

Part 1 – General

1.01 SCOPE

Work described in this section includes furnishing all labor, equipment, materials, tools, and incidentals required for a complete an operable installation of the StormScape® (SS) stormwater treatment system as shown on the drawings and specified herein.

The manufacturer shall design and supply the equipment listed herein and the Contractor shall install the equipment in accordance with the manufacturer's Handling, Storage, and Installation Instructions.

1.02 GENERAL REQUIREMENTS

- A. The treatment system shall use engineered soil media and plantings if specified to filter and/or infiltrate stormwater to separate and remove pollutants from stormwater runoff. The system shall be self-activating with no mechanical parts or external power requirements.
- B. Upon request, independently certified performance data and references shall be made available to the Engineer of Record for use in determining that the treatment system meets the design criteria and performance requirements stated herein.

1.03 SUBMITTALS

- A. Submittals shall be provided and shall include the following:
 - i. Site plan showing location and orientation of proposed pipe sizes, connections, and excavation limits.
 - ii. Product installation drawings showing plan and elevation views with water elevations for the flow conditions specified herein.
 - iii. Performance data as required in Section 2.02.
 - iv. Inspection and maintenance procedures.

1.04 QUALITY ASSURANCE

- A. The Technology Owner shall be a member of the Stormwater Equipment Manufacturer Association (SWEMA).
- B. Supplier / Manufacturer – The treatment system shall be manufactured and/or supplied under the direction of a company(s) with at least 10 years' experience in the design, manufacture, and supply of stormwater treatment equipment.
- C. Inspection – The treatment system shall be subject to inspection by the Engineer of Record or the owner's representative at either the place of manufacture or the project site. Any defects shall be repaired to the satisfaction of the owner or owner's representative, or replacement shall be made available.
- D. Warranty – The manufacturer shall guarantee the treatment system free from defects in materials and workmanship for a period of two years following installation. If during the warranty period defects in materials or workmanship are noted, then the manufacturer shall be promptly notified. The decision to repair or replace affected units shall be made at the discretion of the manufacturer. Warranty does not included plants or other living organisms used in the system.
- E. Patent Indemnity – Upon request, the manufacturer shall warrant that the treatment system does not infringe upon or violate any patent, copyright, trade secret or any other proprietary right of any third party and shall indemnify the Owner against any loss, cost, expense, or liability arising out of such claim whether or not such claim is successful.
- F. Certificate of Compliance – Upon request, the manufacturer shall provide a "Letter of Certification" to certify that the treatment system adheres to the specifications required herein and complies with the project's stormwater management permit.

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1.05 TECHNOLOGY OWNER

- A. Hydro International, 94 Hutchins Dr, Portland, Maine, USA.

Part 2 – Stormwater Treatment Device

2.01 GENERAL

- A. Treatment Device – The treatment device shall use a precast concrete box type structure, with open bottom to contain an Engineered Soil Media. Stormwater shall enter the system from the surface via sheet or channel flow to a curb or surface inlet. An underdrain may or may not be used. The Device shall include a high flow bypass via a vertical overflow pipe extending 9 inches (230 mm) above the top of the engineered soil media. The surface inlet area shall be divided from the inner planting area by vertical perforated baffle plates extending around the central planting area. No entry shall be required to maintain the Device.
- B. Water Quality Flow (WQF) – The flow rate at which the Device must achieve the pollutant reduction standard required. Flows in excess of the WQF are considered bypass flow.
- C. Headloss – The treatment system shall not exceed the pressure drop (headloss) for the design flow rates of 9 inches (230 mm).
- D. Site – The treatment system shall fit within the limits of excavation (area and depth) as shown in the project plans.
- E. Structures and Access Covers – All structures and castings shall conform to relevant AASHTO and ASTM standards including any local and job specific requirements that may exceed these standards.

2.02 PERFORMANCE

- A. Size – The Device shall be sized based on treating the WQF calculated using the locally approved methods, or standard methods outlined in the applicable design guides and regulations.
- B. Engineered Media – The Engineered Media shall treat a minimum flow rate of 140"/hr (3,566 mm/hr) and remove a minimum 85% Total Suspended Solids (TSS).
- C. Verification / Certification – The treatment system performance shall be tested using New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device" dated January 25, 2013 and be verified by New Jersey Corporation for Advanced Technology (NJCAT), and listed on the NJDEP website as Green Infrastructure Certified.
- D. Substitutions – Substitutions require preapproval authorization by the Engineer of Record. Substitutions must submitted to the Engineer of Record prior to bid, documentation demonstrating the proposed Device meets all aspects of this specification. Post bid substitutions are not permitted. The Contractor is responsible for all costs associated with gaining approval for alternate Devices, including engineering fees, permitting fees, etc.

PART 3 – MATERIALS

- E. The treatment system shall be manufactured with materials typically used in stormwater drainage systems that have a minimum life expectancy of 30 years.
 - i. Precast shall be manufactured with concrete that has attained a compressive strength of 4,000 psi after 28 days. The structure shall be reinforced to withstand an HS20-44 loading. Slab tops shall be suitably reinforced and provided with manhole openings and covers as required. The cast iron frames and covers shall be sized as per the manufacturer's drawings and shall be in accordance with ASTM A48, CL.35B and

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AASHTO M105. The masonry fixing bolts, frames, and baffle plates shall be Type 304 stainless steel. Ancillary grates, decorative inserts, and other accessories that may be incorporated shall be suitable for application and conform to relevant applicable standards.

- ii. All piping connections, ancillary connections, and items not listed herein shall be provided by the Contractor.
- iii. Any local applicable standards or project unique requirements must be read in conjunction with this specification.

B. Engineered Soil Media Mixture shall meet the following requirements:

- i. Media blend based on ASTM C33 sand filter gradation with a maximum size of 4750 microns, minimum size 150 microns, and 40% open void space. Total depth 18 inches (460 mm).
- ii. Media shall have organic content in the form of peat.
- iii. Media shall be supplied by Hydro International or their authorized supplier.

C. Top Mulch Layer

- i. Shredded hardwood
- ii. 3 inches (75 mm) depth spread evenly over the Engineered Media
- iii. Provided by contractor

PART 4 - DELIVERY

F. The treatment components of the treatment system shall be delivered within six weeks of date of approved technical submittal unless agreed otherwise.

The components of the treatment system shall be preassembled and delivered to the site fully fabricated and ready for the final assembly and installation.

Off-loading, storage, and installation shall be by the Contractor.

The Contractor shall inspect and provide signed acceptance of equipment prior to unloading or notify the manufacturer of any damage to equipment to effect proper remedial action. Failure to notify the manufacturer of damage to equipment prior to unloading will void all warranties pertaining to subject equipment.

PART 5 - INSTALLATION

G. The system shall be installed in strict accordance with the site plans, and the manufacturer's general arrangement drawings and handling, storage and installation instructions. The Contractor shall be responsible for installing the equipment and all necessary site connections.

The Manufacturer shall be notified immediately of any equipment which is damaged during unloading, storage, or installation. The damaged equipment shall be repaired or replaced at the discretion of the manufacturer and entirely at the Contractor's expense.

The precast concrete structure shall be set on a granular base of ¾ inch (19 mm) clean drainage stone. The sub-base material shall have a thickness of no less than 12 inches.

Underdrain pipes shall not be wrapped in fabric. Underdrains shall be perforated pipes with a flow rate that is equal to or exceed the WQF of the Engineered Media.

The precast concrete structure shall be set level and plumb to within 0.5%.

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Non-shrink grout or hydraulic cement conforming to ASTM C 595 shall be used to provide a watertight seal in the lift holes, any drain holes, and around the concrete knock-outs for outlet pipes.
The Contractor shall take all care and bear responsibility for handling and placing of the Engineered Media to avoid compaction, contamination, or otherwise degrade the Engineered Media.

Plantings must be carried out as per the planting plan for the project.

The treatment system must not be placed in service until the site has been cleaned and stabilized with all construction site erosion control measures no longer required.