State of New Jersey

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Division of Water Quality
Bureau of Nonpoint Pollution Control
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http://www.state.nj.us/dep/dwq/bnpc_home.htm

CATHERINE R. McCABE
Commissioner

August 3, 2020

Jeremy Fink, P.E.
Hydro International (Stormwater)
94 Hutchins Drive
Portland, ME 04102

Re: MTD Lab Certification
StormScape Filter
Off-line Installation

TSS Removal Rate 80%

Dear Mr. Fink:

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Hydro International has requested a Laboratory Certification for the StormScape Filter (StormScape).

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated June 2020) for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the StormScape stormwater treatment unit by Hydro International at a TSS removal rate of 80% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

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1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5. The MTFR is calculated based on a verified loading rate of 1.46 gpm/ft^2 of effective filtration treatment area.

2. The StormScape stormwater treatment unit shall be installed using the same configuration reviewed by NJCAT, and sized in accordance with the criteria specified in item 7 below.

3. This device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 9.6 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at www.njstormwater.org.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the StormScape. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at https://hydro-int.com/sites/default/files/stomscape_install_and_maintenance.pdf for any changes to the maintenance requirements.

6. For an MTD to be considered "green infrastructure" in accordance with the March 2, 2020 amendments to the Stormwater Management rules at N.J.A.C. 7:8, the MTD must meet the GI definition noted at amended N.J.A.C. 7:8-1.2. Specifically, the MTD shall (1) infiltrate into the subsoil; and/or (2) treat stormwater runoff through filtration by vegetation or soil.

   The StormScape is a stormwater treatment system that filters polluted stormwater in a downward flow, horizontal media bed. Each StormScape consists of an array of surface pavers that protect a bed of engineered filtration media. There are two options of installation available for the StormScape. In the "underdrain" option, the system is installed directly in a rough excavation with no enclosing box or liner, but with an underdrain comprised of a perforated discharge pipe embedded in coarse stone. The discharge pipe is installed with an unperforated riser that acts as both a bypass and as an inspection port. This arrangement needs to meet the NJDEP Stormwater BMP Manual condition of having at least one foot of separation from the seasonal high water table measured from the bottom of the stone bed where the underdrain is set. In another arrangement, if surrounding soils allow for infiltration, the open structure of the system allows for installation as a "stand-alone" MTD that encourages stormwater infiltration and runoff volume reduction by maximizing contact with native soils. This arrangement needs to meet the NJDEP Stormwater BMP Manual conditions of having the most hydraulically restrictive soil layer below the MTD meet the minimum tested infiltration rate of one inch per hour, have at least two feet of separation from the seasonal high water table measured from the lowest point of the system, and infiltrate into the subsoil.

7. Sizing Requirement:

The example below demonstrates the sizing procedure for the StormScape:

Example: A 0.25-acre impervious site is to be treated to 80% TSS removal using StormScape. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs or 354.58 gpm.

The selection of the appropriate model of StormScape is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

Inflow Drainage Area Evaluation:

The drainage area to the StormScape in this example is 0.25 acres. Based upon the information in Table 1 below, the 4 x 12, 6 x 8, 6 x 10 and 6 x 12 StormScape models would be able to treat runoff without exceeding the maximum allowable drainage area.

Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:

time of concentration = 10 minutes
i = 3.2 in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)
c = 0.99 (runoff coefficient for impervious)
Q = ciA = 0.99 x 3.2 x 0.25 = 0.79 cfs (354.58 gpm)
(Note: 1 cfs = 448.83 gpm)

Given the site runoff is 0.79 cfs (354.58 gpm) and based on Table 1 below, it would require four 6 x 12 units to treat the impervious area without exceeding the MTFR. The units should be configured such that the flowrate to each unit does not exceed 105 gpm and the entire 0.25 acre area is treated.

Example: four 6 x 12 units at 105 gpm (MTFR) = 420 gpm

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system models is noted below:

Table 1. StormScape MTFRs and Maximum Allowable Drainage Area.

Filter Size (ft)	MTFR (gpm)	MTFR (cfs)	Maximum Allowable Drainage Area (ac)
4 x 6	35	0.078	0.147
4.38 x 6.58	42	0.094	0.176
4 x 8	47	0.105	0.196
4 x 10	58	0.129	0.244
4 x 12	70	0.156	0.293
6 x 6	53	0.118	0.220
6 x 8	70	0.156	0.293
6 x 10	87	0.194	0.367
6 x 12	105	0.234	0.440

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must also include all of the items identified in N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Brian Salvo of my office at (609) 633-7021.

Sincerely,

Gabriel Mahon, Chief
Bureau of Nonpoint Pollution Control

Attachment: Maintenance Plan

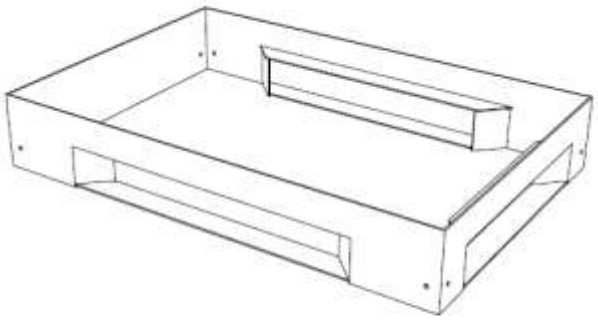
cc: Chron File
Richard Magee, NJCAT
Vince Mazzei, NJDEP - DLUR
Jim Murphy, NJDEP - BNPC
Brian Salvo, NJDEP – BNPC

StormScape™
Assembly and Maintenance

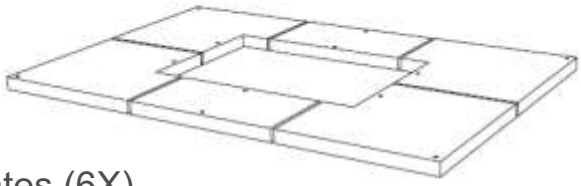
Hydro International, 94 Hutchins Drive, Portland, Maine 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro.com

Materials Supplied By Hydro International

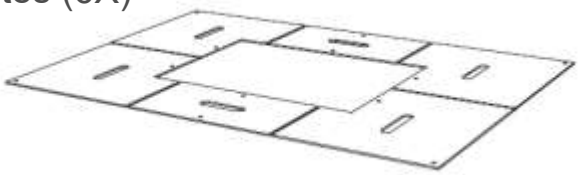
Frame

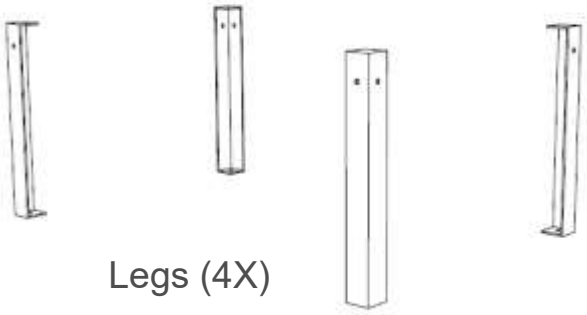


Tiles and bolts (6X)

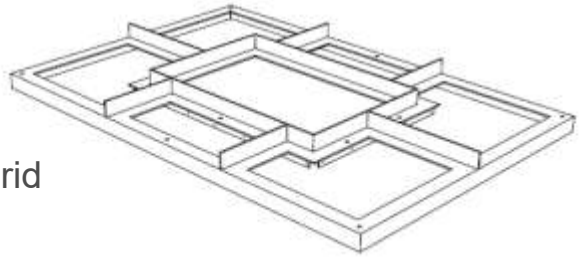


Plates (6X)



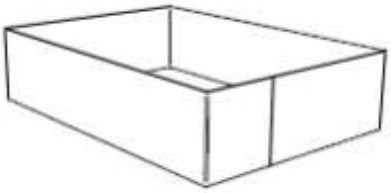


Legs (4X)



Grid

Perforated Baffle



- 1/2-inch Leg-to-Frame Bolt Set (4X)

- Filter Media (2 Tons)

Hydro International, 94 Hutchins Drive, Portland, Maine 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro.com

Materials Supplied By Contractor

- Perforated underdrain pipe as shown in General Arrangement Drawing
- Concrete post supports (i.e. precast block or Sonotube)
- Anchors to attach to post supports (i.e. wedge anchors or cast-in anchors)
- Shrub or small tree to meet local climate conditions

Handling and Storage

Hydro International's **StormScape** components are manufactured utilizing highly durable architectural grade components; however, improper handling can result in damage. Failure to comply with handling, storage, and assembly instructions voids all warranties.

1. Upon delivery of the **StormScape** components, inspect immediately for defects or shipping damage. If any discrepancies or missing components are identified, notify Hydro International prior to unloading to initiate corrective action.
2. At all times, avoid unnecessary and extreme impacts to the internal components. At no time shall anyone step, stand, or otherwise place an unnecessary load, on the components.
3. The **StormScape** shall be, as far as practical, assembled and installed as soon after delivery as possible.

Required Tools and Equipment

- Measuring Tape
- Socket Wrench and Set
- Box Wrench and Set
- Hex Key Set
- Wood Blocking
- Hammer Drill with 1/2 in. Masonry Bit
- Production Detail Drawings

Types of Installation

There are two options of installation available — **Underdrain** and **Stand-Alone**

In the **Underdrain** arrangement, the system is installed directly in a rough excavation with no enclosing box or line, but with an underdrain comprised of a perforated discharge pipe embedded in coarse stone. The discharge pipe is installed with an unperforated riser that acts as both a bypass and as an inspection port. Using this configuration, the Underdrain must meet the regulatory requirements for separation from the seasonal high water table.

If the surrounding soil testing confirms that the soil meets all regulatory requirements for infiltration (i.e., soil hydraulic conductivity, seasonal high water table, and groundwater mounding), the open structure of the system allows for installation as a **Stand-Alone** MTD that encourages stormwater infiltration and runoff volume reduction by maximizing contact with native soils. This arrangement does not have an underdrain installed.

The following set of photographs show the installation steps for a Stand-Alone arrangement. The additional steps required to install the discharge piping required in an **Underdrain** arrangement are shown on Page 6 of this document.

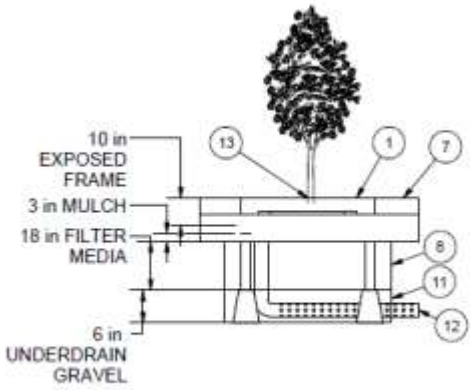
Assembly

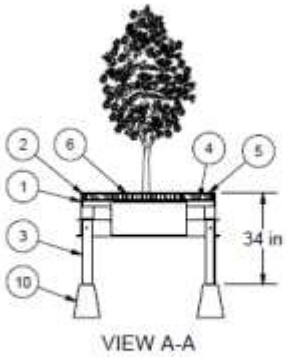
- Excavate a rectangular hole 4 x 6 feet by 3 feet deep.

Assembly

- Install **Post Supports** on gravel base.
- Bolt **Legs** to **Feet** with provided anchor bolts.

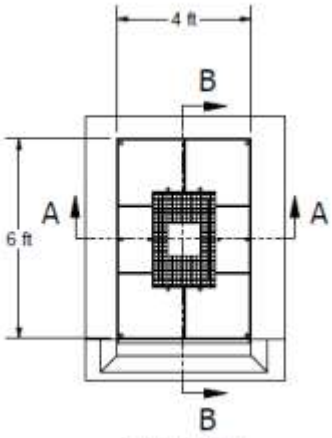
Underdrain Assembly



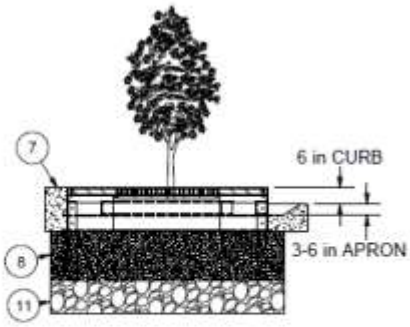


VIEW A-A

Parts List		
ITEM	PART NUMBER	QTY
1	FRAME	1
2	GRID	1
3	LEG	4
4	ACCESS PLATE	6
5	SURFACE TILES	6
6	GRATING	1
7	SIDEWALK (BY OTHERS)	1
8	MEDIA	2 CY
9	BAFFLE	1
10	CONCRETE FOOTING	4
11	GRAVEL FOR FOOTINGS (BY OTHERS)	1
12	OPTIONAL UNDERDRAIN/BYPASS (BY OTHERS)	1
13	TREE (BY OTHERS)	1



PLAN VIEW



VIEW B-B

- For **UNDERDRAIN** installation refer to diagram above:
  - Embed perforated pipe assembly (Item 12) roughly centered within underdrain gravel (Item 11) bed with perforated pipe positioned towards receiving drainage network.
  - Perforated pipe assembly, underdrain gravel or material specifications for these components can be provided by Hydro upon request.
  - Connect pipe to drainage pipe network per site drainage plans.

Assembly

- Bolt **Frame** to **Legs** with provided bolts.

Assembly

- Place **Grid** in **Frame** and square the frame to fit.
- Install perforated pipe and riser as shown in General Arrangement drawing (not shown).
- Backfill gravel to within two feet of grade (not shown).

Assembly

- Backfill the excavation to grade with provided media and rake level.

Assembly

- Install **Baffle** to **Grid** (not shown).
- Install **Plates** and **Tiles** with supplied bolts.
- Plant tree root ball in supplied media.
- Top media with shredded bark mulch.
- Install **Grating** around tree trunk.

Assembly

- Smoothly grout apron to direct runoff to throat of unit.

Maintenance

- The StormScape collects trash and leaves in the perimeter of the unit
- To maintain the system, the tiles can be removed for easy access.

Maintenance

- View of throat of the StormScape clogged with leaves and debris

Maintenance

- Remove **Grating** from around the tree trunk.

Maintenance

- Remove security bolts from the **Tiles** with hex wrench

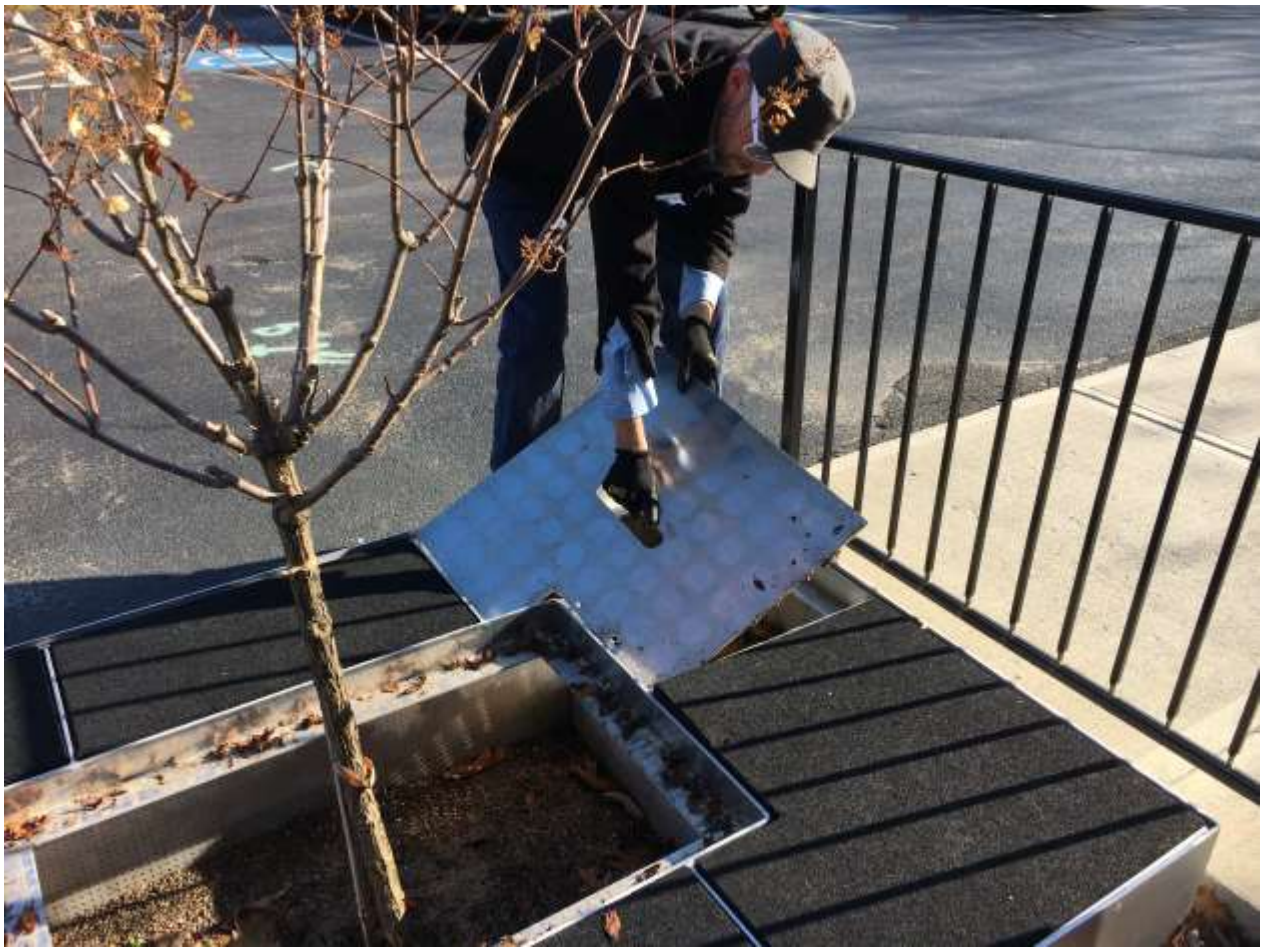
Maintenance

- Remove **Tiles** from surface of StormScape

Maintenance

- View of the **Tile** being removed from the StormScape

Maintenance



- Remove **Plate** from StormScape

Maintenance

- View of leaves and debris within StormScape

Maintenance

- View of StormScape with all **Tiles** removed

Maintenance

- Remove leaves, trash and debris by hand or with a small rake.
- Remove and replace mulch layer.
- Remove and replace top layer of media if necessary.
- Replace plates, tiles and security screws.