



DRAINAGE ANALYSIS
July 22, 2025

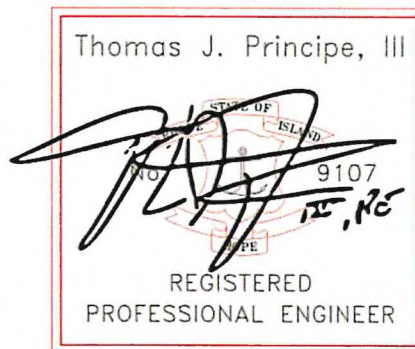
**362 Pond Street
AP 63-3, Lot 60
South Kingstown, RI**

Prepared For:

SHM Silver Spring LLC
14785 Preston Road, Suite 975
Dallas, Texas 75254

Prepared By:

Principe Engineering, Inc.
27 Sakonnet Ridge Drive
Tiverton, Rhode Island



Stormwater Calculations
362 Pond Street
South Kingstown, RI
July 22, 2025

Storm Water Management

The storm water management system selected is best suited to the site and provides the least disturbance of the site while complying with the stormwater regulations to the greatest extent feasible. The storm water management system consists of the collection of roof to an Alternative Stormwater Technology known as a “FocalPoint High Performance Modular Biofiltration System (HPMBS)”. This technology was certified for use in Rhode Island on October 4, 2021 and has been utilized on other Rhode Island marina projects including at Wickford Harbor. As per the certification requirements, the design of the system for the project was completed by **Brett Keszczyk, Green Stormwater Infrastructure (GSI) Engineer, Ferguson | Waterworks**. **Contact information is C: 610-607-4563 E: Brett.Keszczyk@ferguson.com**. The drainage system is designed to provide water quality and recharge in accordance with the regulations of both state and local authorities.

PRE-DEVELOPMENT SITE CONDITIONS

There are several existing site constraints present that impact the design of proposed project. This is an existing developed marina with several existing buildings/containers totaling 6,600 square feet, an inground pool, areas of pavement (concrete and asphalt) and compacted gravel, an existing OWTS, boat storage areas both during the boating season and particularly during the winter off-season, extensive dock system and boat launch.



POST-DEVELOPMENT SITE CONDITIONS

Under post development conditions, one of the existing buildings (2,472 sf) will be removed in its entirety and replaced with a new, larger building (4,680 sf) in the same location, with a portion of the new building located within an area that previously provided for boat storage on compacted gravel. No clearing of any vegetation is proposed, and no work outside of already disturbed areas is proposed. Therefore, no change in discharge peaks or volumes to Silver Spring Cove/Upper Point Judith Pond is anticipated. Per CRMC regulations, the increase in structural Lot Coverage (SLC) is 34.5% (less than 50%). The entirety of the new building roof will be treated to meet water quality volume and recharge requirements in accordance with the manufacturer's certification for the alternative stormwater treatment. As the building is located within 100-year floodplain (BFE 10'), the building is designed with the required flood vents.

APPENDIX A: STORMWATER MANAGEMENT PLAN CHECKLIST AND LID PLANNING REPORT – STORMWATER DESIGN SUMMARY

PROJECT NAME 362 POND STREET	(RIDEM USE ONLY)
TOWN SOUTH KINGSTOWN	STW/WQC File #:
BRIEF PROJECT DESCRIPTION: REMOVE & DISPOSE OF EXISTING BUILDING AND REPLACE WITH NEW LARGER BUILDING IN SAME LOCATION. TREAT WITH ALTERNATIVE STORMWATER TECHNOLOGY	Date Received:

Stormwater Management Plan (SMP) Elements – Minimum Standards

When submitting a SMP,¹ submit **four separately bound** documents: Appendix A Checklist; Stormwater Site Planning, Analysis and Design Report with Plan Set/Drawings; Soil Erosion and Sediment Control (SESC) Plan, and Post Construction Operations and Maintenance (O&M) Plan. Please refer to [Suggestions to Promote Brevity](#).

Note: All stormwater construction projects **must create** a Stormwater Management Plan (SMP). However, not every element listed below is required per the [RIDEM Stormwater Rules](#) and the [RIPDES Construction General Permit \(CGP\)](#). This checklist will help identify the required elements to be submitted with an Application for Stormwater Construction Permit & Water Quality Certification.

PART 1. PROJECT AND SITE INFORMATION

PROJECT TYPE (Check all that apply)				
<input type="checkbox"/> Residential	<input checked="" type="checkbox"/> Commercial	<input type="checkbox"/> Federal	<input type="checkbox"/> Retrofit	<input type="checkbox"/> Restoration
<input type="checkbox"/> Road	<input type="checkbox"/> Utility	<input type="checkbox"/> Fill	<input type="checkbox"/> Dredge	<input type="checkbox"/> Mine
<input type="checkbox"/> Other (specify):				

SITE INFORMATION
<input checked="" type="checkbox"/> Vicinity Map

INITIAL DISCHARGE LOCATION(S): The WQv discharges to: (You may choose more than one answer if several discharge points are associated with the project.)		
<input checked="" type="checkbox"/> Groundwater	<input checked="" type="checkbox"/> Surface Water	<input type="checkbox"/> MS4
<input type="checkbox"/> GAA	<input type="checkbox"/> Isolated Wetland	<input type="checkbox"/> RIDOT
<input checked="" type="checkbox"/> GA	<input checked="" type="checkbox"/> Named Waterbody	<input type="checkbox"/> RIDOT Alteration Permit is Approved
<input type="checkbox"/> GB	<input type="checkbox"/> Unnamed Waterbody Connected to Named Waterbody	<input type="checkbox"/> Town
		<input type="checkbox"/> Other (specify):

ULTIMATE RECEIVING WATERBODY LOCATION(S): Include pertinent information that applies to both WQv and flow from larger storm events including overflows. Choose all that apply, and repeat table for each waterbody.			
<input checked="" type="checkbox"/> Groundwater or Disconnected Wetland	<input checked="" type="checkbox"/> SRWP		
<input checked="" type="checkbox"/> Waterbody Name: PT. JUDITH POND	<input type="checkbox"/> Coldwater	<input type="checkbox"/> Warmwater	<input type="checkbox"/> Unassessed
<input type="checkbox"/> Waterbody ID: RI0010043E-06B	<input type="checkbox"/> 4 th order stream of pond 50 acres or more		
<input checked="" type="checkbox"/> TMDL for: FECAL COLIFORM	<input type="checkbox"/> Watershed of flood prone river (e.g., Pocasset River)		
<input type="checkbox"/> Contributes to a priority outfall listed in the TMDL	<input type="checkbox"/> Contributes stormwater to a public beach		
<input checked="" type="checkbox"/> 303(d) list – Impairment(s) for: FECAL COLIFORM	<input type="checkbox"/> Contributes to shellfishing grounds		

¹ Applications for a Construction General Permit that do not require any other permits from RIDEM and will disturb less than 5 acres over the entire course of the project do not need to submit a SMP. The Appendix A checklist must still be submitted.

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

PROJECT HISTORY		
<input type="checkbox"/> RIDEM Pre- Application Meeting	Meeting Date:	<input type="checkbox"/> Minutes Attached
<input type="checkbox"/> Municipal Master Plan Approval	Approval Date:	<input type="checkbox"/> Minutes Attached
<input type="checkbox"/> Subdivision Suitability Required	Approval #:	
<input type="checkbox"/> Previous Enforcement Action has been taken on the property	Enforcement #:	
FLOODPLAIN & FLOODWAY See Guidance Pertaining to Floodplain and Floodways		
<input type="checkbox"/> Riverine 100-year floodplain: FEMA FLOODPLAIN FIRMETTE has been reviewed and the 100-year floodplain is on site		
<input checked="" type="checkbox"/> Delineated from FEMA Maps		
NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional		
<input type="checkbox"/> Calculated by Professional Engineer		
<input type="checkbox"/> Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain	Amount of Fill (CY):	
	Amount of Cut (CY):	
<input type="checkbox"/> Restrictions or modifications are proposed to the flow path or velocities in a floodway		
<input type="checkbox"/> Floodplain storage capacity is impacted		
<input type="checkbox"/> Project area is not within 100-year floodplain as defined by RIDEM		

CRMC JURISDICTION
<input checked="" type="checkbox"/> CRMC Assent required
<input checked="" type="checkbox"/> Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP: SALT POND REGION
<input type="checkbox"/> Sea level rise mitigation has been designed into this project

LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:		
1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)		
<input type="checkbox"/> Known or suspected releases of HAZARDOUS MATERIAL are present at the site (Hazardous Material is defined in Rule 1.4(A)(33) of 250-140-30-1 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Materials (the Remediation Regulations))		RIDEM CONTACT:
<input type="checkbox"/> Known or suspected releases of PETROLEUM PRODUCT are present at the site (Petroleum Product as defined in Rule 1.5(A)(84) of 250-140-25-1 of the RIDEM Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials)		
<input type="checkbox"/> This site is identified on the RIDEM Environmental Resources Map as one of the following regulated facilities		SITE ID#:
<input type="checkbox"/> CERCLIS/Superfund (NPL)		
<input type="checkbox"/> State Hazardous Waste Site (SHWS)		
<input type="checkbox"/> Environmental Land Usage Restriction (ELUR)		
<input type="checkbox"/> Leaking Underground Storage Tank (LUST)		
<input type="checkbox"/> Closed Landfill		
Note: If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSM Project Manager associated with the Site to determine if subsurface infiltration of stormwater is allowable for the project. Indicate if the infiltration corresponds to "Red," "Yellow" or "Green" as described in Section 3.2.8 of the RISDISM Guidance (Subsurface Contamination Guidance). Also, note and reference approval in PART 3, Minimum Standard 2: Groundwater Recharge/Infiltration.		
2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:		
<input type="checkbox"/> Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php		
<input type="checkbox"/> Auto Fueling Facility (e.g., gas station)		
<input type="checkbox"/> Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area		

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<input type="checkbox"/>	Road Salt Storage and Loading Areas (exposed to rainwater)	
<input type="checkbox"/>	Outdoor Storage and Loading/Unloading of Hazardous Substances	
3. STORMWATER INDUSTRIAL PERMITTING		
<input type="checkbox"/>	The site is associated with existing or proposed activities that are considered Land Uses with Higher Potential Pollutant Loads (LUHPPLS) (see RICR 8.14.C)	Activities: Sector:
<input type="checkbox"/>	Construction is proposed on a site that is subject to <u>THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS.</u>	MSGP permit #

REDEVELOPMENT STANDARD – MINIMUM STANDARD 6		
<input checked="" type="checkbox"/> Pre Construction Impervious Area		
<input checked="" type="checkbox"/>	Total Pre-Construction Impervious Area (TIA):2.94 Ac	
<input checked="" type="checkbox"/>	Total Site Area (TSA): 3.27 Ac	
<input checked="" type="checkbox"/>	Jurisdictional Wetlands (JW) Yes, but not subtracted.	
<input type="checkbox"/>	Conservation Land (CL) N/A	
<input checked="" type="checkbox"/> Calculate the Site Size (defined as contiguous properties under same ownership)		
<input checked="" type="checkbox"/>	Site Size (SS) = (TSA) – (JW) – (CL): 3.27-0=3.27	
<input checked="" type="checkbox"/>	(TIA) / (SS) = 2.94/3.27=0.9>0.4	<input checked="" type="checkbox"/> (TIA) / (SS) >0.4?
<input checked="" type="checkbox"/> YES, Redevelopment		

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1
(NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS)
This section may be deleted if not required.

Note: A written description must be provided specifying why each method is not being used or is not applicable at the Site. Appropriate answers may include:

- Town requires ... (state the specific local requirement)
- Meets Town’s dimensional requirement of ...
- Not practical for site because ...
- Applying for waiver/variance to achieve this (pending/approved/denied)
- Applying for wavier/variance to seek relief from this (pending/approved/denied)

<p>A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Sensitive resource areas and site constraints are identified (required) <input checked="" type="checkbox"/> Local development regulations have been reviewed (required) <input checked="" type="checkbox"/> All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction <input type="checkbox"/> Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. Note: If Conservation Development has been used, check box and skip to Subpart C <input checked="" type="checkbox"/> As much natural vegetation and pre-development hydrology as possible has been maintained 	<p>IF NOT IMPLEMENTED, EXPLAIN HERE</p>
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Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<p>B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies <input type="checkbox"/> Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B) <input type="checkbox"/> Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) <input type="checkbox"/> Development sites and building envelopes have been positioned outside of floodplains <input checked="" type="checkbox"/> Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features <input checked="" type="checkbox"/> Development sites and building envelopes have been located to minimize impacts to steep slopes ($\geq 15\%$) <input type="checkbox"/> Other (describe): 	
<p>C) MINIMIZE CLEARING AND GRADING</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Site clearing has been restricted to <u>minimum area needed</u> for building footprints, development activities, construction access, and safety. <input checked="" type="checkbox"/> Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities) <input checked="" type="checkbox"/> Protection for stands of trees and individual trees and their root zones to be preserved has been specified, and such protection extends at least to the tree canopy drip line(s) <input type="checkbox"/> Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent 	
<p>D) REDUCE IMPERVIOUS COVER</p> <ul style="list-style-type: none"> <input type="checkbox"/> Reduced roadway widths (≤ 22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000) <input type="checkbox"/> Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface) <input type="checkbox"/> Reduced building footprint: Explain approach: <input type="checkbox"/> Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) <input type="checkbox"/> Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) <input type="checkbox"/> Reduced parking lot area: Explain approach <input type="checkbox"/> Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc. <input type="checkbox"/> Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance) <input checked="" type="checkbox"/> Other (describe): No increase over existing. 	
<p>E) DISCONNECT IMPERVIOUS AREA</p> <ul style="list-style-type: none"> <input type="checkbox"/> Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible <input type="checkbox"/> Residential street edges allow side-of-the-road drainage into vegetated open swales <input type="checkbox"/> Parking lot landscaping breaks up impervious expanse AND accepts runoff <input checked="" type="checkbox"/> Other (describe): All new roof to be treated. 	
<p>F) MITIGATE RUNOFF AT THE POINT OF GENERATION</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Small-scale BMPs have been designated to treat runoff as close as possible to the source 	
<p>G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION</p> <ul style="list-style-type: none"> <input type="checkbox"/> Low-maintenance landscaping has been proposed using native species and cultivars <input type="checkbox"/> Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan <input type="checkbox"/> Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots 	

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<p>H) RESTORE STREAMS/WETLANDS</p> <p><input type="checkbox"/> Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands</p> <p><input type="checkbox"/> Removal of invasive species</p> <p><input type="checkbox"/> Other</p>	
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PART 3. SUMMARY OF REMAINING STANDARDS

GROUNDWATER RECHARGE – MINIMUM STANDARD 2		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project has been designed to meet the groundwater recharge standard.
<input type="checkbox"/>	<input type="checkbox"/>	If “No,” the justification for groundwater recharge criterion waiver has been explained in the Narrative (e.g., threat of groundwater contamination or physical limitation), if applicable (see RICR 8.8.D);
<input type="checkbox"/>	<input type="checkbox"/>	Your waiver request has been explained in the Narrative, if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification?
<input type="checkbox"/>	<input type="checkbox"/>	If “Yes,” has approval for infiltration by the OLRSM Site Project Manager, per Part 1, Minimum Standard 8, been requested?

TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)
(Add or Subtract Rows as Necessary)

Design Point	Impervious Area Treated (sq ft)	Total Re _v Required (cu ft)	LID Stormwater Credits (see RISDISM Section 4.6.1)	Recharge Required by Remaining BMPs (cu ft)	Recharge Provided by BMPs (cu ft)
			Portion of Re _v directed to a QPA (cu ft)		
New Roof	4,680	97.50		97.50	*
TOTALS:					

Notes:

- Only BMPs listed in RISDISM Table 3-5 “List of BMPs Acceptable for Recharge” may be used to meet the recharge requirement.
- Recharge requirement must be satisfied for each waterbody ID.

Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):

*NOTE: PROPRIETARY SYSTEM, DESIGN PROVIDED BY MANUFACTURER, CERTIFIED BY RIDEM

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

WATER QUALITY – MINIMUM STANDARD 3		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project meet or exceed the required water quality volume WQv (see RICR 8.9.E-I)?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is the proposed final impervious cover greater than 20% of the disturbed area (see RICR 8.9.E-I)?
<input type="checkbox"/>	<input type="checkbox"/>	If “Yes,” either the Modified Curve Number Method or the Split Pervious/Impervious method in Hydro-CAD was used to calculate WQv; or,
<input type="checkbox"/>	<input type="checkbox"/>	If “Yes,” either TR-55 or TR-20 was used to calculate WQv; and,
<input type="checkbox"/>	<input type="checkbox"/>	If “No,” the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area.
<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable
<input type="checkbox"/>	<input type="checkbox"/>	Does this project meet or exceed the ability to treat required water quality flow WQf (see RICR 8.9.I.1-3)?
<input type="checkbox"/>	<input type="checkbox"/>	Does this project propose an increase of impervious cover to a receiving water body with impairments? If “Yes,” please indicate below the method that was used to address the water quality requirements of no further degradation to a low-quality water.
<input type="checkbox"/>	<input type="checkbox"/>	RICR 8.36. A Pollutant Loading Analysis is needed and has been completed.
<input type="checkbox"/>	<input type="checkbox"/>	The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters) has been followed as applicable.
<input type="checkbox"/>	<input type="checkbox"/>	BMPs are proposed that are on the approved technology list . If “Yes,” please provide all required worksheets from the manufacturer.
<input type="checkbox"/>	<input type="checkbox"/>	Additional pollutant-specific requirements and/or pollutant removal efficiencies are applicable to the site as the result of a TMDL, SAMP, or other watershed-specific requirements. If “Yes,” please describe:

TABLE 3-1: Summary of Water Quality (see RICR 8.9)					
Design Point and WB ID	Impervious area treated (sq ft)	Total WQv Required (cu ft)	LID Stormwater Credits (see RICR 8.18)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
			WQv directed to a QPA (cu ft)		
New Roof	4,680	390		390	*
TOTALS:					
<u>Notes:</u>					
*NOTE: PROPRIETARY SYSTEM, DESIGN PROVIDED BY MANUFACTURER, CERTIFIED BY RIDEM					
<input checked="" type="checkbox"/> YES	This project has met the setback requirements for each BMP.				
<input type="checkbox"/> NO	If “No,” please explain:				
<input type="checkbox"/>	Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):				

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is this standard waived? If “Yes,” please indicate one or more of the reasons below:
		<input checked="" type="checkbox"/> The project directs discharge to a large river (i.e., 4th-order stream or larger. See RISDISM Appendix I for State-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters. <input type="checkbox"/> The project is a small facility with impervious cover of less than or equal to 1 acre. <input type="checkbox"/> The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (Note: LID design strategies can greatly reduce the peak discharge rate).
<input type="checkbox"/>	<input type="checkbox"/>	Conveyance and natural channel protection for the site have been met. If “No,” explain why:

OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is this standard waived? If yes, please indicate one or more of the reasons below:
		<input checked="" type="checkbox"/> The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for state-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters. <input type="checkbox"/> A Downstream Analysis (see RICR 8.11.D and E) indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (e.g., through coincident peaks).
<input type="checkbox"/>	<input type="checkbox"/>	Does the project flow to an MS4 system or subject to other stormwater requirements? If “Yes,” indicate as follows:
		<input type="checkbox"/> RIDOT <input type="checkbox"/> Other (specify):
<p>Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT’s regulations indicate that post-volumes must be less than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4.</p>		
		Indicate below which model was used for your analysis. <input type="checkbox"/> TR-55 <input type="checkbox"/> TR-20 <input type="checkbox"/> HydroCAD <input type="checkbox"/> Bentley/Haestad <input type="checkbox"/> Intellisolve <input type="checkbox"/> Other (Specify):
YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	Does the drainage design demonstrate that flows from the 100-year storm event through a BMP will safely manage and convey the 100-year storm? If “No,” please explain briefly below and reference where in the application further documentation can be found (i.e., name of report/document, page numbers, appendices, etc.): NO TO RIDOT
<input type="checkbox"/>	<input type="checkbox"/>	Do off-site areas contribute to the sub-watersheds and design points? If “Yes,”
<input type="checkbox"/>	<input type="checkbox"/>	Are the areas modeled as “present condition” for both pre- and post-development analysis?
<input type="checkbox"/>	<input type="checkbox"/>	Are the off-site areas shown on the subwatershed maps?
<input type="checkbox"/>	<input type="checkbox"/>	Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff?
<input type="checkbox"/>	<input type="checkbox"/>	Is a Downstream Analysis required (see RICR 8.11.E.1)?
<input type="checkbox"/>	<input type="checkbox"/>	Calculate the following:
		<input type="checkbox"/> Area of disturbance within the sub-watershed (areas):
		<input type="checkbox"/> Impervious cover (%):
<input type="checkbox"/>	<input type="checkbox"/>	Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)?

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

Table 5-1 Hydraulic Analysis Summary								
Subwatershed (Design Point)	1.2" Peak Flow (cfs) **		1-yr Peak Flow (cfs)		10-yr Peak Flow (cfs)		100-yr Peak Flow (cfs)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
DP-1:								
DP-2:								
DP-3:								
DP-4:								
TOTALS:								
** Utilize modified curve number method or split pervious /impervious method in HydroCAD.								
<u>Note:</u> The hydraulic analysis must demonstrate no impact to each individual subwatershed DP unless each DP discharges to the same wetland or water resource.								
Indicate as follows where the pertinent calculations and/or information for the items above are provided						Name of report/document, page numbers, appendices, etc.		
Existing conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations.								
Proposed conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, water surface elevations, and routing showing the methodologies used and supporting calculations.								
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.								
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).								

Table 5-2 Summary of Best Management Practices												
BMP ID	DP #	BMP Type (e.g., bioretention, tree filter)	BMP Functions					Bypass Type	Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4			
			Pre-Treatment (Y/N/NA)	Re _v	WQ _v	CP _v (Y/N/NA)	Overbank Flood Reduction (Y/N/NA)		External (E) Internal (I) or NA	Yes/No	Technical Justification (Design Report page number)	Distance Provided
Roof		FocalPoint		x	x							
		TOTALS:										

NOTE: PROPRIETARY SYSTEM, DESIGN PROVIDED BY MANUFACTURER, CERTIFIED BY RIDEM

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

Table 5.3 Summary of Soils to Evaluate Each BMP									
DP #	BMP ID	BMP Type (e.g., bioretention, tree filter)	Soils Analysis for Each BMP						Exfiltration Rate Applied (in/hr)
			Test Pit ID# and Ground Elevation		SHWT Elevation (ft)	Bottom of Practice Elevation* (ft)	Separation Distance Provided (ft)	Hydrologic Soil Group (A, B, C, D)	
			Primary	Secondary					
Roof		Proprietary							*100
		TOTALS:							

*

NOTE: PROPRIETARY SYSTEM, DESIGN PROVIDED BY MANUFACTURER, CERTIFIED BY RIDEM

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Are these activities already covered under an MSGP? If “No,” please explain if you have applied for an MSGP or intend to do so?
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, “Acceptable BMPs for Use at LUHPPLs.” Please list BMPs:
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Additional BMPs, or additional pretreatment BMP’s if any, that meet RIPDES MSGP requirements; Please list BMPs:
			Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).

ILLCIT DISCHARGES – MINIMUM STANDARD 9			
Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit.			
YES	NO	N/A	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have you checked for illicit discharges?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have any been found and/or corrected? If “Yes,” please identify.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10		
YES	NO	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<p>Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?</p> <p>Have you provided a separately-bound document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed).</p> <p>If “No,” include a document with your submittal that addresses the following elements of an SESC Plan:</p>
		<input type="checkbox"/> Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met:
		<input type="checkbox"/> Provide Natural Buffers and Maintain Existing Vegetation
		<input type="checkbox"/> Minimize Area of Disturbance
		<input type="checkbox"/> Minimize the Disturbance of Steep Slopes
		<input type="checkbox"/> Preserve Topsoil
		<input type="checkbox"/> Stabilize Soils
		<input type="checkbox"/> Protect Storm Drain Inlets
		<input type="checkbox"/> Protect Storm Drain Outlets
		<input type="checkbox"/> Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures
		<input type="checkbox"/> Establish Perimeter Controls and Sediment Barriers
		<input type="checkbox"/> Divert or Manage Run-On from Up-Gradient Areas
		<input type="checkbox"/> Properly Design Constructed Stormwater Conveyance Channels
		<input type="checkbox"/> Retain Sediment On-Site
		<input type="checkbox"/> Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows
		<input type="checkbox"/> Apply Construction Activity Pollution Prevention Control Measures
		<input type="checkbox"/> Install, Inspect, and Maintain Control Measures and Take Corrective Actions
		<input type="checkbox"/> Qualified SESC Plan Preparer’s Information and Certification
		<input type="checkbox"/> Operator’s Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities
		<input type="checkbox"/> Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9		
Operation and Maintenance Section		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have you provided a separately-bound Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If “No,” why not?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is the property owner or homeowner’s association responsible for the stormwater maintenance of all BMP’s? If “No,” you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If “Yes,” have you obtained them? Or please explain your plan to obtain them:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is stormwater being directed from public areas to private property? If “Yes,” note the following: <u>Note:</u> This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner.
Pollution Prevention Section		

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	Designated snow stockpile locations?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Asphalt-only based sealants?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Pet waste stations? (Note: If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Regular sweeping? Please describe:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan).

PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed drainage area delineations
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Locations of all streams and drainage swales
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Drainage flow paths, mapped according to the DEM <i>Guidance for Preparation of Drainage Area Maps</i> (included in RISDISM Appendix K)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mapped seasonal high-water-table test pit locations
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mapped bedrock outcrops adjacent to any infiltration BMP
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Soils were logged by a:
	<input checked="" type="checkbox"/>	DEM-licensed Class IV soil evaluator Name: Thomas J. Principe, III
	<input checked="" type="checkbox"/>	RI-registered P.E. Name: Thomas J. Principe, III

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	First Receiving Water ID or MS4	Area Disturbed (units)	Existing Impervious (units)	Proposed Impervious (units)
DP-1: SITE	PT. JUDITH POND	32,972 SF	32,972 SF	32,972 SF
DP-2:				
DP-3:				
DP-4:				
TOTALS:				

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

Site Construction Plans (Indicate that the following applicable specifications are provided)		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed plans (scale not greater than 1" = 40') with North arrow
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed site topography (with 1 or 2-foot contours); 10-foot contours accepted for off-site areas
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Boundaries of existing predominant vegetation and proposed limits of clearing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Site Location clarification
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location and field-verified boundaries of resource protection areas such as: <ul style="list-style-type: none"> ▶ freshwater and coastal wetlands, including lakes and ponds ▶ coastal shoreline features Perennial and intermittent streams, in addition to Areas Subject to Storm Flowage (ASSFs)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	All required setbacks (e.g., buffers, water-supply wells, septic systems)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Representative cross-section and profile drawings, and notes and details of structural stormwater management practices and conveyances (i.e., storm drains, open channels, swales, etc.), which include: <ul style="list-style-type: none"> ▶ Location and size of the stormwater treatment practices (type of practice, depth, area). Stormwater treatment practices (BMPs) must have labels that correspond to RISDISM Table 5-2; ▶ Design water surface elevations (applicable storms); ▶ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.; ▶ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.); ▶ Location of floodplain and, if applicable, floodway limits and relationship of site to upstream and downstream properties or drainage that could be affected by work in the floodplain; ▶ Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mapping of any OLRSM-approv ed remedial actions/systems (including ELURs)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location of existing and proposed roads, buildings, and other structures including limits of disturbance; <ul style="list-style-type: none"> ▶ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements; ▶ Location of existing and proposed conveyance systems, such as grass channels, swales, and storm drains, and location(s) of final discharge point(s) (wetland, waterbody, etc.); ▶ Cross sections of roadways, with edge details such as curbs and sidewalks; ▶ Location and dimensions of channel modifications, such as bridge or culvert crossings
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization



Rhode Island Department of Environmental Management
Office of Water Resources – Stormwater Technology Review Committee
235 Promenade St. Providence, RI 02908 Ph: 401-222-4700

Alternative Stormwater Technology Program

Vendor Information:

Convergent Water Technologies
13810 Hollister Road
Houston, TX 77086

Contact:

W. Scott Gorneau, P.E.
Vice President
Email: sgorneau@convergentwater.com
Web: www.convergentwater.com
Phone: 207-885-6174

Technology Name:

FocalPoint High Performance Modular
Biofiltration System (HPMBS)

Approval Type:

WQ8BMP, Retrofits, Pre-Treatment

Certification Dates:

Issued: October 4, 2021
Expires: October 4, 2026

CERTIFICATION:

The Rhode Island Stormwater Technology Review Committee which consists of members from the Department of Environmental Management (DEM), Department of Transportation (DOT) and the Coastal Resources Management Council (CRMC) have reviewed the **FocalPoint** High Performance Modular Biofiltration System (HPMBS) application for Technology Approval and accepted use for Stormwater Treatment in the State of Rhode Island.

In accordance with Stormwater Rule 250-RICR-150-10-8.9B, **Convergent Water Technologies** has petitioned the permitting agencies to add the **FocalPoint** HPMBS to the list of acceptable structural stormwater controls described in Sections 8.19 through 8.25 of Stormwater Rule 250-RICR-150-10. They have submitted monitoring results and supporting information developed in accordance with the provisions of the Technology Assessment Protocol for Innovate and Emerging Technologies as described in Stormwater Rule 250-RICR-150-10 Sections 8.39 and 8.40.

The **FocalPoint** HPMBS is granted reciprocity in Rhode Island as a proprietary stormwater treatment technology, given that it has been certified by other State agencies which are members of the Technology Acceptance Reciprocity Partnership. The device was certified by the Maryland Department of Environment as a micro-bioretenion practice in September of 2018. The Pennsylvania Department of Environmental Protection has also certified the device as a constructed filter approved for stand-alone treatment on new construction projects. Additionally, the Virginia Department of Environmental Quality certified the **FocalPoint** as a manufactured treatment device (MTD) in June 2016. These approvals/certifications issued by TARP member States were granted as a result of the multiple field studies of the **FocalPoint** which were conducted in accordance with the protocol specified by the Washington Department of Ecology's Technology Assessment Protocol – Ecology (TAPE). The first TAPE field study was conducted by Civil and Environmental Consultants, Inc. at a parking lot on Campbell Run Road in Pittsburgh, Pennsylvania during the period of July 2015 to May 2016. Another TAPE field study was conducted by the NAVFAC Engineering and Expeditionary Warfare Center at the Navy Fleet Readiness Center Metal Finishing Complex located on Naval Base Point Loma in San Diego, California during the period of February 2018 to May 2019. A third field study was also conducted in accordance with the North Carolina Department of Environmental Quality and University Field Monitoring Protocols to determine total suspended solids (TSS) and pathogen removal. This study was conducted by North Carolina State University's Department of Biological and Agricultural Engineering on a roadside swale South of US Route 17 in Brunswick County, North Carolina during the period of February 2014 to February 2015.

The **FocalPoint** HPMBS is a structural stormwater treatment system developed by **Convergent Water Technologies**. The system utilizes regionally acceptable vegetation housed in an open-bed style without the use of

a pre-cast concrete container. The system contains energy dissipator stones at the inlet, a mulch layer to capture debris, a layer of engineered soil media, an overflow/bypass outlet, and a modular underdrain system.

This device varies from the design guidance for filtering systems described in Stormwater Rule 250-RICR-150-10-8.23 because of the device's atypically high flow-rate engineered soil media in lieu of traditional filter low flow medias such as: ASTM C33 concrete sand, USDA loamy sand or USDA sandy loam. Additionally, the device in and of itself does not meet minimum requirements for filter bed area or minimum temporary water quality storage. However, the increased infiltration rate compensates for the device's smaller filter bed area and temporary storage. The manufacturer has demonstrated through the provided field studies that the device provides the minimum water quality pollutant removal rates specified in Stormwater Rule 250-RICR-150-10-8.9B. It is approved in Rhode Island for the following pollutant removals when designed with a maximum infiltration rate of 100 inches per hour: **85%** removal of total suspended solids (TSS), **60%** removal of pathogens, **30%** removal of total phosphorus (TP) for discharges to freshwaters, and **30%** removal of total nitrogen (TN) for discharges to tidal waters. This device may be used as an approved water quality BMP provided that the design, installation, and maintenance are conducted in accordance with the following terms and conditions:

I. GENERAL CERTIFICATION REQUIREMENTS

1. The system must be designed and installed to adhere to the manufacturer's specifications titled "SPECIFICATION: HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS) Material, Performance and Installation Specification". https://acfenvironmental.com/wp-content/uploads/2015/09/S.1FocalPoint_Specification.pdf
2. The system must be designed to incorporate a PRETX, Rain Guardian or water quality manhole upstream of the filter bed so as to provide a sump to capture and store sediment.
 - a. The maximum drainage area that can be directed to each PRETX unit is 1 acre.
 - b. The maximum drainage area that can be directed to each upstream water quality manhole is 0.5 acres.
 - c. The maximum drainage area that can be directed to each Rain Guardian unit is 0.25 acres.
3. The system must utilize a minimum 3 inch layer of hardwood mulch, a minimum 18 inch layer of the engineered soil media as defined by the device's specification.
4. Systems designed with a modular underdrain must utilize a minimum 6 inch layer of washed 3/8" bridging stone and a high-tenacity monofilament polypropylene yarn, open mesh, woven geotextile to separate the soil media and the underdrain.
5. The system must utilize a plant or plants listed in *Table 2: Approved List of Plants for FocalPoint Systems in Rhode Island*.
6. The **FocalPoint** HPMBS is **certified as a pretreatment device** in accordance with Stormwater Rule 250-RICR-150-10-8.31, provided the device treats the first inch of runoff from the capture area, unless waived by the state permitting agency.
7. The vendor must provide applicants with a signed letter which verifies that the design for each proprietary device meets the requirements set forth in this certification letter and the device's specification. The applicant must include this verification letter as part of their application.
8. A representative from the vendor must be on site during the installation of systems to ensure that the system is installed in accordance with the manufacturer's specifications and the approved design.

9. The **FocalPoint** HPMBBS is **certified as a retrofit device** in accordance with Stormwater Rule 250-RICR-150-10-8.6A. Retrofits are allowed flexibility with regards to the eleven minimum standards described in Sections 8.6 through 8.17 of Stormwater Rule 250-RICR-150-10, but in general they are considered effective if they capture at least 50% of the catchment and meet the target water quality treatment of at least the first 0.5 inches of the water quality volume.
10. This device is **certified as a Water Quality BMP** in accordance with pollutant removal requirements specified in Stormwater Rule 250-RICR-150-10-8.9B, provided that:
 - a. The unit is sized to treat the water quality volume and the water quality flow. The filter bed area must be sized to be at least 0.44% of the impervious area that drains into it (this equates to approximately 192 square feet of filter bed area per acre of impervious cover). Pre-detention practices may be utilized as long as the first inch of runoff is treated. Should the permitting agency waive or relieve the applicant from treatment of the full water quality volume (i.e., retrofits or redevelopments), the applicant is granted relief and may design the system to treat a smaller volume, as required by the permitting agency.
 - b. This product meets recharge volume requirements, as specified in Stormwater Rule 250-RICR-150-10-8.8, only if designed with a modular underdrain that meets all requirements of a water quality stormwater infiltration practice (excluding standard storage sizing requirements), as specified in Stormwater Rule 250-RICR-150-10-8.21. However, use of **FocalPoint** HPMBBS products not designed to infiltrate into in-situ soils are not prohibited so long as the applicant can demonstrate to the permitting agency that the required recharge is met within the sub-watershed, unless waived by the state permitting agency on a case-by-case basis (i.e., LUHHPLs, retrofits or redevelopments).

II. MAINTENANCE REQUIREMENTS

1. The device must be maintained in accordance with the manufacturer's specifications provided in the **FocalPoint** HPMBBS Operation & Maintenance Manual, which can be found on the manufacturer's website. <https://convergewater.wpengine.com/wp-content/uploads/2021/06/focalpoint-operations-maintenance-guide.pdf>
2. The entire device (mulch, soil media, underdrain, etc.) must be maintained in accordance with the requirements for filtering system water quality BMPs, as stated in Stormwater Rule 250-RICR-150-10-8.23-F.3 which requires that the entire device must be inspected on at least an annual basis and after storms equal to or greater than the 1-year Type-III 24-hour design storm.
3. The device must be maintained in accordance with Stormwater Rule 250-RICR-150-10-8.23-F.1b which requires that "silt/sediment shall be removed from the filter bed when the accumulation exceeds one inch. When the filtering capacity of the device diminishes substantially (water ponds on the surface of the filter bed for more than 48 hours), the top few inches of discolored material shall be removed and shall be replaced with fresh material" (where "fresh material" means the engineered soil media described in the manufacturer's specification). If it is determined that replacing the top few inches of discolored material (or other restoration methods) does not restore the device's filtering capacity (water is still ponding on the filter bed for more than 48 hours), then the entirety of the device's filtering media must be replaced with fresh material.
4. The device's sump (i.e., PRETX, Rain Guardian, or upstream manhole) must be maintained in accordance with the requirements for proprietary pre-treatment devices, as stated in Stormwater Rule 250-RICR-150-10-8.31-C, which requires the sump to be inspected a minimum of 2 times per year. Additionally, the sump must be cleaned out when 50% or more of the pollutant storage capacity is filled or displaced.

5. All material removed from the unit must be properly disposed of and is the responsibility of the owner.
6. The applicant must provide evidence of a maintenance contract which extends for a minimum of two years. The contracted maintenance provider must receive training by **Convergent Water Technologies** on how to properly maintain **FocalPoint** HPMBBS devices. This requirement excludes maintenance providers recognized by the RIDEM to be qualified in the maintenance of **FocalPoint** HPMBBS devices.
7. The applicant must include a copy of the **FocalPoint** HPMBBS Operation & Maintenance Manual in their project specific long term operation and maintenance plan.

III. REPORTING REQUIREMENTS

1. Upon request from the owner of any **FocalPoint** HPMBBS system installed in the State of Rhode Island, the vendor shall provide the owner with a recommended maintenance schedule after the first year of operation. If a recommended maintenance schedule is requested by the owner after the first year of the device's operation, then the owner is responsible for notifying the vendor of any additional pollutant loads on sites where contributing drainage areas may be subject to further development (i.e., strip malls).
2. The Vendor shall provide a listing to the RIDEM Office of Water Resources of all systems installed within the State of Rhode Island on an annual basis. This list shall also include the name of the Vendor representative who was on-site to verify proper installation of each system.
3. The Vendor shall provide an annual listing to the RIDEM Office of Water Resources of all Rhode Island maintenance providers that they trained in **FocalPoint** HPMBBS maintenance.
4. The Vendor shall immediately notify the RIDEM Office of Water Resources if and when any changes are made to the model name or number of any **FocalPoint** HPMBBS device applicable to this certification.
5. The Vendor shall immediately notify the RIDEM Office of Water Resources if and when any revisions are made to the design, installation or operation and maintenance manuals for all models applicable to this certification.
6. The Vendor shall notify the RIDEM within at least thirty (30) days following any proposed transfer of ownership of the Component technology. Notification shall include the name and address of the new owner and a written agreement between the existing and new owner specifying a date for transfer of ownership, responsibility, and liability for the Component. All provisions of this Certification shall be applicable to any new owners.

IV. RIGHTS OF THE RIDEM AND CRMC

1. The RIDEM may suspend, modify or revoke this approval for cause, including but not limited to non-compliance with any of the conditions or provisions of this approval, mis-representation or failure to fully disclose all relevant data, or receipt of new information indicating that the use of the **FocalPoint** HPMBBS system is contrary to the public interest, public health or the environment.
2. This approval does not represent an endorsement of the **FocalPoint** HPMBBS system by the RIDEM, RIDOT or CRMC. This letter of approval may be reproduced only in its entirety.

3. The **FocalPoint** HPMBs Bioretention System Standard Specification and **FocalPoint** HPMBs operation and maintenance manual referenced herein are approved upon the date of approval of this Certification.
4. The RIDEM reserves the right to suspend or revoke this Certification if updated design, installation, and O&M manuals are not provided to the RIDEM within thirty (30) days of RIDEM request or one hundred and eighty (180) days prior to the expiration date of this Certification. All revisions must be reviewed and approved by the RIDEM prior to re-certification.

Eric Beck

Digitally signed by Eric Beck
Date: 2021.10.12 10:09:42 -04'00'

Eric A. Beck, P.E.
Administrator of Groundwater and Wetlands Protection
RIDEM – Office of Water Resources

Date

ATTACHMENTS:

Table 2: Approved List of Plants for FocalPoint Systems in Rhode Island

<i>Common Name/Species</i>	<i>Spacing</i>	<i>Exposure</i>	<i>Comments</i>
<i>American Beach Grass/ Ammophila breviligulata</i>	<i>24" on center</i>	<i>Full and high high temperatures</i>	<i>Tolerates wet to well- drained soil; flowers appear to float; high wildlife value.</i>
<i>Switchgrass/Panicum virgatum</i>	<i>24" on center</i>	<i>Full sun, high temperatures</i>	<i>Tolerates wet to well- drained soil; flowers appear to float; high wildlife value.</i>
<i>Day Lily/ Hemerocallis</i>	<i>24" on center</i>	<i>Full sun, tolerate shade</i>	<i>Yellow, Red and Pink colors available. Many red and purple varieties benefit from partial shade in the hottest part of the day since dark colors absorb heat and do not withstand the sun as well as lighter colors.</i>
<i>Black Eyed Susan/Rudbeckia hirta</i>	<i>24" on center</i>	<i>Full sun, tolerate shade</i>	<i>Widely cultivated in parks and gardens, for summer bedding schemes, borders, containers, wildflower gardens, prairie-style plantings and cut flowers.</i>
<i>Cone Flower/Echinacea</i>	<i>24" on center</i>	<i>Full sun, tolerate shade</i>	<i>Herbaceous flowering plant in the daisy family. Grows in moist to dry prairies and open wooded areas.</i>

DESIGNING WITH FOCALPOINT IN RHODE ISLAND (CONTINUED)

4. Pretreatment Device: System must incorporate pretreatment device based on drainage area (select one):

- Rain Guardian (impervious drainage area of 0.25 acres or less)
- Upstream water quality manhole (drainage area of 0.50 acres or less)
- PRETX Unit (drainage area of 1 acre or less)

5. Recharge, channel protection and over-bank flood protection of major storms.

The R-Tank modular underdrain can be expanded beyond the footprint of the FocalPoint treatment area to meet groundwater recharge volume, conveyance, natural channel protection and over-bank flood protection requirements per the Rhode Island Stormwater Design & Installation Standards Manual. Contact Ferguson for additional information on designing expanded R-Tank systems.

6. Prepare a landscape plan including approved plantings for the FocalPoint system (per RIDEM approval letter).

7. Ensure manufacturer’s representative verifies the design of each FocalPoint system with a signed letter as required in the applicant’s submission to the RIDEM.

8. Coordinate installation oversight provided by manufacturer’s representative.

Approved Plant List by Common Name/Species

- | | |
|--|------------------------------------|
| • American Beach Grass/Ammophila Breviligulata | • Day Lily/Hemerocallis |
| • Switchgrass/Panicum Virgatum | • Black Eyed Susan/Rudbeckia Hirta |
| | • Cone Flower/Echinacea |

FOCALPOINT SYSTEMS



FOCALPOINT ACCESSORIES



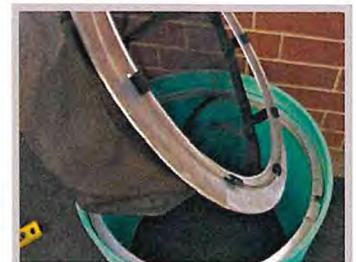
Pretreatment-Rain Guardian Turret



Pretreatment-Rain Guardian Foxhole



Pretreatment-PreTx

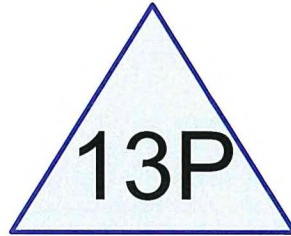


Bypass Protection-Domed Overflow with Filter Insert

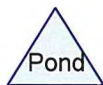
For additional information, please visit: fergusongss.com



POST-BIO



Focal Point 1



362 POND REV

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
4,680	98	New Roof,HSG C (12S)
4,680	98	TOTAL AREA

362 POND REV

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
4,680	HSG C	12S
0	HSG D	
0	Other	
4,680		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchmen Numbers
0	0	4,680	0	0	4,680	New Roof	1 2 S
0	0	4,680	0	0	4,680	TOTAL AREA	

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Type III 24-hr WQV Rainfall=1.00"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 12S: POST-BIO

Runoff Area=4,680 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.10 cfs 308 cf

Pond 13P: Focal Point 1

Peak Elev=7.08' Storage=183 cf Inflow=0.10 cfs 308 cf
Discarded=0.00 cfs 239 cf Primary=0.00 cfs 0 cf Outflow=0.00 cfs 239 cf

Total Runoff Area = 4,680 sf Runoff Volume = 308 cf Average Runoff Depth = 0.79"
0.00% Pervious = 0 sf 100.00% Impervious = 4,680 sf

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Summary for Subcatchment 12S: POST-BIO

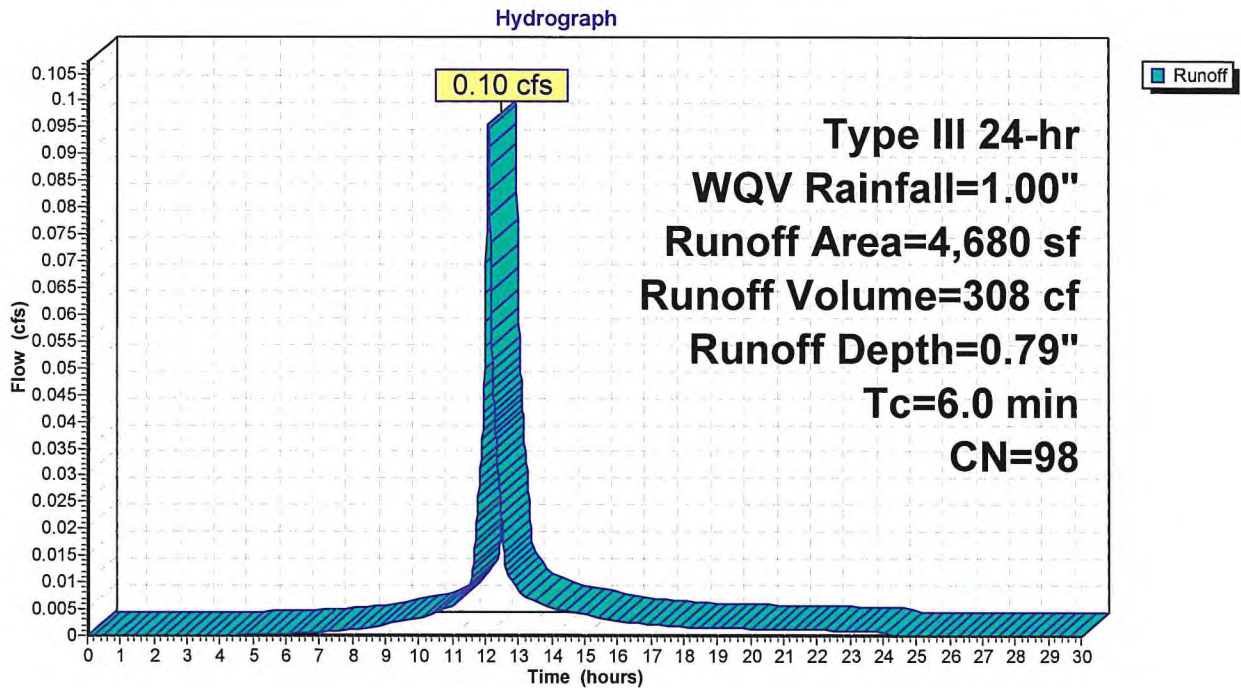
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 308 cf, Depth= 0.79"
Routed to Pond 13P : Focal Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (sf)	CN	Description
* 4,680	98	New Roof,HSG C
4,680	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 12S: POST-BIO



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Type III 24-hr WQV Rainfall=1.00"

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Summary for Pond 13P: Focal Point 1

Inflow Area = 4,680 sf, 100.00% Impervious, Inflow Depth = 0.79" for WQV event
 Inflow = 0.10 cfs @ 12.08 hrs, Volume= 308 cf
 Outflow = 0.00 cfs @ 11.04 hrs, Volume= 239 cf, Atten= 97%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 11.04 hrs, Volume= 239 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to nonexistent node 11L

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 7.08' @ 15.74 hrs Surf.Area= 270 sf Storage= 183 cf

Plug-Flow detention time= 452.2 min calculated for 239 cf (78% of inflow)
 Center-of-Mass det. time= 372.0 min (1,159.9 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1	7.70'	9 cf	3.00'W x 7.00'L x 2.08'H Focal Point 1 44 cf Overall x 20.0% Voids
#2	9.78'	57 cf	Surface Bowl (Prismatic) Listed below (Recalc) -Impervious
#3A	6.00'	152 cf	11.87'W x 22.77'L x 2.19'H Field A 593 cf Overall - 213 cf Embedded = 380 cf x 40.0% Voids
#4A	6.25'	203 cf	Ferguson R-Tank HD 1 x 48 Inside #3 Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 48 Chambers in 6 Rows
		420 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.78	43	0	0
10.00	64	12	12
10.50	116	45	57

Device	Routing	Invert	Outlet Devices
#1	Discarded	6.00'	0.500 in/hr Exfiltration from R-Tank over Surface area Phase-In= 0.10'
#2	Primary	10.25'	2.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.00 cfs @ 11.04 hrs HW=6.14' (Free Discharge)
 ↑1=Exfiltration from R-Tank (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Type III 24-hr WQV Rainfall=1.00"

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Pond 13P: Focal Point 1 - Chamber Wizard Field A

Chamber Model = Ferguson R-Tank HD 1 (Ferguson R-Tank HD)

Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf

Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf

8 Chambers/Row x 2.35' Long = 18.77' Row Length +24.0" End Stone x 2 = 22.77' Base Length

6 Rows x 15.7" Wide + 24.0" Side Stone x 2 = 11.87' Base Width

3.0" Stone Base + 17.3" Chamber Height + 6.0" Stone Cover = 2.19' Field Height

48 Chambers x 4.2 cf = 202.6 cf Chamber Storage

48 Chambers x 4.4 cf = 213.3 cf Displacement

593.0 cf Field - 213.3 cf Chambers = 379.7 cf Stone x 40.0% Voids = 151.9 cf Stone Storage

Chamber Storage + Stone Storage = 354.5 cf = 0.008 af

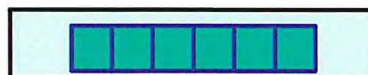
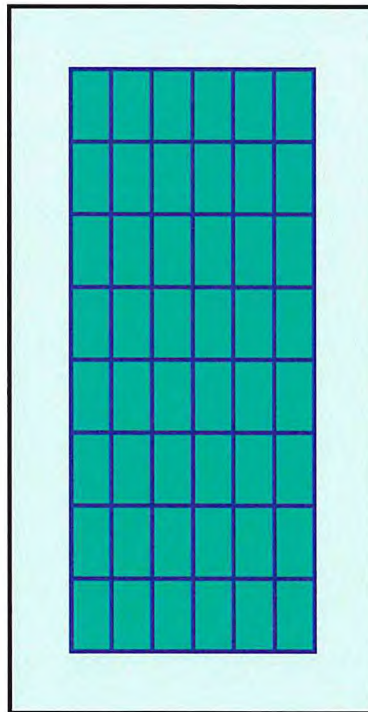
Overall Storage Efficiency = 59.8%

Overall System Size = 22.77' x 11.87' x 2.19'

48 Chambers

22.0 cy Field

14.1 cy Stone



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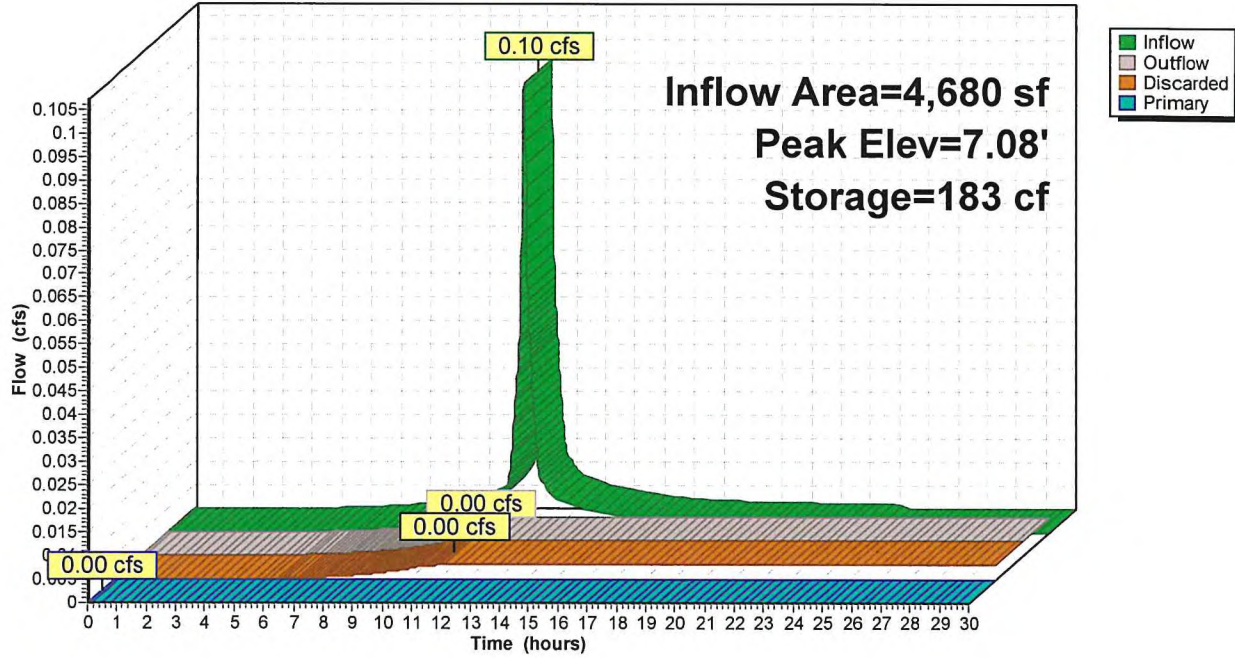
Type III 24-hr WQV Rainfall=1.00"

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Pond 13P: Focal Point 1

Hydrograph



SPECIFICATION

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS)

Material, Performance and Installation Specification

I. Summary

The following general specifications describe the components and installation requirements for a volume based High Performance Modular Biofiltration System (HPMBS) that utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban storm water runoff. The modular treatment system in which the biologically active biofiltration media is used shall be a complete, integrated system designed to be placed in Square Foot or Linear Foot increments per the approved drawings to treat contaminated runoff from impervious surfaces.

The High Performance Modular Biofiltration System (HPMBS) is comprised of the following components:

A. Plant Component

1. Manufacturer shall provide a regionalized list of acceptable plants.
2. Plants, as specified in the approved drawings/manufacturer's plant list, shall be installed at the time the HPMBS is commissioned for use.
3. Plants and planting are typically included in landscape contract.

B. Biofilter Component

1. This component employs a high performance cross-section in which each element is highly dependent on the others to meet the performance specification for the complete system. It is important that this entire cross-section be provided as a complete system and installed as such.
2. As indicated in the approved drawings, the elements of the Biofilter include:
 - A. *A mulch protective layer (if specified).*
 - B. *An advanced high infiltration rate biofiltration planting media bed which utilizes physical, chemical and biological mechanisms of the soil, plant, and microbe complex, to remove pollutants found in storm water runoff.*
 - C. *A separation layer which utilizes the concept of 'bridging' to separate the biofiltration media from the underdrain without the use of geotextile fabrics.*
 - D. *A wide aperture mesh layer utilized to prevent bridging stone from*

entering the underdrain/storage element.

- E. *A modular, high infiltration rate 'flat pipe' style underdrain/storage system which is designed to directly infiltrate or exfiltrate water through its surface. The modular underdrain must provide a minimum of 95% void space.*

C. Energy Dissipation Component

- 1. An Energy Dissipation Component is typically specified to slow and spread out water as it enters the system. This component is dependent upon the design in the approved drawings, but typically consists of a rock gabion, rock filter dam or dense vegetation element, such as native grasses, either surrounding the Biofiltration Component or located immediately upstream of it.

D. Pretreatment Component

- 1. Pretreatment, when specified, is typically accomplished by locating the Biofiltration Component downstream of a swale, curb cut/rock apron, sediment forebay, deep or shallow sump water quality manhole, etc. These BMPs should target trash and debris and medium to coarse sediment.

E. Observation and Maintenance Component

- 1. An Observation and Maintenance Port shall be installed per the approved drawings to provide for easy inspection of the underdrain/storage element, and cleanout access if needed.

F. Extreme Event Overflow (by others)

- 1. An Extreme Event Overflow should be located external to, but near the Biofiltration element to provide bypass when needed. This may be an overland flow bypass structure, beehive overflow grate structure, or equivalent that serves the purpose. If a beehive overflow structure is utilized it should include a removable filter insert to provide a minimum of 50% TSS removal and control of gross pollutants, trash and floatables.

II. Quality Assurance and Performance Specifications

The quality and composition of all system components and all other appurtenances and their assembly process shall be subject to inspection upon delivery of the system to the work site.

Installation is to be performed only by skilled work people with satisfactory record of performance on earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.

A. Plants

1. Plants must be compatible with the HPMBS media and the associated highly variable hydrologic regime. Plants are typically facultative with fibrous roots systems such as native grasses and shrubs.
2. Manufacturer shall provide a regionalized list of acceptable plants.
3. All plant material shall comply with the type and size required by the approved drawings and shall be alive and free of obvious signs of disease.

B. Mulch

1. Mulch, typically double shredded hardwood (non-floatable), shall comply with the type and size required by the approved drawings, and shall be screened to minimize fines. Rock mulch is an alternative to wood-based mulch and typically consists of clean, rounded river rock (3-4' diam in size).

C. Biofiltration Media

1. Biologically active biofiltration media shall be visually inspected to ensure appropriate volume, texture and consistency with the approved drawings, and must bear a batch number marking from the manufacturer which certifies performance testing of the batch to meet or exceed the required infiltration rate (100 in/hr). A third-party laboratory test must be provided to certify the 100 in/hr rate.
2. At no additional cost and within the first year following installation, authorized value-added reseller shall provide one site visit/maintenance training at the request of owner or owner's representative.
3. Pollutant Removal performance, composition and characteristics of the Biofiltration Media must meet or exceed the following minimum standards as demonstrated by testing acceptable to the project engineer:

Pollutant	Removal Efficiency
TSS	91%
Phosphorus	66%
Nitrogen	48%
Composition and Characteristics	
Sand - Fine	< 5%
Sand - Medium	10% - 15%
Sand - Coarse	15% - 25%
Sand - Very Coarse	40% - 45%
Gravel	10% - 20%
Infiltration Rate	>100 inches per hour
Peat Moss*	5% - 15%
* Peat Moss Specification	

<p style="text-align: center;">Listed by Organic Materials Review Institute 100% natural peat (no composted, sludge, yard or leaf waste) Total Carbon >85% Carbon to Nitrogen Ratio 15:1 to 23:1 Lignin Content 49% to 52% Humic Acid >18% pH 6.0 to 7.0 Moisture Content 30% to 50% 95% to 100% passing 2.0mm sieve > 80% passing 1.0mm sieve</p>
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D. Underdrain/Storage System

- Underdrain/storage components shall be manufactured in an ISO certified facility and be manufactured from at least 90% post-consumer recycled materials.
- Underdrain/storage components shall meet or exceed the following characteristics:

Property	Value
Surface Void Area	≥ 85%
Unit Weight	3.25 lbs/cf
Service Temperature	-14° to 167°
Unconfined Crush Strength	32.48 psi
180 Day Creep Test	
Load Applied – Initial and Sustained	11.16 psi
• Creep Sustained – After 180 Days	0.20 inches
• Creep Sustained – After 180 Days	1.13 %
• Projected Creep – 40 years	1.72%

E. Separation Mesh

- Separation Mesh shall be composed of high-tenacity monofilament polypropylene yarns that are woven together to produce an open mesh geotextile which shall be inert to biological degradation and resistant to naturally encountered chemicals, alkalis and acids. The mesh shall meet or exceed the following characteristics:

Properties	Test Method	Unit	Min Ave Roll Value	
			MD	CD
Tensile Strength	ASTM D4595	kN/m (lbs/ft)	21 (1440)	25.3 (1733)
Creep Reduced Strength	ASTM D5262	kN/m (lbs/ft)	6.9 (471)	8.3 (566)
Long Term Allowable Design Load	GRI GG-4	kN/m (lbs/ft)	5.9 (407)	7.2 (490)
UV Resistance (at 500 hours)	-	% strength retained	90	

Aperture Size (machine direction)	-	mm (in)	2 (0.08)
Aperture Size (cross machine direction)	-	mm (in)	2 (0.08)
Mass/Unit Area	ASTM D5261	g/m ² (oz/yd ²)	197 (5.8)

F. Bridging Stone

1. Bridging Stone shall be 3/8" pea gravel, or other diameter sized to prevent migration of filter media, as specified by manufacturer.
2. Stone must be washed and free from sediment, soil and contaminants.

III. Delivery, Storage and Handling

- A. Protect all materials from damage during delivery and store UV sensitive materials under tarp to protect from sunlight including all plastics, when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.
- B. Biofiltration media shall be segregated from any other aggregate materials and shall be protected against contamination, including contamination from any stormwater runoff from areas of the site which are not stabilized.

IV. Submittals

A. Product Data

1. Submit manufacturer's product data and approved Installation Manual as well as manufacturer's Operations and Maintenance Manual for the system. It will be the responsibility of the system owner/operator or their contractor to ensure the system is operated and maintained in accordance with the manual.

B. Certification

1. Manufacturer shall submit a letter of certification that the complete system meets or exceeds all technical and packaging requirements. Biofiltration media packaging must bear a batch number marking from the manufacturer which matches a letter from the manufacturer certifying performance testing of the batch to meet or exceed the required infiltration rate.

C. Drawings

1. Manufacturer shall provide dimensional drawings including details for construction, materials, specifications and pipe connections.

D. Manufacturer's Warranty

1. Manufacturer shall provide a warranty for all components of the HPMBS for a period of one year provided the unit is installed, operated and maintained in accordance with the manual. Improper operation, maintenance or accidental or illegal activities (i.e. dumping of pollutants, vandalism, etc.) will void the warranty.

E. Design Computations

1. The HPMBS must be sized using a volume-based sizing criteria and demonstrate, using an SCS stormwater modelling software/spreadsheet calculator that the required water quality volume (defined by the Engineer of Record) passes through the HPMBS prior to activation of the overflow device (set no higher than twelve (12) inches above the top elevation of the HPMBS (typically defined as top of mulch). Design computations must be provided as part of the submittal process. If local regulations have the system approved based on an alternative sizing criterion the larger of the two computed sizes will govern.

F. Substitutions

1. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data for both flow rate and pollutant removal of biofiltration media. Pollutant removal data must follow specified protocols. All components must meet or exceed Quality Assurance and Performance Criteria indicated herein.

V. Project Conditions

- A.** Review manufacturer's recommended installation procedures and coordinate installation with other work affected, such as grading, excavation, utilities, construction access and erosion control to prevent all non-installation related construction traffic over the completed HPMBS.

B. Cold Weather

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen ground or wet, saturated or muddy subgrade.
3. Care must be taken when handling plastics when air temperature is at 40 degrees Fahrenheit or below as plastic becomes brittle.

- C.** Protect partially completed installation against damage from other construction

traffic when work is in progress and following completion of backfill by establishing a perimeter with highly visible construction tape, fencing, or other means until construction is complete.

- D. Soil stabilization of the surrounding site must be complete before the Biofiltration System can be brought online. Soil stabilization occurs when 90% of the site has been paved or vegetated. Temporary erosion control and/or sedimentation prevention measures shall be implemented to reduce the possibility of sediments being transported into the Biofiltration System prior to full stabilization of the site. Significant sediment loads can damage the HPBMS and lead to failure if not prevented or remediated promptly.

VI. PRODUCTS

A. Acceptable HPBMS

FocalPoint High Performance Biofiltration System

B. Acceptable Beehive Overflow Grate Structure (Optional)

Beehive Overflow Grate Structure with removable StormSack

C. Acceptable Manufacturer

Manufacturer:
Convergent Water Technologies, Inc.
(800) 711-5428
www.convergentwater.com

D. Authorized Value Added Reseller

Ferguson Waterworks
(800) 448-3636
www.ferguson.com

VII. Packaging

- A. HPBMS is assembled on site.
- B. Modular underdrain/storage unit is shipped flat and modules are assembled prior to installation.
- C. Biofiltration media is delivered in one ton super sacks each labeled with manufacturer's batch number and/or in bulk with accompanying manufacturer's certification.
- D. Other components are delivered in bulk or super sacks

VIII. Execution

A. Excavation and Backfill

1. Base of excavation shall be smooth, level and free of lumps or debris, and compacted unless infiltration of storm water into subgrade is desired. A thin layer (3") of compacted base material is recommended to establish a level working platform (may not be needed in sandy soils). If the base of the excavation is pumping or appears excessively soft, a geotechnical engineer should be consulted for advice. In many cases, a stabilization geotextile and 6" of compactable material that drains well will be sufficient to amend the bearing capacity of the soil.
2. Most applications require 8 oz Non-Woven Geotextile or equivalent nonwoven geotextile with a nominal weight of 8 oz per square yard to line the excavation to separate in situ soils and the HPMBS. (Applications requiring water to infiltrate the in situ sub-soils should use a bridging stone rather than geotextile to provide a separation layer between the HPMBS and the in situ soils). Geotextile, when utilized, should be placed on the bottom and up the sides of the excavation. Absolutely no geotextiles should be used in the water column. If an impermeable liner is specified, it shall be installed according to manufacturer's instructions and recommendations.
3. Specified backfill material must be free from lumps, debris and any sharp objects that could penetrate the geotextile. Material is used for backfill along the sides of the system as indicated in engineering detail drawings.

B. Inspection

1. Examine prepared excavation for smoothness, compaction and level. Check for presence of high water table, which must be kept at levels below the bottom of the underdrain structure at all times. If the base is pumping or appears excessively soft, a geotechnical engineer should be consulted for advice.
2. Installation commencement constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found to be unsatisfactory, contact Project Manager or Engineer for resolution prior to installation.

IX. Cleanup and Protection during Ongoing Construction Activity

- A.** Perform cleaning during the installation and upon completion of the work.
- B.** Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation.
- C.** If surrounding drainage area is not fully stabilized, a protective covering of geotextile fabric should be securely placed to protect the Biofiltration Media.
- D.** Construction phase erosion and sedimentation controls shall be placed to protect the inlet(s) to the Biofiltration System. Excessive sedimentation, particularly prior to establishment of plants may damage the HPMBS.
- E.** Strictly follow manufacturer's guidelines with respect to protection of the HPMBS between Installation and Commissioning phases.

X. Commissioning

- A.** Commissioning should only be carried out once the contributing drainage area is fully stabilized. If Commissioning must be carried out sooner, it is imperative that appropriate erosion and sediment controls be placed to prevent the entry of excessive sediment/pollutant loads into the system.
- B.** Commissioning entails removing the protective covering from the Biofiltration Media, planting the plant material in accordance with the approved drawings, and placing mulch if specified.
 - 2.1** Dig planting holes the depth of the root ball and two to three times as wide as the root ball. Wide holes encourage horizontal root growth that plants naturally produce.
 - 2.2** With trees, you must ensure you are not planting too deep. Don't dig holes deeper than root balls. The media should be placed at the root collar, not above the root collar. Otherwise the stem will be vulnerable to disease.
 - 2.3** Strictly follow manufacturer's planting guidance.
- C.** Cover the exposed root ball top with mulch. Mulch should not touch the plant base because it can hold too much moisture and invite disease and insects. Evenly place 3 inches of double-shredded hardwood mulch (if specified) on the surface of the media.
- D.** Plantings shall be watered-in at installation and temporary irrigations shall be provided, if specified.

XI. Using the HPMBS

A. Maintenance Requirements

1. Annual maintenance generally consists of two (2) scheduled visits unless otherwise specified.
2. Each maintenance visit consists of the following:
 - 2.1 *Complete system inspection*
 - 2.2 *Removal of foreign debris, silt, plant material, trash and mulch (if needed)*
 - 2.3 *Evaluation of biofiltration media*
 - 2.4 *Evaluation of plant health*
 - 2.5 *Inspection of underdrain/storage system via Observation/Maintenance Port*
 - 2.6 *Properly dispose of all maintenance refuse items (trash, mulch, etc.)*
 - 2.7 *Take photographs documenting plant growth and general system health*
 - 2.8 *Update and store maintenance records*
 - 2.9 *To ensure long term performance of the HPMBS, continuing annual maintenance should be performed per the manufacturer's Operations and Maintenance Manual.*
3. If sediment accumulates beyond an acceptable level in the underdrain/storage system, it will be necessary to flush the underdrain. This can be done by pumping water into the Observation/Maintenance Port or adjacent overflow structure, allowing the turbulent flows through the underdrain to re-suspend the fine sediments. If multiple Observation/Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency.

Sediment-laden water can be pumped out and either captured for disposal or filtered through a Dirtbag filter bag, if permitted by the locality.

XII. Measurement and Payment

Given the integrated nature of the HPMBS, measurement and payment will be based not on the individual component prices, but on the size of the Biofiltration Media bed. The external dimension as indicated in the approved plans and executed in the installation will be measured in Square Feet and payment will be made per HPMBS system.

Measurement and payment of beehive overflow grate structure with removable filter insert will be based on per unit price.

Section 33 46 23 MODULAR STORMWATER STORAGE UNITS

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes specifications for the supply and installation of modular stormwater storage units, specifically the R-Tank^{HD}, R-Tank^{SD}, R-Tank^{MD}, R-Tank^{UD} or R-Tank^{XD} system (hereafter called R-Tank).

1.02 REFERENCES

- A. **ASTM D698** - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- B. **ASTM D2412** - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- C. **ASTM F2418** - Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers.
- D. Manufacturer's product literature and guidelines for R-Tank product.

1.03 QUALITY CONTROL

- A. **Manufacturer Qualifications:** The R-Tank modular stormwater storage units shall be supplied by Ferguson Waterworks and manufactured in ISO certified facilities.
 - a. Manufacturer samples shall be provided to the client & contractor for review upon request.
 - b. A manufacturer's representative is available for pre-installation conference, per Section 1.06A & site review, upon request.
- B. **Installer Qualifications:** Installation shall be performed by a contractor experienced in the installation of modular stormwater storage units.
 - a. A minimum of three R-Tank or equivalent projects completed within 2 years; and,
 - b. A minimum of 25,000 cubic feet of subsurface storage volume completed within 2 years.
 - c. Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.
 - d. Installation Contractor shall demonstrate knowledge and experience in the installation of subsurface storage system. Work shall be performed only by skilled workers with experience in bulk earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.

1.04 SUBMITTALS

- A. Submit product data, installation guidelines, and product certifications for the R-Tank modular stormwater storage units.
 - a. R-Tank layout drawings, including typical sections, details as well as the required base elevation of stone and tanks, minimum cover requirements and tank configuration.
 - b. R-Tank product data, including compressive strength, and installation guidelines.
 - c. Accessory material documentation / certificates for geotextile, geogrid, base course and backfill materials.
- B. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data that meets or exceeds criteria in Table 2.01 B.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect R-Tank and other materials from damage during delivery and offloading. Handling is to be performed with equipment appropriate to the materials and site conditions.

- B. Storage of materials should be on smooth surfaces, free from dirt, mud and debris, and away from any open flame, welding operations, or other potential heat sources. UV sensitive materials and R-Tank units should be stored under a tarp to protect from sunlight when time from delivery to installation exceeds two weeks.
- C. When handling and installing product in cold weather:
 - a. When the air temperature is 40° F or below, care must be taken when handling plastics to ensure no cracking. Do not use frozen materials, or materials coated with ice or frost.
 - b. Do not build on frozen ground or wet, saturated or muddy subgrade.

1.06 PREINSTALLATION CONFERENCE.

- A. Prior to the start of the installation, a pre-installation conference shall occur with the representatives from the design team, the general contractor, the excavation contractor, the R-Tank installation contractor, and the manufacturer’s representative.
- B. The pre-installation conference shall review the layout drawings, pre-construction checklist, and discuss key steps of the process. The pre-construction checklist shall be signed and dated by all participants.

1.07 PROJECT CONDITIONS

- A. Coordinate installation for the R-Tank system with other on-site activities to eliminate all non-installation related construction traffic over the completed R-Tank system.
- B. Protect adjacent work from damage during R-Tank system installation.
- C. Provide proper sediment controls to prevent sediment intrusion, if the system is operational during construction.
- D. Contractor is responsible for any damage to the system during construction.
- E. All pre-treatment systems must be in place and functional prior to operation of the R-Tank system.

PART 2 PRODUCTS

2.01 R-TANK UNITS

- A. Injection molded plastic tank components assembled to form a modular structure of predesigned height.
- B. R-Tank units shall meet the following Physical & Chemical Characteristics:

PROPERTY	DESCRIPTION	R-Tank ^{HD} VALUE	R-Tank ^{SD} VALUE	R-Tank ^{MD} VALUE	R-Tank ^{UD} VALUE	R-Tank ^{XD} VALUE
Void Area	Volume available for water storage	95%	95%	95%	95%	90%
Surface Void Area	Percentage of exterior available for infiltration	90%	90%	90%	90%	90%
Vertical Compressive Strength	ASTM D 2412 / ASTM F 2418	33.0 psi	42.0 psi	64.0 psi	134.0 psi	220.0 psi
Lateral Compressive Strength	ASTM D 2412 / ASTM F 2418	20.0 psi	22.0 psi	35.0 psi	19.0 psi	N/A
HS-20 Minimum Cover	Cover required to support HS-20 loads	20"	18"	15"	12"	6"
Maximum Cover	Maximum allowable cover depth	< 7 feet	< 10 feet	< 10 feet	< 7 feet	< 10 feet
Unit Weight	Weight of plastic per cubic foot of tank	3.62 lbs/cf	3.96 lbs/cf	3.53 lbs/cf	4.33 lbs/cf	7.55 lbs/cf

2.02 GEOSYNTHETICS

- A. Geotextile
 - a. Standard Application: The standard geotextile shall be an 8 oz per square yard nonwoven geotextile.
 - b. Infiltration Applications: When water must infiltrate/exfiltrate through the geotextile as a function of the system design, a woven monofilament shall be used. In specialty applications, a microgrid/mesh may be approved as an alternative separation fabric, in consultation with the manufacturer's representative.
 - c. Lined Applications: When water must be retained within the tanks to prevent infiltration/exfiltration, an impermeable liner shall be used. The liner material and thickness shall be specified by the project design engineer. This liner should be installed per liner manufacturer specifications and industry accepted techniques.
- B. Geogrid
 - a. For installations subject to traffic loads, install geogrid to reinforce backfill above the R-Tank system.
 - b. Geogrid is not required for R-Tank^{XD} and is often not required for non-traffic load applications.

2.03 BEDDING, BACKFILL & COVER MATERIALS

- A. All materials shall be free from lumps, debris, and any sharp objects that could cut the geotextile.
- B. **Bedding Materials:** Stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System) shall be used below the R-Tank system (3" minimum and 12" maximum). For infiltration applications bedding material shall be free draining.
- C. **Side and Top Backfill:** Recommended backfill material should be clean and free of debris, with a particle size distribution that is appropriate for the specific application. Identical backfill material shall be used on the side and top of the units.
 - a. Traffic Applications: Backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System).
 - b. Non-Traffic Applications - For all R-Tank modules installed in green spaces and not subjected to vehicular loads, backfill materials may either follow the guidelines for Traffic Applications above, or the top backfill layer may consist of AASHTO #57 stone blended with 30-40% (by volume) topsoil to aid in establishing vegetation.
 - c. Biofiltration / Bioretention Applications - Backfill materials shall be in accordance with the cross-section for the specific biofiltration/bioretention application and media. A layer of bridging stone shall separate the soil media from the R-Tank units.
- D. **Additional Cover Materials:** Additional cover material shall be structural fill meeting the gradational requirements of SM, SP, SW, GM, GP, or GW as classified by the Unified Soil Classification System. Structural fill shall be specified by the engineer of record.

2.04 OTHER MATERIALS

- A. **Utility Marker:** Install metallic tape at corners of R-Tank system to mark the area for future utility detection.

PART 3 EXECUTION

3.01 EXCAVATION PREPARATION

- A. Verify the site conditions are suitable for product storage and installation per guidelines.
- B. All excavations must meet OSHA safety standards for slopes or shoring.
- C. Stake out, excavate, and prepare the subgrade area per geotechnical engineer's recommendations and/or as shown on the design drawings, to provide adequate support for project design loads.
 - a. Ensure that the excavation is at least 2 feet greater than R-Tank dimensions in each direction allowing for installation of geotextile filter fabric, R-Tank modules, and free draining backfill materials.
 - b. Base of the excavation shall be uniform, level, and free of lumps or debris and soft or yielding subgrade areas.
- D. **Unsuitable Soils or Conditions:** All questions about the base of the excavation shall be directed to the owner's engineer. The owner's engineer shall determine the required bearing capacity of the R-Tank subgrade; however, in no case shall a bearing capacity of less than 2,000 pounds per square foot be provided.

3.02 BEDDING PREPARATION

- A. Where a geotextile wrap is specified between the native soil and stone base, cut strips to length, and install in excavation, removing wrinkles so material lays flat.
 - a. Overlap geotextile a minimum 12" or as recommended by manufacturer. Use tape, special adhesives, sandbags, or other ballast to secure overlaps.
 - b. Where an impervious liner is specified, install the liner per manufacturer's recommendations and the contract documents. The liner should be sandwiched between layers of non-woven geotextile at a minimum.
 - c. As geotextiles can be damaged by extreme heat, smoking is not permissible on/near the geotextile, and tools using a flame to tack the overlaps, such as propane torches, are prohibited.
- B. Place a thin layer (3" unless otherwise specified) of bedding material (Section 2.03B), within ½" (+/- ¼") of level or as shown on the plans. Vibratory tamp or static roll to prepare bedding materials until they are firm and unyielding.
- C. Outline the footprint of the R-Tank system on the excavation floor using spray paint or chalk line to ensure a 2' perimeter is available around the R-Tank system for proper installation and compaction of backfill.

3.03 LAYOUT AND INSTALLATION OF R-TANK UNITS

- A. Install a geotextile wrap by cutting strips to length and removing wrinkles so material lays flat.
 - a. Overlap geotextile a minimum 12" or as recommended by manufacturer. Use tape, special adhesives, sandbags, or other ballast to secure overlaps.
 - b. Where an impervious liner is specified, install the liner per manufacturer's recommendations and the contract documents. The liner should be sandwiched between layers of non-woven geotextile at a minimum.
 - c. As geotextiles can be damaged by extreme heat, smoking is not permissible on/near the geotextile, and tools using a flame to tack the overlaps, such as propane torches, are prohibited.
- B. Mark or outline the unit area to ensure a square and straight installation.
- C. Assemble R-Tank units in accordance with the R-Tank drawings and installation guidelines.
- D. Install R-Tank modules by placing side by side, in accordance with the design drawings. The modules are to be oriented as per the design drawing with required depth as shown on plans.
 - a. For HD and SD installations, the large side plate of the tank should be placed on the perimeter of the system. This will typically require that the ends of the tank area will have a row of tanks placed perpendicular to all other tanks. Refer to R-Tank drawings and installation guide for more details.
 - b. For MD, UD, and XD installations, there is no perpendicular end row required.
 - c. For MD installation, external side panels shall be installed around the perimeter of the system. Stacking clips shall be installed in each tier and each direction, as shown on design drawing details.
 - d. For XD installations, install stacking clips as specified in design drawings.

3.03 LAYOUT AND INSTALLATION OF R-TANK UNITS (CONTINUED)

- E. Completely encapsulate the R-Tank units in the specified geotextile to prevent backfill entry into the system. Overlap geotextile 12" or as recommended by manufacturer. Take great care to avoid damage to geotextile (and, if specified, impervious liner) during placement.
- F. Identify any inlet(s) or outlet(s) locations. The geotextile fabric shall be cut to enable hydraulic continuity between the connections and the R-Tank units. These connections shall be secured using pipe boots with stainless steel pipe clamps. Support pipe in trenches during backfill operations to prevent pipe from settling and damaging the geotextile wrap or pipe. Ensure end of pipe is installed snug against R-Tank system.
- G. Install inspection and ventilation ports in locations noted on plans. At a minimum one maintenance port shall be installed within 10' of each inlet & outlet connection, and with a maximum spacing of approximately 50' on center. Install all ports as noted in the R-Tank Installation Guide.

3.04 BACKFILLING OF THE R-TANK UNITS

- A. Backfill with materials in accordance with Section 2.03C and project specifications
 - a. Place material around the perimeter of the units in lifts with a maximum thickness of 12" and compacted with walk behind compaction equipment.
 - i. Each lift shall be placed around the entire perimeter such that each lift is no more than 24" higher than the side backfill along any other location on the perimeter of the R-Tank system.
 - ii. No fill shall be placed over top of tanks until the side backfill has been completed.
 - iii. Each lift shall be compacted project specifications or until no further densification is observed (for self-compacting stone materials). Even when "self-compacting" backfill materials are selected, a walk behind vibratory compactor must be used.
 - iv. Take care to ensure that the compaction process does not allow the machinery to contact the modules due to the potential for damage to the geotextile and R-Tank units.
 - v. No compaction equipment is permissible to operate directly on the R-Tank modules.
 - b. Place a top backfill layer on the units to the thickness specified in the R-Tank drawings and in accordance with project specifications.
 - i. Only low-pressure track vehicles shall be operated over the R-Tank system during construction. Dump Trucks and Pans shall not be operated within the R-Tank system footprint at any time. Heavy equipment should unload in an area adjacent to the R-Tank system and the material should be moved over the system using low ground pressure tracked equipment.
 - ii. Lightly compacted using a walk-behind trench roller. Alternately, a roller (maximum gross vehicle weight of 6 tons) may be used. Roller must remain in static mode until a minimum of 24" of cover has been placed over the modules. Sheep foot rollers should not be used.
- B. If specified, completely encapsulate the backfill in the specified geotextile. Overlap geotextile 12" or as recommended by manufacturer. Take great care to avoid damage to geotextile (and, if specified, impervious liner) during placement.
- C. If required, install a geogrid as shown on plans. Geogrid shall extend a minimum of 3 feet beyond the limits of the excavation wall. In cases of limitations such as curb, property line, etc. consult a manufacturer's representative about reducing the minimum extension length.
- D. Following placement and compaction of the initial cover, subsequent lifts of structural fill (Section 2.03D) shall be placed and compacted per engineer of record specifications. Do not exceed maximum cover depths listed in Table 2.01B.
- E. Ensure that all unrelated construction traffic is kept away from the limits of excavation until the project is complete and final surface materials are in place. It is recommended that high visibility tape or other devices be placed around the system to prevent traffic access.
- F. Place surfacing materials, such as groundcovers (no large trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.

3.05 MAINTENANCE REQUIREMENTS

- A. A routine maintenance effort is required to ensure proper performance of the R-Tank system. The Maintenance program should be focused on pretreatment systems. Ensuring these structures are clean and functioning properly will reduce the risk of contamination of the R-Tank system and stormwater released from the site. Maintain as needed using acceptable practices or following manufacturer's guidelines (for proprietary systems).
- B. All inlet pipes and Inspection and/or Maintenance Ports in the R-Tank system will need to be inspected for accumulation of sediments at least quarterly through the first year of operation and at least yearly thereafter.
- C. If sediment has accumulated to the level noted in the R-Tank Operation and Maintenance Guide or beyond a level acceptable to the Owner's engineer, the R-Tank system should be flushed.

3.06 END OF SECTION

FOCALPOINT DESIGN SHEET

HIGH-PERFORMANCE MODULAR BIOFILTRATION SYSTEM

RHODE ISLAND DEM CERTIFIED



DESIGNING WITH FOCALPOINT IN RHODE ISLAND

FocalPoint (High-Performance Modular Biofiltration System) is recognized by the Rhode Island Department of Environmental Management (DEM) and Coastal Resources Management Council (CRMC) for use as a water quality BMP or pretreatment device for site development projects and as a retrofit device for redevelopment projects.

The FocalPoint is approved in Rhode Island for the following pollutant removals when designed with the maximum infiltration rate of 100 inches per hour: 85% removal of total suspended solids (TSS), 60% removal of pathogens, 30% removal of total phosphorus (TP) for discharges to freshwaters, and 30% removal of total nitrogen (TN) for discharges to tidal waters.

1. Determine FocalPoint bed area (minimum 192 sf/acre of impervious drainage area-ex: 0.2 acres = 39 sf)

See step 2 to determine if minimum size is appropriate.

- Tributary impervious area: = 0.107 ac (A)
- Tributary pervious area: = _____ ac (B)
- Minimum FocalPoint bed area required: = $((A \times 1.0) + (B \times 0.4)) \times 192$ = 21 sf
- FocalPoint bed area provided: = 21 sf
- Dimensions of proposed FocalPoint: = 7 ft x 3 ft

2. Model a Type III 24-hr rainfall event that generates the water quality volume to demonstrate that the entire storm volume is treated prior to activation of the overflow (typically set at 6–12 in. above the mulch).

Note: A 1.2–1.3 in. rainfall event usually generates 1.0 in. of runoff.

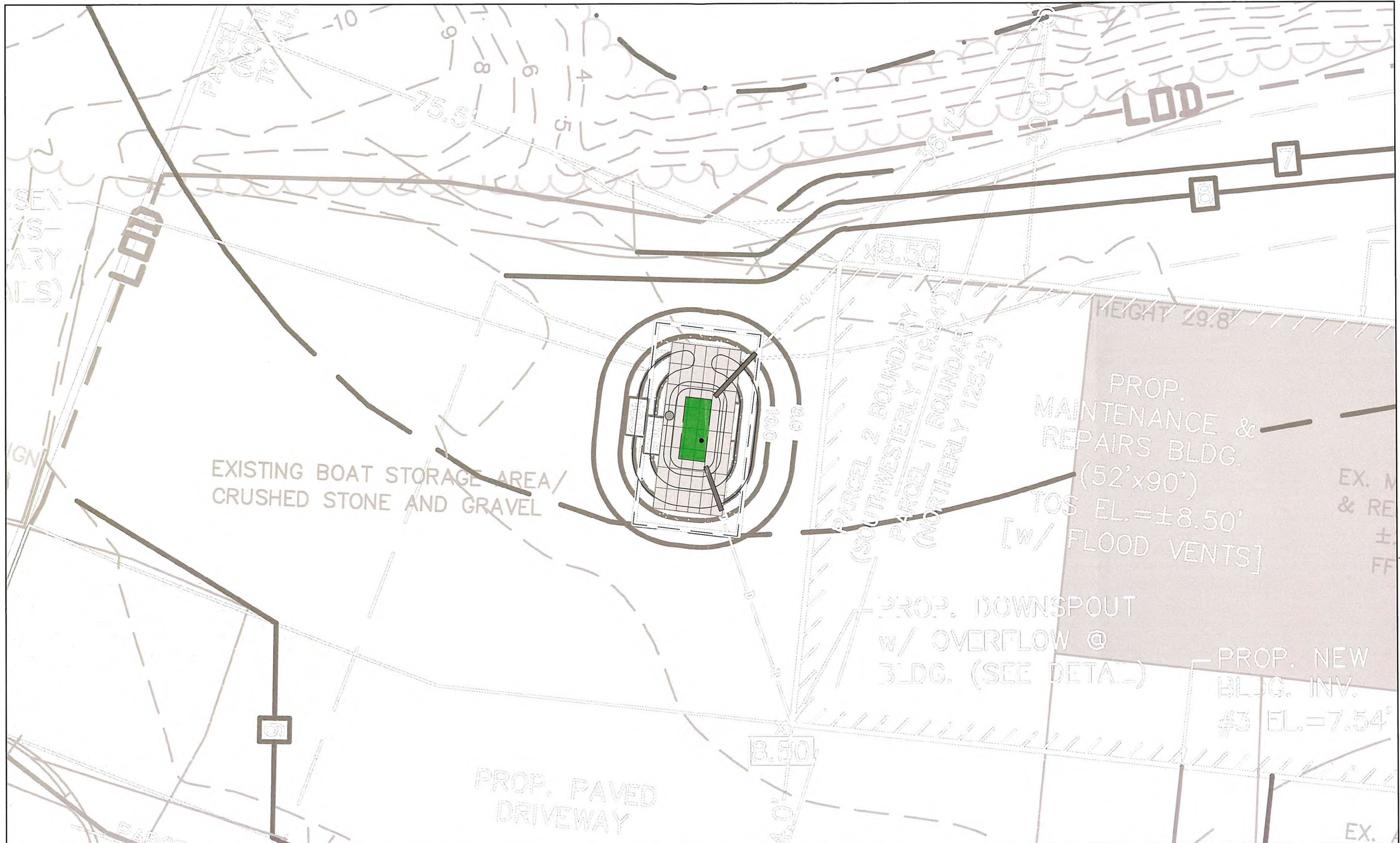
Contact Ferguson for a sample HydroCAD node.

- Water quality volume (WQv) goal: = 307 ft³
- Type III 24-hr rainfall depth to generate WQv: = 1 in.
- Temporary storage depth provided (typically 6–12 in.): = 5.64 in.
- Temporary storage volume provided at above depth: = 57 ft³
- Peak ponding depth from Type III 24-hr WQv event: = 0 in.

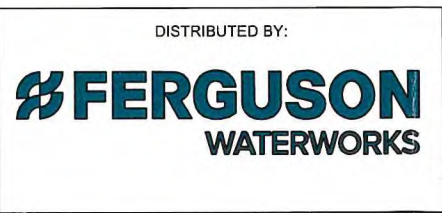
3. Size the Harco PVC domed overflow riser.

Note: Ferguson recommends installation of a Fabco domed overflow filter kit for overflow protection.

- Domed overflow riser diameter: = _____ in.
- Rim elevation of overflow riser: (typically 6–12 in. above mulch surface) = _____ ft
- Pipe size and pipe invert IN elevation: (typically 3 ft. below mulch surface) = _____ in. = _____ ft
- Pipe size and pipe invert OUT elevation: = _____ in. = _____ ft



DATE	INITIALS	DESCRIPTIONS
7/18/2025	BMK	OVERLAY UPDATED, REMOVED OVERFLOW PIPE



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FOCALPOINT
HIGH PERFORMANCE BIOFILTRATION MEDIA

SYSTEM OVERLAY
362 POND STREET
SOUTH KINGSTON, RI

DRAWN BY BMK
DATE 07/02/2025
SHEET NO. 1 of 5

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO FERGUSON WATERWORKS BY THE DESIGN ENGINEER, CONTRACTOR, OR OTHER PROJECT REPRESENTATIVE. THE ENGINEER OF RECORD SHALL REVIEW AND APPROVE THAT THE DEPICTED LAYOUT AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE REGULATIONS AND PROJECT SPECIFIC REQUIREMENTS.

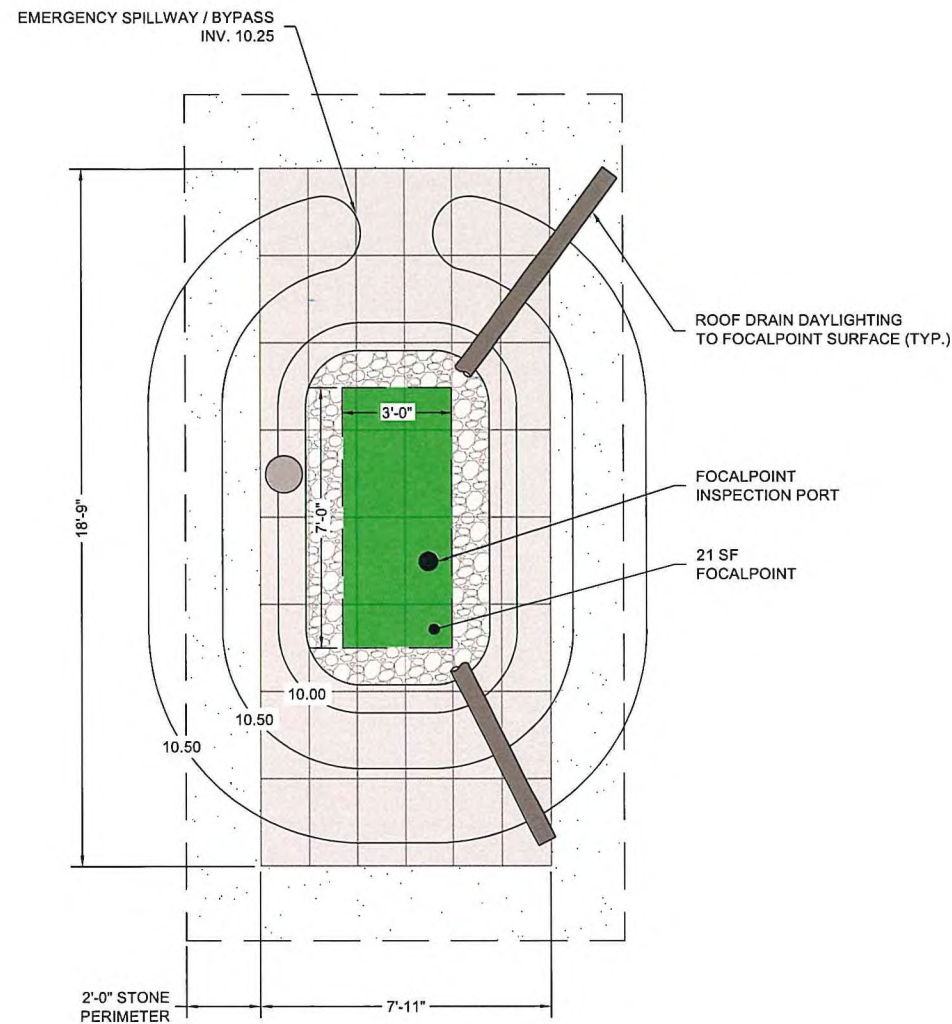
SYSTEM VOLUMES	
FOCALPOINT FOOTPRINT	21 SF
FOCALPOINT MEDIA QUANTITY	1 CY
SUBSURFACE STORAGE VOLUME	351 CF
EXCAVATION FOOTPRINT	270 SF
DRAINAGE STONE QUANTITY	14 CY

R-TANK QUANTITIES	
# OF HD SINGLE R-TANKS	48

ELEVATIONS	
DESCRIPTION	ELEVATION
TOP OF MULCH ELEVATION	9.78
TOP OF MEDIA ELEVATION	9.53
DEPTH OF MEDIA	18"
TOP OF BRIDGING STONE ELEVATION	8.03
TOP OF R-TANK UNDERDRAIN ELEV.	7.70
R-TANK UNDERDRAIN INVERT	6.25
INVERT OF STONE BASE (3")	6.00

LEGEND	
R-TANK HD SINGLE UNITS	
INSPECTION PORT	
6" FOCALPOINT INSPECTION INLET	
PIPE CONNECTION	
EXCAVATION PERIMETER	
PERIMETER BACKFILL	

- NOTES & DISCLAIMERS**
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
 2. BACKFILL, GEOTEXTILE, AND/OR LINER QUANTITIES ARE APPROXIMATIONS BASED ON DIMENSIONS SHOWN.
 3. CONSULTANT DRAWINGS ARE BEING RELIED UPON AS BEING ACCURATE IN DEPICTING SITE CONDITIONS, THAT THEY SATISFY ANY LOCAL BUILDING CODE REQUIREMENTS, AND THAT THEY ACCURATELY DEPICT SUBSURFACE CONDITIONS.
 4. FERGUSON SUPPLIES THE PRODUCTS ONLY AND TAKES NO RESPONSIBILITY FOR INSTALLATION AND HAS NO ROLE IN THE INSTALLATION OF THE PRODUCTS.
 5. R-TANK SYSTEMS ARE NOT DESIGNED TO SUPPORT LOADS FROM BUILDINGS, RETAINING WALLS, ETC. THEREFORE, THE ENGINEER OF RECORD MUST COORDINATED WITH THE PROPER DISCIPLINES TO ENSURE NO STRUCTURAL LOADS ARE IMPARTED UPON THE SYSTEM AND ANY INFILTRATION FROM THE SYSTEM HAS BEEN ACCOUNTED FOR IN FOUNDATION DESIGN.



DATE	INITIALS	DESCRIPTIONS
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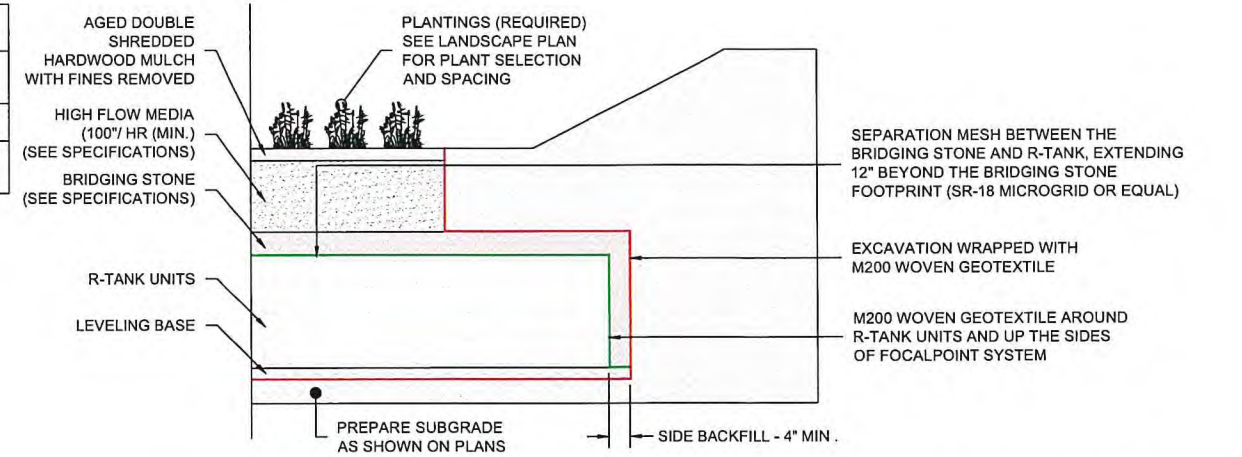
SYSTEM LAYOUT
362 POND STREET
SOUTH KINGSTON, RI

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SHEET NO. 2 of 5

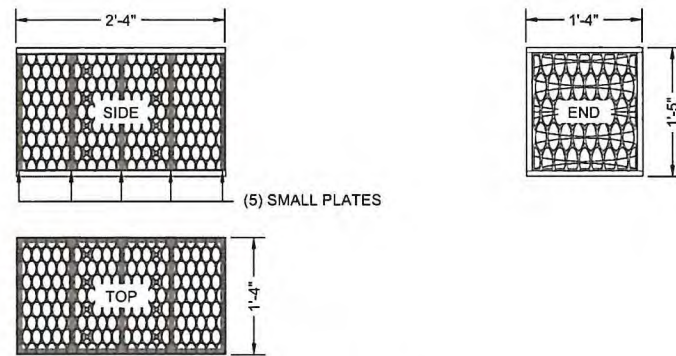
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R-TANK UNIT LOAD RATING					
UNIT TYPE	COMPRESSION STRENGTH	NON-VEHICULAR MIN. COVER*	HS-20 MIN. COVER*	HS-25 MIN. COVER*	MAX. COVER*
HD	33.4 PSI	12"	20"	24"	6.99'

* MINIMUM AND MAXIMUM COVER ARE MEASURED FROM THE TOP OF THE R-TANK UNIT TO THE TOP OF THE FINISHED SURFACE.



TYPICAL FOCALPOINT SECTION



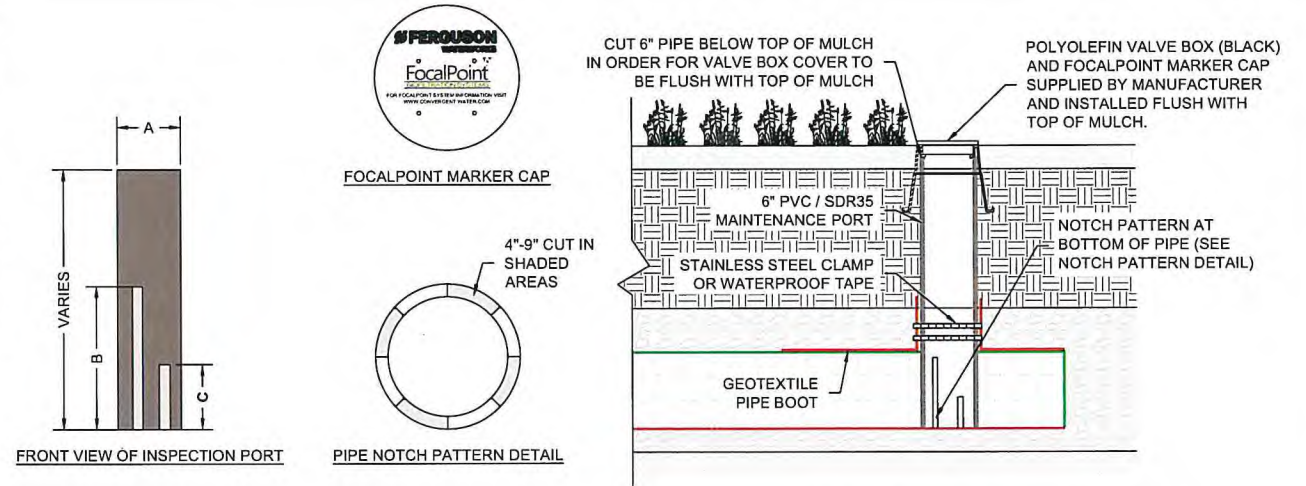
MODULE DATA

GEOMETRY:	LOAD RATING:
LENGTH = 28.15 IN. (715 MM)	33.4 PSI, (MODULE ONLY)
WIDTH = 15.75 IN. (400 MM)	HS20/HS25 - SEE SPEC FOR COVER REQUIREMENTS
HEIGHT = 17.32 IN. (440 MM)	MATERIAL:
TANK VOLUME = 4.44 CF	100% RECYCLED POLYPROPYLENE
STORAGE VOLUME = 4.22 CF	SMALL PLATES REQUIRED:
VOID INTERNAL VOLUME: 95%	5/SEGMENT, 5/MODULE
VOID SURFACE AREA: 90%	

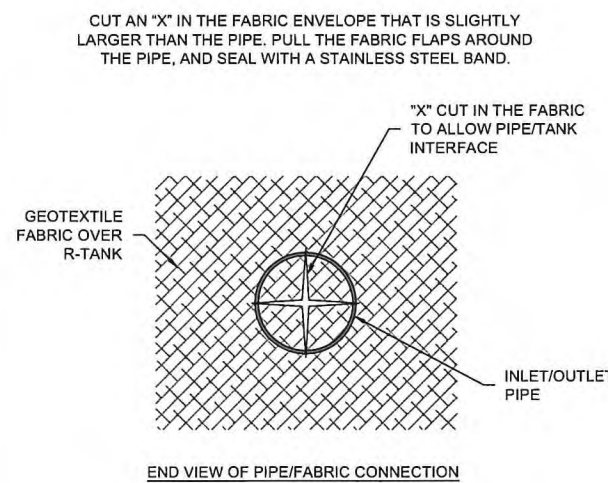
SINGLE R-TANK^{HD} - MODULE DETAIL

R-TANK INSPECTION PORT DIMENSIONS			
UNIT TYPE	PORT DIAMETER ("A")	TALL SLOT HEIGHT ("B")	SHORT SLOT HEIGHT ("C")
HD	12"	9"	4"
SD	12"	7"	4"
UD	10"	9"	4"
XD	12"	VARIES*	VARIES*

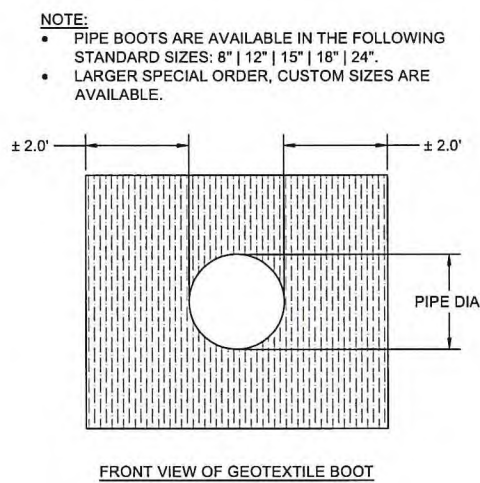
* VERTICAL HEIGHTS VARY BASED ON THE STACKING HEIGHT OF THE XD SYSTEM. THE TOP OF ANY OPENING SHOULD NOT EXCEED THE TOP OF THE STACK HEIGHT.



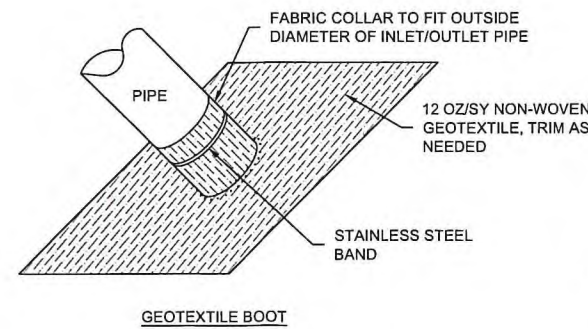
FOCALPOINT 6" INSPECTION PORT DETAIL



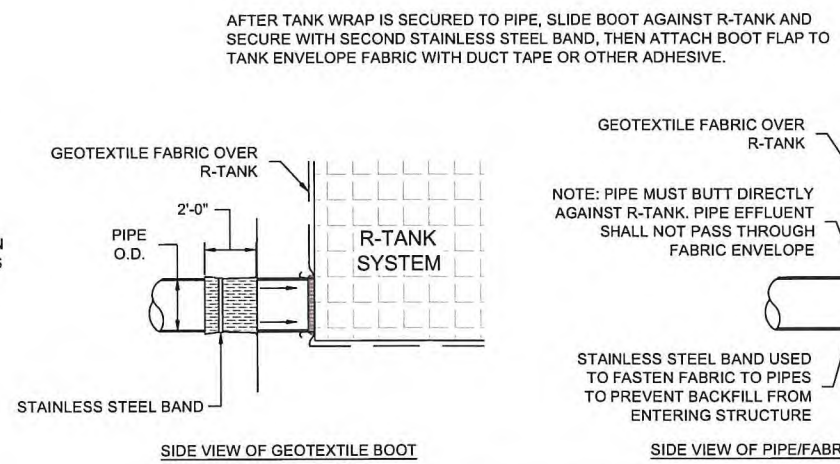
END VIEW OF PIPE/FABRIC CONNECTION



FRONT VIEW OF GEOTEXTILE BOOT



GEOTEXTILE BOOT



SIDE VIEW OF GEOTEXTILE BOOT

SIDE VIEW OF PIPE/FABRIC CONNECTION

R-TANK TYPICAL TANK INLET/OUTLET W/ GEOTEXTILE PIPE BOOT DETAIL

DATE	INITIALS	DESCRIPTIONS
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SYSTEM DETAILS
362 POND STREET
SOUTH KINGSTON, RI

DRAWN BY

BMK

DATE

07/02/2025

SHEET NO.

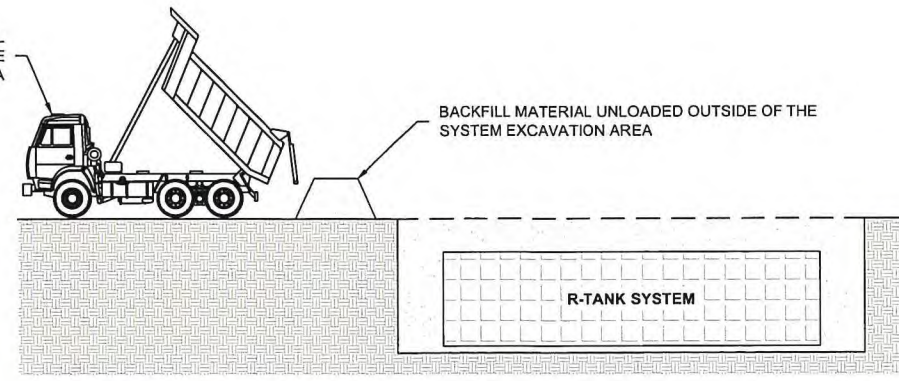
3 of 5

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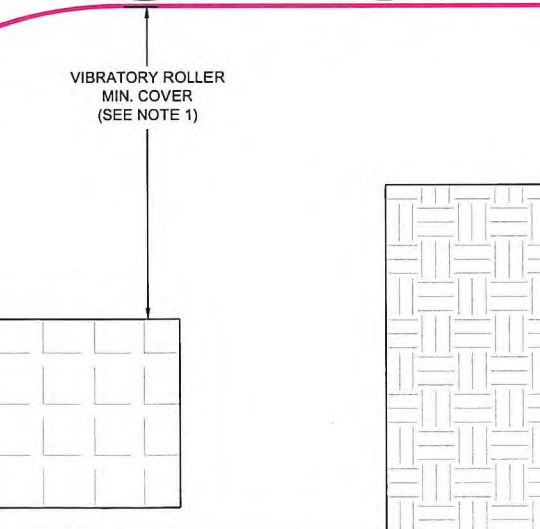
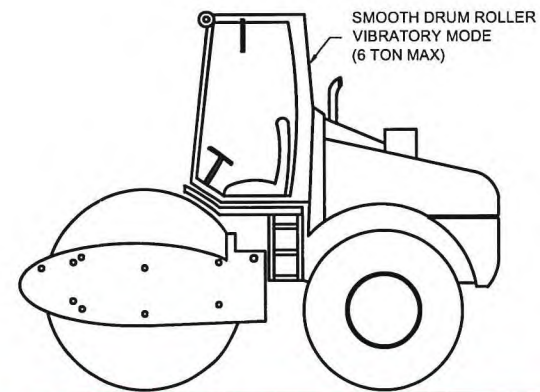
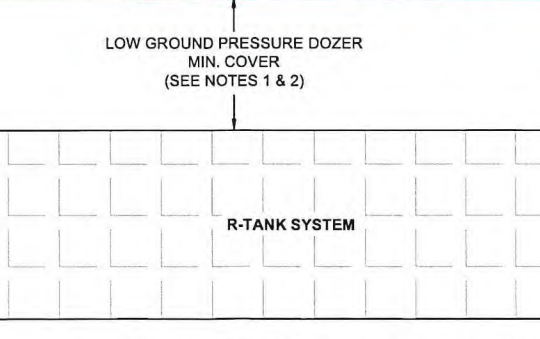
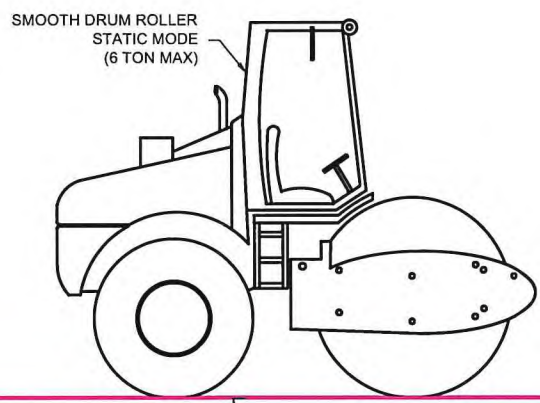
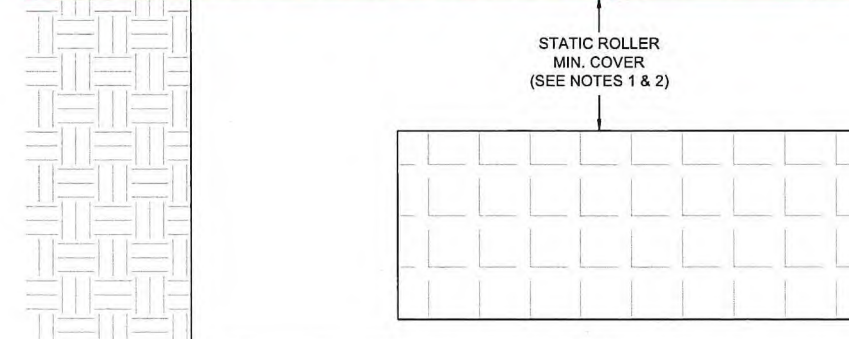
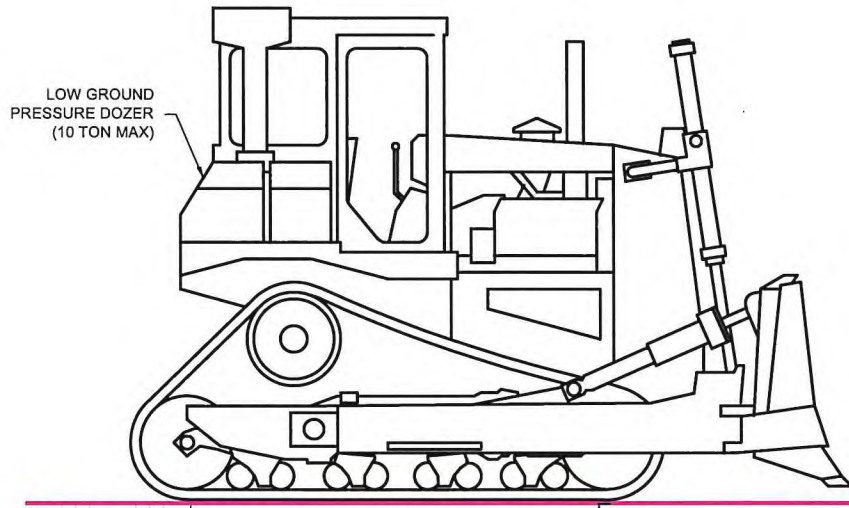
R-TANK CONSTRUCTION EQUIPMENT RECOMMENDATIONS				
UNIT TYPE	COMPRESSION STRENGTH	10 TON LOW GROUND PRESSURE DOZER MIN. COVER	6 TON SMOOTH DRUM STATIC ROLLER MIN. COVER	6 TON SMOOTH DRUM VIBRATORY ROLLER MIN. COVER
HD	33.4 PSI	12" (SEE NOTE 1, 2 & 3)	12" (SEE NOTE 1, 2 & 3)	24" (SEE NOTE 2)
SD	42.9 PSI	12" (SEE NOTE 1, 2 & 3)	12" (SEE NOTE 1, 2 & 3)	24" (SEE NOTE 2)

NOTES:
 1. FOLLOWING PLACEMENT OF SIDE BACKFILL, A UNIFORM 12" LIFT OF THE FREELY DRAINING MATERIAL (SPEC SECTION 2.03 B1) SHALL BE PLACED OVER THE R-TANK AND LIGHTLY COMPACTED USING A WALK-BEHIND TRENCH ROLLER. ALTERNATELY, A ROLLER (MAXIMUM GROSS VEHICLE WEIGHT OF 6 TONS) MAY BE USED. ROLLER MUST REMAIN IN STATIC MODE UNTIL A MINIMUM OF 24" OF COVER HAS BEEN PLACED OVER THE MODULES. SHEEP FOOT ROLLERS SHOULD NOT BE USED. SPEC SECTION 3.05 A5
 2. ONLY LOW PRESSURE TIRE OR TRACK VEHICLES (LESS THAN 7 PSI AND OPERATING WEIGHT OF LESS THAN 20,000 LBS) SHALL BE OPERATED OVER THE R-TANK SYSTEM DURING CONSTRUCTION. SPEC SECTION 3.05 A5
 3. DUMP TRUCKS AND PANS SHALL NOT BE OPERATED WITHIN THE R-TANK SYSTEM AT ANY TIME. WHERE NECESSARY, THE HEAVY EQUIPMENT SHOULD UNLOAD IN AN AREA ADJACENT TO THE R-TANK SYSTEM AND THE MATERIAL SHOULD BE MOVED OVER THE SYSTEM WITH TRACKED EQUIPMENT. SPEC SECTION 3.05 A5
 4. ENSURE THAT ALL UNRELATED CONSTRUCTION TRAFFIC IS KEPT AWAY FROM THE LIMITS OF EXCAVATION UNTIL THE PROJECT IS COMPLETE AND FINAL SURFACE MATERIALS ARE IN PLACE. NO NON-INSTALLATION RELATED LOADING SHOULD BE ALLOWED OVER THE R-TANK SYSTEM UNTIL THE FINAL DESIGN SECTION HAS BEEN CONSTRUCTED (INCLUDING PAVEMENT). SPEC SECTION 3.05 B
 5. SEE R-TANK INSTALLATION GUIDE OR CONTACT YOUR LOCAL FERGUSON REPRESENTATIVE FOR ADDITIONAL INFORMATION.

DUMP TRUCKS AND PANS SHALL NOT OPERATE OVER THE SYSTEM EXCAVATION AREA



DUMP TRUCK DETAIL



R-TANK HD OR SD CONSTRUCTION EQUIPMENT COVER DETAIL - GREEN SPACE

DATE	INITIALS	DESCRIPTIONS
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CONSTRUCTION EQUIPMENT COVER DETAIL
 362 POND STREET
 SOUTH KINGSTON, RI

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FOCALPOINT SPECIFICATION

SUMMARY

THE FOLLOWING GENERAL SPECIFICATIONS DESCRIBE THE COMPONENTS AND INSTALLATION REQUIREMENTS FOR A VOLUME BASED HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS) THAT UTILIZES PHYSICAL, CHEMICAL AND BIOLOGICAL MECHANISMS OF A SOIL, PLANT AND MICROBE COMPLEX TO REMOVE POLLUTANTS TYPICALLY FOUND IN URBAN STORM WATER RUNOFF. THE MODULAR TREATMENT SYSTEM IN WHICH THE BIOLOGICALLY ACTIVE BIOFILTRATION MEDIA IS USED SHALL BE A COMPLETE, INTEGRATED SYSTEM DESIGNED TO BE PLACED IN SQUARE FOOT OR LINEAR FOOT INCREMENTS PER THE APPROVED DRAWINGS TO TREAT CONTAMINATED RUNOFF FROM IMPERVIOUS SURFACES.

THE HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS) IS COMPRISED OF THE FOLLOWING COMPONENTS:

- A. PLANT COMPONENT
 - 1. MANUFACTURER SHALL PROVIDE A REGIONALIZED LIST OF ACCEPTABLE PLANTS.
 - 2. PLANTS, AS SPECIFIED IN THE APPROVED DRAWINGS/MANUFACTURER'S PLANT LIST, SHALL BE INSTALLED AT THE TIME THE HPMBS IS COMMISSIONED FOR USE.
 - 3. PLANTS AND PLANTING ARE TYPICALLY INCLUDED IN LANDSCAPE CONTRACT.
- B. BIOFILTER COMPONENT
 - 1. THIS COMPONENT EMPLOYS A HIGH PERFORMANCE CROSS-SECTION IN WHICH EACH ELEMENT IS HIGHLY DEPENDENT ON THE OTHERS TO MEET THE PERFORMANCE SPECIFICATION FOR THE COMPLETE SYSTEM. IT IS IMPORTANT THAT THIS ENTIRE CROSS-SECTION BE PROVIDED AS A COMPLETE SYSTEM AND INSTALLED AS SUCH.
 - 2. AS INDICATED IN THE APPROVED DRAWINGS, THE ELEMENTS OF THE BIOFILTER INCLUDE:
 - a. A MULCH PROTECTIVE LAYER (IF SPECIFIED).
 - b. AN ADVANCED HIGH INFILTRATION RATE BIOFILTRATION PLANTING MEDIA BED WHICH UTILIZES PHYSICAL, CHEMICAL AND BIOLOGICAL MECHANISMS OF THE SOIL, PLANT, AND MICROBE COMPLEX, TO REMOVE POLLUTANTS FOUND IN STORM WATER RUNOFF.
 - c. A SEPARATION LAYER WHICH UTILIZES THE CONCEPT OF 'BRIDGING' TO SEPARATE THE BIOFILTRATION MEDIA FROM THE UNDERDRAIN WITHOUT THE USE OF GEOTEXTILE FABRICS.
 - d. A WIDE APERTURE MESH LAYER UTILIZED TO PREVENT BRIDGING STONE FROM ENTERING THE UNDERDRAIN/STORAGE ELEMENT.
 - e. A MODULAR, HIGH INFILTRATION RATE 'FLAT PIPE' STYLE UNDERDRAIN/STORAGE SYSTEM WHICH IS DESIGNED TO DIRECTLY INFILTRATE OR EXFILTRATE WATER THROUGH ITS SURFACE. THE MODULAR UNDERDRAIN MUST PROVIDE A MINIMUM OF 95% VOID SPACE.
- C. ENERGY DISSIPATION COMPONENT
 - 1. AN ENERGY DISSIPATION COMPONENT IS TYPICALLY SPECIFIED TO SLOW AND SPREAD OUT WATER AS IT ENTERS THE SYSTEM. THIS COMPONENT IS DEPENDENT UPON THE DESIGN IN THE APPROVED DRAWINGS, BUT TYPICALLY CONSISTS OF A ROCK GABION, ROCK FILTER DAM OR DENSE VEGETATION ELEMENT, SUCH AS NATIVE GRASSES, EITHER SURROUNDING THE BIOFILTRATION COMPONENT OR LOCATED IMMEDIATELY UPSTREAM OF IT.
- D. PRETREATMENT COMPONENT
 - 1. PRETREATMENT, WHEN SPECIFIED, IS TYPICALLY ACCOMPLISHED BY LOCATING THE BIOFILTRATION COMPONENT DOWNSTREAM OF A SWALE, CURB CUT/ROCK APRON, SEDIMENT FOREBAY, DEEP OR SHALLOW SUMP WATER QUALITY MANHOLE, ETC. THESE BMPs SHOULD TARGET TRASH AND DEBRIS AND MEDIUM TO COARSE SEDIMENT.
- E. OBSERVATION AND MAINTENANCE COMPONENT
 - 1. AN OBSERVATION AND MAINTENANCE PORT SHALL BE INSTALLED PER THE APPROVED DRAWINGS TO PROVIDE FOR EASY INSPECTION OF THE UNDERDRAIN/STORAGE ELEMENT, AND CLEANOUT ACCESS IF NEEDED.
- F. EXTREME EVENT OVERFLOW (BY OTHERS)
 - 1. AN EXTREME EVENT OVERFLOW SHOULD BE LOCATED EXTERNAL TO, BUT NEAR THE BIOFILTRATION ELEMENT TO PROVIDE BYPASS WHEN NEEDED. THIS MAY BE AN OVERLAND FLOW BYPASS STRUCTURE, BEEHIVE OVERFLOW GRATE STRUCTURE, OR EQUIVALENT THAT SERVES THE PURPOSE. IF A BEEHIVE OVERFLOW STRUCTURE IS UTILIZED IT SHOULD INCLUDE A REMOVABLE FILTER INSERT TO PROVIDE A MINIMUM OF 50% TSS REMOVAL AND CONTROL OF GROSS POLLUTANTS, TRASH AND FLOATABLES.

QUALITY ASSURANCE AND PERFORMANCE SPECIFICATIONS

THE QUALITY AND COMPOSITION OF ALL SYSTEM COMPONENTS AND ALL OTHER APPURTENANCES AND THEIR ASSEMBLY PROCESS SHALL BE SUBJECT TO INSPECTION UPON DELIVERY OF THE SYSTEM TO THE WORK SITE. INSTALLATION IS TO BE PERFORMED ONLY BY SKILLED WORK PEOPLE WITH SATISFACTORY RECORD OF PERFORMANCE ON EARTHWORKS, PIPE, CHAMBER, OR POND/LANDFILL CONSTRUCTION PROJECTS OF COMPARABLE SIZE AND QUALITY.

- A. PLANTS
 - 1. PLANTS MUST BE COMPATIBLE WITH THE HPMBS MEDIA AND THE ASSOCIATED HIGHLY VARIABLE HYDROLOGIC REGIME. PLANTS ARE TYPICALLY FACULTATIVE WITH FIBROUS ROOTS SYSTEMS SUCH AS NATIVE GRASSES AND SHRUBS.
 - 2. MANUFACTURER SHALL PROVIDE A REGIONALIZED LIST OF ACCEPTABLE PLANTS.
 - 3. ALL PLANT MATERIAL SHALL COMPLY WITH THE TYPE AND SIZE REQUIRED BY THE APPROVED DRAWINGS AND SHALL BE ALIVE AND FREE OF OBVIOUS SIGNS OF DISEASE.
- B. MULCH
 - 1. MULCH, TYPICALLY DOUBLE SHREDDED HARDWOOD (NON-FLOATABLE), SHALL COMPLY WITH THE TYPE AND SIZE REQUIRED BY THE APPROVED DRAWINGS, AND SHALL BE SCREENED TO MINIMIZE FINES. ROCK MULCH IS AN ALTERNATIVE TO WOOD-BASED MULCH AND TYPICALLY CONSISTS OF CLEAN, ROUNDED RIVER ROCK (3-4" DIAM IN SIZE).
- C. BIOFILTRATION MEDIA
 - 1. BIOLOGICALLY ACTIVE BIOFILTRATION MEDIA SHALL BE VISUALLY INSPECTED TO ENSURE APPROPRIATE VOLUME, TEXTURE AND CONSISTENCY WITH THE APPROVED DRAWINGS, AND MUST BEAR A BATCH NUMBER MARKING FROM THE MANUFACTURER WHICH CERTIFIES PERFORMANCE TESTING OF THE BATCH TO MEET OR EXCEED THE REQUIRED INFILTRATION RATE (100 IN/HR). A THIRD-PARTY LABORATORY TEST MUST BE PROVIDED TO CERTIFY THE 100 IN/HR RATE.
 - 2. POLLUTANT REMOVAL PERFORMANCE, COMPOSITION AND CHARACTERISTICS OF THE BIOFILTRATION MEDIA MUST MEET OR EXCEED THE FOLLOWING MINIMUM STANDARDS AS DEMONSTRATED BY TESTING ACCEPTABLE TO THE PROJECT ENGINEER:

Pollutant	Removal Efficiency
TSS	91%
Phosphorus	66%
Nitrogen	48%
Composition and Characteristics	
Sand - Fine	< 5%
Sand - Medium	10% - 15%
Sand - Coarse	15% - 25%
Sand - Very Coarse	40% - 45%
Gravel	10% - 20%
Infiltration Rate	>100 inches per hour
Peat Moss*	5% - 15%

* Peat Moss Specification
Listed by Organic Materials Review Institute
100% natural peat (no composted, sludge, yard or leaf waste)
Total Carbon >85%
Carbon to Nitrogen Ratio 15:1 to 23:1
Lignin Content 49% to 52%
Humic Acid >18%
pH 6.0 to 7.0
Moisture Content 30% to 50%
95% to 100% passing 2.0mm sieve
> 80% passing 1.0mm sieve

- D. UNDERDRAIN/STORAGE SYSTEM
 - 1. UNDERDRAIN/STORAGE COMPONENTS SHALL BE MANUFACTURED IN AN ISO CERTIFIED FACILITY AND BE MANUFACTURED FROM AT LEAST 90% RECYCLED MATERIALS.
 - 2. UNDERDRAIN/STORAGE COMPONENTS SHALL MEET OR EXCEED THE FOLLOWING CHARACTERISTICS:

Property	Value
Surface Void Area	≥ 85%
Unit Weight	3.25 lbs/cf
Service Temperature	-14" to 167"
Unconfined Crush Strength	32.48 psi

180 Day Creep Test	
Load Applied – Initial and Sustained	11.16 psi
* Creep Sustained – After 180 Days	0.20 inches
* Creep Sustained – After 180 Days	1.13%
* Projected Creep – 40 years	1.72%

- E. SEPARATION MESH
 - 1. SEPARATION MESH SHALL BE COMPOSED OF HIGH-TENACITY MONOFILAMENT POLYPROPYLENE YARNS THAT ARE WOVEN TOGETHER TO PRODUCE AN OPEN MESH GEOTEXTILE WHICH SHALL BE INERT TO BIOLOGICAL DEGRADATION AND RESISTANT TO NATURALLY ENCOUNTERED CHEMICALS, ALKALIS AND ACIDS. THE MESH SHALL MEET OR EXCEED THE FOLLOWING CHARACTERISTICS:

Properties	Test Method	Unit	Min Avg Roll Value	
			MD	CD
Tensile Strength	ASTM D4595	kN/m (lbs/ft)	21 (1440)	25.3 (1733)
Creep Reduced Strength	ASTM D5262	kN/m (lbs/ft)	6.9 (471)	8.3 (566)
Long Term Allowable Design Load	GRI GG-4	kN/m (lbs/ft)	5.9 (407)	7.2 (490)
UV Resistance (at 500 hours)	-	% strength retained	90.00	
Aperture Size (machine direction)	-	mm (in)	2 (0.08)	
Aperture Size (cross machine direction)	-	mm (in)	2 (0.08)	
Mass/Unit Area	ASTM D5261	g/m ² (oz/yd ²)	197 (5.8)	

- F. BRIDGING STONE
 - 1. BRIDGING STONE SHALL BE 3/8" PEA GRAVEL, OR OTHER DIAMETER SIZED TO PREVENT MIGRATION OF FILTER MEDIA, AS SPECIFIED BY MANUFACTURER. STONE MUST BE WASHED AND FREE FROM SEDIMENT, SOIL AND CONTAMINANTS.
- G. DELIVERY, STORAGE AND HANDLING
 - 1. PROTECT ALL MATERIALS FROM DAMAGE DURING DELIVERY AND STORE UV SENSITIVE MATERIALS UNDER TARP TO PROTECT FROM SUNLIGHT INCLUDING ALL PLASTICS, WHEN TIME FROM DELIVERY TO INSTALLATION EXCEEDS ONE WEEK. STORAGE SHOULD OCCUR ON SMOOTH SURFACES, FREE FROM DIRT, MUD AND DEBRIS.
 - 2. BIOFILTRATION MEDIA SHALL BE SEGREGATED FROM ANY OTHER AGGREGATE MATERIALS AND SHALL BE PROTECTED AGAINST CONTAMINATION, INCLUDING CONTAMINATION FROM ANY STORMWATER RUNOFF FROM AREAS OF THE SITE WHICH ARE NOT STABILIZED.

SUBMITTALS

- A. PRODUCT DATA
 - 1. SUBMIT MANUFACTURER'S PRODUCT DATA AND APPROVED INSTALLATION MANUAL AS WELL AS MANUFACTURER'S OPERATIONS AND MAINTENANCE MANUAL FOR THE SYSTEM. IT WILL BE THE RESPONSIBILITY OF THE SYSTEM OWNER/OPERATOR OR THEIR CONTRACTOR TO ENSURE THE SYSTEM IS OPERATED AND MAINTAINED IN ACCORDANCE WITH THE MANUAL.
 - 2. CERTIFICATION
 - 3. MANUFACTURER SHALL SUBMIT A LETTER OF CERTIFICATION THAT THE COMPLETE SYSTEM MEETS OR EXCEEDS ALL TECHNICAL AND PACKAGING REQUIREMENTS. BIOFILTRATION MEDIA PACKAGING MUST BEAR A BATCH NUMBER MARKING FROM THE MANUFACTURER WHICH MATCHES A LETTER FROM THE MANUFACTURER CERTIFYING PERFORMANCE TESTING OF THE BATCH TO MEET OR EXCEED THE REQUIRED INFILTRATION RATE.
- B. DRAWINGS
 - 1. MANUFACTURER SHALL PROVIDE DIMENSIONAL DRAWINGS INCLUDING DETAILS FOR CONSTRUCTION, MATERIALS, SPECIFICATIONS, AND PIPE CONNECTIONS. THESE DIMENSIONAL DRAWINGS SHALL INDICATE THE HPMBS FILTER BED AREA (SQ. FT) AND CORRESPOND WITH AN APPROVED SET PLANS OR DRAINAGE/STORMWATER MANAGEMENT REPORT STAMPED BY THE ENGINEER OF RECORD.
 - 2. MANUFACTURER'S WARRANTY
 - 3. MANUFACTURER SHALL PROVIDE A WARRANTY FOR ALL COMPONENTS OF THE HPMBS FOR A PERIOD OF ONE YEAR PROVIDED THE UNIT IS INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE MANUAL. IMPROPER OPERATION, MAINTENANCE OR ACCIDENTAL OR ILLEGAL ACTIVITIES (I.E. DUMPING OF POLLUTANTS, VANDALISM, ETC.) WILL VOID THE WARRANTY.
- C. DESIGN COMPUTATIONS
 - 1. THE HPMBS MUST BE SIZED USING A VOLUME-BASED SIZING CRITERIA AND DEMONSTRATE, USING AN SCS STORMWATER MODELLING SOFTWARE/SPREADSHEET CALCULATOR THAT THE REQUIRED WATER QUALITY VOLUME (DEFINED BY THE ENGINEER OF RECORD) PASSES THROUGH THE HPMBS PRIOR TO ACTIVATION OF THE OVERFLOW DEVICE (SET NO HIGHER THAN TWELVE (12) INCHES ABOVE THE TOP ELEVATION OF THE HPMBS (TYPICALLY DEFINED AS TOP OF MULCH). DESIGN COMPUTATIONS MUST BE PROVIDED AS PART OF THE SUBMITTAL PROCESS. IF LOCAL REGULATIONS HAVE THE SYSTEM APPROVED BASED ON AN ALTERNATIVE SIZING CRITERION THE LARGER OF THE TWO COMPUTED SIZES WILL GOVERN.
- D. SUBSTITUTIONS
 - 1. ANY PROPOSED EQUAL ALTERNATIVE PRODUCT SUBSTITUTION TO THIS SPECIFICATION MUST BE SUBMITTED FOR REVIEW AND APPROVED PRIOR TO BID OPENING. REVIEW PACKAGE SHOULD INCLUDE THIRD PARTY REVIEWED PERFORMANCE DATA FOR BOTH FLOW RATE AND POLLUTANT REMOVAL OF BIOFILTRATION MEDIA. POLLUTANT REMOVAL DATA MUST FOLLOW SPECIFIED PROTOCOLS. ALL COMPONENTS MUST MEET OR EXCEED QUALITY ASSURANCE AND PERFORMANCE CRITERIA INDICATED HEREIN.

PROJECT CONDITIONS

REVIEW MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES AND COORDINATE INSTALLATION WITH OTHER WORK AFFECTED, SUCH AS GRADING, EXCAVATION, UTILITIES, CONSTRUCTION ACCESS AND EROSION CONTROL TO PREVENT ALL NON-INSTALLATION RELATED CONSTRUCTION TRAFFIC OVER THE COMPLETED HPMBS.

- A. COLD WEATHER
 - 1. DO NOT USE FROZEN MATERIALS OR MATERIALS MIXED OR COATED WITH ICE OR FROST.
 - 2. DO NOT BUILD ON FROZEN GROUND OR WET, SATURATED OR MUDDY SUBGRADE.
 - 3. CARE MUST BE TAKEN WHEN HANDLING PLASTICS WHEN AIR TEMPERATURE IS AT 40 DEGREES FAHRENHEIT OR BELOW AS PLASTIC BECOMES BRITTLE.

- B. PROTECT PARTIALLY COMPLETED INSTALLATION AGAINST DAMAGE FROM OTHER CONSTRUCTION TRAFFIC WHEN WORK IS IN PROGRESS AND FOLLOWING COMPLETION OF BACKFILL BY ESTABLISHING A PERIMETER WITH HIGHLY VISIBLE CONSTRUCTION TAPE, FENCING, OR OTHER MEANS UNTIL CONSTRUCTION IS COMPLETE.
- C. SOIL STABILIZATION OF THE SURROUNDING SITE MUST BE COMPLETE BEFORE THE BIOFILTRATION SYSTEM CAN BE BROUGHT ONLINE. SOIL STABILIZATION OCCURS WHEN 90% OF THE SITE HAS BEEN PAVED OR VEGETATED. TEMPORARY EROSION CONTROL AND/OR SEDIMENTATION PREVENTION MEASURES SHALL BE IMPLEMENTED TO REDUCE THE POSSIBILITY OF SEDIMENTS BEING TRANSPORTED INTO THE BIOFILTRATION SYSTEM PRIOR TO FULL STABILIZATION OF THE SITE. SIGNIFICANT SEDIMENT LOADS CAN DAMAGE THE HPMBS AND LEAD TO FAILURE IF NOT PREVENTED OR REMEDIATED PROMPTLY.

PRODUCTS

- A. ACCEPTABLE HPMBS
 - 1. FOCALPOINT HIGH PERFORMANCE BIOFILTRATION SYSTEM
- B. ACCEPTABLE BEEHIVE OVERFLOW GRATE STRUCTURE (OPTIONAL)
 - 1. BEEHIVE OVERFLOW GRATE STRUCTURE WITH REMOVABLE STORMSACK
- C. ACCEPTABLE MANUFACTURER
 - CONVERGENT WATER TECHNOLOGIES, INC.
 - 800-711-5428
 - WWW.CONVERGENTWATER.COM
- D. AUTHORIZED VALUE ADDED RESELLER
 - FERGUSON WATERWORKS
 - 800-448-3636
 - WWW.FERGUSON.COM

PACKAGING

- A. HPMBS IS ASSEMBLED ON SITE.
- B. MODULAR UNDERDRAIN/STORAGE UNIT IS SHIPPED FLAT AND MODULES ARE ASSEMBLED PRIOR TO INSTALLATION.
- C. BIOFILTRATION MEDIA IS DELIVERED IN ONE TON SUPER SACKS EACH LABELED WITH MANUFACTURER'S BATCH NUMBER AND/OR IN BULK WITH ACCOMPANYING MANUFACTURER'S CERTIFICATION.
- D. OTHER COMPONENTS ARE DELIVERED IN BULK OR SUPER SACKS

EXCAVATION

- A. EXCAVATION AND BACKFILL
 - 1. BASE OF EXCAVATION SHALL BE SMOOTH, LEVEL AND FREE OF LUMPS OR DEBRIS, AND COMPACTED UNLESS INFILTRATION OF STORM WATER INTO SUBGRADE IS DESIRED. A THIN LAYER (3") OF COMPACTED BASE MATERIAL IS RECOMMENDED TO ESTABLISH A LEVEL WORKING PLATFORM (MAY NOT BE NEEDED IN SANDY SOILS). IF THE BASE OF THE EXCAVATION IS PUMPING OR APPEARS EXCESSIVELY SOFT, A GEOTECHNICAL ENGINEER SHOULD BE CONSULTED FOR ADVICE. IN MANY CASES, A STABILIZATION GEOTEXTILE AND 6" OF COMPACTABLE MATERIAL THAT DRAINS WELL WILL BE SUFFICIENT TO AMEND THE BEARING CAPACITY OF THE SOIL.
 - 2. MOST APPLICATIONS REQUIRE 8 OZ NON-WOVEN GEOTEXTILE OR EQUIVALENT NONWOVEN GEOTEXTILE WITH A NOMINAL WEIGHT OF 8 OZ PER SQUARE YARD TO LINE THE EXCAVATION TO SEPARATE IN SITU SOILS AND THE HPMBS. (APPLICATIONS REQUIRING WATER TO INFILTRATE THE IN SITU SUB-SOILS SHOULD USE A BRIDGING STONE RATHER THAN GEOTEXTILE TO PROVIDE A SEPARATION LAYER BETWEEN THE HPMBS AND THE IN SITU SOILS). GEOTEXTILE, WHEN UTILIZED, SHOULD BE PLACED ON THE BOTTOM AND UP THE SIDES OF THE EXCAVATION. ABSOLUTELY NO GEOTEXTILES SHOULD BE USED IN THE WATER COLUMN. IF AN IMPERMEABLE LINER IS SPECIFIED, IT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
 - 3. SPECIFIED BACKFILL MATERIAL MUST BE FREE FROM LUMPS, DEBRIS AND ANY SHARP OBJECTS THAT COULD PENETRATE THE GEOTEXTILE. MATERIAL IS USED FOR BACKFILL ALONG THE SIDES OF THE SYSTEM AS INDICATED IN ENGINEERING DETAIL DRAWINGS.
- B. INSPECTION
 - 1. EXAMINE PREPARED EXCAVATION FOR SMOOTHNESS, COMPACTION AND LEVEL. CHECK FOR PRESENCE OF HIGH WATER TABLE, WHICH MUST BE KEPT AT LEVELS BELOW THE BOTTOM OF THE UNDERDRAIN STRUCTURE AT ALL TIMES. IF THE BASE IS PUMPING OR APPEARS EXCESSIVELY SOFT, A GEOTECHNICAL ENGINEER SHOULD BE CONSULTED FOR ADVICE.
 - 2. INSTALLATION COMMENCEMENT CONSTITUTES ACCEPTANCE OF EXISTING CONDITIONS AND RESPONSIBILITY FOR SATISFACTORY PERFORMANCE. IF EXISTING CONDITIONS ARE FOUND TO BE UNSATISFACTORY, CONTACT PROJECT MANAGER OR ENGINEER FOR RESOLUTION PRIOR TO INSTALLATION.
- C. CLEANUP AND PROTECTION DURING ONGOING CONSTRUCTION ACTIVITY
 - 1. PERFORM CLEANING DURING THE INSTALLATION AND UPON COMPLETION OF THE WORK.
 - 2. REMOVE FROM SITE ALL EXCESS MATERIALS, DEBRIS, AND EQUIPMENT. REPAIR ANY DAMAGE TO ADJACENT MATERIALS AND SURFACES RESULTING FROM INSTALLATION.
 - 3. IF SURROUNDING DRAINAGE AREA IS NOT FULLY STABILIZED, A PROTECTIVE COVERING OF GEOTEXTILE FABRIC SHOULD BE SECURELY PLACED TO PROTECT THE BIOFILTRATION MEDIA.
 - 4. CONSTRUCTION PHASE EROSION AND SEDIMENTATION CONTROLS SHALL BE PLACED TO PROTECT THE INLET(S) TO THE BIOFILTRATION SYSTEM. EXCESSIVE SEDIMENTATION, PARTICULARLY PRIOR TO ESTABLISHMENT OF PLANTS MAY DAMAGE THE HPMBS.
 - 5. STRICTLY FOLLOW MANUFACTURER'S GUIDELINES WITH RESPECT TO PROTECTION OF THE HPMBS BETWEEN INSTALLATION AND COMMISSIONING PHASES.
- D. COMMISSIONING
 - 1. COMMISSIONING SHOULD ONLY BE CARRIED OUT ONCE THE CONTRIBUTING DRAINAGE AREA IS FULLY STABILIZED. IF COMMISSIONING MUST BE CARRIED OUT SOONER, IT IS IMPERATIVE THAT APPROPRIATE EROSION AND SEDIMENT CONTROLS BE PLACED TO PREVENT THE ENTRY OF EXCESSIVE SEDIMENT/POLLUTANT LOADS INTO THE SYSTEM.
 - 2. COMMISSIONING ENTAILS REMOVING THE PROTECTIVE COVERING FROM THE BIOFILTRATION MEDIA, PLANTING THE PLANT MATERIAL IN ACCORDANCE WITH THE APPROVED DRAWINGS, AND PLACING MULCH IF SPECIFIED.
 - 3. DIG PLANTING HOLES THE DEPTH OF THE ROOT BALL AND TWO TO THREE TIMES AS WIDE AS THE ROOT BALL. WIDE HOLES ENCOURAGE HORIZONTAL ROOT GROWTH THAT PLANTS NATURALLY PRODUCE.
 - 4. WITH TREES, YOU MUST ENSURE YOU ARE NOT PLANTING TOO DEEP. DON'T DIG HOLES DEEPER THAN ROOT BALLS. THE MEDIA SHOULD BE PLACED AT THE ROOT COLLAR, NOT ABOVE THE ROOT COLLAR. OTHERWISE THE STEM WILL BE VULNERABLE TO DISEASE.
 - 5. STRICTLY FOLLOW MANUFACTURER'S PLANTING GUIDANCE.
 - 6. COVER THE EXPOSED ROOT BALL TOP WITH MULCH. MULCH SHOULD NOT TOUCH THE PLANT BASE BECAUSE IT CAN HOLD TOO MUCH MOISTURE AND INVITE DISEASE AND INSECTS. EVENLY PLACE 3 INCHES OF DOUBLE-SHREDDED HARDWOOD MULCH (IF SPECIFIED) ON THE SURFACE OF THE MEDIA.
 - 7. PLANTINGS SHALL BE WATERED-IN AT INSTALLATION AND TEMPORARY IRRIGATIONS SHALL BE PROVIDED, IF SPECIFIED.

DATE	INITIALS	DESCRIPTIONS
7/18/2025	BMK	OVERLAY UPDATED, REMOVED OVERFLOW PIPE



DISTRIBUTED BY:

FOCALPOINT
HIGH PERFORMANCE BIOFILTRATION MEDIA

FOCALPOINT SPECIFICATION
362 POND STREET
SOUTH KINGSTON, RI

DRAWN BY BMK
DATE 07/02/2025
SHEET NO. 5 of 5

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO FERGUSON WATERWORKS BY THE DESIGN ENGINEER, CONTRACTOR, OR OTHER PROJECT REPRESENTATIVE. THE ENGINEER OF RECORD SHALL REVIEW AND APPROVE THAT THE DEPICTED LAYOUT AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE REGULATIONS AND PROJECT SPECIFIC REQUIREMENTS.