

13. STORMWATER MANAGEMENT PLAN

As previously described, the Site consists entirely of existing paved area. The proposed work includes the construction of a 9,935 square foot building with associated grading and installation of a some landscaped areas. The following section discusses stormwater management relative to the Basic, General, and Flooding Standards as defined in Chapter 5 of the City Technical Manual and the Maine Department of Environmental Protection Chapter 500 Stormwater Regulations. The project will result in an increase of approximately 4,450 square feet of pervious surface, and will disturb an area of approximately 45,000 square feet. The project will result in the redevelopment of over 5,000 square feet of non-roof impervious as such the project is required to provide stormwater quality treatment in accordance with the General Standards for no less than 50% of the redeveloped non-roof impervious area. The project area is greater one acre, so a Maine Construction General Permit is will be required for the project, a notice of intent to comply will be sent to MaineDEP prior to construction. The project does not require a stormwater permit from the Maine Department of Environmental Protection.

13.1 BASIC STANDARD (SOIL EROSION AND SEDIMENTATION CONTROL)

These standards address erosion and sedimentation control, inspection and maintenance, and good housekeeping practices. The application includes erosion and sediment control plans, details, and notes. These notes cover good housekeeping practices. The Erosion and Sedimentation Control Plan for the proposed project is provided below.

13.1.1 Erosion and Sedimentation Control Plan

The overall goal of the Soil Erosion and Sedimentation Plan is to restrict the potential for erosion and sedimentation at the site and down-gradient of the site. The existing site is primarily an impervious surface surrounded by existing buildings and roadways. The entire surface will be disturbed for construction, but due to its location and the nature of the proposed work, the risk of erosion is minimal.

A variety of erosion control techniques will be implemented to achieve this goal. During construction, these include:

- Installation and maintenance of construction entrances at the travelled interface between stabilized and non-stabilized portions of the project site;
- Installation of sediment collection devices within existing catch basins;
- Controls for fugitive dust, debris, and other materials;
- Regular sweeping of the adjacent roadways to eliminate the tracking of sediment outside of the site; and
- Inspection of all in-place measures after every significant rainfall until permanent measures are in place.

Structural measures will be installed where shown on the Soil Erosion and Sedimentation Control Plan, which is included in the drawings attached to Section 3 of this Report; details for the proposed measures are also included in the drawings. All measures will be implemented in accordance with the “Maine Erosion and Sedimentation Handbook for Construction: Best Management Practices”; they will be installed prior to any earth disturbing activities. All temporary measures will be removed after the areas are permanently stabilized.

13.2 GENERAL STANDARD (WATER QUALITY)

The existing project area consists of entirely paved area. The proposed M&O building will incorporate approximately 4,450 square feet of newly proposed landscaped areas which will increase the pervious on site. However, the project will result in the redevelopment of over 5,000 square feet of non-roof impervious and as such the project was designed to treat a minimum of 50% of the redeveloped non-roof impervious area.

The project will result in approximately 30,215 square feet of redeveloped non-roof impervious area, leaving 15,108 square feet of area required to be treated. A Jellyfish filter has been sized to treat 17,000 square feet which exceeds

the 15,108 square foot required for treatment of 50% of the redeveloped impervious area onsite. The jellyfish filter had been placed along the eastern portion of the newly proposed parking lot and will collect stormwater runoff generated by the parking lot and area adjacent to the maintenance bays, via three (3) catch basins. The catch basins will direct stormwater runoff into the Jellyfish Filter for treatment prior to entering the existing onsite storm drain system.

| Stormwater Area Breakdown | |
|---|------------------|
| | Area (sf) |
| Total Project Area | 45,000.00 |
| Total disturbed area: | 45,000.00 |
| Proposed new pervious area: | 4,450.00 |
| Proposed Building Footprint: | 9,935.00 |
| Proposed Field Office Footprint | 400.00 |
| Total redeveloped non-roof impervious area | 30,215.00 |
| 50% non-roof impervious area | 15,108.00 |
| Redeveloped non-roof impervious area treated | 15,200.00 |
| Total Area Treated by Jellyfish Filter | 17,000.00 |

The Jellyfish Filter is a proprietary system which has been reviewed and approved for use by the Maine Department of Environmental Protection, a copy of the approval letter is attached in this section. The proposed Jellyfish Filter for the M&O facility has been designed to meet the MaineDEP approval standards to treat a minimum Water Quality Volume of one (1) inch runoff from impervious areas and 0.4 inch runoff from pervious areas. Please see attached calculations demonstrating that the filter has adequate capacity to treat a 1 inch runoff depth from the proposed parking lot area. As shown a 1 inch of runoff will generate a Water Quality Flow of 0.42 cubic feet per second (cfs), the proposed Jellyfish filter model JF4-2-1 has a maximum Water Quality Flow of 0.45 cfs.

The Jellyfish Filter has been sized to treat additional stormwater runoff that is generated from existing portion of the site from an approximately 1,800 square foot area. Additionally, while the Jellyfish Filter is only required to treat the Water Quality Volume, the proposed capacity has been checked against flows from the 2, 10, and 25-year storm events. These storms produce runoff flows of 1.18 cfs, 1.76 cfs, and 2.23 cfs respectively. The proposed Jellyfish Filter model JF4-2-1 can receive up to a maximum of 2.96 cfs without negatively affecting the stormwater drainage system.

13.3 FLOODING STANDARD (WATER QUANTITY)

As the site will result in a decrease in impervious surfaces, peak stormwater flows and stormwater quantity are not anticipated to increase, and flooding control will not be required. Currently, the site discharges into the Fore River which is a tidal waterbody. We are requesting a waiver from providing flood control.

13.4 INSPECTION AND MAINTENANCE OF STORMWATER SYSTEMS

General inspection and maintenance during and after construction must take place in accordance with the requirements outlined in Chapter 500, Stormwater Management, Appendix B, Inspection and Maintenance and Stormwater Management, Maine Department of Environmental Protection publication No. DEPLW0738. The IMT Facility will be responsible for implementing the maintenance and inspection requirements for the stormwater management system associated with the new development. The Jellyfish Filter and associated stormwater infrastructure will be inspected and maintained per the guidance outlined herein.

In accordance with Ordinance Section 32-38, the IMT Facility will hire a qualified post-construction with knowledge of stormwater management and erosion and sediment control, including the standards and conditions in the permit, to conduct the inspections and perform maintenance of the facilities. On or by June 30th of each year, Certification that the stormwater management system has been inspected, cleaned, and maintained shall be submitted to the Department of Public Works in a form provided by that Department.

The inspection and maintenance criteria outlined in Chapter 500 Stormwater Regulations will be followed. Monitoring and maintenance is critical for the proper operation of the Jellyfish Filter system. First year post-construction monitoring differs primarily by its increased frequency to assure proper system functioning. Post-construction routine monitoring is based on USEPA requirements for good housekeeping practices.

Post-Construction: Inspection frequency should be at least once every six months and after every major storm in the first year following construction.

- Perform sediment removal for depths reaching 12 inches or greater, or within 3 years.
- Removal all floatable trash and debris
- Filter cartridges shall be rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing.
- Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment or if damaged or missing. Tentacles should remain in service for no longer than 5 years.

13.5 ATTACHMENTS

- Jellyfish Filter sizing calculations
- MaineDEP Jellyfish Filter approval letter
- Stormwater Erosion & Sedimentation Control Inspection Report Form



| | | | |
|------------------------------------|--------------------------------------|-------------------------|---------------|
| Project Name: | IMT Maint. & Ops Building | Date: | 8/9/17 |
| Site Designation: | Jellyfish | Design Engineer: | CJA |
| County or Independent City: | Portland | | |
| State: | ME | | |

Mass Loading Calculations:

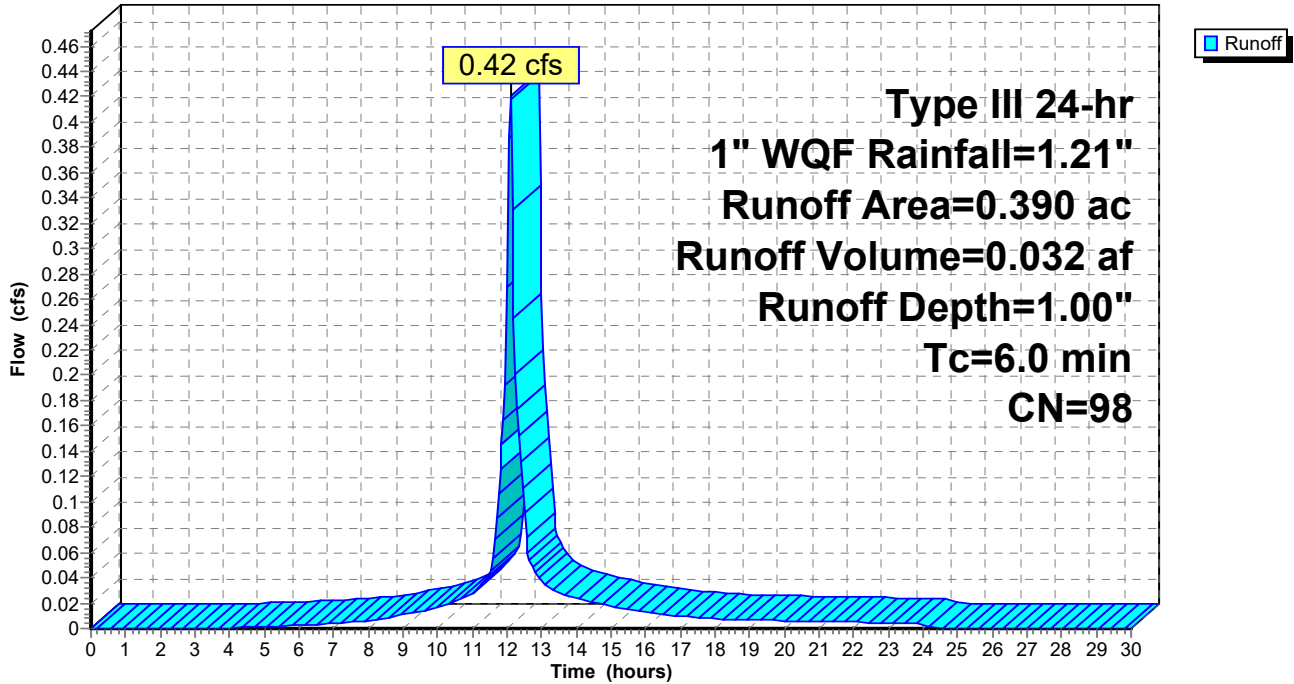
| | |
|---|--------|
| Peak Design Flow (cfs) | 1.76 |
| Water Quality Flow (cfs) | 0.42 |
| Annual Rainfall (inches) | 46 |
| Total Drainage Area, A (ac) | 0.39 |
| Post Development Impervious Area, A _i (ac) | 0.39 |
| Pervious Area, A _p (ac) | 0.00 |
| Impervious Runoff Coefficient, R _v | 0.95 |
| Pervious Runoff Coefficient, R _v | 0.25 |
| % Impervious | 100% |
| Runoff Coefficient, R _c | 0.95 |
| TSS Removal By Pretreatment | 0% |
| Agency Required TSS % Removal | 80% |
| Required TSS Removal Efficiency of Filter | 80% |
| Percent Runoff Capture | 100% |
| Mean Annual Runoff, V _t (ft ³) | 61,866 |
| Event Mean Concentration of Pollutant, EMC (mg/L) | 100 |
| Annual Mass Load, M _{total} (lbs) | 385.99 |

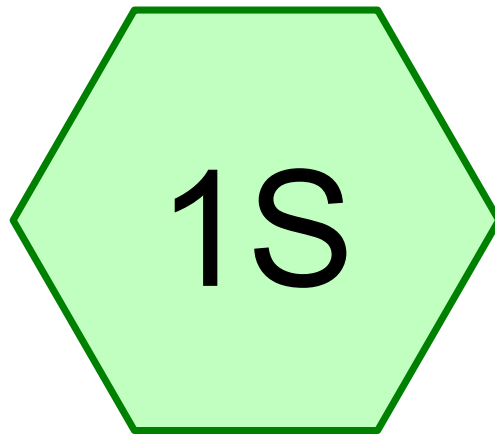
Mass Based Filter Sizing:

| | |
|--|-----------|
| Mass to be Captured by System (lbs) | 308.79 |
| Filter Type | Jellyfish |
| Structure Type | Manhole |
| Cartridge Length | 54" |
| Allowable Load Per Hi-Flo Cartridge (lbs) | 125 |
| Allowable Load Per Draindown Cartridge (lbs) | 63 |
| # Hi-Flo Cartridges Required | 2 |
| # Draindown Cartridges Required | 1 |
| Recommended Model | JF4-2-1 |
| TSS Treatment Capacity (lbs) | 313.00 |
| Maximum Water Quality Flow | 0.45 cfs |

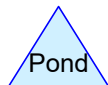
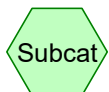
Subcatchment 1S: IMT JF4-2-1

Hydrograph





Jellyfish Subcatchment Area



Jellyfish Area sizing

Prepared by WoodardCurran

HydroCAD® 10.00-18 s/n 01204 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 2yr Rainfall=3.10"

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Summary for Subcatchment 1S: Jellyfish Subcatchment Area

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 0.087 af, Depth> 2.68"

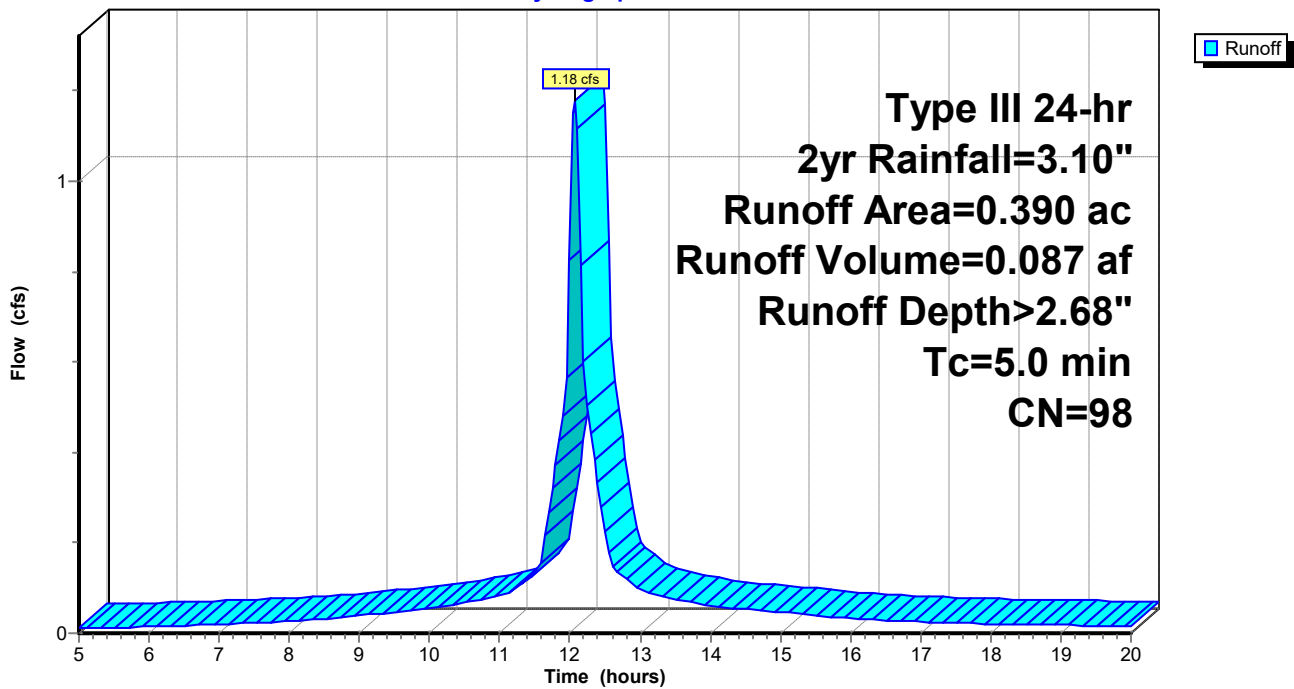
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2yr Rainfall=3.10"

| Area (ac) | CN | Description |
|-----------|----|-------------------------|
| 0.390 | 98 | Paved parking, HSG B |
| 0.390 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment 1S: Jellyfish Subcatchment Area

Hydrograph



Jellyfish Area sizing

Prepared by WoodardCurran

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Type III 24-hr 10yr Rainfall=4.60"

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Summary for Subcatchment 1S: Jellyfish Subcatchment Area

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.76 cfs @ 12.07 hrs, Volume= 0.132 af, Depth> 4.05"

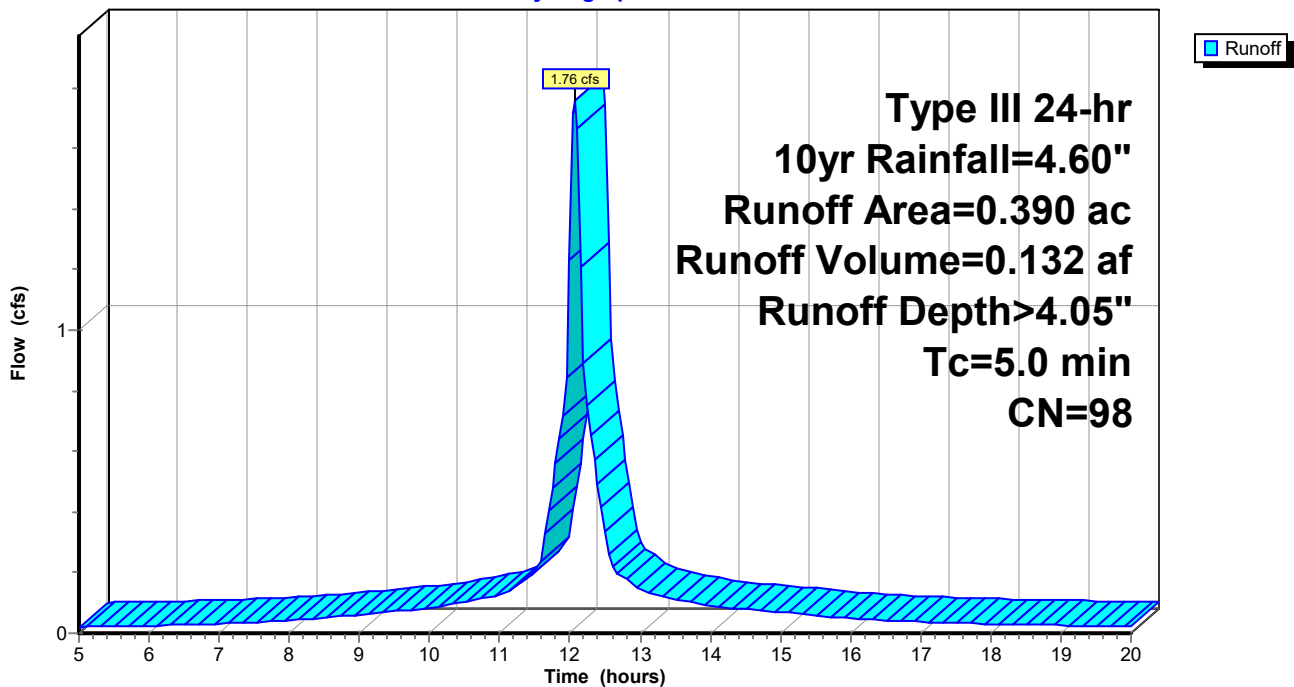
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10yr Rainfall=4.60"

| Area (ac) | CN | Description |
|-----------|----|-------------------------|
| 0.390 | 98 | Paved parking, HSG B |
| 0.390 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment 1S: Jellyfish Subcatchment Area

Hydrograph



Jellyfish Area sizing

Prepared by WoodardCurran

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Type III 24-hr 25yr Rainfall=5.80"

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Summary for Subcatchment 1S: Jellyfish Subcatchment Area

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.23 cfs @ 12.07 hrs, Volume= 0.167 af, Depth> 5.15"

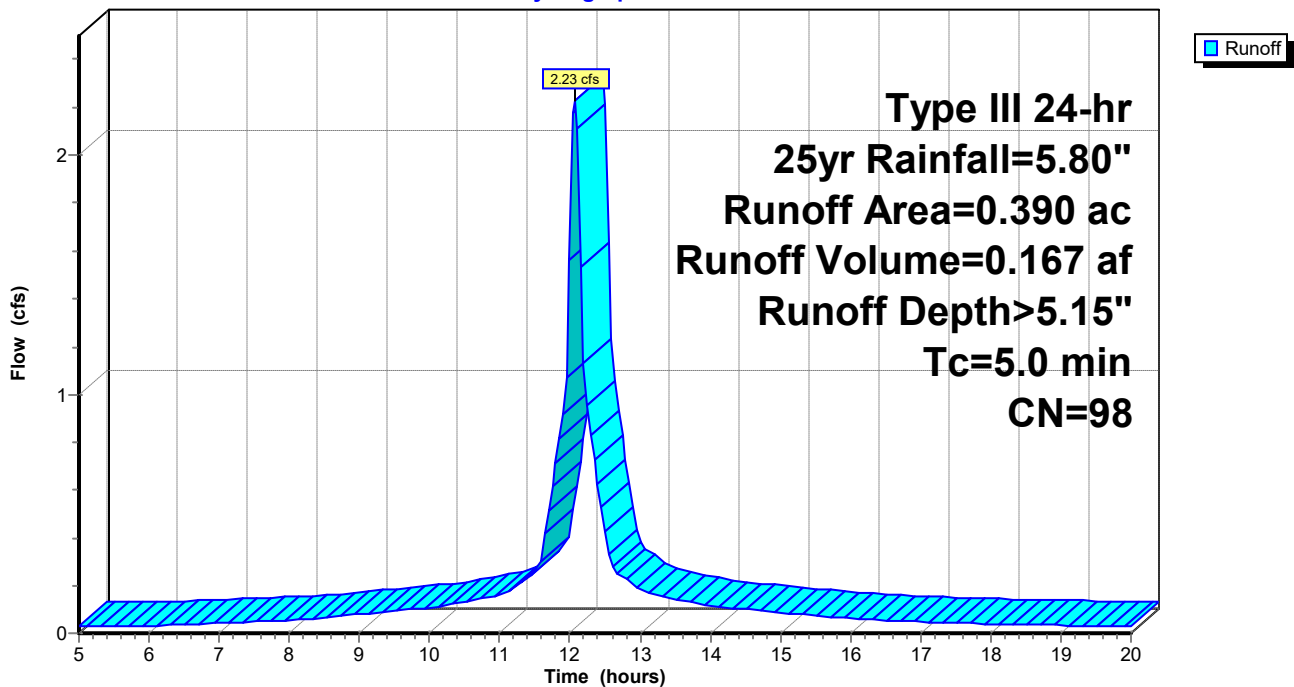
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25yr Rainfall=5.80"

| Area (ac) | CN | Description |
|-----------|----|-------------------------|
| 0.390 | 98 | Paved parking, HSG B |
| 0.390 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment 1S: Jellyfish Subcatchment Area

Hydrograph





STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION



PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
COMMISSIONER

January 21, 2015

CONTECH Engineered Solutions LLC
71 US Route 1, Suite F
Scarborough, ME 04074
ATTN: Derek Berg

Dear Mr. Berg:

This letter is to inform you that the Department of Environmental Protection (Department) will review and approve, on a case-by-case basis, applicants' requests to use the Jellyfish Filter, manhole or vault housing, a cartridge deck supporting membrane filtration cartridges, as a low flow rate filter meeting the requirements of the General Standards (Section 4.B.) of the Stormwater Management Rules (Chapter 500) when sized, installed and maintained in accordance with the following provisions:

1. The Jellyfish Filter must be sized in accordance with the tested hydraulic loading rate, and is approved for a maximum rate of 80 gallons per minute (gpm) for each 54-inch long membrane filter cartridge (1.48 gpm per inch of cartridge length). The structure must include at least one draindown cartridge, which is approved for a hydraulic loading rate of 40 gpm per 54" cartridge (0.74 gpm per inch of cartridge length).
2. Upstream storage must be provided for the water quality/channel protection volume (WQv) consisting of the first 1.0 inch of runoff from impervious areas and 0.4 inch of runoff from lawns and landscaped areas. The WQv should be hydraulically isolated from any additional storage provided onsite by weirs or other means so that only the WQv is routed through the Jellyfish Filter. Additionally, the WQv must be detained for a minimum of 24 hours and a maximum of 48 hours (emptying time). Storage can typically be provided in an underground facility such as corrugated metal pipe, polypropylene chambers, concrete vaults or similar means.
3. All storage systems must include sufficient maintenance access for the removal of accumulated sediment and debris. It is desirable that a pretreatment structure be located upstream of the WQv storage to facilitate capture of coarse solids and trash.
4. The Jellyfish Filter must be delivered to the site and installed under the supervision of the manufacturer's representative.
5. The system must be inspected at least once every six months, and the filters maintained yearly per the manufacturer's guidelines to maintain the established efficiency for pollutant removal. A five-year binding inspection and maintenance contract must be provided prior to review and approval by the Department, and must be renewed before contract expiration.
6. The overall stormwater management design must meet all Department criteria and sizing specifications and shall be reviewed and approved by the Department prior to use.
7. Review and approval by the manufacturer for the proposed use and sizing of the Jellyfish Filter at each specific project is required to ensure conformance with the manufacturer's design specifications.

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AUGUSTA, MAINE 04333-0017
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(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303


PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

8. This approval is conditional to on-the-ground experience confirming that the Jellyfish Filter's pollutant removal efficiency and sizing are appropriate. The "permit shield" provision (Section 14) of the Chapter 500 rules will apply, and the Department will not require the replacement of the system if pollutant removals do not satisfy the General Standard Best Management Practices.

We look forward to working with you as these stormwater management structures are installed on new projects. And, we hope that this stormwater BMP will be included in our manual in the near future.

Questions concerning this decision should be directed to Marianne Hubert at (207) 215-6485 or Jeff Dennis at (207) 215-6376.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark R. Bergeron". The signature is fluid and cursive, with a long horizontal stroke at the end.

Mark Bergeron, P.E.
Director, Division of Land Resource Regulation
Bureau of Land & Water Quality

C: Don Witherill, Maine DEP



**STORMWATER EROSION & SEDIMENTATION CONTROL
INSPECTION REPORT FORM**

Inspectors:

Date: ___ / ___ / ___

_____ of _____ (Project Owner)

_____ of _____ (Contractor)

_____ of _____

_____ of _____

Storm Event? Yes No Rainfall Amount _____ Storm Duration _____ hours

Visual Observations of Activity and Site Conditions:

Disturbed Soil Areas:

Storage of Soils:

Sediment & Erosion Control Measures:

Construction Site Entrance:

Surface Stabilization:

Corrective Actions Taken

Attachments (if any):

Signature:

Representing:

Representing:
