

FOR FILE 2022-8-48
McAllister

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0.0 INTRODUCTION

Redevelopment projects such as the proposed upgrades at One India Street are typically constructed with stormwater management systems to maintain compliance with a variety of regulations and standards. These systems are often constructed as multi-faceted systems that feature a combination of treatment and conveyance devices, often resulting in a variety of configurations within a single project. The introduction of new impervious surfaces, landscaped areas (both soft scape and hard scape) and new buildings can impact the receiving waterbodies in many ways. Control and treatment of the resulting runoff from these surfaces is of paramount importance to improving and maintaining the quality of the region's waterbodies.

Source control and the installation of water quality units can significantly reduce the non-point pollution discharge from the developed area. The stormwater management system can protect and enhance the stormwater runoff water quality through the removal of sediments and pollutants, and source control significantly reduces the amount of pollutants entering the system. Preventative maintenance of the system will include a comprehensive source reduction program of regular vacuuming and litter removal, prohibitions on the use of pesticides and maintenance of designated waste and recycling areas.

This long-term Stormwater Management System Operations and Maintenance (O&M) Manual shall be implemented at the development site located at One India Street to ensure that the stormwater management system functions as designed. The Owner possesses the primary responsibility for overseeing and implementing the O&M plan and assigning a property manager who will be responsible for the proper operation and maintenance of the stormwater structures. In case of the transfer of property ownership, future property owners shall be notified of the presence of the stormwater management system and the requirements for proper implementation of the O&M plan.

It is the intent of this document to provide guidance and detail for the long-term inspection and maintenance requirements of the project site to ensure the overall stormwater management system functions as intended for the life of the system. This manual provides basic criteria and schedules for inspection and trigger points for required maintenance. Included in this manual is a log for tracking the inspections and maintenance.

1.0 PROGRAM ADMINISTRATION

A reliable administrative structure must be established to assure implementation of the maintenance programs described in the foregoing section. Key factors that must be considered in establishing a responsive administrative structure include:

1. Administrative body must be responsible for long-term operation and maintenance of the facilities.
2. Administrative body must have the financial resources to accomplish the inspection and maintenance program over the life of the facility.
3. The administrative body must have a responsible administrator to manage the inspection and maintenance programs.
4. The administrative body must have the staff to accomplish the inspection and maintenance programs, or must have authority to contract for the required services.
5. The administrative body must have a management information system sufficient to file, retain, and retrieve all inspection and maintenance records associated with the inspection and maintenance programs.

If any of the above criteria cannot be met by the entity assigned inspection and maintenance responsibilities, it is likely that the system will fail to meet its water quality objectives at some point during its life. While each of the above criteria may be met by a variety of formats, it is critical to clearly establish the assigned administrative body in a responsible and sustainable manner.

2.0 RESPONSIBILITY

The purpose of the Stormwater Operations and Maintenance Manual is to ensure the inspection of the system, removal of accumulated sediments, oils and debris, and implementation of corrective action and record keeping activities. The ongoing responsibility is the Owner, its successors and assigns. Adequate maintenance is defined in this document as good working condition.

Contact information is provided below:

Responsibility for Operation and Maintenance

Capt. Roger Francis II
Port Captain/FSO
McAllister Towing of Narragansett Bay
DBA Providence Steamboat Co.
One India Street
Providence, RI
rfrancis@mcallistertowing.com
516.357.4572

3.0 DOCUMENTATION

An Inspection and Maintenance Record Log and Schedule should be kept by the Owner or Property Manager summarizing inspections, maintenance, repairs and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. Inspection and Maintenance Logs shall be kept on file at the property management office.

3.1 MAINTENANCE PROGRAM AND BUDGET

The Owner, Property Manager and maintenance staff should conduct the Operation and Maintenance program set forth in this document. The Owner or Property Manager will need to ensure that inspections and record keeping are timely and accurate and that cleaning and maintenance are performed in accordance with the recommended frequency for each stormwater component. Inspection and Maintenance Log Forms (provided herein) shall include the date and amount of the last significant storm event in excess of two (2) inches of rain in a 24-hour period, physical conditions of structures, depth of sediment in structures, evidence of overtopping or debris blockage and maintenance required of each structure.

A list of the individual inspection/maintenance elements is provided in the table of contents. The guidelines are proposed for initial use with adjustments made as appropriate based upon specific project experience.

4.0 ROUTINE MAINTENANCE TASKS

Routine maintenance of all exterior areas shall occur as necessary to maintain the property in a neat and orderly fashion. Landscaping and other debris shall not be washed into the drainage infrastructure.

Maintenance of the Stormwater Management System shall be in accordance with the Operations and Maintenance Checklist below.

Snow shall be stored in areas that will not block runoff inlets.

Good housekeeping – all areas should be kept free of trash and debris. Any storage of materials and waste products shall be inside or under cover. Fertilizers, herbicides and pesticides, if stored on site, shall be stored properly contained and under cover. Storage of salt or deicing chemicals, if any, shall be on impervious area, covered and protected from runoff.

4.1 CATCH BASINS AND MANHOLES

Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Once 50% of the sump volume is filled, the catch basin may not be able to retain additional sediment.

Inspect or clean deep sumps at least four times per year and at the end of the foliage and snow removal seasons. Sediments must also be removed four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. Clamshell buckets are typically used to remove sediment; however, vacuum trucks are preferable as they remove more trapped sediment than clamshells. Vacuuming is also a speedier process and is less likely to damage the hood within the deep sump catch basin.

Always consider the safety of the staff cleaning deep sump catch basins.

Cleaning a deep sump catch basin within a road with active traffic or even within a parking lot is dangerous and a police detail may be necessary to safeguard workers.

Catch basin cleanings may be taken to a landfill or other facility permitted by RIDEM to accept solid waste, without any prior approval by RIDEM; however, some landfills may require testing before they are accepted.

4.2 JELLYFISH UNITS

Much like the catch basins, regular maintenance of the Jellyfish units is essential. The maintenance of these units begins immediately at post-construction prior to putting the unit into service. During the first year of operation, the units should be inspected quarterly in order to determine the rate of accumulation of sediment and oils. In subsequent years, the units can be inspected at a frequency determined by the accumulation rate of sediment and oils, but in no cases should the inspection frequency exceed twelve months.

Cleaning of the units is required when the sediment has accumulated to 12 inches of depth. The unit should also be cleaned immediately in the event of a spill.

The complete manufacturer's recommendations for inspection and maintenance is attached to this manual.

5.0 WINTER MAINTENANCE

Ensure structures are not blocked by ice, snow, debris or trash during winter months. This project site features designated snow storage areas. Snow is to be removed from the site if the capacity of these areas is exceeded.

6.0 FERTILIZER SELECTION

It is not currently anticipated that fertilizer will be used. If fertilizer is used it should be to enhance the ground cover of the facility, yet not result in adverse water quality impacts. The following guidelines are recommended.

The selection of fertilizer should be based upon site-specific requirements. Recommendations for the fertilizer will be made upon completion of the project and actual tests of the soil mix. The benefit of the use of a soil mix is the ability of the soil to absorb and store nutrients for subsequent plant growth better than a sandy loam.

It is recommended that the soil be resampled every three (3) years and the plan adjusted accordingly.

6.1 FERTILIZER STORAGE

If used, it should be stored in a weatherproof area with containers protected from damage. Fertilizer from any damaged containers should be placed in appropriate weatherproof containers.

6.2 FERTILIZER APPLICATION

Fertilizer should be applied with appropriate mechanical equipment properly calibrated to meet the recommended application rates of the soil tests and manufacturer. The Owner or its agents should instruct personnel on the use of equipment and the proper measurement of the fertilizer.

Personnel assigned to application should be instructed that over-application of fertilizer is averse to the landscaped areas and environment. Fertilizer should not be applied to steep slopes, saturated ground, during periods of precipitation, or immediately prior to major rain events.

APPENDIX A: JELLYFISH FILTER OWNER'S MANUAL

**Jellyfish® Filter
Owner's Manual**



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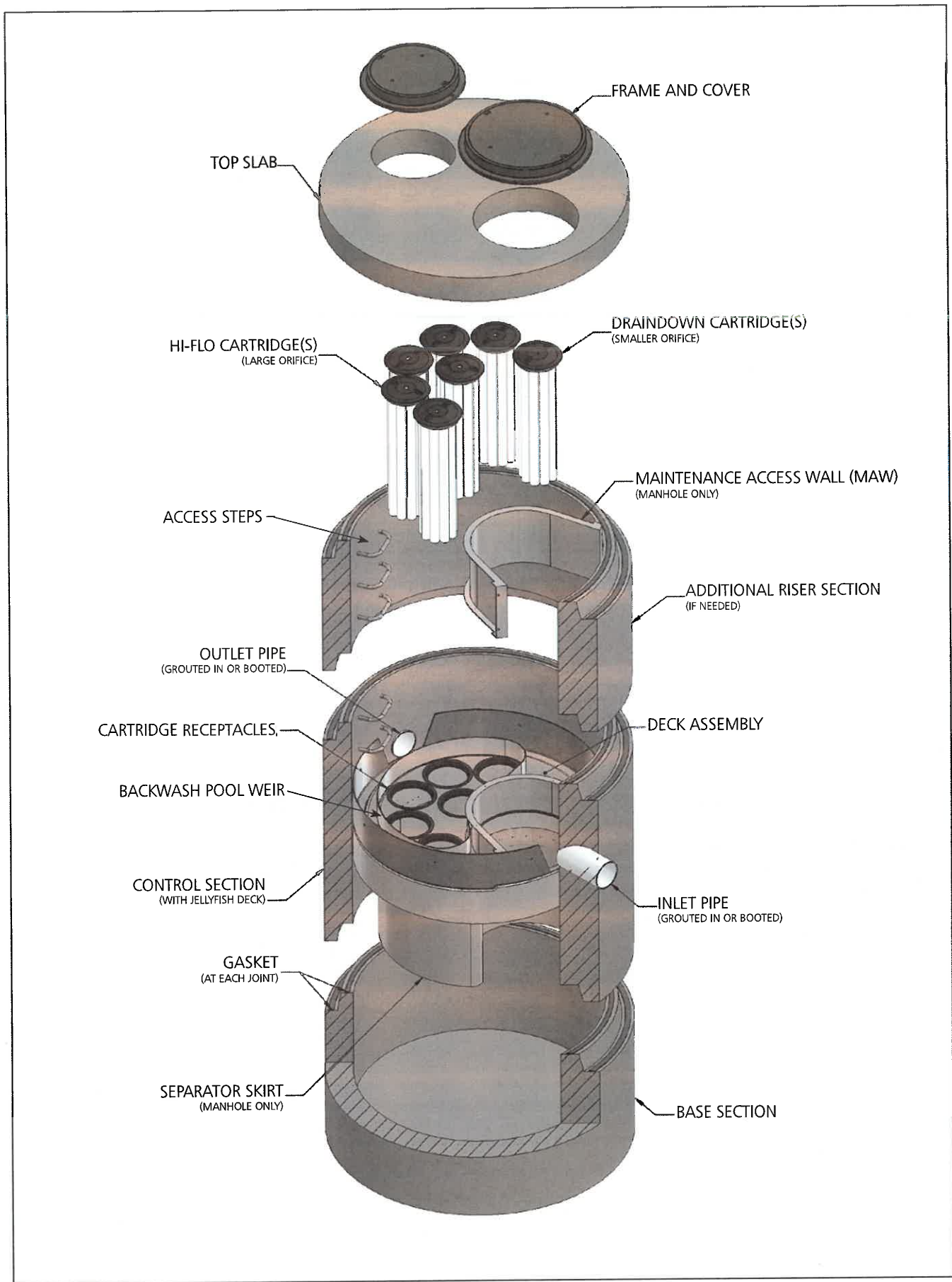
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THANK YOU FOR PURCHASING THE JELLYFISH® FILTER!

Contech Engineered Solutions would like to thank you for selecting the Jellyfish Filter to meet your project's stormwater treatment needs. With proper inspection and maintenance, the Jellyfish Filter is designed to deliver ongoing, high levels of stormwater pollutant removal.

If you have any questions, please feel free to call us or e-mail us:

Contech Engineered Solutions
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513-645-7000 | 800-338-1122
www.ContechES.com
info@conteches.com



WARNINGS / CAUTION

1. FALL PROTECTION may be required.
2. WATCH YOUR STEP if standing on the Jellyfish Filter Deck at any time; Great care and safety must be taken while walking or maneuvering on the Jellyfish Filter Deck. Attentive care must be taken while standing on the Jellyfish Filter Deck at all times to prevent stepping onto a lid, into or through a cartridge hole or slipping on the deck.
3. The Jellyfish Filter Deck can be SLIPPERY WHEN WET.
4. If the Top Slab, Covers or Hatches have not yet been installed, or are removed for any reason, great care must be taken to NOT DROP ANYTHING ONTO THE JELLYFISH FILTER DECK. The Jellyfish Filter Deck and Cartridge Receptacle Rings can be damaged under high impact loads. This type of activity voids all warranties. All damaged items to be replaced at owner's expense.
5. Maximum deck load 2 persons, total weight 450 lbs.

Safety Notice

Jobsite safety is a topic and practice addressed comprehensively by others. The inclusions here are intended to be reminders to whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s) and Contractor(s). OSHA and Canadian OSH, and Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Contractor's responsibility and outside the scope of Contech Engineered Solutions.

Confined Space Entry

Secure all equipment and perform all training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to proceed safely at all times.

Personal Safety Equipment

Contractor is responsible to provide and wear appropriate personal protection equipment as needed including, but not limited to safety boots, hard hat, reflective vest, protective eyewear, gloves and fall protection equipment as necessary. Make sure all equipment is staffed with trained and/or certified personnel, and all equipment is checked for proper operation and safety features prior to use.

- Fall protection equipment
- Eye protection
- Safety boots
- Ear protection
- Gloves
- Ventilation and respiratory protection
- Hard hat
- Maintenance and protection of traffic plan

Chapter 1

1.0 – Owner Specific Jellyfish Filter Product Information

Below you will find a reference page that can be filled out according to your Jellyfish Filter specification to help you easily inspect, maintain and order parts for your system.

Owner Name:	
Phone Number:	
Site Address:	
Site GPS Coordinates/unit location:	
Unit Location Description:	
Jellyfish Filter Model No.:	
Contech Project & Sequence Number	
No. of Hi-Flo Cartridges	
No. of Cartridges:	
Length of Draindown Cartridges:	
No. of Blank Cartridge Lids:	
Bypass Configuration (Online/Offline):	

Notes:

Chapter 2

2.0 – Jellyfish Filter System Operations and Functions

The Jellyfish Filter is an engineered stormwater quality treatment technology that removes a high level and wide variety of stormwater pollutants. Each Jellyfish Filter cartridge consists of eleven membrane - encased filter elements (“filtration tentacles”) attached to a cartridge head plate. The filtration tentacles provide a large filtration surface area, resulting in high flow and high pollutant removal capacity.

The Jellyfish Filter functions are depicted in Figure 1 below.

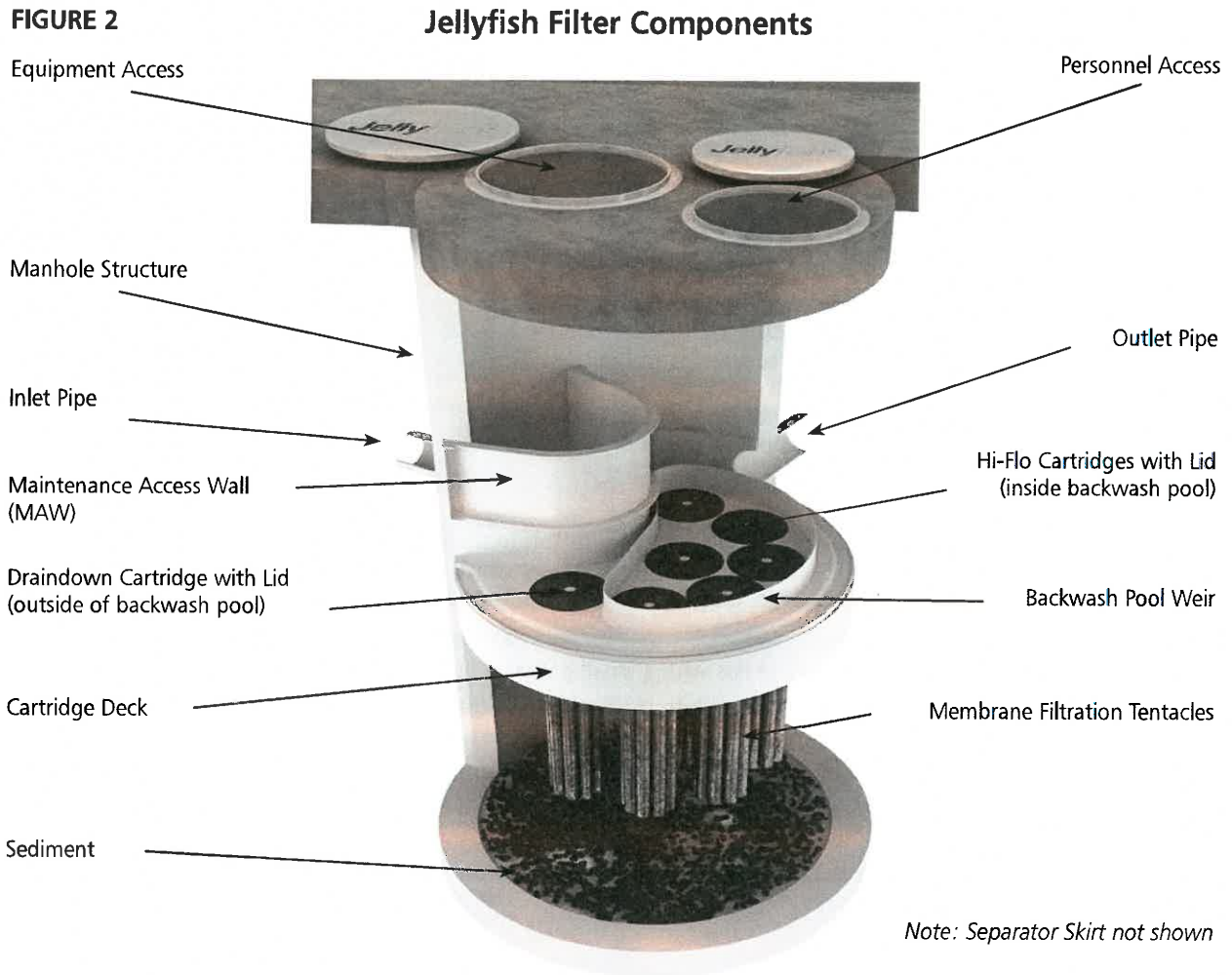


Jellyfish Filter cartridges are backwashed after each peak storm event, which removes accumulated sediment from the membranes. This backwash process extends the service life of the cartridges and increases the time between maintenance events.

For additional details on the operation and pollutant capabilities of the Jellyfish Filter please refer to additional details on our website at www.ContechES.com.

2.1 – Components and Cartridges

The Jellyfish Filter and components are depicted in Figure 2 below.



Tentacles are available in various lengths as depicted in Table 1 below.

Table 1 – Cartridge Lengths / Weights and Cartridge Lid Orifice Diameters

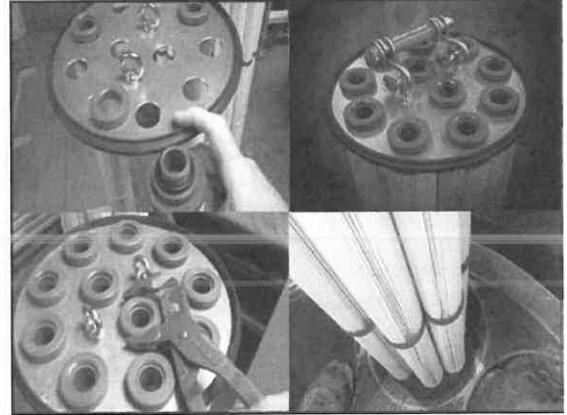
Cartridge Lengths	Dry Weight	Hi-Flo Orifice Diameter	Draindown Orifice Diameter
15 inches (381 mm)	10 lbs (4.5 kg)	35 mm	20 mm
27 inches (686 mm)	14.5 lbs (6.6 kg)	45 mm	25 mm
40 inches (1,016 mm)	19.5 lbs (8.9 kg)	55 mm	30 mm
54 inches (1,372 mm)	25 lbs (11.4 kg)	70 mm	35 mm

2.2 – Jellyfish Membrane Filtration Cartridge Assembly

The Jellyfish Filter utilizes multiple membrane filtration cartridges. Each cartridge consists of removable cylindrical filtration “tentacles” attached to a cartridge head plate. Each filtration tentacle has a threaded pipe nipple and o-ring. To attach, insert the top pipe nipples with the o-ring through the head plate holes and secure with locking nuts. Hex nuts to be hand tightened and checked with a wrench as shown below.

2.3 – Jellyfish Membrane Filtration Cartridge Installation

- Cartridge installation will be performed by trained individuals and coordinated with the installing site Contractor. Flow diversion devices are required to be in place until the site is stabilized (final paving and landscaping in place). Failure to address this step completely will reduce the time between required maintenance.
- Descend to the cartridge deck (see Safety Notice and page 3).
- Refer to Contech's submittal drawings to determine proper quantity and placement of Hi-Flo, Draindown and Blank cartridges with appropriate lids. Lower the Jellyfish membrane filtration cartridges into the cartridge receptacles within the cartridge deck. It is possible that not all cartridge receptacles will be filled with a filter cartridge. In that case, a blank headplate and blank cartridge lid (no orifice) would be installed.



Cartridge Assembly

Do not force the tentacles down into the cartridge receptacle, as this may damage the membranes. Apply downward pressure on the cartridge head plate to seat the lubricated rim gasket (thick circular gasket surrounding the circumference of the head plate) into the cartridge receptacle. (See Figure 3 for details on approved lubricants for use with rim gasket.)

- Examine the cartridge lids to differentiate lids with a small orifice, a large orifice, and no orifice.
 - Lids with a small orifice are to be inserted into the Draindown cartridge receptacles, outside of the backwash pool weir.
 - Lids with a large orifice are to be inserted into the Hi-Flo cartridge receptacles within the backwash pool weir.
 - Lids with no orifice (blank cartridge lids) and a blank headplate are to be inserted into unoccupied cartridge receptacles.
- To install a cartridge lid, align both cartridge lid male threads with the cartridge receptacle female threads before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation.

3.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

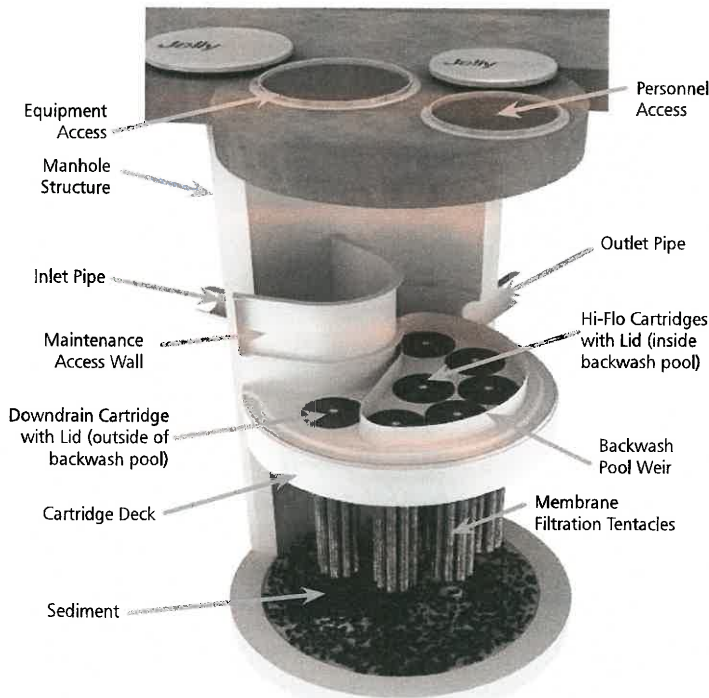
- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed

4.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; or per the approved project stormwater quality documents (if applicable), whichever is more frequent.



Note: Separator Skirt not shown

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

5.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

5.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.



Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment ($\geq 1/16''$) accumulated on the deck surface should be removed.

5.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

6.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

7.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures.
Caution: Dropping objects onto the cartridge deck may cause damage.
3. Perform Inspection Procedure prior to maintenance activity.

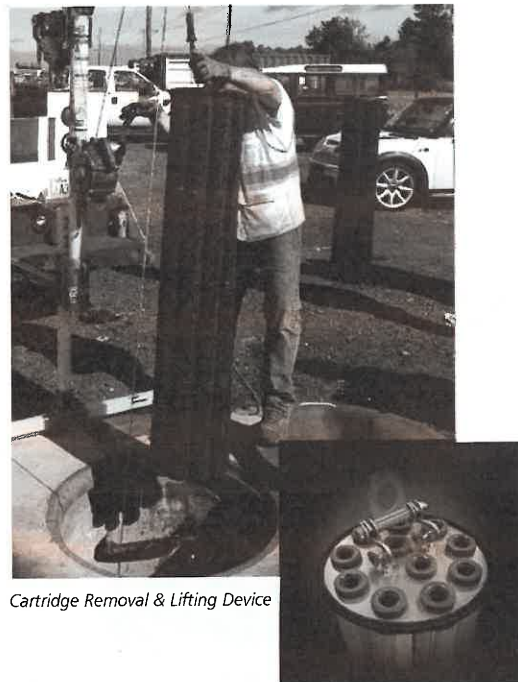
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. *Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.*
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

7.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. *Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs.*
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

7.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.
2. Position tentacles in a container (or over the MAW), with the



Cartridge Removal & Lifting Device

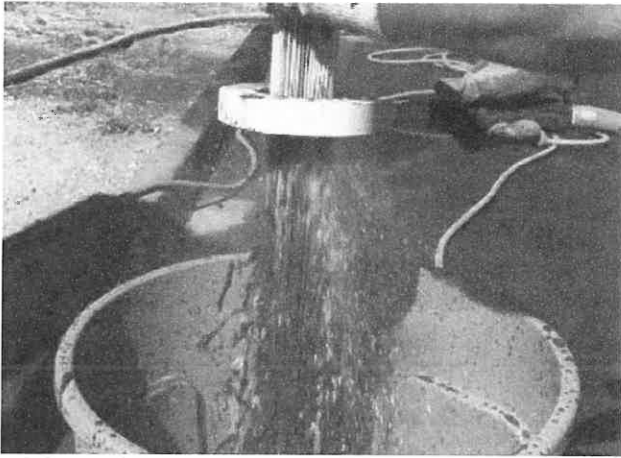
threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.

3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. *Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane.*
4. Collected rinse water is typically removed by vacuum hose.

5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

7.3 Sediment and Floatables Extraction

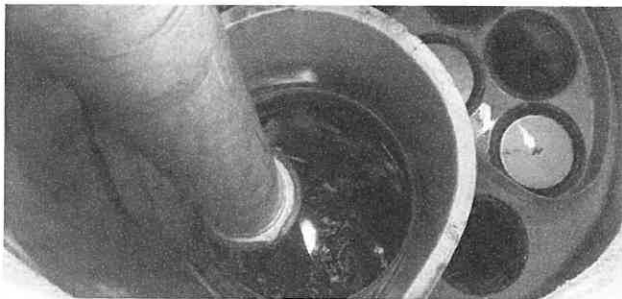
1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.
3. Pressure wash cartridge deck and receptacles to remove all



Rinsing Cartridge with Contech Rinse Tool

sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.

4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.
6. For larger diameter Jellyfish Filter manholes (≥ 8 -ft) and some



Vacuuming Sump Through MAW

vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

7.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. *Caution: Do not force the cartridge downward; damage may occur.*
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

7.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

7.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

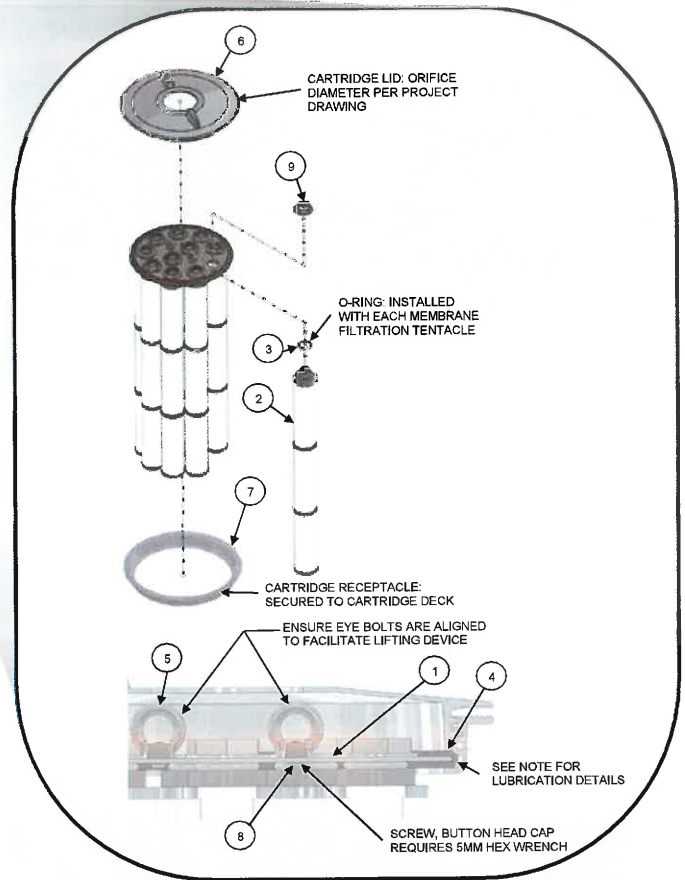
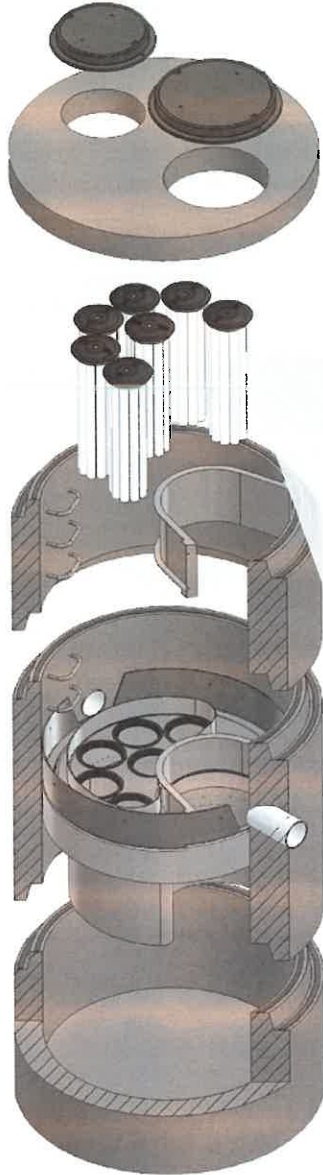


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:

Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lid (Item 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:

Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner: _____ Jellyfish Model No.: _____

Location: _____ GPS Coordinates: _____

Land Use: Commercial: _____ Industrial: _____ Service Station: _____
 Road/Highway: _____ Airport: _____ Residential: _____ Parking Lot: _____

Date/Time:					
Inspector:					
Maintenance Contractor:					
Visible Oil Present: (Y/N)					
Oil Quantity Removed					
Floatable Debris Present: (Y/N)					
Floatable Debris removed: (Y/N)					
Water Depth in Backwash Pool					
Cartridges externally rinsed/re-commissioned: (Y/N)					
New tentacles put on Cartridges: (Y/N)					
Sediment Depth Measured: (Y/N)					
Sediment Depth (inches or mm):					
Sediment Removed: (Y/N)					
Cartridge Lids intact: (Y/N)					
Observed Damage:					
Comments:					

APPENDIX B: STORMWATER MANAGEMENT SYSTEM MAINTENANCE PROGRAM SUMMARY CHECKLIST

Stormwater Management System Maintenance Program Summary Checklist					
Item	Commentary	Frequency			
		Monthly	Quarterly	Semi-Annually	Annually
Catch Basins and Manholes	Inspect for sediment quarterly; inspect at tend of foliage and at end of snowmelt; remove upon accumulation		X		
Jellyfish Filter Channels	Inspect unit for standing water, physical damage and amount of debris; remove sediment as necessary, clean and/or replace filters as required		X (First Year)		X (After First Year)

APPENDIX C: STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENANCE FORMS

McAllister Towing Water Quality Calculation Sheet

Task:

Prepare water quality calculation for design of runoff treatment system at One India Street project site.

Method:

Use TR-20 methods to determine peak flow rate based on tributary area and time of concentration.

Assumptions:

1. Overall site to be considered impervious for maximum treatment area.
2. Minimum time of concentration is 6 minutes for maximum peak flow rate
3. WQV = 1" runoff from impervious surfaces
4. Use calculated WQV to back into total rainfall to determine peak flow rate
5. Use Jellyfish Filter units for ease of maintenance

Calculations:

Tributary Area = 117,600 square feet. Each of the four units has been located to receive $\frac{1}{4}$ of the overall tributary area, so $117,600 / 4 = \underline{29,400}$ square feet per unit.

WQV = $29,400\text{sf} \times 1"/12" = \underline{2,450}$ cubic feet (0.056 acre-feet)

The total rainfall needed to generate 0.056 acre-feet of runoff volume over 29,400 square feet is 1.21 inches (see attached HydroCAD calculation)

Peak Runoff Rate = 0.75 cfs

Select Jellyfish Filter JFS10408 filter cartridge based on ability to accommodate up to or greater than 0.75 cfs. A 40" cartridge system will accommodate up to 1.00 cfs.

1.00 cfs > 0.75 cfs therefore system will meet design criteria

Jellyfish Filter Performance Testing Results

Pollutant of Concern	% Removal
Total Trash	99%
Total Suspended Solids (TSS)	89%
Total Phosphorus (TP)	59%
Total Nitrogen (TN)	51%
Total Copper (TCu)	>50%
Total Zinc (TZn)	>50%
Turbidity (NTU)	< 15

Sources:

TARP II Field Study – 2012 JF 4-2-1 Configuration

MRDC Floatables Testing – 2008 JF6-6-1 Configuration

Peak Runoff to Jellyfish Filter

Prepared by Beals Associates, Inc.

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Type III 24-hr Rainfall=1.21"

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Summary for Subcatchment 1S: Trib. Area

Runoff = 0.75 cfs @ 12.08 hrs, Volume= 0.056 af, Depth= 1.00"

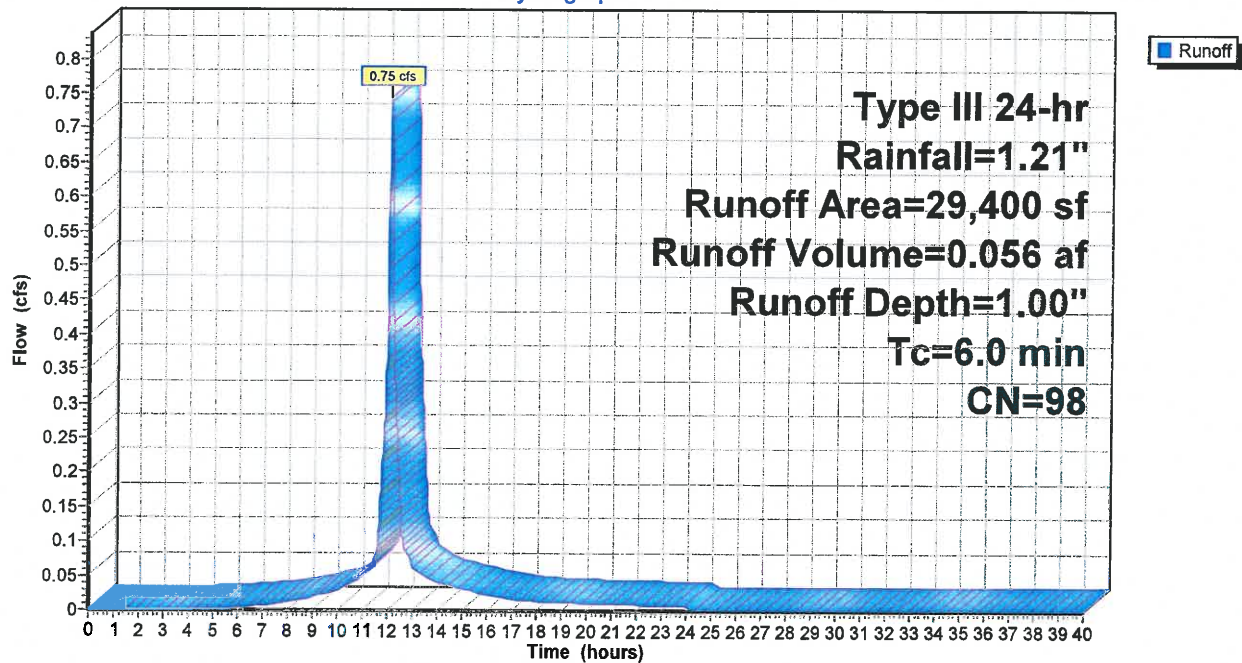
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr Rainfall=1.21"

Area (sf)	CN	Description
29,400	98	Assume Total Area Impervious
29,400		100.00% Impervious Area

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

Subcatchment 1S: Trib. Area

Hydrograph



Peak Runoff to Jellyfish Filter

Type III 24-hr Rainfall=1.21"

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Hydrograph for Subcatchment 1S: Trib. Area

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	1.21	1.00	0.00
0.50	0.01	0.00	0.00	26.50	1.21	1.00	0.00
1.00	0.01	0.00	0.00	27.00	1.21	1.00	0.00
1.50	0.02	0.00	0.00	27.50	1.21	1.00	0.00
2.00	0.02	0.00	0.00	28.00	1.21	1.00	0.00
2.50	0.03	0.00	0.00	28.50	1.21	1.00	0.00
3.00	0.04	0.00	0.00	29.00	1.21	1.00	0.00
3.50	0.04	0.00	0.00	29.50	1.21	1.00	0.00
4.00	0.05	0.00	0.00	30.00	1.21	1.00	0.00
4.50	0.06	0.00	0.00	30.50	1.21	1.00	0.00
5.00	0.07	0.00	0.00	31.00	1.21	1.00	0.00
5.50	0.08	0.01	0.00	31.50	1.21	1.00	0.00
6.00	0.09	0.01	0.00	32.00	1.21	1.00	0.00
6.50	0.10	0.01	0.01	32.50	1.21	1.00	0.00
7.00	0.11	0.02	0.01	33.00	1.21	1.00	0.00
7.50	0.12	0.02	0.01	33.50	1.21	1.00	0.00
8.00	0.14	0.03	0.01	34.00	1.21	1.00	0.00
8.50	0.16	0.04	0.01	34.50	1.21	1.00	0.00
9.00	0.18	0.05	0.02	35.00	1.21	1.00	0.00
9.50	0.20	0.07	0.02	35.50	1.21	1.00	0.00
10.00	0.23	0.09	0.03	36.00	1.21	1.00	0.00
10.50	0.26	0.12	0.04	36.50	1.21	1.00	0.00
11.00	0.30	0.15	0.05	37.00	1.21	1.00	0.00
11.50	0.36	0.20	0.08	37.50	1.21	1.00	0.00
12.00	0.60	0.41	0.46	38.00	1.21	1.00	0.00
12.50	0.85	0.65	0.16	38.50	1.21	1.00	0.00
13.00	0.91	0.70	0.06	39.00	1.21	1.00	0.00
13.50	0.95	0.74	0.05	39.50	1.21	1.00	0.00
14.00	0.98	0.77	0.04	40.00	1.21	1.00	0.00
14.50	1.01	0.80	0.04				
15.00	1.03	0.82	0.03				
15.50	1.05	0.84	0.03				
16.00	1.07	0.86	0.02				
16.50	1.09	0.88	0.02				
17.00	1.10	0.89	0.02				
17.50	1.11	0.90	0.02				
18.00	1.12	0.91	0.01				
18.50	1.13	0.92	0.01				
19.00	1.14	0.93	0.01				
19.50	1.15	0.94	0.01				
20.00	1.16	0.94	0.01				
20.50	1.17	0.95	0.01				
21.00	1.17	0.96	0.01				
21.50	1.18	0.97	0.01				
22.00	1.19	0.97	0.01				
22.50	1.19	0.98	0.01				
23.00	1.20	0.98	0.01				
23.50	1.20	0.99	0.01				
24.00	1.21	1.00	0.01				
24.50	1.21	1.00	0.00				
25.00	1.21	1.00	0.00				
25.50	1.21	1.00	0.00				