

Operation and Maintenance Manual

Stormwater Solutions

Up-Flo® Filter

Filtration System for Stormwater Treatment

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IMPORTANT - ORDER REPLACEMENT PARTS FOR MAINTENANCE - IMPORTANT

Annual maintenance requires replacement of the Media Ribbons. Contact Hydro International to order replacements. Allow 2-4 weeks for delivery.

Office hours Monday thru Friday 8:00 A.M. to 5:00 P.M. EST

Toll free: 1-888-382-7808

Phone: 207-756-6200

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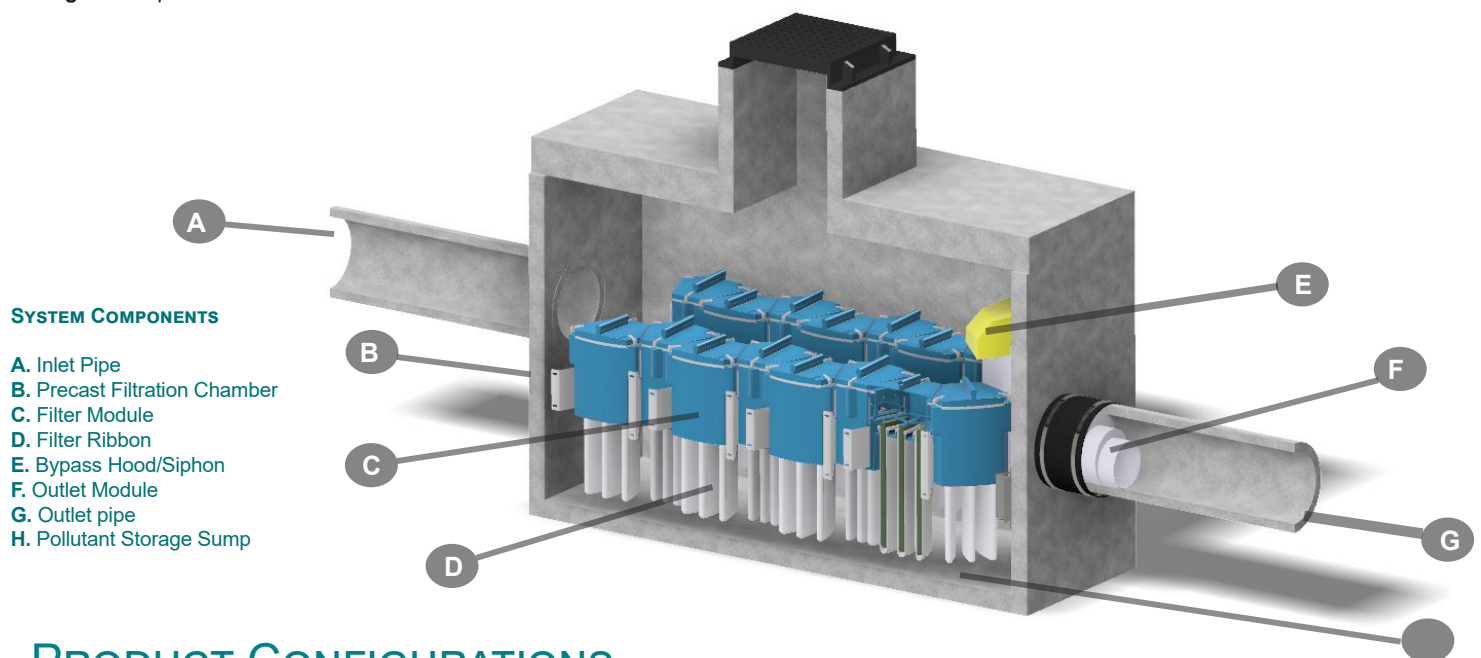
DISCLAIMER: Information and data contained in this manual is exclusively for the purpose of assisting in the operation and maintenance of Hydro International plc's Up-Flo® Filter. No warranty is given nor can liability be accepted for use of this information for any other purpose. Hydro International plc have a policy of continuous product development and reserve the right to amend specifications without notice.

OVERVIEW & PRODUCT DESCRIPTION

The Up-Flo® Filter is a modular high-rate stormwater filtration device designed to capture trash, oil, sediment and remove fine pollutants such as dissolved and particulate metals and nutrients from stormwater runoff. Designed with efficiency, longevity and upkeep in mind, this high performance, low maintenance filter option offers higher loading rates and longer media life for higher quality stormwater for longer periods between servicings.

In general, a minimum of two inspections are required per year to monitor sediment and gross pollutant accumulations. In order to achieve an annual TSS removal rate of 80% for the Up-Flo® Filter, the minimum maintenance frequency specified in the maintenance section for replacement of the media ribbons and removal of accumulated sediment from the sump is mandatory.

Fig.1 The Up-Flo® Filter - Media Filtration



PRODUCT CONFIGURATIONS

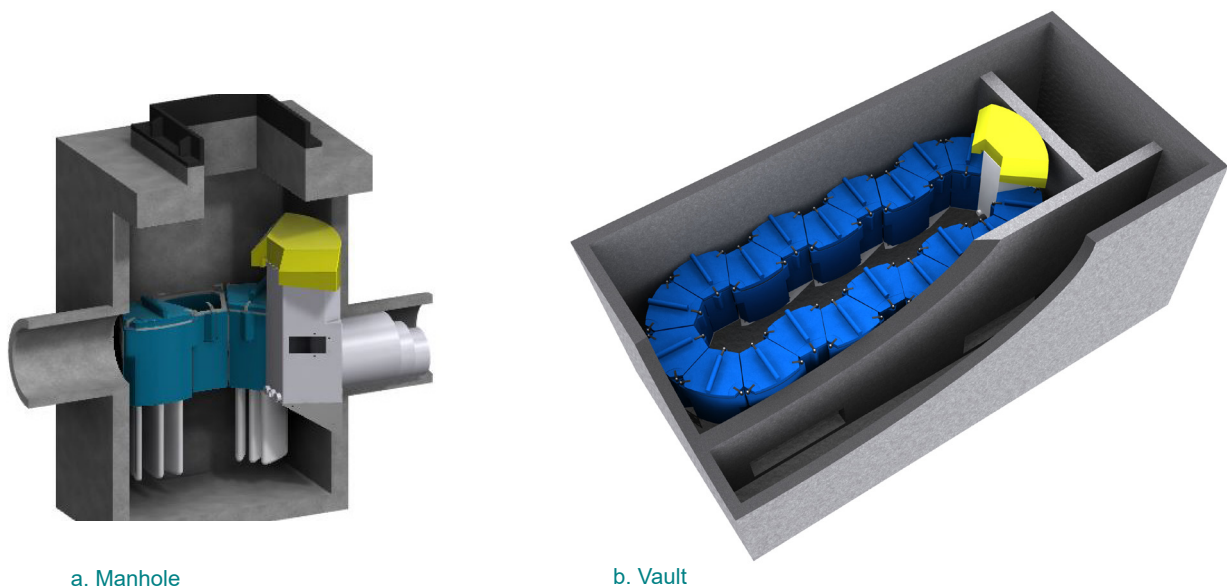


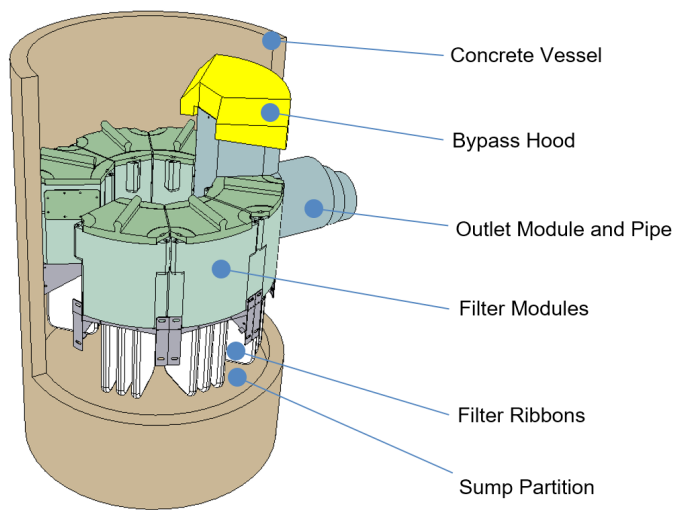
Fig.2 The Up-Flo® Filter is installed in a) 4-ft (1.2m) a manholes or b) in rectangular precast vaults. Both configurations have a wide central opening in the Up-Flo® Filter.

Fig.3 The Up-Flo® Filter - Ribbon Filtration

OPERATION

INTRODUCTION

The Up-Flo® Filter operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirements and is fabricated with durable non-corrosive components. Personnel are not required to operate the unit and maintenance is limited to periodic inspections, sediment and floatables removal, and media ribbon replacement.



POLLUTANT CAPTURE

The Up-Flo® Filter is a wet-sump device. Between storm events, oil and floatables are stored on the water surface separate from the sediment storage volume in the sump (see **Fig.1**). The high-capacity bypass siphon acts as a floatables baffle to prevent washout of captured floatable pollutants during high intensity events.

BEST PRACTICES

Good housekeeping upstream of the Up-Flo® Filter can significantly extend media life. For example, sweeping paved surfaces, collecting leaves and grass trimmings, and protecting bare ground from erosion will reduce loading to the system. Media Ribbons should not be installed in the Filter Modules until construction activities are complete and site stabilization is effective.

DAMAGE DUE TO LACK OF MAINTENANCE

Delayed maintenance would result in clogged Media Ribbons. In that situation, the Up-Flo® Filter would go into bypass and there would be no treatment of the incoming stormwater. Because the Bypass Weir can easily convey all of the flow to the Outlet Module, there would be no lasting damage to the system. Replacement of the Media Ribbons and removal of sediment from the sump would restore the Up-Flo® Filter to its original treatment efficiency. Establishing and adhering to a regular maintenance schedule ensures optimal performance of the system.

OVERVIEW

The Up-Flo® Filter protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the proper functioning of the Up-Flo® Filter.

Maintenance activities can be categorized as those that may be performed from outside the Up-Flo® vessel and those that are performed inside the vessel. Maintenance performed from outside the modules includes removal of floatables and oils that have accumulated on the water surface and removal of sediment from the sump. A vactor truck is required for removal of oils, water, sediment, and to completely pump out the vessel to allow for maintenance inside. If you are not using Hydro International or a trained service provider you must follow OSHA Confined Space Entry procedures when entering the Up-Flo® vessel.

The Up-Flo® Filter design has a wide central opening between the Filter Modules for easy access to all of the components (see **Fig.3**). In the case of inspection and floatables removal, a vactor truck is not required. Otherwise, a vactor truck is normally required for oil removal, removal of sediment from the sump, and replacement of the Media Ribbons. In most cases, entry into the Up-Flo® Filter vessel is required.



AT A MINIMUM, MEDIA RIBBONS MUST BE REPLACED AT LEAST ONCE A YEAR.

The minimum required frequency for replacement of the Media Ribbon is annually, whereas the minimum required frequency for removal of accumulated sediment from the sump is dependent on the Up-Flo® Filter configuration. Configurations with a larger sediment storage volume per module will require less frequent removal of accumulated sediment. Regardless, whenever sediment depth in the sump is found to be greater than 16 inches, sediment removal is required.



TOP-DOWN VIEW OF MEDIA RIBBONS WITHIN A FILTER MODULE



EXTERNAL VIEW OF MEDIA RIBBONS WITHIN A FILTER MODULE



SINGLE MEDIA RIBBON FILLED WITH FLOW DIFFUSING METAL

INSPECTION

ROUTINE INSPECTION

Inspection is a simple process that requires monitoring pollutant accumulations. Maintenance crews should be familiar with the Up-Flo® Filter and its components prior to inspection.

THE FOLLOWING INSTRUCTIONS ARE INTENDED FOR NON-HYDRO MAINTENANCE SERVICE PROVIDERS AND/OR THOSE INTENDING TO MAINTAIN THEIR OWN UP-FLO® FILTER:

SCHEDULING

- Inspection may be conducted during any season of the year but should occur shortly after a rainfall to ensure components are operating properly.

NECESSARY EQUIPMENT

- Safety Equipment and Personal Protective Equipment (traffic cones, work gloves, etc.)
- Crow bar to remove grate or lid
- Pole with skimmer or net
- Sediment probe (such as a Sludge-Judge®)
- Hydro International Up-Flo® Filter Maintenance Log
- Trash bags for removed floatables

ROUTINE INSPECTION PROCEDURES

1. Set up any necessary safety equipment (such as traffic cones) to provide access to the Up-Flo® Filter. Safety equipment should notify passing pedestrian and road traffic that work is being done.
2. Remove the grate or lid to the manhole or vault.
3. Without entering the vessel, look down into the chamber to inspect the inside and to determine whether the high-water level indicator has been activated. Make note of any irregularities. See Fig.6 for a typical Inspection View.
4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the chamber.
5. Using a sediment probe such as a Sludge-Judge®, measure the depth of sediment that has collected in the sump of the vessel. Maximum sediment depth is 16 inches (41 cm).
6. If the high-water level indicator has been activated after two consecutive storms, remove the Filter Module lid by turning the cam latch and remove the Filter Media Ribbons.
7. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or a high standing water level (see Fig.6 for the standard standing water level).
8. Securely replace the grate or lid.
9. Remove safety equipment.
10. Contact Hydro International at (800) 848-2706 to discuss any irregularities noted during inspection.

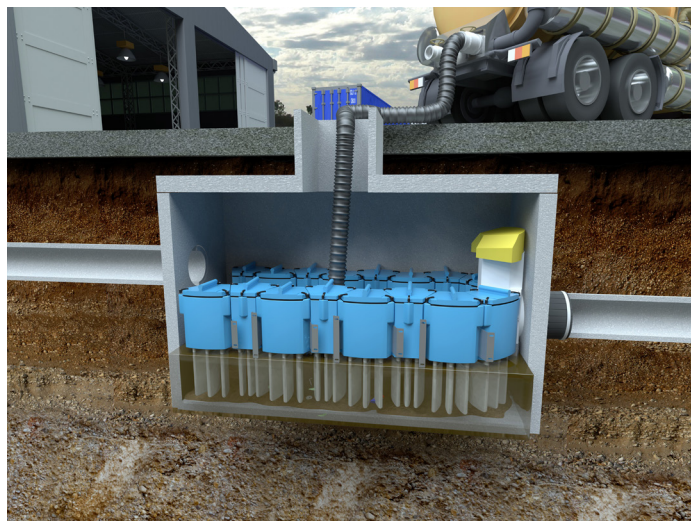


Fig.7 Sediment is removed from the sump with a vector hose. Man entry is not required for this step.

MAINTENANCE - NO MAN ENTRY REQUIRED

ROUTINE MAINTENANCE

Maintenance activities are grouped into two categories:

- **Activities *Not Requiring Man Entry Into the Up-Flo® Filter***
These activities include floatables removal, oil removal and removal of sediment from the sump.
- **Activities *Requiring Man Entry Into the Up-Flo® Filter***
Media Ribbon Replacement

Maintenance intervals are determined from monitoring the Up-Flo® Filter during its first year of operation. Depending on the site, some maintenance activities may have to be performed on a more frequent basis than others. In the case of floatables removal, a vactor truck is not required. Floatables and loose debris can be netted with a skimmer and pole.

A vactor truck is normally required for oil removal, removal of sediment from the sump, and to dewater the vessel for replacement of the Media Ribbons (Fig.7). All inspection and maintenance activities would be recorded in an Inspection and Maintenance Log.

Completion of all the maintenance activities for a typical 4-ft (1.2m) diameter manhole installation takes less than one hour. Approximately 360 gallons of water and up to 0.6 yd³ (0.5 m³) of sediment may be removed in the process. In an installation equipped with six Filter Modules, 18 Media Ribbons (3 ribbons per module) would be removed and replaced. All media ribbons are supplied by Hydro International.

MAINTENANCE ACTIVITIES NOT REQUIRING MAN ENTRY

These activities include floatables removal, oil removal and removal of sediment from the sump.

SCHEDULING

- Floatables and sump cleanout may typically be done during any season of the year - before and after rainy season
- Floatables and sump cleanout should occur as soon as possible following a contaminated spill in the contributing drainage area

RECOMMENDED EQUIPMENT

- Safety Equipment (traffic cones, etc)
- Crow bar to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge-Judge®)
- Vactor truck (flexible hose preferred)
- Pressure nozzle attachment or other screen-cleaning device
- Hydro International Up-Flo® Filter Maintenance Log

NO MAN ENTRY REQUIRED: FLOATABLES, OIL AND SEDIMENT:

1. Set up any necessary safety equipment (such as traffic cones) around the access of the Up-Flo® Filter. Safety equipment should notify passing pedestrian and road traffic that work is being done.
2. Remove the grate or lid to the manhole or vault.
3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.
4. Once all floatables and oil have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris from the sump floor. Up to 0.3 yd³ (0.2 m³) of sediment and 360 gallons (1,363 L) of water will be removed from a typical manhole Up-Flo® Filter during this process.
5. Retract the vactor hose from the vessel.
6. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables, oils, and gross debris removed, and the depth of sediment measured. Note any apparent irregularities such as damaged components or blockages.
7. Securely replace the grate or lid. Remove safety equipment.
8. Dispose of sediment and gross debris following local regulations.
9. Dispose of oil and sump water at a licensed water treatment facility or following local regulations.
10. Contact Hydro International at (800) 848-2706 to discuss any irregularities noted during cleanout.

MAINTENANCE - MAN ENTRY REQUIRED

MAINTENANCE ACTIVITIES REQUIRING MAN ENTRY

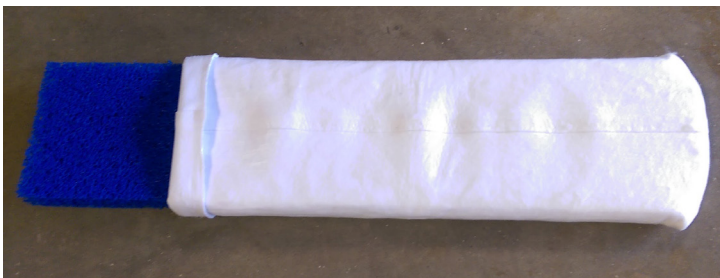
The access port located at the top of the manhole or vault provides access to the Up-Flo® vessel for maintenance personnel to enter the vessel and remove and replace Media Ribbons. The same access would be used for maintenance personnel working from the surface to net or skim debris and floatables or to vacuum out sediment, oil, and water. Unless the Up-Flo® Filter has been installed in a very shallow configuration, it is necessary to have personnel with OSHA Confined Space Entry training performing the maintenance that occurs inside the vessel.

Recommended Equipment

- Safety Equipment (traffic cones, etc.)
- Crow bar to remove grate or lid
- Pole with skimmer or net (if floatables removal is not to be done with vacuum hose)
- Sediment probe (such as a Sludge-Judge®)
- Vacuum truck (flexible hose preferred)
- OSHA Confined Space Entry Equipment
- Up-Flo® Filter Replacement Media Ribbons (available from Hydro International)
- Hydro International Up-Flo® Filter Maintenance Log
- Screwdriver (flat head)

Man Entry Required: Media Ribbons

1. Follow Floatables and Sump Cleanout Procedures, 1 – 13.
2. Following OSHA Confined Space Entry procedures, enter the Up-Flo® Filter Chamber.
3. Open the Filter Module by turning the three cam latches on the front and sides of the module. Remove the lid to gain access to the Media Ribbons.
4. Remove and discard the spent Media Ribbons.
5. Insert new media ribbons, supplied by Hydro International.
 - **NOTE:** The white “sock” may need to first be filled with blue metalla before being inserted back into the filter module as shown below
6. Put the lid on and secure the three latches. Check to make sure that the latches are closed properly.
7. Exit the Up-Flo® Filter chamber and securely replace the grate ___ or lid.
8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables, oil and gross debris removed, and the depth of sediment measured.
 - Note the number of Media Ribbons replaced. Note any irregularities such as damaged components or blockages.
9. Remove safety equipment.
10. Dispose of spent media ribbons at your local landfill, following local regulations.
12. Contact Hydro International to discuss any irregularities noted during annual maintenance.



SOLIDS REMOVAL

Sediment, floatables, gross debris, and spent Media Ribbons can generally be disposed of at the local landfill in accordance with local regulations. The toxicity of the residues captured will depend on the activities in the contributing drainage area, and testing of the residues may be required if they are considered potentially hazardous.

Sump water can generally be disposed of at a licensed water treatment facility but the local sewer authority should be contacted for permission prior to discharging the liquid. Significant accumulations of oil removed separately from sump water should be transported to a licensed hazardous waste treatment facility for treatment or disposal. **In all cases, local regulators should be contacted about disposal requirements.**

MAINTENANCE AT A GLANCE

Activity	Frequency
Inspection	<ul style="list-style-type: none"> - Regularly during first year of installation - Every 6 months after the first year of installation
Floatables/Oils Removal	<ul style="list-style-type: none"> - Twice per year or as needed - Following a contaminated spill in the drainage area
Sediment Removal	<ul style="list-style-type: none"> - Every six to 12 months, depending on the Up-Flo® Filter Configuration - The maximum allowable sediment depth in any Up-Flo Filter configuration is 16 inches (41 cm) - Following a contaminated spill in the drainage area
Media Ribbon Replacement	<ul style="list-style-type: none"> - Once per year - Replacement is required anytime inspection reveals that the high-water level indicator has been activated after two consecutive storms

UP-FLO® FILTER INSTALLATION LOG



SITE REFERENCE NAME OR NUMBER FOR THIS UP-FLO® FILTER LOCATION:	
SITE NAME:	
SITE LOCATION:	
OWNER:	SITE CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

CONFIGURATION (CIRCLE ONE): MANHOLE VAULT SYSTEM

TOTAL NUMBER OF UP-FLO® FILTER MODULES: _____



UP-FLO® FILTER INSPECTION LOG

Site Name: _____ Owner Change since last inspection? Y N

Location: _____

Owner Name: _____

Address: _____ Phone Number: _____

Site Status: _____

Date: _____ Time: _____ Site conditions*: _____
 *(Stable, Under Construction, Needing Maintenance, etc.)

Inspection Frequency Key: A=annual; M=monthly; S=after major storms

Inspection Items	Inspection Frequency	Inspected? (Yes/No)	Maintenance Needed? (Yes/No)	Comments/Description
Debris Removal				
Adjacent area free of debris?	M			
Inlets and Outlets free of debris?	M			
Facility (internally) free of debris?	M			
Vegetation				
Surrounding area fully stabilized? (no evidence of eroding material into Up-Flo® Filter)	A			
Grass mowed?	M			
Water retention where required				
Water holding chamber(s) at normal pool?	A			
Evidence of erosion?	A			
Sediment Deposition				
Filtration Chamber free of sediments?	A			
Sedimentation sump not more than 50% full?	A			
Structural Components				
Any evidence of structural deterioration?	A			
Grates in good condition?	A			
Spalling or cracking of structural parts?	A			
Outlet/Overflow Spillway	A			
Other				
Noticeable odors?	A			
Any evidence of filter(s) clogging?	M			
Evidence of flow bypassing facility?	A			



Inspector Comments: _____

Overall Condition of Up-Flo® Filter**: ☐ Acceptable ☐ Unacceptable

***"Acceptable" would mean properly functioning; "unacceptable" would mean damaged or required further maintenance.*

If any of the above Inspection Items are checked "Yes" for "Maintenance Needed", list Maintenance actions and their completion dates below or on the Maintenance Log provided on page 15 of the Up-Flo® Filter Operation & Maintenance Manual:

Maintenance Action Needed	Due Date

The next routine inspection is schedule for approximately: (date) _____

Inspected by: (signature) _____

Inspected by: (printed) _____



UP-FLO® FILTER MAINTENANCE LOG

Site Name: _____ Owner Change since last inspection? Y N

Location: _____

Owner Name: _____

Address: _____ Phone Number: _____

Site Status: _____

Date: _____ Time: _____ Site conditions: _____
**(Stable, Under Construction, Needing Maintenance, etc.)*

Estimated volume of oil/floatable trash removed: _____

Sediment depth measured in sump prior to removal: _____

Number of Filter Modules fitted with new media ribbons: _____

Inspector Comments: _____

Overall Condition of Up-Flo® Filter: ☐ Acceptable ☐ Unacceptable

***"Acceptable" would mean properly functioning; "unacceptable" would mean damaged or required further maintenance.*

Maintained by: (signature) _____

Maintained by: (printed) _____

HYDRO MAINTENANCE SERVICES

Hydro International has been engineering stormwater treatment systems for over 30 years. We understand the mechanics of removing pollutants from stormwater and how to keep systems running at an optimal level.

NOBODY KNOWS OUR SYSTEMS BETTER THAN WE DO



AVOID SERVICE NEGLIGENCE

Sanitation services providers not intimately familiar with stormwater treatment systems are at risk of the following:

- Inadvertently breaking parts or failing to clean/replace system components appropriately.
- Charging you for more frequent maintenance because they lacked the tools to service your system properly in the first place.
- Billing you for replacement parts that might have been covered under your Hydro warranty plan
- Charging for maintenance that may not yet have been required.

LEAVE THE DIRTY WORK TO US

Trash, sediment and polluted water is stored inside treatment systems until they are removed by our team with a vactor truck. Sometimes teams must physically enter the system chambers in order to prepare the system for maintenance and install any replacement parts. Services include but are not limited to:

- Solids removal
- Removal of liquid pollutants
- Replacement media installation (when applicable)



BETTER TOOLS, BETTER RESULTS

Not all vacor trucks are created equal. Appropriate tools and suction power are needed to service stormwater systems appropriately. Companies who don't specialize in stormwater treatment won't have the tools to properly clean systems or install new parts.

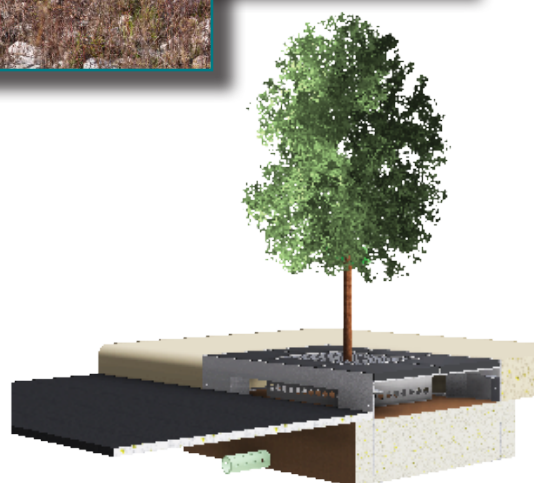
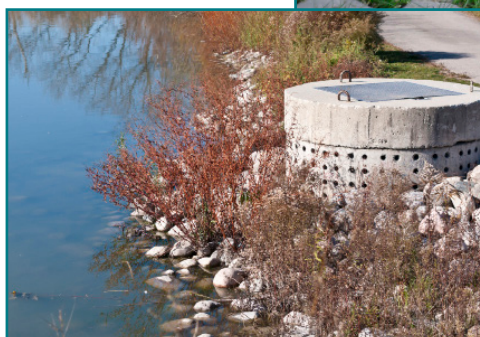


SERVICE WARRANTY

Make sure you're not paying for service that is covered under your warranty plan. Only Hydro International's service teams can identify tune-ups that should be on us, not you.

TREATMENT SYSTEMS SERVICED BY HYDRO:

- Stormwater filters
- Stormwater separators
- Baffle boxes
- Biofilters/biorention systems
- Storage structures
- Catch basins
- Stormwater ponds
- Permeable pavement



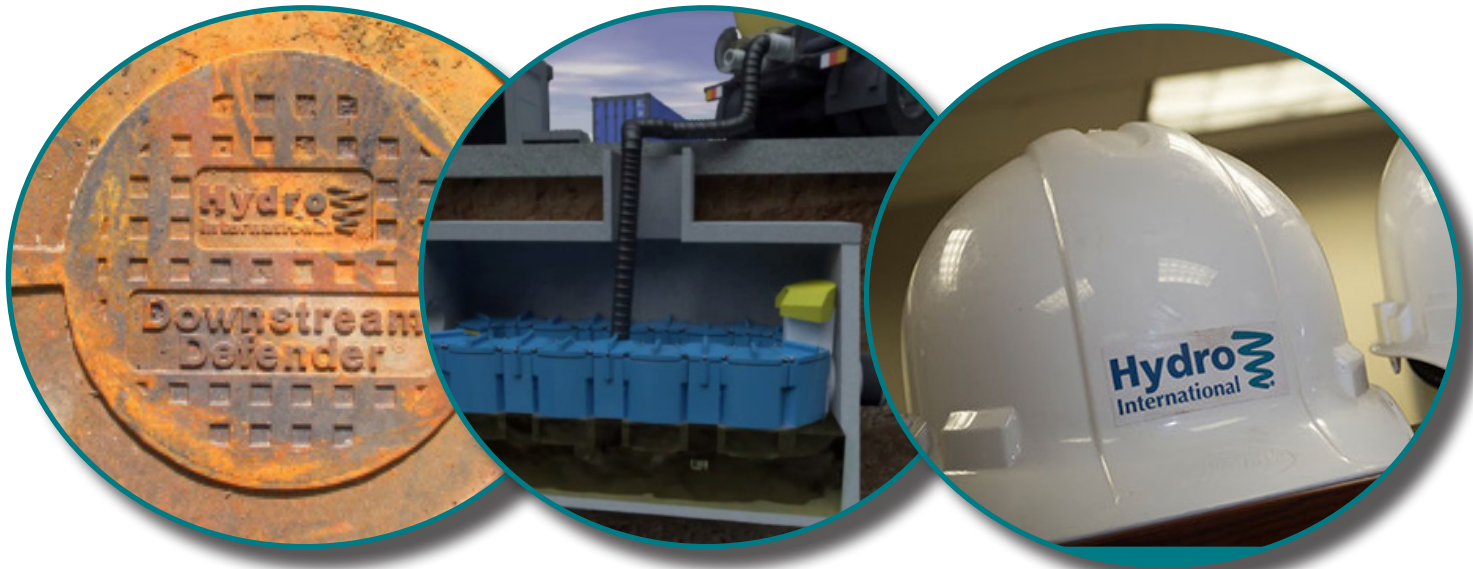
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