

# *BayFilter™*

*The Exact System Needed  
for Large & Small Sites*



The Most **Advanced** Name in Drainage Systems®



## ADS BAYFILTER™ STORMWATER FILTRATION SYSTEM

With over seven years in research and development, BayFilter is the most efficient, effective, economical, and easy-to use stormwater treatment filter on the market today. The BayFilter system utilizes well proven sand filter principles to remove pollutants such as sediments, oil, metals, organics and nutrients. The modular design allows the units to be sized based on site conditions providing the exact system needed for both large and small sites.

### **FILTER OPERATION:**

The BayFilter system consists of modular cartridges placed in vaults for stormwater treatment. The cartridge consists of a spiral wound media filter cartridge utilizing a proprietary sand mix with over 43 square feet of active filtration area. During a storm event, water will begin to enter the vault at the inlet pipe and fill the structure where the filters are housed. When the water surface elevation reaches the operation level, water is forced through the cartridges via hydrostatic head. Water enters the cartridge through the inlet drainage material and is forced through the media filter into the outlet drainage material. Once operation level is reached the filtered stormwater exits the system via the center drain tube into the drainage manifold. During storm subsidence the filters still operate under siphon conditions until the siphon is released and backwash occurs. The remaining water in the vault is evacuated through filtered draindown modules located in the vault. The cartridge system operates in four phases of flow which are:

1. Vault Fill and Air Release
2. Uniform Bed load hydrodynamic filtration
3. Uniform Bed load siphon filtration
4. Siphon break and hydrodynamic backwash.

Due the backwash cycle of the treatment process, sediment is deposited on the vault floor. The back wash provides an additional level of filter cleaning not provided in other modular filter systems. This extends the life of the filter and reduces maintenance. In addition the filter retains some minor amount of sediment as well.



## **DESIGN**

BayFilter systems are designed to be offline systems and can be designed for the water quality flow or volume. Each configuration should be evaluated to determine the best utilization.

When the water quality flow rate is used the treatment flows will be less than the peak discharge from the site. A bypass structure allows the filter system to be placed offline with lower flows routed to it while higher peak storms are bypassed around the system. Use of a BaySeparator as a pretreatment device can prevent the filters from treating many larger particles which are more easily removed by gravity separation. Use of pretreatment can extend the life of the more costly filter system.

In flow based design there is usually a higher flow rate treated per cartridge but reduced treated sediment load per cartridge. Flow based configurations are generally limited by flow capacity and not sediment loading.

It is advisable for these configurations to utilize a BaySeparator prior to the detention system as pretreatment. For volume-based systems the BayFilter is used on the outlet side of the detention system. This provides not only the detention for the site but the ability to route the water quality volume through the BayFilter. These types of designs are generally fewer cartridges with higher sediment loads.

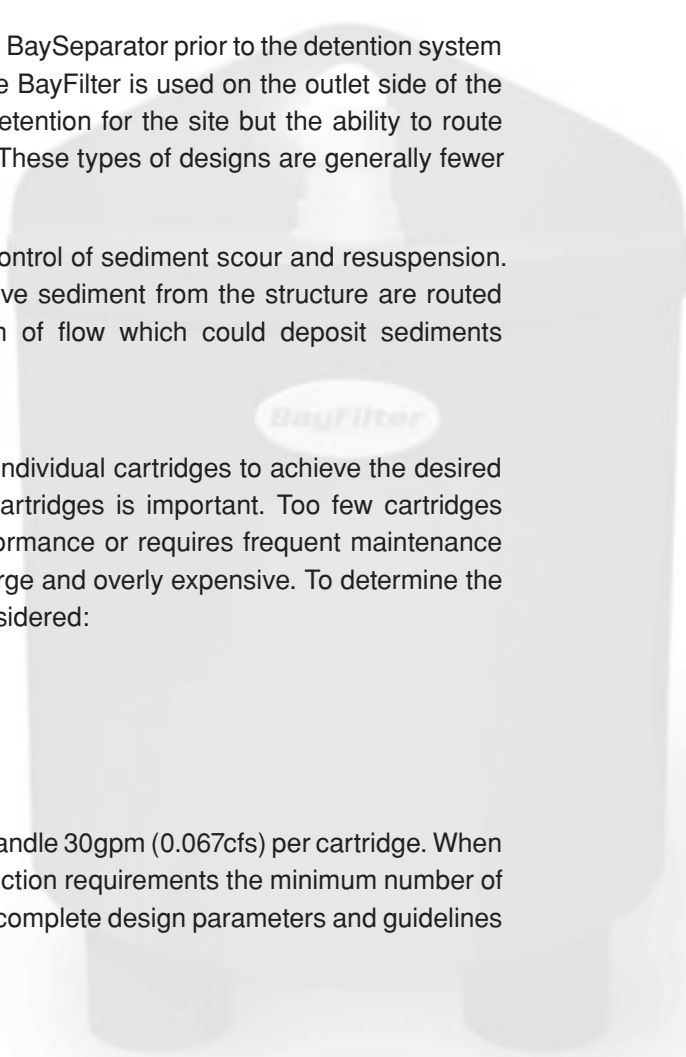
The offline design of the systems provides for control of sediment scour and resuspension. The larger storms which could scour and remove sediment from the structure are routed around the structure and prevent introduction of flow which could deposit sediments downstream.

## **HOW MANY CARTRIDGES**

Each BayFilter system relies on a collection of individual cartridges to achieve the desired removal efficiency so the correct number of cartridges is important. Too few cartridges will result in a system that does not meet performance or requires frequent maintenance while too many results in a system that is too large and overly expensive. To determine the number of cartridges three factors must be considered:

- The flow capacity of the system
- Treated sediment load
- Jurisdiction

In general BayFilter cartridges are designed to handle 30gpm (0.067cfs) per cartridge. When combined with treated sediment load and jurisdiction requirements the minimum number of cartridges necessary can be determined. More complete design parameters and guidelines are available upon request.



## CONFIGURATION

There are several different options available for the BayFilter configurations but the most common are the Manhole filter, precast vault filter, and cast-in-place filter. The Manhole configuration is the most economical version of the system. Treatment Capacities are as follows:



Treatment Capacities	Manhole Size (inches)	Maximum Number of Filter Cartridges	Maximum Treatment Flow gpm (cfs)
	60	3	90 (0.20)
	72	4	120 (0.27)
	84	5	150 (0.037)
	96	7	210 (0.47)

Manhole BayFilters are ideal for installation on the downstream side of a detention system. Precast vaults are used on larger sites with more impervious area. The precast BayFilter system is larger than the manhole BayFilter. It has a treatment capacity as follows:

Treatment Capacities	Vault Size (ft x ft)	Maximum Number of Filter Cartridges	Maximum Treatment Flow gpm (cfs)
	8' x 10'	10	300 (0.67)
	8' x 12'	13	390 (0.87)
	8' x 14'	15	450 (1.00)
	8' x 16'	18	540 (1.20)
	10' x 16'	21	630 (1.40)
	10' x 20'	27	810 (1.80)
	10' x 26'	33	990 (2.21)
	10' x 32'	42	1260 (2.81)
	10' x 38'	51	1530 (3.41)
	10' x 40'	54	1620 (3.61)

Installations of Precast BayFilter systems can be used independently or in conjunction with a detention system. Pretreatment with a BaySeparator should be considered to extend the filter life.

The last option available is the cast-in-place BayFilters. On sites that require more the 54 cartridges or where the precast and manhole



system is not practical, a cast in place vault can provide the solution. High flow rates, shallow installations, very flat sites, and limited footprints can all be reasons for a cast in place system.

**INSTALLATION:**

Installation of the BayFilter system can be performed by the same contractor performing the installation of piping and underground utilities. The installation process is very simple and consistent whether installing the system in a manhole, precast vault, or cast in place vault. Once the containment system has been installed the filter system is placed inside the vault. The installation consists of the drainage manifold, energy dissipater/level spreader, and cartridges. Because the BayFilters are modular the system can be installed very quickly. The cartridges should be installed after the site has been stabilized to avoid unnecessary filter replacements from construction related activities.

**MAINTENANCE:**

As with all stormwater treatment devices the BayFilter systems requires periodic maintenance to continue operating at the design flow rate and efficiency. Maintenance involves the removal and replacement of each cartridge and cleaning of the containment system with a vacuum truck. Maintenance should be performed by trained personnel.

The maintenance cycle of the system will be driven mostly by the actual solids load on the filter. The system should be monitored periodically to make certain that the system is operating correctly. Maintenance cycles can be variable depending on storm events and sediment loads. For complete maintenance instructions and guidelines contact your ADS representative.



## SPECIFICATIONS

### INTERNAL COMPONENTS

- Precast Concrete Vault: Shall be provided according to ASTM C478, C858, and C1433. Precast concrete vaults shall be provided by BaySaver Technologies, Inc.
- PVC Manifold Piping: All internal PVC pipe and fittings shall meet ASTM D1785. Manifold piping shall be provided to the contractor partially pre-cut and pre-assembled.
- Filter Cartridges: External shell of the filter cartridges shall be substantially constructed of polyethylene or equivalent material. Filtration media shall be arranged in a layered fashion to maximize available filtration area. An orifice plate shall be supplied with each cartridge to restrict flow rate to a maximum of 30 gpm.
- Filter Media: Filter media shall be by BaySaver Technologies Inc. Filter media shall consist of the following mix. Sand media shall have an effective particle size of not more than 0.49 mm, it shall have an angular grain shape, a hardness of 7, be 99% silica, and not leach nutrients. The media shall also include a blend of Perlite and Activated Alumina.
- Flow Spreader/Energy Dissipator: Shall be constructed of polyethylene or equivalent material.

### PERFORMANCE

- The stormwater filter system shall be an offline design capable of treating 100% of the required treatment flow at full sediment load conditions.
- The stormwater filter system's cartridge units shall have no moving parts.
- The stormwater treatment unit shall be designed to remove at least 85% of total suspended solids, 65% of total phosphorus, 65% of turbidity, 60% of total copper and 60% of total zinc based on field data collected in compliance with the Technology Acceptance Reciprocity Partnership Tier II test protocol.
- The stormwater filtration system shall reduce incoming turbidity (measured as NTUs) by 65% or more and shall not have any components that leach nitrates or phosphates.
- The stormwater filtration cartridge shall be equipped with a hydrodynamic backwash mechanism to extend the filter's life and optimize its performance. Inlet flow shall be upflow.
- The stormwater filtration system shall be designed to remove a minimum of 65% of the incoming Total Phosphorus (TP) load.
- The stormwater filtration system's cartridge units shall have the following minimum flow and sediment load capacities:

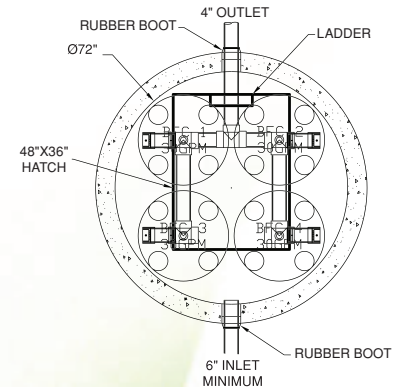
### INSTALLATION

Design Flow per BFC—gmp Nominal	30	23	20	15
Treated Sediment Load for 80% Sediment Removal—lbs.	150	200	250	300

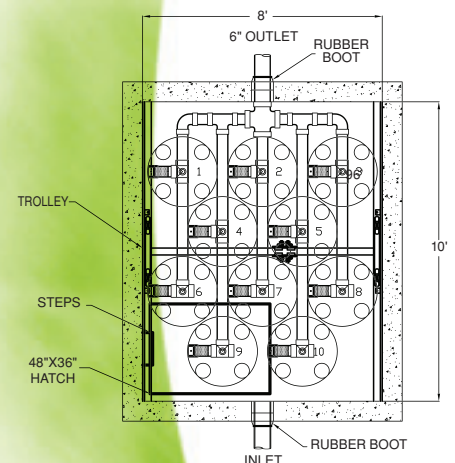
Installation of the BayFilter System(s) shall be performed per manufacturer's Installation Instructions.

For more information on BayFilter Stormwater Filtration System and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

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**Manhole Configuration**



**Vault Configuration**