

AquaShield™ Stormwater Treatment Solutions



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AquaShieldTM Stormwater Treatment Solutions

The highest priority of AquaShieldTM, Inc. (AquaShieldTM) is to protect waterways by providing stormwater treatment solutions to businesses across the world. These solutions have a reliable foundation based on nearly 30 years of water treatment experience. Our long-time commitment to harnessing and focusing the expertise of advanced engineering and technical support staff is recognized throughout the world. It is this commitment that has enabled us to succeed by developing and distributing custom designed and site-specific solutions that are technologically advanced with independent validation, yet simple enough to be totally modular, easy to install, and versatile in meeting our customer's needs.

Local regulators, engineers, and contractors have praised the AquaShieldTM systems for their accessible design and ease of installation. All systems are fabricated from high performance materials such as High-Density Polyethylene (HDPE), Polymer Coated Steel (PCS) or Fiber Reinforced Plastic (FRP). Contractors prefer the quick and easy installation of our cost-effective structures.

The AquaShieldTM line of patented stormwater treatment products provide for three levels of stormwater treatment:

The Aqua-Swirl[®] Hydrodynamic Separator provides a highly effective means for the removal of TSS (fine to coarse sediment), floating debris and free-oil.

The Aqua-FilterTM Stormwater Filtration System is capable of gross contaminant removal, and the removal of fine sediments, waterborne hydrocarbons, heavy metals (i.e. zinc) and nutrients such as phosphorous and nitrogen.

The Aqua-GuardianTM Catch Basin Insert removes gross contaminants, oil and sediment at the source. Filtration of fine sediment and associated pollutants transported during the first flush of the storm continues to be the initial level of treatment.



The Aqua-Swirl[®] Hydrodynamic Separator.



The Aqua-FilterTM Stormwater Filtration System.

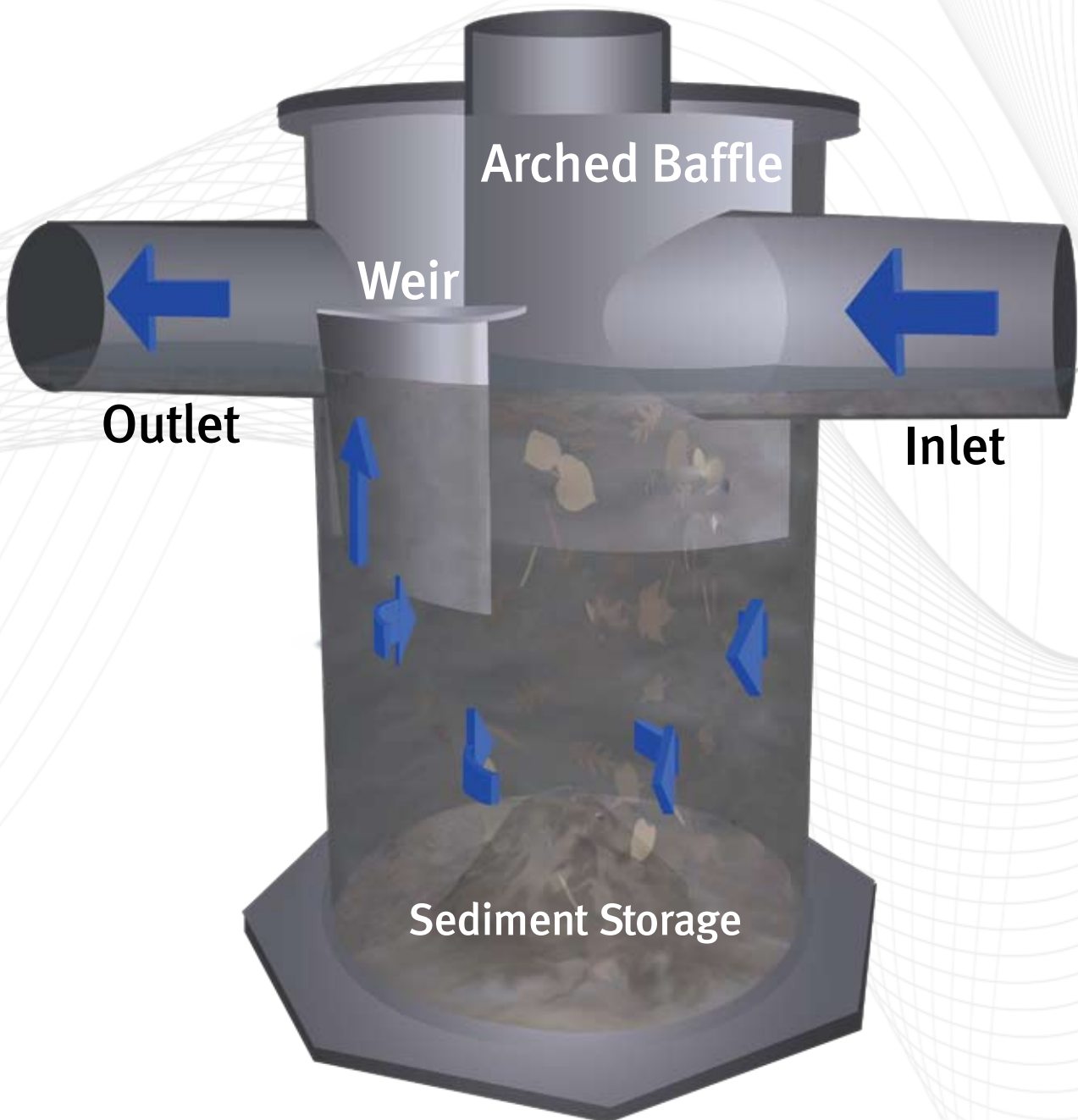


The Aqua-GuardianTM Catch Basin Insert.

Aqua-Swirl[®] Hydrodynamic Separator

The patented Aqua-Swirl[®] Stormwater Treatment System is a hydrodynamic separator, which provides a highly effective means for the removal of sediment, free oil, and floating debris. Independent university laboratory and field performance evaluations have shown that the Aqua-Swirl[®] achieves a TSS removal of >86% calculated on a net annual basis.

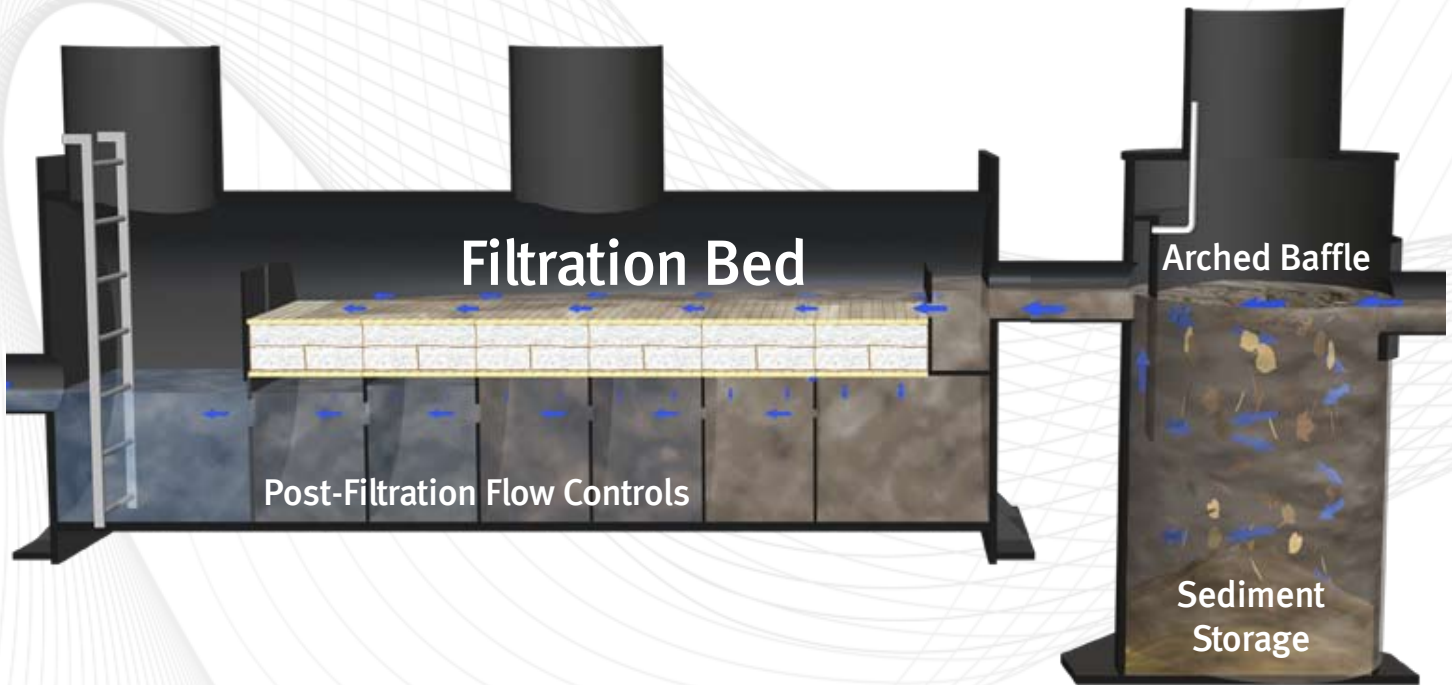
The Aqua-Swirl[®], with a conveyance flow diversion system, allows simple installation by connecting directly to the existing storm conveyance pipe. This connection provides full treatment of the “first flush,” while the peak design storm is diverted and channeled through the main conveyance pipe.



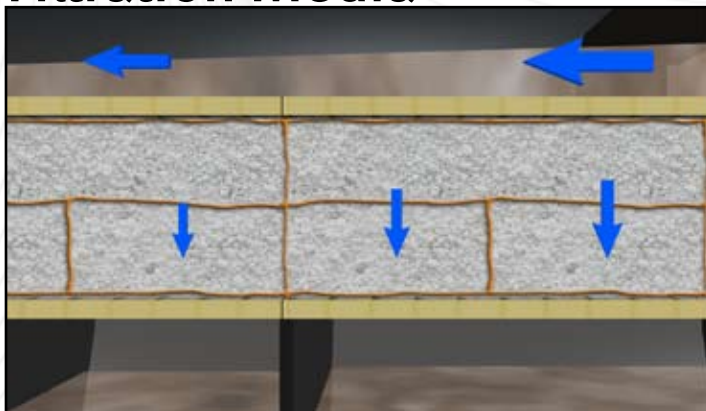
Aqua-FilterTM Stormwater Filtration System

The Aqua-FilterTM Stormwater Filtration System is designed for projects that require advanced treatment for stormwater that discharges to sensitive receiving waters. Each system is custom engineered for site-specific needs.

The patented Aqua-FilterTM filtration system utilizes a unique “treatment-train” approach. The system includes an Aqua-Swirl[®] designed for gross contaminant removal, which pre-treats stormwater before entering the filtration chamber. A variety of natural filter media are used in the filtration chamber to complete the treatment process by polishing the stormwater and removing greater than 80% of fine-grained sediments and waterborne pollutants.

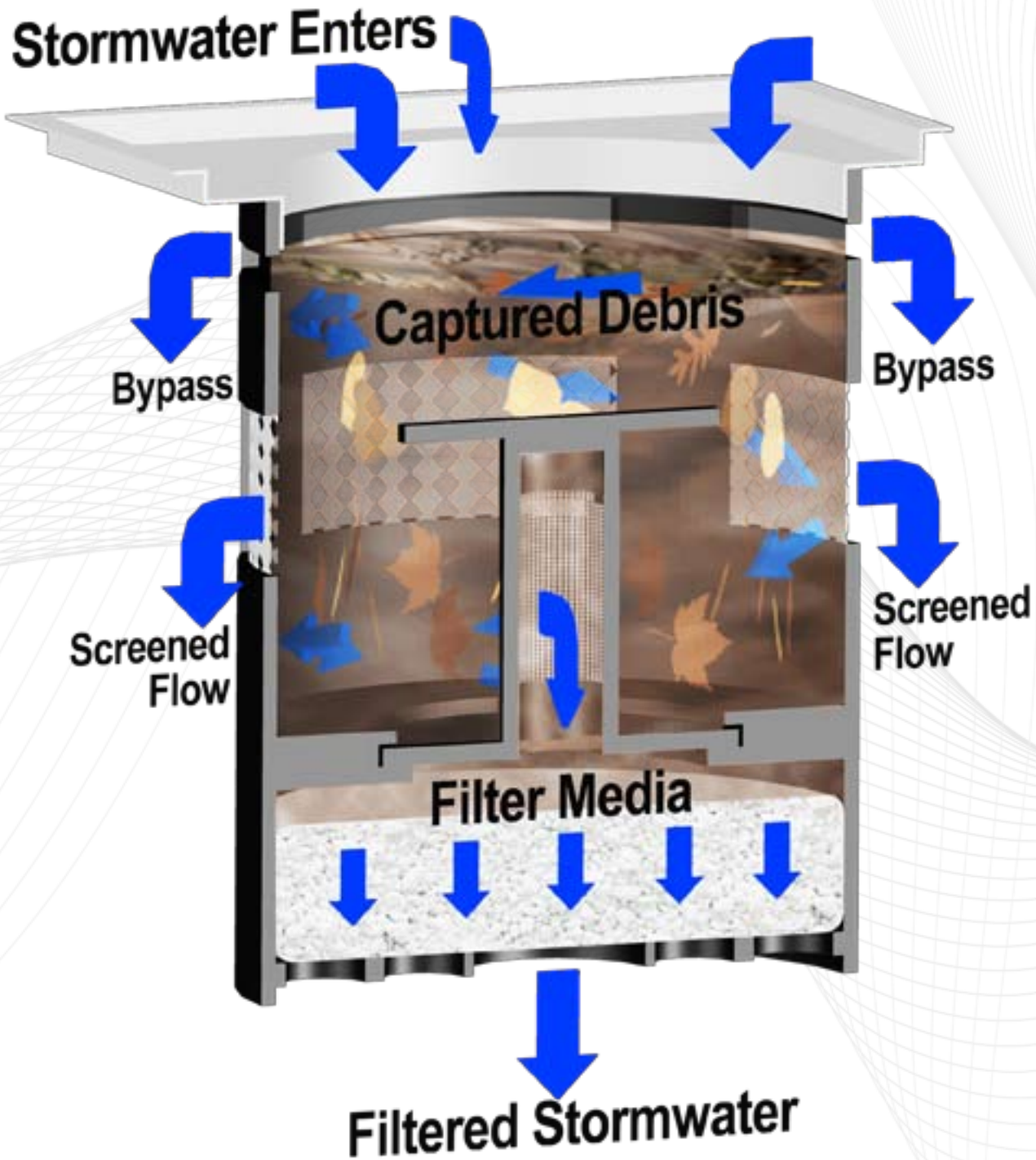


Filtration Media



Aqua-Guardian™ Catch Basin Insert

The Aqua-Guardian™ Catch Basin Insert is the first line of defense in a stormwater treatment plan. Most often used in parking lots and roadway catch basins, the patented Aqua-Guardian™ works to remove gross contaminants, oil, and sediment from urban runoff. These inserts are constructed from durable, corrosion resistant HDPE, making them lightweight and easy to install.



Applications

AquaShield™ Stormwater Treatment Solutions are highly adaptable and custom designed to be specified for virtually any new development project. Their flexible design also allows for easy retrofit into existing facilities. Typical applications include:



Retail/Commercial Developments

- *Retail/Commercial Developments*
- *New and Existing Industrial Facilities*
- *Highway/Transportation Facilities*



Fueling Centers and Convenience Stores

- *Fueling Centers and Convenience Stores*
- *Fast Food Restaurants*
- *Office Complexes*



Highway/Transportation Facilities

- *Watershed Protection*
- *Redevelopment/Retrofit Sites*
- *Government Facilities*
- *Military Installations & Berthing Wharfs*
- *Vehicle and Equipment Wash Rack Areas*



Watershed Protection

- *Residential Developments*
- *Coastal Communities*
- *Drinking Water Well-head Protection Areas*



Residential Developments



Coastal Communities

Sample Installations

Aqua-Swirl[®] Hydrodynamic Separator

- *Vehicle Wash-down Area - Grand Rapids, MI*
- *Industrial Facility Parking Lot - Olancho, CA*
- *Church Parking Lot - Hixson, TN*
- *Shopping Center Parking Lot - Honolulu, HI*
- *Storage Yard - Charlotte, NC*
- *Maintenance Facility - Eugene, OR*
- *Recreation Center - Washington, DC*
- *Fueling Station - Knoxville, TN*
- *Roadway Project - Grand Rapids, MI*
- *Naval Air Station - San Diego, CA*
- *Grocery Store - Emmett, ID*
- *Residential Development/Golf Course - Indianapolis, IN*



Aqua-Swirl[®] installation at a residential development in PA.

- *University Housing - Indianapolis, IN*
- *Department of Transportation Center - Knoxville, TN*
- *News/Publishing Facility - Honolulu, HI*
- *Correctional Facility - Indianapolis, IN*

Aqua-FilterTM Stormwater Filtration System

- *Housing Subdivision - Anchorage, AK*
- *Industrial Facility Parking Lot - Massena, NY*
- *Parking Lot Expansion - Atlantic City, NJ*
- *Truck Wash - Oklahoma City, OK*
- *Department of Public Works Facility - Wayne, MI*
- *Roadway Project/Test Facility - Seattle, WA*
- *Commercial Facility Parking Lot - Rockville, MD*
- *Convenience Center - Andover, CT*
- *Hotel Parking Lot - Dumphries, VA*
- *Highway/Stream Re-development - Jackson, WY*
- *Navy Base Pier - San Diego, CA*



Aqua-FilterTM system installation at an airport in South Korea

- *Department of Transportation - Portsmouth, RI*
- *Highrise Condominiums - Podolsk, Russia*
- *Steam Plant - San Juan, Puerto Rico*

Aqua-GuardianTM Catch Basin Insert

- *Solid Waste Transfer Station - Knoxville, TN*
- *Industrial Facility Parking Lot - Chardon, OH*
- *Storm System Drain To Ocean - Los Angeles, CA*
- *Pharmacy Parking Lot - Chattanooga, TN*
- *Vehicle Wash-down Area - Mobile, AL*
- *Military Facility - Kauai, HI*
- *Heavy Industrial Facility - Virginia Beach, VA*
- *University Test Facility - Honolulu, HI*
- *Heavy Traffic Street - Knoxville, TN*
- *Navy Base Pier - Mayport, FL*
- *Sports Arena - Washington, DC*
- *Packaging Store - Mt. Laurel, NJ*
- *Truck Stop - Chattanooga, TN*



Aqua-GuardianTM system installation in California.

- *International Military Facility - South Korea*
- *University Campus - Fayetteville, AR*
- *Urban Residential Development - Los Angeles, CA*
- *Fast Food Restaurant - Greendale, IN*
- *Highway/Stream Re-development - Jackson, WY*
- *Navy Base Pier - San Diego, CA*

Fabrication

All internal and structural components of the AquaShieldTM line of stormwater treatment products are constructed with high performance materials that are strong, resilient, extremely tough and durable. These materials are resistant to chemicals and corrosion, and can withstand high sodium conditions. All connections are welded using proper methods and techniques to ensure fully restrained joints with zero leakage.



A hot air welded joint provides zero leakage.



An Aqua-Swirl[®] unit inspected before shipment.

Quality control is a high priority within AquaShieldTM. That is why all of the patented products are fabricated, inspected and tested before leaving for the job site. AquaShieldTM handles all workmanship to ensure consistent quality of our patented systems.

Unlike other stormwater treatment systems that are constructed of concrete enclosures and field assembled components, the AquaShieldTM line of stormwater treatment products are fully assembled at the factory allowing for easy on-site handling, installation and connection to the storm drainage structure.

Lifting cables are provided on each Aqua-Swirl[®] and Aqua-FilterTM, allowing an excavator or backhoe to maneuver and position the system. Furthermore, the systems can be stored on the job site following off-loading to accommodate changing schedules.

Stub-outs for the inlet and outlet are part of the modular design of the Aqua-Swirl[®] and Aqua-FilterTM, which allows the contractor to attach the pipes to the inlet and outlet of the Stormwater Treatment System with couplings.



An Aqua-Swirl[®] unit being transported from fabrication.

The Aqua-GuardianTM is also completely assembled at the factory and ready for installation after removing the shipping protection. Typically, an AquaShieldTM representative is present on-site to assist in the installation process.

Both the Aqua-Swirl[®] and the Aqua-FilterTM come with risers and custom manhole frames and covers. Delivery is typically less than four weeks from final approval of shop drawings.

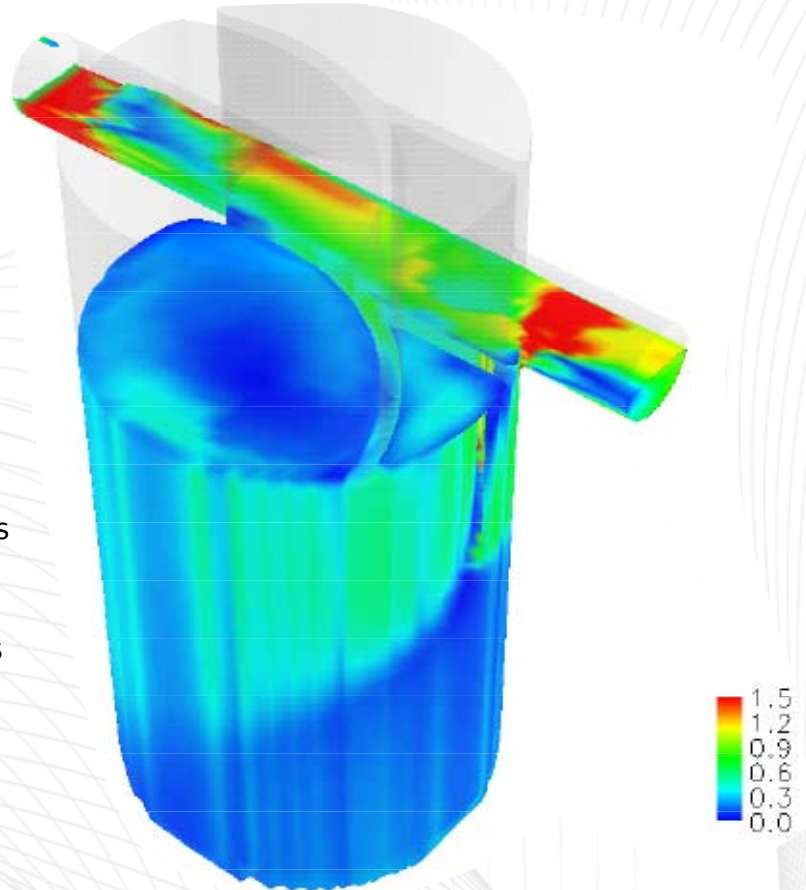
Performance and Testing

The performance of proprietary and public domain stormwater treatment technologies is characterized by their effectiveness in removing pollutants found in stormwater runoff. There are two settings under which this performance can be verified; controlled laboratory conditions, and the natural field conditions. AquaShield™ has a commitment to performance testing of our stormwater treatment products through independent organizations.

As compliance requirements with the Phase II Stormwater Regulations become better defined in the United States, performance evaluations of manufactured stormwater quality structures are occurring more frequently at the local level. These compliance programs range from comparing a selected number of samples and monitoring the maintenance requirements of a treatment device, up to a stringent program of continuous sampling of multiple storm events with strict protocols and quality control procedures in place. AquaShield™ Stormwater Treatment Systems are involved in various stages of these field evaluations at the local level. These locations include various weather patterns across the United States.

AquaShield™ has performed an extensive independent field test of an offline Aqua-Swirl® Model AS-5 hydrodynamic separator. Analytical results from 18 storms and 15.16 inches of rain over two years were obtained following the Technology Acceptance Reciprocity Partnership (TARP) Tier II Field Testing Protocol. Field testing was performed with the intent to gain technology verification by the New Jersey Corporation for Advanced Technology (NJCAT) and subsequent Field Test Certification by the New Jersey Department of Environmental Protection (NJDEP). Results demonstrate that the Aqua-Swirl® can provide a high level of performance by achieving over 80% removal of suspended sediment contained in stormwater runoff.

AquaShield™ also evaluates its systems in controlled lab conditions through Computational Fluid Dynamic (CFD) computer modeling and full



A CFD model of flow velocities in the Aqua-Swirl® (Ft / s).

scale testing. This is the same technology that the aerospace industry uses to test the aerodynamics of their aircraft, and now this technology has branched out into the stormwater industry. The CFD computer program is designed specifically for analysis of hydrodynamic fluid motion in three-dimensions. The computer data is then compared to the results obtained from the full-scale model in the laboratory for accuracy.

AquaShield™ is also participating in a number of other field monitoring programs to continue to verify the effectiveness of our Stormwater Treatment Systems.

AquaShield™ Product System Maintenance

The long-term performance of the stormwater treatment structures (including manufactured systems, ponds, swales, etc.), and the effective protection of receiving waters, depends on a consistent maintenance plan. Inspection and maintenance functions are simple and easy for the AquaShield™ Stormwater Treatment Systems allowing all inspections to be performed from the surface. An AquaShield™ field representative will be available as needed to assist local maintenance personnel in the field. Please see the product specific catalogs for specific product inspection and maintenance procedures.

It is important that a routine inspection and maintenance program be established for each unit based on (1) the volume or load of the contaminants of concern, (2) the frequency of releases of contaminants at the facility or location, and (3) the nature of the area being drained.

In order to ensure that our systems are being maintained properly, AquaShield™ offers a maintenance plan to all of our customers. We recognize there are many service providers and AquaShield will reference a maintenance company that can perform these functions on our customer's behalf.

Inspection

All AquaShield™ products can be inspected from the surface, eliminating the need to enter the systems to determine when cleanout should be performed. Free-floating oil and floatable debris can be directly observed and removed through the provided service access.

In most cases, AquaShield™ recommends a quarterly inspection of the Stormwater Treatment Systems for the first year of operation to develop an appropriate schedule of maintenance.

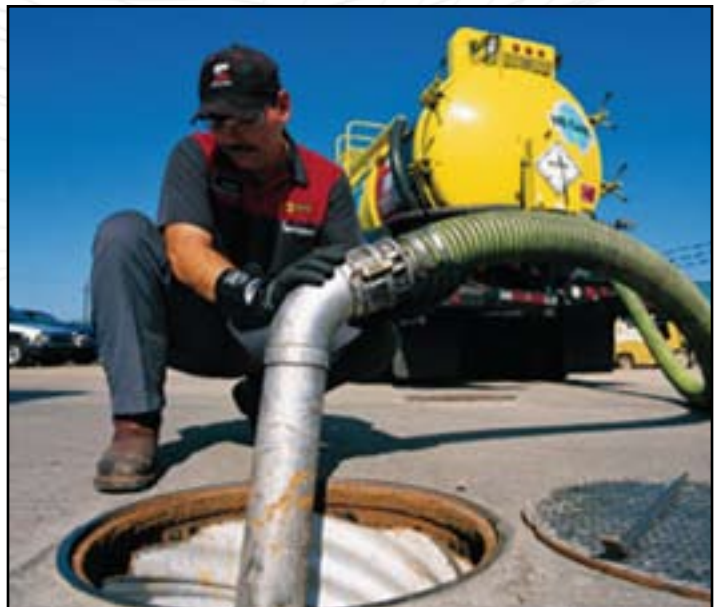
Based on experience of the system's first year in operation, we recommend that the inspection schedule be revised to reflect the site-specific conditions encountered. Typically, the inspection schedule for subsequent years is reduced to semi-annual inspection.

Cleanout of accumulated solids is needed when the usable storage volume has been occupied. A vacuum truck can be used to remove the accumulated sediment and debris.

Disposal of the material is typically treated in the same manner as catch basin cleanouts. AquaShield™ recommends that all materials removed be handled and disposed of in accordance with local and state requirements.



Inspection of an AquaShield™ stormwater treatment system.



Cleanout can be done with a vac truck.

The Worldwide AquaShield™ Sales Force

Independent sales agents sell and market AquaShield™ products to decision makers that have immediate needs for stormwater treatment devices. These sales agents have extensive experience working with municipalities, design engineers, architects and contractors and can help you determine which product that you need.

For quotes, CAD drawings, specifications, sizing questions, or any other need, please contact a sales agent in your area. To find an agent in your area, please visit our website or call the AquaShield™ headquarters at 1-888-344-9044 or 1-423-870-8888.

Here are a few locations around the world where we have agents:



Chattanooga, TN

- *Seoul, Korea*
- *Ontario, Canada*
- *Quebec, Canada*
- *Riyadh, Saudi Arabia*
- *San Juan, Puerto Rico*
- *Kuala Lumpur, Malaysia*
- *Aberdeen, Hong Kong*

- *Arizona, USA*
- *California, USA*
- *Colorado, USA*
- *Hawaii, USA*
- *Idaho, USA*
- *Illinois, USA*
- *Massachusetts, USA*
- *Michigan, USA*
- *Missouri, USA*
- *New Mexico, USA*
- *New Jersey, USA*
- *North Carolina, USA*
- *Tennessee, USA*
- *Texas, USA*
- *Washington, USA*



Hong Kong



Detroit, MI



Toronto, Canada



Jersey City, New Jersey



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The information in this catalog is subject to change. For any questions, please contact AquaShield™ by visiting www.aquashieldinc.com or by calling 1-888-344-9044 (1-423-870-8888).

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