

COMPLETE STORMWATER & RAINWATER MANAGEMENT GUIDE



ADS & RMS

Advanced Drainage Systems (ADS) and Rainwater Management Solutions (RMS) are working together to provide turn-key Stormwater and Rainwater solutions for commercial, industrial, and residential applications. They're able to provide sustainable and high-quality systems for stormwater and rainwater management by combining the knowledge and experience each company has acquired in their respective industries. More than 50 years ago, ADS introduced pipe solutions with lightweight construction for easy handling, high resistance to corrosion and strength and durability.

STORMWATER MANAGEMENT AND REUSE APPLICATIONS AND BENEFITS



Stormwater and rainwater management has become a critical element in modern new construction and retrofits to control runoff from increasingly large areas of impervious surfaces. The ability to not only store water runoff, but to collect and reuse has become a vital step towards sustainability and water conservation.

Outdoor Applications*

- Irrigation
- Pond Filling
- Water and Landscape Features
- Street Cleaning/Dust control
- Fire Fighting
- Sanitary Sewer Flushing
- Aquifer Recharge

**Jurisdiction specific and require additional treatment/disinfection in most areas*

Indoor applications*

- Toilet/Urinal Flushing
- Laundry Services
- Cooling Towers
- Process/Bolier Water
- Fire Suppression
- Utility Wash Water

Managing Stormwater can help meet regulatory guidelines by utilizing the following methods:

- Volume Reduction - by retaining stormwater on site
- Rate Ccontrol - slowing water discharge to the drainage system which mitigates flooding and erosion
- Water Quality - By applying pre-treatment to address contaminates of concerns (i.e. filtration for gross solids, phosphorous, metals and oil/grease)
- Reducing the capacity and size of on site detention measures

STORMWATER VS RAINWATER

Stormwater: Natural precipitation that has contacted a surface at grade or below grade and has not been put to beneficial use. **(ARCSA/ASPE/ANSI 63-2013 Rainwater Catchment Systems)**

Rainwater: Water from natural precipitation from the atmosphere that lands on any mandmade or natural surface that is not contaminated by use. **(ARCSA Rainwater Harvesting Manual 2015)**

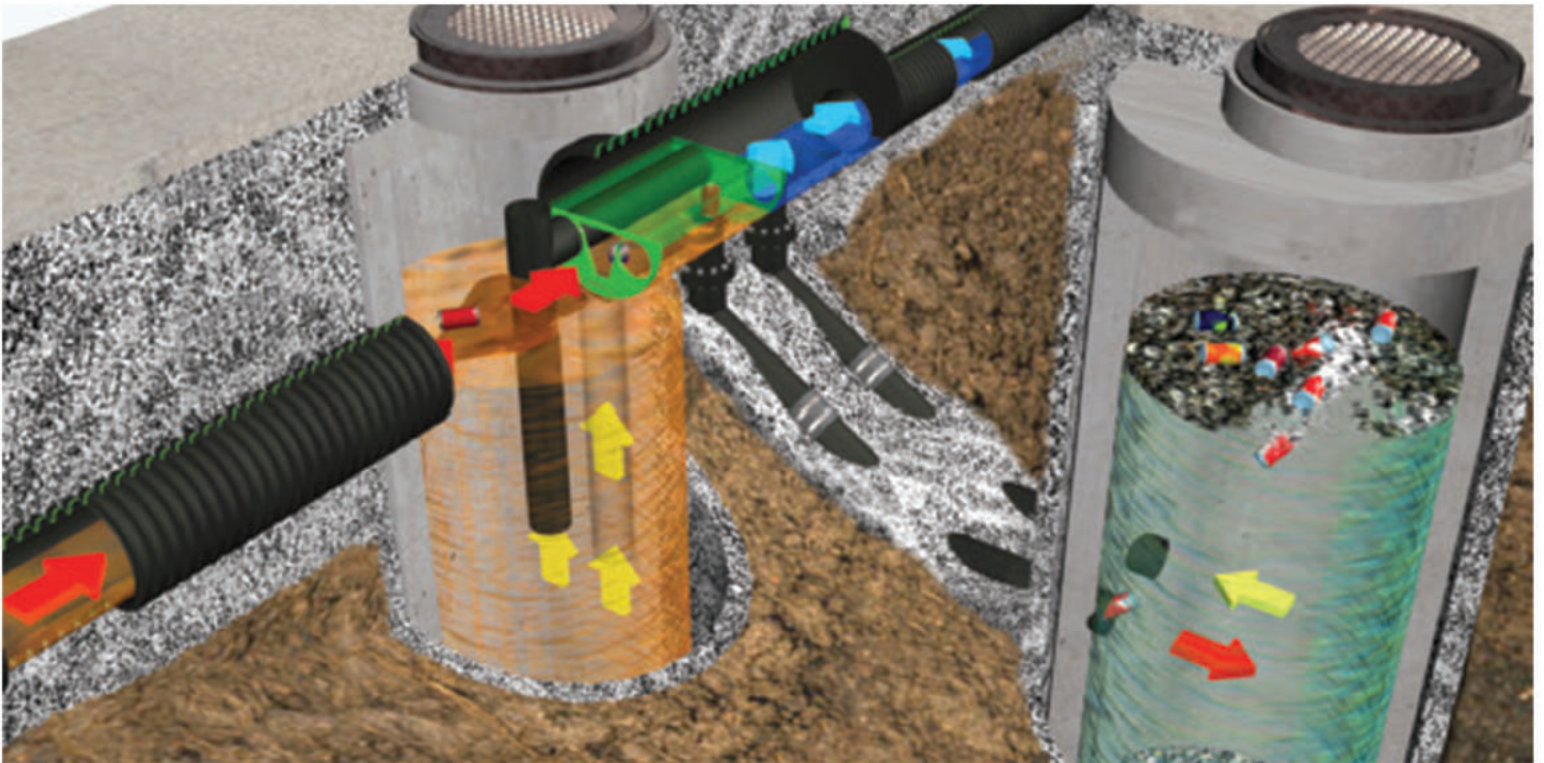
STORMWATER MANAGEMENT PRE-FILTRATION

Bay Separator Stormwater Separator

Efficiently and effectively treat stormwater by separating debris and trapping pollutants before they enter the waterways.

The BaySeparator is a unique hydrodynamic storm water treatment device that is an ideal solution for debris and pollutant trapping. The BaySeparator consists of two standard pre-cast manholes and the BaySeparator unit. The two manholes allow for the removal and storage of pollutants, while the BaySeparator directs the flow of water to provide the most efficient treatment possible. Standard manhole units are available in 4-foot (1.22 m), 5-foot (1.52 m), 6-foot (1.83 m) and 10-foot (3.05 m) diameters, however the primary and storage manholes may be tailored to suit any specific site conditions necessary.

- Removal of TSS, trash, oils and hydrocarbons
- Dual manhole design limits resuspension
- High bypass flow rates
- Short lead times



STORMWATER MANAGEMENT PRE-FILTRATION

Barracuda™ Stormwater Separator

Protect water quality and remove total suspended solids.

The Barracuda is market-changing, stormwater quality technology. A high-performance, vortex hydrodynamic separator, the Barracuda removes total suspended solids (TSS).

KEY FEATURES:

- Single manhole design
- No elevation loss between the inlet and outlet
- Flexible inlet/outlet positions (not just 180 degree orientation)
- Internal bypass for inline installation (where applicable)
- Revolutionary, patent-pending “teeth” mitigate turbulence in the sump area to prevent resuspension of captured contaminants.
- Easy maintenance using a vacuum truck or similar equipment.
- Surface inspection and maintenance with no confined space entry.

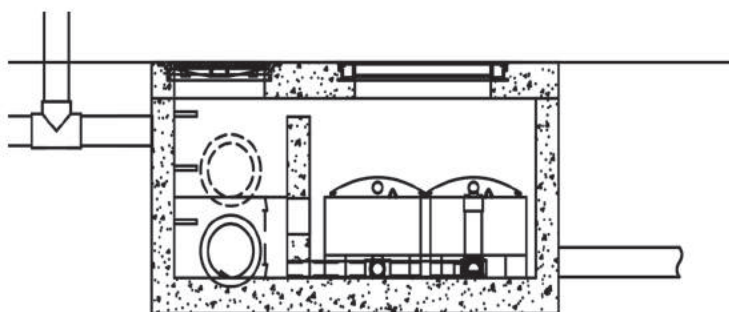


BayFilter™ Stormwater Media Filter

Stormwater Media Filter designed to remove sediment, phosphorous, metal, and other pollutants.

The BayFilter is a state of the art stormwater filter designed to effectively remove pollutants such as total suspended solids (TSS), phosphorus, metals, nitrogen, trash and hydrocarbons. The compound spiral media configuration allows for a large filter surface area in a compact footprint. This configuration results in the most efficient and effective stormwater filter available in the marketplace. The BayFilter is available in multiple sizes, with multiple media configurations, to meet any flow rate and design consideration while targeting specific pollutants. A BayFilter System is typically a concrete structure (precast vault, manhole, or cast in place structure) with a single or multiple BayFilter cartridges.

- Approved by WADOE and NJDEP
- Longest service life of any cartridge filter with the ability to treat over 300 pounds of sediment
- Spiral design provides a large filter surface area
- Ability to treat TSS, total phosphorus, dissolved metals and other pollutants
- Customizable systems



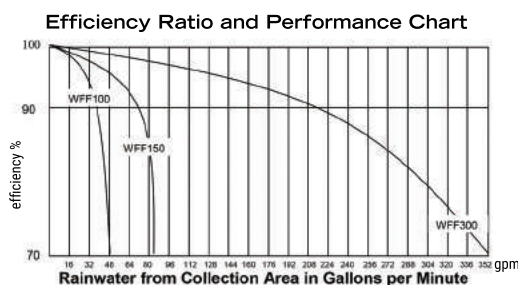
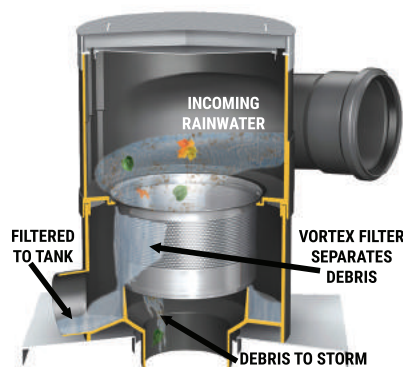
RAINWATER HARVESTING

WISY Rainwater Pre-tank Separator

After more than 20 years in the rainwater industry, Rainwater Management Solutions has identified the WISY 4-Step System as the ideal method for rainwater harvesting. This method provides the best pre-tank separation by way of the WISY Vortex Filter, which is regarded internationally as the best pre-filtration method. Pre-filtration reduces the amount of debris in the tank, promotes a healthy tank environment, and reduces system maintenance. RMS is the exclusive North American distributor of the WISY product line.

1. PRE-TANK SEPARATION

- low maintenance filter
- removes rooftop debris
- protects tank water quality



2. SMOOTHING INLET



- prevents tank stirring
- oxygenates the water
- protects tank water quality

3. FLOATING FILTER



- sits below water surface
- takes in the cleanest water

4. OVERFLOW DEVICE

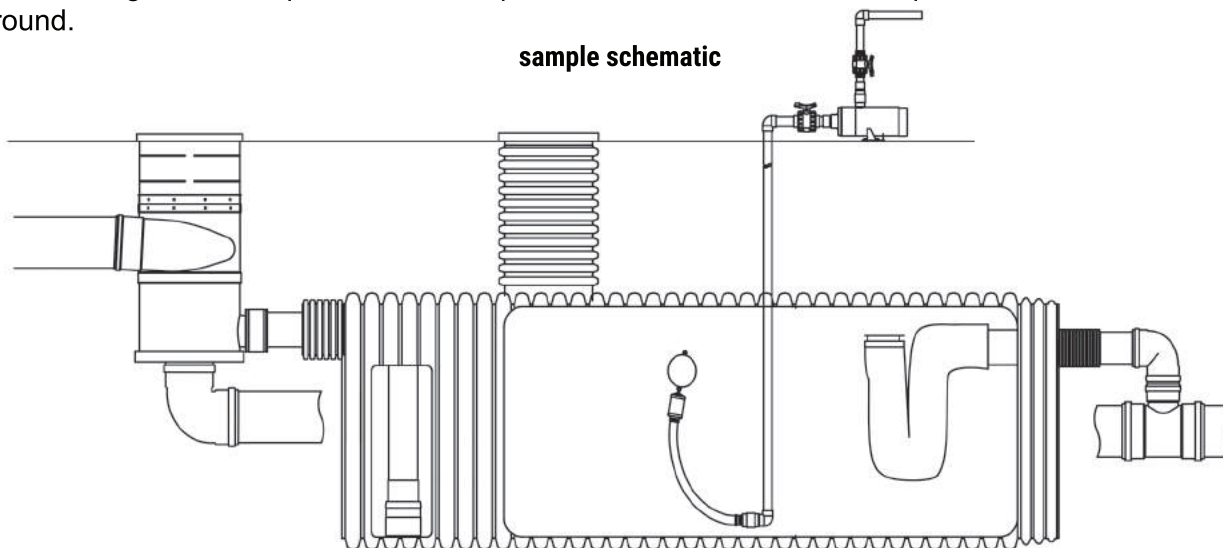


- skims floating particles
- protects tank water quality

WISY separators drastically reduce the amount of sediment that enters the tank by drawing water through a fine stainless-steel mesh into a separate chamber after first flush has been achieved. Debris will remain on the other side of the mesh, washing away to storm drain.

WISY separators are highly efficient when sized correctly, with the separator sending 95% of the water to the storage tank in most applications. Separators should be sized based on roof area to maximize efficiency. When roof area exceeds that of a single WISY separator, more separators can be added. Most separators can be installed either above or below ground.

sample schematic



LARGE-VOLUME STORAGE

StormTech™ Chambers

StormTech Chambers make deals happen by reducing the overall installed costs of underground detention systems. Now you can meet the land-use requirements and overall budgets of your projects by utilizing:

- The most cost-effective subsurface detention/retention system
- High quality injection molded polypropylene chambers
- The only chambers produced to ASTM standards
- The only chambers designed to meet all the AASHTO requirements for live load and earth load design
- Large storage volume per sq.ft. (StormTech can fit in similar footprints up to 60" pipe)
- Lightweight chambers for easy construction and superior production rates for installation of underground systems
- Nonproprietary pipe manifold design based on accepted engineering techniques to assure conveyance capacity for peak flows
- Isolator Row is a filter fabric and is a technique used to inexpensively enhance TSS removal and provide easy access for inspection and maintenance by wrapping the fabric around one of the StormTech Chambers
- Capabilities of adding non-permeable liner encasing chambers to create a detention system.



HDPE AND POLYPROPYLENE CISTERNS

From Drainage to Storage

Meet both economic and environmental goals by taking advantage of rainwater harvesting with cisterns from Advanced Drainage Systems.



From modular systems that can be specially designed to hold more than a million gallons under a huge shopping center, to systems that fit in the smallest of footprints, ADS can help you reduce potable water use while also reducing stormwater runoff volumes. ADS Cisterns are customizable, offering rainwater harvesting and retention that can release water through a controlled outlet or hold water until the surrounding soil can accept it. ADS cisterns are also available with easy maintenance, pre-treatment and and clean-out options. And because ADS cistern systems are constructed from HDPE and inert polypropylene material, you can be assured of a long service life.

- **Customizable**, with a variety of fitting options for site-specific design
- **Easy maintenance**, customizable cleanout risers locations
- **Simple pre-treatment options available**, including the WISY Vortex Separator, Barracuda, Water Quality Units, BayFilters and FLEXSTORM Inlet Filters
- **Small footprint**, with sizes up to 60" (1,524 mm) in diameter that allow for maximum storage
- **Long service life** thanks to inert HDPE and polypropylene materials

Dual Wall - Polypropylene (PP) Pipe

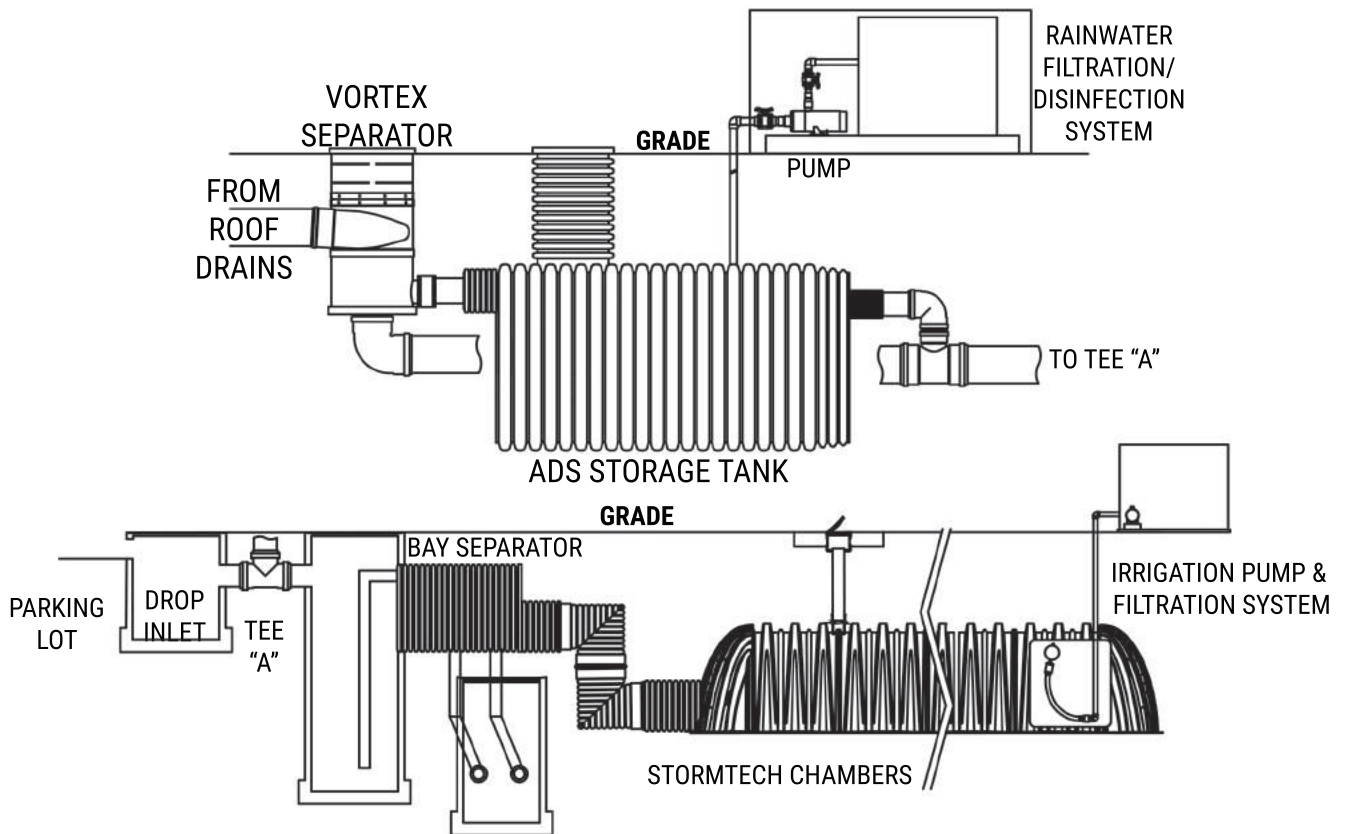
HP Storm is a high-performance polypropylene (PP) pipe for gravity-flow storm drainage applications, and the perfect choice when premium joint performance and/or greater pipe stiffness is required. This pipe couples advanced polypropylene resin technology with a proven, dual-wall profile design for superior performance and durability. The smooth interior wall offers additional strength as well as superior flow.

HP Storm offers up to 100 percent greater pipe stiffness over traditional plastic pipe, which increases safety and service life in installations that demand high performance. The extended bell and spigot joint design adds an additional factor of safety within each joint to ensure watertight performance and long term design service life.

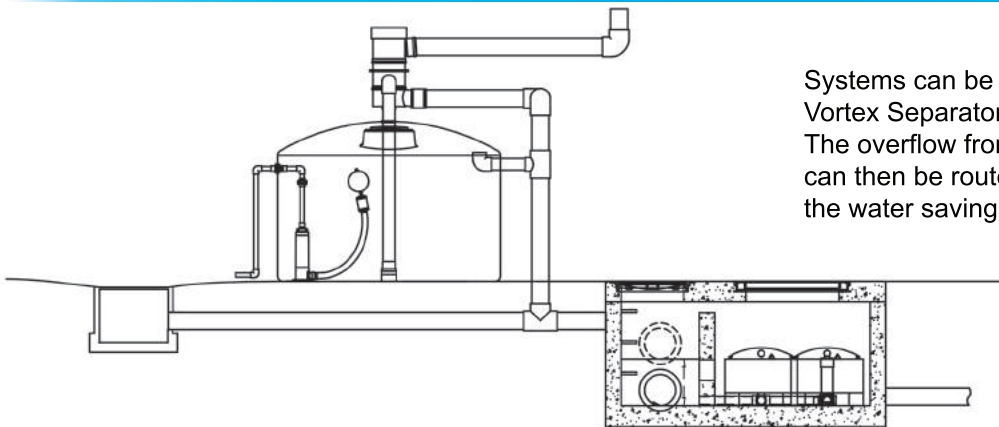


- Increased stiffness results in an additional safety factor against construction loading and poor installations
- The extended bell and spigot joint meets ASTM D3212 and ensures lab and field testable watertight performance
- Smooth interior with a Manning's value of 0.012, resulting in increased flow capacity
- Inert PP material is resistant to the effects of chemicals, abrasion, hot soils, and effluent
- Lightweight product for best installed cost to maximize delivery and installation efficiencies
- Readily available in convenient locations to service local projects

INTEGRATING STORMWATER & RAINWATER SYSTEMS



Additional System Configurations



Systems can be configured to collect water from the WISY Vortex Separator for storage in polyethylene or metal tanks. The overflow from both the tank and WISY Vortex Separator can then be routed to a BaySaver filtration system to optimize the water savings as shown at left.

Above-ground tank configurations are available as well and range from as small as 200-gallons to 200,000 gallons, depending on materials of construction. Opaque tanks should always be used in above-ground applications to prevent algae growth.



BASIS OF DESIGN

Pumping Systems

While project applications and requirements can vary, we have a solution for your pumping needs:

- booster/jet
- submersible
- recirculation
- centrifugal
- pump enclosures

We have pumps to meet a wide variety of horsepower and voltage demands for your project requirements. RMS also builds custom, manufacturer- approved cooling jackets to house large pumps and motors.

VFD

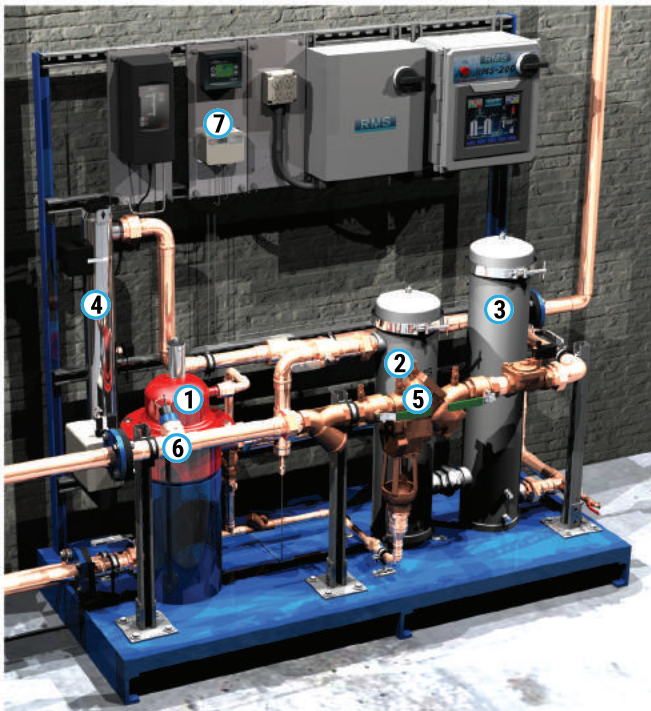
We have partnered with industry-leaders to develop a variable frequency drive specifically for water harvesting applications. A custom macro in the VFD reduces on-site start-up to merely setting the desired pressure.

Modular Pump Skids

In addition to standard transfer pumps that provide water to a day tank or to end use, RMS can provide booster pump skids when the desired flow or pressure needs to be increased. Booster pump skids are also an ideal solution for flooded-suction applications.



Filtration and Disinfection Modular Skids



- 1. Self-cleaning/back-flushing filters** are used to remove large sediment particulate, which can carry pathogens and decrease water clarity.
- 2. Cartridge/Bag Housings** are a secondary form of sediment filtration and remove particles large than 5 microns in size.
- 3. Carbon Filtration** reduces discoloration, odor and volatile organic compounds.
- 4. Ultraviolet Lights** are used to sterilize any pathogens and prevent reproduction, making the rainwater safe to use.
- 5. Domestic back-up lines** are integrated into the piping layout to allow for continuous water supply to the end use, should the rainwater supply be depleted.
- 6. Flowmeters** measure flow from both rainwater and domestic sources.
- 7. Pressure differential transmitters** help determine when sediment and carbon filter elements should be replaced. This increases the accuracy of when to conduct system maintenance.

CONTROLS



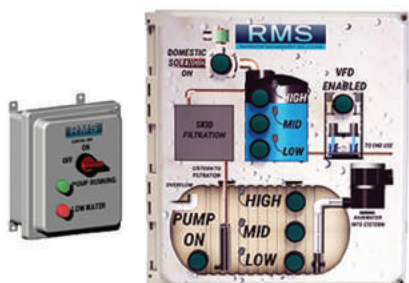
RMS offers custom rainwater harvesting controllers that are built, programmed, and tested in our UL508A Panel Shop.

RMS has developed two touch-screen Programmable Logic Controllers for the rainwater harvesting industry:

- RMS Series 200 Controller: 10.4" Screen
- RMS Series 200 Mini Controller: 5.7" Screen

These PLCs are the “brains” behind our more advanced rainwater harvesting systems, monitoring digital and analog inputs to control outputs or display information pertaining to the system. Controllers can integrate with building automation systems, allowing for remote monitoring of the rainwater system. In addition, we have developed several basic controllers to operate and monitor systems.

RMS can also provide single-point connection power distribution panels to minimize the amount of on-site high-voltage wiring that must be done for a project. Our controls engineering and design team will work with you to provide the custom solution that you need for your rainwater harvesting system.

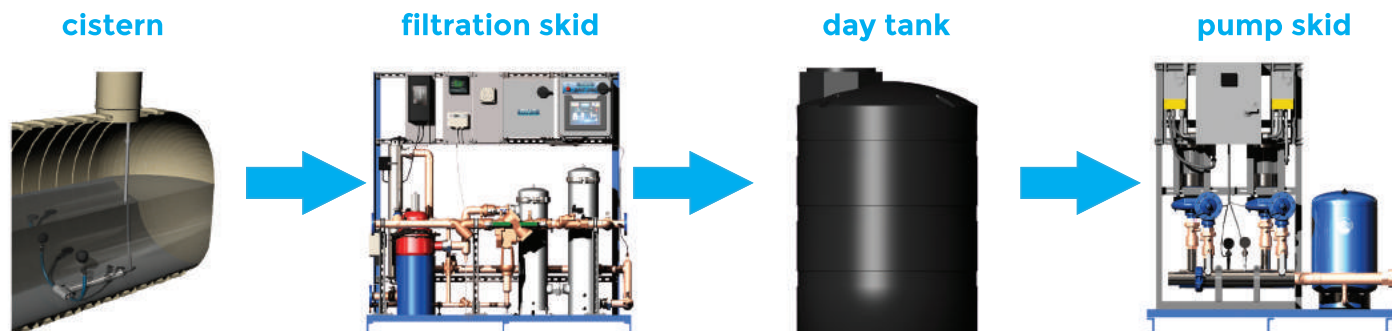


APPLICATION DESIGN

The equipment for the filtration packages has been selected based on flow-rate capacity. As such, each package is named by the maximum flow rate capacity. Standard filtration packages range from 25 gallons per minute to 200 gallons per minute, available in 25 GPM increments. Maximum operating pressure is to be 125 PSI, with minimal operating pressure to be 30 PSI.

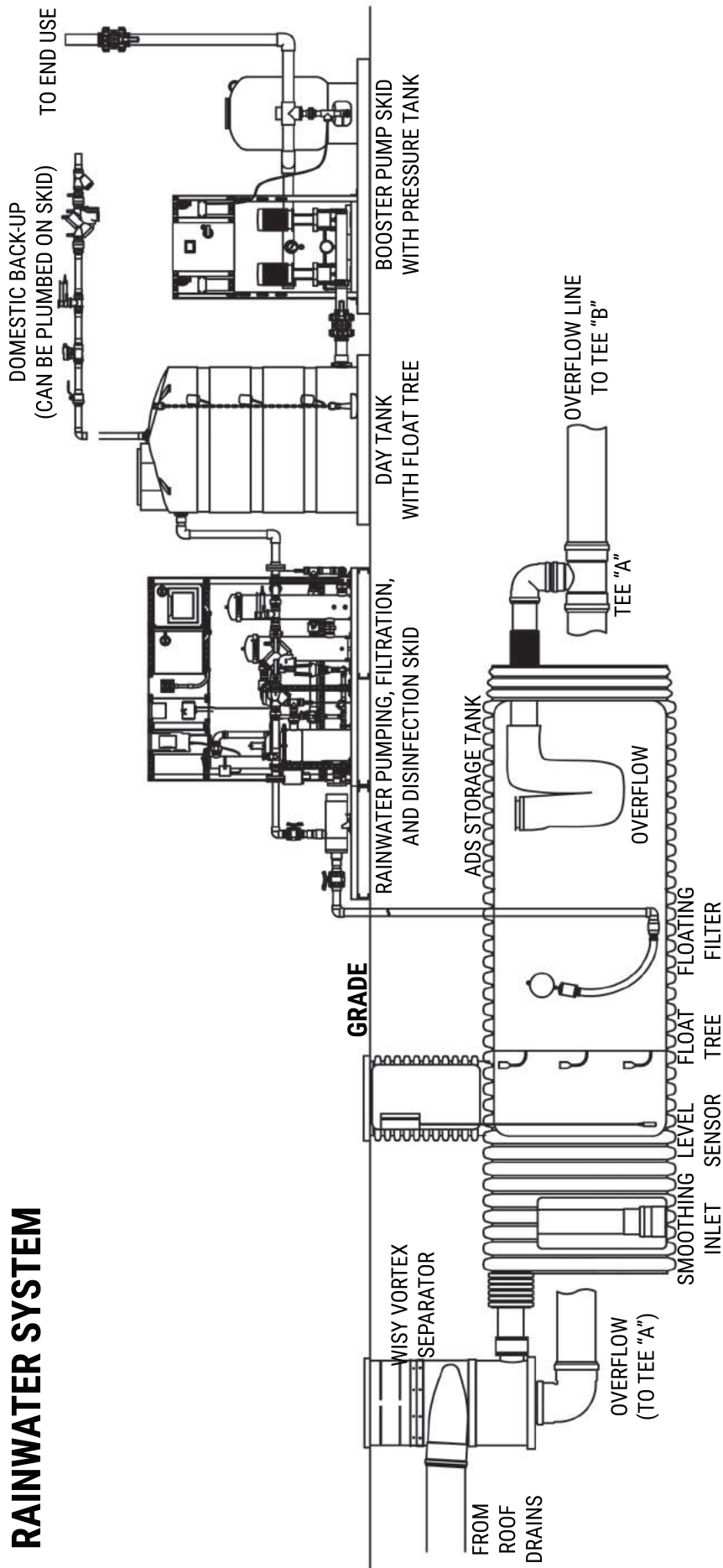
When to use a Day Tank

In applications which require higher flow rates and/or higher pressures at the end use, it is recommended to use a “Day Tank” system. A transfer pump will pump water from the primary cistern, through the filtration skid, for storage in a smaller “Day Tank”. A booster pump can then draw water from the Day Tank and send it to the end use at the required flow rate and/or pressure. Filtration skids *should not* be placed on the suction side of booster pumps.

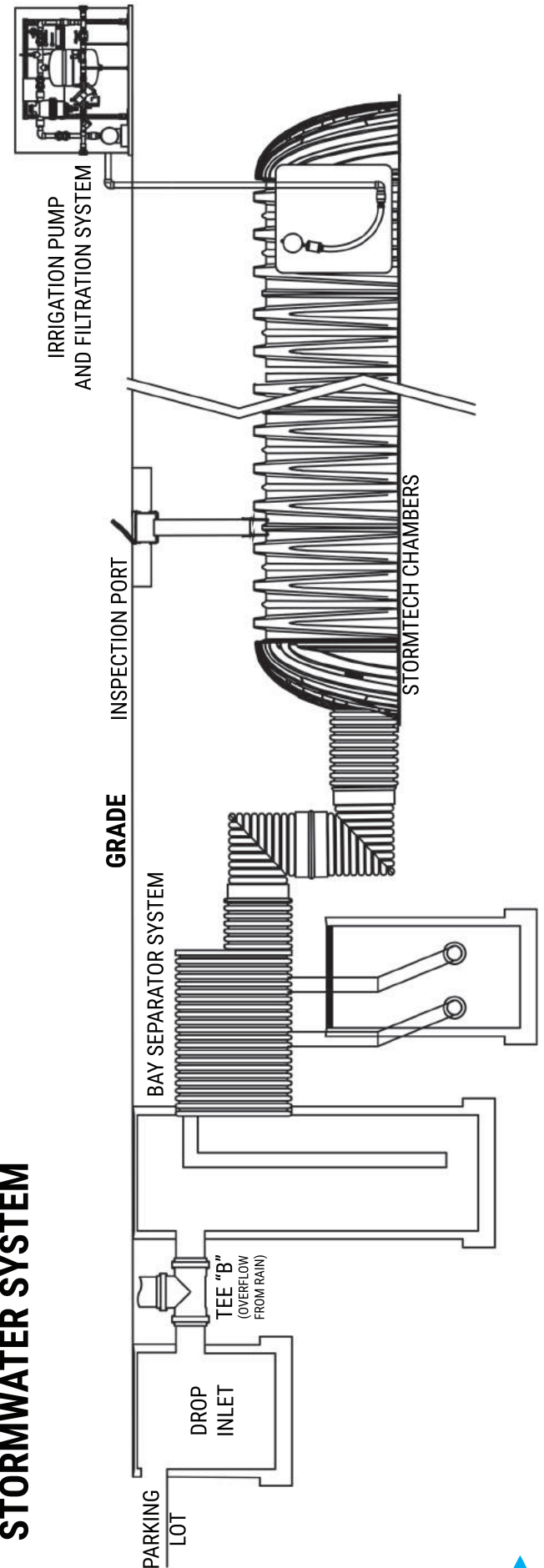


BRINGING IT ALL TOGETHER

RAINWATER SYSTEM



STORMWATER SYSTEM





Rainwater Management Solutions, Inc.

1260 W. Riverside Drive
Salem, VA

www.rainwatermanagement.com
phone: 1-866-653-8337 or 540-375-6750



Advanced Drainage Systems, Inc.

4640 Trueman Blvd.
Hilliard, OH

www.ads-pipe.com
phone: 1-800-821-6710

No part of this publication may be reproduced in any form or by any means without the prior written permission of the publisher.

Vol. 0-0 11-18

© 2018 Rainwater Management Solutions

