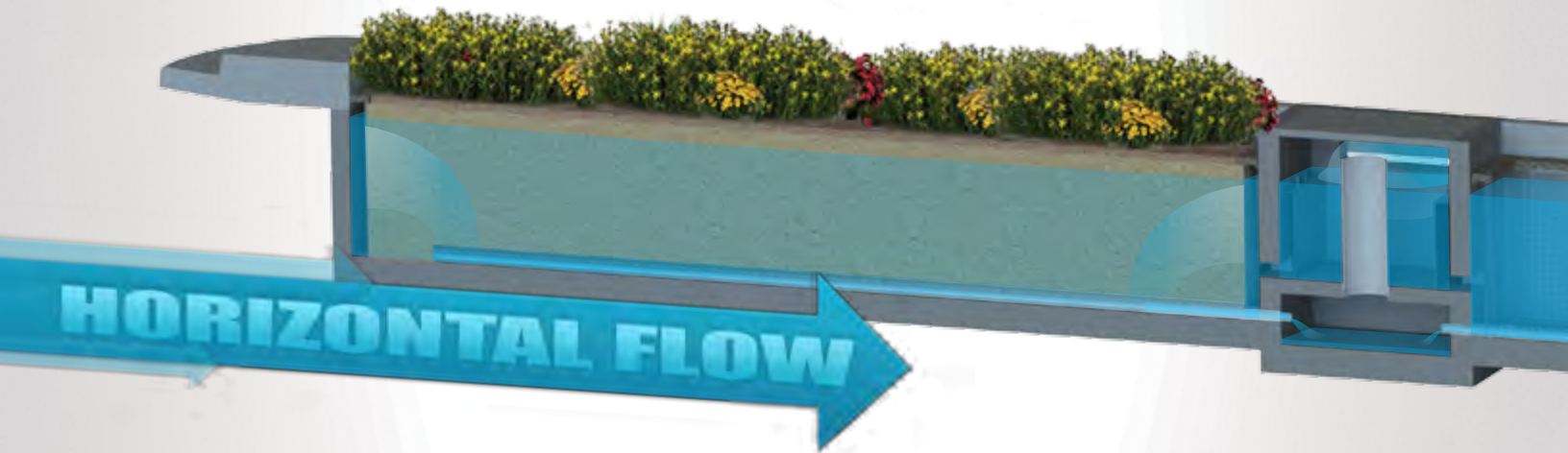




M O D U L A R
WETLANDS[™]

Advanced **Stormwater** Biofiltration



WetlandMod[™]

MODULAR WETLAND TREATMENT, VOLUME REDUCTION, REUSE & STORAGE SYSTEM

A NEW DIRECTION IN TRADITIONAL BIORETENTION / BIOFILTRATION SYSTEMS

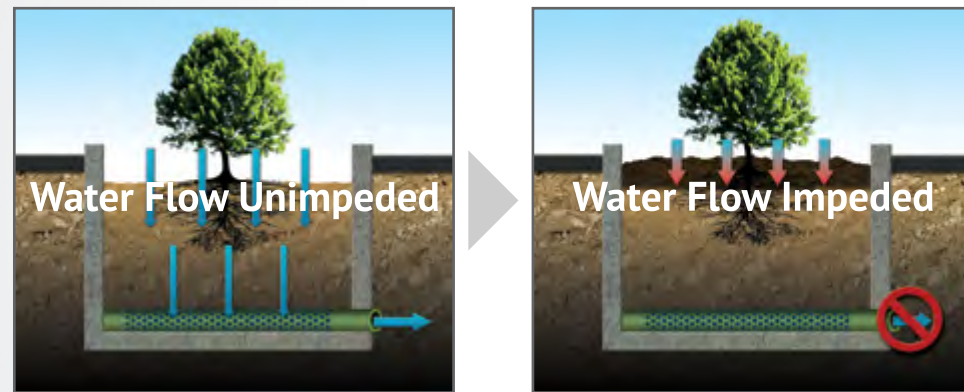
Overview

Modular Wetland Systems, Inc. continues to provide groundbreaking stormwater treatment and volume reduction/control technology with the **WetlandMod™**. This modular system provides the same treatment train concept as the industry leading MWS Linear (Modular Wetland System Linear™) - screening, separation, & biofiltration - combined with the capacity to reduce and control water volume in a more efficient way when compared to traditional downward flow bioretention systems.

The system is built upon the concept of horizontal flow biofiltration, which was first introduced by the MWS Linear in 2007. Horizontal flow works with gravity, not against it, to prevent clogging, standing water and other problems associated with traditional downward flow bioretention systems. Bioretention systems have an inherent flow, the force of gravity. As stormwater runoff carries pollutants into the system, including sediments and hydrocarbons, they are deposited on top of the bioretention media where it accumulates and quickly clogs the filter media.

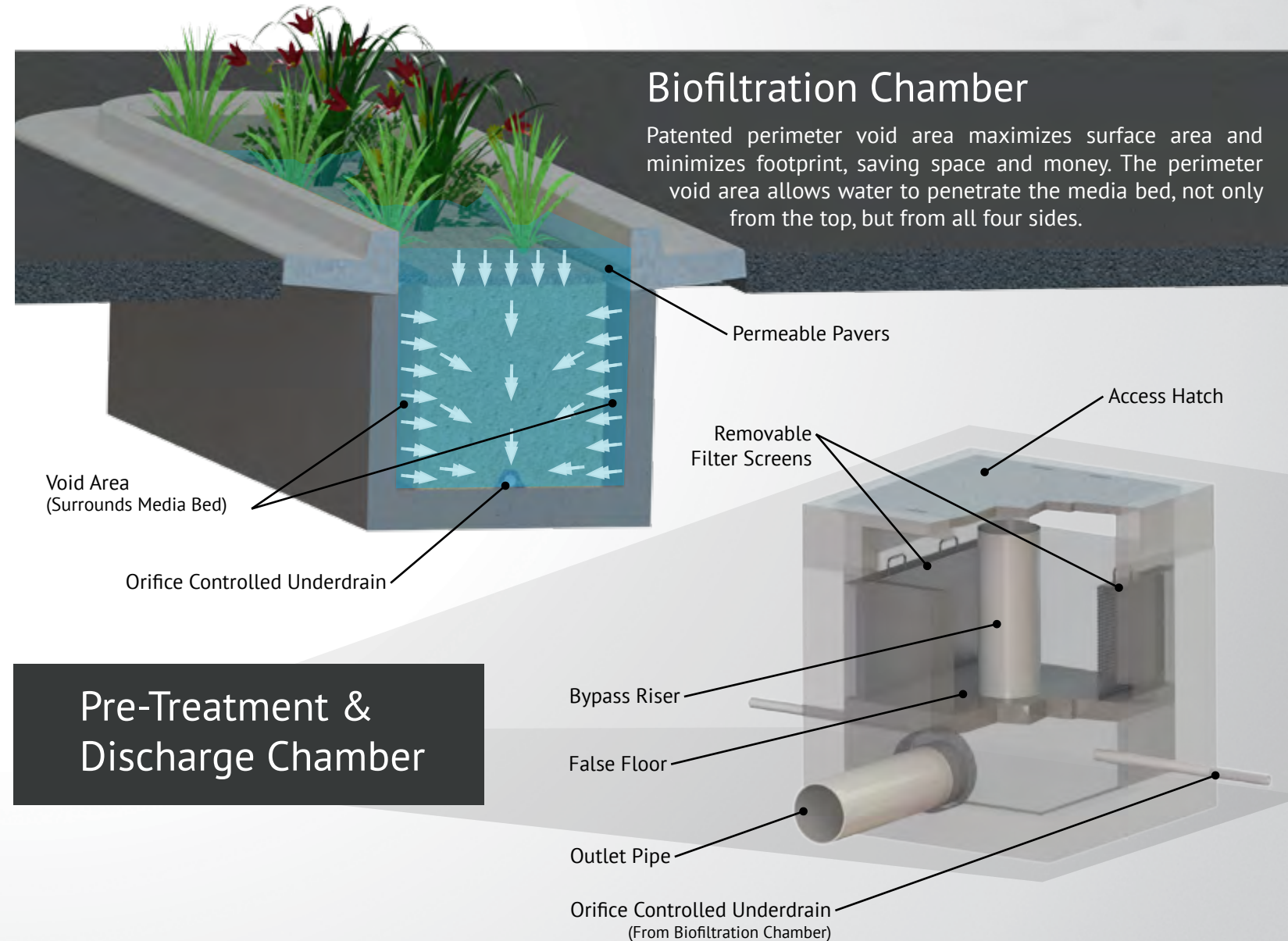
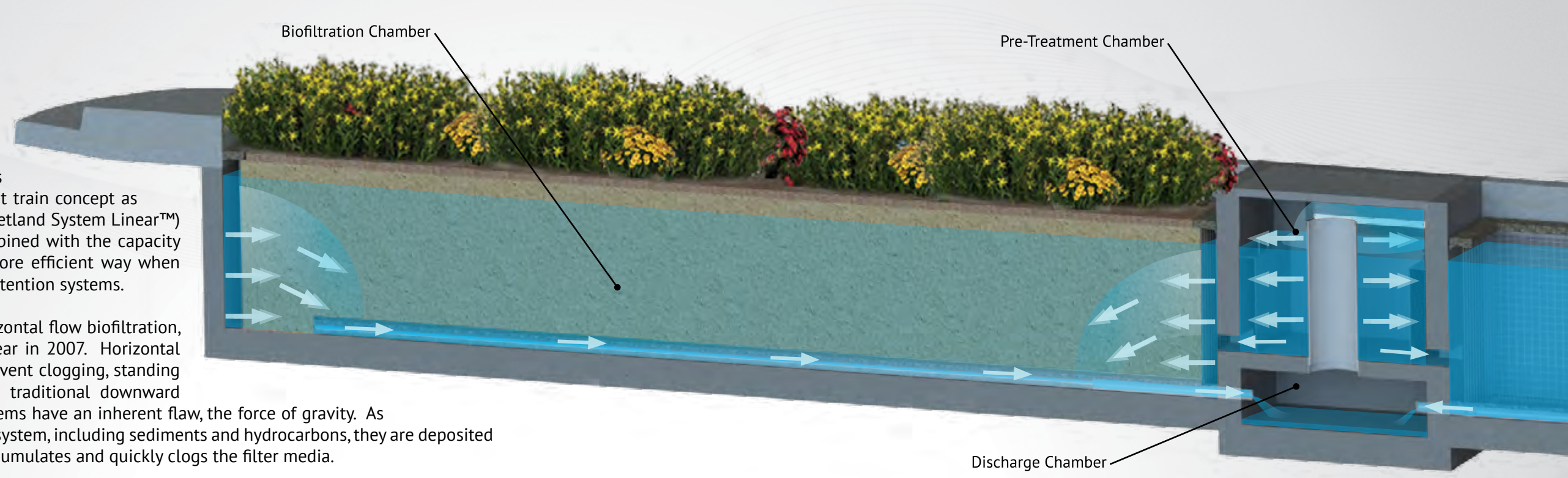
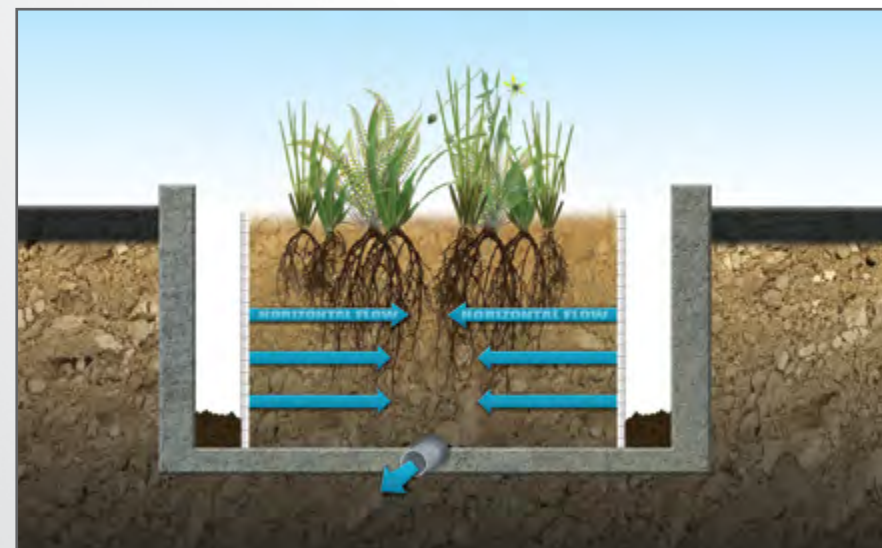
It has been documented that sediment accumulation from just a few storm events can completely clog a bioretention system. This leads to drastically reduced infiltration rates, expensive maintenance burdens, and safety issues associated with standing water, depressed landscaping and vector control.

Downward Flow



Sediments Accumulate on Top of the Media Leading to Clogging

The **WetlandMod™** overcomes these challenges by utilizing pre-treatment, a horizontal flow biofiltration bed, and orifice flow control. The initial surface of the media bed in the **WetlandMod™** is oriented on a vertical plane, as opposed to horizontally, therefore running parallel with the force of gravity as opposed to perpendicular. This simple concept, increases surface area, reduces BMP footprint, prevents clogging and leads to an enhanced overall system with lower maintenance costs. The **WetlandMod™** can utilize various blends to meet local stormwater bioretention media specifications. The system is also available with an organic-free WetlandMEDIA to prevent nutrient leaching and maximize pollutant removal.



Biofiltration Chamber

Patented perimeter void area maximizes surface area and minimizes footprint, saving space and money. The perimeter void area allows water to penetrate the media bed, not only from the top, but from all four sides.

Pre-Treatment & Discharge Chamber

Configuration

One of the biggest challenges of the implementation of LID and bioretention/biofiltration systems is the associated space requirements. The large space requirements of traditional bioretention systems can cause design and feasibility issues, increasing the overall cost to comply with local and state stormwater regulations.

The **WetlandMod™** marks the first technological breakthrough to address how we comply with these regulations. The goal of the system is to minimize footprint and land costs associated with traditional bioretention/biofiltration systems. This is achieved by utilizing horizontal flow technology and combining it with traditional downward flow, therefore maximizing the surface area for a given footprint.

Designed To Minimize Required BMP Footprint and Maximize Buildable Space

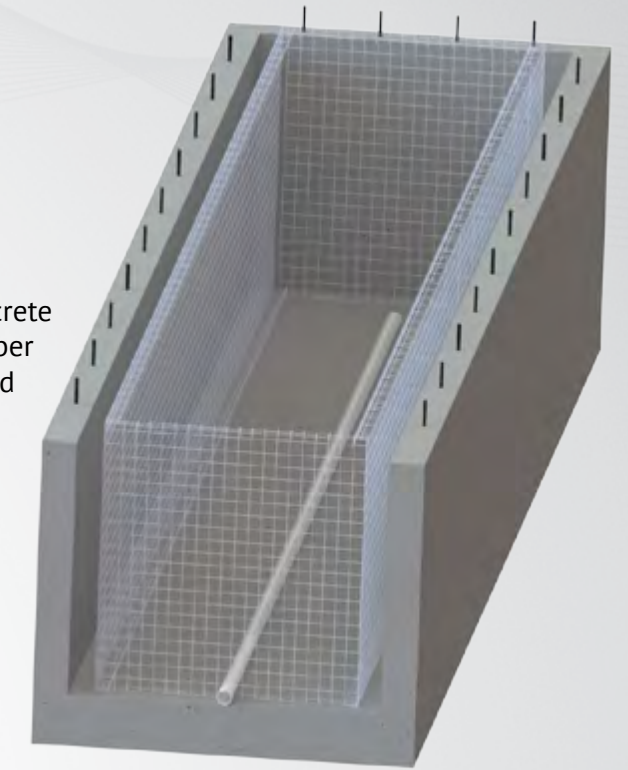
This system is constructed from modular precast concrete structures. The system comes standard with a curb-type pre-treatment structure, including internal bypass. The biofiltration chambers can be made in any length and shape (shown below) to allow for easy integration with parking lot island designs. The system comes in two standard widths, 4 feet (18" minimum media requirement - San Diego County) and 5 feet (24" minimum media requirement - Los Angeles County).

Footprint Reduction Up To 61% Over Traditional Bioretention Systems (Example: Planter Boxes, Rain Gardens, Biofiltration)



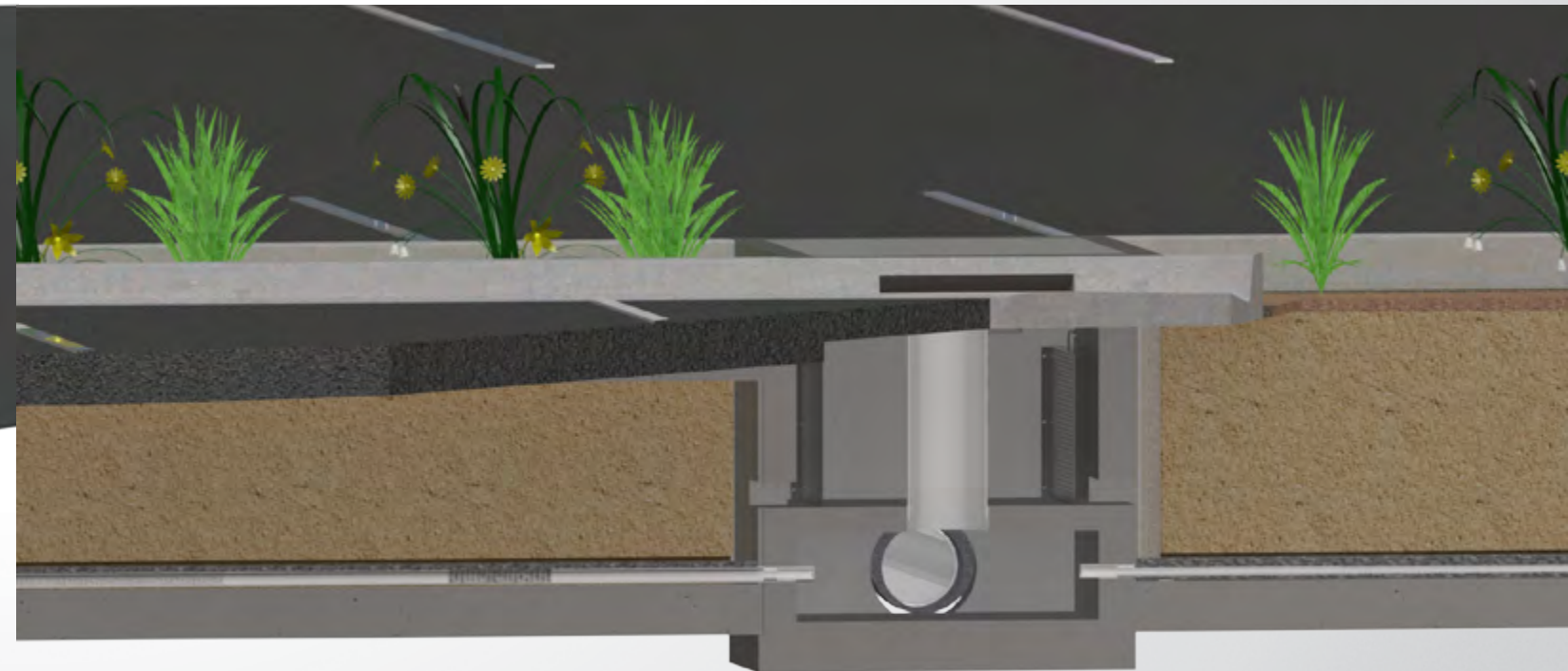
Wetland Chamber Module

The *Wetland Chamber Module* is constructed of precast concrete and available in various lengths and heights. The chamber also includes rebar dowels to attach structure to curb and gutter. Units can be connected mechanically end-to-end for longer modules.



Pre-Treatment Chamber Module

Pre-treatment Chambers come standard with built-in curb inlets to intercept sheet flows from surrounding areas. The pre-treatment chamber is available with an optional internal bypass for high flows and it is easily accessible for quick maintenance. Trash, debris and sediments are isolated in a central location, minimizing maintenance requirements on the biofiltration chamber.

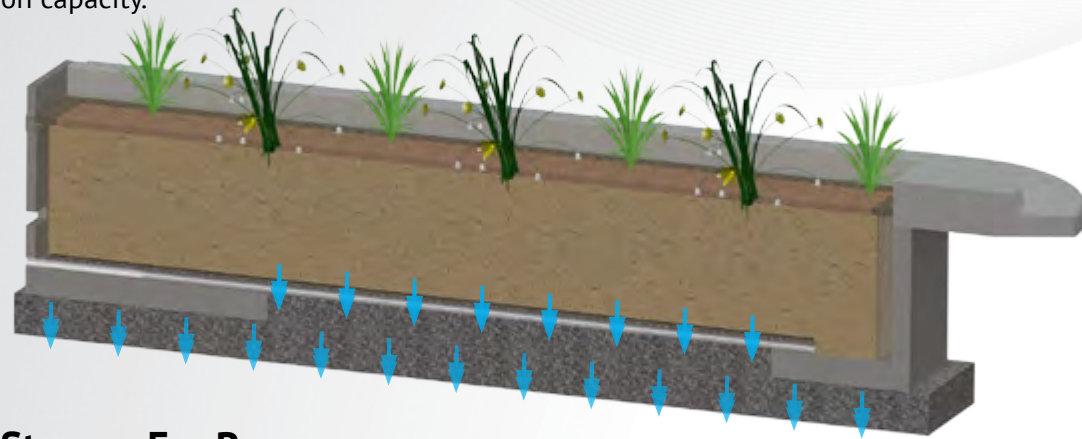


Curb Inlet

Configurations

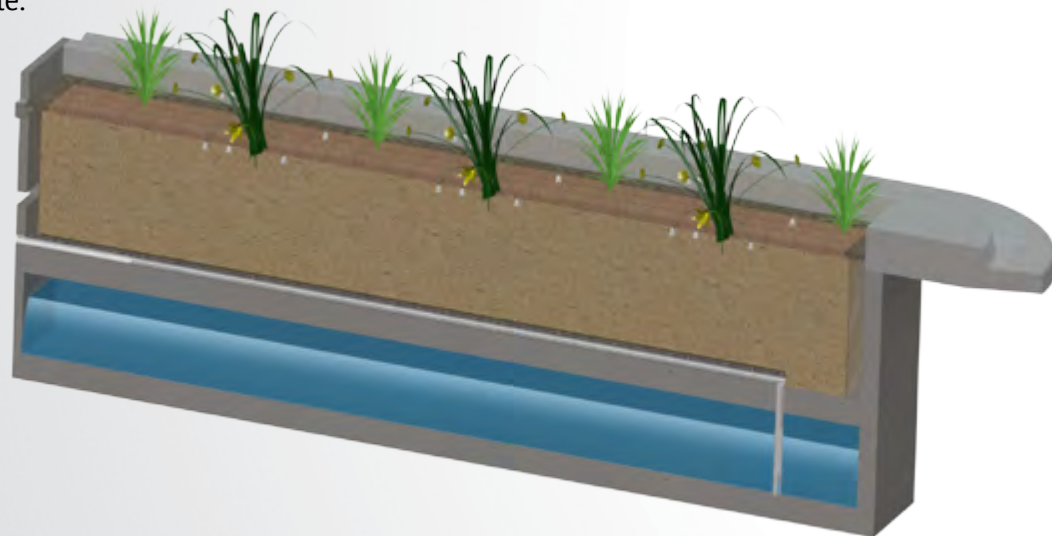
Open Bottom - Infiltration

This configuration is available with an open basin to maximize infiltration and meet “partial infiltration” requirements in many jurisdictions. A 12” rock base is recommended under the structure to maximize storage and infiltration capacity.



Cistern - Storage For Reuse

An optional storage vessel under the biofiltration chamber stores water for reuse, including irrigation and grey water. The *Cistern* configuration allows for treated runoff to be stored for later use and a removable sump pump is available.



WetlandMEDIA

WetlandMEDIA is an organic free alternative to traditional bioretention media. It offers higher infiltration rates and a sorptive media mix with high ion exchange capacity. This makes it ideal for nutrient removal. WetlandMEDIA also supports robust vegetation and prevents standing water.

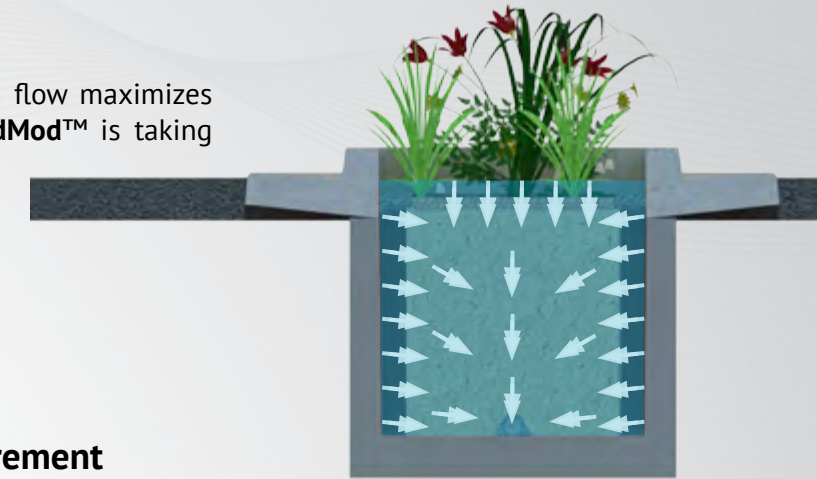


Bioretention Mix

The **WetlandMod™** is designed to utilize any type of bioretention mix required to meet local requirements and specifications, including a *5-Inch Per Hour* sand compost mix found in most LID manuals.

Sizing

The combination of horizontal flow and downward flow maximizes surface area and minimizes footprint. The **WetlandMod™** is taking bioretention/biofiltration to a new level.



18” Media - San Diego County Minimum Requirement

18” Media Thickness	WetlandMod	Traditional Bioretention
Chamber Width I.D. (ft.)	4.00	4.00
Cage Width (ft.)	3.34	n/a
Void Width (ft.)	0.33	n/a
Chamber Height Max (TC) (ft.)	4.40	n/a
Assoc. Cage Height Max (ft.)	3.52	n/a
TC to Top of Cage Distance (ft.)	0.88	n/a
Ponding Over Media (ft.)	0.33	Variable
Chamber Height Min (ft.)	1.61	Variable
Assoc. Cage Height Min (ft.)	1.83	Variable
TC to Top of Cage Distance (ft.)	0.88	Variable
MAX Surface Area Per Linear Foot (sq. ft.)	10.38	4
Footprint Reduction Provided		61%
MIN Surface Area Per Linear Foot (sq. ft.)	7	4
Footprint Reduction Provided		43%

24” Media - Los Angeles County Minimum Requirement

24” Media Thickness	WetlandMod	Traditional Bioretention
Chamber Width I.D. (ft.)	5.00	5.00
Cage Width (ft.)	4.34	n/a
Void Width (ft.)	0.33	n/a
Chamber Height Max (TC) (ft.)	4.40	n/a
Assoc. Cage Height Max (ft.)	3.52	n/a
TC to Top of Cage Distance (ft.)	0.88	n/a
Ponding Over Media (ft.)	0.33	Variable
Chamber Height Min (ft.)	2.05	Variable
Assoc. Cage Height Min (ft.)	2.33	Variable
TC to Top of Cage Distance (ft.)	0.88	Variable
MAX Surface Area Per Linear Foot (sq. ft.)	11.38	5
Footprint Reduction Provided		56%
MIN Surface Area Per Linear Foot (sq. ft.)	9	5
Footprint Reduction Provided		44%

Advantages of WetlandMod™ Over Traditional Downward Flow Bioretention/Biofiltration Systems

- Minimizes Clogging
- Advanced Pre-Treatment
- Maximized Surface Area
- Minimal Footprint
- High Nutrient Removal
- Easy Maintenance
- No Standing Water Concerns
- Greater Volume Reduction, Moisture Retention and Evapotranspiration
- Orifice Controlled Discharge