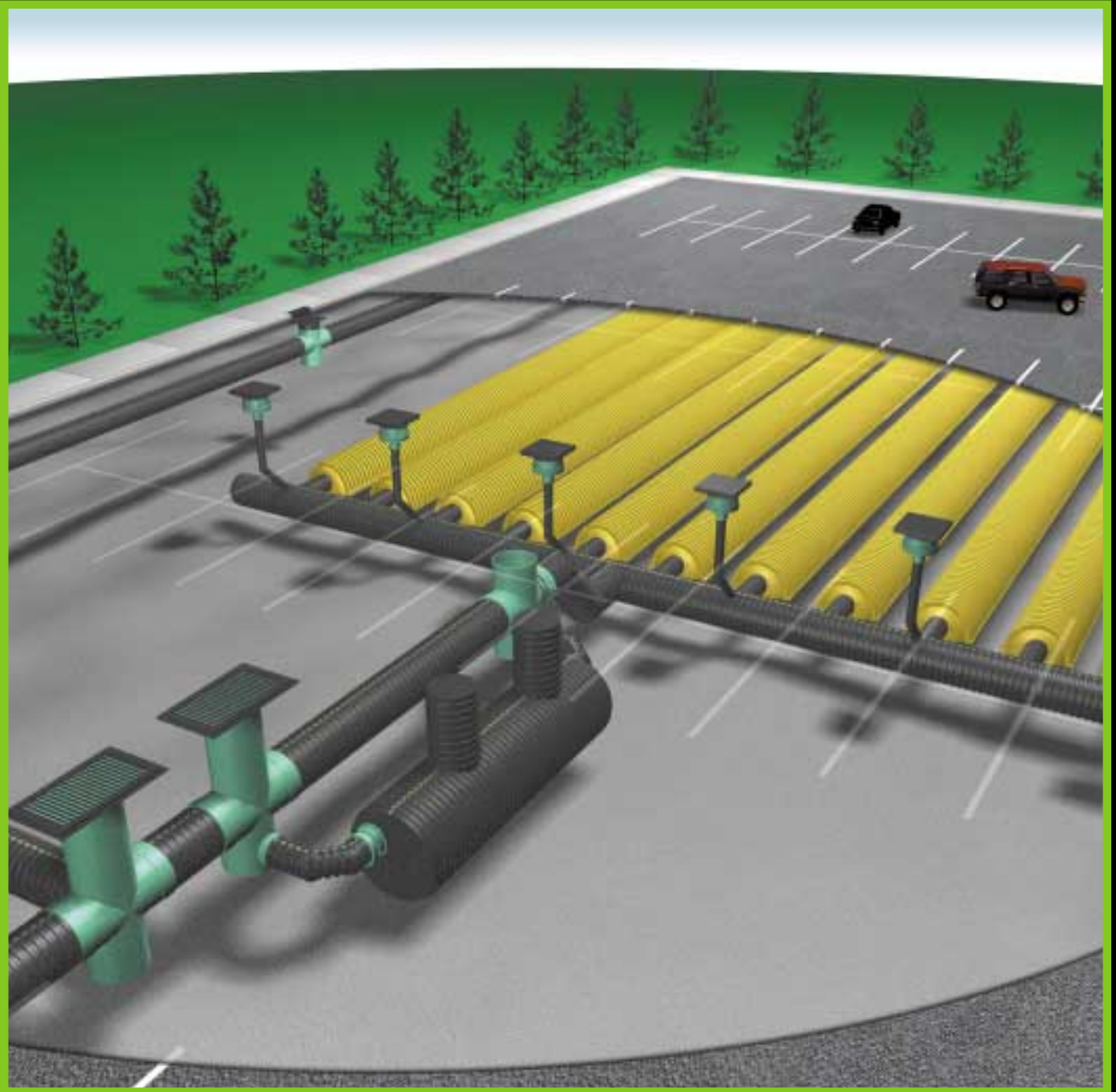


# ADS Water Quality Units



Engineered structures for storm  
water pollutant removal



# Water Quality Units

Standards for storm water quality will necessarily vary by location and land use. The most targeted sources of runoff pollution are paved areas in urban and industrial sites. These are generally small (< 1 acre), or 40 ha with high traffic loads, such as parking lots and gas stations, that generate significant concentrations of contaminant particles and hydrocarbons.

Because of land constraints, ADS underground Water Quality Units\* have become an increasingly efficient solution for treating storm water. These durable, lightweight structures have been specifically designed for fast installation and easy maintenance.

## Benefits

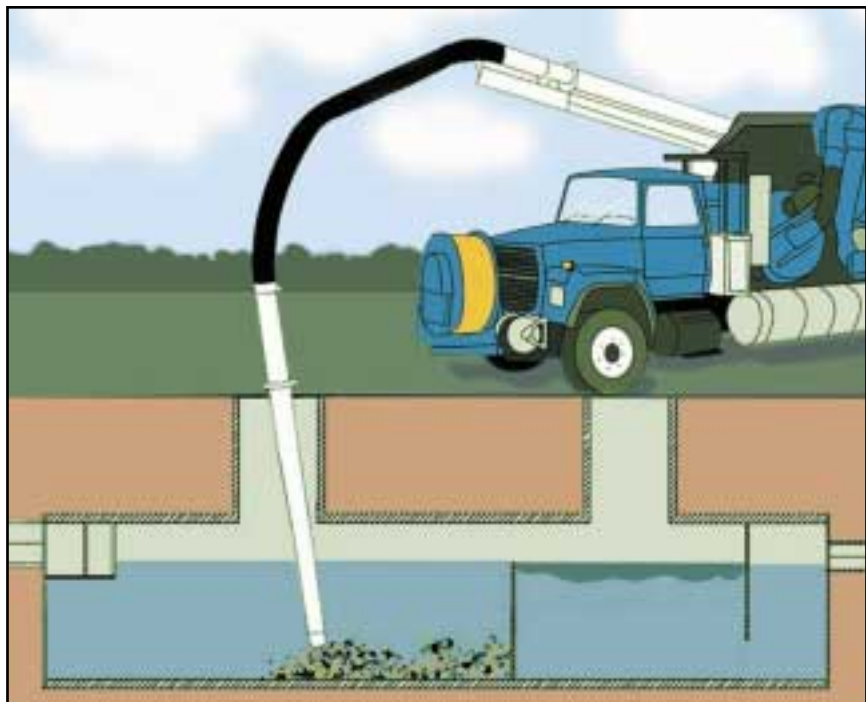
- Laboratory tests have shown an 80% TSS removal rate.
- Removes floatable debris such as oils and greases.
- Available in 36" (900mm) through 60" (1500mm) diameters.
- Lightweight High Density Polyethylene (HDPE) unit installs easily with a minimum of manpower. Heavy cranes are not necessary to install the unit.
- Each unit is fitted with access risers for easy inspection and maintenance of the sediment and oil chambers.
- The unit is inexpensive because the design is simple and there are no moving parts.
- The bypass system prevents re-suspension of captured solids by diverting water flows greater than the first flush.
- HDPE resists abrasion and chemicals found in storm water and in the surrounding soil.

\*Patent Pending



*The Patent Pending ADS Water Quality Unit is lightweight and easy to install, requiring little in the way of manpower or heavy equipment.*

*A bypass system (right) is installed to prevent water flows greater than the first flush from re-suspending captured pollutant particles.*



*The ADS Water Quality Unit is fitted with access risers for easy inspection and maintenance.*

## Standard Models

Product Number	Diameter (in) (mm)	Length (ft) (m)	Inlet Size (in) (mm)	Outlet Size (in) (mm)	Treated Flow Rate (cfs) (L/s)	Sed. Vol. (ft <sup>3</sup> ) (m <sup>3</sup> )	Oil Vol. (ft <sup>3</sup> ) (m <sup>3</sup> )	Sieve Size
3620WQA	36 (900)	20 (6)	10 (250)	8 (200)	1.5 (42)	65 (1.8)	30 (0.8)	140
3640WQA	36 (900)	40 (12)	10 (250)	10 (250)	3.2 (91)	137 (3.9)	63 (1.8)	140
3620WQB	36 (900)	20 (6)	10 (250)	6 (150)	0.7 (20)	65 (1.8)	30 (0.8)	200
3640WQB	36 (900)	40 (12)	10 (250)	8 (200)	1.6 (45)	137 (3.9)	63 (1.8)	200
4220WQA	42 (1050)	20 (6)	12 (300)	8 (200)	1.75 (49)	83 (2.3)	38 (1.1)	140
4240WQA	42 (1050)	40 (12)	12 (300)	12 (300)	3.66 (104)	175 (5.)	81 (2.3)	140
4220WQB	42 (1050)	20 (6)	12 (300)	6 (150)	0.86 (24)	83 (2.3)	38 (1.1)	200
4240WQB	42 (1050)	40 (12)	12 (300)	8 (200)	1.83 (52)	175 (5.)	81 (2.3)	200
4820WQA	48 (1200)	20 (6)	12 (300)	8 (200)	2.26 (64)	116 (3.3)	55 (1.6)	140
4840WQA	48 (1200)	40 (12)	12 (300)	12 (300)	4.78 (135)	245 (6.9)	115 (3.3)	140
4820WQB	48 (1200)	20 (6)	12 (300)	6 (150)	1.13 (32)	116 (3.3)	55 (1.6)	200
4840WQB	48 (1200)	40 (12)	12 (300)	10 (250)	2.39 (68)	245 (6.9)	115 (3.3)	200
6020WQA	60 (1500)	20 (6)	15 (375)	10 (250)	2.95 (84)	183 (5.2)	87 (2.5)	140
6040WQA	60 (1500)	40 (12)	15 (375)	15 (375)	6.23 (176)	385 (10.9)	184 (5.2)	140
6020WQB	60 (1500)	20 (6)	15 (375)	8 (200)	1.47 (42)	183 (5.2)	87 (2.5)	200
6040WQB	60 (1500)	40 (12)	15 (375)	10 (250)	3.12 (88)	385 (10.9)	184 (5.2)	200

140 sieve is equal to a particle size of 0.0042" (0.106mm)

200 sieve is equal to a particle size of 0.0030" (0.075mm)

### Design variations

The standard models listed above will provide efficient removal of pollutant particles and hydrocarbons for the majority of site conditions. For unusual conditions, ADS can recommend a system combining a variety of sizes and configurations.

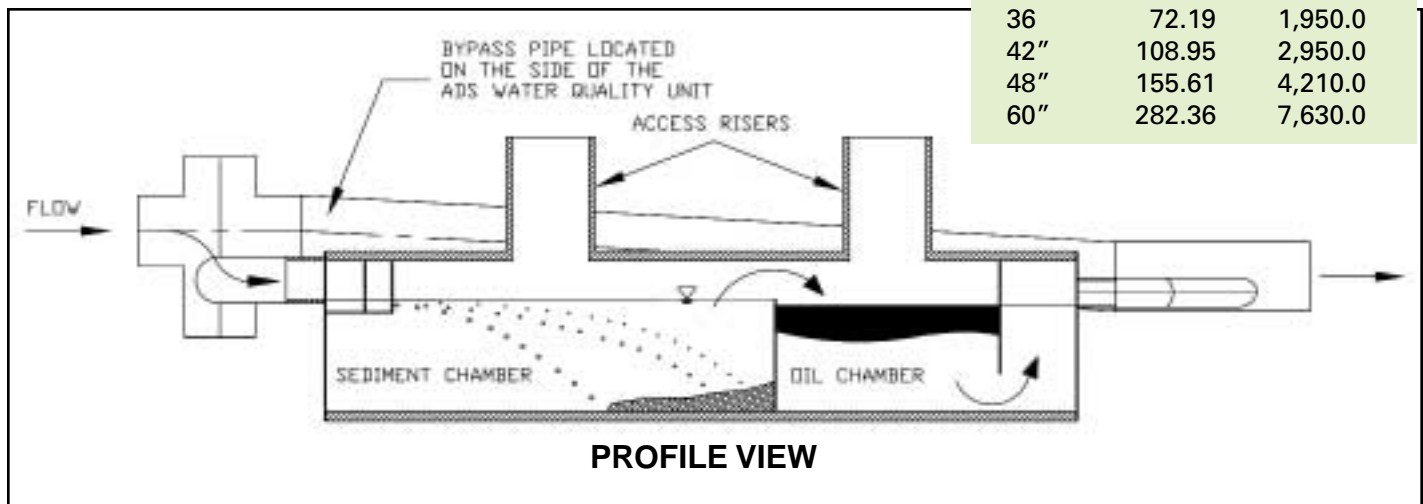
ADS can also incorporate other pollutant control features into the drainage network. These include inlet protection devices, trash screens, filtration systems, and a large selection of sediment prevention products from our strategic partner, SI<sup>®</sup> Geosolutions.

### Peak Flow Rate

The by-pass pipe of the ADS WQU is designed to convey the peak storm water flow of the storm line.

For example, @ a 1% slope, peak flow rates for the by-pass line are as follows:

	CFS	L/S
12"	3.8419	103.9
15"	6.971	188.0
18"	11.343	307.0
24"	24.451	661.0
30"	44.37	1,240.0
36"	72.19	1,950.0
42"	108.95	2,950.0
48"	155.61	4,210.0
60"	282.36	7,630.0





# Design and Installation

## Design principles

Available in 36" (900mm) through 60" (1500mm) diameters, ADS Water Quality Units are modified sections of N-12® pipe with weir plates at certain locations and heights to remove high percentages of sediment and oils from the first flush of a storm event. They can be installed at any point in the subsurface drainage system, and are ideally suited to treat "hot spots" in existing storm water lines.

The unit is designed using the fundamental principles of Stoke's Law and a standard orifice outlet control. The settling velocity of a particle is calculated based on the smallest particle to be removed. Standard units offer a choice of 140 or 200 sieve size.

140 Sieve Size	200 Sieve Size
0.0042" Particle Dia. 106 µm	0.0030" Particle Dia. 75 µm

The outlet orifice is sized to release a typical first flush discharge, and to redirect any excess flow to a bypass piping system installed with the unit.

## Sizing and Installation

Installation of Water Quality Units follows the same accepted practices as for the installation of large diameter flexible pipe.

Basic information is shown on this and the following page. Specific installation instructions, along with details on specifying the proper size of a Water Quality Unit, are contained in ADS Product Note 3.140 and the HDPE Water Quality Unit Specification, each of which can be downloaded from the ADS Web site at [www.ads-pipe.com](http://www.ads-pipe.com).



Setting the Water Quality Unit and the inlet tee fitting



Bedding and backfilling the unit in 12" lifts



Backfill over the Water Quality Unit and installation of bypass line complete

# Installation Details

### 1. Trench and Bedding Preparation for Unit

**NOTES:**

- PLACE EXISTING CLEAN WATER IN THE TRENCH 24" WATER AS REQUIRED.
- REMOVE DEBRIS OR SHARP EDGES.
- REMOVE EXISTING SLOPE FROM THE TOP OF THE HOLE TO FORM GRADE SHALL NOT EXCEED 3" GRADE.

ADD. UNIT SIZE	MINIMUM B	MINIMUM W
12" (305mm)	12" (305mm)	24" (610mm)
18" (457mm)	18" (457mm)	36" (914mm)
24" (610mm)	24" (610mm)	48" (1219mm)
30" (762mm)	30" (762mm)	60" (1524mm)

\* TRENCH WIDTH DOES NOT ACCOUNT FOR BY-PASS PIPE. THIS EXTENSION IS FOR MAIN UNIT ONLY.

### 2. Placing Unit and Initial Backfill

**NOTES:**

- VERIFY SLOPE WHEN LOWERING UNIT INTO THE TRENCH. CHECK USING LEVEL, PLUMB AND TIE FOR PERMIT.
- PLACE BRICKFILL AROUND THE UNIT IN UNIFORM 4" (100mm) - 300mm (12") LAYER COMPACTED TO 95% DTD.
- IF THE UNIT CONSISTS OF 2 SECTIONS, PLACE THE DOWNSTREAM SECTION FIRST. PROCEED UPSTREAM TO WELL AND STREET. CONNECT AND FINE-TUNE THE UPSTREAM SECTION.

### 3. Connecting the Bypass (Outlet Bend)

**NOTES:**

- START ON THE DOWNSTREAM END BY CONNECTING THE COUPLER FITTING BE SURE TO MATCH DIAMETERS OF UNIT OUTLET AND BYPASS PIPE.
- BY-PASS FITTINGS CAN BE CONNECTED USING THE SAME COUPLERS AS THE MAIN STORM SEWER PIPE. COUPLERS MAY BE SPLIT COUPLERS, 30" DIA. WELL COUPLERS, SHAP COUPLERS, WALL-WELL COUPLERS OR WELLS COUPLERS.

### 4. Connecting the Bypass (Inlet End)

**NOTES:**

- CONTINUE CONNECTING THE BY-PASS PIPE TO THE UPSTREAM END OF THE UNIT.
- FINISH THE BY-PASS CONNECTION TO THE UNIT BY CONNECTING THE SPLIT TIE FITTING.

**NOTE:**

PLEASE CONSULT WITH YOUR REPRESENTATIVE ON THE HEIGHT OF FALL FROM THE BY-PASS SPLIT TIE TO THE BY-PASS INLET INLET.

### 5. Backfill Around the Unit and Bypass

**NOTES:**

- COMPLETE BRICKFILL WITH BRICKS BEST, 2" TO 3/4" DIA. OR BRICKS 2 1/2" x 3 1/2" TO 3/4" DIA. WITH BRICKS PER OR WITH SAND STONE TO 95% DENSITY ABOVE WATER QUALITY UNIT.
- FILL UNIT WITH WATER TO THE TOP OF THE DOWNSTREAM PLATE. BRICK BRICKFILL TO FINISH AND COMPACTED 95% DENSITY ABOVE THE UNIT.

\* FOR 48" (1200mm) UNITS CONTINUE BRICKFILL WITH BRICKS BEST, 2" TO 3/4" DIA. OR BRICKS 2 1/2" x 3 1/2" TO 3/4" DIA. WITH BRICKS PER OR WITH SAND STONE TO 95% DENSITY ABOVE WATER QUALITY UNIT.

### 6. Final Cover and Riser Extensions

**NOTES:**

- PLEASE FOLLOW THE INSTALLATION GUIDELINES OF ANY PRODUCT NOTED ELSEWHERE INSTALLING 48" (1200mm) BY-PASS CONNECTION IN AN OTHER DRAINAGE APPLICATION IN THE CITY.
- ALL HOLES EXCEPT 3" DIA. HOLES SHALL BE COVERED THROUGH YOUR A/E REPRESENTATIVE.

FOR 48" (1200mm) UNITS: 18" (457mm) COVER FOR 18" (457mm) 48" (1200mm) AND 60" (1524mm) UNITS: 24" (610mm) COVER FOR 18" (457mm) 48" (1200mm) AND 60" (1524mm) UNITS: 30" (762mm) COVER FROM THE TOP OF THE HOLES TO THE TOP OF DOWNSTREAM INLET OR TOP OF RISEL FINISHES.

# The Heart of the Treatment Train

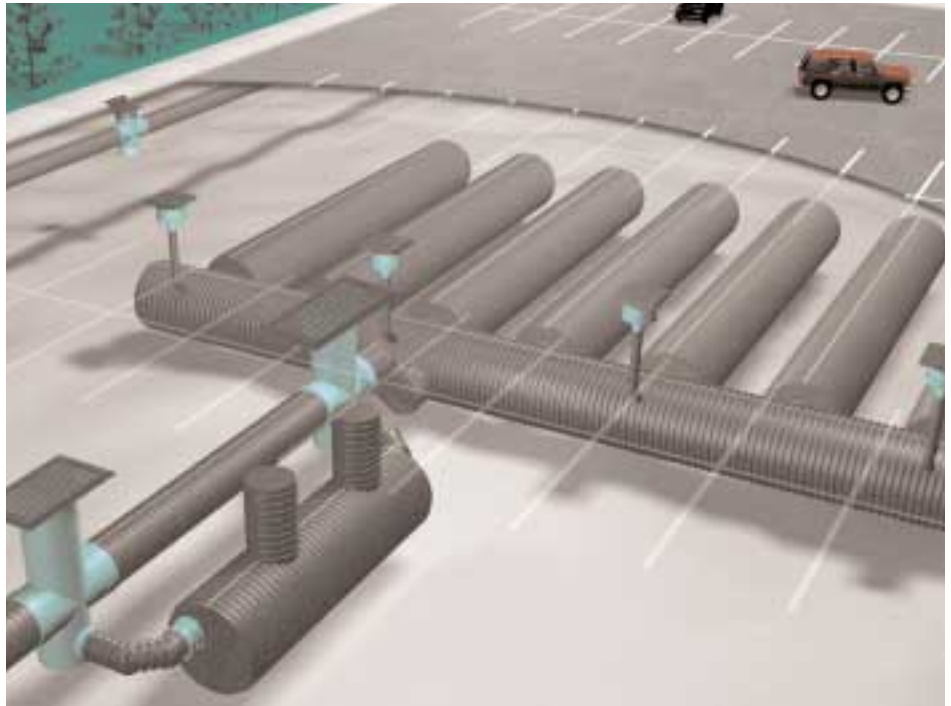
For many drainage sites, the Water Quality Unit by itself can provide the required degree of pollutant removal. Certain sites, however, with higher concentrations of hydrocarbons or sediment runoff will need further treatment upstream and/or downstream of the Unit. This multi-tiered approach to storm water quality is known as the *treatment train*.

Upstream measures include sediment prevention (vegetated swales, etc.) and inlet protection devices such as screens, filters and silt fences. These techniques are designed to prevent a large percentage of pollutants from ever entering the storm drain system. For impervious surfaces such as paved parking areas, catch basin insert filters are most commonly used for early stage treatment.

## Retention/Detention

Treatment downstream from the Water Quality Unit generally involves some form of retention or detention system. Retention allows accumulated storm water to gradually percolate into the surrounding soil, while detention meters the water through an outlet to a ditch, stream or other receiving area.

Inlet designs to such underground storage vessels can also enhance

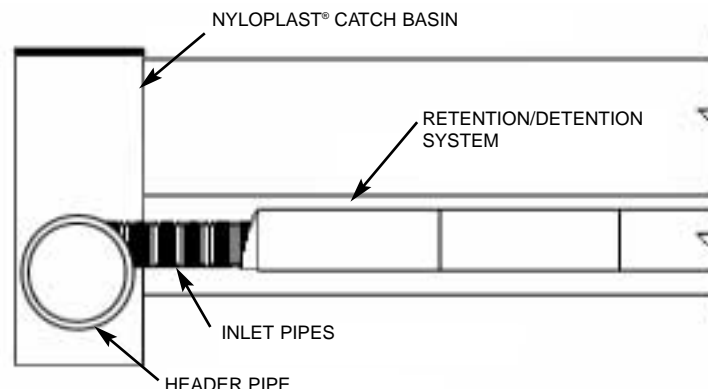


pollutant removal. The “eccentric header system” consists of a large diameter manifold pipe with an invert positioned lower than those of the smaller inlet pipes to the storage vessels. The large header pipe thus acts as a sump into which suspended particles may settle. Manholes and/or risers may be installed to facilitate inspection and cleaning.

Designers can choose between two methods of constructing the retention or detention system. The first is the

use of ADS N-12® large diameter corrugated high density polyethylene pipe, known for its economy and ease of installation. ADS supplies a complete line of pipe, fittings and fabricated manifolds, along with detailed sizing, design and installation instructions on CD.

*The “eccentric header” is installed with its invert lower than the inlet pipes, thus acting as a sump to collect suspended sediment.*





## StormTech® Chambers



The other design choice for retention and detention involves the use of StormTech® underground chambers. A chamber conveys water laterally through its sidewall openings, as well as through the angular stone foundation and backfill, to maintain a constant elevation in a bed.

The durable, chemical-resistant polypropylene chambers are offered in two sizes: (1) the SC-740 chamber provides 2.2 ft<sup>3</sup>/ft<sup>2</sup> (6.7 m<sup>3</sup>/m<sup>2</sup>) of

storage, and (2) the SC-310 low profile unit allows 1.3 ft<sup>3</sup>/ft<sup>2</sup> (4.0 m<sup>3</sup>/m<sup>2</sup>) of storage. Chambers can be cut at 6.5" intervals, providing excellent design flexibility for nearly all sites. They can be centralized or decentralized, configured into beds or trenches of varying sizes and shapes, and installed easily around utilities or other obstructions. Molded end caps are provided to seal each end of a row against backfill intrusion.

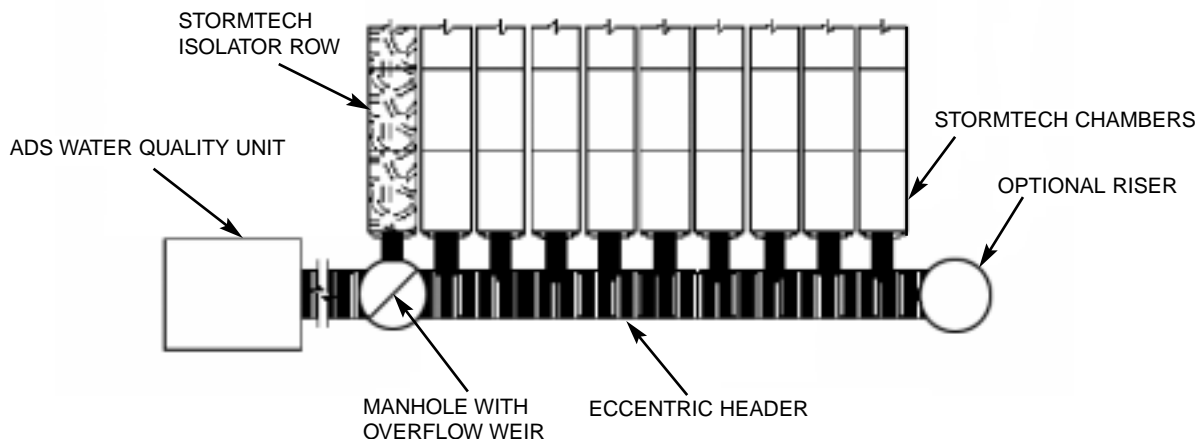
### StormTech Isolator Row® for additional TSS removal

Pre-treated storm water is inlet into selected chamber rows through the StormTech Isolator Row, often augmented by an eccentric header system. The Isolator Row is a patent-pending structure that acts as an extended detention basin, allowing water to exit through its surrounding filter fabric while sediment is trapped within. The Row inexpensively enhances TSS removal, and can be equipped with inspection ports for fast and easy maintenance and cleaning.

A manhole with an overflow weir should be installed at the upstream end of the Isolator Row. The manhole is connected to the Isolator Row with a short length of 12" (300mm) through 18" (450mm) N-12® pipe set near the bottom of the StormTech SC-740 end cap.

### Treatment train inspection and maintenance

It is recommended that inspection and maintenance be initiated at the furthest upstream treatment tier and continue downstream as necessary.

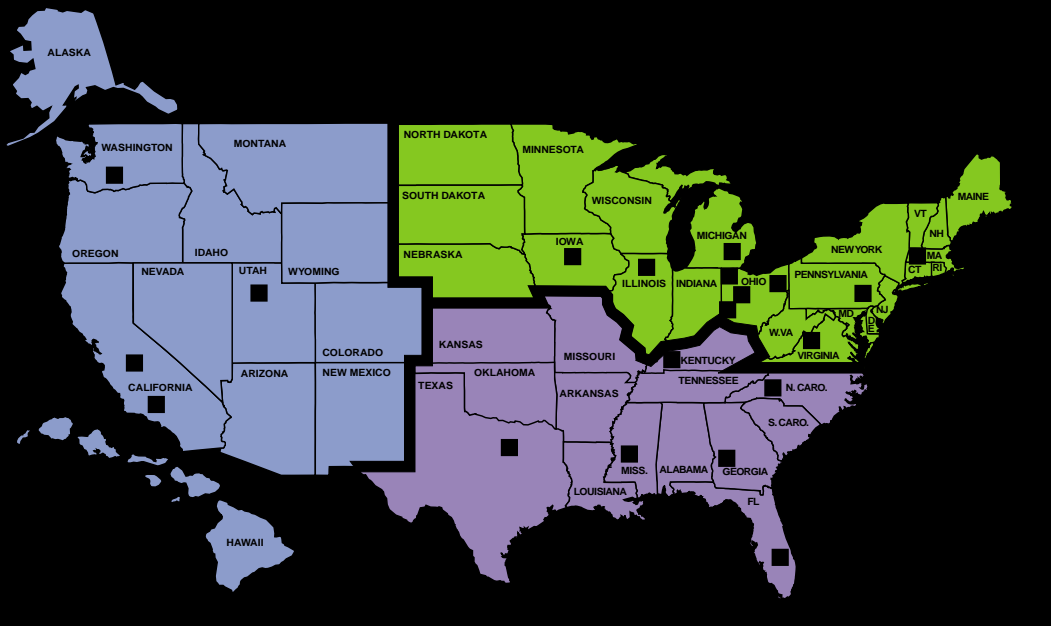


## Technical assistance available

Every drainage site has its own set of variables which affect Water Quality Unit selection. ADS engineers have developed a wealth of technical information on unit sizing and proper installation, much of which is published in ADS Product Note 3.140 (go to [www.ads-pipe.com](http://www.ads-pipe.com) to download). Or you can talk to one of our water quality specialists to discuss your particular application parameters. Just call 1-800-821-6710.



## ADS Sales and Service Locations



For more information on ADS storm water quality technology, log on to [www.ads-pipe.com](http://www.ads-pipe.com), or call 1-800-821-6710.

### Zone Offices

- **MIDWEST/NORTHEAST**  
LONDON, OH  
1-800-733-9554
- **SOUTHERN**  
FRANKLIN, TN  
1-800-733-9987
- **WESTERN**  
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