early stage treatment.

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

The first is the use of ADS N-12® large diameter corrugated high density polyethylene pipe, known for its economy and ease of installation. The second option is StormTech®, specially engineered to meet the demands of subsurface storm water management applications.

Designers can choose between two methods of constructing the 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.

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.

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

Water Quality Units

This specification describes 36- through 80 inch (900 to 2000 mm) Storm Water Quality Units for use in on-site point source storm water treatment applications.

Requirements

Storm Water Quality Units shall have a smooth interior and circular interior cross-sections meeting the requirements of ASTM F2737. The unit shall have at least three containment zones, each one separated from the next by use of a weir or baffle plate. Weir and baffle plates shall be installed at interfaces between the storage vessel and water quality unit. First weir plate shall incorporate a saw tooth design and shall be reinforced with stiffness provided transversely on the downstream side of the plate to be retained. Storm Water Quality Units shall provide adequate clean-out and inspection access.

Joint Performance

Connections for the bypass line and the unit shall utilize the same joint quality as specified for the main storm sewer pipe. Couplers for the bypass line may be either bell couplers, in-line bell couplers, snap couplers, bell bell couplers, or welded bell couplers.

Material Properties

Vegis materials for pipe & fittings used to produce Storm Water Quality Units shall be high density polyethylene conforming with the minimum performance requirements of set classification categories. All piping materials shall be evaluated using the notched ligament-stress (NCLS) test as specified in Section 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively. All smooth baffle and weir plates shall be high density polyethylene.

Installation

Installation shall be in accordance with the ADS installation guidelines, utilizing a class I (ASTM F2737) structural backfill material or flowable fill weir plates shall be high density polyethylene. Connections for the bypass line and the unit shall utilize the same joint quality as specified for the main storm sewer pipe. Couplers for the bypass line may be either bell couplers, in-line bell couplers, snap couplers, bell bell couplers, or welded bell couplers.

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WATER QUALITY UNITS

Standards for storm water quality will necessarily vary by location and land use. The most targeted sources of street pollution are paved areas in urban and industrial sites. These are generally small (< 1 acre), or land use. The most targeted sources of runoff pollution are paved areas (900mm) through 600 (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 Stokes’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 removal. The outlet area is sized to reduce a typical first flush discharge, and to redirect any excess flow to a bypass piping system installed with the unit. All ADS Water Quality Units are designed and manufactured to meet ASTM F2737 – Standard Specification for Composite High Density Polyethylene (HDPE) Water Quality Units.

DESIGN AND INSTALLATION

Available in 36” (900mm) through 60” (1500mm) diameters, ADS Water Quality Units are modified sections of 9” (900mm) 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 Stokes’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 removal. The outlet area is sized to reduce a typical first flush discharge, and to redirect any excess flow to a bypass piping system installed with the unit. All ADS Water Quality Units are designed and manufactured to meet ASTM F2737 – Standard Specification for Composite High Density Polyethylene (HDPE) Water Quality Units.

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 STORM WATER QUALITY UNIT

The ADS Water Quality Unit (below) is fitted with access risers for easy inspection and maintenance. The unit is designed using the fundamental principles of Stokes’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 removal. The outlet area is sized to reduce a typical first flush discharge, and to redirect any excess flow to a bypass piping system installed with the unit. All ADS Water Quality Units are designed and manufactured to meet ASTM F2737 – Standard Specification for Composite High Density Polyethylene (HDPE) Water Quality Units.

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

<table>
<thead>
<tr>
<th>Diameter (in)</th>
<th>12&quot;</th>
<th>18&quot;</th>
<th>24&quot;</th>
<th>30&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velocity (ft/s)</td>
<td>3,865</td>
<td>6,541</td>
<td>10,925</td>
<td>18,179</td>
</tr>
<tr>
<td>200</td>
<td>11,393</td>
<td>207</td>
<td>1,461</td>
<td>2,363</td>
</tr>
<tr>
<td>140</td>
<td>26,407</td>
<td>3,865</td>
<td>6,541</td>
<td>10,925</td>
</tr>
<tr>
<td>100</td>
<td>52,184</td>
<td>13,865</td>
<td>22,645</td>
<td>37,273</td>
</tr>
<tr>
<td>50</td>
<td>109,600</td>
<td>22,645</td>
<td>37,273</td>
<td>62,090</td>
</tr>
<tr>
<td>20</td>
<td>282,362</td>
<td>73,200</td>
<td>122,400</td>
<td>183,600</td>
</tr>
</tbody>
</table>

SIEVING AND INSTALLATION

Installation of Water Quality Units follows the same accepted practices as for the installation of large diameter flexible pipe. Specific installation instructions, along with details on specifying the proper size of a Water Quality Unit, are available in Technical Note 1.05 & Installation Guide 1.05. You can also find more information on our website at www.ads-pipe.com.
The Most Beneficial

These durable, lightweight structures have been specifically designed to become an increasingly efficient solution for treating storm water. They generate significant concentrations of contaminant particles and hydrocarbons. Because of soil constraints, ADS underground Water Quality Units have become an increasingly efficient solution for treating storm water. These devices, lightweight structures have been specifically designed for their installation and easy maintenance.

**Benefits**

- Independent testing shows the following:
  - 90% TSS removal
  - 95% of grease removal
  - Greater than 90% Total Phosphorus removal
  - 74% heavy metals removal
- Removes floatable oils 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 components are not necessarily to install the unit.
- Each unit is fitted with access ports for easy inspection and maintenance of the settling chamber.
- 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 180 sieve sizes depending on the intended use.
- The bypass pipe of the ADS WQU is modified sections of N-12® pipe with a weir plate at certain locations and are ideally suited to treat “hot spots” in existing storm water lines.
- Installation of Water Quality Units follows the same accepted practices as for the installation of large diameter flexible pipe.
**WATER QUALITY UNITS**

Standards for storm water quality will necessarily vary by location and land use. The most targeted sources of street pollution are paved areas in urban and industrial sites. These are generally found in > 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.

The ADS Water Quality Unit (below) is fitted with access risers for easy inspection and maintenance. The ADS Water Quality Unit (above right) is installed to prevent water flows greater than the first flush from re-suspending captured pollutant particles.

### BENEFITS

- **Independent testing shows the following:**
  - **60% HDPE resists abrasion and chemicals found in storm water and in the surrounding soil.**
  - **74% heavy equipment removal.**
  - **Removes floatable scum such as oil and grease.**
  - **Available in 36” (900mm) through 60” (1500mm) diameters.**
  - **Lightweight High Density Polyethylene (HDPE) unit installs easily and is easy to install, requiring little no moving parts.**
  - **Available in 36” (900mm) through 60” (1500mm) diameters.**
  - **A bypass system (above right) is installed to prevent water flows greater than the first flush from re-suspending captured pollutant particles.**

### DESIGN AND INSTALLATION

**Available in 36” (900mm) through 60” (1500mm) diameters, ADS Water Quality Units are modified sections of HD-12” pipe with weld plates at certain locations and height 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 Stokes’ Law and a standard 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 removal.

The outlet is sized to prevent a typical first flush discharge, and to redirect any excess flow to a bypass piping system installed with the unit. All ADS Water Quality Units are designed and manufactured to meet ASTM F2737 - Standard Specification for Corrugated High Density Polyethylene (HDPE) Water Quality Units.

### 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:

- 0.095 ft³/s (10L/s)
- 12” 3,849 180.0
- 18” 8,071 1,062
- 24” 13,363 2,067
- 36” 24,401 4,092
- 42” 38,447 6,240
- 48” 55,661 9,000

### SIZING AND INSTALLATION

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

Specific installation instructions, along with details on specifying the proper size of a Water Quality Unit, are available in Technical Note 1.03 & Installation Guide 1.03. You can also find more information on our website at www.ads-pipe.com.

**STANDARD MODELS**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Length</th>
<th>Inlet Size</th>
<th>Outlet Size</th>
<th>Treated Flow Rate 1% slope (ft³/s)</th>
<th>Sed. &amp; Oil Vol. Size</th>
<th>Sed. Vol.</th>
<th>Oil Vol.</th>
<th>Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>24”</td>
<td>12”</td>
<td>12”</td>
<td>12”</td>
<td>15” (377)</td>
<td>0.85 (64)</td>
<td>183 (5.0)</td>
<td>87 (2.5)</td>
<td>140</td>
</tr>
<tr>
<td>30”</td>
<td>12”</td>
<td>12”</td>
<td>12”</td>
<td>15” (377)</td>
<td>0.51 (40)</td>
<td>100 (2.9)</td>
<td>52 (1.5)</td>
<td>140</td>
</tr>
<tr>
<td>36”</td>
<td>12”</td>
<td>12”</td>
<td>12”</td>
<td>15” (377)</td>
<td>0.34 (26)</td>
<td>75 (2.1)</td>
<td>38 (1.1)</td>
<td>140</td>
</tr>
<tr>
<td>42”</td>
<td>12”</td>
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<td>15” (377)</td>
<td>0.20 (15)</td>
<td>54 (1.5)</td>
<td>28 (0.9)</td>
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<tr>
<td>48”</td>
<td>12”</td>
<td>12”</td>
<td>12”</td>
<td>15” (377)</td>
<td>0.09 (7)</td>
<td>31 (0.9)</td>
<td>18 (0.5)</td>
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</table>

**74% heavy metals removal**

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<tr>
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<th>Outlet Size</th>
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<td>31 (0.9)</td>
<td>18 (0.5)</td>
<td>140</td>
</tr>
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</table>

**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).**

**PLEASE REVIEW THE FOLLOWING ONE-SHEET PDF COVERS THE COMPLETE ADS WQU SYSTEMS.**

**Design WQU is a part of a complete package of products that include the WQU, WQA, WQB and Complete Solution packages.**

**View a video on our website at www.ads-pipe.com.**
The HEART OF THE TREATMENT TRAIN

For many drainage sites, the Water Quality Unit by itself can provide the required degree of pollutant removal. However, certain sites with higher concentrations of sediments or sediments 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 proportion of pollutants from entering the storm drain system. For erosive surfaces such as paved parking areas, catch basins with filters are most commonly used for early stage treatment.

RETENTION/DETENTION

Treatment downstream from the Water Quality Unit generally involves some form of detention or detention system. Retention allows accumulated storm water to gradually percolate into the surrounding soil, while detention makes the water drain 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 acts as a sump into which suspended particles may settle. Manholes and/or risers may be installed to facilitate inspection and cleaning.

Designers 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. The second option is StormTech®, specially engineered to meet the demands of subsurface storm water management applications.

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

ADS STORM WATER QUALITY UNIT

PRODUCT SPECIFICATION

SCOPE

The specification describes 36- through 80 inch (900 to 2000 mm) Storm Water Quality Units for use in on-site point source storm water treatment applications.

REQUIREMENTS

Storm Water Quality Units shall have a smooth interior and similar interior corrosions meeting the requirements of ASTM F2317. The unit shall have at least three containment zones, each zone separated from the next by a weir or baffle plate. Weir and baffle plates shall be welded at interfaces between the plates and water quality unit. First weir plate shall incorporate a saw tooth design and shall be reinforced with stiffness positioned transversely on the downstream side of the plate to be retained. Storm Water Quality Units shall provide adequate clean-out and inspection access.

JOINT PERFORMANCE

Connections for the bypass line and the unit shall utilize the same joint quality as specified for the main storm sewer pipe. Couplings for the bypass line may be either split couplings, in-line bell couplings, snap couplings, bell bell couplings, or welded bell couplings.

MATERIAL PROPERTIES

Vege material for pipe & fittings used to produce Storm Water Quality Units shall be high density polyethylene conforming with the minimum requirements of ASTM D3350. The “eccentric header” material shall be evaluated using the notched ligament-stress (NCLS) test as specified in Section 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively. All smooth baffle and weir plates shall be high density polyethylene.

INSTALLATION

Installation shall be in accordance with the ADS installation guidelines, utilizing a class I (ASTM D2321) structural backfill material or flowable fill as defined and described in the latest version of ASTM D3350. The unit may be installed using an asphalt emulsion or cold asphalt emulsion. First weir plate shall incorporate a saw tooth design and shall be reinforced with stiffness positioned transversely on the downstream side of the plate to be retained. Storm Water Quality Units shall provide adequate clean-out and inspection access.

ADDITIONAL MATERIALS & ACCESSORIES

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ADDITIONAL MATERIALS & ACCESSORIES
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Upstream measures include sediment prevention (vegetated swales, etc.) and inlet protection devices such as screens, filters and still holm. These techniques are designed to prevent a large percentage of pollutants from 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.

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For impervious areas, 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.

The first is the use of ADS N-12® large diameter corrugated high density polyethylene pipe, known for its economy and ease of installation. The second option is StormTech®, specially engineered to meet the demands of subsurface storm water management applications.ADS supplies a complete line of pipe, fittings and fabricated manifolds, along with detailed engineered to meet the demands of subsurface storm water management applications. ADS supplies a complete line of pipe, fittings and fabricated manifolds, along with detailed engineered to meet the demands of subsurface storm water management applications.

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