Proprietary Devices

Description

Generally, Hydrodynamic Devices control stormwater pollution using the movement of water and water's properties to settle or filter pollutants from the stormwater. Commonly, this is accomplished in a large underground structure.

Hydrodynamic devices are widely used flow-through structures that include a settling or separation unit to remove sediments and other pollutants. No outside power source is required, because the energy of the flowing water allows the sediments to efficiently separate. Depending on the type of unit, this separation may be by means of swirl action or indirect filtration. Units are designed to meet specific pollutant removal requirements.

Selection Criteria

The U.S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification (ETV) Program to facilitate the deployment of innovative or improved environmental technologies through performance verification and dissemination of information. The ETV Program's goal is to further environmental protection by substantially accelerating the acceptance and use of innovative, improved, and more cost-effective technologies. ETV seeks to achieve this goal by providing high quality, peer-reviewed data on technology performance to those involved in the design, distribution, permitting, purchase, and use of environmental technologies. See below for more information:

Reports on performance verification from the USEPA:
http://www.epa.gov/etv/verifications/vcenter9-9.html

For further selection guidance: City of Nashville Stormwater Quality Units Selection Guide ftp://ftp.nashville.gov/web/stormwater/2006SWMM/WQUnits_2006.pdf

Design Considerations

Possible Removal Efficiencies:

- *Aquafilter (AquaShield)*
  80.5% of TSS at 0.04cfs
  (NJCAT Certification)
- *Aqua-Swirl Concentrator (AquaShield)*
  88.7% of TSS at 0.2 cfs, 18.0 % of TSS at 1.2 cfs
  (NJCAT Certification)
- *BaySaver*
  80% of TSS at 7.6 cfs for 125 microns size particles
  (Mosehni, 2006)

- *Crystalstream*
  21% of TSS, 89% of SSC, 13% of TKN, 40% of TP
  (SESWA BMP Selection, Maintenance and Effectiveness Seminar, Atlanta, Georgia, Feb. 16, 2007)

- *Downstream Defender*
  80% of Sediment at 1.3 cfs, Unspecified % of Gross Solids, Oil
  (SESWA BMP Maintenance and Selection, Feb 16, 2007)
- *Flo-Gard Dual-Vortex:*
  50 % of 50 micron size particles, 80 % of 125 micron size particles
  (Washington State Dept. of Ecology)
- *Stormceptor*
  25% of TSS, 0% of TN, 10% of TP
  (Clausen, et. al.)
- *Vortechs*
  88% of TSS, 10% of TN, 5% of TP
  (Sutherland, et., el.)

Maintenance

Maintenance is especially important with these devices. Clogging of devices not only can hinder removal of pollutants but may also create drainage problems. A general rule of thumb is that these devices must be cleaned out 1 – 2 times a year. Proper maintenance involves frequent inspections throughout the first year of installation. When the unit has reached capacity, it must be cleaned out. This may be performed with a sump vac or vacuum truck, depending on which unit is used.

Limitations

The design of these devices is often very pollutant and locale specific. In-situ testing is required to verify the removal efficiencies.

NOTE: Inclusion of these devices in this BMP Manual does not in any way act as an endorsement of the products, or a voucher for their removal efficiencies.

References

Nashville (City of). November 2006. “Nashville Stormwater Quality Units Selection Guide,” ftp://ftp.nashville.gov/web/stormwater/2006SWMM/WQUnits_2006.pdf.

Southeast Stormwater Association (SESWA). Feb. 16, 2007. BMP Selection, Maintenance and Effectiveness Seminar. Atlanta, Georgia.

US Environmental Protection Agency (EPA). December 18, 2007. Environmental Technology Verification (ETV) Program.
http://www.epa.gov/etv/verifications/vcenter9-9.html.