SWEMA FACT SHEET

Hydrodynamic Separators

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Hydrodynamic separators (HDS), also known as oil/grit separators (OGS), are widely deployed as stormwater treatment BMPs, both in stand-alone applications and as pretreatment devices in a treatment train. HDS target the removal of high specific gravity suspended solids (such as sand, grit, and degraded asphalt), as well as free-floating oil and grease and trash and debris.

HDS are typically vertically oriented cylinders (manholes) or multi-chambered rectangular vaults that contain a permanent pool of water in the treatment chamber. HDS may use special components such as baffles, weirs, and screens to direct the flow path, attenuate water velocity, and enhance the settling of particulates and the capture of oil and other floatables. Often HDS utilize internal bypass features to prevent or minimize resuspension and washout of previously captured pollutants.

The primary treatments mechanisms used in HDS are gravity separation and spill capture. High specific gravity particulates settle by gravity to the sump of the device, with low specific gravity oil, trash, and debris float to the surface and are trapped. Normally there is sufficient floatables storage for the device to capture and retain an oil or fuel spill of substantial volume until maintenance can be performed to recover the spilled hydrocarbons.

Maintenance of HDS is typically performed with a vacuum truck to evacuate captured sediment and floatables from the unit. Maintenance is normally performed from the surface, without need for confined space entry. Depending on the loading from the site, maintenance frequency will typically range from once per year to once every 3-5 years. For the longer maintenance intervals, it is important to ensure that there is adequate storage capacity for accumulated sediment, and annual inspection is highly recommended.

The primary advantages HDS include good capture of sand and grit at relatively high surface loading rates, capture of floatable pollutants, capture of oil and fuel spills, and relatively simple and low cost maintenance. Additionally, since HDS are typically installed underground, treatment can be provided without consuming valuable developable land. Internal bypass features also reduce the total system footprint since additional manholes and diversions structures are not required for external bypassing of very high flow rates during the most intense storms. HDS are very effective pretreatment for other BMPs such as stormwater ponds, bioretention, filter devices, detention structures, and infiltration, and can significantly extend the maintenance interval for these downstream measures.

There are limitations to HDS treatment effectiveness. TSS and floatables capture is sensitive to the flow rate and detention time within the device, as longer detention time results in better removal of pollutants. Generally, HDS provides relatively low and variable capture of fine particulates (< 50 microns) and particulate-bound pollutants (metals, nutrients, hydrocarbons, bacteria) that are concentrated on the fine particle fractions, except at low surface loading rates during low intensity storms and during inter-event settling periods. HDS can be conservatively sized with a larger structure to provide additional detention time and improved capture of the fine particu-

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late fractions. Neutrally buoyant pollutants (specific gravity similar to water, typically organic particulates) are difficult to remove with HDS.

Hydrodynamic Separator Maintenance

Before commencing maintenance activities contact the manufacturer of the device to be maintained for any specific maintenance instructions. Prior to conducting any work on site all personnel must don appropriate high visibility vests, and as required, hard hats, steel-toed safety boots and safety glasses. Immediately upon arrival at the work site position all traffic control devices to ensure safety for motorists and pedestrians.

Remove any and all manhole covers to access the units being maintained. On a pre-prepared inspection report note all site conditions and device conditions. The report should include observations regarding the stability of the watershed contributing to the device in regards to landscaped areas, i.e. is there erosion occurring? Or are there any conditions present that may bring large quantities of sediment and debris to the unit? Observations should also be made in regards to the construction of the unit and notes taken if there is damage, undue wear or any other noteworthy items. Using the manhole frame as a reference point, a tape measure or other graduated measuring device should be used to take note of the depth to any accumulated sediment pile.

Typically the maintenance of most hydrodynamic separators requires the use of a vacuum truck equipped with a water supply and a high pressure water spray. With that type of equipment the accumulated solids may be removed through the manufacturer supplies access to the sump of the device. During and after the vacuum operation a high pressure water spray should be used to wash sediment and debris from all surfaces of the device into the sump where it may be vacuumed out.

After all surfaces have been washed clean and the debris and sediment has been removed from the unit a measurement from the same reference point used above should be made to the bottom of the device. Subtracting the first measurement from the top of the sediment pile from the total unit depth will result in the depth of accumulated sediment. This depth should be noted on the inspection report.

Return manhole covers to their original position, sweep and remove any sediment and debris from the maintenance area and remove all traffic control devices.