



STORM BULLETIN 18

EVALUATION OF ANNUAL RETAINED POLLUTANTS (EARP)

- **The purpose of monitoring flow** in installed pretreatment chambers and other pollution control systems is to determine the mass and/or percent of the pollutant load that is retained by the control system.
- **Monitoring of municipal Wastewater Treatment Plant (WWTP) clarifiers** is typically done by sampling influent and effluent flow. The flow rate, flow cycle and pollutant concentration are consistent and the flow rate changes slowly. Decades of experience have demonstrated that monitoring municipal WWTP clarifier flows provides an accurate measurement of the daily pollutant load and daily retained pollutants.
- **Monitoring of stormwater Best Management Practices (BMP) flows** can provide inaccurate or misleading data. The pollutant load and rainfall events are inconsistent and site-specific for BMPs. The flow monitoring data is scattered and inconsistent even for stormwater detention ponds. The common practice of sampling flow during 3-5 isolated rainfall events is has never been demonstrated to provide a reasonably accurate estimate of the mass of the retained pollutants.
- **Continuous monitoring of the annual rainfall cycle** using influent and effluent sampling is extremely difficult due to the rapid and extreme variations in flow rate during a rainfall event. The flow sampling devices may not obtain representative samples of the stormwater pollutants. And continuous site-specific sampling of influent and effluent flows is useful only if the test data is correlated with the mass of retained pollutants. This is seldom the case and this type of sampling data should be ignored.
- **A more realistic approach for estimating pollutant removal efficiency** in a stormwater BMP is to compare the estimated annual pollutant load with the actual annual quantity and composition of the retained pollutants. This approach has the additional benefits of confirming the amount of pollutant mass that does not reach the local watershed, providing a basis for establishing a maintenance schedule for the BMP, and confirming that the BMP size is adequate for the site-specific area being treated.
- **If an annual composite of the retained pollutants** is analyzed after a one-year operating cycle it would account for the numerous inconsistent wash-off events that can occur each year.



- **The pollutant wash-off load can be estimated** from extensive databases developed by the EPA or other regulatory agencies. This data can be used to estimate site-specific pollutant loads.
- **An estimated pollutant mass balance** for a BMP should be founded on the following:
 - capability of the BMP to remove pollutants – this is based on treatment science, mass balance testing of laboratory prototypes, and BMP sizing relative to the size and type of tributary area being treated
 - pollutant bypassing if flow splitters are used
 - adequacy of the BMP.
- **Pollutant loads are made up of the floatables and the sediment** that can be effectively washed from the tributary area. Some pollutants will accumulate at pavement curbing or be trapped in drain inlets. The remaining pollutants enter the storm sewer. A portion of these may settle out as bed load in the invert of the storm sewer, but the balance of the pollutants are conveyed to a pretreatment chamber.
- **The long-term data for pollutants** conveyed in a storm sewer to and retained in stormwater BMP chambers indicates the BMPs ability to retain floating oil and to remove 80% of the TSS. To accomplish this, the gravity separator water surface area should be 10-15 ft² for each impervious acre that drains to the BMP. Larger chambers provide better treatment and also longer times between pollutant pump-outs.