

# Monitoring Protocol

Please contact the Rinker Stormceptor® office, with any questions regarding your monitoring program. Toll Free (800) 909-7763.

## Pollutants to be Monitored

Table 1 indicates the pollutants to be monitored during the storm events and the minimum acceptable detection limit for each pollutant to be analyzed. Approved federal or state laboratory analysis methodologies are to be used for the analysis.

The optional metals indicated in Table 1 refer to the Resource Conservation Recovery Act and may be covered by a generic metals scan.

Two sediment samples are to be extracted from the monitored Stormceptor® at the end of the study and analyzed for the particle size distribution and water content. A minimum of 10 particle sizes are to be used to determine the particle size distribution. Sieves to be used include the 35, 60, 100, 140, 200, 270, and 400 size. Three clay particle sizes must be analyzed to denote particle sizes between 5 and 25  $\mu$  m. The particle size distributions should be plotted on a standard grain size distribution graph.

| Table 1. Monitored Pollutants      |                               |
|------------------------------------|-------------------------------|
| Pollutant                          | Minimum Detection Limit (MDL) |
| Total Suspended Solids (TSS)       | 5 mg/l                        |
| Total Phosphorus (P)               | 0.02 mg/l                     |
| Total Kjeldahl Nitrogen (TKN)      | 0.1 mg/l                      |
| Copper (Cu)                        | 0.001 mg/l                    |
| Cadmium (Cd)                       | 0.005 mg/l                    |
| Lead (Pb)                          | 0.05 mg/l                     |
| Zinc (Zn)                          | 0.01 mg/l                     |
| Chromium (Cr)                      | 0.01 mg/l                     |
| Total Petroleum Hydrocarbons (TPH) | 1 mg/l                        |
| Conductivity                       | 0.1 $\mu$ mho/cm              |
| Fecal Coliform *                   | 1 /100 ml                     |
|                                    |                               |
| Additional Metals (optional)       |                               |

|               |             |
|---------------|-------------|
| Arsenic (As)  | 0.005 mg/l  |
| Barium (Ba)   | 0.01 mg/l   |
| Mercury (Hg)  | 0.0005 mg/l |
| Selenium (Se) | 0.005 mg/l  |
| Silver (Ag)   | 0.01 mg/l   |

## Monitoring Methodology

The following monitoring protocol should be followed to ensure reasonable monitoring results and interpretation:

1. Monitoring protocols should conform to **EPA 40 CFR Part 136**.
2. The **EPA guideline of 72 hours dry period** prior to a monitoring event should be used. This will ensure that there is sufficient pollutant build-up available for wash-off during the monitored event.
3. **Flow proportional monitoring** must be conducted for the parameters indicated in Table 1. Samples should be analyzed separately for the first flush versus the remainder of the storm event. Monitoring need not extend longer than an 8-hour period after the start of the storm event (composite).
4. **Sediment sampling** (measuring the sediment depth in the unit at the beginning and end of the monitoring period) must be conducted. The water content of the sediment layer must be analyzed to determine the dry volume of suspended solids. Sediment depth sampling will indicate the rate of pollution accumulation in the unit, provide confirmation that the unit is not scouring and confirm the flow proportional monitoring results. A mass balance using the sediment sampling should be calculated to validate the flow proportional sampling.
5. **Grab sampling** (just taking samples at the inlet and outlet) is an unacceptable methodology for testing the performance of the *Stormceptor*<sup>®</sup> during wet weather conditions. The oil containment area underneath the insert should be inspected via the vent pipe for dry weather spills capture once a month during the monitoring period since the flow rate of a dry weather spill may not trigger the automated samplers.
6. A tipping bucket rain gauge should be installed on-site to record the distribution of storm intensities and rainfall volume during the monitored events.
7. Results that are within the laboratory error (both inlet and outlet) or are representative of relatively clean water should be discarded. Typical concentrations of pollutants in stormwater are:

|          |          |
|----------|----------|
| TSS      | 100mg/L  |
| Total P  | 0.33mg/L |
| TKN      | 1.50mg/L |
| Total Cu | 34µg/L   |
| Total Pb | 144µg/L  |
| Total Zn | 160µg/L  |

A threshold first flush/composite TSS value of 50 mg/L at the inlet to the *Stormceptor*<sup>®</sup> should be used as the lower limit of an acceptable storm for reporting event efficiency. Monitoring results where the influent TSS concentration is less than 50 mg/L should only be used in mass load removal calculations over the entire monitoring period with other storms where the influent concentration is greater than 50 mg/L. The results should not be analyzed if the influent TSS concentrations during all monitored storms are less than 50 mg/L. Storms where the influent TSS concentration is less than 10 mg/L should be discarded from all analyses.

8. A threshold storm event volume equal to 1.5 times the storage volume of the Stormceptor® being monitored should be used as the lower limit of an acceptable storm for monitoring.
9. The personnel monitoring the Stormceptor® should record incidental information in a log file. Information such as weather, site conditions, inspection and maintenance information, monitoring equipment failure, etc. provide valuable information that can explain anomalous results.
10. Laboratory results of monitored samples should be analyzed within 10 days of being submitted to the lab.
11. Weekly inspections of the sampling tubes, flow meter, rain gauge, and quality samplers should be conducted to ensure proper operation of the monitoring equipment. Debris and sediment that collects around the sampling intakes should be cleaned after each event.
12. During the installation of automated quality samplers, care should be exercised to ensure that representative samples will be extracted (placement of intakes, ensuring that tubing is not constricted or crimped).
13. Sampling should be conducted for a minimum of 6 storms. Ideally 15 storms should be sampled if the budget allows.