Washington State Municipal Stormwater Conference
May 17, 2017
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Washington Stormwater Center/UW Tacoma Center for Urban Waters

ASSISTANCE • RESEARCH • TRAINING
Technology Assessment Protocol – Ecology (TAPE)
Requirements for New/Redevelopment

- Stormwater Management Manuals for Eastern & Western Washington
  - 8 Core Elements (E WA) or 9 Minimum Requirements (W WA) for development and redevelopment sites

- Core Element #5/Minimum Requirement #6 – Runoff Treatment
  - Design criteria for runoff treatment facilities
  - Emerging technologies

- TAPE is process for approving emerging and proprietary technologies
Requirements for New/Redevelopment

- Treatment Facilities
  - Pretreatment (Total Suspended Solids)
  - Basic (Total Suspended Solids)
  - Enhanced (Dissolved Copper and Zinc)
  - Phosphorus (Total Phosphorus)
  - Oil (motor oil fraction of Total Petroleum Hydrocarbons)
TAPE Approval Timeline

~ 3 years, $250K

2. Receive P/CULD
3. Find Potential Field Site
   - Pick Site
   - Evaluate Site
4. Prepare QAPP
5. BER Review
   - QAPP Approved
6. Field Evaluation
7. Prepare TER
8. Receive GULD
Pilot Use Level Designation (PULD)
- Laboratory Data
- Up to 5 installations in Washington State
- Monitor ALL installation

Conditional Use Level Designation (CULD)
- Field Data
- Up to 10 installations in Washington State
- Monitor 1 installation

Currently ~17 technologies with a PULD or CULD
# TAPE Application


<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Device Name</th>
<th>Treatment Type</th>
<th>Use Designation</th>
<th>Company Contact Information</th>
<th>Status</th>
<th># of Installations</th>
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<tbody>
<tr>
<td>BaySaver Technologies, Inc.</td>
<td>BayFilter® w/EMC Media</td>
<td>Phosphorus Treatment</td>
<td>General Use Level</td>
<td>Daniel Figola More</td>
<td>4/14/2017</td>
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<td>Bio Clean Environmental Services, Inc.</td>
<td>The Kraken</td>
<td>Basic Treatment</td>
<td>Pilot Use Level **</td>
<td>Zachariha Kent More</td>
<td>1/21/2016</td>
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<td>Chitosan-Enhanced Sand Filtration</td>
<td>1.5% ChitoVan™ (GULD)</td>
<td>Construction Treatment</td>
<td>General Use Level</td>
<td>Joel Van Ornum More</td>
<td>2/17/2017</td>
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January 2016

PILOT USE LEVEL DESIGNATION FOR BASIC (TSS)

For

Bio-Clean Environmental Services, Inc’s
The Kraken™ Membrane Filter

Ecology’s Decision:

Based on Bio-Clean Environmental Services, Inc’s application submissions for The Kraken™ Membrane Filter, Ecology hereby issues the following use level designations:

1. Pilot Use Level Designation (PULD) for Basic Treatment:
   - Sized at a hydraulic loading rate of no more than 0.05 gpm/ft² per cartridge (surface area of 170 square feet).

Table 1. Kraken Membrane Filter cartridge design flow rates, operating at 0.05 gpm/sq ft.

<table>
<thead>
<tr>
<th>Effective Cartridge Height (in)</th>
<th>Surface Area (ft²)</th>
<th>Cartridge Flow Rate (gpm/cartridge)</th>
</tr>
</thead>
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<td>30.75</td>
<td>170</td>
<td>8.5</td>
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Finding a Site

~ 3 years

2. Receive P/CULD
3. Find Potential Field Site
4. Pick Site
5. Evaluate Site
6. Prepare QAPP
7. QAPP Approved
8. BER Review
9. Prepare TER
10. Receive GULD
11. Field Evaluation
Finding a Site

- In the Pacific Northwest

- Pollutant concentrations in the TAPE range:
  - TSS: > 20mg/L
  - Dissolved copper: 0.005 – 0.02 mg/L
  - Dissolved zinc: 0.02 – 0.3 mg/L
  - Total Phosphorus: 0.1 – 0.5 mg/L
  - Oil (TPH-Dx): >10 mg/L

- Technology requirements
Finding a Site

Lake Union Ship Canal Test Facility

University of New Hampshire Stormwater Center

ODOT Stormwater Technology Testing Center

OSU Green Stormwater Infrastructure Research Facility
Field Evaluation

~ 3 years

Flowchart:
2. Receive P/CULD
3. Find Potential Field Site
4. Pick Site
5. Evaluate Site
6. Prepare QAPP
7. QAPP Approved
8. BER Review
9. Field Evaluation
10. Prepare TER
11. Receive GULD
Field Evaluation

- 1.5 maintenance cycles
- 12 qualifying storm events
  - Flow-weighted composite sampling
  - Storm event and sample criteria
  - Influent concentration range
- Meet performance goals
  - Upper 95% CI around mean effluent concentration
  - Lower 95% CI around mean removal efficiency
Field Evaluation

- Continuous flow data
  - Influent
  - Effluent
  - Bypass

- Operation and Maintenance records
~ 3 years

- Submit App.
- Receive P/CULD
- Find Potential Field Site
- Pick Site
- Evaluate Site
- Prepare QAPP
- QAPP Approved
- BER Review
- Field Evaluation
- Prepare TER
- Receive GULD
General Use Level Designation (GULD)
- No expiration
- No limits on # of installations

17 systems with a current GULD
- Pretreatment – 5
- Basic – 12
- Enhanced - 5
- Phosphorus - 7
- Oil - 2
GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS) AND PHOSPHORUS TREATMENT

CONDITIONAL USE LEVEL DESIGNATION FOR ENHANCED (METALS) TREATMENT

For

BaySaver Technologies, LLC
BayFilter™ System
using Enhanced Media Cartridges (EMC)

Ecology’s Decision:

1. Based on BaySaver Technologies’ application submissions, Ecology hereby issues a General Use Level Designation (GULD) for Basic and Phosphorus Treatment for the BayFilter™ System using Enhanced Media Cartridges (EMC).

   • Sized at a hydraulic loading rate of no greater than 0.50 gallons per minute (gpm) per square foot (sq ft) of filter area.

   ○ 45 gpm (0.10 cfs) per cartridge (example dimensions 28-inch diameter, 30-inches tall (90 sq ft filter area))

   ○ 75 gpm (0.167 cfs) per cartridge (example dimensions 39-inch diameter, 30-inches tall (150 sq ft filter area))
3. The water quality design flow rates are calculated using the following procedures:

- Western Washington: for treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.

- Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.

- Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

The GULD designation has no expiration date but it may be amended or revoked by Ecology and is subject to the conditions specified below.
Ecology’s Conditions of Use:

StormFilter systems containing Phosphosorb media shall comply with these conditions:

1. Design, assemble, install, operate, and maintain StormFilter systems containing Phosphosorb media in accordance with applicable Contech Engineered Solutions manuals, documents, and the Ecology Decision.

2. Use sediment loading capacity, in conjunction with the water quality design flow rate, to determine the target maintenance interval.

3. Owners shall install StormFilter systems in such a manner that bypass flows exceeding the water quality treatment rate or flows through the system will not re-suspend captured sediments.

4. Pretreatment of TSS and oil and grease may be necessary, and designers shall provide pre-treatment in accordance with the most current versions of the CONTECH Product Design Manual or the applicable Ecology Stormwater Manual. Design pre-treatment using the performance criteria and pretreatment practices provided in the Stormwater Management Manual for Western Washington (SWMMWW), the Stormwater Management Manual for Eastern Washington (SWMMEW), or on Ecology’s “Evaluation of Emerging Stormwater Treatment Technologies” website.

5. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a “one size fits all” maintenance cycle for a particular model/size of manufactured filter treatment device.

   - Typically, CONTECH designs StormFilter systems for a target filter media replacement interval of 12 months. Maintenance includes removing accumulated sediment from the vault, and replacing spent cartridges with recharged cartridges.

   - Indications of the need for maintenance include the effluent flow decreasing to below the design flow rate, as indicated by the scumline above the shoulder of the cartridge.

   - Owners/operators must inspect StormFilter with Phosphosorb media for a minimum of twelve months from the start of post-construction operation to determine site-specific maintenance schedules and requirements. You must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to SWMMEW, the wet season in eastern Washington is October 1 to June 30). After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.

   - Conduct inspections by qualified personnel, follow manufacturer’s guidelines, and use methods capable of determining either a decrease in treated effluent flowrate and/or a decrease in pollutant removal ability.

   - When inspections are performed, the following findings typically serve as maintenance triggers:

      - Accumulated vault sediment depths exceed an average of 2 inches, or
      - Accumulated sediment depths on the tops of the cartridges exceed an average of 0.5 inches, or
      - Standing water remains in the vault between rain events, or
      - Bypass during storms smaller than the design storm.

   - Note: If excessive floatables (trash and debris) are present, perform a minor maintenance consisting of gross solids removal, not cartridge replacement.
- Application documents
- Performance Claims
- Findings of Fact
- Issues to be addressed by manufacturer
TAPE Program Updates

- TAPE Stormwater Technology Evaluation Facilities
- Updates to guidance document
- Finalize Long Detention/Random Sampling Protocol
For more information:

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