



April 2014

**CONDITIONAL USE LEVEL DESIGNATION FOR BASIC, ENHANCED, &
PHOSPHORUS TREATMENT**

For

StormwaterRx, LLC, Aquip® Enhanced Stormwater Filtration System

Ecology's Decision:

Based on StormwaterRx's application submissions, Ecology hereby issues the following use level designations for the Aquip® Enhanced Stormwater Filtration System:

1. A Conditional Use Level Designation (CULD) for Basic (TSS) Treatment.
 - Sized at a hydraulic loading rate of no greater than 1 gallon per minute (gpm) per square foot (sq ft) of media surface area.
 - Using the enhanced (sorptive) media.
 - Influent by pump station or gravity flow.
2. A Conditional Use Level Designation (CULD) Enhanced (dissolved Cu and Zn).
 - Sized at a hydraulic loading rate of no greater than 1 gallon per minute (gpm) per square foot (sq ft) of media surface area.
 - Using the enhanced (sorptive) media.
 - Influent by pump station or gravity flow.
3. A Conditional Use Level Designation (CULD) for Phosphorus Treatment.
 - Sized at a hydraulic loading rate of no greater than 1 gallon per minute (gpm) per square foot (sq ft) of media surface area.
 - Using the enhanced (sorptive) media.
 - Influent by pump station or gravity flow.

4. Ecology approves the Aquip[®] Enhanced Stormwater Filtration System for treatment at the above flow rates. The designer shall calculate the water quality design flow rates 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.
5. The Use Level Designation expires on January 1, 2019 unless extended by Ecology, and is subject to the conditions specified below.

Ecology's Conditions of Use:

The Aquip[®] Enhanced Stormwater Filtration Systems shall comply with these conditions:

1. Design, assemble, install, operate, and maintain the Aquip[®] systems in accordance with StormwaterRx's applicable manuals and documents and the Ecology Decision.
2. If you pump influent to the system, pump station and bypass design shall follow local guidelines and codes.
3. StormwaterRx, LLC commits to submitting a QAPP for BER review and Ecology approval by March 1, 2016 that meets the TAPE requirements for attaining a GULD for Basic, Enhanced, and Phosphorus Treatment. Ecology must review and approve any QAPPs for each additional field site in Washington State. The sites chosen should reflect the product's treatment intent.
4. StormwaterRx, LLC shall complete all required testing and submit a TER for Ecology review by March 1, 2018.
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.

- StormwaterRx Aquip system maintenance includes routine media maintenance, inert media replacement and sorptive media replacement. Maintenance frequency is site specific and for preventative maintenance purposes is estimated based on elapsed time and/or cumulative flow through the system. Maintenance includes the following:
 - Surface Media Maintenance – remove visible surface accumulation of sediment and discolored inert media from pretreatment and filtration chambers. Top off with new media to original media height when approximately 3-inches of filter media has been removed. Surface media maintenance interval averages 1 month.
 - Inert Media Replacement– replace inert media in filtration chamber when surface media maintenance program results in a continuous operating filtration chamber water level of more than two feet. Replacing the inert media protects the underlying sorptive media and extends sorptive media life. Inert media replacement interval averages 12 months.
 - Sorptive Media Replacement – replace sorptive media in concert with an inert media replacement when the operating filtration chamber water level is greater than two feet despite proper routine and inert media maintenance, or when dissolved pollutant concentrations exceed regulatory standards. Remove accumulated pretreatment chamber sediment and media at time of sorptive media replacement. Pollutant removal capacity of the sorptive media can exhaust due to high loading, inadequate routine and inert media maintenance, and extended Aquip throughput. Sorptive media replacement interval averages 24 months.

- Owners/operators must inspect Aquip systems for a minimum of twelve months from the start of post-construction operation to determine site-specific maintenance schedules and requirements. 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:
 - Effluent flow decreasing to below the design flow rate.
 - Accumulated sediment discoloration on the media surface is visually more predominant than filtration media, or
 - Evidence of bypass or operating water levels more than one foot above the inlet distributor, or
 - Standing water remains inside the filtration chamber between rain events, or
 - Treatment system performance has declined for two or more samples, or
 - Jar testing indicates that media samples have accumulated more than 20% solids by volume.

6. StormwaterRx, LLC may request Ecology to grant deadline or expiration date extensions, upon showing cause for such extensions.
7. Discharges from Aquip® Enhanced Stormwater Filtration Systems shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: StormwaterRx, LLC

Applicant's Address: 122 SE 27th Avenue
Portland, OR, 97214

Application Documents:

- Aquip® Enhanced Stormwater Filtration System, Technology Assessment Protocol – Ecology Application for Certification (January 26, 2011; revised May 20, 2011). Prepared by StormwaterRx, LLC. Received May 27, 2011.

Applicant's Use Level Request:

- Conditional Use Level Designation as a Basic, Enhanced, and Phosphorus treatment device in accordance with Ecology's 2005 *Stormwater Management Manual for Western Washington*.

Applicant's Performance Claims:

- The Aquip® Enhanced Stormwater Filtration System provides statistically significant removal of TSS, dissolved copper, dissolved zinc, and total phosphorus from stormwater, and can meet or exceed Ecology's Basic, Enhanced, and Phosphorus treatment standards.

Ecology's Recommendations:

- Ecology should provide StormwaterRx, LLC with the opportunity to demonstrate, through field testing that follows an approved QAPP, whether the Aquip® Enhanced Stormwater Filtration System can attain Ecology's Basic, Enhanced, and Phosphorus treatment performance levels.

Findings of Fact:

- Based on paired grab sample data for TSS, from 14 installation sites, the Aquip® Enhanced Stormwater Filtration System achieved the following treatment levels:
 - Median effluent was 5 mg/L TSS, influent concentration in the range of 20-100 mg/L (n=32).
 - Median percent removal was 98 percent, influent concentration in the range of 100-200 mg/L (n=8).

- Median percent removal was 98 percent, influent concentration greater than 200 mg/L (n=8).
- Based on paired grab sample data for dissolved copper, from 7 installation sites, the Aquip® Enhanced Stormwater Filtration System achieved the following treatment levels:
 - Median percent removal was 73 percent, influent concentration in the range of 0.003-0.02 mg/L (n=5).
 - Median percent removal was 93 percent, influent concentration greater than 0.02 mg/L (n=32).
- Based on paired grab sample data for dissolved zinc, from eight installation sites, the Aquip® Enhanced Stormwater Filtration System achieved the following treatment levels:
 - Median percent removal was 59 percent, influent concentration in the range of 0.02-0.3 mg/L (n=30).
 - Median percent removal was 94 percent, influent concentration greater than 0.3 mg/L (n=21).
- Based on paired grab sample data for total phosphorus, from six installation sites, the Aquip® Enhanced Stormwater Filtration System achieved the following treatment levels:
 - Median percent removal was 60 percent, influent concentration in the range of 0.1-0.5 mg/L (n=14).
 - Median percent removal was 89 percent, influent concentration greater than 0.5 mg/L (n=5).

Issues to be Addressed By the Company:

1. The Aquip® Enhanced Stormwater Filtration System must show that it can reliably attain the minimum percent removal criteria for Basic, Enhanced, and Phosphorus treatment for runoff found from local highways, parking lots, and other high-use areas at the design-operating rate in accordance with the Ecology TAPE protocols. StormwaterRx, LLC should test a variety of operating rates to establish conservative design rates.
2. Test the system under normal operating conditions, such that pollutants partially fill the system. Results obtained for “clean” systems may not be representative of typical performance.
3. StormwaterRx, LLC submitted extensive grab sample data from several sites operating in industrial treatment settings. Pollutant concentrations are both within and above the ranges required by TAPE. Testing to achieve a GULD under the TAPE program will need to focus on pollutant concentrations within the specified TAPE ranges, as well as using flow-weighted composite sampling (or other method approved in the QAPP) as opposed to grab sampling.
4. Calculation of treatment efficiency shall be in accordance with the 2011 Revision of the *Guidance for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (TAPE)*.

5. StormwaterRx shall include a discussion of treatment efficiency (percent removed) as flow rates change in the Technical Evaluation Report.
6. Conduct field-testing at sites that are indicative of the treatment goals.
7. Conduct testing to obtain information about maintenance requirements in order to come up with a maintenance cycle.
8. Conduct loading tests on the filter media to determine maximum treatment life of the system.

Technology Description: Download at: www.stormwaterx.com/Products/Aquip.aspx

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Revision History

Date	Revision
July 2011	Original use-level-designation document
September 2012	Revised dates for QAPP, TER, and Expiration
January 2013	Updated document format to match Ecology standard, added maintenance criteria
April 2014	Revised Due dates for QAPP and TER and changed Expiration date