

**WASHINGTON STATE DEPARTMENT OF ECOLOGY**

**August 31, 2009**

**PILOT USE LEVEL DESIGNATION FOR PRE-TREATMENT**

**For**

**Environment 21, LLC**

**Ecology's Decision:**

Based on Environment 21's application submissions and recommendations by the Technical Review Committee (TRC), Ecology hereby issues the following use level designation:

1. Pilot use level designation (PLUD) for the V2B1<sup>®</sup> Stormwater Treatment System for pre-treatment:

- Sized at hydraulic loading rate based on Environment 21 values listed in Table 1.

Table 1. Design Flowrates

Model Number	Treatment Rate (cfs)
2	0.51
3	0.66
4	0.80
6	0.98
7	1.15
8	1.36
9	1.18
10	1.42
11	1.60
12	1.81
13	2.05
14	2.00
15	2.18
16	2.38
17	2.62
18	3.20
19	2.70
20	2.88
21	3.09
22	3.90
25	3.33
50	5.70
60	8.00

The use level designation expires on January 31, 2012 unless extended by Ecology, and is subject to the conditions specified below.

**Ecology's Conditions of Use:**

V2B1<sup>®</sup> Stormwater Treatment System units shall be designed, installed, and maintained to comply with these conditions:

1. V2B1<sup>®</sup> Stormwater Treatment System units must be designed, assembled, installed, operated, and maintained in accordance with Environment 21's applicable manuals and documents and the Ecology Decision.
2. V2B1<sup>®</sup> Stormwater Treatment System units are approved for pre-treatment at the hydraulic loading rate listed above at the 15-minute water quality design flow rate (as specified in Ecology's most recent Stormwater Manual), as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model. Note that if Single event methods are used to estimate runoff flow rates, Figures 9.6a and 9.6b of the 2005 Stormwater Management Manual for Western Washington should be used to adjust the peak single event flowrate for calculation purposes. This is done by dividing the peak 10 minute flow rate predicted by the single event method by the ratio indicated in Figure 9.6a for on-line designs, or Figure 9.6b for offline designs. The 6-month, 24-hour rainfall amount for the project site must be known to identify the appropriate ratio. The adjusted flowrate is then used to determine the Model of the V2B1<sup>®</sup> Treatment system to be used. Note: This method is not applicable for Eastern Washington.
3. Environment 21 commits to submitting a QAPP for TRC review and Ecology approval by January 31, 2010 that meets the TAPE requirements for attaining a GULD for pre-treatment for the V2B1<sup>®</sup> unit. Additional QAPPs must be reviewed and approved by the TRC and Ecology for each field site in Washington State. The sites chosen (maximum of five) should be reflective of the product's treatment intent.
4. Local jurisdictions must file a "Pilot Level Technologies Notice of Intent" form with the Department of Ecology prior to authorizing V2B1<sup>®</sup> Stormwater Treatment System for a pilot use level application.
5. Environment 21 shall complete all required testing and submit a TER for TRC and Ecology review by January 31, 2012.
- 6~ Environment 21 may request Ecology to grant deadline or expiration date extensions, upon showing cause for such extensions.
7. Discharges from the V2B1<sup>®</sup> Stormwater Treatment System units shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: *Environment 21 Enterprises, Inc.*

Applicant's Address: *8713 Read Road, PO Box 55  
East Pembroke, NY 14056-0055*

**Application Documents:**

- NJCAT Technology Verification, V2B1<sup>®</sup> Stormwater Treatment System, Environment 21, LLC, March 2009
- Performance Assessment of Underground Stormwater Treatment Devices by University of Minnesota, St. Anthony Falls Laboratory, July 2007.

**Applicant's Use Level Request:**

- Pilot use level designation as a pre- treatment device in accordance with Ecology's 2005 Western Washington Stormwater Manual.

**Applicant's Performance Claims:**

- Capability to remove 63.8% of total suspended solids from stormwater runoff from sites with influent concentrations between 100 mg/L and 200 mg/L given a particle size distribution with d<sub>50</sub> of 60 microns. For influent concentrations less than 100 mg/l, the facilities will achieve an effluent quality no greater than 50 mg/l total suspended solids.

**Technical Review Committee's Recommendations:**

The TRC finds that:

- Environment 21 should be given the opportunity to demonstrate, through additional laboratory and field testing, whether the V2B1<sup>®</sup> Stormwater Treatment System filter system can attain Ecology's pre-treatment goals.

**Findings of Fact:**

- Based on laboratory testing at a flowrate of 0.8 cfs (358 gpm), the V2B1<sup>®</sup> Model 4 Stormwater Treatment System had an average total suspended solids removal efficiency of 63.8% with influent concentration of 100 to 320 mg/l and a range of flows from 50% to 125% of the design flow rate.
- Percent removal of TSS at the design flow rate (0.8 cfs) averaged 56.8%.
- The test was begun with an initial loading for the units of 50% full.
- The influent suspended solids had a D<sub>50</sub> of 60 microns and an overall range from 850 microns to less than 8 microns. The percent removed was based on the increase in weight in the V2B1<sup>®</sup> units following completion of the flow test.
- The V2B1<sup>®</sup> units were laboratory tested at flow rates of 25%, 50%, 75%, 100%, and 125% of the design flow.
- The Particle distribution was not measured for either captured particles or the effluent.

**Other V2B1<sup>®</sup> Stormwater Treatment System Related Issues to be Addressed By the Company:**

1. The submitted field test did not satisfy Ecology's requirements, so it is unknown whether the V2B1<sup>®</sup> Stormwater Treatment System can reliably attain 50% removal of the finer particles comprising TSS found on local highways, parking lots, and other high-use areas at the design operating rate in accordance with the Ecology TAPE protocols. Environment 21 should test a variety of operating rates to establish

conservative design rates. Pollutant loading capacities should also be determined to better predict maintenance cycles.

2. The system should be tested under normal operating conditions, such that the settling basin is partially filled with pollutants. Results obtained for "clean" systems may not be representative of typical performance.
3. Calculation of treatment efficiency shall be in accordance with Appendix A of the January 2008 Revision of the *Guidance for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (TAPE)*.
4. A discussion of treatment efficiency (percent removed) as flow rates change shall be included in the Technical Evaluation Report.
5. Field testing should be conducted at sites that are indicative of the treatment goals.
6. Testing should be conducted to obtain information about maintenance requirements in order to come up with a maintenance cycle.
7. Loading tests should be conducted on the units to determine maximum treatment life of the system.

**Technology Description:** Download at [www.ENV21.com](http://www.ENV21.com)

**Contact Information:**

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*dino@env21.com*

Applicant website: [www.ENV21.com](http://www.ENV21.com)

Ecology web link: <http://www.ecy.wa.gov/programs/wg/stormwater/newtech/index.html>

Ecology: Foroozan Labib Water Quality Program (360) 407-6439 [flab461@ecy.wa.gov](mailto:flab461@ecy.wa.gov)

## V2B1 OK-110 Gradation Removal Efficiency

V2B1 Model Number	M1 Diameter (in)	M2 Diameter (in)	Minimum Depth Below Invert (in)	Treatment Rate (CFS)	Maximum Inlet Pipe Diameter(in)
2	48	48	42	1.54	12
3	48	60	42	1.97	16
4	60	60	66	2.40	21
6	72	60	54	2.93	24
7	72	72	54	3.46	24
8	84	72	54	4.08	30
9	84	60	54	3.55	30
10	96	60	54	4.27	36
11	96	72	54	4.80	36
12	96	84	54	5.42	36
13	96	96	60	6.14	36
14	120	60	60	6.00	42
15	120	72	60	6.53	42
16	120	84	60	7.15	42
17	120	96	60	7.87	42
18	120	120	66	9.60	42
19	144	60	60	8.11	48
20	144	72	60	8.64	48
21	144	84	66	9.26	48
22	144	120	66	11.71	48
25	144	96	66	9.98	48
50	192	120	72	17.09	72
60	240	120	72	24.00	80

**Please note:** Above models are based on standard product, custom designs may be provided for Cast-In-Place applications or alternative precast sizes. System Design allows for flows higher than Treatment Rate (WQF) to be bypassed.