Novembre 28th, 2018

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Ref: ECOFLO® Biofilter – ST/STB model series
Renewal of TL3 general approval

On July 2002, Premier Tech Aqua sought and received Provisional Approval, GMP #118, from the Commonwealth of Virginia's Department of Health for the ECOFLO® ST-650 and STB-650 onsite wastewater treatment system. This Provisional Approval includes a monitoring program designed to gather performance data in order to verify that ECOFLO® technology meets the standards set by the Virginia Department of Health (VDH).

In 2008, Premier Tech Aqua obtained, after duly completing the approved monitoring program and as per Sewage Advisory Committee recommendation, TL3 general approval for the ECOFLO® Biofilter GMP #118. Approval was initially granted for the only ECOFLO® Biofilter model, the ST/STB-650 designed to accommodate up to 600 gpd, available on the market. But along the year additional models were developed. These other models were approved by VDH and listed under the same approval. The table 1 below presents the different ECOFLO® Biofilter of the ST/STB model series certified and listed under ANSI/NSF Standard 40. An important thing to know is that for all the models approved and listed below, all wastewater distribution components (tipping bucket/distribution plates), aeration/ventilation, treated effluent collection, filtering media composition and height, and hydraulic loading rate were the same and still remain unchanged. Technical data sheets are presented in Appendix VIII.

Table 1

ST/STB units	500	570	650	730	750
Rated capacity (gpd)	**420**	**530**	**600**	**675**	**695**
Filtering media surface (sq.ft.)	49	61	70	77	81
Hydraulic loading rate (gpd/sq.ft.)	8.6				
Filtering media height (in.)	31.5				
Containment					
Fiberglass	X		X		X
Polyethylene		X	X	X	
Concrete	X		X		
Type of effluent discharge					
Open (O)/Perforated bottom (P)*	O	P	O/P	P	O
Close bottom Gravity		X	X	X	
Close bottom Pump		X	X	X	

* Fiberglass unit are Open bottom only, Polyethylene are perforated bottom

The objective of this document is to demonstrate that the testing that was then performed complies with the current protocol detailed in GMP 2016-03. The detailed Sampling Protocol for Field Testing, Sampling and Evaluation of Premier Tech ECOFLO® Sewage Treatment System, approved in its revised version in July 2003 by Virginia Department of Health, is presented in Appendix I. In this protocol the details of the monitoring campaign organization (verification organization, testing organization, laboratory, etc.), site selection procedure, time line for the completion of the program, system installation and sampling ports, sampling procedure, standards, complementary field information, status reporting and final reporting are detailed.

Final report for the field performance demonstration is presented in Appendix II. The final report was done by Dr. Albert Rubin from North Carolina State University. Dr. Rubin ensure the general coordination and the supervision of field works (Verification Organization) for the entire duration of the program. Dr. Rubin was back then, professor and extension specialist at the NC State University. Dr. Rubin, was also responsible of providing training to Delmarva (ECOFLO® distributor) and the Independent field technician (Testing Organization) on use and installation of sampling equipment and sampling procedure.

In addition to Dr. Rubin, the realization of this protocol implied the participation of several parties:

Premier Tech Environment: ECOFLO®: Manufacturer

- Premier Tech, manufacturer of the technology to be tested, provided the specialized staff necessary to train all parties involved in the realization of the Sampling Protocol on the different process unique to the ECOFLO® Biofilter.

Delmarva Septic Solutions, Inc.: Virginia ECOFLO® Distributor

- Delmarva was Premier Tech's exclusive product distributor in Virginia. They provided the required sampling equipment, coordinated and oversaw the installation of those equipment under the supervision of Dr. Rubin and the assent of the Virginia Department of Health.

Commonwealth of Virginia Department of Health (Dr. Don Alexander and Mr. Anish Jantrania)

- VDH provided input on the development of final sampling protocol and counseled Delmarva on selection of sites for sampling.

BKA Environmental: Independent Field Technician (Testing Organization) Trained by Dr. Rubin and Premier Tech Environment

- Mr Bruce King: he has a degree in physics and chemistry, and at the was NSF certified inspector through VOWRA and later obtained his state operator licence (VA OSSP licence)

Virginia Certified Laboratory:

- Mid-Atlantic Laboratories, and
- Air, Water and Soil Laboratory

While the ECOFLO® field performance monitoring program was performed by third party organizations, we have submitted for review and evaluation the presented report to Mr. Mike Kraun, professional engineer licensed to practice in Virginia, to certify that in his professional opinion the treatment unit can

be expected to consistently produce "end-of-pipe" effluent meeting TL-3. The written certification is provided in Appendix III.

Before getting into the detailed of the information requested per GMP 2016-03, the table 2 below summarises the main differences between the monitoring protocol agreed upon in 2003 and the one described in GMP 2016-03.

Table 2

Protocol requirements	2003 Protocol	GMP 2016-03

Sampling period and frequency	• Testing period 18 consecutive months
	• ECOFLO® effluent and Fecal Coliforms: monthly
	• Septic tank effluent
	  ○ BOD_5: monthly
	  ○ TSS: quarterly
	  ○ Fecals: 6 months
	• Other parameters: 6 months
		Quarterly over a 12-months period (consecutive)

Number of sites	24	20
Sites selection	• 6 sites for each of the 4 soil Type • Permanent homes	• No requirements relative to soil type • Permanent homes • Minimum occupancy of 2 people
Point of sampling (treatment train)	1. Septic tank effluent 2. ECOFLO® effluent 3. 1 ft in the soil directly underneath the application area of treated effluent 4. 1 ft below and 10 ft away in the soil underneath the application area of treated effluent	1. Septic tank effluent 2. Treatment system effluent
Type of sampling	Grab samples: 1. Septic tank effluent 2. All Fecal Coliforms samples 3. All samples for the different form of Nitrogen Grab and some 24-hour flow composite samples: 1. ECOFLO® effluent	Grab or composite samples could be performed

Protocol requirements	2003 Protocol	GMP 2016-03
Main parameters monitored	BOD_5, TSS, Fecal Coliforms, Nitrate, TKN, wastewater flow (event counter)	Essentially BOD_5 and TSS, mean to determine water usage or flow
Performance requirement	< 30 mg/L for BOD_5 and TSS < 10 CFU/100 mL (geomean) and < 200 CFU/100 mL (single sample) at 1 ft directly underneath the application area of treated effluent	< 10 mg/L for BOD_5 and TSS
Targeted performance	< 10 mg/L for BOD_5 and TSS < 10 CFU/100 mL (geomean) and < 200 CFU/100 mL (single sample) at 1 ft directly underneath the application area of treated effluent	W/O
Analysis method	BOD_5 SM 5210B TSS SM 2540D Fecal SM 9221C TKN SM 4500NorgC Nitrate SM 4500NO3D Standard Methods for the Examination of Water & Wastewater, 18th Edition	

Basically, monitoring protocol followed by Premier Tech exceeds the minimum testing requirements of GMP 2016-03.

1. Description of sites selected and typical installation – and sites selection

The study was initiated in October 2003 and was completed in December 2006. A total of 21 systems were initially enrolled in the study. One was eliminated because of very low and unrepresentative flow. Eighteen (18) systems were installed in Type 1 (very sandy), 2, 3 soils and 2 systems in Type 4 (clayey). Systems selected for inclusion in the study were selected based upon: soil type, requirement for compressed footprint system, homeowner agreement to participate, and requirement that the system was treating typical domestic wastewater. Approval was finally granted based on the results of the 20 remaining sites. Because of very good performance stability and quality of data no additional sampling was required. Selected sites are presented in table 3.

Table 3

No	Sites	Address	Design Q	ECOFLO® unit	Soil type
1	**Humphrey**	327 Mary Ball Road, White Stone, VA 22578	450 gpd 3 bedrooms	ST-650	II
2	**Beatley**	150 Landing Drive, Kilmarnock, VA 22482	600 gpd 4 bedrooms	ST-650	I
3	**Pittman**	309 Flowering Fields, White Stone, VA 22578	600 gpd 4 bedrooms	ST-650	II
4	**Smith E**	423 Rosa Brann Road, Sandy Point, VA 22577	150 gpd 1 bedroom	ST-650	III
5	**Campbell****	730 Parrish Lane, Montross, VA 225220	450 gpd 3 bedrooms	ST-650	III
6	**Bethel/Parsonage**	42 Hudgins Avenue, Lively, VA 22507	600 gpd 4 bedrooms	ST-650	I
7	**McCarthy/Taylor**	3371 Windmill Point Road, White Stone, VA 22578	450 gpd 3 bedrooms	ST-650	II
8	**Benefield**	3541 Windmill Point Road, White Stone, VA 22578	600 gpd 4 bedrooms	ST-650	II
9	**Stephens/Ford/Nuss**	White Stone, VA	450 gpd 3 bedrooms	ST-650	II
10	**Goodrich**	19490 Brandon Road, Spring Cove, VA 23881	450 gpd 3 bedrooms	ST-650	III
11	**Whittaker**	1993 Mila Road, Heathsville, VA 22473	300 gpd 2 bedrooms	ST-650	II
12	**Pride of VA #A***	3121 Little Bay Road, Ocran, White Stone, VA 22578	1125 gpd	2X ST-650	III
13	**Pride of VA #B***	3121 Little Bay Road, Ocran, White Stone, VA 22578			
14	**Nicolato**	1501 Gum Bridge Road, Virginia Beach, VA 23457	600 gpd 4 bedrooms	ST-650	III
15	**Stevens**	P.O Box 623, Atlantic, VA 23303 (Chinconteague, VA)	600 gpd 2 x 2 bedrooms	ST-650	I
16	**Hale**	3694 Willow Street, Chincoteague, VA 23410	600 gpd 4 bedrooms	ST-650	I
17	**Reed**	7174 Bunting Road, Chincoteague, VA 23336	300 gpd 2 bedrooms	ST-650	I
18	**Palmer**	7759 Eastside Road, Chincoteague, VA 23336	300 gpd 2 bedrooms	ST-650	I
19	**Thompson**	6032 Hare Road, Richmond, VA 23231	450 gpd 3 bedrooms	STB-650	III
20	**Garcia**	9135 Whitestone Ct, Culpeper, VA 22701	600 gpd 4 bedrooms	STB-650	IV
21	**Loomis**	2029 Buckhill Road, Mt Jackson, VA 22842	600 gpd 4 bedrooms	STB-650	IV

* Worker camp application

** Site discarded

Despite the sites Pride of VA #A and #B were commercial application, these sites were kept in the monitoring program because wastewater source is typically domestic wastewater and following discussion

installation, not only in term of treatment performance but also in term of efficiency of wastewater distribution between the 2 units, its impact on overall individual units performance.

Typical installations are presented in the approved protocol enclosed in Appendix I.

2. Geographic locations of systems tested

Figure 1 presents a map of geographic locations of systems tested.

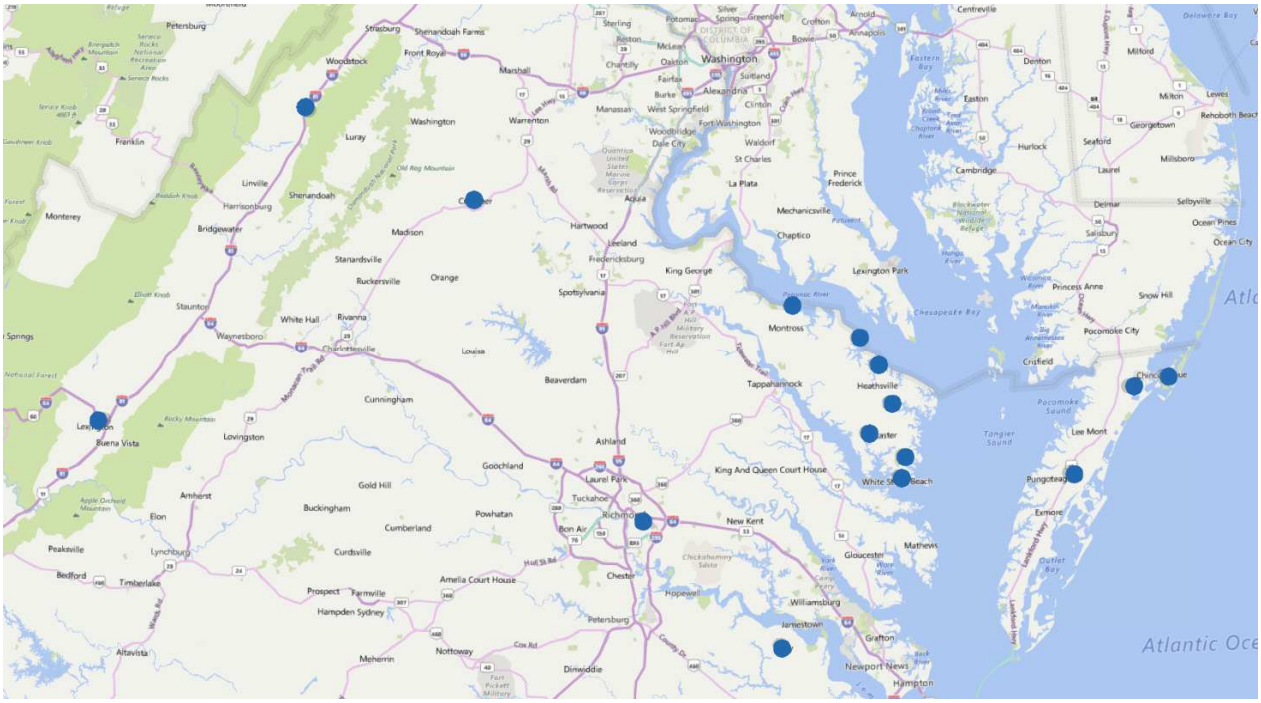


Figure 1

3. O&M

Up to 2008, all ECOFLO® Biofilter were sold with an 8 years maintenance contract included into the purchase price of the unit. Maintenance was performed annually for the seven years following the purchase and installation of the system. Annual maintenance was provided by a Premier Tech duly trained, qualitied and authorized representative.

Annual maintenance includes a visual inspection of the shell, all internal components to ensure the system is functioning properly and raking of the peat-based filtering media. Maintenance visit record is given to the property owner after each inspection. ECOFLO® Biofilter O&M manual is provided in Appendix IV with a Virginia-licenced P.E. certification that the O&M Manual accurately reflects the service and maintenance requirements of the product.

In addition to the maintenance of ECOFLO® Biofilter, effluent filter need also to be inspected annually and clean as needed and when applicable pumping station shall also be pumped and clean as needed.

Table 4 summarises maintenance activities performed, for each site, during the duration of the monitoring program. One to two regular annual maintenance were performed on selected sites during the monitoring campaign. Maintenance records enclosed in Appendix V demonstrate that systems were operating normally, and no additional O&M, special actions nor corrective actions were required during the course of the monitoring program.

Table 4

No	Sites	Installation date	Sampling period	Maintenance performed
1	**Humphrey**	July 12th, 2003	From Oct 29th, 2003 to March 22nd, 2005	May 17th, 2004
2	**Beatley**	Aug 17th, 2002	From Oct 29th, 2003 to April 28th, 2005	May 17th, 2004
3	**Pittman**	July 1st, 2003	From Nov 12th, 2003 to April 12th, 2005	May 17th, 2004
4	**Smith E**	July 11th, 2003	From Nov 20th, 2003 to April 26th, 2005	Dec 23rd, 2004
5	**Campbell****	Discarded		
6	**Bethel/Parsonage**	Feb 26th, 2004	From April 20th, 2004 to Oct 25th, 2005	Feb 7th, 2005
7	**McCarthy/Taylor**	March 2nd, 2004	From May 12th, 2004 to Oct 20th, 2005	Oct 20th, 2005
8	**Benefield**	Oct 15th, 2002	From May 27th, 2004 to Jan 24th, 2006	Dec 2nd, 2004 Oct 27th, 2005
9	**Stephens/Ford/Nuss**		From July 15th, 2004 to Nov 17th, 2005	
10	**Goodrich**	Dec 4th, 2003	From Sept 15th, 2004 to Feb 14th, 2006	Dec 14th, 2004 Dec 21st, 2005
11	**Whittaker**	Oct 15th, 2002	From Sept 21th, 2004 to Feb 26th, 2006	Dec 12th, 2004 Oct 25th, 2005
12	**Pride of VA #A***	Sept 12th, 2003	From Feb 2nd, 2005 to June 20th, 2006	Oct 26th, 2005
13	**Pride of VA #B***			Oct 26th, 2005
14	**Nicolato**	Jan 31st, 2005	From May 25th, 2005 to Oct 25th, 2006	March 22nd, 2006
15	**Stevens**		From June 8th, 2005 to Nov 11th, 2006	
16	**Hale**	Jan 22nd, 2003	From June 9th, 2005 to Nov 15th, 2006	Jan 27th, 2005 Dec 14th, 2005
17	**Reed**	Aug 24th, 2005	From June 14th, 2005 to Nov 16th, 2006	None during monitoring program
18	**Palmer**	June 21st, 2004	From June 7th, 2005 to Nov 14th, 2006	Feb 16th, 2005 May 9th, 2006
19	**Thompson**	May 4th, 2005	From Nov 2nd, 2005 to March 22nd, 2007	Sept 27th, 2006
20	**Garcia**	July 28th, 2005	From Jan 31st, 2006 to July 25th, 2007	Sept 28th, 2006
21	**Loomis**	July 1st, 2004	From Sept 14th, 2006 to Feb 2nd, 2008	Oct 12th, 2006

The regular annual maintenance was generally performed at least 2 to 4 weeks prior to a sampling event in other to minimize potential impact of maintenance activities on sampling results. When performed on

the same day of a sampling event, it was performed after completion of sampling procedure to not interfere with sampling. Looking at the results, it is noticeable that maintenance activities, while essential to ensure proper operation and performance of the system, are not significantly impacting system performance during the monitoring program. This could be easily explained by the fact that the ECOFLO® Biofilter act as a physical barrier and doesn't rely on any electromechanical components for the treatment which contributes to its robustness and reliability, and makes it inherently fail-safe, i.e. prevent partially treated or untreated effluent from short-circuiting the treatment process and reaching the absorption area. But this is not the only unique feature, the absorbent organic media filters present certain characteristics which makes it suitable for intermittent use (robust) and resistant to hydraulic and organic overloading.

4. Chain of custody

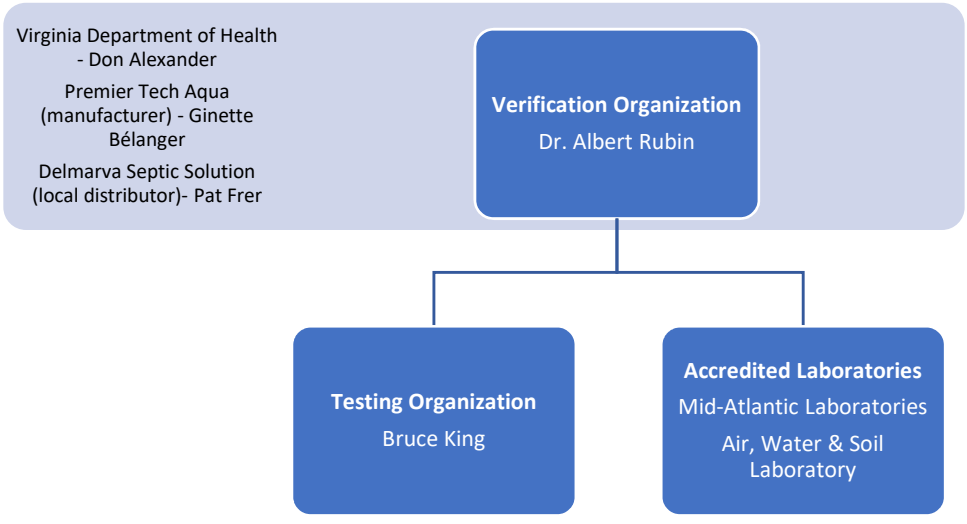
To assure the sample integrity between the sampling site and the laboratory, all laboratory sample containers were properly identified, positioned upright and tightly closed. They were provided by the lab and placed in a cooler with sufficient ice cubes or ice packs to ensure good preservation of samples. The cooler was sealed with a signed tape (signed by field technician) around the lid. At arrival to laboratory, the seal integrity was verified and the laboratory employee who receives the cooler signed the reception form and specified if the seal was intact or broken. Once the laboratory representative has signed the reception form, the current laboratory QC program was applied to all the samples.

As part of the chain of custody, a sampling follow-up report was provided. The purpose of this field report was to report conditions that were prevailing at time of sampling and also control, and report samples taken, and laboratory analysis requested for each sampling event.

5. List of key participants

As explained above, key participants are presented in figure 2.

Figure 2



6. Description of sampling and analytical method

Sampling methods are presented in Appendix C, D and E of the revised Sampling Protocol for Field Testing, Sampling and Evaluation of Premier Tech ECOFLO® Sewage Treatment System – July 2003 attached in Appendix I of this document.

A Sampling follow up report was also provided and is included in Appendix F of the revised Sampling Protocol for Field Testing, Sampling and Evaluation of Premier Tech ECOFLO® Sewage Treatment System – July 2003 attached in Appendix I of this document. The purpose of this field report was to report conditions that were prevailing at time of sampling and also control, and report samples taken, and laboratory analysis requested for each sampling event (part of the chain of custody).

Standard methods as listed in the approved protocol were used for all testing and analysis.

- BOD_5 SM 5210B
- TSS SM 2540D
- Fecal SM 9221C
- TKN SM 4500NorgC
- Nitrate SM 4500NO3D

Holding times were maintained properly between sampling events and testing. Sample preservation was in accordance with standard field protocol (cooling for microbiological tests and preservation for others). All samples were transported from the site to the laboratory in a cooler with adequate ice to maintain proper temperatures through the transportation process.

7. Testing data

All data collected during the monitoring program are presented in the table in Appendix VI. Quarterly data retained for the statistical analysis, for each site, are highlighted in dark yellow in the table of results. This detailed spreadsheet report includes influent and effluent sampling results for all parameters sampled during the monitoring campaign and general observations.

BOD_5: Data summarizing the treatment efficiency for the ECOFLO® treatment systems are presented in table 5 below. These data summarize the treatment achieved in all systems enrolled in the study. The mean and median values from the testing and the standard deviation of the measure are provided. Inclusion of the mean and median value is important when examining a long-time series test. The median values have been included in reports by Tyler and Converse (1997), Hoover and Groves (2005), and these median values may be more representative of performance than the mean.

Table 5

	Influent	Effluent	% Removal
Mean BOD_5 ± StDev	186 ± 113	8 ± 8	96
Median BOD_5	170	6	96

The mean and median BOD_5 values observed in all samples from the ECOFLO® treatment unit were 8 mg/l and 6 mg/l respectively. Examination of all data indicates the maximum BOD_5 values observed through all

testing were encountered at the Pride of Virginia facility. This facility is a somewhat atypical residential facility with migrant labor providing services to a seafood processing operation.

TSS: The ECOFLO® Biofilter affords excellent removal of TSS. Influent concentrations to the filter surface were measured as a mean of 34 mg/l. Effluent generated from the peat treatment unit contained a TSS mean value of 6 mg/l and a median value of 4 mg/l. These low TSS values facilitate long term successful operation of the land-based component of the system.

Statistical analysis of quarterly data retained for each site, using calculation sheet provided by VDH, is presented in Appendix VII. This spreadsheet includes sample results only for BOD_5 and TSS ECOFLO® Biofilter influent and BOD_5 and TSS ECOFLO® Biofilter effluent.

The pass/fail criteria for TL3 effluent is as follows:

Effluent Parameter	Upper 99% Confidence Interval of Log-transformed data converted back to native units
BOD_5 (mg/L)	Less than or equal to 10 mg/l
TSS (mg/L)	Less than or equal to 10 mg/l

The spreadsheet provided by the department allow to log transformed each of the four quarterly samples taken for each site and then averaged these before applying the statistical manipulation. A one tailed t-test is applied with n-1 degrees of freedom, where "n" is equal to the number of test sites/units. The method detection level is reported for the required parameter analyses. For the purposes of data manipulation, values below the method detection level are treated as one-half of the method detection level. Data are then converted back to “native” units.

Table 6 presents a summary of general performance based on quarterly results retained for each site and the value of the upper 99% confidence interval of log-transformed data converted back to native units.

Table 6

	BOD_5 (mg/L)*	TSS (mg/L)
ECOFLO® Biofilter Influent Mean	178 ± 104	35 ± 25
ECOFLO® Biofilter Effluent Mean	6.8 ± 5.5	5.7 ± 7.9
Upper 99% T Conf Int (Native values)	6.7	4.8
Targeted performance – TL3	< 10	< 10

* BOD_5 for effluent

While TSS average influent concentrations seam to be on the low side, BOD_5 ones are representative of typical domestic wastewater. BOD_5 and TSS removal exceeds the required performance level established for TL3 approval.

8. Rational for exclusion of data

All data collected during the monitoring program are presented in the table in Appendix VI. Only one selected site was eliminated from the monitoring program and it was because of very low and

unrepresentative flow. However, detailed data collected for that site, Campbell, are included into the data presentation table of Appendix VI.

No data were rejected. Since complete influent and effluent sampling were schedule quarterly, four of those consecutive datasets, for each site, were used to perform the statistical analysis.

9. Overall evaluation and assessment of the study data

Dr. Rubin final report in Appendix I covers this aspect in detail.

Marie-Christine Belanger
Product Director

Appendix I

Approved Sampling Protocol for Field Testing, Sampling and Evaluation of Premier Tech ECOFLO® Sewage Treatment System - July 2003

Revised Version

Sampling Protocol for Field Testing, Sampling and Evaluation Premier Tech ECOFLO® Sewage Treatment System

Proposed to:

Virginia Office of Environmental Health Services
Division of Sewage and Water Services
Richmond, Virginia 23219

By:

Premier Tech Environment
1, avenue Premier
Riviere-du-Loup (Quebec) Canada
G5R 4C9

and

Delmarva Septic Solutions, Inc.
1281 Goodluck Rd
P.O. Box 456
Kilmarnock, VA 22482

Revised July 21st, 2003
(Drafted: 28th April 2003)

Revised Version

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Appendix C Sampling Method for the Influent of the Ecoflo Peat Biofilter - Grab sample

Appendix D Sampling Method for the Effluent of the Ecoflo Peat Biofilter
- Controled grab St-650
- Grab STB-650

Appendix E Sampling Method for the Lysimeter

Appendix F Field Report

Revised Version

Introduction

On July 2002, Premier Tech Environment sought and received Provisional Approval, GMP #118, from the Commonwealth of Virginia's Department of Health for the ECOFLO® ST-650 and STB-650 onsite wastewater treatment system. This Provisional Approval includes a monitoring program designed to gather performance data in order to verify that ECOFLO® technology meets the standards set by the Virginia Department of Health.

The main objective of the present document is to describe in detail the sampling protocol for the field testing, sampling and evaluation proposed by Premier Tech Environment to the Virginia Department of Health.

1 Organization

The realization of this protocol implies the participation of several parties:

- Premier Tech Environment: Ecoflo: Manufacturer
  Contact: Marie-Christine Bélanger, Director Technological Development

  Premier Tech, manufacturer of the technology to be testes, will provide the specialized staff necessary to train all parties involved in the realization of the Sampling Protocol on the different process unique to the Ecoflo Biofilter.

- Delmarva Septic Solutions, Inc.: VA Ecoflo Distributor
  Contact: Patrick Frere, Vice-President

  Delmarva, Premier Tech's exclusive product distributor in Virginia, will provide the required sampling equipment, coordinate and oversee the installation of those equipment under the supervision of Dr. Rubin and the assent of the Virginia Department of Health.

- Dr. Robert Rubin: NC State University
  General coordination and supervision of field work

  Dr. Rubin, professor and extension specialist at the NC State University, will provide overall coordination and supervision. Dr. Rubin, will also be responsible of providing training to Delmarva and the Independent field technician on use and installation of sampling equipment and sampling procedure.

- Commonwealth of Virginia Department of Health
  Contact: Dr. Don Alexander

  VDH will provide input on the development of final sampling protocol and will counsel Delmarva on selection of sites for sampling.

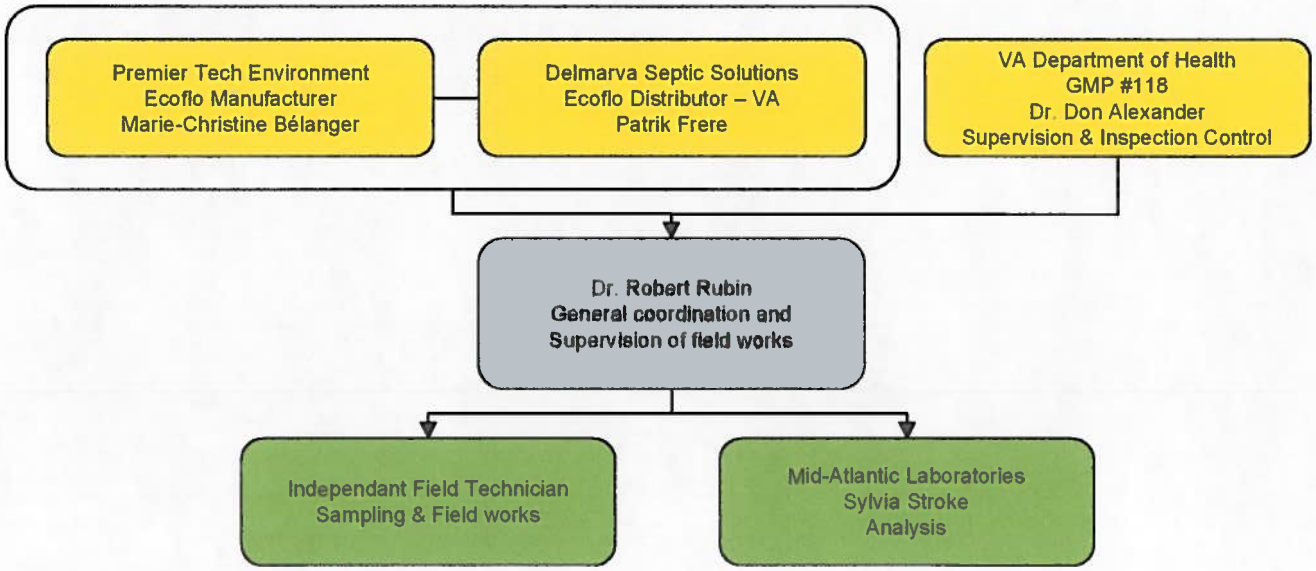
- Independent Field Technician Trained by Dr. Rubin and Premier Tech Environment

- Mid-Atlantic Laboratories: VA Certified Laboratory
  Contact: Sylvia Stroke

The figure below presents the general organizational structure for the realization of the protocol.

Virginia Monitoring Protocol

Organizational Structure



2 Site selection

2.1 Selection Procedure

Premier Tech Environment's sampling campaign will be carried out with sites selectively chosen using the Soil Type and Installation Scenario Criteria explained hereafter. For each of the four (4) types of soil, six (6) sites will be chosen. In the first year, emphasis will be placed on attempting to monitor at least two (2) sites for each type of soil for a total of 8 sites.

Through previous meetings with the Virginia Department of Health; Premier Tech Environment has been made aware of the difficulty in finding sampling sites in Types I and IV soils. Despite this challenge, Premier Tech Environment and Delmarva Septic Solutions, Inc. will attempt to locate the required number of Types I and IV sampling sites within the boundaries of the Commonwealth of Virginia. However, if this proves to become impossible within the proposed sampling campaign time schedule; then Premier Tech Environment would like to have the flexibility to locate such sampling sites in neighboring states. Those sites chosen would be located in either North Carolina or Pennsylvania. Specifically, eligible Type I sites would be located in the Coastal Plain areas of North Carolina with soil characteristics similar to Type I soils in Virginia. Moreover, eligible Type IV sites would be located in the Plateau or Mountain regions of Pennsylvania with soil characteristics similar to Type IV soils in Virginia.

2.2 Different Installation Scenarios Utilizing Ecoflo® Biofilters

When possible, Premier Tech Environment would like to perform sampling on sites that utilize different installation scenarios. Due to the proprietary design of the ST-650 and the STB-650 Biofilters; as well as the PSA-240 and the PSA-240L Pumping Stations, Premier Tech Environment's products can be installed in several different combinations or configurations. Premier Tech believes that one benefit of the required sampling campaign would be to demonstrate that the Ecoflo's treatment capabilities are uniform; despite the soil condition and installation configuration at a particular site. Following are the different types of Installation Scenarios that would be possible to sample in Virginia.

1. Septic tank gravity flowing to PSA-240; and pumped to ST-650; overtop absorption bed.

2. Septic tank gravity flowing to ST-650; over-top absorption bed.

3. Septic tank gravity flowing to STB-650; pumped by PSA-240L to trenches.

4. Septic tank gravity flowing to STB-650; pumped by PSA-240L to absorption bed.

5. Septic tank gravity flowing to STB-650; gravity flowing to trenches.

6. Septic tank gravity flowing to STB-650; gravity flowing to absorption bed.

2.3 Home Owner Authorization

Premier Tech Environment's authorized Virginia Distributor, Delmarva Septic, will coordinate required authorization from homeowners at selected sampling sites. Delmarva Septic will receive written authorization from homeowners to allow necessary access to sampling sites for VDH, Delmarva Septic, Premier Tech Environment, and other parties involved in the monitoring program.

3 Time-Table

The 24 systems to be tested will be installed progressively over the next two years. This will enable the require sampling protocol to be completed by January, 2007. Following is a detailed breakdown and time schedule for installation of systems to be sampled:

- Before 1st October 2003 : 8 systems (the last sampling of this cohort will be in April 2005).
- Before 1st October 2004 : 10 more systems (the last sampling will be in April 2006).
- Before 1st July 2005 : 6 more systems (the last sampling will be in January 2007).

A list of sampling sites is presented below. Among this list, eight sites have been primarily selected for the first year of the monitoring protocol. To date, no Type IV sites have been located.

MONITORING PROTOCOL – YEAR 1				
No.	**Name**	**Address**	**Permit No.**	**Soil type**
1	Nathaniel Sawyer	City of Suffolk	58--03-0093	Type I
2	Bethel Meth. Parsonage	Lancaster County		Type I
3	Kenneth Beatley	Lancaster County	151-02-323	Type II
4	Joseph Humphreys	Lancaster County	151-03-009	Type II
5	Steven Pittman	Lancaster County		Type II
6	Willie Goodrich, III	Prince George County	03-174-0047	Type III
7	Essie Smith	Westmoreland County	196-03-012	Type III
8	Shirley Campbell	Westmoreland County	116-02-154	Type III

MONITORING PROTOCOL – YEAR 2				
No.	Name	Address	Permit No.	Soil type
9 to 18	To be determined			

MONITORING PROTOCOL – YEAR 3				
No.	Name	Address	Permit No.	Soil type
19 to 24	To be determined			

We propose to update and complete this list every six months.

4 Installations

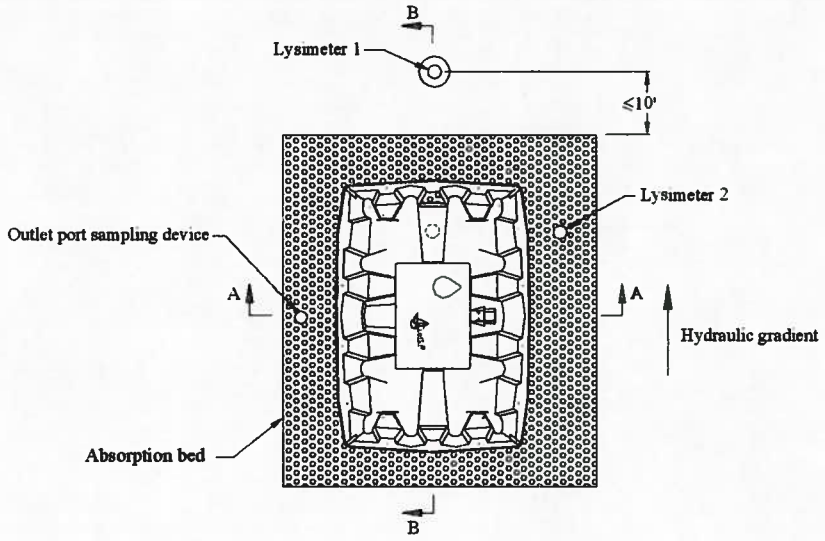
Per Virginia Department of Health GMP #118, Ecoflo® Provisional Approval, the type of sampling devices and their placement on the selected site shall be as follows:

> *"Each system selected by the Division and Premier Tech Environment for sampling shall have two suction lysimeters installed for the purpose of sampling effluent. At least one of these lysimeters shall be located beneath the footprint of the Ecoflo® Biofilter system. One lysimeter may be located beneath an absorption field trench provided it is located within the first ten feet of the trench. Because of the advantages of installing monitoring devices at the time of system installation, as compared with retrofitting of monitoring devices to systems already installed, the Division or Premier Tech Environment may contact a local health department for assistance in the scheduling of installation of systems selected for sampling. The suction lysimeters must be designed and installed to preclude the entrance of untreated effluent and the final design and installation process shall be agreed between VDH and Premier Tech Environment within six months of installing the first system and prior to installation of any of the lysimeters."*

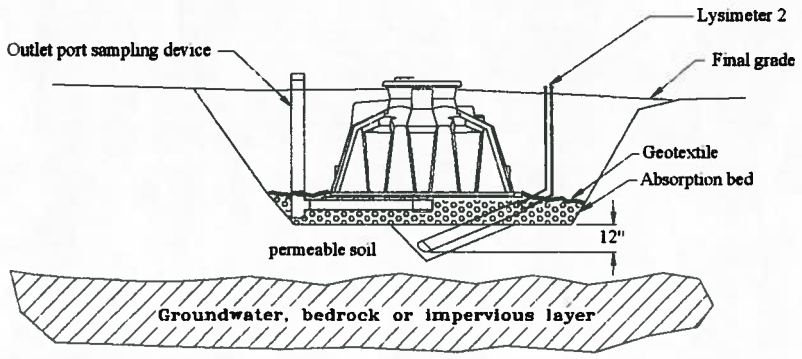
> *"Effluent samples shall be collected from at a depth of 12" below the bottom of the absorption area. For the purposes of evaluating test results, samples will be collected to assess performance at a point below an estimated 12" of unsaturated soil." [Note: As initially permitted, systems installed in soils with a percolation rate of less than 50 minutes per inch, and in accordance with this protocol, will not always be installed at least 12 inches above a seasonally saturated horizon.]*

Figure 1 a and b shows typical installations with all monitoring devices. The proposed testing will be accomplished using High Flow Porous Ceramic Cup Suction Lysimeter model 1920F1-B01M3. The 1920F1 Pressure/Vaccum Soil Water Sampler consists of a PVC body with a ceramic cup epoxy bonded to one end. The porous ceramic cup has an outside diameter of 1.9" and is 2.0" in length. The B01M3 ceramic cup consists in a 1 bar high flow porous ceramic cup. Nylon compression fittings are threaded into the top cap and are used to attach lengths of polyethylene tubing for surface access. The specified lysimeters are manufactured by Soil Moisture Inc. A description of the products is presented in the Appendix A.

Figure 1a – Typical Ecoflo installation with monitoring components
Bottomless system (ST-650)

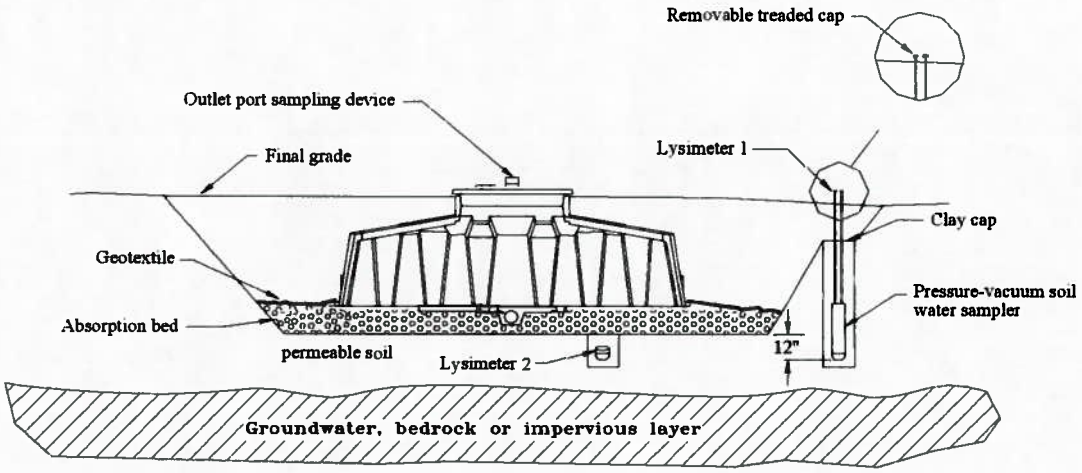


Plan view



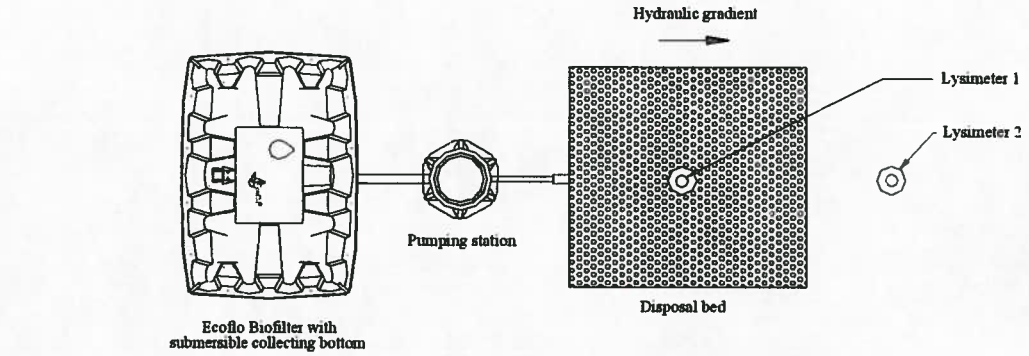
Section A-A

Figure 1a – Typical Ecoflo installation with monitoring components
Bottomless system (ST-650)

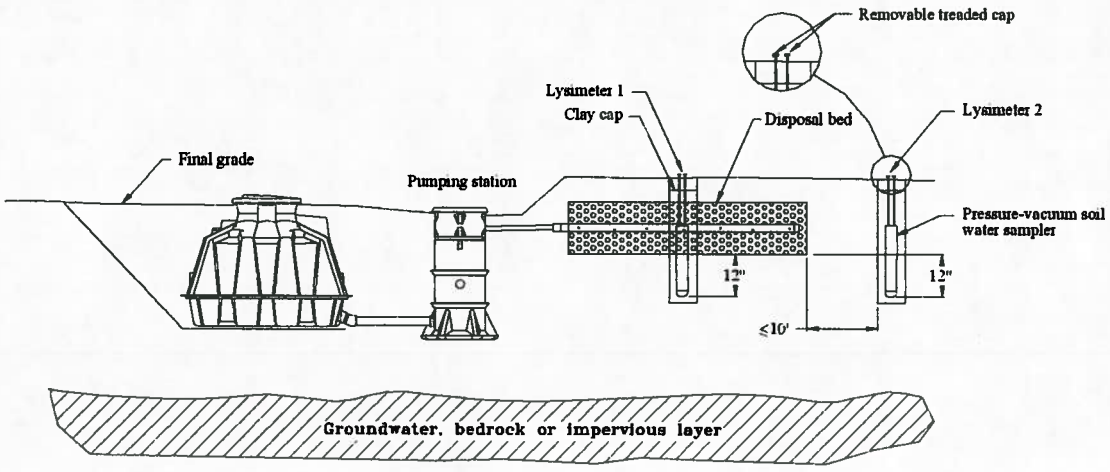


Section B-B

Figure 1b – Typical Ecoflo installation with monitoring components
System with bottom (STB-650)



Plan view



Section view

Suction lysimeters are installed at the desired depth and left in the soil, allowing periodic sampling to occur with a minimal disturbance of the soil. The samplers consist of a porous ceramic cup and a sample collection tube. A vacuum pump is used to create a vaucum in the sampler, which allows water from the soil to be drawn through the ceramic cup and into the sampler. The water sample can then be extracted from the collection tube and taken to the laboratory for analysis.

Lysimeter installation procedure is presented in Appendix B.

5 Sampling

5.1 Samples

After the filter bed has been used for a period of at least four weeks, the sampling program for each site will be initiated. Each system will be sampled monthly for 18 consecutive months.

Four samples could be taken :

- Influent of the peat filter (correspond to the septic tank effluent).
- Treated effluent of the peat bed (interface of peat bed bottom and absorption area).
- Treated effluent at a depth of 12" below the bottom of the absorption field (below the footprint of the Ecoflo).
- Treated effluent at a depth of 12" below the bottom of absorption trenches, if utilized; and within the first 10 feet of the trench.
- Groundwater at a depth of 12" below the bottom of the absorption field, at a site outside the designated absorption area. (To analyze for background contamination)

5.2 Monitoring Program

The table below indicates the analysis to be performed on each site and the frequency for each sample to be collected (in parenthesis: total number of samples by site at the end of the sampling program).

Revised Version

PARAMETER	INFLUENT OF THE PEAT BED (SEPTIC TANK EFFLUENT) *Ecoflo inlet pipe*	EFFLUENT OF THE PEAT BED *Sampling device underneath the Ecolfo unit*	UNSATURATED SOIL BENEATH THE ECOFLO FOOT PRINT *12 in. below the infiltrative surface*	UNSATURATED SOIL *12 in. below the infiltrative surface and 10 feet beside the Ecoflo foot print*
BOD_5	1/month (18)	1/month (18)	-	-
TSS	1/3 months (6)	1/month (18)	-	-
Fecal coliforms	1/6 month (3)	1/month (18)	1/month (18)	1/month (18)
Chloride[1]	-	1	1	1/month (18)
Nitrate	Hach	1/6 months (3)[2]	1/6 months (3)[2]	1/6 months (3)[2]
TKN	1/6 months (3)[4]	1/6 months (3)[2]	1/6 months (3)[2]	1/6 months (3)[2]

Note:

1. The tap water of the site will be analyzed for the chloride one time at the beginning of the sampling program.
2. This analysis will be performed only if the volume of the sample collected is sufficient.
3. Qualitative field method (HACH®test strips for nitrate Cat. 27454-25 or equivalent).
4. Nitrate and TKN of septic tank effluent will be analyze only if others effluents could be performed.

All the samples will be delivered to an Independent Laboratory duly certified by the Virginia Department of Health. The only exception will be the nitrate from the septic tank effluent, which will be completed in the field. Generally, a septic tank effluent does not have any nitrate, but this will be verified by a field qualitative method (HACH® test strips for nitrate Cat. 27454-25 or equivalent).

In addition, in order to measure the potential for background contamination, it is proposed to install some sites with an additional lysimeter upstream from the Ecoflo unit. Sampling frequency to measure the potential background contamination will be determined in function of the first sample results.

Analysis method for each parameter are presented in the table below.

PARAMETERS	ANALYSIS METHOD
BOD_5	SM 5210B
TSS	SM 2540D
TKN	SM 4500NorgC
Fecal Coliform	SM 9221C
Nitrate	SM 4500NO3 D
Chloride	SM 4500C1 C

Note: SM = Standard Methods for the Examination of Water & Wastewater, 18th Edition

Finally, all sites will be equipped with an event counter that will count the number of tipping bucket events of the Ecoflo distribution system. This will allow the analysis to include evaluation of the total volume of wastewater that is treated by the Ecoflo unit.

5.3 Sampling Method for the Influent of the Ecoflo Peat Biofilter

The method is detailed at Appendix C.

5.4 Sampling Method for the Effluent of the Ecoflo Peat Biofilter

The method is detailed at Appendix D.

5.5 Sampling Method for the Lysimeter

The method is detailed at Appendix E.

6 Standards

According to the Ecoflo's provisional approval, the table below describes the sampling standards for each site to be tested.

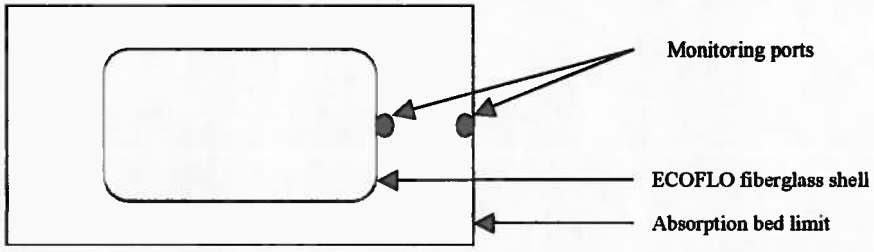
PARAMETERS	INFLUENT	EFFLUENT (PEAT MEDIA)	EFFLUENT (12" BELOW THE BOTTOM OF THE ABSORPTION FIELD)
TSS	-	-	< 30 mg/L [1]
BOD_5	>100 and <300 (for any individual samples) > 150 mg/L (average)	-	< 30 mg/L [1]
Fecal Coliforms	-	-	< 10 CFU/100 mL (geometric mean) <200 CFU/100 mL (single sample)
Nitrate	No standard is established. But results may be used to demonstrate the performance.		
Chlorides	Increase compared to tap water.		

1. The TSS and BOD_5 will not be analyzed from the samples collecting by the lysimeters but at the effluent of the peat bed. It is assumed that if the 30 mg/L standard is achieved at the effluent of the peat bed, it is certainly less than that everywhere in the absorption bed.

7 Surfacing and Ponding Follow-Up

Two monitoring ports will be installed at each site. One just at the limit of the Ecoflo fiberglass shell and the other at limit of the absorption bed. At each sampling, the ponding depths will be monitored at these two ports.

The figure below shows an overhead view plan with the location of the two monitoring ports.



8 Communication during the monitoring program

Each year in March (March 2004, 2005, 2006 and 2007), a report presenting all the results of the monitoring program will be presented to the Virginia Health Department by the third party and Premier Tech Environment. Within eight weeks following the receipt of the report, a meeting will be planned in order to discuss the results and, if appropriate, to agree about the remaining activities of the monitoring program.

However, we propose that a meeting be held within the first 3 months of the campaign; towards the beginning of monitoring activities. This will allow for an initial status/results report to be presented to the advisory committee.

9 Result Analysis

When samples do not meet treatment standards specified in section 5, since systems are sampled every month, no additional samples will be taken.

References:

Commonwealth of Virginia, State Board of Health; Sewage Handling and Disposal Regulations. July 1, 2000; Virginia Department of Health; Richmond, VA.

World Book Encyclopedia Volume 20; "Virginia – the Land – Land Regions." Raymond C. Dingledine, Jr. and John E. Leard; World Book Inc.; Chicago, Illinois; 1985.

Baker, James C. "Part VI – Soils of Virginia". Virginia Cooperative Extension, Virginia Polytechnic Institute and State University; Blacksburg, Virginia.

Source: Titus, B.D. and Mahendrappa, M.K.; Lysimeter System Designs Used in Soil Research: A Review – Information Report N-X-301. Canadian Forest Service; Natural Resources Canada.

Revised Version

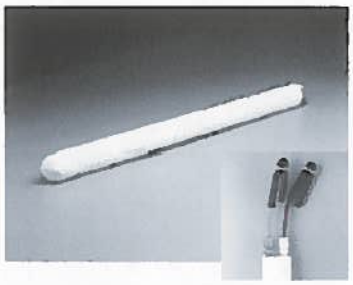
APPENDIX A

Lysimeters Technical Information

Revised Version

1920F1 SOIL WATER SAMPLER

The 1920F1 Pressure/Vacuum Soil Water Sampler consists of a PVC body with a ceramic cup epoxy bonded to one end. The porous ceramic cup has an outside diameter of 1.9" (4.8 cm) and is 2.0" (5.0 cm) in length. The 1920F1 is normally supplied with a 2 bar (200 kPa) ceramic cup, but 0.5 bar (50 kPa) and 1 bar (100 kPa) cups are also available. Nylon compression fittings are threaded into the top cap and are used to attach lengths of Polyethylene tubing to a remote sampling station. A pressure-vacuum hand pump, Model 2006G2, is used for evacuating the sampler and recovering the sample. For situations where specific cleaning operatings are required, the 1920F1K1, which has a removable ceramic cup, is available.

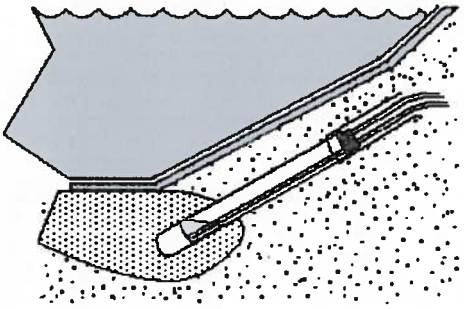


1920F1, Soil Water Sampler

Please specify ceramic cup:

-B0.5M2	1/2 BAR POROUS CERAMIC CUP
-B02M2	2 BAR POROUS CERAMIC CUP
-B01M3	1 BAR HIGH FLOW POROUS CERAMIC CUP

Product No.	Description	Weight
1920F1L06-B#M#	P/V SOIL WATER SAMPLER, 6" (15 cm) length	0.17 kgs
1920F1L12-B#M#	P/V SOIL WATER SAMPLER, 12" (30 cm) length	0.26 kgs
1920F1L24-B#M#	P/V SOIL WATER SAMPLER, 24" (61 cm) length	0.11 kgs
1920F1L36-B#M#	P/V SOIL WATER SAMPLER, 36" (91 cm) length	0.68 kgs



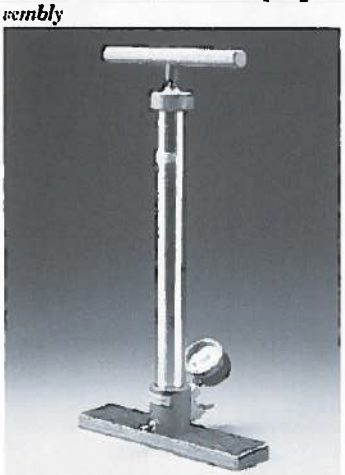
1920 installed

1902K3, Centralizer with Adapter Kit

1902K4, Stainless Steel Coupling Assembly

Accessories

Product No.	Description	Weight
0920W050	BENTONITE, 50 lb. bag	22.68 kgs
	Used to seal soil in installation of Soil Water Samplers.	
0930W050	SILICA FLOUR, 50 lb. bag	22.68 kgs
	Used to provide good hydraulic connection between soil and porous ceramic cup when installing Soil Water Samplers.	
1902K3	CENTRALIZER WITH ADAPTER KIT	.45 kgs
	Includes two 1902K4 and one Centralizer	
1902K4	1.5" STAINLESS STEEL COUPLING ASSY	0.07 kgs
	Used to couple 1920 to 1.5" PVC conduit. No adhesive required.	
1903L100	BLACK POLYETHYLENE TUBING, 100 ft. length	1.30 kgs
1903L1000	BLACK POLYETHYLENE TUBING, 1000 ft. length	7.60 kgs
1901L100	GREEN POLYETHYLENE TUBING, 100 ft. length	1.30 kgs
1901L1000	GREEN POLYETHYLENE TUBING, 1000 ft. length	7.60 kgs
1920F1K1	UNASSEMBLED 1920F1L#	??? lbs
2006G2	PRESSURE/VACUUM HAND PUMP	2.49 kgs
	Provides vacuums up to 0.9 bar (90 kPa) and pressures up to 75 psi (500 kPa). Includes pump, vacuum dial gauge, fittings, & inline filter.	
2031G2	CLAMPING RING, one dozen	0.03 kgs
MRT003	NEOPRENE TUBING, 3/16" I.D. X 1/8" wall, per foot	0.01 kgs



2006G2, Pressure/Vacuum Hand Pump

SOILMOISTURE EQUIPMENT CORP.
801 S. Kellogg Ave., Goleta, CA 93117 USA
Phone: (805) 964-3525 - Fax (805) 683-2189 - email: sales@soilmoisture.com - www.soilmoisture.com

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APPENDIX B

Lysimeter Installation Procedure

LYSIMETER INSTALLATION PROCEDURE

Gather tools:

Auger, shovel, tape measures, channel locks, knife or scissors for cutting neoprene tubing and polyethylene tubing, pencils, paper, clipboard, straight edge for drawing, eraser, camera

Supplies:

Lisymeter, green polyethylene tubing, black polyethylene tubing, neoprene tubing, clamping rings, valve boxes

At each site, two lysimeters will be installed in the footprint of the soil absorption area (as presented in Figure 1 a and b). Some selected sites will be equipped with a third lysimeter installed upslope from the soil absorption system to measure background on the lot.

1. Let the homeowner know that we are on site and what we are doing.

2. Locate the soil absorption area.

3. Determine depth of the soil absorption system by probing.

4. Assemble the lysimeter tubing, connections and tubing clamping rings.

5. Drill a 2 ½ inch access hole to the desired depth (according to figure 1 a and b). For very shallow depths a hand auger can be used.

6. Make a slurry of silica flour from about 2 cups of silica flour. Make the slurry pourable, so it will go into the auger hole.

7. Connect the vacuum/pressure line (black polyethelene) to the longer outlet tube. Connect the return flow line (PTFE, stainless steel or polyethelene) to the shorter lysimeter outlet. Stainless steel unions can be used for this purpose. After testing the lysimeter system for leaks, lower the lysimeter into the hole, and push it all the way to the bottom of the access hole, into the slurry to ensure good contact with the soil.

   It is often convenient to place a 1-1/4" OD (1" ID) plastic pipe over the vacuum/pressure and return flow lines in order to push the lysimeter to the desired depth. This pipe can be left in place to protect the tubing. With the right adapter, the plastic pipe can be screwed onto the threaded top of the lysimeter.

8. Place some soil (about ½ or so) from the bottom of the auger hole onto the silica flour slurry (to keep the bentonite/sand mix from mixing with the silica flour).

9. Fill the annular space with a bentonite /sand mixture.

10. Dig around the top of the installation to make an excavation for the valve box.

11. Place the valve box flush or nearly flush with the final grade, and finish grading to clean up around the valve box.

12. Triangulate into the valve boxes so that they may be located in the future in case landscaping or other activities cover them.

13. Record the locations of the valve boxes, the depth of the installation, and the date of the installation. Include the address of the home.

14. Take photographs of the site.

15. Send a copy of the map to the laboratory or field works people so they can locate the lysimeters.

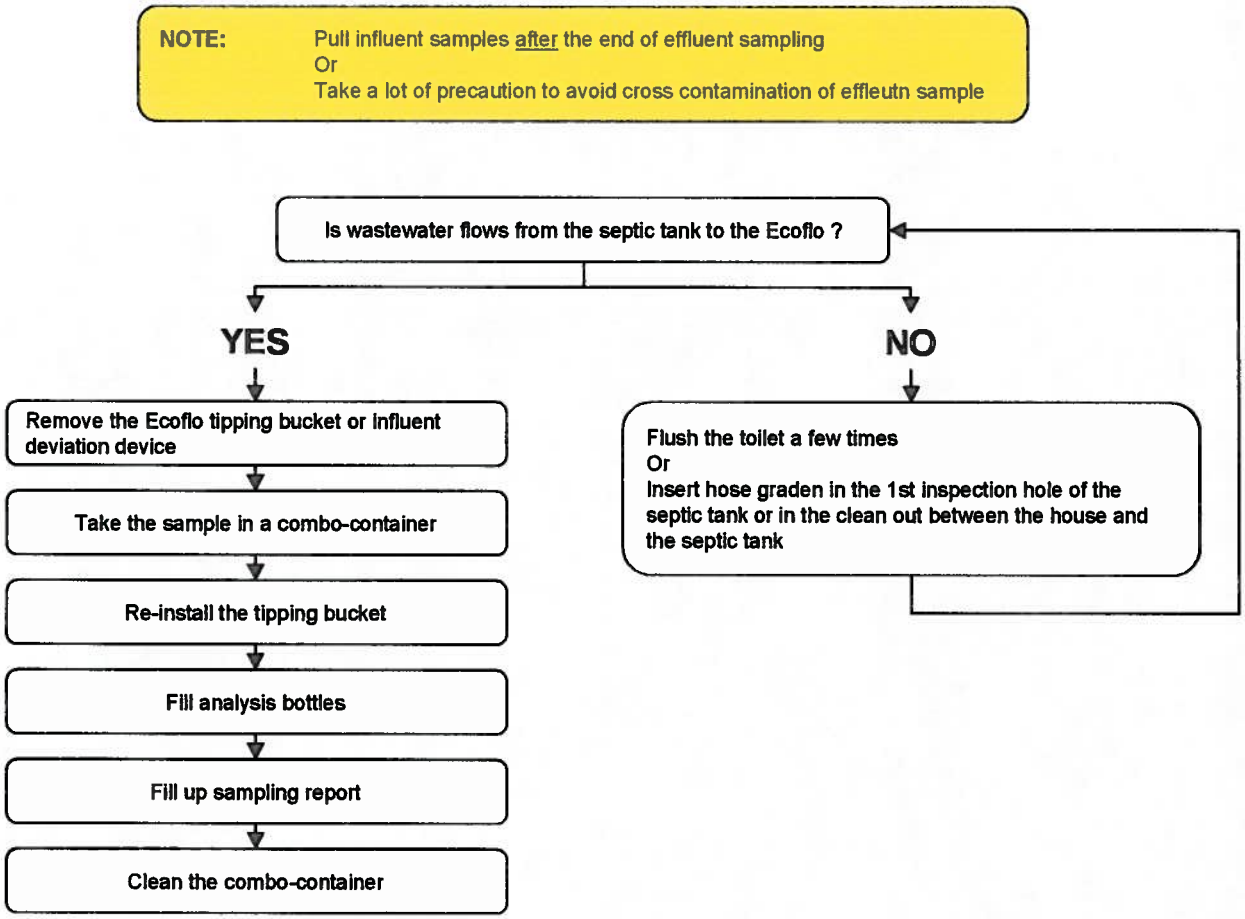
Revised Version

APPENDIX C

Sampling Method for the Influent of the Ecoflo Peat Biofilter

- Grab sample

INFLUENT GRAB SAMPLE PROCEDURE



If applicable, you could also do influent sampling in the pumping station between septic tank and ECOFLO.

Or

Start manually the pump of the pump station and take sample in the ECOFLO (do not take the early beginning of the flow, but wait few seconds, and start to fill the combo-container).

Note: It is always easier to use wide mouth containers or bottles.

Revised Version

APPENDIX D

Sampling Method for the Effluent of the Ecoflo Peat Biofilter

- Controled grab St-650
- Grab STB-650

CONTROLLED GRAB SAMPLING PROCEDURE
WITH PORTABLE SAMPLER G-2
ECOFLO ST-650 WITH DEPORTED SAMPLING PORT

Materials

- Clean ECOFLO SAMPLER G-2.
- Clean ECOFLO sampling flask.
- ECOFLO sampling flask holding pole.
- Liquid waste container.
- Combo-container cleaned by a laboratory or equivalent.
- Cooler.
- Frozen ice-pack or ice cubes.
- Laboratory samples bottles for analysis (ex: TSS, BOD_5, Nitrate, TKN, fecal coliforms, chloride, etc.).
- Timer.
- Graduated container for the flow measurement.
- Clean water (for the cleaning of the sampler after the sampling).
- Flashlight.

Methods

1. Start to fill out a new "Sampling follow-up report".
2. Note general condition of the site and any abnormalities.
3. Open ECOFLO access lid. Check if all water distribution devices function properly.
4. Open the cap of the outlet port-sampling device.
5. Measure the effluent flow output with the flow measurement container. Write down the result on the report.
6. If the output reads less than 150 mL/min proceed to #8. If not proceed to #7.

   Note : If the flow is under 60 mL/min and the discharge from the septic tank in the ECOFLO is zero or negligible, it is possible to add flow to the system by feeding artificially the septic tank. In this manner, sampling will take a reasonable time. You could also choose to rescheduled the sampling an other day.

   For feeding artificially the septic tank:

   a) Flush toilet a few times (for toilet of approximately 13 L/flush : flush the toilet 6 times with a waiting period of 4 min. between each flush);

      or

   b) Insert a garden hose into the first inspection hole of the septic tank or into the clean out between septic tank and house. Important: the flow rate at the hose output must not exceed 4 L per minute. Write down what time the forced water supply started and stopped.

7. If the flow output is above 151 mL/min, the sampling must be cancel and rescheduled for an other day. This decision is necessary because sampling in that condition will be not representative of the mean performance of the system.
8. Set the sampling flask in appropriate position by using the holding pole (figure 1).
9. Connect the tube coming from the sampling flask to the ECOFLO-SAMPLER G-2.
10. Connect the battery. Put the sampler switch at ON
11. Rinse the tubing of the sampling system (tubing of sampling flask and sampler). The volumes of rinsing water pumped must be selected considering the diameter and the length of the tubing.

    Volume of RINSING WATER = total length tubing (cm) x 0,181 cm^2 □ (1 cm^3 = 1mL)

    Ex. : - tubing of sampling flask = 380 cm
    - tubing of sampler = 120 cm
    - total length of tubing = (380+120) = 500 cm

- Conclusion : 500 cm x 0,181 cm^2 = 90 cm^3 or 90 mL is volume of liquid to be discard.

12. Hold the tube coming from the ECOFLO SAMPLER G-2 on the top of the combo-container. Fill it until you have reached a volume sufficient for all the analysis you need.
13. Turn OFF the switch of ECOFLO SAMPLER G-2 and put the end of tube on a clean safety spot (to avoid contamination).

Reminder : Take care to never touch the inside of any container, bottle, etc. with the end of the tube to avoid contamination.

14. Close the Combo-container. Put it in the cooler.
15. Stop the water source if it is still opened (if applicable). See #6.
16. Change gloves if appropriate.
17. To fill the coliforms bottle: open the sterile bottle and turn ON the ECOFLO SAMPLER G-2. Put the end of the tube in right position on the top of the bottle. When you reach the correct level of sample in the bottle, turn the switch OFF. Close the coliforms bottles and shake it. Store immediately in the cooler.

Note : never touch the inside off the coliforms bottle with the tube to avoid contamination.

18. Open one analysis bottle. Shake the Combo-container very well. Fill correctly the bottle. Close the bottle and the container. Shake both bottle and container, and repeat for all analysis bottles. Start to fill with TSS, BOD_5 and finish with bottle with chemical preservative solution (ex.: bottle for Nitrate, TKN, etc.). Put all the samples in the cooler.

Note : never touch the inside of the bottles or the lids and never mix lids.

19. Disconnect the battery.
20. Disconnect the tube coming from the sampling flask.
21. Pull out the sampling flask.
22. Replace carefully the cap on the outlet port-sampling device.

23. Take a grab influent sample of the biofilter's influent if required. See the procedure "Virginia : Grab Sampling of ECOFLO Influent".

Note: **Always take influent after the end of effluent sampling in order to avoid cross-contamination.**

24. Write down all the required information on the sampling report and any relevant observations. Fill in the lab analysis form.
25. Replace ECOFLO lid.
26. Deliver or send samples to the laboratory as quickly as possible and always within the time limit indicated by the lab procedure.

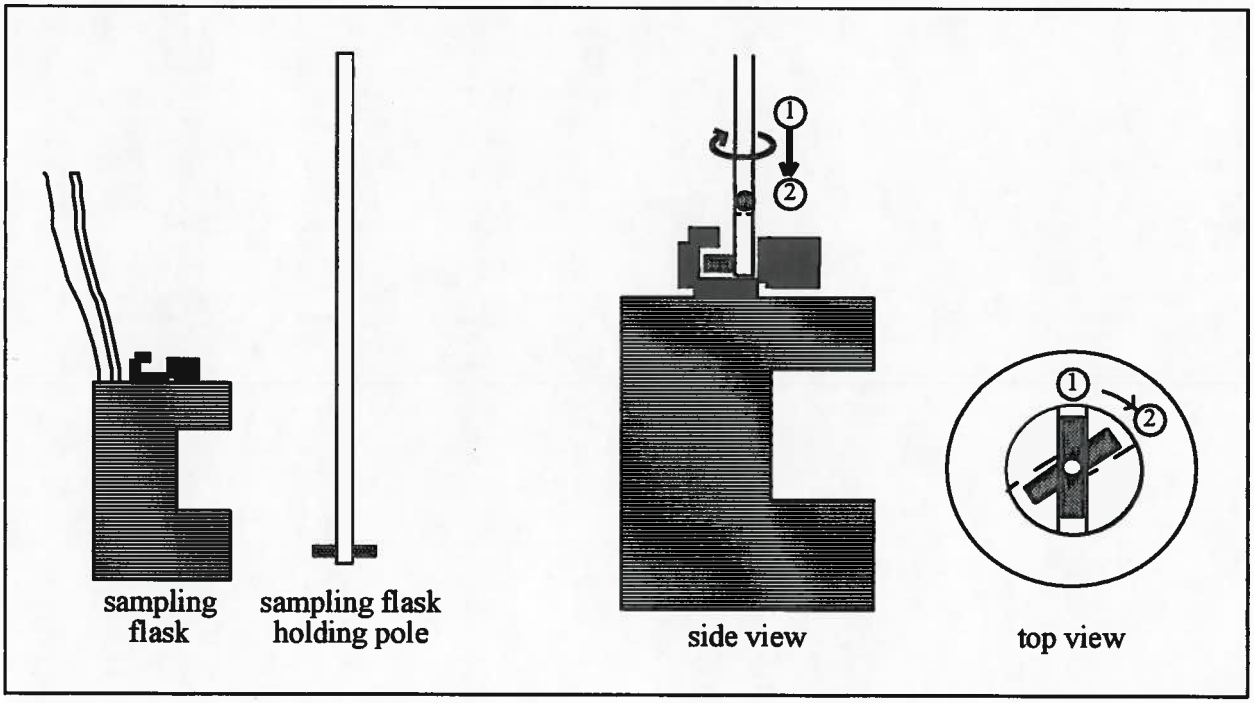
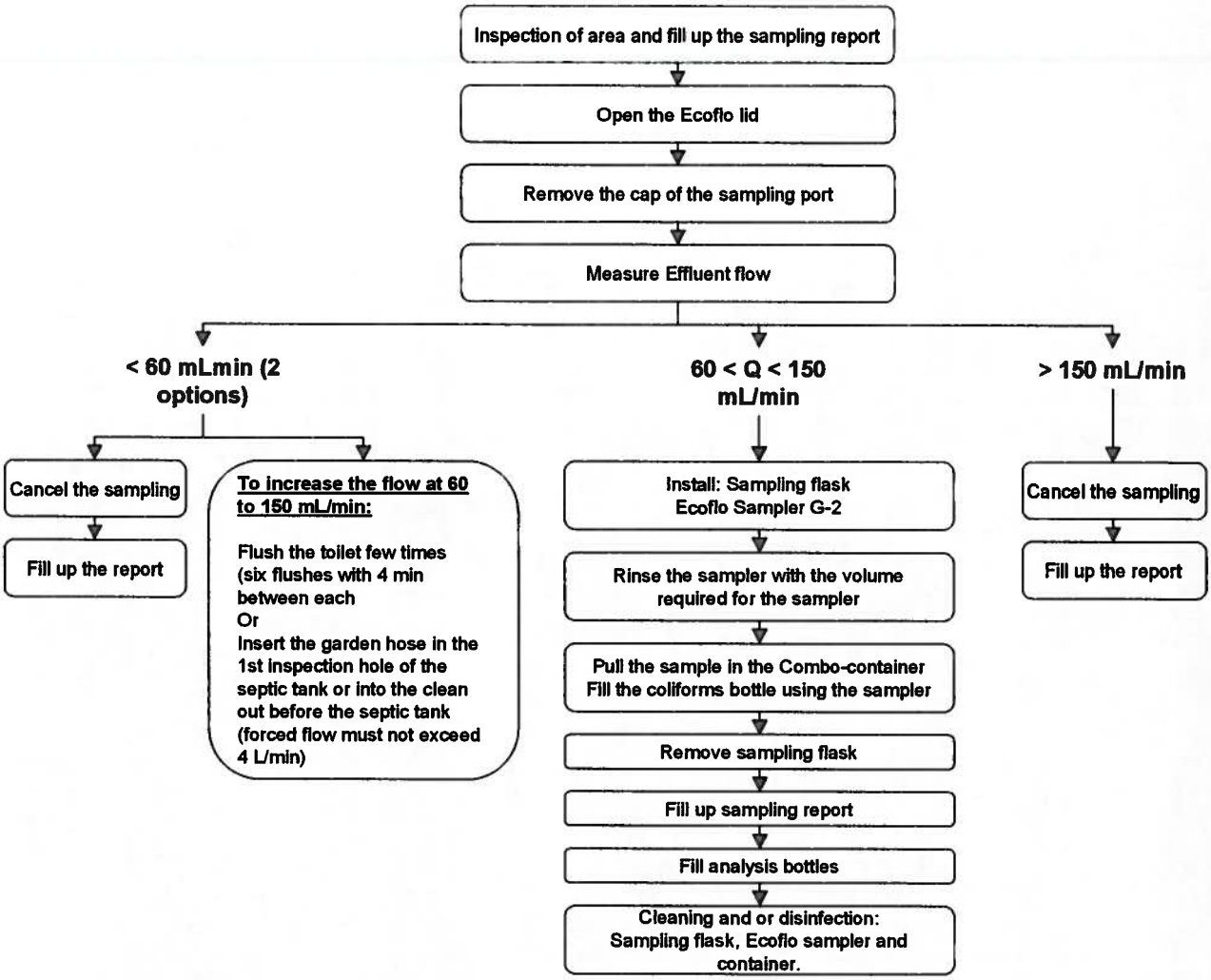


Figure 1. Sampling flask and pole.


Inspection of area and fill up the sampling report
Open the Ecoflo lid
Remove the cap of the sampling port
Measure Effluent flow
< 60 mL/min (2 options)
60 < Q < 150 mL/min
> 150 mL/min
Cancel the sampling
Fill up the report
To increase the flow at 60 to 150 mL/min:
Flush the toilet few times (six flushes with 4 min between each
Or
Insert the garden hose in the 1st inspection hole of the septic tank or into the clean out before the septic tank (forced flow must not exceed 4 L/min)
Install: Sampling flask Ecoflo Sampler G-2
Rinse the sampler with the volume required for the sampler
Pull the sample in the Combo-container Fill the coliforms bottle using the sampler
Remove sampling flask
Fill up sampling report
Fill analysis bottles
Cleaning and or disinfection: Sampling flask, Ecoflo sampler and container.
Cancel the sampling
Fill up the report

GRAB SAMPLING PROCEDURE
WITH PORTABLE SAMPLER G-2
ECOFLO STB-650

Note : This procedure in applicable for STB-650 with a pump station after the filter bed.

Materials

- Clean ECOFLO SAMPLER G-2.
- Special weighed tubing with quick connect.
- Liquid waste container.
- Combo-container cleaned by a laboratory or equivalent.
- Cooler.
- Frozen ice-pack or ice cubes.
- Laboratory samples bottles for analysis (ex.: TSS, BOD_5, Nitrate, TKN, fecal coliforms, chloride, etc.).
- Clean water (for the cleaning of the sampler after the sampling).
- Flashlight.

Methods

1. Fill out a "Sampling follow-up report".
2. Check general condition of area and any abnormalities in pump station and in the Ecoflo.
3. Before opening the access lid of the pump station, clean the area around in order to avoid objects (soil, gravel, tree's leaves, etc.) felt in the water during the opening.
4. Connect the special tubing to the ECOFLO-SAMPLER G-2.
5. Lower the weighed tubing down to 5 inches under the top of the water in the pump station (try to not touch anything in order to avoid solids fall off in the liquid).

   Note : The ending extremity of the tubing should be immerged at about 5 to 6 inches. Usually, the top of the plastic coated lead rolled on the tubing is set to play as an easy to see mark.

6. Put the ECOFLO SAMPLER G-2 at ON only after the extremity of the tubing is immerged. Take care to maintain the tubing immerged at the right depth during all the sampling.

7. Pump about 1 to 2 liters in the liquid waste container.

   Note : Discard the rinsing liquid when you come back to the laboratory or in the pump station but **only at the** end of the sampling.

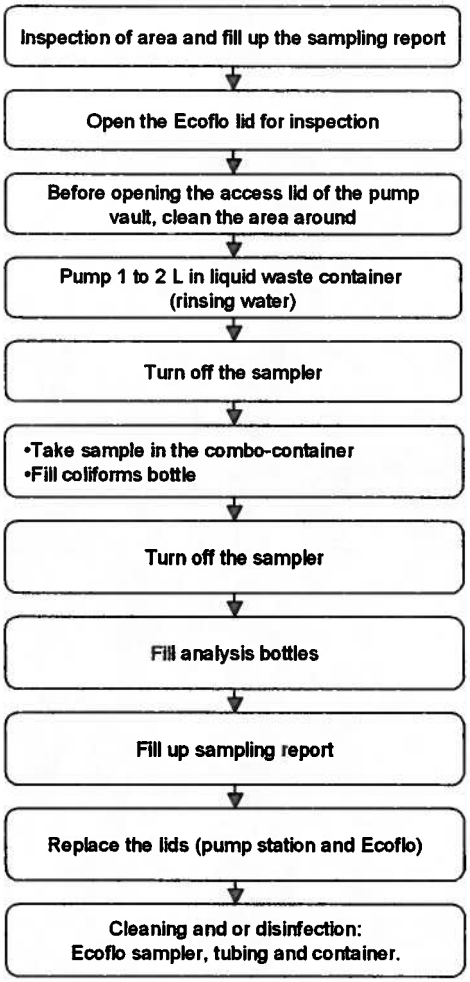
8. Switch the ECOFLO SAMPLER G-2 at OFF.
9. Hold the tube coming from the ECOFLO SAMPLER G-2 on the top of the combo-container. Fill it until you have reached a volume sufficient for all the analysis you need.
10. Turn OFF the switch of ECOFLO SAMPLER G-2 and put the end of tube at a clean safety spot (to avoid contamination).

    Take care to never touch the inside bottles with the tube to avoid contamination.

11. Close the combo-container. Put it in the cooler.
12. Change gloves if appropriate.
13. If you have a bottle for coliforms: Open the sterile bottle. Put the end of the tube in right position on the top of the bottle and turn ON the switch.
14. Stop the ECOFLO SAMPLER G-2 (do not raise the tubing out of the pumping station's water). Close the coliforms bottle and shake it. Put the samples in the cooler filled with frozen ice packs or ice as soon as possible.
15. Shake the Combo-container very well. Fill an analysis bottle. Close the bottle and the container. Shake both bottle and Combo-container, and repeat for all analysis bottles. Start to fill with TSS, BOD5 and finish with bottle with preservative solution (ex.: bottle of TKN, etc.). Put all the samples in the cooler.
16. Raise the tubing out of the water. Pump the tubing remaining liquid in the pump station.
17. Write down all the required information on the "Sampling follow-up report" and any relevant observations. Fill in the lab analysis form.
18. Clean the sampler immediately or as soon as you arrived at the laboratory.
19. Replace lid(s) and make sure that the system is functioning correctly.
20. Deliver or send samples to the laboratory as quickly as possible and within the time limit indicated by the lab procedure.

Notes:

- Before and during the sampling: avoid creating turbulence in the water in pump tank; avoid taking the floating solids in the samples; avoid mix up the decanted or attached solids with the water in the pump station.
- Always use aseptic techniques when handling sampling coliforms.


Inspection of area and fill up the sampling report
Open the Ecoflo lid for inspection
Before opening the access lid of the pump vault, clean the area around
Pump 1 to 2 L in liquid waste container (rinsing water)
Turn off the sampler
•Take sample in the combo-container
•Fill coliforms bottle
Turn off the sampler
Fill analysis bottles
Fill up sampling report
Replace the lids (pump station and Ecoflo)
Cleaning and or disinfection:
Ecoflo sampler, tubing and container.

CLEANING PROCEDURE

ON the site

1. Wipe the exterior of the tubing with a clean paper towel.
2. Then, prepare a clean container, add at least 2 liters of sterile or potable water. Pump all the liquid. Discard it properly.
3. Pump air for one minute.

At the office (lab, etc.)

a) Cleaning sampling flask and ECOFLO® Automatic Effluent sampler.

1. Thoroughly rinse exterior and interior of sampling flask and exterior of tubing with warm-hot water.
2. Join the sampling flask to pumping system of ECOFLO® Automatic Effluent sampler.
3. Connect claws to battery poles. Turn switch to ON (MANUAL position).
4. Remove liquid from system by pumping air.
5. Add warm-hot water in the sampling flask and send in tubing at least 5 minutes (add water as needed and don't recirculate the water).
6. Empty the system by pumping air.
7. Turn switch to AUTOMATIC position.
8. Add warm water three times to the sampling flask until the pump of sampler activates itself (it is a verification step : of the proper sampling flask float operation and if pumping time is long enough to empty sampling flask and tubing).
9. Rinse three times with de-ionized water or fresh drinking water.
10. Empty system of any trace of water by pumping air and gently shaking sampling flask, up side down, to remove any interior water.
11. With a clean hand towel, dry the exterior of sampling flask and tubing.
12. Place cup in a large plastic bag to cover the top and tie with electrical tape.
13. Place tubing extremities in plastic bags and seal them with electrical tape.
14. Register on bags: the word « Cleaned », the date and your name.

b) Cleaning 20 Liters Nalgene Tank or other container

1. Empty the container.
2. Rinse the exterior of container.
3. Rinse the container 1 to 2 times with warm-hot water.
4. Brush interior of the container (use a brush or green scour pad).
5. Rinse three times with warm-hot water.
6. Rinse three times with de-ionized water or fresh drinking water.
7. Drip dry up side down in clean area.
8. Clean the cap: adapt step # 2 to # 7.

Revised Version

APPENDIX E

Sampling Method for the Lysimeter

SUCTION LYSIMETER SAMPLING PROCEDURE

1. Close the valve or clamp on the tubing going to the collection bottle, and open the clamp on the tubing to the overflow bottle.

2. Turn the vacuum pump on, so that the solution in the soil is sucked through the porous part of the lysimeter and collected in the ceramic cup. Leave the pump on for a long enough time to collect an adequate amount of soil solution. The time it takes for sampling depends on the moisture content of the soil and can vary between 30 minutes and 24 hours. If the soil is too dry (if the tension in the soil around the lysimeter is greater than 500 mbar), no soil solution will be collected

3. When enough solution is collected, turn the vacuum pump off, and open the valve or clamp on the tubing to the collection bottle. Now connect a hand-operated pressure pump (a good bicycle pump will do) to the vacuum/pressure line. Apply pressure and the solution sample collects in the collection bottle.

4. When the pump is turned on, or when vacuum is applied, the soil solution should flow directly into the collection bottle. In this case the solution is not stored in the lysimeter.

5. It is recommended to install an overflow bottle between the sample collection bottle and the vacuum pump. This will prevent fluid from accidentally entering the pump.

Revised Version

APPENDIX F

Field Report

VIRGINIA SAMPLING FOLLOW-UP REPORT

Site : _____ **Date :** _____

City : _____ **By :** ( ) Bruce King

Others : _____

TIPPING BUCKET COUNTS

Counts: _____ **Reset: ( ) no ( ) yes: date _____ hour _____**

ECOFLO INFLUENT Grab sampling ( ) yes ( ) no

( ) In the ECOFLO

( ) In the pumping station located between the septic tank and the ECOFLO

( ) Other : _____

ECOFLO EFFLUENT Grab sampling ( ) yes ( ) no

( ) Conventional ECOFLO (ST-650) **Effluent collecting samples :** approx. ___h____min to ___h____min

( ) ECOFLO with submersible bottom (STB-650)

( ) using sampler G-2/sampling flask: **( ) in the central support or ( ) in the outlet port**

( ) using sampler G-2/weighed tubing in the effluent pumping station

( ) other : _____

If measured : flow measurement at the lip outlet of the sampling device : about _____mL/min at ____h ____min

Feed artificially the septic tank : ( ) no

( ) yes : manually start the pumping station

( ) yes : with ____ toilet flushes at an interval of ____ minutes between each flush.

( ) yes : with a tap openned inside the house at a flow of about : ____ Liter(s)/min for a period of _____ minutes.

( ) yes : with garden hose in first inspection hole of the septic tank at a flow of : ____ Liter(s)/min for a period of _____ minutes.

(Reminder : 6 toilet flushes with 4 min between each one or a garden hose in septic tank first hole at less than 4 L/min).

Lysimeter (if water, please note any particularities)

Lysimeter 1: ( ) no water ( ) water: _____

Lysimeter 2: ( ) no water ( ) water: _____

Lysimeter 3: ( ) no water ( ) water: _____

Laboratory and analysis

Laboratory : _____

Influent: ( ) BOD_5 ( ) TSS ( ) Fecal coliforms ( ) Nitrate ( ) TKN Others : _____

Effluent: ( ) BOD_5 ( ) TSS ( ) Fecal coliforms ( ) Chloride ( ) Nitrate ( ) TKN Others : _____

Lysimeter 1: ( ) Fecal coliforms ( ) Chloride ( ) Nitrate ( ) TKN Others : _____

Lysimeter 2: ( ) Fecal coliforms ( ) Chloride ( ) Nitrate ( ) TKN Others : _____

Lysimeter 3: ( ) Fecal coliforms ( ) Chloride ( ) Nitrate ( ) TKN Others : _____

Comments or others observations

Influent HACH strip test result: _____ mg N-NOx /L

Appendix II

FIELD PERFORMANCE ASSESSMENT OF PREMIER TECH ECOFLO® WASTEWATER TREATMENT SYSTEMS IN VIRGINIA - October 2007

FIELD PERFORMANCE ASSESSMENT OF PREMIER TECH ECOFLO® WASTEWATER TREATMENT SYSTEMS IN VIRGINIA

SUBMITTED IN SUPPORT OF GMP 118 REQUIREMENTS

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Project Report
Field Performance Assessment
Premier Tech Peat Based Bio-filter Wastewater Systems

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ABSTRACT

The performance of 21 Premier Tech ECOFLO® Model ST-650 or STB-650 wastewater treatment systems was evaluated at residential facilities installed in Type 1, 2, 3, and 4 soils (sand to clay) in Virginia. The 18 systems installed in Type 1, 2 and 3 soils were each monitored for a period of 18 months. Currently the 2 systems installed in Type 4 soil have been tested for 16 and 8 months respectively and testing is ongoing according to the protocol. One system was eliminated because of very low and unrepresentative flow. Monitoring was performed in accordance with provisions contained in Premier Tech Environment test protocol, 21 July, 2003. The monitoring was staggered indicating the varying time at which a system entered into the testing. Over 5,700 data points comprise the data set for this study.

All systems assessed met the treatment standard imposed by the test protocol (date of study approval). The treatment unit/soil mantle provided wastewater renovation meeting or exceeding the standards imposed in the protocol. The monitored parameters, five (5) day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), total suspended solids (TSS), nitrogen series and Fecal Coliform bacteria levels established in the protocol were consistently achieved at the treatment boundary imposed in the approved test protocols. Those target performance levels listed in the project test protocols were: $CBOD_5$ of 30 at a depth of 12 inches below the infiltrative surface in the test systems and at the discharge from the ECOFLO® ST(B)-650 treatment systems and a Coliform level of less than 10 CFU/100 ml with no Coliform sample exhibiting a count greater than 200 CFU/100 ml at any site at any time.

SUMMARY

The Commonwealth of Virginia, like many neighboring states, is experiencing tremendous growth in both sewered and unsewered areas. All growth necessitates use of approved wastewater treatment facilities and in unsewered areas of the Commonwealth, onsite wastewater systems are required. All onsite options utilized within the border of the Commonwealth must be approved by appropriate agencies in accordance with GMP 118. This testing was developed to comply with provisions contained in this GMP.

The primary objective of this study was to assess field performance of ECOFLO® wastewater treatment units used in conjunction with soil as a receiver for treated wastewater. This field assessment and collection of performance data is necessary to determine whether to classify the ECOFLO®/soil treatment system as "generally approved" throughout the Commonwealth. Treatment standards were established for five day Carbonaceous Biological Oxygen Demand ($CBOD_5$) and Fecal Coliform (Coliform) bacteria at specified compliance boundaries. The researcher also wished to assess phosphorus removal potential of the system.

The study was initiated in October 2003 and was completed in December 2006. A total of 21 systems were initially enrolled in the study. One was eliminated because of very low and unrepresentative flow. Eighteen (18) systems were installed in Type 1 (very sandy), 2, 3 soils and 2 systems in Type 4 (clayey). Wastewater treatment systems were monitored for 18 months (Type 1, 2 and 3 soils) and monitoring is ongoing according to the protocol for the 2 systems installed in Type 4 soil. Systems selected for inclusion in the study were selected based upon: soil type, requirement for compressed footprint system, homeowner agreement to participate, and requirement that the system was treating domestic wastewater.

The study was developed to document concentrations of Carbonaceous Biochemical Oxygen Demand and Fecal Coliform levels at a depth of 12 inches below the infiltrative surface separating the ECOFLO® system from the underlying soil. The performance standard established in the test protocol (Premier Tech Environment, 21 July, 2003) required a Fecal Coliform concentration of less than 10 CFU/100 ml with no sample exceeding 200 CFU/100 ml and a $CBOD_5$ of less than 30 mg/l at this designated performance boundary. Testing was required to monitor nitrate nitrogen at this boundary, but no performance standard was established. In addition, the study coordinator and field supervisor requested measurements of the concentration of Total Kjeldahl Nitrogen (TKN) at this performance boundary. This request follows from

knowledge that TKN (the sum of organic nitrogen and ammonium nitrogen) convert to nitrate in aerobic environments.

Each test system was monitored monthly for required parameters and quarterly for additional parameters. Over 5,700 data points represent the test information collected. Water quality testing was performed by an independent certified laboratory. Sample holding times were assessed closely to assure validity of data. Sample data and sample point locations are provided in the report.

The ECOFLO® treatment system/underlying soil system consistently provided effluent meeting performance standards established in the approved test protocol. The average or mean, median, standard deviation and 90% confidence limit for parameters measured are presented in tables which are included in the body of the report. Test results show the mean $CBOD_5$ in all samples tested at the treatment unit compliance boundary for the ECOFLO® unit was 8 mg/l. Test results show the mean Coliform levels at the 12 inch compliance boundary was 2 CFU/100 ml or less for all samples. Median and 90% confidence values confirm the robustness of the treatment system. At this time the results are complete for Type 1, 2 and 3 soils. For Type 4 soil, interim information is provided and monitoring is ongoing according to the protocol.

1 INTRODUCTION

Properly sited, sized, installed, operated and maintained onsite wastewater treatment facilities are essential for millions of residents in rural and urban fringe areas of Canada, the U.S., Asia, Australia, or any area with water carry plumbing. Onsite wastewater facilities have been utilized effectively for over a century. Onsite wastewater systems were initially developed to provide wastewater treatment systems in unsewered rural areas – especially farmsteads. Today, onsite wastewater systems are utilized in sensitive receiver environments and the level of treatment technology utilized prior to dispersal into the soil and the levels of technology associated with dispersal technology have advanced dramatically in the last 25 years. These advancements have been associated with utilization of onsite wastewater systems in receiver environments that pose some limitation on the ability of natural soil to adequately treat and assimilate the constituents in a wastestream. These advanced treatment and dispersal systems require a higher level of commitment to service than a traditional system. Nonetheless, these advanced systems function well and perform well when specified and developed along with being properly managed comprehensively.

The ECOFLO® wastewater treatment systems are manufactured by Premier Tech Environment in Rivière–du-Loup (Quebec) Canada. The system consists of a down-flow peat filter system, an absorption bed, and an associated soil to serve as a receiver for treated wastewater.

My understanding of the issue involved with the use of the ECOFLO® Peat Filter in conjunction with soil based wastewater treatment and reclamation facilities in Virginia involve the:

1. Appropriate hydraulic loading rate to land
2. Vertical separation requirements between the zone of waste application and watertable or restrictive layer, and
3. The level of treatment associated with the peat filter system.

The proprietary ECOFLO® wastewater treatment units are utilized as alternatives to the non-proprietary sand filter system and other approved proprietary and non-proprietary wastewater treatment devices (home aerobic treatment units or media filters) in the Commonwealth. The sand filter system as a pretreatment unit appeared in onsite wastewater literature in the mid 1970's based on Chowdry's work with sand filters accomplished in the late 1960's through the early 1970's and Hines and Favreau's work with recirculating sand filters in the early 1970's. Review of the monitoring data from operating treatment systems (aeration systems and sand filter systems) and review of

monitoring data from the ECOFLO® peat filter suggest that this proprietary treatment facility performs more reliably that the sand filter system and selected aerobic treatment units. Data on removal of bacteria and removal of organic matter as BOD_5 appear more substantial from these proprietary peat-based units than from the sand filters. Further, the sand filter may be installed as an unmanaged option while the proprietary facilities have associated with the sale, a long term management contract. The review of performance monitoring data from the contract managed proprietary facilities (ECOFLO®) suggests a degree of reliable performance associated with a wide range of input conditions.

Monitoring data from the Massachusetts Test Center, from the Virginia test sites and from facilities in North Carolina suggest managed ECOFLO® treatment systems perform more reliably and achieve higher levels of pollutant removal than those from unmanaged systems. The management system is an essential element for developing long term sustainability in the wastewater management efforts throughout the Commonwealth.

Background

Converse and Tyler (1991) report Coliform levels below soil absorption systems receiving septic tank effluent (STE) at a distance of 1 foot from the infiltrative surface of between 290 and 1140 counts per gram dry soil. Using the conversions provided by Converse and Tyler this Coliform count is equivalent to over 100,000 counts/100 ml at a depth of 1 ft below the zone of waste application for a site receiving septic tank effluent. Penninger and Hoover (1998) report Coliform levels at a maximum Coliform count of 230 counts/ml at a distance of 3 feet from a soil based system receiving sand filter effluent. Converse and Tyler (1998) report that Coliform levels fall to below detection levels where influent applied to soil contains 10 E +4 Coliform bacteria or less following flow through 1 ft (30 cm) soil. Clearly, there exists ample evidence that soil systems remove significant levels of bacteria. Typical levels of removal suggest a 2 to 3 log reduction (99%to 99.9%) removal following migration through 1 foot of soil. Higher levels of removal are typically associated with finer textured soil as the receiver.

2 DESCRIPTION OF ECOFLO® TREATMENT SYSTEM

The ECOFLO® treatment system approved for testing under this protocol consists of a primary treatment tank (a septic tank) followed by a PSA 240 pump tank with discharge to the ECOFLO® treatment unit or an alternative gravity discharge from the septic tank to the ECOFLO® treatment unit. These ECOFLO® devices are designed to discharge into a permeable mantle and final dispersal into the underlying soil. The critical treatment system boundaries can be described as: top of peat filter receiving septic tank effluent,

base of peat filter, base of mantle, natural soil 12 inches below infiltrative surface, natural soil 10 feet from system and the ultimate boundary at adjacent surface water or underlying groundwater (this ultimate boundary was not monitored in this study).

Wastewater from the facility enters the septic tank for primary settling and initial clarification. This primary treatment device provided the initial treatment separating floatable and solids from the wastewater requiring treatment in the adjacent receiver environment. Liquid enters the ECOFLO® down-flow filter through a tipping bucket that facilitates uniform dispersal of liquid onto corrugated plates which distribute liquid over the peat material in the container. Peat provides the medium where physical, chemical, and biological treatment processes reduce concentrations of pollutants in the liquid and render that residential wastewater suitable for absorption into the soil. Liquid from the peat filter enters a mantle over soil where final treatment in the designed system is realized.

3 STUDY OBJECTIVES

The Virginia Department of Health approved installation of the ECOFLO® treatment devices to demonstrate performance of units in a defined footprint mode. The approval was granted under GMP 118 which includes a monitoring program designed to gather performance data in order to verify that ECOFLO® technology meets the standards set by the Virginia Department of Health. The treatment or performance standard specified in the GMP was $CBOD_5$ of 30 mg/l and Coliform of 10 CFU/100 ml or less at the performance boundary. This boundary was located at a depth of 12 inches below the infiltrative surface and in the foot print of the treatment system. The general location of the monitoring points is provided in Figures 1a and 1b.

In addition, an up-gradient lysimeter was installed to assess the quality of the shallow soil moisture in the area immediately up-gradient of the treatment system. This background is critical when assessing levels of nitrate in soil systems. An additional treatment boundary was defined as the base of the ECOFLO® peat filter. Liquid samples collected at this boundary reflect the quality of the treated wastewater introduced to the soil component of the ECOFLO® treatment system.

Suction lysimeters were installed at this performance boundary and at a down-gradient boundary to assess overall performance of the treatment system. In addition, a sampling point was specified at the base of the ECOFLO® treatment unit to assess $CBOD_5$, Nitrogen, Fecal Coliform bacteria and chloride (and an occasional phosphorus test) in the liquid entering the soil system from the ECOFLO® treatment device. The primary objectives of this testing were to:

1. Assess $CBOD_5$ and Coliform levels at the prescribed performance boundary defined in the test protocol.
2. Monitor nitrogen levels in soil moisture at a depth of 12 inches below the infiltrative surface separating the created environment from the natural soil environment.

4 PROCEDURES

4.1 Site Selection Procedures

Sites selected for inclusion in the test protocol were selected to represent installations in the various soil resource groups identified in Virginia Rule (Types 1, 2, 3, and 4). Sites were selected through a partnership between Delmarva Septic Solutions (the Premier Tech representatives in Virginia) and the research team (Rubin and King). Test sites were selected to represent domestic or residential wastewater systems. Sites were also selected to insure that the various soil resource groups represented in Virginia were included in the study.

Homeowners were required to sign a document stating their willingness to participate and to grant access to their property to accomplish required monthly and quarterly sampling. As an aside, the homeowners expressed interest in the study and were very willing to open their property to the testing. Sites were selected to insure sufficient sampling data would be collected during the test period. One of the homes initially enrolled was subsequently removed from the testing due to inadequate volume of wastewater for treatment and dispersal. The home was a three bedroom facility and the owner did not generate sufficient volume of wastewater to stress the treatment system.

4.2 Field Monitoring Procedures

Figures 1a and 1b show typical ECOFLO® system installations with all monitoring devices located. Figure 1a shows a typical open bottom installation and Figure 1b shows a typical trench system. The soil moisture/shallow groundwater testing was accomplished using High Flow Porous Ceramic Cup Suction Lysimeter model 1920F1-B01M3. These are used in many groundwater sampling activities. The 1920F1 Pressure/Vacuum Soil Water Sampler consisted of a PVC body with a ceramic cup epoxy bonded at the distal end and a suction line at the proximal end. The porous ceramic cup had an outside diameter of 1.9″ and is 2.0″ in length. The B01M3 ceramic cup consists of a 1 bar high flow porous ceramic cup capable of transmitting bacteria from soil solution to the sample collection lysimeter. Nylon compression fittings were threaded into the top cap and were used to attach lengths of polyethylene tubing for surface access. The specified lysimeters were manufactured by Soil Moisture Inc.

Suction lysimeters were installed at the desired depth and these remained in the soil receiver at each of the sites through the entire testing period. This allowed required periodic sampling to occur with minimal disturbance to the site and soil. The samplers consisted of a porous ceramic cup and a sample collection tube. A vacuum pump was used to create a vacuum in the sampler, which allowed water from the soil to be drawn through the ceramic cup and into the sampler. The water sample was then removed from the collection tube, placed in sample bottle; the bottles were placed in a cooler and transported to the certified laboratory for analysis. Chain of custody paperwork procedures was followed. All details regarding monitoring procedures are described in the document entitled, "*Sampling Protocol for Field Testing, Sampling and Evaluation Premier Tech ECOFLO® Sewage Treatment System"* prepared by Premier Tech Environment and Delmarva Septic Solutions Inc. and approved by the Virginia Department of Health in July 2003.

4.3 Samples

After the filter bed had been in use for a period of at least four weeks, the sampling program for each site was initiated. Systems numbered 1 through 19 were sampled monthly for 18 consecutive months. Systems 20 and 21 were sampled for 8 and 16 months (monitoring is ongoing according to protocol).

Four samples were collected at each test site. These were:

- Influent of the peat filter (correspond to the septic tank effluent).
- Treated effluent from the peat bed (interface of peat bed bottom and absorption area).
- Treated effluent at a depth of 12″ below the bottom of the absorption field (measured directly below the footprint of the ECOFLO® module using Lysimeter #1).
- Treated effluent at a depth of 12″ below the bottom of absorption field and within the first 10 feet down-gradient of the absorption field (Lysimeter #2).
- Background soil moisture at a depth of 12″ below the bottom of the absorption field to analyze for background contamination (Lysimeter #3 located up-gradient of the absorption field).

4.4 Monitoring Program

Table 1, below indicates the testing and analysis performed on each site and the frequency for each sample collected in support of this protocol. The value in parenthesis indicates the total number of samples projected by site at the end of the sampling program. Since

all systems were not monitored for 18 months, the total number of data points is slightly below the target.

Table 1: Testing and analysis

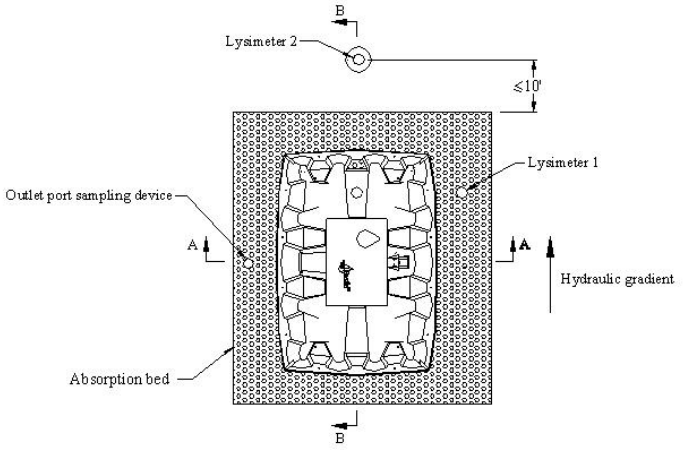
PARAMETER	INFLUENT OF THE PEAT BED (SEPTIC TANK EFFLUENT) ECOFLO® inlet pipe	EFFLUENT OF THE PEAT BED (Sampling device underneath the ECOFLO® unit)	UNSATURATED SOIL BENEATH THE ECOFLO® FOOT PRINT (12 in. below the infiltrative soil surface)	UNSATURATED SOIL 10 FEET DOWN-GRADIENT OF THE ECOFLO® FOOTPRINT
$CBOD_5$	1/month (18)	1/month (18)	-	-
TSS	1/3 months (6)	1/month (18)	-	-
Fecal Coliform	1/6 month (3)	1/month (18)	1/month (18)	1/month (18)
Chloride[1]	-	1	1	1/month (18)
Nitrate	Hach[3]	1/6 months (3)[2]	1/6 months (3)[2]	1/6 months (3)[2]
TKN	1/6 months (3)[4]	1/6 months (3)[2]	1/6 months (3)[2]	1/6 months (3)[2]

Note:

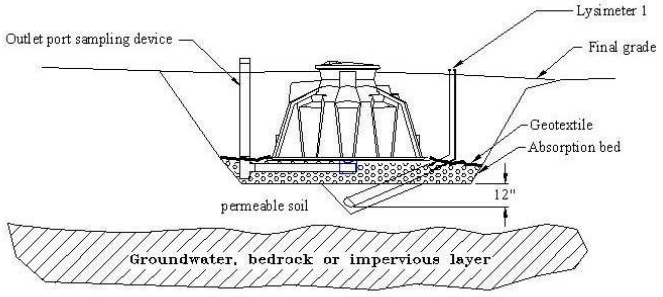
1. The tap water at each site was analyzed for the chloride one time at the beginning of the sampling program.
2. This analysis was performed only if the volume of the sample collected was sufficient for testing.
3. Qualitative field method (HACH® test strips for nitrate Cat. 27454-25 or equivalent).
4. Nitrate and TKN of septic tank effluent were analyzed only if others effluents could be performed (if sufficient sample volume was available at effluent).

Figure 1a – Typical ECOFLO® installation with monitoring components

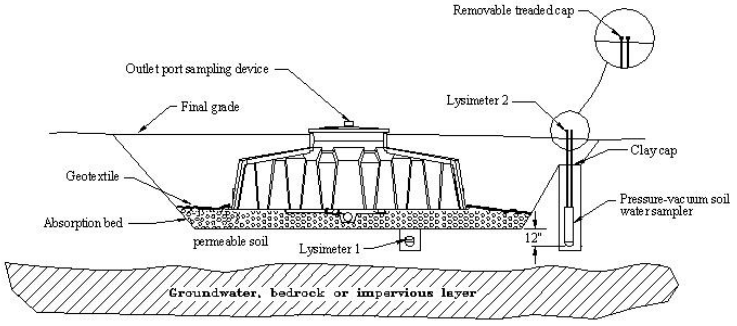
Bottomless system (ST-650)



Plan view

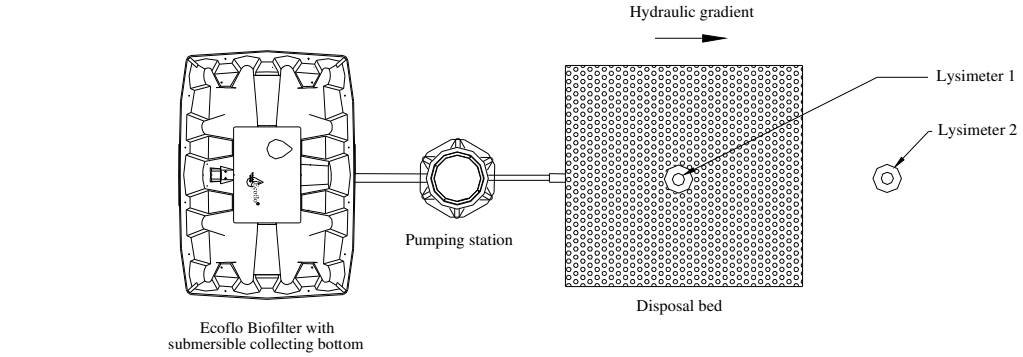


Section A-A

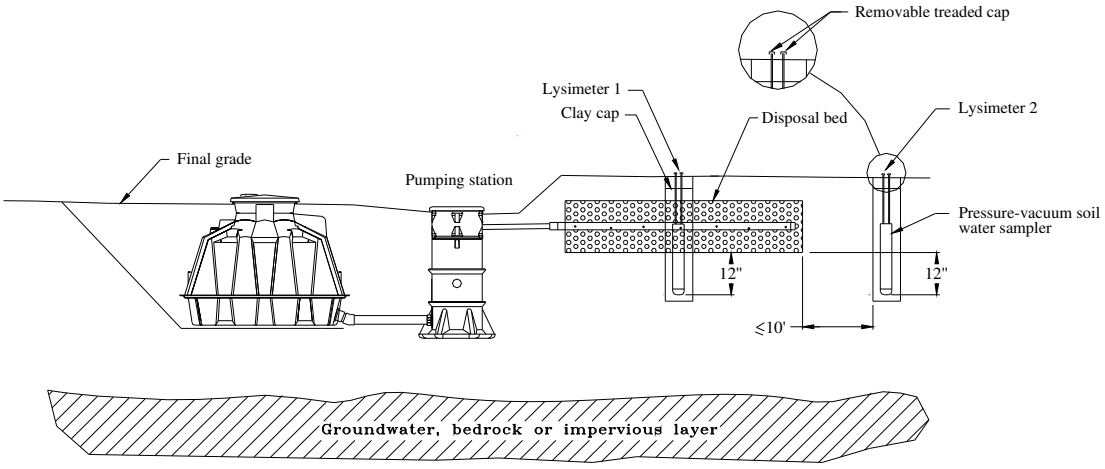


Section B-B

Figure 1b – Typical ECOFLO® installation with monitoring components
<u>System with bottom (STB-650)</u>



Plan view



Section view

All the samples were delivered to an independent laboratory duly certified by the Virginia Department of Health. The only exception was the nitrate from the septic tank effluent, which was completed in the field. Generally, septic tank effluent does not have any nitrate, and this was verified by a field qualitative method (HACH® test strips for nitrate Cat. 27454-25 or equivalent). Should nitrate have been detected, that may indicate groundwater intrusion into the septic tank or the line between the tank and the treatment unit.

In addition, in order to measure the potential for background contamination, an additional suction lysimeter was installed at selected sites up-gradient of the ECOFLO® treatment unit. Sampling frequency to measure the potential background contamination was determined as a function of the first sample results. If nitrate levels were high in test samples, up-gradient testing of the groundwater was initiated to assess relative contribution from wastewater as compared to background. The goal of the treatment was to insure nitrate levels in shallow groundwater did not increase by over 10 mg/l above background.

The methods specified for analysis of each test parameter are presented in the Table 2, below.

Table 2: Standard Test Methods

PARAMETERS	ANALYSIS METHOD
$CBOD_5$	SM 5210B
TSS	SM 2540D
TKN	SM 4500NorgC
Fecal Coliform	SM 9221C
Nitrate	SM 4500NO3 D
Chloride	SM 4500C1 C

Note: SM = Standard Methods for the Examination of Water & Wastewater, 18th Edition

Finally, all sites were equipped with an event counter that counted the number of tipping bucket events of the ECOFLO® distribution system. This will allow the analysis to include evaluation of the total volume of wastewater that is treated by the ECOFLO® unit and discharged into the soil.

Referencing the ECOFLO® provisional approval, Table 3, below describes the target treatment standards (performance standards) for each site examined and included in this testing protocol.

Table 3: Performance Requirements for ECOFLO® Treatment System (Filter and Soil)

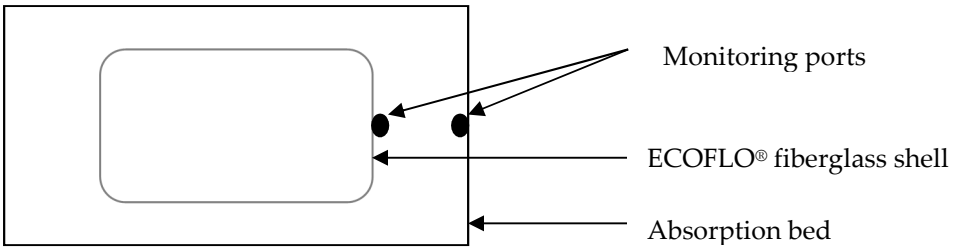
PARAMETERS	INFLUENT	EFFLUENT (PEAT MEDIA)	SOIL WATER (12″ BELOW THE BOTTOM OF THE ABSORPTION FIELD)
TSS	-	-	< 30 mg/L (1)
$CBOD_5$	>100 and <300 (for any individual samples) > 150 mg/L (average)	-	< 30 mg/L (1)
Fecal Coliform	-	-	< 10 CFU/100 ml (geometric mean) <200 CFU/100 ml (single sample)
Nitrate	No standard is established; however results may be used to demonstrate the performance.		
Chlorides	Increase compared to tap water.		

1. The TSS and $CBOD_5$ were not analyzed in the samples collected by the lysimeters but at the effluent discharge from the peat bed. The research team assumed that if the 30 mg/L standard was achieved at the effluent from the peat bed, it was certainly less than that everywhere in the absorption bed which followed.

4.5 Ponding

Two monitoring ports were installed at each site. One just at the limit of the ECOFLO® fiberglass shell and the other at the outer limit or extent of the hydrologic boundary associated with the absorption bed. During each sampling event, the ponding depths were monitored at these two ports. Figure 2 below shows an overhead plan view with the location of the two monitoring ports.

Figure 2: Monitoring ports



5 RESULTS AND DISCUSSION

A total of 21 systems were sampled through this approved test protocol**.** Systems installed in Type 1, 2 and 3 soils were tested for the requisite 18 months; however the two systems installed in Type 4 soil were enrolled in the protocol late and were tested only 8 to 16 times. The testing involved assessment of the peat treatment unit and the soil environment. Measures of the quality of the liquid generated from the ECOFLO® treatment unit were collected to determine $CBOD_5$, nitrogen, and Fecal Coliform bacteria generated from the treatment unit. Measures of concentrations of soluble nutrients and Coliform bacteria in the soil receiver environment immediately below the infiltrative surface and at defined system boundaries were collected to assess potential environmental and health impacts of the total system. Data details on the soil types and results from individual sampling events, as well as a summary of the results are provided in the table presented in Appendix A.

Standard methods as listed in the approved protocol were used for all testing and analysis. Holding times were maintained properly between sampling events and testing. Sample preservation was in accordance with standard field protocol (cooling for microbiological tests and preservation for others). All samples were transported from the site to the laboratory in a cooler with adequate ice to maintain proper temperatures through the transportation process.

The summary table provides information on the testing from all systems. The mean and median values from the testing, the standard deviation of the measure, and the 90% confidence level are provided. Inclusion of the mean and median value is important when examining a long time series test. The median values have been included in reports by Tyler and Converse (1997), Hoover and Groves (2005), and these median values may be more representative of performance than the mean. In addition, the 90% confidence level indicates the values to which systems can perform under stress because of flow variation, temperature and climatic variations, changing wastewater inflow characteristics, or other influences on system performance.

5.1 ECOFLO® Peat Filter Treatment Unit Performance

$CBOD_5$: Data summarizing the treatment efficiency for the ECOFLO® treatment systems is presented in Table 4 below. These data summarize the treatment achieved in all systems enrolled in the study. Specific site data is contained in the table presented in Appendix A, previously mentioned.

Table 4: Mean, Median, Standard Deviation (SD), 90% Confidence Limits and Percent for $CBOD_5$ in Influent to and Effluent from ECOFLO® Peat Filter at Sites in Virginia (as mg/l), n = 332

	Influent	Effluent	% Removal
Mean $CBOD_5$ and (SD)	186 (113)	8 (8)	96
Median $CBOD_5$	170	6	96
90% Confidence Limit	343	16	95

The mean and median $CBOD_5$ values observed in all samples from the ECOFLO® treatment unit were 8 mg/l and 6 mg/l respectively. The value below which 90% of the $CBOD_5$ values fell was 16 mg/l. Based on these test data, the $CBOD_5$ removal exceeds the required performance level established in the test protocol. Examination of all data indicates the maximum $CBOD_5$ values observed through all testing were encountered at the Pride of Virginia facility. This facility is a somewhat atypical residential facility with migrant labor providing services to a seafood processing operation. Nonetheless, the mean and median values of $CBOD_5$ from this facility met the standards imposed through the approved test protocol. The 90% confidence limit of testing from this facility was 30 mg/l. and that is the standard imposed through the protocol. Even under conditions of duress, the ECOFLO® unit treated liquid to the required standard.

The maximum $CBOD_5$ observed through the testing were detected at the Palmer residence, the Stevens – Jeff residence and at Pride of Virginia (A). The high values do not seem correlated with anticipated low temperature, high rainfall, or other conditions that would facilitate an increase in $CBOD_5$. The values associated with these excursions cannot be explained by data assessment only. The high values experienced at the Stevens residence do seem to occur during a cool season, but not all high values are represented in the cool season only. The ponding height at the central support is also not an indicator of the high $CBOD_5$ potential. Systems exhibiting significantly higher ponding height achieve high levels of $CBOD_5$ removal. Further, wastewater flow to the systems is not excessive during periods where these excursions in $CBOD_5$ were observed.

In contrast to these maximum values, minimum values observed through the testing were 2 to 3 mg/l and the frequency of these low values was greater than the frequency of the higher values. This suggests that the curve representing all data is skewed toward the higher levels of treatment observed in the bulk of the data represented. The ECOFLO® treatment unit does meet the conditions imposed for effluent $CBOD_5$ concentration through the test protocol.

Fecal Coliform: The treatment standard imposed on the ECOFLO® treatment system required a Fecal Coliform level of 10 CFU/100 ml following flow through 12 inches of soil below the treatment unit. Data collected during the testing at the base of the treatment

unit suggests that the peat treatment unit itself was capable of achieving a 1.5 to 2 log reduction (95% to 99%) in Coliform counts following flow through the filter only. This was achieved without disinfection. Performance data regarding the filter only are presented in Table 5, below.

Table 5: Mean, Median, and 90 % Confidence Limits for Fecal Coliform Bacteria in Influent to and Effluent from ECOFLO® Peat Filter at Sites in Virginia (as CFU/100 ml), N = 301

	Influent	Effluent	Removal (log)
Mean F. Coliform	34,262	1,029	1.5
Median F. Coliform	57,900	920	1.8
90% Confidence Limit	240,200	34,300	0.8

This is an impressive reduction in bacteria count, but does not meet the standard imposed for the entire process. Consequently, the peat filter effluent does not meet standards and the soil system is required to provide the additional treatment required to meet performance standards imposed through this protocol. See additional results from 12 inches of soil treatment where performance boundaries need to be and are met.

TSS: total suspended solids represent a good measure of the potential solids content in liquid applied to soils. High levels of solids in effluent tend to facilitate clogging of fine pores in soil and this can result in some reductions in permeability. The peat filter affords excellent removal of TSS. Influent concentrations to the filter surface were measured as a mean of 34 mg/l. Effluent generated from the peat treatment unit contained a TSS mean value of 6 mg/l and a median value of 4 mg/l. This skewness in the curve suggests that the peat filter typically generates a TSS value of 4 mg/l or less. This is critical when potential for soil clogging is considered. These low TSS values facilitate long term successful operation of the land based component of the system. No performance standard was established for total suspended solids.

Nitrogen (as TKN and nitrate): The Total Kjeldahl Nitrogen (TKN) represents the sum of organic nitrogen and ammonium nitrogen in a sample. These forms of nitrogen convert to nitrate nitrogen when soil conditions are aerobic. Since aerobic soil conditions are a condition associated with siting an on-site wastewater system on a property, the organic nitrogen and ammonium contained in a sample will convert to nitrate. Treatment efficiency indicating the level of nitrogen transformation and potential removal for the peat filter is presented in Table 6, below.

Table 6: Median, Standard Deviation, and 90% Confidence Limits for TKN and Nitrate in Influent to and Effluent from ECOFLO® Peat Filter at Sites in Virginia (as mg/l), n = 82 for TKN and n=324 for NO_3

	Influent	Effluent
Mean TKN and (SD)	51 (42)	10 (14)
Median TKN	42	4
90% Confidence	83	25
Mean NO_3 and (SD)	1 (1)	22 (17)
Median NO_3	1	21
90% confidence	1	48

The levels of nitrogen present in the treated effluent generated by the peat filter suggest significant nitrogen removal through the peat filter during the test period.

No nitrate nitrogen is expected in septic tank effluent. A detectable nitrate level in liquid applied to the filter would suggest intrusion of groundwater into the system. No evidence of elevated nitrate was observed in the testing. The elevated nitrate present in the peat filter effluent indicates that the filter is functioning as an aerobic treatment system. The conversion of the organic and inorganic nitrogen (as ammonium) to nitrate is expected in a properly functioning aerobic filter. The average nitrogen in the effluent is the combination of TKN and nitrate, the sum of these is the total nitrogen. The mean total nitrogen in the peat filter effluent was 32 mg/l and this represents a 38.5% reduction in total nitrogen through the filter component of the system. This is a significant reduction in the nitrogen present in the liquid to be applied to the soil.

5.2 Soil Treatment System Performance

The ECOFLO® treatment system consists of a peat filter to condition liquid prior to discharge to the soil system. The soil serves as the final receiver for the liquid generated at the residential facilities examined in this study. The soil serves as a buffer between shallow groundwater and adjacent surface water. These elements of the aquatic environment constitute the final receiver for materials applied to land, but performance standards are imposed where property owners can be held accountable for maintaining a mandated level of system performance.

The test protocol approved in 2003 established performance standards at a location 12 inches below the infiltrative surface separating the natural soil system from the ECOFLO® peat filter component. The filter system consisted of a fiberglass enclosure containing the peat filter media and a permeable infiltration bed placed on the soil surface. The

compliance boundary for the treatment system was the soil solution 12 inches below the footprint of the ECOFLO® treatment unit. This performance allowed flow through only 12 inches of natural unsaturated soil before compliance was imposed. Compliance at this boundary assures compliance further down-gradient. A second sampling point was established 120 inches (10 feet) from this initial compliance boundary. This second sampling location was established to assure no potential for contamination down-gradient from the system because of deep flow which may migrate below the initial compliance boundary and rise toward the soil surface down-gradient of the system.

Samples of soil moisture were extracted from the sites utilizing suction lysimeters. These are standard monitoring devices for assessing performance of land based waste treatment systems. Parameters assessed to assure compliance at this treatment boundary were $CBOD_5$ and Fecal Coliform Bacteria. Nitrate was established as a "monitor only" parameter.

$CBOD_5$: The sample protocol required a $CBOD_5$ of 30 mg/l at 12 inches below the infiltrative surface. In lieu of testing soil moisture levels where confounding parameters may skew results, the research team chose to sample effluent entering the soil system. The samples were collected at the discharge from the peat filter. The mean, median, and 90% confidence values for $CBOD_5$ indicate that the performance standard was achieved over 90% of the time at the peat filter system boundary. The research team inferred that compliance at the filter discharge would result in compliance at the specified performance boundary. This performance level of 30 mg/l in the ECOFLO® peat filter effluent was achieved over 90% of the time during this study. The performance of the filter was discussed in the previous section.

Nitrate: Nitrate nitrogen levels of 10 mg/l or higher in groundwater violate the primary drinking water standard. Since untreated groundwater can be used as a source of drinking water, regulatory agencies have established the 10 mg/l level as a typical compliance value for land-based wastewater treatment systems. Nitrate is formed as ammonium nitrogen which is biologically oxidized to nitrate. This biological conversion occurs in aerobic soil. The soil into which land-based wastewater systems is placed must be aerobic in and around the zone of wastewater application. These aerobic conditions encourage formation of nitrogen.

Background nitrate levels were assessed at all facilities. These background levels represent the nitrate levels in areas uninfluenced by the wastewater system; areas located up-gradient from the treatment system. Water flows along gravity gradients and the

groundwater from these up-gradient lysimeters (L3) will migrate toward the wastewater treatment system.

Nitrate and TKN concentrations in the shallow groundwater indicate excellent removal for nitrogen through the treatment process. Table 7, below summarizes the nitrogen levels in treatment units by soil resource group.

Table 7: Mean, Median, Standard Deviation and 90% Confidence Level for TKN and Nitrate in Lysimeters Installed in ECOFLO® Absorption Field (L1), 10 Feet Down-Gradient (L2) and Up-Gradient (L3) (as mg/l) by Soil Resource Type

	L1	L2	L3 (Background)
Type 1 TKN Mean (SD)	3 (7)	4 (11)	2 (3)
Type 1 TKN Median	1	1	1
Type 1 TKN 90%	5	8	4
Type 2 TKN Mean (SD)	1 (2)	0.9 (1.2)	0.5 (0.6)
Type 2 TKN Median	1	0.3	0.3
Type 2 TKN 90%	3	3	1
Type 3 TKN Mean (SD)	6 (9)	3 (10)	1.0 (1.4)
Type 3 TKN Median	1	1	0.4
Type 3 TKN 90%	21	2	3
Type 1 NO_3 Mean (SD)	7 (10)	3 (6)	4 (5)
Type 1 NO_3 Median	2	1	4
Type 1 NO_3 90%	21	13	10
Type 2 NO_3 Mean (SD)	6 (8)	4 (6)	2 (3)
Type 2 NO_3 Median	3	1	1
Type 2 NO_3 90%	19	10	6
Type 3 NO_3 Mean (SD)	2 (2)	1 (1)	2 (3)
Type 3 NO_3 Median	1	0.5	1
Type 3 NO_3 90%	6	3	3

The mean and median background nitrate levels from systems tested are 3 mg/l and 1 mg/l respectively. Peak nitrate values in selected residences are detected at levels as high as 20 mg/l. These background values violate the standards imposed in the testing. Assessment of the high nitrate levels associated with individual treatment systems correlate well with the high background levels observed for nitrate in selected systems. For example, the 21 mg/l nitrate levels observed in the Beatley system monitoring wells are located in an area with a background nitrate of 14.4 mg/l. Similarly, high background levels are associated with other excursions. This is discussed below.

Testing accomplished at the 12 inch compliance boundary indicates that the systems tested achieved this treatment standard. The mean and median nitrate nitrogen levels for all systems tested were 5 mg/l and 2 mg/l respectively. The 90% confidence limit was 19 mg/l. This suggests that, although the systems met the 10 mg/l limit imposed, the curve is skewed toward the higher levels. The higher levels of nitrate detected appear correlated slightly with the coarse textured sandy and loamy soils. This is consistent with potential for rapid movement of air into the soil profile to create air rich environments encouraging nitrification. The finer textured soils (clay loams and clays) transmit air at slower rates and there is potential for denitrification in these finer textured soils. Consequently, the nitrate levels appear slightly lower in the heavier textured soils than the coarser textured materials.

Testing in the boundary located 120 inches (10 feet) down-gradient indicates that nitrate levels fall significantly. Mean and median nitrate levels in these down-gradient wells are 3 mg/l and 1 mg/l respectively. These levels are well within property boundaries and compliance is assured at property lines.

Levels of nitrate in the system monitoring wells at the Beatley residence, Pittman residence, Stephen Ford residence and Reed residence are associated with abnormally high levels of nitrate in the shallow groundwater up-gradient from the on-lot wastewater treatment systems. Adjusting the system monitoring levels by removing the background nitrate concentration results in compliance with treatment system standards at the Beatley residence, but not at others. Clearly, background nitrate does influence system performance and compliance.

Correlation between nitrate levels in shallow soil moisture samples does not appear related to ponding in the soil at the fringe of the system boundary. Examination of the nitrate levels and ponding depth does not appear to demonstrate a correlation between saturated soil and nitrate concentrations.

Statistical sampling suggests compliance with the nitrate requirement for groundwater. Mean and median values for nitrate are below the drinking water standard at the compliance boundary. Since nitrate was a “monitor only” parameter, no compliance with a performance standard is required, only compliance with federally mandated groundwater standards at groundwater.

Fecal Coliform Bacteria: Fecal Coliform bacteria are indicators of human fecal contamination. Levels of Fecal Coliform bacteria at the established compliance boundary

located 12 inches below the infiltrative surface indicate excellent removal of this public health indicator. The standard required a geometric mean of 10 CFU/100 ml and no single sample containing a Coliform count in excess of 200 CFU/100 ml.

A performance standard was specified for Fecal Coliform bacteria in the shallow soil moisture. Table 8, below presents results from the Coliform testing by soil resource type.

Table 8: Mean, Median and 90% Confidence Level for Coliform Bacteria in Lysimeters Installed in ECOFLO® Absorption Field (as CFU/100 ml) by Soil Resource Type

	L1	L2	L3 (background)
Type 1 Coliform Mean	2	2	2
Type 1 Coliform Median	2	2	2
Type 1 Coliform 90%	2	2	2
Type 2 Coliform Mean	2	2	2
Type 2 Coliform Median	2	2	2
Type 2 Coliform 90%	2	2	2
Type 3 Coliform Mean	2	1	1
Type 3 Coliform Median	2	1	2
Type 3 Coliform 90%	2	2	2
Type 4 Coliform Mean	1	1	2
Type 4 Coliform Median	1	1	2
Type 4 Coliform 90%	2	2	2

Examination of the monitoring data indicates most samples contain a Coliform level of 1 CFU/100 ml to 2 CFU/100 ml. The highest level detected reliably was 170 CFU/100 ml. Coliform counts reported in excess of the target performance standard are associated with sampling or laboratory problems (field collection notes are available upon request). Re-sampling at those residential facilities where excursions from the Coliform standard were present indicate compliance.

Soil systems are effective in removing Fecal Coliform bacteria. The processes critical to Coliform bacteria attenuation ongoing in the soil environment include physical separation or filtering which separate bacteria from the soil solution. This facilitates the biological processes required for attenuation of bacteria and includes natural die-off, predation, and consumption. Bacteria and other microorganisms present in human waste and potentially threats to public health and environmental quality are most suited for survival in the human host. Moisture levels, temperature, food supply, and lack of predators render the human digestive system an ideal host for these microorganisms.

When discharged into the environment, bacteria and other microorganisms that populate the human gut encounter conditions very hostile for their survival. The soil system typically provides a 2 to 3 log reduction in Coliform bacteria count per foot of soil material through which wastewater moves. The reductions encountered at the 12 inch level are comparable to those achieved as septic tank effluent moves through an equivalent of 2 to 3 feet. The ECOFLO® treatment system serves as a surrogate for soil where high levels of bacterial attenuation are required and limited soil exists to provide this desired result.

Bacteria levels in the septic tank effluent tested in this study ranged widely through the study. Bacteria levels as low as 280 counts/100 ml were reported in the septic tank effluent testing. These low values are atypical of domestic wastewater. Higher values reported as 200,000 to 1,000,000 counts/100 ml are more representative of domestic wastewater. The peat treatment unit reduced these bacteria levels by 90% to 99% (1 to 2 log reduction). The soil system reduced these bacteria concentrations by an additional 99.9%. This is equivalent to a 5 or 6 log reduction in Coliform bacteria levels through the ECOFLO®/soil system. The system is defined as the peat filter unit, a permeable infiltration layer below the filter, and 12 inches of natural soil. This combination results in excellent treatment. The performance standard imposed at commencement of this study was achieved at the designated performance boundary. Coliform bacteria removal was demonstrated successfully at the 20 systems tested in Virginia.

Process indicator assessments: process indicators include measures that can be taken instantly at a site. These represent real time indicators for system performance. The most common of the process indicators assessed are flow, pH, dissolved oxygen (D.O.), and conductivity. Wastewater flow from each of the facilities was measured with a metered tipping bucket. The mean and median wastewater flows to the systems tested were 156 and 127 gallons per day respectively. These are generally low flows for residential facilities. The skewness of the data suggests that the flows tend to be more conservative than typically utilized for the design of residential wastewater systems.

The wastewater flows at Pride of Virginia (B) are higher than design. These high wastewater flows may account for the deviations in treatment efficiencies noted at this facility. The $CBOD_5$ levels in several of the monitoring events reflect values higher than collected at facilities with lower flows. This process indicator could be used as a surrogate to assess system performance. When flows are in excess of those planned, treatment efficiency often declines.

Supplemental Monitoring – Phosphorus: phosphorus levels were monitored in soil moisture samples extracted from areas adjacent to ECOFLO® treatment units in Virginia. Phosphorus is emerging as a water quality concern in many freshwater systems. The

phosphorus concentrations in effluent applied to shallow subsurface wastewater systems were measured at selected ECOFLO® test sites as a part of the test protocol for the Premier Tech system monitoring. Systems were selected to include soil types represented in the test protocol. There was no requirement to test phosphorus as a component of the original approved test protocol. These levels were measured to assess the potential for phosphorus removal in the peat wastewater systems. The system is defined as the peat filter and the soil material underlying the peat system. Results in total phosphorus concentrations at septic tank effluent, peat filter effluent and Lysimeter #1 are presented in Appendix B, Table 1S, and the results in phosphates from the three lysimeters (#1, 2 and 3) are presented in Table 2S (Appendix B). The detection level for the test methods utilized was 0.02 mg/l.

Phosphorus levels detected in the septic tank effluent applied to the peat treatment units ranged from 4.9 mg/l to 7.1 mg/l. The peat filter reduced these influent concentrations to 3.8 mg/l to 6.5 mg/l. This is approximately a 10% reduction through the peat filter. Samples of the soil moisture removed at Lysimeter 1 typically contained a total phosphorus level below or equal to 0.2 mg/L in total phosphorus and below or equal to 0.1 mg/L in phosphates. This indicates that the soil system is an excellent medium for attenuating phosphorus. This phosphorus attenuation potential will become more critical where eutrophication of surface waters becomes an issue of local concern.

6 CONCLUSIONS

Performance standards were imposed on the ECOFLO® treatment system for Carbonaceous Biochemical Oxygen Demand and Fecal Coliform bacteria. Monitoring data indicates that the systems assessed met the treatment standards imposed over 90% of the time. No reliability was imposed in the protocol and the 90% confidence level is generally considered stringent.

The performance level imposed for $CBOD_5$ at the interface between the man-made environment and the soil infiltrative surface was established as 30 mg/l. This treatment level was achieved. This parameter was measured at the discharge from the peat filter.

The limit for Fecal Coliform bacteria established at a depth of 12 inches below the infiltrative surface was 10 counts or colony forming units (CFU)/100 ml with no sample exceeding 200 CFU/100 ml. This treatment level was achieved.

A "monitor only" standard was imposed for the nitrogen series as TKN and NO_3. An additional nutrient parameter was added by the researcher. Shallow groundwater monitoring indicates that nitrogen removal achieved shallow groundwater levels of nitrate and TKN near 2 mg/l. This meets drinking water standards. Supplemental monitoring indicated excellent removal for phosphorus. Total phosphorus levels in shallow groundwater samples never exceeded 0.2 mg/l.

Based on a review of the data collected, the systems installed in Type 1, 2 and 3 soils achieved the performance levels established in the test protocol. For Type 4 soil, monitoring is ongoing according to protocol.

Respectfully Submitted;

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APPENDICES

A – Data table
B – Phosphorus results

APPENDIX A

Data table

Premier Tech Environment

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

Realised by:
Delmarva Septic Solution
Premier Tech Environment

Collaboration of:
Dr. Robert Rubin
Bruce King

Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
1	Humphrey	Lancaster	II	1	2003-10-29	75	220	25	>2 400	45	<1	-	5	3	*2*		21	98	*2*	-	-	70	*2*	-	-	35	nw	-	-	nw		-	-	
	151-03-009			2	2003-11-24	-	130	-	-	-	<1	-	4	3	1,203	0.1	-	-	2	*0.1*	5.6	90	2	0.1	20	170	*2*	0.1	7.2	75	149	-	-	2
				3	2003-12-22	-	83	8	-	-	<1	-	3	5	1,553	-	-	-	2	-	-	-	1	-	-	50	-	-	-	-	295	4.5	-	80
				4	2004-01-28	-	386	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	118	0	-	?
				4 (cont.)	2004-01-29	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
				4 (cont.)	2004-02-05	-	-	-	-	-	-	-	19	2	2,419	-	-	-	-	-	-	-	2	-	-	37	-	-	-	-	116	-	-	40
				5	2004-02-25	-	408	-	-	-	<1	-	4	2	1,046	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	167	-	-	
				6	2004-03-23	-	393	19	1,110	27	1	-	13	5	920	2.3	17	-	2	1.7	1.2	-	2	-	6.8	31	-	-	-	-	113	6.0	0	20
				6 (cont.)	2004-03-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-	
				7	2004-04-27	-	271	-	-	-	<1	-	8	3	*2*	-	-	-	2	-	-	-	2	-	-	45	-	-	-	-	202	8.3	5.1	80
				8	2004-05-25	-	319	-	-	-	<1	-	9	2	920	-	-	-	2	-	-	-	2	-	-	37	-	-	-	-	127	5.0	0	40
				9	2004-06-22	-	157	19	-	-	<1	-	10	5	920	-	-	-	2	-	-	-	2	-	-	29	2	-	-	26	122	5.0	0	85
				10	2004-07-28	-	210	-	-	-	<1	-	10	6	920	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	148	9.0	0	160
				11	2004-08-24	-	230	-	-	-	<1	-	6	4	1,600	-	-	-	2	-	-	-	2	-	-	12	-	-	-	-	Malfonction	14.5	0	>150
				12	2004-09-28	-	116	16	240,000	21	<1	-	10	4	920	2.6	9	-	2	1.0	2.4	-	2	0.2	11	24	-	-	-	-	-	16.0	7.0	±150
				13	2004-10-26	-	161	-	-	-	<1	-	5	1	1,600	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	-	18.0	9.8	>150
				14	2004-11-22	-	260	-	-	-	<1	-	11	2	920	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	-	20.1	14.0	>150
				15	2004-12-28&30	-	249	45	-	-	<1	-	8	2	1,600	-	-	-	2	-	-	-	2	-	-	31	-	-	-	-	-	16.0	8.0	160
				16	2005-01-26	-	273	-	-	-	<1	-	9	4	>2 400	-	-	-	2	-	-	-	2	-	-	17	-	-	-	-	-	23.0	15.0	155
				17	2005-02-22	-	301	-	-	-	<1	-	12	2	>2 400	-	-	-	2	-	-	-	2	-	-	60	-	-	-	-	159	25.5	21.0	200
		FINAL TEST		18	2005-03-22	-	300	43	160,000	20	<1	-	17	5	11,000	2.0	0.4	-	*2*	*0.1*	0.1	-	2	0.1	1.5	50	*2*	*0.1*	1	85	175	32.0	27.5	>150
					Arithmetic mean	-	248	25	133,703	28	-	-	9	3	1,722	1.8	12	-	2	0.7	2.3	80	2	1	10	41	2	0	4	62	158	13.5	8.3	
					Geometric mean	-	228	22	34,932	27	-	-	8	3	623	1.1	6	-	2	0.4	1.0	79	2	0	7	34	2	0	2	55	152	-	-	
					Percentille 80	-	312	39	208,000	34	-	-	11	5	1,600	2.4	19	-	2	1.3	3.7	86	2	1	15	48	2	0	6	81	173	20.7	14.6	
					Standard deviation	-	95	14	121,597	11	-	-	4	1	2,545	1.1	9	-	0	0.8	2.4	14	0	1	8	34	0	0	5	31	51	9.1	9.0	
					MIN	75	83	8	1,110	20	-	-	3	1	2	0.1	0	98	2	0.1	0.1	70	1	0	1	12	2	0	1	26	113	0.0	0.0	
					MAX	75	408	45	240,000	45	-	-	19	6	11,000	2.6	21	98	2	1.7	5.6	90	2	2	20	170	2	0	7	85	295	32.0	27.5	
					n	1	18	7	3	4	-	-	18	18	16	4	4	1	18	4	4	2	18	4	4	18	3	2	2	3	12	15	13	
2	Beatley	Lancaster	I	1	2003-10-29	4	344	35	>2 400	73	<1	140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
				1 (cont.)	2003-11-25	-	239	-	-	-	-	-	11	7	816	0.3	21	100	*2*	0.1	20.8	140	*2*	*0.1*	20.8	130	*2*	*0.1*	14.4	-	164	11.0	-	130
				2	2003-12-23	-	357	-	-	-	1	-	10	9	2,419	-	-	-	2	-	-	-	2	-	-	62	-	-	-	52	164	11.5	-	145
				3	2004-01-29	-	413	23	-	-	<1	-	14	1	1,413	-	-	-	2	-	-	-	2	-	-	1,754	-	-	-	-	182	16.0	-	>180
				4	2004-03-01	-	324	-	-	-	<1	-	-	3	1,732	-	-	-	2	-	-	-	2	-	-	52	-	-	-	-	135	21.0	-	170
				5	2004-03-24	-	317	-	-	-	1	-	13	3	1,600	-	-	-	2	-	-	-	2	-	-	21	-	-	-	-	-	26.0	24.0	160
				6	2004-04-28	-	346	30	92,000	234	1	-	16	10	920	53.6	16	-	2	32.5	1.6	-	2	-	2.8	-	-	-	-	-	124	43.0	42.0	-
				6 (cont.)	2004-04-29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		52.5	-	21	-	-	-	-	-	-	-	
				7	2004-05-26	-	338	-	-	-	<1	-	10	3	920	-	-	-	2	-	-	-	2	-	-	31	-	-	-	-	175	26.0	22.0	-
				8	2004-06-23	-	261	-	-	-	<1	-	10	5	540	-	-	-	2	-	-	-	2	-	-	34	-	-	-	-	196	43.0	41.0	-
				9	2004-07-29	-	225	36	-	-	<1	-	8	1	540	-	-	-	2	-	-	-	2	-	-	36	2	0.4	6.0	36	103	55.5	47.0	>190
				10	2004-08-25	-	344	-	-	-	<1	-	13	7	920	-	-	-	2	-	-	-	2	-	-	15	-	-	-	-	-	44.0	36.0	>150
				11	2004-09-29	-	279	-	-	-	1	-	11	3	70	-	-	-	2	-	-	-	2	-	-	22	-	-	-	-	-	38.5	40.0	-
				12	2004-10-27	-	141	20	92,000	14	<1	-	9	32	920	11.7	2	-	2	11.5	7.6	-	2	9.6	2.8	24	-	-	-	-	-	36.5	40.0	>150
				13	2004-11-23	-	296	-	-	-	<1	-	10	6	540	-	-	-	2	-	-	-	2	-	-	37	-	-	-	-	-	36.0	32.0	>150
				14	2004-12-28	-	262	-	-	-	<1	-	12	20	920	-	-	-	2	-	-	-	2	-	-	47	-	-	-	-	-	56.0	52.6	-
				15	2005-01-27	-	289	39	-	-	<1	-	11	7	1,600	-	-	-	2	-	-	-	2	-	-	300	-	-	-	-	-	29.5	31.0	>150
				16	2005-02-22	-	306	-	-	-	<1	-	18	24	920	-	-	-	2	-	-	-	2	-	-	50	-	-	-	-	-	66.0	76.1	-
				17	2005-03-24	-	271	-	-	-	<1	-	8	28	3,100	-	-	-	2	-	-	-	2	-	-	55	-	-	-	-	-	49.5	54.0	-
		FINAL TEST		18	2005-04-28	-	278	30	110	31	<1	-	10	4	*2*	24	4	-	*2*	*0.1*	2	-	*2*	*0.1*	*0.01*	60	*2*	*0.1*	8	55	-	12.5	0.0	-
					Arithmetic mean	-	296	30	61,370	88	-	-	11	9	1,105	22	11	-	2	11	8	-	2	16	7	153	2	0.2	10	48	155	34.5	38.4	
					Geometric mean	-	290	30	9,765	52	-	-	11	6	656	8	7	-	2	2	5	-	2	1.5	1.1	52	2	0.2	9	47	152	30.2	-	
					Percentille 80	-	344	36	92,000	138	-	-	13	16	1,600	36	18	-	2	20	13	-	2	27	10	61	2	0.3	12	54	179	47.3	49.2	
					Standard deviation	-	59	7	53,053	100	-	-	3	10	775	23	9	-	0	15	9	-	0	25	10	405	0	0.2	4	10	32	16.5	17.6	
					MIN	4	141	20	110	14	-	-	8	1	2	0	2	100	2	0	2	140	2	0.1	0.0	15	2	0.1	6	36	103	11.0	0.0	
					MAX	4	413	39	92,000	234	-	-	18	32	3,100	54	21	100	2	32	21	140	2	53	21	1,754	2	0.4	14	55	196	66.0	76.1	
					n	1	19	7	3	4	-	-	17	18	18	4	4	1	18	4	4	1	18	4	4	18	3	3	3	3	8	18	14	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

Realised by:
Delmarva Septic Solution
Premier Tech Environment

Collaboration of:
Dr. Robert Rubin
Bruce King

Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
3	Pittman	Lancaster	II	1	2003-11-12	18	204	14	16,300	68	<1	-	13	13	242	0.1	19	38	2	-	-	-	2	-	-	-	nw	-	-	nw	-	-	-	168
				1 (cont.)	2003-11-18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*0.1*	18.8	145	-	0.2	2.4	25	*2*	-	3.6	-	-	-	-	
				2	2003-12-09	-	182	-	-	-	-	-	12	7	461	-	-	-	*2*	-	-	-	*2*	-	-	55	-	-	-	-	179	0	-	140
				3	2004-01-13	-	224	16	-	-	<1	-	17	3	613	-	-	-	*2*	-	-	-	*2*	-	-	26	-	-	-	-	166	0	-	40
				4	2004-02-10	-	391	-	-	-	<1	-	5	2	137	-	-	-	*2*	-	-	-	*2*	-	-	22	-	-	-	-	148	13.5	-	160
				5	2004-03-09	-	313	-	-	-	<1	-	12	3	540	-	-	-	*2*	-	-	-	*2*	-	-	16	-	-	-	-	-	0	0	80
				6	2004-04-14	-	244	14	16,000	44	<1	-	4	5	110	3.6	8	-	2	0.4	22.4	-	2	4.4	3.2	12	-	-	-	-	154	29.0	23.0	170
				7	2004-05-11	-	181	-	-	-	<1	-	15	5	1,600	-	-	-	*2*	-	-	-	2	-	-	26	-	-	-	-	147	0	0	40
				8	2004-06-08	-	186	-	-	-	<1	-	5	1	240	-	-	-	*2*	-	-	-	*2*	-	-	14	-	-	-	-	108	0	0	40
				9	2004-07-06	-	275	23	-	-	<1	-	11	3	920	-	-	-	-	-	-	-	-	-	-	-	*2*	0.03	-	-	99	0	0	80
				9 (cont.)	2004-07-07	-	-	-	-	-	-	-	-	-	-	-	-	-	*2*	-	-	-	*2*	-	-	20	-	-	-	-	-	-	-	
				10	2004-08-10	-	262	-	-	-	<1	-	11	4	140	-	-	-	*2*	-	-	-	*2*	-	-	17	-	-	3.2	19	113	0	0	0
				11	2004-09-14	-	227	-	-	-	<1	-	*2*	*1*	540	-	-	-	*2*	-	-	-	*2*	-	-	12	-	-	-	-	-	0	0	80
				12	2004-10-12	-	343	14	160,000	24	<1	-	12	2	920	3	22	-	2	2	19	-	2	1.8	-	17	-	-	-	-	133	0	0	40
				13	2004-11-11	-	207	-	-	-	<1	-	7	6	920	-	-	-	*2*	-	-	-	*2*	-	9	24	-	-	-	-	139	0	0	85
				14	2004-12-09	-	135	-	-	-	<1	-	5	4	920	-	-	-	*2*	-	-	-	*2*	-	-	24	-	-	-	-	137	0	0	35
				15	2005-01-13	-	218	12	-	-	<1	-	7	3	170	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	141	0	0	60
				16	2005-02-10	-	210	-	-	-	<1	-	14	13	1,600	-	-	-	*2*	-	-	-	*2*	-	-	60	-	-	-	-	133	0	0	160
				17	2005-03-10	-	184	-	-	-	<1	-	23	6	4,900	-	-	-	*2*	-	-	-	*2*	-	-	45	-	-	-	-	126	0	5.0	60
		FINAL TEST		18	2005-04-12	-	140	17	54,000	31	<1	-	12	12	7,000	1	38	-	*2*	*0.1*	19	-	*2*	*0.1*	0.2	45	*2*	0.1	2.3	80	132	0	0	110
					Arithmetic mean	-	229	16	61,575	42	-	-	10	5	1,221	1.9	22	-	2	0.6	20	-	2	1.6	3.6	27	2	0.1	3.0	49	137	2.5	2.0	86
					Geometric mean	-	221	15	38,744	39	-	-	9	4	602	0.9	19	-	2	0.3	20	-	2	0.6	1.8	24	2	0.1	3.0	39	135	-	-	
					Percentille 80	-	270	17	96,400	54	-	-	14	7	1,328	3.2	29	-	2	0.9	20	-	2	2.8	5.4	41	2	0.1	3.4	68	149	0.0	0.0	152
					Standard deviation	-	67	4	67,999	20	-	-	5	4	1,816	1.7	13	-	0	0.8	2	-	0	2.0	3.7	15	0	0.0	0.7	43	21	7.6	6.2	53
					MIN	18	135	12	16,000	24	-	-	2	1	110	0.1	8	38	2	0.1	19	145	2	0.1	0.2	12	2	0.0	2.3	19	99	0.0	0.0	0
					MAX	18	391	23	160,000	68	-	-	23	13	7,000	3.6	38	38	2	1.7	22	145	2	4.4	8.8	60	2	0.1	3.6	80	179	29.0	23.0	170
					n	1	18	7	4	4	-	-	18	18	18	4	4	1	18	4	4	1	18	4	4	17	3	2	3	2	15	17	14	18
4	Smith.E	Westmoreland	III	1	2003-11-20	11	253	41	198,600	128	<1	-	6	7	1,011	1.9	57	190	2	*0.1*	1.2	-	2	1.4	2.0	-	2	-	1.2	1,375				>200
				1 (cont.)	2003-11-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210	-	-	-	617	-	0.4	-	-	196			
				2	2003-12-16	-	366	-	-	-	<1	-	7	3	461	-	-	-	*2*	-	-	-	*2*	-	-	100	-	-	-	-	110	8.5	-	90
				3	2004-01-20	-	465	30	-	-	<1	-	7	4	755	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	80	9.0	-	80
				4	2004-02-19	-	592	-	-	-	<1	-	16	8	1,119	-	-	-	*2*	-	-	-	*2*	-	-	-	-	-	-	-	83	12.0	-	60
				4 (cont)	2004-02-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	-	-	-	-	-	-	-	
				5	2004-03-18	-	455	-	-	-	<1	-	14	1	540	-	-	-	*2*	-	-	-	*2*	-	-	77	-	-	-	-	78	12.5	16.5	90
				6	2004-04-21	-	444	65	54,000	280	1	-	12	2	540	16.5	6	-	2	8.8	0.8	-	2	-	0.4	-	-	-	-	-	88	12.8	18.9	40
				6 (cont)	2004-04-22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	-	31	-	-	-	-	-	-	-	
				7	2004-05-20	-	432	-	-	-	<1	-	8	4	920	-	-	-	*2*	-	-	-	*2*	-	-	30	-	-	-	-	93	7.7	18.0	20
				8	2004-06-17	-	440	-	-	-	<1	-	10	2	540	-	-	-	*2*	-	-	-	*2*	-	-	37	-	-	-	-	103	10.5	18.0	140
				9	2004-07-27	-	351	65	-	-	<1	-	8	5	920	-	-	-	2	-	-	-	2	-	-	32	*2*	0.19	3.2	99	-	12.5	20.8	60
				10	2004-08-19	-	437	-	-	-	<1	-	9	3	1,600	-	-	-	*2*	-	-	-	*2*	-	-	44	-	-	-	-	-	11.0	21.0	120
				11	2004-09-23	-	460	-	-	-	<1	-	11	2	920	-	-	-	*2*	-	-	-	*2*	-	-	106	-	-	-	-	-	11.0	16.0	140
				12	2004-10-21	-	421	101	160,000	75	<1	-	11	10	1,600	10.4	14	-	2	1.2	7.2	-	2	0.6	2.8	39	-	-	-	-	-	9.0	17.4	110
				13	2004-11-17	-	309	-	-	-	1	-	10	20	920	-	-	-	*2*	-	-	-	*2*	-	-	35	-	-	-	-	-	11.0	19.0	140
				14	2004-12-23	-	324	-	-	-	<1	-	15	8	540	-	-	-	*2*	-	-	-	*2*	-	-	32	-	-	-	-	-	8.3	17.0	155
				15	2005-01-26	-	437	86	-	-	<1	-	14	7	>2 400	-	-	-	*2*	-	-	-	*2*	-	-	-	-	-	-	-	-	11.0	19.0	160
				16	2005-02-17	-	520	-	-	-	<1	-	12	20	>2 400	-	-	-	*2*	-	-	-	*2*	-	-	75	-	-	-	-	-	10.0	18.0	100
				17	2005-03-17	-	489	-	-	-	<1	-	8	4	3,300	-	-	-	*2*	-	-	-	*2*	-	-	45	-	-	-	-	-	11.0	20.5	160
		FINAL TEST		18	2005-04-26	-	385	92	>241 900	64	<1	-	9	8	28,000	8.8	53	-	*2*	*0.1*	3	-	*2*	*0.1*	0.5	50	*2*	*0.1*	0	195	-	12.5	21.0	-
					Arithmetic mean	-	421	69	137,533	137	-	-	10	6	2,730	9	32	-	2	2.6	3.1	-	2	1.4	1.4	88	2	0.2	1.6	556	104	10.6	18.7	
					Geometric mean	-	413	63	119,719	114	-	-	10	5	1,115	7	22	-	2	0.6	2.2	-	2	0.8	1.0	57	2	0.2	1.2	298	99	10.5	18.6	
					Percentille 80	-	463	91	183,160	189	-	-	13	8	1,600	13	55	-	2	4.3	4.9	-	2	2.3	2.3	77	2	0.3	2.4	903	107	12.4	20.6	
					Standard deviation	-	80	26	74,872	99	-	-	3	5	6,774	6	26	-	0	4.2	2.9	-	0	1.5	1.2	143	0	0.2	1.4	710	39	1.6	1.7	
					MIN	11	253	30	54,000	64	-	-	6	1	461	2	6	190	2	0.1	0.8	210	2	0.1	0.4	30	2	0.1	0.5	99	78	7.7	16.0	
					MAX	11	592	101	198,600	280	-	-	16	20	28,000	17	57	190	2	8.8	7.2	210	2	3.6	2.8	617	2	0.4	3.2	1,375	196	12.8	21.0	
					n	1	18	7	3	4	-	-	18	18	16	4	4	1	18	4	4	1	17	4	4	16	3	3	3	3	8	17	14	

up dated December 22, 2006

VIRGINIA

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Premier Tech Environment

Collaboration of:
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Bruce King

Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
5	Campbell	Westmoreland	III	1	2003-11-21	-	2	3	100	1	1.5	-	5	3	11	3.0	12	90	2	0.7	2.4	2,719	2	0.5	2.4	1,280	2	1.4	1.2	850	-			
				2	2003-12-17	-	2	-	-	-	<1	-	3	3	4	-	-	-	2	-	-	-	2	-	-	92	-	-	-	-	-	-	-	
				3	2004-01-21	-	2	11	-	-	1	-	-	-	13	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	
				3 (cont.)	2004-01-22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51	-	-	-	-	-	-	-	
				4	2004-02-24	-	44	-	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	-	-	
				4 (cont.)	2004-02-25	-	-	-	-	-	-	-	6	-	5	-	-	-	2	-	-	-	2	-	-	67	-	-	-	-	-	0	-	
					Arithmetic mean	-	13	7	-	-	-	-	5	3	8	-	-	-	2	-	-	-	2	-	-	373	-	-	-	-	-	-	-	
					Geometric mean	-	4	5	-	-	-	-	5	3	7	-	-	-	2	-	-	-	2	-	-	142	-	-	-	-	-	-	-	
					Percentille 80	-	19	9	-	-	-	-	6	3	12	-	-	-	2	-	-	-	2	-	-	567	-	-	-	-	-	-	-	
					Standard deviation	-	21	6	-	-	-	-	2	0	4	-	-	-	0	-	-	-	0	-	-	605	-	-	-	-	-	-	-	
					MIN	-	2	3	100	1	-	-	3	3	4	3	12	90	2	1	2	2,719	2	0	2	51	2	1	1	850	50	0	-	
					MAX	-	44	11	100	1	-	-	6	3	13	3	12	90	2	1	2	2,719	2	0	2	1,280	2	1	1	850	50	0	-	
					n	-	4	2	1	1	-	-	3	2	4	1	1	1	4	1	1	1	4	1	1	4	1	1	1	1	1	1	-	
6	Bethel Parsona	Lancaster	I	1	2004-04-20	19	190	24	92,000	86	<1	-	11	2	920	77	1	27	2	4.9	3.2	-	2	3.5	1.2	-	2	4.0	-	-	-	0	0	40
				1 (cont)	2004-04-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.7	-	-	-	27.5	-	-	2.8	-	-	-	-	
				2	2004-05-19	-	207	-	-	-	<1	-	8	4	1,600	-	-	-	2	-	-	-	2	-	-	19	-	-	-	-	203	0	0	150
				3	2004-06-16	-	208	29	-	-	<1	-	9	9	920	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	188	0	0	120
				4	2004-07-26	-	174	-	-	-	<1	-	7	2	920	-	-	-	2	-	-	-	2	-	-	31	-	-	-	-	137	0	11.5	<5
				5	2004-08-18	-	118	-	-	-	<1	-	10	1	920	-	-	-	2	-	-	-	2	-	-	29	-	-	-	-	137	0	0	5
				6	2004-09-22	-	169	35	54,000	27	<1	-	7	2	2	4.1	20	-	2	1.6	10	-	2	1.3	3.2	19	-	-	-	-	127	0	0	5
				7	2004-10-20	-	97	-	-	-	<1	-	5	2	920	-	-	-	2	-	-	-	2	-	-	30	-	-	-	-	137	0	22.1	60
				8	2004-11-17	-	74	-	-	-	-	-	2	1	920	-	-	-	2	-	-	-	2	-	-	32	-	-	-	-	116	0	20.0	10
				9	2004-12-22	-	98	24	-	-	<1	-	9	2	920	-	-	-	2	-	-	-	2	-	-	30	2	2.2	2.4	30	150	0	20.3	30
				10	2005-01-18	-	125	-	-	-	<1	-	2	1	>2 400	-	-	-	2	-	-	-	2	-	-	30	-	-	-	-	117	0	17.0	60
				11	2005-02-15	-	80	-	-	-	<1	-	8	5	>2 400	-	-	-	2	-	-	-	2	-	-	60	-	-	-	-	134	0	7.0	15
				12	2005-03-16	-	111	26	92,000	14	<1	-	6	5	14,000	0.2	19	-	2	0.1	15	-	2	0.1	1.3	70	-	-	-	-	263	0	0	110
				13	2005-04-18	-	117	-	-	-	<1	-	9	1	35,000	-	-	-	2	-	-	-	2	-	-	40	-	-	-	-	120	0	0	160
				14	2005-05-18	-	>68	-	-	-	<1	-	8	5	410	-	-	-	1	-	-	-	1	-	-	20	-	-	-	-	137	0	0	60
				15	2005-06-28	-	51	46	-	-	-	-	2	2	39,000	-	-	-	1	-	-	-	1	-	-	9	-	-	-	-	120	0	0	110
				16	2005-07-26	-	73	-	-	-	<1	-	4	3	7,300	-	-	-	1	-	-	-	1	-	-	18	-	-	-	-	-	0	0	110
				17	2005-08-23	-	83	-	-	-	<1	-	8	4	>240 000	-	-	-	1	-	-	-	1	-	-	18	-	-	-	-	-	0	0	>140
		FINAL TEST		18	2005-09-27	-	67	26	>241 000	35	<1	-	10	3	>241 000	4.1	16	-	1	0.5	5	-	1	0.5	1.3	11	1	0.8	0.1	3	-	0	0	±160
				18 '	2005-10-25	-	-	-	>241 000	-	-	-	-	-	98,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
					Arithmetic mean	-	120	30	79,333	40	-	-	7	3	13,450	21	14	-	2	1.8	8	-	2	1.3	1.7	29	2	2.3	1.8	17	149	0.0	5.4	
					Geometric mean	-	110	29	77,029	33	-	-	6	2	1,848	4	8	-	2	0.8	7	-	2	0.7	1.6	26	2	1.9	0.9	10	145	-	-	
					Percentille 80	-	173	34	92,000	55	-	-	9	5	18,200	33	19	-	2	2.9	12	-	2	2.2	2.1	32	2	3.3	2.6	25	165	0.0	14.8	
					Standard deviation	-	51	8	21,939	31	-	-	3	2	26,585	37	9	-	0	2.2	5	-	0	1.5	1.0	16	1	1.6	1.5	19	42	0.0	8.5	
					MIN	19	51	24	54,000	14	-	-	2	1	2	0	1	27	1	0.1	3	29	1	0.1	1.2	9	1	0.8	0.1	3	116	0.0	0.0	
					MAX	19	208	46	92,000	86	-	-	11	9	98,000	77	20	27	2	4.9	15	29	2	3.5	3.2	70	2	4.0	2.8	30	263	0.0	22.1	
					n	1	17	7	3	4	-	-	18	18	15	4	4	1	18	4	4	1	17	4	4	17	3	3	3	2	14	18	18	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

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Collaboration of:
Dr. Robert Rubin
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Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
7	McCarthy	Lancaster	II	1	2004-05-12	42	190	26	>2 400	61	<1	-	7	6	920	58	3	41	2	2.2	1.2	22	2	0.2	0.8	27	2	0.6	0.8	8.7	-	0	0	50
	/ Taylor			2	2004-06-09	-	2	-	-	-	-	-	14	3	<2	-	-	-	2	-	-	-	2	-	-	25	-	-	-	-	-	0	0	10
				3	2004-07-07	-	2	6	-	-	1	-	4	6	220	-	-	-	2	-	-	-	2	-	-	26	-	-	-	-	-	0	0	90
				4	2004-08-11	-	36	-	280	-	<1	-	4	3	26	-	-	-	2	-	-	-	2	-	-	20	-	-	-	-	-	0	0	160
				5	2004-09-20	-	37	-	-	-	<1	-	4	1	350	-	-	-	2	-	-	-	2	-	-	41	-	-	-	-	-	0	8.0	±150
				6	2004-10-18	-	42	7	54,000	36	<1	-	5	1	920	2	29	-	2	2	5	-	2	1	1	46	-	-	-	-	113	0	0	160
				7	2004-11-15	-	32	-	-	-	<1	-	2	1	920	-	-	-	2	-	-	-	2	-	-	34	-	-	-	-	123	0	14.0	160
				8	2004-12-16	-	30	-	-	-	<1	-	2	4	920	-	-	-	2	-	-	-	2	-	-	36	-	-	-	-	116	0	6.4	120
				9	2005-01-17	-	39	15	-	-	<1	-	4	2	220	-	-	-	2	-	-	-	2	-	-	27	2	0.4	2	35	129	0	17.0	150
				10	2005-02-15	-	35	-	-	-	<1	-	2	4	12	-	-	-	2	-	-	-	2	-	-	75	-	-	-	-	118	0	23.0	160
				11	2005-03-17	-	34	-	-	-	<1	-	3	1	350	-	-	-	2	-	-	-	2	-	-	60	-	-	-	-	121	0	11.0	130
				12	2005-04-11	-	36	20	9,400	27	<1	-	5	4	100	1	51	-	2	0.1	0.2	-	2	0.1	1	80	-	-	-	-	132	0	8.0	85
				13	2005-05-17	-	>70	-	-	-	<1	-	3	1	30	-	-	-	1	-	-	-	1	-	-	27	-	-	-	-	113	0	0	±50
				14	2005-06-23	-	47	-	-	-	-	-	2	1	48	-	-	-	1	-	-	-	1	-	-	7	-	-	-	-	129	0	0	160
				15	2005-07-21	-	50	-	-	-	<1	-	2	1	170	-	-	-	1	-	-	-	1	-	-	33	-	-	-	-	-	0	0	110
				16	2005-08-18	-	36	13	-	-	<1	-	2	1	4,600	-	-	-	1	-	-	-	1	-	-	27	-	-	-	-	-	0	0	±140
				17	2005-09-22	-	58	-	-	-	<1	-	2	1	24,000	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	0	0	70
		FINAL TEST		18	2005-10-20	-	50	10	29,000	56	<1	-	2	1	260	2	24	-	1	0.5	0.5	-	1	0.5	0.6	58	1	0.6	0.1	6	-	0	0	40
					Arithmetic mean	-	45	14	23,170	45	-	-	4	2	2,004	16	27	-	2	1.2	1.8	-	2	0.5	0.8	38	2	0.5	0.9	17	122	0	4.9	
					Geometric mean	-	31	12	8,013	42	-	-	3	2	294	3	18	-	2	0.7	0.9	-	2	0.3	0.8	34	2	0.5	0.5	12	121	-	-	
					Percentille 80	-	49	19	39,000	58	-	-	5	4	920	24	38	-	2	2.0	2.8	-	2	0.8	1.0	56	2	0.6	1.4	24	129	0	9.8	
					Standard deviation	-	40	7	23,791	16	-	-	3	2	5,770	28	20	-	0	1.0	2.3	-	0	0.5	0.3	20	1	0.2	0.9	16	7	0	7.2	
					MIN	42	2	6	280	27	-	-	2	1	12	1	3	41	1	0.1	0.2	22	1	0.1	0.6	7	1	0.4	0.1	6	113	0	0.0	
					MAX	42	190	26	54,000	61	-	-	14	6	24,000	58	51	41	2	2.2	5.2	22	2	1.2	1.2	80	2	0.6	1.8	35	132	0	23.0	
					n	1	17	7	4	4	-	-	18	18	17	4	4	1	18	4	4	1	18	4	4	17	3	3	3	3	9	18	18	
8	Benefiel	Lancaster	II	1	2004-05-27	94	-	9	1,600	8	<1	-	-	-	-	-	-	-	2	0.2	5.2	74	2	1	2.4	22	2	1	0.8	56	-	0	0	-
				1 (cont.)	2004-05-27	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				2	2004-08-26	-	253	12	6,300	36	<1	-	13	1	540	2	19	110	2	-	-	14	2	0.5	4	24	2	0.4	1.6	45	40	0	0	>180
				3	2004-09-30	-	59	-	-	-	<1	-	11	2	2	-	-	-	2	-	-	-	2	-	-	26	-	-	-	-	58	0	0	<5
				4	2004-10-28	-	125	12	-	-	<1	-	5	2	9	-	-	-	2	-	-	-	2	-	-	34	-	-	-	-	124	0	0	>160
				5	2004-11-24	-	309	-	-	-	<1	-	4	11	31	-	-	-	2	-	-	-	2	-	-	24	-	-	-	-	51	0	0	120
				6	2004-12-30	-	316	-	-	-	<1	-	6	1	1,600	-	-	-	2	-	-	-	2	-	-	25	-	-	-	-	127	1.0	0	160
				7	2005-01-27	-	86	11	540	8	<1	-	11	11	540	1	56	-	2	0.3	3.1	-	2	0.2	0.5	25	-	-	-	-	11	0	0	0
				8	2005-02-24	-	100	-	-	-	<1	-	2	6	100	-	-	-	2	-	-	-	2	-	-	40	-	-	-	-	107	0	0	160
				9	2005-03-24	-	108	-	-	-	<1	-	5	6	100	-	-	-	2	-	-	-	2	-	-	65	-	-	-	-	142	0	0	70
				10	2005-04-27	-	138	6	-	-	<1	-	13	12	100	-	-	-	2	-	-	-	2	-	-	60	2	0	0.01	95	100	0	0	2
				11	2005-05-19	-	210	-	-	-	<1	-	13	9	3,100	-	-	-	1	-	-	-	1	-	-	25	-	-	-	-	107	0	0	100
				12	2005-06-30	-	110	-	-	-	-	-	2	4	4	-	-	-	1	-	-	-	1	-	-	24	-	-	-	-	-	0	0	130
				13	2005-07-28	-	160	11	>2 400	21	<1	-	14	14	3,400	3	17	-	1	1.2	0.2	-	1	0.7	0.1	25	-	-	-	-	-	0	0	15
				14	2005-08-25	-	220	-	-	-	<1	-	4	11	23	-	-	-	1	-	-	-	1	-	-	24	-	-	-	-	-	0	0	80
				15	2005-10-04	-	200	-	-	-	<1	-	11	6	200	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	0	0	70
				16	2005-10-27	-	160	10	-	-	<1	-	3	1	590	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	-	0	0	140
				17	2005-11-29	-	230	-	-	-	<1	-	10	5	4,000	-	-	-	1	-	-	-	1	-	-	130	-	-	-	-	-	0	0	5
				18	2005-12-27	-	270	-	-	-	<1	-	11	4	460	-	-	-	1	-	-	-	1	-	-	39	-	-	-	-	-	0	0	40
		FINAL TEST		19	2006-01-24	-	150	25	20,000	19	<1	-	4	18	740	4	33	-	2	0.2	0.3	-	2	0.2	0.1	35	2	0.3	0.1	120	-	0	0	5
					Arithmetic mean	-	178	12	7,110	19	-	-	8	7	863	2	31	-	2	0	2	44	2	0	1	36	2	0	1	79	87	0	0	
					Geometric mean	-	161	11	3,230	16	-	-	7	5	181	2	28	-	1	0	1	32	2	0	1	27	2	0	0	73	71	-	-	
					Percentille 80	-	244	12	11,780	24	-	-	12	11	1,256	3	42	-	2	1	4	62	2	1	3	40	2	0	1	105	125	0	0	
					Standard deviation	-	77	5	8,950	11	-	-	4	5	1,285	1	18	-	1	0	2	42	1	0	2	27	0	0	1	35	44	0	0	
					MIN	94	59	6	540	8	-	-	2	1	2	1	17	110	1	0	0	14	1	0	0	1	2	0	0	45	11	0	0	
					MAX	94	316	25	20,000	36	-	-	14	18	4,000	4	56	110	2	1	5	74	2	1	4	130	2	0	2	120	142	1	0	
					n	1	18	9	4	5	-	-	18	18	18	4	4	1	19	4	4	2	18	5	5	18	4	4	4	4	10	19	19	

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	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
9	Stephens, Ford	Lancaster	II	1	2004-06-15	100	302	14	920	28	<1	-	7	3	2	35	2	62	2	0.3	1.6	87	2	0.3	7.2	32	2	0.5	5.6	55	98	0	32.0	80
				2	2004-07-22	-	79	-	-	-	<1	-	10	9	1,600	-	-	-	2	-	-	-	2	-	-	54	-	-	-	-	121	0	34.5	40
				3	2004-08-17	-	297	15	-	-	<1	-	6	1	1,600	-	-	-	2	-	-	-	2	-	-	21	-	-	-	-	-	0	35.0	80
				4	2004-09-16	-	277	-	-	-	<1	-	11	2	>2 400	-	-	-	2	-	-	-	2	-	-	26	-	-	-	-	-	0	30.5	±160
				5	2004-10-13	-	317	-	-	-	<1	-	6	2	1,600	-	-	-	2	-	-	-	2	-	-	29	-	-	-	-	-	0	16.9	155
				6	2004-11-11	-	329	23	92,000	37	<1	-	5	1	920	1	7	-	2	-	-	-	2	1	6	125	-	-	-	-	-	0	35.3	40
				7	2004-12-15	-	123	-	-	-	<1	-	8	2	920	-	-	-	2	-	-	-	2	-	-	41	-	-	-	-	-	0	27.2	50
				8	2005-01-17	-	298	-	-	-	<1	-	8	6	>2 400	-	-	-	2	1	11	-	2	-	-	52	-	-	-	-	-	0	24.0	100
				9	2005-02-10	-	289	16	-	-	<1	-	8	6	>2 400	1	-	-	2	-	-	-	2	-	-	75	2	0.3	0.3	65	91	0	0	>150
				10	2005-03-10	-	247	-	-	-	<1	-	11	4	54,000	-	-	-	2	-	-	-	2	-	-	65	-	-	-	-	121	0	27.8	70
				11	2005-04-11	-	249	-	-	-	<1	-	5	2	28,000	-	-	-	2	-	-	-	2	-	-	65	-	-	-	-	115	0	35.6	160
				12	2005-05-17	-	>70	31	340,000	45	<1	-	3	2	10,000	5	21	-	1	1.6	7	-	1	0.5	0.3	28	-	-	-	-	200	0	33.0	160
				13	2005-06-23	-	200	-	-	-	-	-	3	1	34,000	-	-	-	1	-	-	-	1	-	-	28	-	-	-	-	94	0	29.0	-
				14	2005-07-21	-	310	-	-	-	<1	-	20	7	>2 400	-	-	-	1	-	-	-	1	-	-	4	-	-	-	-	-	0	36.5	160
	Stephens/Nuss			15	2005-08-18	-	200	44	-	-	<1	-	6	2	6,100	-	-	-	1	-	-	-	1	-	-	25	-	-	-	-	-	0	24.4	±150
				16	2005-09-22	-	260	-	-	-	<1	-	7	20	55,000	-	-	-	1	-	-	-	1	-	-	14	-	-	-	-	-	0	25.0	±150
				17	2005-10-24	-	240	-	-	-	<1	-	7	6	8,200	-	-	-	1	-	-	-	1	-	-	18	-	-	-	-	-	0	16.5	80
		FINAL TEST		18	2005-11-17	-	140	18	>241 960	26	<1	-	2	7	67	5	44	-	1	1.6	23	-	1	0.2	22	150	1	0.2	0.1	1	-	0	28.6	±150
					Arithmetic mean	-	244	23	144,307	34	-	-	7	4	14,429	9	19	-	2	1.1	11	-	2	0.6	9.0	47	2	0.3	2.0	40	120	0	27.3	
					Geometric mean	-	230	21	30,644	33	-	-	6	3	2,603	4	11	-	2	0.9	7.2	-	2	0.4	4.2	35	2	0.3	0.5	16	116	-	-	
					Percentille 80	-	301	29	240,800	40	-	-	9	6	30,400	11	30	-	2	1.6	16	-	2	0.9	13.1	65	2	0.4	3.5	61	121	0	34.8	
					Standard deviation	-	73	11	175,487	9	-	-	4	5	19,961	14	19	-	1	0.6	9.1	-	1	0.5	9.2	38	1	0.1	3.1	34	37	0	9.1	
					MIN	100	79	14	920	26	-	-	2	1	2	1	2	62	1	0.3	1.6	87	1	0.2	0.3	4	1	0.2	0.1	1	91	0	0.0	
					MAX	100	329	44	340,000	45	-	-	20	20	55,000	35	44	62	2	1.6	23	87	2	1.4	22.0	150	2	0.5	5.6	65	200	0	36.5	
					n	1	17	7	3	4	-	-	18	18	14	5	4	1	18	4	4	1	18	4	4	18	3	3	3	3	7	18	18	
10	Goodrich	Prince Geor	III	1	2004-09-15	15	2	7	92,000	22	<1	-	6	4	92,000	3	9	22	2	0.7	6.8	20	2	1.8	2.8	36	2	1.0	2.4	17	-	12.2	23.0	10
				2	2004-10-14	-	2	5	160,000	26	1	-	4	1	1,600	1	26	29	2	-	-	-	2	-	-	29	-	-	-	-	50	0	0	<5
				3	2004-11-10	-	25	4	-	-	<1	-	4	1	920	-	-	-	2	-	-	-	2	-	-	25	-	-	-	-	54	0	0	0
				4	2004-12-14	-	11	-	-	-	<1	-	2	2	920	-	-	-	2	-	-	-	2	-	-	22	-	-	-	-	-	0	0	10
				5	2005-01-19	-	34	-	-	-	<1	-	8	1	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	0.5	0	30
				6	2005-02-09	-	20	6	>24 0000	22	<1	-	6	3	1,600	1	26	-	2	0.5	0.3	-	2	0.3	0.7	174	-	-	-	-	97	0	0	5
				7	2005-03-08	-	18	-	-	-	<1	-	4	26	1,600	-	-	-	2	-	-	-	2	50	-	-	-	-	-	-	35	6.0	16.5	85
				8	2005-04-13	-	15	-	-	-	<1	-	5	15	1,100	-	-	-	2	-	-	-	2	-	-	60	-	-	-	-	31	0	0	10
				9	2005-05-16	-	32	30	-	-	<1	-	2	9	44,000	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	33	0	0	>5
				10	2005-05-21	-	12	-	-	-	-	-	2	1	290	-	-	-	1	-	-	-	1	-	-	10	-	-	-	-	34	0	0	10
				11	2005-07-19	-	26	-	-	-	<1	-	2	5	1	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	52	0	0	30
				12	2005-08-16	-	17	8	>2 400	19	<1	-	3	3	2	4	1	-	1	0.5	0.1	-	1	0.5	0.1	1	-	-	-	-	51	0	0	>5
				13	2005-09-20	-	10	-	-	-	<1	-	5	8	5,800	-	-	-	1	-	-	-	1	-	-	5	-	-	-	-	47	0	0	>150
				14	2005-10-19	-	16	-	-	-	<1	-	2	4	1	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	45	0	0	10
				15	2005-11-15	-	14	4	-	-	<1	-	2	3	3	-	-	-	2	-	-	-	2	-	-	14	-	-	-	-	47	0	0	<5
				16	2005-12-20	-	30	-	-	-	<1	-	3	10	17	-	-	-	1	-	-	-	1	-	-	6	-	-	-	-	41	0	0	5
				17	2006-01-17	-	30	-	-	-	<1	-	3	7	16,000	-	-	-	2	-	-	-	2	-	-	9	-	-	-	-	47	0	0	1
		FINAL TEST		18	2006-02-14	-	41	8	160,000	21	<1	-	2	8	1,500	6.1	17	-	2	0.2	0.5	-	2	0.3	0.6	4	2	0.5	0.9	3	39	0	0	1
					Arithmetic mean	-	20	9	137,333	22	-	-	4	6	9,844	3	16	26	2	0.5	2	-	2	11	1	24	2	1	2	10	47	1	2	
					Geometric mean	-	16	7	133,048	22	-	-	3	4	377	2	10	25	2	0.4	1	-	2	1	1	9	2	1	1	7	45	-	-	
					Percentille 80	-	30	8	160,000	23	-	-	5	9	4,960	4	26	27	2	1	3	-	2	11	2	28	2	1	2	15	51	0	0	
					Standard deviation	-	11	9	39,260	3	-	-	2	6	23,790	2	11	4	1	0	3	-	1	22	1	42	0	0	1	10	16	3	6	
					MIN	15	2	4	92,000	19	-	-	2	1	1	1	1	22	1	0.2	0	20	1	0	0	1	2	1	1	3	31	0	0	
					MAX	15	41	30	160,000	26	-	-	8	26	92,000	6	26	29	2	0.7	7	20	2	50	3	174	2	1	2	17	97	12	23	
					n	1	18	8	3	5	-	-	18	18	17	5	5	2	17	4	4	1	17	5	4	17	2	2	2	2	15	18	18	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

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Premier Tech Environment

Collaboration of:
Dr. Robert Rubin
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Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
11	Whittaker	Nothumberland	II	1	2004-09-21	17	130	37	92,000	64	<1	-	3	*1*	540	8	39	45	2	4.5	8.0	152	2	3.1	2.8	42	*2*	2.2	11.6	39	-	0	0	
				2	2004-10-19	-	269	-	-	-	1	-	6	2	920	-	-	-	2	-	-	-	2	-	-	36	-	-	-	-	-	0	3.2	
				3	2004-11-16	-	129	33	-	-	<1	-	2	4	350	-	-	-	2	-	-	-	2	-	-	42	-	-	-	-	-	12.8	22.0	
				4	2004-12-21	-	111	-	-	-	<1	-	11	15	1,600	-	-	-	2	-	-	-	2	-	-	36	-	-	-	-	-	8.0	13.5	
				5	2005-01-18	-	142	-	-	-	<1	-	2	1	>2 400	-	-	-	2	-	-	-	2	-	-	109	-	-	-	-	-	4.5	14.0	
				6	2005-02-16	-	200	35	160,000	38	<1	-	12	6	>2 400	0.14	30	-	2	3.1	*0.01*	-	2	0.52	*0.01*	65	-	-	-	-	108	4.0	7.0	
				7	2005-03-16	-	177	-	-	-	<1	-	23	14	11,000	-	-	-	2	-	-	-	2	-	-	55	-	-	-	-	108	7.0	17.0	
				8	2005-04-18	-	316	-	-	-	<1	-	16	8	22,000	-	-	-	2	-	-	-	2	-	-	65	-	-	-	-	117	10.0	10.5	
				9	2005-05-19	-	200	56	-	-	<1	-	15	14	3,700	-	-	-	1	-	-	-	1	-	-	15	1	0.6	3	6	111	6.0	0	
				10	2005-06-28	-	72	-	-	-	-	-	3	4	430	-	-	-	1	-	-	-	1	-	-	11	-	-	-	-	112	17.2	0	
				11	2005-07-26	-	98	-	-	-	<1	-	10	7	12,000	-	-	-	1	-	-	-	1	-	-	13	-	-	-	-	133	18.0	19.5	
				12	2005-08-23	-	200	49	>240 000	60	<1	-	20	9	200,000	18	*0.1*	-	1	7.1	*0.1*	-	1	4	*0.1*	16	-	-	-	-	144	15.3	-	
				13	2005-09-27	-	130	-	-	-	<1	-	20	10	18,000	-	-	-	1	-	-	-	1	-	-	14	-	-	-	-	-	18.3	27.0	
				14	2005-10-25	-	100	-	-	-	<1	-	8	4	24,000	-	-	-	2	-	-	-	1	-	-	29	-	-	-	-	-	33.6	53.9	
				15	2005-11-21	-	170	26	-	-	<1	-	3	8	31,000	-	-	-	170	-	-	-	1	-	-	10	-	-	-	-	-	0	0	150 +
				16	2005-12-22	-	120	-	-	-	<1	-	6	2	61,000	-	-	-	28	-	-	-	3	-	-	8	-	-	-	-	-	0	0	70
				17	2006-01-19	-	110	-	-	-	<1	-	3	2	2,500	-	-	-	2	-	-	-	2	-	-	12	-	-	-	-	-	0	0	20
		FINAL TEST		18	2006-02-16	-	110	19	87,000	26	<1	-	13	9	12,000	9	33	-	2	1.8	*0.1*	-	2	0.2	*0.1*	1	2	2	1	5	-	0	0	70
					Arithmetic mean	-	155	36	113,000	47	-	-	10	7	25,065	9	25	-	13	4	2	-	2	2	1	32	2	2	5	17	119	9	11	
					Geometric mean	-	144	34	108,595	44	-	-	7	5	6,309	4	8	-	2	4	0.2	-	2	1	0	22	2	1	3	10	118	-	-	
					Percentille 80	-	200	47	132,800	62	-	-	16	10	24,000	13	35	-	2	6	3	-	2	3	1	50	2	2	8	26	130	16	19	
					Standard deviation	-	63	13	40,780	18	-	-	7	5	49,293	7	17	-	40	2	4	-	1	2	1	28	1	1	6	19	14	9	14	
					MIN	17	72	19	87,000	26	-	-	2	1	350	0	0	45	1	2	0.0	152	1	0	0	1	1	1	1	5	108	0	0	
					MAX	17	316	56	160,000	64	-	-	23	15	200,000	18	39	45	170	7	8	152	3	4	3	109	2	2	12	39	144	34	54	
					n	1	18	7	3	4	-	-	18	18	16	4	4	1	18	4	4	1	18	4	4	18	3	3	3	3	7	18	17	
12	Pride of VA	Lancaster	III	1	2005-02-02	300	176	44	>240 000	80	<1	-	9	21	>2 400	27	16	310	2	0.6	6.6	3	2	0.3	*0.01*	300	-	-	-	-	-	30.0	71.0	>150
	# A			2	2005-02-23	185	184	-	-	-	<1	-	5	8	540	-	-	-	2	-	-	-	2	-	-	210	2	*0.1*	1	360	244	48.6	49.0	-
				3	2005-03-23	-	251	43	-	-	<1	-	11	20	6,300	-	-	-	2	-	-	-	2	-	-	213	-	-	-	-	-	29.0	68.0	-
				4	2005-04-27	-	168	-	-	-	<1	-	14	23	54,000	-	-	-	2	-	-	-	2	-	-	225	-	-	-	-	-	19.0	39.0	?
				5	2005-05-24	-	180	-	-	-	<1	-	7	17	20,000	-	-	-	1	-	-	-	1	-	-	220	-	-	-	-	-	44.0	44.0	-
				6	2005-06-29	-	92	21	>2 419	66	-	-	5	29	>2 419	19	7	-	1	1	*0.1*	-	-	-	-	-	-	-	-	-	-	23.6	15.1	±160
				6 cont	2005-06-30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.9	*0.1*	200	-	-	-	-	-	-	-	
				7	2005-07-27	-	110	-	-	-	1	-	7	25	8,700	-	-	-	1	-	-	-	1	-	-	260	-	-	-	-	-	17.0	21.2	>150
				8	2005-08-24	-	63	-	-	-	<1	-	4	31	45	-	-	-	1	-	-	-	1	-	-	240	-	-	-	-	-	0	6.3	>160
				9	2005-10-05	-	59	10	-	-	<1	-	2	4	*1*	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	0	0	±140
				10	2005-10-26	-	28	-	-	-	<1	-	7	19	1,300	-	-	-	1	-	-	-	1	-	-	410	-	-	-	-	-	8.0	68.0	-
				11	2005-11-22	-	85	-	-	-	<1	-	2	14	2,900	-	-	-	150	-	-	-	1	-	-	410	-	-	-	-	-	14.0	-	150 +
				12	2005-12-28	-	130	30	>241 960	24	<1	-	7	55	37,000	19	9	-	1	31	0.6	-	1	0.4	*0.1*	330	-	-	-	-	-	17.0	19.0	-
				13	2006-01-25	-	160	-	-	-	<1	-	12	14	2,100	-	-	-	2	-	-	-	2	-	-	290	-	-	-	-	268	18.6	-	130
				14	2006-02-21	-	170	-	-	-	<1	-	67	17	15,000	-	-	-	2	-	-	-	2	-	-	680	-	-	-	-	540	19.5	46.4	100
				15	2006-03-30	-	196	49	-	-	<1	-	3	9	387	-	-	-	1	-	-	-	1	-	-	190	-	-	-	-	448	0	22.0	110
				16	2006-04-26	-	148	-	-	-	<1	-	3	2	4,880	-	-	-	1	-	-	-	1	-	-	190	-	-	-	-	546	25.0	34.0	-
				17	2006-05-31	-	96	-	-	-	<1	-	8	6	>241 960	-	-	-	1	-	-	-	1	-	-	170	-	-	-	-	798	20.0	30.0	-
		FINAL TEST		18	2006-06-20	-	127	24	141,000	76	<1	-	3	5	1,120	5.4	0.4	-	1	1	0.1	-	1	0.4	*0.1*	140	1	4.2	11	340	700	0	0	30
					Arithmetic mean	242	135	32		62	-	-	10	18	10,285	18	8	-	11	8	2	-	1	0	0	275	2	2	6	350	506	19	33	
					Geometric mean	236	120	28		56	-	-	6	13	1,884	15	4	-	2	2	0	-	1	0	0	254	1	1	3	350	467	-	-	
					Percentille 80	277	178	44		78	-	-	10	24	16,000	22	12	-	2	13	3	-	2	1	0	324	2	3	9	356	669	27	49	
					Standard deviation	81	57	14		26	-	-	15	13	15,763	9	6	-	35	15	3	-	1	0	0	130	1	3	7	14	206	14	23	
					MIN	185	28	10		24	-	-	2	2	1	5	0	310	1	1	0	3	1	0	0	140	1	0	1	340	244	0	0	
					MAX	300	251	49		80	-	-	67	55	54,000	27	16	310	150	31	7	3	2	1	0	680	2	4	11	360	798	49	71	
					n	2	18	7		4	-	-	18	18	15	4	4	1	18	4	4	1	18	4	4	17	2	2	2	2	7	18	16	

up dated December 22, 2006

VIRGINIA

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						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
13	Pride of VA	Lancaster	III	1	2005-02-02	460	176	65	>240 000	94	<1	-	6	13	920	7	43	400	*2*	26	4.2	1,699	*2*	*0.1*	*0.01*	430	-	-	-	-	-	15.0	39.0	>150
	# B			2	2005-02-23	205	172	-	-	-	<1	-	6	7	*100*	-	-	-	*2*	-	-	-	*2*	-	-	400	*2*	*0.1*	1	155	230	0	16.2	-
				3	2005-03-23	-	246	61	-	-	<1	-	11	8	7,000	-	-	-	*2*	-	-	-	*2*	-	-	385	-	-	-	-	-	2	42.0	-
				4	2005-04-27	-	177	-	-	-	<1	-	13	13	28,000	-	-	-	*2*	-	-	-	*2*	-	-	255	-	-	-	-	-	0	0	160
				5	2005-05-24	-	190	-	-	-	<1	-	15	8	24,000	-	-	-	*1*	-	-	-	*1*	-	-	180	-	-	-	-	-	18.2	27.0	160
				6	2005-06-29	-	86	26	200,000	61	-	-	13	7	37,000	19	6	-	*1*	15	*0.1*	-	*1*	2	*0.1*	320	-	-	-	-	-	0	0	±160
				7	2005-07-27	-	110	-	-	-	1	-	49	18	>24 000	-	-	-	*1*	-	-	-	*1*	-	-	400	-	-	-	-	-	0	0	>150
				8	2005-08-24	-	96	-	-	-	<1	-	47	17	55,000	-	-	-	1	-	-	-	1	-	-	430	-	-	-	-	-	7.5	0	>160
				9	2005-10-05	-	53	10	-	-	<1	-	2	4	25	-	-	-	*1*	-	-	-	*1*	-	-	-	-	-	-	-	-	0	0	±130
				10	2005-10-26	-	29	-	-	-	<1	-	9	24	50	-	-	-	*1*	-	-	-	*1*	-	-	630	-	-	-	-	-	26.2	11.5	-
				11	2005-11-22	-	78	-	-	-	<1	-	8	19	38,000	-	-	-	*1*	-	-	-	*1*	-	-	690	-	-	-	-	-	0	30.0	150 +
				12	2005-12-28	-	150	45	>241 960	25	<1	-	-	25	240,000	27	*0.1*	-	*1*	21	2	-	*1*	0.4	1	530	-	-	-	-	-	9.5	0	±80
				13	2006-01-25	-	210	-	-	-	<1	-	24	9	2	-	-	-	2	-	-	-	2	-	-	440	-	-	-	-	535	20.6	-	75
				14	2006-02-21	-	160	-	-	-	<1	-	6	10	1,600	-	-	-	2	-	-	-	2	-	-	490	-	-	-	-	677	13.0	0	±130
				15	2006-03-30	-	197	25	-	-	<1	-	4	6	670	-	-	-	*1*	-	-	-	*1*	-	-	320	-	-	-	-	449	-	-	90
				16	2006-04-26	-	142	-	-	-	<1	-	3	3	4,110	-	-	-	*1*	-	-	-	*1*	-	-	430	-	-	-	-	547	0	9	-
				17	2006-05-31	-	87	-	-	-	<1	-	7	4	>241 960	-	-	-	*1*	-	-	-	*1*	-	-	390	-	-	-	-	773	0	0	80
		FINAL TEST		18	2006-06-20	-	102	20	120,000	78	<1	-	3	2	1,730	9	1	-	*1*	20	1	-	*1*	*0.2*	1	270	*1*	4	0.3	39	679	0	0.0	40
					Arithmetic mean	332	137	36		64	-	-	13	11	27,388	15	12	-	1	20	2	-	1	1	1	411	2	2	1	97	556	7	11	
					Geometric mean	307	122	30		58	-	-	9	9	2,109	13	2	-	1	20	1	-	1	0	0	392	1	1	1	78	523	-	-	
					Percentille 80	409	185	58		84	-	-	15	18	37,000	22	21	-	2	23	3	-	2	1	1	480	2	3	1	132	679	15	27	
					Standard deviation	180	59	21		29	-	-	14	7	59,368	9	21	-	0	4	2	-	0	1	1	128	1	3	0	82	180	9	15	
					MIN	205	29	10		25	-	-	2	2	2	7	0	400	1	15	0	1,699	1	0	0	180	1	0	0	39	230	0	0	
					MAX	460	246	65		94	-	-	49	25	240,000	27	43	400	2	26	4	1,699	2	2	1	690	2	4	1	155	773	26	42	
					n	2	18	7		4	-	-	17	18	16	4	4	1	18	4	4	1	18	4	4	17	2	2	2	2	7	17	16	
14	Nicolato	Virginia	III	1	2005-05-25	230	250	31	4,600	57	1	-	19	7	1,200	50	2	270	28	2	0.2	9	*1*	0.5	2	69	-	-	-	-	216	0	0	110
		Beach		2	2005-06-22	-	650	-	-	-	-	-	6	1	21,000	-	-	-	*1*	-	-	-	*1*	-	-	180	*1*	0.8	*0.1*	210	90	0	0	120
				3	2005-07-20	-	140	17	-	-	<1	-	5	1	16,000	-	-	-	*1*	-	-	-	*1*	*0.5*	0.3	47	-	-	-	-	237	0	0	50
				4	2005-08-17	-	260	-	-	-	<1	-	8	2	>2 400	-	-	-	*1*	-	-	-	*1*	-	-	73	-	-	-	-	116	0	0	150
				5	2005-09-21	-	140	-	-	-	<1	-	3	5	640	-	-	-	*1*	-	-	-	*1*	-	-	149	-	-	-	-	118	0	0	±150
				6	2005-10-18	-	160	16	>240 000	70	<1	-	3	1	28,000	2	49	-	*1*	1	0.4	-	*1*	*0.5*	0.3	10	-	-	-	-	93	0	0	>150
				7	2005-11-16	-	110	-	-	-	<1	-	2	2	2	-	-	-	5	-	-	-	*1*	-	-	63	-	-	-	-	122	0	0	10
				8	2005-12-21	-	150	-	-	-	<1	-	2	8	8,700	-	-	-	*1*	-	-	-	*1*	-	-	16	-	-	-	-	125	0	0	40
				9	2006-01-18	-	230	22	-	-	<1	-	24	5	26,000	-	-	-	*2*	-	-	-	*2*	-	-	15	*2*	0.2	*0.1*	10	135	0	0	30
				10	2006-02-15	-	150	-	-	-	<1	-	5	4	2,400	-	-	-	*2*	-	-	-	*2*	-	-	2	-	-	-	-	129	0	0	80
				11	2006-03-22	-	135	-	-	-	<1	-	11	3	> 241 960	-	-	-	*1*	-	-	-	*1*	-	-	300	-	-	-	-	119	0	0	90
				12	2006-04-20	-	178	20	173,000	51	<1	-	2	4	3,450	4	25	-	*1*	*0.2*	6	-	*1*	*0.2*	0.8	52	-	-	-	-	115	0	0	20
				13	2006-05-17	-	201	-	-	-	<1	-	4	2	2,600	-	-	-	*1*	-	-	-	*1*	-	-	18	-	-	-	-	124	0	0	20
				14	2006-06-21	-	210	-	-	-	<1	-	4	4	15,500	-	-	-	5	-	-	-	*1*	-	-	260	-	-	-	-	149	-	-	40
				15	2009-08-01	-	122	11	-	-	<1	-	22	16	49,000	-	-	-	56	-	-	-	2	-	-	29	-	-	-	-	133	-	-	<5
				16	2006-08-23	-	121	-	-	-	<1	-	4	1	6,500	-	-	-	11	-	-	-	2	-	-	40	-	-	-	-	131	-	-	140
				17	2006-09-26	-	183	-	-	-	<1	-	24	5	1,370	-	-	-	7	-	-	-	*1*	-	-	420	-	-	-	-	132	0	0	10
		FINAL TEST		18	2006-10-25	-	99	14	57,900	63	<1	-	14	3	6,130	3	40	-	*1*	1	2	-	*1*	0.6	*0.1*	340	*1*	0.9	0.1	300	117	0	0	<5
					Arithmetic mean	-	194	19	78,500	60	-	-	9	4	11,781	15	29	-	7	1	2	-	1	0	1	116	1	1	0	173	133	0	0	
					Geometric mean	-	174	18	35,850	60	-	-	6	3	3,904	6	17	-	2	1	1	-	1	0	0	55	1	1	0	85	130	-	-	
					Percentille 80	-	222	22	126,960	66	-	-	17	5	21,000	22	43	-	6	1	3	-	2	1	1	228	2	1	0	264	134	0	0	
					Standard deviation	-	123	7	86,069	8	-	-	8	4	13,568	24	21	-	14	1	3	-	0	0	1	130	1	0	0	148	37	0	0	
					MIN	230	99	11	4,600	51	-	-	2	1	2	2	2	270	1	0	0	9	1	0	0	2	1	0	0	10	90	0	0	
					MAX	230	650	31	173,000	70	-	-	24	16	49,000	50	49	270	56	2	6	9	2	1	2	420	2	1	0	300	237	0	0	
					n	1	18	7	3	4	-	-	18	18	16	4	4	1	18	4	4	1	18	4	4	18	3	3	3	3	18	15	15	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

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Collaboration of:
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Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
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						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
15	Stevens-Jeff	Accomack	I	1	2005-06-08	63	160	61	-	24	-	-	-	-	-	-	-	-	-	*0.5*	*0.1*	*1*	-	*0.5*	*0.1*	*1*	-	-	-	-	-	0	0	5
		Chincoteague city		1 (cont.)	2005-06-08 & 09	-	-	-	>1 600	-	-	-	22	-	>1 600	-	-	-	*2*	-	-	-	*2*	-	-	-	-	-	-	-				
	fecal coliform analysis other lab			2	2005-07-13	-	180	47	>1 600	68	<1	-	11	8	>1 600	4	23	120	8	-	-	-	*2*	-	-	2	-	-	-	-	176	0	0	70
				3	2005-08-10	-	160	29	-	-	<1	-	10	5	>1 600	-	-	-	*2*	-	-	-	*2*	-	-	2	-	-	-	-	238	0	0	-
				4	2005-09-14	-	150	-	-	-	1	-	17	7	13,000	-	-	-	*2*	-	-	-	*2*	-	-	*1*	-	-	-	-	-	0	0	-
				5	2005-10-12	-	220	-	-	-	<1	-	13	*1*	54,000	-	-	-	*2*	-	-	-	*2*	-	-	1	-	-	-	-	-	0	0	-
				6	2005-11-09	-	210	29	1,600,000	29	<1	-	*2*	8	79,000	10	30	-	*2*	2	0.4	-	*2*	*0.5*	*0.1*	70	-	-	-	-	-	0	0	-
				7	2005-12-14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*2*	-	-	200	-	-	-	-	-	0	0	-
				8	2006-01-10	-	31	-	-	-	<1	-	49	33	1,600,000	-	-	-	*2*	-	-	-	*2*	-	-	140	-	-	-	-	-	-	-	10
				9	2006-02-07 & 09	-	210	37	-	-	<1	-	23	19	54,000	-	-	-	*2*	-	-	-	*2*	-	-	170	-	-	-	-	-	-	-	20
				10	2006-03-08	-	123	-	-	-	<1	-	48	12	2,600	-	-	-	*2*	-	-	-	*2*	-	-	74	-	-	-	-	160	0	0	110
				11	2006-04-11	-	198	-	-	-	<1	-	2	*1*	130,000	-	-	-	7	-	-	-	*2*	-	-	77	-	-	-	-	-	0	0	30
				12	2006-05-10	-	56	59	>1 600	27	<1	-	*2*	3	*200*	8	1	-	*2*	3	0.5	-	*2*	*0.2*	15	94	-	-	-	-	171	-	-	10
				13	2006-06-13	-	152	-	-	-	<1	-	56	16	920,000	-	-	-	*2*	-	-	-	*2*	-	-	85	-	-	-	-	211	-	-	20
				14	2006-07-19	-	71	-	-	-	<1	-	6	5	24,000	-	-	-	*2*	-	-	-	*2*	-	-	88	-	-	-	-	254	-	-	40
				15	2006-08-29	-	100	39	-	-	<1	-	18	14	92,000	-	-	-	2	-	-	-	*2*	-	-	68	-	-	-	-	185	-	-	<5
				16	2006-09-20	-	150	-	-	-	<1	-	*2*	2	*200*	-	-	-	*2*	-	-	-	*2*	-	-	150	-	-	-	-	273	-	-	-
				17	2006-10-19	-	212	-	-	-	<1	-	31	15	2,300	-	-	-	*2*	-	-	-	*2*	-	-	86	-	-	-	-	315	-	-	<5
		FINAL TEST		18	2006-11-15	-	142	20	790,000	46	<1	-	13	2	110,000	8	4	-	*2*	0.3	*0.1*	-	2	1	0.1	71	-	-	-	-	435	-	-	60
					Arithmetic mean	-	148	40	1,195,000	39	-	-	19	9	220,093	7	14	-	3	1	0	-	2	1	4	77	-	-	-	-	242	0	0	
					Geometric mean	-	134	38	1,124,278	36	-	-	12	6	24,800	7	7	-	2	1	0	-	2	0	0	30	-	-	-	-	231	-	-	
					Percentille 80	-	208	54	1,438,000	51	-	-	30	15	118,000	9	26	-	2	2	0	-	2	1	6	122	-	-	-	-	281	0	0	
					Standard deviation	-	57	15	572,756	18	-	-	17	9	462,312	3	14	-	2	1	0	-	0	0	7	61	-	-	-	-	84	0	0	
					MIN	63	31	20	790,000	24	-	-	2	1	200	4	1	120	2	0	0	1	2	0	0	1	-	-	-	-	160	0	0	
					MAX	63	220	61	1,600,000	68	-	-	56	33	########	10	30	120	8	3	1	1	2	1	15	200	-	-	-	-	435	0	0	
					n	1	17	8	2	5	-	-	17	16	14	4	4	1	17	4	4	1	18	4	4	18	-	-	-	-	10	9	9	
16	Hale	Accomack	I	1	2005-06-09	64	220	98	-	64	-	-	4	6	-	1	62	110	-	2	2	41	-	1	4	12	-	-	-	-	-	0	0	120
		Chincoteague city		2	2005-07-13	-	160	-	-	-	<1	-	*2*	3	920	-	-	-	*2*	-	-	-	*2*	-	-	6	-	-	-	-	-	0	0	100
	fecal coliform analysis other lab			3	2005-08-10	-	190	43	-	-	<1	-	2	2	1,600	-	-	-	*2*	-	-	-	*2*	-	-	6	-	-	-	-	197	0	0	-
				4	2005-09-14	-	120	-	-	-	<1	-	*2*	15	220	-	-	-	*2*	-	-	-	*2*	-	-	4	-	-	-	-	62	-	-	-
				5	2005-10-12	-	170	-	-	-	<1	-	*2*	1	110	-	-	-	*2*	-	-	-	*2*	-	-	3	-	-	-	-	-	0	0	-
				6	2005-11-09	-	80	28	16,000	1	<1	-	*2*	3	490	30	55	-	*2*	*0.5*	4	-	*2*	*0.5*	4	1	-	-	-	-	-	0	0	-
				7	2005-12-14	-	-	-	-	-	-	-	45	2	2	-	-	-	2	-	-	-	*2*	-	-	9	-	-	-	-	-	0	0	
				8	2006-01-10	-	220	-	-	-	<1	-	6	2	240	-	-	-	*2*	-	-	-	*2*	-	-	28	-	-	-	-	-	0	0	30
				9	2006-02-07 & 08	-	160	46	-	-	<1	-	3	*1*	240	-	-	-	*2*	-	-	-	*2*	-	-	11	-	-	-	-	-	0	0	10
				10	2006-03-08 & 09	-	134	-	-	-	<1	-	2	1	1,600	-	-	-	*2*	-	-	-	*2*	-	-	13	-	-	-	-	79	-	-	50
				11	2006-04-11	-	113	-	-	-	<1	-	2	*1*	2,400	-	-	-	*2*	-	-	-	*2*	-	-	4	-	-	-	-	-	-	-	5
				12	2006-05-10	-	178	85	>1 600	32	<1	-	3	3	79	*0.2*	31	-	*2*	1	7	-	*2*	*0.2*	8	15	-	-	-	-	133	0	0	<10
				13	2006-06-13	-	157	-	-	-	<1	-	2	3	3,500	-	-	-	8	-	-	-	4	-	-	9	-	-	-	-	184	-	-	<10
				14	2006-07-19	-	138	-	-	-	<1	-	2	*1*	>16 000	-	-	-	>1600	-	-	-	*2*	-	-	7	-	-	-	-	-	-	-	5
				15	2006-08-29	-	101	43	-	-	<1	-	2	3	54	-	-	-	*2*	-	-	-	4	-	-	15	-	-	-	-	73	-	-	<1
				16	2006-09-20	-	118	-	-	-	<1	-	3	3	*20*	-	-	-	*2*	-	-	-	*2*	-	-	6	-	-	-	-	107	-	-	-
				17	2006-10-19	-	119	-	-	-	<1	-	2	7	>1 600	-	-	-	*2*	-	-	-	*2*	-	-	19	-	-	-	-	74	-	-	<5
		FINAL TEST		18	2006-11-15	-	229	35	33,000	58	<1	-	19	*1*	350	0.4	48	-	2	1	3	-	2	2	3	23	-	-	-	-	63	0	0	<5
					Arithmetic mean	-	153	54	24,500	39	-	-	6	3	788	8	49	-	2	1	4	-	2	1	4	11	-	-	-	-	108	0	0	
					Geometric mean	-	147	49	22,978	18	-	-	3	2	248	1	47	-	2	1	3	-	2	1	4	8	-	-	-	-	98	-	-	
					Percentille 80	-	188	77	29,600	60	-	-	4	3	1,600	13	58	-	2	1	5	-	2	1	5	15	-	-	-	-	153	0	0	
					Standard deviation	-	44	27	12,021	29	-	-	11	3	1,042	15	13	-	2	0	2	-	1	1	2	7	-	-	-	-	52	0	0	
					MIN	64	80	28	16,000	1	-	-	2	1	2	0	31	110	2	1	2	41	2	0	3	1	-	-	-	-	62	0	0	
					MAX	64	229	98	33,000	64	-	-	45	15	3,500	30	62	110	8	2	7	41	4	2	8	28	-	-	-	-	197	0	0	
					n	1	17	7	2	4	-	-	18	18	15	4	4	1	16	4	4	1	17	4	4	18	-	-	-	-	9	10	10	

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	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
17	Reed	Accomack	I	1	2005-06-14	64	200	35	-	50	-	-	-	-	-	-	-	-	-	2	0.5	18	-	13	*0.1*	41	-	1	5	5	-	0	0	-
		Chincoteague city		2	2005-07-14	-	99	34	>1 600	35	<1	-	-	-	-	-	-	-	*1*	-	-	-	*1*	-	-	47	-	-	-	-	-	0	0	-
	fecal coliform analysis other lab			3	2005-08-11	-	160	22	>1 600	35	<1	-	14	-	>1 600	8	20	120	2	-	-	-	2	-	-	43	-	-	-	-	-	0	0	140
				4	2005-09-15	-	130	-	-	-	<1	-	8	26	22,000	-	-	-	2	-	-	-	2	-	-	30	-	-	-	-	-	0	0	±100
				5	2005-10-13	-	110	-	-	-	<1	-	5	3	*200*	-	-	-	2	-	-	-	2	-	-	18	-	-	-	-	366	0	0	-
				6	2005-11-10	-	140	19	11,000	25	<1	-	2	5	17,000	8	40	-	2	1	21	-	2	2	17	33	-	-	-	-	138	-	-	-
				7	2005-12-15	-	170	-	-	-	<1	-	6	2	*2*	-	-	-	2	-	-	-	2	-	-	33	-	-	-	-	134	0	0	160
				8	2006-01-12	-	150	-	-	-	<1	-	8	13	9,200	-	-	-	2	-	-	-	2	-	-	88	-	-	-	-	136	0	0	70
				9	2006-02-09	-	210	44	-	-	<1	-	4	3	200	-	-	-	2	-	-	-	2	-	-	73	2	1	10	8	112	0	0	60
				10	2006-03-09	-	156	-	-	-	<1	-	51	6	16,000	-	-	-	2	-	-	-	2	-	-	74	-	-	-	-	103	0	0	90
				11	2006-04-13	-	174	-	-	-	<1	-	*2*	3	2,800	-	-	-	170	-	-	-	2	-	-	62	-	-	-	-	-	0	0	70
				12	2006-05-11	-	130	89	>1 600	34	<1	-	21	56	540	17	8	-	2	*0.2*	27	-	2	3	*0.1*	43	-	-	-	-	204	0	0	80
				13	2006-06-15	-	96	-	-	-	<1	-	5	13	54,000	-	-	-	2	-	-	-	2	-	-	30	-	-	-	-	175	-	-	40
				14	2006-07-20	-	176	-	-	-	<1	-	3	5	24,000	-	-	-	2	-	-	-	2	-	-	50	-	-	-	-	168	-	-	20
				15	2006-08-31	-	83	40	-	-	<1	-	6	*1*	*2*	-	-	-	2	-	-	-	2	-	-	86	-	-	-	-	111	-	-	50
				16	2006-09-21	-	91	-	-	-	<1	-	3	2	*2*	-	-	-	2	-	-	-	2	-	-	44	-	-	-	-	194	-	-	50
				17	2006-10-18	-	124	-	-	-	<1	-	3	6	260	-	-	-	2	-	-	-	2	-	-	61	-	-	-	-	139	-	-	30
		FINAL TEST		18	2006-11-16	-	135	32	3,500,000	51	<1	-	12	2	12	6	6	-	2	1	34	-	2	5	*0.1*	35	2	*0.2*	4	4	112	0	0	75
					Arithmetic mean	-	141	39	1,755,500	38	-	-	10	10	9,748	10	18	-	12	1	21	-	2	6	4	50	2	1	7	6	161	0	0	
					Geometric mean	-	136	35	196,214	37	-	-	6	5	544	9	14	-	2	1	10	-	2	4	0	46	2	0	6	5	151	-	-	
					Percentille 80	-	172	42	2,802,200	50	-	-	12	13	18,000	12	28	-	2	1	30	-	2	8	7	69	2	1	8	7	186	0	0	
					Standard deviation	-	37	22	2,467,096	10	-	-	12	14	15,092	5	16	-	41	1	14	-	0	5	8	20	0	0	3	2	70	0	0	
					MIN	64	83	19	11,000	25	-	-	2	1	2	6	6	120	1	0	1	18	1	2	0	18	2	0	4	4	103	0	0	
					MAX	64	210	89	3,500,000	51	-	-	51	56	54,000	17	40	120	170	2	34	18	2	13	17	88	2	1	10	8	366	0	0	
					n	1	18	8	2	6	-	-	16	15	15	4	4	1	17	4	4	1	17	4	4	18	2	3	3	3	13	12	12	
18	Palmer	Accomack	I	1	2005-06-07	55	130	73	1,600	48	-	-	71	9	>1 600	12	*0.1*	76	2	2	*0.1*	27	2	2	*0.1*	44	*2*	10	*0.1*	47	76	0	24	0
		Chincoteague city		2	2005-07-12	-	110	-	-	-	20	-	8	2	920	-	-	-	2	-	-	-	2	-	-	36	-	-	-	-	101	0	0	120
	fecal coliform analysis other lab			3	2005-08-09	-	300	49	-	-	-	-	8	*1*	>1 600	-	1	-	2	-	-	-	2	-	-	22	-	-	-	-	196	0	0	>160
				4	2005-09-13	-	350	-	-	-	<1	-	8	2	160,000	-	-	-	2	-	-	-	2	-	-	20	-	-	-	-	180	0	0	>160
				5	2005-10-11	-	120	-	-	-	<1	-	28	6	26,000	-	-	-	2	-	-	-	2	-	-	20	-	-	-	-	-	0	0	140
				6	2005-11-08	-	160	58	49,000	102	<1	-	6	2	13,000	6	30	-	2	4	0.2	-	2	2.2	*0.1*	24	-	-	-	-	112	0	0	150+
				7	2005-12-13	-	130	-	-	-	<1	-	26	10	54,000	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	111	0	0	±140
				8	2006-01-11	-	160	-	-	-	<1	-	20	8	240,000	-	-	-	2	-	-	-	2	-	-	32	-	-	-	-	121	-	-	90
				9	2006-02-08	-	200	39	-	-	<1	-	22	11	2,300	-	-	-	2	-	-	-	2	-	-	22	*2*	2	*0.1*	81	96	0	0	90
				10	2006-03-07	-	214	-	-	-	<1	-	20	14	1,600,000	-	-	-	2	-	-	-	2	-	-	19	-	-	-	-	-	0	0	120
	The results are discard see remarks and field report			11	2006-04-12	-	184	-	-	-	<1	-	90	36	>1 600 000	-	-	-	2	-	-	-	2	-	-	24	-	-	-	-	-	-	-	110
				12	2006-05-10	-	189	83	>1 600	20	<1	-	7	9	160,000	8	23	-	2	2	0.3	-	2	2	*0.1*	29	-	-	-	-	129	-	-	50
				13	2006-06-14	-	206	-	-	-	<1	-	12	7	140,000	-	-	-	31	-	-	-	31	-	-	24	-	-	-	-	164	-	-	<5
				14	2006-07-19	-	190	-	-	-	<1	-	16	9	160,000	-	-	-	2	-	-	-	22	-	-	25	-	-	-	-	138	-	-	80
				15	2006-08-31	-	68	80	-	-	<1	-	6	3	24,000	-	-	-	7	-	-	-	2	-	-	37	-	-	-	-	114	-	-	80
				16	2006-09-19	-	37	-	-	-	<1	-	3	*1*	830	-	-	-	2	-	-	-	2	-	-	76	-	-	-	-	287	-	-	70
				17	2006-10-17	-	59	-	-	-	<1	-	3	5	680	-	-	-	2	-	-	-	2	-	-	74	-	-	-	-	178	-	-	20
		FINAL TEST		18	2006-11-14	-	34	37	26,000	40	<1	-	*2*	1	620	8	35	-	2	2	0.2	-	2	4	*0.1*	51	*2*	1	*0.1*	58	159	16	30	30
					Arithmetic mean	-	158	60	25,533	52	-	-	20	8	172,157	8	18	-	4	3	0.2	-	5	3	0.1	34	2	4	0	62	144	2	5	
					Geometric mean	-	133	57	12,679	44	-	-	12	5	21,066	8	4	-	2	3	0.2	-	3	3	0.1	31	2	3	0	60	136	-	-	
					Percentille 80	-	204	79	39,800	70	-	-	24	10	160,000	10	31	-	2	3	0.2	-	2	3	0.1	41	2	7	0	72	178	0	5	
					Standard deviation	-	84	19	23,703	35	-	-	24	8	403,004	3	16	-	7	1	0.1	-	8	1	0.0	17	0	5	0	17	53	5	11	
					MIN	55	34	37	1,600	20	-	-	2	1	620	6	0	76	2	2	0.1	27	2	2	0.1	19	2	1	0	47	76	0	0	
					MAX	55	350	83	49,000	102	-	-	90	36	#######	12	35	76	31	4	0.3	27	31	4	0.1	76	2	10	0	81	287	16	30	
					n	1	18	7	3	4	-	-	18	18	15	4	5	1	18	4	4	1	18	4	4	18	3	3	3	3	15	10	10	

up dated December 22, 2006

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Realised by:
Delmarva Septic Solution
Premier Tech Environment

Collaboration of:
Dr. Robert Rubin
Bruce King

Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
19	Thompson	Glendale	III	1	2005-11-02	3	410	39	>241 960	59	<1	-	2	*1*	860	2	27	42	*1*	*0.5*	3	86	*1*	1	4	28	-	-	-	-	-	0	0	**STB-650**
	STB-650			2	2005-11-30	-	270	-	-	-	<1	-	6	*1*	870	-	-	-	*1*	-	-	-	1	-	-	9	-	-	-	-	-	0	0	-
				3	2005-12-29	-	320	25	-	-	<1	-	2	*1*	5	-	-	-	*1*	-	-	-	*1*	-	-	21	*1*	-	-	18	-	-	-	-
				4	2006-01-26	-	380	-	-	-	<1	-	*2*	*1*	120	-	-	-	*2*	-	-	-	*2*	-	-	18	-	-	-	-	-	0	0	-
				5	2006-02-22	-	400	-	-	-	<1	-	*2*	*1*	290	-	-	-	*2*	-	-	-	*2*	-	-	17	-	-	-	-	69	-	-	-
				6	2006-03-23	-	380	37	>241 960	62	1	-	5	*1*	116	*0.2*	37	-	*1*	0.2	0.4	-	*1*	0.3	0.5	5	-	-	-	-	-	-	-	-
				7	2006-04-19	-	474	-	-	-	<1	-	2	2	5,480	-	-	-	*1*	-	-	-	*1*	-	-	1	-	-	-	-	-	0	0	-
				8	2006-05-18	-	327	-	-	-	<1	-	*2*	3	2	-	-	-	*1*	-	-	-	*1*	-	-	2	-	-	-	-	111	-	-	-
				9	2006-06-22	-	388	54	-	-	<1	-	2	*1*	62	-	-	-	*1*	-	-	-	*1*	-	-	1	-	-	-	-	-	-	-	-
				10	2006-07-31	-	211	-	-	-	<1	-	4	*1*	2,200	-	-	-	*2*	-	-	-	*2*	-	-	4	-	-	-	-	101	0	0	-
				11	20006-08-22	-	175	-	-	-	<1	-	2	*1*	260	-	-	-	*2*	-	-	-	*2*	-	-	3	-	-	-	-	163	-	-	-
				12	2006-09-27	-	251	35	>241 960	112	<1	-	2	*1*	238	1	25	-	*1*	1	1	-	*1*	1	2	7	-	-	-	-	43	0	0	-
				13	2006-10-24	-	231	-	-	-	<1	-	8	5	172	-	-	-	*1*	-	-	-	*1*	-	-	6	-	-	-	-	-	0	0	-
				14	2006-11-20	-	303	120	-	-	<1	-	*2*	7	365	-	-	-	*1*	-	-	-	*1*	-	-	7	-	-	-	-	49	0	0	-
				15	2006-12-11	-	336	63	-	-	<1	-	30	21	15,500	-	-	-	*1*	-	-	-	*1*	-	-	10	-	-	-	-	69	0	0	-
				16	2007-01-25	-	343	-	-	-	<1	-	*2*	10	28	-	-	-	*1*	-	-	-	*1*	-	-	6	-	-	-	-	51	0	0	-
				17	2007-02-13	-	421	-	-	-	<1	-	5	19	537	-	-	-	*1*	-	-	-	*1*	-	-	3	-	-	-	-	38	0	0	-
				18	2007-03-22	-	257	50	>2419600	83	<1	-	*2*	2	60	*0*	23	-	*1*	0.6	0.25	-	*1*	0.4	*0.1*	5	*1*	0.4	*0.1*	3	44	-	-	
				19																														
					Arithmetic mean	3	327	53	#DIV/0!	79	-	-	5	4	1,509	1	28	42	1	1	1	86	1	1	2	8	1	0	0	10	74	0	0	
					Geometric mean	3	316	47	#NUM!	77	-	-	3	2	218	1	27	42	1	0	1	86	1	1	1	6	1	0	0	7	66	#NUM!	#NUM!	
					Percentille 80	3	395	59	#NUM!	95	-	-	5	6	866	1	31	42	2	1	2	86	2	1	3	14	1	0	0	15	103	0	0	
					Standard deviation	#DIV/0!	81	30	#DIV/0!	24	-	-	7	6	3,728	1	6	#DIV/0!	0	0	1	#DIV/0!	0	0	2	8	0	#DIV/0!	#DIV/0!	11	40	0	0	
					MIN	3	175	25	0	59	-	-	2	1	2	0	23	42	1	0	0	86	1	0	0	1	1	0	0	3	38	0	0	
					MAX	3	474	120	0	112	-	-	30	21	15,500	2	37	42	2	1	3	86	2	1	4	28	1	0	0	18	163	0	0	
					n	1	18	8	0	4	-	-	18	18	18	4	4	1	18	4	4	1	18	4	4	18	2	1	1	2	10	11	11	
20	Garcia	Madison	IV	1	2006-01-31	6	170	36	12	30	<1	-	*2*	1	5	*0.2*	35	36	*2*	*0.2*	13	16	*2*	*0.2*	0.2	7	*2*	*0.2*	0.6	41	-	-	-	**STB-650**
	STB-650			2	2006-02-23	-	140	-	-	-	<1	-	4	2	2,200	-	-	-	*2*	-	-	-	*2*	-	-	2	-	-	-	-	125	-	-	-
				3	2006-03-29	-	163	61	-	-	<1	-	3	1	184	-	-	-	*1*	-	-	-	*1*	-	-	2	-	-	-	-	129	-	-	-
				4	2006-04-25	-	162	-	-	-	<1	-	2	2	205	-	-	-	*1*	-	-	-	*1*	-	-	3	-	-	-	-	57	0	0	-
				5	2006-05-25	-	151	-	-	-	<1	-	2	1	45	-	-	-	*1*	-	-	-	*1*	-	-	2	-	-	-	-	11	-	-	-
				6	2006-06-22	-	270	62	>241 960	70	<1	-	4	*1*	387	19	25	-	-	-	-	-	-	-	-	-	-	-	-	-	128	-	-	-
				7	2006-08-02	-	189	-	-	-	<1	-	2	*1*	370	-	-	-	*2*	-	-	-	*2*	-	-	1	-	-	-	-	125	-	-	-
				8	2006-08-24	-	156	-	-	-	<1	-	2	1	2,400	-	-	-	*2*	-	-	-	*2*	-	-	3	-	-	-	-	135	-	-	-
				9	2006-09-28	-	206	43	-	-	<1	-	5	*1*	9	-	-	-	*1*	1	2	-	*1*	1	2	4	-	-	-	-	138	-	-	-
				10	2006-10-26	-	155	-	-	-	<1	-	2	*1*	488	-	-	-	*1*	-	-	-	*1*	-	-	3	-	-	-	-	162	-	-	-
				11	2006-11-21	-	219	-	-	-	<1	-	*2*	*1*	53	-	-	-	*1*	-	-	-	*1*	-	-	*1*	-	-	-	-	181	0	0	-
				12	2006-12-12	-	184	56	242,000	71	<1	-	*2*	*1*	22	6	48	-	*1*	*0.2*	2	-	*1*	0.4	2	4	-	-	-	-	402	0	0	-
				13	2007-01-24	-	209	-	-	-	<1	-	2	*1*	55	-	-	-	*1*	-	-	-	*1*	-	-	*1*	-	-	-	-	171	0	0	-
				14	2007-02-20	-	171	-	-	-	<1	-	5	*1*	816	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	162	0	0	-
				15	2007-03-20	-	179	31	-	-	-	-	6	2	613	-	-	-	*1*	-	-	-	*1*	-	-	*1*	-	-	-	-	156	0	0	
				16	2007-04-18	-	218	-	-	-	<1	-	11	5	1,990	-	-	-	*1*	-	-	-	*2*	-	-	*1*	-	-	-	-	149	0	0	
				17	2007-05-23	-	210	-	-	-	<1	-	7	6	2,480	-	-	-	*1*	-	-	-	*1*	-	-	*1*	-	-	-	-	161	-	-	
				18	2007-06-20	-	151	54	2,420	63	<1	-	3	2	980	18	23	-	26	0.3	1.2	-	7	0.4	1.3	6	-	-	-	-	170	-	-	
				19	2007-07-25	-	-	-	-	-	-	-	-	-	-	-	-	-	*1*	-	-	-	*1*	-	-	-	*1*	0.6	*0.1*	*1*	-	-	-	
					Arithmetic mean	6	184	49	81,477	58	-	-	4	2	739	11	33	36	3	0	4	16	2	1	1	3	2	0	0	21	151	0	0	
					Geometric mean	6	181	48	1,915	55	-	-	3	1	234	5	31	36	1	0	3	16	1	0	1	2	1	0	0	6	128	#NUM!	#NUM!	
					Percentille 80	6	210	60	146,168	70	-	-	5	2	1,586	18	40	36	2	1	6	16	2	1	2	4	2	1	1	33	168	0	0	
					Standard deviation	#DIV/0!	33	12	139,022	19	-	-	2	1	891	9	11	#DIV/0!	6	0	6	#DIV/0!	1	0	1	2	1	0	0	28	78	0	0	
					MIN	6	140	31	12	30	-	-	2	1	5	0	23	36	1	0	1	16	1	0	0	1	1	0	0	1	11	0	0	
					MAX	6	270	62	242,000	71	-	-	11	6	2,480	19	48	36	26	1	13	16	7	1	2	7	2	1	1	41	402	0	0	
					n	1	18	7	3	4	-	-	18	18	18	4	4	1	17	4	4	1	17	4	4	16	2	2	2	2	17	7	7	

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DOCUMENT INTERNE ETG

Realised by:
Delmarva Septic Solution
Premier Tech Environment

Collaboration of:
Dr. Robert Rubin
Bruce King

Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
21	Loomis	Mt Jackson	IV	1	2006-09-14	8	124	36	>241 960	67	<1	-	9	2	54,800	3	29	45	1	*0.2*	6	10	*1*	*0.2*	0.4	10	-	-	-	-	-	-	-	**STB-650**
	STB-650			2	2006-10-12	-	95	-	-	-	1	-	8	2	1,790	-	-	-	1	-	-	-	-	-	-	16	-	-	-	-	124	-	-	-
				3	2006-11-09	-	88	120	-	-	1	-	10	2	16,200	-	-	-	1	-	-	-	3	-	-	19	-	-	-	-	43	-	-	-
				4	2006-12-05	-	195	-	-	-	<1	-	10	6	4,610	-	-	-	*1*	-	-	-	*1*	-	-	7	-	-	-	-	79	0	0	-
				5	2007-01-09	-	169	-	-	-	<1	-	13	4	2,610	-	-	-	2	-	-	-	*1*	-	-	14	-	-	-	-	298	0	0	-
				6	2007-02-28	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0	0	-
				7	2007-03-21	-	244	27	29,100	86	-	-	-	-	-	-	-	-	*1*	1	8	-	*1*	0	1	3	-	-	-	-	24	-	-	-
				8	2007-04-19	-	236	36	18,700	84	<1	-	5	3	488	6	35	-	*1*	0	4	-	*1*	0	*0*	*1*	-	-	-	-	32	-	-	-
				9	2007-05-31	-	82	-	-	-	<1	-	5	3	1	-	-	-	*1*	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-
				10	2007-06-27	-	163	27	4,390	84	<1	-	7	4	620	6	35	-	*1*	1	0	-	-	-	-	-	-	-	-	-	31	-	-	-
				11	2007-07-26		141	-	39,900	-	<1	-	6	3	20,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65	-	-	-
					2007-07-26		-	-	30,800	-	idem	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	idem	-	-	-
				12	2007-08-29	-	69	-	-	-	<1	-	120	2	>241 960	-	-	-	*1*	-	-	-	1	-	-	8	-	-	-	-	73	-	-	-
				13	2007-09-25	-	170	31	921	48	<1	-	6	1	*1*	2	29		-	-	-	-	-	-	-	-	-	-	-	-	60	-	-	-
				14	2007-11-08	-	<49.8	-	-	-	2	-	*2*	3	249	-	-	-	*2*	-	-	-	*2*	-	-	6	-	-	-	-	69	-	-	-
				15	2007-11-29	-	114	-	-	-	*1*	-	<175	3	>2419.6	-	-	-	*1*	-	-	-	*1*	-	-	12	-	-	-	-	43	-	-	-
				16	2008-01-09	-	144	14	-	-	1	-	3	1	*1*	-	-	-	*1*	-	-	-	*1*	-	-	9	-	-	-	-	64	-	-	-
				17	2008-01-30	-	177	-	-	-	1	-	*2*	4	3,870	-	-	-	1	-	-	-	*1*	-	-	3	-	-	-	-	28	-	-	-
				18	2008-02-28	-	137	-	-	-		-	8	2	19,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
					Arithmetic mean	8	147	42	20,635	74	-	-	14	3	8,946	5	32	45	1	1	4	10	1	0	1	9	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	66	0	0	
					Geometric mean	8	138	34	11,803	72	-	-	7	2	647	4	32	45	1	0	3	10	1	0	0	7	#NUM!	#NUM!	#NUM!	#NUM!	44	#NUM!	#NUM!	
					Percentille 80	8	177	36	30,800	84	-	-	10	4	17,680	6	35	45	1	1	7	10	1	0	1	14	#NUM!	#NUM!	#NUM!	#NUM!	73	0	0	
					Standard deviation	#DIV/0!	52	35	15,507	16	-	-	29	1	15,171	2	4	#DIV/0!	0	0	3	#DIV/0!	1	0	1	5	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	68	0	0	
					MIN	8	69	14	921	48	-	-	2	1	1	2	29	45	1	0	0	10	1	0	0	1	0	0	0	0	2	0	0	
					MAX	8	244	120	39,900	86	-	-	120	6	54,800	6	35	45	2	1	8	10	3	0	1	19	0	0	0	0	298	0	0	
					n	1	16	7	6	5	-	-	15	16	14	4	4	1	14	4	4	1	12	3	3	12	0	0	0	0	16	3	3	

up dated December 22, 2006

APPENDIX B

Phosphorus results table

Table 1S: Phosphorus Concentrations in Influent to, Effluent from, and Shallow Groundwater at Selected ECOFLO® Peat Wastewater Treatment Systems (as mg/l)

Site	Soil Type	STE	PFE	% Removal	Lysimeter #1 (12″ under peat filter)
Site 1, 01-04	2	7.1	6.5	8.5	0.1
Site 1, 04-04	2	5.3	4.5	15.1	0.1
Site 1, 11-04	2	6.7	5.7	14.9	0.1
Site 1, 01-05	2	4.9	3.8	22.4	0.1
Site 2, 01-04	1	6.4	4.9	23.4	0.2
Site 2, 04-04	1	5.3	4.7	11.3	0.1
Site 2, 11-04	1	7.1	6.7	5.6	0.2
Site 2, 01-05	1	6.8	6.0	11.8	0.1
Site 6, 04-04	1	5.2	4.9	5.8	0.1
Site 6, 11-04	1	4.9	4.5	8.2	0.1
Site 6, 01-05	1	5.5	5.1	7.3	0.1

Table 2S: Phosphate Levels as Ortho-Phosphorus or Soluble Phosphorus in Lysimeter Samples Collected below Soil Mantle and Background (as mg/l)

Site	Soil Type	Lysimeter 1 (12″ under peat filter)	Lysimeter 2 (10 ft apart)	Lysimeter 3 (Background)
Site 1, 01-04	2	0.02	0.02	0.02
Site 1, 04-04	2	0.02	0.02	0.02
Site 1, 11-04	2	0.02	0.02	0.02
Site 1, 01-05	2	0.02	0.02	0.02
Site 2, 01-04	1	0.10	0.02	0.03
Site 2, 04-04	1	0.07	0.02	0.02
Site 2, 11-04	1	0.02	0.02	0.02
Site 2, 01-05	1	0.05	0.02	0.02
Site 6, 04-04	1	0.02	0.02	0.02
Site 6, 11-04	1	0.02	0.02	0.02
Site 6, 01-05	1	0.05	0.02	0.02
Site 12, 2-05	3	0.02	0.02	0.03
Site 12, 5-05	3	0.05	0.02	0.02
Site 12, 9-05	3	0.03	0.02	0.02
Site 12, 12-05	3	0.02	0.02	0.02

Appendix III

Virginia-licenced P.E certification
Compliance with TL-3 treatment standards

Old Dominion Engineering

December 7, 2018

Lance Gregory
Program Manager
Virginia Department of Health
109 Governor Street, 5th Floor
Richmond, VA 23218

cc: Premier Tech Aqua 200 Kelly Rd. Suite B Quakertown, PA 18951

Re: ECOFLO® Biofilter – ST/STB model series Residential Treatment Units Effluent Performance and Operations and Maintenance Manuals

Dear Mr. Gregory,

In my professional opinion as an engineer licensed to practice in Virginia, the ECOFLO® Biofilter – ST/STB model series Residential Treatment units (for design flows $\leq$ 695 gpd) when properly designed, installed, operated, and maintained will likely produce an end of pipe effluent quality for BOD_5 and TSS in accordance with the criteria set forth in VDH GMP 2016-3 (Log Transformed Upper 99% Confidence Interval Converted Back to Native Units of $\leq$ 10 mg/l BOD_5, $\leq$ 10 mg/l TSS, and fecal coliforms $\leq$ 2000 cfu/100 mL). This assessment is based upon our experience designing and operating ECOFLO® Biofilter – ST/STB units and reviewing available testing data from unit performance in Virginia.

I have reviewed the Premier Tech Aqua Operation and Maintenance Manual for ECOFLO® Biofilter – ST/STB Residential Treatment units and the maintenance tasks and schedule appears to accurately reflect the servicing and maintenance needs of the various ECOFLO® Biofilter – ST/STB products.

Please do not hesitate to call if you have any questions.

Sincerely,

Michael Craun PE

Old Dominion Engineering
366 S. Linden Avenue • Waynesboro, VA 22980
PHONE (540) 942-5600 • EMAIL olddomeng@ntelos.net

Appendix IV

ECOFLO® Biofilter O&M manual &
Virginia-licenced P.E certification relative to
service and maintenance requirements
of the product

Old Dominion Engineering

December 7, 2018

Lance Gregory
Program Manager
Virginia Department of Health
109 Governor Street, 5th Floor
Richmond, VA 23218

cc: Premier Tech Aqua 200 Kelly Rd. Suite B Quakertown, PA 18951

Re: ECOFLO® Biofilter – ST/STB model series Residential Treatment Units Effluent Performance and Operations and Maintenance Manuals

Dear Mr. Gregory,

In my professional opinion as an engineer licensed to practice in Virginia, the ECOFLO® Biofilter – ST/STB model series Residential Treatment units (for design flows $\leq$ 695 gpd) when properly designed, installed, operated, and maintained will likely produce an end of pipe effluent quality for BOD_5 and TSS in accordance with the criteria set forth in VDH GMP 2016-3 (Log Transformed Upper 99% Confidence Interval Converted Back to Native Units of $\leq$ 10 mg/l BOD_5, $\leq$ 10 mg/l TSS, and fecal coliforms $\leq$ 2000 cfu/100 mL). This assessment is based upon our experience designing and operating ECOFLO® Biofilter – ST/STB units and reviewing available testing data from unit performance in Virginia.

I have reviewed the Premier Tech Aqua Operation and Maintenance Manual for ECOFLO® Biofilter – ST/STB Residential Treatment units and the maintenance tasks and schedule appears to accurately reflect the servicing and maintenance needs of the various ECOFLO® Biofilter – ST/STB products.

Please do not hesitate to call if you have any questions.

Sincerely,

Michael Craun PE

Old Dominion Engineering
366 S. Linden Avenue • Waynesboro, VA 22980
PHONE (540) 942-5600 • EMAIL olddomeng@ntelos.net

Ecoflo Biofilter

Residential Owner's Manual – CAN/USA

*Congratulations on your purchase of an **Ecoflo® Biofilter** system from **Premier Tech Aqua (PTA)**. With the **Ecoflo® Biofilter** system, you have wisely chosen to protect your health as well as the environment. This manual contains information on the operation, operating guidelines, maintenance and warranties of the **Ecoflo® Biofilter**. For additional information, contact our customer service at **1 800 632-6356** or visit our website at **PREMIERTECHAQUA.COM.***

Operating Principle

Onsite wastewater treatment systems must respect applicable local rules and regulations. These systems are specifically designed to treat residential wastewater to such a level that treated effluent can be safely returned to the environment. Typically, an onsite wastewater treatment system is composed of 2 to 3 main treatment steps depending on site constraints: primary treatment, treatment system and if required, polishing treatment.

① Primary treatment

The primary/septic tank is the primary treatment. It clarifies wastewater by letting suspended solids settle to the bottom and retaining floating matter to prevent premature clogging of the treatment system. It is strongly recommended that the primary/septic tank be equipped with an effluent filter. Every primary/septic tank and effluent filter shall be installed according to the local regulations.

For more information on the operation, operating guidelines, maintenance and warranties of PTA's primary/septic tanks with effluent filter, please refer to the primary/septic tanks Owner's Manuals which can be found at PREMIERTECHAQUA.COM.

② Treatment system

Once wastewater has passed through the primary/septic tank, it then flows towards the Ecoflo® Biofilter. Inside the biofilter, a tipping bucket equally disperses the wastewater on specially designed plates which evenly distribute the wastewater on top of the filtering media. The wastewater then trickles through the natural filtering media. The treated effluent can then be discharged to the environment through an appropriate dispersal/disposal mean in accordance to local regulations.

The Ecoflo® Biofilter's operating principle allows the system to be used continuously or intermittently without requiring any special precaution or having any impact on the quality of the treatment. In most cases, no specific action from the owner is required to start the system.

The model and the number of Ecoflo® Biofilter are determined by the domestic wastewater flow per day. The selection of the model also depends on the available surface area, the topography of the lot, as well as the type, permeability and depth of the natural soil on site.

③ Polishing treatment

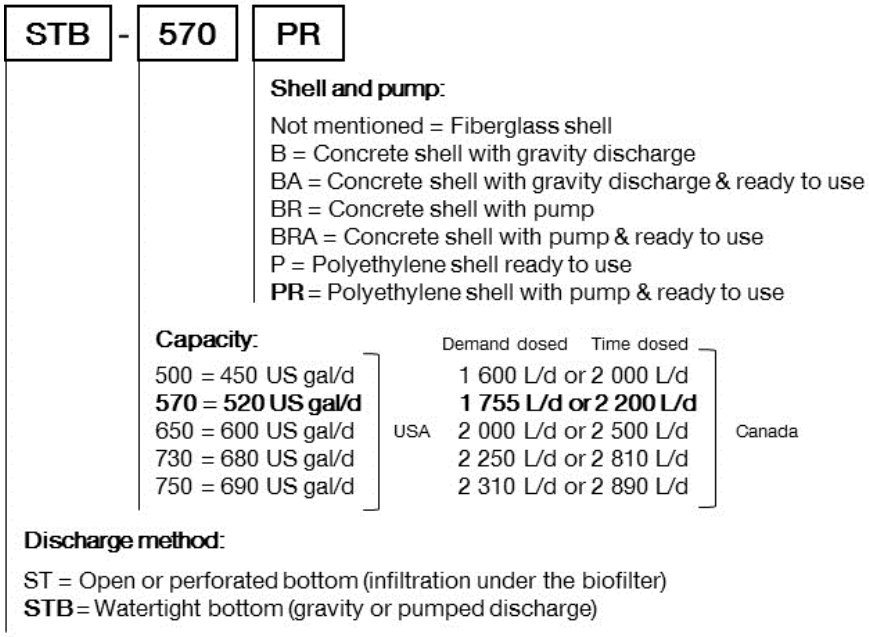
When required, the Ecoflo® Biofilter can be combined with PTA's disinfection filter (FDi), a UV disinfection unit (DiUV) or a phosphorus removal unit (DpEC) to reduce respectively pathogen concentrations or phosphorus.

For more information on the operation, operating guidelines, maintenance, and warranties of PTA's FDi, DiUV or DpEC, please refer to the products' Owner's Manuals, which can be found at PREMIERTECHAQUA.COM.

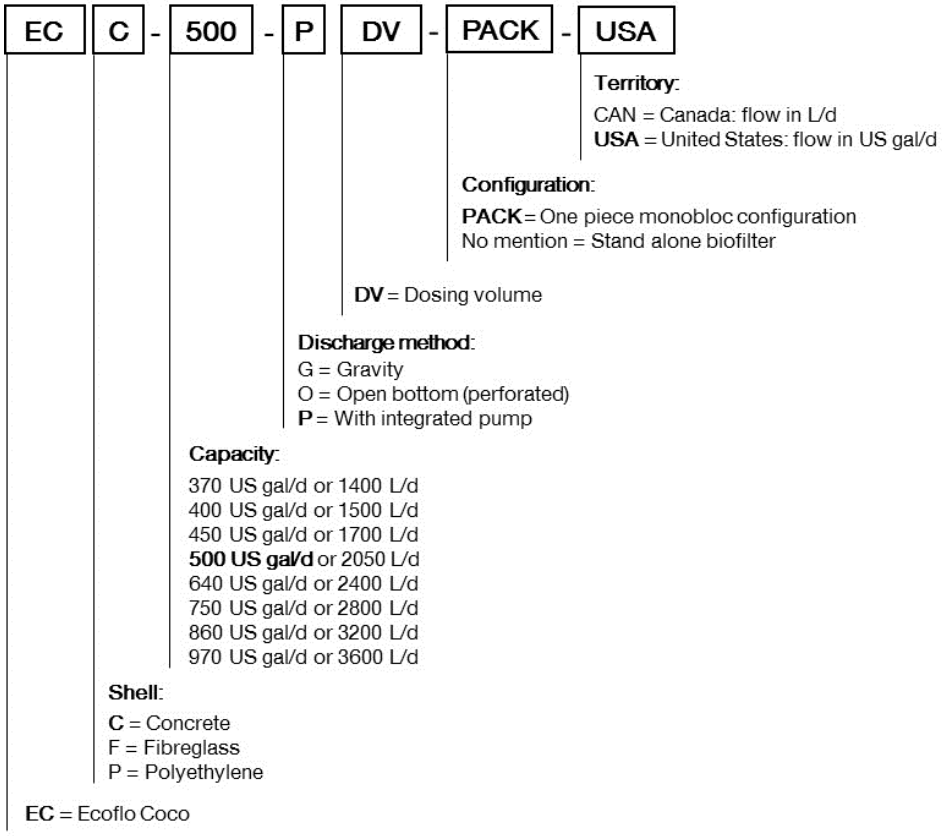
Ecoflo® Biofilter Models

The Ecoflo® Biofilter can be found in different model series, which are ST, STB, EC, EC5 and EC7 and each has different characteristics. The model number of the Ecoflo® Biofilter relates to its characteristics, as presented in the following table. **NOTE:** Some model series may not be approved in your area.

ST and STB model series:



EC5 model series (maximum applicable HLR 500 L/m²d or 12.25 gal/ft²d)



EC7 model series (maximum applicable HLR 700 L/m²d or 17.2 gal/ft²d)

EC7 - 600 - P - P - DV - PACK - USA

Territory:
CAN = Canada: flow in L/d
USA = United States: flow in US gal/d

Configuration:
PACK = One piece monobloc configuration
No mention = Stand alone biofilter

DV = Dosing volume

Discharge method:
G = Gravity
O = Open bottom (perforated)
P = With integrated pump

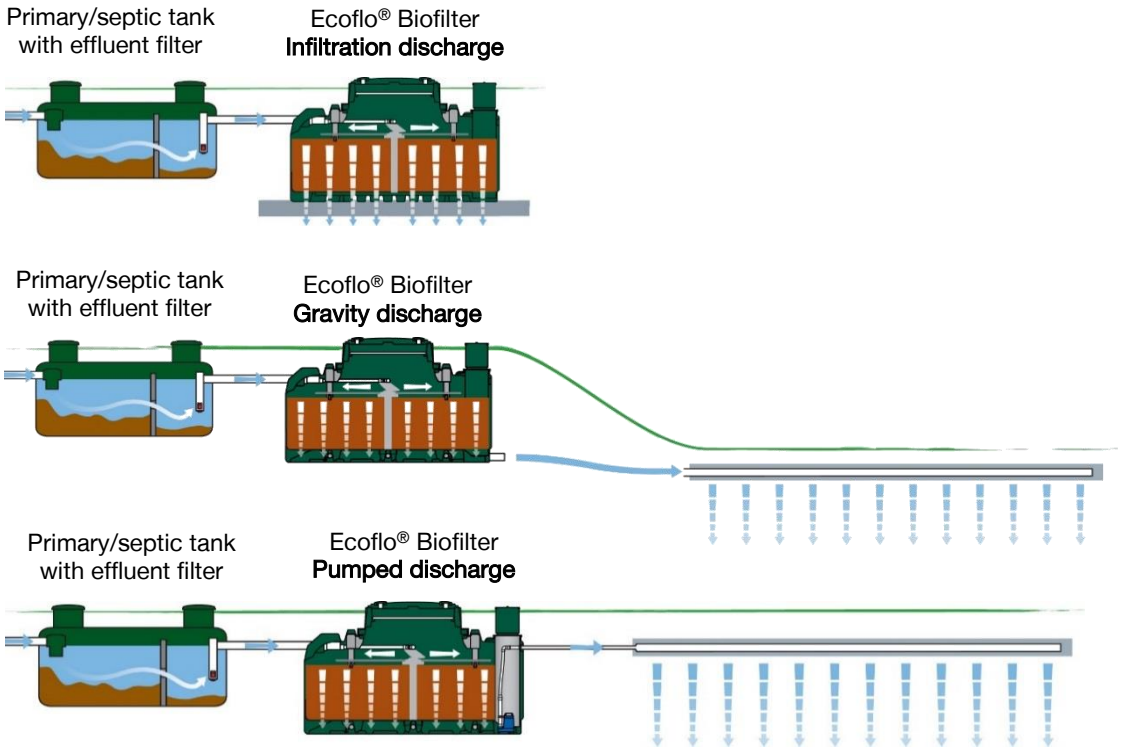
Shell:
C = Concrete
F = Fibreglass
P = Polyethylene

Capacity:
500 US gal/d or 1900 L/d
600 US gal/d or 2200 L/d
750 US gal/d or 2800 L/d
800 US gal/d or 3000 L/d
900 US gal/d or 3400 L/d
1050 US gal/d or 4000 L/d
1200 US gal/d or 4500 L/d
1350 US gal/d or 5000 L/d

EC = Ecoflo Coco

Installation Diagrams

NOTE: The installation diagrams below show the Ecoflo® Biofilter with polyethylene shells.



Operating Guidelines

Type of wastewater that can be treated by an Ecoflo® Biofilter:

Domestic wastewater (for example: wastewater from isolated dwellings).

It is NOT RECOMMENDED to discharge any of the following substances into the septic system:

- Oil and grease (motor oil, cooking oil, etc.);
- Wax and resins;
- Paints and solvents;
- Any kind of petroleum product;
- Any kind of pesticide;
- Any kind of septic tank additive;
- Any kind of toxic substance;
- Anything not easily biodegradable (for example, coffee beans, cigarette butts, sanitary napkins, tampons, condoms, cotton swab, etc.).

AND

- **NEVER open or go inside the primary/septic tank or the Ecoflo® Biofilter.**
- **Keep all lids of the septic system accessible at all times. NEVER cover them with mulch, dirt or any permanent structure (patio, swing, shed, etc.).**
- **NEVER connect a drain pipe, roof gutter, sump pump or air conditioner drain to the septic system.**
- **NEVER discharge content or water from a water softener backwash, a spa or pool in your septic system.**
- **NEVER discharge wastewater from a recreation vehicle (camping trailer, caravan, etc.) into any of the components of your septic system.**
- **NEVER use automatic toilet bowl cleaners**
- **Make sure all lids of the septic system are at least 50 mm (2") above the surface of the landscaped lot.**
- **NEVER install a riser on an open bottom fibreglass Ecoflo® Biofilter.**
- **NEVER install a riser on polyethylene Ecoflo® Biofilter with a separate pumping vault access.**
- **NEVER install more than one (1) extra 150 mm (6") riser on polyethylene Ecoflo® Biofilter with only a main access.**
- **NEVER install more than ONE (1) RISER on a concrete Ecoflo® Biofilter.**
- **Use only PTA products.**
- **NEVER plant trees within 6 m (20') of the Ecoflo® Biofilter lid and within 2 m (6' 6") of the absorption bed.**
- **ALWAYS maintain the surface of the lid of the Ecoflo® Biofilter free of any accumulated material or too close to blown snow, backfill, landscaping material, rocks, the bottom of a slope, an embankment or a retaining wall, etc. Minimum distances to respect are 5 m (16' 5") for a fiberglass shell Ecoflo® unit, 4 m (13' 1") for a polyethylene unit and 3 m (9' 10") for a concrete unit.**

By respecting these guidelines, you contribute to the proper operation of your septic system and help prolong the life of your Ecoflo® Biofilter filtering media. Failure to abide by these guidelines may, at Premier Tech Aqua's discretion, render the warranty invalid.

Owner's responsibility

The owner must respect all existing laws and regulations regarding the system's effluent quality and its discharge into the environment. The owner of the wastewater treatment system is responsible for its installation, operation and maintenance.

The system's warranty begins upon purchase. Should the start-up be delayed, it is the customer's responsibility to inform Premier Tech Aqua about it so the first maintenance, which is included in the purchase price, is postponed. If the first maintenance has been performed prior to the client's call, Premier Tech Aqua reserves the right to decide whether another maintenance, free of charge or not, will be carried out the following year. No request for delayed start-up will be accepted any later than one (1) year after the purchase date without it affecting the product's warranties.

Keep heavy objects off your septic system

Never drive a vehicle or place objects weighing more than 225 kg (500 lb) too close of the lid of your Ecoflo® Biofilter. **Minimum distances to respect are 5 m (16' 5") for a fiberglass shell Ecoflo® unit, 4 m (13' 1") for a polyethylene unit and 3 m (9' 10") for a concrete unit.** If you are planning any kind of landscaping or any other type of work on the property (i.e.: snow removal, lawn mowing, excavation, etc.), **make sure you advise all those involved,** so they do not damage your septic system. It is recommended to note where your septic system elements are located.

About your home

Your home must be equipped with an air vent that is in proper working order and all plumbing must comply with the applicable standards of the building code in your location. Every septic tank must be ventilated by an air duct with a diameter of at least 100 mm (4") or be connected to the air vent of the isolated dwelling being served. Premier Tech Aqua strongly recommends using a pipe with a diameter of 100 mm (4") for the air vent.

Any change in the use of your home or any modification to your Ecoflo® Biofilter must be authorized by the local authorities, and Premier Tech Aqua must be advised. If this requirement is not fully met, the warranty for your Ecoflo® Biofilter will be null and void.

Maintenance

Primary/septic tank

Empty your primary/septic tank every two to four years or if the level of sludge measured exceed the 2/3 of the total height of water in the tank. This helps to keep your septic system in proper working order. Every primary/septic tank and effluent filter shall be inspected and maintained as prescribed by local regulations.

If your home is equipped with a garbage disposal or a sewage pump, we strongly recommend emptying your primary/septic tank more frequently than the frequency noted above. Using this kind of equipment increases the amount of sludge in the primary/septic tank.

To have complete records of the maintenance performed on your septic system, we recommend that you to keep the proof of maintenance (invoice) with this Owner's Manual.

IMPORTANT: Primary/septic tanks can be emptied in several ways that can be classified into two categories: **complete emptying and selective emptying.** Complete emptying, the most common, consists of completely pumping the contents of the primary/septic tank. It's easy to check if the work was properly done because the primary/septic tank will be completely empty when the vacuum truck leaves the site. Selective emptying is divided into two sub-categories: with a filter (or recycled) or without a filter. The method with a filter requires a truck that has been adapted for this type of emptying, that is, one that separates and retains the solids from the wastewater. The mechanically clarified water is then returned to the primary/septic tank. The selective method without a filter allows the solids to settle while in the truck before the water is returned to the primary/septic tank. As such, in an effort to ensure the Ecoflo® Biofilter continues to perform optimally, **it is very important that you ensure than the water that is returned to the primary/septic tank has been properly clarified and does not contain or contains very few suspended solids**. We also recommend you to call one of the members of PTA's local partners. He will assist and verify if the work is done according to your specific needs to best protect your Ecoflo® Biofilter system.

Effluent filter

Under normal operating conditions, as described in this manual, an effluent filter that complies with local regulations should operate efficiently for many years. It must be cleaned every time the primary/septic tank is emptied, as established or recommended by local authorities.

Ecoflo® Biofilter

The owner of a biofiltration system **shall follow the manufacturer's recommendations regarding the maintenance of the system.** For that purpose, he must at all times have a valid contract with the manufacturer or its local representative and, depending on the local regulations, **a copy of the contract may have to be filed to the authorities**.

Annual maintenance is important to ensure optimal performance of your **Ecoflo® Biofilter** and essential to maintain its warranty. Therefore, your biofilter must be serviced annually for the duration of its useful life. According to local regulations, more than 1 visit per year may be required.

The maintenance of your Ecoflo® Biofilter shall be carried out by one of our duly trained service providers. This service includes a visual inspection of all components and a verification of the operation, as well as maintenance of the filtering media. **For maintenance purposes and to replace the filtering media, you must ensure that your system's lid is easily accessible.** Never cover or bury the lid of the Ecoflo® Biofilter. After each inspection, you will be given a maintenance record. Keep it with this manual in a safe place.

At the end of its normal life span (ten (10) years for EC, EC5 and EC7 model series and eight (8) years for ST and STB model series), the filtering media is analyzed by one of our authorized agents. Under normal usage, if the filtering media has not been abused and the operating guidelines have been respected, the filtering media might not have to be replaced and can be used for some additional years. **However, your Ecoflo® Biofilter's filtering media must be replaced before the system's treatment capacity and performance begins to deteriorate.** The filtering media is easily pumped out using a truck adapted to emptying primary/septic tanks. The new filtering media is then installed by an authorized agent or the pumper.

To know more about the maintenance of your Ecoflo® Biofilter, refer to your Maintenance Agreement. If you need help or more information, please call our Customer Service Department at **1 800 632-6356** or visit our website at **PREMIERTECHAQUA.COM**.

Ecoflo® Biofilter with Pump

Some Ecoflo Biofilters have an integrated pumping station (other situations may require a separate pumping station), that directs the treated effluent to an appropriate disposal mean according to local regulations. The electro-mechanical components are included in this system. Here are some of the details.

Visual and audio alarm system

The pumping station is equipped with a high-water-level float connected to an alarm system. This alarm system must be installed inside the residence (home) so it can be heard when it is activated. The following information describes how this system works.

Alarm box

A red indicator lights up and an audible alarm is heard when the water level in the Ecoflo® Biofilter is unusually high. If an alarm is activated, contact Premier Tech Aqua's After-Sales Service Department because the incident has to be checked. To silence the alarm, press the "**SILENCE**" button.

The **"TEST"** button lets you check if the alarm system is working properly. During a test, the red indicator should light up and an audio alarm should be heard.

In the event of a power failure, the alarm system continues to function on an emergency 9-volt alkaline battery (not supplied). Using a rechargeable battery is not recommended.

NOTE: Replace the emergency battery every 12 months, each time the alarm is activated or whenever there is a power failure. If the battery is weak, the system will beep once every minute. When this occurs, replace the battery immediately.

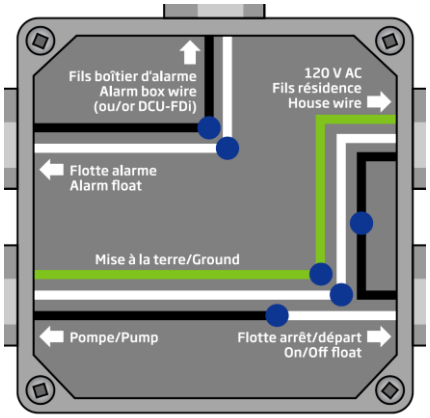
To replace the 9-volt battery:

- Disconnect the alarm box and remove it from the wall (the battery must be inserted on the side of the box).
- Open the cover of the 9-volt battery compartment and replace the battery with a 9-volt alkaline battery.
- Close the cover, reinstall the box on the wall and reconnect it.
- If the alarm is activated, press the "**RESET/TEST**" button to initialize it.

Electrical connections

All electrical connections must be done by a **certified electrician** and using seal connectors is mandatory. Premier Tech Aqua recommends installing the power box on top of the pumping station's insulating board to avoid humidity problems.

Use two (2) separate circuit-breakers, one to operate the pump and the other to connect the alarm box. Do not connect anything else to these circuit-breakers (for example, a household appliance). They must be used exclusively for the pump and the alarm box.



What to do in case of...

An activated alarm

If an alarm is activated, unrelated to a power failure, contact Premier Tech Aqua's After-Sales Service Department so the problem can be identified and corrected.

A prolonged power failure

If a power failure that occurs during winter is prolonged, protect the components of your septic system against freezing. If you have any questions to restart your system, contact Premier Tech Aqua's After-Sales Service Department.

Flooding

Certain sites are prone to flooding or to rises in groundwater levels. This can lead to a malfunction in your septic system or alter the performance of your Ecoflo® Biofilter. If this happens, contact Premier Tech Aqua's After-Sales Service Department.

Backflow

Backflow rarely occurs. But if it does happen, the primary/septic tank is usually the cause. Your primary/septic tank installer or primary/septic tank pumper can generally take care of the situation.

Odours

All septic systems are apt to generate gases and odours. The position of the air vent, as well as other factors unrelated to the Ecoflo® Biofilter itself, can prevent septic gases from dispersing properly and lead to odours. If this happens, contact Premier Tech Aqua's After-Sales Service Department.

If you have any questions or comments, do not hesitate to contact Premier Tech Aqua at 1 800 632-6356.

PREMIER TECH AQUA

1 800 632-6356
418 862-6642
pta@premiertech.com
PREMIERTECHAQUA.COM

Certificate of Warranty for Ecoflo® Biofilter

1. PREAMBLE

Premier Tech Technologies Ltd. (hereinafter called "Premier Tech") is proud to provide its customers with an exclusive wastewater treatment system guaranteed by an innovative Warranty.

For the application and interpretation of this Warranty, "Customer" shall mean the person who has purchased an Ecoflo® Biofilter (hereinafter called "Initial Purchaser"), for a residential installation, as well as any subsequent purchaser (hereinafter called "Subsequent Purchaser(s)"), in accordance with the provisions of section 8 of this Warranty. "Successor(s)" shall mean any other person entitled to exercise the same rights as the Customer under the law.

2. NATURE OF THE WARRANTY

2.1. Ecoflo® Biofilter

Premier Tech warrants to the Customer that the filtering media of the Ecoflo® Biofilter shall function properly for a period of ten (10) years for EC, EC5, EC7, ST and STB model series (except ST and STB models with 100% peat filtering media that shall function properly for eight (8) years) from the date of purchase by the Initial Purchaser (proof of purchase required).

Except as provided in sections 2.2 and 2.3 below, Premier Tech also warrants all parts of the Ecoflo® Biofilter components against any manufacturing defect for a period of ten (10) years from the date of purchase by the Initial Purchaser (proof of purchase required). The first two years of the warranty also cover the labour.

2.2. Concrete

Premier Tech does not offer any additional Warranty on the shell of the concrete Ecoflo® Biofilter. Accordingly, the Customer shall rely on the local concrete manufacturer's Warranty policy.

2.3. Pump, floats, alarm box and junction box

The pump, floats, alarm box and junction box included with the Ecoflo® Biofilter are guaranteed for two (2) years (parts only), from the date of purchase by the Initial Purchaser (proof of purchase required). The first year of the warranty also covers the labour.

Premier Tech's conventional Warranty is expressly limited to the text of this Certificate and valid provided the Ecoflo® Biofilter was installed in accordance with applicable regulations and with the manufacturer's recommendations.

3. NOTICE

For this Warranty to be valid, the Customer must notify Premier Tech in writing immediately upon the appearance of any indication of an anomaly or irregularity in the Ecoflo® Biofilter.

Such notice shall be mailed to Premier Tech's Head Office at 1, avenue Premier, Rivière-du-Loup, Québec, G5R 6C1, CANADA or by facsimile at (418) 862-6642.

Upon receipt of this notice, Premier Tech shall examine the situation and, if necessary, take appropriate corrective measures in accordance with the terms of this Warranty.

4. GENERAL EXCLUSIONS

The following damages or problems are excluded from the Warranty:

(a) Any damage or problem caused by a fortuitous event or "force majeure", such as, without limiting the generality of the foregoing, an earthquake, a flood, frost, hurricane, landslide, explosion or dynamiting;
(b) Any damage or problem caused by the fault or act of a third party including, without limiting the generality of the foregoing, the execution of landscaping work;
(c) Any damage or problem arising from a defective installation carried out by a person trained by Premier Tech, or any installation, modification, correction or addition carried out by a person not trained by Premier Tech;
(d) Any damage or problem arising from any installation, modification, correction or addition to the treatment system carried out after installation of the Ecoflo® Biofilter without prior written approval from Premier Tech;
(e) Any damage or problem caused by the use of a septic tank that does not comply with the applicable regulations and/or with Premier Tech's specifications, as described in the Owner's Manual;
(f) Any damage or problem, if it is shown that the usage of the Ecoflo® Biofilter was not in accordance with the instructions and guidelines described in the Owner's Manual;
(g) Any damage or problem, if the maintenance of the Ecoflo® Biofilter was not carried out by a person authorized by Premier Tech, in accordance with the Maintenance Agreement;
(h) Any damage or problem caused by an omission or act of the Customer or the Customer's Successors including, without limiting the generality of the foregoing, refusal to allow access to the system for maintenance;
(i) Any damage or problem, if it is found that the Customer or the Customer's Successors have modified or changed the use of the property serviced by the Ecoflo® Biofilter resulting in the alteration of the nature or quality of wastewater being treated and/or that constitutes a violation of the applicable regulations;
(j) Any damage or problem caused by and/or resulting from the work carried out to access to the Ecoflo® Biofilter, including, without limiting the generality of the foregoing, excavation, snow removal or demolition;
(k) Any damage or problem resulting from the condition of the site or of the soil and not reported or not properly reported to Premier Tech by the Customer or the person undertaking the site investigation.

5. PARTICULAR EXCLUSIONS

It is further expressly understood that the Customer may not carry out or cause to be carried out any repair or verification of the Ecoflo® Biofilter sold to him, or attempt to carry out any work or to apply any corrective measures whatsoever to said work, before notifying Premier Tech in accordance with the provisions of section 3 of this Warranty and before Premier Tech has visited the site, within a reasonable time following receipt of said notice, to assess the situation.

If the Customer carries out or causes to be carried out repairs, or attempts to repair or to apply corrective measures of any kind whatsoever to the Ecoflo® Biofilter sold to him without prior authorization by Premier Tech, this Warranty shall be considered null and void and Premier Tech shall be considered completely discharged from any and all of its obligations under this Warranty.

Certificate of Warranty for Ecoflo® Biofilter

6. INDEMNITIES AND DAMAGES

Subject to the application of the provisions and exclusions provided for in this Warranty, Premier Tech's liability and obligations regarding any corrective measure carried out or any attempt to correct an indicated problem shall be limited to replacing the filtering media and/or one or several components of the Ecoflo® Biofilter and to supplying the required labour, if applicable.

7. LIMITATION OF LIABILITY

Premier Tech's compensation or indemnification obligation shall be limited to the provisions of section 6 of this Certificate of Warranty and Premier Tech shall not be held liable for any other damage or loss that may have been suffered or incurred by the Customer or any third party in connection with the Ecoflo® Biofilter, its parts and/or components which originate thereof.

No additional warranty, express or implied, hence excluding any direct or indirect consequential damages (not limited to but including third parties loss) concerning the design, sale or use of the Ecoflo® Biofilter and/or services provided by Premier Tech is hereby granted. Premier Tech's liability under its warranty obligation shall in no case exceed the cost of the Ecoflo® Biofilter.

8. TRANSFER OF OWNERSHIP

In the event of transfer of ownership, sale, assignment or disposal in any way whatsoever of the Customer's property to a third party, this Warranty shall continue to apply if and only if the Subsequent Purchaser or the Successor confirms, by forwarding the attached "Notice of New Property Owner" to Premier Tech within a reasonable delay, that he/she is the new owner of the property, he/she understands and is aware of the content of this Certificate of Warranty and accepts its terms and conditions.

The person who proceeds with the transfer, sale, assignment or disposal of any way whatsoever of the property undertakes to hand over to the Subsequent Purchaser or the Successor the Certificate of Warranty provided upon completion of the work, as well as the Owner's Manual and, if applicable, the Maintenance and Environmental Monitoring Program for the Ecoflo® Biofilter.

Failure to abide by the terms and conditions of section 8 of this Certificate of Warranty may, at Premier Tech's discretion, render it invalid or to be rejected.

9. INSPECTION

The Customer and/or the Customer's Successors shall allow Premier Tech or its duly authorized representatives to carry out all necessary monitoring and inspections, as required, for implementation of this Warranty.

If the Customer and/or the Customer's Successors notify Premier Tech of an alleged defect or malfunction of the Ecoflo® Biofilter and that, after inspection, it is found that no such defect or malfunction exists or that such defect or malfunction is excluded from or does not apply to the Warranty, a minimum charge of $200.00 plus direct expenses shall be paid by the Customer and/or the Customer's Successors for the cost of the inspection.

10. INTERPRETATION

The terms and conditions of this Warranty shall be interpreted according to and governed by the provisions of this Warranty and the legislation in effect in the Province of Quebec.

11. PRIORITY OF THE CERTIFICATE OF WARRANTY

This Warranty supersedes any contract or understanding, written or verbal, entered into between the Customer and Premier Tech. In the event of contradiction between this Warranty and any other documents and/or contracts entered into between the Customer and Premier Tech, this Warranty shall prevail.

12. PURCHASERS AND SUCCESSORS

Subject to the provisions of this Warranty and especially those of section 8, this Warranty shall continue to be valid for Subsequent Purchasers and Successors and shall continue to have full effect until the end of the agreed Warranty period provided for in section 2 of this Certificate.

Operation and Maintenance (O&M) Manual for Ecoflo® Biofilters

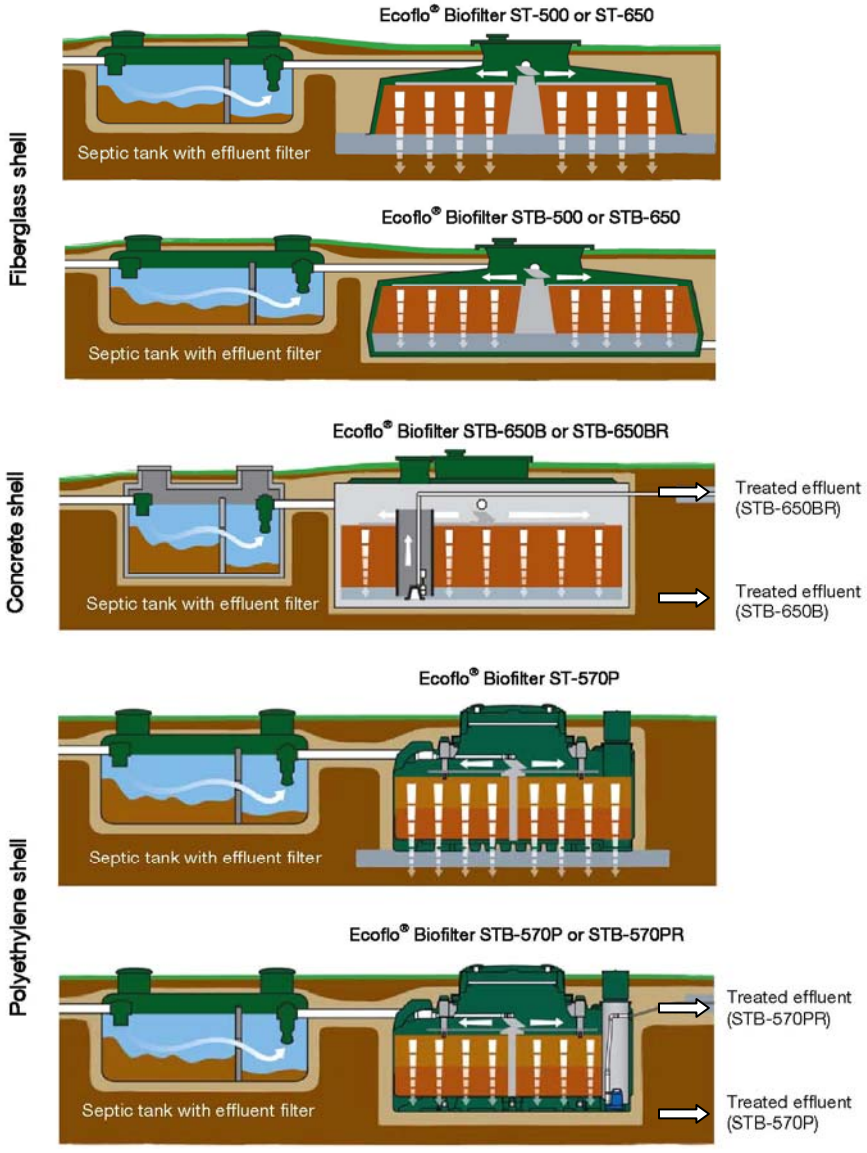
Model ST-500	450 GPD
Model STB-500	450 GPD
Model ST-650	600 GPD
Model STB-650	600 GPD
Model STB-650B	600 GPD
Model STB-650BR	600 GPD
Model ST-570P	525 GPD
Model STB-570-P	525 GPD
Model STB-570-PR	525 GPD

Ecoflo® Biofilters
(With open bottom or collecting bottom)

Congratulations on your purchase of an **Ecoflo® Biofilter system** from **Premier Tech Aqua (PTA)**! With the **Ecoflo® Biofilter system**, you have wisely chosen to protect your health as well as the environment and the value of your property. This manual contains information on the system's operation and maintenance, plus guidelines for use and warranties for models **ST-500/ST-650/ST-570P** and **STB-500/STB-650/STB-650B/STB-650BR/STB-570P/STB-570PR.** For additional information, please contact our customer service at **1 800 632-6356** or visit our website at **PREMIERTECHAQUA.COM.**

1. Operating Principle

The **Ecoflo® Biofilter ST-500, ST-650, ST-570P, STB-500**, **STB-650, STB-650B, STB-650BR, STB-570P and STB-570PR** models are made of a durable shell enclosing a natural filtering media to treat the wastewater coming from a septic tank, before it is discharged into the environment.



The **Ecoflo® Biofilter's** operating principle allows the system to be used continuously or intermittently without requiring any particular precaution and without impacting the performance of the system. No action is required from the owner to start the system.

Your complete **septic treatment system** includes a septic tank with an effluent filter, one or more **Ecoflo® Biofilters,** a dispersal/disposal component and, depending on the type of installation, a pumping station and/or a flow divider.

The model and the number of **Ecoflo® Biofilters** required are determined according to the number of bedrooms in the residence and/or the total daily flow of wastewater of the residence, or of domestic waters from other types of buildings.

2. Dos and Don'ts

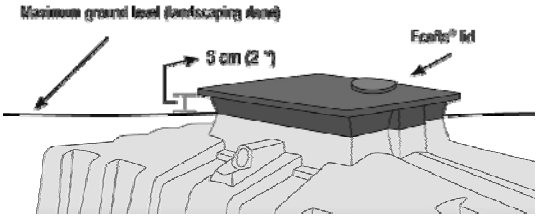
Type of wastewater that can be treated by an Ecoflo® Biofilter:
Domestic wastewater (e.g.: wastewater from individual residences)

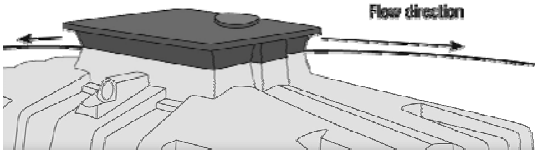
It is NOT RECOMMENDED to discharge any of the following substances into the septic system:

- Water softener backwash;
- Oil and grease (engine oil, cooking oil, etc.);
- Wax and resin;
- Paint and solvent;
- Petroleum products;
- Pesticides of any kind;
- Any kind of septic tank additive;
- Toxic substances;
- Anything not easily biodegradable (e.g. coffee beans, cigarette butts, sanitary napkins, tampons, condoms, cotton swabs, etc.).

AND:

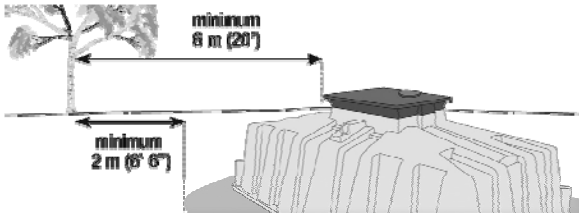
- **NEVER cover or bury the access lid of the Ecoflo® Biofilter;**



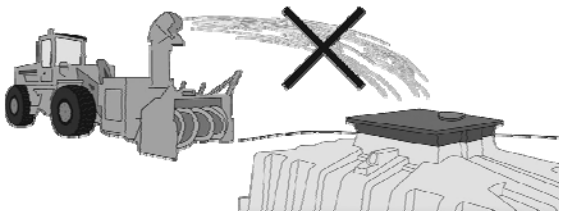


- **NEVER open or enter the Ecoflo® Biofilter without prior authorization;**
- **NEVER install a riser on an Ecoflo® Biofilter ST-500 or ST-650. For models STB-500 and STB-650 with collecting bottom, use ONLY ONE (1) PTA extension kit STR-080F if necessary;**

- NEVER plant trees within 20’ of the Ecoflo® Biofilter lid and within 6’6” of the absorption bed;



- NEVER connect a drain pipe or roof gutter or sump pump or air conditioner unit drain to the septic system;
- DO NOT let anything accumulate on top of the septic system (e.g.: blown snow). The surcharge can cause damage to your system;



- NEVER discharge water coming from a spa or a pool backwash into any component of your septic system;
- NEVER discharge wastewater coming from a recreational vehicle (camping trailer, caravan, etc.) into any component of your septic system;
- NEVER use an automatic toilet bowl cleaner;
- NEVER use a garbage disposal or sewage pump (upstream of the septic tank). In this case, an EFT-080 effluent filter from PTA is mandatory. Call PTA's customer service for information.

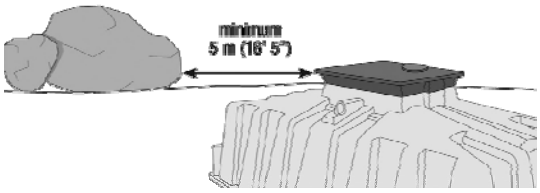
By respecting these guidelines, you contribute to the proper functioning of your septic installation and have better chances to increase the life span of the filtering media of your Ecoflo® Biofilter.

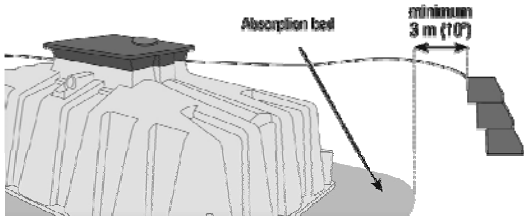
Owner’s Responsibility

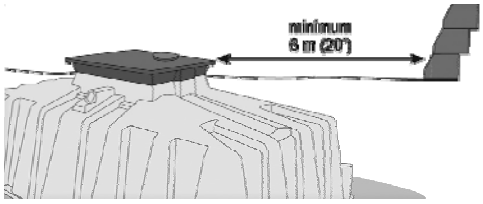
The owner must respect the local laws and regulations in force concerning the effluent quality of the system and its discharge into the environment. The owner must make sure that all components are readily accessible at the time of maintenance.

Keep heavy weights off your septic installation

Never drive vehicles or place objects weighing more than **500 lbs within 16’5” of your Ecoflo® Biofilter** system’s lid. If you are planning to do some landscaping or any other type of work, **make sure you advise those involved** so they do not damage your septic system. **Do not shovel, blow or accumulate snow on top of the septic system**. The overload could cause damage. Mark or indicate the location of your system’s components.







Warning

Electrical hazard: Some Ecoflo® models have an integrated pump station. Disconnect power before servicing. Flooded areas present an electrical hazard. Failure to do so may result in an electrical shock causing serious bodily injury or death. The unit is to be serviced by trained and certified Premier Tech Aqua partners and technicians only.

Biohazard: The septic tank may contain potentially hazardous gases and materials. Only trained and certified service technicians and partners can service your complete system.

Access to treatment system: DO NOT allow children to climb or play around this equipment. Failure to do so may result in falls or other accidents causing serious bodily injury.

Buried electric cables: DO NOT dig above or near the treatment system. Ask a trained and certified service provider to do it. Failure to do so may result in an electric shock causing death or serious bodily injury.

Service on Ecoflo®: Service on Ecoflo® or other components have to be performed by a Premier Tech Aqua authorized service provider. DO NOT attempt to service your wastewater treatment system yourself.

Ice around vents: Ice may form around vents in cold weather. Use caution when walking in these areas to avoid falling and being seriously injured.

Contact with wastewater: Anyone coming in contact with wastewater must remove any contaminated piece of clothing and thoroughly wash all body parts and clothes exposed to wastewater with soap and water. Then consult a physician to minimize the risk of illness.

About your home

Your home must be equipped with an air vent that is in proper working order and complies with the applicable standards. **Premier Tech Aqua** strongly recommends using a 4" Ø pipe for the air vent. Any change in the use or function of your home, or any modification to your **Ecoflo® Biofilter** must be authorized by local authorities, and **Premier Tech Aqua** must be informed. The warranty for the **Ecoflo® Biofilter** will be void if this condition has not been fully respected.

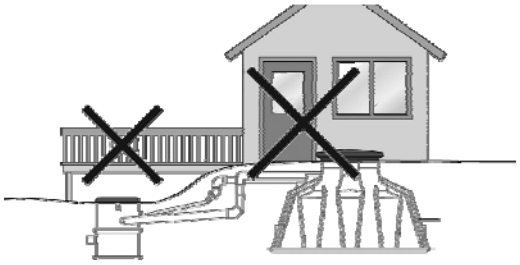
3. Maintenance

Ecoflo® Biofilter

The owner of a biofiltration system shall **follow the manufacturer's recommendations regarding the maintenance of the system.** For that purpose, he must at all times have a valid contract with a licensed service provider **According to local regulation, a copy of the contract may have to be filed with the authorities**. Premier Tech Aqua requires authorizedauthorised service provider to be duly trained by Premier Tech Aqua and to enter report maintenance and inspection information into the Premier Tech Aqua maintenance and management program (database).

Annual maintenance performed as per manufacturer's specifications (following manufacturer's requirements) is essential to ensure the proper operation and performance of your **Ecoflo® Biofilter** and is essential to maintain its warranty on the filter mediamedia. Therefore, your **Ecoflo®** must be serviced annually for the entire duration of its useful life. Depending on the local regulation, more than one (1) visit per year may be mandated.

The maintenance of your **Ecoflo® Biofilter** must be carried out by **a local licensed service provider duly trained by Premier Tech Aqua. A list of Premier Tech Aqua authorizedauthorized service providers in your area is available at PTZONE.PREMIERTECHAQUA.COM or by calling 1-800-632-6356**. The annual maintenance includes a visual inspection of all components, a verification of operation, as well as maintenance of the filtering mediamedia. **Easy access to your system's lid is essential for maintenance and for filtering mediamedia replacement purposes.** You will be given a maintenance record after each inspection, which you should keep with this manual in a safe place. A video of main maintenance steps to be performed on the **Ecoflo® Biofilter** is available on Premier Tech Aqua's web site at www.premiertechaqua.com.



At the end of its 8-year life span, the filtering media of your Ecoflo® Biofilter should be replaced. Otherwise, its condition may reduce the treatment performance of the system. An analysis of the filter condition can be done upon demand from the owner or licensed service provider by PTA. PTA can do the filter media assessment for **free** only if it has annual reports and pictures coming from the Premier Tech Aqua maintenance program in its possession. The analysis can be done by assessing and comparing the evolution of the filter media condition every year.

The filtering media is easily pumped out with the help of a truck usually used to pump septic tank sludges. The installation of the new filtering media is performed by a local authorized agent or pumper.

If you need assistance or more information, we invite you to call our customer service at **1 800 632-6356** or to visit our web site at **PREMIERTECHAQUA.COM**.

4. Maintenance and reporting

Annual maintenance

Steps to follow for the maintenance of the Ecoflo® Biofilter

1- Localization of the Ecoflo® Biofilter

2- Inspection of the site and localisation of the septic tank (report any problem observed with the septic tank, Dbox, flow divider or pumping station)

3- Inspection of the distribution system and the shell (report problem if inaccessible or if there are signs of infiltration)
   - Note serial number
   - Verify functioning of feeding bucket
   - Verify condition of shell
   - Clean up obstructed holes on the distribution plates

4- Inspection and maintenance of the filter media:
   - Verify condition of filter media Verify level of compaction of filter media
   - Take pictures **(After raking)**
   -  Picture with this angle required to see also the level of compaction
   - Perform raking (minimum 6 inches deep, mix lower filter layer with the top layer and also mix with the good peat close to shell)
   - Watch for presence of water on the surface of the filter bed (before and after raking)
   - Watch for presence of standing water in infiltration zone (at the base of the Ecoflo® Biofilter)

5- Verification of the proper functioning of the system and installation of tie wraps (write initials and year)

6- Enter data in the **Premier Tech Aqua maintenance program** to ensure the follow-up of the treatment performance.

7- Give a maintenance proof to owner and highlight any corrective actions that may be required

Premier Tech Aqua maintenance and management program (database)

Premier Tech Aqua has its own database to report the information from every maintenance visit performed by service providers. Every authorized service provider trained by Premier Tech Aqua has access to this reporting program. This information constitutes a follow-up of the condition of the Ecoflo® system and insures the warranty on the filtering media performance.

Basic inspection guidance for other components

Other system components to be inspected	Inspection recommended	Licensed service provider has to inspect and maintain according to local jurisdiction
Septic tank	Sludge measurement	Report any failure or problem to owner and authorities (if applicable)
	Effleunt filter clean and functionnal	
	Tank condition	
Flow divider	Distribution device at level	Report any failure or problem to owner and authorities (if applicable)
	Even distribution of the flow between the units	
	Look if there's break on the pipes.	
Pumping station	Verify floats and pump function	Report any failure or problem to owner and authorities (if applicable)
	Look if there's infiltration	
	Tank condition	
Dispersal area	Look if there is presence of water surfacing	Report any failure or problem to owner and authorities (if applicable)
	Look for any seepage (breakout)	

Evaluation of the filtering media

The evaluation of the filtering media is a critical step of the maintenance to be performed. The Ecoflo® Biofilter's filtering mediahas to meet specific criteria and the evaluation of its evolution requires training and experience. The evaluation tools service providers work with help them in the assessment of the deterioration level of the filtering media. Those tools are given to the service provider at the training session.

Premier Tech Aqua always improves its products and maintenance procedures. An annual update is required for a service provider to get the latest tools and learn about the improvements brought by Premier Tech.

Hydraulic overload could affect the life span of the filtering media. It is the owner's responsibility to make sure that the system receives wastewater of domestic source only.

When a licensed service provider determines a filtering media has to be changed before it has reached 8 years of age, Premier Tech Aqua will confirm service provider's decision by assessing maintenance reports and pictures of the filtering mediataken during maintenance activities duly recorded in the Premier Tech Aqua database. Premier Tech Aqua will communicate its evaluation and recommendation to the service provider and the owner.

If the service provider is not using the Premier Tech Aqua maintenance reporting tool and database, an hourly fee will be charged for the analysis of the document and information submitted by the service provider.

Filtering media replacement

The filter bed is pumped by septic tank pumpers who are authorized by Premier Tech Aqua. The replacement filter must be installed by a Premier Tech Aqua authorized agent.

Premier Tech Aqua's wastewater service team prepare a listing of every filtering media at the end of their normal useful life. A letter is then sent to the owner when the filtering media has to be replaced. A listing of authorized partners habilitated to perform filtering media replacements is attached to this letter. The owner can then select who will perform the filtering media replacement. In order to get the new filtering media, the owner has to communicate with the authorized partners (pumper). The authorized partners will order the quantity of filtering media they need to perform the replacement

schedule with customers. Customers and partners must order before end of April to get a reduce price.

The new filtering media will be delivered directly to the site by the authorized partners to the owner. New filtering media, pumping and spent filtering media disposal fees will be charged by the authorized partner to the owner. Approximately, it takes between 45 minutes and 1 h 15 minutes to pump out the spent filtering media, under normal conditions of installation and deterioration. It takes approximately 20 minutes to install the new filtering media. A video is available on PTA's web site **PREMIERTECHAQUA.COM.**

Sampling

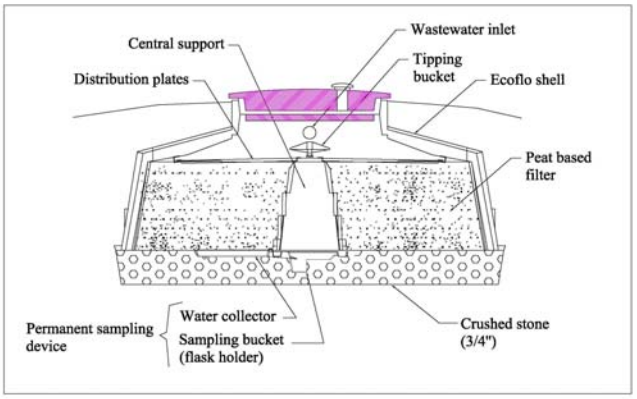
The Ecoflo® Biofilter is equipped with a filtering media which acts as physical barrier providing robustness for the system to be used continuously or intermittently. This physical barrier protects the infiltration area. When a sample is required by the local regulation, the service provider can collect the sample from the sampling tray located under the filtering media (ST model). The sampling tray is accessible through the central support. Depending on water usage, sampling can take a certain time due to the sponge effect created by the filtering media. Service providers must be experienced in collecting samples and must follow the manufacturer's procedures to ensure the representativeness of the sample and prevent any cross contamination.

Equipment required

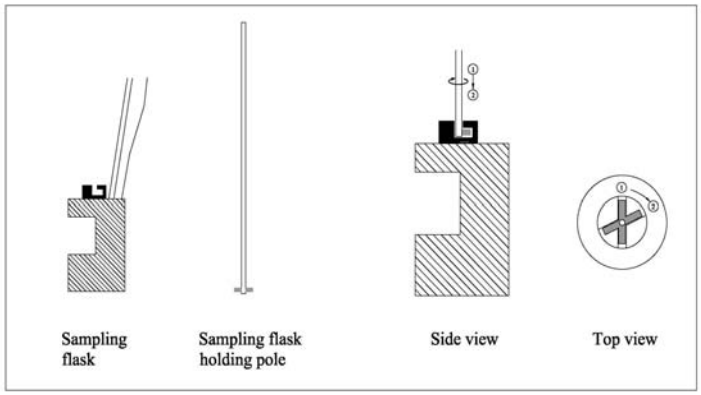
- Clean ECOFLO SAMPLER G-2. (sampler available on demand to Premier Tech Aqua)
- Special weighed tubing with quick connect
- Liquid waste container
- Combo-container cleaned by a laboratory or equivalent
- Cooler
- Frozen ice-packs or ice cubes
- Laboratory sample bottles for analysis (ex.: TSS, BOD_5, NH_4^+, fecal coliforms, etc.)
- Clean water (for the cleaning of the sampler after the sampling)
- Flashlight

ST Model: Open bottom (See Appendix 1)

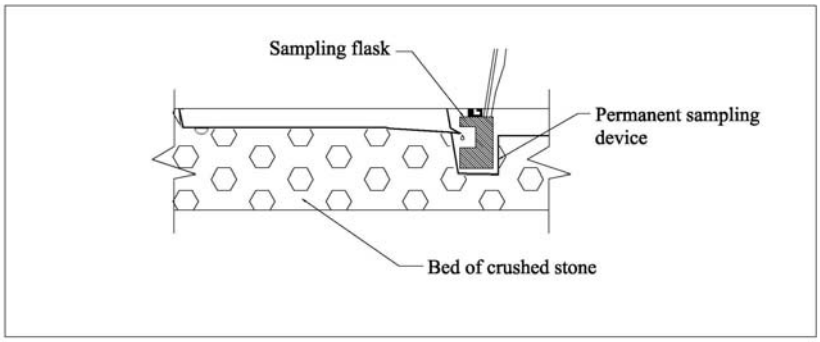
The Ecoflo® Biofilter ST model is equipped with a sampling tray located under the filtering media and accessible through the central support.



Sampling device made by Premier Tech



Location of the sampling device in the sampling tray



Take care not to touch the lip of the sampling tray with the sampling device when installation and removal.

STB Model: with Collecting bottom (See Appendix 2)

The sampling for the Ecoflo® STB model is made by the pumping station. Service provider has to use proper tools and bottles to collect the sample without contaminating it. Never take water from the bottom of the pumping station. Keep the bottle in the upper part of water and never remove particles accumulated at the bottom of the pumping station.

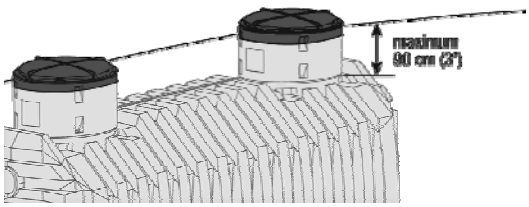
Other equipment

It is possible for the service provider to enter information about other equipment before and after the Ecoflo® Biofilter. The Premier Tech Aqua maintenance program has script to enter this information in the database.

Septic tank

Pumping out accumulated sludge from your septic tank on a regular basis helps to keep your septic system in proper working conditions. The septic tank sludge pumping frequency and requirements are prescribed in local jurisdiction and must be respected. If your home is equipped with a garbage disposal or a sewage pump, we strongly recommend emptying your septic tank more frequently. The use of this kind of equipment increases the amount of sludge in the septic tank.

We recommend that you keep proof of pumping (invoice) with this Operation and Maintenance manual so as to keep a complete record of your septic system maintenance. It is the owner's responsibility to keep the septic tank accessible for inspection and sludge pumping.



Effluent filter

Effluent filter must be cleaned every time the septic tank is pumped, or as per manufacturer's specifications or local jurisdiction requirements. PTA recommends that the effluent filter be inspected at least once a year and, if required, cleaned before being put back in place.

Pumping station (when applicable)

The pumping station may be required to convey water from the septic tank to the Ecoflo® Biofilter or convey water from the Ecoflo® Biofilter to the dispersal component, when gravity flow is not possible. Like the septic tank, the pumping station must also be watertight to prevent groundwater infiltration. If the pumping station capacity exceeds 300 gallons, Premier Tech Aqua recommends using a TPA-300 timed dosing unit to control the pump (Premier Tech Aqua dosing recommendation is 8 to 10 gallons per dose. Refer to the PSA-240 installation guide for more information). The pumping station must be inspected annually and flow calibration validated at that time.

Dbox or flow divider (when applicable)

Any model of Dbox or flow divider must be checked on an annual basis to ensure even distribution of water

Timed dosing unit TPA-300 (when applicable)

The TPA-300 and other acceptable timed dosing units control the release of wastewater to the Ecoflo® Biofilters (see TPA-300 installation guide). All commercial installations with 3 or more **Ecoflo® Biofilters** should be installed with a timed dosing unit and an overall pumping totalizer, or with a flow meter.

For all those other components of the treatment train reporting of malfunction, maintenance required or corrective actions done must be reported to the owner.

General troubleshooting on Ecoflo® after maintenance

Items	Question from maintenance forms	Answers	Problems	Troubleshooting	Actions
1	Access to the biofilter on the property	No	No access to the property	N/A	Letter sent to the home owner by the service provider and notification to PTA and local authorities.
2	Equipment accessibility	No	No access to open the lid	See if the obstacle can be removed	Letter sent to the home owner by the service provider and notification to PTA and local authorities.
3	Water in the infiltration zone[(1)]	Yes		See troubleshooting chart	
4	Water in the infiltration zone	Yes	Less than 6 inches of water from the bottom of the sampling tray (this situation is not critical but can be addressed)	If it's clear water, see if the situation happens every year (permanent)or if the level of water increases .	Offer the owner to come back when there's a dry period to see if there is still water inside. Also inform the designer and/or installer.
	Water in the infiltration zone	Yes	Less than 6 inches of water from the bottom (this situation is not critical but can be addressed)	If it's dirty water, see if there's infiltration in the soil for ST model. For STB, if the pump is running properly.	Offer a soil test to determine the permeability of the soil layer where the absorption bed is installed. Inform the designer and installer.
	Water in the infiltration zone	Yes	4-36 inches (19-91 cm) of water from the bottom of the stone layer.	If it's clear water that means the water table or surface water infiltrates the system	For the water table, install the system higher than the water table layer. For better infiltration, make the drainage to have water table drain from the infiltration zone. Call designer and installer to evaluate possible solutions. Inform the owner.
	Water in the infiltration zone	Yes	4-36 inches (19-91 cm) of water from the bottom of the stone layer.	If it's dirty water, see if there's infiltration in the soil for ST model. For STB, see if the pump is running properly.	Inform owner. Inform designer and/or installer. Relocation and new soil test will be required.
	Water in the infiltration zone	Yes	More than 36 inches (more than 91 cm) of water from the bottom of the stone layer.	Clear water or dirty water system becomes dysfunctional. Verify soil permeability	Inform owner. Inform designer and/or installer. Relocation and new soil test will be required.
5	Tear drop vent condition	Obstructed	No proper aeration in the system	Remove material over the vent of the lid. See if there's grease biomat due to lack of aeration. See if there's a good vent on the house (4-inch pipe).	Install an independent aeration on the septic tank. Inform the owner to keep the aeration on the lid free. Clean the biomat on the tipping bucket and distribution plates. New visit to verify if aeration reduces biomat in the system (not included in the normal maintenance fees).

Items	Question from maintenance forms	Answers	Problems	Troubleshooting	Actions
6	Shell condition	Broken	Structure of shell affected (depending on the urgency)	Take pictures of the breaks. Take pieces of fiberglass and send to PTA (Quality control). Indicate zones where pieces come from with diagram. Verify if there's more than one riser (note how many risers there are). Verify if there are styrofoam pads installed with riser. Verify if there is overcharge or a wall close to the system. Verify if there are traces of vehicles passing over the system. Verify if snow has accumulated on the system.	Ask PTA if break is under warranty. Inform owners (letter by PTA or ORC). Offer repair to customer or change shell. Repair shell.
7	Tipping bucket condition	Broken	Distribution in the system impossible (Urgent repair)	See if it's possible to repair temporarily.	Call Premier Tech to know if it's warranted. Partners must have tipping bucket spare parts with them. Change the tipping bucket for a new one. If it's not warranted, inform the customer to have is authorization.
8	Distribution plates condition	Broken	Distribution in the system affected (repair is urgent)	See if the peat needs more raking because of compaction.	Ask PTA if it's warranted. Replace distribution plates. Partners must have distribution plates with them. If it's not warranted, inform the customer to have is authorization.
	Distribution plates support condition	Broken	Plates not angled adequately Water will be more distributed at the end of peat.	Lift up distribution plates with support screw at the end of distribution plates and put on peat (made with 4-inch pipe shape as a triangle)	Put back the distribution plates with support described previously. Put a note in the folder for the pumper to change the plate supports on peat replacement. Every year, verify if the temporary support has to be adjusted.
9	Water on peat before raking	Yes	Less than 50% (no problem)	N/A	Rake the peat. Check if there are signs of infiltration or hydraulic overload.
			More than 50% (can be a problem if caused by a hydraulic overload)	Verify if peat is at grade or if there is more peat on one end of the shell which forces water to infiltrate by the center part. Evaluate infiltration or hydraulic overload. Look at tipping bucket counter if it required in the system to see the flow use in the system.	Rake the peat. Water should infiltrate (if so, no problem). If water does not infiltrate and pounding water stays at 50 % and more, evaluate the peat condition with the criteria process.
10	Water on peat after raking	Yes	Less than 50% (follow-up of the situation at next maintenance)	Verify if peat is at grade or if there is more peat on one end of the shell which forces water to infiltrate by the center part. Evaluate infiltration or hydraulic overload. Look at tipping bucket counter if it required in the system to see the flow use in the system.	Rake the peat. Water should infiltrate. (If so, no problem). If water does not infiltrate and ponding water stays at 50% and more, evaluate the peat condition with the criteria process

Items	Question from maintenance forms	Answers	Problems	Troubleshooting	Actions
11	Filtering media condition	Deteriorated	Before 5 years of age	Look at flow counter if available. Investigate for water infiltration or hydraulic overload. Look at aeration of the system and vent of the house. Peat can be affected by lack of aeration.	Evaluate the peat condition with the criteria process. Ask PTA to give an analysis result. (Charge this service to customer if before end of contract date.)
		Very deteriorated	Before 8 or 10 years of age (depends on the date of installation)	Look at flow counter if available. Investigate for water infiltration or hydraulic overload. Look at aeration of the system and vent of the house. Peat can be affected by lack of aeration.	Evaluate the peat condition with the criteria process. Ask PTA to give an analysis result. Replace the peat,
12		Important biomat presence	Affect the flow distribution in the system. Migration to infiltration zone. Chance of clogging on the long term. Maintain aerobic condition into the filtering media ?	Evaluate aeration of the system. Analyze water from septic tank (oil and grease). Look at effluent filter condition and TSS in septic tank (not included in the maintenance fees).	Make a visual inspection of tear drop on Ecoflo lid, vent of the house or independent vent for septic tank. Perform a smoke test for better aeration results. Take sample of wastewater from the septic tank and house (not included in the maintenance fees). Inform customer of this situation, obtain his authorization to investigate.
13	Roots in the peat	Some or many	Difficulty to rake peat. Difficulty to remove old peat.	Evaluate the distance of trees around the system. Evaluate condition of the peat following point 10.	Look if trees or bushes can be relocated. Cut the roots when replacing peat.
14	Flow Divider	Does not work properly	Water not distributed in every system equally	Look if system at level (gravity). Look if the flow divider is broken or clogged (gravity or pressure)	

What to do in case of…

Flooding

Certain sites are prone to flooding or have a high groundwater table level. This can lead to a malfunction of the **Ecoflo® Biofilter** or any other septic system. If this happens, contact **your service provider and installer.**

Backflow

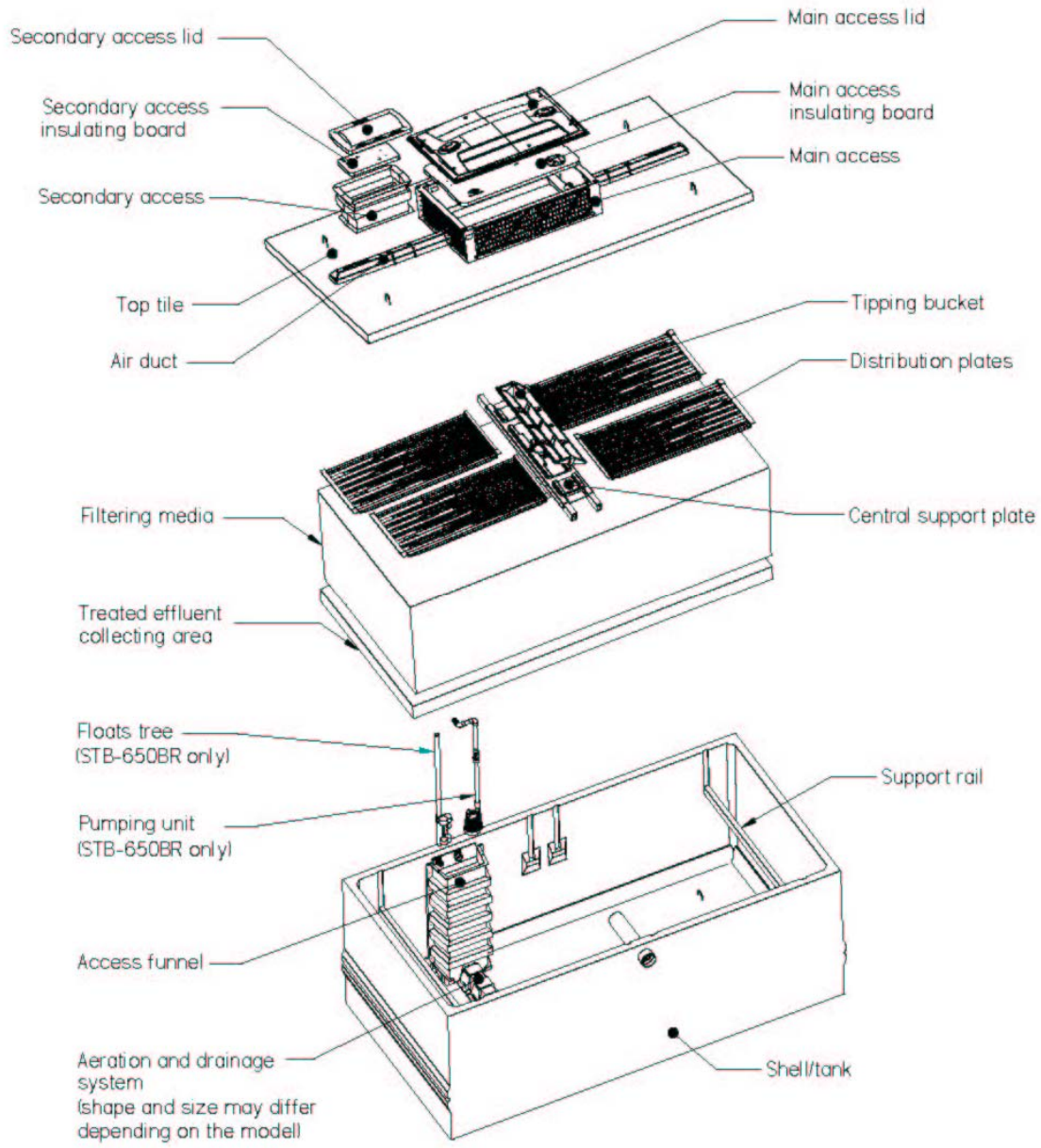
Backflows rarely occur in homes. It is generally caused by poor septic tank maintenance. Your septic system installer or septic tank pumper can usually take care of the situation.

Odours

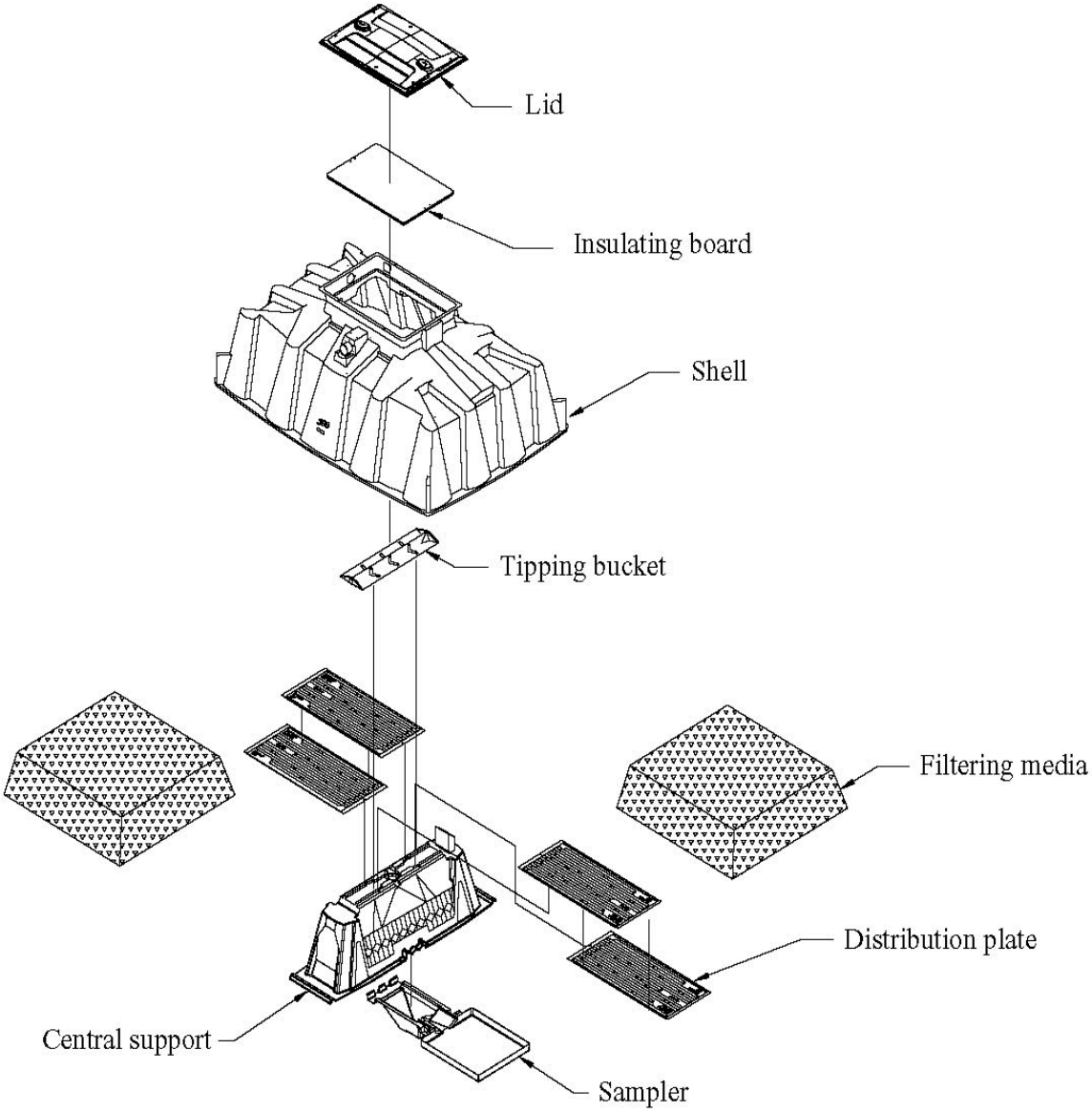
The position of the air vent of the house, as well as other factors unrelated to the **Ecoflo® Biofilter**, can prevent proper dispersion of septic gases and lead to odours. If this happens, contact your **service provider** for solutions.

FOR ANY PROBLEM, QUESTION OR COMMENT,
DO NOT HESITATE TO CONTACT OUR CUSTOMER SERVICE
AT 1 800 632-6356

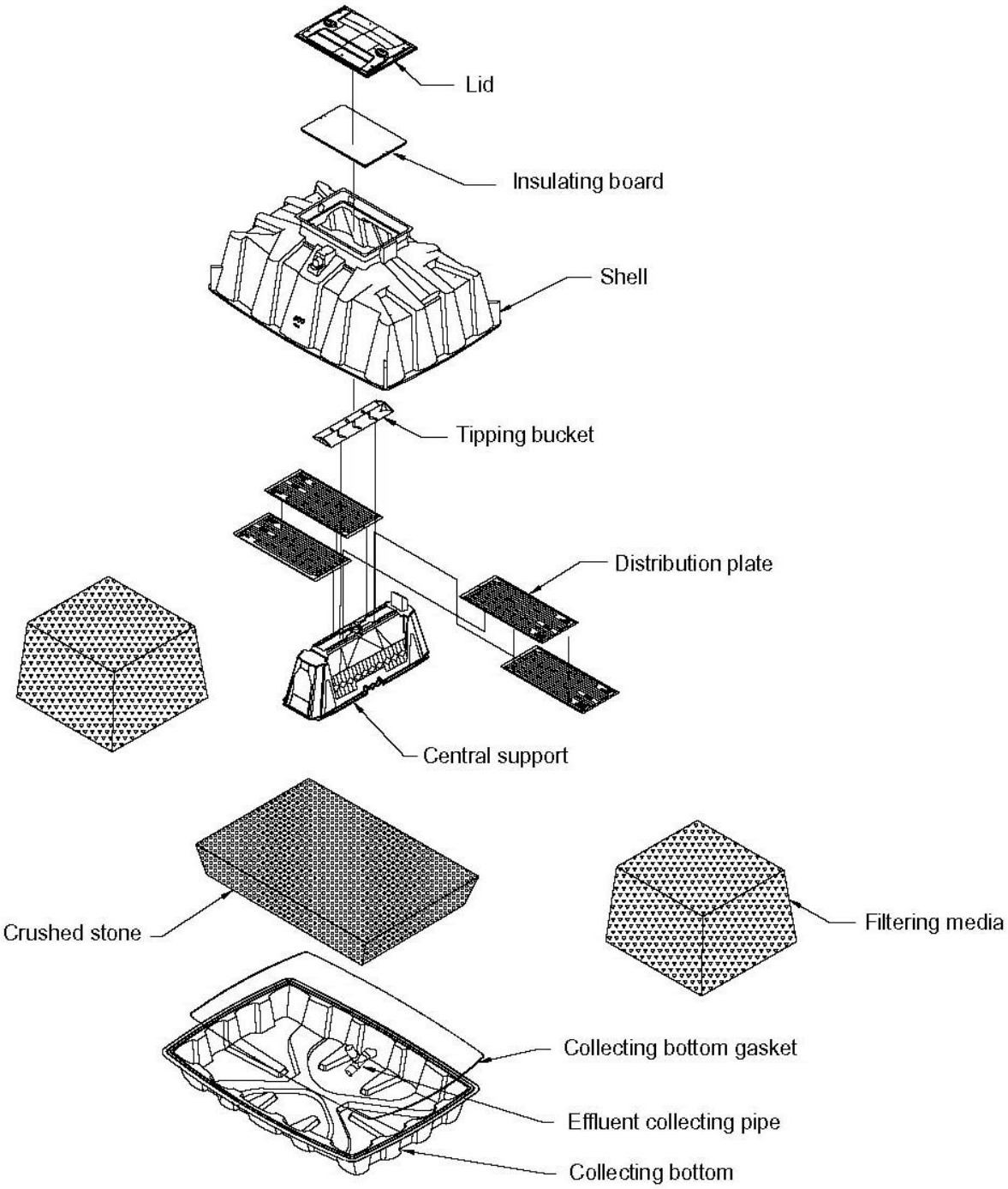
Components of the Ecoflo® Biofilter



Exploded view of the system
Concrete models



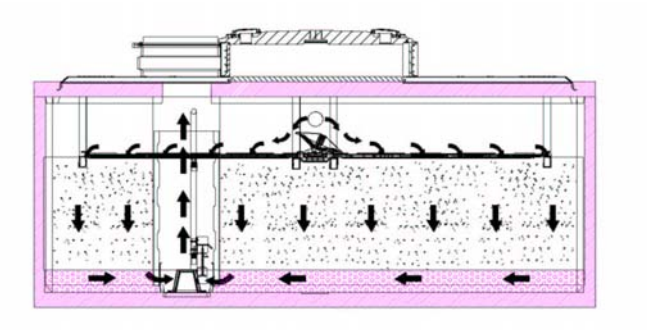
Exploded view of the system
ST fiberglass models



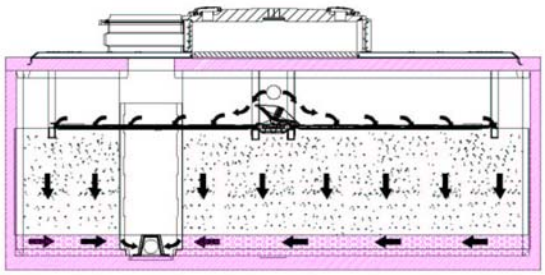
Exploded view of the system
STB fiberglass models

Ecoflo Biofilter process

The overall function of the **Ecoflo® Biofilter** is to treat domestic wastewater after a primary treatment. It is done via a water and air (oxygen) management inside the system. Wastewater is treated aerobically by bacteria fixed in the filtering media.

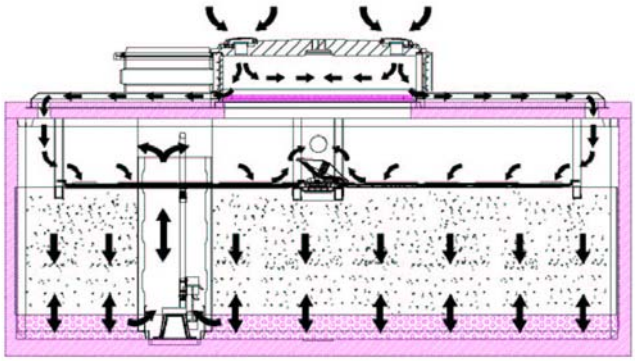


Water flow diagram
(STB-650BR with integrated pump)



Water flow diagram
(STB-650B discharge by gravity)

To be treated, the wastewater first goes into the septic tank where it is submitted to a primary treatment and then it enters the **Ecoflo® Biofilter**. Once inside the **Ecoflo®**, the water is directed into the tipping bucket and split equally over the distribution plates located on both sides of the central support plate. These plates include channels with holes that distribute the influent evenly over the filtering media. Afterwards, wastewater trickles down through the filtering media where its organic content is consumed by bacteria. The treated effluent is collected in the gravel bed and discharged by gravity (STB-650B) or with an integrated pump (STB-650BR).

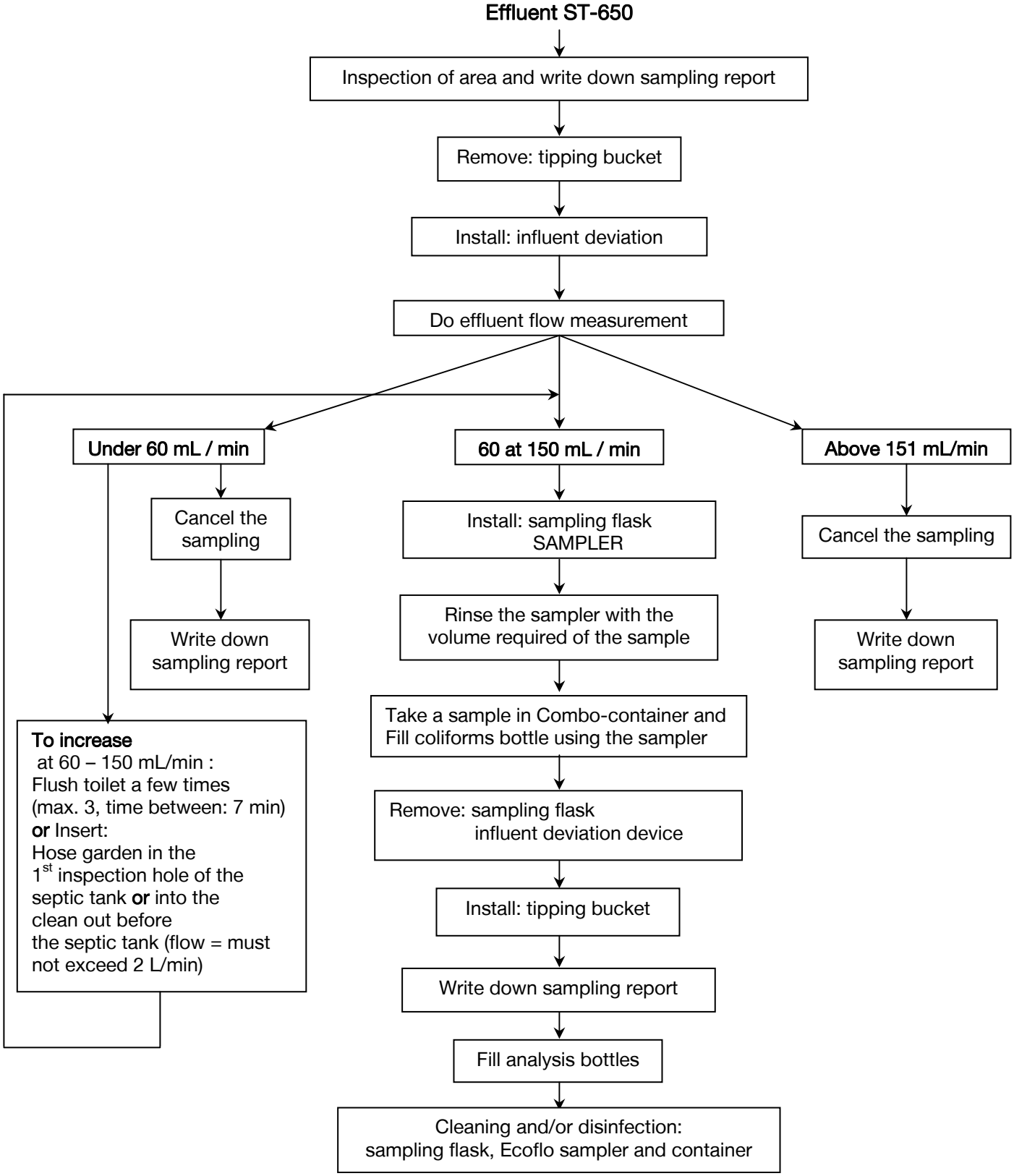


Airflow diagram

To be efficient, the system requires enough oxygen for the filtering media's bacteria do their work. In order to achieve this goal, the filtering media is fed in oxygen by air flowing both at the top and at the bottom of the filtering media. Air enters the system through the intake located on the main access lid. Then, it goes to the extremities of the filter bed via the top tile's air ducts. Air flows at the top of the filtering media, which is located underneath the distribution plates, and enters the filtering media via the water infiltration that takes it to the bottom. Moreover, a gas exchange occurs at the top and at the bottom of the filtering media promoting its oxygenation. The opening located in the access funnel allows for air circulation between the top and the bottom of the filtering media. Finally, air circulation in the system is made by convection to the home’s air vent (or independent vent) via the inlet pipe and the septic tank.

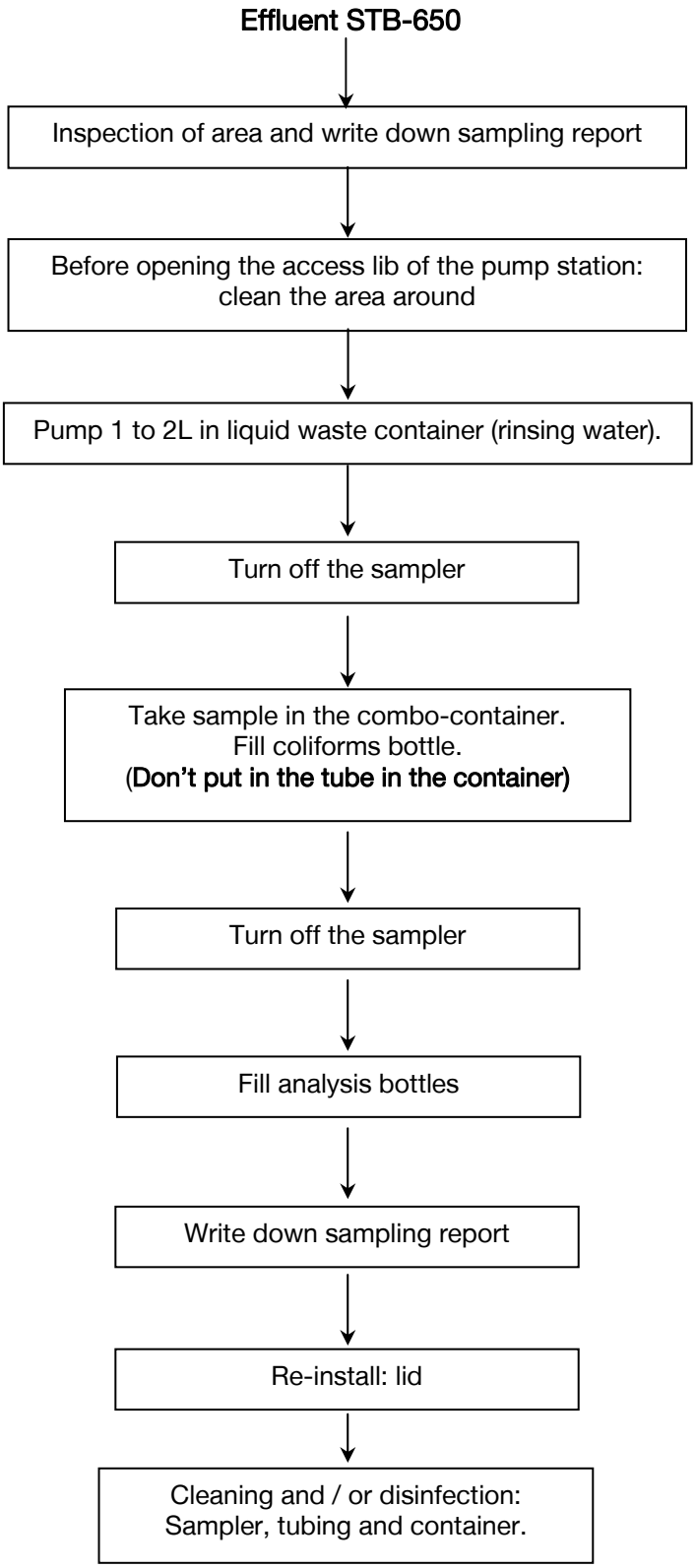
Appendix 1

Grab sampling of ECOFLO ST-650



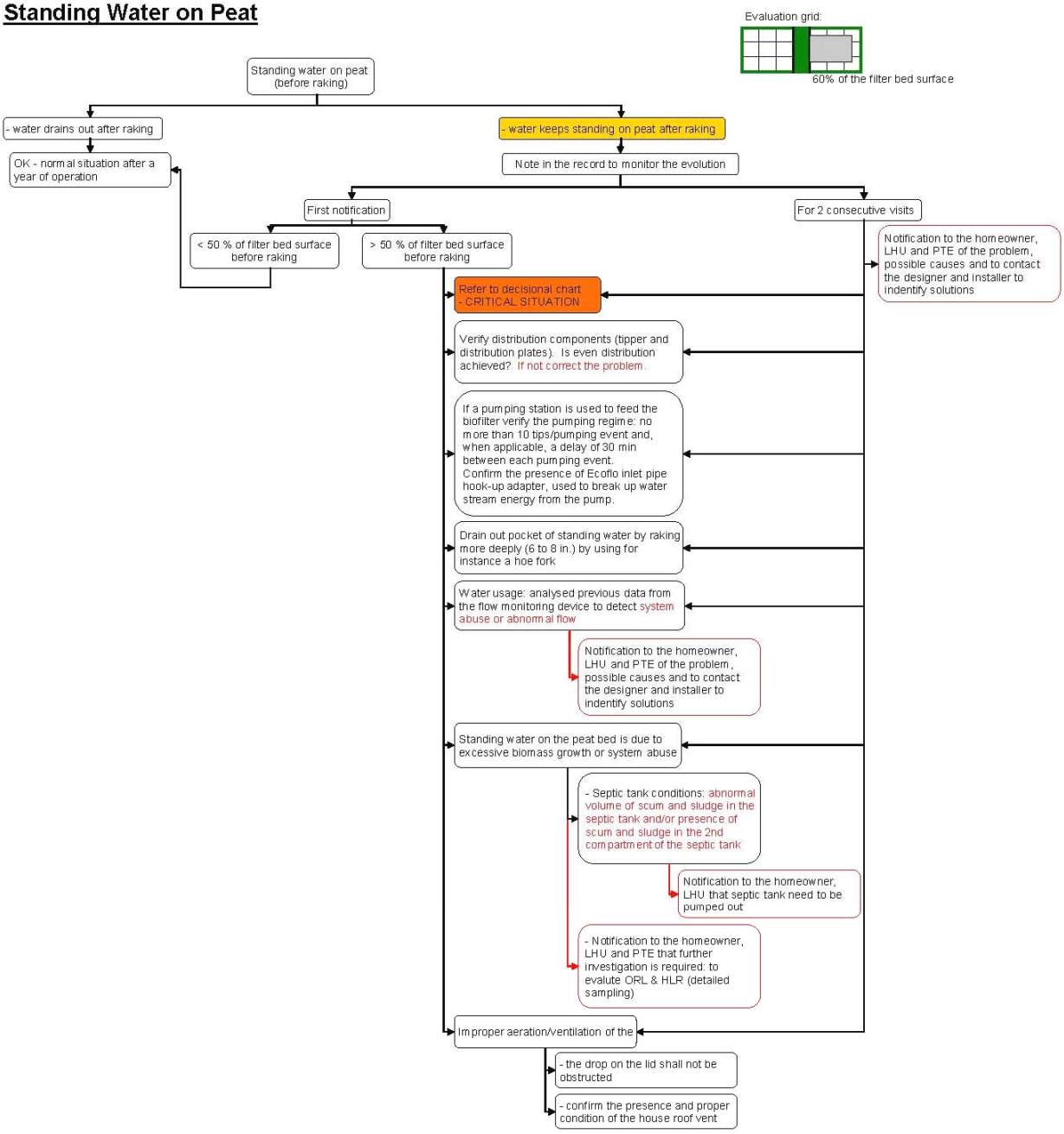
Appendix 2

Grab sampling of ECOFLO STB-650



Appendix 3

Troubleshooting chart
Standing Water on Peat



Possible causes of standing water on peat:

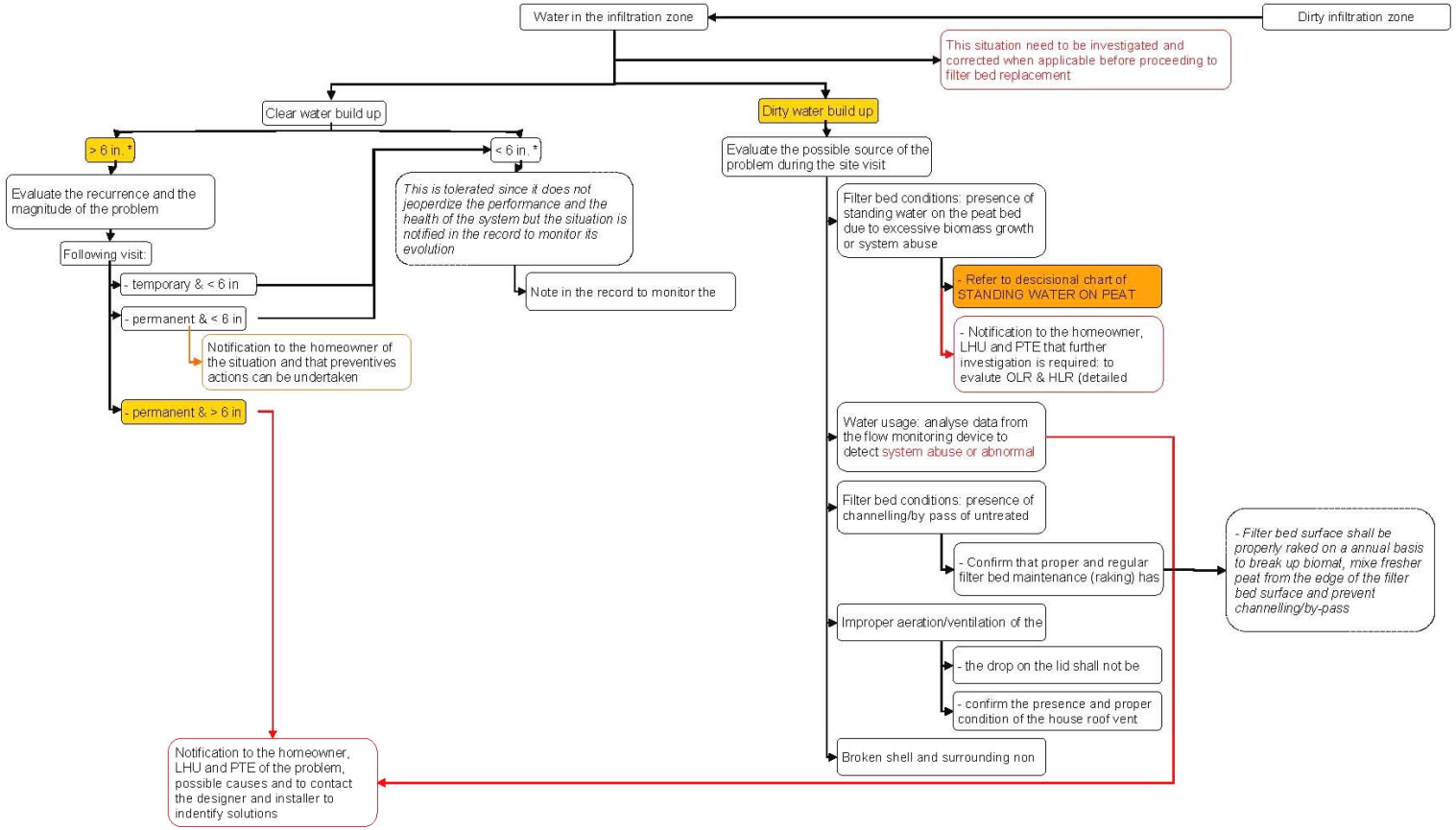
- water flow to the system, design vs real flow
- ponctual and recurent high water flow event
- too much biomass growth caused by unusual ORL and/or HLR and/or inadequate maintenance of the septic tank
- level of peat degradation related to the age of the system
- system has been flooded due to a improper design and/or installation
- uneven water distribution
- improper system ventilation/areation
- water quality causing premature ageing or clogging of the filter bed; unusual water chemistry, toxic spills, household cleaning products, household appliance (garbage grinder), etc.

Consequences:

- on long term, decrease of system hydraulic performance and treatment efficiency
- abnormal compaction of the filter bed
- reduced ventilation/aeration within the filter bed profil, reduced biomass degradation

Troubleshooting procedure

Water in the Infiltration Zone



Diagnostic tool: Iron oxyde redox stick

Possible causes of water in the infiltration:

- improper soil & site evaluation was performed and consequently the design of the infiltration zone is inappropriate
- installation, not according to design
- infiltration zone/ soils got compacted during installation
- improper evaluation of high seasonal ground water table
- landscaping alteration & modification of the drainage (surface and sub surface) surrounding the property
- water flow to the system design vs real flow (septic and parasite water)
- unusually high and sustained precipitation period

Consequences:

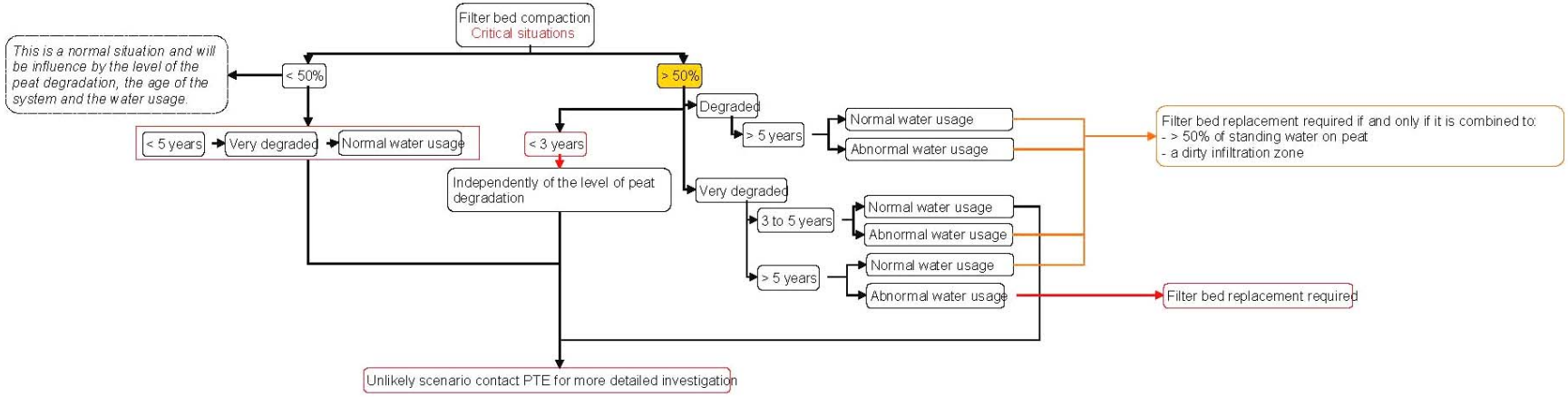
- if permanently > 6 in., impact on the air flow into the system which will affect over time the overall efficiency of the system
- if < 6 in., no real impact but need to be monitored

Note:

* For close bottom system since there is no sampling device to measure the level of water into the infiltration zone, simply determine if the stone layer is 1) saturated, 2) no visible standing water at gravel bed surface

Troubleshooting procedure

Filter Bed Compaction



Possible causes of compaction of the filter bed:

- water flow to the system, design vs real flow
- ponctual and recurent high water flow event
- too much biomass growth caused by unusual ORL and/or HLR
- level of peat degradation related to the age of the system
- system is periodically flooded due to a improper design and/or installation

Consequences:

- on long term, decrease of system hydraulic performance and treatment efficiency
- impact on the capability of the system to deal with peak flow

Possible causes of standing water on peat:

- water flow to the system, design vs real flow
- ponctual and recurent high water flow event
- too much biomass growth caused by unusual ORL and/or HLR
- level of peat degradation related to the age of the system
- system is periodically flooded due to a bad design and/or installation

Consequences:

- on long term, decrease of system hydraulic performance and treatment efficiency

Notice of New Property Owner

Send a copy to Premier Tech Aqua.

Name of previous the owner:_____

I, the undersigned,_____ hereby declare that I have acquired the property located at

_____

Civic Number Street City Province or State

_____ (___)_____

ZIP or Postal Code Phone number

I have read and I understand the Warranty provided by Premier Tech Technologies Ltd for the Ecoflo® Biofilter. I wish to benefit from this Warranty for the remaining period, if any, and from the date of the transfer of ownership, that is,_____. I accept to be bound by this Warranty and by any and all of the sections, undertakings and conditions set forth therein. I have had the opportunity to examine the Ecoflo® Biofilter and declare myself satisfied with it at the time of this transfer. I ask Premier Tech Technologies Ltd. to take note of this transfer of ownership.

Signature: _____ Date: _____

Name of new owner: _____
(block letters)

Language preference: ❑ English ❑ French New owner's e-mail address: _____

Appendix V

Maintenance records

MAINTENANCE FORM

Company		**File number**	UVA02-10963-01
		Reference no	VIR-0208-001
Name	Beatley , Kenny		
Inspector	Wes Combs/RDL/PTE/PREMIERTECH		
Compagnie	Premier Tech		
Contract	1	**Maintenance #**	2
Address	150 Landing View Drive, P.O. Box 456	**City**	Kilmarnock
Province	VA	**Country**	United States
Date	2004-05-17	**Time**	03:36:15 PM

Maintenance status

○ Not done ● Done ○ Last Year ○ Inacessible Biofilter

MAINTENANCE COMMENTS

For Coordinator

SHELL

Shell	☒ Inspected ☐ Broken shell
Shell type	ST-650
Serial Number	ST-650A-E-0940
Tipping bucket inspection	☐ Inspected

DISTRIBUTION PLATES

Distribution plates	☐ Inspected
# of holes partially blocked	6
# of holes completely blocked	0
Distribution plate brackets	☐ Inspected

PEAT ASPECT

Peat bed	☐ Inspected
Grading	● Yes ○ No
Peat aspect	● Good condition ○ Medium ○ Bad condition
Worms	● None ○ 1 - 100 ○ 101 - 500 ○ 500 +
Water in cavities	☐ In cavities
Water on left surface	0 % after grading
Water on right surface	0 % after grading
Water level	6cm
Flooded ?	☒ No ☐ Yes

SEPTIC TANK

Septic tank type	Concrete
Access	● Accessible ○ Inaccessible

PUMPING STATION

Pump type	Non
Pumping station inspection	☐ Inspected

Access	● Accessible ○ Inaccessible

PICTURE

If it's not possible for you to take pictures, please explain the reason.

ref : BC1E70BF81F4286385256EDD006C14BD

Premier Tech Environment — Maintenance record

Ecoflo

UVA02-11781-01

Customer: Benefiel, Richard
Serial #: ST650A-E 0931
File #: VIR-0210-001
City: 3541 Windmill Rd. Whit Stre VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2005 (Year) - OCT (Month) - 27 (Day) at 1230 (Time)

By: BRUCE KING

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report)	☑ Ok	☑ Ok ☐ Jammed
☑ ST-650 ☐ ST-500	☐ N-C	☐ Unhoooked ☐ Broken
☐ Buttom ☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: Ø
		# of holes completely blocked: Ø

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☐ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: Ø cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS 37°.37.503 N W 076° 19.559' Precision 20 Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

TEST SITE 700' run to Ecoflow

Entered 11/16

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

Premier Tech Environment — Maintenance record

Ecoflo®

Customer: BENEFIEL, RICHARD
Serial #: ST650A-E 0931
File #: VIR-0210-001
City: WHITE STONE, VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2004 (Year) - DEC (Month) - 2 (Day) at 1345 (Time)

By: BRUCE KING

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report)	☑ Ok	☑ Ok ☐ Jammed
☑ ST-650 ☐ ST-500	☐ N-C	☐ Unhoooked ☐ Broken
☐ Buttom ☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: 0
		# of holes completely blocked: 0

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☐ None ☑ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N 37. 37. 507 W 076. 19. 559 Precision Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

Some bio-mass @ end & distribution plates but not severe otherwise in good shape

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

DSSI MAINTENANCE INFORMATION

HOMEOWNER:	Benefiel, Richard
LOCATION/911 ADDRESS:	3541 Windmill Point Road
CITY:	White Stone
STATE:	VA
ZIP:	22578
COUNTY:	Lancaster
GPS:	37.37.507/-76.19.559
DSSI INSTALLATION DATE:	10/15/2002
MAINTENANCE COMPLETED:	12/2/2004
PTE ID #:	VIR-0210-001
SERIAL #	931

OTHER INFORMATION:

Test Site

Premier Tech Environment — Maintenance record

Ecoflo

Customer Bethel United Methodist Church
Serial # ST650A-E 2134
File # VIR 0402-003
City Lively, VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2005 (Year) - FEB (Month) - 7 (Day) at 1045 (Time)

By: EM King

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report) ☑ ST-650 ☐ ST-500 ☐ Buttom ☑ Buttomless	☑ Ok ☐ N-C ☐ Fixed/comments	☑ Ok ☐ Jammed ☐ Unhoooked ☐ Broken # of holes partially blocked: 0 # of holes completely blocked: 0

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☑ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N 37° 46.324 W 076° 30.897 Precision 28 Meters

Septic Tank ☒ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☒ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

HOMEOWNER:	Bethel United Methodist Church
LOCATION/911 ADDRESS:	42 Hudgins Avenue
CITY:	Lively
STATE:	VA
ZIP:	22507
GPS:	37.46.324/-76.30.897
DSSI INSTALLATION DATE:	2/26/2004
MAINTENANCE COMPLETED:	2/7/2005
PTE ID #:	VIR-0402-003
SERIAL #	2134

OTHER INFORMATION:

Premier Tech Environment — Maintenance record

Ecoflo®

Customer: CAMPBELL SHIRLEY
Serial #: ST650A-E 0939
File #: MIR 0202-001
City: OAK GROVE LA. WEST MONROELAND

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2004 (Year) - Dec (Month) - 23 (Day) at 1307 (Time)

By: Bruce McKinney

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report) ☑ ST-650 ☐ ST-500 ☐ Buttom ☑ Buttomless	☑ Ok ☐ N-C ☐ Fixed/comments	☑ Ok ☐ Jammed ☐ Unhoooked ☐ Broken # of holes partially blocked: 0 # of holes completely blocked: 0

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☑ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N 38°10.394 W077°00.337 ft Precision 20 Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

First copy Customer

Second Copy Premier Tech Environment

Third Copy Agent

DSSI MAINTENANCE INFORMATION

HOMEOWNER:	Campbell, Shirley
LOCATION/911 ADDRESS:	730 [redacted] Parrish Lane
CITY:	Montross
STATE:	VA
ZIP:	22520
GPS:	38.10.394/-77.00.337
DSSI INSTALLATION DATE:	2/10/2002
MAINTENANCE COMPLETED:	12/23/2004
PTE ID #:	VIR-0202-003
SERIAL #	930
OTHER INFORMATION:	Test Site

ANNUAL MAINTENANCE FORM

UVA05-20940-01

Customer Garcia, Abel File # VIR-0507-020

Inspector Michael Pruett Serial # 4126

GPS ____ / ____ Date/Time 10-10-06 6:15 PM

Address of Installation 153 Hebron Valley Rd. City Madison, VA

Maintenance Information

Maintenance Status:

☐ Not Done ☒ Done ☐ Last Year ☐ Inaccessible Biofilter

Comments ____

Shell and Cover

Vent Cap ☒ Verify

Shell Inspection ☒ Verify ☐ Broken/Cracked Shell

Type of Shell Indicated ☐ ST ☒ STB

Distribution System

Tipping Bucket Inspection ☒ Verify

Distribution plates and supports inspected ☒ Verify and clean

Presence of remnants ☐ Solid remnants

Peat Bed Status

Water on peat (before raking)
☒ Both sides identical
☐ More accumulation on picture side
☐ Less accumulation on picture side

Water on peat (after raking) ☐ Water after raking

Peat Status
☒ Good Condition
☐ Medium
☐ Bad Condition

ENTER 10/19

Odor contamination ☐ Yes

Flooded? ☐ Yes ☒ No

Crushed Stone Bed

Central support cover ☒ Verify

Water in zone ☐ Yes ____ cm

Premier Tech Environment — Maintenance record

Ecoflo

4VA05-20940-01

Customer: GARCIA
Serial #: ST650A-E 4126
File #: VIR-0507-020
City: MADISON

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2006 (Year) - SEPT (Month) - 28 (Day) at 1300 (Time)

By: BRUCE KING

Shell		Tipping Bucket	Distribution plates	
☑ Ok	☐ N-C (use the broken shell report)	☑ Ok	☑ Ok	☐ Jammed
☑ ST-650	☐ ST-500	☐ N-C	☐ Unhoooked	☐ Broken
☑ Buttom	☐ Buttomless	☐ Fixed/comments	# of holes partially blocked: 0	
			# of holes completely blocked: 0	

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N W Precision Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☐ PSA-240 ☑ Others ☐ To Ecoflo ☑ To field ☐ Inacessible

Comments

ENTER 114

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

HOMEOWNER:	Garcia, Abel
LOCATION/911 ADDRESS:	153 Hebron Valley Road
CITY:	Madison
STATE:	VA
ZIP:	22727
GPS:	38.24.293/-78.13.617
DSSI INSTALLATION DATE:	7/28/2005
CONTRACTOR:	The Harlow Company
MAINTENANCE COMPLETED:	9/28/2006
PTE ID #:	VIR-0507-020
SERIAL #:	4126
OTHER INFORMATION:	

ANNUAL MAINTENANCE FORM

Customer GARCIA File #

Inspector BRUCE KINZ Serial # ST650A-NE 4126

GPS 38° 24.293 / 078° 13.617 W Date/Time 3/29/06

Address of Installation 153 Hebron Valley Rd. City MADISON, VA

Maintenance Information

Maintenance Status:

☐ Not Done ☑ Done ☐ Last Year ☐ Inaccessible Biofilter

Comments

Shell and Cover

Vent Cap	☑ Verify	
Shell Inspection	☑ Verify	☐ Broken/Cracked Shell
Type of Shell Indicated	☐ ST	☑ STB

Distribution System

Tipping Bucket Inspection	Good / clear	☑ Verify
Distribution plates and supports inspected	Clear all holes clear	☑ Verify and clean
Presence of remnants	No	☐ Solid remnants

Peat Bed Status

Water on peat (before raking) No	☑ Both sides identical ☐ More accumulation on picture side ☐ Less accumulation on picture side
Water on peat (after raking) No	☐ Water after raking
Peat Status	☑ Good Condition ☐ Medium ☐ Bad Condition
Odor contamination	☐ Yes
Flooded?	☐ Yes ☑ No

Crushed Stone Bed

Central support cover	☑ Verify	
Water in zone No	☐ Yes	_____ cm

ANNUAL MAINTENANCE FORM UVA03-15919-01

Customer Goodrich, W File # VIR-0312-002

Inspector BRUCE RIDG Serial # ST650A-E 2077

Important Information 12/21/05 Renee Hearg

Address of Installation 19490 BRANDON Rd City Disputanta, VA

Maintenance Information

Maintenance Status:

☐ Not Done ☑ Done ☐ Last Year ☐ Inaccessible Biofilter

Comments

Shell and Cover

Vent Cap	☑ Verify	
Shell Inspection	☑ Verify	☐ Broken/Cracked Shell
Type of Shell Indicated	☑ ST	☐ STB

Distribution System

Tipping Bucket Inspection	☑ Verify
Distribution plates and supports inspected	☑ Verify and clean
Presence of remnants No	☐ Solid remnants

Peat Bed Status

Water on peat (before raking)	☑ Both sides identical ☐ More accumulation on picture side ☐ Less accumulation on picture side
Water on peat (after raking)	☐ Water after raking
Peat Status	☑ Good Condition ☐ Medium ☐ Bad Condition
Odor contamination	☐ Yes
Flooded?	☐ Yes ☑ No

CMTEK 12/28

Crushed Stone Bed

Central support cover	☑ Verify	
Water in zone	☐ Yes	∅ cm

Premier Tech Environment — Maintenance record

Ecoflo®

Customer: Goodrich, W
Serial #: ST650A-E 2077
File #: VIR-0312-002-
City: Poquoson, VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2004 (Year) - Dec (Month) - 14 (Day) at 1400 (Time)

By: [signature]

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report) ☑ ST-650 ☐ ST-500 ☐ Buttom ☑ Buttomless	☑ Ok ☐ N-C ☐ Fixed/comments	☑ Ok ☐ Jammed ☐ Unhoooked ☐ Broken # of holes partially blocked: 0 # of holes completely blocked: 0

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☑ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N 37°13.226 W077° 03.741 Ft Precision 23 Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

First copy — Customer
Second Copy — Premier Tech Environment
Third Copy — Agent

HOMEOWNER:	Goodrich, Willie B.
LOCATION/911 ADDRESS:	19490 Brandon Road
CITY:	Spring Grove
STATE:	VA
ZIP:	23881
COUNTY:	Surry
GPS:	37.13.226/-77.03.741
DSSI INSTALLATION DATE:	12/4/2003
MAINTENANCE COMPLETED:	12/14/2004
PTE ID #:	VIR-0312-002
SERIAL #	2077
OTHER INFORMATION:	

ANNUAL MAINTENANCE FORM

Customer HALE, Stephanie File # YIR-0301-005

Inspector Bruce King Serial # ST650A-E 1156

Important Information 12/14/05

Address of Installation 3694 Willow St. City Chincoteague, VA

Maintenance Information

Maintenance Status:

☐ Not Done ☑ Done ☐ Last Year ☐ Inaccessible Biofilter

Comments

Shell and Cover

Vent Cap	☑ Verify	
Shell Inspection	☑ Verify	☐ Broken/Cracked Shell
Type of Shell Indicated	☑ ST	☐ STB

Distribution Svstem

Tipping Bucket Inspection	☑ Verify
Distribution plates and supports inspected	☑ Verify and clean
Presence of remnants NO	☐ Solid remnants

Peat Bed Status

Water on peat (before raking)	☑ Both sides identical ☐ More accumulation on picture side ☐ Less accumulation on picture side
Water on peat (after raking)	☐ Water after raking
Peat Status	☑ Good Condition ☐ Medium ☐ Bad Condition
Odor contamination	☐ Yes
Flooded?	☐ Yes ☑ No

lots of worms in peat.

ENTER 12/19

Crushed Stone Bed

Central support cover	☑ Verify	
Water in zone	☐ Yes	4 cm

Premier Tech Environment

Maintenance record

Ecoflo®

Customer: Hale, Stephanie
Serial #: ST 650 A-E 1156
File #: VIR-0301-005
City: Christiansburg, VA.

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☒ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2005 (Year) - 01 (Month) - 27 (Day) at 1:30 (Time)

By: Philip Marston

Shell	Tipping Bucket	Distribution plates
☒ Ok ☐ N-C (use the broken shell report)	☒ Ok	☒ Ok ☐ Jammed
☒ ST-650 ☐ ST-500	☐ N-C	☐ Unhoooked ☐ Broken
☐ Buttom ☒ Buttomless	☐ Fixed/comments	# of holes partially blocked: 0
		# of holes completely blocked: 0

Peat aspect: ☒ Good ☐ Medium ☐ Bad condition
Worms: ☒ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☒ No ☐ Yes

Grading ☒ Yes ☐ No
Water ☒ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N 37° 55.824 W 075° 22.501 Precision Meters

Septic Tank ☒ Concrete ☐ Plastic ☒ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☒ PSA-240 ☐ Others ☒ To Ecoflo ☐ To field ☐ Inacessible

Comments

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

HOMEOWNER:	Hale, Stephanie
LOCATION/911 ADDRESS:	3694 Willow Street
CITY:	Chincoteague
STATE:	VA
ZIP:	23336
GPS:	37.55.824/-75.22.501
DSSI INSTALLATION DATE:	1/22/2003
MAINTENANCE COMPLETED:	1/27/2005
PTE ID #:	VIR-0301-005
SERIAL #	1156

OTHER INFORMATION:

Premier Tech Environment — Maintenance record

Ecoflo®

Customer: Humphreys
Serial #: ST650A-F 0831
File #:
City: White Stone, VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2004 (Year) - 05 (Month) - 17 (Day) at 11 PM (Time)

By: MICHAEL AUETT

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report) ☑ ST-650 ☐ ST-500 ☐ Buttom ☐ Buttomless	☑ Ok ☐ N-C ☐ Fixed/comments	☑ Ok ☐ Jammed ☐ Unhoooked ☐ Broken # of holes partially blocked: 2 # of holes completely blocked:

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☑ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 3 cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N W Precision Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

ONE OF THE 24 SAMPLING SYSTEMS.

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

ANNUAL MAINTENANCE FORM

Customer Loomis File # VIR-0404-017

Inspector Bruce King Serial # ST650 A-E 2222

GPS 38° 48.015 N 078° 40.126 W Date/Time 1300 10/12/06

Address of Installation City Mt Jackson, VA

Maintenance Information

Maintenance Status:

☐ Not Done ☑ Done ☐ Last Year ☐ Inaccessible Biofilter

Comments

Shell and Cover

Vent Cap ☑ Verify

Shell Inspection ☑ Verify ☐ Broken/Cracked Shell

Type of Shell Indicated ☐ ST ☑ STB

Distribution System

Tipping Bucket Inspection ☑ Verify

Distribution plates and supports inspected ☑ Verify and clean

Presence of remnants No ☐ Solid remnants

Peat Bed Status

Water on peat (before raking)
☑ Both sides identical
☐ More accumulation on picture side
☐ Less accumulation on picture side

Water on peat (after raking) No ☐ Water after raking

Peat Status
☑ Good Condition
☐ Medium
☐ Bad Condition

Enter 11/4

Odor contamination No ☐ Yes

Flooded? ☐ Yes ☑ No

Crushed Stone Bed

Central support cover ☐ Verify

Water in zone No ☐ Yes _____ cm

HOMEOWNER:	Loomis, David
LOCATION/911 ADDRESS:	2029 Buckhill Road
CITY:	Mt. Jackson
STATE:	VA
ZIP:	22842
GPS:	38.48.015/-78.40.126
DSSI INSTALLATION DATE:	7/2004
CONTRACTOR:	Ira S. Carte, The Enterrpise, Inc
MAINTENANCE COMPLETED:	10/12/2006
PTE ID #:	VIR-0404-017
SERIAL #:	2222
OTHER INFORMATION:	Formerly Ira Carte

HOMEOWNER:	Loomis, David
LOCATION/911 ADDRESS:	2029 Buckhill Road
CITY:	Mt. Jackson
STATE:	VA
ZIP:	22842
GPS:	38.48.015/-78.40.126
DSSI INSTALLATION DATE:	7/2004
CONTRACTOR:	Ira S. Carte, The Enterrpise, Inc
MAINTENANCE COMPLETED:	10/12/2006
PTE ID #:	VIR-0404-017
SERIAL #:	2222
OTHER INFORMATION:	Formerly Ira Carte

Premier Tech Environment

Maintenance record

Ecoflo

VA04-16204-01

March 2, 04

Customer: TAYLOR 337 Windmill Pt Rd
Serial #: ST650A-E 2123
File #: VIR-04083-002
City: WHITE STONE, VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2005 (Year) - OCT (Month) - 20 (Day) at 1300 (Time)

By: BRUCE KING

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report)	☑ Ok	☑ Ok ☐ Jammed
☑ ST-650 ☐ ST-500	☐ N-C	☐ Unhoooked ☐ Broken
☐ Buttom ☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: 0
		# of holes completely blocked: 0

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☐ None ☑ 0@100 ☐ 101@500 ☐ 500+
Water level in the zone: Ø cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 1 %
Water on right surface after racking 1 %

GPS N 37° 62.55 W 075° 32.87 Precision Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

Entrée filtre

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

Premier Tech Environment — Maintenance record

Ecoflo

2VA05-19698-01

Customer: NICOLATO,
Serial #: ST650A-E 2701
File #: VIR-0501-005
City: VA BEACH, VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2006 (Year) - MAR (Month) - 22 (Day) at 1300 (Time)

By: BRUCE KING

Shell		Tipping Bucket	Distribution plates	
☑ Ok	☐ N-C (use the broken shell report)	☑ Ok	☑ Ok	☐ Jammed
☑ ST-650	☐ ST-500	☐ N-C	☐ Unhoooked	☐ Broken
☐ Buttom	☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: Ø	
			# of holes completely blocked: Ø	

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: Ø cm
Flooded: ☑ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking Ø %
Water on right surface after racking Ø %

GPS N 36° 36.658' W 076° 05.878' Precision Ex Meters 26

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

Premier Tech Environment — Maintenance record

Ecoflo®

UVA04-17133-01

Customer: PALMER, CARL
Serial #: ST650 A-E 2566
File #: VIR-0406-003
City: CHINCOTEAGUE, VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2006 (Year) - MAY (Month) - 04 (Day) at 1130 (Time)

By: BRUCE KING

Shell		Tipping Bucket	Distribution plates	
☑ Ok	☐ N-C (use the broken shell report)	☑ Ok	☑ Ok	☐ Jammed
☑ ST-650	☐ ST-500	☐ N-C	☐ Unhoooked	☐ Broken
☐ Buttom	☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: Ø	
			# of holes completely blocked: Ø	

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☐ None ☑ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: Ø cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking Ø %
Water on right surface after racking Ø %

GPS N W Precision Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

PEAT ON ONE SIDE WETTER THAN OTHER
UNIT IS LEVEL & TIPPING BUCKET IS OPERATING PROPERLY
TIP RATIO IS 1 EVERY 12 SEC.

ENTER GIS

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

Premier Tech Environment

Maintenance record

Ecoflo

Customer: Palmer, Carl + Lee
Serial #: ST 650 A-E 2566
File #: VIR-0406-003
City: Chincoteague, VA.

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☒ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2005 (Year) - 02 (Month) - 16 (Day) at 11:00 (Time)

By: Philip Marston

Shell		Tipping Bucket	Distribution plates	
☒ Ok	☐ N-C (use the broken shell report)	☒ Ok	☒ Ok	☐ Jammed
☒ ST-650	☐ ST-500	☐ N-C	☐ Unhoooked	☐ Broken
☐ Buttom	☒ Buttomless	☐ Fixed/comments	# of holes partially blocked: 0	
			# of holes completely blocked: 0	

Peat aspect: ☒ Good ☐ Medium ☐ Bad condition
Worms: ☒ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☒ No ☐ Yes

Grading ☒ Yes ☐ No
Water ☒ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N 37° 55.294 W 075° 22.100 Precision Meters

Septic Tank ☒ Concrete ☐ Plastic ☒ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☒ PSA-240 ☐ Others ☒ To Ecoflo ☐ To field ☐ Inacessible

Comments

First copy Customer | Second Copy Premier Tech Environment | Third Copy Agent

HOMEOWNER:	Palmer, Carl & Lee
LOCATION/911 ADDRESS:	7759 Eastside Road
CITY:	Chincoteage Island
STATE:	VA
ZIP:	23336
GPS:	37.55.294/-75.22.100
DSSI INSTALLATION DATE:	6/29/2004
MAINTENANCE COMPLETED:	2/16/2005
PTE ID #:	VIR-0406-003
SERIAL #	2566

OTHER INFORMATION:

Premier Tech Environment — Maintenance record

Ecoflo®

Customer: Pittman
Serial #: ST650OA-2878
File #: WTR-0307-010
City: White Stone VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2024 (Year) - MAY (Month) - 17 (Day) at 1230 PM (Time)

By: MICHAEL PENETT

Shell		Tipping Bucket	Distribution plates
☑ Ok	☐ N-C (use the broken shell report)	☑ Ok	☑ Ok ☐ Jammed
☑ ST-650	☐ ST-500	☐ N-C	☐ Unhoooked ☐ Broken
☐ Buttom	☐ Buttomless	☐ Fixed/comments	# of holes partially blocked: 4
			# of holes completely blocked:

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☑ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N W Precision Meters

Septic Tank ☑ Concrete ☐ Plastic ☐ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☐ To Ecoflo ☐ To field ☐ Inacessible

Comments

1 of 24 testing sites

First copy — Customer
Second Copy — Premier Tech Environment
Third Copy — Agent

Premier Tech Environment — Maintenance record

Ecoflo

UVA03-14658-01

Customer: PRIDE of VIRGINIA
Serial #: ST650A-E 1415
File #: VIR-0309-002-1
City: WHITE STONE / ORAN VA

3121 LITTLE BAY Road

The visit of your Ecoflo® Biofilter took place on the:
2005 (Year) - OCT (Month) - 26 (Day) at 1330 (Time)

By: BRUCE KING

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report)	☐ Ok	☑ Ok ☐ Jammed
☑ ST-650 ☐ ST-500	☐ N-C	☐ Unhoooked ☐ Broken
☐ Buttom ☑ Buttomless	☑ Fixed/comments HAS holes in it Replaced	# of holes partially blocked: 9
		# of holes completely blocked: 0

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 26.2 cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☐ None ☑ On peat (VERY LITTLE)
Water on left surface after racking 2 %
Water on right surface after racking 2 %

GPS N 37° 37.932 W 076° 20.868 Precision 0 Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

PEAT VERY SATURATED / TURNED IT OVER & RACKED IT OUT.

ENTERED 11/10/05

First copy — Customer
Second Copy — Premier Tech Environment
Third Copy — Agent

Premier Tech Environment — Maintenance record

Ecoflo

UVA03-14658-02

Customer: PRIDE OF VIRGINIA
Serial #: ST650A-E 1595
File #: VIR-0309-002-2
City: WHITE STONE / CLRAN VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2005 (Year) - OCT (Month) - 26 (Day) at 1330 (Time)

By: BRUCE KING

Shell		Tipping Bucket	Distribution plates	
☑ Ok	☐ N-C (use the broken shell report)	☑ Ok	☑ Ok	☐ Jammed
☑ ST-650	☐ ST-500	☐ N-C	☐ Unhoooked	☐ Broken
☐ Buttom	☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: 0	
			# of holes completely blocked: 0	

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 8.0 cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N 37° 37.936' W 076 20.868' Precision 2 Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

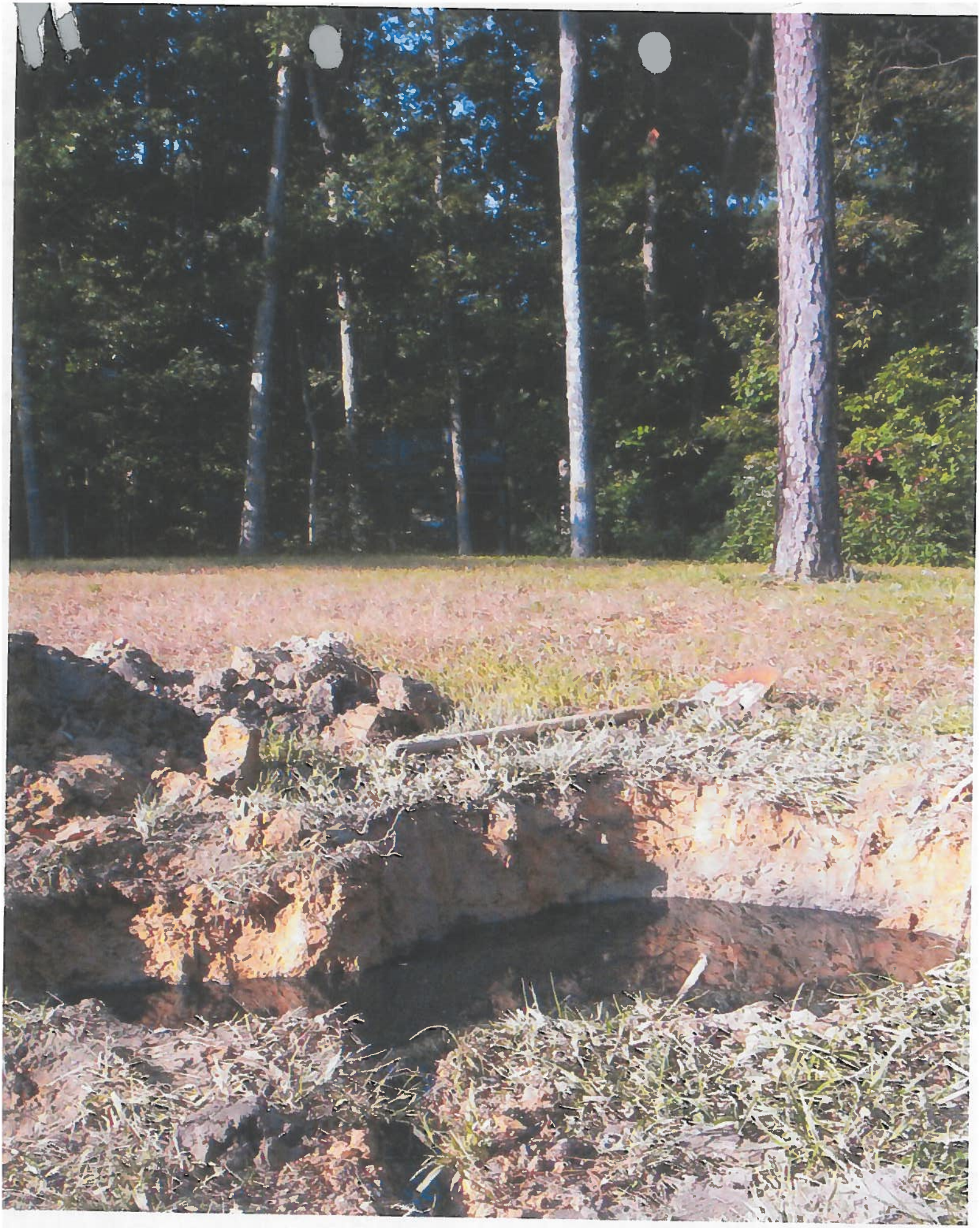
Comments

Entered 11/10/05

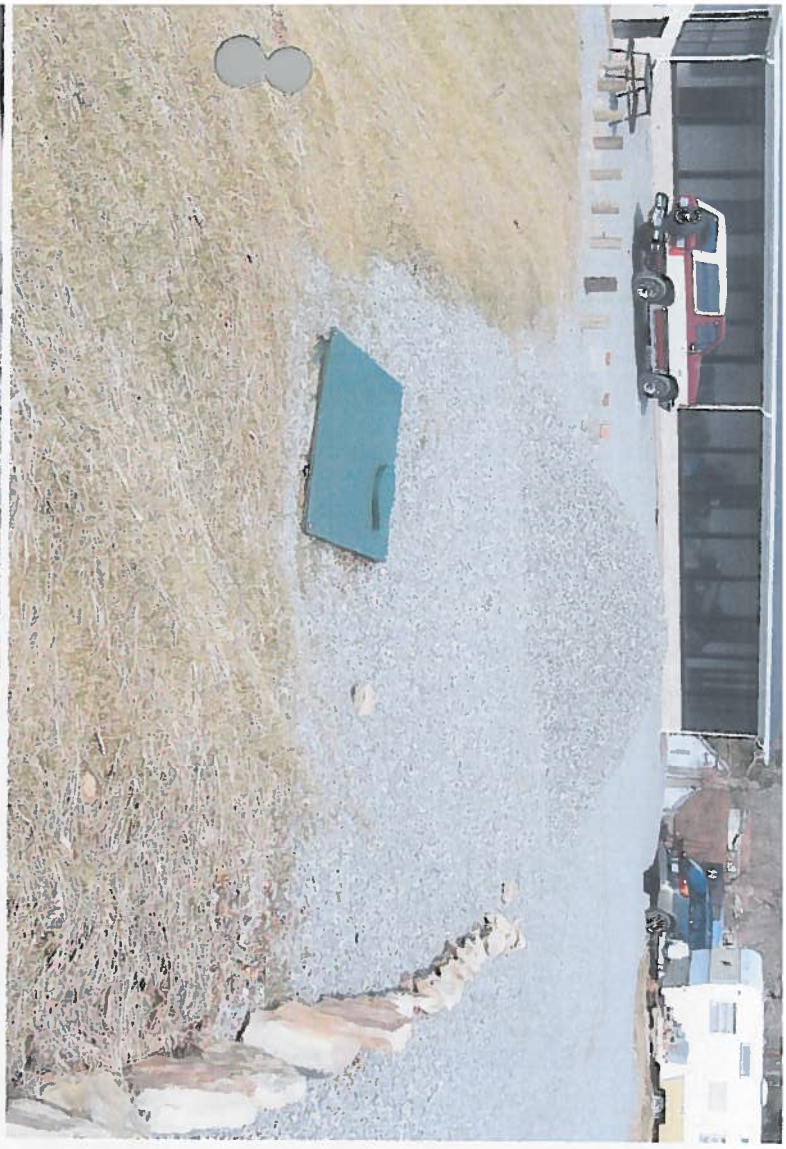
First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent



Pride of Va.



Premier Tech Environment — USA Maintenance Agreement

Ecoflo® Biofilter

UVA05-25234-01

between

PREMIER TECH
1, avenue Premier, Rivière-du-Loup, (Québec)
G5R 6C1, CANADA

Each Ecoflo® ST-650 and STB-650 Biofilter complies with specifications written in local regulations.

Hereinafter called "PREMIER TECH"

and

Customer's name: Billy Reed & Sons LLC

Address of installation: 7178 Bunting Rd. (Number / Street)
Chincoteague (City) Va. (Province) 23336 (Postal code)

Telephone: 757-336-6631 (Home) 757-894-2767 (Work)

Hereinafter called the "USER"

The USER has purchased an Ecoflo® ST-650 Biofilter and hereby contracts with PREMIER TECH for maintenance services, subject to the following terms and conditions :

Description	Number of Biofilters	Date ~~of purchase~~ INSTALLED
Ecoflo® ST-650 / STB-650 Biofilter	1	8/24/05

Authorized installer Boggs Water & Sewage, Inc (Company)

Signed at Phillip H. Dunn this 10/9/06 (Date of agreement)

PREMIER TECH LTD.

Represented by

Authorized Representative

I declare that I have read all the clauses on the front and back of this contract, and that I fully understand the terms and requirements of said clauses.

USER's signature

THE CONDITIONS OVERLEAF FORM AN INTEGRAL PART OF THIS CONTRACT.

Copy 1: USER

Copy 2: HEALTH UNIT

Copy 3: DISTRIBUTOR

Return to: Delmarva Septic Solutions, Inc.
P.O. Box 456
Kilmarnock, VA 22482

Premier Tech Environment — Maintenance record

Ecoflo

2VA03-13796-01

Customer: SMITH, ESSIE
Serial #: ST650A-E 1155
File #: VIR-0307-015
City: SANDY HOOK, VA
WESTMORELAND CO

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the:
2004 (Year) - DEC (Month) - 23 (Day) at 1000 (Time)

By: Brandon King

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report)	☑ Ok	☑ Ok ☐ Jammed
☑ ST-650 ☐ ST-500	☐ N-C	☐ Unhoooked ☐ Broken
☐ Buttom ☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: Ø
		# of holes completely blocked: Ø

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500+
Water level in the zone: 8 cm
Flooded: ☑ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 1 %
Water on right surface after racking 1 %

GPS N 38° 03.479 W 076° 33.423 Ex Precision 8 Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

THIS IS A TEST SITE
NEEDS MORE MOUNDING AROUND TANK TO ACHIEVE 3to1 ratio

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

DSSI MAINTENANCE INFORMATION

HOMEOWNER:	Smith, Essie
LOCATION/911 ADDRESS:	423 Rosa Brant Road
CITY:	Sandy Point
STATE:	VA
ZIP:	22577
GPS:	38.03.479/-76.33.423
DSSI INSTALLATION DATE:	7/1/2003
MAINTENANCE COMPLETED:	12/23/2004
PTE ID #:	VIR-0307-015
SERIAL #	1155
OTHER INFORMATION:	Test Site

Premier Tech Environment

Maintenance record

Ecoflo

UVA05-20074-01

Customer THOMPSON
Serial # ST650A-E 3736
File # VIR-0505-017
City MATHICK ESTATES
Henrico Co.

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2006 (Year) - SEPT (Month) - 27 (Day) at 1405 (Time)

By: BRUCE KING

Shell		Tipping Bucket	Distribution plates	
☑ Ok	☐ N-C (use the broken shell report)	☑ Ok	☑ Ok	☐ Jammed
☑ ST-650	☐ ST-500	☐ N-C	☐ Unhoooked	☐ Broken
☑ Buttom	☐ Buttomless	☐ Fixed/comments	# of holes partially blocked: 00	
			# of holes completely blocked: 00	

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 0 cm
Flooded: ☒ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☒ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 0 %

GPS N 37° 25.808 W 077° 14.061 Precision 49 Meters

Septic Tank ☒ Concrete ☐ Plastic ☐ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☒ PSA-240 ☐ Others ☐ To Ecoflo ☒ To field ☐ Inacessible

Comments

ENTER 1114

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

HOMEOWNER:	Thompson, Timothy
LOCATION/911 ADDRESS:	6032 Hare Road
CITY:	Richmond
STATE:	VA
ZIP:	23231
GPS:	37.25.808/-77.14.061
DSSI INSTALLATION DATE:	5/4/2005
CONTRACTOR:	Dowdy's Well & Septic
MAINTENANCE COMPLETED:	9/27/2006
PTE ID #:	VIR-0505-017
SERIAL #:	3735
OTHER INFORMATION:	Matnick Estates Lot # 6

Premier Tech Environment — Maintenance record

Ecoflo

2VA02-11017-01

Customer: WHITTAKER
Serial #: ST650A-E 0941
File #: VIR-0208-003
City: Mila VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2005 (Year) - OCT (Month) - 25 (Day) at 1300 (Time)

By: BRUCE KING

Shell		Tipping Bucket	Distribution plates	
☑ Ok	☐ N-C (use the broken shell report)	☑ Ok	☑ Ok	☐ Jammed
☑ ST-650	☐ ST-500	☐ N-C	☐ Unhoooked	☐ Broken
☐ Buttom	☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: 0	
			# of holes completely blocked: 0	

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☐ None ☑ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 33.6 cm
Flooded: ☐ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking 0 %
Water on right surface after racking 1 %

GPS N 37°50.375 W 076 20.313 Precision Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

TEST SITE

Entered 12/19

First copy — Customer
Second Copy — Premier Tech Environment
Third Copy — Agent

Premier Tech Environment — Maintenance record

Ecoflo®

Customer: WHITTAKER, KEVIN
Serial #: ST650A-E 0141
File #: VIB-0208-003
City: MILA, VA

- ☐ The follow-up has been carried out.
- ☐ The follow-up has not been carried out.
- ☐ Please contact our customer service.
- ☐ Please see the enclosed instructions.

Evaluation report

- ☑ Your Ecoflo Biofilter is operating properly.
- ☐ Your Ecoflo Biofilter is not accessible or can not be located.

The visit of your Ecoflo® Biofilter took place on the: 2004 (Year) - DEC (Month) - 21 (Day) at 1400 (Time)

By: [signature]

Shell	Tipping Bucket	Distribution plates
☑ Ok ☐ N-C (use the broken shell report)	☑ Ok	☑ Ok ☐ Jammed
☑ ST-650 ☐ ST-500	☐ N-C	☐ Unhoooked ☐ Broken
☐ Buttom ☑ Buttomless	☐ Fixed/comments	# of holes partially blocked: 0
		# of holes completely blocked: 0

Peat aspect: ☑ Good ☐ Medium ☐ Bad condition
Worms: ☑ None ☐ 0@100 ☐ 101@500 ☐ 500 +
Water level in the zone: 8 cm
Flooded: ☑ No ☐ Yes

Grading ☑ Yes ☐ No
Water ☑ None ☐ On peat
Water on left surface after racking .5 %
Water on right surface after racking .5 %

GPS N 37°50.375 W076° 20.313 Ex Precision 4 Meters

Septic Tank ☑ Concrete ☐ Plastic ☑ Accessible ☐ Inacessible

Pumping Station ☐ None ☐ SP-180 ☑ PSA-240 ☐ Others ☑ To Ecoflo ☐ To field ☐ Inacessible

Comments

First copy
Customer

Second Copy
Premier Tech Environment

Third Copy
Agent

DSSI MAINTENANCE INFORMATION

HOMEOWNER:	Whittaker, Leon Mila
LOCATION/911 ADDRESS:	1993 ~~Miles~~ Road
CITY:	Heathsville
STATE:	VA
ZIP:	22473
GPS:	37.50.375/-76.20.313
DSSI INSTALLATION DATE:	10/15/2002
MAINTENANCE COMPLETED:	12/21/2004
PTE ID #:	VIR-0203-003
SERIAL #	941
OTHER INFORMATION:	Mila area

Appendix VI

Monitoring program complete detailed results, field reports and flow measurements

-Electronic files only for field reports and laboratory analysis certificates

Premier Tech Environment

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

Realised by:
Delmarva Septic Solution
Premier Tech Environment

Collaboration of:
Dr. Robert Rubin
Bruce King

Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
1	Humphrey	Lancaster	II	1	2003-10-29	75	220	25	>2 400	45	<1	-	5	3	*2*		21	98	*2*	-	-	70	*2*	-	-	35	nw	-	-	nw		-	-	
	151-03-009			2	2003-11-24	-	130	-	-	-	<1	-	4	3	1,203	0.1	-	-	2	*0.1*	5.6	90	2	0.1	20	170	*2*	0.1	7.2	75	149	-	-	2
				3	2003-12-22	-	83	8	-	-	<1	-	3	5	1,553	-	-	-	2	-	-	-	1	-	-	50	-	-	-	-	295	4.5	-	80
				4	2004-01-28	-	386	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	118	0	-	?
				4 (cont.)	2004-01-29	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
				4 (cont.)	2004-02-05	-	-	-	-	-	-	-	19	2	2,419	-	-	-	-	-	-	-	2	-	-	37	-	-	-	-	116	-	-	40
				5	2004-02-25	-	408	-	-	-	<1	-	4	2	1,046	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	167	-	-	
				6	2004-03-23	-	393	19	1,110	27	1	-	13	5	920	2.3	17	-	2	1.7	1.2	-	2	-	6.8	31	-	-	-	-	113	6.0	0	20
				6 (cont.)	2004-03-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-	
				7	2004-04-27	-	271	-	-	-	<1	-	8	3	*2*	-	-	-	2	-	-	-	2	-	-	45	-	-	-	-	202	8.3	5.1	80
				8	2004-05-25	-	319	-	-	-	<1	-	9	2	920	-	-	-	2	-	-	-	2	-	-	37	-	-	-	-	127	5.0	0	40
				9	2004-06-22	-	157	19	-	-	<1	-	10	5	920	-	-	-	2	-	-	-	2	-	-	29	2	-	-	26	122	5.0	0	85
				10	2004-07-28	-	210	-	-	-	<1	-	10	6	920	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	148	9.0	0	160
				11	2004-08-24	-	230	-	-	-	<1	-	6	4	1,600	-	-	-	2	-	-	-	2	-	-	12	-	-	-	-	Malfonction	14.5	0	>150
				12	2004-09-28	-	116	16	240,000	21	<1	-	10	4	920	2.6	9	-	2	1.0	2.4	-	2	0.2	11	24	-	-	-	-	-	16.0	7.0	±150
				13	2004-10-26	-	161	-	-	-	<1	-	5	1	1,600	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	-	18.0	9.8	>150
				14	2004-11-22	-	260	-	-	-	<1	-	11	2	920	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	-	20.1	14.0	>150
				15	2004-12-28&30	-	249	45	-	-	<1	-	8	2	1,600	-	-	-	2	-	-	-	2	-	-	31	-	-	-	-	-	16.0	8.0	160
				16	2005-01-26	-	273	-	-	-	<1	-	9	4	>2 400	-	-	-	2	-	-	-	2	-	-	17	-	-	-	-	-	23.0	15.0	155
				17	2005-02-22	-	301	-	-	-	<1	-	12	2	>2 400	-	-	-	2	-	-	-	2	-	-	60	-	-	-	-	159	25.5	21.0	200
		FINAL TEST		18	2005-03-22	-	300	43	160,000	20	<1	-	17	5	11,000	2.0	0.4	-	*2*	*0.1*	0.1	-	2	0.1	1.5	50	*2*	*0.1*	1	85	175	32.0	27.5	>150
					Arithmetic mean	-	248	25	133,703	28	-	-	9	3	1,722	1.8	12	-	2	0.7	2.3	80	2	1	10	41	2	0	4	62	158	13.5	8.3	
					Geometric mean	-	228	22	34,932	27	-	-	8	3	623	1.1	6	-	2	0.4	1.0	79	2	0	7	34	2	0	2	55	152	-	-	
					Percentille 80	-	312	39	208,000	34	-	-	11	5	1,600	2.4	19	-	2	1.3	3.7	86	2	1	15	48	2	0	6	81	173	20.7	14.6	
					Standard deviation	-	95	14	121,597	11	-	-	4	1	2,545	1.1	9	-	0	0.8	2.4	14	0	1	8	34	0	0	5	31	51	9.1	9.0	
					MIN	75	83	8	1,110	20	-	-	3	1	2	0.1	0	98	2	0.1	0.1	70	1	0	1	12	2	0	1	26	113	0.0	0.0	
					MAX	75	408	45	240,000	45	-	-	19	6	11,000	2.6	21	98	2	1.7	5.6	90	2	2	20	170	2	0	7	85	295	32.0	27.5	
					n	1	18	7	3	4	-	-	18	18	16	4	4	1	18	4	4	2	18	4	4	18	3	2	2	3	12	15	13	
2	Beatley	Lancaster	I	1	2003-10-29	4	344	35	>2 400	73	<1	140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
				1 (cont.)	2003-11-25	-	239	-	-	-	-	-	11	7	816	0.3	21	100	*2*	0.1	20.8	140	*2*	*0.1*	20.8	130	*2*	*0.1*	14.4	-	164	11.0	-	130
				2	2003-12-23	-	357	-	-	-	1	-	10	9	2,419	-	-	-	2	-	-	-	2	-	-	62	-	-	-	52	164	11.5	-	145
				3	2004-01-29	-	413	23	-	-	<1	-	14	1	1,413	-	-	-	2	-	-	-	2	-	-	1,754	-	-	-	-	182	16.0	-	>180
				4	2004-03-01	-	324	-	-	-	<1	-	-	3	1,732	-	-	-	2	-	-	-	2	-	-	52	-	-	-	-	135	21.0	-	170
				5	2004-03-24	-	317	-	-	-	1	-	13	3	1,600	-	-	-	2	-	-	-	2	-	-	21	-	-	-	-	-	26.0	24.0	160
				6	2004-04-28	-	346	30	92,000	234	1	-	16	10	920	53.6	16	-	2	32.5	1.6	-	2	-	2.8	-	-	-	-	-	124	43.0	42.0	-
				6 (cont.)	2004-04-29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		52.5	-	21	-	-	-	-	-	-	-	
				7	2004-05-26	-	338	-	-	-	<1	-	10	3	920	-	-	-	2	-	-	-	2	-	-	31	-	-	-	-	175	26.0	22.0	-
				8	2004-06-23	-	261	-	-	-	<1	-	10	5	540	-	-	-	2	-	-	-	2	-	-	34	-	-	-	-	196	43.0	41.0	-
				9	2004-07-29	-	225	36	-	-	<1	-	8	1	540	-	-	-	2	-	-	-	2	-	-	36	2	0.4	6.0	36	103	55.5	47.0	>190
				10	2004-08-25	-	344	-	-	-	<1	-	13	7	920	-	-	-	2	-	-	-	2	-	-	15	-	-	-	-	-	44.0	36.0	>150
				11	2004-09-29	-	279	-	-	-	1	-	11	3	70	-	-	-	2	-	-	-	2	-	-	22	-	-	-	-	-	38.5	40.0	-
				12	2004-10-27	-	141	20	92,000	14	<1	-	9	32	920	11.7	2	-	2	11.5	7.6	-	2	9.6	2.8	24	-	-	-	-	-	36.5	40.0	>150
				13	2004-11-23	-	296	-	-	-	<1	-	10	6	540	-	-	-	2	-	-	-	2	-	-	37	-	-	-	-	-	36.0	32.0	>150
				14	2004-12-28	-	262	-	-	-	<1	-	12	20	920	-	-	-	2	-	-	-	2	-	-	47	-	-	-	-	-	56.0	52.6	-
				15	2005-01-27	-	289	39	-	-	<1	-	11	7	1,600	-	-	-	2	-	-	-	2	-	-	300	-	-	-	-	-	29.5	31.0	>150
				16	2005-02-22	-	306	-	-	-	<1	-	18	24	920	-	-	-	2	-	-	-	2	-	-	50	-	-	-	-	-	66.0	76.1	-
				17	2005-03-24	-	271	-	-	-	<1	-	8	28	3,100	-	-	-	2	-	-	-	2	-	-	55	-	-	-	-	-	49.5	54.0	-
		FINAL TEST		18	2005-04-28	-	278	30	110	31	<1	-	10	4	*2*	24	4	-	*2*	*0.1*	2	-	*2*	*0.1*	*0.01*	60	*2*	*0.1*	8	55	-	12.5	0.0	-
					Arithmetic mean	-	296	30	61,370	88	-	-	11	9	1,105	22	11	-	2	11	8	-	2	16	7	153	2	0.2	10	48	155	34.5	38.4	
					Geometric mean	-	290	30	9,765	52	-	-	11	6	656	8	7	-	2	2	5	-	2	1.5	1.1	52	2	0.2	9	47	152	30.2	-	
					Percentille 80	-	344	36	92,000	138	-	-	13	16	1,600	36	18	-	2	20	13	-	2	27	10	61	2	0.3	12	54	179	47.3	49.2	
					Standard deviation	-	59	7	53,053	100	-	-	3	10	775	23	9	-	0	15	9	-	0	25	10	405	0	0.2	4	10	32	16.5	17.6	
					MIN	4	141	20	110	14	-	-	8	1	2	0	2	100	2	0	2	140	2	0.1	0.0	15	2	0.1	6	36	103	11.0	0.0	
					MAX	4	413	39	92,000	234	-	-	18	32	3,100	54	21	100	2	32	21	140	2	53	21	1,754	2	0.4	14	55	196	66.0	76.1	
					n	1	19	7	3	4	-	-	17	18	18	4	4	1	18	4	4	1	18	4	4	18	3	3	3	3	8	18	14	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

Realised by:
Delmarva Septic Solution
Premier Tech Environment

Collaboration of:
Dr. Robert Rubin
Bruce King

Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
3	Pittman	Lancaster	II	1	2003-11-12	18	204	14	16,300	68	<1	-	13	13	242	0.1	19	38	2	-	-	-	2	-	-	-	nw	-	-	nw	-	-	-	168
				1 (cont.)	2003-11-18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*0.1*	18.8	145	-	0.2	2.4	25	*2*	-	3.6	-	-	-	-	
				2	2003-12-09	-	182	-	-	-	-	-	12	7	461	-	-	-	*2*	-	-	-	*2*	-	-	55	-	-	-	-	179	0	-	140
				3	2004-01-13	-	224	16	-	-	<1	-	17	3	613	-	-	-	*2*	-	-	-	*2*	-	-	26	-	-	-	-	166	0	-	40
				4	2004-02-10	-	391	-	-	-	<1	-	5	2	137	-	-	-	*2*	-	-	-	*2*	-	-	22	-	-	-	-	148	13.5	-	160
				5	2004-03-09	-	313	-	-	-	<1	-	12	3	540	-	-	-	*2*	-	-	-	*2*	-	-	16	-	-	-	-	-	0	0	80
				6	2004-04-14	-	244	14	16,000	44	<1	-	4	5	110	3.6	8	-	2	0.4	22.4	-	2	4.4	3.2	12	-	-	-	-	154	29.0	23.0	170
				7	2004-05-11	-	181	-	-	-	<1	-	15	5	1,600	-	-	-	*2*	-	-	-	2	-	-	26	-	-	-	-	147	0	0	40
				8	2004-06-08	-	186	-	-	-	<1	-	5	1	240	-	-	-	*2*	-	-	-	*2*	-	-	14	-	-	-	-	108	0	0	40
				9	2004-07-06	-	275	23	-	-	<1	-	11	3	920	-	-	-	-	-	-	-	-	-	-	-	*2*	0.03	-	-	99	0	0	80
				9 (cont.)	2004-07-07	-	-	-	-	-	-	-	-	-	-	-	-	-	*2*	-	-	-	*2*	-	-	20	-	-	-	-	-	-	-	
				10	2004-08-10	-	262	-	-	-	<1	-	11	4	140	-	-	-	*2*	-	-	-	*2*	-	-	17	-	-	3.2	19	113	0	0	0
				11	2004-09-14	-	227	-	-	-	<1	-	*2*	*1*	540	-	-	-	*2*	-	-	-	*2*	-	-	12	-	-	-	-	-	0	0	80
				12	2004-10-12	-	343	14	160,000	24	<1	-	12	2	920	3	22	-	2	2	19	-	2	1.8	-	17	-	-	-	-	133	0	0	40
				13	2004-11-11	-	207	-	-	-	<1	-	7	6	920	-	-	-	*2*	-	-	-	*2*	-	9	24	-	-	-	-	139	0	0	85
				14	2004-12-09	-	135	-	-	-	<1	-	5	4	920	-	-	-	*2*	-	-	-	*2*	-	-	24	-	-	-	-	137	0	0	35
				15	2005-01-13	-	218	12	-	-	<1	-	7	3	170	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	141	0	0	60
				16	2005-02-10	-	210	-	-	-	<1	-	14	13	1,600	-	-	-	*2*	-	-	-	*2*	-	-	60	-	-	-	-	133	0	0	160
				17	2005-03-10	-	184	-	-	-	<1	-	23	6	4,900	-	-	-	*2*	-	-	-	*2*	-	-	45	-	-	-	-	126	0	5.0	60
		FINAL TEST		18	2005-04-12	-	140	17	54,000	31	<1	-	12	12	7,000	1	38	-	*2*	*0.1*	19	-	*2*	*0.1*	0.2	45	*2*	0.1	2.3	80	132	0	0	110
					Arithmetic mean	-	229	16	61,575	42	-	-	10	5	1,221	1.9	22	-	2	0.6	20	-	2	1.6	3.6	27	2	0.1	3.0	49	137	2.5	2.0	86
					Geometric mean	-	221	15	38,744	39	-	-	9	4	602	0.9	19	-	2	0.3	20	-	2	0.6	1.8	24	2	0.1	3.0	39	135	-	-	
					Percentille 80	-	270	17	96,400	54	-	-	14	7	1,328	3.2	29	-	2	0.9	20	-	2	2.8	5.4	41	2	0.1	3.4	68	149	0.0	0.0	152
					Standard deviation	-	67	4	67,999	20	-	-	5	4	1,816	1.7	13	-	0	0.8	2	-	0	2.0	3.7	15	0	0.0	0.7	43	21	7.6	6.2	53
					MIN	18	135	12	16,000	24	-	-	2	1	110	0.1	8	38	2	0.1	19	145	2	0.1	0.2	12	2	0.0	2.3	19	99	0.0	0.0	0
					MAX	18	391	23	160,000	68	-	-	23	13	7,000	3.6	38	38	2	1.7	22	145	2	4.4	8.8	60	2	0.1	3.6	80	179	29.0	23.0	170
					n	1	18	7	4	4	-	-	18	18	18	4	4	1	18	4	4	1	18	4	4	17	3	2	3	2	15	17	14	18
4	Smith.E	Westmoreland	III	1	2003-11-20	11	253	41	198,600	128	<1	-	6	7	1,011	1.9	57	190	2	*0.1*	1.2	-	2	1.4	2.0	-	2	-	1.2	1,375				>200
				1 (cont.)	2003-11-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210	-	-	-	617	-	0.4	-	-	196			
				2	2003-12-16	-	366	-	-	-	<1	-	7	3	461	-	-	-	*2*	-	-	-	*2*	-	-	100	-	-	-	-	110	8.5	-	90
				3	2004-01-20	-	465	30	-	-	<1	-	7	4	755	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	80	9.0	-	80
				4	2004-02-19	-	592	-	-	-	<1	-	16	8	1,119	-	-	-	*2*	-	-	-	*2*	-	-	-	-	-	-	-	83	12.0	-	60
				4 (cont)	2004-02-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	-	-	-	-	-	-	-	
				5	2004-03-18	-	455	-	-	-	<1	-	14	1	540	-	-	-	*2*	-	-	-	*2*	-	-	77	-	-	-	-	78	12.5	16.5	90
				6	2004-04-21	-	444	65	54,000	280	1	-	12	2	540	16.5	6	-	2	8.8	0.8	-	2	-	0.4	-	-	-	-	-	88	12.8	18.9	40
				6 (cont)	2004-04-22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	-	31	-	-	-	-	-	-	-	
				7	2004-05-20	-	432	-	-	-	<1	-	8	4	920	-	-	-	*2*	-	-	-	*2*	-	-	30	-	-	-	-	93	7.7	18.0	20
				8	2004-06-17	-	440	-	-	-	<1	-	10	2	540	-	-	-	*2*	-	-	-	*2*	-	-	37	-	-	-	-	103	10.5	18.0	140
				9	2004-07-27	-	351	65	-	-	<1	-	8	5	920	-	-	-	2	-	-	-	2	-	-	32	*2*	0.19	3.2	99	-	12.5	20.8	60
				10	2004-08-19	-	437	-	-	-	<1	-	9	3	1,600	-	-	-	*2*	-	-	-	*2*	-	-	44	-	-	-	-	-	11.0	21.0	120
				11	2004-09-23	-	460	-	-	-	<1	-	11	2	920	-	-	-	*2*	-	-	-	*2*	-	-	106	-	-	-	-	-	11.0	16.0	140
				12	2004-10-21	-	421	101	160,000	75	<1	-	11	10	1,600	10.4	14	-	2	1.2	7.2	-	2	0.6	2.8	39	-	-	-	-	-	9.0	17.4	110
				13	2004-11-17	-	309	-	-	-	1	-	10	20	920	-	-	-	*2*	-	-	-	*2*	-	-	35	-	-	-	-	-	11.0	19.0	140
				14	2004-12-23	-	324	-	-	-	<1	-	15	8	540	-	-	-	*2*	-	-	-	*2*	-	-	32	-	-	-	-	-	8.3	17.0	155
				15	2005-01-26	-	437	86	-	-	<1	-	14	7	>2 400	-	-	-	*2*	-	-	-	*2*	-	-	-	-	-	-	-	-	11.0	19.0	160
				16	2005-02-17	-	520	-	-	-	<1	-	12	20	>2 400	-	-	-	*2*	-	-	-	*2*	-	-	75	-	-	-	-	-	10.0	18.0	100
				17	2005-03-17	-	489	-	-	-	<1	-	8	4	3,300	-	-	-	*2*	-	-	-	*2*	-	-	45	-	-	-	-	-	11.0	20.5	160
		FINAL TEST		18	2005-04-26	-	385	92	>241 900	64	<1	-	9	8	28,000	8.8	53	-	*2*	*0.1*	3	-	*2*	*0.1*	0.5	50	*2*	*0.1*	0	195	-	12.5	21.0	-
					Arithmetic mean	-	421	69	137,533	137	-	-	10	6	2,730	9	32	-	2	2.6	3.1	-	2	1.4	1.4	88	2	0.2	1.6	556	104	10.6	18.7	
					Geometric mean	-	413	63	119,719	114	-	-	10	5	1,115	7	22	-	2	0.6	2.2	-	2	0.8	1.0	57	2	0.2	1.2	298	99	10.5	18.6	
					Percentille 80	-	463	91	183,160	189	-	-	13	8	1,600	13	55	-	2	4.3	4.9	-	2	2.3	2.3	77	2	0.3	2.4	903	107	12.4	20.6	
					Standard deviation	-	80	26	74,872	99	-	-	3	5	6,774	6	26	-	0	4.2	2.9	-	0	1.5	1.2	143	0	0.2	1.4	710	39	1.6	1.7	
					MIN	11	253	30	54,000	64	-	-	6	1	461	2	6	190	2	0.1	0.8	210	2	0.1	0.4	30	2	0.1	0.5	99	78	7.7	16.0	
					MAX	11	592	101	198,600	280	-	-	16	20	28,000	17	57	190	2	8.8	7.2	210	2	3.6	2.8	617	2	0.4	3.2	1,375	196	12.8	21.0	
					n	1	18	7	3	4	-	-	18	18	16	4	4	1	18	4	4	1	17	4	4	16	3	3	3	3	8	17	14	

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- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
5	Campbell	Westmoreland	III	1	2003-11-21	-	2	3	100	1	1.5	-	5	3	11	3.0	12	90	2	0.7	2.4	2,719	2	0.5	2.4	1,280	2	1.4	1.2	850	-			
				2	2003-12-17	-	2	-	-	-	<1	-	3	3	4	-	-	-	2	-	-	-	2	-	-	92	-	-	-	-	-	-	-	
				3	2004-01-21	-	2	11	-	-	1	-	-	-	13	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	
				3 (cont.)	2004-01-22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51	-	-	-	-	-	-	-	
				4	2004-02-24	-	44	-	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	-	-	
				4 (cont.)	2004-02-25	-	-	-	-	-	-	-	6	-	5	-	-	-	2	-	-	-	2	-	-	67	-	-	-	-	-	0	-	
					Arithmetic mean	-	13	7	-	-	-	-	5	3	8	-	-	-	2	-	-	-	2	-	-	373	-	-	-	-	-	-	-	
					Geometric mean	-	4	5	-	-	-	-	5	3	7	-	-	-	2	-	-	-	2	-	-	142	-	-	-	-	-	-	-	
					Percentille 80	-	19	9	-	-	-	-	6	3	12	-	-	-	2	-	-	-	2	-	-	567	-	-	-	-	-	-	-	
					Standard deviation	-	21	6	-	-	-	-	2	0	4	-	-	-	0	-	-	-	0	-	-	605	-	-	-	-	-	-	-	
					MIN	-	2	3	100	1	-	-	3	3	4	3	12	90	2	1	2	2,719	2	0	2	51	2	1	1	850	50	0	-	
					MAX	-	44	11	100	1	-	-	6	3	13	3	12	90	2	1	2	2,719	2	0	2	1,280	2	1	1	850	50	0	-	
					n	-	4	2	1	1	-	-	3	2	4	1	1	1	4	1	1	1	4	1	1	4	1	1	1	1	1	1	-	
6	Bethel Parsona	Lancaster	I	1	2004-04-20	19	190	24	92,000	86	<1	-	11	2	920	77	1	27	2	4.9	3.2	-	2	3.5	1.2	-	2	4.0	-	-	-	0	0	40
				1 (cont)	2004-04-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.7	-	-	-	27.5	-	-	2.8	-	-	-	-	
				2	2004-05-19	-	207	-	-	-	<1	-	8	4	1,600	-	-	-	2	-	-	-	2	-	-	19	-	-	-	-	203	0	0	150
				3	2004-06-16	-	208	29	-	-	<1	-	9	9	920	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	188	0	0	120
				4	2004-07-26	-	174	-	-	-	<1	-	7	2	920	-	-	-	2	-	-	-	2	-	-	31	-	-	-	-	137	0	11.5	<5
				5	2004-08-18	-	118	-	-	-	<1	-	10	1	920	-	-	-	2	-	-	-	2	-	-	29	-	-	-	-	137	0	0	5
				6	2004-09-22	-	169	35	54,000	27	<1	-	7	2	2	4.1	20	-	2	1.6	10	-	2	1.3	3.2	19	-	-	-	-	127	0	0	5
				7	2004-10-20	-	97	-	-	-	<1	-	5	2	920	-	-	-	2	-	-	-	2	-	-	30	-	-	-	-	137	0	22.1	60
				8	2004-11-17	-	74	-	-	-	-	-	2	1	920	-	-	-	2	-	-	-	2	-	-	32	-	-	-	-	116	0	20.0	10
				9	2004-12-22	-	98	24	-	-	<1	-	9	2	920	-	-	-	2	-	-	-	2	-	-	30	2	2.2	2.4	30	150	0	20.3	30
				10	2005-01-18	-	125	-	-	-	<1	-	2	1	>2 400	-	-	-	2	-	-	-	2	-	-	30	-	-	-	-	117	0	17.0	60
				11	2005-02-15	-	80	-	-	-	<1	-	8	5	>2 400	-	-	-	2	-	-	-	2	-	-	60	-	-	-	-	134	0	7.0	15
				12	2005-03-16	-	111	26	92,000	14	<1	-	6	5	14,000	0.2	19	-	2	0.1	15	-	2	0.1	1.3	70	-	-	-	-	263	0	0	110
				13	2005-04-18	-	117	-	-	-	<1	-	9	1	35,000	-	-	-	2	-	-	-	2	-	-	40	-	-	-	-	120	0	0	160
				14	2005-05-18	-	>68	-	-	-	<1	-	8	5	410	-	-	-	1	-	-	-	1	-	-	20	-	-	-	-	137	0	0	60
				15	2005-06-28	-	51	46	-	-	-	-	2	2	39,000	-	-	-	1	-	-	-	1	-	-	9	-	-	-	-	120	0	0	110
				16	2005-07-26	-	73	-	-	-	<1	-	4	3	7,300	-	-	-	1	-	-	-	1	-	-	18	-	-	-	-	-	0	0	110
				17	2005-08-23	-	83	-	-	-	<1	-	8	4	>240 000	-	-	-	1	-	-	-	1	-	-	18	-	-	-	-	-	0	0	>140
		FINAL TEST		18	2005-09-27	-	67	26	>241 000	35	<1	-	10	3	>241 000	4.1	16	-	1	0.5	5	-	1	0.5	1.3	11	1	0.8	0.1	3	-	0	0	±160
				18 '	2005-10-25	-	-	-	>241 000	-	-	-	-	-	98,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
					Arithmetic mean	-	120	30	79,333	40	-	-	7	3	13,450	21	14	-	2	1.8	8	-	2	1.3	1.7	29	2	2.3	1.8	17	149	0.0	5.4	
					Geometric mean	-	110	29	77,029	33	-	-	6	2	1,848	4	8	-	2	0.8	7	-	2	0.7	1.6	26	2	1.9	0.9	10	145	-	-	
					Percentille 80	-	173	34	92,000	55	-	-	9	5	18,200	33	19	-	2	2.9	12	-	2	2.2	2.1	32	2	3.3	2.6	25	165	0.0	14.8	
					Standard deviation	-	51	8	21,939	31	-	-	3	2	26,585	37	9	-	0	2.2	5	-	0	1.5	1.0	16	1	1.6	1.5	19	42	0.0	8.5	
					MIN	19	51	24	54,000	14	-	-	2	1	2	0	1	27	1	0.1	3	29	1	0.1	1.2	9	1	0.8	0.1	3	116	0.0	0.0	
					MAX	19	208	46	92,000	86	-	-	11	9	98,000	77	20	27	2	4.9	15	29	2	3.5	3.2	70	2	4.0	2.8	30	263	0.0	22.1	
					n	1	17	7	3	4	-	-	18	18	15	4	4	1	18	4	4	1	17	4	4	17	3	3	3	2	14	18	18	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

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Premier Tech Environment

Collaboration of:
Dr. Robert Rubin
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Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
7	McCarthy	Lancaster	II	1	2004-05-12	42	190	26	>2 400	61	<1	-	7	6	920	58	3	41	2	2.2	1.2	22	2	0.2	0.8	27	2	0.6	0.8	8.7	-	0	0	50
	/ Taylor			2	2004-06-09	-	2	-	-	-	-	-	14	3	<2	-	-	-	2	-	-	-	2	-	-	25	-	-	-	-	-	0	0	10
				3	2004-07-07	-	2	6	-	-	1	-	4	6	220	-	-	-	2	-	-	-	2	-	-	26	-	-	-	-	-	0	0	90
				4	2004-08-11	-	36	-	280	-	<1	-	4	3	26	-	-	-	2	-	-	-	2	-	-	20	-	-	-	-	-	0	0	160
				5	2004-09-20	-	37	-	-	-	<1	-	4	1	350	-	-	-	2	-	-	-	2	-	-	41	-	-	-	-	-	0	8.0	±150
				6	2004-10-18	-	42	7	54,000	36	<1	-	5	1	920	2	29	-	2	2	5	-	2	1	1	46	-	-	-	-	113	0	0	160
				7	2004-11-15	-	32	-	-	-	<1	-	2	1	920	-	-	-	2	-	-	-	2	-	-	34	-	-	-	-	123	0	14.0	160
				8	2004-12-16	-	30	-	-	-	<1	-	2	4	920	-	-	-	2	-	-	-	2	-	-	36	-	-	-	-	116	0	6.4	120
				9	2005-01-17	-	39	15	-	-	<1	-	4	2	220	-	-	-	2	-	-	-	2	-	-	27	2	0.4	2	35	129	0	17.0	150
				10	2005-02-15	-	35	-	-	-	<1	-	2	4	12	-	-	-	2	-	-	-	2	-	-	75	-	-	-	-	118	0	23.0	160
				11	2005-03-17	-	34	-	-	-	<1	-	3	1	350	-	-	-	2	-	-	-	2	-	-	60	-	-	-	-	121	0	11.0	130
				12	2005-04-11	-	36	20	9,400	27	<1	-	5	4	100	1	51	-	2	0.1	0.2	-	2	0.1	1	80	-	-	-	-	132	0	8.0	85
				13	2005-05-17	-	>70	-	-	-	<1	-	3	1	30	-	-	-	1	-	-	-	1	-	-	27	-	-	-	-	113	0	0	±50
				14	2005-06-23	-	47	-	-	-	-	-	2	1	48	-	-	-	1	-	-	-	1	-	-	7	-	-	-	-	129	0	0	160
				15	2005-07-21	-	50	-	-	-	<1	-	2	1	170	-	-	-	1	-	-	-	1	-	-	33	-	-	-	-	-	0	0	110
				16	2005-08-18	-	36	13	-	-	<1	-	2	1	4,600	-	-	-	1	-	-	-	1	-	-	27	-	-	-	-	-	0	0	±140
				17	2005-09-22	-	58	-	-	-	<1	-	2	1	24,000	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	0	0	70
		FINAL TEST		18	2005-10-20	-	50	10	29,000	56	<1	-	2	1	260	2	24	-	1	0.5	0.5	-	1	0.5	0.6	58	1	0.6	0.1	6	-	0	0	40
					Arithmetic mean	-	45	14	23,170	45	-	-	4	2	2,004	16	27	-	2	1.2	1.8	-	2	0.5	0.8	38	2	0.5	0.9	17	122	0	4.9	
					Geometric mean	-	31	12	8,013	42	-	-	3	2	294	3	18	-	2	0.7	0.9	-	2	0.3	0.8	34	2	0.5	0.5	12	121	-	-	
					Percentille 80	-	49	19	39,000	58	-	-	5	4	920	24	38	-	2	2.0	2.8	-	2	0.8	1.0	56	2	0.6	1.4	24	129	0	9.8	
					Standard deviation	-	40	7	23,791	16	-	-	3	2	5,770	28	20	-	0	1.0	2.3	-	0	0.5	0.3	20	1	0.2	0.9	16	7	0	7.2	
					MIN	42	2	6	280	27	-	-	2	1	12	1	3	41	1	0.1	0.2	22	1	0.1	0.6	7	1	0.4	0.1	6	113	0	0.0	
					MAX	42	190	26	54,000	61	-	-	14	6	24,000	58	51	41	2	2.2	5.2	22	2	1.2	1.2	80	2	0.6	1.8	35	132	0	23.0	
					n	1	17	7	4	4	-	-	18	18	17	4	4	1	18	4	4	1	18	4	4	17	3	3	3	3	9	18	18	
8	Benefiel	Lancaster	II	1	2004-05-27	94	-	9	1,600	8	<1	-	-	-	-	-	-	-	2	0.2	5.2	74	2	1	2.4	22	2	1	0.8	56	-	0	0	-
				1 (cont.)	2004-05-27	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				2	2004-08-26	-	253	12	6,300	36	<1	-	13	1	540	2	19	110	2	-	-	14	2	0.5	4	24	2	0.4	1.6	45	40	0	0	>180
				3	2004-09-30	-	59	-	-	-	<1	-	11	2	2	-	-	-	2	-	-	-	2	-	-	26	-	-	-	-	58	0	0	<5
				4	2004-10-28	-	125	12	-	-	<1	-	5	2	9	-	-	-	2	-	-	-	2	-	-	34	-	-	-	-	124	0	0	>160
				5	2004-11-24	-	309	-	-	-	<1	-	4	11	31	-	-	-	2	-	-	-	2	-	-	24	-	-	-	-	51	0	0	120
				6	2004-12-30	-	316	-	-	-	<1	-	6	1	1,600	-	-	-	2	-	-	-	2	-	-	25	-	-	-	-	127	1.0	0	160
				7	2005-01-27	-	86	11	540	8	<1	-	11	11	540	1	56	-	2	0.3	3.1	-	2	0.2	0.5	25	-	-	-	-	11	0	0	0
				8	2005-02-24	-	100	-	-	-	<1	-	2	6	100	-	-	-	2	-	-	-	2	-	-	40	-	-	-	-	107	0	0	160
				9	2005-03-24	-	108	-	-	-	<1	-	5	6	100	-	-	-	2	-	-	-	2	-	-	65	-	-	-	-	142	0	0	70
				10	2005-04-27	-	138	6	-	-	<1	-	13	12	100	-	-	-	2	-	-	-	2	-	-	60	2	0	0.01	95	100	0	0	2
				11	2005-05-19	-	210	-	-	-	<1	-	13	9	3,100	-	-	-	1	-	-	-	1	-	-	25	-	-	-	-	107	0	0	100
				12	2005-06-30	-	110	-	-	-	-	-	2	4	4	-	-	-	1	-	-	-	1	-	-	24	-	-	-	-	-	0	0	130
				13	2005-07-28	-	160	11	>2 400	21	<1	-	14	14	3,400	3	17	-	1	1.2	0.2	-	1	0.7	0.1	25	-	-	-	-	-	0	0	15
				14	2005-08-25	-	220	-	-	-	<1	-	4	11	23	-	-	-	1	-	-	-	1	-	-	24	-	-	-	-	-	0	0	80
				15	2005-10-04	-	200	-	-	-	<1	-	11	6	200	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	0	0	70
				16	2005-10-27	-	160	10	-	-	<1	-	3	1	590	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	-	0	0	140
				17	2005-11-29	-	230	-	-	-	<1	-	10	5	4,000	-	-	-	1	-	-	-	1	-	-	130	-	-	-	-	-	0	0	5
				18	2005-12-27	-	270	-	-	-	<1	-	11	4	460	-	-	-	1	-	-	-	1	-	-	39	-	-	-	-	-	0	0	40
		FINAL TEST		19	2006-01-24	-	150	25	20,000	19	<1	-	4	18	740	4	33	-	2	0.2	0.3	-	2	0.2	0.1	35	2	0.3	0.1	120	-	0	0	5
					Arithmetic mean	-	178	12	7,110	19	-	-	8	7	863	2	31	-	2	0	2	44	2	0	1	36	2	0	1	79	87	0	0	
					Geometric mean	-	161	11	3,230	16	-	-	7	5	181	2	28	-	1	0	1	32	2	0	1	27	2	0	0	73	71	-	-	
					Percentille 80	-	244	12	11,780	24	-	-	12	11	1,256	3	42	-	2	1	4	62	2	1	3	40	2	0	1	105	125	0	0	
					Standard deviation	-	77	5	8,950	11	-	-	4	5	1,285	1	18	-	1	0	2	42	1	0	2	27	0	0	1	35	44	0	0	
					MIN	94	59	6	540	8	-	-	2	1	2	1	17	110	1	0	0	14	1	0	0	1	2	0	0	45	11	0	0	
					MAX	94	316	25	20,000	36	-	-	14	18	4,000	4	56	110	2	1	5	74	2	1	4	130	2	0	2	120	142	1	0	
					n	1	18	9	4	5	-	-	18	18	18	4	4	1	19	4	4	2	18	5	5	18	4	4	4	4	10	19	19	

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						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
9	Stephens, Ford	Lancaster	II	1	2004-06-15	100	302	14	920	28	<1	-	7	3	2	35	2	62	2	0.3	1.6	87	2	0.3	7.2	32	2	0.5	5.6	55	98	0	32.0	80
				2	2004-07-22	-	79	-	-	-	<1	-	10	9	1,600	-	-	-	2	-	-	-	2	-	-	54	-	-	-	-	121	0	34.5	40
				3	2004-08-17	-	297	15	-	-	<1	-	6	1	1,600	-	-	-	2	-	-	-	2	-	-	21	-	-	-	-	-	0	35.0	80
				4	2004-09-16	-	277	-	-	-	<1	-	11	2	>2 400	-	-	-	2	-	-	-	2	-	-	26	-	-	-	-	-	0	30.5	±160
				5	2004-10-13	-	317	-	-	-	<1	-	6	2	1,600	-	-	-	2	-	-	-	2	-	-	29	-	-	-	-	-	0	16.9	155
				6	2004-11-11	-	329	23	92,000	37	<1	-	5	1	920	1	7	-	2	-	-	-	2	1	6	125	-	-	-	-	-	0	35.3	40
				7	2004-12-15	-	123	-	-	-	<1	-	8	2	920	-	-	-	2	-	-	-	2	-	-	41	-	-	-	-	-	0	27.2	50
				8	2005-01-17	-	298	-	-	-	<1	-	8	6	>2 400	-	-	-	2	1	11	-	2	-	-	52	-	-	-	-	-	0	24.0	100
				9	2005-02-10	-	289	16	-	-	<1	-	8	6	>2 400	1	-	-	2	-	-	-	2	-	-	75	2	0.3	0.3	65	91	0	0	>150
				10	2005-03-10	-	247	-	-	-	<1	-	11	4	54,000	-	-	-	2	-	-	-	2	-	-	65	-	-	-	-	121	0	27.8	70
				11	2005-04-11	-	249	-	-	-	<1	-	5	2	28,000	-	-	-	2	-	-	-	2	-	-	65	-	-	-	-	115	0	35.6	160
				12	2005-05-17	-	>70	31	340,000	45	<1	-	3	2	10,000	5	21	-	1	1.6	7	-	1	0.5	0.3	28	-	-	-	-	200	0	33.0	160
				13	2005-06-23	-	200	-	-	-	-	-	3	1	34,000	-	-	-	1	-	-	-	1	-	-	28	-	-	-	-	94	0	29.0	-
				14	2005-07-21	-	310	-	-	-	<1	-	20	7	>2 400	-	-	-	1	-	-	-	1	-	-	4	-	-	-	-	-	0	36.5	160
	Stephens/Nuss			15	2005-08-18	-	200	44	-	-	<1	-	6	2	6,100	-	-	-	1	-	-	-	1	-	-	25	-	-	-	-	-	0	24.4	±150
				16	2005-09-22	-	260	-	-	-	<1	-	7	20	55,000	-	-	-	1	-	-	-	1	-	-	14	-	-	-	-	-	0	25.0	±150
				17	2005-10-24	-	240	-	-	-	<1	-	7	6	8,200	-	-	-	1	-	-	-	1	-	-	18	-	-	-	-	-	0	16.5	80
		FINAL TEST		18	2005-11-17	-	140	18	>241 960	26	<1	-	2	7	67	5	44	-	1	1.6	23	-	1	0.2	22	150	1	0.2	0.1	1	-	0	28.6	±150
					Arithmetic mean	-	244	23	144,307	34	-	-	7	4	14,429	9	19	-	2	1.1	11	-	2	0.6	9.0	47	2	0.3	2.0	40	120	0	27.3	
					Geometric mean	-	230	21	30,644	33	-	-	6	3	2,603	4	11	-	2	0.9	7.2	-	2	0.4	4.2	35	2	0.3	0.5	16	116	-	-	
					Percentille 80	-	301	29	240,800	40	-	-	9	6	30,400	11	30	-	2	1.6	16	-	2	0.9	13.1	65	2	0.4	3.5	61	121	0	34.8	
					Standard deviation	-	73	11	175,487	9	-	-	4	5	19,961	14	19	-	1	0.6	9.1	-	1	0.5	9.2	38	1	0.1	3.1	34	37	0	9.1	
					MIN	100	79	14	920	26	-	-	2	1	2	1	2	62	1	0.3	1.6	87	1	0.2	0.3	4	1	0.2	0.1	1	91	0	0.0	
					MAX	100	329	44	340,000	45	-	-	20	20	55,000	35	44	62	2	1.6	23	87	2	1.4	22.0	150	2	0.5	5.6	65	200	0	36.5	
					n	1	17	7	3	4	-	-	18	18	14	5	4	1	18	4	4	1	18	4	4	18	3	3	3	3	7	18	18	
10	Goodrich	Prince Geor	III	1	2004-09-15	15	2	7	92,000	22	<1	-	6	4	92,000	3	9	22	2	0.7	6.8	20	2	1.8	2.8	36	2	1.0	2.4	17	-	12.2	23.0	10
				2	2004-10-14	-	2	5	160,000	26	1	-	4	1	1,600	1	26	29	2	-	-	-	2	-	-	29	-	-	-	-	50	0	0	<5
				3	2004-11-10	-	25	4	-	-	<1	-	4	1	920	-	-	-	2	-	-	-	2	-	-	25	-	-	-	-	54	0	0	0
				4	2004-12-14	-	11	-	-	-	<1	-	2	2	920	-	-	-	2	-	-	-	2	-	-	22	-	-	-	-	-	0	0	10
				5	2005-01-19	-	34	-	-	-	<1	-	8	1	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	0.5	0	30
				6	2005-02-09	-	20	6	>24 0000	22	<1	-	6	3	1,600	1	26	-	2	0.5	0.3	-	2	0.3	0.7	174	-	-	-	-	97	0	0	5
				7	2005-03-08	-	18	-	-	-	<1	-	4	26	1,600	-	-	-	2	-	-	-	2	50	-	-	-	-	-	-	35	6.0	16.5	85
				8	2005-04-13	-	15	-	-	-	<1	-	5	15	1,100	-	-	-	2	-	-	-	2	-	-	60	-	-	-	-	31	0	0	10
				9	2005-05-16	-	32	30	-	-	<1	-	2	9	44,000	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	33	0	0	>5
				10	2005-05-21	-	12	-	-	-	-	-	2	1	290	-	-	-	1	-	-	-	1	-	-	10	-	-	-	-	34	0	0	10
				11	2005-07-19	-	26	-	-	-	<1	-	2	5	1	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	52	0	0	30
				12	2005-08-16	-	17	8	>2 400	19	<1	-	3	3	2	4	1	-	1	0.5	0.1	-	1	0.5	0.1	1	-	-	-	-	51	0	0	>5
				13	2005-09-20	-	10	-	-	-	<1	-	5	8	5,800	-	-	-	1	-	-	-	1	-	-	5	-	-	-	-	47	0	0	>150
				14	2005-10-19	-	16	-	-	-	<1	-	2	4	1	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	45	0	0	10
				15	2005-11-15	-	14	4	-	-	<1	-	2	3	3	-	-	-	2	-	-	-	2	-	-	14	-	-	-	-	47	0	0	<5
				16	2005-12-20	-	30	-	-	-	<1	-	3	10	17	-	-	-	1	-	-	-	1	-	-	6	-	-	-	-	41	0	0	5
				17	2006-01-17	-	30	-	-	-	<1	-	3	7	16,000	-	-	-	2	-	-	-	2	-	-	9	-	-	-	-	47	0	0	1
		FINAL TEST		18	2006-02-14	-	41	8	160,000	21	<1	-	2	8	1,500	6.1	17	-	2	0.2	0.5	-	2	0.3	0.6	4	2	0.5	0.9	3	39	0	0	1
					Arithmetic mean	-	20	9	137,333	22	-	-	4	6	9,844	3	16	26	2	0.5	2	-	2	11	1	24	2	1	2	10	47	1	2	
					Geometric mean	-	16	7	133,048	22	-	-	3	4	377	2	10	25	2	0.4	1	-	2	1	1	9	2	1	1	7	45	-	-	
					Percentille 80	-	30	8	160,000	23	-	-	5	9	4,960	4	26	27	2	1	3	-	2	11	2	28	2	1	2	15	51	0	0	
					Standard deviation	-	11	9	39,260	3	-	-	2	6	23,790	2	11	4	1	0	3	-	1	22	1	42	0	0	1	10	16	3	6	
					MIN	15	2	4	92,000	19	-	-	2	1	1	1	1	22	1	0.2	0	20	1	0	0	1	2	1	1	3	31	0	0	
					MAX	15	41	30	160,000	26	-	-	8	26	92,000	6	26	29	2	0.7	7	20	2	50	3	174	2	1	2	17	97	12	23	
					n	1	18	8	3	5	-	-	18	18	17	5	5	2	17	4	4	1	17	5	4	17	2	2	2	2	15	18	18	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

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Delmarva Septic Solution
Premier Tech Environment

Collaboration of:
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Bruce King

Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
11	Whittaker	Nothumberland	II	1	2004-09-21	17	130	37	92,000	64	<1	-	3	*1*	540	8	39	45	2	4.5	8.0	152	2	3.1	2.8	42	*2*	2.2	11.6	39	-	0	0	
				2	2004-10-19	-	269	-	-	-	1	-	6	2	920	-	-	-	2	-	-	-	2	-	-	36	-	-	-	-	-	0	3.2	
				3	2004-11-16	-	129	33	-	-	<1	-	2	4	350	-	-	-	2	-	-	-	2	-	-	42	-	-	-	-	-	12.8	22.0	
				4	2004-12-21	-	111	-	-	-	<1	-	11	15	1,600	-	-	-	2	-	-	-	2	-	-	36	-	-	-	-	-	8.0	13.5	
				5	2005-01-18	-	142	-	-	-	<1	-	2	1	>2 400	-	-	-	2	-	-	-	2	-	-	109	-	-	-	-	-	4.5	14.0	
				6	2005-02-16	-	200	35	160,000	38	<1	-	12	6	>2 400	0.14	30	-	2	3.1	*0.01*	-	2	0.52	*0.01*	65	-	-	-	-	108	4.0	7.0	
				7	2005-03-16	-	177	-	-	-	<1	-	23	14	11,000	-	-	-	2	-	-	-	2	-	-	55	-	-	-	-	108	7.0	17.0	
				8	2005-04-18	-	316	-	-	-	<1	-	16	8	22,000	-	-	-	2	-	-	-	2	-	-	65	-	-	-	-	117	10.0	10.5	
				9	2005-05-19	-	200	56	-	-	<1	-	15	14	3,700	-	-	-	1	-	-	-	1	-	-	15	1	0.6	3	6	111	6.0	0	
				10	2005-06-28	-	72	-	-	-	-	-	3	4	430	-	-	-	1	-	-	-	1	-	-	11	-	-	-	-	112	17.2	0	
				11	2005-07-26	-	98	-	-	-	<1	-	10	7	12,000	-	-	-	1	-	-	-	1	-	-	13	-	-	-	-	133	18.0	19.5	
				12	2005-08-23	-	200	49	>240 000	60	<1	-	20	9	200,000	18	*0.1*	-	1	7.1	*0.1*	-	1	4	*0.1*	16	-	-	-	-	144	15.3	-	
				13	2005-09-27	-	130	-	-	-	<1	-	20	10	18,000	-	-	-	1	-	-	-	1	-	-	14	-	-	-	-	-	18.3	27.0	
				14	2005-10-25	-	100	-	-	-	<1	-	8	4	24,000	-	-	-	2	-	-	-	1	-	-	29	-	-	-	-	-	33.6	53.9	
				15	2005-11-21	-	170	26	-	-	<1	-	3	8	31,000	-	-	-	170	-	-	-	1	-	-	10	-	-	-	-	-	0	0	150 +
				16	2005-12-22	-	120	-	-	-	<1	-	6	2	61,000	-	-	-	28	-	-	-	3	-	-	8	-	-	-	-	-	0	0	70
				17	2006-01-19	-	110	-	-	-	<1	-	3	2	2,500	-	-	-	2	-	-	-	2	-	-	12	-	-	-	-	-	0	0	20
		FINAL TEST		18	2006-02-16	-	110	19	87,000	26	<1	-	13	9	12,000	9	33	-	2	1.8	*0.1*	-	2	0.2	*0.1*	1	2	2	1	5	-	0	0	70
					Arithmetic mean	-	155	36	113,000	47	-	-	10	7	25,065	9	25	-	13	4	2	-	2	2	1	32	2	2	5	17	119	9	11	
					Geometric mean	-	144	34	108,595	44	-	-	7	5	6,309	4	8	-	2	4	0.2	-	2	1	0	22	2	1	3	10	118	-	-	
					Percentille 80	-	200	47	132,800	62	-	-	16	10	24,000	13	35	-	2	6	3	-	2	3	1	50	2	2	8	26	130	16	19	
					Standard deviation	-	63	13	40,780	18	-	-	7	5	49,293	7	17	-	40	2	4	-	1	2	1	28	1	1	6	19	14	9	14	
					MIN	17	72	19	87,000	26	-	-	2	1	350	0	0	45	1	2	0.0	152	1	0	0	1	1	1	1	5	108	0	0	
					MAX	17	316	56	160,000	64	-	-	23	15	200,000	18	39	45	170	7	8	152	3	4	3	109	2	2	12	39	144	34	54	
					n	1	18	7	3	4	-	-	18	18	16	4	4	1	18	4	4	1	18	4	4	18	3	3	3	3	7	18	17	
12	Pride of VA	Lancaster	III	1	2005-02-02	300	176	44	>240 000	80	<1	-	9	21	>2 400	27	16	310	2	0.6	6.6	3	2	0.3	*0.01*	300	-	-	-	-	-	30.0	71.0	>150
	# A			2	2005-02-23	185	184	-	-	-	<1	-	5	8	540	-	-	-	2	-	-	-	2	-	-	210	2	*0.1*	1	360	244	48.6	49.0	-
				3	2005-03-23	-	251	43	-	-	<1	-	11	20	6,300	-	-	-	2	-	-	-	2	-	-	213	-	-	-	-	-	29.0	68.0	-
				4	2005-04-27	-	168	-	-	-	<1	-	14	23	54,000	-	-	-	2	-	-	-	2	-	-	225	-	-	-	-	-	19.0	39.0	?
				5	2005-05-24	-	180	-	-	-	<1	-	7	17	20,000	-	-	-	1	-	-	-	1	-	-	220	-	-	-	-	-	44.0	44.0	-
				6	2005-06-29	-	92	21	>2 419	66	-	-	5	29	>2 419	19	7	-	1	1	*0.1*	-	-	-	-	-	-	-	-	-	-	23.6	15.1	±160
				6 cont	2005-06-30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.9	*0.1*	200	-	-	-	-	-	-	-	
				7	2005-07-27	-	110	-	-	-	1	-	7	25	8,700	-	-	-	1	-	-	-	1	-	-	260	-	-	-	-	-	17.0	21.2	>150
				8	2005-08-24	-	63	-	-	-	<1	-	4	31	45	-	-	-	1	-	-	-	1	-	-	240	-	-	-	-	-	0	6.3	>160
				9	2005-10-05	-	59	10	-	-	<1	-	2	4	*1*	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	0	0	±140
				10	2005-10-26	-	28	-	-	-	<1	-	7	19	1,300	-	-	-	1	-	-	-	1	-	-	410	-	-	-	-	-	8.0	68.0	-
				11	2005-11-22	-	85	-	-	-	<1	-	2	14	2,900	-	-	-	150	-	-	-	1	-	-	410	-	-	-	-	-	14.0	-	150 +
				12	2005-12-28	-	130	30	>241 960	24	<1	-	7	55	37,000	19	9	-	1	31	0.6	-	1	0.4	*0.1*	330	-	-	-	-	-	17.0	19.0	-
				13	2006-01-25	-	160	-	-	-	<1	-	12	14	2,100	-	-	-	2	-	-	-	2	-	-	290	-	-	-	-	268	18.6	-	130
				14	2006-02-21	-	170	-	-	-	<1	-	67	17	15,000	-	-	-	2	-	-	-	2	-	-	680	-	-	-	-	540	19.5	46.4	100
				15	2006-03-30	-	196	49	-	-	<1	-	3	9	387	-	-	-	1	-	-	-	1	-	-	190	-	-	-	-	448	0	22.0	110
				16	2006-04-26	-	148	-	-	-	<1	-	3	2	4,880	-	-	-	1	-	-	-	1	-	-	190	-	-	-	-	546	25.0	34.0	-
				17	2006-05-31	-	96	-	-	-	<1	-	8	6	>241 960	-	-	-	1	-	-	-	1	-	-	170	-	-	-	-	798	20.0	30.0	-
		FINAL TEST		18	2006-06-20	-	127	24	141,000	76	<1	-	3	5	1,120	5.4	0.4	-	1	1	0.1	-	1	0.4	*0.1*	140	1	4.2	11	340	700	0	0	30
					Arithmetic mean	242	135	32		62	-	-	10	18	10,285	18	8	-	11	8	2	-	1	0	0	275	2	2	6	350	506	19	33	
					Geometric mean	236	120	28		56	-	-	6	13	1,884	15	4	-	2	2	0	-	1	0	0	254	1	1	3	350	467	-	-	
					Percentille 80	277	178	44		78	-	-	10	24	16,000	22	12	-	2	13	3	-	2	1	0	324	2	3	9	356	669	27	49	
					Standard deviation	81	57	14		26	-	-	15	13	15,763	9	6	-	35	15	3	-	1	0	0	130	1	3	7	14	206	14	23	
					MIN	185	28	10		24	-	-	2	2	1	5	0	310	1	1	0	3	1	0	0	140	1	0	1	340	244	0	0	
					MAX	300	251	49		80	-	-	67	55	54,000	27	16	310	150	31	7	3	2	1	0	680	2	4	11	360	798	49	71	
					n	2	18	7		4	-	-	18	18	15	4	4	1	18	4	4	1	18	4	4	17	2	2	2	2	7	18	16	

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						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
13	Pride of VA	Lancaster	III	1	2005-02-02	460	176	65	>240 000	94	<1	-	6	13	920	7	43	400	*2*	26	4.2	1,699	*2*	*0.1*	*0.01*	430	-	-	-	-	-	15.0	39.0	>150
	# B			2	2005-02-23	205	172	-	-	-	<1	-	6	7	*100*	-	-	-	*2*	-	-	-	*2*	-	-	400	*2*	*0.1*	1	155	230	0	16.2	-
				3	2005-03-23	-	246	61	-	-	<1	-	11	8	7,000	-	-	-	*2*	-	-	-	*2*	-	-	385	-	-	-	-	-	2	42.0	-
				4	2005-04-27	-	177	-	-	-	<1	-	13	13	28,000	-	-	-	*2*	-	-	-	*2*	-	-	255	-	-	-	-	-	0	0	160
				5	2005-05-24	-	190	-	-	-	<1	-	15	8	24,000	-	-	-	*1*	-	-	-	*1*	-	-	180	-	-	-	-	-	18.2	27.0	160
				6	2005-06-29	-	86	26	200,000	61	-	-	13	7	37,000	19	6	-	*1*	15	*0.1*	-	*1*	2	*0.1*	320	-	-	-	-	-	0	0	±160
				7	2005-07-27	-	110	-	-	-	1	-	49	18	>24 000	-	-	-	*1*	-	-	-	*1*	-	-	400	-	-	-	-	-	0	0	>150
				8	2005-08-24	-	96	-	-	-	<1	-	47	17	55,000	-	-	-	1	-	-	-	1	-	-	430	-	-	-	-	-	7.5	0	>160
				9	2005-10-05	-	53	10	-	-	<1	-	2	4	25	-	-	-	*1*	-	-	-	*1*	-	-	-	-	-	-	-	-	0	0	±130
				10	2005-10-26	-	29	-	-	-	<1	-	9	24	50	-	-	-	*1*	-	-	-	*1*	-	-	630	-	-	-	-	-	26.2	11.5	-
				11	2005-11-22	-	78	-	-	-	<1	-	8	19	38,000	-	-	-	*1*	-	-	-	*1*	-	-	690	-	-	-	-	-	0	30.0	150 +
				12	2005-12-28	-	150	45	>241 960	25	<1	-	-	25	240,000	27	*0.1*	-	*1*	21	2	-	*1*	0.4	1	530	-	-	-	-	-	9.5	0	±80
				13	2006-01-25	-	210	-	-	-	<1	-	24	9	2	-	-	-	2	-	-	-	2	-	-	440	-	-	-	-	535	20.6	-	75
				14	2006-02-21	-	160	-	-	-	<1	-	6	10	1,600	-	-	-	2	-	-	-	2	-	-	490	-	-	-	-	677	13.0	0	±130
				15	2006-03-30	-	197	25	-	-	<1	-	4	6	670	-	-	-	*1*	-	-	-	*1*	-	-	320	-	-	-	-	449	-	-	90
				16	2006-04-26	-	142	-	-	-	<1	-	3	3	4,110	-	-	-	*1*	-	-	-	*1*	-	-	430	-	-	-	-	547	0	9	-
				17	2006-05-31	-	87	-	-	-	<1	-	7	4	>241 960	-	-	-	*1*	-	-	-	*1*	-	-	390	-	-	-	-	773	0	0	80
		FINAL TEST		18	2006-06-20	-	102	20	120,000	78	<1	-	3	2	1,730	9	1	-	*1*	20	1	-	*1*	*0.2*	1	270	*1*	4	0.3	39	679	0	0.0	40
					Arithmetic mean	332	137	36		64	-	-	13	11	27,388	15	12	-	1	20	2	-	1	1	1	411	2	2	1	97	556	7	11	
					Geometric mean	307	122	30		58	-	-	9	9	2,109	13	2	-	1	20	1	-	1	0	0	392	1	1	1	78	523	-	-	
					Percentille 80	409	185	58		84	-	-	15	18	37,000	22	21	-	2	23	3	-	2	1	1	480	2	3	1	132	679	15	27	
					Standard deviation	180	59	21		29	-	-	14	7	59,368	9	21	-	0	4	2	-	0	1	1	128	1	3	0	82	180	9	15	
					MIN	205	29	10		25	-	-	2	2	2	7	0	400	1	15	0	1,699	1	0	0	180	1	0	0	39	230	0	0	
					MAX	460	246	65		94	-	-	49	25	240,000	27	43	400	2	26	4	1,699	2	2	1	690	2	4	1	155	773	26	42	
					n	2	18	7		4	-	-	17	18	16	4	4	1	18	4	4	1	18	4	4	17	2	2	2	2	7	17	16	
14	Nicolato	Virginia	III	1	2005-05-25	230	250	31	4,600	57	1	-	19	7	1,200	50	2	270	28	2	0.2	9	*1*	0.5	2	69	-	-	-	-	216	0	0	110
		Beach		2	2005-06-22	-	650	-	-	-	-	-	6	1	21,000	-	-	-	*1*	-	-	-	*1*	-	-	180	*1*	0.8	*0.1*	210	90	0	0	120
				3	2005-07-20	-	140	17	-	-	<1	-	5	1	16,000	-	-	-	*1*	-	-	-	*1*	*0.5*	0.3	47	-	-	-	-	237	0	0	50
				4	2005-08-17	-	260	-	-	-	<1	-	8	2	>2 400	-	-	-	*1*	-	-	-	*1*	-	-	73	-	-	-	-	116	0	0	150
				5	2005-09-21	-	140	-	-	-	<1	-	3	5	640	-	-	-	*1*	-	-	-	*1*	-	-	149	-	-	-	-	118	0	0	±150
				6	2005-10-18	-	160	16	>240 000	70	<1	-	3	1	28,000	2	49	-	*1*	1	0.4	-	*1*	*0.5*	0.3	10	-	-	-	-	93	0	0	>150
				7	2005-11-16	-	110	-	-	-	<1	-	2	2	2	-	-	-	5	-	-	-	*1*	-	-	63	-	-	-	-	122	0	0	10
				8	2005-12-21	-	150	-	-	-	<1	-	2	8	8,700	-	-	-	*1*	-	-	-	*1*	-	-	16	-	-	-	-	125	0	0	40
				9	2006-01-18	-	230	22	-	-	<1	-	24	5	26,000	-	-	-	*2*	-	-	-	*2*	-	-	15	*2*	0.2	*0.1*	10	135	0	0	30
				10	2006-02-15	-	150	-	-	-	<1	-	5	4	2,400	-	-	-	*2*	-	-	-	*2*	-	-	2	-	-	-	-	129	0	0	80
				11	2006-03-22	-	135	-	-	-	<1	-	11	3	> 241 960	-	-	-	*1*	-	-	-	*1*	-	-	300	-	-	-	-	119	0	0	90
				12	2006-04-20	-	178	20	173,000	51	<1	-	2	4	3,450	4	25	-	*1*	*0.2*	6	-	*1*	*0.2*	0.8	52	-	-	-	-	115	0	0	20
				13	2006-05-17	-	201	-	-	-	<1	-	4	2	2,600	-	-	-	*1*	-	-	-	*1*	-	-	18	-	-	-	-	124	0	0	20
				14	2006-06-21	-	210	-	-	-	<1	-	4	4	15,500	-	-	-	5	-	-	-	*1*	-	-	260	-	-	-	-	149	-	-	40
				15	2009-08-01	-	122	11	-	-	<1	-	22	16	49,000	-	-	-	56	-	-	-	2	-	-	29	-	-	-	-	133	-	-	<5
				16	2006-08-23	-	121	-	-	-	<1	-	4	1	6,500	-	-	-	11	-	-	-	2	-	-	40	-	-	-	-	131	-	-	140
				17	2006-09-26	-	183	-	-	-	<1	-	24	5	1,370	-	-	-	7	-	-	-	*1*	-	-	420	-	-	-	-	132	0	0	10
		FINAL TEST		18	2006-10-25	-	99	14	57,900	63	<1	-	14	3	6,130	3	40	-	*1*	1	2	-	*1*	0.6	*0.1*	340	*1*	0.9	0.1	300	117	0	0	<5
					Arithmetic mean	-	194	19	78,500	60	-	-	9	4	11,781	15	29	-	7	1	2	-	1	0	1	116	1	1	0	173	133	0	0	
					Geometric mean	-	174	18	35,850	60	-	-	6	3	3,904	6	17	-	2	1	1	-	1	0	0	55	1	1	0	85	130	-	-	
					Percentille 80	-	222	22	126,960	66	-	-	17	5	21,000	22	43	-	6	1	3	-	2	1	1	228	2	1	0	264	134	0	0	
					Standard deviation	-	123	7	86,069	8	-	-	8	4	13,568	24	21	-	14	1	3	-	0	0	1	130	1	0	0	148	37	0	0	
					MIN	230	99	11	4,600	51	-	-	2	1	2	2	2	270	1	0	0	9	1	0	0	2	1	0	0	10	90	0	0	
					MAX	230	650	31	173,000	70	-	-	24	16	49,000	50	49	270	56	2	6	9	2	1	2	420	2	1	0	300	237	0	0	
					n	1	18	7	3	4	-	-	18	18	16	4	4	1	18	4	4	1	18	4	4	18	3	3	3	3	18	15	15	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

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Collaboration of:
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Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
- L2: 12 inches underneath the Ecoflo absorption field and 10 feet apart the foot print of the absorption field
- L3: Up gradient to measure the background contamination
- nw: no water
- Data in italic should be preceded by the symbol "<".
- Data treatment do not include values with ">".

						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
15	Stevens-Jeff	Accomack	I	1	2005-06-08	63	160	61	-	24	-	-	-	-	-	-	-	-	-	*0.5*	*0.1*	*1*	-	*0.5*	*0.1*	*1*	-	-	-	-	-	0	0	5
		Chincoteague city		1 (cont.)	2005-06-08 & 09	-	-	-	>1 600	-	-	-	22	-	>1 600	-	-	-	*2*	-	-	-	*2*	-	-	-	-	-	-	-				
	fecal coliform analysis other lab			2	2005-07-13	-	180	47	>1 600	68	<1	-	11	8	>1 600	4	23	120	8	-	-	-	*2*	-	-	2	-	-	-	-	176	0	0	70
				3	2005-08-10	-	160	29	-	-	<1	-	10	5	>1 600	-	-	-	*2*	-	-	-	*2*	-	-	2	-	-	-	-	238	0	0	-
				4	2005-09-14	-	150	-	-	-	1	-	17	7	13,000	-	-	-	*2*	-	-	-	*2*	-	-	*1*	-	-	-	-	-	0	0	-
				5	2005-10-12	-	220	-	-	-	<1	-	13	*1*	54,000	-	-	-	*2*	-	-	-	*2*	-	-	1	-	-	-	-	-	0	0	-
				6	2005-11-09	-	210	29	1,600,000	29	<1	-	*2*	8	79,000	10	30	-	*2*	2	0.4	-	*2*	*0.5*	*0.1*	70	-	-	-	-	-	0	0	-
				7	2005-12-14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*2*	-	-	200	-	-	-	-	-	0	0	-
				8	2006-01-10	-	31	-	-	-	<1	-	49	33	1,600,000	-	-	-	*2*	-	-	-	*2*	-	-	140	-	-	-	-	-	-	-	10
				9	2006-02-07 & 09	-	210	37	-	-	<1	-	23	19	54,000	-	-	-	*2*	-	-	-	*2*	-	-	170	-	-	-	-	-	-	-	20
				10	2006-03-08	-	123	-	-	-	<1	-	48	12	2,600	-	-	-	*2*	-	-	-	*2*	-	-	74	-	-	-	-	160	0	0	110
				11	2006-04-11	-	198	-	-	-	<1	-	2	*1*	130,000	-	-	-	7	-	-	-	*2*	-	-	77	-	-	-	-	-	0	0	30
				12	2006-05-10	-	56	59	>1 600	27	<1	-	*2*	3	*200*	8	1	-	*2*	3	0.5	-	*2*	*0.2*	15	94	-	-	-	-	171	-	-	10
				13	2006-06-13	-	152	-	-	-	<1	-	56	16	920,000	-	-	-	*2*	-	-	-	*2*	-	-	85	-	-	-	-	211	-	-	20
				14	2006-07-19	-	71	-	-	-	<1	-	6	5	24,000	-	-	-	*2*	-	-	-	*2*	-	-	88	-	-	-	-	254	-	-	40
				15	2006-08-29	-	100	39	-	-	<1	-	18	14	92,000	-	-	-	2	-	-	-	*2*	-	-	68	-	-	-	-	185	-	-	<5
				16	2006-09-20	-	150	-	-	-	<1	-	*2*	2	*200*	-	-	-	*2*	-	-	-	*2*	-	-	150	-	-	-	-	273	-	-	-
				17	2006-10-19	-	212	-	-	-	<1	-	31	15	2,300	-	-	-	*2*	-	-	-	*2*	-	-	86	-	-	-	-	315	-	-	<5
		FINAL TEST		18	2006-11-15	-	142	20	790,000	46	<1	-	13	2	110,000	8	4	-	*2*	0.3	*0.1*	-	2	1	0.1	71	-	-	-	-	435	-	-	60
					Arithmetic mean	-	148	40	1,195,000	39	-	-	19	9	220,093	7	14	-	3	1	0	-	2	1	4	77	-	-	-	-	242	0	0	
					Geometric mean	-	134	38	1,124,278	36	-	-	12	6	24,800	7	7	-	2	1	0	-	2	0	0	30	-	-	-	-	231	-	-	
					Percentille 80	-	208	54	1,438,000	51	-	-	30	15	118,000	9	26	-	2	2	0	-	2	1	6	122	-	-	-	-	281	0	0	
					Standard deviation	-	57	15	572,756	18	-	-	17	9	462,312	3	14	-	2	1	0	-	0	0	7	61	-	-	-	-	84	0	0	
					MIN	63	31	20	790,000	24	-	-	2	1	200	4	1	120	2	0	0	1	2	0	0	1	-	-	-	-	160	0	0	
					MAX	63	220	61	1,600,000	68	-	-	56	33	########	10	30	120	8	3	1	1	2	1	15	200	-	-	-	-	435	0	0	
					n	1	17	8	2	5	-	-	17	16	14	4	4	1	17	4	4	1	18	4	4	18	-	-	-	-	10	9	9	
16	Hale	Accomack	I	1	2005-06-09	64	220	98	-	64	-	-	4	6	-	1	62	110	-	2	2	41	-	1	4	12	-	-	-	-	-	0	0	120
		Chincoteague city		2	2005-07-13	-	160	-	-	-	<1	-	*2*	3	920	-	-	-	*2*	-	-	-	*2*	-	-	6	-	-	-	-	-	0	0	100
	fecal coliform analysis other lab			3	2005-08-10	-	190	43	-	-	<1	-	2	2	1,600	-	-	-	*2*	-	-	-	*2*	-	-	6	-	-	-	-	197	0	0	-
				4	2005-09-14	-	120	-	-	-	<1	-	*2*	15	220	-	-	-	*2*	-	-	-	*2*	-	-	4	-	-	-	-	62	-	-	-
				5	2005-10-12	-	170	-	-	-	<1	-	*2*	1	110	-	-	-	*2*	-	-	-	*2*	-	-	3	-	-	-	-	-	0	0	-
				6	2005-11-09	-	80	28	16,000	1	<1	-	*2*	3	490	30	55	-	*2*	*0.5*	4	-	*2*	*0.5*	4	1	-	-	-	-	-	0	0	-
				7	2005-12-14	-	-	-	-	-	-	-	45	2	2	-	-	-	2	-	-	-	*2*	-	-	9	-	-	-	-	-	0	0	
				8	2006-01-10	-	220	-	-	-	<1	-	6	2	240	-	-	-	*2*	-	-	-	*2*	-	-	28	-	-	-	-	-	0	0	30
				9	2006-02-07 & 08	-	160	46	-	-	<1	-	3	*1*	240	-	-	-	*2*	-	-	-	*2*	-	-	11	-	-	-	-	-	0	0	10
				10	2006-03-08 & 09	-	134	-	-	-	<1	-	2	1	1,600	-	-	-	*2*	-	-	-	*2*	-	-	13	-	-	-	-	79	-	-	50
				11	2006-04-11	-	113	-	-	-	<1	-	2	*1*	2,400	-	-	-	*2*	-	-	-	*2*	-	-	4	-	-	-	-	-	-	-	5
				12	2006-05-10	-	178	85	>1 600	32	<1	-	3	3	79	*0.2*	31	-	*2*	1	7	-	*2*	*0.2*	8	15	-	-	-	-	133	0	0	<10
				13	2006-06-13	-	157	-	-	-	<1	-	2	3	3,500	-	-	-	8	-	-	-	4	-	-	9	-	-	-	-	184	-	-	<10
				14	2006-07-19	-	138	-	-	-	<1	-	2	*1*	>16 000	-	-	-	>1600	-	-	-	*2*	-	-	7	-	-	-	-	-	-	-	5
				15	2006-08-29	-	101	43	-	-	<1	-	2	3	54	-	-	-	*2*	-	-	-	4	-	-	15	-	-	-	-	73	-	-	<1
				16	2006-09-20	-	118	-	-	-	<1	-	3	3	*20*	-	-	-	*2*	-	-	-	*2*	-	-	6	-	-	-	-	107	-	-	-
				17	2006-10-19	-	119	-	-	-	<1	-	2	7	>1 600	-	-	-	*2*	-	-	-	*2*	-	-	19	-	-	-	-	74	-	-	<5
		FINAL TEST		18	2006-11-15	-	229	35	33,000	58	<1	-	19	*1*	350	0.4	48	-	2	1	3	-	2	2	3	23	-	-	-	-	63	0	0	<5
					Arithmetic mean	-	153	54	24,500	39	-	-	6	3	788	8	49	-	2	1	4	-	2	1	4	11	-	-	-	-	108	0	0	
					Geometric mean	-	147	49	22,978	18	-	-	3	2	248	1	47	-	2	1	3	-	2	1	4	8	-	-	-	-	98	-	-	
					Percentille 80	-	188	77	29,600	60	-	-	4	3	1,600	13	58	-	2	1	5	-	2	1	5	15	-	-	-	-	153	0	0	
					Standard deviation	-	44	27	12,021	29	-	-	11	3	1,042	15	13	-	2	0	2	-	1	1	2	7	-	-	-	-	52	0	0	
					MIN	64	80	28	16,000	1	-	-	2	1	2	0	31	110	2	1	2	41	2	0	3	1	-	-	-	-	62	0	0	
					MAX	64	229	98	33,000	64	-	-	45	15	3,500	30	62	110	8	2	7	41	4	2	8	28	-	-	-	-	197	0	0	
					n	1	17	7	2	4	-	-	18	18	15	4	4	1	16	4	4	1	17	4	4	18	-	-	-	-	9	10	10	

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	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
17	Reed	Accomack	I	1	2005-06-14	64	200	35	-	50	-	-	-	-	-	-	-	-	-	2	0.5	18	-	13	*0.1*	41	-	1	5	5	-	0	0	-
		Chincoteague city		2	2005-07-14	-	99	34	>1 600	35	<1	-	-	-	-	-	-	-	*1*	-	-	-	*1*	-	-	47	-	-	-	-	-	0	0	-
	fecal coliform analysis other lab			3	2005-08-11	-	160	22	>1 600	35	<1	-	14	-	>1 600	8	20	120	2	-	-	-	2	-	-	43	-	-	-	-	-	0	0	140
				4	2005-09-15	-	130	-	-	-	<1	-	8	26	22,000	-	-	-	2	-	-	-	2	-	-	30	-	-	-	-	-	0	0	±100
				5	2005-10-13	-	110	-	-	-	<1	-	5	3	*200*	-	-	-	2	-	-	-	2	-	-	18	-	-	-	-	366	0	0	-
				6	2005-11-10	-	140	19	11,000	25	<1	-	2	5	17,000	8	40	-	2	1	21	-	2	2	17	33	-	-	-	-	138	-	-	-
				7	2005-12-15	-	170	-	-	-	<1	-	6	2	*2*	-	-	-	2	-	-	-	2	-	-	33	-	-	-	-	134	0	0	160
				8	2006-01-12	-	150	-	-	-	<1	-	8	13	9,200	-	-	-	2	-	-	-	2	-	-	88	-	-	-	-	136	0	0	70
				9	2006-02-09	-	210	44	-	-	<1	-	4	3	200	-	-	-	2	-	-	-	2	-	-	73	2	1	10	8	112	0	0	60
				10	2006-03-09	-	156	-	-	-	<1	-	51	6	16,000	-	-	-	2	-	-	-	2	-	-	74	-	-	-	-	103	0	0	90
				11	2006-04-13	-	174	-	-	-	<1	-	*2*	3	2,800	-	-	-	170	-	-	-	2	-	-	62	-	-	-	-	-	0	0	70
				12	2006-05-11	-	130	89	>1 600	34	<1	-	21	56	540	17	8	-	2	*0.2*	27	-	2	3	*0.1*	43	-	-	-	-	204	0	0	80
				13	2006-06-15	-	96	-	-	-	<1	-	5	13	54,000	-	-	-	2	-	-	-	2	-	-	30	-	-	-	-	175	-	-	40
				14	2006-07-20	-	176	-	-	-	<1	-	3	5	24,000	-	-	-	2	-	-	-	2	-	-	50	-	-	-	-	168	-	-	20
				15	2006-08-31	-	83	40	-	-	<1	-	6	*1*	*2*	-	-	-	2	-	-	-	2	-	-	86	-	-	-	-	111	-	-	50
				16	2006-09-21	-	91	-	-	-	<1	-	3	2	*2*	-	-	-	2	-	-	-	2	-	-	44	-	-	-	-	194	-	-	50
				17	2006-10-18	-	124	-	-	-	<1	-	3	6	260	-	-	-	2	-	-	-	2	-	-	61	-	-	-	-	139	-	-	30
		FINAL TEST		18	2006-11-16	-	135	32	3,500,000	51	<1	-	12	2	12	6	6	-	2	1	34	-	2	5	*0.1*	35	2	*0.2*	4	4	112	0	0	75
					Arithmetic mean	-	141	39	1,755,500	38	-	-	10	10	9,748	10	18	-	12	1	21	-	2	6	4	50	2	1	7	6	161	0	0	
					Geometric mean	-	136	35	196,214	37	-	-	6	5	544	9	14	-	2	1	10	-	2	4	0	46	2	0	6	5	151	-	-	
					Percentille 80	-	172	42	2,802,200	50	-	-	12	13	18,000	12	28	-	2	1	30	-	2	8	7	69	2	1	8	7	186	0	0	
					Standard deviation	-	37	22	2,467,096	10	-	-	12	14	15,092	5	16	-	41	1	14	-	0	5	8	20	0	0	3	2	70	0	0	
					MIN	64	83	19	11,000	25	-	-	2	1	2	6	6	120	1	0	1	18	1	2	0	18	2	0	4	4	103	0	0	
					MAX	64	210	89	3,500,000	51	-	-	51	56	54,000	17	40	120	170	2	34	18	2	13	17	88	2	1	10	8	366	0	0	
					n	1	18	8	2	6	-	-	16	15	15	4	4	1	17	4	4	1	17	4	4	18	2	3	3	3	13	12	12	
18	Palmer	Accomack	I	1	2005-06-07	55	130	73	1,600	48	-	-	71	9	>1 600	12	*0.1*	76	2	2	*0.1*	27	2	2	*0.1*	44	*2*	10	*0.1*	47	76	0	24	0
		Chincoteague city		2	2005-07-12	-	110	-	-	-	20	-	8	2	920	-	-	-	2	-	-	-	2	-	-	36	-	-	-	-	101	0	0	120
	fecal coliform analysis other lab			3	2005-08-09	-	300	49	-	-	-	-	8	*1*	>1 600	-	1	-	2	-	-	-	2	-	-	22	-	-	-	-	196	0	0	>160
				4	2005-09-13	-	350	-	-	-	<1	-	8	2	160,000	-	-	-	2	-	-	-	2	-	-	20	-	-	-	-	180	0	0	>160
				5	2005-10-11	-	120	-	-	-	<1	-	28	6	26,000	-	-	-	2	-	-	-	2	-	-	20	-	-	-	-	-	0	0	140
				6	2005-11-08	-	160	58	49,000	102	<1	-	6	2	13,000	6	30	-	2	4	0.2	-	2	2.2	*0.1*	24	-	-	-	-	112	0	0	150+
				7	2005-12-13	-	130	-	-	-	<1	-	26	10	54,000	-	-	-	2	-	-	-	2	-	-	27	-	-	-	-	111	0	0	±140
				8	2006-01-11	-	160	-	-	-	<1	-	20	8	240,000	-	-	-	2	-	-	-	2	-	-	32	-	-	-	-	121	-	-	90
				9	2006-02-08	-	200	39	-	-	<1	-	22	11	2,300	-	-	-	2	-	-	-	2	-	-	22	*2*	2	*0.1*	81	96	0	0	90
				10	2006-03-07	-	214	-	-	-	<1	-	20	14	1,600,000	-	-	-	2	-	-	-	2	-	-	19	-	-	-	-	-	0	0	120
	The results are discard see remarks and field report			11	2006-04-12	-	184	-	-	-	<1	-	90	36	>1 600 000	-	-	-	2	-	-	-	2	-	-	24	-	-	-	-	-	-	-	110
				12	2006-05-10	-	189	83	>1 600	20	<1	-	7	9	160,000	8	23	-	2	2	0.3	-	2	2	*0.1*	29	-	-	-	-	129	-	-	50
				13	2006-06-14	-	206	-	-	-	<1	-	12	7	140,000	-	-	-	31	-	-	-	31	-	-	24	-	-	-	-	164	-	-	<5
				14	2006-07-19	-	190	-	-	-	<1	-	16	9	160,000	-	-	-	2	-	-	-	22	-	-	25	-	-	-	-	138	-	-	80
				15	2006-08-31	-	68	80	-	-	<1	-	6	3	24,000	-	-	-	7	-	-	-	2	-	-	37	-	-	-	-	114	-	-	80
				16	2006-09-19	-	37	-	-	-	<1	-	3	*1*	830	-	-	-	2	-	-	-	2	-	-	76	-	-	-	-	287	-	-	70
				17	2006-10-17	-	59	-	-	-	<1	-	3	5	680	-	-	-	2	-	-	-	2	-	-	74	-	-	-	-	178	-	-	20
		FINAL TEST		18	2006-11-14	-	34	37	26,000	40	<1	-	*2*	1	620	8	35	-	2	2	0.2	-	2	4	*0.1*	51	*2*	1	*0.1*	58	159	16	30	30
					Arithmetic mean	-	158	60	25,533	52	-	-	20	8	172,157	8	18	-	4	3	0.2	-	5	3	0.1	34	2	4	0	62	144	2	5	
					Geometric mean	-	133	57	12,679	44	-	-	12	5	21,066	8	4	-	2	3	0.2	-	3	3	0.1	31	2	3	0	60	136	-	-	
					Percentille 80	-	204	79	39,800	70	-	-	24	10	160,000	10	31	-	2	3	0.2	-	2	3	0.1	41	2	7	0	72	178	0	5	
					Standard deviation	-	84	19	23,703	35	-	-	24	8	403,004	3	16	-	7	1	0.1	-	8	1	0.0	17	0	5	0	17	53	5	11	
					MIN	55	34	37	1,600	20	-	-	2	1	620	6	0	76	2	2	0.1	27	2	2	0.1	19	2	1	0	47	76	0	0	
					MAX	55	350	83	49,000	102	-	-	90	36	#######	12	35	76	31	4	0.3	27	31	4	0.1	76	2	10	0	81	287	16	30	
					n	1	18	7	3	4	-	-	18	18	15	4	5	1	18	4	4	1	18	4	4	18	3	3	3	3	15	10	10	

up dated December 22, 2006

VIRGINIA

Monitoring Protocol

DOCUMENT INTERNE ETG

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Notes:
- L1: 12 inches underneath the bottom of the Ecoflo absorption field
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						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
19	Thompson	Glendale	III	1	2005-11-02	3	410	39	>241 960	59	<1	-	2	*1*	860	2	27	42	*1*	*0.5*	3	86	*1*	1	4	28	-	-	-	-	-	0	0	**STB-650**
	STB-650			2	2005-11-30	-	270	-	-	-	<1	-	6	*1*	870	-	-	-	*1*	-	-	-	1	-	-	9	-	-	-	-	-	0	0	-
				3	2005-12-29	-	320	25	-	-	<1	-	2	*1*	5	-	-	-	*1*	-	-	-	*1*	-	-	21	*1*	-	-	18	-	-	-	-
				4	2006-01-26	-	380	-	-	-	<1	-	*2*	*1*	120	-	-	-	*2*	-	-	-	*2*	-	-	18	-	-	-	-	-	0	0	-
				5	2006-02-22	-	400	-	-	-	<1	-	*2*	*1*	290	-	-	-	*2*	-	-	-	*2*	-	-	17	-	-	-	-	69	-	-	-
				6	2006-03-23	-	380	37	>241 960	62	1	-	5	*1*	116	*0.2*	37	-	*1*	0.2	0.4	-	*1*	0.3	0.5	5	-	-	-	-	-	-	-	-
				7	2006-04-19	-	474	-	-	-	<1	-	2	2	5,480	-	-	-	*1*	-	-	-	*1*	-	-	1	-	-	-	-	-	0	0	-
				8	2006-05-18	-	327	-	-	-	<1	-	*2*	3	2	-	-	-	*1*	-	-	-	*1*	-	-	2	-	-	-	-	111	-	-	-
				9	2006-06-22	-	388	54	-	-	<1	-	2	*1*	62	-	-	-	*1*	-	-	-	*1*	-	-	1	-	-	-	-	-	-	-	-
				10	2006-07-31	-	211	-	-	-	<1	-	4	*1*	2,200	-	-	-	*2*	-	-	-	*2*	-	-	4	-	-	-	-	101	0	0	-
				11	20006-08-22	-	175	-	-	-	<1	-	2	*1*	260	-	-	-	*2*	-	-	-	*2*	-	-	3	-	-	-	-	163	-	-	-
				12	2006-09-27	-	251	35	>241 960	112	<1	-	2	*1*	238	1	25	-	*1*	1	1	-	*1*	1	2	7	-	-	-	-	43	0	0	-
				13	2006-10-24	-	231	-	-	-	<1	-	8	5	172	-	-	-	*1*	-	-	-	*1*	-	-	6	-	-	-	-	-	0	0	-
				14	2006-11-20	-	303	120	-	-	<1	-	*2*	7	365	-	-	-	*1*	-	-	-	*1*	-	-	7	-	-	-	-	49	0	0	-
				15	2006-12-11	-	336	63	-	-	<1	-	30	21	15,500	-	-	-	*1*	-	-	-	*1*	-	-	10	-	-	-	-	69	0	0	-
				16	2007-01-25	-	343	-	-	-	<1	-	*2*	10	28	-	-	-	*1*	-	-	-	*1*	-	-	6	-	-	-	-	51	0	0	-
				17	2007-02-13	-	421	-	-	-	<1	-	5	19	537	-	-	-	*1*	-	-	-	*1*	-	-	3	-	-	-	-	38	0	0	-
				18	2007-03-22	-	257	50	>2419600	83	<1	-	*2*	2	60	*0*	23	-	*1*	0.6	0.25	-	*1*	0.4	*0.1*	5	*1*	0.4	*0.1*	3	44	-	-	
				19																														
					Arithmetic mean	3	327	53	#DIV/0!	79	-	-	5	4	1,509	1	28	42	1	1	1	86	1	1	2	8	1	0	0	10	74	0	0	
					Geometric mean	3	316	47	#NUM!	77	-	-	3	2	218	1	27	42	1	0	1	86	1	1	1	6	1	0	0	7	66	#NUM!	#NUM!	
					Percentille 80	3	395	59	#NUM!	95	-	-	5	6	866	1	31	42	2	1	2	86	2	1	3	14	1	0	0	15	103	0	0	
					Standard deviation	#DIV/0!	81	30	#DIV/0!	24	-	-	7	6	3,728	1	6	#DIV/0!	0	0	1	#DIV/0!	0	0	2	8	0	#DIV/0!	#DIV/0!	11	40	0	0	
					MIN	3	175	25	0	59	-	-	2	1	2	0	23	42	1	0	0	86	1	0	0	1	1	0	0	3	38	0	0	
					MAX	3	474	120	0	112	-	-	30	21	15,500	2	37	42	2	1	3	86	2	1	4	28	1	0	0	18	163	0	0	
					n	1	18	8	0	4	-	-	18	18	18	4	4	1	18	4	4	1	18	4	4	18	2	1	1	2	10	11	11	
20	Garcia	Madison	IV	1	2006-01-31	6	170	36	12	30	<1	-	*2*	1	5	*0.2*	35	36	*2*	*0.2*	13	16	*2*	*0.2*	0.2	7	*2*	*0.2*	0.6	41	-	-	-	**STB-650**
	STB-650			2	2006-02-23	-	140	-	-	-	<1	-	4	2	2,200	-	-	-	*2*	-	-	-	*2*	-	-	2	-	-	-	-	125	-	-	-
				3	2006-03-29	-	163	61	-	-	<1	-	3	1	184	-	-	-	*1*	-	-	-	*1*	-	-	2	-	-	-	-	129	-	-	-
				4	2006-04-25	-	162	-	-	-	<1	-	2	2	205	-	-	-	*1*	-	-	-	*1*	-	-	3	-	-	-	-	57	0	0	-
				5	2006-05-25	-	151	-	-	-	<1	-	2	1	45	-	-	-	*1*	-	-	-	*1*	-	-	2	-	-	-	-	11	-	-	-
				6	2006-06-22	-	270	62	>241 960	70	<1	-	4	*1*	387	19	25	-	-	-	-	-	-	-	-	-	-	-	-	-	128	-	-	-
				7	2006-08-02	-	189	-	-	-	<1	-	2	*1*	370	-	-	-	*2*	-	-	-	*2*	-	-	1	-	-	-	-	125	-	-	-
				8	2006-08-24	-	156	-	-	-	<1	-	2	1	2,400	-	-	-	*2*	-	-	-	*2*	-	-	3	-	-	-	-	135	-	-	-
				9	2006-09-28	-	206	43	-	-	<1	-	5	*1*	9	-	-	-	*1*	1	2	-	*1*	1	2	4	-	-	-	-	138	-	-	-
				10	2006-10-26	-	155	-	-	-	<1	-	2	*1*	488	-	-	-	*1*	-	-	-	*1*	-	-	3	-	-	-	-	162	-	-	-
				11	2006-11-21	-	219	-	-	-	<1	-	*2*	*1*	53	-	-	-	*1*	-	-	-	*1*	-	-	*1*	-	-	-	-	181	0	0	-
				12	2006-12-12	-	184	56	242,000	71	<1	-	*2*	*1*	22	6	48	-	*1*	*0.2*	2	-	*1*	0.4	2	4	-	-	-	-	402	0	0	-
				13	2007-01-24	-	209	-	-	-	<1	-	2	*1*	55	-	-	-	*1*	-	-	-	*1*	-	-	*1*	-	-	-	-	171	0	0	-
				14	2007-02-20	-	171	-	-	-	<1	-	5	*1*	816	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	162	0	0	-
				15	2007-03-20	-	179	31	-	-	-	-	6	2	613	-	-	-	*1*	-	-	-	*1*	-	-	*1*	-	-	-	-	156	0	0	
				16	2007-04-18	-	218	-	-	-	<1	-	11	5	1,990	-	-	-	*1*	-	-	-	*2*	-	-	*1*	-	-	-	-	149	0	0	
				17	2007-05-23	-	210	-	-	-	<1	-	7	6	2,480	-	-	-	*1*	-	-	-	*1*	-	-	*1*	-	-	-	-	161	-	-	
				18	2007-06-20	-	151	54	2,420	63	<1	-	3	2	980	18	23	-	26	0.3	1.2	-	7	0.4	1.3	6	-	-	-	-	170	-	-	
				19	2007-07-25	-	-	-	-	-	-	-	-	-	-	-	-	-	*1*	-	-	-	*1*	-	-	-	*1*	0.6	*0.1*	*1*	-	-	-	
					Arithmetic mean	6	184	49	81,477	58	-	-	4	2	739	11	33	36	3	0	4	16	2	1	1	3	2	0	0	21	151	0	0	
					Geometric mean	6	181	48	1,915	55	-	-	3	1	234	5	31	36	1	0	3	16	1	0	1	2	1	0	0	6	128	#NUM!	#NUM!	
					Percentille 80	6	210	60	146,168	70	-	-	5	2	1,586	18	40	36	2	1	6	16	2	1	2	4	2	1	1	33	168	0	0	
					Standard deviation	#DIV/0!	33	12	139,022	19	-	-	2	1	891	9	11	#DIV/0!	6	0	6	#DIV/0!	1	0	1	2	1	0	0	28	78	0	0	
					MIN	6	140	31	12	30	-	-	2	1	5	0	23	36	1	0	1	16	1	0	0	1	1	0	0	1	11	0	0	
					MAX	6	270	62	242,000	71	-	-	11	6	2,480	19	48	36	26	1	13	16	7	1	2	7	2	1	1	41	402	0	0	
					n	1	18	7	3	4	-	-	18	18	18	4	4	1	17	4	4	1	17	4	4	16	2	2	2	2	17	7	7	

up dated December 22, 2006

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						Tap water	Influent						Ecoflo effluent						L1				L2				L3				Flow Rate	Ponding (cm)		Flow measurement of the sampling (ml/min)
	Sites	County	Soil type	Sampling	Date	Chloride	BOD_5	TSS	Fecal	TKN	$N\text{-}NO_x$ field test (res. of lab)	Chloride	$CBOD_5$	TSS	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	Fecal	TKN	$N\text{-}NO_x$	Chloride	app. GPD	Central support	Edge of abs. field	
21	Loomis	Mt Jackson	IV	1	2006-09-14	8	124	36	>241 960	67	<1	-	9	2	54,800	3	29	45	1	*0.2*	6	10	*1*	*0.2*	0.4	10	-	-	-	-	-	-	-	**STB-650**
	STB-650			2	2006-10-12	-	95	-	-	-	1	-	8	2	1,790	-	-	-	1	-	-	-	-	-	-	16	-	-	-	-	124	-	-	-
				3	2006-11-09	-	88	120	-	-	1	-	10	2	16,200	-	-	-	1	-	-	-	3	-	-	19	-	-	-	-	43	-	-	-
				4	2006-12-05	-	195	-	-	-	<1	-	10	6	4,610	-	-	-	*1*	-	-	-	*1*	-	-	7	-	-	-	-	79	0	0	-
				5	2007-01-09	-	169	-	-	-	<1	-	13	4	2,610	-	-	-	2	-	-	-	*1*	-	-	14	-	-	-	-	298	0	0	-
				6	2007-02-28	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0	0	-
				7	2007-03-21	-	244	27	29,100	86	-	-	-	-	-	-	-	-	*1*	1	8	-	*1*	0	1	3	-	-	-	-	24	-	-	-
				8	2007-04-19	-	236	36	18,700	84	<1	-	5	3	488	6	35	-	*1*	0	4	-	*1*	0	*0*	*1*	-	-	-	-	32	-	-	-
				9	2007-05-31	-	82	-	-	-	<1	-	5	3	1	-	-	-	*1*	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-
				10	2007-06-27	-	163	27	4,390	84	<1	-	7	4	620	6	35	-	*1*	1	0	-	-	-	-	-	-	-	-	-	31	-	-	-
				11	2007-07-26		141	-	39,900	-	<1	-	6	3	20,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65	-	-	-
					2007-07-26		-	-	30,800	-	idem	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	idem	-	-	-
				12	2007-08-29	-	69	-	-	-	<1	-	120	2	>241 960	-	-	-	*1*	-	-	-	1	-	-	8	-	-	-	-	73	-	-	-
				13	2007-09-25	-	170	31	921	48	<1	-	6	1	*1*	2	29		-	-	-	-	-	-	-	-	-	-	-	-	60	-	-	-
				14	2007-11-08	-	<49.8	-	-	-	2	-	*2*	3	249	-	-	-	*2*	-	-	-	*2*	-	-	6	-	-	-	-	69	-	-	-
				15	2007-11-29	-	114	-	-	-	*1*	-	<175	3	>2419.6	-	-	-	*1*	-	-	-	*1*	-	-	12	-	-	-	-	43	-	-	-
				16	2008-01-09	-	144	14	-	-	1	-	3	1	*1*	-	-	-	*1*	-	-	-	*1*	-	-	9	-	-	-	-	64	-	-	-
				17	2008-01-30	-	177	-	-	-	1	-	*2*	4	3,870	-	-	-	1	-	-	-	*1*	-	-	3	-	-	-	-	28	-	-	-
				18	2008-02-28	-	137	-	-	-		-	8	2	19,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
					Arithmetic mean	8	147	42	20,635	74	-	-	14	3	8,946	5	32	45	1	1	4	10	1	0	1	9	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	66	0	0	
					Geometric mean	8	138	34	11,803	72	-	-	7	2	647	4	32	45	1	0	3	10	1	0	0	7	#NUM!	#NUM!	#NUM!	#NUM!	44	#NUM!	#NUM!	
					Percentille 80	8	177	36	30,800	84	-	-	10	4	17,680	6	35	45	1	1	7	10	1	0	1	14	#NUM!	#NUM!	#NUM!	#NUM!	73	0	0	
					Standard deviation	#DIV/0!	52	35	15,507	16	-	-	29	1	15,171	2	4	#DIV/0!	0	0	3	#DIV/0!	1	0	1	5	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	68	0	0	
					MIN	8	69	14	921	48	-	-	2	1	1	2	29	45	1	0	0	10	1	0	0	1	0	0	0	0	2	0	0	
					MAX	8	244	120	39,900	86	-	-	120	6	54,800	6	35	45	2	1	8	10	3	0	1	19	0	0	0	0	298	0	0	
					n	1	16	7	6	5	-	-	15	16	14	4	4	1	14	4	4	1	12	3	3	12	0	0	0	0	16	3	3	

up dated December 22, 2006

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	Site	Date	Count	Reset	Count	Days	Total flow (L)	Mean daily flow (L/d)	Total flow (US gallon)	Mean daily flow (US gallon/d)
1	Humphrey	29-Oct-2003	0	installed (à confirmer)						
		24-Nov-2003	2,101	yes	2,101	26	14,707	566	3,886	149
		22-Dec-2003	4,473	yes	4,473	28	31,311	1,118	8,272	295
		28-Jan-2004	2,360	yes	2,360	37	16,520	446	4,365	118
		5-Feb-2004	503	no	503	8	3,521	440	930	116
		25-Feb-2004	2,312	yes	1,809	20	12,663	633	3,346	167
		23-Mar-2004	1,654	yes	1,654	27	11,578	429	3,059	113
		27-Apr-2004	3,823	yes	3,823	35	26,761	765	7,070	202
		25-May-2004	1,918	yes	1,918	28	13,426	480	3,547	127
		22-Jun-2004	1,840	yes	1,840	28	12,880	460	3,403	122
		28-Jul-2004	2,888	yes	2,888	36	20,216	562	5,341	148
		24-Aug-2004	9,888	yes	9,888	27	69,216	2,564	18,287	677, malfonction
		28-Sep-2004	not functioning, removed to repair							
		26-Oct-2004	no counter	-	-	-	-	-	-	-
		20-Nov-2004	no counter	-	-	-	-	-	-	-
		28-Dec-2004	no counter	-	-	-	-	-	-	-
		26-Jan-2005	0	installed						
		22-Feb-2005	2,327	yes	2,327	27	16,289	603	4,304	159
	FINAL TEST	22-Mar-2005	2,644	yes	2,644	28	18,508	661	4,890	175
2	Beatly	29-Oct-2003	0	installed						
		25-Nov-2003	2,392	yes	2,392	27	16,744	620	4,424	164
		23-Dec-2003	2,483	yes	2,483	28	17,381	621	4,592	164
		29-Jan-2004	3,642	yes	3,642	37	25,494	689	6,736	182
		1-Mar-2004	2,342	yes	2,342	32	16,394	512	4,331	135
		24-Mar-2004	*563*	to repair	-	-	-	-	-	-
		28-Apr-2004	3,030	yes	2,342	35	16,394	468	4,331	124
		26-May-2004	2,650	yes	2,650	28	18,550	663	4,901	175
		23-Jun-2004	2,974	yes	2,974	28	20,818	744	5,500	196
		29-Jul-2004	2,003	yes	2,003	36	14,021	389	3,704	103
		25-Aug-2004	no counter	-	-	-	-	-	-	-
		29-Sep-2004	no counter	-	-	-	-	-	-	-
		27-Oct-2004	no counter	-	-	-	-	-	-	-
		23-Nov-2004	no counter	-	-	-	-	-	-	-
		28-Dec-2004	no counter	-	-	-	-	-	-	-
		27-Jan-2005	no counter	-	-	-	-	-	-	-
		22-Feb-2005	no counter	-	-	-	-	-	-	-
		24-Mar-2005	no counter	-	-	-	-	-	-	-
	FINAL TEST	28-Apr-2005	no counter	-	-	-	-	-	-	-
3	Pittman	12-Nov-2003	0	installed						
		9-Dec-2003	2,614	yes	2,614	27	18,298	678	4,834	179
		13-Jan-2004	3,148	yes	3,148	35	22,036	630	5,822	166
		10-Feb-2004	2,238	yes	2,238	28	15,666	560	4,139	148
		9-Mar-2004	-	-	-	28	-	-	-	-
		14-Apr-2004	2,990	yes	2,990	36	20,930	581	5,530	154
		11-May-2004	2,146	yes	2,146	27	15,022	556	3,969	147
		8-Jun-2004	1,640	yes	1,640	28	11,480	410	3,033	108
		6-Jul-2004	1,496	yes	1,496	28	10,472	374	2,767	99
		10-Aug-2004	2,138	yes	2,138	35	14,966	428	3,954	113
		14-Sep-2004	0	installed						
		12-Oct-2004	2,019	yes	2,019	28	14,133	505	3,734	133
		11-Nov-2004	2,252	yes	2,252	30	15,764	525	4,165	139
		9-Dec-2004	2,072	yes	2,072	28	14,504	518	3,832	137
		13-Jan-2005	2,673	yes	2,673	35	18,711	535	4,943	141
		10-Feb-2005	2,014	yes	2,014	28	14,098	504	3,725	133
		10-Mar-2005	1,912	yes	1,912	28	13,384	478	3,536	126
	FINAL TEST	12-Apr-2005	2,361	yes	2,361	33	16,527	501	4,366	132

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	Site	Date	Count	Reset	Count	Days	Total flow (L)	Mean daily flow (L/d)	Total flow (US gallon)	Mean daily flow (US gallon/d)
4	Smith	19-Nov-2003	0	installed						
		20-Nov-2003	106	yes	106	1	742	742	196	196
		16-Dec-2003	1,652	yes	1,546	26	10,822	416	2,859	110
		20-Jan-2004	1,517	yes	1,517	35	10,619	303	2,806	80
		19-Feb-2004	1,347	yes	1,347	30	9,429	314	2,491	83
		18-Mar-2004	1,177	yes	1,177	28	8,239	294	2,177	78
		21-Apr-2004	1,610	yes	1,610	34	11,270	331	2,978	88
		20-May-2004	1,458	yes	1,458	29	10,206	352	2,696	93
		17-Jun-2004	1,561	yes	1,561	28	10,927	390	2,887	103
		27-Jul-2004	not functioning		-	-	-	-	-	-
		19-Aug-2004	-	-	-	-	-	-	-	-
		23-Sep-2004	no counter	-	-	-	-	-	-	-
		21-Oct-2004	no counter	-	-	-	-	-	-	-
		17-Nov-2004	no counter	-	-	-	-	-	-	-
		23-Dec-2004	no counter	-	-	-	-	-	-	-
		26-Jan-2005	no counter	-	-	-	-	-	-	-
		17-Feb-2005	no counter	-	-	-	-	-	-	-
		17-Mar-2005	no counter	-	-	-	-	-	-	-
	FINAL TEST	26-Apr-2005	no counter	-	-	-	-	-	-	-
5	Campbell	21-Nov-2003	no counter	-	-	-	-	-	-	-
		17-Dec-2003	no counter	-	-	-	-	-	-	-
		21-Jan-2004	0	installed						
		24-Feb-2004	923	yes	923	34	6,461	190	1,707	50
6	Bethel Parsonage	20-Apr-2004	0	installed						
		19-May-2004	3,177	yes	3,177	29	22,239	767	5,876	203
		16-Jun-2004	2,842	yes	2,842	28	19,894	711	5,256	188
		26-Jul-2004	2,953	yes	2,953	40	20,671	517	5,461	137
		18-Aug-2004	1,699	yes	1,699	23	11,893	517	3,142	137
		22-Sep-2004	2,403	yes	2,403	35	16,821	481	4,444	127
		20-Oct-2004	2,079	yes	2,079	28	14,553	520	3,845	137
		17-Nov-2004	1,762	yes	1,762	28	12,334	441	3,259	116
		22-Dec-2004	2,831	yes	2,831	35	19,817	566	5,236	150
		18-Jan-2005	1,703	yes	1,703	27	11,921	442	3,150	117
		15-Feb-2005	2,031	yes	2,031	28	14,217	508	3,756	134
		16-Mar-2005	4,125	yes	4,125	29	28,875	996	7,629	263
		18-Apr-2005	2,141	yes	2,141	33	14,987	454	3,960	120
		18-May-2005	2,224	yes	2,224	30	15,568	519	4,113	137
		28-Jun-2005	2,662	yes	2,662	41	18,634	454	4,923	120
		26-Jul-2005	no counter	-	-	-	-	-	-	-
		23-Aug-2005	no counter	-	-	-	-	-	-	-
		27-Sep-2005	no counter	-	-	-	-	-	-	-
	FINAL TEST	25-Oct-2005	no counter	-	-	-	-	-	-	-
7	McCarthy / Taylor	12-May-2004	0	installed						
		9-Jun-2004	-	-	-					
		7-Jul-2004	-	-	-					
		11-Aug-2004	-	-	-					
		20-Sep-2004	0	installed						
		18-Oct-2004	1,704	yes	1,704	28	11,928	426	3,151	113
		15-Nov-2004	1,859	yes	1,859	28	13,013	465	3,438	123
		16-Dec-2004	1,948	yes	1,948	31	13,636	440	3,603	116
		17-Jan-2005	2,227	yes	2,227	32	15,589	487	4,119	129
		15-Feb-2005	1,848	yes	1,848	29	12,936	446	3,418	118
		17-Mar-2005	1,962	yes	1,962	30	13,734	458	3,629	121
		11-Apr-2005	1,783	yes	1,783	25	12,481	499	3,297	132
		17-May-2005	2,203	yes	2,203	36	15,421	428	4,074	113
		23-Jun-2005	2,590	removed	2,590	37	18,130	490	4,790	129
		21-Jul-2005	no counter	-	-	-	-	-	-	-
		18-Aug-2005	no counter	-	-	-	-	-	-	-
		22-Sep-2005	no counter	-	-	-	-	-	-	-
		20-Oct-2005	no counter	-	-	-	-	-	-	-

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	Site	Date	Count	Reset	Count	Days	Total flow (L)	Mean daily flow (L/d)	Total flow (US gallon)	Mean daily flow (US gallon/d)
8	Benefiel	27-May-2004	0	installed						
		26-Aug-2004	1,975	yes	1,975	91	13,825	152	3,653	40
		30-Sep-2004	1,094	yes	1,094	35	7,658	219	2,023	58
		28-Oct-2004	1,881	yes	1,881	28	13,167	470	3,479	124
		24-Nov-2004	749	yes	749	27	5,243	194	1,385	51
		30-Dec-2004	2,468	yes	2,468	36	17,276	480	4,564	127
		27-Jan-2005	167	yes	167	28	1,169	42	309	11
		24-Feb-2005	1,621	yes	1,621	28	11,347	405	2,998	107
		24-Mar-2005	2,151	yes	2,151	28	15,057	538	3,978	142
		27-Apr-2005	1,833	yes	1,833	34	12,831	377	3,390	100
		19-May-2005	1,267	yes	1,267	22	8,869	403	2,343	107
		30-Jun-2005	not functioning		-	-	-	-	-	-
		28-Jul-2005	no counter	-	-	-	-	-	-	-
		25-Aug-2005	no counter	-	-	-	-	-	-	-
		4-Oct-2005	no counter	-	-	-	-	-	-	-
		27-Oct-2005	no counter	-	-	-	-	-	-	-
		29-Nov-2005	no counter	-	-	-	-	-	-	-
		27-Dec-2005	0	installed	-	-	-	-	-	-
	FINAL TEST	24-Jan-2006	8	yes	8	28	56	2	15	1
9	Stephens-Ford/ Nuss	10-Jun-2004	0	installed						
		15-Jun-2004	266	yes	266	5	1,862	372	492	98
		22-Jul-2004	2,426	yes	2,426	37	16,982	459	4,487	121
		17-Aug-2004	not functioning		-	-	-	-	-	-
		16-Sep-2004	0	installed						
		13-Oct-2004	no counter	-	-	-	-	-	-	-
		11-Nov-2004	no counter	-	-	-	-	-	-	-
		17-Jan-2005	0	installed						
		10-Feb-2005	1,182	yes	1,182	24	8,274	345	2,186	91
		10-Mar-2005	1,832	yes	1,832	28	12,824	458	3,388	121
		11-Apr-2005	1,998	yes	1,998	32	13,986	437	3,695	115
		17-May-2005	3,888	yes	3,888	36	27,216	756	7,190	200
		23-Jun-2005	1,888	removed	1,888	37	13,216	357	3,492	94
		21-Jul-2005	no counter	-	-	-	-	-	-	-
		18-Aug-2005	no counter	-	-	-	-	-	-	-
		22-Sep-2005	no counter	-	-	-	-	-	-	-
		24-Oct-2005	no counter	-	-	-	-	-	-	-
	FINAL TEST	17-Nov-2005	no counter	-	-	-	-	-	-	-
10	Goodrich	15-Sep-2004	0	installed						
		14-Oct-2004	787	yes	787	29	5,509	190	1,455	50
		10-Nov-2004	793	yes	793	27	5,551	206	1,467	54
		14-Dec-2004	no counter	-	-	-	-	-	-	-
		19-Jan-2005	0	installed						
		9-Feb-2005	1,104	yes	1,104	21	7,728	368	2,042	97
		8-Mar-2005	516	yes	516	27	3,612	134	954	35
		13-Apr-2005	597	yes	597	36	4,179	116	1,104	31
		16-May-2005	591	yes	591	33	4,137	125	1,093	33
		21-Jun-2005	665	yes	665	36	4,655	129	1,230	34
		19-Jul-2005	791	yes	791	28	5,537	198	1,463	52
		16-Aug-2005	772	yes	772	28	5,404	193	1,428	51
		20-Sep-2005	897	yes	897	35	6,279	179	1,659	47
		19-Oct-2005	713	yes	713	29	4,991	172	1,319	45
		15-Nov-2005	682	yes	682	27	4,774	177	1,261	47
		20-Dec-2005	779	yes	779	35	5,453	156	1,441	41
		17-Jan-2006	714	yes	714	28	4,998	179	1,320	47
	FINAL TEST	14-Feb-2006	584	yes	584	28	4,088	146	1,080	39

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	Site	Date	Count	Reset	Count	Days	Total flow (L)	Mean daily flow (L/d)	Total flow (US gallon)	Mean daily flow (US gallon/d)
11	Whittaker	21-Sep-2004	no counter	-	-	-	-	-	-	-
		19-Oct-2004	no counter	-	-	-	-	-	-	-
		16-Nov-2004	no counter	-	-	-	-	-	-	-
		21-Dec-2004	no counter	-	-	-	-	-	-	-
		18-Jan-2005	0	installed						
		16-Feb-2005	1,686	yes	1,686	29	11,802	407	3,118	108
		16-Mar-2005	1,632	yes	1,632	28	11,424	408	3,018	108
		18-Apr-2005	2,088	yes	2,088	33	14,616	443	3,862	117
		19-May-2005	1,864	yes	1,864	31	13,048	421	3,447	111
		28-Jun-2005	2,426	yes	2,426	40	16,982	425	4,487	112
		26-Jul-2005	2,019	yes	2,019	28	14,133	505	3,734	133
		23-Aug-2005	2,175	yes	2,175	28	15,225	544	4,022	144
		27-Sep-2005	no counter	-	-	-	-	-	-	-
		25-Oct-2005	no counter	-	-	-	-	-	-	-
		21-Nov-2005	no counter	-	-	-	-	-	-	-
		22-Dec-2005	no counter	-	-	-	-	-	-	-
		19-Jan-2006	no counter	-	-	-	-	-	-	-
	Vanghan									
12	Pride of VA # A	2-Feb-2005	no counter	-	-	-	-	-	-	-
		23-Feb-2005	no counter	-	-	-	18,471	924	4,880	244
		23-Mar-2005	no counter	-	-	-	-	-	-	-
		27-Apr-2005	no counter	-	-	-	-	-	-	-
		24-May-2005	no counter	-	-	-	-	-	-	-
		29-Jun-2005	no counter	-	-	-	-	-	-	-
		27-Jul-2005	no counter	-	-	-	-	-	-	-
		24-Aug-2005	no counter	-	-	-	-	-	-	-
		5-Oct-2005	no counter	-	-	-	-	-	-	-
		26-Oct-2005	no counter	-	-	-	-	-	-	-
		22-Nov-2005	no counter	-	-	-	-	-	-	-
		28-Dec-2005	0	installed						
		25-Jan-2006	4,050	yes	4,050	28	28,350	1,013	7,490	268
		21-Feb-2006	7,878	yes	7,878	27	55,146	2,042	14,570	540
		30-Mar-2006	8,967	yes	8,967	37	62,769	1,696	16,584	448
		26-Apr-2006	7,976	yes	7,976	27	55,832	2,068	14,751	546
		31-May-2006	15,096	yes	15,096	35	105,672	3,019	27,919	798
	FINAL TEST	20-Jun-2006	7,566	yes	7,566	20	52,962	2,648	13,993	700
13	Pride of VA # B	2-Feb-2005	no counter	-	-	-	-	-	-	-
		23-Feb-2005	no counter	-	-	-	17,411	871	4,600	230
		23-Mar-2005	no counter	-	-	-	-	-	-	-
		27-Apr-2005	no counter	-	-	-	-	-	-	-
		24-May-2005	no counter	-	-	-	-	-	-	-
		29-Jun-2005	no counter	-	-	-	-	-	-	-
		27-Jul-2005	no counter	-	-	-	-	-	-	-
		24-Aug-2005	no counter	-	-	-	-	-	-	-
		5-Oct-2005	no counter	-	-	-	-	-	-	-
		26-Oct-2005	no counter	-	-	-	-	-	-	-
		22-Nov-2005	no counter	-	-	-	-	-	-	-
		28-Dec-2005	0	installed						
		25-Jan-2006	8,098	yes	8,098	28	56,686	2,025	14,976	535
		21-Feb-2006	9,888	yes	9,888	27	69,216	2,564	18,287	677
		30-Mar-2006	8,986	yes	8,986	37	62,902	1,700	16,619	449
		26-Apr-2006	7,987	yes	7,987	27	55,909	2,071	14,771	547
		31-May-2006	14,620	yes	14,620	35	102,340	2,924	27,038	773
	FINAL TEST	20-Jun-2006	7,344	yes	7,344	20	51,408	2,570	13,582	679

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	Site	Date	Count	Reset	Count	Days	Total flow (L)	Mean daily flow (L/d)	Total flow (US gallon)	Mean daily flow (US gallon/d)
14	Nicolato	8-May-2005	0	installed						
		25-May-2005	1,989	yes	1,989	17	13,923	819	3,678	216
		22-Jun-2005	1,361	yes	1,361	28	9,527	340	2,517	90
		20-Jul-2005	3,595	yes	3,595	28	25,165	899	6,649	237
		17-Aug-2005	1,753	yes	1,753	28	12,271	438	3,242	116
		21-Sep-2005	2,224	yes	2,224	35	15,568	445	4,113	118
		18-Oct-2005	1,363	yes	1,363	27	9,541	353	2,521	93
		16-Nov-2005	1,908	yes	1,908	29	13,356	461	3,529	122
		21-Dec-2005	2,363	yes	2,363	35	16,541	473	4,370	125
		18-Jan-2006	2,041	yes	2,041	28	14,287	510	3,775	135
		15-Feb-2006	1,947	yes	1,947	28	13,629	487	3,601	129
		22-Mar-2006	2,255	yes	2,255	35	15,785	451	4,170	119
		20-Apr-2006	1,796	yes	1,796	29	12,572	434	3,322	115
		17-May-2006	1,816	yes	1,816	27	12,712	471	3,359	124
		21-Jun-2006	2,827	yes	2,827	35	19,789	565	5,228	149
		1-Aug-2006	2,951	yes	2,951	41	20,657	504	5,458	133
		23-Aug-2006	1,556	yes	1,556	22	10,892	495	2,878	131
		26-Sep-2006	2,422	yes	2,422	34	16,954	499	4,479	132
	FINAL TEST	25-Oct-2006	1,831	yes	1,831	29	12,817	442	3,386	117
15	Stevens-Jeff	8-Jun-2005	no counter	-	-	-	-	-	-	-
		12-Jul-2005	0	installed	-	-	-	-	-	-
		13-Jul-2005	95	yes	95	1	665	665	176	176
		10-Aug-2005	3,602	yes	3,602	28	25,214	901	6,662	238
		14-Sep-2005	not functioning							
		9-Nov-2005	no counter	-	-	-	-	-	-	-
		14-Dec-2005	no counter	-	-	-	-	-	-	-
		10-Jan-2006	no counter	-	-	-	-	-	-	-
		07-09-Feb-2006	0	installed						
		8-Mar-2006	2,505	yes	2,505	29	17,535	605	4,633	160
		11-Apr-2006	no counter	-	-	-	-	-	-	-
		10-May-2006	2,681	yes	2,681	29	18,767	647	4,958	171
		13-Jun-2006	3,426	yes	3,426	30	23,982	799	6,336	211
		19-Jul-2006	4,260	yes	4,260	31	29,820	962	7,878	254
		29-Aug-2006	3,206	yes	3,206	32	22,442	701	5,929	185
		20-Sep-2006	4,879	yes	4,879	33	34,153	1,035	9,023	273
		19-Oct-2006	5,790	yes	5,790	34	40,530	1,192	10,708	315
	FINAL TEST	15-Nov-2006	8,232	yes	8,232	35	57,624	1,646	15,224	435
16	Hale	9-Jun-2005	no counter	-	-	-	-	-	-	-
		13-Jul-2005	0	installed	-	-	-	-	-	-
		10-Aug-2005	2,988	yes	2,988	28	20,916	747	5,526	197
		14-Sep-2005	1,173	yes	1,173	35	8,211	235	2,169	62
		12-Oct-2005	not functioning							
		9-Nov-2005	no counter	-	-	-	-	-	-	-
		14-Dec-2005	no counter	-	-	-	-	-	-	-
		10-Jan-2006	no counter	-	-	-	-	-	-	-
		07-08-Feb-2006	0	installed						
		8-Mar-2006	1,245	yes	1,245	29	8,715	301	2,303	79
		11-Apr-2006	no counter	-	-	-	-	-	-	-
		10-May-2006	2,080	yes	2,080	29	14,560	502	3,847	133
		13-Jun-2006	2,988	yes	2,988	30	20,916	697	5,526	184
		19-Jul-2006	no working	-	-	-	-	-	-	-
		29-Aug-2006	1,178	yes	1,178	30	8,246	275	2,179	73
		20-Sep-2006	1,787	yes	1,787	31	12,509	404	3,305	107
		19-Oct-2006	1,279	yes	1,279	32	8,953	280	2,365	74
	FINAL TEST	15-Nov-2006	1,120	yes	1,120	33	7,840	238	2,071	63

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	Site	Date	Count	Reset	Count	Days	Total flow (L)	Mean daily flow (L/d)	Total flow (US gallon)	Mean daily flow (US gallon/d)
17	Reed	14-Jun-2005	no counter	-	-	-	-	-	-	-
		14-Jul-2005	no counter	-	-	-	-	-	-	-
		11-Aug-2005	no counter	-	-	-	-	-	-	-
		15-Sep-2005	0	installed	-	-	-	-	-	-
		13-Oct-2005	5,545	yes	5,545	28	38,815	1,386	10,255	366
		10-Nov-2005	2,090	yes	2,090	28	14,630	523	3,865	138
		15-Dec-2005	2,530	yes	2,530	35	17,710	506	4,679	134
		12-Jan-2006	2,055	yes	2,055	28	14,385	514	3,801	136
		9-Feb-2006	1,689	yes	1,689	28	11,823	422	3,124	112
		9-Mar-2006	1,566	yes	1,566	28	10,962	392	2,896	103
		13-Apr-2006	-	-	-	-	-	-	-	-
		11-May-2006	3,096	yes	3,096	28	21,672	774	5,726	204
		15-Jun-2006	3,317	yes	3,317	35	23,219	663	6,134	175
		20-Jul-2006	3,171	yes	3,171	35	22,197	634	5,864	168
		31-Aug-2006	2,530	yes	2,530	42	17,710	422	4,679	111
		21-Sep-2006	2,207	yes	2,207	21	15,449	736	4,082	194
		18-Oct-2006	2,030	yes	2,030	27	14,210	526	3,754	139
	FINAL TEST	16-Nov-2006	1,759	yes	1,759	29	12,313	425	3,253	112
18	Palmer	2-Jun-2005	0	installed						
	Chincoteague	7-Jun-2005	206	yes	206	5	1,442	288	381	76
		12-Jul-2005	1,914	yes	1,914	35	13,398	383	3,540	101
		9-Aug-2005	2,964	yes	2,964	28	20,748	741	5,482	196
		13-Sep-2005	3,411	yes	3,411	35	23,877	682	6,308	180
		11-Oct-2005	no working	-	-	-	-	-	-	-
		8-Nov-2005	1,699	yes	1,699	28	11,893	425	3,142	112
		13-Dec-2005	2,095	yes	2,095	35	14,665	419	3,875	111
		11-Jan-2006	1,905	yes	1,905	29	13,335	460	3,523	121
		8-Feb-2006	1,459	yes	1,459	28	10,213	365	2,698	96
		7-Mar-2006	no working	-	-	-	-	-	-	-
		12-Apr-2006	no counter	-	-	-	-	-	-	-
		10-May-2006	1,947	yes	1,947	28	13,629	487	3,601	129
		14-Jun-2006	3,111	yes	3,111	35	21,777	622	5,754	164
		19-Jul-2006	2,610	yes	2,610	35	18,270	522	4,827	138
		31-Aug-2006	2,649	yes	2,649	43	18,543	431	4,899	114
		19-Sep-2006	2,949	yes	2,949	19	20,643	1,086	5,454	287
		17-Oct-2006	2,699	yes	2,699	28	18,893	675	4,992	178
	FINAL TEST	14-Nov-2006	2,406	yes	2,406	28	16,842	602	4,450	159
19	Thompson	2-Nov-2005	no counter	-	-	-	-	-	-	-
	STB-650	30-Nov-2005	no counter	-	-	-	-	-	-	-
		29-Dec-2005	no counter	-	-	-	-	-	-	-
		26-Jan-2006	0	installed	-	-	-	-	-	-
		22-Feb-2006	1,006	yes	1,006	27	7,042	261	1,861	69
		23-Mar-2006	no working	-	-	-	-	-	-	-
		19-Apr-2006	0	installed						
		18-May-2006	1,739	yes	1,739	29	12,173	420	3,216	111
		22-Jun-2006	No reading	-	-	-	-	-	-	-
		31-Jul-2006	2,130	yes	2,130	39	14,910	382	3,939	101
		22-Aug-2006	1,937	yes	1,937	22	13,559	616	3,582	163
		27-Sep-2006	844	yes	844	36	5,908	164	1,561	43
		24-Oct-2006	no working	installed	-	-	-	-	-	-
		20-Nov-2006	715	yes	715	27	5,005	185	1,322	49
		11-Dec-2006	783	yes	783	21	5,481	261	1,448	69
		25-Jan-2007	1,243	yes	1,243	45	8,701	193	2,299	51
		13-Feb-2007	391	yes	391	19	2,737	144	723	38
		22-Mar-2007	888	yes	888	37	6,216	168	1,642	44

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	Site	Date	Count	Reset	Count	Days	Total flow (L)	Mean daily flow (L/d)	Total flow (US gallon)	Mean daily flow (US gallon/d)
20	Garcia	31-Jan-2006	-	-	-	-	-	-	-	-
	Madison	23-Feb-2006	-	-	-	23	10,917	475	2,884	125
	STB-650	29-Mar-2006	-	-	-	34	16,637	489	4,396	129
		25-Apr-2006	-	-	-	27	5,791	214	1,530	57
		25-May-2006	-	-	-	30	1,245	41	329	11
		22-Jun-2006	-	-	-	28	13,577	485	3,587	128
		2-Aug-2006	-	-	-	41	19,355	472	5,114	125
		24-Aug-2006	0	installed	-	22	11,249	511	2,972	135
		28-Sep-2006	2,618	yes	2,618	35	18,326	524	4,842	138
		26-Oct-2006	2,454	yes	2,454	28	17,178	614	4,538	162
		21-Nov-2006	2,549	yes	2,549	26	17,843	686	4,714	181
		12-Dec-2006	4,568	yes	4,568	21	31,976	1,523	8,448	402
		24-Jan-2007	3,970	yes	3,970	43	27,790	646	7,342	171
		20-Feb-2007	2,358	yes	2,358	27	16,506	611	4,361	162
		20-Mar-2007	2,356	yes	2,356	28	16,492	589	4,357	156
		18-Apr-2007	2,336	yes	2,336	29	16,352	564	4,320	149
		23-May-2007	3,039	yes	3,039	35	21,273	608	5,620	161
		20-Jun-2007	2,580	Removed	2,580	28	18,060	645	4,771	170
		25-Jul-2007	-	-	-	-	-	-	-	-
21	Loomis	14-Sep-2006	0	installed						
	Mt Jackson	12-Oct-2006	1,871	yes	1,871	28	13,097	468	3,460	124
	STB-650	9-Nov-2006	649	yes	649	28	4,543	162	1,200	43
		5-Dec-2006	1,108	yes	1,108	26	7,756	298	2,049	79
		9-Jan-2007	5,632	yes	5,632	35	39,424	1,126	10,416	298
		28-Feb-2007	71	yes	71	85	497	6	131	2
		21-Mar-2007	906	yes	906	71	6,342	89	1,676	24
		19-Apr-2007	860	yes	860	50	6,020	120	1,590	32
		31-May-2007	969	yes	969	71	6,783	96	1,792	25
		27-Jun-2007	1,144	yes	1,144	69	8,008	116	2,116	31
		26-Jul-2007	1,978	yes	1,978	56	13,846	247	3,658	65
		29-Aug-2007	2,495	yes	2,495	63	17,465	277	4,614	73
		25-Sep-2007	1,968	yes	1,968	61	13,776	226	3,640	60
		8-Nov-2007	2,646	yes	2,646	71	18,522	261	4,894	69
		29-Nov-2007	1,499	yes	1,499	65	10,493	161	2,772	43
		9-Jan-2008	2,145	yes	2,145	62	15,015	242	3,967	64
		30-Jan-2008	936	yes	936	62	6,552	106	1,731	28
		28-Feb-2008	1,648	yes	1,648	50	11,536	231	3,048	61
	FINAL TEST	27-Mar-2008	1,253	yes	1,253	57	8,771	154	2,317	41

Appendix VII

Statistical analysis

			RAW DATA				CLEAN DATA*		LOG-TRANSFORMED DATA		TEST UNIT AVERAGES	
			Influent		Effluent		Effluent		Effluent		Effluent	
Test Site No.	Test Site Name	Sample Date	BOD_5 (mg/L)	TSS (mg/L)	BOD_5 (mg/L)	TSS (mg/L)	BOD_5 (mg/L)	TSS (mg/L)	BOD_5 (mg/L)	TSS (mg/L)	BOD_5 (mg/L)	TSS (mg/L)
1	Humphrey	12-22-03	83	8	3	5	3	5	1.099	1.609		
		3-23-04	393	19	13	5	13	5	2.565	1.609		
		6-22-04	157	19	10	5	10	5	2.303	1.609		
		9-28-04	116	16	10	4	10	4	2.303	1.386	2.067	1.554
2	Beatley	7-29-04	225	36	8	1	8	1	2.079	0.000		
		10-27-04	141	20	9	32	9	32	2.197	3.466		
		1-27-05	289	39	11	7	11	7	2.398	1.946		
		4-28-05	278	30	10	4	10	4	2.303	1.386	2.244	1.699
3	Pitmann	4-14-04	244	14	4	5	4	5	1.386	1.609		
		7-6-04	275	23	11	3	11	3	2.398	1.099		
		10-12-04	343	14	12	2	12	2	2.485	0.693		
		1-13-05	218	12	7	3	7	3	1.946	1.099	2.054	1.125
4	Smith E.	1-20-04	465	30	7	4	7	4	1.946	1.386		
		4-21-04	444	65	12	2	12	2	2.485	0.693		
		7-27-04	351	65	8	5	8	5	2.079	1.609		
		10-21-04	421	101	11	10	11	10	2.398	2.303	2.227	1.498
5	Bethel	6-16-04	208	29	9	9	9	9	2.197	2.197		
		9-22-04	169	35	7	2	7	2	1.946	0.693		
		12-22-04	98	24	9	2	9	2	2.197	0.693		
		3-16-05	111	26	6	5	6	5	1.792	1.609	2.033	1.298
6	McCarthy/Taylor	10-18-04	42	7	5	1	5	1	1.609	0.000		
		1-17-05	39	15	4	2	4	2	1.386	0.693		
		4-11-05	36	20	<5	4	2.5	4	0.916	1.386		
		8-18-05	36	13	<2	<1	1	0.5	0.000	-0.693	0.978	0.347
7	Benefiel	10-28-04	125	12	5	2	5	2	1.609	0.693		
		1-27-05	86	11	11	11	11	11	2.398	2.398		
		4-27-05	138	6	13	12	13	12	2.565	2.485		
		7-28-05	160	11	14	14	14	14	2.639	2.639	2.303	2.054
8	Stephens/Ford	6-15-04	302	14	7	3	7	3	1.946	1.099		
		11-11-04	329	23	5	1	5	1	1.609	0.000		
		2-10-05	289	16	8	6	8	6	2.079	1.792		
	Note (1)	8-18-05	200	44	6	2	6	2	1.792	0.693	1.857	0.896
9	Goodrich	11-10-04	25	4	4	<1	4	0.5	1.386	-0.693		
		2-9-05	20	6	6	3	6	3	1.792	1.099		
		5-16-05	32	30	<2	9	1	9	0.000	2.197		
		8-16-05	17	8	3	3	3	3	1.099	1.099	1.069	0.925
10	Whittaker	11-16-04	129	33	<2	4	1	4	0.000	1.386		
		2-16-05	200	35	12	6	12	6	2.485	1.792		
		5-19-05	200	56	15	14	15	14	2.708	2.639		
		8-23-05	200	49	20	9	20	9	2.996	2.197	2.047	2.004
11	Pride of VA #A	6-29-05	92	21	5	29	5	29	1.609	3.367		
		10-5-05	59	10	2	4	2	4	0.693	1.386		
		3-30-06	196	49	3	9	3	9	1.099	2.197		
		6-20-06	127	24	3	5	3	5	1.099	1.609	1.125	2.140
12	Pride of VA #B	6-29-05	86	26	13	7	13	7	2.565	1.946		
		10-5-05	53	10	2	4	2	4	0.693	1.386		
		3-30-06	197	25	4	6	4	6	1.386	1.792		
		6-20-06	102	20	3	2	3	2	1.099	0.693	1.436	1.454
13	Nicolato	7-20-05	140	17	5	1	5	1	1.609	0.000		
		10-18-05	160	16	3	1	3	1	1.099	0.000		
		1-18-06	230	22	24	5	24	5	3.178	1.609		
		4-20-06	178	20	2	4	2	4	0.693	1.386	1.645	0.749
14	Stevens-Jeff	7-13-05	180	47	11	8	11	8	2.398	2.079		
		11-9-05	210	29	<2	8	1	8	0.000	2.079		
		2-7-06	210	37	23	19	23	19	3.135	2.944		
		5-10-06	56	59	<2	3	1	3	0.000	1.099	1.383	2.050
15	Hale	8-10-05	190	43	2	2	2	2	0.693	0.693		
		11-9-05	80	28	<2	3	1	3	0.000	1.099		
		2-7-06	160	46	3	<1	3	0.5	1.099	-0.693		
		5-10-06	178	85	3	3	3	3	1.099	1.099	0.723	0.549
16	Reed	11-10-05	140	19	<2	5	1	5	0.000	1.609		
		2-9-06	210	44	4	3	4	3	1.386	1.099		
		5-11-06	130	89	21	56	21	56	3.045	4.025		
		8-31-06	83	40	6	<1	6	0.5	1.792	-0.693	1.556	1.510
17	Palmer	2-8-06	200	39	22	11	22	11	3.091	2.398		
		5-10-06	189	83	7	9	7	9	1.946	2.197		
		8-31-06	68	80	6	3	6	3	1.792	1.099		
		11-14-06	34	37	<2	1	1	1	0.000	0.000	1.707	1.423
18	Thompson	6-22-06	388	54	<2	<1	1	0.5	0.000	-0.693		
		9-27-06	251	35	<2	<1	1	0.5	0.000	-0.693		
		11-20-06	303	120	<2	7	1	7	0.000	1.946		
		3-22-07	257	50	2	2	2	2	0.693	0.693	0.173	0.313
19	Garcia	3-29-06	163	61	3	1	3	1	1.099	0.000		
		6-22-06	270	62	4	<1	4	0.5	1.386	-0.693		
		9-28-06	206	43	5	<1	5	0.5	1.609	-0.693		
		12-12-06	184	56	2	<1	2	0.5	0.693	-0.693	1.197	-0.520
20	Loomis	11-9-06	88	120	10	2	10	2	2.303	0.693		
		4-19-07	236	36	5	3	5	3	1.609	1.099		

	9-25-07	170	31	6	1	6	1	1.792	0.000		
Note (2)	1-9-08	144	14	3	1	3	1	1.099	0.000	1.701	0.448

Note (1) In lieu of May 17th sample that presented a low influent concentration
Note (2) Quarter are not precisely respected because only dataset presenting complete values for BOD5 an

* If any cell in CLEAN DATA column displays "#VALUE!", datum corresponding to that cell must be "cleaned" and manually entered into CLEAN DATA column cell. Datum reported as "<QL" is entered as value of QL/2. E.g., datum reported as "<1" is entered as 0.5 and datum reported as "<5" is entered as 2.5

	BOD_5	TSS
Count (N) =	20	20
Degrees of Freedom (N-1) =	19	19
Mean =	1.58	1.18
Std Dev =	0.57	0.71
Std Err =	0.13	0.16
Upper 99% T (1-tailed) =	2.54	2.54
Upper 99% T Conf Int =	1.90	1.58
Upper 99% T Conf Int =	6.7	4.8

Native Values
Log-Transformed Values

Appendix VIII

Technical data sheets

Ecoflo® Biofilter - Fiberglass

Technical data sheet

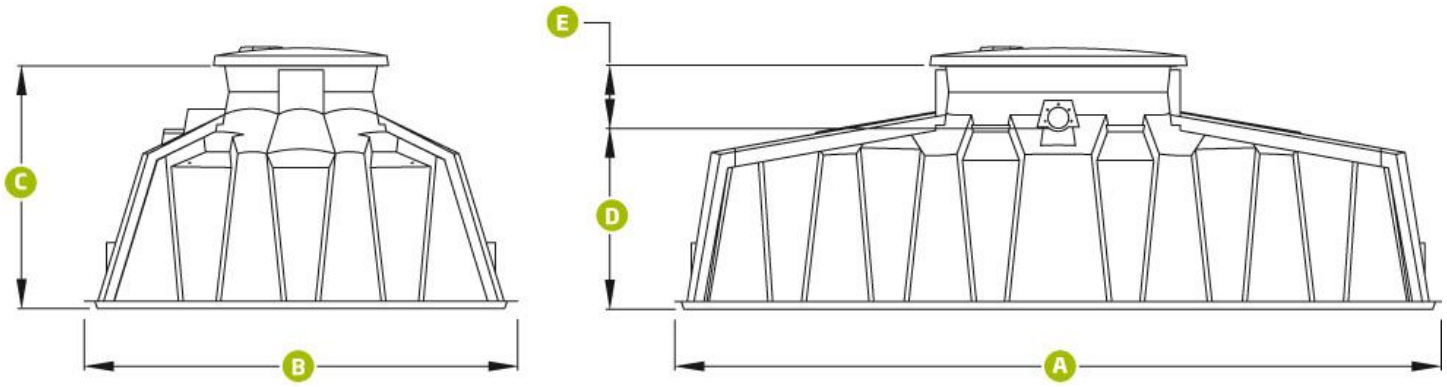
*This is the technical data sheet of the **Fiberglass Ecoflo® Biofilter.** If you have any questions or comments please contact the customer service at **1 800 632-6356.***

Material used

- **Shell:** fiberglass and polyester resin composite;
- **Lid, central support, tipping bucket, distribution plates and sampling device:** plastic;
- **Filtering media:** natural fibers.

Models	ST-500	ST-650	ST-750
Type of disposal	infiltration	infiltration	infiltration
Type of bottom	open	open	open
Length (A)	3 345 mm (11')	4 175 mm (13' 8")	4 675 mm (15' 4")
Width (B)	2 361 mm (7' 9")	2 361 mm (7' 9")	2 361 mm (7' 9")
Height (C)	1 320 mm (4' 4")	1 320 mm (4' 4")	1 320 mm (4' 4")
Inlet height (D)	970 mm (3' 2")	970 mm (3' 2")	970 mm (3' 2")
Inlet height (E)	350 mm (1' 2")	350 mm (1' 2")	350 mm (1' 2")
Outlet height (F)	---	---	---
Weight*	105 kg (230 lb)	125 kg (275 lb)	145 kg (320 lb)

* Weights indicated are approximate and not binding (for handling and lifting purposes only).



Ecoflo® Biofilter - Concrete

Technical data sheet

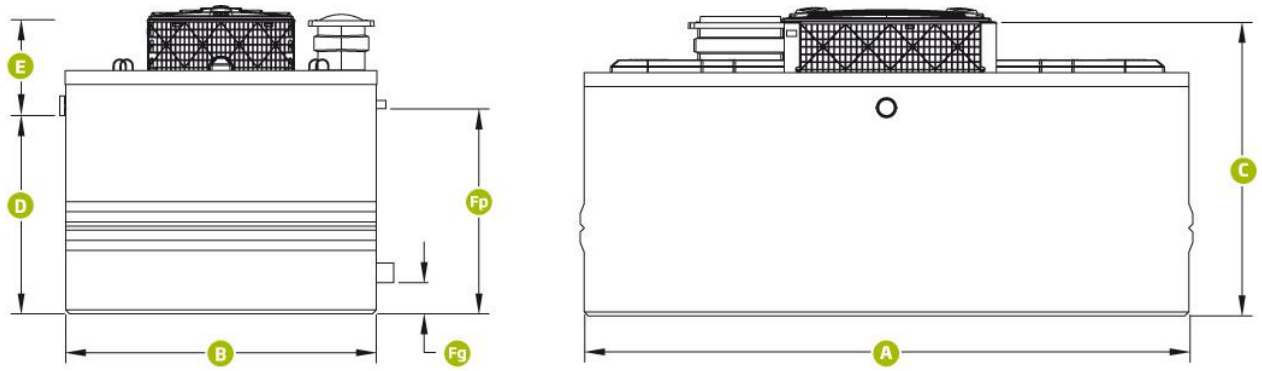
*This is the technical data sheet of the **Concrete Ecoflo® Biofilter.** If you have any questions or comments please contact the customer service at **1 800 632-6356.***

Material used

- **Shell:** reinforced concrete 35 MPa (5000 PSI);
- **Lid, central support, tipping bucket, distribution plates and sampling device:** plastic;
- **Filtering media:** natural fibers.

Models	STB-650B-H1	STB-650BR-H1	STB-650B-H2	STB-650BR-H2	STB-650B-H2+3	STB-650BR-H2+3	STB-650B-H3	STB-650BR-H3
Type of disposal	gravity	pumped	gravity	pumped	gravity	pumped	gravity	pumped
Type of bottom	watertight	watertight	watertight	watertight	watertight	watertight	watertight	watertight
Length (A)	3 835 mm (12' 7")		3 835 mm (12' 7")		3 837 mm (12' 7")		3 860 mm (12' 8")	
Width (B)	2 075 mm (6' 10")		2 075 mm (6' 10")		2 075 mm (6' 10")		2 100 mm (6' 11")	
Height (C)	1 850 mm (6' 1")		2 035 mm (6' 8")		2 107 mm (6' 11")		2 330 mm (7' 8")	
Inlet height (D)	1 245 mm (4' 1")		1 425 mm (4' 8")		1 510 mm (4' 11")		1 725 mm (5' 8")	
Inlet height (E)	600 mm (2')		600 mm (2')		600 mm (2')		600 mm (2')	
Outlet height (Fg and Fp)	150 mm (6")	1 335 mm (4' 5")	150 mm (6")	1 493 mm (4' 11")	150 mm (6")	1 510 mm (4' 11")	150 mm (6")	1 790 mm (5' 10")
Weight* (tank only)	5 220 kg (11 500 lb)	5 230 kg (11 520 lb)	6 125 kg (13 500 lb)	6 135 kg (13 520 lb)	6 486 kg (14 300 lb)	6 496 kg (14 320 lb)	7 260 kg (16 000 lb)	7 270 kg (16 020 lb)
Weight* (tank and slab)	7 575 kg (16 700 lb)	7 585 kg (16 720 lb)	8 485 kg (18 700 lb)	8 495 kg (18 720 lb)	8 845 kg (19 500 lb)	8 855 kg (19 520 lb)	9 620 kg (21 200 lb)	9 630 kg (21 220 lb)
Dosing volume	---	120 L (30 US gal)	---	up to 830 L (220 US gal)	---	120 L (30 US gal) to 550 L (145 US gal)	---	up to 945 L (250 US gal)
Retention volume (between tank's bottom and under filtering media)	---	600 L (160 US gal)	---	1 645 L (435 US gal)	---	1 980 L (523 US gal)	---	3 405 L (900 US gal)

* Weights may vary according to mold configuration, they are approximate and not binding (for handling and lifting purposes only).



Ecoflo® Biofilter - Polyethylene

Technical data sheet

*This is the technical data sheet of the **Polyethylene Ecoflo® Biofilter.** If you have any questions or comments please contact the customer service at **1 800 632-6356.***

Material used

- **Shell:** polyethylene;
- **Lid, central support, tipping bucket, distribution plates and sampling device:** plastic;
- **Filtering media:** natural fibers.

Models	ST-570P	STB-570P	STB-570PR	ST-650P	STB-650P	STB-650PR	ST-730P	STB-730P	STB-730PR
Type of disposal	infiltration	gravity	pumped	infiltration	gravity	pumped	infiltration	gravity	pumped
Type of bottom	perforated	watertight	watertight	perforated	watertight	watertight	perforated	watertight	watertight
Length (A)	3 380 mm (11' 1")			3 860 mm (12' 8")			4 140 mm (13' 7")		
Width (B)	2 000 mm (6' 7")			2 050 mm (6' 9")			2 050 mm (6' 9")		
Height (C)	1 850 mm (6' 1")			1 850 mm (6' 1")			1 850 mm (6' 1")		
Inlet height (D)	1 260 mm (4' 2")			1 260 mm (4' 2")			1 260 mm (4' 2")		
Inlet height (E)	580 mm (1' 11")			580 mm (1' 11")			580 mm (1' 11")		
Outlet height (Fg and Fp)	---	38 mm (1½")	1 240 mm (4' 1")	---	38 mm (1½")	1 240 mm (4' 1")	---	38 mm (1½")	1 240 mm (4' 1")
Weight* (including internal components and dry filtering media)	1 120 kg (2 460 lb)	1 190 kg (2 620 lb)	1 200 kg (2 640 lb)	1 250 kg (2 760 lb)	1 300 kg (2 870 lb)	1 310 kg (2 890 lb)	1 355 kg (2 990 lb)	1 405 kg (3 100 lb)	1 415 kg (3 120 lb)
Dosing volume	---	---	145 L (38 US gal)	---	---	100 L (26 US gal)	---	---	110 L (29 US gal)
Retention volume (between tank's bottom and under filtering media)	---	---	500 L (130 US gal)	---	---	660 L (175 US gal)	---	---	715 L (190 US gal)

* Weights indicated are approximate and not binding (for handling and lifting purposes only).