
APPENDIX D: SANITARY SURVEY OF CROOKED CREEK AND SMITH HOLLOW CREEK

Sanitary Survey of Crooked Creek and Smith Hollow Creek

Task 4, Integrated Water Resources Management Plan Town of Colchester, Vermont

*Prepared for Aldrich + Elliott, PC by Bruce F. Douglas, PE, Brent Toth, and Katie Budreski
Project ID: 051694-G*

December 20, 2011

1 Overview and Findings

Findings from a sanitary survey of Crooked Creek and Smith Hollow Creek in the Vermont town of Colchester, completed by Stone Environmental, Inc., are summarized and presented in this document. The survey was conducted to supplement the results of the Microbial Source Tracking (MST) Task of the Town of Colchester's Integrated Water Resources Management Plan. Both streams are included in the State of Vermont's list of impaired water bodies, as noted in the draft Statewide Total Maximum Daily Load (TMDL) for Bacteria (Vermont Department of Environmental Conservation, 2011).

1.1 Overview

In 2009 and 2010, 29 water quality samples were collected in the Smith Hollow Creek watershed; of these samples, 22 exceeded the water quality standard (WQS) for *E. coli*. The predominant identified sources of *E. coli* were wild birds, followed closely in abundance by wild animals; human-associated strains of *E. coli* were detected in four of the samples. During the same period, 22 water quality samples were collected in the Crooked Creek watershed; of these samples, 19 exceeded the WQS for *E. coli*. Similarly to Smith Hollow Creek, the predominant identified sources of *E. coli* were wild birds, followed closely in abundance by wild animals; human-associated strains of *E. coli* were detected in one of the samples.

The objective of the sanitary survey was to look for potential sources of human bacterial contamination contributing to the documented impairment in Crooked Creek and Smith Hollow Creek. Over three field days, the streambanks and tributaries were observed and water samples were collected at selected locations (Figure 1, attached) for *E. coli* analysis. The field work was completed during dry weather periods in November 2011 while leaves were off the trees and before snow cover. The project had three tasks:

1. Base Map Preparation
2. Field Work

- a. Stream Bank Reconnaissance
 - b. Water Sampling and Analysis
 - c. GPS and GIS Spatial Analysis
3. Data Analysis and Reporting

1.2

Findings

- No clear signs of contamination of the stream from septic systems were noted during the streambank reconnaissance.
- More subtle potential sources of bacterial contamination were noted: disposal of solid waste along creek and over banks, seeps in locations that appeared to be potentially downgradient of leachfield areas, and areas of streambank erosion.
- There was only one exceedance of Vermont's water quality standard for *E. coli* (77 MPN/100 ml) among samples collected at 14 locations along Smith Hollow Creek.
- None of the samples collected at 17 locations along Crooked Creek had *E. coli* concentrations above the water quality standard.
- Bacteria results indicate relatively good water quality with one exception on the two sampling days. Reviewing this data in conjunction with previous fecal indicator bacteria and MST ribotyping reveals:
 - Smith Hollow Creek has a potential area of concern near where it flows under Williams Road.
 - Crooked Creek water quality is highly variable with apparent upstream human sources of fecal indicator bacteria (*E. coli*).

2

Survey Preparation

Color orthophoto base maps were prepared for each watershed with hydrography, roads, property lines, ground surface contours, and existing infrastructure. These maps were used in the field to confirm locations along the stream and to identify potential source areas that were out of sight from the stream channel. A project-specific health and safety plan was completed prior to commencing field work.

3

Field Work

The field work included streambank reconnaissance and collection of water samples for *E. coli* analysis.

3.1

Streambank Reconnaissance

Beginning at the creeks' outlets to Lake Champlain, the field work team followed Crooked Creek and Smith Hollow Creek (and their major tributaries) upstream looking for potential sources of human bacterial contamination, such as pipes discharging to surface water, solid waste disposal areas, campsites, seeps near developed properties, etc. Routes traveled and locations of interest were noted with GPS units (Figures 1 & 2, attached) and potential sources of human bacterial contamination were identified. Priority was given to the lower

reaches of the main stem of each creek, and to reaches of each creek and its tributaries that pass close to developed areas and roads.

3.2

Water Sampling

Based on the findings of the streambank reconnaissance, locations were identified for collecting water samples to be analyzed for *E. coli*. Locations were selected to bracket potential sources of contamination—such as subdivisions with septic systems or large leachfields—with upstream and downstream sampling locations.

Sampling was conducted according to Stone Environmental’s standard operating procedures. Samples were collected in sterile, 100-mL plastic bottles, preserved with sodium thiosulfate, transferred to a cooler with ice, and delivered to Endyne Labs in Williston within six hours of collection. *E. coli* quantitation was by method SM9223B (Colilert Quanti-Tray).

4

Results

Field work was conducted on the following days:

- November 7, 2011 – streambank reconnaissance
- November 10, 2011 – Smith Hollow Creek bacteria sampling
- November 14, 2011 – Crooked Creek bacteria sampling

4.1

Streambank Reconnaissance

Figures 1 and 2 summarize the field reconnaissance effort, showing locations of interest, points of potential concern, seeps, reaches walked, windshield survey locations, and notes describing observations at particular locations.

4.1.1

Crooked Creek

The following is a summary of the streambank reconnaissance observations for Crooked Creek, as illustrated in Figure 1:

- One location with trash on steep bank (see #3).
- One location with metal drums on the streambank of a tributary stream (see #5).
- Three pipe outlets: one that appears to be a foundation drain (see #8), one that appears to be a gutter drain (#13), and, one that has no clear apparent source (see #11).

4.1.2

Smith Hollow Creek

The following are the highlights of the streambank reconnaissance observations for Smith Hollow Creek, as illustrated in Figure 2:

- Four locations of severe streambank erosion (see #18, #35, #36, #39).

- Three locations of buried cars, automobile parts, or metal and trash along the creek (see #17, #34, #40).
- A seep area, noted by three adjacent seeps, that appears to be downgradient of a cluster leachfield serving a portion of the Everbreeze Drive subdivision (see #25, #26, #29).
- One pipe outlet that appears to be a foundation drain (see #20).

4.2

Bacteria Sampling

Sampling dates were selected to represent dry weather conditions. Sampling was scheduled to be at least 48 hours after a measurable precipitation event. Laboratory results are summarized in Tables 1 and 2 (attached), and chain of custody and laboratory analysis documentation is attached.

4.2.1

Crooked Creek

Sampling of 17 locations along Crooked Creek and its tributaries was completed on November 14, 2011 (Table 1, Figure 1). All of the results were below the state's water quality standard of 77 organisms per 100 mL for *E. coli*. In fact, all *E. coli* concentrations in these samples were less than 30 MPN/100 mL.

These low results contrast with previous sampling upstream of the outlet of the creek in August and October of 2010 (Aldrich + Elliott, 2011). Five samples were collected during those months at WQ-05, WQ-45, WQ-06, WQ-07, and WQ-08 (Figure 1). Among these five samples, there were three exceedances of the state water quality standard, at WQ-05, WQ-06, and WQ-07. MST analyses of these samples revealed human, wild bird, and wild animal sources at all three locations, along with a domestic animal (dog) source at WQ-07. The sharp contrast reveals the variability in fecal indicator bacteria concentrations over time. No obvious potential sources of human bacterial contamination were observed during the sanitary survey of Crooked Creek.

4.2.2

Smith Hollow Creek

Sampling of 14 locations along Smith Hollow Creek and its tributaries was completed on November 10, 2011. Of the 14 analyses, only one location had an exceedance of the *E. coli* water quality standard. The exceedance was at SHC-05, located downstream of Williams Road. The *E. coli* concentration at this location was 210 MPN/100 mL. The *E. coli* concentration at the sampling point immediately upstream of Williams Road was 9 MPN/100 mL. There is no apparent evidence between these locations as to whether the exceedances at SHC-05 was attributable to wildlife, pets/domestic animals, or a human source; therefore, further interpretation of this result is not possible.

Upstream samples along Smith Hollow Creek collected during field work for the MST task in September and October 2010 revealed two exceedances out of six samples (Aldrich + Elliott, 2011).

One of these previous exceedances was located immediately upstream from Williams Road, at location WQ-22 (Figure 2). The *E. coli* concentration for this sample was 84 MPN/100 ml, and was not analyzed (ribotyped) for source species. The other upstream exceedance in 2010 was WQ-25, immediately downstream of Blakely Road (Figure 2). The WQ-25 sample was ribotyped and revealed three identified sources: goose, deer, and sheep.

Although no definitive conclusions can be drawn from these limited data, there is a possibility that the exceedences at WQ-22 and SHC-05 may be related to the seeps on the left bank of Smith Hollow Creek upstream of WQ-22, which appear to be downgradient of the cluster leachfield serving the Everbreeze Drive subdivision.

5

References

- State of Vermont Department of Environmental Conservation's Vermont Statewide Total Maximum Daily Load (TMDL) for Bacteria-Impaired Waters Draft for Public Comment, dated May 2011, in reference to specific implications for the Town of Colchester and the Colchester watersheds included in the TMDL: Direct Smaller Drainages to Inner Mallets Bay (Appendix 7).
- Aldrich + Elliott, PC. 2011. Microbial Source Tracking Study. In preparation for Colchester Integrated Water Resources Management Program.

6

Attachments

6.1 Tables

- Table 1. Crooked Creek Bacteria Sampling Results
- Table 2. Smith Hollow Creek Bacteria Sampling Results

6.2 Figures

- Figure 1. Crooked Creek—Field Reconnaissance and Bacteria Sampling Locations
- Figure 2. Smith Hollow Creek—Field Reconnaissance and Bacteria Sampling Location

6.3 Endyne *E. coli* Results



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Table 1. Crooked Creek Bacteria Sampling Results

Location ID#	Latitude/Longitude	E. coli Concentration (MPN/100 mL)	Description from Field Notes
CSS-CC01	44°33'20.271"N 73°11'29.363"W	<1	high organic material; sample taken 20' from shore
CSS-CC02	44°33'20.719"N 73°11'28.846"W	7	under bridge; water turbid
CSS-CC03	44°33'20.513"N 73°11'26.84"W	15	outflow of pipe under bridge, ~5' of flow
CSS-CC04	44°33'20.106"N 73°11'25.448"W	15	south fork (main channel)
CSS-CC05	44°33'20.265"N 73°11'25.145"W	10	red staining; sample taken for ammonia test
CSS-CC06	44°33'21.956"N 73°11'18.774"W	9	small stream from ravine on right bank
CSS-CC07	44°33'19.688"N 73°11'17.627"W	11	downstream of outlet from campground
CSS-CC08	44°33'16.788"N 73°11'10.25"W	3	7' culvert, ~2' + of flow, turbid
CSS-CC09	44°33'16.419"N 73°11'17.071"W	9	west edge of alder tree copse
CSS-CC10	44°32'59.089"N 73°10'55.383"W	5	left channel, under overhang hemlock
CSS-CC11	44°32'59.894"N 73°10'54.143"W	10	right channel (north)
CSS-CC12	44°32'59.707"N 73°10'44.372"W	12	north channel under hemlock
CSS-CC13	44°32'59.58"N 73°10'27.616"W	30	tip of streambed, turbid, above large pool
CSS-CC14	44°32'28.934"N 73°10'7.75"W	14	west of 7; south of culvert/poor farm rd
CSS-CC15	44°32'30.759"N 73°10'8.584"W	21	west of 7; north of poor farm rd culvert
CSS-CC16	44°32'29.31"N 73°10'6.4"W	3	east of 7; south of poor farm rd intersection
CSS-CC17	44°32'30.399"N 73°10'5.061"W	4	east of 7; upstream of culvert under 7

Table 2. Smith Hollow Creek Bacteria Sampling Results

Location ID#	Latitude/Longitude	E. coli Concentration (MPN/100 mL)	Comment from Field Notes
CSS-SHC01	44°32'47.317"N 73°12'22.047"W	4	
CSS-SHC02	44°32'47.869"N 73°12'22.535"W	29	
CSS-SHC03	44°32'29.034"N 73°12'26.749"W	4	
CSS-SHC04	44°32'17.093"N 73°12'15.684"W	10	no pond exists on this reach of Smith Hollow Creek
CSS-SHC05	44°32'6.688"N 73°12'15.359"W	210	
CSS-SHC06	44°32'1.015"N 73°12'28.159"W	9	
CSS-SHC07	44°32'2.2"N 73°11'59.676"W	9	
CSS-SHC08	44°31'39.893"N 73°11'1.426"W	9	
CSS-SHC09	44°31'45.338"N 73°11'15.242"W	11	tributary crosses under road at this point
CSS-SHC10	44°31'47.168"N 73°11'31.226"W	2	
CSS-SHC11	44°31'55.869"N 73°11'33.477"W	52	
CSS-SHC12	44°31'53.417"N 73°11'14.747"W	12	
CSS-SHC13	44°31'48.006"N 73°10'55.079"W	3	
CSS-SHC14	44°31'49.22"N 73°10'55.221"W	16	very low flow, some sediment in sample

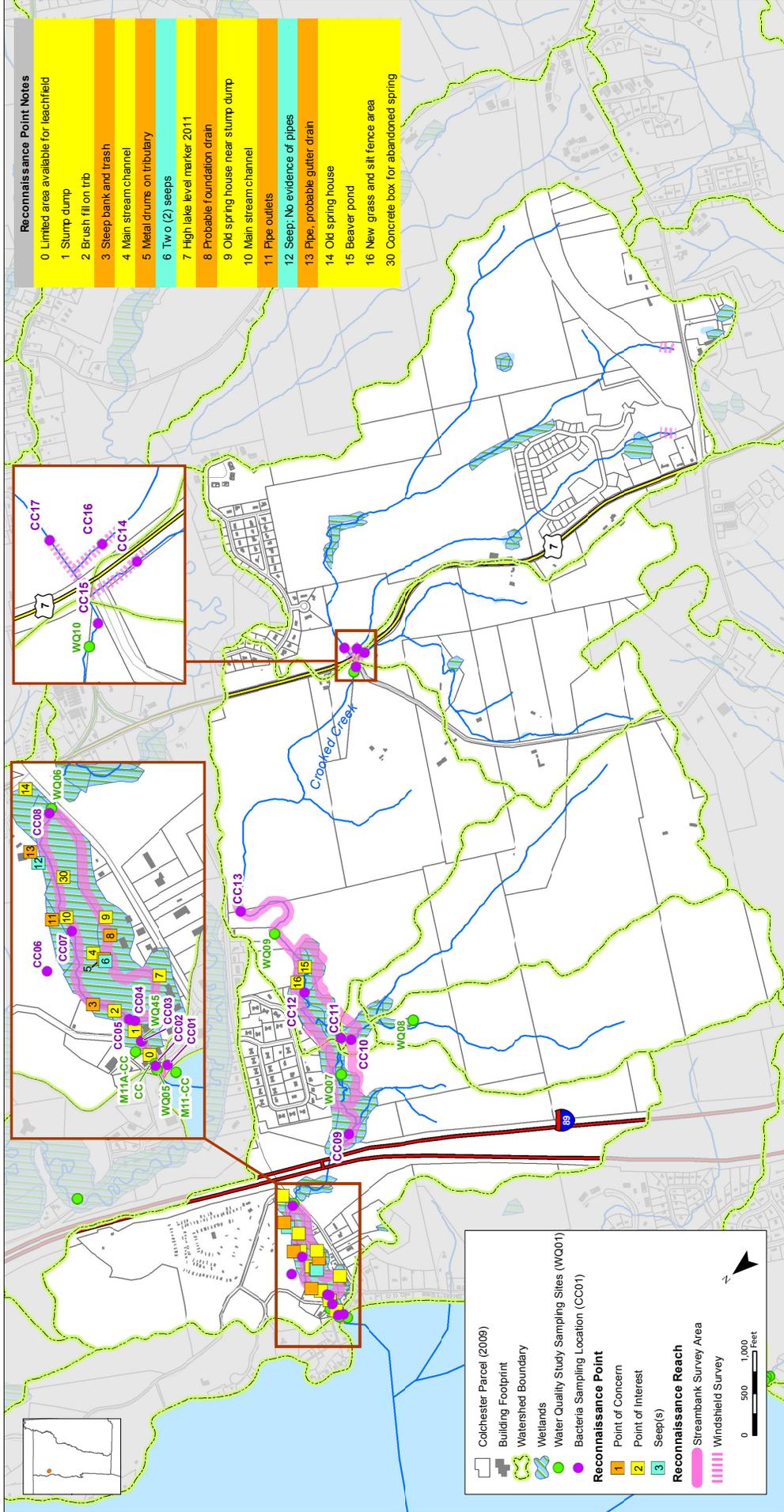


Figure 1. Crooked Creek – Field Reconnaissance and Bacteria Sampling Location (November 2011)
Town of Colchester, Vermont

Sources: Stone Environmental; MST Water Quality Study Sampling Sites; Bacteria Sampling Location; Field Reconnaissance Data; Watershed Boundaries; UVM; Building Footprint; Town of Colchester; Parcel Boundaries; VCGI; Streams; Roads

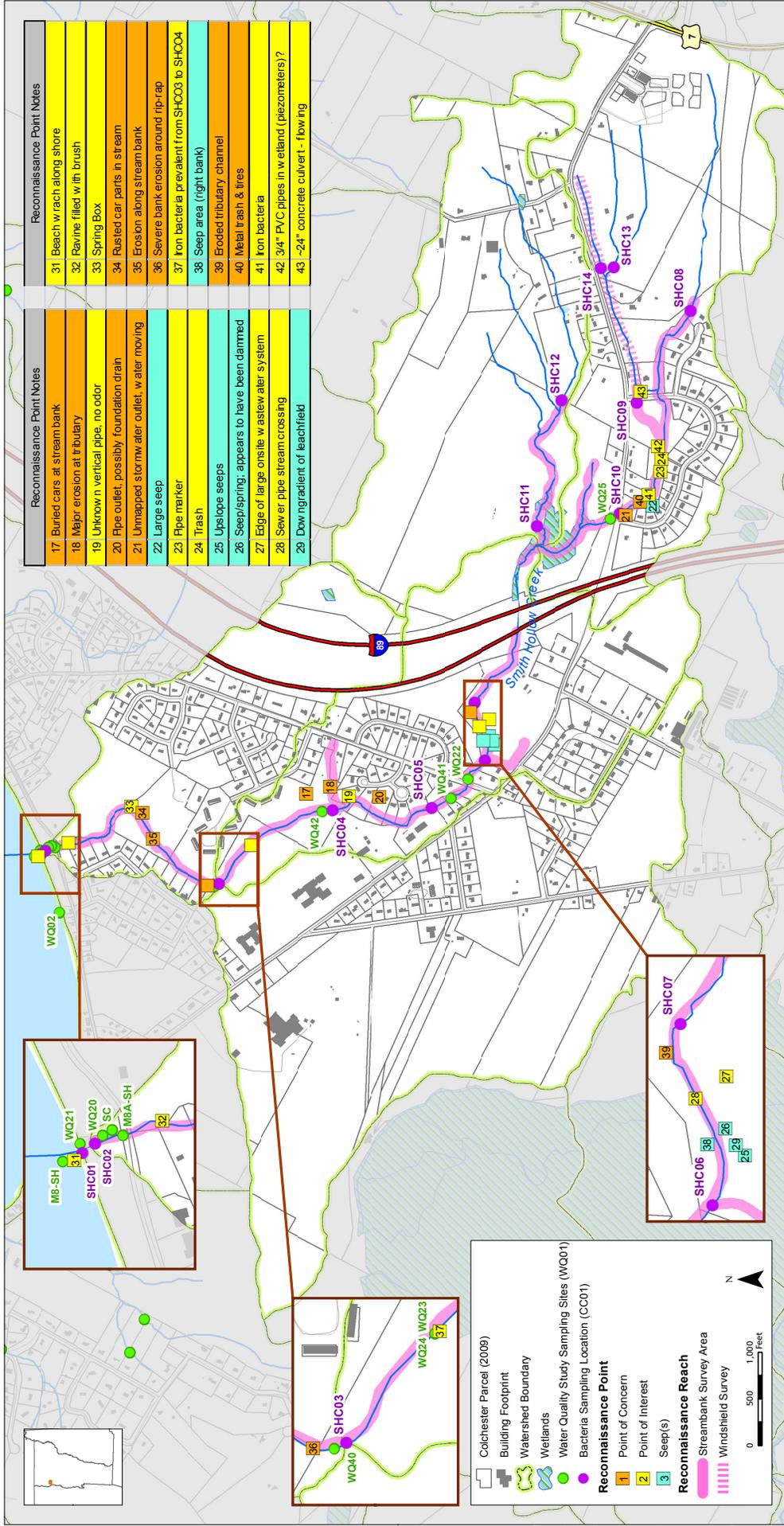


Figure 2. Smith Hollow Creek – Field Reconnaissance and Bacteria Sampling Location (November 2011)
Town of Colchester, Vermont

Sources: Stone Environmental; MST Water Quality Study Sampling Sites; Bacteria Sampling Location; Field Reconnaissance Data; Watershed Boundaries; UVM; Building Footprint; Town of Colchester; Parcel Boundaries; VCGI; Streams; Roads



Stone Environmental, Inc.
535 Stone Cutters Way 070233
Montpelier, VT 05602

Atten: Mr. Chris Stone

PROJECT: Colchester 051694
WORK ORDER: **1111-16839**
DATE RECEIVED: November 10, 2011
DATE REPORTED: November 14, 2011
SAMPLER: Bruce Douglas

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

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Laboratory Report

DATE REPORTED: 11/14/2011

CLIENT: Stone Environmental, Inc.
PROJECT: Colchester 051694

WORK ORDER: **1111-16839**
DATE RECEIVED 11/10/2011

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
001 Site: CSS-SHC01 Lake C Date Sampled: 11/10/11 Time: 9:40							
e. coli	4	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
002 Site: CSS-SHC02 Mouth of SHC Date Sampled: 11/10/11 Time: 9:42							
e. coli	29	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
003 Site: CSS-SHC03 Behind Condos Date Sampled: 11/10/11 Time: 9:49							
e. coli	4	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
004 Site: CSS-SHC04 @ Dry Tributary Date Sampled: 11/10/11 Time: 9:56							
e. coli	10	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
005 Site: CSS-SHC05 Behind Fletcher Date Sampled: 11/10/11 Time: 10:01							
e. coli	210	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
006 Site: CSS-SHC06 Everbreeze Downstream Date Sampled: 11/10/11 Time: 10:10							
e. coli	9	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
007 Site: CSS-SHC07 Everbreeze Upstream Date Sampled: 11/10/11 Time: 10:14							
e. coli	9	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
008 Site: CSS-SHC08 End of Cul-de-Sac Date Sampled: 11/10/11 Time: 12:00							
e. coli	9	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
009 Site: CSS-SHC09 Edgewood Upstream Date Sampled: 11/10/11 Time: 12:05							
e. coli	11	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	
010 Site: CSS-SHC10 Edgewood Downstream Date Sampled: 11/10/11 Time: 12:15							
e. coli	2	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB	N	

Laboratory Report

DATE REPORTED: 11/14/2011

CLIENT: Stone Environmental, Inc.
PROJECT: Colchester 051694

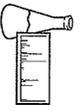
WORK ORDER: **1111-16839**
DATE RECEIVED 11/10/2011

011		Site: CSS-SHC11 N. Branch Barry			Date Sampled: 11/10/11 Time: 12:40		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	52	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB		N

012		Site: CSS-SHC12 S. Branch @ Mazza			Date Sampled: 11/10/11 Time: 12:50		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	12	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB		N

013		Site: CSS-SHC13 S. Corners South			Date Sampled: 11/10/11 Time: 13:24		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	3	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB		N

014		Site: CSS-SHC14 S. Corners North			Date Sampled: 11/10/11 Time: 13:27		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	16	MPN/100ml	SM18 9223B	11/10/11 15:35	W KMB		N



ENDYNE, INC.
 160 James Brown Drive
 Williston, Vermont 05495
 (802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions:

32210

Project Name: COLCHESTER
 051694

Endyne Order ID: 1111-168351

Reporting Address: BRUCE POWERS
STONE ENVIRONMENTAL
5 STONE CUSTODIAL
PROVIDENCE VT 05602

Company: STONE
 Contact Name/Phone #: BRUCE POWERS
802-229-5382

Billing Address:
SAME

Sampler Name: BRUCE POWERS
 Phone #: 802-229-5382

Ref # (Lab Use Only)	Sample Identification	Matrix	R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
	CSS-SHC01	water	✓		11/10/11 9:40	1	100ml	lake C.	E.coli		
	CSS-SHC02		✓		9:42			Mud of SHC			
	CSS-SHC03		✓		9:49			Behind cul-de-sac			
	CSS-SHC04		✓		9:56			Dry tributary			
	CSS-SHC05		✓		10:01			behind Fletcher			
	CSS-SHC06		✓		10:10			overbreeze downstream			
	CSS-SHC07		✓		10:14			overbreeze upstream			
	CSS-SHC08		✓		12:00			end of cul-de-sac			
	CSS-SHC09		✓		12:05			edge of wood upstream			
	CSS-SHC10		✓		12:15			edge of wood downstream			

Relinquished by: [Signature] Date/Time: 11/10/11 14:33

Received by: [Signature] Date/Time: 11/10/11 014:30

New York State Project: Yes ✓ No ✓ Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	PP13 Metals
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	RCRA8 Metals
4	Nitrite N	9	BOD	14	Turbidity	19	8021B	24	8260/8260B	29	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	8010/8020	25	8270 B/N or Acid	30	
31	Metals (As, Is, Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Tl, V, Zn										
32	TCUP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)						33				
34	Other										

Delivery: clean LAB USE ONLY

Temp: 4.5°C Comment: C



Stone Environmental, Inc.
535 Stone Cutters Way 070233
Montpelier, VT 05602

Atten: Mr. Chris Stone

PROJECT: Colchester Sanitary Survey
WORK ORDER: **1111-16913**
DATE RECEIVED: November 14, 2011
DATE REPORTED: November 16, 2011
SAMPLER: Dave Braun

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report

DATE REPORTED: 11/16/2011

CLIENT: Stone Environmental, Inc.
PROJECT: Colchester Sanitary Survey

WORK ORDER: **1111-16913**
DATE RECEIVED 11/14/2011

001	Site: CSS-CCO1			Date Sampled: 11/14/11 Time: 9:45			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	< 1	MPN/100ml	SM18 9223B	11/14/11 15:39	W RJL	N	
002	Site: CSS-CCO2			Date Sampled: 11/14/11 Time: 9:47			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	7	MPN/100ml	SM18 9223B	11/14/11 15:39	W RJL	N	
003	Site: CSS-CCO3			Date Sampled: 11/14/11 Time: 9:54			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	15	MPN/100ml	SM18 9223B	11/14/11 15:39	W RJL	N	
004	Site: CSS-CCO4			Date Sampled: 11/14/11 Time: 10:00			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	15	MPN/100ml	SM18 9223B	11/14/11 15:39	W RJL	N	
005	Site: CSS-CCO5			Date Sampled: 11/14/11 Time: 10:03			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	10	MPN/100ml	SM18 9223B	11/14/11 15:39	W RJL	N	
006	Site: CSS-CCO6			Date Sampled: 11/14/11 Time: 10:25			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	9	MPN/100ml	SM18 9223B	11/14/11 15:52	W RJL	N	
007	Site: CSS-CCO7			Date Sampled: 11/14/11 Time: 10:35			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	11	MPN/100ml	SM18 9223B	11/14/11 15:52	W RJL	N	
008	Site: CSS-CCO8			Date Sampled: 11/14/11 Time: 10:55			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	3	MPN/100ml	SM18 9223B	11/14/11 15:52	W RJL	N	
009	Site: CSS-CCO9			Date Sampled: 11/14/11 Time: 12:03			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	9	MPN/100ml	SM18 9223B	11/14/11 15:52	W RJL	N	
010	Site: CSS-CCO10			Date Sampled: 11/14/11 Time: 12:22			
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	5	MPN/100ml	SM18 9223B	11/14/11 15:52	W RJL	N	

Laboratory Report

DATE REPORTED: 11/16/2011

CLIENT: Stone Environmental, Inc.
PROJECT: Colchester Sanitary Survey

WORK ORDER: **1111-16913**
DATE RECEIVED 11/14/2011

011		Site: CSS-CCO11			Date Sampled: 11/14/11 Time: 12:31		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	10	MPN/100ml	SM18 9223B	11/14/11 16:02	W R J L	N	

012		Site: CSS-CCO12			Date Sampled: 11/14/11 Time: 12:44		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	12	MPN/100ml	SM18 9223B	11/14/11 16:02	W R J L	N	

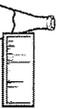
013		Site: CSS-CCO13			Date Sampled: 11/14/11 Time: 13:14		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	30	MPN/100ml	SM18 9223B	11/14/11 16:02	W R J L	N	

014		Site: CSS-CCO14			Date Sampled: 11/14/11 Time: 13:53		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	14	MPN/100ml	SM18 9223B	11/14/11 16:02	W R J L	N	

015		Site: CSS-CCO15			Date Sampled: 11/14/11 Time: 13:56		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	21	MPN/100ml	SM18 9223B	11/14/11 16:02	W R J L	N	

016		Site: CSS-CCO16			Date Sampled: 11/14/11 Time: 14:00		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	3	MPN/100ml	SM18 9223B	11/14/11 16:02	W R J L	N	

017		Site: CSS-CCO17			Date Sampled: 11/14/11 Time: 14:02		
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
e. coli	4	MPN/100ml	SM18 9223B	11/14/11 16:02	W R J L	N	



CHAIN-OF-CUSTODY-RECORD

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

Special Reporting Instructions/PO#: 051694-G / Bruce Douglas

55790

Project Name: Chelsea Sanitary Survey

State of Origin: VT X NY NH Other

Endyne W/O # 1111-16913

Client/Contact Name: Stone Environmental

Phone #: 802-229-5379

Mailing Address: Stone Environmental
535 Stone Center Way
Montpelier, VT 05602

Sampler Name: Bruce Brown

Phone #: 802-229-5379

Billing Address: Bruce Douglas
535 Stone Center Way
Montpelier, VT 05602

Sample Location	Matrix	C R B	C M P	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Field Results/Remarks	Due Date
					No.	Type/Size				
CSS-CC01	Water	X		11/14/11/9:45	1	100 mL	NASD	E. Coli	APP	
CSS-CC02				9:47						
CSS-CC03				9:54						
CSS-CC04				10:00						
CSS-CC05				10:03						
CSS-CC06				10:25						
CSS-CC07				10:35						
CSS-CC08				10:55						
CSS-CC09				12:03						
CSS-CC10				12:22						

Relinquished by: Alex Hry Date/Time: 11/14/11/14:47 Received by: Alex Brown Date/Time: 11/14/11/2:45

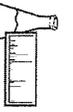
1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)										
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY

Delivery: Client

Temp: 38

Comment:



ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: 051694-G/Bruce Douglas

55791

Project Name: *Caldwells Sanctuary Survey*

State of Origin: VT ___ NY ___ NH ___ Other ___

Endyne WO # *1111-16913*

Client/Contact Name: *State Environmental*

Phone #: *802-229-5379*

Mailing Address: *State Environmental
535 Spore Cutters Way
Montpelier, VT 05602*

Sampler Name: *Dave Brown*

Phone #: *802-229-5379*

Billing Address: *Bruce Douglas
535 Spore Cutters Way
Montpelier, VT 05602*

Sample Location	Matrix	GRAB	COMPOSITE	Date/Time Sampled	Sample Containers		Sample Preservation	Analysis Required	Field Results/Remarks	Due Date
					No.	Type/Size				
<i>CSS-CC11</i>	<i>Water</i>	<i>X</i>		<i>11/14/11/12:31</i>	<i>1</i>	<i>100ml</i>	<i>NaSO4</i>	<i>E. coli</i>		
<i>CSS-CC12</i>				<i>12:44</i>						
<i>CSS-CC13</i>				<i>13:14</i>						
<i>CSS-CC14</i>				<i>13:53</i>						
<i>CSS-CC15</i>				<i>13:56</i>						
<i>CSS-CC16</i>				<i>14:00</i>						
<i>CSS-CC17</i>				<i>14:02</i>						

Relinquished by: *Alex Hill* Date/Time: *11/14/11 14:46*

Received by: *Suee Perry* Date/Time: *11/14/11 2:45*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
pH	TKN	Total Solids	Sulfate	1664 TPH/FOG	8270 PAH Only	Chloride	Total P	TSS	8015 GRO	8081 Pest	Ammonia N	Total Diss. P	TDS	8015 DRO	8082 PCB	Nitrite N	BOD	Turbidity	VT PCF	8260B	PP13 Metals	Nitrate N	Alkalinity	Conductivity	VOC Halocarbons	8270 B/N or Acid	Total RCRA8		
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn																												
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)																												
33	Other																												
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other																						
38	Other																												

LAB USE ONLY

Delivery: *Client*

Temp: *38*

Comment: