

**DETECTION AND ELIMINATION OF
NON-STORMWATER DISCHARGES
TO THE
NORTH BRANCH, DOG RIVER AND THE STEVENS
BRANCH
IN
MONTPELIER, BERLIN AND NORTHFIELD**

July 2009

FRIENDS OF THE WINOOSKI RIVER
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INTRODUCTION

Background

The Winooski River in Montpelier (VT08-05) is impaired by high *Escherichia coli* (*E. coli*) levels (State of Vermont 2006 303(d) List of Waters). The Stevens Branch in Berlin (VT08-16) and the Dog River in the Northfield area (VT08-17) are also identified as having high *E. coli* levels, although further assessment is required. In older town centers, the discharge of materials other than stormwater through the stormwater drainage system may be a source of bacteria. Locating and eliminating illicit discharges can be a cost-effective element of a long-term strategy to reduce water pollution.

The stormwater drainage system is designed to collect and convey urban runoff. If water is flowing from a stormwater outfall during a dry period and the source is not one of the generally allowable discharges indicated in the box to the right, then the discharge may be considered illicit. Illicit discharges enter the stormwater drainage system through either direct connections or indirect connections.

Examples of direct connections include:

- Wastewater piping either mistakenly or deliberately connected to the stormdrain system;
- A shop floor drain that is connected to the stormdrain system; and
- A cross-connection between the sanitary sewer and stormdrain system.

Examples of indirect connections include:

- Infiltration into the stormdrain system from a leaking sanitary sewer line;
- Infiltration or surface discharge into the stormdrain system from a failed septic system.
- A spill flowing to a catchbasin; and
- Materials (e.g., paint or used oil) dumped directly into a catchbasin.

In our previous, illicit discharge detection and elimination (IDDE) work, the project team of the Friends of the Winooski River (the Friends) and Stone Environmental, documented a variety of problems, some of which would have been obvious to an untrained observer and some that we found through water testing. We documented pollutants entering stormwater drainage systems from leaking wastewater and water supply infrastructure, hazardous materials releases, and improper pipe connections. In our largest project to date, a 2006 project in Barre City, the most egregious of the 20 contaminated discharges we identified was a substantial flow of raw wastewater discharging from a sewer main through a drain line into the Stevens Branch. *E. coli* levels were too high to count, even after 100-fold sample dilution. This problem was quickly rectified by the City of Barre, which repaired the broken sewer pipe. When would this problem have been discovered and corrected if not for the IDDE program conducted by the Friends of the Winooski River?

- Allowable (non-stormwater) discharges to stormwater drainage systems typically include:
 - groundwater,
 - water line flushing,
 - landscape/lawn irrigation,
 - diverted stream flows,
 - springs,
 - water from crawl space pumps,
 - potable water,
 - foundation/footing drains,
 - air conditioner condensation,
 - individual car washing,
 - dechlorinated swimming pool water, and
 - street and bridge wash water.

Goals of the Study

The goal of this project was to reduce water quality degradation in the Winooski River, the North Branch, the Stevens Branch, and the Dog River by finding and eliminating illicit discharges to the stormwater systems in Montpelier, Berlin, and Northfield. To our knowledge, there had never been any assessment of the prevalence of contaminated, non-stormwater flows (illicit discharges) to the Stevens Branch in Berlin or to the Dog River in Northfield. These communities are not subject to the requirements of the EPA Phase II stormwater rule; therefore they had not initiated any illicit discharge detection and elimination program. Nor is Montpelier subject to the Phase II stormwater rule; however, in 2001 the Friends recognized the possibility that illicit discharges in the City were contributing to poor water quality in the North Branch and Winooski Rivers. Through a small 319 grant, the Friends mapped and visually assessed stormwater outfalls. Several obvious pollution sources were eliminated as a result of this limited project.

The purpose of this project was to identify and eliminate contaminated, non-stormwater discharges entering the stormwater drainage system and discharging to impaired surface waters in Central Vermont communities in the Winooski River watershed. Once pollutant sources were identified, we cooperated with participating municipalities to plan elimination of the discharges.

Specific objectives included:

1. Comprehensively assess dry-weather flows from stormwater outfalls in three communities discharging to surface waters with documented impairment by indicator bacteria.
2. Produce or verify a GIS datalayer of outfall locations in each community.
3. Where outfall monitoring indicated contamination, assist communities in locating sources of suspected contamination within their storm drainage networks and planning corrective measures.

METHODS

Overview

The study approach consisted of three steps. The first step was to record observations and to perform basic water quality tests at flowing outfalls during dry-weather periods. The field sheet in Appendix A was used in this step. The second step involved tracing the sources of the pollutants through the stormwater drainage system. Lastly, plans were developed with the participating municipalities to eliminate the identified pollution sources.

Project Roles and Responsibilities

The Friends of the Winooski River provided project administration, assisted with the field survey and follow up investigations, and drafted the final report.

Stone Environmental developed a Quality Assurance Project Plan, led the field survey, produced GIS maps of outfall locations, consulted with municipal officials regarding planning corrective actions, and reviewed the project final report.

Specific Project Plan

1. Develop QAPP

The first task completed was the development of a Quality Assurance Project Plan (QAPP) in accordance with published EPA guidance. This was completed in September 2008.

2. Outfall Inspection

The field work was coordinated by Dave Braun of Stone Environmental, with participation by the Friends and Stone staff. Observations, test results, and discharge point locations were recorded in an ArcPad database using a Mobile Mapper CE GPS unit. Digital orthophotography was uploaded to the Mobile Mapper unit for reference in the field. In Montpelier, outfall locations recorded by the Friends of the Winooski River during the 2001 Montpelier stormwater outfall survey were overlain on the orthophotography. These locations were verified or corrected in the course of this project.

Outfalls and other discharge points were inspected during dry weather, when there had been little or no rain in the preceding 24 hours. Because storm drainage systems are designed to carry stormwater, all dry weather discharges are considered suspect. At the same time that outfalls and other discharge points were tested, conditions in the receiving stream were monitored to provide a benchmark against which to compare outfall sample results. In-stream monitoring was performed immediately below the most downstream discharge point and above the most upstream discharge point investigated on a given day.

Each outfall or other discharge point was assigned a unique identifying code. Discharge points were observed for deposits and stains, abnormal vegetation conditions (noting abundant algae, inhibited plant growth, or other potentially significant conditions), and damage to the structure. If present, dry-weather flows were observed for color, odor, turbidity, and floatable matter. Temperature, pH, and specific conductance measurements were made in the field using an Oakton Series 10 multi-parameter probe. In addition, dry weather discharges were tested for chlorine and the presence of optical brighteners.

Chlorine is added to public water supplies as a disinfectant. Outfall samples were tested for total chlorine concentration to aide in identifying leaks in water supply systems. Chlorine tests were conducted per Hach Method 8167 (equivalent to EPA 330.5), using a Hach DR-890 portable spectrophotometer and Accu-vac reagent ampules. This is a sensitive method with a detection limit of 0.01 parts per million. During humid weather, condensation of the glass ampules resulted in inaccurate spectrophotometer readings, requiring frequent retesting.

Optical brighteners are the fluorescent white dyes used in laundry detergents. Flowing outfalls were tested for optical brighteners to aide in identifying discharges from laundry facilities, failing septic systems, leaking sanitary sewers, and cross-connections. Optical brightener monitoring was performed according to Stone Environmental Standard Operating Procedure 6.38.0. An untreated cotton pad, held in a mesh sleeve, is placed in each flowing outfall for 4-8 days. The pad is then rinsed and dried and placed under a long-wave fluorescent (UVA or “black”) light. Fluorescence indicates the presence of optical brightener. An advantage of optical brightener monitoring is that some intermittent or dilute discharges may be detected due to the multiple-day exposure of the pad, whereas tests performed on grab samples may miss the

contaminant. Optical brightener monitoring is also an extremely inexpensive screening tool that can help target more expensive laboratory tests.

If an outfall tested positive for optical brightener, grab samples were collected for laboratory analysis of *Escherichia coli* (*E. coli*). *E. coli* is commonly used as an indicator of fecal contamination. Samples were placed on ice in the field and transported to Endyne Laboratory, Inc. for analysis. Endyne is a full-service environmental testing laboratory. A Colilert method was used to enumerate *E. coli* (*Standard Methods for the Examination of Water and Wastewater*, 20th edition, method 9223B QuantiTray). Quantifying *E. coli* over the wide range of concentration found in contaminated waters was of greater interest than accuracy at very low concentrations; therefore a 10:1 dilution was made of all *E. coli* samples prior to analysis, providing a quantifiable range of 10 MPN/100 mL – 24,000 MPN/100 mL. At the same time, samples were also analyzed for total phosphorus according to *Standard Methods for the Examination of Water and Wastewater*, 20th edition, method 4500 P-F.

Some of the suspect outfalls returned inconclusive results for the combination of optical brightener and *E. coli* tests that were performed. Certain dry weather discharges tested positive for optical brightener in one or more rounds (some outfalls were tested 2-3 times) of testing but did not test positive for *E. coli*. In order to evaluate suspected problems and focus more clearly on the real problems, additional tests for ammonia, fluoride and detergents were conducted at nine outfalls. This suite of tests is recommended by EPA Region 1 in its Illicit Discharge Detection and Elimination (IDDE) Protocol (DRAFT) as a means to identify the source of flow.

As described in more detail later, eight discharges were suspected sources of hydrocarbon contaminants, based on visual clues and odor. Samples from six of these discharges were sent to Sitelab Corporation (West Newbury, Massachusetts) for hydrocarbon analysis. Results were also forwarded to the Waste Management Division of the Vermont Department of Environmental Conservation.

3. Tracing Pollutant Sources and Corrective Actions

Once an outfall was determined to have an illicit discharge, a follow up test and investigation plan was created. The exact approach varied by outfall based on the nature of the contaminant and local infrastructure but typically included some or all of the following techniques. Often the initial step involved determining if stormwater lines converged and to isolate the problem line if possible. This was done by consulting existing stormwater system maps, field tracing and mapping stormlines by inspecting catch basins, and testing for optical brightener at key junctures. The proximity of the stormwater line to sanitary sewer lines, or in the case of Montpelier, whether the stormwater line was known to pass combined sewer overflows, was also taken into consideration. Based on the above analysis, more intensive tests including taking video of the stormwater line via a mobile TV camera or dye testing or other inspection of service lines was undertaken. The goal was to identify a specific source and take corrective action.

See the Results and Analysis Section for more details.

RESULTS AND ANALYSIS

Overview of Results

A total of 346 discharge points were assessed. There were 35 on the Dog River in Northfield, 95 on the North Branch in Montpelier, 65 on the Stevens Branch in Berlin, 5 on the Stevens Branch in Montpelier, 5 on Blanchard Brook in Montpelier, and 141 on the Winooski River in Montpelier. These discharge points included twelve tributary stream sample sites, six groundwater seeps, five drainage ditches, and one hose.

Of the 322 pipe or culvert outfalls, 98 were flowing during the initial assessment visits. The flow ranged from a drip to approximately 13 inches in depth. Two pipes were partially submerged and it was not possible to discern if they were flowing or not. A total of 26 discharge points had test results that indicated a source of pollution was present.

Stream/Municipality	All Types of Discharges	Piped/ Culvert Discharges	Flowing Pipes/Culverts	Possible Contamination All Discharges
Winooski River Montpelier	141	132	35	11
North Branch Montpelier	95	94	18	7
Blanchard Brook Montpelier	5	5	1	0
Stevens Branch Montpelier	5	5	2	1
Stevens Branch Berlin	65	57	34	6
Dog River Northfield	35	29	8	1
Total	346	322	98	26

See Appendix B for a summary report of the initial discharge point screening data. Appendix C contains a series of four maps representing all discharge points assessed during the study.

Summary of Types of Contamination

Seven outfalls tested positive for optical brighteners. Tests for *E. coli* were conducted on five of those outfalls with four returning results in excess of the Vermont water quality standard of 77 colonies per 100 ml. One outfall could not be tested due to partial submergence. The other was not flowing during subsequent visits to the site.

Seven dry weather discharges tested positive for chlorine in excess of 0.10 mg/L. Two of these discharges also tested positive for optical brighteners and exceeded Vermont's *E. coli* standard. For these two discharges, the elevated chlorine concentration was slight (0.22 and 0.18 mg/L).

At eight discharge points, including three groundwater seeps, petroleum odors and/or sheens suggested hydrocarbon contamination. Seven discharges including one of the suspected hydrocarbon discharges has specific conductance in excess of 2,000 $\mu\text{S}/\text{cm}$.

Parameter/Test	Number of Discharges	Additional parameters/tests
Optical Brightener	7	5 tested > 77 MPN/100 ml, two not tested
Chlorine > 0.10 mg/L	7	2 tested positive for optical brightener and <i>E. coli</i> exceeded > 77 MPN/100 ml
Hydrocarbon--sensory	8	One had specific conductance >2,000 $\mu\text{S}/\text{cm}$
High Conductivity > 2000 $\mu\text{S}/\text{cm}$	7	Soap suds were visible at one site

Appendix D contains a summary table of the contaminated discharges. Appendix E contains hand drawn maps created during the investigation of pollutant sources.

1. Outfalls testing positive for Optical Brightener (7)

As noted above, a positive optical brightener result triggered tests for *E. coli* where possible. Five outfalls were tested for *E. coli* with four returning results in excess of the Vermont water quality standard of 77 colonies per 100 ml. One outfall (WR-0690) could not be tested due to partial submergence. The other (DR-0210) was not flowing during subsequent visits to the site.

Dog River: DR-0210

Location: Just downstream of the Northfield wastewater treatment plant
Lat/Long: 44.1641/72.6563

Description: 24 in. diameter concrete pipe.

Water quality: Date = 10/20/08

Flow observation: Clear, slight flow from crack on interior of outfall.

E. coli = Not tested--no flow at subsequent visits

Optical brightener = Positive

Follow up: The staff of the Northfield wastewater treatment plant periodically checked the outfall subsequent to the positive optical brightener test. Flow was never observed on these ts.

North Branch: NB-0010

Location: Adjacent to the Cummings Street bridge at the northeast corner (upstream on left bank)

Lat/Long: 44.2715/72.5705

Description: 12 in. diameter concrete pipe.

Water quality: Date = 9/29/08

Flow observation: Dripping (0.0063 L/s); strong septic odor

E. coli = 12,000 MPN/100 mL

Optical brightener = Two tests in the fall of 2008 were positive

Chlorine = 0.22 mg/L

Follow up: In the fall of 2008, the only catchbasin connected to outfall NB-0010 was tested and came back negative for optical brightener. In May 2009, the outfall was retested for optical

There are two access points to the storm water line discharging at outfall NB-0130, at manholes marked “B” and “C” on the accompanying diagram. On July 15, 2009, the ammonia concentration at outfall NB-0130 was 0.8 mg/L. A water sample drawn from the storm line at manhole B also had an ammonia concentration of 0.8 mg/L. At manhole C, there are two inflows, one from the direction of the Main Street rotary and the other from an old, brick box culvert that is believed to run from the direction of St. Paul’s Street. No ammonia was detected in the inflow from the stormline entering from the direction of the traffic rotary. It was not possible to sample the flow from the old box culvert. As the flow at manhole B (0.8 mg/L ammonia) is a mixture of water from the system above the rotary (0.0 mg/L ammonia) and from the old box culvert, we concluded that the box culvert is the source of the contamination.

The box culvert is no longer an active component of either the sanitary or storm sewer system. Subsequent investigation revealed that the box culvert is part of a blocked off sanitary sewer overflow. From a manhole at the corner of Baird and St Paul Street, the sealed entrance to the box culvert is visible. The only other access to the box culvert that has been located is through a catch basin behind the Montpelier Inn. However, this catch basin is not a direct access but allows access to a six-inch pipe that connects to the box culvert. The next step is to video this pipe to the edge of the box culvert. This procedure itself may locate illicit connections. It will also help the Public Works staff determine if direct video of the box culvert is feasible. It may be that the culvert is filled with debris and therefore impassable.

North Branch: NB-0460

Location: Behind the Jacobs’ parking lot near the mouth of the North Branch
Lat/Long: 44.2598/72.5768

Description: 24 in. diameter concrete pipe

Water quality: Date = 9/30/08

Flow observation: 0.12 L/s; grayish in color, strong septic odor

E. coli = 14,100 MPN/100 mL

Optical brightener = Two tests in the fall of 2008 were strongly positive.

Follow up: In fall 2008, three catch basins on the stormwater line leading to this outfall were tested for optical brightener. The basin closest to the outfall, on the west side of Main Street opposite City Hall, tested positive. Stormlines enter this catchbasin from the north (intersection of State Street and Main Street), from the south, and from the east (across Main Street at the corner City Hall). A sanitary sewer line runs down the center of Main Street. Catchbasins upstream of the catchbasin testing positive for the presence of optical brightener were either dry or tested negative. Inflow was observed from the stormline crossing under Main Street despite the fact that the upstream end of the pipe, in the catchbasin at the corner of City Hall, was dry.

In May 2009, the outfall was retested for optical brightener and returned a positive result. At the same time, the discharge was tested for MBA detergents (0.5 mg/L), ammonia (3.0-6.0 mg/L), and fluoride (0.7 mg/L).

Based on the above information, we suspect that there is some infiltration of wastewater into the stormline crossing the sanitary sewer under Main Street.

brightener and returned a strong positive result. At the same time, the discharge was tested for MBA detergents (0.5-0.75 mg/L), ammonia (1.0 mg/L), and fluoride (0.2 mg/L). The combined testing indicated a fairly concentrated wastewater flow.

In July 2009, the project team and Montpelier Public Works staff performed a preliminary investigation of the sanitary and storm sewers on Cummings Street. Field testing at both the outfall and in the catchbasin nearest the river yielded 0.5 mg/L of ammonia. The two closest catchbasins were subsequently cleared of accumulated debris and sediment by the Public Works staff. Once cleared, three pipes, one entering the catchbasin nearest the river and two entering the basin across the street, became visible. The Public Works staff plans to investigate each of these three pipes as a possible wastewater source. Investigation methods will include a combination of videoing of the lines and dye testing for possible connections from houses and businesses along Cummings Street.

North Branch: NB-0130

Location: Behind dentist's office at 152 Main Street
Lat/Long: 44.2628/72.5729

Description: 40 in. diameter concrete pipe

Water quality: Date = 9/29/08

Flow observation: 0.50 L/s; clear discharge with septic odor

E. coli = 1,780 MPN/100 mL

Optical brightener = Three tests in the fall 2008 were positive

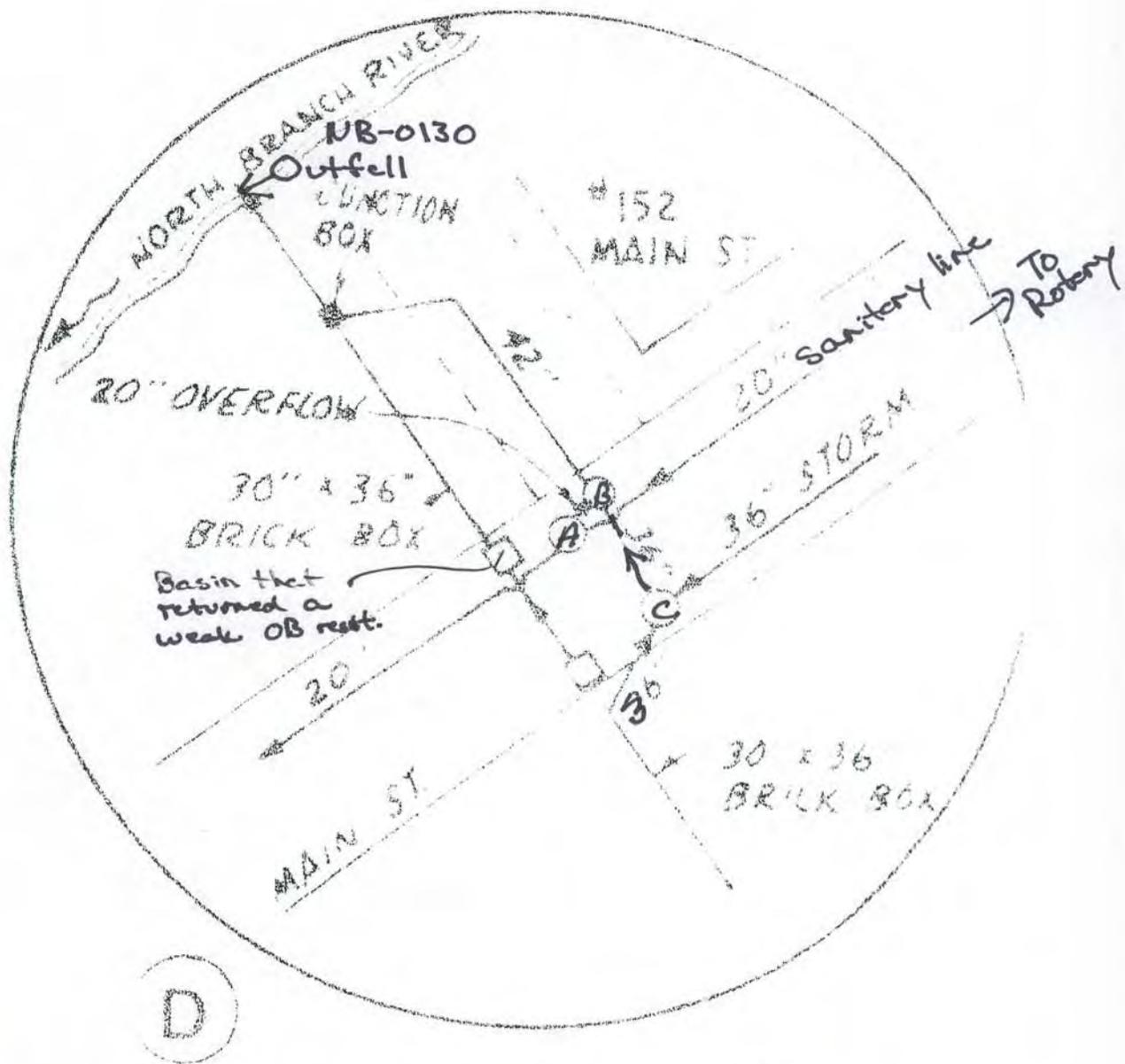
Chlorine = 0.18 mg/L

Follow up: In the fall of 2008, four catch basins on the storm water line were tested for optical brightener. The basin closest to the outfall tested a weak positive and the other three came back negative. The basin testing positive has had stagnant water in it at all inspections.

In May 2009, the outfall was retested for optical brightener and returned a positive result. At the same time, the discharge was tested for MBA detergents (0.0-0.25 mg/L), ammonia (1.0-2.0 mg/L) and fluoride (0.2 mg/L). The combined testing indicated a high likelihood of wastewater flow.

In July 2009, the project team and Montpelier Public Works staff conducted a number of tests and visual inspections of the outfall and its contributing stormwater system. This is a complex situation. Please refer to the diagram on the next page. A sanitary sewer line runs down the center of Main Street. In the middle of Main Street, the sanitary sewer line passes through a vault (marked "A" in the diagram), which passes combined sewage to the stormwater line during large storm events. In the last year, the City attempted to plug the pipe from the overflow structure to the stormline (the "20-inch overflow" pipe depicted connecting manholes "A" and "B"); however businesses in the vicinity reported that sewage backed up into their buildings during storm events, therefore the plug was removed. The City is working to eliminate stormwater connections to this sanitary sewer to prevent recurrent combined sewer overflow events. Public works staff stated that the most recent combined sewer overflow event at this location occurred in May 2009.

NB-0130



- A - Manhole access to sanitary overflow
- B - Manhole access to storm water line
- C - Manhole access to stormwater line
At this point, flows are coming in from the direction of the Main Spring St rotary and a brick box culvert from the other side of Main St.

Due to the rainy weather, the level of the North Branch River has submerged this outfall and surcharged the stormwater line where we suspect the problem arises, precluding further investigation. The City of Montpelier is committed to inspecting the stormline when the water level drops.

A potentially complicating factor is that a potable water leak occurred over the fall and winter that flooded the telephone conduits and resulted in widespread discharges in the downtown area. No one is sure when this leak started or how long it went ected.

Stevens Branch: SB-0330

Location: Behind Sears on Route 302

Lat/Long: 44.2311/72.5520

Description: 12 in. diameter corrugated steel pipe.

Water quality: Date = 10/10/08

Flow observation: Clear

E. coli = 10 MPN/100 mL

Optical brightener = Two tests in the fall of 2008 were weakly positive

Follow up: In the fall 2008, optical brightener was detected in the catchbasin nearest the outfall (at the entrance to the Sunoco gas station) and in the upstream catchbasin on the opposite side of the street, in front of the Twin City Motel.

In May 2009, the outfall was retested for optical brightener and returned a weak positive result. At the same time, the discharge was tested for MBA detergents (0.0-0.25 mg/L), ammonia (1.0-3.0 mg/L), and fluoride (0.3 mg/L).

In July 2009, the project team worked with the owner of the Twin City Motel and Doug Newton of VTrans to investigate possible sources of contamination. VTrans was consulted because Route 302 is a State highway and VTrans is therefore the operator of the storm sewer system along the roadway. The catchbasins at the Twin City Motel and Sunoco were tested for ammonia and the concentrations were the same, approximately 1.0 mg/L. A third catchbasin, by the entrance to Berlin Automotive Service, drains to the catchbasin near Sunoco, but this was dry.

Due to the optical brightener detections and significant ammonia concentration in the catchbasin in front of the Twin City Motel, contamination is believed to enter the stormwater system at this location. Four small diameter (4-6 inch) pipes enter the basin, which may be underdrains or relief pipes. The water level in the basin was at the inverts of the incoming pipes and slowly flowing out the discharge pipe. The catchbasin was bailed out in order to observe possible inflows. There was no flow from the four small pipes but the basin did refill slowly, indicating that groundwater enters through the deteriorated sides of the basin. A rust colored plume of water was seen entering from the corner of the basin, below and to the side of the largest diameter (6-inch) pipe.

The Twin City Motel consists of 10 rooms plus several cottages surrounding a horseshoe drive. Each cottage is connected via a 4-inch service line to a 6-inch sewer pipe that runs around the horseshoe drive. Red fluorescent dye was added to the toilet in the first of the several cottages and flushed repeatedly. The intent of this dye test was to check on the integrity of the 6-inch

sewer line, not to test every connection. Yellow/green dye was added to the discharge pipe of the washing machine in the laundry room next to Unit 20 and a rinse cycle was run. Since optical brightener had been detected at the outfall, the suspicion was that there was a leak in either the service line for Unit 20 or in the sewer line downstream of the Unit 20 connection. However, no dye was detected in the catchbasin immediately after the testing was performed or on three subsequent visits over the course of the next seven days.

The results of the investigation suggest that contaminated groundwater enters the basin either from a faulty sanitary sewer connection at Twin City Motel or from a leak in the sanitary sewer main under Route 302. There is probably not a direct sanitary wastewater connection to the catchbasin. No further investigation by the project team is possible given the available testing methods. This suspected problem has been referred to VTrans for further consideration.

Winooski River: WR-0500

Location: On the left bank, just upstream of the Main Street (Route 12) bridge

Lat/Long: 44.2573/72.5772

Description: 24 in. diameter corrugated steel pipe

Water quality: Date = 9/23/08

Flow observation: Clear, septic odor

E. coli = 336 MPN/100 mL

Optical brightener = First test October 2008 was positive; two subsequent tests in November and December 2008 were negative.

Follow up: In November 2008, four catch basins on the storm water line were tested for optical brightener. No optical brightener was detected although a septic smell was noted at one of the basins.

In May 2009, the outfall was retested for optical brightener and the result was negative. At the same time, the discharge was tested for MBA detergents (0.0 mg/L), ammonia (0.25 mg/L) and fluoride (0.0 mg/L). Based on these results, the project team did not recommend further investigation.

Winooski River: WR-0690

Location: Left bank of Winooski River near Montpelier High School track

Lat/Long: 44.2603/72.5902

Description: 48 in. diameter concrete pipe

Water quality: Date = 9/26/08

Flow observation: 3 inches depth, partially submerged

E. coli = Not tested due to partial submergence of outfall

Optical brightener = Weak positive results in two tests in the fall of 2008

Follow up: The outfall retested negative for optical brightener in May 2009. At that time, the discharge was tested for MBA detergents (0.25 mg/L), ammonia (0.25 mg/L), and fluoride (0.3 mg/L).

In July 2009, the project team and Montpelier Public Works staff opened a stormwater manhole upstream of the outfall. Between this manhole and outfall WR-0690, a sanitary sewer line crosses over the stormline. This sanitary sewer was the suspected source of contamination. However, water samples at the manhole (ammonia = 0.0 mg/L, fluoride = 0.3 mg/L) and at the

outfall (MBA detergents = 0.0 mg/L, ammonia = 0.0 mg/L, fluoride = 0.1 mg/L). did not indicate wastewater contamination, possibly as a consequence of substantial flow dilution.

Our conclusion is that there is likely a small sanitary wastewater leak to the stormwater system in this vicinity, which is difficult to detect given the volume of stormwater flows and frequent pipe submergence. This is likely to elude further investigation attempts. Therefore our recommendation is for periodic dry weather monitoring of the outfall and upstream manhole to demonstrate if in fact sanitary wastewater enters the connecting stormline.

2. Outfalls testing positive for chlorine (7)

As noted in the Results Summary section, two of the outfalls that tested in excess of 0.10 mg/L of chlorine also tested positive for optical brightener. The chlorine levels for these two outfalls (NB-0010 and NB-0130) were fairly low, 0.22 mg/L and 0.18 mg/L. The follow up for these two outfalls has focused on the possible wastewater contamination and therefore they are addressed in the section entitled 'Outfalls testing positive for optical brightener'.

North Branch River: NB-0305

Location: On right bank, between Langdon Street and School Street
Lat/Long: 44.2611/72.5757

Description: Leak emanating from foundation along Elm Street

Water quality: Date = 9/30/08

Flow observation: Clear, 0.5 inch depth, flowing at about 18 gpm.

Chlorine = 0.93 mg/L

Optical brightener = Negative

Follow up: The Montpelier Public Works Department has since capped the leaking water line, eliminating the problem.

North Branch River: NB-0390

Location: On left bank at State Street
Lat/Long: 44.2603/72.5763

Description: 26 inch stone box culvert

Water quality: Date = 9/30/08

Flow observation: Clear, 0.5 inch depth

Chlorine = 0.10 mg/L

Optical brighteners = Negative

Follow up: The outfall was retested for chlorine on October 15, 2008. The result was 0.09 mg/L. The Montpelier Public Works Department has been made aware of this discharge. In the project team's opinion it is not a serious threat to water quality. The greater concern may be its impact on the bridge abutment.

Stevens Branch: SB-0370

Location: On left bank, behind commercial development, downstream of Partridge Road and the tributary below Partridge Road
Lat/Long: 44.2338/72.5521

Description: 15 inch corrugated steel pipe

Water quality: Date = 10/10/08

Flow observation: Clear, 0.1 inch depth

Chlorine = 0.16 mg/L

Optical brighteners = Negative

Follow up: A second visit to the outfall was made on November 3, 2008, but the water was frozen in the pipe. No sample was taken and no additional follow up testing has been done.

Winooski River: WR-0565

Location: On right bank, just upstream of the Green Mount Cemetery

Lat/Long: 44.2566/72.5932

Description: Seep

Water quality: Date = 9/26/08

Flow observation: Seep

Chlorine = 0.98 mg/L

Optical brighteners = Negative

Follow up: The outfall was retested for chlorine on October 15, 2008. The result was 0.86 mg/L. The Montpelier Public Works Department will work with Vermont Rural Water to detect any leaks in the water line in this area.

Winooski River: WR-0625

Location: On right bank, immediately upstream of the I-89 bridge

Lat/Long: 44.2563/72.5999

Description: 36 inch corrugated black plastic pipe

Water quality: Date = 9/26/08

Flow observation: Clear, 0.25 inch depth

Chlorine = 0.96 mg/L

Optical brighteners = Negative

Follow up: The outfall was retested for chlorine on October 15, 2008. The result was 0.83 mg/L. The City of Montpelier has reportedly fixed a water leak in this area, eliminating this discharge.

3. Outfalls with suspected hydrocarbon contamination (8)

As noted previously, eight discharges had sensory indicators (smell or oily sheen) of hydrocarbons. Samples were taken where feasible and set to Sitelab for analysis for several potential hydrocarbon pollutants. All results were forwarded to the Waste Management Division of the Department of Environmental Conservation for further action if warranted.

Stevens Branch: SB-0220

Location: On left bank, opposite Mobil Station on Route 302

Lat/Long: 44.2243/72.5507

Description: 30 inch corrugated steel pipe

Water quality: Date = 10/08/08

Flow observation: Clear, 1.0 inch in depth, strong petroleum odor

Follow up: Samples sent to Sitelab for analysis (Appendix F). All tests were below the detection limits.

Stevens Branch: SB-0440

Location: On left bank, not far upstream from confluence of the Stevens Branch with the Winooski River.

Lat/Long: 44.2393/72.5510

Description: 48 inch corrugated steel pipe

Water quality: Date = 10/08/08

Flow observation: Clear, 3.0 inch in depth, petroleum odor

Follow up: Samples sent to Sitelab for analysis (Appendix F). All tests were below the detection limits.

Winooski River: WR-0070

Location: On left bank, just upstream of Route 2 bridge.

Lat/Long: 44.2458/72.5490

Description: 18 inch corrugated steel pipe

Water quality: Date = 9/16/08

Flow observation: Clear, 1.0 inch in depth, petroleum odor

Follow up: Samples sent to Sitelab for analysis (Appendix F). All tests were below the detection limits. Note that after this survey and sample collection, construction of a new traffic rotary at the intersection of Route 2 and Route 302 involved excavation of soils in the area draining to WR-0070, which may have affected (i.e., further mitigated residual petroleum contamination) the potential for contaminant discharge at this location. See reference to “residual petroleum soil contamination from former leaking underground storage tanks” in letter from Matt Moran of the Waste Management Division of the Department of Environmental Conservation to Lawrence Rothstein, the current property owner, dated June 19, 2009 (Appendix G). In the letter, DEC requests all environmental investigation and testing results for site. In particular, DEC is interested in a Phase I Environmental Site Assessment and any Phase II ESA performed. The property owner was granted an extension and the information is due to DEC on 8/10/09. Once this information is received, DEC will determine if further investigation is required.

Winooski River: WR-0090, WR-0100,

Location: On left bank, behind the old Grossmans building.

WR-0090: Lat/Long: 44.2484/72.5494

WR-0100: Lat/Long: 44.2487/72.5498

Description: Groundwater seeps

Water quality: Date = 9/18/08

Flow observation: Seeps with orange color and petroleum odor

Follow up: Samples sent to Sitelab for analysis (Appendix F). The Sitelab report was forwarded to Matt Moran of Waste Management Division of the Vermont Department of Environmental Conservation. DEC has recently taken action with respect to the site by requesting environmental data from the site’s current owner (see attached letter from Matt Moran of the Waste Management Division of the Department of Environmental Conservation to Lawrence Rothstein, the current property owner, dated June 19, 2009 (Appendix G). In the letter, DEC requests all environmental investigation and testing results for site. In particular, DEC is interested in a Phase I Environmental Site Assessment and any Phase II ESA performed. The property owner was granted an extension and the information is due to DEC on

8/10/09. Once this information is received, DEC will determine if further investigation is required. Appendix H includes a detailed map and photos of the seeps.

Winooski River: WR-0110

Location: On left bank, between Grossmans building and self-storage units
Lat/Long: 44.2494/72.5514

Description: Channel conveying groundwater seepage

Water quality: Date = 9/18/08

Flow observation: Seep, slight petroleum odor

Follow up: None. A sample from this site was not included in the Sitelab testing due to its proximity to the WR-0090 and WR-0100 seeps and the expense of the Sitelab analyses.

Contamination expressed at these three discharge points is assumed to originate from the same general source area and WR-0090 and WR-0100 exhibit stronger petroleum odors.

Winooski River: WR-0170

Location: On left bank, immediately downstream of the Pioneer Street bridge
Lat/Long: 44.2504/72.5593

Description: 18 inch corrugated black plastic pipe

Water quality: Date = 9/18/08

Flow observation: 0.5 inch depth, clear, slight petroleum odor

Follow up: Samples sent to Sitelab for analysis (Appendix F). All tests were below the detection limits. The outfall is located near the Montpelier Stoveworks, where there was a fuel oil spill a number of years ago.

Winooski River: WR-0180

Location: On left bank, immediately downstream of the Pioneer Street bridge
Lat/Long: 44.2504/72.5595

Description: 15 inch concrete pipe

Water quality: Date = 9/18/08

Flow observation: 0.5 inch depth, orange sediment staining, petroleum odor, soap suds

Conductivity: 2,600 μ S/cm

Follow up: Pipe submerged when revisited for sampling. Contamination expressed at this outfall is assumed to originate from the same general source area as WR-0170,

4. Outfalls with high conductivity (7)

As noted previously, seven discharges had specific conductance in excess of 2,000 μ S/cm. One of those, WR-0180 also had sensory indicators for hydrocarbon contamination and is addressed in the previous section. No specific follow up has been conducted for the high conductivity only discharges.

North Branch NB-0090

Location: On left bank, upstream of Spring Street
Lat/Long: 44.2639/72.5705

Description: 24 inch diameter corrugated black plastic pipe

Water quality: Date = 9/29/08

Flow observation: 0.5 inch depth, clear

Conductivity: 2,920 $\mu\text{S}/\text{cm}$

North Branch NB-0190

Location: On left bank, at School Street

Lat/Long: 44.2614/72.5749

Description: 52 inch diameter corrugated steel pipe

Water quality: Date = 9/30/08

Flow observation: 1.0 inch depth, soap suds

Conductivity: 2,230 $\mu\text{S}/\text{cm}$

Winooski River WR-0295

Location: On left bank, upstream of Route 12, Main Street

Lat/Long: 44.2562/72.5750

Description: 24 inch diameter stone box culvert

Water quality: Date = 9/23/08

Flow observation: 1.0 inch depth, clear

Conductivity: 3,690 $\mu\text{S}/\text{cm}$

Stevens Branch SB-0070

Location: On left bank, just upstream of Barre City line, near Route 62

Lat/Long: 44.2128/72.5325

Description: 18 inch diameter corrugated steel pipe

Water quality: Date = 10/7/08

Flow observation: 0.1 inch depth, clear

Conductivity: 3,050 $\mu\text{S}/\text{cm}$

Stevens Branch SB-0080

Location: On left bank, just upstream of Barre City line, near Route 62

Lat/Long: 44.2128/72.5318

Description: 12 inch diameter corrugated steel

Water quality: Date = 10/7/08

Flow observation: 0.1 inch depth, clear

Conductivity: 2,460 $\mu\text{S}/\text{cm}$

Stevens Branch SB-0205

Location: On right bank, just upstream of Partridge Road

Lat/Long: 44.2323/72.5512

Description: 4 inch diameter iron pipe

Water quality: Date = 10/10/08

Flow observation: 2.0 inch depth, clear

Conductivity: 2,840 $\mu\text{S}/\text{cm}$

CONCLUSION

The most important aspect of the report is the detailed information for each possible source of contamination and the steps taken or to be taken in tracing and correcting the problem. Since each discharge is so different, it is difficult to draw any general concluding statements. The

reader should reference the previous section for this information. The notable exceptions are the discharges with high conductivity. The project timeline and budget did not allow for further investigation of these discharges.

This project and the previous IDDE project in Barre in 2006 points out the complexity of locating, tracing and correcting sources of pollution from stormwater systems. The complications include old unmapped infrastructure and completely unexpected impacts such as the flooding of the telephone conduits and subsequent impact on the stormwater system. In the project team's opinion, this underscores the value of nonprofit organization's involvement in these types of projects. An organization such as the Friends of the Winooski River can undertake the initial monitoring and investigation much more cost effectively than the municipalities or the State. At some point, the municipalities or possibly State agencies such as ANR or VTRANS need to be involved but this is only necessary after the potential problems have been narrowed down significantly. These relatively higher cost resources can then focus on the 'real' problems. The Friends' approach is to cooperate with the municipalities on addressing the problems but through the project and through this report to also provide regulatory agencies with information on pollutant sources.

For this reason, the Friend intends to pursue additional funding to follow up on both this project and the 2006 project.

DATA SHEET FOR INITIAL DISCHARGE POINT ASSESSMENT

Structure ID: _____

Date: _____ Time: _____

Inspector: _____

Physical Observations (circle and/or comment as appropriate)

Pipe inner diameter _____ in. Pipe position: Free flow Partially submerged Submerged

Pipe material: Corrugated steel Concrete Corrugated black plastic Other (describe): _____

Pipe flow depth: dry drip <1/2 in. 1/2 - 2 in. 2 - 4 in. 4 - 8 in. Other _____

Color and/or odor of flow if present: _____

Turbidity of flow: clear cloudy
 Floatables in flow: (not incl. Trash) none petroleum sheen sewage other _____

Deposits/stains at outlet: none sediment oily iron staining other _____

Vegetation condition at outlet: not abnormal excessive algae growth inhibited other _____

Damage to structure: None cracking, spauling erosion corrosion other _____

OB pad set? No Yes

Date OB Pad retrieved _____ PAD ID (if different) _____

temperature _____ °C

Water quality tests: pH _____

sp. conductance _____ μS/cm

total chlorine _____ ppm

Comments:

Table 1: Initial Discharge Point Assessment

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: Blanchard Brook</i>														
<i>Town: Montpelier</i>														
Contamination: None														
SS-0010	9/19/2008	Corrugated steel	112	Partially submerged	1	None	None	Corrosion	Negative	15.7	8.31	516	0.00	D-Shaped road culvert
SS-0020	9/19/2008	PVC	9	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SS-0030	9/19/2008	Corrugated steel	18	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
SS-0040	9/19/2008	Corrugated black plastic	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SS-0050	9/19/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Footing drain
<i>Receiving Water: Dog River</i>														
<i>Town: Northfield</i>														
Contamination: Wastewater														
DR-0210	10/20/2008	Concrete	24	Free flow	0.25	None	None	Cracking	Positive	12.8	5.82	375	0.06	Water flowing from a crack in the side of the pipe
Contamination: None														
DR-0005	10/13/2008	Corrugated black plastic	18	Free flow	0.1	None	None	None	Negative	N/A	N/A	N/A	N/A	No WQ measurements taken due to low flow
DR-0010	10/13/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	11.7	6.51	830	0.03	
DR-0015	10/13/2008	Corrugated steel	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0020	10/13/2008	Corrugated steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0030	10/13/2008	Corrugated black plastic	24	Free flow	0.25	None	None	None	Negative	N/A,7.2	N/A,5.69	N/A,61.3	N/A,0.06	WQ tests taken 10/23/08
DR-0032	10/13/2008	Corrugated black plastic	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0040	10/13/2008	PVC	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0050	10/13/2008	Corrugated black plastic	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0060	10/13/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	11.9	8.15	96.1	0.01	Union Brook
DR-0065	10/13/2008	PVC	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0070	10/13/2008	PVC	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0075	10/14/2008	PVC	30	Free flow	0.1	Soap suds	None	None	Negative	N/A	N/A	N/A	N/A	No WQ measurements taken due to low flow
DR-0080	10/13/2008	Corrugated steel	15	Free flow	Dry	None	None	Partially crushed, corrosion	N/A	N/A	N/A	N/A	N/A	Located under pedestrian bridge
DR-0085	10/14/2008	Concrete	72	Free flow	4	None	None	None	Negative	11.5,7.1	8.17,8.14	156,Not Read	N/A,0.02	WQ tests taken 10/23/08
DR-0090	10/13/2008	PVC	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
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Receiving Water: Dog River

Town: Northfield

DR-0095	10/14/2008	PVC	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0100	10/13/2008	PVC	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0105	10/14/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	13.3,7.0	7.87,7.9	505,134	0.00,0.05	WQ tests taken 10/23/08
DR-0110	10/14/2008	Corrugated steel	30	Free flow	0.1	None	None	Corrosion	Negative	13.1,12.6	7.55,7.13	706,661	N/A,0.06	WQ tests tested 10/23/08
DR-0115	10/20/2008	Corrugated black plastic	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at top of bank
DR-0120	10/14/2008	Corrugated steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0125	10/20/2008	Corrugated steel	10	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at top of bank
DR-0130	10/14/2008	Corrugated steel	12	Free flow	1	None	Iron deposits	None	Negative	13.3,10.7	7.31,7.09	1410,1220	N/A,0.06	WQ tests tested 10/23/08
DR-0135	10/20/2008	Corrugated steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at top of bank
DR-0140	10/14/2008	Seep	0	Free flow	N/A	None	None	N/A	Negative	11.4,8.9	7.44,7.29	587,503	N/A,0.03	WQ tests taken 10/23/08
DR-0145	10/20/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0180	10/14/2008	Iron	1	Free flow	Dry	None	Iron deposits	None	N/A	N/A	N/A	N/A	N/A	
DR-0190	10/14/2008	Corrugated black plastic	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0200	10/14/2008	Corrugated steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0220	10/20/2008	PVC	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0230	10/20/2008	PVC	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
DR-0240	10/20/2008	Stone	66	Free flow	0.5	None	None	None	Negative	7.7	7.45	86.2	0.00	Stream running through box culvert
DR-0250	10/20/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	6.8	7.40	139	0.01	
DR-0260	10/20/2008	Stream	0	Free flow	N/A	None	None	N/A	N/A	7.7	8.01	98.9	0.00	Cox Brook

Receiving Water: North Branch

Town: Montpelier

Contamination: Wastewater, Chlorine

NB-0010	9/29/2008	Concrete	12	Free flow	Dripping	None	None	Cracking	Positive	16.2	7.00	547	0.22	Septic odor
NB-0130	9/29/2008	Concrete	40	Free flow	1	None	None	None	Positive	15.9	8.24	680	0.18	Septic odor

Contamination: Wastewater

NB-0460	9/30/2008	Concrete	24	Free flow	1	None	None	Cracking	Positive	15.0	7.54	1693	0.00	Grayish color, septic odor; Standing water at outlet draining slowly
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Contamination: None

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: North Branch</i>														
<i>Town: Montpelier</i>														
NB-0005	9/29/2008	Corrugated steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0008	9/29/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0015	9/29/2008	Iron	2	Free flow	Dry	None	None	Rusted out	N/A	N/A	N/A	N/A	N/A	
NB-0020	9/29/2008	Iron	40	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at dam
NB-0025	9/29/2008	Iron	10	Free flow	Dry	None	None	Cracking	N/A	N/A	N/A	N/A	N/A	
NB-0030	9/29/2008	Iron	54	Free flow	0.5	None	None	None	Negative	17.1	7.83	101.3	0.00	Located at dam
NB-0035	9/29/2008	Iron	14	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0040	9/29/2008	Corrugated steel	12	Free flow	2	None	None	Corrosion	Negative	17.6	7.24	117.9	0.00	
NB-0045	9/29/2008	PVC	10	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0050	9/29/2008	PVC	8	Free flow	1	None	None	None	Negative	17.7	7.26	91.3	0.13,0.03	Chlorine retested 10/15/08
NB-0055	9/29/2008	Corrugated steel	38	Free flow	1	None	None	None	Negative	15.1	8.08	222	0.00	
NB-0060	9/29/2008	Iron	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0065	9/29/2008	Iron	6	Free flow	Dry	None	None	Mostly filled	N/A	N/A	N/A	N/A	N/A	
NB-0070	9/29/2008	Corrugated steel	24	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
NB-0075	9/29/2008	Iron	4	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
NB-0080	9/29/2008	Concrete	30	Free flow	0.5	None	None	None	Negative	16.1	8.45	726	0.00	
NB-0085	9/29/2008	Corrugated steel	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0095	9/29/2008	Concrete	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under Spring St. bridge
NB-0100	9/29/2008	Corrugated steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0105	9/29/2008	Concrete	30	Free flow	0.25	None	None	None	Negative	14.8	8.12	262	0.31,0.06	Chlorine retested 10/15/08
NB-0110	9/29/2008	PVC	4	Free flow	Dry	None	None	Cracking	N/A	N/A	N/A	N/A	N/A	
NB-0115	9/30/2008	Steel pipe	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	From building
NB-0120	9/29/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0125	9/30/2008	Steel pipe	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	From building
NB-0135	9/30/2008	Steel pipe	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	From building
NB-0140	9/29/2008	PVC	4	Free flow	Dry	None	None	Cracking	N/A	N/A	N/A	N/A	N/A	
NB-0145	9/30/2008	Steel pipe	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	From building
NB-0150	9/30/2008	Iron	10	Partially submerged	Unknow	None	None	Partially filled	Negative	N/A	N/A	N/A	N/A	No WQ measurements taken due to submersion of pipe; probably a relic pipe

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: North Branch</i>														
<i>Town: Montpelier</i>														
NB-0155	9/30/2008	Steel pipe	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	From building
NB-0160	9/30/2008	Laid stone culvert	20	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0165	9/30/2008	Steel	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located below NB-0155
NB-0170	9/30/2008	Steel	6	Free flow	Dry	None	None	Half filled	N/A	N/A	N/A	N/A	N/A	
NB-0175	9/30/2008	Steel	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0180	9/30/2008	PVC	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0185	9/30/2008	Steel pipe	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	From building
NB-0195	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at river's edge
NB-0200	9/30/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0205	9/30/2008	Iron	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at eye level
NB-0210	9/30/2008	Stone box culvert	26	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0215	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at river's edge
NB-0220	9/30/2008	Ceramic	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0225	9/30/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Foundation drain
NB-0230	9/30/2008	PVC	6	Free flow	Dry	None	None	None	Negative	N/A	N/A	N/A	N/A	Laundry detergent odor; Pipe appears to be a laundry vent
NB-0235	9/30/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0240	9/30/2008	Steel	6	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
NB-0245	9/30/2008	Steel	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under School St. bridge
NB-0250	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0255	9/30/2008	Concrete	30	Free flow	0.25	None	None	Cracking	Negative	14.4	8.60	1121	0.00	Located under School St. bridge
NB-0260	9/30/2008	Iron	4	Free flow	Dry	None	None	Cracking	N/A	N/A	N/A	N/A	N/A	Located below NB-0250 on wall
NB-0265	9/30/2008	Iron	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under School St. bridge
NB-0270	9/30/2008	Iron	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0275	9/30/2008	Iron	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under School St. bridge
NB-0280	9/30/2008	Iron	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0285	9/30/2008	Laid stone box culvert	22	Free flow	0.10	None	None	None	Negative	N/A	N/A	N/A	0.01	Only a chlorine sample was taken
NB-0290	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0295	9/30/2008	Black hose	1	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located above NB-0285

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: North Branch</i>														
<i>Town: Montpelier</i>														
NB-0300	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located above NB-0290 on wall
NB-0310	9/30/2008	Iron	4	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
NB-0315	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0320	9/30/2008	Iron	4	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
NB-0325	9/30/2008	Iron	10	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0330	9/30/2008	Iron	4	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
NB-0335	9/30/2008	Iron	6	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
NB-0340	9/30/2008	Iron	20	Partially submerged	0.1	None	None	None	Negative	N/A	N/A	N/A	N/A	No WQ measurements taken due to low flow
NB-0345	9/30/2008	Concrete	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under Langdon St. bridge
NB-0350	9/30/2008	Iron	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located high on wall
NB-0355	9/30/2008	Concrete	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0360	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0365	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0370	9/30/2008	Iron	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located above NB-0360 on wall
NB-0375	9/30/2008	Iron	10	Free flow	0.25	None	None	None	Negative	16.7	7.83	206	0.01	
NB-0380	9/30/2008	Iron	6	Free flow	0.25	None	None	None	Negative	16.5	7.99	187.7	0.09	Intermittent flow
NB-0385	9/30/2008	PVC	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under State St. bridge
NB-0395	9/30/2008	PVC	1	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under State St. bridge
NB-0400	9/30/2008	Iron	4	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	Located under State St. bridge
NB-0405	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under State St. bridge
NB-0410	9/30/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0415	9/30/2008	Iron	4	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
NB-0420	9/30/2008	Iron	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0425	9/30/2008	Corrugated steel	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0430	9/30/2008	PVC	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0435	9/30/2008	Corrugated steel	18	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
NB-0440	9/30/2008	PVC	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0450	9/30/2008	PVC and Iron	2	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	4 pipes in same location

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
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Receiving Water: North Branch

Town: Montpelier

NB-0470	9/30/2008	Corrugated steel	15	Free flow	Dry	None	None	Buried	N/A	N/A	N/A	N/A	N/A	
NB-0480	9/30/2008	Ceramic	30	Free flow	0.1	None	None	Cracking	Negative	N/A	N/A	N/A	N/A	No WQ measurements taken due to low flow
NB-0490	9/30/2008	Corrugated steel	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
NB-0500	9/30/2008	Corrugated steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	

Contamination: High Conductivity

NB-0090	9/29/2008	Corrugated black plastic	24	Free flow	0.5	None	None	None	Negative	14.7	7.59	2920	0.01	
NB-0190	9/30/2008	Corrugated steel	52	Free flow	1	Soap suds	None	Corrosion	Negative	15.7	8.64	2230	0.00	D-Shaped culvert

Contamination: Chlorine

NB-0305	9/30/2008	Leak	0	Free flow	0.5	None	None	N/A	Negative	17.5	8.01	345	0.93	Leak in foundation; Flowing at about 18 gpm
NB-0390	9/30/2008	Stone box culvert	26	Free flow	0.5	None	None	None	Negative	18.0	8.41	398	0.10,0.09	Located under State St. bridge. Chlorine retested 10/15/08

Receiving Water: Stevens Branch

Town: Berlin

Contamination: Wastewater

SB-0330	10/10/2008	Corrugated steel	12	Free flow	0.25	None	None	Corrosion	Positive	12.9	8.13	302	0.03	
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Contamination: None

SB-0010	10/7/2008	Concrete	30	Free flow	0.5	None	None	Front section broken off	Negative	7.0	8.34	353	0.05	Located at top of bank
SB-0015	10/7/2008	Steel	72	Free flow	0.25	None	Iron deposits	None	Negative	7.9,4.1	7.67,7	690,622	0.78,0.00	Water Quality retest 11/3/08
SB-0020	10/7/2008	Corrugated steel	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at top of bank
SB-0025	10/7/2008	Laid stone culvert	16	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
SB-0030	10/7/2008	Corrugated steel	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located at top of bank
SB-0035	10/7/2008	Iron	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0040	10/7/2008	Corrugated steel	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0045	10/7/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	6 pipes at location
SB-0050	10/7/2008	Corrugated steel	24	Free flow	3	None	Calcium deposits	None	Negative	8.3	8.19	670	0.00	Musty odor
SB-0055	10/7/2008	Concrete	24	Free flow	0.25	Soap suds	None	Debris buildup restricting flow	Negative	10.7	8.39	665	0.00	

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: Stevens Branch</i>														
<i>Town: Berlin</i>														
SB-0060	10/7/2008	Corrugated steel	60	Free flow	1	None	None	Pooling at base of pipe causing erosion	Negative	7.9	8.39	333	0.08	
SB-0065	10/7/2008	Corrugated black plastic	24	Free flow	0.25	None	None	None	Negative	10.7	8.03	611	0.01	
SB-0075	10/7/2008	Corrugated steel	24	Free flow	0.5	None	None	None	Negative	12.2	8.52	1003	0.00	
SB-0085	10/8/2008	PVC	12	Free flow	1	None	None	None	Negative	9.2	7.72	507	0.00	
SB-0090	10/7/2008	Corrugated steel	30	Free flow	0.5	Petroleum sheen	None	None	Negative	8.7	8.65	288	0.05	Flow depth fluctuates
SB-0095	10/8/2008	Corrugated steel	24	Free flow	6	Petroleum sheen	None	Slightly crushed	Negative	7.8	8.24	363	0.00	Water backed up in pipe
SB-0100	10/7/2008	Corrugated steel	36	Free flow	1	None	Iron deposits	None	Negative	8.7	8.30	549	0.00	Flow depth fluctuates
SB-0105	10/8/2008	Stone box culvert	30	Free flow	1	None	None	None	Negative	9.1	8.13	481	0.00	
SB-0110	10/7/2008	Drainage ditch	0	Free flow	N/A	None	None	N/A	Negative	9.5,8.2	8.39,8.34	334,408	0.13,0.02	Likely road drainage; Water Quality retested 11/3/08
SB-0115	10/8/2008	Corrugated black plastic	30	Free flow	0.1	None	None	None	Negative	12.7	8.24	902	0.00	
SB-0120	10/7/2008	Drainage ditch	0	Free flow	N/A	None	None	N/A	Negative	10.0,6.6	8.19,8.06	387,352	0.64,0.00	Likely road drainage; Chlorine retested 11/3/08
SB-0125	10/8/2008	Steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0130	10/7/2008	Drainage ditch	0	Free flow	N/A	None	None	None	Negative	9.3	8.32	260	0.04	Access to water source blocked by fence
SB-0135	10/8/2008	Corrugated steel	48	Free flow	1	None	None	None	Negative	12.5	8.09	475	0.01	
SB-0138	10/7/2008	Corrugated steel	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0140	10/7/2008	Concrete	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0144	10/7/2008	Drainage ditch	0	Free flow	N/A	None	None	N/A	Negative	9.0	8.44	987	0.00	Upstream outlet of drainage ditch
SB-0145	10/8/2008	Corrugated steel	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0148	10/7/2008	Drainage ditch	0	Free flow	N/A	None	None	N/A	Positive	9.2	8.37	404	0.28	Downstream outlet of road drainage ditch
SB-0150	10/7/2008	Corrugated steel	46	Free flow	1	None	Iron deposits	None	Negative	8.5	8.56	343	0.00	Pool at outlet
SB-0155	10/8/2008	Corrugated steel	34	Free flow	1	None	None	None	Negative	11.2	8.16	173	0.00	
SB-0160	10/7/2008	Iron	3	Free flow	N/A	None	None	None	Negative	8.4	8.24	287	0.00	Break in pipe that runs parallel to river; water flowing into SB-0150's drainage
SB-0165	10/10/2008	Laid stone culvert	24	Free flow	5	None	None	None	Negative	9.6	7.91	287	0.03	
SB-0170	10/8/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	6.2	8.25	354	0.00	
SB-0175	10/10/2008	Iron	12	Free flow	1	None	None	None	Negative	9.1	8.08	368	0.02	
SB-0180	10/8/2008	Concrete	30	Free flow	0.5	None	Iron deposits	None	Negative	7.8	8.13	274	0.00	
SB-0185	10/10/2008	Corrugated black plastic	15	Free flow	0.25	Petroleum sheen	None	None	Negative	10.7	7.86	392	0.05	Slight petroleum sheen

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
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Receiving Water: Stevens Branch

Town: Berlin

SB-0190	10/8/2008	Concrete	30	Free flow	12	None	None	Cracking	Negative	9.6	8.34	438	0.00	Backed up water
SB-0195	10/10/2008	Corrugated steel	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located upstream of Partridge bridge
SB-0200	10/8/2008	Concrete	30	Free flow	3	Soap suds	None	None	Negative	8.8	8.04	694	0.00	
SB-0210	10/8/2008	Unknown	0	Free flow	N/A	None	None	Buried	Negative	14.3	7.77	743	0.00	Pipe buried under granite slabs
SB-0215	10/10/2008	Corrugated black plastic	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0230	10/8/2008	Concrete	15	Free flow	0.1	None	None	None	Negative	13.2,5.8	8.23,8.24	340,350	0.26,0.03	Water Quality retest 11/3/08
SB-0240	10/8/2008	Concrete	24	Free flow	0.25	None	None	None	Negative	12.9	8.43	330	0.00	
SB-0250	10/8/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0256	10/8/2008	Corrugated black plastic	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0260	10/8/2008	PVC	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0270	10/8/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	10.0	8.31	1341	0.00	Petroleum seep located upstream 30ft
SB-0280	10/10/2008	PVC	12	Free flow	0.1	Soap suds	None	None	Negative	11.5	6.78	35.2	0.00	
SB-0290	10/10/2008	Corrugated black plastic	18	Free flow	Dry	None	None	Outlet crushed	N/A	N/A	N/A	N/A	N/A	
SB-0300	10/10/2008	Corrugated steel	24	Free flow	0.5	None	None	Outlet crushed	Negative	14.0	8.35	1080	0.00	
SB-0310	10/10/2008	Corrugated steel	12	Free flow	Dry	None	None	Filled with sediment	N/A	N/A	N/A	N/A	N/A	
SB-0320	10/10/2008	Corrugated steel	12	Free flow	0.25	None	None	None	Negative	12.9	8.41	499	0.00	
SB-0340	10/10/2008	Corrugated steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0350	10/10/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	12.1	8.44	450	0.01	
SB-0360	10/10/2008	Iron	4	Free flow	Dry	None	None	Rusting	N/A	N/A	N/A	N/A	N/A	Located at top of bank
SB-0380	10/10/2008	Concrete	12	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
SB-0390	10/10/2008	Concrete	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0400	10/10/2008	Corrugated steel	24	Free flow	1	Soap suds	None	None	Negative	12.9	8.23	402	0.05	

Contamination: Hydrocarbon

SB-0220	10/8/2008	Corrugated steel	30	Free flow	1	None	Iron deposits	None	Negative	11.4	8.04	612	0.00	Strong petroleum odor; Mobil gas station across street
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Contamination: High Conductivity

SB-0070	10/7/2008	Corrugated steel	18	Free flow	0.1	None	None	None	Negative	8.2	8.36	3050	0.03	
SB-0080	10/7/2008	Corrugated steel	12	Free flow	0.1	None	None	None	Negative	8.2	8.61	2460	0.07	
SB-0205	10/10/2008	Iron	4	Free flow	2	None	None	None	Negative	16.1	6.62	2840	0.00	

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
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Receiving Water: Stevens Branch

Town: Berlin

Contamination: Chlorine

SB-0370	10/10/2008	Corrugated steel	15	Free flow	0.1	None	None	Corrosion	Negative	11.9	8.32	288	0.16	11/3/08: Revisited for chlorine retest but water frozen.
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Town: Montpelier

Contamination: None

SB-0410	10/10/2008	Corrugated steel	15	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
SB-0420	10/10/2008	Concrete box culvert	54	Free flow	2	None	None	None	Negative	10.6	8.34	392	0.02	
SB-0430	10/10/2008	Corrugated steel	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
SB-0450	10/10/2008	Corrugated black plastic	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	

Contamination: Hydrocarbon

SB-0440	10/10/2008	Corrugated steel	48	Free flow	3	None	None	None	Negative	11.9	8.42	734	0.00	Petroleum odor
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Receiving Water: Winooski River

Town: Montpelier

Contamination: Wastewater

WR-0500	9/23/2008	Corrugated steel	24	Free flow	1	None	None	None	Positive	14.2	8.02	411	0.00	Septic odor
WR-0690	9/26/2008	Concrete	48	Partially submerged	3	None	None	Partially filled	Positive	13.5	7.84	1686	0.07	

Contamination: None

WR-0010	9/16/2008	Corrugated steel	30	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0020	9/16/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0030	9/16/2008	Corrugated steel	18	Free flow	Dry	None	None	Partially filled, crushed	N/A	N/A	N/A	N/A	N/A	
WR-0040	9/16/2008	Concrete	18	Free flow	0.5	None	Iron deposits	None	Negative	14.2	7.09	214	0.03	
WR-0050	9/16/2008	Corrugated steel	15	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0055	9/16/2008	Concrete	12	Free flow	Dripping	None	None	None	Negative	N/A	N/A	N/A	N/A	No WQ measurements taken due to low flow
WR-0060	9/16/2008	Corrugated steel	15	Free flow	Dry	None	None	Crushed	N/A	N/A	N/A	N/A	N/A	
WR-0065	9/16/2008	Concrete	12	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0075	9/16/2008	Stream	0	Free flow	N/A	None	None	Buried	Negative	14.4	6.78	1524	0.09	Small flow stream or possible collapsed pipe or spring; 20 ft from WR-0065
WR-0080	9/16/2008	Concrete	14	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under Route 2 bridge; Left Bank

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: Winooski River</i>														
<i>Town: Montpelier</i>														
WR-0085	9/16/2008	Concrete	14	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under center of Route 2 bridge
WR-0095	9/18/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	12.7	7.26	457	0.02	Located downstream railroad trestle
WR-0105	9/18/2008	Stream	0	Free flow	N/A	None	None	N/A	Negative	13.0	7.98	616	0.08	
WR-0115	9/18/2008	Laid stone culvert	36	Free flow	13	None	None	None	Negative	13.3	6.84	244	0.05	
WR-0120	9/18/2008	Steel	14	Free flow	0.5	None	None	Corrosion	Negative	14.4	8.19	878	0.03	
WR-0125	9/18/2008	Corrugated black plastic	24	Free flow	0.5	None	Iron deposits	None	Negative	14.0	7.83	291	0.00	Minor iron staining
WR-0130	9/18/2008	PVC	2	Free flow	1	None	None	None	Negative	10.0	7.45	1104	0.00	Intermittent flow; Owner said the source is 200+ ft deep artesian well
WR-0135	9/18/2008	Corrugated black plastic	12	Free flow	0.5	None	Iron deposits	Cracking	Negative	16.8	7.58	215	0.01	Sediment filled concrete pipe section directly below outfall
WR-0140	9/18/2008	Cast iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0145	9/18/2008	Corrugated black plastic	15	Free flow	0.5	None	Iron deposits	None	Negative	17.6	8.00	404	0.00	
WR-0150	9/18/2008	Cast iron	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0154	9/19/2008	Steel	12	Free flow	0.25	None	None	None	Negative	14.3	8.04	156	0.05	
WR-0155	9/18/2008	Corrugated black plastic	12	Free flow	0.5	None	Iron deposits	None	Negative	16.4	7.93	439	0.01	
WR-0158	9/19/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0160	9/18/2008	Concrete	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0165	9/18/2008	Corrugated steel	12	Free flow	0.5	None	None	None	Negative	17.9	8.06	369	0.02	
WR-0175	9/18/2008	Corrugated black plastic	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0185	9/18/2008	Corrugated black plastic	18	Free flow	0.5	None	None	None	Negative	15.9	8.23	478	0.04	
WR-0190	9/19/2008	Corrugated steel	32	Free flow	1	None	Iron deposits	Corrosion	Negative	14.8	8.21	1035	0.02	
WR-0195	9/19/2008	Corrugated steel	12	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0200	9/19/2008	Corrugated black plastic	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0205	9/19/2008	Corrugated black plastic	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0210	9/19/2008	Stream	0	Free flow	N/A	None	None	N/A	Positive	12.6	8.43	598	0.00	
WR-0215	9/19/2008	Corrugated black plastic	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0220	9/19/2008	Corrugated black plastic	32	Free flow	Dripping	None	None	None	Positive	12.9	8.35	631	0.02	
WR-0225	9/19/2008	Corrugated steel	32	Free flow	0.5	None	Iron deposits	Corrosion	Negative	14.6	8.47	1496	0.02	
WR-0230	9/19/2008	Corrugated steel	24	Free flow	0.1	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	Can't obtain sample due to pipe corrosion

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: Winooski River</i>														
<i>Town: Montpelier</i>														
WR-0235	9/23/2008	Corrugated steel	18	Free flow	Dry	None	Iron deposits	Crushed, corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0240	9/19/2008	Corrugated steel	40	Free flow	0.5	None	None	Partially filled	Negative	17.1	7.60	1045	0.42,0.00	Chlorine retested 10/9/08
WR-0245	9/23/2008	Corrugated black plastic	15	Free flow	0.25	Soap suds	None	None	Negative	0	9.70	272	0.00	
WR-0250	9/19/2008	Corrugated steel	15	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0255	9/23/2008	Corrugated black plastic	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0260	9/19/2008	Corrugated steel	18	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0265	9/23/2008	Corrugated black plastic	15	Free flow	0.1	None	None	None	Negative	14.1	8.34	1140	0.04	
WR-0270	9/19/2008	Corrugated steel	24	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0275	9/23/2008	Corrugated black plastic	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0280	9/19/2008	Corrugated steel	67	Free flow	1	None	None	None	Negative	13.1	8.65	609	0.06	D-Shaped culvert
WR-0285	9/23/2008	Steel	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0290	9/19/2008	Corrugated steel	18	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0300	9/19/2008	Corrugated steel	18	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0305	9/23/2008	Steel	12	Free flow	Dry	None	None	Broken, partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0310	9/19/2008	Iron	10	Partially submerged	0	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0315	9/23/2008	Smooth plastic	12	Free flow	Dry	None	None	Broken	N/A	N/A	N/A	N/A	N/A	
WR-0320	9/19/2008	Corrugated steel	18	Free flow	0.5	None	Iron deposits	None	Negative	14.0	8.52	1389	0.00	
WR-0325	9/23/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	5 PVC pipes located along Main Street bridge abutment
WR-0330	9/23/2008	Corrugated steel	18	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0333	11/11/2008	Corrugated black plastic	36	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	New culvert installed by Public Works
WR-0335	9/25/2008	Concrete	30	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0340	9/23/2008	Corrugated steel	8	Free flow	Dry	None	None	Cement plugged	N/A	N/A	N/A	N/A	N/A	Road culvert plugged with concrete
WR-0345	9/25/2008	Ceramic	8	Free flow	Dry	None	None	Cracking	N/A	N/A	N/A	N/A	N/A	
WR-0350	9/23/2008	Corrugated steel	8	Free flow	Dry	None	None	Cement plugged	N/A	N/A	N/A	N/A	N/A	Road culvert plugged with concrete
WR-0355	9/25/2008	Iron	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0360	9/23/2008	Corrugated black plastic	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0365	9/25/2008	Iron	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0370	9/23/2008	Smooth plastic	8	Free flow	Dry	None	None	Cement plugged	N/A	N/A	N/A	N/A	N/A	Road culvert plugged with concrete

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: Winooski River</i>														
<i>Town: Montpelier</i>														
WR-0375	9/25/2008	Corrugated steel	15	Free flow	Dry	None	Iron deposits	Crushed, corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0380	9/23/2008	Corrugated steel	8	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	Road culvert plugged with concrete; Inner pvc pipe [3 inches] also plugged
WR-0385	9/25/2008	Concrete	30	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0390	9/23/2008	Concrete	18	Free flow	Dry	None	None	Erosion	N/A	N/A	N/A	N/A	N/A	8 ft section unattached
WR-0395	9/25/2008	Ceramic	12	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0400	9/23/2008	Corrugated steel	8	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0405	9/25/2008	Corrugated steel	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0410	9/23/2008	Smooth plastic	10	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0415	9/25/2008	Concrete	24	Free flow	0.25	None	None	None	Negative	15.5	7.71	293	0.12, 0.01	Chlorine retested 10/15/08
WR-0420	9/23/2008	Smooth plastic	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0425	9/25/2008	Corrugated steel	15	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0430	9/23/2008	Corrugated steel	6	Free flow	Dry	None	None	Crushed, corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0435	9/25/2008	Concrete	20	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0440	9/23/2008	Smooth plastic	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0445	9/25/2008	Corrugated steel	24	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0450	9/23/2008	Corrugated steel	8	Free flow	Dry	None	None	Crushed, corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0455	9/25/2008	Corrugated steel	32	Free flow	0.25	None	None	Corrosion	Negative	16.5	8.30	1180	0.10,0.03	Located under Bailey Ave. bridge. Chlorine retested 10/15/08
WR-0460	9/23/2008	Corrugated steel	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0465	9/25/2008	Corrugated steel	24	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0470	9/23/2008	Corrugated steel	10	Free flow	Dry	None	None	Crushed, corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0475	9/25/2008	Corrugated steel	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0480	9/23/2008	Corrugated steel	8	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0485	9/25/2008	Concrete box culvert	84	Partially submerged	0.5	None	None	None	Negative	14.3	8.40	518	0.18,0.02	Chlorine retested 10/15/08
WR-0490	9/23/2008	Corrugated steel	15	Free flow	Dry	None	None	Buried	N/A	N/A	N/A	N/A	N/A	
WR-0495	9/26/2008	Corrugated steel	18	Free flow	Dry	None	None	Partly crushed, corrosion	N/A	N/A	N/A	N/A	N/A	

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: Winooski River</i>														
<i>Town: Montpelier</i>														
WR-0505	9/26/2008	Corrugated steel	18	Free flow	Dry	None	None	Partly crushed	N/A	N/A	N/A	N/A	N/A	
WR-0510	9/23/2008	Corrugated steel	24	Free flow	Dry	None	None	Crushed, corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0515	9/26/2008	Corrugated steel	18	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0520	9/23/2008	Concrete	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0525	9/26/2008	Corrugated steel	24	Free flow	Dry	None	None	Partially crushed	N/A	N/A	N/A	N/A	N/A	
WR-0530	9/25/2008	Corrugated steel	18	Free flow	Unknow	None	None	None	N/A	N/A	N/A	N/A	N/A	Directly below dam unable to reach
WR-0535	9/26/2008	Corrugated steel	18	Free flow	Dry	None	None	Crushed	N/A	N/A	N/A	N/A	N/A	
WR-0540	9/25/2008	Corrugated steel	36	Free flow	Dry	None	None	Slightly crushed	N/A	N/A	N/A	N/A	N/A	
WR-0545	9/26/2008	Corrugated steel	18	Free flow	Dry	None	None	Partially crushed	N/A	N/A	N/A	N/A	N/A	
WR-0550	9/25/2008	Corrugated steel	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0555	9/26/2008	Corrugated steel	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Bank eroded to river
WR-0560	9/25/2008	Corrugated steel	15	Free flow	Dry	None	None	Slightly crushed	N/A	N/A	N/A	N/A	N/A	Located high on wall
WR-0570	9/25/2008	Corrugated steel	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located high on wall
WR-0575	9/26/2008	Corrugated steel	18	Free flow	Dry	None	None	Erosion	N/A	N/A	N/A	N/A	N/A	Slight erosion beneath pipe
WR-0580	9/25/2008	Corrugated steel	15	Free flow	Dry	None	None	Partly crushed	N/A	N/A	N/A	N/A	N/A	
WR-0585	9/26/2008	Corrugated steel	6	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0590	9/25/2008	Corrugated steel	18	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0595	9/26/2008	Corrugated black plastic	18	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0600	9/25/2008	Seep	0	Free flow	N/A	None	None	N/A	Negative	16.3	7.30	886	0.14,0.04	10 vertical ft below top of bank; Chlorine retested 10/15/08
WR-0605	9/26/2008	Corrugated steel	24	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	
WR-0610	9/25/2008	Corrugated steel	15	Free flow	Dry	None	None	Corrosion	N/A	N/A	N/A	N/A	N/A	
WR-0615	9/26/2008	Corrugated black plastic	32	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	Bank erosion
WR-0620	9/25/2008	Concrete	24	Free flow	1	None	None	Broken	Negative	12.9	7.04	1957	0.07	Located upstream of railroad bridge. Front pipe section broken off
WR-0630	9/25/2008	Corrugated black plastic	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located under railroad bridge
WR-0640	9/25/2008	Corrugated black plastic	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0650	9/25/2008	Steel	8	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Bailey Avenue bridge drains (2 pipes located at each end of the bridge)
WR-0660	9/25/2008	Corrugated steel	36	Free flow	Dry	None	None	Partially filled	N/A	N/A	N/A	N/A	N/A	

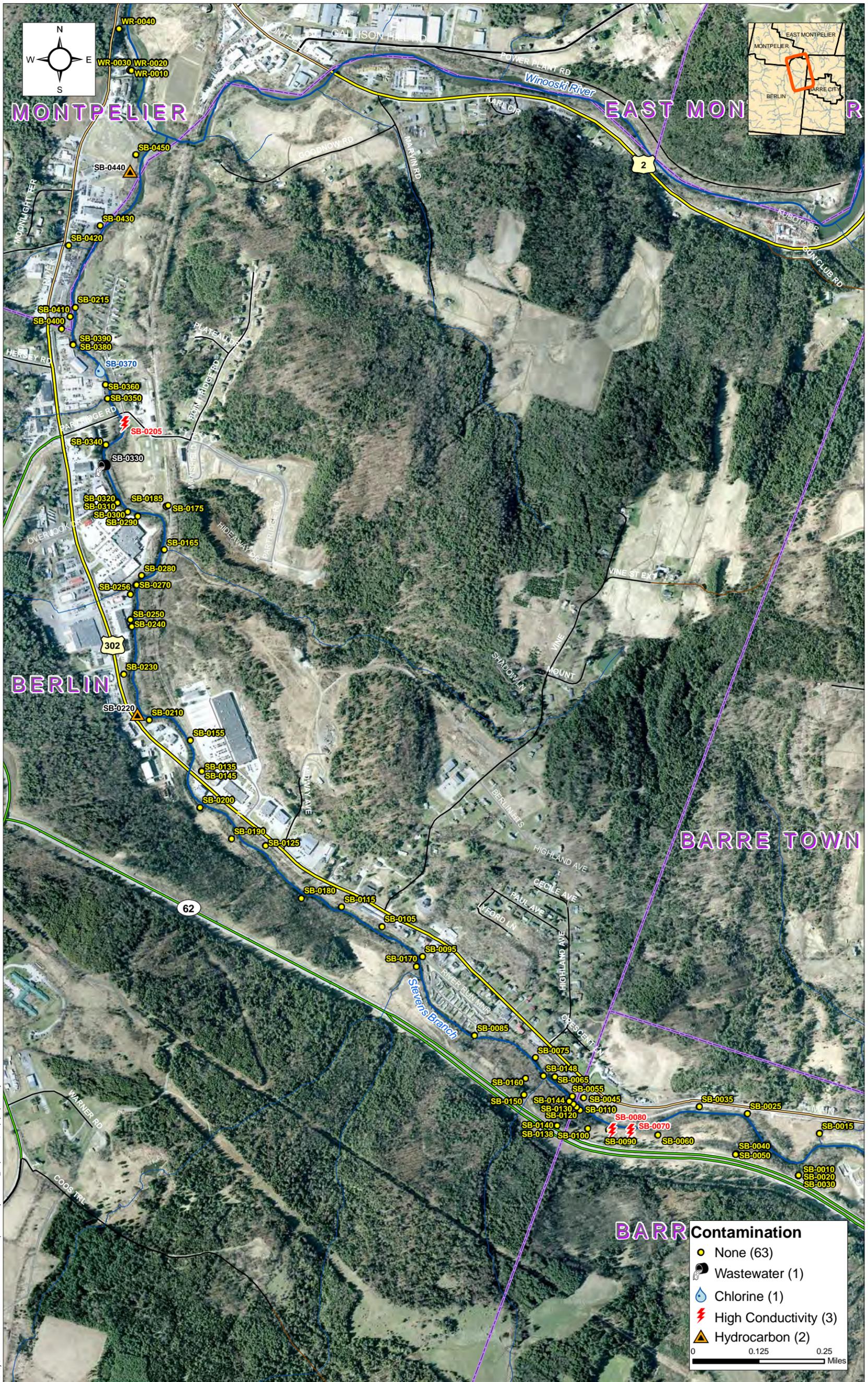
Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
<i>Receiving Water: Winooski River</i>														
<i>Town: Montpelier</i>														
WR-0670	9/26/2008	Corrugated black plastic	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0680	9/26/2008	Corrugated black plastic	15	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0700	9/26/2008	Corrugated black plastic	18	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0710	9/26/2008	Corrugated steel	12	Free flow	0.25	None	None	None	Negative	14.1	8.26	279	0.00	
WR-0720	9/26/2008	Corrugated black plastic	30	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	Located high on bank
WR-0730	9/26/2008	Corrugated black plastic	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0740	9/26/2008	Corrugated black plastic	24	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0748	9/26/2008	PVC	4	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0750	9/26/2008	Corrugated steel	10	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0760	9/26/2008	Corrugated black plastic	12	Free flow	Dry	None	None	None	N/A	N/A	N/A	N/A	N/A	
WR-0770	9/26/2008	Corrugated steel	68	Partially submerged	2	None	None	None	Positive	11.8	8.03	596	0.01	
WR-0780	9/26/2008	Concrete	126	Free flow	Dry	None	None	Half filled	N/A	N/A	N/A	N/A	N/A	Concrete base
WR-0790	9/26/2008	Concrete	18	Free flow	Dry	None	None	Mostly filled	N/A	N/A	N/A	N/A	N/A	
Contamination: Hydrocarbon, High Conductivity														
WR-0180	9/18/2008	Concrete	15	Free flow	0.5	Petroleum sheen, soap suds	Iron/oily deposits	Filled with sediment	Negative	14.0	7.78	2600	0.03	Orange color, petroleum odor
Contamination: Hydrocarbon														
WR-0070	9/16/2008	Corrugated steel	18	Free flow	1	None	None	Partially filled, corrosion	Negative	15.5	7.79	770	0.00	Petroleum odor
WR-0090	9/18/2008	Seep	0	Free flow	N/A	Petroleum sheen	Iron/oily deposits	N/A	Negative	13.3	6.72	1431	0.03	Located directly behind Grossman's building. Orange color, petroleum odor
WR-0100	9/18/2008	Seep	0	Free flow	N/A	Petroleum sheen	Iron/oily deposits	N/A	Negative	13.4	6.78	10.51	2.20	Orange color, petroleum odor; Unable to get clear pH reading; Natural and synthetic oil residue
WR-0110	9/18/2008	Seep	0	Free flow	N/A	None	Iron deposits	N/A	Negative	14.0	6.92	675	0.49	Seep located near outlet of gully. Slight petroleum odor; Unable to get clear pH reading
WR-0170	9/18/2008	Corrugated black plastic	18	Free flow	0.5	None	None	None	Negative	13.3	8.34	712	0.02	Slight petroleum odor
Contamination: High Conductivity														
WR-0295	9/23/2008	Stone box culvert	36	Free flow	1	None	None	None	Negative	14.9	8.45	3690	0.06	24-inch corrugated black plastic pipe (dry) located further back in stone box culvert
Contamination: Chlorine														
WR-0565	9/26/2008	Seep	0	Free flow	N/A	None	None	N/A	Negative	16.0	7.99	256	0.98, 0.86	Chlorine retested 10/15/08

Discharge Point	Date Inspected	Material	Diameter (inches)	Position	Flow Depth (inches)	Floatables	Deposits	Damage	O.B. Result	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	Comments
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Receiving Water: *Winooski River*

Town: *Montpelier*

WR-0625	9/26/2008	Corrugated black plastic	36	Free flow	0.25	None	Iron deposits	Partially filled	Negative	14.7	8.31	209	0.96,0.83	Chlorine retested 10/15/08
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Figure 3: Discharge Points to Stevens Branch in Berlin and Montpelier

STONE ENVIRONMENTAL INC

Sources: Vermont Mapping Program: 1:1250 Capital Region Production 2006 Orthophotos;
 VCGI: Roads, Hydrology; Stone Environmental Inc: Discharge Points

535 Stone Cutters Way
 Montpelier, Vermont
 05602 USA

Phone / 802.229.4541
 Fax / 802.229.5417
 Web Site / www.stone-env.com



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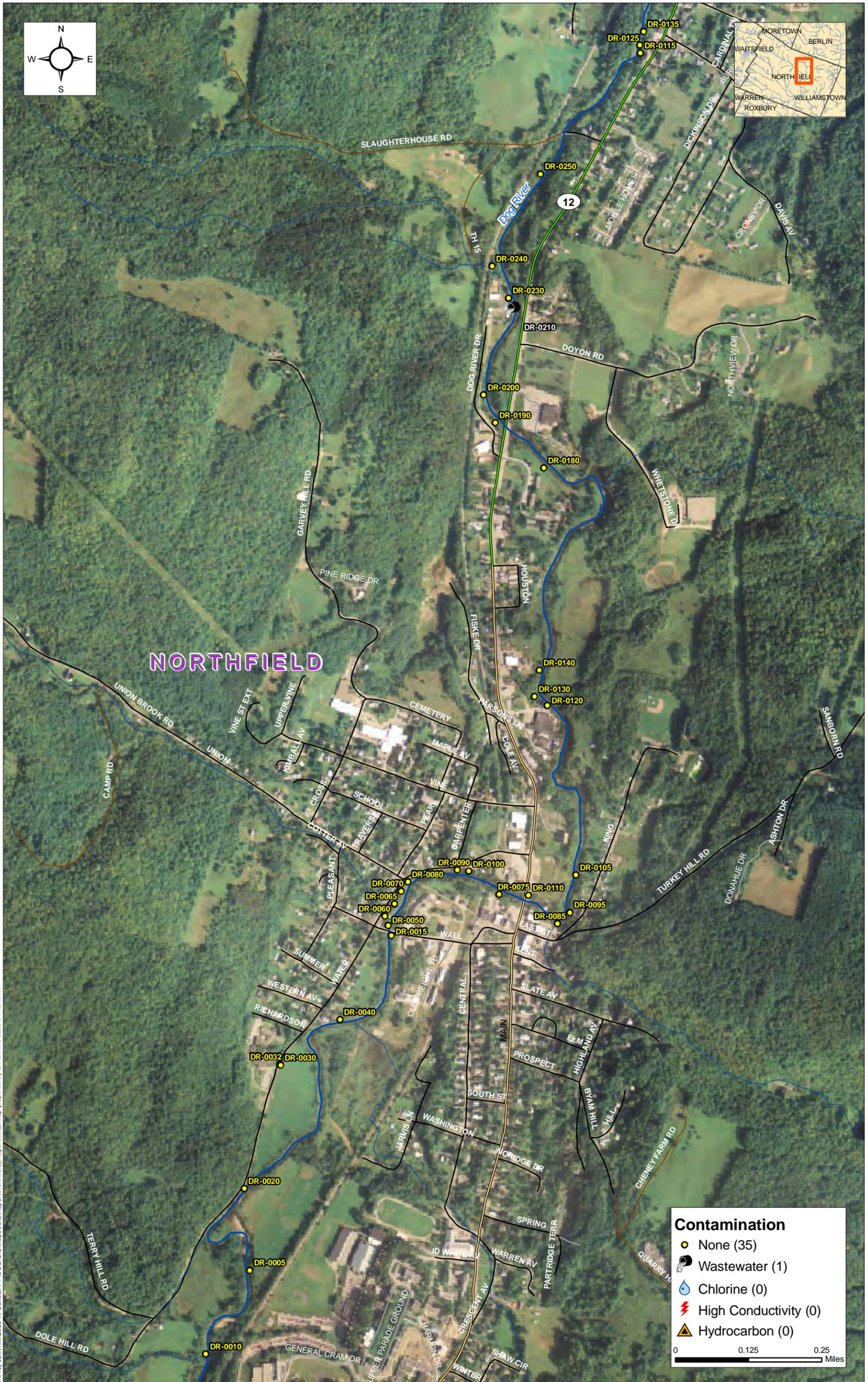
Figure 2: Discharge Points to North Branch in Montpelier

Sources: Vermont Mapping Program: 1:1250 Capital Region Production 2006 Orthophotos; VCGI: Roads, Hydrology; Stone Environmental Inc: Discharge Points

STONE ENVIRONMENTAL INC

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Figure 4: Discharge Points to Dog River in Northfield

STONE ENVIRONMENTAL INC
 535 Stone Cutters Way
 Montpelier, Vermont
 05602 USA
 Phone / 802.229.4541
 Fax / 802.229.5417
 Web Site / www.stone-env.com

Sources: NAIP Imagery; VCGI: Roads, Hydrology; Stone Environmental Inc: Discharge Points

Table 2: Follow-up Testing of Suspected Wastewater-Contaminated Discharge

Discharge Point	OB Test	OB Test I	OB Test II	Flow Depth (inches)	Flow (L/s)	Water Temp. (°C)	pH	Conductance (µS/cm)	Chlorine (ppm)	E. coli (MPN/100 mL)	Total Phosphorus (mg/L)	Comment
DR-0210	Positive	N/A	N/A									
NB-0010	Positive (strong)	Positive	N/A	Dripping	0.0063	13.8	6.85	433	0	12000	0.63	Strong septic odor; no oil apparent
NB-0130	Positive (strong)	Positive	Positive	1	0.5	13.8	8.13	623	0.07	1780	0.045	No apparent odor
NB-0460	Positive (strong)	Positive	N/A	3	0.12	13.8	7.62	1406	0	14100	3.4	Strong septic odor; Producing small grey plume at entry point in river
SB-0148	Positive (weak)	Negative	N/A	1	0.11	8.2	8.33	356	0.04	10	0.078	Drainage ditch
SB-0330	Positive (weak)	Positive	N/A	0.5	0.04	11	8.17	475	0.01	10	0.029	
WR-0210	Positive	N/A	N/A	1	12	8.5	7.76	461	0	63	0.016	No septic odor
WR-0220	Positive	Negative	Negative	0.5	0.013	9.6	8.21	517	0.05	10	0.016	No septic odor
WR-0500	Positive (strong)	Negative	Negative	1	1.9	9.3	8.22	301	0	336	0.052	Septic odor noted
WR-0690	Positive (indeterminate)	Positive (weak)	N/A									Unable to sample due to partial submergence of pipe
WR-0770	Positive (indeterminate)	Negative	N/A									Unable to sample due to partial submergence of pipe

OBSERVATIONS AND REMARKS



STONE ENVIRONMENTAL INC

535 Stone Cutters Way
Montpelier, Vermont
05602 USA

Phone / 802.229.4541
Fax / 802.229.5417
Web Site / www.stone-env.com

Project Name/Description:

Central VT IDDE

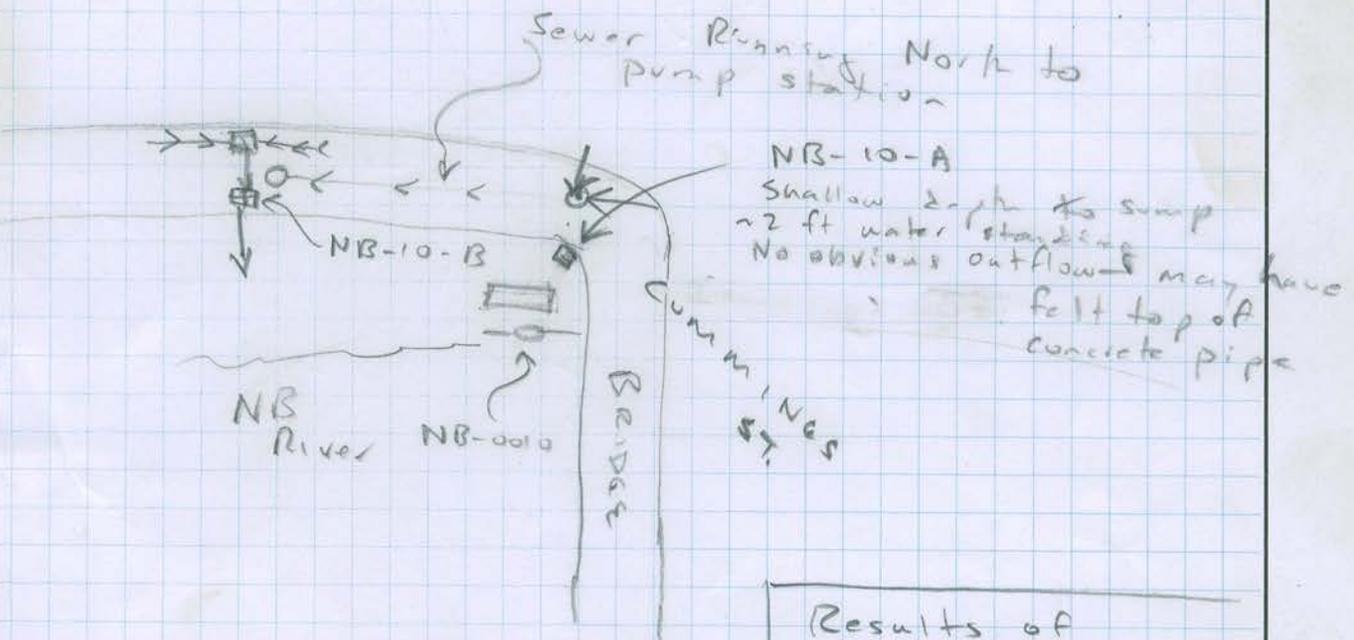
SEI Project #: 08 2036-W

Client/Sponsor:

NB-0010 (Cummings Street)

NB-10-A plugged catch basin in front of white trailer

NB-10-B



Results of 11/12/08 08 readings

NB-0010 Retest (+)

NB-10-A (-)

NB-10-B (-)

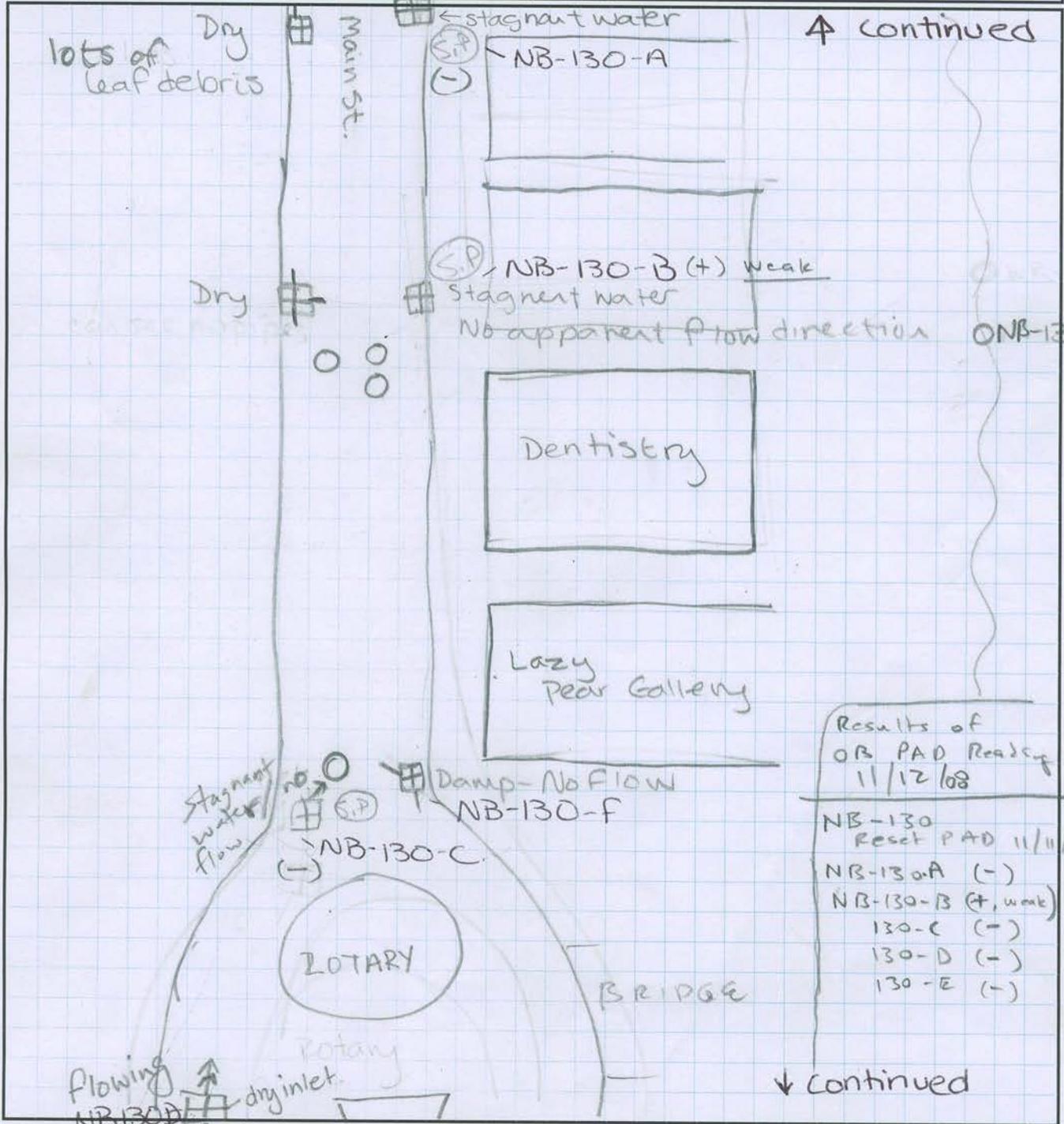
Local source of WW
infiltrating pipe
likely - best guess

Signed: CED, DCB

Date: 11/4/08

OBSERVATIONS AND REMARKS

 <p>STONE ENVIRONMENTAL INC</p> <p>535 Stone Cutters Way Montpelier, Vermont 05602 USA</p> <p>Phone / 802.229.4541 Fax / 802.229.5417 Web Site / www.stone-env.com</p>	<p>Project Name/Description: Central VT IDDE</p>
<p>SEI Project #: 082036-W</p>	<p>Client/Sponsor: ANK/FNR</p>



Results of
OB PAD Reading
11/12/08

NB-130
Reset PAD 11/11/08

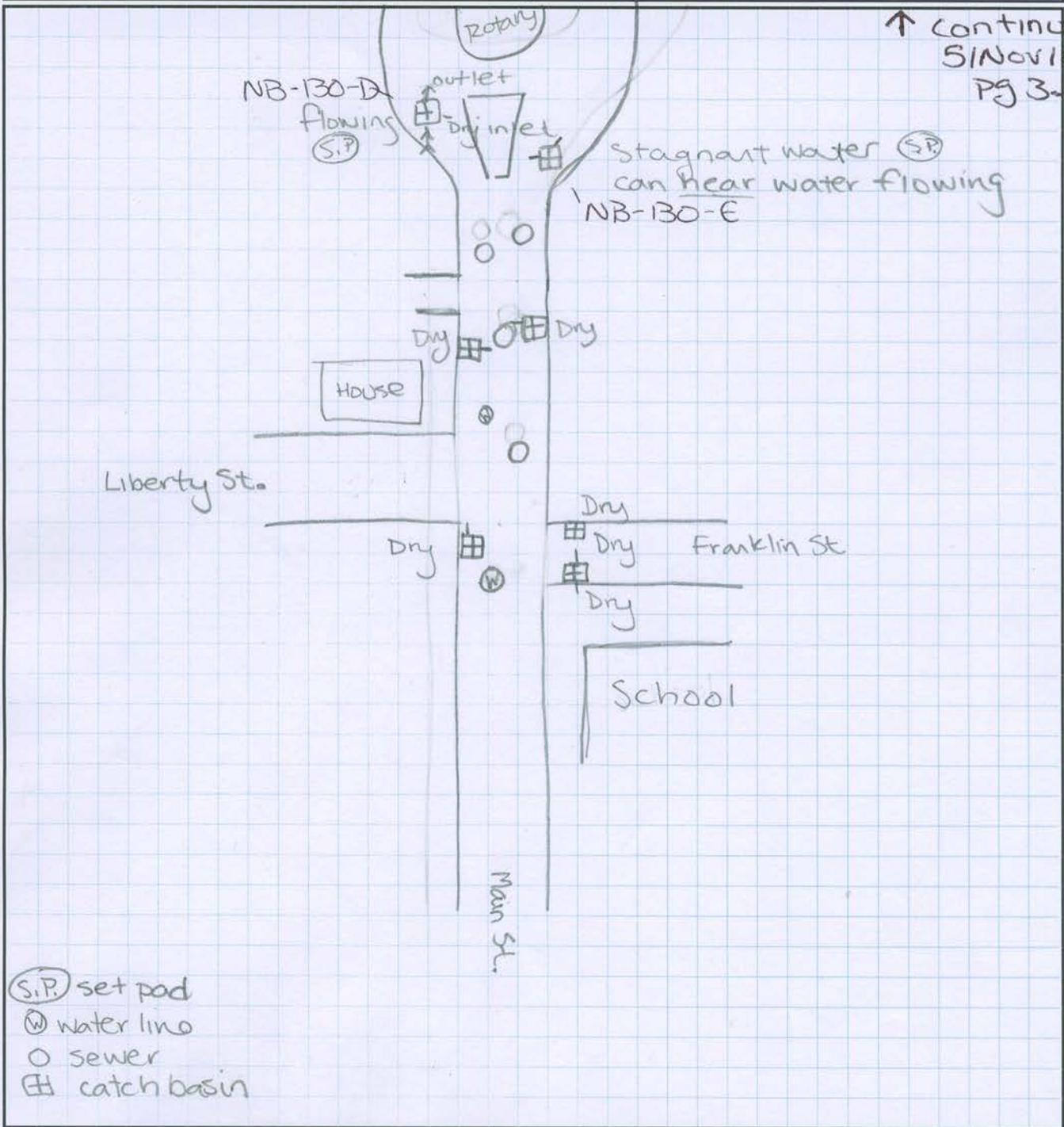
- NB-130-A (-)
- NB-130-B (+, weak)
- 130-C (-)
- 130-D (-)
- 130-E (-)

Signed: CEJ/CJN

Date: 5/11/08

OBSERVATIONS AND REMARKS

 STONE ENVIRONMENTAL INC 535 Stone Cutters Way Montpelier, Vermont 05602 USA Phone / 802.229.4541 Fax / 802.229.5417 Web Site / www.stone-env.com	Project Name/Description: Client/Sponsor:
SEI Project #: 682036	Client/Sponsor:



Signed: CEP, AES

Date: 6/Nov/08

OBSERVATIONS AND REMARKS



STONE ENVIRONMENTAL INC

535 Stone Cutters Way
Montpelier, Vermont
05602 USA

Phone / 802.229.4541
Fax / 802.229.5417
Web Site / www.stone-env.com

Project Name/Description:

SEI Project #: 082036-W

Client/Sponsor: ANR / FWR

NB-460

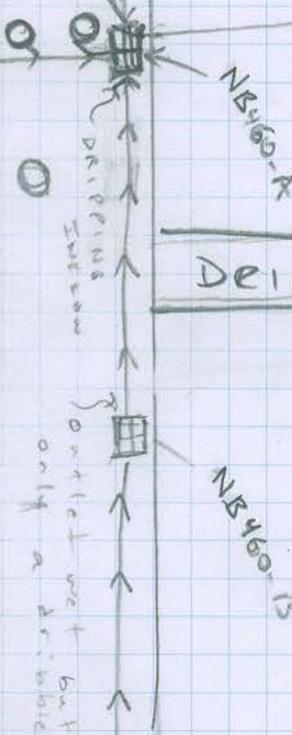
PIPE invert from NB460-D to NB460-A wet but not apparently flowing. Outlet of pipe under main street to NB-460-A partially submerged.

NB460-A smells of WW.

WR 460-D

CITY HALL
OUTLET DCA

DECK
pipe



DRIVE

NB460-B

Positive PI

*Did not place 0.3 pad

Results	11/12/08 Readings
NB-0460 Retest	+
460-A (Brooks)	+
460-B (SPLASH)	(-)
460-D (City Hall)	(-)

Sewer line under Main St.

Suspected source of contamination

Signed: DCB

Date: 11/14/08

OBSERVATIONS AND REMARKS



STONE ENVIRONMENTAL INC

535 Stone Cutters Way
Montpelier, Vermont
05602 USA

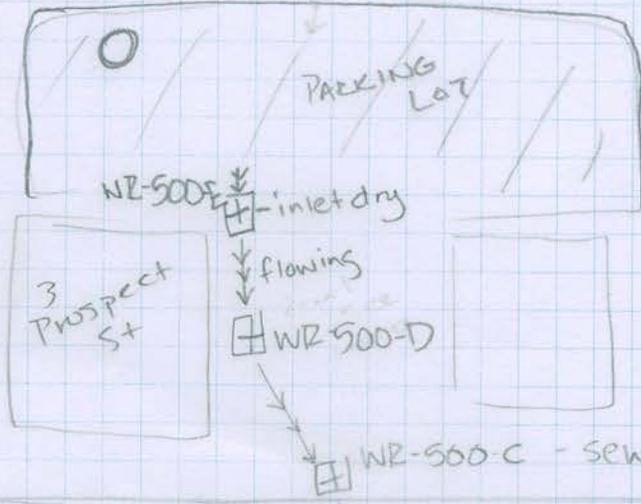
Phone / 802.229.4541
Fax / 802.229.5417
Web Site / www.stone-env.com

Project Name/Description:

Central VT IDDE

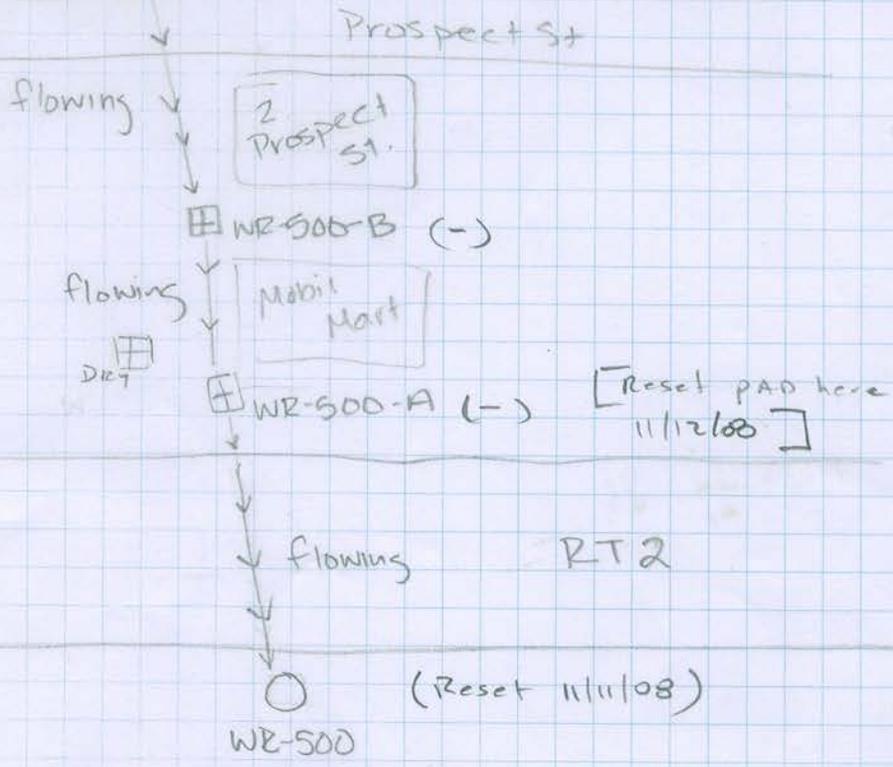
SEI Project #: 082036-W

Client/Sponsor:



Results of
O.S. PAD Reading
11/12/08

- WR-500-A (-)
- WR-500-B (-)
- WR-500-D (-)
- WR-500-E (-)

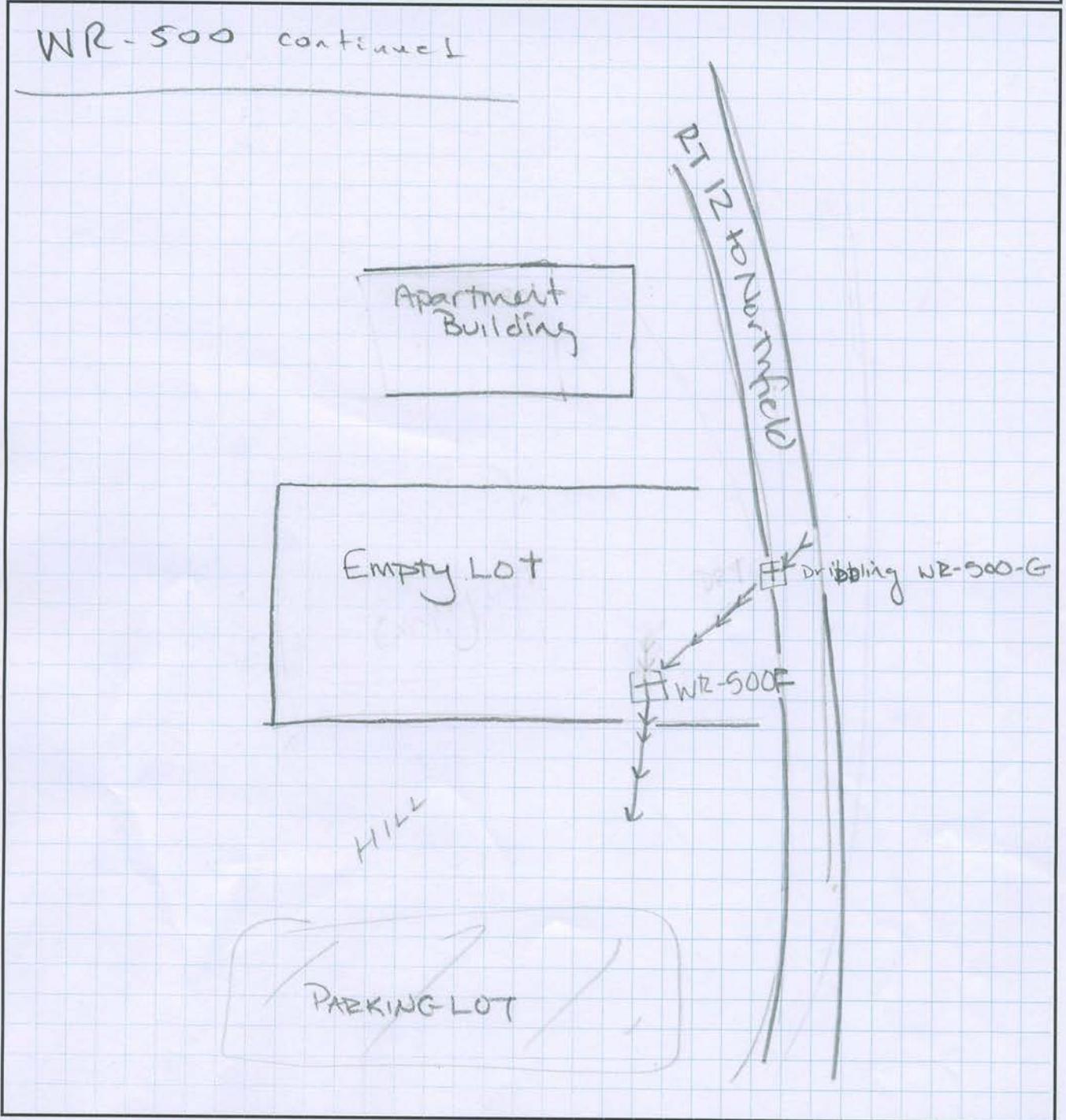


Signed: CEO

Date: 5/16/08

OBSERVATIONS AND REMARKS

 STONE ENVIRONMENTAL INC 535 Stone Cutters Way Montpelier, Vermont 05602 USA Phone / 802.229.4541 Fax / 802.229.5417 Web Site / www.stone-env.com	Project Name/Description:
SEI Project #:	Client/Sponsor:



Signed: CEC

Date: 5 Nov 08

Sitelab Petroleum Hydrocarbons Summary Report

Project No. 091011 Date: 1/14/2008 Site Location: Winooski River

Customer:

Ann Smith
 Friends of the Winooski River
 P.O. Box 777
 Montpelier, VT 05601

Sitelab Operator: Steve Greason

Signature: _____

Date & Time: _____



Sample ID No. Results in ppm (mg/L in Water)	Test 1: GRO C6-C10 Gasoline Range Hydrocarbons Cal Kit #025 Slot B Optics	Test 2: EDRO C10-C36 Diesel & Oil Range Hydrocarbons Cal Kit #042 Slot A Optics	Test 3: Total PAHs EPH C11-C22 Hydrocarbons Cal Kit #060 Slot A Optics	Test 4: Target PAHs (EPA 8270 PAHs) Cal Kit #060 Slot D Optics	Test 5: TD-500 Analyzer Heavy PAHs Using same PAH Cal Kit #060
SB-0220-A	ND <0.5	ND <0.1	ND <0.05	ND <0.05	ND <0.05
SB-0440-A	ND <0.5	ND <0.1	ND <0.05	ND <0.05	ND <0.05
WR-0070-A	ND <0.5	ND <0.1	ND <0.05	ND <0.05	ND <0.05
WR-0090-A	ND <0.5	0.3	0.08	ND <0.05	ND <0.05
WR-0100-A	1.2	1.8	0.45	ND <0.05	ND <0.05
WR-0170-A	ND <0.5	ND <0.1	ND <0.05	ND <0.05	ND <0.05
Correlates to EPA Method 8015-GRO		Correlates to EPA Method 8015-DRO		Correlates to EPA Method 8270 by GC/MS as sum of PAH compounds	



State of Vermont

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Waste Management Division
103 South Main Street/West Building
Waterbury, VT 05671-0404
(802) 241-3888
FAX (802) 241-3296
matt.moran@state.vt.us

CERTIFIED MAIL #7002 2410 0007 0257 3103

June 19, 2009

Lawrence Rothstein, President
260 River Corporation
1870 South Bayshore Drive
Miami, FL 33133

RE: 260 River Street (former Capital City Gas, Inc.), Montpelier, Vermont (Complaint #2009-194)

Dear Mr. Rothstein:

The Vermont Department of Environmental Conservation's Sites Management Section (SMS) is concerned that there may be contamination at the above referenced property that poses a risk to either human health or to the environment. The property was once the site of a coal gasification plant owned by Capital City Gas, Inc. This operation provided gas for lighting to the City of Montpelier in the earlier half of the 20th century. In Vermont historic manufactured gas sites have been found to contain significant levels of contamination, impacting the environment and posing significant health risks.

This site was brought to our attention following a complaint received on April 27, 2009. It was an anonymous report from a former Grossman's employee (Grossman's was the former lumber business on site) who alleged that he observed pools of coal tar in the woods that were each a few feet across. In the fall of 2008 a complaint was also received from Stone Environmental who was performing unrelated river assessment work for the Friends of the Winooski River. This report was of significant chemical odors and sheens from seeps emanating from the site that were entering the Winooski River.

The area around this site is currently garnering some additional attention given the construction of a roundabout that overlaps part of this site and at least two other properties. Those properties each had residual petroleum soil contamination from former leaking underground storage tanks. This affected the roundabout project precipitating a site meeting with city and contractor representatives. It was learned that the 260 River Street parcel is being evaluated for possible development and a "For Lease" sign was observed. Development at an industrial property is typically preceded by a Phase I Environmental Site Assessment that often leads to a Phase II.

(Over)



Lawrence Rothstein
June 19, 2009
Page 2 of 2

Prior to requesting the performance of any site investigation work, the SMS is first asking that you submit all information that may be related to environmental conditions at the site, including any Phase I or II Environmental Site Assessments. Under Vermont law (10 V.S.A. §6617), *“Any person who has knowledge of a release or a suspected release and who may be subject to liability for a release, as detailed in section 6615 of this chapter, shall immediately notify the agency.”* *“Failure to notify shall make those persons liable to the penalty provisions of section 6612 of this title.”* Under §6615, current property owners are joint and severally liable for contamination even if it predates their purchase.

In order to move this forward, I am asking for a written response with the requested information by no later than July 10, 2009. Your cooperation is appreciated in ensuring that this property does not pose a threat to public health or to the surrounding environment. Please feel free to contact me if you have any questions. I may be reached at (802) 241-3243 or matt.moran@state.vt.us.

Sincerely,

A handwritten signature in blue ink, appearing to read "Matt", is written over a light blue horizontal line.

Matt Moran, Environmental Analyst
Sites Management Section



Contaminant Seepage to River, Grossman's Site Winooski River, Montpelier

Sources: Vermont Mapping Program: 1:1250 Capital Region Production 2006 Orthophotos; VTrans: TransRoad_RDS, 2007
Map prepared on 10/09/2008 by Christine DeLeo, Stone Environmental, Inc.



WR-0090. Smells strongly of organic chemical contaminants. Sheen is petroleum based.



WR-0090. Smells strongly of organic chemical contaminants. Sheen is petroleum based.



WR-0100. Smells strongly of organic chemical contaminants. Sheen is petroleum based



WR-0110. Faint smell of organic compounds. Iron staining suggests contamination