

TOWN OF SPRINGFIELD, VERMONT

Illicit Discharge Detection and Elimination Study

January 2013



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SECTION 1
INTRODUCTION

SECTION 1 INTRODUCTION

1.1 BACKGROUND

Illicit Discharge Detection and Elimination (IDDE) programs were first developed in Vermont to meet the requirements of the EPA's Phase II Stormwater Rule. The Rule requires that owners of Municipal Separate Storm Sewer Systems (MS4s) must develop, implement, and enforce a storm water management program that is designed to reduce the discharge of pollutants to the maximum extent practicable, protect water quality, and satisfy the applicable water quality requirements of the Clean Water Act.

In 2000, the Vermont Legislature expanded IDDE efforts from the MS4 regulated communities to all developed areas in Vermont by requiring the Department of Environmental Conservation (DEC) to implement a statewide program to promote detection and elimination of improper or illegal connections and illicit discharges (Sec. 3. 10 V.S.A. § 1264 (b)(9)). The Legislature's intent was to expand IDDE efforts from the MS4 communities to encompass all developed areas of Vermont. Following the Legislature's mandate, the DEC Ecosystem Restoration Program has assisted municipalities not subject to the Phase II Stormwater Rule by mapping drainage systems and performing IDDE programs. This work has been completed for all major municipalities in the Missisquoi, Lamoille and Winooski River Basins, the three largest Connecticut River Basin towns, and is ongoing in the Otter Creek River Basin. Twenty-five communities have had GIS drainage maps completed and assessments have been conducted in thirteen non-MS4 designated communities.

1.2 PURPOSE

The purpose of this project is to assess the illicit discharges to the Black River in the Town of Springfield. The objective is to locate and characterize contaminant sources of bacterial, nutrient, and hazardous material discharges to the Black River, within the project area. Refer to Figure No. 1 in Appendix A for the project location.

The Black River from its mouth to 2.5 miles upstream is listed in Vermont's 2010 303(d) List of Impaired Waters due to E. coli contamination, attributed to combined sewer overflows. The contiguous segment from 2.5 to 7.5 miles above the mouth is listed due to sediment, nutrients, and E. coli contamination from urban runoff and land development. Illicit discharges are a source of water quality degradation in both river segments, in addition to stormwater runoff and known combined sewer overflows.

The DEC previously mapped approximately 216 stormwater outfalls discharging to the Black River and its tributaries in the Town of Springfield. This study includes the DEC mapped outfalls and the catchment areas draining to the outfalls.

This project was a collaboration between DEC, the Southern Windsor County Regional Planning Commission (SWCRPC), and the Town of Springfield. DEC has provided the funding and outfall mapping for this project and the SWCRPC has administered the project.



SECTION 2
APPROACH

SECTION 2 APPROACH

2.1 OVERVIEW

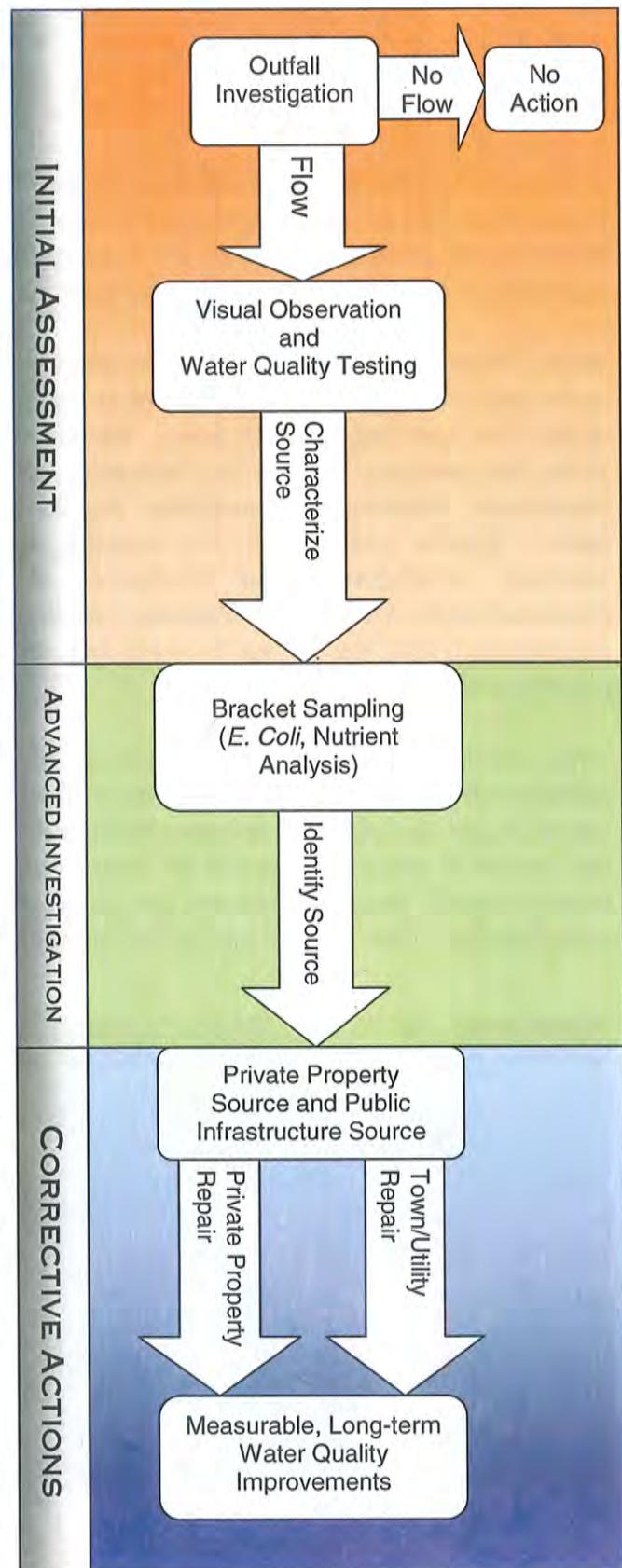
The project was separated into two phases: 1) Initial Assessment and 2) Advanced Investigation. In Phase I, the project team assessed the extent of illicit discharges. This initial effort allowed the project team to make informed decisions about how to effectively and efficiently complete advanced investigations and characterize (and in some cases mitigate) the illicit discharges in Phase II.

2.2 PHASE I - INITIAL ASSESSMENT

Phase I Initial Assessment began with the use of the DEC stormwater map (Figure No. 2 in Appendix A) to locate the outfalls along the Black River. The study area included approximately 216 mapped outfalls. During the initial assessment, unidentified outfalls were also located. These unidentified outfalls were located on the DEC mapping as accurately as possible and assessed accordingly.

The primary task of Phase I was to assess the conditions of each outfall and conduct simple water quality testing. Stormwater outfalls, catch basins, and other discharge points were inspected during dry weather. The presence of flow in a stormwater outfall or catch basin during dry weather conditions indicates a likely illicit discharge. (Other explanations of dry weather flows could be the infiltration of groundwater or the diversion of surface streams to the stormwater system.) Dry weather for this study was defined as no measureable rainfall within the previous 48 hours.

Each outfall was assigned a unique identifying code that correlated with the DEC stormwater map. If dry weather flows were present during the initial assessment,



the condition of the outfall was recorded including structure type, material, and inside diameter. The dry weather flow rates were measured and water quality observations recorded including: color, odor, turbidity and floatable matter. Dry weather flows were sampled directly into a sample container by hand or a telescoping pole. Simple water quality testing was conducted at each outfall to identify not readily apparent illicit discharges. Each flowing outfall was tested for the following water quality parameters: water temperature, total chlorine, specific conductance, and optical brighteners. A standard IDDE Field Data form is provided in Appendix B.

If an outfall did not have any dry weather flow the outfall was recorded as dry on the overall system map. In some cases where dry weather flows were encountered and the source was obviously groundwater infiltration, the investigators made educated decisions not to record the conditions of the outfall or test the water quality.

Water temperature and specific conductance were measured with a field instrument at each outfall that had dry weather flow. Elevated water temperatures can be an indication of wastewater discharge or industrial process water. Specific conductance is a measure of electrical conductivity and indication of dissolved solids in the water. Elevated specific conductance may occur due to road salt or commercial/industrial discharge.



Figure 2.1: Conductivity Testing

Total chlorine was tested in the field at all outfalls with dry weather flow with a color disk test kit. A powder packet of deoxyypyridinoline (DPD) was the chemical agent used to determine the amount of chlorine present in the outfall water in comparison to the color disk. Chlorine is added to public water supplies and can be an indication that discharge is from a leaking water supply system. The Town of Springfield currently adds chlorine to their drinking water supply.



Figure 2.2: Chlorine Color Disk

The optical brighteners test indicates the presence of laundry detergents, which often contain fabric whiteners causing substantial fluorescence. The test aids in identifying failing septic systems, leaking sanitary sewers, sewer cross connections, and discharges from laundry facilities. Optical brighteners (OB) utilize an untreated cotton pad, held within a nylon screen bag, placed in a outfall or catch basin for 4-8 days. The cotton pad is then dried and examined under a long wave fluorescent (UVA or “black”) light.

2.3 PHASE II – ADVANCED INVESTIGATION

Following Phase I (the Initial Assessment), outfalls that indicated the presence of illicit discharges were prioritized and further investigated. The Town was instrumental in testing and locating outfalls. Various methods were used to narrow down the source of the discharge. This included bracket water quality testing, dye testing, and using cameras to view storm drain lines.

The goal of bracketing water quality tests is to isolate a contaminant between adjacent structures, such as an outfall and the upstream catch basin. DEC's stormwater mapping was utilized to track the stormwater lines to the next structure.

In attempting to locate contaminants within the stormwater systems, the same testing methods and procedures were used as in Phase I. In most cases, optical brightener testing was used to bracket contaminants. Additionally, water quality analysis for the presence of *Escherichia coli* (*E. coli*) was used to confirm the presence of wastewater influence or failing septic systems when the initial sample had a positive OB test. *E. Coli* samples were tested at the Vermont Department of Health Laboratory.



Figure 2.3: Camera Inspection

Dye testing was used to determine if lines were cross-connected to the storm sewers and to identify where potential sources of contamination originated. In some cases where a line was found to be connected, the Town used their camera to locate the exact cross connection.

Illicit discharges were also analyzed for Total Nitrogen and Total Phosphorus in order to support the DEC's effort to quantify Nitrogen and Phosphorus loading to the Black River caused by illicit discharge. Water samples were analyzed for Total Nitrogen and Phosphorus by Endyne Inc. in Williston, Vermont.

2.4 CORRECTIVE ACTIONS

After the illicit discharges were characterized and located to a suitable degree, A+E met with the project team to discuss corrective actions. The Town was very proactive and was able to mitigate most of the illicit discharges found during this study. The Town followed up with property owners that had illicit discharge connections and worked with these owners to correct the problems.

Corrective actions included disconnecting wastewater connections and providing preliminary design for more complicated disconnections, fixing water leaks on the Town's water system, and consulting with the DEC on known petroleum sites.



SECTION 3
RESULTS

SECTION 3 RESULTS

3.1 OVERVIEW

The initial illicit discharge assessment in Springfield was performed between June 18, 2012 and September 27, 2012. During these dates, A+E worked extensively alongside the Town of Springfield Public Works Department to locate outfalls and detect sources of illicit discharges.

3.2 PHASE I – INITIAL ASSESSMENT

Of the 216 outfalls assessed, 37 were flowing or dripping when inspected. Of the 37, eleven (11) outfalls were determined to have an illicit discharge. These discharge points are summarized in Table 3.1 with a brief description.

A field data summary sheet in Appendix C provides a complete list of outfalls that were flowing during the Phase I Initial Assessment, along with the physical characteristics of the outfall and the water quality test results. Notes are also included to provide additional information recorded in the field for each outfall. Potential petroleum contaminants were cross checked with oil spills and reports recorded in the Agency of Natural Resources Environmental Interest Locator.

**Table 3.1
Suspected Illicit Discharges**

Outfall ID	Indicator (discharge)	Description
U-1	OB (wastewater)	8-inch corrugated metal pipe from the Jones Center Building discharging into the Black River. Grey water and paper products found below outfall. OB pad tested positive.
Near 376	OB (wastewater)	Old building foundation to the east of the State Building that was most likely part of an old penstock sluiceway that traveled down near Park St. OB pad tested positive.
2006	OB (wastewater)	24-inch corrugated metal pipe from the stormwater surrounding the Springfield Shopping Plaza which discharges to the Black River. OB pad tested positive and presence of paper products noted below outfall.
1380	OB	36-inch corrugated HDPE pipe from Mary St. Ravine discharging into the Black River. OB pad tested positive.
1467	Dye Testing (Wastewater)	An illicit discharge point was found upstream behind the Peoples United Bank near the entrance of the underground sluiceway.
1467	Chlorine	6-inch corrugated metal pipe from River St. stormwater system discharging into Valley St. Brook. Chlorine test confirmed water was Town water supply.
Near 749	Chlorine	Water leak in floor of building near Outfall 749. Chlorine test confirmed water was Town water supply.
1467	Odor/Visible Sheen (Petroleum)	Petroleum odor and sheen found in the Valley Street Brook sluiceway.
313	Odor/Visible Sheen (Petroleum)	24-inch corrugated metal pipe from Clinton St. stormwater discharging to the Black River. Petroleum odor including visible petroleum sheen.
2004	Odor/Visible Sheen (Petroleum)	12-inch corrugated HDPE pipe from the Riverside School stormwater that discharges to the Black River. Heating oil found in upstream manhole. Petroleum odor at outfall including presence of petroleum sheen in Black River.
376	Visual (Latex Paint)	18-inch corrugated HDPE from the State Building drainage system that discharges into the Black River. Cloudy water present in retention pond.

3.3 PHASE II – ADVANCED INVESTIGATION

Phase II involved investigating the suspected illicit discharges from the Phase I Initial Assessment in greater detail. Each outfall had a different approach depending on the observations in Phase I. Provided below is a brief summary of the advanced investigation for each illicit discharge outfall and the findings. The outfalls are divided into four (4) categories based on the type of illicit discharge:

- Wastewater
- Water
- Petroleum
- Other

A field summary data sheet is provided in Appendix C to document the data and notes collected from the Phase II Advanced Investigation. A map of each outfall with a suspected illicit discharge can be found in Appendix A.

3.4 WASTEWATER

3.4.1 Outfall U-1

Outfall U-1 is an 8-inch diameter corrugated metal pipe discharging at the west bank of the Black River directly behind the Jones Center Building on Route 11, also known as Clinton Street. The outfall was labeled as U-1, since the outfall was not identified on the DEC stormwater mapping. During the initial investigation, the pipe was found to be dripping with an odor of sewage present and paper products located below the outfall. An OB pad was tested in the outfall with positive results. Table 3.2 shows the water quality results from the initial assessment.

**Table 3.2
Outfall U-1 Water Quality Test Results**

Flow (gpm)	Deposits/Staining	Conductivity(uS/cm)	OB Pad
0.04	Iron/Grey Water	355	Positive

The Town of Springfield dye tested within the Jones Center Building to confirm the source of the illicit discharge. Through the dye testing, it was determined that a sink, seen in Figure 3.1 and a floor drain were connected to this outfall. The Town, informed the property owner of the identified problem. The property owner subsequently had the drain pipe rerouted to the building sewer to eliminate the illicit connection. This repair was made by the property owner at a cost of \$1,200.



Figure 3.1: Sink Connected to Outfall

3.4.2 Park Street Sluiceway (Near Outfall 376)

During the initial assessment water quality testing was done on the flow passing through the underground tunnel. Refer to the water quality tests results in Table 3.3.

Table 3.3
Park Street Sluiceway Water Quality Test Results

Flow (gpm)	Deposits/Staining	Conductivity(uS/cm)	OB Pad
0.5	---	483	Positive

The Town's Public Works Department believes that this tunnel was once the bypass of an old penstock that was upstream on Park Street. Visual inspection of the tunnel showed that the tunnel turns and continues toward Park Street, supporting this claim. The Town dye tested an apartment building at 24 Park Street to see if the sewer system was connected into the sluiceway. The dye test confirmed that the sewer in 24 Park Street is connected to the sluiceway. The Town confirmed through remote camera that the catch basins in the parking lot south of 24 Park street are also connected to the sluiceway. It is believed that the sluiceway is located to the west of the parking lot, as shown in Figure 3.2. Based on the slow movement of the dye through the sluiceway, obstructions and accumulated debris slow the water and hold back the evidence of paper products at the discharge point in the river. The Town informed the property owner about the sewer connection and is working with the property owner to address this issue.



Figure 3.2: Sluiceway

A+E completed a survey to verify that the building sewer could be rerouted into the sewer line on Park Street. A preliminary design for the new sewer service was completed and shown on Figure No. 12 in Appendix A. In Spring 2013, the Town is planning to coordinate with the property owner to construct the new sewer building service from the Park Street sewer main. The cost to construct the new service is estimated at \$11,000. The Town needs to confirm prior to the repair that the roof drains are not tied into the sewer service. After the repair, it is recommended that the Town resample the sluiceway to confirm that the illicit discharge has been eliminated.

3.4.3 Outfall 2006

Outfall 2006 is a 24-inch diameter corrugated metal pipe located behind the insurance agency adjacent to the Family Dollar. During the initial assessment, no dry weather flow was observed, but paper products were noted below the outfall with an odor of wastewater, as shown in Figure 3.3. OB results came back positive from the initial assessment. Table 3.4 summarizes the water quality results for Outfall 2006.

**Table 3.4
Outfall 2006 Water Quality Test Results**

Flow (gpm)	Deposits/Staining	Conductivity(uS/cm)	OB Pad
Dry	Iron	---	Positive

A+E and the Town of Springfield traced the outfall back to the first catch basin to identify potential sources. At the first catch basin in front of the insurance agency, an overflow pipe from the insurance agency's pump station was found connected into the catch basin. A discussion with the property owner confirmed the existence of the overflow pipe. The Town sent a letter to the property owner about this violation and the property owner agreed to cut and cap the overflow pipe. The letter can be found in Appendix E. This repair cost the property owner approximately \$500.



Figure 3.3: Outfall 2006

3.4.4 Outfall 1380

Outfall 1380 is a 36-inch diameter corrugated metal pipe that was flowing during the initial assessment. The outfall was tested and retested for OB, both came back positive. The initial water quality results are provided in Table 3.5 below.

**Table 3.5
Outfall 1380 Water Quality Test Results**

Flow (gpm)	Deposits/Staining	Conductivity(uS/cm)	OB Pad
3.0	---	1150	Positive

An *E. Coli* test sample was taken at Outfall 1380. The result was 8 MPN/100mL, which is insignificant and rules out the influence of wastewater cross connection. The lab results can be found in Appendix D.

The water quality testing was bracketed upstream of the outfall to isolate the illicit discharge. Figure 3.4 shows the Mary Street Ravine with the approximate locations of each outfall. Outfall 1531 and two outlet pipes in catch basins on Douglas and Mary Street were tested with OB pads. The Douglas and Mary Street catch basin results were negative, but Outfall 1531 was positive.

The Town of Springfield pushed a remote camera down the Mary Street catch basin to Outfall 1531 to see if any connections occurred between the two points. No connections were found during the inspection. The storm sewer upstream from catch basin 1531 was also inspected with a remote camera and no connections were found. An OB pad was left in the catch basin upstream of Outfall 1490 and the result was negative.

The Mary Street ravine was walked to locate any possible sources of illicit discharges and none were found. One possible intermittent source for the positive OB test may be car washing in this residential neighborhood near the Mary Street catch basin above Outfall 1531.

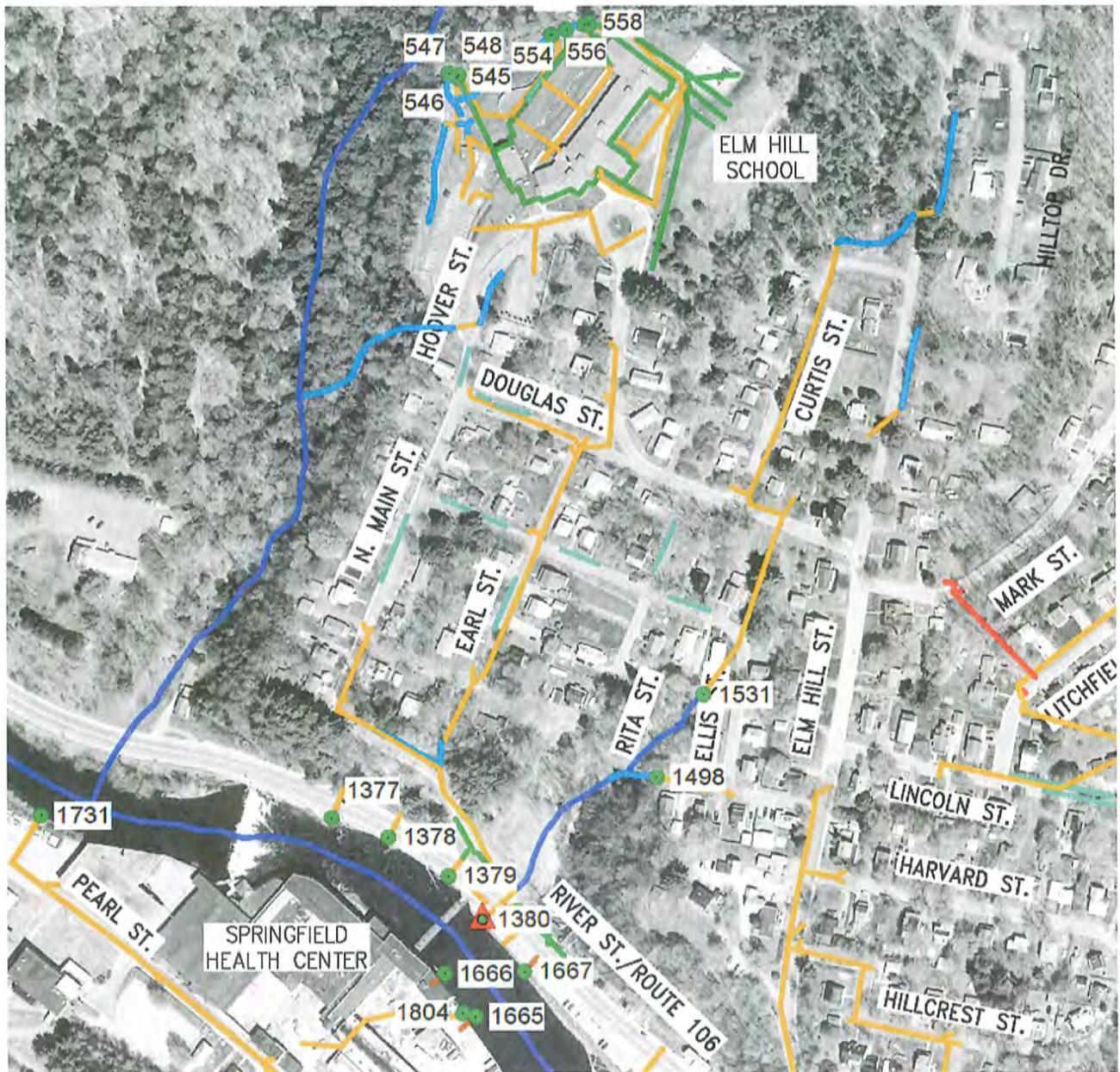


Figure 3.4: Mary Street Ravine

A+E collected total nitrogen and total phosphorus samples for Outfall 1380. Provided below in Table 3.6 are the results of the total nitrogen and total phosphorus analysis. Loadings are based on an estimated flow of 3 gpm. The lab results can be found in Appendix D.

Table 3.6
Total Nitrogen & Total Phosphorus Loadings

Test	Concentration	Loading
Total Nitrogen	2.6 mg/L	34.2 lbs/year
Total Phosphorus	0.012 mg/L	0.158 lbs./year

3.4.5 Valley Street Brook (Outfall 1467)

After the Initial Assessment, the Town investigated the Valley Street Sluiceway looking for a petroleum source. During the follow-up inspection, the flows were extremely low and the Town found a protruding pipe into the brook buried by rocks and debris. The Town dye tested the catch basin on Valley Street and surrounding buildings to identify the source of the discharge pipe. Based on the investigation it was found that three buildings on Valley Street discharged wastewater directly into the brook. The location of the three buildings and discharge are highlighted in Figure 3.5. The existing sewer system runs underneath the Valley Street Brook northeast of the People's United Bank. There is no existing sewer line that runs down Valley Street to the intersection of Main Street. A+E completed a survey to verify existing field conditions on Valley Street, including ground elevations, existing infrastructure, and building sewer elevations. A preliminary design for a new sewer on Valley Street to intercept the building services was completed and is shown on Figure No. 11 in Appendix A. The preliminary construction cost for this project is estimated at \$120,000. Refer to Appendix F for a breakdown of the cost estimate.



Figure 3.5: Valley Street Brook

A+E collected total nitrogen and total phosphorus samples for the Valley Street Brook. Provided below in Table 3.7 are the results of the total nitrogen and total phosphorus loadings based on an estimated flow of 50 gpm. The lab results can be found in Appendix D.

**Table 3.7
Total Nitrogen & Total Phosphorus Loadings**

Test	Concentration	Loading
Total Nitrogen	1.3 mg/L	285 lbs./year
Total Phosphorus	0.062 mg/L	13.6 lbs./year

3.5 DRINKING WATER

3.5.1 Valley Street Brook (Outfall 1467)

In the Valley Street Sluiceway (Outfall 1467) a 6-inch corrugated metal pipe discharges below Main Street into the Valley Street Brook. During inspection of the sluiceway, the underdrain pipe had a steady flow of water discharging into the brook, estimated at 50 gpm. A photo of the chlorinated water discharging into the Valley Street Brook is provided in Figure 3.6. The chlorine concentration of this flow was 0.5 mg/L. To determine if the source was Town water, the fountain on Main Street was tested for chlorine as well, and yielded the same results. The Town, with the aid of EJ Prescott, located two (2) separate water leaks. The first was on Valley Street in front of the Springfield United Methodist Church. The source of the leak was an old abandoned 1" corporation

stop that had not been shut off and was releasing approximately 50 gpm of treated Town water. The other leak was a small crack found in the water main at the intersection of Main Street and Valley Street. Both leaks were promptly fixed by the Town of Springfield Public Works Department. The cost for this repair was approximately \$1,700.



Figure 3.6: Valley Street Brook Water Break

3.5.2 Park Street Building near Outfall 749

The building to the west of Outfall 749 had a steady flow of water discharging into the Black River. Chlorine testing determined that the water leak was from the Town water supply. The property owner was informed of this leak by the Town. Underneath the building, visible petroleum stains were seen on the bottom of the floor slab. The property owner was present during the on-site inspection and informed of the findings and his responsibility to take corrective actions.

3.6 PETROLEUM

3.6.1 Valley Street Brook (Outfall 1467)

During the initial inspection of the Valley Street Brook, a strong odor of petroleum was present in the sluiceway near the outlet into the Black River. Visible petroleum sheen and deposit were witnessed during the inspection. The source and location of the seepage into the brook could not be determined during the assessment. Petroleum spills and incidents surrounding the Valley Street Brook have been documented by the DEC Site Management Section on previous occasions. The presence of petroleum in the Valley Street Brook was referred to the Department of Environmental Conservation Sites Management Section for further investigation.

3.6.2 Outfall 313

Outfall 313 is a 24-inch diameter corrugated metal pipe that collects stormwater from Clinton Street and discharges into the Black River. Petroleum odor and sheen were identified during the initial assessment. Provided below in Table 3.8 are the initial assessment water quality results.

**Table 3.8
Outfall 313 Water Quality Test Results**

Flow (gpm)	Deposits/Staining	Conductivity(uS/cm)	OB Pad
0.5	Iron/Petroleum Sheen	1257	Negative

Figure 3.7 shows the collection system for Outfall 313. It extends up Clinton Street past numerous existing and past gas stations. Based on information provided from the ANR Environmental Interest Locator, there are several sites that have had petroleum spills and site cases along this area previously. During the advanced investigation, all catch basins connected to this outfall were inspected to identify any sources of contamination. No additional evidence of petroleum leaks was found during this investigation. The outfall was referred to DEC Site Manager for further investigation.



Figure 3.7: Outfall 313 Collection System

3.6.3 Outfall 2004

Outfall 2004 is a 12-inch corrugated HDPE pipe from the Riverside Middle School which discharges into the Black River. During the Initial Assessment there was a petroleum odor as well as a visible sheen in the river. The Town informed us that the Middle School had problems with heating oil spills in the past. An upstream manhole was opened and heating oil was visible on the inside as seen in Figure 3.8. The manhole has snouts installed to limit the amount of floating oil that discharges to the river. This site was referred to DEC Site Manager for follow-up.

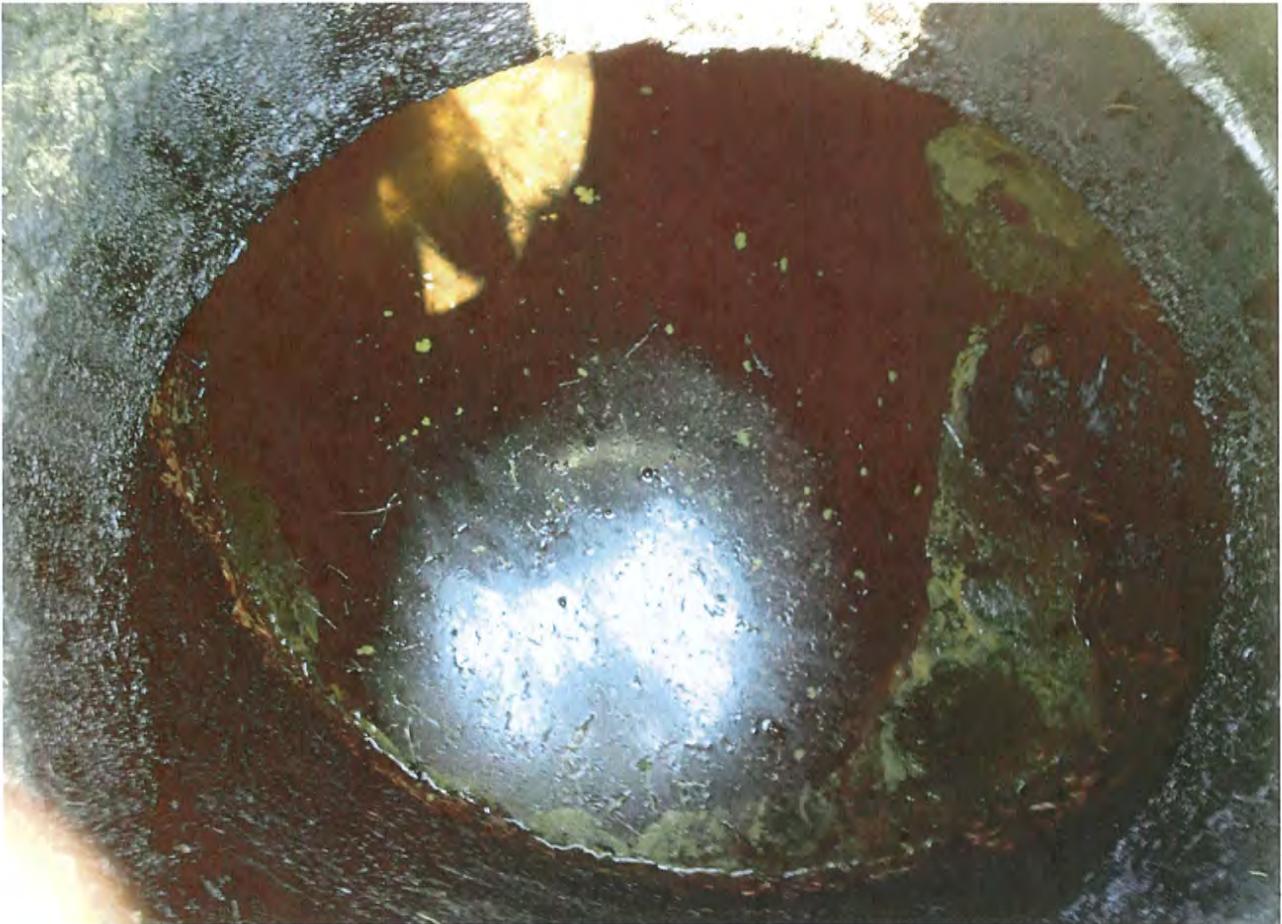


Figure 3.8: Heating Oil in Manhole near Riverside Middle School

3.7 OTHER

3.7.1 Outfall 376

Outfall 376 is an 18-inch diameter corrugated HDPE outfall that discharges from a retention pond at the State Office Building into the Black River. During the inspection the water in the retention pond was found to be turbid and cloudy as seen in Figure 3.9. After discussion with a maintenance worker at the State Building, it was determined that latex paint had been washed into a nearby catch basin earlier that day. The water in the detention pond cleared over the next several hours.



Figure 3.9: State Building Retention Pond



SECTION 4
CONCLUSIONS

SECTION 4 CONCLUSIONS

A thorough assessment was made of the storm sewer systems in the Town of Springfield for the presence of illicit discharges. Over 200 structures were assessed during the summer of 2012 by A+E and Town staff. A+E would like to recognize the South Windsor Regional Planning Commission, the Town of Springfield and DEC for their efforts during the project. The Town's assistance and effort were instrumental in locating outfalls, identifying illicit discharges, and taking corrections actions. The stormwater mapping provided by DEC was very accurate and useful for locating outfalls and stormwater pipes.

Eleven (11) illicit discharges were investigated based upon the findings of the initial dry weather assessment. The discharges were divided into four categories based on the type of illicit discharge:

- Wastewater
- Water
- Petroleum
- Other

Below is a synopsis of the illicit discharges that have been addressed to date.

Outfall U-1

A floor and sink drain that was discharging directly to the Black River has been disconnected and rerouted to the building sewer. The approximate repair cost was approximately \$1,200.

Outfall 2006

A pump station overflow was illegally connected into a catch basin and discharging directly into the Black River. The Town sent a letter to the property owner about this violation. The property owner cut and capped the overflow pipe to the catch basin. The approximate repair cost was approximately \$500.

Outfall 1467

A 6" underdrain was discharging treated drinking water directly into Valley Street Brook sluiceway. The Town, with the aid of E.J. Prescott, located water line breaks. The leaks were promptly fixed by the Town and it was confirmed that the discharge to Valley Brook ceased. The Town of Springfield Public Works Department fixed these breaks at a cost of approximately \$1,700.

All sites that had apparent petroleum contamination have been referred to the Department of Environmental Conservation Site Management Section for further investigation.

The cause of the positive OB test at Outfall 1380 could not be determined. The Town should on occasion inspect the Mary Street Ravine to determine whether an intermittent illicit discharge is occurring.

The Town of Springfield should address illicit discharges that have yet to be resolved. This includes the sewer services on Park Street and Valley Street. A+E has prepared a preliminary design of an intercept sewer down Valley Street to eliminate the direct wastewater discharges to Valley Brook

(Appendix A, Figure 11). The preliminary construction cost estimate for this project \$120,000 (not including engineering fees).

The Town should follow-up with the property owner on Park Street in order to connect the wastewater discharge from this apartment building to the Town sewer main on Park Street. A+E has prepared a design for this wastewater disconnection (Appendix A, Figure 12). The cost estimate to construct this repair is approximately \$11,000.

The Town should also follow-up with the property owner on Park Street near Outfall 749 to address the water leak coming from a failed valve. The Town should fix this leak in order to reduce operating costs of the water system and limit unaccounted water production.

Follow-up activities under taken by the Town to correct these illicit discharges should be reported to the DEC to confirm that this project continues to result in improved water quality.

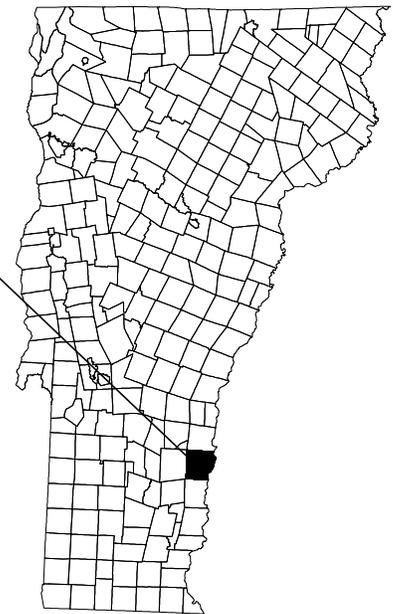
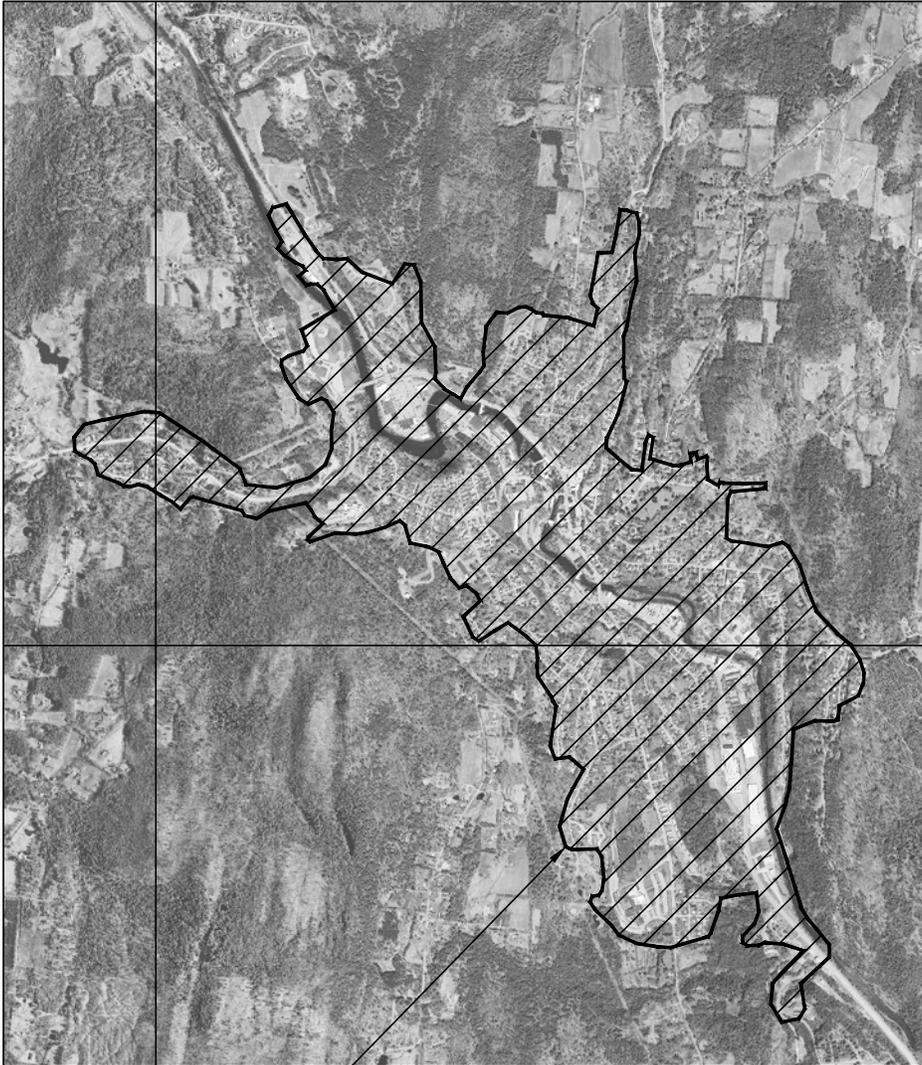


APPENDICES



APPENDIX A

FIGURES



**PROJECT
LOCATION**



PLAN

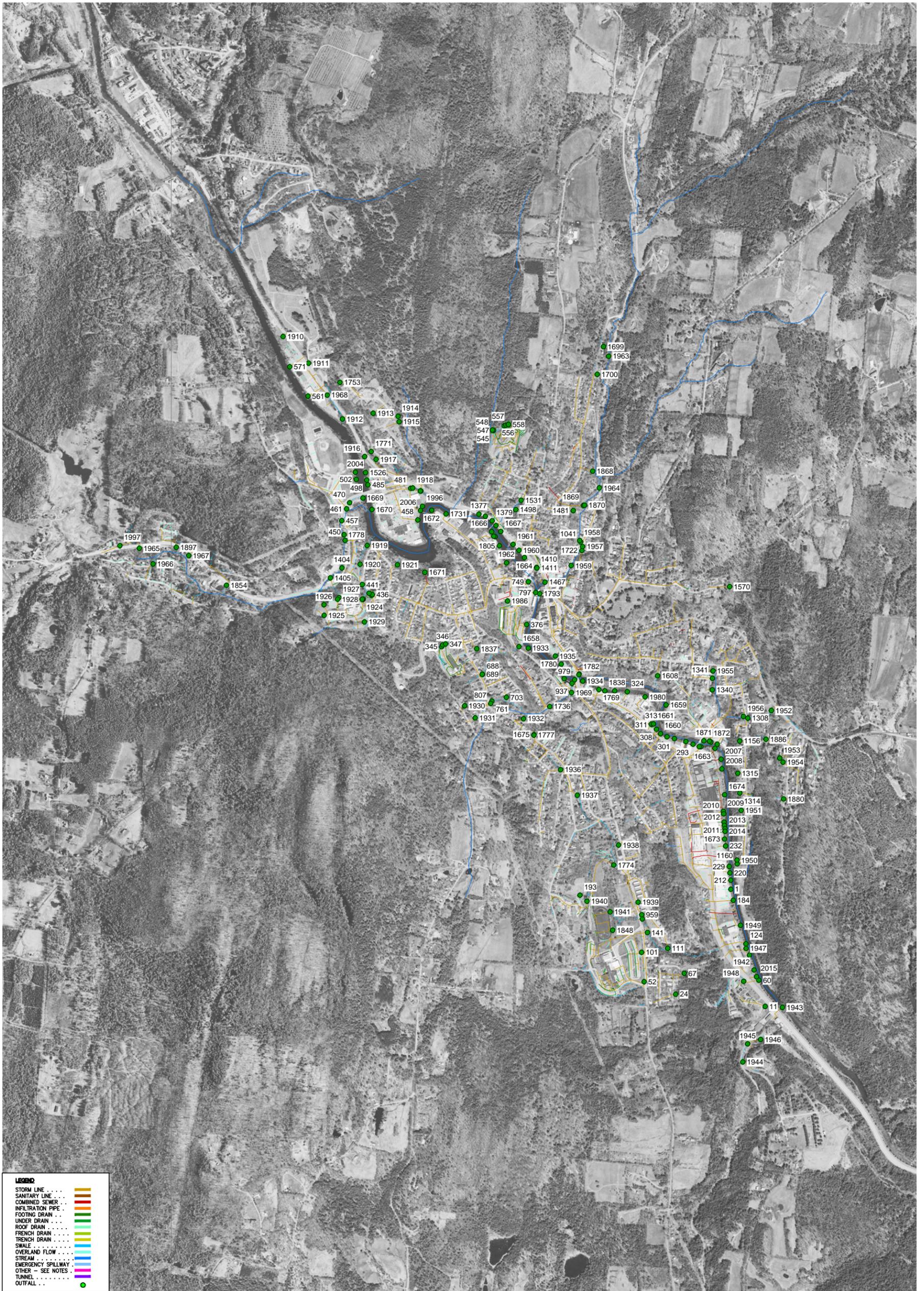
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GRAPHIC SCALE



(IN FEET)

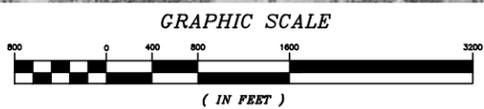
 Aldrich + Elliott WATER RESOURCE ENGINEERS	6 Market Place, Suite 2 Essex Jct., VT 05452 P: 802.879.7733 AEngineers.com	PROJECT LOCATION MAP		DESIGNED NAP	PROJECT NO. 12049
		SPRINGFIELD IDDE STUDY		DRAWN JEB	
		TOWN OF SPRINGFIELD		CHECKED (PM) ADL	FIGURE NO. 1
		SPRINGFIELD VERMONT		CHECKED (PE) JJD	
				SCALE AS NOTED	
		DATE NOV. 2012			



LEGEND

STORM LINE	Orange line
SANITARY LINE	Red line
COMBINED SEWER	Yellow line
INFILTRATION PIPE	Green line
FOOTING DRAIN	Light green line
UNDER DRAIN	Dark green line
ROOF DRAIN	Blue line
FRENCH DRAIN	Light blue line
TRENCH DRAIN	Medium blue line
SWALE	Dark blue line
OVERLAND FLOW	Light purple line
STREAM	Dark purple line
EMERGENCY SPILLWAY	Pink line
OTHER - SEE NOTES	Magenta line
TUNNEL	Cyan line
OUTFALL	Green dot

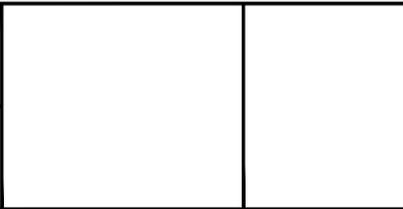
PLAN
SCALE: 1"=800'



DESIGNED	
DRAWN	
CHECKED	
DATE	NOV. 2012
PROJECT NO.	12049
FIGURE NO.	2

TOWN OF SPRINGFIELD
SPRINGFIELD, VERMONT

SPRINGFIELD
IDDE STUDY



AE
Aldrich + Elliott
WATER RESOURCE ENGINEERS

6 Market Place, Suite 2
Essex Jct., VT 05452
P: 802.879.7733
AEEngineers.com



PLAN

SCALE: 1"=200'

GRAPHIC SCALE



(IN FEET)

LEGEND

- STORM LINE —
- SANITARY LINE —
- COMBINED SEWER —
- INFILTRATION PIPE —
- FOOTING DRAIN —
- UNDER DRAIN —
- ROOF DRAIN —
- FRENCH DRAIN —
- TRENCH DRAIN —
- SWALE —
- OVERLAND FLOW —
- STREAM —
- EMERGENCY SPILLWAY —
- OTHER - SEE NOTES —
- TUNNEL —
- OUTFALL ▲

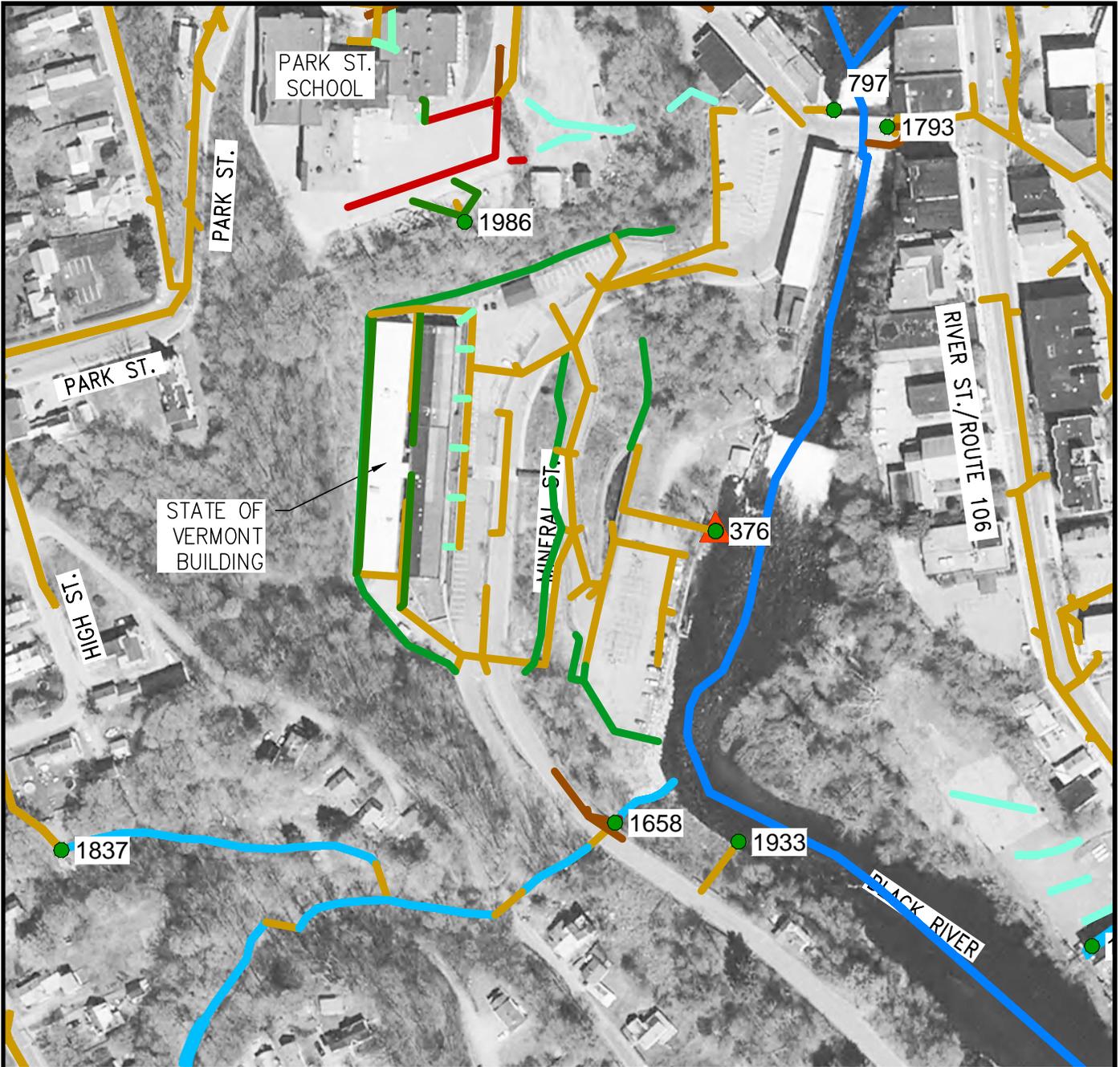
HIGHLIGHTED OUTFALL . ▲



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OUTFALL #U-1	DESIGNED NAP	PROJECT NO. 12049
	DRAWN JEB	
SPRINGFIELD IDDE STUDY	CHECKED (PM) ADL	FIGURE NO. 3
TOWN OF SPRINGFIELD	CHECKED (PE) JJD	
SPRINGFIELD	SCALE AS NOTED	DATE NOV. 2012
VERMONT		



PLAN

SCALE: 1"=200'

GRAPHIC SCALE



(IN FEET)

LEGEND

- STORM LINE
- SANITARY LINE
- COMBINED SEWER
- INFILTRATION PIPE
- FOOTING DRAIN
- UNDER DRAIN
- ROOF DRAIN
- FRENCH DRAIN
- TRENCH DRAIN
- SWALE
- OVERLAND FLOW
- STREAM
- EMERGENCY SPILLWAY
- OTHER - SEE NOTES
- TUNNEL
- OUTFALL

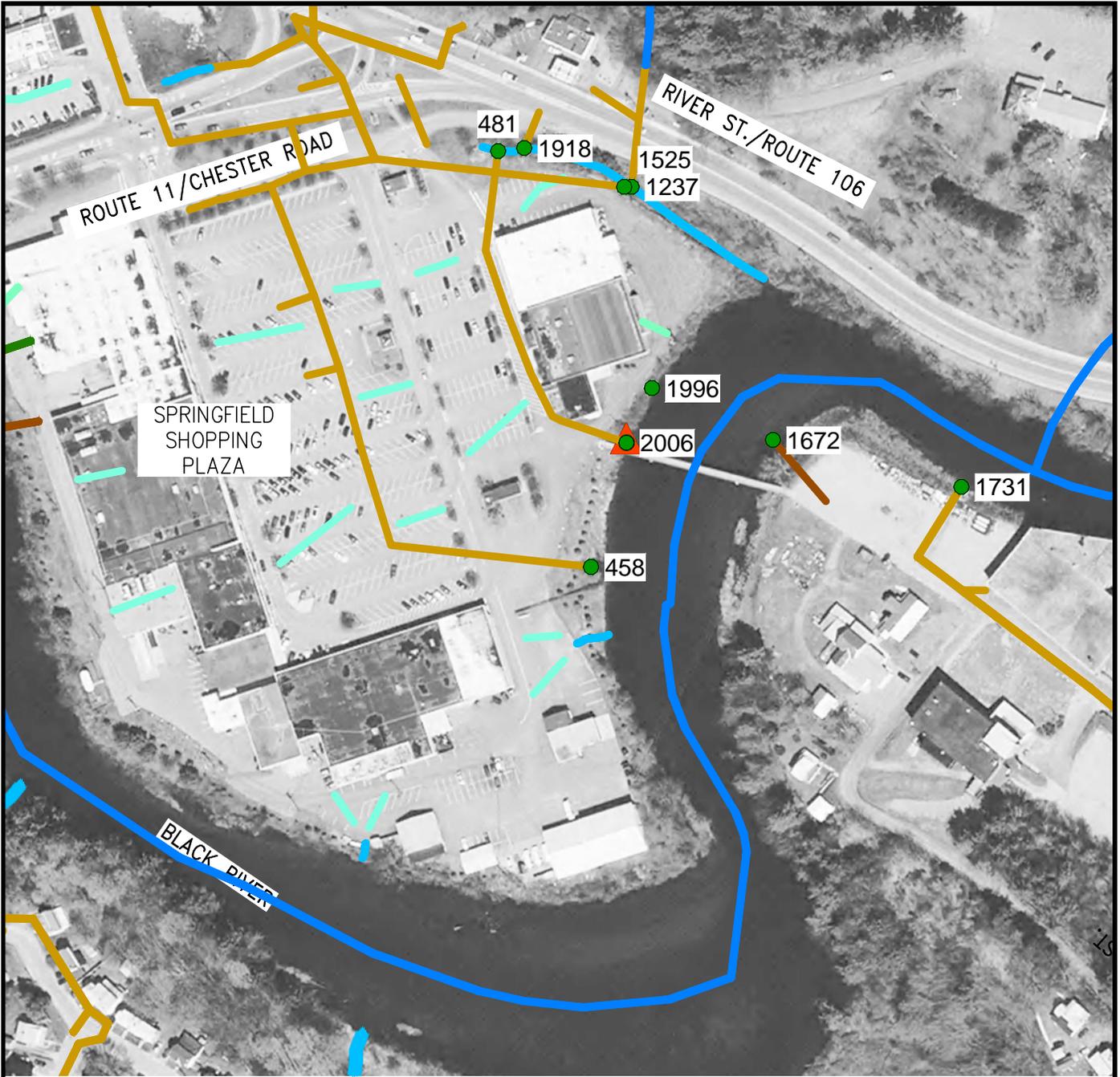
HIGHLIGHTED OUTFALL



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OUTFALL #376	DESIGNED MAP	PROJECT NO. 12049
	DRAWN JEB	
SPRINGFIELD IDDE STUDY	CHECKED (PM) ADL	FIGURE NO. 4
TOWN OF SPRINGFIELD	CHECKED (PE) JJD	
SPRINGFIELD	SCALE AS NOTED	DATE NOV. 2012
VERMONT		



LEGEND

- STORM LINE
- SANITARY LINE
- COMBINED SEWER
- INFILTRATION PIPE
- FOOTING DRAIN
- UNDER DRAIN
- ROOF DRAIN
- FRENCH DRAIN
- TRENCH DRAIN
- SWALE
- OVERLAND FLOW
- STREAM
- EMERGENCY SPILLWAY
- OTHER - SEE NOTES
- TUNNEL
- OUTFALL



HIGHLIGHTED OUTFALL



PLAN

SCALE: 1"=200'

GRAPHIC SCALE



(IN FEET)



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OUTFALL #2006

SPRINGFIELD
IDDE STUDY

TOWN OF SPRINGFIELD

SPRINGFIELD

DESIGNED NAP	PROJECT NO. 12049
DRAWN JEB	
CHECKED (PM) ADL	FIGURE NO. 5
CHECKED (PE) JJD	
SCALE AS NOTED	
DATE NOV. 2012	

PROJECT NO.

12049

FIGURE NO.

5

VERMONT



PLAN

SCALE: 1"=300'

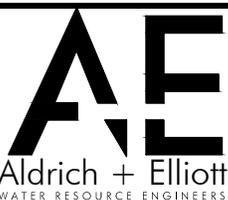
GRAPHIC SCALE



(IN FEET)

LEGEND

- STORM LINE
- SANITARY LINE
- COMBINED SEWER
- INFILTRATION PIPE
- FOOTING DRAIN
- UNDER DRAIN
- ROOF DRAIN
- FRENCH DRAIN
- TRENCH DRAIN
- SWALE
- OVERLAND FLOW
- STREAM
- EMERGENCY SPILLWAY
- OTHER - SEE NOTES
- TUNNEL
- OUTFALL
- HIGHLIGHTED OUTFALL



6 Market Place, Suite 2
Essex Jct., VT 05452
P: 802.879.7733
AEngineers.com

OUTFALL #1380

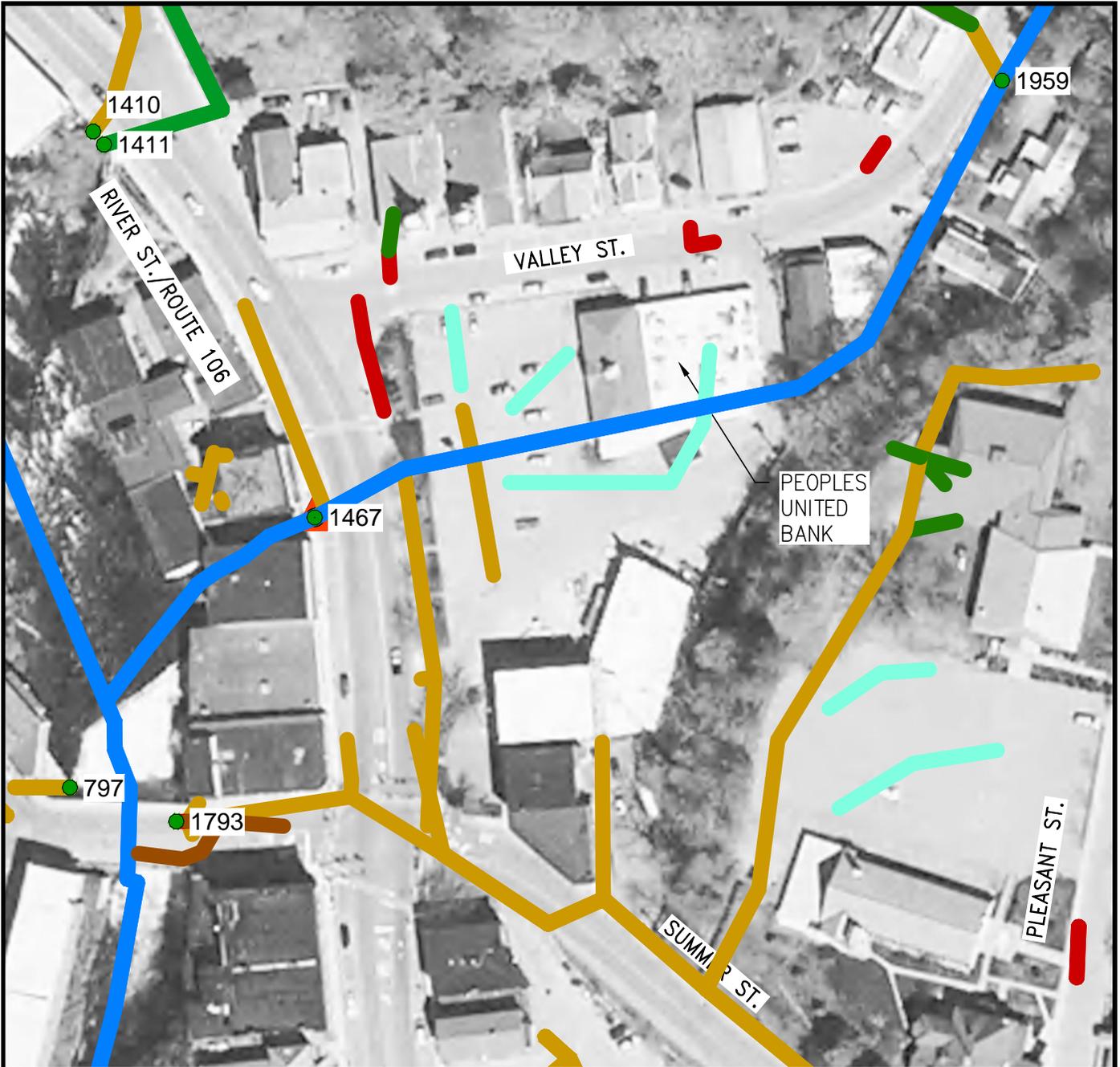
SPRINGFIELD
IDDE STUDY

TOWN OF SPRINGFIELD

SPRINGFIELD

DESIGNED NAP	PROJECT NO. 12049
DRAWN JEB	
CHECKED (PM) ADL	FIGURE NO. 6
CHECKED (PE) JJD	
SCALE AS NOTED	
DATE NOV. 2012	

DESIGNED NAP	PROJECT NO. 12049
DRAWN JEB	
CHECKED (PM) ADL	FIGURE NO. 6
CHECKED (PE) JJD	
SCALE AS NOTED	
DATE NOV. 2012	



PLAN

SCALE: 1"=100'

GRAPHIC SCALE



(IN FEET)

LEGEND

- STORM LINE
- SANITARY LINE
- COMBINED SEWER
- INFILTRATION PIPE
- FOOTING DRAIN
- UNDER DRAIN
- ROOF DRAIN
- FRENCH DRAIN
- TRENCH DRAIN
- SWALE
- OVERLAND FLOW
- STREAM
- EMERGENCY SPILLWAY
- OTHER - SEE NOTES
- TUNNEL
- OUTFALL
- HIGHLIGHTED OUTFALL



6 Market Place, Suite 2
Essex Jct., VT 05452
P: 802.879.7733
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OUTFALL #1467

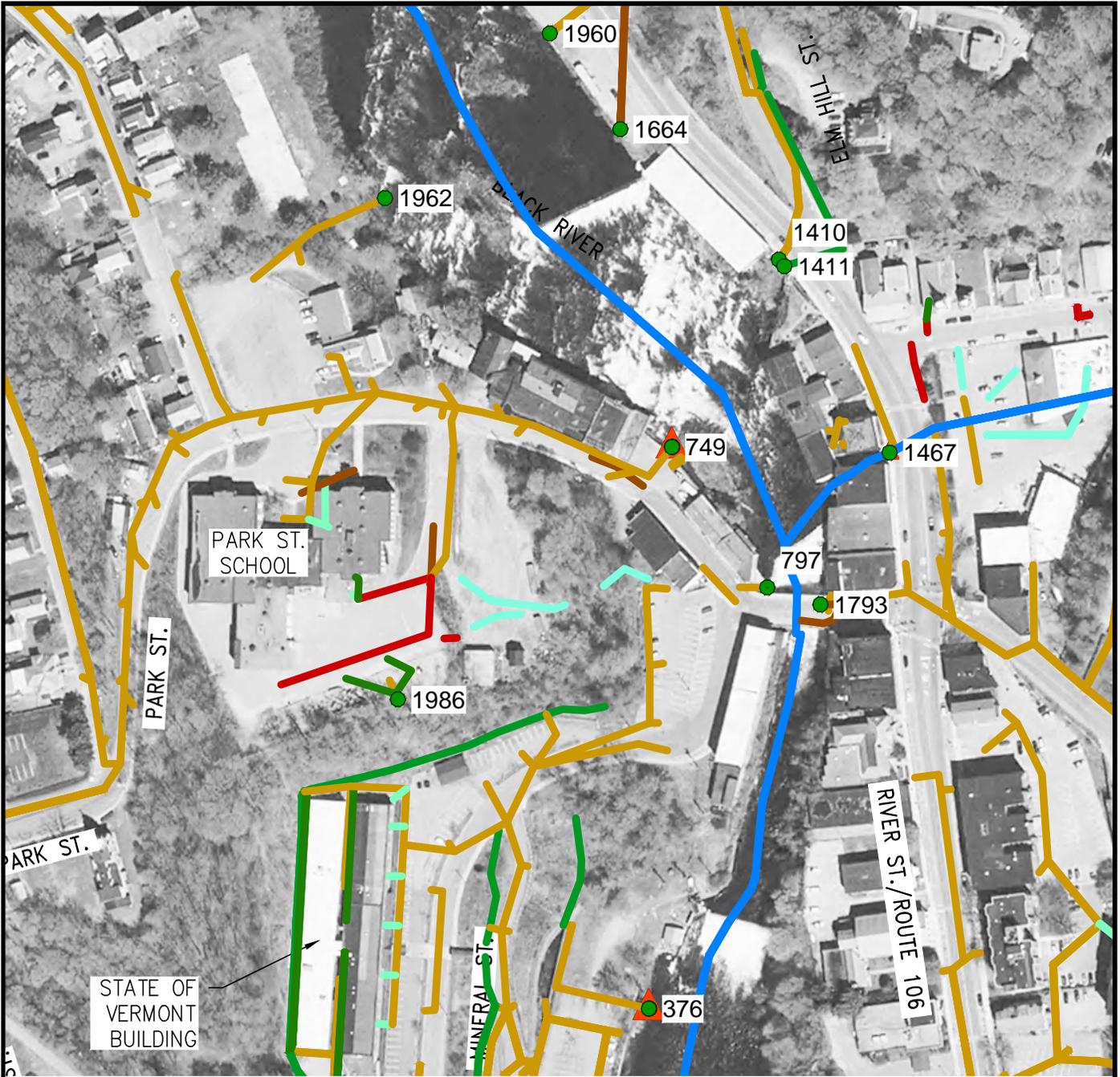
SPRINGFIELD
IDDE STUDY

TOWN OF SPRINGFIELD

SPRINGFIELD

DESIGNED NAP	PROJECT NO. 12049
DRAWN JEB	
CHECKED (PM) ADL	FIGURE NO. 7
CHECKED (PE) JJD	
SCALE AS NOTED	
DATE NOV. 2012	

VERMONT



PLAN

SCALE: 1"=200'

GRAPHIC SCALE



(IN FEET)

LEGEND

- STORM LINE
- SANITARY LINE
- COMBINED SEWER
- INFILTRATION PIPE
- FOOTING DRAIN
- UNDER DRAIN
- ROOF DRAIN
- FRENCH DRAIN
- TRENCH DRAIN
- SWALE
- OVERLAND FLOW
- STREAM
- EMERGENCY SPILLWAY
- OTHER - SEE NOTES
- TUNNEL
- OUTFALL

HIGHLIGHTED OUTFALL



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Essex Jct., VT 05452

P: 802.879.7733
AEngineers.com

OUTFALL #749	DESIGNED NAP	PROJECT NO. 12049
	DRAWN JEB	
SPRINGFIELD IDDE STUDY	CHECKED (PM) ADL	FIGURE NO. 8
TOWN OF SPRINGFIELD	CHECKED (PE) JJD	
SPRINGFIELD	SCALE AS NOTED	
VERMONT	DATE NOV. 2012	



PLAN

SCALE: 1"=200'

GRAPHIC SCALE



(IN FEET)

LEGEND

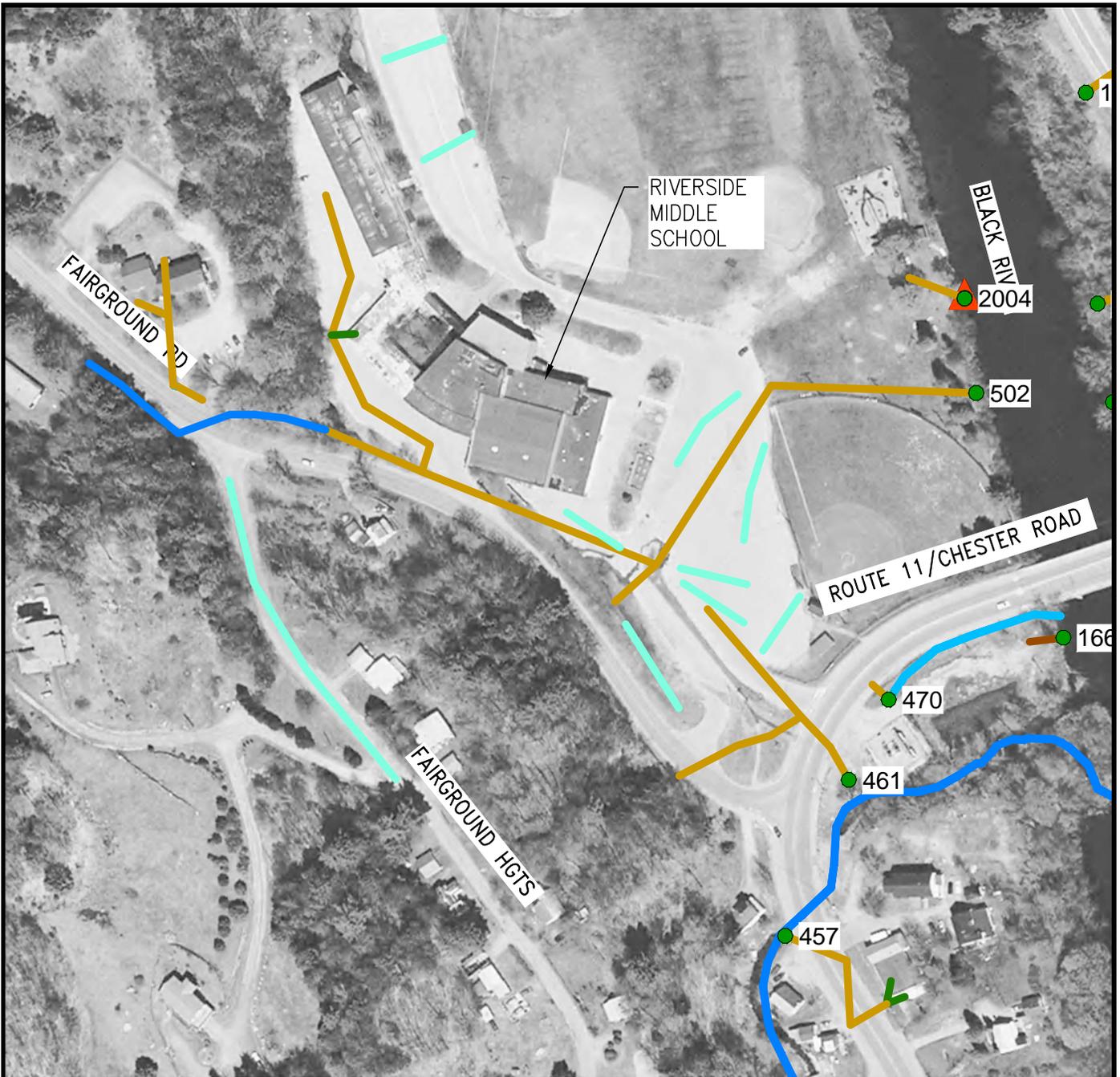
STORM LINE	
SANITARY LINE	
COMBINED SEWER	
INFILTRATION PIPE	
FOOTING DRAIN	
UNDER DRAIN	
ROOF DRAIN	
FRENCH DRAIN	
TRENCH DRAIN	
SWALE	
OVERLAND FLOW	
STREAM	
EMERGENCY SPILLWAY	
OTHER - SEE NOTES	
TUNNEL	
OUTFALL	
HIGHLIGHTED OUTFALL	

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AEngineers.com

OUTFALL #313	DESIGNED MAP	PROJECT NO. 12049
	DRAWN JEB	
SPRINGFIELD IDDE STUDY	CHECKED (PM) ADL	FIGURE NO. 9
	CHECKED (PE) JJD	
TOWN OF SPRINGFIELD VERMONT	SCALE AS NOTED	
	DATE NOV. 2012	



PLAN

SCALE: 1"=200'

GRAPHIC SCALE



(IN FEET)

LEGEND

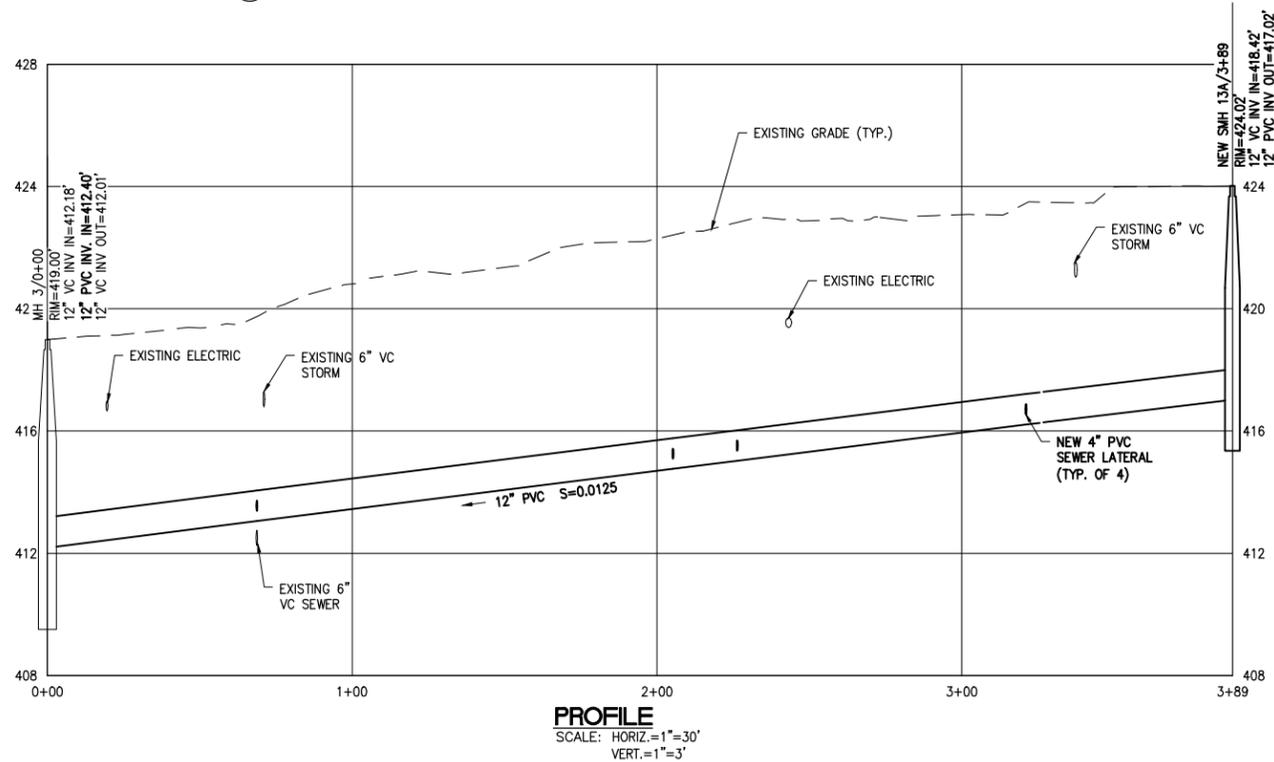
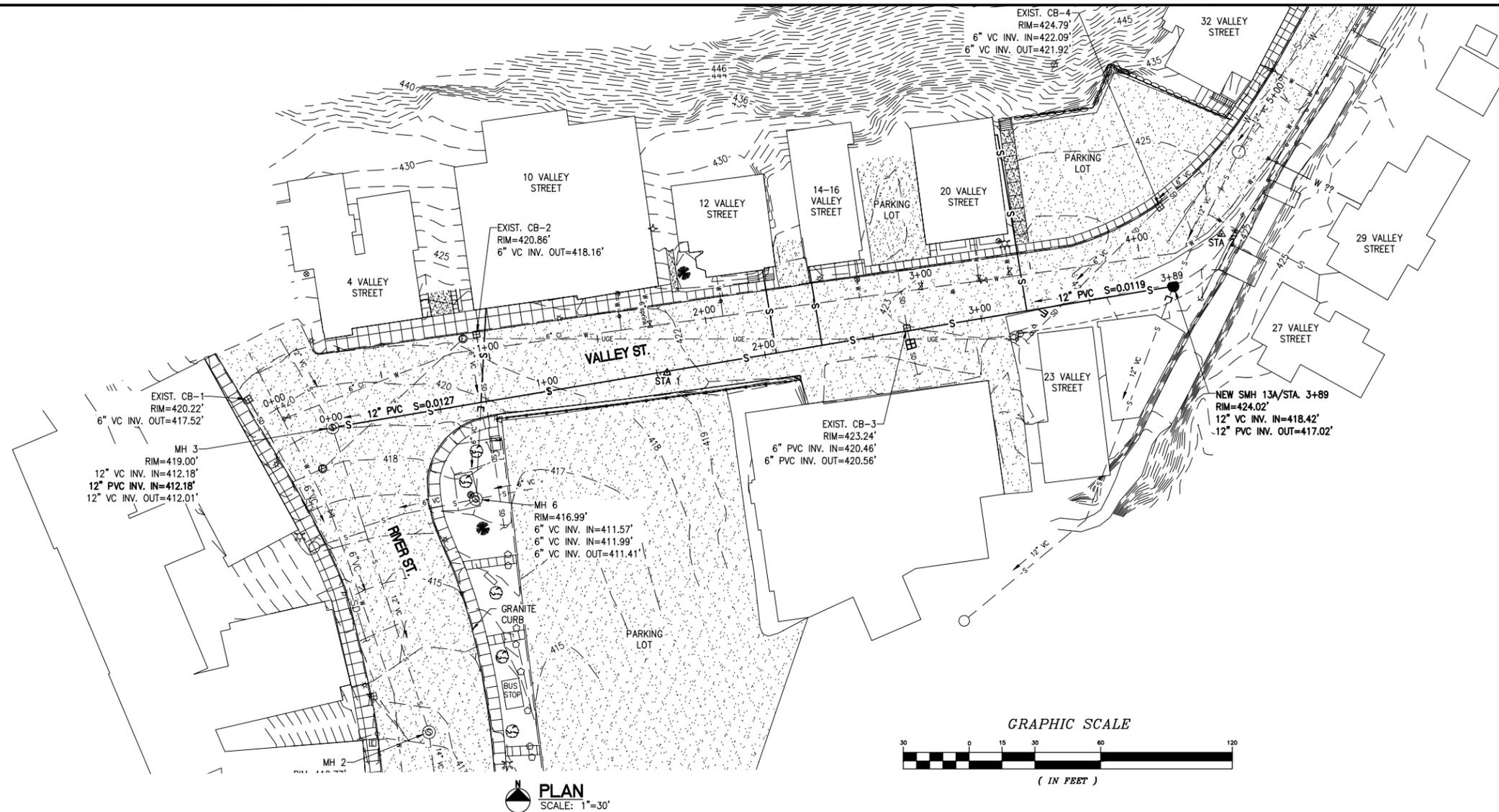
STORM LINE	
SANITARY LINE	
COMBINED SEWER	
INFILTRATION PIPE	
FOOTING DRAIN	
UNDER DRAIN	
ROOF DRAIN	
FRENCH DRAIN	
TRENCH DRAIN	
SWALE	
OVERLAND FLOW	
STREAM	
EMERGENCY SPILLWAY	
OTHER - SEE NOTES	
TUNNEL	
OUTFALL	
HIGHLIGHTED OUTFALL	

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OUTFALL #2004		DESIGNED NAP	PROJECT NO. 12049
		DRAWN JEB	
SPRINGFIELD IDDE STUDY		CHECKED (PM) ADL	FIGURE NO. 10
		CHECKED (PE) JJD	
TOWN OF SPRINGFIELD VERMONT		SCALE AS NOTED	
		DATE NOV. 2012	



CHECKED	DESCRIPTION	DATE	NO.

TOWN OF
 SPRINGFIELD,
 SPRINGFIELD, VT

VALLEY STREET
 SEWER

PROPOSED PLAN
 AND
 PROFILE

DESIGNED NAP	PROJECT NO. 12049
DRAWN JEB	DRAWING 11
CHECKED ADL	DATE NOV. 2012



APPENDIX B
SAMPLE FIELD DATA SHEET

IDDE Field Data Form



IDDE ID:		DEC ID Cross Ref.:			
Date:	Time:	Inspector:			
Structure type:		Inner diameter (outfall only) in.			
Material (outfall only):	Corrugated Metal	Concrete	Corrugated HDPE	Smooth Lined HDPE	Other (describe):
Flow depth (outfall only):	Dry	Wet (no flow)	Dripping	Flowing	Depth in.
Pipe position (outfall only):	Free flow	Partially Submerged	Submerged	If partially submerged, surcharged? YES NO	
Erosion at outfall	None	If present, describe:			
Discharge characteristics (observations on Color, Turbidity, and Odor of flow):					
Flotables:	None	Sheen	Sewage	Suds	Other:
Deposits or staining:	None	Sediment	Oily	Iron Staining	Other:
Damage to structure:	None	Cracking, Spauling	Corrosion	Crushed	Other:
Obstructions:	None	Partially Obstructed	Fully Obstructed	Other:	
OB pad set? YES NO	Date OB pad retrieved:				
Temp. °C	Specific Conductance μS/cm		Total Chlorine mg/l		
Sample Collected for <i>E. Coli</i> analysis: YES NO NA		Time:			
Sample Collected for N analysis: YES NO NA		Time:			
Comments:					

(Modified from field form in DEC IDDE Reports)



APPENDIX C
FIELD DATA SUMMARY SPREADSHEETS

PHASE I (INITIAL ASSESSMENT) FIELD DATA SUMMARY SHEET

TOWN OF SPRINGFIELD IDDE STUDY

PROJECT NO. 12049

DATE: 10/25/12

Map #	Outfall ID	Date	Material	Diameter (inches)	Flow Depth	Flow (gpm)	Deposits/Staining	Temp. (Celsius)	Conductivity (uS/cm)	Chlorine (mg/l)	OB pad	Notes
4	1871	6/18/2012	Concrete	48	Flowing	37.5	---	14.6	475	0	Negative	
4	1156	6/18/2012	Corrugated metal	15	Flowing	5	---	18	590	0	Negative	OB pad washed out (twice). OB tested in CB above outfall on Commonwealth Ave - negative.
4	1608	6/18/2012	PVC	24	Flowing	50	---	---	---	---	Negative	No Sample Taken (Natural Drainage Area)
4	313	6/18/2012	Corrugated metal	24	Flowing	0.5	Iron	15	1257	0	Negative	Color=Orange, Sheen, Odor=petroleum, Partially obstructed by rock. (Near old sunoco station). Potential Contaminants: Cheshire Oil, 7480 Clinton St, Joe's Discount Beverage, T-Bird Mini Mart, Penguin Market
4	308	6/18/2012	Corrugated metal	24	Flowing	12.5	---	15.5	560	0	Negative	Structure is separated. Poor condition
4	1955	6/19/2012	Natural Spring	N/A	Flowing	30	---	17.7	287	0	---	
5	1673	6/18/2012	Concrete	24	Dripping	0.17	---	15.3	792	0	Negative	
5	2009	6/18/2012	Cl	10	Dripping	0.125	---	12.3	915	0	Negative	
5	290	6/18/2012	Concrete	32	Flowing	10	---	15	582	0	Negative	
5	2007	---	---	---	---	---	---	---	---	---	---	Not Found. Spent a good portion of time in overgrown brush looking for outfall. ANR information shows outfall is connected to combined sewer line to an abandoned building.
6	229	6/18/2012	Corrugated metal	24	Dripping	0.17	---	14.9	506	0	Negative	
6	U-1	6/18/2012	Corrugated metal	8	Dripping	0.04	Iron	15	355	0	Slightly Positive	Color Grey, Iron Staining(orange). Potential Contaminants: Jones Ctr.
6	212	6/18/2012	Corrugated metal	12	Dripping	0.03	---	15	23	0	Negative	
7	184	6/18/2012	Corrugated metal	48	Dripping	4.84	---	15	502	0	Negative	
9	1481	6/19/2012	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Slope failure (significant), Outfall is over land flow. Town has remediated slope with grant from DEC.
9	1869	6/19/2012	Clay	10	Dry	---	---	---	---	---	---	Damage to structure separated for 50' (slope failure). Upstream manhole dry. Town aware of slope failure
10	749	6/19/2012	Smooth Lined HDPE	24	Flowing	20	---	16	282	0	N/A	
10	1410	6/18/2012	Concrete	24	Flowing	10	---	12.6	880	0	Negative	Undermined all the way back to the CB
10	1960	6/18/2012	Concrete	12	Flowing	1	---	16	1280	0	N/A	Underdrain
10	1380	6/19/2012	Corrugated HDPE	36	Flowing	3	---	16.4	1150	0	Slightly Positive	OB pad retested 7/10/12 - Positive.
10	1041	6/19/2012	Smooth Lined HDPE	12	Flowing	5	---	13	500	0	---	
10	1467	6/19/2012	---	---	Flowing	50+	---	---	---	0.5	---	6" diameter corrugated metal pipe. Water break located near Valley St. Brook underneath parking lots.
10	1467	6/19/2012	---	---	Flowing	50+	---	16.9	300	---	---	Sluiceway of Brook: Strong petroleum smell, visible product, source not located. Potential Contaminants: United Methodist Church, 2 Valley St., Village Pizza, Red House Press
10	1467	6/19/2012	---	---	Flowing	50+	---	16.9	300	---	---	Sluiceway of Brook: The Town found a discharge pipe in the Valley Street Brook north of the Citizens United Bank.
10	1805	---	---	---	---	---	---	---	---	---	---	Not Found. Buried under debris from Healthcare Center construction.
11	1838	6/19/2012	Corrugated metal	24	Dripping	0.125	---	16	825	0	Negative	Partially obstructed
11	937	6/19/2012	Concrete	42	Flowing	~50	---	13	440	0	Negative	
11	979	6/19/2012	Cl	24	Flowing	30	---	13	400	0	Negative	Sampled at Moose Lodge
11	---	6/19/2012	old building foundation	large	Flowing	50+	---	13	483	0	Slightly Positive	Stream flow in Tunnel
13	1940	6/18/2012	Corrugated metal	24	Flowing	3.75	---	18.5	557	0	Negative	Turbidity=cloudy, odor=stale/musty
13A	101	7/10/2012	Corrugated metal	24	Wet	N/A	---	21.1	1115	0	Negative	Sample-stagnant, standing water in ditch
15	1525	6/19/2012	Corrugated metal	24	Flowing	15	---	17	240	0	Negative	
15	2006	6/19/2012	Corrugated metal	24	Dry	---	Iron	---	---	---	Positive	Odor=wastewater smell. Presence of paper products.
15	1996	---	---	---	---	---	---	---	---	---	---	Not Found. Connected to roof drain.
19	2004	6/20/2012	Corrugated HDPE	12	Flowing	3	---	16	440	0	Negative	Potential source of petroleum leak. Potential Contaminants: Riverside Middle School.
19	461	---	---	---	---	---	---	---	---	---	---	Not Found. Removed during construction of waterline.
20	1926	7/10/2012	Corrugated HDPE	24	Flowing	3	Iron	15.2	1380	0	Negative	

NOTES:

1. N/A is for not accessible outfalls.
2. --- is for no data collected.
3. Potential contaminants were identified from the ANR Environmental Interest Locator.

PHASE II (ADVANCED INVESTIGATION) FIELD DATA SUMMARY
TOWN OF SPRINGFIELD IDDE STUDY
PROJECT NO. 12049
DATE: 10/25/12

Map #	Outfall ID	Date	Phase II Follow-up Investigation Notes
4	313	6/18/2012	Outfall dry 8/20/12. Conductivity in CB 1030. Checked all basins connected. Some potential petroleum but none confirmed. Reported to ANR Site Manager.
6	U-1	6/18/2012	Sink & floor drain from Bldg. confirmed with dye test by Town. Property owner disconnected sink and floor drain and tied to building sewer.
10	749	8/20/2012	Building near Outfall #749 has water leak. The water leak was tested & confirmed as Town Water Supply. Oil staining on floor under building over river.
10	1380	6/19/2012	E. Coli sample at outfall - Negative. OB pad Outfall #1531 - Positive. Upstream pipe dripping. Douglas & Mary St. OB Pads - Negative. OB pad retested in CB above 1531 - negative. OB tested in CB above 1498 - negative.
10	1467	6/19/2012	Town repaired two (2) leaks on Valley Street. 1. An open waterstop located in front of the United Methodist Church. 2. A small break near the intersection of Valley & Maint St.
10	1467	6/19/2012	Reported to ANR Site Manager.
10	1467	6/19/2012	Three (3) house sewer services on Valley Street are tied into this discharge pipe. Confirmed via dye testing by Town.
11	Near 376	6/19/2012	Basement toilet of 24 Park St. dyed by Town and confirmed building sewer and catch basins are connected to sluice way which eventually flows to tunnel. Sewer Smell in sluice way.
11	376	8/20/2012	Suspected latex paint discharge confirmed by ANR maintenance worker who dumped wash bucket into storm drain. OB Pad - Negative.
15	2006	6/19/2012	Sewer source located. Property owner capped, Town confirmed. Property owner had Gurney Brothers cut/cap overflow pipe from pump station to catch basin.
19	2004	6/20/2012	Reported to ANR Site Manager



APPENDIX D
ILLICIT DISCHARGE LETTER

Waste Water & Water Division

TOWN OF SPRINGFIELD

DEPARTMENT OF PUBLIC WORKS
96 MAIN STREET, SPRINGFIELD, VERMONT 05156
(802) 885-2854 (802) 886-2208 FAX (802) 886-2200

Keith Young
Springfield Realty Corp.
2 Chester Road
Springfield, VT 05156

June 21, 2012

RE: Illicit Discharge Investigation Springfield Plaza

Dear Mr. Young,

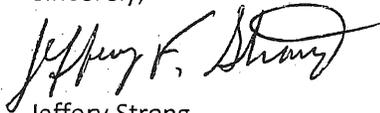
The Town of Springfield along with the State of Vermont and Aldrich & Elliott Engineering have been conducting an illicit discharge investigation of all the outfall going into the Black River.

On June 20, 2012 it was determined that an overflow pipe exists at the wastewater pump station in front of the Finn & Stone office. This overflow pipe discharges to a storm drain that flows directly to the Black River.

I would request that the pipe be removed from the catch basin as soon as possible and both ends be plugged with concrete. You or your contractor should notify us 24 hours in advance of doing the work so we can inspect it prior to backfilling.

If you have any questions, please contact me. Your prompt attention to this matter is appreciated.

Sincerely,



Jeffery Strong
Water/Wastewater Superintendent
96 Main Street
Springfield, VT 05156

Cc: Robert Forguites, Town Manager
Andy Legg, Aldrich & Elliott
Robert Verge, WW Collection

ALDRICH & ELLIOTT

JUN 22 2012

RECEIVED

PROGRESS THROUGH PRECISION



APPENDIX E
LABORATORY TEST RESULTS

Results Report

State Health Dept #: 12-WB-08375

Report To ALDRICH & ELLIOTT CONSULTG ENG
 ATTN OF ANDREW LEGG
 Address 6 MARKET PLACE STE 2
 ESSEX JCT, VT 05452

WSID
 Account Name ALDRICH & ELLIOTT CONSULTG ENG
 Date Received 08/22/2012
 Time Received 09:32
 Approved Date 08/23/2012

Sample Desc. KIT SW
 Collection Date 08/21/2012
 Collection Time 12:31
 Sampled By Andrew Legg
 Sampling Location Stormwater Outfall 1380
 Street Address
 Town Springfield

Sample Type
 Free Chlorine Residual
 Total Chlorine Residual
 Chlorinated? No
 Field Temp.
 Field Fluoride
 Temp at Receipt

Test Enzyme Substrate Quantitation 2000

Date/Time of Analysis 08/23/2012 10:35
 Test Method: SM 9223B-QT

Analyte MPN/100mL
 E.coli 8

■ The water sample tested was found to contain LESS than 235 E. coli per 100mL. This water is considered SUITABLE FOR SWIMMING. This test does not indicate if the water sample is suitable for drinking. Drinking raw water such as an untreated lake, pond or stream is not advised. **NOTE: It is recommended that testing of recreational water begin within 6 to 24 hours of collection for optimal results but testing must begin within 30 hours of collection.

Units of Measurement and Definitions: mL = milliliter, > equals greater than, MPN = Most Probable Number, CFU = Colony Forming Unit, TNTC = Too Numerous To Count

The test results included on this report meet all National Environmental Laboratory Accreditation Program requirements unless noted otherwise. Test results relate only to the samples tested and are representative of the samples as they were received at the laboratory. This is a public record. Information contained in this report may be used for statistical purposes and may be released upon request, pursuant to Vermont Access to Public Documents law (1 V.S.A. 315-320). This report shall not be reproduced, except in full, without the written approval of the laboratory.

Test Report Authorized By:

Mary Celotti
 Mary Celotti, Laboratory Director

If you have received this report in error or have questions about this report, please call the laboratory at (802) 863-7336.



Aldrich & Elliot, PC.
6 Market Place, Suite 2 100219
Essex Jct, VT 05452

PROJECT: Springfield IDDE (12049)
WORK ORDER: 1209-13736
DATE RECEIVED: September 12, 2012
DATE REPORTED: September 27, 2012
SAMPLER: Nathan

Laboratory Report

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

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

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

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

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 09/27/2012

CLIENT: Aldrich & Elliot, PC.
PROJECT: Springfield IDDE (12049)WORK ORDER: 1209-13736
DATE RECEIVED 09/12/2012

001	Site: Valley Street			Date Sampled: 9/12/12		Time: 9:00	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Nitrate as N	0.49	mg/L	EPA 300.0	9/13/12 0:34	W CM	A	
Nitrite as N	< 0.20	mg/L	EPA 300.0	9/13/12 11:58	W CM	A	
TKN	0.8	mg/L	SM 4500 Norg-C/NH3-C	9/24/12	R LVB	A	
Total Nitrogen as N	1.3	mg/L	Sum of TKN+NO2/NO3	9/25/12	R JSW	U	
Phosphorus, Total	0.062	mg/L	EPA 365.1	9/18/12	W AM	A	

002	Site: Springfield State Bldg			Date Sampled: 9/12/12		Time: 9:15	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Nitrate as N	1.1	mg/L	EPA 300.0	9/13/12 12:17	W CM	A	
Nitrite as N	< 0.20	mg/L	EPA 300.0	9/13/12 12:17	W CM	A	
TKN	1.4	mg/L	SM 4500 Norg-C/NH3-C	9/24/12	R LVB	A	
Total Nitrogen as N	2.5	mg/L	Sum of TKN+NO2/NO3	9/25/12	R JSW	U	
Phosphorus, Total	0.020	mg/L	EPA 365.1	9/18/12	W AM	A	

003	Site: Outfall #1380			Date Sampled: 9/12/12		Time: 9:00	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Nitrate as N	2.6	mg/L	EPA 300.0	9/13/12 12:37	W CM	A	
Nitrite as N	< 0.20	mg/L	EPA 300.0	9/13/12 12:37	W CM	A	
TKN	< 0.5	mg/L	SM 4500 Norg-C/NH3-C	9/25/12	R LVB	A	
Total Nitrogen as N	2.6	mg/L	Sum of TKN+NO2/NO3	9/26/12	R JSW	U	
Phosphorus, Total	0.012	mg/L	EPA 365.1	9/18/12	W AM	A	

$$1 \text{ Gal.} = 3.785 \text{ L}$$

$$1 \text{ mg} = 2.20462 \times 10^{-6} \text{ lbs.}$$

Valley Street: (50+ gpm)

$$\text{Total N} = (1.3 \text{ mg/L}) \left(\frac{3.785 \text{ L}}{1 \text{ gal}} \right) \left(\frac{2.20462 \times 10^{-6} \text{ lbs}}{1 \text{ mg}} \right) (50 \text{ gpm}) \left(\frac{60 \text{ min}}{1 \text{ hr}} \right) \left(\frac{24 \text{ hr}}{1 \text{ day}} \right) \left(\frac{365 \text{ days}}{1 \text{ yr}} \right)$$

$$\boxed{\text{Total N} = 285 \text{ pounds/yr}}$$

$$\text{Total P} = (0.062 \text{ mg/L}) (50 \text{ gpm}) (4.38586221)$$

$$\boxed{\text{Total P} = 13.6 \text{ pounds/yr.}}$$

Springfield State Bldg (Underground Tunnel) (50+ gpm)

$$\text{Total N} = (2.5 \text{ mg/L}) (50 \text{ gpm}) (4.38586221) = \boxed{548 \text{ pounds/yr}}$$

$$\text{Total P} = (0.020 \text{ mg/L}) (50 \text{ gpm}) (4.38586221) = \boxed{4.39 \text{ pounds/yr}}$$

Outfall #1380 (3 gpm)

$$\text{Total N} = (2.6 \text{ mg/L}) (3 \text{ gpm}) (4.38586221) = \boxed{34.2 \text{ pounds/yr}}$$

$$\text{Total P} = (0.012 \text{ mg/L}) (3 \text{ gpm}) (4.38586221) = \boxed{0.158 \text{ pounds/yr}}$$



APPENDIX F
OPINION OF PROBABLE COST

TOWN OF SPRINGFIELD
 VALLEY STREET SEWERLINE EXTENSION
 OPINION OF PROBABLE CONSTRUCTION COST
 As of October 18, 2012

Description of Item		Estimated Quantity	Unit	Unit Price	Cost ENR 9400	Cost ENR 9600
A - Sewerline						
A- 1	12" Diameter PVC C900	385	L.F.	\$100	\$38,500	\$39,319
B - Sewerline Appurentances						
B- 1	5' Diameter Precast Concrete Manhole	8	V.F.	\$600	\$4,800	\$4,902
B- 2	12"x6" PVC Sewer Wye	3	EA.	\$210	\$630	\$643
B- 3	6" Diameter PVC SDR35 Sewer Service	155	L.F.	\$60	\$9,300	\$9,498
B- 4	Catch Basin Structure	1	EA.	\$2,500	\$2,500	\$2,553
B- 5	MH Coring	1	EA.	\$2,500	\$2,500	\$2,553
B- 6	Cut/Cap	2	EA.	\$1,000	\$2,000	\$2,043
C - Earthwork						
C- 1	Boulder Excavation	5	C.Y.	\$90	\$450	\$460
C- 2	Misc. Extra. Below Grade Excavation	10	C.Y.	\$40	\$400	\$409
C- 3	Exc. & Replac. Unsuuitable	10	C.Y.	\$40	\$400	\$409
D - Roadwork						
D- 1	Permanent Bit. Pavement Repair	425	S.Y.	\$65	\$27,625	\$28,213
D- 2	Perm. Bit. Drive Repair	50	S.Y.	\$60	\$3,000	\$3,064
D- 3	Concrete Sidewalk Repair	75	L.F.	\$50	\$3,750	\$3,830
D- 4	Granite Curb Replacement	40	L.F.	\$25	\$1,000	\$1,021
E - Incidental Work						
E- 1	Class B Concrete	5	C.Y.	\$250	\$1,250	\$1,277
E- 2	Calcium Chloride	1	TON	\$1,000	\$500	\$511
E- 3	Rigid Trench Insulation	25	L.F.	\$6	\$150	\$153
E- 4	Silt Fence	100	L.F.	\$3	\$300	\$306
F -Lump Sum						
F- 1	Preparation of Site and Miscellaneous Work (15%)	1	L.S.	\$15,000	\$15,000	\$15,319
F- 2	Bonds (2%)	1	L.S.	\$3,000	\$3,000	\$3,064
TOTALS					\$117,055	\$119,546
USE					\$120,000	\$120,000

Notes:

1. ENR 9400 = October 2012
2. ENR 9600 = June 2013

TOWN OF SPRINGFIELD
 PARK STREET SEWERLINE
 OPINION OF PROBABLE CONSTRUCTION COST
 As of December 19, 2012

Description of Item		Estimated Quantity	Unit	Unit Price	Cost ENR 9400
A - Sewerline					
B - Sewerline Appurentances					
B- 1	6" Diameter PVC SDR35 Sewer Service	50	L.F.	\$60	\$3,000
B- 2	Cleanout	1	EA.	\$150	\$150
B- 3	MH Coring	1	EA.	\$1,500	\$1,500
B- 4	Foundation Coring	2	EA.	\$1,500	\$3,000
C - Earthwork					
D - Roadwork					
D- 1	Permanent Bit. Pavement Repair	20	S.Y.	\$65	\$1,300
D- 2	Concrete Sidewalk Repair	20	L.F.	\$50	\$1,000
D- 3	Curb Replacement	20	L.F.	\$25	\$500
F -Lump Sum					
F- 1	Preparation of Site and Miscellaneous Work (15%)	0	L.S.	\$2,000	\$0
F- 2	Bonds (2%)	0	L.S.	\$1,000	\$0
TOTALS					\$10,450
USE					\$11,000

Notes:

1. ENR 9400 = December 2012