

Memorandum



To: Chip Sawyer, Director of Planning & Development
PO Box 867, 100 No. Main St.
St. Albans, VT 05478

From: Watershed Consulting

Date: January 29, 2025

Re: **MS4 IDDE Outfall Survey Update**

Dear Chip,

Watershed Consulting is pleased to present this memorandum detailing the work completed to date on the 2025 Illicit Discharge Detection & Elimination Study required by the City’s Municipal Separate Storm Sewer Systems (MS4) permit.

Watershed Consulting began the dry weather outfall survey work in late fall of 2024 and expects to complete the survey in spring of 2025. The IDDE team completed one day of field work on November 25th, 2024, during which 36 of 90 total mapped outfalls were assessed.

A map of existing stormwater outfalls previously developed by Watershed Consulting was used to locate known stormwater outfalls into Stevens Brook. The Fulcrum field data collection application and proprietary data collection sheets were used to collect georeferenced data for each outfall. When an outfall was located, the stormwater drainage structure’s type, structure material, and pipe diameter were recorded. The structure was also evaluated for signs of staining, abnormal vegetation, algal growth, odor, or maintenance concerns. If flow was present at the time of the visit, the team collected a sample and measured its temperature (°C), pH, and conductivity (uS/cm). The sample was then tested for four parameters indicative of potential illicit discharge: Ammonia, Anionic Surfactants, Chlorine, and Fluoride. The threshold concentrations for these parameters are shown in the table below.

Parameter	Threshold Value
Conductivity	>2,000 uS/cm
Ammonia	>0.25 mg/L
Anionic Surfactants (via Methyl Blue Activated Substances, MBAS)	>0.2 mg/L
Chlorine	>0.06 mg/L
Fluoride	Presence

Outfalls that were flowing and had present flow/no-flow indicators and/or which exceeded threshold values of the sampled parameters have been identified as “Suspect” for illicit discharges. Of the 36 outfalls assessed so far, 7 were identified as suspect outfalls based on a qualitative and quantitative field investigation. These 7 outfalls are detailed below. Their locations are shown on the attached map.

Suspected Outfalls

Outfall 14C

Outfall 14C is a large stormwater outfall located beneath Lincoln Avenue, where extensive advanced investigation (AI) was previously completed. Substantial flow was noted, though no flow-only indicators were present. Brown pipe benthic growth was noted (Figure 1). The anionic surfactant and chlorine concentrations were both elevated above their respective thresholds. The previous AI was completed due to high ammonia and anionic surfactant concentrations, and subsequent *E. coli* readings, however no ammonia was detected during this field visit. The previous round of AI included smoke and dye testing, camera work, and microbial source tracking (MST). While racoons were observed in the pipe previously, human fecal contamination was also confirmed via MST. The previously identified recommendations included:

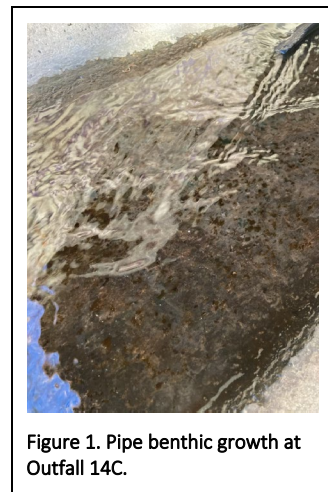


Figure 1. Pipe benthic growth at Outfall 14C.

- Completing additional *E. coli* sampling at key points along the stormline, especially upstream of the manhole at Lincoln Ave/Rugg St intersection and closer to the intersection with Fairfield Street.
- Clean the stormline and vector catchbasins along Lincoln Ave.
- Conducting additional camera work after the stormline has been cleaned to identify additional unknown connections or breaks.
- Sealing the sewer/stormline connection discovered at the catchbasin in front of 70 Lincoln Ave.
- Upon further *E. coli* sampling, consider additional MST sampling, dye testing, and smoke testing at key locations in the storm and sewer system.

The results found during the most recent round of sampling support these recommendations.

Parameter	Field Measurement	Threshold Value
Temperature (°C)	11.3	-
pH	7.91	-
Conductivity (uS/cm)	1050	>2,000
Ammonia (mg/L)	Below test limit	>0.25
Anionic Surfactants (mg/L)	0.216	>0.2
Chlorine (mg/L)	0.77	>0.06
Fluoride	Absent	Presence

Table 1. Outfall 14C field measurements (elevated values shown with light orange highlighting).

Outfall 14S

Outfall 14S is the box culvert beneath Lincoln Ave conveying Stevens Brook. Brown pipe benthic growth was noted, though it is worth noting that this is perennial stream unlike the other outfalls described here. The chlorine concentration was substantially elevated at 0.264 mg/L with a threshold value of 0.06 mg/L. While this is the only elevated parameter, it is substantially elevated enough that additional investigation may be useful. There are several known outfalls upstream of this point along Stevens Brook that have not been located in recent years. Stream walks to locate these outfalls may help to locate additional sources of contamination.

Parameter	Field Measurement	Threshold Value
Temperature (°C)	4.4	-
pH	7.95	-
Conductivity (uS/cm)	1068	>2,000
Ammonia (mg/L)	Below test limit	>0.25
Anionic Surfactants (mg/L)	0.119	>0.2
Chlorine (mg/L)	0.264	>0.06
Fluoride	Absent	Presence

Table 2. Outfall 14S field measurements (elevated values shown with light orange highlighting).

Outfall 39_2

Outfall 39_2 is located east of the Department of Public Works and has previously been the subject of AI throughout the Public Works yard. The outfall is approximately 90% submerged and was noted to have poor pool quality, including staining of leaves and the pool bottom around the outfall (Figure 2). The conductivity measurement, ammonia, anionic surfactants, and chlorine concentrations were all above their respective threshold values. Due to the elevated ammonia reading, a laboratory sample was also collected and brought to Endyne Laboratories (Williston, VT) to measure *E. coli*. The Endyne analysis yielded a result of 2 MPN, indicating that *E. coli* contamination is very minimal. While AI has been completed at this outfall previously, it is clear that additional AI is still required, as well as general outfall remediation.



Figure 2. Poor pool quality at Outfall 39_2.

Parameter	Field Measurement	Threshold Value
Temperature (°C)	11.4	-
pH	6.82	-
Conductivity (uS/cm)	3999	>2,000
Ammonia (mg/L)	0.450	>0.25
Anionic Surfactants (mg/L)	0.923	>0.2
Chlorine (mg/L)	0.086	>0.06
Fluoride	Absent	Presence

Table 3. Outfall 39_2 field measurements (elevated values shown with light orange highlighting).

Outfall 40

Outfall 40 is located behind the Four Winds subdivision located off North Elm Street. The outfall had flow present, though no flow-only indicators were noted. Orange benthic growth was noted in the bottom of the pipe (Figure 3). Anionic surfactant and chlorine concentrations both exceeded their thresholds. These findings indicate that AI is needed to locate the source of these elevated readings. AI was previously completed for this outfall in the Four Winds subdivision with no illicit discharges detected; it was determined at that time that further investigation of the stormline from Finn Ave was necessary. Catchbasin sampling in the Finn Ave section of the contributing storm system should be completed.

Parameter	Field Measurement	Threshold Value
Temperature (°C)	9.7	-
pH	8.0	-
Conductivity (uS/cm)	1296	>2,000
Ammonia (mg/L)	0.087	>0.25
Anionic Surfactants (mg/L)	0.278	>0.2
Chlorine (mg/L)	0.128	>0.06
Fluoride	Absent	Presence

Table 4. Outfall 40 field measurements (elevated values shown with light orange highlighting).



Figure 3. Pipe benthic growth at Outfall 40.

Outfall 42

Outfall 42 is located where Lower Newton Street crosses Stevens Brook. The outflow from this outfall had a high degree of floatables (Figure 4). Brown pipe benthic growth was also noted in the bottom of the concrete pipe. All parameters measured within the normal range except for the anionic surfactant concentration, which was substantially elevated. The pH was also slightly elevated. AI may be necessary to determine the source of the elevated anionic surfactant reading and sudsy floatables.

Parameter	Field Measurement	Threshold Value
Temperature (°C)	10.6	-
pH	8.05	-
Conductivity (uS/cm)	919	>2,000
Ammonia (mg/L)	Below test limit	>0.25
Anionic Surfactants (mg/L)	0.428	>0.2
Chlorine (mg/L)	0.051	>0.06
Fluoride	Absent	Presence

Table 5. Outfall 42 field measurements (elevated values shown with light orange highlighting).



Figure 4. Sudsy outflow at Outfall 42.

Outfall 43_A

Outfall 43_A is located just south of the town line at the intersection of Sheldon Road and North Main Street. The chlorine and anionic surfactant concentrations were found to be substantially elevated. AI is recommended to understand the source of these elevated readings. The ditch where this and several other outfalls are located is very grown in with knotweed and appears to frequently accumulate trash blown in from the nearby road. This area should be cleaned of trash and any necessary repairs to these outfalls should be completed.

Parameter	Field Measurement	Threshold Value
Temperature (°C)	7.1	-
pH	8.06	-
Conductivity (uS/cm)	1071	>2,000
Ammonia (mg/L)	Below test limit	>0.25
Anionic Surfactants (mg/L)	0.441	>0.2
Chlorine (mg/L)	0.242	>0.06
Fluoride	Absent	Presence

Table 6. Outfall 43_A field measurements (elevated values shown with light orange highlighting).

Outfall 43B_C

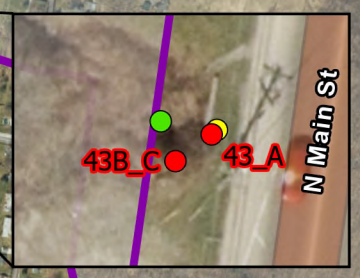
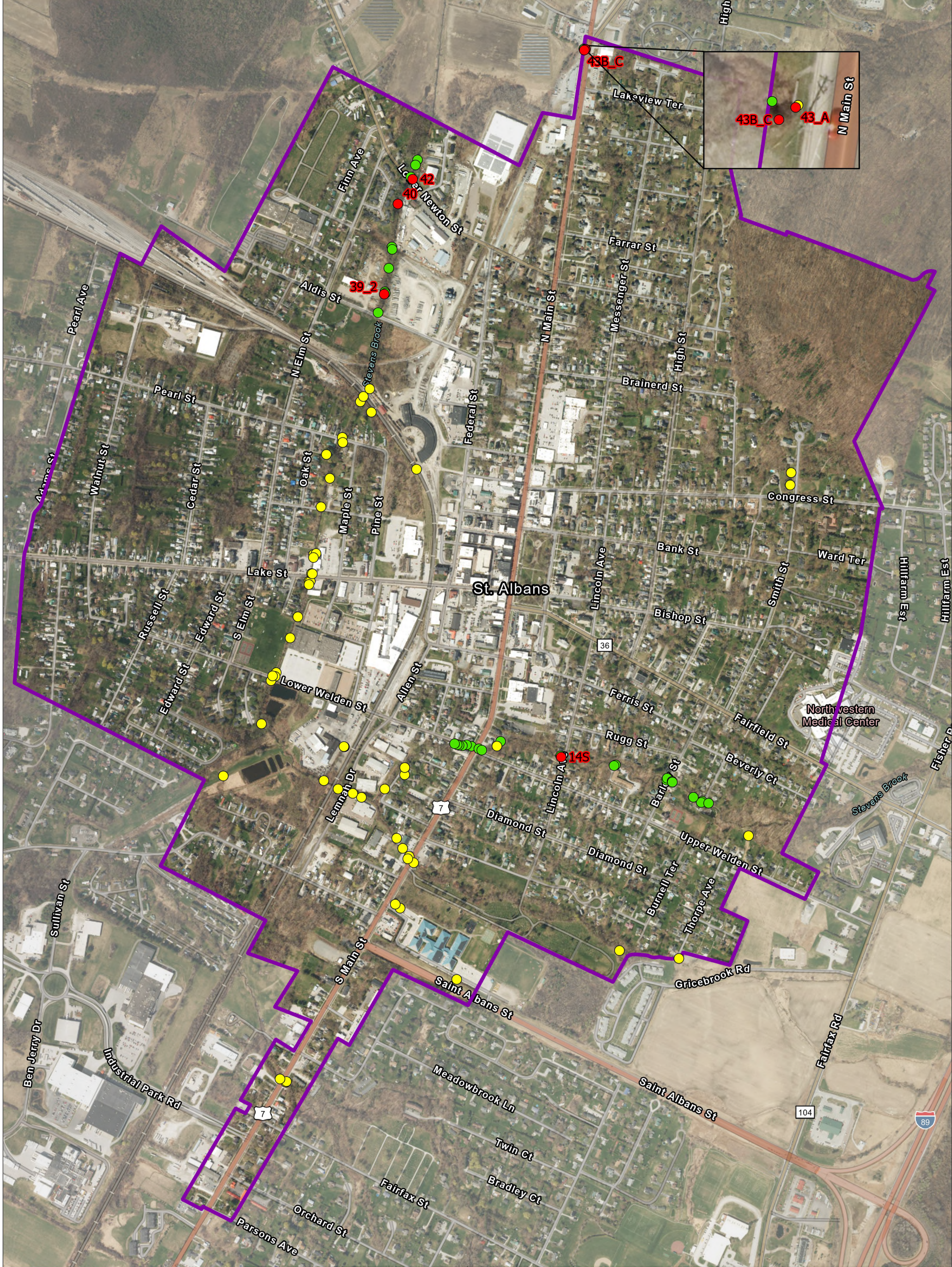
Outfall 43B_C is also in the same ditch as Outfall 43_A across from the intersection of Sheldon Road and North Main Street. No qualitative flow/non-flow indicators were detected. The chlorine and anionic surfactant concentrations were elevated above their respective threshold values. AI is recommended to understand the source of these elevated readings. As with Outfall 43_A above, maintenance work should be completed in the ditch to remove trash and debris from the flow path of the outfalls.

Parameter	Field Measurement	Threshold Value
Temperature (°C)	7.9	-
pH	8.05	-
Conductivity (uS/cm)	941	>2,000
Ammonia (mg/L)	Below test limit	>0.25
Anionic Surfactants (mg/L)	0.276	>0.2
Chlorine (mg/L)	0.09	>0.06
Fluoride	Absent	Presence

Table 7. Outfall 43B_C field measurements (elevated values shown with light orange highlighting).

Next Steps

When conditions allow, specifically dry weather with little to no snow cover, Watershed Consulting will proceed with additional stormwater outfall assessments. It is anticipated that these conditions will occur in the spring of 2025.



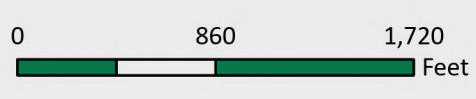
IDDE Outfalls

St. Albans City, VT

Map Date: 3/28/2025

Legend

- Assessed
- Not Assessed
- Suspect
- St. Albans City Boundary



Scale: 1:10,000

