1. Agenda

    Documents:

        AGENDA 04-08-20.PDF

2. Supporting Documents

    Documents:

        BUDGET ADJUSTMENT - GENERAL PARKING WATER FUND - REVISED 032320 (002).PDF
        STONE-PROPOSAL-PLATTSBURGH-IDDE.PDF

REGULAR MEETING OF THE COMMON COUNCIL
OF THE CITY OF PLATTSBURGH, NEW YORK
April 8, 2020
5:30 P.M.

AGENDA

Pledge of Allegiance
(RC)
Present: Mayor Colin Read, Councilors Ira Barbell (W1), Mike Kelly (W2), Elizabeth Gibbs (W3), Paul DeDominicas (W4), Patrick McFarlin (W5), Jeff Moore (W6)
Absent:
****

MAYOR'S COMMENTS:
****

1. MINUTES OF THE PREVIOUS MEETING:

RESOLVED: That the Minutes of the Regular Meeting of the Common Council held on April 2, 2020 are approved and placed on file among the public records of the City Clerk's Office

By Councilor _____; Seconded by Councilor _____
(All in Favor/opposed)
Roll call: Councilors Barbell, Kelly, Gibbs, DeDominicas, McFarlin, Moore
****

2. PAYROLLS OF VARIOUS DEPARTMENTS:

RESOLVED: That the payrolls of the various Departments of the City of Plattsburgh for the week ending April 8, 2020 in the amount of **$_____** are authorized and allowed and the Mayor and the City Clerk are hereby empowered and directed to sign warrants drawn on the City Chamberlain for the payment thereof.

By Councilor _____; Seconded by Councilor _____
(All in Favor/opposed)
Roll call: Councilors Barbell, Kelly, Gibbs, DeDominicas, McFarlin, Moore
****

3. REPORTS OF CITY OFFICES & COMMITTEE REPORTS:

- Report from the Building Inspector's office for the week of April 1 – 7, 2020
- Minutes from the Governance, Strategy and City Operations Committee meeting held on April 2, 2020
- Reports from the Police Department dated April 6, 2020

COUNCILOR/DEPARTMENT CHAIR COMMITTEE REPORTS:

Governance, Strategy, and City Operations- Chair Councilor Barbell

City Infrastructure – Chair Councilor Moore

Finance and Budget – Chair Councilor Kelly

Public Safety – Chair Councilor Gibbs

Plattsburgh Public Library – Chair Councilor DeDominicas

MLD - MLD Board President Councilor McFarlin

RESOLVED: That the reports as listed are hereby ordered received and any written reports are placed on file among the public records of the City Clerk's Office.

By Councilor _____; Seconded by Councilor _____
(All in Favor/opposed)
Roll call: Councilors Barbell, Kelly, Gibbs, DeDominicas, McFarlin, Moore

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4. CORRESPONDENCE OR RECOMMENDATIONS FROM BOARDS: None

****

5. AUDIT OF CLAIMS:

RESOLVED: That the bills Audited by the Common Council for the week ending April 10, 2020 in the amount of **$_____** are authorized and allowed and the Mayor and City Clerk are hereby authorized and directed to sign warrants drawn on the City Chamberlain for the payment thereof.

By Councilor _____; Seconded by Councilor _____
(All in Favor/opposed)
Roll call: Councilors Barbell, Kelly, Gibbs, DeDominicas, McFarlin, Moore

****

6. PERSONS ADDRESSING COUNCIL ON AGENDA ITEMS ONLY:

_____

_____

_____

****

7. OTHER ITEMS:

A. RESOLVED: In accordance with the request therefore the Common Council approves the City Chamberlain to adjust the 2020 General Fund, Parking Fund and Water Fund budgets for unbudgeted or under-budgeted costs of $27,500.00, $1,850.00 and $63,000.00, respectively.

By Councilor _____; Seconded by Councilor _____

Discussion:

Roll call: Councilors Barbell, Kelly, Gibbs, DeDominicas, McFarlin, Moore

ACTION TAKEN: Adopted _____ Defeated _____ Withdrawn _____ Tabled _____
Follow up Action:

****

B. RESOLVED: In accordance with the request therefore the Common Council approves agrees to and authorizes entering into an agreement with Stone Environmental per their March 12, 2020 proposal in the amount of $20,000.

By Councilor _____; Seconded by Councilor _____

Discussion:

Roll call: Councilors Barbell, Kelly, Gibbs, DeDominicas, McFarlin, Moore

ACTION TAKEN: Adopted _____ Defeated _____ Withdrawn _____ Tabled _____
Follow up Action:

****

8. TRAVEL REQUEST: None

****

9. RESOLUTIONS FOR INITIAL CONSIDERATION: None

****

10. NEW BUSINESS AND COUNCILOR REPORTS:

_____

_____

_____

****

11. CLOSING PUBLIC COMMENTS ON ANY TOPIC:

_____

_____

_____

****

Motion to Adjourn by Councilor _____; Seconded by Councilor _____
Roll Call: Councilors Barbell, Kelly, Gibbs, DeDominicas, McFarlin, Moore
MEETING ADJOURNED: _____

Richard A. Marks
City Chamberlain

Department of Finance
41 City Hall Place
Plattsburgh, NY 12901
518-563-7704 TEL
518-563-1714 FAX

DATE: March 23, 2020

MEMO TO: Mayor Read

FROM: Richard Marks

RE: Budget Adjustment – General Fund, Parking Fund and Water Fund

It is being requested to adjust the 2020 General, Parking and Water Fund Budgets, as follows:

Increase: General Fund – CD Contract Services	16330000-4330	$ 27,500.00
Increase: General Fund - Appropriated Fund Balance	1-0599	$ 27,500.00

To provide appropriation for the under-budgeted cost of $27,500.00 for 2019 and 2020 contract services for Chazen Engineering needed for services to complete work on the DRI. This adjustment will increase the General Fund budgeted appropriations by $27,500.00 in 2020.

Increase: Parking Fund – Materials & Supplies	35650000-4330	$ 1,850.00
Increase: Parking Fund - Appropriated Fund Balance	3-0599	$ 1,850.00

To provide appropriation for the unbudgeted cost of $1,850.00 for 2020 materials and supplies needed for downtown to purchase trash bags, sidewalk salt, salt spreaders and other supplies. This adjustment will increase the Parking Fund budgeted appropriations by $1,850.00 in 2020.

Increase: Water Fund – Materials & Supplies	48340000-4330	$ 63,000.00
Increase: Water Fund - Appropriated Fund Balance	4-0599	$ 63,000.00

To provide appropriation for the unbudgeted cost of $63,000.00 for 2020 materials and supplies needed for materials and supplies for water system repairs. This adjustment will increase the Water Fund budgeted appropriations by $63,000.00 in 2020.

Thank you for your attention to this request.

Cc: Matt Miller
Shelise Marbut
Barbara Phillips
Lynda Mulcahy
Mike Brodi
Kristy Duell

Proposal: Illicit Discharge Detection and Elimination for the City of Plattsburgh

STONE ENVIRONMENTAL

PROJECT NO.

P20-031

REVIEWED BY:

Carleigh Cricchi

PREPARED FOR:

Jonathan Ruff, P.E. / *Environmental Manager*
City of Plattsburgh
53 Green St.
Plattsburgh / NY 12901
RuffJ@cityofplattsburgh-ny.gov
518-536-7519

SUBMITTED BY:

Dave Braun / *Senior Water Resources Scientist*
Stone Environmental, Inc.
535 Stone Cutters Way
Montpelier / VT 05602
dbraun@stone-env.com
802-272-8819

535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

March 12, 2020

Jonathan Ruff, P.E., Environmental Manager
City of Plattsburgh
53 Green St.
Plattsburgh, NY 12901
RuffJ@cityofplattsburgh-ny.gov (*submitted electronically*)

Subject: Proposal for the City of Plattsburgh's Illicit Discharge Detection and Elimination Project

Dear Jonathan and Members of the Selection Committee:

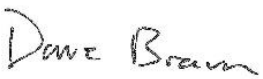
Stone Environmental, Inc. (Stone) is excited to submit this proposal to the City of Plattsburgh to perform an illicit discharge detection and elimination (IDDE) study as a basic step toward improving water quality. Our goal is to work in close collaboration with the City and leverage existing mapping data to locate and characterize contaminant sources and begin the process of reducing bacterial, nutrient, and hazardous material discharges to receiving waters in the City.

IDDE requires numerous judgments regarding which stormwater drainage systems are receiving illicit discharges, and how to approach investigations of suspected illicit discharges. Stone was the first consulting firm to perform IDDE work in Vermont, and our team brings more experience in this field than any other firm in the region. Beginning with our first project in Barre City in 2006, Stone has conducted illicit discharge detection and elimination projects in 106 towns and cities in Vermont and assessed approximately 4,300 stormwater systems for the presence of illicit discharges.

Over the past decade, we have continually refined and improved our assessment methods. Through our hands-on experience, we have become experts in differentiating between systems that are receiving contaminated non-stormwater discharges and those that are not. With persistence, we have been successful in identifying the source of contaminants in nearly every case. Most importantly, we are always interested in finding ways to improve efficiency and produce more definitive, actionable data.

The Stone team derives great satisfaction from locating illicit discharges and working with our partners to correct them. We appreciate this opportunity to share our approach with you and are available to answer any questions you may have regarding our qualifications.

Sincerely,



Dave Braun
Senior Water Resources Scientist
Direct Phone / 802.272.8819
Email / dbraun@stone-env.com

Proposal: Illicit Discharge Detection and Elimination for the City of Plattsburgh

Cover Photo: Outfall HP160 in Hyde Park. Two houses were found with wastewater connections to this stormwater system

Contents

List of Tables

1. Introduction

1.1. Project Understanding

The goal of Illicit Discharge Detection and Elimination (IDDE) is to improve water quality by identifying and eliminating bacterial, nutrient, and hazardous material discharges (e.g., non-stormwater) into stormwater drainage systems. Wastewater leaking from sanitary sewers and malfunctioning septic systems into stormwater infrastructure or entering via direct connections between sanitary wastewater and stormwater piping, can result in significant nutrient and microbial pollution. Such discharges pose a public health risk and contribute to degradation of local receiving waters. Performing IDDE is an important step toward protecting and improving water quality.

Stone Environmental, Inc. (Stone) will perform a comprehensive assessment of dry weather flows from all of the City of Plattsburgh's known separate storm drain outfalls (estimated at 41 systems) within the municipal study area for the presence of illicit discharges. Our team will coordinate with the City's public works staff and use the City's stormwater infrastructure mapping to complete an initial assessment based on field observations and basic water quality testing. Where monitoring indicates that contamination is present, we will perform an advanced investigation (AI), including bracket sampling to identify specific segments of closed drainage systems where illicit discharges originate, and will work with the City to conduct tracing techniques. When sources of illicit discharges are identified, we will assist the City in planning and implementing corrective measures.

Plattsburgh has a combined sewer and stormwater system covering part of the City. As sewer separation projects have been completed in Plattsburgh, none of the stormwater outfalls have been tested, which we believe presents a significant risk of untreated wastewater discharges to surface waters. In Vermont, Stone has found numerous direct wastewater connections to previously combined and now (incompletely) separated stormwater drainage systems, as was the case at the outfall in Hyde Park shown on the proposal cover. While the prevalence and characteristics of illicit discharges in the City of Plattsburgh are not known, long-term pollution reductions are anticipated as a result of this project. Another outcome of this project will be information regarding stormwater infrastructure condition, which may be used to identify and prioritize retrofits and/or repairs.

This project is part of a larger effort to complete illicit discharge detection and elimination in all municipalities in the Lake Champlain Basin not required to perform IDDE by federal regulations. Reports of the Vermont municipalities participating to date in these studies and the results can be found at: https://dec.vermont.gov/watershed/cwi/manage/idde. Stone conducted the majority of this work, assessing approximately 4,300 discharge points and identifying nearly 200 wastewater sources.

1.2. Primary Point of Contact & Bid Contributors

Stone Environmental is a 100% employee-owned corporation registered in the State of Vermont. Dave Braun (Senior Water Resources Scientist / Water Resources Service Leader) is the single point of contact for this proposal. He can be reached via email (dbraun@stone-env.com) or phone (802.272.8819).

The following staff contributed to the development of this proposal: Dave Braun (Single Point of Contact, Drafter & Reviewer) and Carleigh Cricchi (Drafter & Reviewer).

2. Qualifications and Experience

2.1. Firm Description

Stone Environmental is a 100% employee-owned environmental science, engineering, and field services firm located in Montpelier, Vermont. Founded in 1992, our mission is to provide scientific tools, information, and analyses to help clients solve environmental challenges with integrity, expertise, and innovation. We bring together over 50 scientists, engineers, modelers, developers, and foundation staff with diverse backgrounds and skills—and a shared commitment to scientific integrity, innovation, and focus on client needs. Our areas of expertise include infrastructure feasibility and watershed assessments, environmental planning and policy development, developed lands stormwater retrofit practice design and implementation, hydrology and water quality modeling, stream restoration design and implementation, environmental monitoring, geographic information systems (GIS) spatial analysis, and application development.

The work of Stone's water resources scientists and engineers is focused on understanding and addressing the effects of land use on the region's water resources. Much of our team's work is in response to and in support of the efforts of local communities, watershed groups, and regulatory agencies to improve water quality in Lake Champlain by improving land management in its tributary watersheds. Our team has performed numerous studies of the impacts of stormwater runoff, evaluated the effectiveness of best management practices through field studies and modeling, and worked regularly with municipalities, state agencies, and non-government organizations to design and implement retrofits that improve conditions in local receiving waters. We offer expertise extending beyond the evaluation, siting and design of green and gray stormwater infrastructure, ranging from the development and implementation of strategies to improve the resiliency of municipal infrastructure to insights into the nexus between stormwater management for working lands, developed lands, and roadways as Vermont's Agencies of Natural Resources (VANR), Transportation (VTrans) and the Agriculture, Food and Markets (VAAFM) continue to develop and implement permit programs to meet the goals and deadlines of the Lake Champlain Phosphorus TMDL.

2.2. Relevant IDDE Experience

Stone's scientists and engineers are uniquely suited to support the City of Plattsburgh in performing a comprehensive assessment of dry weather flows from storm drain outfalls and other discharge points, as well as advanced investigations of systems having suspected wastewater contamination. We have the expertise, resources, and commitment to locate and characterize contaminant sources and initiate correction of bacterial, nutrient, and hazardous material discharges. Stone's first IDDE project was conducted in Barre City in 2006, in partnership with the Friends of the Winooski River. Since then, Stone and its partners have conducted IDDE studies in 106 Vermont communities (Table 1). Of the roughly 4,300 stormwater drainage systems we have assessed; we have confirmed an illicit discharge in 3–4%. By combining drainage mapping, environmental investigative work, and municipal cooperation, Stone has decreased nutrient loading to Vermont's rivers and lakes and reduced the risk of pathogen exposure. In addition, while performing IDDE work, we have identified and addressed a variety of other problems, such as: pet waste and trash dumping, truck washing runoff, mop water discharges via floor drains and catchbasins, and elimination of several small

industrial discharges. No other contractor in Vermont has a comparable depth of experience and record of success performing IDDE.

Over the past several years, Stone has resolved over 90 illicit discharges, including:

Dye testing revealed multiple residential wastewater connections to this stormdrain in Middlebury. The Town of Middlebury ultimately constructed a new sanitary sewer on North Pleasant Street to eliminate the illicit connections.

- Sanitary wastewater cross connections in Hardwick, Hyde Park (4), Wolcott, Middlebury (3), Proctor (3), Poultney, Newport City (3), Barton (3), North Troy, Barre City (3), Montpelier (7), Woodstock, and Rutland Town. Among the most significant of these were elimination of wastewater connections to the stormwater systems at elementary schools in Hardwick and Newport City; a sewage pump station in Barre City; a sewer main serving four houses in Middlebury; two cross connections at the Montpelier Inn in Montpelier, and a sewer main serving two commercial building and one house in Proctor.
- Leaking municipal sewer lines in Barre City (6), Branden, Montpelier (3), Proctor (2), Richford, and Vergennes;
- Leaking sewer laterals in Barre City (4), Bennington, Enosburg Falls, Fair Haven, Gilman (2), and Morrisville, St. Johnsbury, and Weston;
- Dry weather combined sewer overflows in Montpelier, St. Johnsbury, and Rutland.
- Failed septic systems in Barton, Barre City, Concord (2), Derby (2), Fair Haven, Groton, Rockingham, St. Johnsbury, Wallingford, and Wolcott;
- Washwater connections or direct dumping in Fair Haven, Georgia, Middlebury, West Rutland, North Troy, Enosburg Falls, Rutland Town (2), Newport City, St. Johnsbury, Barton, Orleans Village, Barre Town, and Plymouth;
- Significant water leaks in Middlebury, Derby, Montpelier, and St. Johnsbury; and
- Industrial discharges in Fair Haven, Swanton, and Rutland.

Stone is not interested in simply going through the motions to fulfill a contract's scope of work. Rather, we are single minded in our pursuit of illicit discharges and we believe our work produces significant, tangible benefits.

Over the past twelve years, Stone has continually refined and improved our assessment methods. The methods we use work well in our region. We are able to differentiate between systems that are receiving contaminated non-stormwater discharges and those that are not. With persistence, we have been successful in identifying the source of contaminants in nearly every case. Most importantly, we are always interested in finding ways to improve efficiency and produce more definitive, actionable data. Like all practitioners, we struggle with the limitations of the testing methods available to us and strive to keep abreast of promising new techniques and technologies. The workhorse method we have had success with time and again is optical brightener monitoring, without which a majority of the sanitary wastewater and washwater discharges we have eliminated would not have been detected. Given this track record, we cannot understand why all contractors are not required to test for optical brightener and we are concerned that illicit discharges may be going undetected in other contractors' IDDE assessments.

Table 1, on the following page, provides an overview of our team's project experience. We have also included three descriptions of relevant project experience in Appendix B.

Table 1. Stone IDDE Project Experience

IDDE Project Name & Towns	Partner / Sponsor
Basin 1 (Battenkill, Hoosic, and Walloomsac Rivers) and Basin 12 (Deerfield River) IDDE Arlington, Dorset, Pownal, Manchester, Shaftsbury, Stamford, Sunderland and Woodford in Basin 1 and Dover-Mt Snow, Readsboro, Whitingham, and Wilmington in Basin 12	VTDEC CWIP
West, Williams, Saxtons, and Lower Connecticut River Basins IDDE (Basin 11) Chester, Dummerston, Grafton, Guilford, Jamaica, Londonderry, Marlboro, Newfane, Peru, Putney, Rockingham, Townshend, Vernon, Wardsboro, Westminster, Weston, Winhall	VTDEC CWIP
Ottauquechee and Black River Basins IDDE (Basin 10) Cavendish, Killington, Ludlow, North Springfield, Plymouth, Windsor, Woodstock, Bridgewater, Hartland, Weathersfield, West Windsor	VTDEC CWIP
Montpelier IDDE	VTDEC CWIP
Upper Winooski River IDDE Barre City, Barre Town, Berlin, Stowe	VTDEC CWIP
Upper Connecticut River and Passumpsic River Basins IDDE Bradford, Burke, Canaan, Concord, Danville, East St. Johnsbury, Fairlee, Glover, Groton, Lyndon, Lunenburg (Gilman), Newbury (Wells River), Norwich, and Ryegate	VTDEC ERP
Stevens Branch and Stowe IDDE Barre City, Barre Town, Berlin, Stowe, and Williamstown	Friends of the Winooski River
St Johnsbury IDDE	Caledonia County NRCD
Memphremagog Basin IDDE Barton, Brighton, Derby, Orleans Village, and Newport City	Memphremagog Watershed Association
Rutland County IDDE Benson, Castleton, Fair Haven, Poultney, Proctor, Wallingford, West Rutland	Rutland NRCD / VTDEC ERP
Missisquoi River Basin Advanced Investigations Enosburg Falls, North Troy, Richford, Swanton	Aldrich and Elliot (prime) / VTDEC ERP
Winooski Headwaters IDDE Cabot, Marshfield, Plainfield	Friends of the Winooski River / VTDEC ERP
Lamoille River Basin IDDE Cambridge, Fairfax, Georgia, Hardwick, Hyde Park, Jeffersonville, Jericho, Johnson, Morrisville, Underhill, and Wolcott	VTDEC ERP
Otter Creek Basin IDDE Middlebury, Vergennes, Brandon, Pittsford, Rutland City, and Rutland Town	VTDEC / Lake Champlain Basin Program
Brattleboro IDDE	VTDEC ERP
Missisquoi River Basin IDDE Enosburg Falls, Highgate, Montgomery Center, North Troy, Richford, Swanton	VTDEC ERP
Winooski River Basin IDDE Waterbury, Richmond, Waitsfield, Moretown	Friends of the Winooski River & Friends of the Mad River / VTDEC ERP
Central Vermont IDDE Berlin, Montpelier, Northfield	Friends of the Winooski River / ANR EPA Section 319 grant
Barre City IDDE	Friends of the Winooski River / Supplemental Environmental Project
Milton IDDE	Town of Milton

2.3. Project Organization & Team Qualifications

Our team's extensive IDDE experience translates to an unparalleled ability to tackle the challenges associated with identifying sources of contaminants in these buried systems. Success with this work requires persistence, attention to detail, and creativity. Led by Senior Water Resources Scientist Dave Braun, Stone's IDDE team excels at the dogged pursuits that chasing suspected illicit discharges frequently entails.

Dave Braun will serve as the Project Manager and primary point of contact for the project. Dave has managed all of Stone's IDDE projects conducted to date, and understands the complexities associated with identifying and eliminating illicit discharges. John Hanzas, President, will oversee Dave in meeting all contractual obligations within his role as executive officer.

A team of scientists with significant IDDE project experience will assist Dave in this project. Branden Martin, P.E. and Warren Rich have participated in IDDE work and are available to provide support on the City of Plattsburgh's IDDE Project.

Stone will work closely with the City of Plattsburgh. We will remain mindful of the interests and needs of the City as we proceed through the project and will solicit information or guidance where appropriate. However, we should not require substantial assistance from Department of Public Works staff. We will under no circumstances purport to represent the City of Plattsburgh but will make clear in interactions with the public that we are a private firm working in cooperation with the City for this project.

The bios and roles of key personnel are provided in the following section and resumes for key project staff are included in Appendix A.

Toilet paper caught on a monitoring pad in a Rutland Town outfall. Hotel management eliminated the cross-connection in 2018.

2.4. Key Staff Roles & Bios

DAVE BRAUN — Senior Water Resources Scientist

Project Manager, Primary Point of Contact, Lead Assessment and Advanced Investigations, Reporting

Dave's experience in the water quality field is focused broadly on evaluating the fate and transport of nutrients, microbial pathogens, and pesticides in the environment and practices to manage these pollutants. Over his 20+ years at Stone, Dave has designed and implemented numerous flow and water quality monitoring programs, performed numerous IDDE assessments and advanced investigations, as well as managed several research and demonstration studies aimed at reducing phosphorus and sediment transport from developed and agricultural lands to local receiving waters. To date, he has managed twenty IDDE projects for 106 Vermont communities, often working in partnership with watershed organizations to identify

and reduce illicit discharges contributing to water quality concerns. Dave leads Stone's Water Resources team and has a B.S. in Biology and M.S. in Water Resources.

BRANDEN MARTIN, P.E. — Water Resources Engineer

Assessment Team Member, Assist Illicit Discharge Detection Assessment

Branden is involved in a variety of projects at Stone, including stormwater practice design, illicit discharge detection and elimination, and agricultural water and wastewater management. Branden is familiar with the challenges of closed drainage systems and has supported illicit discharge detection and elimination studies in the Winooski River and Otter Creek watersheds. Branden graduated from the University of Vermont in 2012 with a Bachelor of Science in Civil Engineering and holds a Professional Engineers license in Vermont.

WARREN RICH — Project GIS Specialist

GIS Spatial Analysis and Mapping

Warren is a Project GIS Specialist responsible for providing geospatial solutions to a wide variety of projects, including data visualization, data extraction and compilation, database management, and spatial analysis. His recent experience includes preparing report maps for the Ottauquechee and Black River Basin IDDE project, as well as performing GIS analysis and mapping for Stone's inventory and assessment of roof drains in combined sewer areas in Montpelier, Vermont. He holds a M.S. in GIS for Sustainability and has over eight years of relevant GIS experience.

GEORGE VALENTINE — Water Resources Technician

Assessment Team Member, Assist Illicit Discharge Detection Assessment

George Valentine is the newest member of our IDDE team. He is a field scientist with a focus on flow and water quality monitoring. George will assist in the illicit discharge assessment phase of this project. George recently his B.A. in Environmental Studies and Conservation Biology from Middlebury College.

3. Project Approach and Scope of Work

3.1. Our Approach

Performing the tasks of an IDDE project does not require particularly advanced knowledge or instruments. Rather, success is a product of approach, and the Stone team's deep experience set us apart from other firms. Our approach is comprehensive, consistent, and collaborative.

Comprehensive

Stone's methodology begins with taking a broad view of the stormwater drainage systems warranting assessment. We will assess the 41 municipal drainage systems designated by the City of Plattsburgh. In addition to the mapped infrastructure, we scout streambanks in areas of concentrated development (for example, along the backsides of downtown or village center buildings built on a riverbank) for undocumented drain outlets. In one recent study, we found a pipe behind an apartment building in Concord, Vermont that proved to be a septic tank overflow discharging to the Moose River. Stone has found illicit discharges in new infrastructure and old; and in residential, commercial, and industrial areas—thus, we don't like to make guesses about where we might find illicit discharges. One exception to this rule, however, is that it is not worthwhile to assess highway drainage systems in areas where there is no sanitary wastewater infrastructure and no upslope development.

Consistent

If selected, Stone will conduct this illicit discharge assessment using methods consistent with recent IDDE projects administered by Vermont DEC—methods proven to work well in the Lake Champlain Basin. Working independently and as part of a team, Stone has performed IDDE projects for DEC in 106 communities in the last twelve years. One of the methods we find useful is testing for the presence of optical brighteners. As an illicit discharge detection tool, we have had more success monitoring optical brighteners than ammonia, detergents, or *E. coli*. Our consistency in assessment methods and approach will benefit the City of Plattsburgh because comparable data are being developed for communities throughout the Lake Champlain Basin. In the present project, we will maintain this consistency.

Collaborative

Stone looks forward to collaborating with the City of Plattsburgh. The Stone team is interested in solving problems, not in creating difficulties for the City or its residents. We will provide as much information as we can about what we find. If we suspect a business or home is discharging an inappropriate material to a municipal stormdrain or stream, we will provide the City with this information and discuss possible solutions, rather than confronting the business or resident directly. When the need arises to enter a building, for instance to dye-test a toilet, we prefer to accompany a municipal employee who makes the introduction or knocks on the door. The Stone team is looking forward to a productive collaboration with the City of Plattsburgh to complete this project.

3.2. Task 1: Prepare Quality Assurance Project Plan (QAPP)

Stone will draft a primary data Quality Assurance Project Plan (QAPP) consistent with the requirements of EPA-funded projects administered by the Lake Champlain Basin Program (LCBP). The QAPP will describe the methods of collection and analysis of primary environmental data. No data will be collected until the QAPP is approved by the LCBP, the New England Interstate Water Pollution Control Commission (fiduciary agent to LCBP), and EPA representatives. Stone has prepared numerous QAPP's for LCBP-funded projects and can draw on existing templates in completing the Plattsburgh IDDE QAPP.

3.3. Task 2: Illicit Discharge Detection and Elimination Assessments

In Task 2, Stone will perform a comprehensive assessment to locate and characterize illicit discharges. The stormwater infrastructure mapping provided by the City will enable Stone to perform efficient illicit discharge detection and contaminant tracing. Knowledge of system extent is essential for the detection and elimination of illicit discharges. Outfall locations and system connectedness data are used as a basis for locating illicit or illegal discharges to municipal stormwater systems and tracing them to the source.

3.3.1. Preparing for the Assessment

Stone will hold an initial kickoff meeting with Plattsburgh's Environmental Manager and Public Works staff to discuss the general study approach, site access policy, and coordination of traffic control for any necessary in-street sampling. This meeting will also provide Stone an opportunity to collect pertinent background information, including:

- General schedules of road, wastewater, and stormwater collection system projects that are anticipated to occur in 2020 (to avoid potential conflicts with construction activities).
- Locations of any known, suspected, or potential cross connections, combined sewer overflows, and sanitary sewer overflows. These may include areas with a history of pipe back-ups or failures, or where complaints have been received about sewage odors or other nuisance conditions.

Other preparations for the illicit discharge assessments will include purchasing and assembling the necessary equipment and supplies, as well as preparing a Health and Safety Plan. Field equipment will be assembled from Stone's inventory. Consumable supplies, including test reagents, will be purchased to meet the needs of the project.

Large format field maps will be prepared by overlaying the City's stormwater infrastructure mapping on the best available orthophotography. These maps will be consulted during the kickoff meeting and will be annotated in the field.

We will configure a mobile GIS application with an electronic data entry form (created in Survey 123) to allow field staff to document field observations and record test results using a mobile device, tablet, or any other platform with a data or internet connection. Stone has developed electronic data entry forms that tie observations and water quality data to specific structures in the infrastructure mapping, improving the effciency of field data collection and reporting. This streamlined data collection process allows users to record field observations and sampling data using a mobile device, tablet, or any other device with wifi

3.3.2. Illicit Discharge Assessment

Stone will perform a comprehensive assessment of dry weather flows from stormdrain outfalls and other discharge points in Plattsburgh to identify and characterize illicit discharges. Plattsburgh's recently completed stormwater infrastructure mapping will be used as a guide.

Stormwater outfalls will be inspected during dry weather to minimize dilution by stormwater. Dry weather will be defined as negligible rainfall (less than 0.1 inches) since approximately 12:00 p.m. on the previous day. In larger stormwater collection systems where the effects of dilution must be considered, selected catchbasins and junction manholes will also be assessed. Stormwater structures will be accessed along the public right-of-way or from the receiving waterbody, as appropriate. Stormwater structures located on private property will be assessed where landowner permission is granted, particularly if these private systems discharge to a municipal drainage system.

Stone scientist assessing outfalls to the Winooski River in Montpelier.

Stone will assign a unique identifying code to each outfall or other stormwater structure assessed and record the position of any unmapped outfalls identified. Stone will describe the condition of each discharge point and the area immediately below each discharge point. If present, dry-weather flows will be observed for color, odor, turbidity, and floatable matter. Obvious deficiencies in the structure, such as severe corrosion, will be noted. Dry weather flows will be captured directly in a sample container, either by hand or by using a telescoping pole. At catchbasins and manholes located at junctions in the storm sewer, samples will be collected independently from each in-flowing pipe, when accessible. Field data will be entered using a mobile GIS application configured with an electronic data entry form (Survey 123).

Stone scientist inspecting a catchbasin for dry weather flows.

Every dry weather discharge will be tested for ammonia, methylene blue active substances (common detergents), and the presence of optical brightener to identify potential illicit discharges from laundry facilities, leaking sanitary sewers, and cross-connections. Optical brighteners are fluorescent dyes contained in most laundry detergents. Specific conductance will be measured as an indication of dissolved solids content and chloride concentration. Samples will also be analyzed for free chlorine concentration to detect treated municipal water leakage.

In large stormwater systems, testing at the outfall is not always sufficient to demonstrate that an illicit discharge is not present. Contaminants introduced near the top of the system may not be detected at the outfall due to retention, dilution, and degradation within the system. In addition to the outfall, we normally test every major branch of the system, approximately every twelfth structure up the line. At catchbasins and

manholes located at junctions in the storm sewer, samples will be collected independently from each in-flowing pipe, when accessible.

With certain exceptions, structures where no dry-weather flow is observed will be assumed not to have illicit connections and no further assessment will be made. Our general procedure will be to provide additional assessment of dry structures only if there is evidence of contamination in the area below the outfall or in a catchbasin or manhole sump, such as deposits, staining, or offensive odors.

Measuring chlorine concentration in dry weather discharge.

3.3.2.1. Water Analysis Methods

Stone will perform a standard battery of tests at all outfalls and selected catchbasins and manholes that are flowing at the time of inspection. The most efficient and effective test Stone employs to detect and isolate illicit wastewater discharges is the optical brightener test, wherein cotton pads are placed at outfalls or in structures within the drainage system, are collected and processed after an exposure period of 5-10 days and are then viewed under a UV lamp.

Stone has undoubtedly conducted the optical brightener test more often than any firm in Vermont, if not the United States. We have found more than 75 illicit discharges using this test, often leading us directly to the wastewater or washwater source. This test is best suited for detecting and isolating wastewater discharges from municipal sanitary sewer mains to stormwater systems. However, the optical brightener test is not perfect, as illustrated by a sanitary wastewater discharge Stone missed at the Waitsfield public library—these discharges from individual residences and commercial/institutional sources may not be detected if there are no laundry facilities or if certain detergents that lack optical brightener dyes are used. For this reason, and to identify other important discharges including industrial wastewaters, illegal dumping, and potable water leaks, Stone's standard procedure is to also test all flowing outfalls for ammonia, methylene-blue active substances (anionic surfactants), free chlorine, and conductivity.

Positive optical brightener monitoring pad under fluorescent (left) and UV (right) lamps

Ammonia will be tested using Aquacheck ammonia test strips. Methylene blue active substances will be tested using CHEMetrics test kit K-9400, a method consistent with APHA Standard Methods, 21st ed., Method 5540

C (2005). Free chlorine analyses will be conducted with powdered DPD reagent (Hach Method 8167, equivalent to USEPA method 330.5) and a portable Hach DR/900 colorimeter. Specific conductance will be measured using an Oakton model conductivity meter, according to Stone Environmental Standard Operating Procedure (SOP) 5.23.3.

Table 2, below, provide a summary of the water quality tests that Stone staff will perform at all discharge points, and at selected catchbasins and manholes that are flowing at the time they are inspected.

Table 2. Water Quality Tests Performed at Flowing Structures

Parameter	Sample Container	Analytical Method
Ammonia	Glass Bottle	Aquacheck ammonia test strips
Free chlorine	Glass Bottle	Hach Method 8167 (EPA 330.5) (DPD method)
MBAS detergents (anionic surfactants)	Glass Bottle	APHA Standard Methods, 21st ed., Method 5540 C (2005)
Specific conductance	Glass Bottle	Stone SOP 5.23.3
Optical brighteners	Cotton Test Pads	Stone SOP 6.38.0

Upon confirming discovery of an illicit discharge, Stone will notify the City of Plattsburgh, following the reporting requirements described in Attachment A of the Request or Proposals. As is usually the case, we expect to find a small number of illicit discharges where the source of the discharge is obvious, and the remedy is simple to implement. These illicit discharges will be resolved immediately.

3.3.3. Summary of Assessment Findings

At the conclusion of the illicit discharge assessment, a data table presenting the survey results will be provided to the City, with a description of drainage systems warranting advanced investigation. This summary will provide a basis for the final report, which will be delivered following advanced investigation.

3.4. Task 3: Advanced Investigations

Through our extensive IDDE experience, we have developed a strong understanding of constituent concentrations indicative of contamination and those associated with natural or background conditions. These thresholds are summarized in Table 3. We will apply these thresholds as well as our observations in recommending to the City the stormwater systems warranting advanced investigation. With the Environmental Manager's concurrence, Stone will perform advanced investigation for the stormwater systems where contamination was observed. Stone will perform advanced investigations on a maximum of five stormwater systems.

Table 3. Threshold Levels for Determining Illicit Discharges

Test	Benchmark	Remarks
E. coli	>= 235 *E. coli*/100 mL	Undiluted municipal wastewater can have *E. coli* levels an order of magnitude or higher than this benchmark. Pet waste and wildlife sources also cause elevated *E. coli* levels.
Ammonia	>= 0.25 mg/L	In the absence of other wastewater indicators, follow-up investigation is performed when the ammonia concentration is 0.5 mg/L or higher. If other wastewater indicators are present, then the 0.25 mg/L benchmark is used. Decomposing vegetation under anoxic conditions can release ammonia to water, which can cause misleading results.

Test	Benchmark	Remarks
Detergents (methylene blue active substances)	>=0.2 mg/L	Detection of low concentrations (0.1-0.3 mg/L) of anionic detergents is common at stormwater outfalls. Most detections are not correlated with other wastewater indicators and do not lead to a definite source. These detections may be attributable to outdoor washing. However, concentrations as low as 0.2 mg/L have occasionally led us to significant wastewater sources that might otherwise have been missed; therefore, this is a useful test to trigger additional investigation.
Optical brightener	presence	Presence usually indicates contamination by sanitary wastewater or washwater. Exposure of the test pad for 5-10 days means that diluted and intermittent discharges can be detected. Optical brightener testing in catchbasins and manholes has proven to be our most effective method to bracket sources of contamination in storm sewers.
Free chlorine	>=0.10 mg/L	The field test used for free chlorine analyses is sufficiently sensitive to detect municipal tapwater sources diluted by groundwater or runoff approximately 3- to 10-fold, depending on the strength of the tapwater chlorine residual. Chlorine is a good indicator of tapwater leaks and graywater sources. Chlorine is degraded in the presence of organic materials; therefore, it is not a good wastewater indicator.
Specific conductance	>600 µS/cm	Specific conductance is not a reliable indicator of wastewater contamination. Road salt and metals from pipe corrosion often result in levels in the 1,000-10,000 µS/cm range, whereas flows contaminated with wastewater generally have specific conductance in the 600-1,000 µS/cm range. Although infrequent, this measurement has proven most useful in identifying certain industrial discharges.

3.4.1. *E. coli* and Phosphorus Testing

If wastewater contamination is suspected at a discharge point, (because of a positive optical brightener test, elevated ammonia, and/or septic odor), our team will collect samples to measure *E. coli* and total phosphorus concentrations in the water (Table 4). *E. coli* bacteria levels provide an indication of fecal contamination. Contributing sources of *E. coli* contamination include wastewater leaking from sanitary sewers and malfunctioning septic systems into stormwater infrastructure and by direct connections between sanitary wastewater and stormwater piping. Phosphorus is a concern throughout the Lake Champlain Basin because elevated concentrations of phosphorus promote eutrophication of fresh waters. Therefore, total phosphorus will be analyzed at all discharge points with suspected wastewater contamination.

Table 4: Laboratory Sample Analyses

Parameter	Sample Container	Sample Preservation	Holding Time
E. coli	Plastic bottle (100 mL)	Cool (4°C), sodium thiosulfate	6 hours
Total P	Glass vial (50 mL)	Cool (4°C)	28 days

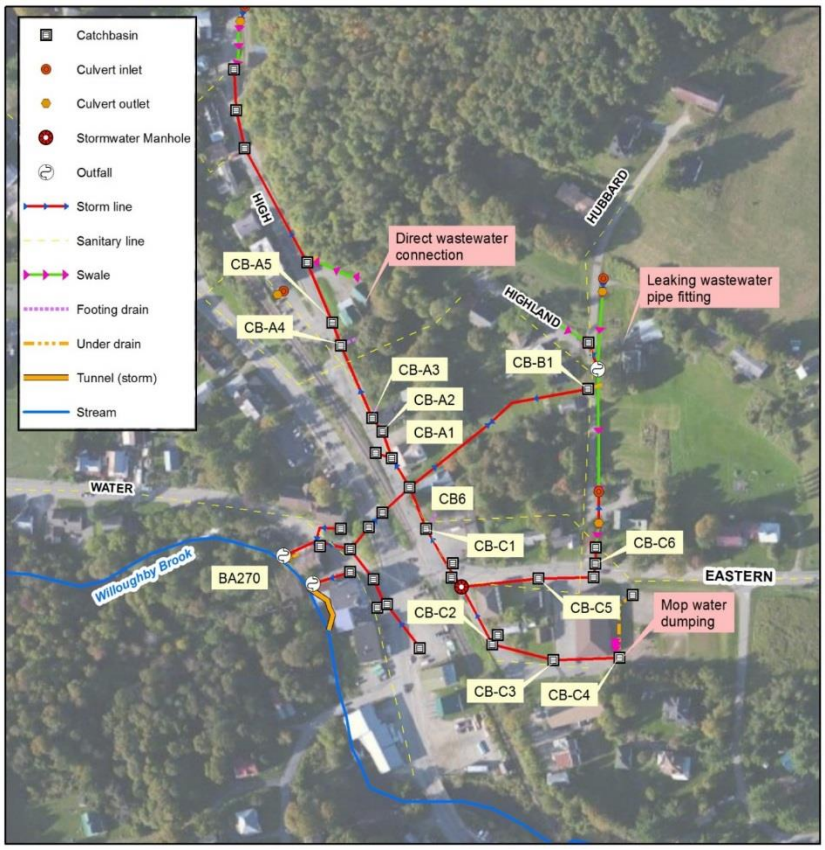
At discharge points where wastewater contamination is suspected, we will simultaneously collect water samples for *E. coli* and total phosphorus analyses, and record flow measurements so that we can calculate total phosphorus mass loading. Flow will be measured by timing the filling of a container of known volume.

3.4.2. Bracket Sampling

If a stormwater drainage system is suspected of passing illicit discharges based on the results of the initial assessment, additional observations and testing will be performed within the collection system to locate or bracket the origin of the contaminated flow. Our goal is to bracket the contaminant source between adjacent structures, such as a stormline connecting a catchbasin to a down-pipe manhole. The City's stormwater infrastructure mapping data will be used to guide this effort.

To locate or bracket contaminant sources within stormwater drainage systems, the same testing methods (or a subset of the methods) will be used as in the dry weather survey. The most reliable method to bracket a source of wastewater contamination is usually optical brightener monitoring throughout the drainage system. In many instances, we have used optical brightener results to narrow the search area for illicit discharges from a large drainage system to a specific structure or the pipe connecting two structures, as in the example illustrated on High Street in Barton. The presence, appearance, and odor of dry-weather flows are also useful in isolating sources of contamination within segments of the drainage system.

After bracketing the discharge source as closely as possible using the water quality test methods, Stone will review each discharge location with municipal staff and plan any needed tracing techniques. When presented with the assessment results, municipal staff very often dredge up critical history regarding past infrastructure changes, which helps determine the course of further investigations. Regarding discharges originating on private property, it has often worked well for Stone to write a letter to the City Manager explaining the relevant findings for the City to use in discussions with the home or business owner. A meeting can help sort out which entity is the appropriate lead for aspects of a plan to find and fix identified illicit discharges.



Stone used optical brightener monitoring to bracket sources of wastewater contamination in system BA270 in Barton. OB was detected in all three branches of the system up-pipe of catchbasin CB-6. Further investigation identified the wastewater source in all three branches.

3.4.3. Contaminant Tracing

The Stone team will work with municipal staff to find specific improper connections, leaks, and other problems contributing the contaminated flows observed in the assessment phase. Stone will coordinate and guide these investigations to the extent that resources permit. We will review engineering plans and perform dye testing, camera inspection, or smoke testing in trying to locate the exact source of the discharge if the source is not readily apparent. Dye testing of individual houses or buildings is typically the most direct method of finding specific improper wastewater or washwater connections to stormwater drainage system.

Laundry washwater in a catch basin in Georgia, Vermont. A direct graywater connection was eliminated. Optical brightener was detected in this and all downstream structures.

We have found that dye testing and/or smoke testing in conjunction with pipeline inspection using a sewer camera is often the most direct method to positively identify cross connections and locations of wastewater infiltration into closed drainage systems. As needed, Stone can perform dye testing, smoke testing, and pipeline inspection using a closed-circuit television camera. For targeted camera inspections, we will work with a Plattsburgh Public Works Department staff and available or equipment, or a subcontracted camera operator, if necessary.

In addition, in certain systems, Stone may deploy time-lapse cameras within stormwater structures to identify visible, intermittent discharges. Stone will dedicate two time-lapse cameras with infrared flashes to this survey. We used this technique in Rutland Town (Holiday Inn) and multiple locations in Montpelier to document intermittent illicit discharges.

Left: Smoke testing of a storm drain in Proctor, Vermont revealed a sanitary wastewater connection from this house (note smoking sewer vent). Right: Stone deploys time-lapse cameras within stormwater structures to identify visible, intermittent discharges, cross connections, and locations of wastewater infiltration in closed drainage systems.

If a repair or other corrective action is undertaken within the timeframe of this project, the discharge point will be resampled to confirm anticipated reductions in *E. coli* and total phosphorus concentrations (these data will be reported as daily phosphorus load reductions and instantaneous *E. coli* concentration reductions). Flow measurements will also be repeated if feasible. From the concentration and flow data, changes in the estimated daily loading rates of total phosphorus resulting from discharge elimination will be calculated. In some cases, repairs of leaking municipal infrastructure will necessarily occur after the project has been completed.

When sources of illicit discharges are identified, Stone will assist the City in planning corrective actions. In many cases, the solutions to IDDE problems are readily apparent and not expensive. If the problem is more complex, Stone will meet with the City to discuss repair alternatives. Stone cannot commit to full engineering design and cost analysis of various alternatives, given that it is impossible know what we will find (and therefore how to budget for the work). However, as resources allow, Stone will offer the City of Plattsburgh our expertise, so that there are a reasonable range of infrastructure rehabilitation options to consider.

3.5. Task 4: Quarterly and Final Reports

Stone will prepare brief progress reports at the end of each calendar quarter for the City to use in its reporting to LCBP, assuming submission of these reports is a requirement of the City's LCBP grant. The brief quarterly reports will document progress on each objective and task.

Following advanced investigations, Stone will prepare a draft final report by November 30, 2021 for review by the City of Plattsburgh and LCBP. The final report will detail the assessment scope, methods, results, and recommendations. The findings sections will describe each contaminated discharge identified, together with the evidence indicating its contamination, the work performed to locate the source of contamination, measures taken or planned to eliminate the discharge, and pollution reductions measured or estimated as a result of discharge elimination. The final report will include an annotated map of each drainage system in which an illicit discharge was identified. Any follow up actions that remain to be completed will be summarized.

4. Deliverables and Outcomes

The proposed project will locate and characterize illicit discharge sources and initiate correction of bacterial, nutrient, and hazardous material discharges from the City of Plattsburgh. Microbial and nutrient pollution can result from wastewater leaking from sanitary sewers and malfunctioning septic systems into stormwater infrastructure and by direct connections between sanitary wastewater and stormwater piping. While the prevalence and characteristics of illicit discharges in the City are not well known, long-term pollution reductions are anticipated as a result of this project. Another outcome of this project will be information regarding stormwater infrastructure condition, which is often used by the municipality and/or local watershed groups to identify and prioritize retrofits and/or repairs. Specific deliverables are presented in Table 5 below.

The expected project start date is April 1, 2020. Initial assessment of stormwater discharge points will be completed by late fall of 2020. Advanced investigations will be performed during the 2021 field season. Brief quarterly reports will be prepared for the City's use, assuming submission of these reports to LCBP is a requirement of the City's grant. A draft final report documenting findings of the discharge assessment and advanced investigation work will be submitted by November 30, 2021 for review and comment, followed by a final draft by December 15, 2021.

Table 5. Deliverables Table

	Performance Measure	Deliverable	Timeframe
1	**Stone will:** Prepare a QAPP	Approved Primary Data QAPP	April – May 2020
2	**Stone will:** Perform Illicit Discharge Detection Surveys	Illicit discharge detection surveys	May – Nov. 2020
3	**Stone will:** Perform Advanced Investigations	Summary of identified or bracketed contaminant sources	April – Nov..2021
4	**Stone will:** Prepare Draft Quarterly Reports and a Final Report	Prepare draft quarterly reports for City of Plattsburgh submission to LCBP	2020: Q2, Q3, Q4 2021: Q1, Q2, Q3
		Final Report to the City of Plattsburgh and LCBP	Draft: Nov. 30, 2021 Final Dec. 15, 2021

5. Budget

Our proposed budget, provided below (Table 6), includes all Stone personnel, equipment, supplies, travel costs, and costs of laboratory services.

Costs included in these budget categories are as follows:

- **Personnel**: Stone staff time for all tasks from QAPP preparation through the final report.
- **Equipment/Supplies**: Costs associated with water quality meters, test kits, sample bottles, and laboratory costs.
- **Travel**: Expenses related to lodging in Plattsburgh and travel between Montpelier and Plattsburgh, including Lake Champlain ferry fees. Includes vehicle mileage at the prevailing federal reimbursement rate.

Table 6. Budget Summary

Task	Stone Personnel	Equipment / Supplies	Travel	Task Total	Unit Costs
Task 1: QAPP Preparation	$2,000	$0	$0	$2,000	NA
Task 2: Illicit Discharge Detection	$5,300	$1,200	$800	$7,300	$178/system (not to exceed $7,300)
Task 3: Advanced Investigations	$4,800	$700	$200	$5,700	$1,140/Investigation (not to exceed $5,700)
Task 4: Final Report	$5,000	$0	$0	$5,000	NA
TOTALS:	$17,100	$1,900	$1,000	$20,000	

Appendix A. Resumes of Key Staff

David C. Braun / *Senior Water Resources Scientist*

Dave's experience in the water quality field is focused broadly on evaluating the fate and transport of nutrients, microbial pathogens, and pesticides in the environment and practices to manage these pollutants. Over his 20+ years at Stone, Dave has managed and implemented a wide variety of water resource assessments, including twelve multi-year water quality monitoring programs (along with several other studies of shorter duration), and more than twenty illicit discharge detection and elimination (IDDE) projects for 106 Vermont communities. Dave's expertise also includes infiltration-based stormwater treatment practices, pollutant source control methods, phosphorus attenuation in soil, and nutrient budget analysis.

Years of Experience / 25

Years of Experience at Stone / 22

Education
M.S., Water Resources, 1997, University of Vermont, Burlington, Vermont.

B.A., Biology, 1992, Bard College, Annandale, New York

Professional Certifications
OSHA 40-Hour HAZWOPER

Skills
Installation and use of flumes, weirs, flow meters, automatic samplers, pressure transducers, water quality sondes, monitoring wells, leachate collectors, suction lysimeters, weather stations, and telemetry systems.

Illicit discharge detection and eliminations studies

Hydraulic conductivity testing of saturated and vadose zone sediments

Soil classification and sampling

Stream discharge measurement

Hydrologic modeling: TR55, TR20, HydroCAD

Computer applications: Microsoft Office suite, Microsoft Access, ArcMap GIS, Microcal Origin, Aquifer Test

Technical writing

Basic surveying

Honors and Awards
Paul Williams Scholarship for academic distinction and commitment to public service, May 1991

Related Project Experience

Illicit Discharge Detection and Elimination in Vermont Communities, Statewide, 2006—Present

Dave is the project manager and lead scientist of all of Stone's efforts to locate and eliminate illicit discharges throughout Vermont. Since 2006, Dave has worked with Vermont DEC staff and with local partners to conduct IDDE surveys over 106 Vermont communities, assessing approximately 4,300 stormwater systems to date. In cooperation with participating municipalities and aided by infrastructure mapping provided by DEC, Dave has identified and eliminated more than 90 sanitary wastewater discharges, decreasing phosphorus loading to Vermont's rivers and lakes and reducing the risk of pathogen exposure. In the course of these IDDE projects, he has developed and refined the methods now preferred by the Vermont Agency of Natural Resources.

Burlington Sewer Flow Monitoring Plan Development, 2017

Dave worked with the City of Burlington to develop a flow monitoring plan for the Burlington Main Wastewater Treatment Plant's collection system. He reviewed the City's PCSWMM model of the plant's collection system, collaborated with the City DPW and Burlington Integrated Planning wastewater and modeling teams in defining objectives and priorities for the flow monitoring, researched potential monitoring equipment and associated costs, and developed a monitoring plan with recommendations and cost estimations.

Monitoring Precipitation and Stream Flow in Vermont's Stormwater-Impaired Watersheds, Vermont Department of Environmental Conservation, 2016—Present

Since 2016, Dave has been the project manager and technical lead on design and implementation of a stream flow and precipitation monitoring program, with real-time data acquisition and web display, for 11 stormwater-impaired streams in Chittenden and Franklin Counties—a program supported by funding from participating MS4s. Dave oversaw selection of monitoring sites and installation of streamflow and precipitation gauging stations, and now manages ongoing station operations and maintenance, data analysis, and reporting. Continuous (5-minute) measurements of stream stage and water temperature are displayed in near real-time on a project website. Stage-discharge relations were developed to derive continuous streamflow records from the 5-minute stage measurements.

Basin 1 & 12 IDDE, Vermont DEC Clean Water Initiative, 2019—Present

Dave is the project manager and lead scientist of this ongoing effort to locate and characterize illicit discharges in stormwater systems draining to the Battenkill, Walloomsac, Hoosic, and Deerfield Rivers and their tributaries.

West, Williams, Saxtons, and Lower Connecticut River Basins IDDE (Basin 11), DEC Clean Water Initiative Program, 2018—Present

Dave is the project manager and lead scientist of this effort to locate and characterize illicit discharge sources and initiate correction of bacterial, nutrient, and hazardous material discharges to the West, Williams, and Saxtons Rivers and their tributaries as well direct drainages to the Lower Connecticut River.

Ottauquechee and Black River Basins IDDE (Basin 10), DEC Clean Water Initiative Program, 2017—2019

Dave was the project manager and lead scientist of this effort to locate and eliminate illicit discharges in the towns of the Ottauquechee and Black River watersheds, Vermont.

Upper Winooski River Basin IDDE, DEC Clean Water Initiative Program, 2016—2018

Dave was the project manager and lead scientist of this effort to locate and eliminate illicit discharges in Barre City, Barre Town, Berlin, and Stowe. This is a follow-on project to the Stevens and Stowe IDDE project, to perform additional advanced investigations in these communities given the higher than expected number of suspected or confirmed illicit discharges.

Montpelier IDDE, DEC Clean Water Initiative Program, 2016—2018

Dave is the project manager and lead scientist of this ongoing effort to locate and eliminate illicit discharges in Montpelier, Vermont.

Upper Connecticut River and Passumpsic River Basins IDDE, DEC Ecosystem Restoration Program, 2015—2016

Dave was the project manager and lead scientist of this effort to locate and eliminate illicit discharges in 14 towns in the Upper Connecticut and Passumpsic River Basins in Vermont.

Stevens Branch plus Stowe IDDE, Friends of the Winooski River, 2014—2015

Dave was the project manager and lead scientist of this effort to locate and eliminate illicit discharges in Barre City, Barre Town, Berlin, Stowe, and Williamstown, Vermont.

Memphremagog Basin IDDE, Memphremagog Watershed Association, 2014—2015

Dave was the project manager and lead scientist of this effort to locate and eliminate illicit discharges in Barton, Brighton, Derby, Newport City, and Orleans, Vermont.

St. Johnsbury IDDE, Caledonia County Natural Resource Conservation District, 2014—2015

Dave was the project manager and lead scientist of this effort to locate and eliminate illicit discharges in St. Johnsbury, Vermont.

Winooski Headwaters IDDE, DEC Ecosystem Restoration Program, 2013—2014

Dave was the project manager and lead scientist of this effort to locate and eliminate illicit discharges in the Winooski River watershed towns of Cabot, Marshfield, and Plainfield Vermont.

Rutland County IDDE, Rutland Natural Resource Conservation District, 2013—2014

Dave was the project manager and lead scientist of this effort to locate and eliminate illicit discharges in the Rutland County towns of Benson, Castleton, Fair Haven, Poultney, Proctor, Wallingford, and West Rutland, Vermont.

Reducing Phosphorus Pollution from Onsite Wastewater Treatment Systems in the Greenwood Lake Watershed, New York, Orange County Water Authority, 2008 – 2013

Dave was the project manager and lead scientist responsible for demonstrating innovative onsite wastewater management approaches and technologies in the Village of Greenwood Lake, New York. This EPA-funded demonstration involved needs assessment, public outreach, trainings, design and installation of experimental wastewater treatment systems to remove phosphorus, monitoring of treatment system performance over a two-year period, and development of a comprehensive onsite wastewater management plan for the Village.

Branden Martin, PE / *Water Resources Engineer*

Branden is involved in a variety of projects at Stone including stormwater practice evaluation and design, stream and bank restoration, illicit discharge detection and elimination, and agricultural water and wastewater management. During Branden's professional career he has gained broad knowledge in various engineering disciplines and is readily able to apply his experience to the task at hand. Branden is fully versed in retrofit planning and design, topographic surveying, watershed assessments, hydraulic & hydrologic modeling, engineering plan development and cost estimating, and has experience with geotechnical assessments as it relates to the identification of bank stability techniques.

Years of Experience / 7

Years of Experience at Stone / 3

Education
B.S. Civil Engineering, 2012, The University of Vermont

Professional Certifications
Vermont Professional Engineer (#134591)

Intern

Skills
Software and Equipment Skills: HydroCAD, MicroStation, AutoCAD, PCSWMM, HEC-RAS, GeoStudio Products, AQTESOLV, Argus ONE, MatLAB, EDM Total Stations, GPS receivers, and Microsoft Office

Surveying

Technical Writing

Professional and Community Activities
Vermont Society of Engineers – Member and First Vice President of the Board of Directors

American Society of Civil Engineers – Member and Past President of the Board of Directors, Past Secretary and Younger Member Chairperson

2019 Report Card for Vermont's Infrastructure – Vice Chair of the committee and co-author of the stormwater section

Lotus Lake Corporation – Member and Clerk of the Board of Directors

Judge, UVM CEMS National Engineer's Day Competition Judge 2011 – 2014

Related Project Experience

Illicit Discharge Detection and Elimination for the Otter Creek Watershed, Poultney, Pittsford, Proctor, Rutland, New Haven, Middlebury, Brandon, Vergennes, Charlotte, Vermont, Vermont DEC / Lake Champlain Basin Program, 2016-2017

Branden assisted and will continue to assist in field sampling and analyzing stormwater for the purpose of detecting illicit discharges to the stormwater system.

Illicit Discharge Detection and Elimination for the Winooski River Watershed, Montpelier, Vermont, Vermont DEC Clean Water Initiative Program, 2016-2017

Branden assisted in field sampling and analyzing stormwater for the purpose of detecting illicit discharges to the stormwater system.

Burlington Railyard Enterprise Project, Burlington, VT, 2017-2018

Branden Served as Project Engineer and created a proposed drainage alignment along a newly proposed roadway corridor to help mitigate flooding and provide a combined sewer overflow system with some relief by rerouting existing flows to the proposed system. Design included data acquisition, topographical survey, use of HydroCAD, AutoCAD, and PCSWMM, and quantity and construction estimates.

Stormwater Master Planning, Engineering Design, and Green Stormwater Infrastructure Implementation for the Town of St. Johnsbury, Vermont, CNRCD, 2016-Present

Branden assisted in data collection and development of a collection of stormwater BMPs that were applied to a number of high-priority stormwater management issues in the village area. supported design of conceptual solutions including a sedimentation basin and erosion control improvements at the Town Garage and a series of erosion control and culvert retrofit improvements along a steeply sloping section of roadway. Branden worked with an engineering partner to implement one high-priority project identified in St. Johnsbury's Stormwater Master Plan, providing pre-construction coordination and construction inspection services for a series of bioswales designed to provide infiltration.

Malletts Bay Stormwater Management System and Transportation Scoping, Colchester, VT, 2016-2017

Branden assisted in data collection, field assessment, and the development of a series of retrofit concept designs that can be applied in coordination with transportation-related improvements along the West Lakeshore Drive corridor

on the south shore of Malletts Bay, as well as in upland areas of the watershed in support of the Town's water quality improvement goals. Branden completed watershed sizing calculations with the use of PCSWMM to adequately size stormwater practices to be presented to the town, and determine correct culvert diameters.

Assessment of Tile Drainage Systems in the Jewett Brook Watershed, Lake Champlain Basin Program, St. Albans, VT, 2016-present

Brande assisted with the planning and installation of monitoring systems at 12 tile drain outfalls in the Jewett Brook watershed, where flow rates are continuously measured, and flow-paced composite samples are collected, processed, and analyzed to calculate P concentrations and loading.

Sweet Tree Holdings Wastewater Study, Island Pond, VT, 2017-Present

Branden assisted in sampling efforts to help characterize wastewater discharges from a large-scale maple production operation.

Montpelier Stormwater Master Plan, Montpelier, Vermont, 2016-2017

Branden assisted in data collection, field assessment, problem area data sheet creation, and developed a series of concept designs for high-priority stormwater problem areas, including erosion control improvements in the City's storage area for construction materials and woody debris, and stormwater management improvements for a street scheduled to be reconstructed in the next five years as part of the City's capital improvement program.

Richmond Stormwater Master Plan, Richmond, Vermont, 2017-2018

Branden served as Project Engineer and assisted in data collection, field assessment, problem area data sheet creation, and prioritization and implementation matrices. Led the effort to complete a series of concept designs that address high priority stormwater problem areas within the Town of Richmond.

Richford Stormwater Master Plan, Richford, Vermont, 2017-Present

Branden served as Project Engineer and assisted in data collection, field assessment, problem area data sheet creation, and creation of the prioritization and implementation matrices. Developed a series of concept designs that address high priority stormwater problem areas within the Town of Richford.

Hardwick Stormwater Master Plan, Hardwick, Vermont, 2016-2017

Branden assisted in data collection, field assessment, problem area data sheet creation, and developed of a series of concept designs that will address high-priority stormwater problem areas within the Town of Hardwick.

St. Johnsbury Pearl Street Parking Lot Bioswales / CCNRCD / Saint Johnsbury, VT / 2018-2019

Branden worked with an engineering partner to implement one high-priority project identified in St. Johnsbury's Stormwater Master Plan, providing pre-construction coordination and construction inspection services for a series of bioswales designed to provide infiltration. The project was the first in Vermont to combine neighborhood-scale green infrastructure with "gray" infrastructure to reduce combined sewer overflow events and will receive an Engineering Excellence Merit Award from the Vermont chapter of the American Council of Engineering Companies in June 2019.

Pine Grove Pond Upgrade at Pine Grove Terrace, Morehouse Brook, Winooski, Vermont, 2017-2019

Branden served as a Project Engineer and advanced a 30% design for the expansion of an existing stormwater pond, Design plans included data acquisition, site survey, HydroCAD modeling to analyze storm flows and inform the required pond size and outlet structure design, site grading, and quantity and construction estimates. He added curb extension bioretention areas to improve water quality treatment in the contributing watershed, in anticipation of the City's Phosphorus Control Planning obligations. The pond and outlet structure were designed to manage the 100- year storm and reduce peak flows, helping to address the high flow target established in the Morehouse Brook stormwater flow TMDL.

Deer Brook Gully Restoration, Georgia, Vermont, 2017-2019

Branden served as Project Engineer for restoration design of a gully where deteriorating conditions have led to significant sediment loads discharged to nearby Deer Brook. The addition of impervious flows over recent decades has led to mass soil failure, loss of root structure and significant erosion in the gully and intermittent stream. Work completed includes watershed delineation and upland hydrology and hydraulic calculations using PCSWMM. Results were used to evaluate potential upland BMPs that will reduce inflows into the gully.

Warren Rich / *Project GIS Specialist*

Warren is a GIS Specialist responsible for providing geospatial solutions to a wide variety of projects, including data visualization, data extraction and compilation, database management, and spatial analysis. His recent experience includes preparing report maps for the Ottauquechee and Black River Basin IDDE project, as well as performing GIS analysis and mapping for Stone's inventory and assessment of roof drains in combined sewer areas in Montpelier, Vermont. He holds a M.S. in GIS for Sustainability and has over eight years of relevant GIS experience.

Years of Experience / 10

Years of Experience at Stone / <1

Education

Master of Sciences, GIS for Sustainability, 2018, University of Washington

Graduate Certificate in GIS, Archaeology Track, 2014, University of West Florida

Bachelor of Arts, Anthropology, 2008, University of Vermont

Skills

GIS Spatial Analysis and Statistics

Data Discovery & Aggregation

Data Visualization

Mapping and Application Developmnet

ArcGIS: 10.1 -10.5; Pro; Online; Enterprise

QGIS

Python programming language

Carto software

HTML/CSS

Professional and Community Activities

Crisis Mapping: Kilauea Volcanic Fissures, volunteer

Dominica, Lesser Antilles Archeological Research Project, volunteer

Friends of Discovery Park Holistic Web-Based GIS Vegetation & Land Management Platform, volunteer

Related Project Experience

Basin 1 & 12 IDDE, Vermont DEC Clean Water Initiative, 2019—Present

Warren prepared maps and associated documentation for this ongoing illicit discharge detection and elimination project aimed at locating and characterizing illicit discharges in stormwater systems draining to the Battenkill, Walloomsac, Hoosic, and Deerfield Rivers and their tributaries.

Illicit Discharge Detection and Elimination in West, Williams, Saxtons, and Lower Connecticut River Basins (Basin 11) / Vermont DEC Clean Water Initiative / 2018-present

Warren prepared maps and associated documentation for the illicit discharge detection and elimination project aimed at locating and characterizing illicit discharge sources and initiate correction of bacterial, nutrient, and hazardous material discharges to the West, Williams, and Saxtons Rivers and their tributaries as well direct drainages to the Lower Connecticut River.

Illicit Discharge Detection and Elimination in Ottauquechee and Black River Basins (Basin 10) / Vermont DEC Clean Water Initiative Program / 2018-2019

Warren prepared map figures for final report for this illicit discharge detection and elimination project.

Inventory of Building and Roof Drains in the City of Montpelier's Combined Sewer Area / City of Montpelier, Vermont / 2018–Present

Warren analyzed data from updated rooftop inventory in ArcGIS Online and used various publicly available datasets to refine and calculate revised rooftop areas for buildings of interest, spatially join data regarding the location of the buildings/rooftops in relation to zoning city zoning districts, parcel data, and other spatial information, and calculate the estimated runoff contributions to the city's sewer system based on the size of the rooftops which are currently connected or suspected connected to the system.

Drinking Water Monitoring and Water Supply Treatment / Rutland Southern Vermont Regional Airport / Vermont Agency of Transportation / Clarendon, Vermont / 2019-Present

Warren is currently providing geospatial mapping, data management, and analysis support for a drinking water monitoring and water supply treatment study in the area surrounding the Southern Vermont Regional Airport (SVRA). This study is designed to address the ongoing response to the poly and perfluoroalkyl substances (PFAS) detected in groundwater, including drinking water sources, and soils at the SVRA.

VTrans Phosphorus Control Planning / Vermont Agency of Transportation / Vermont / 2019–Present

Warren conducted spatial analyses to help assign phosphorous loading factors to VTrans owned paved road areas within the Lake Champlain Basin. Large scale spatial analyses were conducted on all VTrans roads within the basin, considering factors such as hydrologic connectivity and slope, as they relate to the overall potential phosphorous load of VTrans owned paved roads. The resulting dataset was packaged and delivered to VTrans for future use in practices addressing the reduction of phosphorous load carried by VTrans roads to hydrologic features within the Lake Champlain Basin. Warren also drafted part memo to go along with the GIS deliverable for this specific task of the larger project. During the more recent, on-going aspects of this project, Warren has been involved with managing and analyzing the MATS (Maintenance Activities Tracking Database) to identify potential projects which aid can be credited to reducing runoff and loading rates, and analyzing how these activities can be used to track runoff/loading rate reductions across the Lake Champlain Basin. Warren also created an ArcGIS Collector application for VTrans field workers to use during field verification of erosion fixes conducted on VTrans roadways, comparing the location of these fixes to the location of probable erosion areas based on Stone's GIS-based erosion risk assessment

Burlington Integrated Water Quality Management Planning / City of Burlington, Vermont / 2018-Present

Warren assisted in developing the BMP analysis workplan, created methodology and performed analysis to extract hazardous site data based on parcel buffer distance and BMP status. Upon acquisition of a new dataset of BMP opportunities from the City of Burlington, Warren is currently processing the new data for smooth integration into the dataset which Stone has curated and currently houses.

Deer Brook Gully Restoration / Northwest Regional Planning Commission / Georgia, Vermont / 2019

Warren conducted spatial analysis using land cover and right-of-way data to determine total area of impervious and revpervious surfaces for privately owned and VTrans owned portions of the study area. The analysis was used to aid in the implementation of green stormwater infrastructure practices within the study area to address runoff and erosion issues.

Lake Sunapee Watershed Management Planning, Sunapee, New Hampshire / 2019-Present

Warren processed and analyzed the datasets which were collected in the field using Survey123. The field data was QC'd for accuracy, changing the locations of the field points as necessary. Utilizing the field data in ArcGIS Pro, Warren performed analysis utilizing LiDAR data to calculate the approximate watershed boundaries of each point location, and then calculate the approximate percent impervious surface for each watershed. Warren also conducted analysis at the Lake Sunapee watershed level to approximate the total potential for future buildout within the watershed, and how the overall land cover of the watershed could change given these buildout estimates

Recreation Road Erosion and Gully Alternatives Analysis / Friends of the Winooski River / Plainfield, Vermont / 2018–Present

Warren analyzed the results of UAV survey of the project area to identify the primary drainage areas and the primary drainages, as well as creating elevation profiles of these drainages to help provide a better understanding of the hydrologic process influencing the current status of the project area. He also maintains a web map of associated site features to help the stakeholder in the visualization and analysis of this project.

VELCO Barre Substation Oil and Hazardous Materials Soil Cleanup Verification / Barre / 2019-Present

Warren assisted in drafting GIS datasets representing sampling locations and associated soil cleanup verification excavation areas. Additionally, Warren also created report figures displaying the location and analytical results of the sample locations and excavation areas.

Bolton Valley Environmental Review/ Bolton Valley Resort / Bolton, Vermont / 2019

Warren assisted in creating figures for the Phase I Environmental Site Assessment, including the editing of parcel boundaries and recalculation of total site area, creation of relevant site features in GIS, determining distance from the site to two major airports, and creating GIS figures for the project work plan.

Jones & Lamson Brownfield Corrective Action Planning / SWRCP / SRDC / Springfield, Vermont / 2018

Warren helped with mapping parcels, locating and placing proposed sample locations, and developing figures for the site's Corrective Action Plan. Warren is actively maintaining and updating the sample locations and associated analytical results through the Phase II Environmental Site Assessment field efforts.

George Valentine / *Water Resources Technicia*

George is the newest member of Stone's Illicit Discharge Detection and Elimination team. George is a field scientist with a focus on flow and water quality monitoring. He will assist in the illicit discharge assessment phase of this project. George recently his B.A. in Environmental Studies and Conservation Biology from Middlebury College.

Years of Experience / 2

Years of Experience at Stone / <1

Education
Bachelor of Arts in Environmental Studies and Conservation Biology, Minor in Geology, 2020, Middlebury College

Degree, focus, year, institution

Professional Certifications
PADI Open Water Scuba Certification

Wilderness First Responder (WFR) Certification

VT Boating License

Skills
Water quality sampling & analysis

Electrofishing, remote logger operation, radio telemetry, water chemistry, well water sampling/prep, scanning electron microscopy, stable isotope analysis, streamflow measurements

ArcMap, ArcGIS Pro, QGIS, Adobe Photoshop & Illustrator, Google Earth Engine, Microsoft Office, R statistical software

Biological inventory reports, indices of biological integrity, population & connectivity modeling

Spanish: intermediate—high

Employment History

Green Mountain National Forest, US Forest Service
GIS and Grant Writing Intern / Dec 2019 – Feb 2020
Partnered with Forest Service staff across departments to design and execute a six-week intensive internship. Organized and interpreted large spatial data sets to design trail maps in brochure and poster form. Researched and drafted national grant applications for trail infrastructure and vocational training programs

Department of Biology, Middlebury College
Laboratory Teaching Assistant - Aquatic Ecology / Aug - Dec 2019
Assisted instructors with planning, prepare lab courses and monitor fieldwork. Instructed students in skills such as macroinvertebrate sampling, water chemistry analysis, and scientific writing techniques

Sheldon Lab, Middlebury College
Research Assistant (RA) / May - Aug 2019
Collaborated with Dr. Sallie Sheldon on research project investigating the use of a native insect in biocontrol of a hybrid invasive aquatic plant. Assisted in streamlining methods of field collection, preparation, and analysis of benthic diatoms. Planned, proposed, and received project funding from the Lake Champlain Research Consortium

Department of Biology, Middlebury College
Senior Independent Research Project / Feb - Aug 2019
Completed stable isotope analysis and nutrient fate study conducted on a natural treatment wetland in response to the potential closure of the Vermont Fish and Wildlife Department's Salisbury Fish Culture Station. Designed and implemented six-month investigation, proposed and received senior research grant, and recommended continued nutrient monitoring. Employed Gas Chromatography Mass Spectroscopy, scanning electron microscopy of diatoms, and colorimeter water chemistry analysis. Presented research findings at 2019 Ecological Society of America meeting, Louisville, KY

Oklahoma Cooperative Fish & Wildlife Research Unit, Oklahoma State University / NSF - REU Intern / May – Aug 2017
Completed ten-week independent research project advised by Dr. Shannon Brewer on groundwater inputs and thermal refugia in Ozark streams. Partnered with OSU graduate and doctoral researchers in stream surveys, radio tracking smallmouth bass, cave eDNA collection, and Acoustic Doppler Current Profiler (ADCP) surveys at 16 sites. Presented research findings at 2018 Ecological Society of America meeting, New Orleans, LA.

Appendix B. Selected Project Descriptions

Detecting and Eliminating Illicit Discharges in Rutland County to Improve Water Quality

Rutland Natural Resources Conservation District

Seven towns participated in the Rutland County Illicit Discharge Detection and Elimination Project: Benson, Castleton, Fair Haven, Poultney, Proctor, Wallingford, and West Rutland. The goal of the project was to improve water quality by identifying and eliminating contaminated, non-stormwater discharges entering stormwater drainage systems and discharging to the Otter Creek, the Poultney River, and their tributaries. The geographic scope included the entire extents of the municipal closed drainage systems in these towns. Prior to this assessment, the Vermont Department of Environmental Conservation prepared stormwater infrastructure maps for all seven towns. This infrastructure mapping was used to plan the assessment in each town and to guide further investigations in systems with suspected illicit discharges.

Project Overview

- ✓ 7 Participating Towns
- ✓ 227 Closed Drainage Systems Assessed
- ✓ 20 Suspected Illicit Discharges
- ✓ 14 Confirmed Illicit Discharges
- ✓ Dave Braun as Project Manager

Between April and October 2013, Stone conducted a thorough assessment of stormwater drainage systems, including stormwater outfalls, selected manholes and catchbasins in Benson, Castleton, Fair Haven, Poultney, Proctor, Wallingford, and West Rutland for the presence of illicit discharges. A total of 227 stormwater drainage systems were assessed. Field tests were performed for ammonia, total chlorine, common anionic detergents (using the methylene blue active substances method), and optical brighteners. Specific conductance was also measured. Among the 227 stormwater drainage systems assessed, 20 systems were designated as warranting further investigation due to suspected illicit discharges: one in Castleton, five in Fair Haven, one in Poultney, five in Proctor, four in Wallingford, and four in West Rutland. There were no indications of possible illicit discharges in Benson.

Dye flushed down a toilet in Fair Haven discharges to the Castleton River at outfall FH280, confirming presence of a sanitary wastewater connection

Following the initial assessment, Stone conducted advanced investigations to verify the presence of illicit discharges in these 20 drainage systems and to attempt to determine their sources. Further investigation of these drainage systems confirmed 14 illicit discharges in 12 stormwater drainage systems. Illicit discharges identified included treated municipal water, sanitary wastewater, washwater, and quarry process water. Stone presented the results of the investigation of these 20 drainage systems and the measures taken or plans made to correct the identified illicit discharges in a final report. Stone completed this project on time and within budget.

Detecting and Eliminating Illicit Discharges to Improve Water Quality in the Lake Memphremagog Basin / *Memphremagog Watershed Association*

The goal of the Lake Memphremagog Basin Illicit Discharge Detection and Elimination Project was to improve water quality by identifying and eliminating contaminated, non-stormwater discharges entering stormwater drainage systems and discharging to Lake Memphremagog and its tributaries. The project was administered by the Memphremagog Watershed Association (MWA) under a grant from the Vermont Department of Environmental Conservation. Stone was awarded the contract to perform the field assessments and advanced investigations and completed the project on time and within budget.

Project Overview

- ✓ 7 Participating Towns
- ✓ 375 Systems Assessed
- ✓ 73 Suspected Illicit Discharges
- ✓ 13 Confirmed Illicit Discharge
- ✓ Dave Braun as Project Manager
- ✓ Project Completed On Time & Within Budget

Seven municipalities participated in the project: The Town of Barton, the Village of Orleans in Barton, the Town of Brighton, Newport City, and the Town of Derby and its villages of Derby Line and Derby Village. The geographic scope of the project included the entire extents of the municipal closed drainage systems. Prior to this assessment, the Vermont Department of Environmental Conservation prepared stormwater infrastructure mapping for all these municipalities. This infrastructure mapping was used to plan the assessment in each municipality and to guide further investigations in systems with suspected illicit discharges.

Stone identified the presence of dry weather flow at a wastewater pump station, suggesting that a municipal water leak was infiltrating the pipe (contributing chlorine) and flushing out wastewater residues from past overflow events.

Between June and December 2014, Stone assessed stormwater outfalls and certain manholes and catchbasins in each participating municipality for the presence of illicit discharges. A total of 375 stormwater drainage systems were assessed. Of the total, 320 systems were assessed at the outfall. 55 systems were assessed in structures up-pipe from the mapped outfall location because the outfall could not be located, was inaccessible, or was inundated by the receiving waterbody. Field tests were performed for ammonia, free chlorine, common anionic detergents (using the methylene blue active substances method), and optical brighteners. Optical brighteners are fluorescent whitening dyes contained in most laundry detergents. Specific conductance was also measured. Of the 375 systems assessed, 90 were flowing or dripping when inspected.

Among the 375 stormwater drainage systems assessed, contaminants indicating a possible illicit discharge were detected in 69 systems. However, there were two illicit discharges suspected in system NC350 in Newport and three in system BA270 in Barton, for a total of 73 suspected illicit discharges: 17 in Barton, 10 in Derby (Town, Village, and Line), 11 in Orleans, and 35 in Newport City. There were no indications of possible illicit discharges in Brighton.

In the fall of 2014 and spring of 2015, Stone completed an advanced investigation of the systems with suspected illicit discharges to confirm the presence of illicit discharges and to attempt to determine their

sources. Investigations were categorized as either "simple" or "complex" according to the types of contaminants detected and the time expended on the investigation. At the outset of the investigation phase, it was clear that the number of simple and complex investigations that needed to be performed exceeded the maximum numbers specified in MWA's contract with Stone. Stone was able to complete simple investigations at all systems with suspected illicit discharges, as well as more complex investigations where needed in Barton and Derby. Stone presented the results of the investigation for all the systems with suspected illicit discharges in a final report. Following completion of this project, the Vermont Department of Environmental Conservation awarded Stone a contract to conduct eight additional advanced investigations in Newport City that were outside the scope and budget of the MWA's contract.

Detecting and Eliminating Illicit Discharges in the Upper and Middle Connecticut River Basin / *Vermont Department of Environmental Conservation*

The goal of the Upper and Middle Connecticut River Basin Illicit Discharge Detection and Elimination Project was to improve water quality by identifying and eliminating contaminated, non-stormwater discharges from entering stormwater drainage systems and discharging to the Connecticut River and its tributaries. The project was funded and administered by the Vermont Department of Environmental Conservation.

Sixteen towns and villages participated in the project: Bradford, Burke, Canaan, Concord, Danville, East St. Johnsbury, Fairlee, Gilman, Glover, Groton, Lunenburg, Lyndon, Newbury, Norwich, Ryegate, and Wells River. The geographic scope of the project included the entire extents of the municipal closed drainage systems in these towns and villages. Prior to this assessment, DEC prepared stormwater infrastructure mapping for all of the municipalities, which was used to plan the assessment and to guide further investigations in systems with suspected illicit discharges.

Project Overview

- ✓ 16 Participating Towns
- ✓ 250 Systems Assessed
- ✓ 80 Outfalls Flowing or Dripping
- ✓ 26 Suspected Illicit Discharges
- ✓ 9 Confirmed Illicit Discharge
- ✓ Project Completed On Time
- ✓ Received a Five-Month No Cost Time Extension to Complete Advanced Investigations

From May to December 2015, Stone assessed stormwater outfalls and certain manholes and catchbasins in each participating municipality for the presence of illicit discharges. A total of 250 stormwater drainage systems were assessed. Of the total, 238 systems were assessed at the outfall, while 12 systems were assessed in structures up-pipe from the mapped outfall location because the outfall either could not be located, was inaccessible, or was inundated by the receiving waterbody. Field tests were performed for ammonia, free chlorine, optical brighteners (i.e., fluorescent whitening dyes contained in most laundry detergents), and common anionic detergents (using the methylene blue active substances method). In addition, Stone measured the specific conductance of each discharge point. Of the 250 systems assessed, 80 were flowing or dripping when inspected.

Among the 250 stormwater drainage systems assessed, contaminants indicating a possible illicit discharge were detected in 26 systems. In 2016, Stone completed its investigations of systems with suspected illicit discharges to confirm the presence of illicit discharges and to attempt to determine their sources. Stone presented the assessment data and investigation findings for all of the systems that were suspected of having an illicit discharge in a final report. Stone completed this project within budget and received a five-month no cost time extension to complete this project.

Appendix C. Certificate of Insurance

STONENV-01 TWILLIAMSON

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 5/14/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Denis, Ricker & Brown - MTP PO Box 565 Montpelier, VT 05601-0565	PHONE (A/C, No, Ext): (802) 229-0563	FAX (A/C, No): (802) 229-9327
	E-MAIL ADDRESS: twilliamson@hbinsurance.com	

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
Stone Environmental, Inc 535 Stone Cutters Way Montpelier, VT 05602	INSURER A : Crum & Forster	31348
	INSURER B : Ohio Security Insurance Company	24082
	INSURER C : Ohio Casualty Ins Co	24074
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR X Contractors Pollutio GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT LOC OTHER:			EPK-126159	3/10/2019	3/10/2020	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG **Deductible**	$ 1,000,000 $ 100,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $ 5,000
B	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY SCHEDULED AUTOS X HIRED AUTOS ONLY X NON-OWNED AUTOS ONLY			BAS57157375	3/10/2019	3/10/2020	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
A	UMBRELLA LIAB X OCCUR X EXCESS LIAB CLAIMS-MADE DED RETENTION $			EFX-112409	3/10/2019	3/10/2020	EACH OCCURRENCE AGGREGATE	$ 4,000,000 $ 4,000,000
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y / N: N If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		XWO57157375	3/10/2019	3/10/2020	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
A	Professional Liabili			EPK-126159	3/10/2019	3/10/2020	Per Claim Ded $10k	1,000,000
A	Professional Liabili			EPK-126159	3/10/2019	3/10/2020	Aggregate	2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

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

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE