



**CITY OF ST. ALBANS**  
**MS4 PHASE II**  
**STORM WATER MANAGEMENT PROGRAM**  
**GENERAL PERMIT 3-9014 (2018)**

*Amended: January 23, 2019*

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# Summary of Adoption and Amendments

## **September 3, 2013:**

The City of St. Albans SWMP was first submitted.

## **September 29, 2016:**

1. SWMP was reformatted with a table of contents
2. Incorporation of expired permits 1-0477.XXXX, 1-0691.XXXX, and 2-0147.YYYY was added to MCM 5.
3. Stevens and Rugg Brook Flow Restoration Plans were added as Appendices.

## **January 23, 2019:**

1. SWMP was reformatted and various items added to comply with 2018 update to General Permit 3-9014.
2. Various items added as Appendices:
  - a. 2018 Notice of Intent
  - b. Franklin County Stormwater RSEP MOU
  - c. City Stream Corridor Protection Rules
  - d. City Stormwater Management and Operations Ordinance
  - e. City Construction Stormwater Guidance Documents


# Part 1 - Purpose and Authority

## STORMWATER MANAGEMENT PROGRAM CERTIFICATION

*The City of St. Albans (permittee) must develop a written stormwater management program (SWMP) and the SWMP must be signed in accordance with Part 10.8 of this Permit. The SWMP shall provide measurable goals for the development and implementation of the six minimum control measures described in Part 6 and additional measures necessary to protect water quality described in Part 4. The permittee's approved Flow Restoration Plan developed in accordance with Subpart 8.1 shall be considered a part of the permittee's SWMP.*

*"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

Name: Chip Sawyer Title: Director of Planning & Development

Signature:  Date: 1/23/19

## Parts 2 and 3 [reserved]

A note to the reader – this SWMP is designed to follow the applicable parts of the 2018 MS4 General Permit. For this reason, section labels may appear non-sequential throughout this SWMP.

## Part 4 - Discharge Requirements

### Section 4.1 Discharges

*The permittee shall develop, implement, and enforce a program to reduce the discharge of pollutants from the regulated small MS4 to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the CWA and the Vermont Water Quality Standards.*

### Section 4.2 Discharges to Impaired Waters

*Impaired waters are those waters that the Secretary has identified pursuant to Section 303(d) of the Clean Water Act as not meeting the Vermont Water Quality Standards. Impaired waters encompass both those with approved Total Maximum Daily Loads (TMDLs) or Water Quality Remediation Plans (WQRPs), and those for which TMDL development has been identified as necessary, but for which a TMDL has not yet been approved by the Secretary or EPA.*

#### *A. Discharges to Impaired Waters with an Approved TMDL*

- 1. For any discharge covered by this permit to impaired waters with an approved TMDL, the permittee shall control discharges consistent with the assumptions and requirements of any wasteload allocation (WLA) applicable to the permittee in the TMDL. The permittee shall describe in the SWMP all measures that are being used to address this requirement. The Secretary may notify the permittee of the need to comply with additional requirements that are consistent with the assumptions and requirements of any applicable WLA or that an individual permit application is necessary in accordance with Part 10 of this permit.*

Stevens Brook (VT05-07) is listed as impaired in the Town and City of St. Albans, and has an EPA approved TMDL dated October 2008 to Address Biological Impairment. The stormwater impaired portion of the stream extends from river mile 6.8, at Pearl Street in St. Albans up to river mile 9.3. The designated impairment is due to non-support of aquatic designated uses. Since all tributaries and the upstream main stem drain to the impaired lower portion of the stream, the entire Stevens Brook watershed upstream from river mile 5.8 is considered to contribute to the impairment. The source of the impairment is multiple impacts associated with excess stormwater runoff.

Rugg Brook (VT05-07) is listed as impaired with the majority of the impaired portion located in the Town of St. Albans with extent portions located in the City of St. Albans and Towns of Fairfield and Georgia. Rugg Brook has an EPA approved TMDL dated October 2008 to Address Biological Impairment. The stormwater impaired reach extends from river mile 3.1 and extends upriver 1.6 miles. The designated impairment is due to non-support of aquatic life designated uses. Since all tributaries and the upstream main stem drain to the impaired lower portion of the stream, the entire Rugg Brook watershed upstream from river mile 3.1 is considered to contribute to the impairment. The source of the impairment is multiple impacts associated with excess stormwater runoff.

2. *If the applicable TMDL does not specify a WLA or other requirements either individually or categorically for the permittee's discharge and the permittee has complied with the terms and conditions of this permit, and has undertaken Secretary-approved measures and documented them in the SWMP to address the pollutant(s) of concern addressed by the TMDL, then compliance with these conditions will be presumed adequate to meet the requirements of this permit.*
3. *If the applicable TMDL specifies a WLA or other requirements either individually or categorically for the permittee's discharge, the permittee shall describe in its annual reports all control measures which have been or are planned to be implemented to control discharges consistent with the assumptions and requirements of the TMDL WLA. The permittee shall include in the annual reports and the SWMP the rationale supporting the permittee's assessment that such controls are adequate to meet the applicable TMDL requirements.*
4. *For discharges to stormwater-impaired waters with EPA-approved stormwater TMDLs, the permittee shall comply with the requirements in Subpart 8.1.*

As described above the City of Saint Albans has approved FRPs for the Stevens and Rugg Brooks. The City is working to implement necessary measures to achieve the flow restoration targets in the stormwater TMDLs no later than December 5, 2032. Most recently the City Council has implemented a new Stormwater Utility in order to provide funding for implementation of necessary BMPs. The City has also entered Memorandum of Agreement with DEC to meet flow monitoring requirements, and adopted Stream Corridor Protection Ordinances.

5. *For discharges to Lake Champlain or the Lake Champlain watershed, the permittee shall comply with the requirements in Subpart 8.2.*

The City of Saint Albans shall develop and implement a Phosphorus Control Plan

(PCP). At a minimum, the PCP shall be designed to achieve the phosphorus reduction target listed in Table 8 of the Phosphorus TMDLs for Vermont Segments of Lake Champlain, June 17, 2016. For the City of Saint Albans, the applicable lake segment is the Saint Albans Bay with a reduction target of 21.7%.

6. *If the Secretary determines that more stringent requirements are necessary to bring discharges into compliance with any future TMDLs or WQRPs, the Secretary shall impose such requirements through amendment of this permit or through the reissuance of this permit.*

**B. Discharges to Impaired Waters without an Approved TMDL**

1. *For any discharge covered by this permit, if the permittee discharges to an impaired water that is without an approved TMDL, but that is listed as impaired on the “State of Vermont 303(d) List of Impaired Waters, Part A – Impaired Surface Waters in Need of TMDL,” the permittee shall develop a response plan as part of its SWMP that addresses how any discharges, determined by the Agency to cause or contribute to the impairment, will be controlled to ensure compliance with the Vermont Water Quality Standards. The permittee may achieve an increased level of control through additional BMPs or enhancement of existing BMPs. The content of the response plan should reflect the magnitude and complexity of the impairment and the regulated discharge’s potential to contribute to the impairment. Permittees shall report on the implementation of their response plan in their annual reports. Pursuant to Subpart 10.17, the Secretary reserves the right to revoke authorization under this permit and require authorization under an individual permit, as necessary to ensure compliance with water quality standards.*

DEC has determined that stormwater discharges from several municipalities may cause or contribute to the impairments included in the State’s 2016 303(d) List, Part A (Impaired Surface Waters in Need of a TDML). The Following has been identified for the City of Saint Albans.

<b>Location</b>	<b>Vermont 303(d) List, Part A Impairments</b>	<b>Pollutant</b>	<b>Surface Water Quality Problem</b>	<b>Response Plan Components</b>
St. Albans City, St. Albans Town	VT 05-07 Stevens Brook, Mouth upstream 6.5 Miles	Nutrients, Sediment, E. Coli	Agricultural runoff, Morphological instability, St. Albans CSO	Follow 1272 order in compliance with the 2016 CSO Rule; FRP; PCP; and municipal road standard implementation

The 1272 Order for Discharge Permit 3-1279 applies to the Lower Weldon CSO discharge. Monitoring of the Lower Weldon Street overflow has been ongoing

since May 2006. Continuous rainfall and flow data logging is provided automatically through a Mission unit via cellular communication so that all of the information can be viewed and downloaded from the Mission website.

Between January and June, 2017 & 2018 data indicates that an overflow event is typically triggered by rainfall and/or snowmelt if the 24-hour rainfall total is greater than 0.60 inches and/or the intensity is more than 0.30 inches per hour.

In order to comply with the 1272 Order, the City is currently developing a Long Term Control Plan (LTCP) to bring the Weldon CSO in compliance with Vermont Water Quality Standards (VWQS). This work is being funded through the CWSRF planning loan, so Facilities Engineering Division (FED) is involved with the funding and technical review. The LTCP is about 50% complete, and a progress meeting will be conducted with the City and FED staff in the middle of January. The LTCP is on track to be submitted to the State by the end of March 2019.

#### **Section 4.3 Discharges to High Quality Waters; Anti-degradation**

*This permit is adopted in conformance with the Anti-Degradation Policy of the Vermont Water Quality Standards and the Department of Environmental Conservation's Interim Anti-Degradation Implementation Procedure (October 2010).*

*The BMPs required under this permit are established consistent with 40 C.F.R. § 122.44(k), and will be reviewed in cycles not to exceed five years, in conformance with the Department's plan, to ensure that the required practices provide the highest level of stormwater treatment. Where warranted based on this review, the Department will revise this permit to add, remove, or modify practices to ensure ongoing compliance with the anti-degradation requirements of the Vermont Water Quality Standards.*

*Application of the BMPs required under this permit will maintain and protect the higher quality of the State's high-quality waters, will prevent limited reductions in the existing higher quality of those waters, and will minimize risk to the existing and designated uses of those waters.*

*Therefore, compliance with this permit affords a rebuttable presumption of compliance with the State's Anti-Degradation Policy. The overall presumption of compliance with anti-degradation requirements for projects and sites in conformance with this permit may be rebutted on a case-by-case basis if warranted by credible and relevant project- or site-specific information available to the Agency during the review of an application for a proposed discharge.*

## **Part 5 – Stormwater Management Program (SWMP)**

### **Section 5.1 Comprehensive Plan for Covered Stormwater Discharges**

*The traditional municipality or non-traditional MS4 must amend or develop a written Stormwater Management Program (SWMP). The SWMP must be signed in accordance with Subpart 10.8 of this permit. The SWMP shall include the information required, as necessary, under Part 3; the information required under Part 4 to address discharges to impaired waters; the required elements under the six minimum control measures described in Part 6; the information required under Part 7 for stormwater systems for which the municipality has assumed full legal responsibility; and the Flow Restoration Plan (FRP) and Phosphorus Control Plan (PCP) developed in accordance with Part 8.*

### **Section 5.2 Reviewing and Updating Stormwater Management Programs**

- A. SWMP Review: The permittee shall perform an annual review of its SWMP in conjunction with preparation of the annual report required under Subpart 9.3.*
- B. SWMP Update: When the permittee amends its SWMP during the life of this permit, the requirements of Subpart 3.8 shall apply.*
- C. Transfer of Ownership, Operational Authority, or Responsibility for SWMP Implementation: When the permittee takes over ownership, operational authority, or SWMP implementation of impervious surfaces not under the ownership or control of the permittee at the time of the permittee's initial application for coverage under this permit, the impervious surface shall be subject to the requirements of this permit. If no amendments to the SWMP are necessary to comply with this permit, at a minimum the permittee shall notify the Secretary of this addition in its annual report submitted under Subpart 9.3.*

## **Part 6 - Minimum Control Measures**

### **Section 6.1 Requirements to Reduce Pollutants to the Maximum Extent Practicable**

- A. The permittee shall, for the regulated small MS4, develop, implement, and enforce the six minimum control measures, designed to reduce the discharge of pollutants from the regulated small MS4 to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the CWA. For purposes of the six minimum control measures, implementation of BMPs consistent with the provisions of the SWMP shall constitute compliance with the standard of reducing pollutants to the MEP.*
- B. [...] Permittees that were previously covered under the 2012 MS4 GP, shall continue implementing the six minimum control measures as previously authorized and in conformance with the requirements of this permit.*



The City of Saint Albans previously developed the six minimum control measures under the 2012 MS4 GP, and continues to implement these six control measures while meeting the requirements of subsection 6.1.B.

## **Section 6.2 Minimum Control Measures**

The six (6) minimum control measures included in the City of St. Albans SWMP are:

1. Public Education and Outreach on Storm Water Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Storm Water Runoff Control
5. Post-Construction Storm Water Management for New Development and Redevelopment
6. Pollution Prevention and Good Housekeeping for Municipal Operations

### **MCM #1. Public Education and Outreach on Storm Water Impacts**

#### *Permit Requirements:*

- a) *The permittee must implement a public education program reasonably designed to educate the community about the impacts of stormwater discharges on water bodies. The program shall include the steps that the public can take to reduce pollutants in stormwater runoff, including an explanation of the problem of stormwater volume and solutions for reducing the amount of runoff volume reaching waters of the State.*

The City of St. Albans participates in Franklin County Stormwater as a regional stormwater education program (RSEP). This RSEP is administered by Northwest Regional Planning Commission (NRPC) under contract with the City and Town of St. Albans, which are the two MS4 members as of the date of this SWMP. The MOU between the parties is attached as an appendix.

- b) *The permittee shall document its decision process for the development of a stormwater public education and outreach program in accordance with Subpart 6.1.B.*

See measures and rationales below.

- c) *The permittee shall include the following public education and outreach measures in its program:*

*(1) Maintain on its own or in cooperation with other small MS4s a web site with locally*

*relevant stormwater management information and promote its existence and use,*

MCM 1.c.(1): Maintain City webpage with locally relevant stormwater information

- Measurable Goal: The City will maintain basic information about stormwater on a dedicated page within its website which describe its stormwater related programming and include links on same for visitors to learn more. The City will track the annual number of visits to this page. The City stormwater page will also link to the Franklin County Stormwater website at [www.fcsvt.org](http://www.fcsvt.org).

- Rationale: Permittee websites are often the place where residents first go to obtain information on stormwater issues. Provision of basic information on such websites will help form a strong initial form of engagement to site visitors.

Responsible Parties: City Stormwater Program and Franklin County Stormwater RSEP.

*(2) Maintain on its own or in cooperation with other regulated small MS4s a program to identify opportunities for and provide technical assistance to landowners in the implementation by landowners of low impact BMPs such as maximizing disconnection, maximizing infiltration of stormwater runoff, preventing and eliminating soil erosion, and preventing and eliminating the delivery of pollutants to stormwater conveyances,*

MCM 1.c.(2): Franklin County Stormwater (RSEP) will maintain a program to identify opportunities and provide technical assistance on Low Impact BMPs. The website will contain links to technical assistance resources, and NRPC staff will assist the City and Town of St. Albans with making referrals as necessary.

Measurable Goal: Franklin County Stormwater will provide content and tools on the [www.fcsvt.org](http://www.fcsvt.org) website that will provide basic technical assistance on steps for implementing low impact BMPs. In addition, the RSEP will provide information within its website with links to relevant sites which can provide additional technical assistance. The RSEP will track the annual number of visits to relevant page(s).

Rationale: By providing resources in a variety of formats (videos, checklists, guidance documents, etc.) and links to external resource providers (organizations and contractors), the visitor will have access to an assortment of opportunities and can select the resource or entity best suited to provide technical assistance.

Responsible Parties: City Stormwater Program and Franklin County

Stormwater RSEP.

*(3) Participate in the regional stormwater education and outreach strategy described in the July 1, 2017 Stormwater Program Agreement between a group of MS4 permittees and the Chittenden County Regional Planning Commission, or subsequent amendment approved by the Secretary; or participate in another regional stormwater education strategy approved by the Agency; or submit a plan based on the following EPA guidance documents listed below.*

MCM 1.c.(3): The City will participate in the Franklin County Stormwater RSEP as described above and below.

Measurable Goal: The City will participate in and provide financial support for operation of the Franklin County Stormwater Collaborative consisting generally of a program that provides periodic advertising, school outreach and educational programming throughout each year. The City, via NRPC as the subcontractor, will document the annual number of site visits to the website as well as provide other metrics to BMPs listed in the Regional Stormwater Education, Public Involvement, and Participation Program Memorandum of Understanding.

Rationale: Support of the Collaborative will educate the general public in the MS4 area about key stormwater quality issues by using local and online media advertising, community events, and educational programming to drive viewers to the website and learn about the Program. The Collaborative intends to maintain communication with the school district and educators and provide pertinent resources for educational programming. In the prior permit cycle (2014-2018) the Collaborative built relationships with school educators (local teachers) and external partners (St. Albans Museum, Lake Champlain Basin, and UVM Watershed Alliance) and intends to continue this work to take advantage of new opportunities for collaboration and assistance.

Responsible Parties: City Stormwater Program and Franklin County Stormwater RSEP.

## **MCM #2. Public Involvement/Participation**

*Permit Requirements:*

*a) The permittee shall develop and implement a public involvement and participation program,*

*and the program shall, at a minimum, comply with applicable state and local public notice requirements. Public notice of the SWMP concurrent with the NOI and public notice of SWMP amendments shall serve to ensure the public is included in the development and review of the SWMP.*

The City of St. Albans participates in Franklin County Stormwater as a regional stormwater education program (RSEP). This RSEP is administered by Northwest Regional Planning Commission (NRPC) under contract with the City and Town of St. Albans, which are the two MS4 members as of the date of this SWMP. The MOU between the parties is attached as an appendix.

- b) The permittee shall post the SWMP and annual reports on the permittee's website at the same time they are submitted to the Agency.*

These items will be available on the City's Stormwater Program webpage at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater).

- c) The permittee shall document its decision process for the development of a stormwater public involvement and participation program in accordance with Subpart 6.1.B.*

See measure and rationale below.

- d) The permittee shall implement the following public involvement and participation activities:*

- 1. Participate in the regional stormwater public involvement and participation strategy described in the July 1, 2017 Stormwater Program Agreement between a group of MS4 permittees and the Chittenden County Regional Planning Commission, or subsequent amendment approved by the Secretary, or*
- 2. Participate in another regional stormwater public involvement and participation strategy approved by the Agency.*

MCM 2.d.: Participate in Franklin County Stormwater as a regional stormwater public involvement and participation strategy.

- **Measurable Goal:** The City will participate in and provide financial support for operation of the Franklin County Stormwater Collaborative consisting generally of both outreach and hands-on participation events, such as stream and garbage clean-ups when the opportunities arise. The City, via NRPC as the subcontractor, will document on an annual basis the number of participants and/or persons contacted by outreach events and hands-on activities as well as provide other relevant metrics.

- **Rationale:** Through support of the Franklin County Stormwater Collaborative, the City will support the engagement of local residents in the MS4 area via outreach events and via hands-on participation events. Hands-on events are a rational and effective way of giving community members first-hand experience with local water quality issues, especially in light of local water-ways. In the last permit cycle (2014-2018), our regional program has found it most effective to join efforts with other clean-up events, especially in light of the finite number of streams, volunteers, and accessible sites.

**Responsible Parties:** City Stormwater Program and Franklin County Stormwater RSEP.

### **MCM #3. Illicit Discharge Detection and Elimination**

*Permit Requirements:*

- a. The permittee shall develop, implement, and enforce a program to detect and eliminate illicit discharges into the stormwater systems of the regulated small MS4. As a part of the permittee's program to detect and eliminate illicit discharges, the permittee shall:*
  - 1. Develop, if not already completed, and maintain a storm sewer geographic information systems (GIS) or AutoCAD map of the regulated small MS4, showing the location of all outfalls and the names and location of all waters of the State that receive discharges from those outfalls. Permittees are encouraged to work with their regional planning commission and the Agency to acquire funding assistance for maintenance and updating of small MS4 maps.*
  - 2. To the extent allowable under State and local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-stormwater discharges into the regulated small MS4 and implement appropriate enforcement procedures and actions. Non-traditional MS4s shall adopt a policy prohibiting the discharge of foreign substances into storm drains and suitable means of enforcing it.*
  - 3. Develop and implement a plan to detect and address non-stormwater discharges, with emphasis on outfalls in stormwater impaired watershed(s) and random illegal dumping to the system, such as the dumping of RV wastes, used oil, and paint. In developing the plan, the permittee should collect or utilize existing local or Agency data. The permittee may conduct such investigations itself, contract for investigation, coordinate with storm drain investigation activities of others, or any combination of*

*these approaches. The plan shall:*

- i. Include dry weather field screening for non-stormwater flows and field tests of selected chemical parameters as indicators of discharge sources,*
  - ii. Address on-site sewage disposal systems that flow into the storm drainage system,*
  - iii. Include procedures for locating priority areas likely to have illicit discharges, which include those areas with a higher likelihood of illicit connections (e.g., areas with older sanitary sewer lines),*
  - iv. Include procedures, including the specific techniques used, for tracing the source of an illicit discharge,*
  - v. Include procedures for removing the source of the illicit discharge,*
  - vi. Include procedures for program evaluation and assessment, and*
  - vii. Require documentation of the results of the program evaluation and assessment.*
- 4. Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.*
  - 5. Address the following categories of non-stormwater discharges, if the permittee identifies them as significant contributors of pollutants to the regulated small MS4: water line flushings; landscape irrigation and lawn watering, provided all pesticides, herbicides, and fertilizers have been applied in accordance with the approved labeling; diverted stream flows; rising ground water; uncontaminated ground water; uncontaminated pumped ground water; discharges from potable water sources; foundation drains or footing drains where flows are not contaminated with process materials, and to which there are no floor drain, septic wastewater, or grey water connections; uncontaminated condensate from air conditioners, coolers/chillers, and other compressors and from the outside storage of refrigerated gases or liquids; irrigation water; spring water; uncontaminated water from crawl spaces; flows from riparian habitats and wetlands; discharges from emergency/unplanned fire-fighting activities; fire hydrant flushing; pavement and external building wash waters to which no detergents or other chemicals have been added; incidental windblown mist; and de-chlorinated swimming pool discharges.*
  - 6. Provide the Secretary with an annual status report of monitoring activities conducted and corrective actions taken. The final annual report required by this permit shall summarize the monitoring activities and corrective actions taken during the course of this permit.*
  - 7. Notify the Secretary as soon as practicable after discovery of unpermitted discharges to waters that may pose a threat to human health or the environment. The Secretary, in compliance with 10 V.S.A. § 1295, will post this unpermitted discharge on the*

*Agency's website for public notice.*

*Rationale.* The best management practices listed in Table 3.1 are required for this minimum control measure to comply with the permit requirements. The City plans to continue an overall illicit discharge detection and elimination program with individual BMPs, measurable goals, and responsible party for the program. The rationale is described in the following narratives.

**Table 3.1 Illicit Discharge Detection and Elimination Selected Best Management Practices**

<b>BMP ID #</b>	<b>Best Management Practice (BMP)</b>
3.a.(1)	Continue to update and maintain the GIS stormwater system mapping
3.a.(2)	Enforce the ordinance to address illicit discharge connections
3.a.(3)	Continue monitoring program to detect illicit discharges and enforce their elimination under the new ordinance.
3.a.(4)	Inform public of illicit discharge and disposal hazards
3.a.(5)	Address specific categories of illicit discharges, if necessary
3.a.(6)	Prepare annual report of monitoring and corrective actions taken
3.b	Document the decision process for development of the illicit discharge detection and elimination MCM. Part 6.1.B.

In 2008, the City began an update of the stormwater and combined sewer system mapping to document existing infrastructure. This inventory included the physical location of each drainage manhole and catch basin using mobile global positioning (GPS) unit with sub-meter accuracy. Each catch basin was then inspected from ground surface to observe the condition, verify pipe sizes, materials and direction of flow. A total 1,045 drainage manholes and catch basins were located.

Once the inventory was done, storm sewer maps were prepared with GIS layers that show drainage manholes, catch basins, outfalls, and pipelines on the maps. An overall base map was prepared and divided into 12 smaller subareas for ease of use. These maps were provided in ArcGIS format to the City and Northwest Regional Planning Commission (NRPC) for use in ongoing management and prioritization of maintenance and repairs.

Follow-up work included continued dye and smoke testing at eight locations to verify the points of discharge, and in the summer 2009, delineation of the drainage subareas to exclude the non-separated areas was performed with the assistance of the NRPC.

In 2012, an Illicit Discharge Detection and Elimination Study was performed for the City of St. Albans funded by the State Ecosystem Restoration Program. At least 12 confirmed or suspected illicit discharges were identified and flagged for elimination. An additional 9 outfalls were classified as a potential concern and were recommended for further investigation.

As a continuation of the 2012 work, an advanced Illicit Discharge Detection and Elimination Study was funded through the State Ecosystem Restoration Program to investigate 10 City drainage systems in 2014. The study referred 6 of the outfalls for further investigation and concluded that 2 others would be addressed by CSO mitigation work. The final 2 were resolved.

In 2018, the City continued investigations on ten of the drainage systems from the 2012 and 2014 work. Six of the systems were determined resolved, 3 were recommended for further study in 2019, and 1 was found to have a connection to the sewer system to allow excess stormwater to enter the sanitary sewer. The last one was slated for future work in 2019 after disconnection occurs.

On May 14<sup>th</sup>, 2018 the Saint Albans City Council adopted a new “Stormwater Management and Operation Ordinance” which prohibits illicit discharge connections to the stormwater system under Chapter 3, and establishing a monitoring program under Chapter 4.

The City will inform the public employees, businesses, and general public of the Ordinance and provide updates on the City website. Training of employees is described under minimum control measure 6.

The management and implementation of the program is the responsibility of the Public Works Director and Superintendent. An annual status report of the IDDE monitoring activities conducted and corrective actions will be submitted to the Agency as part of the MS4 annual report. This report will be organized to address specific categories of illicit discharges.

*Implementation Plan.* The implementation schedule for each BMP is provided in Table 3.2, and includes the designation of the responsible party.

*Measurable Goals.* The measurable goals for each BMP were selected to evaluate the success of this minimum control measure and are described in Table 3.2.



**Table 3.2 Illicit Discharge Detection and Elimination Implementation Schedule and Measurable Goals**

Schedule	BMP ID #	Best Management Practice	Responsible Party	Measurable Goal
Years 1 thru 5	3.a.(1)	Maintain and update the stormwater system mapping	Stormwater Program/ Public Works	Complete annual update of mapping
	3.a.(2)	Enforce illicit discharge ordinance	Stormwater Program/ Public Works	Document illicit discharges and parties responsible.
	3.a.(3)	Continue monitoring program to detect illicit discharges under new illicit discharge ordinance.	Stormwater Program	Continue IDDE program and document illicit discharges in Stevens and Rugg Brooks. Prioritize systems unresolved from 2012-2014-2018 work.  Number of illicit discharges detected and corrective actions to be taken
	3.a.(4)	Inform public of illicit discharge and disposal hazards	Stormwater Program/ Public Works	Continue general public education efforts regarding IDDE.  Number of catch basins stenciled.
	3.a.(5)	Address specific categories of illicit discharges, if necessary	Stormwater Program/ Public Works	Document illicit discharges and categorize types to determine trends
	3.a.(6)	Prepare annual report of monitoring and corrective actions taken	Stormwater Program	Submit IDDE information with annual MS4 report

#### **MCM #4. Construction Site Storm Water Runoff Control**

*Permit Requirement: The permittee must:*

- a) *Pursuant to federal regulations 40 C.F.R. 122.34(b)(4), the permittee must develop, and enforce a program to reduce pollutants in any stormwater runoff to the small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger plan of development or sale that would disturb one acre or more.*

*Because the State of Vermont is approved to implement the federal NPDES Program, the Secretary must regulate stormwater runoff from construction activities that result in a land disturbance of greater than or equal to one acre and stormwater runoff from construction*

*activity disturbing less than one acre that is part of a larger common plan of development or sale. To satisfy this requirement, the Secretary has issued General Permit 3-9020 for Stormwater Runoff from Construction Sites. If a construction project requiring a permit does not qualify for coverage under the general permit, then an individual permit from the Secretary is required. The requirements of the Agency's construction stormwater program are at least as stringent as the requirements of 40 C.F.R. § 122.34(b)(4). Therefore, the Secretary has determined that the permittee is not required to develop a separate program. However, the permittee shall:*

- (1) Develop and implement procedures to assure that construction activities undertaken by the permittee are properly permitted and implemented in accordance with the terms of their stormwater construction permit.*

For routine maintenance, such as excavation necessary for a water line repair, the City Public Works Dept. follows the standards of the Vermont Low Risk Site Handbook

For Erosion Prevention and Sediment Control. For larger construction projects in which the City engages, such as a streetscape/roadway improvement project or a development project, the City obtains State and local construction permits as necessary. The local construction permits would be subject to the stream corridor protection amendments to the St. Albans City Land Development Regulations, adopted on January 8, 2018, and the City's new Stormwater Management and Operations Ordinance, adopted on May 14, 2018. Both documents are attached to this SWMP as appendices.

- (2) In conjunction with the review required by Subpart 6.2.5, review existing policies; planning, zoning, and subdivision regulations; and ordinances to determine their effectiveness in managing construction-related erosion and sediment and controlling waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at construction sites that may cause adverse impacts to water quality. The permittee shall also review its policies, regulations, and ordinances for their consistency with the requirements of the Secretary's general permits for stormwater runoff from large and small construction sites and construction erosion guidelines for low impact development. If the permittee's review indicates that its policies are inconsistent with the Secretary's permits, the permittee shall amend its policies to complement, at a minimum, or be more stringent than the requirements of the Secretary.*

The City and Town of St. Albans procured this review in May 2015 as a part of a joint effort to draft new rules for stream corridor protection and local stormwater regulation. For the City, this effort resulted in the development and adoption of stream corridor protection amendments and the Stormwater Management and Operations Ordinance, both adopted in 2018 and attached to this SWMP as

appendices. The new rules complemented the Secretary's requirements. The aforementioned review is available at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater). The City constantly reviews its regulations and ordinances as they are implemented and enforced "on the ground." Any revisions to the rules, proposed and/or adopted, that result from ongoing review will be reported on in annual reports.

- (3) *Develop and implement an erosion control ordinance, or zoning or subdivision regulation, or other regulatory mechanism, or if a non-traditional MS4, a policy which, at a minimum, regulates development activities not subject to state or federal erosion control requirements. At a minimum, the plan shall require implementation of the measures in the Low Risk Site Handbook for Erosion Prevention and Sediment Control.*

The City's new Stormwater Management and Operations Ordinance, adopted on May 14, 2018, accomplishes this task. The ordinance and related EPSC documents are available at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater).

*Rationale.* The best management practices as described above and listed in Table 4.1 are selected for this minimum control measure to comply with the permit requirements. In 2018 the City adopted new rules in order to fulfill MCMs 4.a.(1) and 4.a.(3), and these rules were informed by the review required by MCM 4.a.(2). These new rules complement the Secretary's requirements. The City's rules will continue to be performed by ongoing review as MCM 4.a.(2) is implemented.

*Implementation Plan.* The implementation schedule for each BMP is provided in Table 4.1, and includes the designation of the responsible party.

*Measurable Goals.* The measurable goals for each BMP were selected to evaluate the success of this minimum control measure and are described in Table 4.1.

**Table 4.1 Construction Site Stormwater Runoff Control Implementation Schedule and Measurable Goals**

<b>Schedule</b>	<b>BMP ID #</b>	<b>Best Management Practice</b>	<b>Responsible Party</b>	<b>Measurable Goal</b>
Years 1 thru 5	4.a.(1)	Review and implement procedures to ensure MS4 construction activities are properly permitted.	Planning Director / PW Director	Year 1: Review procedures and update as necessary.  Years 1-5: Annual reports will contain examples of compliance with State permit requirements for MS4 construction activities.
	4.a.(2)	Implement and enforce existing MS4 regulations and maintain ongoing review for effectiveness in managing construction related E&S and consistency with state construction permit.	Planning Director	Implement and enforce E&S requirements.  Annual reports will include summary of regulated activities and any results of ongoing review, as well as record of any revisions to rules adopted by the City.
	4.a.(3)	Enforce an erosion control ordinance that regulates development not subject to State permitting.	Planning Director	Implement and enforce the ordinance.  Annual reports will include summary of regulated activities and any results of ongoing review, as well as record of any revisions to rules adopted by the City.

## **MCM #5. Post-Construction Storm Water Management for New Development and Redevelopment**

*Permit Requirement:*

- a) *Pursuant to 40 C.F.R § 122.34(b)(5), the permittee shall develop, implement, and enforce a program to address post-construction stormwater runoff from new development and redevelopment projects that involve land disturbance of greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development, that discharge into the regulated small MS4. The program must ensure that controls are in place that would prevent or minimize water quality impacts.*

*Pursuant to 10 V.S.A. § 1264 and Agency rules and procedures adopted thereunder, the Secretary is required to regulate post-construction stormwater runoff from activities that result in creation of new or redevelopment of one acre or more of impervious surface. However, there is a gap between what the Agency's post-construction stormwater*

*management permit program regulates and what the permittee must regulate to comply with this minimum control measure. This gap consists of activities that disturb one acre of earth or greater, but that do not trigger post construction jurisdiction. Except for those activities falling within the gap and thus, not requiring a state permit, the requirements of the Agency's post-construction stormwater management permit program are at least as stringent as the requirements of 40 C.F.R. § 122.34(b)(5). Consequently, the permittee shall develop, implement, and enforce a program to reduce pollutants in any post-construction stormwater runoff from only those activities that result in a land disturbance of greater than or equal to one acre and that are not subject to regulation under the Agency's post-construction stormwater management permit program.*

This requirement has been fulfilled by the adoption of the City's new Stormwater Management and Operations Ordinance on May 14, 2018.

- b) If the Secretary ceases to implement the Agency's post-construction stormwater permit program, this permit shall be reopened and modified, as necessary.*
- c) Traditional municipalities and non-traditional MS4s are encouraged to cooperate when stormwater runoff moves across MS4 jurisdictional boundaries.*
- d) In conjunction with the review required by Subpart 6.2.4, the permittee shall review existing policies, planning, zoning and subdivision regulations, and ordinances to:
  - (1) Determine their effectiveness in managing stormwater runoff from new development and redevelopment projects to prevent adverse impacts to water quality;*
  - (2) Determine their consistency with the requirements of the Secretary's rules and general permits regulating post-construction stormwater runoff;*
  - (3) Assess whether changes can be made to such policies, regulations and ordinances to support low impact design options; and*
  - (4) Assess whether changes can be made to current street design and parking lot guidelines and other local requirements that affect the creation of impervious surfaces to support low impact design options.**

The City and Town of St. Albans procured this review in May 2015 as a part of a joint effort to draft new rules for stream corridor protection and local stormwater regulation. For the City, this effort resulted in the development and adoption of stream corridor protection amendments and the Stormwater Management and Operations Ordinance, both adopted in 2018 and attached to this SWMP as appendices. The new rules complemented the Secretary's requirements. The aforementioned review is available at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater). The City constantly reviews its regulations and ordinances as they are implemented and enforced "on the ground." Any revisions to the rules, proposed and/or adopted, that result from ongoing review will be reported on in annual reports.

- e) *The permittee shall develop and implement procedures to identify new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre, that are not subject to regulation under the Agency's post-construction stormwater management permit program.*

This requirement is fulfilled by the City's current procedures for implementation and enforcement of the Land Development Regulations. When a project is assessed by the permitting office, the amount of disturbance is determined, and the project will be referred for post-construction stormwater regulation, as necessary.

- f) *For stormwater runoff that discharges from new development and redevelopment projects that disturb greater than or equal to one acre, and that are not subject to regulation under the Agency's post-construction stormwater management permit program the permittee shall adopt an ordinance, planning, zoning and subdivision regulation, or other regulatory mechanism, or if the permittee is a non-traditional MS4, a policy that:*
- (1) Prevents or minimizes water quality impacts from post-construction stormwater runoff from such developments; and*
  - (2) Utilizes a combination of structural, non-structural and low impact best management practices (BMPs) which are appropriate for the community,; and*
  - (3) Ensures adequate long-term operation and maintenance of BMPs.*

Fulfilled by the May 2018 adoption of the City's Stormwater Management and Operations Ordinance. See above.

- g) *For stormwater runoff that discharges from new development and redevelopment projects that disturb greater than or equal to one acre, that are not subject to regulation under the Agency's post-construction stormwater management permit program, the permittee shall:*
- (1) Develop and implement procedures for inspecting development and redevelopment projects for compliance with the conditions of the permittee's regulations. Traditional municipalities and non-traditional MS4s shall cooperate when stormwater runoff moves across MS4 jurisdictional boundaries.*
  - (2) Develop and implement procedures to assure that development and redevelopment activities undertaken by the permittee, including road projects, are properly permitted and maintained.*

For construction projects in which the City engages, such as a streetscape/roadway improvement project or a development project, the City obtains State and local construction permits as necessary. The local construction permits would be subject to the stream corridor protection amendments to the St. Albans City Land Development Regulations, adopted on January 8, 2018, and the City's new Stormwater Management and Operations Ordinance, adopted on May 14, 2018.

Both documents are attached to this SWMP as appendices. In order to fulfill this requirement, the City will, within 12 months of the date of this SWMP, codify its procedures for (1) inspecting development and redevelopment projects for compliance and for (2) assuring that development and redevelopment activities undertaken by the City are properly permitted and maintained.

*h) The permittee shall provide the foregoing plans, policies, and procedures as a part of its SWMP.*

Fulfilled with attachments in the appendices.

*Rationale.* The best management practices in Table 5.1 are selected for this minimum control measure to comply with the General Permit requirements. The City will develop a post construction storm water management program with individual BMPs, measurable goals, and responsible party.

*Implementation Plan.* The implementation schedule for each BMP is provided in Table 5.1, and includes the designation of the responsible party.

*Measurable Goals.* The measurable goals for each BMP were selected to evaluate the success of this minimum control measure and are described in Table 5.1.

**Table 5.1 Post-Construction Storm Water Management in New Development and Redevelopment Implementation Schedule and Measurable Goals**

Schedule	BMP ID #	Best Management Practice	Responsible Party	Measurable Goals
Year 1	5.g.(1)	Codify procedures for inspecting projects subject to City’s stormwater ordinance.	Planning Director	Include in annual report and post to <a href="http://www.stalbansvt.com/stormwater">www.stalbansvt.com/stormwater</a> .
	5.g.(2)	Codify procedures to ensure that development activities undertaken by the City are properly permitted.	Planning Director / PW Director	Include in annual report and post to <a href="http://www.stalbansvt.com/stormwater">www.stalbansvt.com/stormwater</a>
	5.h	Provide plans, policies, and procedures as part of SWMP.	Planning Director	Submit with SWMP.
Years 1 thru 5	5.d	If necessary, amend policies and regulations for effectiveness in managing stormwater runoff and consistency with the Secretary’s permit.	Planning Director	Annual reports will include summary of regulated activities and any results of ongoing review, as well as record of any revisions to rules adopted by the City.

Schedule	BMP ID #	Best Management Practice	Responsible Party	Measurable Goals
	5.e	Implement procedures to identify projects that disturb >1ac, but do not require a state post-construction permit.	Planning Director	Include summary of procedures and identified projects in annual reports.
	5.f	Implement ordinance that disturb >1ac to utilize structural, non-structural, and low-impact BMPs and ensure maintenance.	Planning Director	Include summary of regulated projects in annual reports.
	5.g.(1)	Implement procedures for inspecting projects subject to the City's stormwater ordinance	Planning Director	Include summary of regulated projects in annual reports.
	5.g.(2)	Implement procedures to ensure that development activities undertaken by the City are properly permitted.	Planning Director / PW Director	Include summary of projects in annual reports.

**MCM #6. Pollution Prevention & Good Housekeeping for Municipal Operations**

*Permit Requirements:*

- a) *The permittee shall develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff to the regulated small MS4 from all operations of the permittee.*

This is currently fulfilled by a myriad of Public Work Dept. procedures and training opportunities. The City will develop and provide a comprehensive stormwater-specific operation and maintenance program within 12 months of the date of this SWMP and submit via annual reports and post at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater).

- b) *The program shall include the following:*
  - (1) *A list of the permittee's operations covered by the program, including activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance,*

The operations include:

- Management of parks at Barlow Street Park, Houghton Park and Taylor Park.
- Public Works, Water Dept. and Wastewater Dept. fleet maintenance.
- Maintenance of the Public Works Garage and the Wastewater Treatment Facility.
- Street sweeping and cleaning and maintenance of stormwater catch basins.



- Reconstruction and repair of neighborhood sidewalks.
- Streetscape and roadway improvement projects.

(2) *A training component to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance,*

Past practice has been for the Public Works Dept. to send personnel to at least one stormwater-related training event per year. The City will develop and provide a comprehensive training component within 12 months of the date of this SWMP and submit via annual reports and post at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater).

(3) *Controls for reducing or eliminating the discharge of pollutants from the regulated small MS4, and*

Street sweeping of all City-owned streets, using the City's street sweeper, begins in the spring, typically in mid-April. Approximately 100 hours is spent on this initial cleaning of 24 miles of roadway. Sweeping in the downtown business district continues on Mondays and Fridays through October for about two hours per day. The accumulated material is transported back to the DPW site for screening. Paper and other debris are removed by screening and the remaining material is reused for other purposes.

Catch basin cleaning is performed for most structures each year using the City-owned vacuor truck. The cleaning takes about 6 weeks, at 40 hours per week. Records on cleaning activities will be maintained

(4) *Procedures for compliance with applicable state and federal laws for the proper disposal of waste, including dredged spoil, accumulated sediments, floatables, and other debris.*

This is currently fulfilled by a myriad of Public Work Dept. and Wastewater Dept. procedures. The City will develop and provide a comprehensive set of procedures for compliance with applicable state and federal laws for the proper disposal of waste within 12 months of the date of this SWMP and submit via annual reports and post at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater).

c) *Where lawn or garden fertilizers are used in the facility operation, the permittee shall prohibit the use of any phosphorus containing fertilizer, unless warranted by a current soil test. If a phosphorus fertilizer is used, a soil test shall be performed annually and a copy of the test submitted with the annual report. This requirement does not apply to community gardens.*

This requirement is fulfilled by current Public Works Dept. practices. The City will develop and provide a codified phosphorus fertilizer procedure within 12 months of the date of this SWMP and submit via annual reports and post at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater).

- d) *A permittee may comply with this measure for municipal garages through participation in the Agency's Municipal Compliance Assistance Program or another facility audit program approved by the Secretary, provided that any deficiencies identified must be corrected and documented within 90 days.*

The City has complied with this requirement in the past and will continue to do so. The City will request an updated survey of facilities from the Municipal Compliance Assistance Program (MCAP) within the first 12 months after the date of this SWMP and will continue to stay involved in this program. There are emergency spill kits located at each facility. All chemicals and fuels are stored inside and in contained areas to minimize spills. An MCAP inspection will be scheduled. MCAP activities will be summarized in annual reports.

- e) *The permittee shall provide a list of industrial facilities that it owns or operates that discharge to its regulated small MS4 and are subject to an individual NPDES permit or the Agency's General Permit 3-9003, Multi-Sector General Permit for Stormwater Discharges Associated With Industrial Activity, including facilities covered by a "no exposure certification." Include the permit number for each facility.*

The Wastewater Treatment Facility (WWTF) is subject to the Multi-Sector General Permit (MSGP) and the City submitted a Notice of Intent (NOI) based on a Certificate of No Exposure. The permit is #4947-9003 and was last renewed on December 29, 2011.

The City will update the MSGP status of its facilities within the first 12 months after the date of this SWMP. This will be summarized in the annual report.

- f) *The permittee shall provide a copy of its operation and maintenance program to prevent or reduce pollutant runoff from the permittee's operations as a part of its SWMP.*

The City will develop and provide a comprehensive stormwater-specific operation and maintenance program within 12 months of the date of this SWMP and submit via annual reports and post at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater).

*Rationale.* The best management practices in Table 6.1 are selected for this minimum

control measure to comply with the permit requirements. The City will develop a pollution prevention/good housekeeping program for municipal operations with individual BMPs, measurable goals, and responsible party.

*Implementation Plan.* The implementation schedule for each BMP is provided in Table 6.1, and includes the designation of the responsible party.

*Measurable Goals.* The measurable goals for each BMP were selected to evaluate the success of this minimum control measure and are described in Table 6.1.

**Table 6.1 Pollution Prevention/Good Housekeeping for Municipal Operations Implementation Schedule and Measurable Goals**

Schedule	BMP ID #	Best Management Practice	Responsible Party	Measurable Goals
Year 1	6.b.(2)	Develop and provide a comprehensive training component.	PW Director	Provide with first annual report.
	6.b.(4)	Compile and codify procedures for compliance with applicable state and federal laws for the proper disposal of waste.	PW Director	Provide with first annual report.
	6.c	Codify a phosphorus fertilizer procedure.	PW Director	Provide with first annual report.
	6.f	Develop and provide a comprehensive stormwater-specific operations and maintenance program	PW Director	Provide with first annual report.
Years 1 thru 5	6.b.(1)	List operations covered by the Good Housekeeping program.	PW Director	Provided with this SWMP. Updated list with each annual report.
	6.b.(2)	Train City public works staff on maintenance schedules, and inspection procedures for long-term structural controls.	PW Director	Document topics and number of employees participating in training.
	6.b.(3)	Implement controls for reducing or eliminating the discharge of pollutants from the MS4 by inspecting/cleaning catch basins, and sweeping City Streets.	PW Director	Number of catch basins cleaned and volume of material removed. Document street sweeping schedules and estimated volumes of material removed.

Schedule	BMP ID #	Best Management Practice	Responsible Party	Measurable Goals
	6.b.(4)	Implement procedures for compliance with applicable state and federal laws for the proper disposal of waste.	PW Director	Update procedures as necessary and note the updates in annual reporting.
	6.c	For municipal parks and facilities where fertilizers are applied, the use of fertilizers containing phosphorus will be prohibited.	PW Director	Use phosphorus-free fertilizer unless justified by a soil test.
	6.d	Participate in the ANR's Municipal Compliance Assistance Program.	PW Director	Document MCAP visits and actions in annual reports.
	6.3	Provide a list of all industrial facilities that the MS4 owns or operates that are subject to the MSGP.	PW Director	Update list of facilities and status of permits in each annual report.
	6.f	Continue and update the operations and maintenance program.	PW Director	Update program as necessary and note the updates in annual reporting.

## Part 7 - Assumption of Responsibility for Previously Permitted Stormwater Systems

The City may assume “full legal responsibility” for a stormwater system that was previously permitted under an operational stormwater permit. To assume “full legal responsibility” the City will establish legal control of the stormwater system, including a legal right to access the stormwater system, a legal duty to properly maintain the stormwater system, and a legal duty to repair and replace the stormwater system when it no longer adequately protects waters of the State.

When the City assumes “full legal responsibility” for a stormwater system, the City will apply to amend its authorization to incorporate the previously permitted systems in accordance with Subpart 3.8. The permittee shall list the incorporated systems and previous permit numbers in the SWMP, shall certify that it has “full legal responsibility” for such systems, and shall report on maintenance of the systems in the annual report.

### Managed Stormwater Treatment Facilities

The City has incorporated three stormwater treatment facilities (STFs) with expired state permits. There are listed in Table 7.1 below. This list will be updated as the City assumes responsibility for more STFs. City will report on an annual basis all new STFs for which it has

assumed responsibility.

**Table 7.1 Stormwater Treatment Facilities**

Facility Name	Location	State Permit #	Year City Began Maintenance
Murray Drive Swales (formerly “Lake Street Subdivision”)	Murray Dr.	1-0477	2016
Guyette Circle / Bowles Lane Swales (formerly “Edward Street Subdivision”)	Guyette Cir. and Bowles Ln.	1-0691	2016
Lemnah Drive 1 (formerly “St. Albans Industrial Park”)	Lemnah Dr.	2-0147	2016

**Measurable Goal:** The City will ensure proper maintenance of all STFs included in Table 7.1. These STFs will be inspected at least once a year. The City will report the number of inspections conducted on an annual basis. The results of these inspections will be made available upon request.

**Measurable Goal:** The City will track the number of new STFs constructed by the City and the existing STFs that were transferred to the City and report this information annually.

## Part 8 - TMDL Implementation

### Section 8.1 Stormwater Flow Restoration Plan (FRP)

- A. *All permittees, subject to stormwater TMDL implementation requirements, submitted Flow Restoration Plans (FRPs), pursuant to the requirements of “General Permit 3-9014 for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems” (2012).*
- B. *A FRP that has been approved by the Secretary shall be a part of a permittee’s SWMP.*
- C. *Schedule of Compliance. As outlined in the FRP, the permittee shall implement all measures necessary to achieve the flow restoration targets in the stormwater TMDLs no later than December 5, 2032. The permittee shall submit a report on an annual basis on the development and implementation of the FRP. The reports shall be submitted every April 1st. The report shall address actions taken to implement all FRP components, including the extent of BMP implementation, an estimate of the extent of completion for remaining items, and an assessment of the ability to meet outstanding schedule items. The FRP report shall include a written statement, signed by a designer acceptable to the Secretary, that any BMP built or implemented within the preceding six-month period was constructed in compliance with the approved plans.*

The City of Saint Albans continues to submit annual reports detailing the development and implementation of the Stevens and Rugg Brook FRPs. The most recent report was submitted on March 26, 2018. In order to implement the FRP's, the City has developed a Stormwater Utility as a means to raise the local match necessary for state grant funding for the design and construction of stormwater BMPs that achieve targets outline in the FRPs. On May 14, 2018, the City Council created the City's stormwater program and utility, to begin on July 1, 2018.

*D. Flow Monitoring. The permittee shall implement, or otherwise fund, a flow and precipitation monitoring program, subject to approval by the Secretary, in its respective stormwater-impaired watershed(s). The permittee may cost share with other regulated dischargers in the operation and maintenance costs of the gage(s) for each watershed into which it discharges.*

The City of Saint Albans has entered into a "Memorandum of Agreement" between the Vermont Department of Environmental Conservation (DEC) and 12 other MS4 communities. The purpose of this agreement is to "aid participating MS4 Permittees in obtaining compliance with the flow monitoring requirements of their MS4 permits."

This agreement will provide monitoring services for the participating MS4 Permittees from State Fiscal Year 2017 (July 1, 2016) through State Fiscal Year 2021 (June 30, 2021).

Through this agreement, DEC will develop and manage a contract with a third party to carry out flow monitoring requirements as outlined in the existing MS4 permits. All management of the Contractor and non-compliance due to the Contractor will be the responsibility of DEC and will not result in any violations under the MS4 permit for any MS4 Permittee signed onto this MOU.

This project will help to assess the effectiveness of flow restoration plans for up to eleven stormwater impaired streams. Vermont's stormwater Total Maximum Daily Loads (TMDL) utilize flow targets to represent a range of stressors to water quality, from pollutant loads, land based and instream erosion, to increased flooding. Implementation of the flow restoration may take over fifteen years in some watersheds. Flow monitoring will be used by DEC and the Parties to ensure that the management practices implemented under the flow restoration plans are making progress towards the TMDL targets, and redirect efforts if needed.

The City of Saint Albans has agreed to pay 6.6% of the total costs of the DEC implemented flow monitoring program according to the following schedule.

% of Total Cost	Costs by State Fiscal Years (July 1 – June 30)				
	2017	2018	2019	2020	2021
6.6%	\$11,418	\$8,842	\$8,813	\$6,579	\$6,743

*E. Stream Corridor Protection. The 2012 MS4 GP required that permittees report on the legal authorities or strategies that the permittee had adopted to protect and regulate development in the stream corridors of stormwater impaired waters and develop a plan for enhanced stream corridor protection. The permittee shall report on any updates to the plan and provide a link to relevant municipal ordinances or regulations.*

Per the 2012 MS4 GP requirement, The City of Saint Albans had adopted Land Development Regulations aimed at protecting stream corridors during development. These regulations are listed under Article 5, Sections 523 & 524 of the St. Albans City Land Development Regulations January 29, 2018 Edition. The City has also developed a map and listing of properties potentially affected by the stream corridor regulations. These documents may be found at [www.stalbansvt.com/stormwater](http://www.stalbansvt.com/stormwater).

## **Section 8.2 Lake Champlain Phosphorus Control Plan (PCP) Requirements**

- A. The permittee shall develop and implement a Phosphorus Control Plan (PCP), for approval by the Secretary, for developed land consistent with the Lake Champlain TMDLs.*
- 1. At a minimum, the PCP shall be designed to achieve a level of phosphorus reduction equivalent to the percent reduction target for developed land in the associated TMDL lake segment(s) as applied to municipally-owned developed lands. The percent reduction target is 21.7% for Saint Albans Bay (See Table 8 of the Phosphorus TMDLs for Vermont Segments of Lake Champlain, June 17, 2016).*
  - 2. The PCP may include the treatment of non-municipally-owned developed lands.*
  - 3. The PCP may include, but is not limited to, reductions calculated from:*
    - a) Implementation of the Municipal Road Standards (in Subpart 8.3),*
    - b) Street sweeping and catch basin cleaning practices,*
    - c) Retrofits to municipally owned properties,*
    - d) Implementation of stormwater treatment practice upgrades or retrofits to treat existing impervious after the adoption of the 2002 Vermont State Stormwater Manual,*
    - e) Implementation of stormwater treatment practices after July 1, 2010, on developed lands that are not subject to the state’s operational stormwater permit.*

*f) Implementation of municipal ordinances or regulations to address sub-jurisdictional impervious surfaces.*

*4. The following conditions apply when calculating phosphorus reductions for application towards the PCP targets:*

- a) Where a PCP includes phosphorus reductions from non-municipally-owned developed lands that are otherwise subject to an operational stormwater permit that requires an upgrade of the stormwater treatment system pursuant to the Department's regulations, including 3-acre sites, the PCP shall be designed to achieve, in aggregate, a level of phosphorus reduction equivalent to the lake segment target as applied to municipally-owned developed land, and a 50% reduction<sup>2</sup> from the non-municipally-owned developed lands. The MS4 shall assume full legal responsibility for the stormwater systems as per Part 7.*
- b) Where a PCP includes non-municipally-owned developed lands that are subject to an operational stormwater permit that does not otherwise require an upgrade of the stormwater system pursuant to the Department's regulations, the management of stormwater from these lands is creditable towards the phosphorus reduction target. The MS4 shall assume full legal responsibility for the stormwater systems as per Part 7.*
- c) Where a PCP includes non-municipally-owned developed lands that are not otherwise subject to an operational stormwater permit, the management of stormwater from these lands is creditable towards the phosphorus reduction target. The MS4 shall establish a maintenance agreement with the property owner(s) to ensure long-term maintenance of the BMP(s). The maintenance agreement can be conditions in a local permit, or part of a municipally-approved plan.*
- d) The PCP may include a component to address a reduction of future growth discharges of phosphorus from developed lands. The future growth component shall track the amount of development, and the level of stormwater management achieved by local ordinances or regulations, on future development. Future development is any development after July 1, 2010 that is not subject to a state operational permit.*

*B. The Secretary will evaluate the phosphorus reductions achieved through all of the developed lands regulatory tools to assess compliance, per lake segment, with the Lake Champlain TMDL reduction targets. This evaluation may result in the regulation of additional impervious surface to meet the phosphorus reduction requirements.*

*C. The submissions of the Road Stormwater Implementation Table (Implementation Table) and the final PCP shall be placed on public notice pursuant to Subpart 3.8. Upon approval by the Secretary, these shall become a part of the permittee's SWMP.*



D. *Schedule of Compliance. The permittee shall complete implementation of the PCP no later than June 17, 2036.*

*The permittee shall, according to the following schedule:*

<b><i>Deadline</i></b>	<b><i>Task</i></b>
<i>April 1, 2019</i>	- <i>Submit the first Annual PCP Report</i>
<i>April 1, 2020</i>	- <i>Submit the Annual PCP Report and the Implementation Table with results of the Road Erosion Inventory (REI)</i>
<i>April 1, 2021</i>	- <i>Complete the Phosphorus Control Plan (PCP) and submit it to the Secretary</i>  - <i>Submit the Annual PCP Report</i>
<i>April 1, 2022 and every year thereafter</i>	- <i>Submit the Annual PCP Report</i>
<i>No Later than June 17, 2036</i>	- <i>Complete full implementation of the approved PCP</i>

The City has contracted with Watershed Consulting Associates to develop a PCP, including the Road Erosion Inventory and the Implementation Table. The scope of work for this project integrates the above timeline table for deliverables. The PCP project will be complete by August 2020.

E. *Pursuant to the foregoing table, the permittee shall submit a report every April 1st on the development and implementation of the PCP. The reports shall address actions taken to implement all PCP components, including:*

- 1. Extent of implementation of the Municipal Roads Standards and any necessary updates to the Implementation Table,*
- 2. Extent of street sweeping and catch basin cleaning,*
- 3. Extent of stormwater BMP implementation,*
- 4. An estimate of the extent of remaining items requiring completion,*
- 5. An assessment of the ability to meet outstanding schedule items, and*
- 6. A written statement, signed by a designer acceptable to the Secretary, that any structural BMP built or implemented within the preceding six-month period was constructed in compliance with the approved plans.*

### **Section 8.3 Municipal Road Requirements**

A. *Road Erosion Inventory for all Municipal Hydrologically-connected road segments*

*Each traditional municipality shall complete a Road Erosion Inventory (REI) of all hydrologically-connected road segments within the municipality. The REI is intended to verify which municipal road segments are hydrologically connected, and identify which of those segments meet the operational standards required under this permit. The municipal road segments are broken down into the following categories: Gravel and Paved Roads with Ditches, Paved Roads with Catch Basins, and Class 4 Roads.*

*Results of the REI shall be recorded in the Implementation Table and submitted by April 1, 2020. The REI forms can be found at:*

*<http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program>*

#### *1. Hydrologically-Connected Road Segment Determination*

*The REI shall include all hydrologically-connected municipal road segments that appear on the ANR Atlas at the time that the REI is conducted. All hydrologically-connected road segments depicted on the ANR Atlas shall be field visited and evaluated using the REI Form. Additionally, the municipality may propose to add road segments from its REI based on an evaluation of criteria described in Subsection 8.3.A.1 of the Permit.*

*If a road segment appears on the ANR Atlas and none of the above conditions are observed in the field, permittees may propose to re-classify a segment as not hydrologically connected. Alternately, if none of the above conditions are observed in the field, but the segment is likely to discharge to waters or wetlands, a permittee shall propose to add this segment to the inventory following a field evaluation.*

*The addition or removal of any road segments not appearing on the ANR Atlas must be documented as part of the REI, and justification for the removal or addition shall be included in the Implementation Table.*

*The Secretary may determine at any time that a road segment not identified on the ANR Atlas is hydrologically connected, based on the criteria listed above, as well as other site-specific factors that indicate the likelihood of a discharge, including slope, soil type, proximity to waters, etc. When the Secretary determines that an unmapped road segment is hydrologically connected and informs the municipality of its determination, the permittee shall include the segment in its Implementation Table as part of the next annual report.*

## 2. Erosion Scoring

*The REI shall include a road erosion “score” for each hydrologically-connected road segment. All road segments shall be scored as “Fully Meets,” “Partially Meets,” or “Does Not Meet” the standards listed in Subpart 8.3.C of this permit. A detailed procedure for scoring road segments is provided on the REI form. Road segments that score “Partially Meets” or “Does Not Meet” shall be upgraded to meet standards according to the municipality’s implementation schedule. Road segments that score “Fully Meets” do not require upgrades, but shall be maintained to ensure that they continue to meet standards. The REI scores and explanation of those scores shall be entered into the Implementation Table.*

### B. Implementation Table

*Municipalities shall record the REI scoring information in the Implementation Table. In the Implementation Table, the municipality shall prioritize road segments for upgrades to meet the standards in Subpart 8.3.C. The municipality shall submit the Implementation Table on April 1, 2020. The Table shall include the planned road upgrades for the first permit term period. The Implementation Table shall be the municipality’s working document to track planned road stormwater improvements and implementation. Municipalities shall update the table with the segments that were brought up to standards in the previous year and segments planned for upgrades in the following calendar year as part of the Annual Report (Subpart 8.2.E). The Implementation Table is available on the Stormwater Program’s website:*

*<http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program>*

### C. Road Stormwater Management Standards

*The standards listed below constitute the minimum required Best Management Practices (BMPs) applicable to all “hydrologically-connected” municipal roads. It is the municipality’s responsibility to maintain all practices after installation. Road segments not meeting these standards must implement the BMPs listed below in order to meet the required standards. These standards are further described in Subsection 8.3.C of the Permit.*

- 1. Feasibility*
- 2. Standards for All Construction and Soil Disturbing Activities*
- 3. Standards for Gravel and Paved Roads with Ditches*
- 4. Standards for Paved Roads with Catch Basins*
- 5. Standards for Connected Class 4 Roads*

## **Part 9 - Monitoring, Record Keeping and Reporting**

### **Section 9.1 Monitoring**

1. The City will evaluate program compliance, the appropriateness of identified best management practices, and progress toward achieving identified measurable goals.
2. When the City conducts monitoring of illicit discharges pursuant to Subpart IV.H.3.a.4. all samples and measurements taken shall be representative of the monitored activity.
3. Records of monitoring information shall include:
  - a) The date, exact place, and time of sampling or measurement;
  - b) The name(s) of the individual(s) who performed the sampling or measurements;
  - c) The date(s) analyses were performed;
  - d) The names of the individuals who performed the analyses;
  - e) The analytical techniques or methods used; and
  - f) The results of such analyses.
4. Discharge Monitoring Report. Monitoring results will be reported on a Discharge Monitoring Report (DMR).
5. The Agency may require a permittee on a case-by-case basis to undertake water quality monitoring at an individual stormwater discharge point if there is evidence of an unusual discharge or if it is necessary to verify the effectiveness of BMP's and other control measures in the permittee's SWMP.

### **Section 9.2 Recordkeeping**

1. The City will retain records of all monitoring information, copies of all reports required by this permit, copies of Discharge Monitoring Reports (DMRs), a copy of the NPDES permit, and records of all data used to complete the application (NOI) for this permit, for a period of at least three years from the date of the sample, measurement, report or application, or for the term of permit, whichever is longer.
2. The City will submit records to the Secretary only when specifically asked to do so. It must retain a copy of the SWMP required by the permit at a location accessible to the Secretary. A permittee must make its records, including the notice of intent (NOI) and the

copy of the SWMP, available to the public if requested to do so in writing.

### **Section 9.3 Annual Reporting**

The City shall submit its annual reports (based on a calendar year from January 1 to December 31) to the VTDEC Watershed Management Division, Stormwater Management program by the following April 1 of each year. FRP and PCP reports may be included with the annual report when reporting deadlines coincide. In addition to any FRP reporting requirements, the report must include:

1. The status of the City's compliance with permit conditions, an assessment of the appropriateness of the identified best management practices, progress towards achieving implementation of BMPs necessary to meet TMDL requirements and progress towards achieving the statutory goal for the six minimum measures of reducing the discharge of pollutants to the MEP, and the measurable goals for each of the minimum control measures and TMDL implementation measures;
2. Results of information collected and analyzed, if any, during the reporting period, including monitoring data used to assess the success of the program at meeting TMDL requirements and the success of the six minimum measures.
3. A summary of the stormwater activities the City plans to undertake during the next reporting cycle (including an implementation schedule);
4. A change in any identified BMPs or measurable goals for any of the minimum measures, and
5. Notice that the permittee is relying on another entity to satisfy some of its permit obligations, if applicable.

**Appendix A. Notice of Intent (NOI)**

for Stormwater Discharges from Municipal Separate Store Sewer Systems (MS4)  
General Permit 3-9014



**Notice of Intent (NOI)**  
 for Stormwater Discharges from

Municipal Separate Storm Sewer Systems (MS4) General Permit 3-9014

Submission of this Notice of Intent (NOI) constitutes notice that the entity in Section A intends to be authorized to discharge pollutants to waters of the State under Vermont's Municipal Separate Storm Sewer Systems (MS4) permit. Submission of the NOI also constitutes notice that the party identified in Section A of this form has read, understands and meets the eligibility conditions; agrees to comply with all applicable terms and conditions; and understands that continued authorization under the MS4 General Permit is contingent on maintaining eligibility for coverage. In order to be granted coverage, all information required on this form and a complete Stormwater Management Program (SWMP) Plan must be submitted.

**A. Permittee Information**

1. Name of MS4: City of St. Albans

2a. Name of Principle Executive Officer (PEO) or Chief Elected Official (CEO): Dominic Cloud

2b. Title: City Manager

3a. Mailing Address: PO Box 867, 100 No. Main St.

3b. Town: St. Albans      3c. State: VT      3d. Zip: 05478

4. Phone: 802-524-1500 \*254      5. Email: d.cloud@stalbansvt.com

6. Municipal Office Latitude: 44.813181 °N      Longitude: - 73.083613 °W

**B. Primary contact responsible for overall coordination of SWMP, if different than PEO/CEO**

1. Name: Chip Sawyer

2a. Mailing Address: PO Box 867, 100 No. Main St.

2b. Town: St. Albans      2c. State: VT      2d. Zip: 05478

3. Phone: 802-524-1500 \*259      4. Email: c.sawyer@stalbansvt.com

5. Additional Contact Name: Chip Sawyer, Director of Planning & Development

6. Additional Contact Email: [c.sawyer@stalbansvt.com](mailto:c.sawyer@stalbansvt.com)

**C. Partnering organization responsible for Minimum Control Measure implementation (if applicable)**

1. If you are participating in the CCRPC MOU to implement MCM1 &/or MCM2 check here:      MCM 1      MCM 2

*Or, if you are relying on another entity to implement a MCM, please complete the following:*

2. Organization: Northwest Regional Planning Commission

3. Contact Name: Catherine Dimitruk

4. Minimum Control Measure(s) being implemented: 1 and 2

5a. Mailing Address 75 Fairfield St.

5b. Town: St. Albans      5c. State: VT      5d. Zip: 05478

6. Phone: 802-524-5958      7. Email: cdimitruk@nrpcvt.com

**D. Incorporation of Previously Permitted Stormwater Systems**

1a. As part of this application, is the MS4 incorporating a stormwater system that was previously authorized under a State stormwater permit?      Yes       No (Nothing in addition to systems previously incorporated.)

1b. If yes, the MS4 must complete and attach the MS4 Incorporation Form.

List permit numbers here: \_\_\_\_\_  
 \_\_\_\_\_

**E. Stormwater Discharges**


1. Identify the names of all know waters that receive a discharge from the MS4 or developed lands subject to this permit:

Receiving water	# of outfalls (if known)	Impaired status	Nature of impairment	Response Plan developed (FRP, PCP, No TMDL - Part 4.2.B)
Stevens Brook	45	No <input checked="" type="radio"/> Yes	Multiple impacts associated with excess stormwater runoff. CSO.	FRP developed. CSO LTCP under development. PCP to be developed.
Rugg Brook	6	No <input checked="" type="radio"/> Yes	Multiple impacts associated with excess stormwater runoff.	FRP developed. PCP to be developed.
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		
		No <input type="radio"/> Yes		

**F. Certification**

This NOI shall be signed by a principal executive officer, ranking elected official or other duly authorized employee consistent with 40 CFR §122.22(b) and certified as follows:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Chip Sawyer  
 \_\_\_\_\_  
 Print Name  
  
 \_\_\_\_\_  
 Signature

Director of Planning & Development  
 \_\_\_\_\_  
 Title  
 1/23/19  
 \_\_\_\_\_  
 Date

Submit this form and applicable attachments to:

MS4 Permit Coordinator  
 VTDEC · Watershed Management Division Stormwater Management Program  
 One National Life Drive  
 Montpelier, Vermont 05620-3522



## **Appendix B. Franklin County Stormwater RSEP MOU**

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**FRANKLIN COUNTY  
REGIONAL STORMWATER EDUCATION, PUBLIC INVOLVEMENT AND  
PARTICIPATION PROGRAM  
MEMORANDUM OF UNDERSTANDING  
FOR THE PERIOD JANUARY 1, 2019 THROUGH DECEMBER 31, 2023**

This Memorandum of Understanding (“MOU”) establishes an agreement among the Parties (as specified in Section 1) for a group of Municipal Separate Storm Sewer Systems (“MS4s”) to contract to operate a Regional Stormwater Education, Public Involvement, and Participation Program (“Program”) that conforms with and satisfies the relevant requirements regarding Minimum Control Measure One (“Public Education and Outreach”) and Minimum Control Measure Two (“Public Involvement and Participation”) of the Phase II NPDES Permit for Program Years 2019-2023, as established in General Permit 3-9014 (2018) (“MS4 Permit”) as continued or renewed by the Vermont Department of Environmental Conservation (“VTDEC”).

1. **Parties to the MOU** – The parties to this agreement are:
  - a. **MS4s** – the undersigned municipal MS4s and other entities and any other MS4 that may execute this agreement following approval of that MS4’s inclusion as a party to this MOU by a majority of the voting members of the Steering Committee as defined in Section 2.a. below and
  - b. **Lead Agency** – the Northwest Regional Planning Commission (“NRPC”), unless a majority of the Steering Committee favors a different lead agency or the NRPC no longer wishes to act as the Lead Agency and withdraws its services pursuant to section 10 below.
  
2. **Steering Committee**
  - a. **Composition** – The voting members of the Steering Committee shall consist of one representative from each of the MS4s who are signatory to this Agreement as designated by each MS4. The voting members may, by a majority vote, invite one or more other organizations to each appoint a representative to serve as a new member, a non-voting member or as an advisory member of the Steering Committee. Such organizations may include, but not be limited to, the Lake Champlain Committee, the Friends of the Northern Lake Champlain, the St. Albans Area Watershed Association, the Solid Waste District, other MS4s, or other municipalities.
  - b. **Duties** – The voting members of the Steering Committee shall direct the Lead Agency on the development and performance of Program Services and on matters bearing on the administration of this agreement. The Steering Committee will endeavor to meet, quarterly or more often as needed.
  
3. **Lead Agency**
  - a. **Duties** – The Lead Agency will provide Administrative Services in terms of administering this MOU and agreements with contractors (including executing contracts, receiving and disbursing funds, and monitoring the provision of services) on behalf of the MS4s. The Lead Agency will also provide Non-Administrative services (including, but not limited to, public education and outreach activities, public involvement and participation activities, public relations, grant

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writing, web site editing, etc.) as directed by the Steering Committee and at a level consistent with each year's Program Budget as described in Section 6.a.

- b. **Compensation** – The MS4s agree to compensate the Lead Agency for the actual costs of performing Duties defined in Section 3.a. in accordance with the budget adopted by the Steering Committee. The Lead Agency shall submit quarterly invoices and progress reports. Progress reports shall provide a description of work tasks completed by the Lead Agency for that billing period with sufficient detail to the satisfaction of the steering committee.
4. **Selection of Contractors** – In general, the Steering Committee shall competitively bid for contract(s) for Program Services that collectively satisfy the requirements for Minimum Control Measure One (“Public Education and Outreach”) and Minimum Control Measure Two (“Public Involvement and Participation”) as established by the MS4 Permit and as defined in Section 5. All contracts shall be awarded based on qualifications, price, and the ability of the entity to provide services that meet the relevant MS4 Permit requirements. However, upon consent of the majority of the voting members of the Steering Committee present, the Steering Committee may waive the bid process for select contracts. Contracts may be up to 5 years in length and shall include, but not be limited to, language specifying the right of the Steering Committee to cancel a contract if services are not being adequately provided and language specifying that payments to contractors shall be made only for services rendered.
  5. **Program Services** – The Steering Committee, assisted by the Lead Agency and its contractor(s), will implement a unified Program that satisfies the requirements of Minimum Control Measure One (“Public Education and Outreach”) and Minimum Control Measure Two (“Public Involvement and Participation”) of the Phase II NPDES Permit, as established by the MS4 Permit, in accordance with Section 5.a. and 5.b. respectively.
    - a. **MCM1 Program Content** – The Program Content for each Program Year will be as approved by a majority of the Steering Committee. Annual Program elements will include, at a minimum:
      - i. development and operation of the Program’s website or its equivalent,
      - ii. perform marketing and advertising of the Program in various media, and
      - iii. coordination with educators and organizations that can provide educational programming on curriculum resources and programming.
    - b. **MCM2 Program Content** – The Program Content for each Program Year will be as approved by a majority of the Steering Committee. Annual Program elements will include, at a minimum:
      - i. hosting and/or organization of workshops, projects and other events to engage the public, and
      - ii. recruiting volunteers to support projects, promote events, and/or engage the public.
    - c. **Reporting** - End of MS4 permit year annual reporting on Minimum Control Measure 1 and 2 compliance efforts to the MS4s for inclusion in MS4 annual reports to VTDEC.
  6. **Program Budget, Costs, and Payments**
    - a. **Program Budget**

- 
- 1) The annual Program Budget shall consist of an annual sum of \$5,000 for a given Program Year made by participating MS4s plus any other funds available to the Program by majority vote of the Steering Committee as specified in Section 6.c. below.
  - 2) Prior to March 1<sup>st</sup> of every year, the Steering Committee shall adopt a Program Budget governing expenditures for the subsequent program year. Budget categories shall include, but not be limited to: Lead Agency Administrative Duties, Lead Agency Non-Administrative Duties, Media Advertising Purchases, Media Marketing Consulting Services, and Other Contractual Services and Expenses. Special projects beyond the tasks identified in 5.a. and 5.b. may require special assessments. Special assessments will require unanimous vote of the Steering Committee.
- b. **Participating MS4 Maximum Annual Costs and Payments** – Except as otherwise provided for in this section, each MS4 that is a party to this MOU shall make bi-annual payments of \$2,500 to the Lead Agency in January and July of each year for a total of \$5,000 yearly to pay for Program Services (as defined in Section 5) and Lead Agency duties (as defined in Section 3.a.). In the event that costs are less than anticipated or that grants or other funding sources become available, a majority of the voting members of the Steering Committee may decide to reduce each MS4’s payment by an equal amount or to credit the following Program Year assessment to each MS4.
- d. **Other Funds** – Any funds made available to the Program other than Participating MS4 Costs and Payments (pursuant to Section 6.b.) shall be dedicated to reducing the annual costs of each MS4 participating in the Program, except as a majority of the voting members of the Steering Committee may decide.
- e. **Excess Funds** – Any funds remaining at the end of a Program Year, less any earmarked set aside funds, shall be carried over to the next Program Year, unless a majority of the voting members of the Steering Committee decides otherwise. Following the payment for all Program Services and Lead Agency services at the end of Program Year 2023, any funds remaining shall be carried forward for successive years where program services continue under successive agreements. Any funds refunded to the MS4s participating in this MOU shall be refunded based upon a prorated portion depending upon the number of months of participation by that MS4, except that any additional payments made by a member beyond its \$5,000 annual payments shall be first refunded in full.
7. **Contracts Required** – All contracts with Contractors to provide Program Services shall be conditioned upon approval by a majority of the voting members of the Steering Committee.
8. **Withdrawal Prohibited** – No MS4 that is a party to this MOU may withdraw from this MOU, except for early termination as defined in Section 9 of this MOU. Early termination of a signatory may be considered by the Steering Committee with 12 months’ notice of withdrawal for cause and with a majority approval of the voting members of the Steering Committee.
9. **Early Termination** – This MOU shall become null and void with no further obligation of the parties if:
- a. VTDEC determines that the Program outlined in this MOU does not meet the relevant requirements for Minimum Control Measure One (“Public Education and Outreach”) and/or Minimum Control Measure Two (“Public Involvement and Participation”), and the parties to this MOU are unable to craft a Program to satisfy VTDEC.
  - b. Should this measure be enacted any unspent funds shall be returned to the participating MS4s.

- 
10. **Termination of Lead Agency** - The NRPC or the Steering Committee by a majority vote of its full membership may elect to terminate the Agreement for Lead Agency Services by providing 90 days written notice to the other party.
- a. Should the Lead Agency be terminated, then the authority of the Program will shift to the Steering Committee.
  - b. Should the Lead Agency be terminated, any unspent or unobligated funds shall be returned to the Steering Committee using the prorated process outlined in Section 6.e.
11. **Automatic Termination** – This MOU will terminate at the end of Program Year 2023.
12. **Amendment** – Unless a specific section of this MOU provides otherwise, this MOU may be amended only upon the unanimous consent of all of the Parties.
13. **Counterparts** – This MOU may be executed in multiple counterparts, each of which is deemed an original and all of which constitute one and the same document. Each such counterpart may be a facsimile or PDF copy and such facsimile or PDF copy shall be deemed an original.

**Signature of Lead Agency**



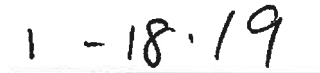
Catherine Dimitruk, Executive Director  
Northwest Regional Planning Commission

  
Date

**Signatures of Members**



Carrie Johnson, Town Manager  
Town of St. Albans

  
Date

/s/ Dominic Cloud (see attached)

\_\_\_\_\_  
Dominic Cloud, City Manager  
City of St. Albans

1/18/19  
Date

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10. **Termination of Lead Agency** - The NRPC or the Steering Committee by a majority vote of its full membership may elect to terminate the Agreement for Lead Agency Services by providing 90 days written notice to the other party.

- a. Should the Lead Agency be terminated, then the authority of the Program will shift to the Steering Committee.
- b. Should the Lead Agency be terminated, any unspent or unobligated funds shall be returned to the Steering Committee using the prorated process outlined in Section 6.e.

11. **Automatic Termination** – This MOU will terminate at the end of Program Year 2023.

12. **Amendment** – Unless a specific section of this MOU provides otherwise, this MOU may be amended only upon the unanimous consent of all of the Parties.

13. **Counterparts** – This MOU may be executed in multiple counterparts, each of which is deemed an original and all of which constitute one and the same document. Each such counterpart may be a facsimile or PDF copy and such facsimile or PDF copy shall be deemed an original.

**Signature of Lead Agency**

\_\_\_\_\_  
Catherine Dimitruk, Executive Director  
Northwest Regional Planning Commission

\_\_\_\_\_  
Date

**Signatures of Members**

\_\_\_\_\_  
Carrie Johnson, Town Manager  
Town of St. Albans

\_\_\_\_\_  
Date

\_\_\_\_\_  
Dominic Cloud, City Manager  
City of St. Albans

\_\_\_\_\_  
Date

11/8/19

**Appendix C. City Stream Corridor Protection Rules**

## **SOUP KITCHEN**

A public or charitable institution that, as an integral part of the normal activities of the institution, maintains an established feeding operation to provide food to needy or homeless persons on a regular basis.

## **STORAGE, WAREHOUSE AND DISTRIBUTION FACILITIES**

Facilities used primarily for storing, warehousing and/or distribution of goods, wares and merchandise, and which do not involve retail sale of such goods on the premises.

## **STREAM ALTERATION AND BANK MAINTENANCE**

Pertains to perennial and intermittent streams and includes in-stream alterations, stream bank alterations, construction of bridges, and addition, replacement, or reconstruction of materials for stream bank armor or channelization. See Section 524.

## **STREAM CORRIDOR AREA**

A special area within the City along perennial streams and with specific development restrictions and criteria. See Section 523.

## **STREET**

Any road, highway, thoroughfare, avenue, land or right-of-way, whether public or private, used for vehicular circulation and/or to provide access to individual properties.

## **STREET, COLLECTOR**

A street that collects traffic from local streets and connects with minor and major arterials.

## **STREET, CUL-DE-SAC**

A street with a single means of ingress and egress and having a turnaround at the end.  
(See Figure 2.)

## **STREET LINE**

Right-of-way line of a street as dedicated by a deed of record. Where the width of the street is not established, the street line shall be considered to be twenty-five (25) feet from the center line of the street pavement.

## **STREET, LOCAL**

A street designed to provide vehicular access to abutting property and to discourage through traffic.

## **STREET, MAJOR ARTERIAL**

A street with access control channelized intersections, restricted parking and that collects and distributes traffic to and from minor arterials. (US Route 7, and State Highway 36)

## **STREET, MINOR ARTERIAL**

A street with signals at important intersections and stop signs on the side streets and that collects and distributes traffic to and from collector streets.



Review Board shall determine which street frontage shall be provided with a prominent front entrance. This determination shall take into account the historical interaction of the property and neighboring lots, especially other nearby corner lots, with the adjacent streets. The selected building entrance does not necessarily need to face the same street that contains the property's curb cut. The building may also provide an entrance to more than one street.

- C. Accessory structures and those that accommodate vehicles shall not detract from the prominence of the entrance to the building.
- D. The inclusion of a paved, brick, stone or gravel walkway connecting a front entrance to a driveway, City sidewalk and/or street is encouraged.

### **Section 523 Development and Other Activities in Stream Corridor Areas**

- A. Delineation of Stream Corridor Area – The Stream Corridor Area shall run along a perennial stream and shall consist of the area within 30 horizontal feet of the stream center-line.
- B. Delineation of Riparian Buffer Area – The Riparian Buffer Area is within a Stream Corridor Area and shall consist of the area within 15 horizontal feet of the stream center-line.
- C. Clearing of Trees and Vegetation – A permit is required to remove any healthy native trees of 2 inches in diameter as measured 4 feet from the ground in the Riparian Buffer Area. In considering such a permit, the Zoning Administrator shall take into account the ability of the property owner to access the stream and care for their property, other vegetation that will be left in place, and any vegetation that could be added to replace the tree(s).
- D. Limitations on Expansion of Impervious Areas and Structures - Unless authorized by the Development Review Board as a Waiver pursuant to Section 604 of the City of St. Albans Land Development Regulations, and save for the allowance of subsections E and H below, no new or expanded impervious surface, building footprint area, including overhangs, or service areas, such as dumpsters, shall be constructed within the Stream Corridor Area.
- E. Provisions for Single-Family and Two-Family Residential Uses - For single-family and two-family residential uses, in conjunction with issuance of a Zoning Permit, one (1) accessory structure with a floor area located at grade totaling less than twenty (20) square feet, may be permitted within the Stream Corridor Area but not within the Riparian Buffer Area.
- F. Stabilization and Planting Required - Regardless of any legal nonconformity or existing practice, any existing used and permitted or legally nonconforming impervious areas

within the Stream Corridor Area that consist of bare dirt and any impervious areas in states of disrepair that present erosion risks shall be either repaired with an acceptable hard surface, as permitted by the Zoning Administrator, or seeded and stabilized with a mix of vegetation suitable to the climate of Northwest Vermont by July 30, 2019.

- G. Drainage Outfalls - Existing drainage outfalls within the Stream Corridor Area and Riparian Buffer Area may remain, although this allowance does not preclude any rules requiring disconnection of these outfalls from potential sources of pollution. New outfalls for roof drains, perimeter drains, and stormwater are allowed, as permitted by the Zoning Administrator, and provided that they are free of any source of illicit discharge. Outfalls directly within the bank of a stream shall also require a Stream Alteration and Bank Maintenance permit (see Section 524).
- H. Bridges and Boardwalks – Bridges and pedestrian boardwalks that receive Stream Alteration and Bank Maintenance permits (see Section 524) shall be allowed within the Stream Corridor Area and Riparian Buffer Area.
- I. Landscaping in the Riparian Buffer Area - Regardless of any legal nonconformity or existing practice, the following shall apply to any vegetated area, otherwise non-impervious area, or impervious areas in states of disrepair that present erosion risks within the Riparian Buffer Area:
  - 1. As of July 30, 2019, the area shall be seeded and stabilized with a naturalized mix of grasses suitable to the climate of Northwest Vermont shall be utilized, rather than sod or standard turfgrass. Additional trees, shrubs, and other plantings are encouraged.
  - 2. Lawn areas within the Riparian Buffer Area shall be mowed no shorter than 3 inches.
  - 3. Additional conditions may be placed by the Design Advisory Board or Development Review Board on landscaping and mowing in areas subject to Design Review or for applications that require site plan review.
  - 4. The placing or storing of cut or cleared trees and other vegetation from other areas is prohibited within the Riparian Buffer Area.
- J. Re-establishment of Riparian Buffer Areas - In reviewing any development, the Zoning Administrator, Design Advisory Board or Development Review Board may require that existing impervious areas within the Riparian Buffer Area be discontinued and be subject to all other requirements of this Section, provided that other areas of the development can reasonably assume the functions of the discontinued impervious area.
- K. Demarcation of Buffer - In order to facilitate and monitor maintenance of the Riparian Buffer Area, the Zoning Administrator, Design Advisory Board or Development Review Board may require that any application for land disturbance or land development on a site lying wholly or partially within the Stream Corridor Area, other than for modification of an existing single-family or two-family residential use, include provisions to demarcate, with sturdy plantings, fencing, or a combination thereof, a boundary line along the Riparian Buffer Area.

- L. Prevention of Stream Obstruction - Regardless of any legal nonconformity or existing practice, the Zoning Administrator may find in violation of these Regulations any storage area, snow-clearing practice or other activity that threatens to obstruct a perennial stream, wholly or partially, with snow, ice or other material.
- M. Exemptions - City infrastructure and City or State-permitted stormwater management facilities are exempt from the rules of Section 523.

### **Section 524 Stream Alteration and Bank Maintenance**

- A. Stream alteration and bank maintenance shall be subject to the approval of the Development Review Board provided that the alteration or maintenance:
  - 1. Is needed to accomplish a clear public purpose or objective or is reasonably necessary for the protection or viability of private property;
  - 2. Will not reduce the ability of the watercourse to carry or store flood waters adequately;
  - 3. Will not have an unmitigated adverse impact on downstream or upstream water quality;
  - 4. Will not require adjacent or downstream property owners to undertake activities to protect their properties from new stream behaviors and erosion;
  - 5. Will not affect adversely the use and enjoyment of adjacent properties; and
  - 6. Will not affect adversely the habitat value of the watercourse or immediately adjacent areas or wetlands.
- B. In making findings relative to these criteria, the DRB shall be authorized to invoke technical review by a qualified professional in hydrology, geomorphology, or other related science whose services shall be paid for by the applicant. The DRB may also rely on the issuance of a Stream Alteration Permit issued by the Vermont Department of Environmental Conservation as evidence that the above criteria have been met.
- C. In order to ensure compliance with the criteria above, the DRB may also place additional conditions upon the applicant for approval of a stream alteration/bank maintenance application, including riparian plantings and improvements to other properties and rights-of-way.
- D. Stream alteration and bank maintenance applications to the DRB shall be subject to the same hearing notice requirements as conditional use applications with additional abutter's notices sent to the adjacent upstream and cross-stream properties, as well as all properties 200 feet downstream. These additional abutter's notice requirements shall also apply to site plan applications that propose stream alteration and bank maintenance.
- E. Emergency stream alterations and bank maintenance will not be considered in violation, as long as an application to the Development Review Board is submitted within 15 days after the work. When considering the application, the DRB may require additional work

**Appendix D. City Stormwater Management and Operations Ordinance**

# **St. Albans City Ordinances**

## **Title 25 Stormwater Management and Operations**

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## **Chapter 1. General**

### **Sec. 1.1 Findings.**

The St. Albans City Council finds and declares that:

- A. Land development activities and associated increases in the amount of impervious cover within a watershed often alter the hydrologic response and water quality aspects of local watersheds and increase stormwater runoff rates and volumes, flooding, stream channel erosion, sediment transport and deposition and the concentration of waterborne pollutants and pathogens.
- B. Clearing and grading during construction tend to increase soil erosion and reduce the native vegetation important for terrestrial habitat, for stream regulation through shading and for maintenance of natural food cycles important to food chains and aquatic habitat. Effective erosion controls are important techniques in preventing water pollution, soil loss, wildlife habitat loss and human property loss. Clearing and grading is particularly disruptive within stream corridors, contributing to streambank erosion, loss of vegetative cover, overland transport of pollutants into the stream, and loss of riparian habitat.
- C. Improper design and construction of stormwater management practices can increase downstream flooding and increase the velocity of stormwater runoff causing stream bank erosion and buildup of sedimentation.
- D. Impervious surfaces allow less water to percolate into the soil, thereby decreasing groundwater recharge and stream base flow.
- E. Stormwater runoff, soil erosion and non-point source pollution can be controlled, minimized and in some cases eliminated through the regulation of stormwater runoff from land development activities. Illicit discharges must be eliminated.
- F. The regulation of stormwater discharges from new development and redevelopment of existing sites, the elimination of illicit discharges, and the control of erosion, sediment and stormwater discharge is in the public interest and will minimize threats to public health and safety posed by unmanaged runoff.
- G. The creation of a stormwater utility, enterprise fund, and a system of fees is necessary to ensure the public health and safety in the management of stormwater pollution and operation of the stormwater system in the City of St. Albans.

### **Sec. 1.2 Purpose.**

This Ordinance is adopted pursuant to the City of St. Albans Charter §§ 16-22, 10 V.S.A. Chapter 47, 24 V.S.A. Chapters 97 and 101, and 24 V.S.A. §2291(14). This Ordinance defines the rules and regulations for the control of stormwater and operation of the stormwater utility, also referred to as the stormwater system and/or stormwater program, of the City of St. Albans, allow the City to exercise general regulation over the planning, location, construction, and operation

and maintenance of stormwater facilities in the City, whether or not owned and operated by the City, to adopt any regulations deemed necessary to accomplish the purposes of this Ordinance, including the adoption of an enterprise fund and system of fees for services and permits, and to define what constitutes a public nuisance relating to illicit discharges, soil erosion, water pollution, and stormwater management related to land disturbance activities. This Ordinance also provides procedures for the abatement or removal of such public nuisances as the public health, safety or welfare may require. This Ordinance also establishes methods for controlling the discharge of sediment, stormwater and non-stormwater discharges into the MS4, and/or surface or ground water in order to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) permit process, and General Permit No. 3-9014 as issued by the State of Vermont.

**Sec. 1.3 Applicability.**

This Ordinance shall apply to all property within the City of St. Albans and shall apply specifically as indicated in Chapters within this Ordinance.

**Sec. 1.4 Severability.**

The provisions of this Ordinance are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Ordinance or the application thereof to any person, establishment, or circumstances shall be held invalid, it shall not affect the validity or application of other provisions of this Ordinance.

**Sec. 1.5 Relation to other Ordinances of the City of St. Albans.**

If the provisions of these regulations conflict with the provisions of any other valid and enforceable City of St. Albans Ordinance(s), the stricter shall prevail.

**Sec. 1.6 Ultimate Responsibility.**

The standards set forth herein and promulgated pursuant to this Ordinance are minimum standards; therefore, this Ordinance does not intend nor imply that compliance by any Person will ensure that there will be no contamination, pollution, nor unauthorized discharge or discharge of pollutants.

**Sec. 1.7 Documents Incorporated by Reference as may be amended from time to time.**

- A. St. Albans City Revised Ordinances.
- B. St. Albans City Land Development Regulations.
- C. Vermont Stormwater Management Manual.
- D. Vermont Low Risk Site Handbook for Erosion Prevention and Sediment Control.
- E. City of St. Albans Construction Stormwater Guidance Document.
- F. City of St. Albans Stormwater Utility Credit Manual.
- G. City of St. Albans Stormwater Regulation Fees.



## **Sec. 1.8 Definitions.**

For the purposes of this Ordinance, the following shall mean:

“Administrative Officer” shall mean the person or designated by the City Manager to administer, implement, and enforce this Ordinance.

“Agent” shall mean a person authorized to act in the place of another person.

“Applicant” shall mean a property owner or duly designated representative who files an application for a land disturbance activity.

“Best Management Practices” or “BMPs” shall mean a schedule of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce water pollution.

“Certified Professional in Erosion and Sediment Control” or “CPESC” shall mean an individual holding a certification in good standing as a Certified Professional in Erosion and Sediment Control from EnviroCert International, Inc.

“Clearing” shall mean any activity that removes the vegetative surface cover.

“Common Plan of Development” shall mean a development that is completed in phases or stages when such phases or stages share a common state or City permit related to the regulation of land use, the discharge of wastewater or a discharge to surface waters or groundwater, or a development designed with shared common infrastructure. Common plans of development include, but are not limited to, subdivisions, industrial and commercial parks, and university and other campuses. Construction activities or portions of construction activities that have achieved final stabilization as of the effective date of this Ordinance shall not be considered for purposes of determining what constitutes disturbance under a common plan of development that requires coverage under this Ordinance. Following completion of the common plan components on a parcel of land, any additional development of the parcel shall be considered as separate from the original common plan for the purposes of evaluating whether one or more acres of land will be disturbed.

“Construction” and “Construction Activity” shall mean Land Disturbing Activity associated with development, including land preparation such as clearing, grading, filling, and breaking of topsoil; installation of streets and walkways; excavation for basements, footings, piers, or foundations; erection of temporary forms; and installation of accessory buildings such as garages. Also includes activities subject to NPDES Construction Permits.

“Construction and Demolition Debris” shall mean those materials resulting from the alteration, construction, destruction, rehabilitation, or repair of any manmade physical structure including houses, buildings, industrial or commercial facilities, and roadways.

“Construction Permit” shall mean a permit approved by the City Zoning Administrator and/or

Administrative Officer which authorizes any land disturbance activities in the City of St. Albans.

“Construction Season” shall mean the period of time between May 1 and October 14 when land disturbance activities are permitted under this Ordinance.

“Credits” shall mean an ongoing reduction in a property’s or parcel’s normally calculated stormwater fee for certain qualifying activities that reduce the impact of increased stormwater runoff resulting from development, or provide an ongoing public benefit related to stormwater management.

“Department of Public Works” shall mean the Director of Public Works and employees or designees of the Director of Public Works.

“Developed Property” shall mean any property that is altered from a natural state by construction, or installation of improvements such as buildings, structures, or other impervious surfaces.

“Development” shall mean the Construction of improvements or other alterations on a tract of land for any purpose.

“Erosion and Sediment Control Plan” or “ESCP” shall mean a set of plans prepared by or under the direction of a licensed professional engineer or a certified erosion control technician indicating the specific measures and sequencing to be used to control sediment and erosion on a development site during and after construction.

“Erosion Control” shall mean a measure that prevents or controls wind or water erosion in agriculture, land development, coastal areas, riverbanks or construction.

“ERU” is an acronym for “Equivalent Residential Unit” and is described further in Sec. 10.1.

“Grading” shall mean any excavation or fill of material, including the resulting conditions thereof.

“Hazardous Materials” shall mean any material, including any substance, waste, or combination thereof, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

“Illegal Discharge” shall mean any direct or indirect non-stormwater discharge to the MS4, except as exempted in Section 3.4 of this Ordinance.

“Illicit Connections” shall mean any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the MS4, including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water to enter the MS4, and any connections to the MS4, from indoor drains and sinks,

regardless of whether said drain or connection had been previously allowed, permitted, or approved by the City.

“Impervious Surface” shall mean those manmade surfaces that cannot effectively infiltrate rainfall. Examples include but shall not be limited to paved and unpaved roads; rooftops; parking lots; decks; stationary vehicles and trailers; walkways and driveways; compacted gravel or soil surfaces, including those created through agricultural activities; swimming pools; the horizontal coverage of free-standing solar panels; storage areas; awnings and other fabric or plastic coverings; and other hardscapes, whether paved, brick, stone or concrete. Surfaces that are specifically designed and installed to directly infiltrate stormwater into the ground and that are functioning properly shall not be defined as impervious. Impervious Surface shall also mean the so-classified pixels and polygons contained within the geographic information systems data layers used from time to time by the City and its agents to establish ERU values for multiple parcels.

“Industrial Activity” shall mean activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b) (14).

“Infiltration Basin” shall mean any structure or device designed to infiltrate retained water to the subsurface.

“Land Disturbance” and “Land Disturbance Activities” shall mean any activity that disturbs or breaks the topsoil or results in the movement of earth on land.

“Limits of Disturbance” shall mean the boundary within which all construction, materials and equipment storage, grading, landscaping and related activities shall occur.

“Maintenance Agreement” shall mean a legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance of stormwater management practices.

“Municipal Separate Storm Sewer System” and “MS4” shall mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains): (i) owned or operated by the City of St. Albans or another designated MS4 entity that discharges to surface waters or ground water; (ii) designed or used for collecting or conveying stormwater; (iii) which is not a combined sewer; and (iv) which is not part of a Publicly Owned Treatment Works (POTW) as defined in 40 CFR, Section 122.2

“National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit” shall mean a permit issued by EPA (or by the State of Vermont under authority delegated pursuant to 33 USC § 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

“Non-point Source Pollution” shall mean pollution from any source other than from any discernible, confined, and discrete conveyances, and shall include, but not be limited to, pollutants from mining, construction, subsurface disposal and urban runoff sources.

“Non-Stormwater Discharge” shall mean any discharge to the MS4 that is not composed entirely of stormwater.

“Parcel” is any lot, subdivided piece of land, unit of land, any subset of land, land owned in common, or a condominium unit or condominium association in the City of St. Albans that could legally be sold as a separate entity as of April 1 of the year the fee is based on, and has a separate parcel identification number, map identification number or is identified as a separate parcel on the City of St. Albans Parcel Maps. Included in this definition are all roadways owned by the City, the State, and the Federal Government.

“Permitted Premises” shall mean any building, lot, parcel of land, or portion of land whether improved or unimproved, including adjacent sidewalks and parking strips, that require a NPDES permit to discharge stormwater, or a state stormwater discharge permit, or a construction erosion control permit, or stormwater best management practices constructed and submitted for receiving stormwater credits.

“Person” shall mean any individual, association, organization, partnership, firm, corporation or other entity recognized by law and acting as either the owner, the owner's agent, or the operator of a premise.

“Private Stormwater System” shall mean all elements of a stormwater system located in the City of St. Albans that are controlled and operated by individuals, corporations, and other organizations and not by the City of St. Albans, County, State, or Federal Government Agency, or that carry water that drains from any private property or parcel.

“Property Owner” shall mean any person, firm, partnership, association, joint venture, corporation or other entity or combination of entities who alone, jointly, or severally with others hold(s) legal or equitable title to any real-estate. The term “Property Owner” shall also include heirs, successors, and assigns.

“Pollutant” shall mean anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coli form and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

“Premises” shall mean any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

“Public Stormwater Treatment Facility” shall mean a form of stormwater treatment that collects stormwater from more than one property and/or from City streets for the purposes of meeting the City's watershed-wide MS4 water quality requirements and that has been so-designated by the

Administrative Officer.

“Sediment” shall mean soil, sand, and minerals washed from land into surface waters or onto other lands.

“Sediment Control” shall mean measures that prevent eroded sediment from leaving the Site.

“SF” or “Sq Ft” shall mean square feet, as a measurement.

“Single Family Property” or “Single Family Dwelling” shall mean any single parcel of developed land that contains a single dwelling unit as the only principal use. This definition includes single family properties where a legal home business/occupation exists and/or where an accessory dwelling unit exists, as defined by the St. Albans City Land Development Regulations.

“Site” shall mean a parcel of land or a contiguous combination thereof, where grading work is performed as a single unified operation.

“Site Development” shall mean construction or alteration of the ground, improvements and structure installation.

“Soil Erosion” shall mean when land or soil is diminished or worn due to wind or water.

“Stabilization” shall mean the use of accepted practices that prevent exposed soil from eroding.

“Start of Construction” shall mean the first land-disturbing activity associated with a development, including land preparation such as clearing, grading, and filling; installation of streets and walkways; excavation for basements, footings, piers, or foundations; erection of temporary forms; and installation of accessory buildings such as garages.

“Stormwater” shall mean precipitation and snowmelt that does not infiltrate into the soil, including material dissolved or suspended in it, but does not include discharges from undisturbed natural terrain.

“Stormwater Fee” shall mean the periodic fee imposed pursuant to this Ordinance for the purpose of funding costs related to stormwater programs, services, systems, and facilities.

“Stormwater Impaired Watershed” shall mean the water catchment area that contributes to a section of surface water failing to meet Vermont Water Quality Standards and listed as “impaired” by the Vermont Department of Environment Conservation.

“Stormwater Management” shall mean the use of structural or non-structural practices that are designed to reduce stormwater runoff pollutant loads, discharge volumes, peak flow discharge and detrimental changes in stream temperature that affect water quality and habitat.

“Stormwater Management Plan” shall mean a comprehensive plan consistent with the requirements of the Vermont Stormwater Management Manual as most recently adopted by the

Vermont Department of Environmental Conservation, and designed to manage the volume, rate and pollutant load of stormwater runoff after a site has undergone final stabilization following completion of the construction activity.

“Stormwater Runoff” shall mean Precipitation, snowmelt, and the material dissolved or suspended in precipitation and snowmelt that flows on the surface of the ground and discharges into surface waters or into groundwater via infiltration.

“Stormwater Treatment Practices” shall mean measures, either structural or nonstructural, that are determined to be the most effective, practical means of preventing or reducing point source or non-point source pollution inputs to stormwater runoff and water bodies.

“Structure” shall mean a house, building or any other assembly of materials used for human occupancy, including but not limited to residence, place of employment, meeting places and places used for recreation.

“Surface Waters” shall mean any receiving waters existing on the surface of the ground, including but not limited to; brooks, streams, rivers, wetlands, ponds, or lakes.

“Two-Family Property” or “Two-Family Dwelling” shall mean any single parcel of developed land that contains a total of two dwelling units as the only principal use. This definition includes two-family properties where a legal home business/occupation exists.

“Undeveloped Property” shall mean any property that exists in a natural state.

“Un-permitted Premises” shall mean any building, lot, parcel of land, or portion of land whether improved or unimproved, including adjacent sidewalks and parking strips, that does not require a NPDES permit to discharge stormwater, or a state stormwater discharge permit, or a construction erosion control permit, or stormwater best management practices constructed and submitted for receiving stormwater credits.

“Wastewater” shall mean any water or other liquid, other than uncontaminated stormwater, discharged from premises.

“Watercourse” shall mean any body of water, including, but not limited to lakes, ponds, rivers, streams, and bodies of water delineated by the City of St. Albans.

“Waterway” shall mean a channel that directs surface runoff to a watercourse or to the public storm drain.

“Zoning Administrator” shall mean the person or persons appointed to administer and enforce the St. Albans City Land Development Regulations.

## **Chapter 2. Administration.**

### **Sec. 2.1 Responsibility for Administration.**

The City Manager shall appoint an Administrative Officer to implement and enforce the provisions of this Ordinance. The City Manager and Administrative Officer may also delegate other powers and duties to implement and enforce this Ordinance to persons or entities acting in the beneficial interest of or in the employ of the City of St. Albans. Except where otherwise noted in this Ordinance, the Administrative Officer shall administer, implement, and enforce the provisions of this Ordinance.

### **Sec. 2.2 Technical Review.**

In the event the Administrative Officer finds, in the discharge of their duties under this Ordinance, that they require the assistance of qualified professionals in stormwater management, erosion control, engineering or related fields to determine compliance with the provisions of this Ordinance, the Administrative Officer may require an independent review of one or more aspects of a permit, plan or application, with the cost of the review to be paid by the applicant or permittee.

## **Chapter 3. Illicit Discharge and Stormwater Connection**

### **Sec. 3.1 Purpose and Intent.**

Under the authority set forth in the City of St. Albans Charter §§ 16-22, 10 V.S.A. Chapter 47, 24 V.S.A. Chapters 97 and 101, and 24 V.S.A § 2291(14), and to provide for the public health, safety, welfare and convenience, it is hereby declared that it shall be a public nuisance for anyone to contribute pollutants, illegally connect, or illegally discharge into the Municipal Separate Storm Sewer System, (MS4), or to otherwise discharge non-stormwater discharges in violation of the requirements of this Ordinance. It is the further purpose of this Chapter to provide procedures for the regulation of non-stormwater discharges to the MS4, and where required by public health, safety, or welfare, to provide for the abatement or removal of any public nuisance related thereto. This Chapter establishes methods for controlling the introduction of pollutants into the MS4 in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process, and General Permit No. 3-9014 as issued by the State of Vermont.

The objectives of this Chapter are:

- A. To regulate the introduction of pollutants to the MS4 from non-stormwater discharges by any user;
- B. To prohibit illicit connections and illegal discharges to the MS4;
- C. To establish legal authority to carry out all inspection, monitoring, and enforcement procedures necessary to ensure compliance with this Chapter.

### **Sec. 3.2 Applicability.**

This Chapter applies to all properties and parcels within the City of St. Albans.

### **Sec. 3.3 Prohibitions.**

A. No person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, left, or maintained, in or upon any premise, public or private property, driveway, parking area, street, alley, sidewalk, component of the MS4, or any surface water of the City of St. Albans, any object or material, including but not limited to: Refuse, rubbish, garbage, animal waste, litter, yard waste, or other discarded or abandoned objects, articles, and accumulations, so that the same may cause or contribute to pollution, or interfere with the operation, maintenance and access to the MS4. Wastes deposited in streets in proper waste receptacles for the purposes of collection are exempted from this prohibition.

B. The construction, use, maintenance or continued existence of illicit connections to the MS4 are prohibited. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

C. No person shall discharge or cause to be discharged into the MS4, any materials, including but not limited to pollutants or waters containing any pollutants, other than stormwater, or any materials that may impede the natural flow of stormwater or the functionality of the MS4.

### **Sec. 3.4 Exemptions.**

The commencement or continuance of any illegal discharge to the MS4 is prohibited except as described as follows:

A. Water line flushing or other potable water sources, landscape irrigation or lawn watering, approved stream flow diversions, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, non-commercial washing of vehicles, natural riparian habitat or wetland flows, swimming pool draining (if dechlorinated - typically less than one PPM chlorine), firefighting activities, and any other water source not containing Pollutants.

B. Discharges specified in writing by the Director of Public Works or Administrative Officer as being necessary to protect public health and safety.

C. Dye testing is an allowable discharge, but requires notification of, and acknowledgement of receipt of notification by, the Administrative Officer prior to the time of the test.

D. The prohibition in this Section shall not apply to any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and



administered under the authority of the United States Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the MS4 by the Administrative Officer.

### **Sec. 3.5 Industrial or Construction Activity Discharges.**

Any person subject to an industrial or construction activity NPDES stormwater discharge regulation, and/or permit shall comply with all provisions of such regulation and/or permit. Proof of compliance with said regulation and/or permit may be required in a form acceptable to the Administrative Officer prior to allowing such discharges to the MS4.

## **Chapter 4. Monitoring of Discharges.**

### **Sec. 4.1 Applicability.**

This Chapter applies to all premises that have stormwater discharges associated with industrial activity as defined in this Ordinance, including construction activity.

### **Sec. 4.2 Access to Premises.**

A. The Administrative Officer and his/her representatives shall be permitted to enter and inspect any premise subject to regulation under this Ordinance as often as may be necessary to determine compliance with this Ordinance. If a person has security measures in force that require proper identification and clearance before entry into its premise, the person shall make the necessary arrangements to allow access to the Administrative Officer and his/her representatives.

B. A person shall allow the Administrative Officer and his/her representatives ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by state and federal law.

C. The Administrative Officer and his/her representatives shall have the right to set up on any permitted premises such devices as are necessary in the opinion of the Administrative Officer to conduct monitoring and/or sampling of the premises stormwater discharge.

D. The Administrative Officer shall have the authority to require a person to install monitoring equipment as necessary. The sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the owner or operator of the premise at their own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy. The owner or operator of the premise shall demonstrate calibration techniques and satisfactory operation of the devices to the Administrative Officer and his/her representatives upon request.

E. Any temporary or permanent obstruction to safe and easy access to the premises to be inspected and/or sampled shall be promptly removed by the owner or operator of the premise at

the written or oral request of the Administrative Officer and shall not be replaced. The costs of clearing such access shall be borne by the owner or operator of the premise.

F. Unreasonable delays in allowing the Administrative Officer and his/her representatives access to permitted premises are a violation of this Chapter. A person who is the operator of a premise with a NPDES permit to discharge stormwater associated with industrial activity commits an offense if the person denies the Administrative Officer and his/her representatives reasonable access to the permitted premises for the purpose of conducting any activity authorized or required by this Chapter.

G. If the Administrative Officer and his/her representatives have been refused access to any part of the premises from which stormwater is discharged, and he/she is able to demonstrate probable cause to believe that there may be a violation of this Chapter, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this Chapter or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the Administrative Officer may seek issuance of a search warrant from any court of competent jurisdiction.

#### **Sec. 4.3 Requirement to Prevent, Control, and Reduce Stormwater Pollutants by the use of Best Management Practices.**

A. The owner or operator of a commercial or industrial establishment shall provide, at their own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the MS4 through the use of structural and non-structural Best Management Practices (BMPs).

B. Any person responsible for a property or premise, which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the MS4. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this Section.

#### **Sec. 4.4 Notification of Spills.**

A. Notwithstanding other requirements of law, as soon as any person responsible for a premises or operation, or responsible for emergency response for a premises or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into the MS4, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Administrative Officer either in person, by phone, or via email no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Administrative Officer within three business days of the phone notice.

B. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge, steps taken to remediate said illicit discharge, and the actions taken to prevent its recurrence. Such records shall be retained on site by the owner or operator for at least three years.

## **Chapter 5. Erosion and Sediment Control**

### **Sec. 5.1 Purpose and Intent.**

A. The purpose of this Chapter is to regulate and prevent the discharge of sediment to the MS4 and surface waters and to provide for the abatement of any public nuisance related thereto. This Ordinance establishes these regulations to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) permit process and General Permit No. 3-9014 (2012) as issued by the State of Vermont.

B. Under the authority of Section 18 of the City of St. Albans Charter, 10 V.S.A. Chapter 47, 24 V.S.A. Chapters 97 and 101, and 24 V.S.A. § 2291(14), and to provide for the public health, safety, welfare and convenience, it is hereby declared a public nuisance for any person to discharge sediment into the MS4 or surface waters in violation of this Ordinance or an approved Erosion and Sediment Control Plan.

### **Sec. 5.2 General Prohibition.**

No person shall cause, allow, or permit any sediment created by soil erosion resulting from Land Disturbance Activity to enter the MS4 or the surface waters of the City.

### **Sec. 5.3 Erosion Prevention and Sediment Control Plans.**

A. Land Disturbance Activity disturbing less than one acre of land, either individually or as part of a Common Plan of Development, that is not subject to the requirements of the Vermont Construction General Permit 3-9020, that is not exempt under Section 5.4, and that meets any of the following criteria, shall require an Erosion Prevention and Sediment Control Plan approved by the Administrative Officer:

1. Any Land Disturbance Activity disturbing more than 50 SF within 30 linear feet of the centerline of Grice Brook, Rugg Brook or Stevens Brook.
2. Any Land Disturbance Activity disturbing more than 100 SF located within a Stormwater Impaired Watershed.
3. Any Land Disturbance Activity disturbing more than 500 SF located outside a Stormwater Impaired Watershed.

4. Any project that, in the opinion of the Administrative Officer, has the potential to cause significant erosion, resulting in the transport of sediment to surface waters or the MS4 or endanger property or public safety if not properly mitigated and controlled.

B. The content of an Erosion Prevention and Sediment Control Plan shall be as set forth in the City of St. Albans Construction Stormwater Guidance Document, as amended. All erosion control practices, sediment control practices, waterway and watercourse protection practices and construction site access practices shall be consistent with the City of St. Albans Construction Stormwater Guidance Document and shall be adequate to prevent erosion and transportation of sediment to the satisfaction of the Administrative Officer.

C. The Administrative Officer shall review each Erosion Prevention and Sediment Control Plan to determine its conformance with the City of St. Albans Construction Stormwater Guidance Document and this Ordinance. Within thirty (30) days after receiving an application for review, the Administrative Officer shall in writing: 1) Approve the Plan; 2) Approve the Plan subject to such conditions as may be necessary to secure the objectives of this Ordinance; or 3) Disapprove the Plan, indicating in writing the reason(s) and procedure for submitting a revised Plan.

D. In the event an Erosion Prevention and Sediment Control Plan is associated with an application for another permit or decision to be issued by the City of St Albans, the Erosion Prevention and Sediment Control Plan shall be deemed to be a required component of a complete application for the associated permit or decision.

#### **Sec. 5.4 Exemptions.**

A. Any emergency activity that is immediately necessary for the protection of life, property or natural resources shall not require an Erosion Prevention and Sediment Control Plan immediately before the commencement of Land Disturbance Activities. However, an Erosion Prevention and Sediment Control Plan shall be required if the associated Land Disturbance Activities last more than 96 hours.

B. Any active nursery or garden for permanent landscaping or harvested for personal use of products shall not require an Erosion Prevention and Sediment Control Plan, provided that, in the opinion of the Administrative Officer, the activity does not have the potential to cause significant erosion or stormwater management impacts, or endanger property or public safety.

#### **Sec. 5.5 Inspection.**

A. For all projects for which an Erosion Prevention and Sediment Control Plan has been approved, the Administrative Officer shall make inspections, and either shall approve that portion of the work completed or shall notify the permittee that the work fails to comply with the Erosion Prevention and Sediment Control Plan. To obtain inspections, the applicant shall request an inspection from the Administrative Officer at least three (3) business days before commencement of any of the following:

1. Start of construction, at which time the inspection shall include inspection of the limits of disturbance to ensure the limits are correctly and fully demarcated on the site;

2. Installation of all sediment and erosion control measures;
3. Completion of final grading;
4. Completion of final landscaping.

B. In lieu of inspection by the Administrative Officer, the Administrative Officer may, upon written request of the applicant, allow the applicant to provide a written certification from a professionally licensed engineer, or a certified professional in erosion and sediment control (CPESC), certifying compliance with the Erosion Prevention and Sediment Control Plan upon completion of the activities enumerated in subsection A. above. The applicant shall make regular inspections of all control measures in accordance with the inspection schedule outlined in the Erosion Prevention and Sediment Control Plan and shall provide written certification to the Administrative Officer upon completion of each inspection, noting any remedial action required to achieve compliance with the Erosion and Sediment Control Plan.

### **Sec. 5.6 Access to Land Disturbance Activities.**

The Administrative Officer or his/her designee shall be permitted to enter and inspect any Land Disturbance Activities in the City of St. Albans to determine compliance with this Ordinance and the Erosion Prevention and Sediment Control Plan. The limits of Land Disturbance Activity shall be physically demarcated using measures described in the City of St. Albans Construction Stormwater Guidance Document.

### **Sec. 5.7 Surety.**

As a condition of approval of an Erosion Prevention and Sediment Control Plan, the Administrative Officer may require the applicant to deposit a surety bond or irrevocable letter of credit to guarantee good faith execution of the approved Erosion Prevention and Sediment Control Plan. Surety generally shall be required only in those instances where a site's conditions or a proposed land disturbing activity pose a unique or substantial threat of causing erosion or sedimentation in surface waters or the MS4, or where there are unique technical issues affecting the content and prospective effectiveness of an Erosion Prevention and Sediment Control Plan.

## **Chapter 6. Post-Construction Stormwater Management.**

### **Sec. 6.1 Purpose and Intent.**

Under the authority set forth in the City of St. Albans Charter §§ 16-22, 10 V.S.A. Chapter 47, and 24 V.S.A. Chapters 97 and 101, and 24 V.S.A. § 2291 (14), and to provide for the public health, safety, welfare and convenience, it is hereby declared that it shall be a public nuisance for anyone to improperly manage stormwater runoff created by land development, or to otherwise manage stormwater runoff caused by land development in violation of the requirements of this Ordinance.

It is the purpose of this Chapter to provide procedures for the regulation of stormwater runoff caused by land Development, and where required by public health, safety, or welfare, to provide for the abatement or removal of any public nuisance related thereto. This Chapter establishes

minimum stormwater management requirements for post-construction sites in the City of St. Albans, in order to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) permit process, and General Permit No. 3-9014 as issued by the State of Vermont. The specific purposes of this Chapter are:

- A. To minimize increases in stormwater runoff from Development in order to reduce flooding, siltation, increases in stream temperature, and stream bank erosion;
- B. To maintain the integrity of stream channels and minimize disruption to natural hydrologic processes from land development;
- C. To minimize increases in non-point source pollution caused by stormwater runoff from Development which would otherwise degrade local water quality;
- D. To reduce stormwater runoff rates and volumes, soil erosion, and non-point source pollution through the effective use of landscaping, surfacing, and stormwater treatment practices, and to ensure that these management controls are properly maintained;
- E. To establish the legal authority to carry out all review, inspection and enforcement procedures necessary to ensure compliance with this Chapter.

### **Sec. 6.2 Applicability of Post-Construction Stormwater Management Requirements.**

This Chapter applies to Development activities that result in the creation, expansion or redevelopment of impervious surface, as such terms are defined in this Ordinance and as enumerated in Section 6.4, unless otherwise exempted under Section 6.5. All projects undertaken by the City of St. Albans shall be subject to the applicable provisions of this Chapter.

### **Sec. 6.3 Prohibitions.**

No person required to obtain a permit from the City for any Development that results in the creation, expansion or redevelopment of impervious surface shall improperly manage stormwater runoff associated with these activities, and/or fail to conform to the requirements of this Chapter.

### **Sec. 6.4 Permits.**

No person shall be granted an approval by the City of St. Albans for any Development regulated under this Chapter without compliance with the following provisions:

- A. Projects that result in the creation of new impervious surface greater than one acre or the expansion of existing impervious surface of greater than one acre shall require evidence of application to the Vermont Department of Environmental Conservation for coverage under General Permit 3-9015 for Stormwater Discharges or an Individual Stormwater Discharge Permit, as applicable.

B. Projects resulting in one acre or more of land disturbance, whether as an individual project or under a Common Plan of Development, and that do not otherwise require coverage under General Permit 3-9015 for Stormwater Discharges or a Vermont Individual Stormwater Discharge Permit shall require approval by the Administrative Officer or his/her designee of a Stormwater Management Plan equivalent to the requirements of General Permit 3-9015 for Stormwater Discharges as enumerated in the Vermont Stormwater Management Manual, as most recently revised.

### **Sec. 6.5 Exemptions.**

The following activities shall be exempt from the provisions of this Chapter:

- A. Any emergency activity that is immediately necessary for the protection of life, property or natural resources.
- B. Any active nursery or garden harvested for personal use of products and that, in the opinion of the Administrative Officer, does not have the potential to cause significant erosion or stormwater management impacts, or endanger property or public safety, if post-construction stormwater is not properly mitigated and controlled.
- C. Construction or modification of single-family or two-family dwellings and accessory structures and appurtenances thereto, where no impervious surface or structure is proposed to be sited within 30 linear feet of the centerline of Grice Brook, Rugg Brook or Stevens Brook, and that, in the opinion of the Administrative Officer, does not have the potential to cause significant erosion or stormwater management impacts, or endanger property or public safety, if post-construction stormwater is not properly mitigated and controlled.

### **Sec. 6.6 Stormwater Management Plans; Content and Preparation.**

A. At a minimum all stormwater management practices in a Stormwater Management Plan shall meet the design requirements set forth in the Vermont Stormwater Management Manual, as most recently amended. All Plans shall include a Maintenance Plan as described in Section 6.8 of this Ordinance.

B. A Stormwater Management Plan shall be prepared and signed by a professional engineer licensed to practice in the State of Vermont who shall verify and demonstrate conformance to the applicable water quality treatment standards and stormwater management design criteria contained in this Chapter.

### **Sec. 6.7 Stormwater Management Plans; Approval Process.**

A. In the event a Stormwater Management Plan is associated with an application for another permit or decision to be issued by the City of St Albans, the Stormwater Management Plan shall be deemed to be a required component of a complete application for the associated permit.

B. The Administrative Officer will review each Plan to determine its conformance with the provisions of this regulation, unless explicitly exempted within this Ordinance. Within 30 days after receiving an application for review, the Administrative Officer shall in writing:

1. Approve the plan;
2. Approve the plan subject to such reasonable conditions as may be necessary to secure substantially the objectives of this regulation; or
3. Disapprove the plan, indicating in writing the reason(s) and procedure for submitting a revised plan.

### **Sec. 6.8 Maintenance of Stormwater Management Practices and Landscaping.**

A Maintenance Plan shall be prepared and approved in conjunction with all Stormwater Management Plans. The Maintenance Plan shall include detailed maintenance and repair procedures to ensure the continued function of all stormwater management measures, including those landscaped or surfaced areas that are integral to the function of the Plan. The Maintenance Plan shall include:

A. Landscape Plan; The applicant must present a detailed plan for the management of vegetation at the site after construction is finished, including identification of all landscaped areas or practices that are to provide stormwater treatment and control, the responsible party for maintenance of vegetation at the site, and practices that will be employed to ensure the healthy condition and function of landscaped areas.

B. Maintenance Easements; The applicant must ensure access to all stormwater treatment practices at the site for the purpose of inspection and repair by securing all of the maintenance easements needed on a permanent basis. These easements shall be recorded in the land records before commencement of the approved land use and shall remain in effect upon transfer of title to the property.

C. Maintenance Agreement; The applicant must execute a maintenance agreement binding on all subsequent owners of land served by a stormwater management measure included in the approved Stormwater Management Plan. The maintenance agreement shall be recorded in the land records before commencement of the approved land use and shall specify the required maintenance measures for all stormwater treatment practices, including landscaped or surfaced areas providing stormwater treatment and control, along with a maintenance schedule specifying when and how often maintenance shall be performed on each stormwater treatment practice.

D. Maintenance Records; The applicant shall be required to maintain records that verify that all required maintenance and inspections were performed in conformance with the approved Stormwater Management Plan. The records shall be maintained for a period of three (3) years, and a copy of all records shall be submitted annually to the Administrative Officer.



### **Sec. 6.9 Access to Stormwater Treatment Practices.**

The Administrative Officer shall be permitted to enter and inspect any property where stormwater treatment practices are being, or have been constructed, subject to regulation under this Ordinance as often as may be necessary to determine compliance with the Stormwater Management Plan and this Ordinance.

### **Sec. 6.10 Inspection Requirements.**

The applicant shall notify the Administrative Officer via email, mail or telephone no less than three (3) business days in advance of the start of Construction. The Administrative Officer or his/her designees shall inspect stormwater treatment practices a minimum of once during the construction phase to verify that practices are being constructed per the approved Stormwater Management Plan and shall inspect the stormwater treatment practices upon notification of completion. If any violations are found, the property owner shall be notified in writing of the nature of the violation and the required corrective actions. No additional work shall proceed until any violations are corrected and all work previously completed has received approval from the Administrative Officer.

### **Sec. 6.11 Inspection Certifications.**

In lieu of the requirements outlined in Section 6.10 of this Chapter, the Administrative Officer may allow or require that the applicant or their agent provide a written certification from a professionally licensed engineer certifying compliance with the Stormwater Management Plan, as approved.

### **Sec. 6.12 Surety Requirements.**

As a condition of approval and issuance of the permit, the Administrative Officer may at his/her discretion require the applicant to deposit a surety bond or irrevocable letter of credit to guarantee a good faith execution of the approved Stormwater Management Plan, and any other related permit conditions. Surety generally shall be required only in those instances where a site's conditions or a proposed land development activity pose a unique or substantial threat of causing stormwater runoff-related problems in surface waters or the MS4, or where there are unique technical issues affecting the content and prospective effectiveness of the Stormwater Management Plan.

### **Sec. 6.13 As-Built Drawings.**

Within thirty (30) days of completion of a project, the applicant shall submit as-built drawings of all stormwater treatment practices to the Administrative Officer.

## **Chapter 7. [Reserved]**

## **Chapter 8. Management of Construction Waste and Debris.**

### **Sec. 8.1 Construction Waste and Debris.**

Any person conducting activity involving the outdoor generation or storage of construction waste or debris shall be required by this Ordinance to observe the following:

- A. Piles of uncontained wastes, and wastes stored in open containers, shall be covered during windy conditions that would result in the mobilization of debris into the MS4 or waterways, and shall be covered prior to significant forecasted rain (0.25 inches in a 24-hour period).
- B. No dumpsters shall be hosed out onto the construction site.

## **Chapter 9. Enforcement.**

The City of St Albans, by and through its authorized agents, shall have the authority to enforce the provisions of this Ordinance, and any orders, violation notices, or enforcement orders issued hereunder, and may pursue all civil and criminal remedies in connection with any violation hereunder.

### **Sec. 9.1 Remedies not Exclusive.**

The remedies set forth herein are not exclusive of any other remedies available, including criminal prosecution, under any applicable federal, state or local law. Election of one remedy shall not preclude pursuing other remedies and nothing herein shall prohibit the City of St Albans from seeking multiple remedies.

### **Sec. 9.2 Judicial Bureau Municipal Civil Complaint Ticket.**

Pursuant to 24 V.S.A., Chapters 59 and 61 and 4 V.S.A., Chapter 29, the City may commence prosecution in the Judicial Bureau for any violation of this Ordinance by serving two copies of a municipal civil complaint ticket either in person or by first class mail on the alleged offender, and thereafter promptly filing the original with the Judicial Bureau. The issuing officer shall follow the procedure set forth by the Judicial Bureau for municipal complaint tickets. The first offense ticketed for a violation shall be punishable by a fine of one hundred dollars (\$100.00), the waiver fee shall be fifty dollars (\$50.00); a second offense ticketed for the same violation shall be punishable by a fine of two hundred dollars (\$200.00), the waiver fee shall be one hundred dollars (\$100.00); all third and subsequent offenses ticketed for the same violation shall be punishable by a fine of five hundred dollars (\$500.00), the waiver fee shall be two hundred and fifty dollars (\$250.00).

### **Sec. 9.3 Other Enforcement Remedies Generally; Fines, Injunctive Relief.**

- A. Any person violating any of the provisions of this Ordinance shall be subject to fines as outlined in Section 9.2 In addition to any other penalty authorized by this section, any person,

partnership, or corporation convicted of violating any of the provisions of this Ordinance shall be required to bear the expense of such restoration.

B. An action, injunction, or other enforcement proceeding may be instituted by the City of St. Albans to prevent, restrain, correct, or abate any violation or activity causing a violation. The relief sought may include the right to enter onto private property to abate or correct the violation, to restrain any activity that would create further violations, or to compel a person or persons to perform abatement or remediation of the violation; and to seek damages for all costs, including reasonable attorney's fees, incurred by the City of St. Albans in pursuing and obtaining such relief. In addition to any other remedies authorized in law or equity, the City of St. Albans may seek an order specifically requiring:

1. The elimination of illicit connections and/or non-stormwater discharges to the MS4;
2. The discontinuance of practices, activities, or operations that lead to violations of this Ordinance;
3. The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
4. The implementation of source control or treatment through the use of best management practices;
5. The performance of monitoring, analysis, and reporting.

In the event that any person holding a Construction Permit approved by the Administrative Officer, or any other City-issued approval for land development or land disturbance activities, violates the terms of this Ordinance or alters a site in such a manner as to adversely affect the public health, safety or welfare, the Administrative Officer or his/her designee may issue a Stop Work Order and/or suspend or revoke the permit.

## **Chapter 10. Stormwater System User Fees.**

### **Sec. 10.1 Establishment of Stormwater User Fees.**

- A. A user fee based on an Equivalent Residential Unit (ERU) shall be imposed on all properties or parcels as otherwise defined in Section 10.1(D). An ERU shall equal that square footage that approximately represents the average of the area of impervious surface for all single family and two-family properties with total impervious surface less than 10,000 square feet in the City. The City Council shall, by resolution, establish the square footage that constitutes one ERU on a periodic basis.
- B. The City Council shall have the authority to set and modify the user fee rates so that the total revenue generated by said charges, and any secondary sources of revenue, shall be sufficient to fund the City's stormwater program.
- C. The City Council shall establish by resolution the annual rate for each ERU. The annual user fee for a specific property or parcel is determined by multiplying the rate per ERU times the number of ERUs allocated to the property or parcel.

- D. Owners of all parcels, including tax-exempt parcels, that are assigned an ERU value under Section 10.3 will be charged a stormwater fee. Owners of condominiums will be assigned an ERU and be charged a stormwater fee, unless their ownership association receives a St. Albans water and sewer bill for the combined property as of the adoption of this Ordinance, in which case the association will be charged the fee for the combined property's assigned ERU. The ERUs and stormwater fee for mobile home parks shall be assigned to the mobile home park owner. The Administrative Officer may waive charging a stormwater fee to any property whereby the owner cannot be easily determined and that the efforts to do so create an unreasonable and disproportionate burden to the utility and its rate payers in relationship to the overall public benefit.
- E. From time to time, the City Council may order that the impervious surface square footage basis for a portion or all of the City be updated using the most recent appropriate geographic information systems data. During this update, the Administrative Officer is allowed, but not required, to use other permitting, assessing or on-site measurement data to supplement the process.

**Sec. 10.2 User Fee Credits.**

- A. The Stormwater Utility Credit Manual shall specify the design and performance standards of on-site stormwater systems, activities and services which qualify for application of a user fee credit and the method of calculating credits. Under no circumstances shall a credit be applied to the stormwater bill for parcels having only 1 ERU, or to condominium properties for which the total combined impervious equals only 1 ERU. The City Council, by resolution, shall have the authority to approve, modify or disapprove the Credit Manual.
- B. Any property or parcel owner may appeal the determination regarding an award of a credit. The appeal process is outlined under Chapter 11 of this Ordinance.
- C. Credits may be awarded retroactively for one (1) year from the date of initiation of the stormwater user fee. Thereafter, credits shall be applied to user fees on the next billing period after the completed credit application is approved.
- D. Any award of credit shall be conditioned on continuing compliance with the City's design and performance standards as stated in the Stormwater Utility Credit Manual and/or upon continuing provision of the systems, facilities, services, and activities provided, operated, and maintained by the property or parcel owner or owners upon which the credit is based. The Administrative Officer may revoke a credit at any time for non-compliance by providing thirty (30) days written notice of a non-complying condition and intent to revoke the credit to the property or parcel owner. If the non-compliance is not cured within the thirty (30) day period, the Administrative Officer shall eliminate the credit for user fee bills issued to the property or parcel owner after such period.

### **Sec. 10.3 Assignment of ERUs**

- A. Single Family and two-family properties or parcels with less than 6,000 square feet of impervious shall be billed one (1.0) ERU, as defined in Section 10.1.
- B. All properties or parcels with no impervious surface shall be billed one (1.0) ERU, as defined in Section 10.1.
- C. Owners of condominiums will be assigned an ERU rounded to the nearest 0.5 and greater than zero (0), unless their ownership association already receives a water/wastewater utility bill for the combined property as of the adoption of this Ordinance, in which case the association will be assigned an ERU rounded to the nearest whole number as defined in Section 10.3, subsection D.
- D. All properties or parcels with impervious surface that do not qualify under Section 10.3, subsections A through C, shall be billed the ERU's that are determined by dividing the total impervious surface on the property or parcel by one (1.0) ERU as defined in Section 10.1. The resulting value shall be rounded to the nearest whole number and shall be greater than zero (0). In those instances when the calculations produce a value exactly half-way between two numbers, (.5) the number is rounded up to the next whole number.
- E. Notwithstanding the other subsections of this Section, no City-owned parcel that contains a Public Stormwater Treatment Facility and no City street rights-of-way shall be assigned any ERUs.
- F. Also, notwithstanding the other subsections of this Section, the City Manager or their designee may enter into agreements with property owners to reduce the number of assigned ERUs for any properties that contain a Public Stormwater Treatment Facility. Such agreements may also be made for property owners that make financial contributions to Public Stormwater Treatment off-site and could include reductions in assigned ERUs for any other related properties.
- G. A property-owner may appeal their ERU assignment to the Administrative Officer. The Administrative Officer may choose to use GIS data, permitting and assessing information, and on-site measurements to update the impervious surface square footage basis of the appellant's property's ERU. After the Administrative Officer's analysis, the property's ERU may be adjusted up or down or stay the same. If changed, the new ERU shall take effect on the next billing period after the analysis is complete. The property-owner may appeal the Administrative Officer's decision pursuant to Chapter 11.

### **Sec. 10.4 Billing and Collection**

- A. Stormwater user fees shall be billed quarterly and shall be reflected on the utility bill for each property or parcel owner.
- B. The filing of an appeal pursuant to Chapter 11 of this Ordinance shall not relieve a property

or parcel owner of the obligation to pay the user fee when due.

- C. . Stormwater user fees shall be considered delinquent thirty (30) days after the billing date. Delinquent stormwater user fees shall bear interest at the rate of one percent (1%) per month, or fraction thereof, for the first three months and thereafter one and one-half percent (1.5%) per month or fraction thereof, from the due date of such stormwater user fee bill. Such interest shall be imposed on a fraction of a month as if it were an entire month.
- D. All stormwater user fees, interest, finance charges, and court costs shall be a charge and a lien upon the property to which the stormwater user fee is assessed from the date the same becomes due until paid in full, in the same manner and to the same effect, as taxes are a lien upon real estate pursuant to 32 V.S.A. §5061 and 24 V.S.A. §3612.
- E. When a property pays late fees, interest and finance charges for stormwater, water and wastewater charges shown on one bill, any payments shall be applied toward the stormwater liabilities first, before being applied to water and wastewater liabilities.

#### **Sec. 10.5 Establishment of Stormwater Enterprise Fund**

- A. The user fees, as well as any secondary sources of revenue, shall be used to fund the City's efforts to manage stormwater in the municipality and operate the City's system for stormwater collection, conveyance and treatment.
- B. Revenues will be placed into the Stormwater Enterprise Fund and may be retained and expended in the manner set forth herein.
- C. The St. Albans City Council shall establish a dedicated stormwater enterprise fund in the City budget and an accounting system for the purpose of managing all funds collected for the purposes and obligations of the stormwater program. All revenues and receipts of the stormwater program shall be placed in the enterprise fund, which shall be separate from all other funds. Fees will be set at a rate that covers the costs associated with stormwater management, collection, conveyance, treatment, planning, staffing, engineering, maintenance and repair, public education, capital improvements, technical assistance, customer service, and other services approved by the City to implement the purposes of the stormwater program as set forth herein. The City Council may consider both stormwater quality and quantity management needs in determining whether to expend any funds in the Stormwater Enterprise Fund, and the use of the fund is limited to operating expenses, non-operating expenses such as equipment, payment of principal and interest on debt obligations, capital improvement projects, reserve expenses and other costs as deemed necessary by the St. Albans City Council.
- D. Excess revenues may be placed into a reserve fund and may be retained and expended pursuant to Section 10.5.

## **Chapter 11. Appeals.**

The following process shall be followed for appeals to City decisions pertaining to this Ordinance:

### **Sec. 11.1 Appeals of Decisions of Administrative Officer or Director of Public Works**

- A. Any aggrieved Person or parcel owner shall have the right to appeal any action or decision of the Administrative Officer or Director of Public Works under this Ordinance to the City Manager by filing a petition with the City Manager.
- B. Such petition shall be filed within fifteen (15) days after receipt of notice of such action or decision. Within forty-five (45) days following receipt of the petition, the City Manager shall hear the petitioner and the Administrative Officer and/or Director of Public Works. The City Manager shall determine whether he/she should affirm or reverse the Administrative Officer and/or Director of Public Works' decision or action or modify the same; any modification shall conform to the provisions of this Ordinance. The City Manager's determination shall be made in writing and shall be sent to the Administrative Officer and/or Director of Public Works and to the petitioner.
- C. Any aggrieved Person or parcel owner may appeal the decision of the City Manager to the St. Albans City Council, pursuant to Section 11.2.

### **Sec. 11.2 Appeals of Decisions of City Manager**

- A. Any aggrieved Person or parcel owner shall have the right to appeal any action or decision of the City Manager under this Ordinance to the St. Albans City Council by filing a petition with the City Clerk and a copy with the City Manager.
- B. Such petition shall be filed within fifteen (15) days after receipt of notice of such action or decision. Within forty-five (45) days following receipt of the petition, the City Council shall meet and hear the petitioner and the Administrator Officer and/or Director of Public Works. The City Council shall determine whether they should affirm or reverse the City Manager's decision or action or modify the same; any modification shall conform to the provisions of this Ordinance. The City Council's determination shall be made in writing and shall be sent to the City Manager and to the petitioner.
- C. Any aggrieved Person or parcel owner may appeal the decision of the City Manager to the Vermont Superior Court, Civil Division, Franklin Unit, pursuant to V.R.C.P. 75.

### **Sec. 11.3 Ongoing Obligations.**

The filing of an appeal shall not relieve a Person or parcel owner of the obligations of this

Ordinance.

**Chapter 12. Effective Date.**

This Ordinance shall take effect on July 1, 2018.

**END OF TITLE.**



**Appendix E. City Construction Stormwater Guidance Documents**



## City of St. Albans

### Construction Stormwater Guidance Document

Adopted by Resolution of the St. Albans City Council, June 11, 2018.

Chapter 5 of the St. Albans City Stormwater Management and Operations Ordinance states that *no person shall cause, allow, or permit any sediment created by soil erosion resulting from Land Disturbance Activity to enter the municipal separated storm sewer system or the surface waters of the City.* To that end, many types of land disturbance activity in the City are required to follow an Erosion Prevention and Sediment Control Plan (EPSCP).

The basis of an EPSCP in the City of St. Albans shall be the State of Vermont's Low Risk Site Handbook for Erosion Prevention and Sediment Control (the Handbook), available from the VT Dept. of Environmental Conservation.

To ensure the establishment of an EPSCP that meets the standards of the Handbook, City Staff will provide applicants with forms to determine the following:

1. Property owner name and contact information.
2. Developer/Contractor (if applicable) name and contact information.
3. Basic information about the property and the area to be disturbed.
4. Proof of a State of Vermont Construction Stormwater Permit (if required).
5. Plans and details, as needed for staff to review the proposed Land Disturbance Activity and assess compliance.
6. Information on the applicant's agents responsible for monitoring the site.
7. Information on possible disturbances to the City right-of-way, how those disturbances will also be mitigated with the EPSCP, and how the disturbances will be repaired.
8. Assurances and certifications from the applicant and their agents to ensure:
  - a. site access by City inspectors,
  - b. daily and other periodic monitoring of the site by the applicant or their agents, and
  - c. ultimate compliance with the EPSCP, the Handbook, and the City Ordinance.

City Staff may develop and revised application forms to be appended to this document as needed, from time to time. Staff may also develop additional information materials to aid applicants in navigating the EPSCP process and ensuring compliance.



**City of St. Albans  
Stormwater Program**

PO Box 867, 100 No. Main Street, St. Albans, VT 05478  
PH: 802-524-500 x\*262 Email: d.southwick@stalbansvt.com

**Standard Erosion Prevention & Sediment Control (EPSC) Plan**

This questionnaire and associated EPSC plans are required for any Land Disturbance Activity:

- disturbing more than 50 SF within 30 feet of the centerline of Grice Brook, Rugg Brook or Stevens Brook;
- disturbing more than 100 SF located within a Stormwater Impaired Watershed;
- disturbing more than 500 SF located outside a Stormwater Impaired Watershed; or
- that, in the opinion of the Administrative Officer, has the potential to cause significant erosion, resulting in the transport of sediment to surface waters or the MS4 or endanger property or public safety if not properly mitigated and controlled.

1. Project Address: \_\_\_\_\_

2. Parcel ID: \_\_\_\_\_ Zoning District: \_\_\_\_\_

3. Brief Project Description (i.e. building construction, subdivision, site work)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Owner's Name: \_\_\_\_\_

5. Owner's Mailing Address: \_\_\_\_\_

6. Owner's Phone: \_\_\_\_\_ Owner's Email: \_\_\_\_\_

7. Contractor's Name: \_\_\_\_\_

8. Contractor's Phone: \_\_\_\_\_ Contractor Email: \_\_\_\_\_

9. Project Start Date: \_\_\_\_\_ End Date: \_\_\_\_\_

10. Total Area of Land Disturbance: \_\_\_\_\_ sq. ft.

11. Total Amount of Finished Impervious Surface: \_\_\_\_\_ sq. ft.

12. Does your project require a State Construction Stormwater Permit (9020 or INDC)? \_\_\_ Yes \_\_\_ No

**A. EPSC QUESTIONNAIRE**

Yes	No	N/A	Project Questions	Plan Details
			Will excavated soil be stockpiled on the site?	<input type="checkbox"/> Cover small stockpiles with a tarp when not being used. <input type="checkbox"/> Install silt fencing or other appropriate devices around the stockpiles to filter sediment. <input type="checkbox"/> Cover stockpiles with straw or other approved mulching material. <input type="checkbox"/> Plan to remove any unusable material as soon as possible from the site to an approved location. <input type="checkbox"/> Plant grass and mulch stockpiles that will be on site for more than 14 days.
			If the excavated soil is being removed from the site, ultimately, where will the excess soil be disposed?	<input type="checkbox"/> Location:
			Will stockpiles or disturbed soils be present and/or exposed after Nov. 1 <sup>st</sup> of any construction year?	<input type="checkbox"/> Cover, vegetate or install erosion matting on stockpiles that will remain disturbed over the winter.
			Within 48 hours of reaching final grading, the exposed soil will be seeded and mulched or covered with erosion control matting (for slopes steeper than 3:1 or high wind prone areas). Erosion control matting is preferred.	<input type="checkbox"/> Soil will be seeded <input type="checkbox"/> Soil will be mulched <input type="checkbox"/> Area will be covered with hay <input type="checkbox"/> Area will be covered with matting
			Do you anticipate the need for any dewatering of excavations during the construction?	<input type="checkbox"/> Plan:
			Do you plan to park construction vehicles on or disturb City owned property like the greenbelt area?	<input type="checkbox"/> Do not park construction vehicles on City owned green space. <input type="checkbox"/> Any green belt disturbance will need to be permanently stabilized with grass seed and erosion control matting. <input type="checkbox"/> Prevent sediment from leaving the project by cleaning the tires of vehicles, or use clean gravel at project access points to clean tires. <input type="checkbox"/> Sweep city streets, sidewalks and bikepaths daily or as needed to remove sediment transported from the project.
Yes	No	N/A	Owner Acknowledgements	
			I acknowledge that it is the responsibility of the owner and his/her representatives to ensure that: <ul style="list-style-type: none"> <li>• sediment does not enter surface water bodies (streams, ditches, ponds, lakes, wetlands etc.)</li> <li>• sediment does not enter City conveyance infrastructure (catch basins, sewers etc.) and</li> <li>• All sediment must be removed from the city ROW (sidewalks and roadways) by the end of each work day.</li> </ul>	
			Sediment control measures will be installed <u>prior</u> to the initiation of earth disturbance.	

		<p>During the non-winter construction season (April 15 – November 1): After an initial <b>14 day</b> period of initial disturbance, temporary or permanent stabilization (mulching, erosion control matting or tarps for stockpiles, or other approved method) of exposed areas and stockpiles will occur at the end of each work day unless:</p> <ul style="list-style-type: none"> <li>• Earthwork is to continue in the area within the next 24 hours <b>and</b> there is NO liquid precipitation forecast for the next 24 hours; or</li> <li>• If work is occurring in a self contained excavation (no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation or utility trenches).</li> </ul>	
		<p>During the winter construction period from November 1 to April 15, any <b>new disturbance</b> must be temporarily or permanently stabilized (mulching, erosion control matting or tarps for stockpiles, or other approved method) will occur at the end of each work day unless:  Earthwork is to continue in the area within the next 24 hours <b>and</b> there is NO liquid precipitation forecast for the next 24 hours; or  If work is occurring in a self-contained excavation (no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation or utility trenches)</p>	
		<p>The perimeter of the site and all BMPs will be inspected at the <b>end of each workday</b> to ensure that sediment will not leave the site. If sediment has travelled beyond the site boundary, it shall be swept up or otherwise removed and deposited on-site in an upgradient area at the <b>end of each work day.</b></p>	
		<p>The owner and his/her representatives shall abide by the best management practices (BMPs) indicated in this plan and conditions and in the Vermont DEC Low Risk Site Handbook for Erosion Prevention and Sediment Control (2006). Contact 802-863-4501 for a hard copy or go to the web: <a href="http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/stormwater-construction-discharge-permits">http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/stormwater-construction-discharge-permits</a></p>	
		<p><b>If soils will be exposed after November 1st and winter construction has not been permitted the project will notify the City Property Services Office prior to October 15<sup>th</sup> and ensure that sediment control is installed PRIOR to soil freezing.</b> If the project is completed during the winter months, an additional inspection will be required to ensure that the site is buttoned up for the winter.</p>	
		<p>The owner will contact the City Property Services Office to schedule a stabilization inspection when site work is finished and stabilization measures (seeding and mulching or matting) have been installed.</p>	

Additional Conditions of Approval:

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**AGREEMENT**

By filling out and signing this plan, I agree to abide by the terms and conditions outlined above. Failure to follow this plan can result in a stop work order by the City of St. Albans, fines, or both.

By: Owner      Contractor

\_\_\_\_\_

Name

\_\_\_\_\_

Signature

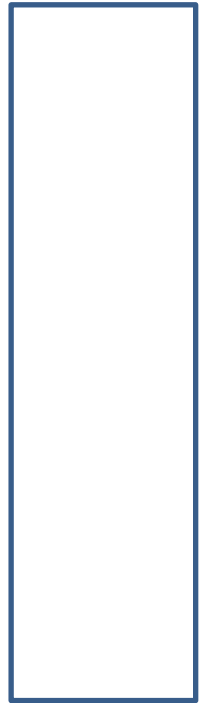
\_\_\_\_\_

Date

Site Plan



Key



# AN EROSION PREVENTION AND SEDIMENT CONTROL PLAN

FOR THE PROJECT AT:

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HAS BEEN FILED WITH THE CITY OF ST. ALBANS PROPERTY SERVICES OFFICE IN ACCORDANCE WITH TITLE 25 OF THE ST. ALBANS CITY ORDINANCES

THIS REQUIRES THAT MEASURES BE INSTALLED OR TAKEN TO PREVENT SEDIMENT FROM LEAVING THE SITE AND ENTERING WATERWAYS AND IMPACTING CITY INFRASTRUCTURE (RIGHT OF WAY AND STORMDRAINS)

FOR QUESTIONS OR TO REPORT SEDIMENT LEAVING THE SITE CALL 802-524-1500 X\*262

This notice to be posted in full view at all times during earth disturbance. Additional conditions on attached.

Plan Approved by: \_\_\_\_\_  
City of St. Albans

Date: \_\_\_\_\_

## TYPICAL SOLUTIONS TO PREVENT OR CONTROL SEDIMENT AND EROSION

### STOCKPILES

- Cover small stockpiles with a tarp when not being used.
- Install silt fencing or other appropriate devices around the stockpiles to filter sediment.
- Cover stockpiles with straw or other approved mulching material.
- Plan to remove any unusable material as soon as possible from the site to an approved location.
- Plant grass and mulch stockpiles that will be on site for more than 14 days.
- Cover, vegetate or install erosion matting on stockpiles that will remain disturbed over the winter.

### DISTURBED AREAS

- Maintain vegetated buffers around disturbed areas.
- Install silt fencing or other appropriate device to filter sediment washing off from disturbed areas. Remember that the bottom of the silt fence must be “keyed in” (dug into ground) to work correctly.
- To prevent sediment from running off your site via your driveway (or other paved areas where you can’t install silt fence) use a row of hay bales or tube sand.
- Cover disturbed areas as soon as possible with straw or other approved mulching material. Use erosion control matting in high wind, traffic or slopes steeper than 3:1 (horizontal to vertical), and follow the manufacturer’s guidelines staple the matting down.
- Plant grass and mulch or use erosion control matting all disturbed areas that will remain exposed for more than 14 days.
- Cover, vegetate or install erosion matting on areas that will remain disturbed over the winter.
- Protect ditches, catch basins or water bodies off-site by using silt fencing, gravel check dams or other approved sediment control methods.

### CONSTRUCTION VEHICLES

- Do not park construction vehicles on City owned green space. Vehicles disturb vegetation and compact the soil, thereby reducing its ability to infiltrate stormwater. Any green belt disturbance will need to be permanently stabilized with grass seed and erosion control matting.
- Prevent sediment from leaving the project by cleaning the tires of vehicles, or use clean gravel at project access points to clean tires.
- Sweep city streets, sidewalks and bikepaths daily or as needed to remove sediment transported from the project.



**B. PROJECT SKETCH:**

14. Plans MUST BE ATTACHED showing the following:

- Limits of disturbance
- Direction of stormwater flow on site
- Location of stockpiles (if any)
- Location of sediment control BMP's (silt fence etc.)
- Location of stabilized construction entrances
- Stabilization measures
- Phasing plan (if appropriate)

15. Detail sheet MUST BE ATTACHED and include details for all EPSC measures listed on the EPSC Plan Sheet. Additionally, notes must be included related to:

- Daily inspection of roadways and sweeping as necessary
- Dewatering measures (if applicable)
- Temporary site stabilization requirements
- Final site stabilization requirements
- Winter site stabilization (for disturbance after November 1)
- Inspection requirements

# Appendix F. Rugg Brook Flow Restoration Plan



# Rugg Brook Flow Restoration Plan

MS4 GENERAL PERMIT REQUIREMENT (IV.C.1)

May 26, 2017



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**Prepared for:**

*City of St. Albans  
Town of St. Albans*

**Prepared by:**

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## **I. Disclaimer**

The intent of this plan is to present the data collected, evaluations, analyses, designs, and cost estimates for the Rugg Brook Flow Restoration Plan (FRP) Project, completed under a contract between Northwest Regional Planning Commission and the hired consultant team, Watershed Consulting Associates, LLC and Aldrich & Elliott. The Rugg Brook FRP was prepared to meet the compliance requirement for the National Pollutant Discharge Elimination System General Permit 3-9014 (Vermont Department of Environmental Conservation 2012) for stormwater discharges to impaired waters for Rugg Brook impervious surface owners: the City of St. Albans and the Town of St. Albans.

## II. Executive Summary

This Flow Restoration Plan (FRP) for the Rugg Brook watershed was developed in accordance with requirements for Municipal Separate Storm Sewer System (MS4) entities. Once approved by the Vermont Department of Environmental Conservation (VT DEC) this FRP will become part of the Rugg Brook Stormwater Management Plan (SWMP) prepared by the Town of St. Albans and the City of St. Albans, two of the three MS4 permittees. Although three MS4 entities own impervious cover within the Rugg Brook watershed, the Vermont Department of Transportation (VTrans) has elected to prepare its own FRP document. However, all proposed projects including the VTrans projects are included in this document to provide a watershed-wide plan. The MS4 permittees in this watershed are the Town of St. Albans, the City of St. Albans, and VTrans. The plan was developed in accordance with the Municipal Separate Storm Sewer System (MS4) General Permit #3-9014 Subpart IV.C.1 as a part of the participating MS4s Stormwater Management Program (SWMP). This FRP will serve as a long-term planning tool for the MS4s to implement stormwater best management practices (BMPs) throughout the watershed in the effort to return Rugg Brook to its attainment condition.

As a part of the FRP development, an assessment was completed to determine to what extent current stormwater controls have reduced high flows (flows occurring less than 0.3% of the time, equivalent to greater than the 1-year design storm) from the Pre-2002 condition, as required by the Rugg Brook Total Maximum Daily Load (TMDL) for stormwater. The Vermont Best Management Practice Decision Support System (BMPDSS) model, a GIS-based hydrologic model used to assess the impact of various stormwater BMP scenarios, was used for the assessment. The BMPDSS estimated 16% of the high flow target was met with existing BMPs, designed to meet the 2002 Vermont Stormwater Management Manual (VTSWMM) design standards, when compared to the Pre-2002 condition. Therefore, additional BMPs are required to meet 100% of the actionable flow target.

In addition to the identification of stormwater controls, the TMDL flow targets and future growth assumption developed by the VT DEC was reviewed in the context of the FRP development. Specifically, the expected non-jurisdictional impervious area growth in the watershed over the next 20 years was determined using a GIS analysis. An assumed 15 acres of non-jurisdictional impervious growth was used to develop the original TMDL requirements. A revised estimate of 4.54 acres was calculated based on the actual non-jurisdictional growth rate from 2003 to 2014. The revised future growth reduced the high flow target ( $Q_{0.3\%}$ ) from 16.0% to 15.3%<sup>1</sup>. The modified flow target was incorporated into the FRP planning process and assessment of the proposed BMP implementation scenario.

Development of the FRP involved field inspection of all existing BMPs with an expired stormwater permit followed by review and revision of the previously run BMPDSS model scenarios. Several revisions to existing BMP drainage areas and BMP design configurations were identified during

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<sup>1</sup> See Tables 1 and 2: The modified target was calculated as:  $-(15.0\%) + (-1.0\%)*(4.54 \text{ ac}/15 \text{ ac}) = -15.3\%$



field inspection and accounted for in the revised models. After the existing model scenarios were reviewed, new BMPs were identified, inspected, and assessed in the BMPDSS.

The final evaluated BMP list includes 31 projects: nine retrofits to existing ponds with expired permits, five new detention practices in the Town, one new infiltration basin in the Town, four new underground infiltration systems along Route 7 in the City, four new detention practices to mitigate runoff from primarily VTrans-owned impervious, and eight new sand filters in the I-89 median.

The proposed BMPs were assessed with the BMPDSS model, and determined to provide a -17.46% reduction in high flow, which addresses 114% of the TMDL high flow target ( $Q_{0.3\%}$ ) through reduction of runoff from the 1-year design storm. While not an actionable target, the low flow (baseflow) was estimated to increase by 9% over the Post-2002 condition. However, the low flow in the proposed scenario was still below the Pre-2002 condition. The high flow target mitigated by each project (%) and cumulative target addressed (%) was determined for each project. In order to address 100% of the high flow target, 30 of the 31 proposed BMPs must be constructed. The planning level cost for implementation of the FRP is approximately \$2,400,000 (excluding VTrans). Preliminary 30% engineering plans were developed for the new projects with planning level cost estimates.

A comprehensive ranking matrix was developed to prioritize the proposed projects based on criteria including considerations for the cost, design, aesthetics, and other project benefits and constraints. The ranking provides a tool for the MS4s to use as they prioritize projects with available financial resources. The prioritization was also used to develop a long-term implementation schedule.

### **III. Background**

Rugg Brook is currently one of the State of Vermont's stormwater impaired waterways, as determined by the US Environmental Protection Agency's (EPA) 303(d) list. In the effort to restore Rugg Brook to its attainment condition and lift its impaired designation, a flow based TMDL was developed for the watershed, outlining required reductions in high flows and an increase in baseflow. The flow targets are the basis for the FRP.

The purpose of the FRP is to outline a plan for the retrofit of existing impervious cover with stormwater management Best Management Practices (BMPs). These practices can include detention basins, bioretention filters, underground storage, and others. The TMDL set forth that watershed hydrology must be controlled in the Rugg Brook Watershed to reduce high flow discharges and increase base flow in order to restore degraded water quality and achieve compliance with the Vermont Water Quality Standards (VWQS). Components of the FRP include the identification of retrofits to existing BMPs with expired State stormwater permits, new BMP controls, a design and construction (D&C) schedule, a financial plan, and a regulatory analysis.

Each MS4 is required to prepare an FRP for impaired waters. Two of the three MS4s contributing impervious cover runoff to Rugg Brook, the Town of St. Albans and the City of St. Albans, agreed to prepare a joint FRP for the watershed with consideration of the individual MS4's flow target allocation based on impervious ownership. VTrans, the third MS4 permittee, will complete a separate FPR document.

### **III.1 TMDL Flow Targets**

In the effort to restore Rugg Brook to its attainment condition and lift its impaired designation, a flow-based Total Maximum Daily Load (TMDL) was developed for Rugg Brook using flow as a surrogate for pollutant loading. This document outlines required reductions in stream high flows and increase in stream low flows.

The basis for the TMDL required high flow reductions was the comparison of modeled Flow Duration Curves (FDCs) between this impaired watershed and comparable attainment watersheds. A FDC graphs the percentage of time during a period that flow exceeds a certain value, with the low flow represented by the 95<sup>th</sup> percentile ( $Q_{95\%}$ ) and the high flow represented by the 5<sup>th</sup> percentile ( $Q_{0.3\%}$ ). The Program for Predicting Polluting Particles Passage through Pits, Puddles, and Ponds, Urban Catchment Model (P8) was used to model gauged and ungauged watersheds in Vermont to develop FDCs from which an area normalized high flow and low flow were extracted by drainage area. The percent change between impaired and attainment FDCs were used as a basis for the TMDL requirements. The high-flow ( $Q_{0.3\%}$ ) was determined to be relatively equivalent to the 1-year design storm flow. Therefore, all proposed BMPs are designed to the Channel Protection volume ( $CP_v$ ) storage standard to address the high-flow reduction target.

Included in the 2012 MS4 permit issuance were new requirements for municipalities to develop FRPs to implement the stormwater TMDLs. The FRPs must be developed for each impaired watershed by October 1, 2016, and must include the following elements:

- 1) An identification of required controls
- 2) A design and construction schedule
- 3) A financial plan
- 4) A regulatory analysis
- 5) The identification of regulatory assistance
- 6) Identification of any third party implementation

The schedule shall provide for implementation of the required BMPs as soon as possible, but no later than 20 years from the effective date of the permit, before December 5, 2032.

**Table 1: Rugg Brook TMDL flow targets are shown below.**

Target High Flow Q 0.3 (± %) Reduction	Target Low Flow Q 95 (± %) Increase
-16.0%	16.8%

**III.2 Future Growth Modified Target:**

The VT DEC added a future growth factor to the TMDL flow targets to account for future non-jurisdictional impervious growth. Non-jurisdictional growth encompasses impervious area that does not require a stormwater permit and is not managed by a stormwater BMP. Therefore, this type of growth is important to account for within the 20-year stormwater management plan. The VT DEC estimated a future growth of 15 acres based on local development and projected growth. A GIS-based exercise was completed the Chittenden County Regional Planning Commission (CCPRC) to verify the VT DEC’s assessment. They found that a more realistic future growth estimate was 4.54 acres based on the actual non-jurisdictional growth rate from 2003 to 2014.

The CCPRC used impervious cover mapping from 2003, developed from Quickbird satellite imagery, and compared this data to imperious cover mapping from 2014. The net change in impervious cover was calculated over the 11-year timeframe. Impervious cover within the drainage area of a Post-2002 Stormwater BMP was cut from the layer. The remaining impervious cover was considered the non-jurisdictional growth over 11 years. A growth rate was then calculated as shown below. The revised non-jurisdictional future growth over the next 20 years was estimated to be 4.54 acres, versus the VTDEC’s estimate of 15 acres.

$$\text{Growth Rate} = \left( \left( \frac{\text{Non-Jurisdictional Impervious, 2014}}{\text{Non-Jurisdictional Impervious, 2003}} \right)^{\left( \frac{1}{\text{years}} \right)} - 1 \right) * 100$$

The revised future growth (FG) reduced the high-flow target (Q 0.3%) reduction from 16.0% to 15.3%, which was calculated as shown in the following equation.

$$\text{Modified Flow Target} = (\text{Target \% with no FG}) + (\text{Target \% from FG}) * \left( \frac{\text{Revised FG acres}}{\text{Original FG acres}} \right)$$

The modified flow targets for Rugg Brook were used for this FRP and are shown in Table 2.

**Table 2 TMDL flow restoration targets**

Target High Flow Q 0.3 (± %) Reduction	Target Low Flow Q 95 (± %) Increase
-15.3%	16.8%

While the low flow goal is important to ensure baseflow during the dry summer months, it is not an actionable requirement in the EPA approved TMDL, and therefore was not the primary focus for this study.

### III.3 MS4 Allocation of Flow Targets

Allocation of the flow targets by MS4 was approximated based on relative impervious cover ownership within the watershed. Railroads and agricultural areas were excluded from these calculations.

Approximately 74% of the impervious cover in the Rugg Brook watershed is within the Town of St. Albans, 16% within the City of St. Albans, and 10% is owned by VTrans (Table 3). The TMDL flow targets were then allocated to each MS4 based on their impervious ownership with the modified target with 4.54 acres and adjusted TMDL targets (Table 3).

**Table 3 Rugg Brook flow targets allocated by MS4**

Owner	Total Watershed Area (acres)	Impervious Cover (acres)	% of Watershed Impervious Cover	Target High Flow Q 0.3 (± %) Reduction <sup>1</sup>	Target Low Flow Q 95 (± %) Increase
St. Albans Town	1556.4	151.4	73.9%	-11.30%	12.41%
VTrans	131.8	32.2	15.7%	-2.40%	2.64%
St. Albans City	70.5	21.4	10.4%	-1.60%	1.75%
<b>Watershed Total</b>	<b>1758.8</b>	<b>204.9</b>		<b>-15.30%</b>	<b>16.80%</b>

<sup>1</sup> The high flow target is negative (-), indicating there needs to be a reduction in high flow from the baseline condition. The low flow target is positive (+), indicating there needs to be an increase in low flow from the baseline condition.

## IV. BMPDSS Model Assessment

The VTDEC worked with an external consultant (TetraTech) to develop a Vermont-specific hydrologic model, the Vermont BMPDSS, to predict progress toward the TMDL flow targets based on proposed BMP implementation scenarios. The BMPDSS model is used to predict peak flows at the watershed outlet for a Pre-2002 (baseline), Post-2002 (existing condition), and a Credit (BMP implementation) scenario. All models are compared to the Pre-2002 model on a percent change basis.

### IV.1 Existing Condition Review

Both the Pre-2002 and Post-2002 models were reviewed and updated as necessary. Several field visits were conducted from July to September of 2014 of permitted sites within the Rugg Brook watershed (Figure 1). Existing BMPs included in the Pre-2002 and Post-2002 BMPDSS models were assessed and existing VT DEC model inputs were compared with field observations. Updated input files for the Pre-2002 and Post-2002 models were submitted to the VT DEC to run the updated model scenarios.



**Figure 1. Staff inspect existing stormwater swales in St. Albans.**

### IV.2 Permit Review

All expired stormwater permits in the watershed were acquired and reviewed during the BMPDSS model assessments. The expired permits were grouped into those existing stormwater systems with a BMP which provided extended detention of the 1-year design storm (Group 1; Table 4), and those existing stormwater systems without a BMP that provides extended detention (i.e., a system of catchbasins with no outfall management; Group 2).

The Group 1 list was compared to the list of BMPs included in the BMPDSS Pre-2002 and Post-2002 models to check for omissions. Only expired permit systems that include a BMP with CPv storage were included in the BMPDSS model, because only these BMPs can help to meet flow targets. Field assessments were then completed at each Group 1 site to determine if the practice was operating according to the approved expired permit. Each site was also assessed for retrofit opportunities to upgrade the system to the 2002 VTSWMM standards. A full list of expired permits within the watershed and a description of their existing stormwater system and proposed retrofit (if applicable) is included in Appendix 2 (A-2-1).

**Table 4 Group 1” Expired permit stormwater BMPs that provide extended detention of the 1-year design storm**

Permit #	Permittee	MS4 Draining to Practice	Project Name	Associated Permits	BMP Type in Model
1-1428b	Private	VTrans/ Town	St. Albans Milk and Maple		Detention Pond
1-0908	HOA	VTrans/ Town	Tanglewoods		Detention Pond
1-1563 P1	HOA	VTrans/ Town	Pineview Estates		Detention Pond
1-1563 P2	HOA	Town	Pineview Estates		Detention Pond
1-1563 P3	HOA	Town	Pineview Estates		Detention Pond
1-1563 P4	HOA	VTrans/ Town	Pineview Estates		Detention Pond
1-1563 P5	HOA	VTrans/ Town	Pineview Estates		Detention Pond
2-0291	Town	Town	Collins-Perley Athletic Complex	#5961-9010 upgrades	Detention Pond
1-1428c	Private	VTrans/ Town	St Albans Milk and Maple		Detention Pond
1-1428a	Private	Town	St Albans Milk and Maple		Detention Pond
1-0930	Private	Town	Church of the Rock		Detention Pond
1-1442	HOA	Town	Sunset Terrace Phase 3		Detention Pond
3567-9010	Private	Town	Barry Callebaut Inc	# 2-0142	Detention Pond

\*Prepared by Emily Schelley (VTDEC, Jan. 2014). Revised by WCA (2015)

## IV.2.1 VTDEC BMPDSS Existing Model Review

Progress towards target high flow reductions were assessed using the BMPDSS model, but in order to assure that these results were accurate, both the Pre-2002 and Post-2002 models were assessed and revised as needed. New BMPs either developed since the model was last updated or unknown at the time of the last model update were added. Additionally, other revisions such as watershed boundary changes were incorporated. Updated input files for the Pre-2002 and Post-2002 models were submitted to VT DEC so that updated model scenarios could be run. Input files included revised HydroCAD® models of each BMP as necessary and GIS data for BMP drainage areas, subwatersheds, and BMP locations. A full list of existing BMPs in the Pre-2002 and Post-2002 model scenarios is included in Appendix 2 (Table A-2-2).

### IV.2.1.1 Pre-2002 Model Revisions

Several revisions were made to the Pre-2002 BMPDSS model based on information provided by the MS4 entities and the VT DEC as well as field investigations. The model was revised as follows:

- Subwatershed boundaries around the Superior Ceramics pond, permitted under #3410-9010, and the St. Albans Interstate Access Road (SASH) were adjusted to reflect field observations (Figure 2).
- BMP model entries were adjusted for the following BMPs after comparison between the existing model data and field measurements:



**Figure 2. WCA and Town Public Works Director inspect #3410-9010 outlet structure to verify pond routing.**

- #1-1428 Ponds 2 and 3: St. Albans Milk and Maple
- #1-0908 Tanglewoods Pond
- #1-1563 Ponds 1, 2, and 3: Pine View Estates
- #1-0930 Church of the Rock
- #1-1442 Sunset Terrace
- #3567-9010 Barry Callebaut
- #4197-9010 Superior Ceramics Lot

#### ***IV.2.1.2 Post-2002 Model Revisions***

Several revisions were also necessary for the Post-2002 BMPDSS model. The model was revised as follows

- Two new development projects previously omitted from the model had since begun construction and were thus added, including:
  - #5577-INDS Harborview development on Main Street, permit (conventional catchbasin and pipe conveyance systems routed to stormwater detention pond)
  - #6375-INDS AFB subdivision along Bellevue Carriage Road (conventional catchbasin and pipe conveyance systems routed to stormwater detention pond)
- Subwatershed boundaries around the new Harborview subdivision were adjusted to account for changes in the pond routing to a different tributary compared to the pre-development condition.

The proposed rain garden and gravel swale on the Barry-Callebaut property were not added to the model due to limitations of the BMPDSS model resolution. The scale of the project is too small to be accounted for by the model, and caused an error when included in the model input.

#### ***IV.2.1.3 Diversion Structure Considerations***

The Stevens-Rugg diversion structure, first built in 1957, is a historic structure designed to address flooding issues in the City of St. Albans by diverting stream flow from Stevens Brook to Rugg Brook. After an extensive study of the structure in the early 2000s, a new water quality and flood equalization system was constructed at the site to minimize increased stormwater flows to Rugg Brook and provide enhanced water quality treatment.

The diversion structure has posed some difficulties for modeling the Rugg Brook watershed in the BMPDSS model. The VTDEC developed an alternative method to simulate the interaction between Stevens Brook and Rugg Brook by use of a regulator device. The regulator design was calibrated to the BMP design, and effectively splits the flow. Flow from the Stevens Brook watershed model is added to the Rugg Brook watershed by using the time series output file from the Stevens Brook model as an input file for Rugg Brook. The Stevens Brook models used for the

Rugg Brook analysis correspond to the scenario modeled. For the Pre-2002 condition, the latest Pre-2002 scenario model is used. For the Rugg Credit scenario model, the proposed FRP Credit scenario model for Stevens Brook (developed under the Stevens Brook FRP Project in 2012) is used to account for future flow reductions. A memo prepared by Emily Schelley (VT DEC) is provided in Appendix 2 which details the procedure utilized for the diversion structure in the BMPDSS.

#### ***IV.2.1.4 Post-2002 Model Results***

The Post-2002 model was revised with three iterations resulting in an overall slight increase in progress toward the high flow target from the previous model prepared by the VT DEC (Table 5). This is primarily due to changes in the Pre-2002 condition model, improving the modeled condition from the previous model iterations. A full list of the existing BMPs in the Pre-2002 and Post-2002 models is included in Appendix 2 (Table A-2-1). The Post-2002 condition scenario includes 15 individual BMPs, each managing the 1-year design storm, and five of which also provide recharge to groundwater. The most up-to-date Post-2002 condition model scenario (as of January 30<sup>th</sup>, 2015) was estimated to provide a -2.5% reduction in high flow, calculated as a percent change between the unadjusted flow in the Pre-2002 and Post-2002 scenario, addressing 16% of the TMDL high flow target. The low flow was estimated to decrease by 2.99% from the Pre-2002 scenario, not addressing the non-actionable low flow target. Based on the model results, additional CPv stormwater controls will be required to meet the required TMDL high flow target. Biomonitoring of the streams will ultimately determine if Rugg Brook has reached attainment conditions in compliance with the Vermont Water Quality Standards.



**Table 5 Post-2002 BMPDSS model assessment results**

Model Run	Description	High Flow Reduction (%)	Low Flow Increase (%) <sup>1</sup>	BMPDSS Model Run Date
TMDL Targets for Rugg Brook with 15 acres Non-Jurisdictional Growth		-16.00%	16.8%	----
Modified TMDL Target for Rugg Brook with 4.54 acres Non-Jurisdictional Future Growth		-15.30%		
VT DEC Post-2002 Model	VT DEC's original Post-2002 model	-2.49%	0.0%	9/18/2013
WCA Revised Existing Condition Model (8/21/2014)	Addition of 5577-INDS and 6375-INDS projects	-2.82%	-1.5%	8/21/2014
WCA Revised Existing Condition Model (10/10/2014)	WCA revised additional subwatersheds and existing BMP designs.	-2.65%	-4.5%	10/10/2014
WCA Revised Existing Condition Model (1/30/2015)	Revised subwatersheds.	-2.50%	-2.99%	1/30/2015
Percent of Target Managed (with Post-2002 Model Run 1/30/2015)		16%	-27%	----
1 - The low flow target is not actionable under the TMDL, but is included in the summary because improving base flow in the watershed is still a water quality goal.				

## V. Required Controls Identification

The process of BMP identification was initiated with a field assessment on August 20<sup>th</sup>, September 11<sup>th</sup>, and October 22<sup>nd</sup>, 2014, of existing BMPs covered by an expired permit to assess the opportunity for upgrade potential to the 2002 VTSWMM standards. Prior to the initial field visit, the team conducted a desktop assessment of the watershed to identify open spaces ideal for BMP implementation, with priority on municipally owned land. The distribution of BMPs was considered to provide storage throughout the watershed. Potential site selection focused on areas with a high percentage of impervious coverage where flows were expected to be highest and where infiltration was possible as indicated by mapped Hydrologic Group A or B soils.

After an initial list of retrofits was identified, a follow up field assessment was completed at each site documenting the preliminary engineering feasibility of each retrofit and mapped drainage area for the proposed BMPs. The BMPs were then designed using the HydroCAD<sup>®</sup> model to meet the CPv storage criteria for cold waters (12-hour detention standard).

Feasibility of BMPs was determined based on available space, Natural Resources Conservation Service mapped soils, existing 1-foot topographic elevation contours derived from LIDAR, and mapped stormwater and wastewater infrastructure provided by the Town and VTrans. Supplemental survey data was collected for the projects as needed. Natural resources were

screened at the sites as well. An in-depth engineering assessment will still be required at each site to confirm the presence or absence of utilities and potential transportation impacts as part of the final design process.

Once the final list of proposed BMPs was determined to meet the flow targets, the projects were ranked using a comprehensive ranking matrix, as detailed below. The team prepared 30% preliminary engineering conceptual designs for the new projects provided in Appendix 1.

### **V.1 BMPDSS Credit Model Results**

Selection of the final proposed BMP list was an iterative process. The final proposed BMP list was developed based on an iterative assessment using the BMPDSS model. The first proposed Credit scenario included:

- Nine retrofits to existing ponds with expired permits,
- Five new detention practices in the Town,
- One new infiltration basin in the Town,
- One new underground infiltration system along Route 7 in the City,
- Three new detention practices to mitigate runoff from primarily VTrans owned impervious, and
- Eight new sand filters in the I-89 median.

A separate model run was done only with the nine existing BMP retrofits, Credits\_EX. The Credits\_EX scenario estimated a decrease in high flow of 6.85%, addressing 45% of the target (Table 6). Another Credit model was then run, Credit 1, which included all proposed retrofits except the SASH BMP. This model estimated a decrease in high flow of 17.97%, addressing 117% of the target (Table 6).

Additional field work was completed at several sites and a few revisions were made to the Credit 1 model run BMPs. A large infiltration basin on the J+L Service lot was removed, and replaced with four new infiltration BMPs in the ROW of South Main Street. In addition, a new gravel wetland was added to mitigate runoff from the SASH. These revisions and additions constitute the second proposed Credit model, Credit 2. The Credit 2 scenario estimated a 17.46% decrease in the high flow from the Pre-2002 condition, addressing 114% of the high flow target. A full modeling summary, including all the model run results completed for Rugg Brook with results compared to the original and modified target, is provided in Appendix 3 (Table A-3-1). There is also a table of BMPs, sorted by the model run to which the BMP was first added (Table A-3-2). BMPs were maintained in each subsequent run. The low flow did not increase in any Credit model scenarios.

**Table 6 BMPDSS model runs summary for proposed FRP scenario**

Model Run	Description	High Flow Reduction (%)	BMPDSS Model Run Date
Modified TMDL Target for Rugg Brook with 4.54 ac Non-Jurisdictional Future Growth		-15.30%	
VT DEC Post-2002 Condition Model	VT DEC's existing model, includes all Post-2002 BMPs	-2.49%	9/18/2013
WCA Revised Post-2002 Model (1/30/2015)	Revised Subwatersheds.	-2.50%	1/30/2015
Percent of target managed with revised Post-2002 model (1/30/2015)		16%	----
Credit_EX model	Proposed BMP scenario with only retrofits to existing BMPs with expired permits (9 projects).	-6.85%	10/10/2014
Percent of target managed with Credit_EX model run (10/10/14)		45%	----
Credit 1 model	Proposed BMP scenario with all proposed retrofits except SASH BMP.	-17.97%	10/13/2014
Percent of target managed with Credit 1 model run (10/13/14)		117%	----
Credit 2 model	Revised South Main St. practices, Nason St., and Twin Court. Add new SASH BMP.	-17.46%	1/30/2015
Percent of target managed with Credit 2 model run (1/30/2015)		114%	----

These modeled high flow reductions were then allocated to each of the MS4 entities based on impervious cover in the watershed and impervious cover managed by BMPs that provide extended detention. Each of the three MS4s have met >100% of their high flow reduction target, with the Town of St. Albans and the City of St. Albans addressing 110% and 102% respectively (Table 7).

**Table 7 BMPDSS model runs summary for proposed FRP scenario**

Owner	Target High Flow Q 0.3 (± %) Reduction	High Flow Q 0.3 (± %) Reduction Achieved with Credit Model	High Flow Q 0.3 (± %) Reduction Remaining with Credit Model <sup>1</sup>	High Flow (Q 0.3) Target addressed (%)
St. Albans Town	-11.30%	-12.4%	1.11%	109.8%
VTRANS	-2.40%	-3.42%	1.02%	142.4%
St. Albans City	-1.60%	-1.6%	0.03%	101.9%
<b>Watershed Total</b>	<b>-15.30%</b>	<b>-17.46%</b>	<b>2.16%</b>	<b>114.1%</b>
<sup>1</sup> The high flow reduction remaining is positive (+), indicating that modeled results have overachieved the high flow reduction and no reduction remains.				

## **V.2 Proposed FRP Model Scenario**

The final recommended BMP list is represented in the Credit 2 model run, which includes 31 proposed BMPs (Table 8). The proposed FRP scenario addresses 114% of the modified high flow target, providing a 14% factor of safety (FOS). The additional FOS is included in the recommended BMP list to provide the MS4s with additional options in the event the list has to be modified, or as conditions in the watershed change from what is present today.

The individual and cumulative percent of the high flow target mitigated is also included in Table 8, calculated based on the CPv storage and the BMPDSS model run result (Credit 2 run). The individual and cumulative percent mitigated allows for a quick understanding of the relative benefit of each BMP toward meeting the high flow target. The CPv volume is used as an indicator of the percent mitigated because it was determined by the VT DEC that the high flow ( $Q_{0.3\%}$ ) is approximately equivalent to the 1-year storm peak discharge. Essentially, the high flow is directly reduced in the model by mitigating the CPv.

The cumulative percent of target addressed, allows the MS4s flexibility in the event one of the top projects is determined infeasible and the projects need to be rearranged. The TMDL requires that 100% of the high flow target be addressed. The ultimate determination for implementation of projects providing benefit beyond the high flow target (>100%) will be made by the State based on monitoring data or other relevant information. Progress toward the TMDL flow targets with the proposed FRP scenario was allocated by MS4 to determine the extent to which the proposed BMPs addressed each MS4's allocated responsibility of the flow targets, summarized in Table A-3-3 (Appendix 3).

## VI. Proposed Implementation Plan

The proposed BMPs are summarized in Table 8, including the impervious cover treated, drainage area, and CPv storage estimated by the HydroCAD® model. A map of the proposed BMP locations is included in Appendix 4. The individual and cumulative percent of the high flow target mitigated is also included in Table 8. An additional table is included in Appendix A-3-2, which separates the projects by the model run to which the project was first added.

**Table 8 Final proposed BMPs for the Rugg Brook FRP**

Site Name	Ownership of Land where BMP is located	BMP Type <sup>2</sup>	Permit #	Drainage Area (acres)	Impervious Acres Managed (acres)	Runoff Channel Protection Volume (CPv) Storage		Percent of High flow Target Managed	Cumulative Percent of High flow Target Managed
						cft	ac-ft		
Industrial Park Pond	Town	Detention	3348-9010/ 1-1268	38.64	9.0	49713	1.141	13.4%	29.4%
Tanglewoods	Private	Detention	1-0908	27.69	8.8	28140	0.646	13.2%	42.5%
South Main St. Infiltration	Private/ Cadillac Motel	Infiltration	No Permit	6.55	3.5	15769	0.362	5.2%	47.8%
SASH/Nason St Connector	City/ VTrans/Town	Detention	No Permit	21.12	4.9	15682	0.36	7.3%	55.1%
Twin Court	Private	Detention	1-0658	17.64	5.2	15682	0.36	7.8%	62.8%
Barry Callebaut Inc	Private	Detention	3567-9010	10.37	6.9	8364	0.192	10.3%	73.2%
Nason Street/ Green Mountain Dr.	Private	Detention	1-0577	7.76	1.7	8189	0.188	2.5%	75.7%
Industrial Park Pond	Town	Detention	3348-9010/ 1-1268	38.64	9.0	49713	1.141	13.4%	29.4%

<sup>1</sup> See Table 6. The existing BMPDSS model run estimated 16% of the flow target is addressed with existing BMPs.

Site Name	Ownership of Land where BMP is located	BMP Type <sup>2</sup>	Permit #	Drainage Area (acres)	Impervious Acres Managed (acres)	Runoff Channel Protection Volume (CPv) Storage		Percent of High flow Target Managed	Cumulative Percent of High flow Target Managed
						cft	ac-ft		
Clyde Allen Dr.	Private	Detention	2-1168	11	2.5	8015	0.184	3.8%	79.5%
St Albans Milk and Maple (P3)	Private/Public Road	Detention	1-1428c (P3)	3.08	1.3	6447	0.148	1.9%	81.4%
South Main St.-2	City	Infiltration	No Permit	4.13	1.2	4792	0.11	1.8%	83.2%
St Albans Milk and Maple (P2)	Private	Detention	1-1428a (P2)	1.66	1.4	4095	0.094	2.2%	85.4%
Freeborn St.	Private/ Public Road	Underground Infiltration	No Permit	2.94	1.3	3572	0.082	1.9%	87.3%
South Main St.-3	City	Infiltration	No Permit	0.98	0.4	2526	0.058	0.7%	88.0%
Church of the Rock	Private	Detention	1-0930	3.24	1.4	2483	0.057	2.1%	90.0%
Pineview Estates (P2)	Private	Detention	1-1563	5.52	1.9	2047	0.047	2.9%	92.9%
Pineview Estates (P3)	Private	Detention	1-1563	4.9	0.9	1437	0.033	1.3%	94.2%
Sunset Terrace Phase 3	Private	Detention	1-1442	1.75	0.7	958	0.022	1.0%	95.2%
Pineview Estates (P1)	Private	Detention	1-1563	1.02	0.3	697	0.016	0.5%	95.7%
South Main St.-1	City	Infiltration	No Permit	0.9	0.2	1394	0.032	0.4%	96.0%
Exit 19 South_CN	VTrans	Detention	No Permit	62.11	3.8	90169	2.07	5.6%	101.7%
Access Rd. East	VTrans/Private	Detention	No Permit	103.1	2.8	79279	1.82	4.1%	105.8%

Site Name	Ownership of Land where BMP is located	BMP Type <sup>2</sup>	Permit #	Drainage Area (acres)	Impervious Acres Managed (acres)	Runoff Channel Protection Volume (CPv) Storage		Percent of High flow Target Managed	Cumulative Percent of High flow Target Managed
						cft	ac-ft		
Access Rd. West	VTrans/Priv	Detention	Portion of 1-1428	13.7	0.6	28401	0.652	0.8%	106.6%
SDC87	VTrans	Median Filter	No Permit	3.8	0.9	5579	0.128	1.4%	108.0%
SDC83b	VTrans	Median Filter	No Permit	1.8	0.4	3339	0.077	0.5%	108.5%
SDC27	VTrans	Median Filter	No Permit	1.61	0.4	2762	0.063	0.6%	109.2%
SDC280	VTrans	Median Filter	No Permit	2.13	0.4	2741	0.063	0.6%	109.7%
SDC347	VTrans	Median Filter	No Permit	1.4	0.3	2608	0.06	0.5%	110.2%
SDC83a	VTrans	Median Filter	No Permit	1.71	0.3	2534	0.058	0.4%	110.6%
SDC342	VTrans	Median Filter	No Permit	1.6	0.3	2358	0.054	0.5%	111.0%
SDC29	VTrans	Median Filter	No Permit	2.25	0.4	2358	0.054	0.6%	111.6%
I-89/Holyoke Farm	Private	Infiltration	No Permit	61.87	1.6	62117	1.426	2.5%	114.1%
				Totals:	99.9		10.66		

<sup>2</sup> BMP Type: Detention = stormwater pond designed to detain the 1-yr design storm (1.94"). Underground infiltration = storage tank under pavement or grass which infiltrates runoff into the subsurface soils.

## VI.1 Proposed Retrofits to Existing BMPs

Each existing BMP with an expired stormwater permit providing CPv storage was assessed for retrofit to meet the 2002 VTSWMM standards. Nine of the existing detention ponds were not providing full detention of the CPv for 12 hours. For most of the ponds, either a new low flow or reduced size orifice was proposed to provide full CPv detention. Expansion of several of the ponds was also proposed. Table 9 summarizes the retrofits proposed for the existing BMPs.

**Table 9 Proposed retrofits to existing BMPs**

Permit #	Project Name	Address	Managed Impervious (acres)	Existing System	Proposed Retrofit
1-0908	Tanglewoods	Tanglewoods Dr.	8.8	Shallow detention pond. Flooding issues in upstream conveyance.	Regrade pond, add outlet structure, add two forebays and improve drainage swales to reduce flooding.
3567-9010	Barry Callebaut Inc	Industrial Park Rd.	6.9	Detention Pond	Reduce 8" low flow orifice to 2.5".
1-1428a	St Albans Milk and Maple/ Mobil (P2)	Fairfax Rd. /SASH	1.4	Detention area in Mobil Station parking lot (North)	Regrade and expand existing detention area.
1-1428c	St Albans Milk and Maple/ Mobil (P3)	Fairfax Rd. /SASH	1.3	Detention Pond in Mobil Station parking lot (West)	Reduce low flow orifice from 4" to 2".
1-0930	Church of the Rock	Fairfax Rd. / Garden Dr.	1.4	Detention Pond in back parking lot.	Remove 4" low flow orifice. Expand Pond.
1-1563	Pineview Estates (P1)	Fairfax Rd. / Allaire Dr.	0.3	1 of 5 ponds built for Pineview Estates Subdivision.	Add 2" low flow orifice at 518.75'.
1-1563	Pineview Estates (P2)	Fairfax Rd. / Allaire Dr.	1.9	1 of 5 ponds built for Pineview Estates Subdivision.	Reduce 3" low flow orifice to 2".
1-1563	Pineview Estates (P3)	Fairfax Rd. / Allaire Dr.	0.9	3 of 5 ponds built for Pineview Estates Subdivision.	Add 2" low flow orifice. Needs Maintenance.
1-1442	Sunset Terrace Phase 3	Sunset Terrace Rd.	0.7	Existing pond, built for portion of Sunset Terrace subdivision.	Reduce 2" low flow to 1.5". Expand and clear overgrowth.



## VI.2 Town of St. Albans Proposed New BMPs

### Industrial Park Pond (#3348-9010/ #1-1268)

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In 2008, Cross Engineering of St. Albans, developed a stormwater enhancement study for the industrial park, under contract with the Franklin County Industrial Development Corp (Appendix 1-Plans). The study was tabled at the time. The focus of the study was an existing stormwater lagoon, that since has been abandoned (Figure 3). In 2012, part of the proposed enhancements were implemented including several engineered check dams within the median strip along Industrial Park Road. The improvements were observed to be functioning as designed on a site visit in September of 2014.



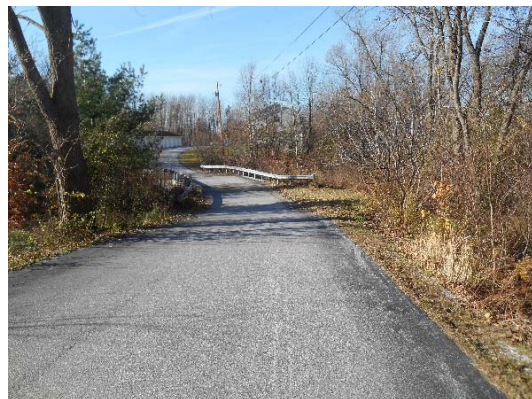
**Figure 3. Industrial Park median swales which drain to the area of the proposed new detention pond.**

The initial design involved an expanded detention pond extending from the existing stormwater pond at the end of Industrial Park Road, to the south onto Mylan Technologies Property. A new inlet pipe would route runoff from 38.64 acres of the industrial park to the pond. This design would meet the water quality, CPv, overbank flood control, and extreme flood control. Mylan Technologies and the neighboring property owner, Lapierre, were not willing to provide land for the project. Therefore, an alternative smaller pond design was developed in 2009 by Cross Engineering. This alternative design includes a revised detention pond layout within the Town owned parcel at the end of Industrial Park Road, but does not provide full overbank flood protection or extreme flood control. Cross Engineering's design and corresponding report are included in Appendix 1. This was the design used for the BMP in the BMPDSS modeling assessment. A revised cost estimate was developed for the project as well.

### Twin Court Pond (#1-0658)

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Twin Court has a history of flooding issues along the roadway. Ruggiano Engineering developed plans to increase the size of the stormwater conveyance along Twin Court. In addition, a detention pond is proposed at the end of the conveyance system, located along the stream on the north side of the stream crossing (Figure 4).



**Figure 4. Rugg Brook crossing at end of Twin Court.**

The Town has discussed accepting ownership of a portion of the roadway, currently owned by the Homeowner's Association (HOA) of the condominiums on the west side of the Rugg Brook crossing. However, there have been easement issues with the HOA, slowing progress on this project. The pond was included in the project list and FRP assessment.

### **Clyde Allen Drive Gravel Wetland (#2-1168)**

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Clyde Allen Drive is a neighborhood off Fairfax Street with a system of catchbasins and swales permitted under expired permit #2-1168. The existing drainage system drains directly to the stream. The open grass lawn, just south of the Vermont Housing Authority owned homes, was identified as an ideal location for a detention retrofit due to the open space, proximity to the stream, and ability to help mitigate an existing flooding issue (Figure 5).



**Figure 5. Grassed lawn proposed for retrofit with new gravel wetland.**

Across the road from the BMP site, there is an area of low ground in the backyard of two homes (Figure 6). The homeowners have brought the issue of standing water to the attention of the Town before, and have reported wet basements.

The proposed retrofit involves installing a new footing drain and stone swale between the two homes' backyards. The footing drain would then connect to a new storm pipe, which would be routed to the proposed gravel wetland. Two new 18 inch culverts would also be needed to provide the necessary drain improvements. A flow splitter will route the 1-year storm to the proposed gravel wetland, while all high flows are routed to existing discharge, with additional buffer improvements. The proposed gravel wetland will be a large open basin, with vegetation on the surface. Beneath the vegetation will be 2 feet of stone, which provides additional storage and filtering of sediment and other pollutants from the stormwater prior to discharge out a low flow orifice.



**Figure 6. Low area between homes along Clyde Allen Drive with history of flooding. New footing drain and outlet proposed to drain area.**

### **Freeborn Street Infiltration Basin**

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An area east of South Main Street, at the intersection of Freeborn Street and Potter Avenue, was identified as a potential site for an infiltration basin. There is a pocket of soils mapped as Hydrologic Group B, which is suitable for infiltration. Upon field inspection, it appeared the existing stormwater outfall, just to the left of the open green space was severely eroded (Figure 7). In addition, an exposed PVC sewer pipe was observed within the existing channel. The sewer pipe was covered with stone shortly after observation in the field (Figure 8). The work revealed there are sandy soils in this area.



**Figure 7. Open lawn area on Freeborn Street identified for stormwater retrofit.**

This project was installed by the Town of St. Albans during the summer of 2015. The retrofit involved the installation of an underground infiltration basin at the edge of the open grass lawn. The existing stormwater conveyance system was routed to the new basin, with a high flow bypass (>10-year storm) to a new outfall. The infiltration basin consisted of a 15'x 50' chamber with 6

feet of drainage stone. A Downstream Defender® (D4GA) pretreatment hydrodynamic separator was placed at the inlet for ease of maintenance, and to ensure longevity of the infiltration. The Downstream Defender is vacuumed like a typical catch basin.



**Figure 8. New stone cover in existing drainage swale, near location of the new infiltration basin.**

### **Nason Street/Green Mountain Drive (#1-0577) Detention**

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The neighborhood along Green Mountain Drive is currently covered under an expired stormwater permit (#1-0577). It was determined that the northern portion of the neighborhood, north of Victoria Drive, drains to a collection system on the west side of Green Mountain Drive. The east side of Green Mountain Drive drains to a bowl-shaped area with a 24-inch culvert to the brook (Figure 9).

The bowl-shaped area in the right-of-way was identified as a retrofit site to provide detention and



**Figure 9. Nason St. / Green Mt. Dr. Right-of-Way**

improved water quality. The project would involve regrading the existing depressed area to a detention basin, with a low flow orifice and high flow bypass to the existing culvert. In addition, the swale on the east side of the roadway would be regraded to create a series of detention areas, with lateral check dams. The bowl would be grassed for ease of maintenance.

### **VI.3 City of St. Albans Proposed BMPs**

#### **South Main Street Infiltration Basins**

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Along South Main Street and Route 7, between the intersection with the SASH to Freeborn Street, there is an area of Hydrologic Group B soils, which have potential for infiltration. As such, the ROW was inspected for opportunities for green stormwater infrastructure practices, like stormwater planters, curb extensions, underground infiltration basins, dry wells, etc.

##### **South Main Street Infiltration Basin:**

A large open grass area in front of the Cadillac Motel was identified as the location for a proposed 840 square foot underground infiltration basin (Figure 10). An underground infiltration chamber system was selected as the best option because this type of practice requires limited maintenance and will not interfere with road maintenance operations. The chamber would be offline, tied into the existing stormwater conveyance system along Route 7, and sized to mitigate the 1-year design storm. Flows above the 1-year storm would bypass the system. Potential water line conflicts are still to be determined. The town would need to acquire an easement for the practice from the motel property owners.



**Figure 10. Entrance to Cadillac Motel. Site of proposed underground infiltration basin.**

##### **South Main Street M1, M3, M3:**

Along Route 7, three stormwater curb extensions with infiltration basins were proposed in the right-of-way, designed as offline practices to detain and infiltrate up to the 1-year design storm volume (Figures 11, 12, and 13). An example of a stormwater curb extension is provided in Figure 14. The practices would be tied into the existing stormwater conveyance system. Curb cuts would be installed to increase catchment of surface runoff from the roadway. The current roadway width is approximately 25 feet, which is wider than the minimum 13 feet for shared use. The proposed practices would extend a maximum of 4 feet into the existing roadway, maintaining the required road width. Practices could be left with a pea gravel surface to reduce maintenance.



**Figure 11. Site for "M2" Stormwater Curb Extension along Route 7.**



**Figure 12. Site for "M3" Stormwater Curb Extension along Route 7.**



**Figure 13. Site for "M1" Stormwater Curb Extension along Route 7.**



**Figure 14. Example of a stormwater curb extension for the Route 7 ROW (Credit: VA DRC Stormwater Design Manual 2013).**

## VI.4 VTrans Proposed BMPs

### Exit 19 South Detention Basin

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The center median between the Exit 19 South on-ramp and the SASH is presently contoured and piped to collect drainage from three segments of I-89, and a large portion of the upper watershed, east of I-89. This makes this site a feasible candidate for stormwater improvements (Figure 15). The land is within the VTrans ROW and would only treat VTrans owned impervious, with the exception of a small amount of private impervious area at the top of the upstream watershed. The proposed BMP is a stormwater detention pond designed to VTrans standards for structures within the ROW, with approximately 2 acre-feet of storage. Water quality components such as a sand or stone bed, forebay, and/or micro pool could be integrated into the design if necessary. The site was screened for natural resources and found to contain dense *Phragmites australis* growth, which will need to be considered in the excavation process. It is recommended that excavated materials are re-used onsite to minimize the spread of invasive species offsite.



**Figure 15. Exit 19 center median. Site of proposed stormwater basin.**

### Access Road East (SASH/Fairfax Road)

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There is a privately owned open space, located between Rugg Brook, the northwest corner of Fairfax Road, and the SASH, which is a candidate site for implementation of a new stormwater detention basin (Figure 16). A stone bed and micro pool are proposed to improve water quality benefits of the project. The proposed basin would collect and store drainage from a segment of an existing mapped tributary which takes drainage from an expired permit site (#1-1428), a segment of I-89, and a large area of the upper watershed east of I-89.



**Figure 16. Site of proposed Access Rd. East project.**

The location of the proposed BMP is on land that is currently owned by a local farmer, and within the VTrans ROW. The section of land which is proposed for BMP implementation appears to be devoid of farming practices, likely due to the presence of the existing tributary dividing the field. This BMP would be a shared system that would require town management and cost sharing with VTrans as well as private permittees. This

project has the potential to provide very significant benefits toward the flow target in the watershed, therefore it would be worth the effort to approach the landowner.

### Access Road (SASH) West Basin

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The Access Road (SASH) West Basin would be located along the northern (westbound) side of a section of the SASH. The BMP was designed as a median sand filter which would collect drainage from the roadway and the upslope field, before draining to a culvert under the SASH. The BMP could be designed to provide CPv storage as well as water quality treatment. This project would be located within the VTrans ROW, but has potential for cost-sharing with the Town, as the BMP would treat drainage from privately owned land, and cropland within the Town. Additionally, a portion of the highway which currently drains to the Tanglewood subdivision basin, under expired permit #1-0908, would drain to the proposed BMP.



**Figure 17. Site of proposed "Access Rd. East Basin" at intersection of Fairfax Rd. and the SASH.**

### Median Sites

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Eight median sites were identified which would detain and treat runoff from I-89 in the existing highway median. The structures would be considered equivalent to dry swales as defined in the 2002 VTSWMM. The structures would be located in existing vegetated stormwater conveyances in the I-89 median. Key features of the structures include earthen check dams designed to create up to 1.5 feet of ponding depth behind each dam, amended soils consisting of a 50/50 blend of sand and native soil at the surface, and a pure sand filter below (Figure 18). A perforated underdrain wrapped in stone would be located below the sand filter, which would be connected to the outlet structure, or daylighted. A plan for SDC 280 is provided to demonstrate the typical layout of the median sand filter BMP, which would be consistent for the other median sites (Appendix 1). The proposed sand filters are consistent with the three filter systems constructed in the Exit 19 ROW in 2013—existing BMPs VTrans 138, 75c, and 80b (See Map in Appendix A-4).



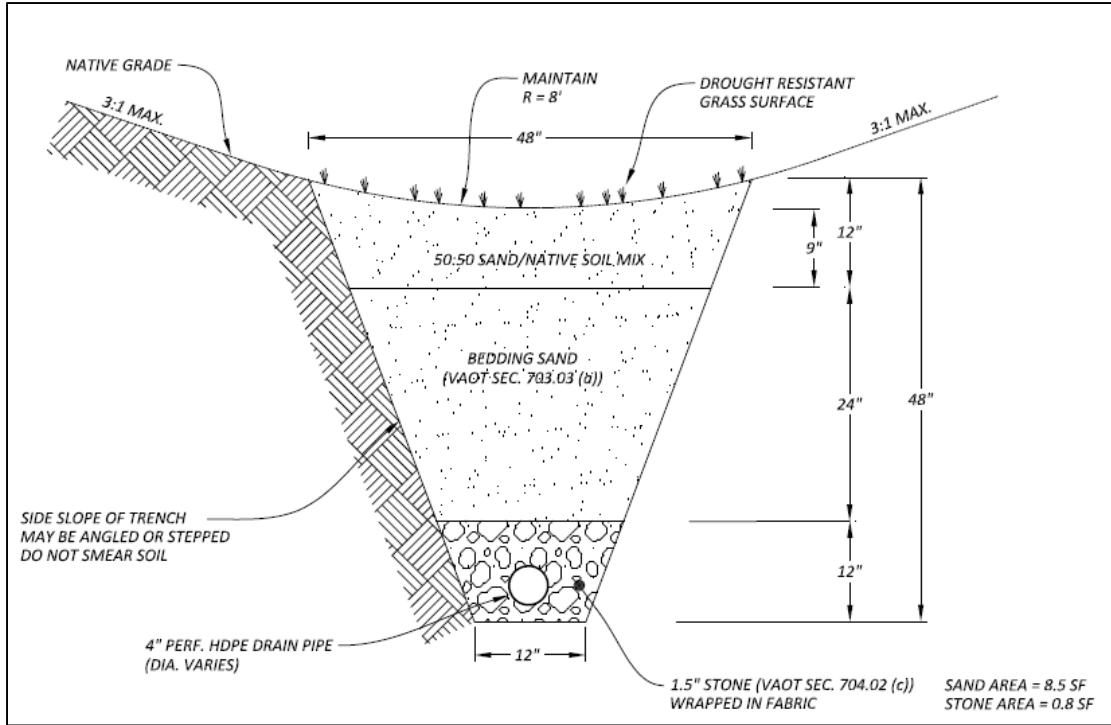


Figure 18. Median filter section view (Credit- WCA)

## VI.5 Joint MS4 Proposed BMPs

### I-89/ Holyoke Farm Infiltration Basin

On the southern border of the impaired watershed boundary, there is an area with Hydrologic Group A mapped soils, which have potential for infiltration. The area was identified as a potential site for an infiltration BMP to treat runoff from an I-89 culvert. The proposed BMP would be located on land owned by an active farm, adjacent to I-89, located off Holyoke Farm Road. This project is one of five BMPs that have the potential to increase baseflow to the stream, via infiltration, which addresses both the high flow and low flow TMDL targets.

The proposed BMP would be a 15,000 square foot infiltration basin (Figure 19). The surface would be reseeded with grass for ease of maintenance. Below the surface would be 3 feet of drainage stone on top of the native soil. The basin would detain and filter the 1-year design storm CPv to reduced Total Suspended Solids (TSS), and Total Phosphorus (TP). New surface flow paths draining to the proposed BMP would be constructed as well as a new discharge pipe to direct runoff from the southern VTrans culvert to the practice (Figure 19). The proposed placement of the BMP was based on optimizing catchment of runoff from two I-89 culverts and the flat terrain. The existing use of the open space for farm operations would need to be verified to limit disturbance to the owner’s ongoing use of the land.

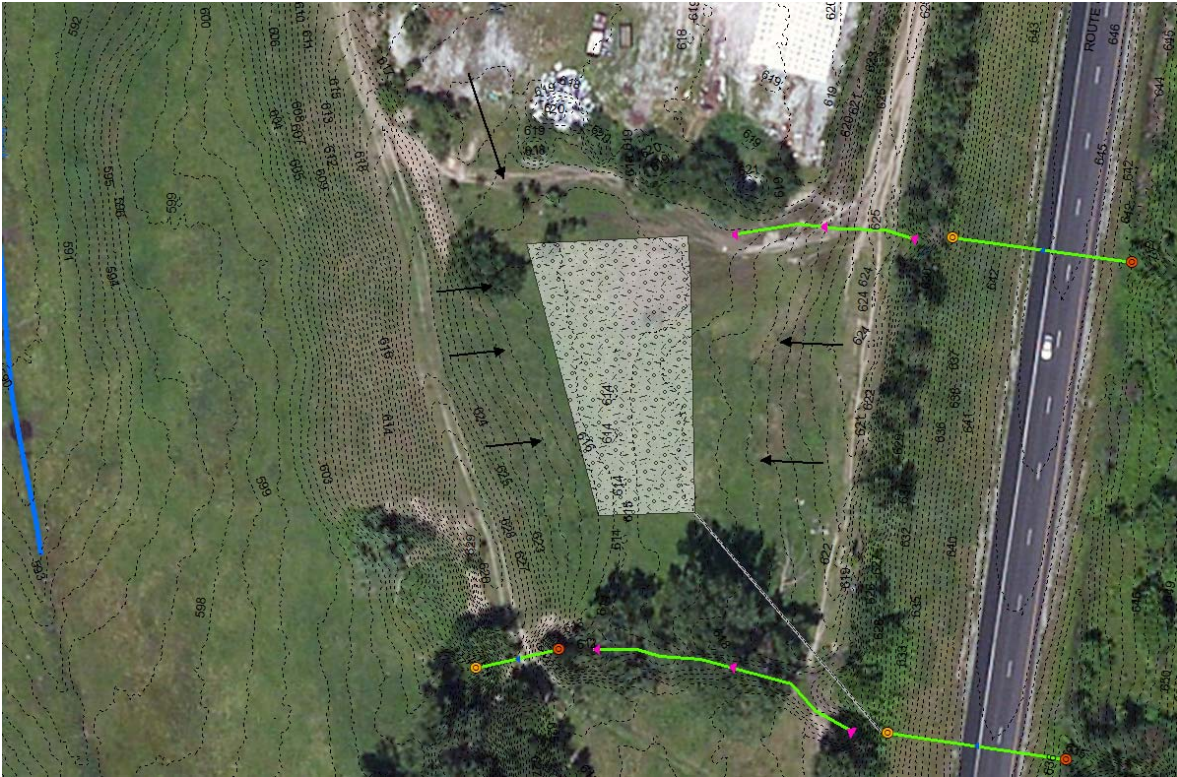


Figure 19. Proposed infiltration basin on farm land, located off Holyoke Farm Rd.

The proposed project is on land owned by an active farm. There is potential the farm may need to implement BMPs for compliance with the Lake Champlain Phosphorus TMDL. This proposed project has potential to also address runoff from the farm to mitigate phosphorus runoff, which could provide VTrans with a joint opportunity to address runoff from a portion of I-89.

### SASH/Route 7 Gravel Wetland

The culvert under Route 7 on South Main Street (at the west end of the SASH) was identified as a priority for stormwater drainage management. The existing drainage area for the culvert includes: a majority of impervious cover from the SASH owned by VTrans, the portion of the SASH owned by the City, and a minor portion of the St. Albans Education Center's back parking lot (Figure 20). There is no VTrans owned land available to manage the SASH runoff. A City owned parcel, located across Route 7 from the SASH and set back approximately 500 feet from the culvert outlet, was identified as a potential location for a gravel wetland to provide storage and filtration for the 1-year storm runoff volume.

**Nason Street Connector Project:** Plans developed by VHB Engineering to add a new road connection from Route 7 to Lemnah Drive were considered when developing the plan for this project. As of now, the project is at the 60% design phase. Based on plans from January 2015, a water quality basin was proposed between the railroad and new road, potentially leaving space for an additional BMP. The Nason Street Project is still in the design phase, and is subject to

change. Therefore, this project may need to be revised and/or could be prohibited due to the lack of available space.



**Figure 20. Drainage area for SASH/Route 7 culvert, with MS4 boundaries. The proposed plan as of January 2015 for the Nason St. Connector road was included in this map (NW corner).**

## VI.6 Watershed-Wide Project Ranking

A comprehensive ranking matrix was developed in order to rank the proposed projects based on a multitude of criteria grouped into four general categories. The purpose of the ranking matrix is to provide the MS4s with a tool to prioritize projects on a number of criteria, rather than just on flow benefit. The matrix is set up for use in the future as new information for the proposed BMPS is developed and/or BMPs are added or removed from the list. The criteria and categories are included in Table 10.

**Table 10 Criteria used for project ranking**

Category	ID	Criteria
Cost/Operations	A	Relative Project Cost
	B	Ease of O/M
Project Design Metrics	C	Impervious Acres Managed (ac)
	D	Channel Protection Volume (CPv) Mitigated, (ie. 1-year Storm)
	E	Volume Infiltrated (ac-ft)
	F	Water Quality (WQ) Volume Control
	G	Primary or Secondary BMP
Project Implementation	H	Permitability
	I	Land Availability
Other Project Benefits	J	Flood Mitigation (Is existing flooding issue mitigated by project?)
	K	TMDL Flow Target Addressed (Q <sub>03%</sub> , Q <sub>95%</sub> )
	L	Lake Champlain Phosphorus TMDL Metrics Met*
	M	Other Project Benefits/Constraints (Educational, Infrastructure Improvement, Unknown Feasibility)

\*For now the Lake Champlain Phosphorus TMDL criteria is a placeholder, until the final TMDL is approved and the compliance metrics are outlined.

Values for each criteria were identified and assigned a relative score so the projects could be ranked based on a total score. A secondary set of water quality criteria were added to the matrix to rank the BMPs on water quality benefits, using the Source Loading & Management Model (WinSLAMM). WinSLAMM is a field verified and calibrated model that will accurately predict pollutant loading and BMP effectiveness. WCA modeled the BMPs using WinSLAMM and quantified the annual TSS and TP reductions in loads of pollutant per year. Ranges for the TSS and TP removals were identified, and assigned a score of zero to six points, with six being the greatest benefit. The final ranking of proposed projects is included in Table 11 below. The criteria key (Table A-5-1), scoring key (Table A-5-2), and the full matrix spreadsheet (A-5-3) are included in Appendix 5. A separate table with the TP and TSS loading reductions for each proposed BMP is provided in Appendix A-5-4.

**Table 11 Ranked proposed FRP BMPs based on comprehensive ranking matrix**

Rank	Site ID	MS4	Retrofit Description	Total Score
1	Tanglewoods	Town	Expand and retrofit Detention Basin	25.00
2	Industrial Park Pond	Town	Expand abandoned pond and redirect parking lot/road runoff to pond.	25.00
3	Exit 19 South	VTrans	Detention Basin	22.00
4	Barry Callebaut Inc	Town	Reduce 8" low flow orifice to 2.5".	21.00
5	S. Main St. Infiltration	City	Underground Infiltration gallery in open space at Cadillac Motel Entrance	20.50
6	S. Main St.-2	City	Dry well system in ROW	20.25
7	SASH/Federal St Connector	VTrans/City	Incorporate detention of SASH runoff with Federal St. Connector Project	20.00
8	Clyde Allen Dr.	Town	Gravel Wetland	19.00
9	Access Rd. East	VTrans	Gravel Wetland	19.00
10	SDC83b	VTrans	Median Filter	19.00
11	SDC27	VTrans	Median Filter	19.00
12	SDC83a	VTrans	Median Filter	19.00
13	SDC342	VTrans	Median Filter	19.00
14	SDC29	VTrans	Median Filter	19.00
15	S. Main St.-1	City	Dry well system in ROW	18.25
16	S. Main St.-3	City	Dry well system in ROW	18.25
17	Freeborn St.	Town	Dry Well adjacent to parking lot	18.25
18	SDC87	VTrans	Median Filter	18.00
19	SDC280	VTrans	Median Filter	18.00
20	Nason St./ Green Mountain Dr.	Town	Bioretention with underdrain along roadway	18.00
21	St. Albans Milk and Maple (P2)	Town	Regrade and expand pond.	18.00
22	St. Albans Milk and Maple (P3)	Town	Reduce low flow orifice.	18.00
23	Church of the Rock	Town	Remove 4" low flow orifice. Expand Pond.	18.00
24	SDC347	VTrans	Median Filter	18.00
25	Pineview Estates (P2)	Town	Reduce 3" low flow orifice to 2".	17.00
26	I-89/Holyoke Farm	Town	Infiltration Basin	16.00
27	Pineview Estates (P1)	Town	Add 2" low flow orifice at 518.75'.	16.00
28	Pineview Estates (P3)	Town	Add 2" low flow orifice.	16.00
29	Sunset Terrace Phase 3	Town	Reduce 2" low flow to 1.5".	16.00
30	Twin Court	Town	Detention Basin.	16.00
31	Access Rd. West	VTrans	Gravel Wetland	13.00

## VI.7 Critical Source Area Study for St. Albans

A Critical Source Area (CSA) Study was completed by the NRPC to quantify phosphorus loading in the St. Albans City and Town in order to identify critical areas for phosphorus pollution control. The proposed FRP scenario was overlaid onto the CSA study results to exhibit the proposed BMPS largely focused in areas with higher TP loading (Appendix 8). There are also areas where an existing BMP could potentially decrease the estimated TP loadings for some subwatersheds. As the Lake Champlain Phosphorus TMDL is finalized, it is important to try to address both the stormwater flow TMDL and phosphorus TMDL goals at the same time. In addition to flow control, which is the most effective way to address the stormwater TMDL, considerations for improved water quality benefits by the proposed stormwater control BMPs, were incorporated into the design alternatives. For example, phosphorus loading reductions were improved by choosing a gravel wetland design alternative, versus a detention pond.

## VII. Design and Construction Schedule

A D&C schedule is a required element of the final approved FRP, providing an outline for the implementation of the proposed FRP over a 16-year timeframe to conclude in 2032. A D&C was prepared with the 23 projects that will be implemented by the Town of St. Albans and the City of St. Albans and including the 13 projects with VTrans involvement or ownership. The projects were spaced out over the timeframe in five separate, three year phases with the final phase having 4 years. The timeline considered: effort for design, acquisition of necessary permits and/or regulatory approvals. It should be noted that both the Town of St. Albans and the City of St. Albans have projects proposed in multiple watersheds, and as such the schedule presented below may appear not well distributed across the timeframe. This is due to the schedule projects in Stevens Brook watershed. Summed project costs are shown by implementation phase in Table 12. The total costs included in this table take into account the cost sharing described below. They do not include the Freeborn St. project in St. Albans Town as this project has already been completed. The D&C is included in Appendix A-6. Adjustments to the flow targets may impact the schedule and full implementation of the proposed projects. Additionally, the D&C is a working document and will be revised based on new information about the projects and/or stream conditions.

**Table 12 Total cost by implementation phase for both MS4 entities**

MS4	Phase 1 (1-4 years)	Phase 2 (4-6 years)	Phase 3 (7-9 years)	Phase 4 (10-12 years)	Phase 5 (14-17 years)	Total Cost
St. Albans Town	\$382,000	\$110,000	\$295,000	\$789,500	\$133,000	\$1,709,500
St. Albans City	--	--	\$379,000	\$34,750	--	\$413,750

## **Cost-Share Allocation**

A cost-share was applied for projects with multiple MS4 jurisdictions based on a percentage factor. This combined the percent runoff contribution and percent impervious surface ownership within the BMP drainage area into an overall percent allocation. The percent runoff contribution was determined using site specific HydroCAD models for each BMP drainage area. The percent impervious was determined through a GIS exercise, using 2011 impervious cover mapping prepared by the Lake Champlain Basin Program. The cost-share allocation applied, provides one example for how the MS4s can share the financial responsibility for projects with contributing areas from multiple jurisdictions. The cost breakdown, percent runoff volume and percent impervious area are summarized in Appendix A-10 for the following projects: I-89 Holyoke Farm infiltration gallery, Access Road East detention basin, Access Road West detention basin, Exit 19 South basin, and the SASH/Nason Street Connector project.

## **VIII. Financial Plan**

A financial plan is required as a part of the FRP which demonstrates the means by which the plan will be financed, as well as initial BMP cost estimates. The TMDL is a watershed-wide reduction in the high flow, and therefore the proposed BMPs are located throughout the watershed. MS4 permittee ownership was considered, and the plan preparers attempted to identify BMPs with a sole MS4 owner. However, optimal BMP locations did not always follow property boundaries. For joint ownership projects, the funding responsibility will be negotiated between the involved MS4s. The challenges with cost-sharing will be considered in the final FRP proposed financial plan, and may dictate the recommended strategy.

### ***Town of St. Albans***

The Town of St. Albans hopes to establish a Stormwater Utility prior to December 31, 2018. This Stormwater Utility will cover the entire town, not just the MS4 areas. The Town plans to create a comprehensive utility similar in scope to the existing South Burlington and Williston stormwater utilities and will integrate the Green Stormwater Infrastructure LID spreadsheet developed by VLCT. At this time, the Town assumes an annual assessment per single family dwelling at \$120. Based on 2010 census data, this should generate a maximum of ~\$350,000 annually prior to offering discounts for installing and or improving stormwater mitigation structures. Assuming a maximum discount of 25%, in the "best" case with all properties receiving a maximum discount, our stormwater utility would generate ~\$250,000 annually. At ~\$250,000 spread over 20 years nominally matches the expected cost for FRP implementation for the Town. Non-residential properties will be assessed at Equivalent Residential Unit (ERU) and based on square footage of building. This amount would be in addition to pursuing grants from State and Federal sources (i.e., the Clean Water Initiative) combined with negotiating fair cost sharing arrangements with all expired, existing, and future stormwater permit holders.

While the Town does expect to apply for grants and loans, the Stormwater Utility will ensure funding as it is assumed that all grant and loan programs will be extremely competitive. The Town expects to apply for any and all grant and loan programs that it may be eligible for, but the Town is also planning to have its own funding source from the utility to meet its MS4 obligation prior to 2032. The Town does expect to negotiate fair cost sharing arrangements with any and all expired, existing, and future stormwater permit holders on sharing the cost to rehabilitate and or reconstruct their stormwater mitigation structure and other associated facilities.

### **City of St. Albans**

In order to maintain sustainable local tax and fee rates, and ensure the ability of local voters to pass any required bonds, the City of St. Albans assumes that significant state and federal funds will be available for final engineering and implementation of the BMPs listed by this FRP. The City is assuming at least an 50% match from external grant sources, such as the Clean Water Initiative. If sufficient external funds do not materialize, the City will have to delay the implementation of BMPs and update the schedules in this FRP. The City will spend the next 2 years exploring a stormwater utility as a source of local funding for the BMPs as well as the overall stormwater program associated with the MS4 permit and other related items.

In the case of multi-jurisdictional BMPs, the City is willing to pursue cost sharing of planning, construction and O&M costs based on how much land is treated within the MS4 (City/Town/VTrans). For BMPs associated with expired stormwater permits, the City will pursue financial participation of the landowner on a case-by-case basis.

#### **VIII.1 BMP Cost Estimates:**

Itemized cost estimates were developed for the VTrans, Exit 19 South Basin, as well as the Clyde Allen Drive projects (Appendix 7). For all other projects, a modified spreadsheet method was used as detailed in section 7.1.2.

##### **VIII.1.1 Itemized Cost Estimates:**

The itemized cost estimates were estimated using a combination of the VTrans estimator program, RS Means, and local values, based on the 30% engineering plans. The full itemized cost estimates are included in Appendix 7. The cost estimates are based on the following criteria:

- **Construction Cost:** The construction costs were developed based on using both VTrans 5-year average costs, VTrans Estimator Program, RS Means (where applicable), and vendor estimates as necessary for each of the itemized units.
- **Construction Contingency:** The construction contingency is calculated as 15% of the construction cost.
- **Final Design Engineering:** The final design engineering cost is estimated based on the State Fee Curve Allowance as developed by the VTDEC. The equations used are as follows:
  - For construction costs less than \$780,000



- Construction cost =  $\$1,950 + (\text{Construction cost} * 0.069)$
  - For construction costs greater than  $\$780,000$ ,
    - Construction cost =  $(\text{Construction cost}^{0.9206}) * 0.6788 * 0.30$ .
- **Construction Engineering:** The construction engineering cost is based on the State Fee Curve Allowance as developed by the VTDEC. The equations used are as follows:
  - For construction costs less than  $\$780,000$ 
    - Construction cost =  $\$3,575 + (\text{Construction cost} * 0.1265)$
  - For construction costs greater than  $\$780,000$ 
    - Construction cost =  $(\text{Construction cost}^{0.9206}) * 0.6788 * 0.55$ .
- **Other costs:** These costs are established based on simple percentages of the construction cost for the project as follows:
  - Administrative = 0.5%
  - Easement Assistance = 1.5%
  - Land Acquisition =  $\$120,000$  per acre for projects on private land (\*Value estimated by local Town Assessor)
  - Legal = 5%
  - Bond Vote Assistance = 0.5%
  - Short Term Interest = 2.5%.

### VIII.1.2 Cost Estimates Using Spreadsheet Method:

A spreadsheet-based method, originally developed by Horsley-Witten Group, was used to develop planning level costs for all proposed BMPs. The methodology was used in the development of the Centennial Brook FRP and provides consistent cost estimates for each BMP within the watershed. It is expected that these costs will change as further design is completed and site conditions and constraints are better understood. Cost estimates are based on limited site investigation, but are useful for planning purposes. All estimates presented are based on 2014 dollars.

The cost estimation is based on the design control volume as determined by HydroCAD models developed for each site, unit costs that take into account the type of BMP, a site adjustment factor that takes into account the difficulty of construction based on present development at a location, a factor for the design and permitting of the BMP, and a land acquisition cost.

**Unit Costs and Site Adjustment Factors:** construction costs were estimated using unit costs and a site adjustment factor summarized in Table 13 below. Unit costs were assigned for each BMP type, and a site adjustment multiplier was applied depending on the type of site.

**Table 13 Unit costs and adjustment factors for each BMP type**

BMP Type	Base Cost (\$/ft <sup>3</sup> )
Detention Basin	\$2
Infiltration Basin	\$4
Underground Chamber (infiltration or detention)	\$12
Bioretention	\$10
Green Infrastructure/ Underground Chamber Combo	\$22
Site Type	Cost Multiplier
Existing BMP retrofit	0.25
New BMP in undeveloped area	1
New BMP in partially developed area	1.5
New BMP in developed area	2
Adjustment factor for large aboveground basin projects	0.5

Derived from Horsley Witten Memorandum Dated January 9<sup>th</sup> 2014 (Page 11)

**Site Specific Costs:** Cost of significant utility or other work related to the construction of the BMP itself. Site specific costs are variable based on past experience.

**Base Construction Cost:** Calculated as the product of the design control volume, the unit cost, and the site adjustment factor.

**Permits and Engineering Costs:** Used either 20% (for largest storage volume projects), and 35% for smaller or complex projects.

**Land Acquisition Costs (Modified):** A variation from the HW method was applied. Based on an estimate from the City Assessor, the land acquisition cost was calculated as \$120,000 per acre required for the BMP, applied to projects on private land. It should be noted that this value is based on a limited estimate and not necessary an expected cost per acre.

**Total Project Cost:** Calculated as the sum of the base construction cost, permitting and engineering costs, and land acquisition costs.

**Cost per Impervious Acre:** Calculated as the construction costs plus the permitting and engineering costs divided by the impervious acres managed by the BMP.

**Operation and Maintenance:** The annual O&M was calculated as 3% of the base construction costs, with a maximum of \$10,000.

**Minimum Cost Adjustment:** After total project costs were determined for each proposed BMP based on the HW methodology, costs were reviewed and adjusted so that projects involving an outlet retrofit, such as a new outlet structure, were assigned a minimum cost of \$10,000, and a project involving an expansion retrofit were assigned a minimum cost of \$25,000.

### VIII.1.3 BMP Cost Estimates Table

The total cost for implementation of the FRP projects was determined, with assumed cost-sharing for the joint MS4 projects (Table 14). This is an approximate estimate and is subject to change, based on more refined design and cost-sharing agreements. The cost breakdown is relatively consistent with the impervious cover breakdown in the watershed. Tables 15 and 16 show the cost breakdown by BMP for the Town of St. Albans and the City of St. Albans respectively. The Freeborn St. project in St. Albans Town has already been completed. As such, the cost of this project has not been included in the watershed and MS4 totals below.

**Table 14 Total project cost estimate for FRP projects by MS4, assuming cost sharing for joint MS4 projects**

MS4	Total Project Cost
Town of St. Albans	\$1,709,500
City of St. Albans	\$413,750
VTrans	See VTrans FRP Document
<b>Total:</b>	<b>\$2,123,250 (excluding VTrans)</b>

**Table 15 Proposed BMPs cost estimates for the Town of St. Albans**

Project Name	Impervious Cover (Acres)	Design Control Volume (ac-ft)	Base Unit Cost (\$/cft)	Site Adjustment Factor	Permits & Engineering Contingency	Land Cost	Minimum Project Cost (\$10k for simple retrofits; \$25k otherwise)	Final Project Cost Rounded to Nearest \$1,000	St. Albans Town Cost Allocation (% of total project cost)	St. Albans Town Cost Allocation (\$)
Pineview Estates (P1)	0.2	0.02	\$2	0.25	\$122	\$0	\$10,000	\$10,000	100%	\$10,000
St Albans Milk and Maple (P3)	1.3	0.15	\$2	0.25	\$1,128	\$0	\$10,000	\$10,000	100%	\$10,000
Sunset Terrace Phase 3	0.3	0.02	\$2	0.25	\$168	\$0	\$10,000	\$10,000	100%	\$10,000
Pineview Estates (P2)	1.7	0.05	\$2	0.25	\$358	\$0	\$10,000	\$10,000	100%	\$10,000
Pineview Estates (P3)	0.5	0.03	\$2	0.25	\$144	\$0	\$10,000	\$10,000	100%	\$10,000
Barry Callebaut Inc	7.0	0.19	\$2	0.25	\$836	\$0	\$10,000	\$10,000	100%	\$10,000
St Albans Milk and Maple (P2)	1.4	0.09	\$2	0.25	\$717	\$0	\$25,000	\$25,000	100%	\$25,000
Church of the Rock	1.4	0.06	\$2	0.25	\$248	\$0	\$25,000	\$25,000	100%	\$25,000
Tanglewoods	7.7	0.65	\$2	0.5	\$9,849	\$0	\$25,000	\$38,000	100%	\$38,000
SASH/Nason St Connector **	4.3	0.39	\$2	2	\$23,601	\$48,000	\$25,000	\$139,000	50%	\$69,500
Exit 19 South	6.9	2.07	Itemized Cost Estimate*					\$360,000	25%	\$90,000
Nason St./ Green Mountain Dr.	1.5	0.19	\$10	1	\$16,379	\$0	\$25,000	\$98,000	100%	\$98,000
Twin Court	4.2	0.36	\$2	2	\$21,954	\$16,080	\$25,000	\$101,000	100%	\$101,000
Freeborn St. <sup>1</sup>	1.1	0.08	Itemized Cost Estimate*					\$120,000	100%	\$120,000
Access Rd West	0.6	0.65	Itemized Cost Estimate*					\$250,000	50%	\$125,000
I-89/Holyoke Farm	2.7	1.43	\$4	1	\$49,693	\$72,000	\$25,000	\$370,000	50%	\$185,000
Industrial Park Pond	18.5	1.14	\$2	1.5	\$52,187	\$31,440	\$25,000	\$233,000	100%	\$233,000

Clyde Allen Dr.	2.4	0.18	Itemized Cost Estimate*	\$250,000	100%	\$250,000	
Access Rd East	10.2	1.82	Itemized Cost Estimate* (Significant land cost included)	\$820,000	50%	\$410,000	
				<b>Total</b>	<b>\$2,769,000<sup>1</sup></b>	<b>Total</b>	<b>\$1,709,500</b>

\* An itemized cost estimate was completed for this project, which was considered to be a more accurate representation of the costs based on site-specific conditions.

\*\* Although this project is a retrofit of an existing BMP, it was determined that due to site specific complexity, costs would be comparable to a new BMP. As such, a site adjustment factor of 2 was used.

<sup>1</sup> The Freeborn St. project has already been completed. As such, totals do not take this project into account.

**Table 16 Proposed BMPs cost estimates for the City of St. Albans**

Project Name	Impervious Cover (Acres)	Design Control Volume (ac-ft)	Base Unit Cost (\$/cft)	Site Adjustment Factor	Permits & Engineering Contingency	Land Cost	Minimum Project Cost (\$10k for simple retrofits; \$25k otherwise)	Final Project Cost	Final Project Cost Rounded to Nearest \$1,000	St. Albans Town Cost Allocation (% of total project cost)	St. Albans Town City Allocation (\$)
SASH/Nason St Connector	4.3	0.39	\$2	2	\$23,601	\$48,000	\$25,000	\$139,032	\$139,000	25%	\$34,750
South Main St.-1	0.2	0.01	\$22	1.5	\$5,031	\$0	\$25,000	\$25,000	\$25,000	100%	\$25,000
South Main St.-2	1.1	0.03	\$22	1.5	\$15,094	\$0	\$25,000	\$58,218	\$58,000	100%	\$58,000
South Main St.-3	0.4	0.02	\$22	1.5	\$10,062	\$0	\$25,000	\$38,812	\$39,000	100%	\$39,000
S. Main St. Infiltration	3.1	0.28	\$12	1	\$51,227	\$59,760	\$25,000	\$257,348	\$257,000	100%	\$257,000
								<b>Total</b>	<b>\$518,000</b>	<b>Total</b>	<b>\$413,750</b>

\*\* Although this project is a retrofit of an existing BMP, it was determined that due to site specific complexity, costs would be comparable to a new BMP. As such, a site adjustment factor of 2 was used.

## **IX. Regulatory Analysis**

### ***Town of St. Albans***

The Town of St. Albans has decided that all expired stormwater permits be incorporated into the Town's MS4 permit. The Town does not request that the State exercise Residual Designation Authority (RDA) on any of the expired permits in Rugg Brook at this time. The Town is working diligently to contact the homeowners responsible for the expired permits to complete the needed maintenance and discuss the Town's intention of taking over the permits. In many cases this is a difficult and time consuming task given no homeowner associations exist. It remains a possibility that the Town may request RDA assistance from the Agency of Natural Resources, if an agreement for the Town to take over an expired permit cannot be reached. Additional regulatory authorities will likely be required. The Town plans to establish a Stormwater Utility prior to December 31, 2018.

The Town does not expect to have any "third party" implementation beyond VTrans. However, the Town does expect financial participation from "third parties", namely the appropriate permit holders and/or current owners. The extent of financial participation from appropriate permit holders and/or owners will certainly vary, but the Town will be negotiating with the appropriate permit holders and/or owners during the Final Design and Permitting phase of each project.

### ***City of St. Albans***

Stormwater runoff within the City of St. Albans' portion of the Rugg Brook watershed is regulated primarily by the Vermont Dept. of Environmental Conservation (VTDEC), and VTrans (via 19 V.S.A. 1111 "Permitted use of the right-of-way"). VTDEC regulates new developments through issuance of Stormwater Discharge Permits with technical requirements as outlined in the 2002 Vermont Stormwater Manual. The City is required by its MS4 permit to draft and adopt its own ordinances and bylaws for the regulation of stormwater management by new land development. The City intends to have the necessary ordinances and bylaws adopted in 2017. Once this is complete, no further regulatory authorities or modifications to the above regulatory framework should be required.

The City has provided to the State a list of expired stormwater permits that will be incorporated into the City's MS4 permit and an additional list of permits of sites proposed for Residual Designation Authority (RDA) permitting through VT ANR. The City has incorporated the only expired stormwater permit within the City's portion of the impaired Rugg Brook watershed, and there are no other permits for which to request RDA. The City will assume O&M of the incorporated stormwater system and will report on any pertinent activities as part of the MS4 requirements. Therefore, the City does not anticipate the need for third party implementation within its portion of the Rugg Brook watershed.

A full list of the expired permits with discharges to Rugg Brook indicating the retrofits proposed under this FRP is included in Appendix 2 (Table A-2-1).



## X. Glossary of Terms

A glossary of relevant terms is provided below.

**Best Management Practice (BMP)-** Generally, BMPs are defined as “Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State and waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage” (MS4 Permit, 2012). In the context of the FRP, BMPs include prescribed stormwater flow control practices as defined in the computer-based BMPDSS model, in which various BMPs scenarios can be assessed.

**Best Management Practice Decision Support System (BMPDSS)-** A computer-based hydrologic model used to assess the impact of various stormwater Best Management Practice (BMP) scenarios. This tool was developed by a private consultant for the VTDEC to use as the assessment tool for the compliance of the Stormwater TMDLs.

**Channel Protection Volume (CPv)-** The stormwater volume generated from the one-year, 24-hour rainfall event (1.9”). The Vermont Stormwater CPv Design Standard requires 12 hours of extended detention storage (ED) of the CPv in warmwater fish habitat (24 hour for coldfish), as a means to reduce channel erosion.

**Detention BMP-** A BMP (eg. Pond, biofilter) which stores stormwater for a defined length of time before it eventually drains to the receiving water body. Stormwater is not retained in the practice. The objective with a detention BMP is to reduce the peak discharge ( $Q_p$ ) from the Basin, in the effort to reduce channel erosion and settle out pollutants from the stormwater.

**Flow Duration Curve (FDC)-** An FDC is a curve displaying the percentage of time during a period that flow exceeds a certain value, with the “low” flow represented by the 95<sup>th</sup> percentile ( $Q_{95\%}$ ) of the curve and the “high” flow represented by the 5<sup>th</sup> percentile ( $Q_{0.3\%}$ ).

**Flow Restoration Plan (FRP)-** The FRP is a required element of the MS4 General Permit #3-9014, under section IV. C. 1., for stormwater discharges to impaired waters. The FRP is a 20-year implementation plan of stormwater flow control Best Management Practices (BMPs) to meet the TMDL high flow target and return the impaired water to its attainment condition. The FRP is required to include a list of stormwater BMP controls, as well as modeling results from the State’s Vermont BMPDSS model demonstrating compliance of the approved TMDL flow-target with the proposed BMP list.

**Infiltration BMP-** A BMP (eg. Storm-tech Chamber, bioretention) which allows for the infiltration of stormwater into the subsurface soil as groundwater, which returns to the stream as baseflow. Mapped soils of Hydrologic group A or B (sandy well drained soils) are an indicator of infiltration

potential. Infiltration reduces the amount of surface storage required. Typical BMP practices include infiltration basins, underground chamber systems, bioretention practices, etc.

**Non-Jurisdictional Impervious-** Non-jurisdictional growth is by definition impervious area that does not require a stormwater permit and it not managed by a stormwater BMP (impervious growth < 1 acre).

**Residual Designation Authority (RDA)-** State's authority to issue an RDA permit to discharges not covered by the MS4 Permit. The RDA permit is separate from the MS4 permit, held by the private landowner.

**Stormwater Management Plan (SWMP)-** A comprehensive program to manage stormwater discharges from the Municipal Separated Storm Sewer System as mandated by the MS4 General Permit #3-9014.

**Stormwater TMDL (TMDL)-** Vermont developed stormwater TMDL's for impaired watersheds using stormwater flow as a surrogate for pollutants. The basis for the flow-based TMDL is the understanding that stormwater is the source of pollutant loading, therefore minimizing stormwater flows will reduce pollutant loading to the streams and Lake Champlain. The approved TMDL is defined by a reduction in high flows, defined as greater than the 1-year storm event (~1.94" in St. Albans). The TMDL also includes a non-actionable (not enforced) lo-flow target which is an increase in baseflow (groundwater flow to streams).

**Total Maximum Daily Load (TMDL)-** A TMDL is a calculation of the maximum pollutant loading that a water body can accommodate and still meet Vermont Water Quality Standards. The term TMDL also refers to the regulated management plan, which defines who the water body will be regulated and returned to its acceptable condition, including the maximum loading, sources of pollution, and criteria for determining if the TMDL is met.

**TMDL High flow Target -** The TMDL target defined as the percent change between the baseline condition (pre 2002) and the existing or proposed condition (Post 2002) high flow. The high flow is the flow rate in the stream that is exceeded only 0.3% of the time (Q0.3%), over a 10 year simulation period. The Q0.3% has been equated to the 1-year design storm runoff.

**TMDL Low flow Target -** The non-actionable TMDL target defined as the percent change between the baseline condition (pre 2002) and the existing or proposed condition (Post 2002) low flow. The low flow is the flow rate in the stream that is exceeded 95% of the time (Q95%), over a 10 year simulation period. The Q95% is considered "baseflow" which is the flow in a stream fed by groundwater.

## **XI. Appendices**

**Appendix G. Stevens Brook Flow Restoration Plan**



# STEVENS BROOK FLOW RESTORATION PLAN (FRP)

## MS4 GENERAL PERMIT REQUIREMENT (IV.C.1)

**FINAL REPORT**  
May 26, 2017



**Prepared for:**  
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*Town of St. Albans*

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- Appendix 2: Steven Brook Proposed BMPs Table
- Appendix 3: HydroCAD Model Output Reports
- Appendix 4: Proposed BMP Concept Plans
- Appendix 5: Proposed Design and Construction Schedule
- Appendix 6: Email Correspondences with the VT DEC
- Appendix 7: Cost Share for Joint MS4 Projects

## **I. Disclaimer**

The intent of this plan is to present the data collected, evaluations, analyses, designs, and cost estimates for the Stevens Brook Flow Restoration Plan (FRP) Project, completed under a contract between the City of St. Albans and the hired consultant team, Watershed Consulting Associates, LLC (WCA). The Stevens Brook FRP was prepared to meet the compliance requirement for the National Pollutant Discharge Elimination System General Permit 3-9014 (Vermont Department of Environmental Conservation 2012) for stormwater discharges to impaired waters for Stevens Brook impervious surface owners: the City of St. Albans and the Town of St. Albans.



## II. Executive Summary

This Flow Restoration Plan (FRP) for the Stevens Brook watershed was developed in accordance with requirements for Municipal Separate Storm Sewer System (MS4) entities. Once approved by the Vermont Department of Environmental Conservation (VT DEC) this FRP will become part of the Stevens Brook Stormwater Management Plan (SWMP) prepared by the Town of St. Albans and the City of St. Albans, two of the three MS4 permittees. The MS4 permittees in this watershed are the Town of St. Albans, the City of St. Albans, and the Vermont Department of Transportation (VTrans). Although three MS4 entities own impervious cover within the Stevens Brook watershed, VTrans has elected to prepare its own FRP document. All proposed projects including the VTrans projects are included in this document to provide a watershed-wide plan. The plan was developed in accordance with the Municipal Separate Storm Sewer System (MS4) General Permit #3-9014 Subpart IV.C.1 as a part of the participating MS4s Stormwater Management Program (SWMP). This FRP will serve as a long-term planning tool for the two MS4s to implement stormwater best management practices (BMPs) throughout the watershed in the effort to return Stevens Brook to its attainment condition.

As a part of the FRP development, an assessment was completed to determine to what extent current stormwater controls have reduced high flows (flows occurring less than 0.3% of the time, equivalent to greater than the 1-year design storm) from the Pre-2002 condition, as required by the Stevens Brook Total Maximum Daily Load (TMDL) for stormwater. The Vermont Best Management Practice Decision Support System (BMPDSS) model, a GIS-based hydrologic model used to assess the impact of various stormwater BMP scenarios, was used for the assessment. The BMPDSS estimated 3.8% of the high flow target was met with existing BMPs, designed to meet the 2002 Vermont Stormwater Management Manual (VTSWMM) design standards, when compared to the Pre-2002 condition. Therefore, additional BMPs are required to meet 100% of the actionable flow target.

In addition to the identification of stormwater controls, the TMDL flow targets take into account the expected non-jurisdictional impervious area growth in the watershed over the next 20 years, which was determined using a GIS analysis. An assumed 15 acres of non-jurisdictional impervious growth was used to develop the TMDL requirements.

Development of the FRP involved field inspection of all existing BMPs with an expired stormwater permit followed by review and revision of the previously run BMPDSS model scenarios. Several revisions to existing BMP drainage areas and BMP design configurations were identified during field inspection and accounted for in the revised models. After the existing model scenarios were reviewed, new BMPs were identified, inspected, and assessed in the BMPDSS.

The final evaluated BMP list includes 27 projects distributed across the Town of St. Albans, the City of St. Albans, and on VTrans owned property. The proposed BMPs were assessed with the BMPDSS model, and determined to provide a -21.1% reduction in high flow, which addresses 115% of the TMDL high flow target ( $Q_{0.3\%}$ ) through reduction of runoff from the 1-year design

storm. The high flow target mitigated by each project (%) and cumulative target addressed (%) was determined for each project. The planning level cost for implementation of the FRP is approximately \$5,300,000 (excluding VTrans).

A comprehensive ranking matrix was developed to prioritize the proposed projects based on criteria including considerations for the cost, design, aesthetics, and other project benefits and constraints. The ranking provides a tool for the MS4s to use as they prioritize projects with available financial resources. The prioritization was also used to develop a long-term implementation schedule.

The goal of this project was to develop an FRP for the Stevens Brook watershed, to assist the City and Town of St. Albans in the effort to help protect and restore Vermont's stormwater impaired streams. The allocation of impervious ownership between the MS4s in the watershed was determined, and guided the plan development.

### **III. Background**

Stevens Brook, upstream of Pearl Street in the City, is currently on the State of Vermont's impaired waters list and determined to be primarily a result of stormwater runoff. In the effort to restore Stevens Brook and lift its impaired designation, a flow based TMDL was developed for the brook outlining required reductions in stormwater high flows and increases in baseflows. The flow targets are the basis for the FRP, developed in accordance with the MS4 general permit subpart IV.C.1 as a required part of the MS4's Stormwater Management Program (SWMP).

The purpose of the FRP is to outline a plan for the retrofit of existing impervious cover with stormwater management BMPs, such as detention basins and bioretention filters, to meet the TMDL flow targets. The TMDL set forth that watershed hydrology must be controlled in the SBW to reduce high flow discharges and increase baseflow in order to restore degraded water quality and achieve compliance with the Vermont Water Quality Standards. Components of the FRP, as outlined in the MS4 general permit, include:

- The identification of retrofits to existing BMPs with expired State stormwater permits,
- New BMP controls and design plans for selected BMPs,
- A financial plan, and
- A regulatory analysis.

Three MS4s, including the City and Town of St. Albans, and VTrans, own impervious cover within the impaired Stevens Brook watershed. The contributing MS4s are allowed to prepare a joint-FRP for the watershed, or separate plans addressing their individual contributions. The TMDL flow targets are watershed-wide. Therefore, the approach for this independent study was to develop a watershed-wide FRP, with consideration of the individual MS4's flow-target allocation based on impervious ownership.

#### **III.1 TMDL Flow Targets**

In the effort to restore Stevens Brook to its attainment condition and lift its impaired designation, a flow-based Total Maximum Daily Load (TMDL) was developed for Stevens Brook using flow as a surrogate for pollutant loading. This document outlines required reductions in stream high flows and increases in stream low flows.

The basis for the TMDL required high flow reductions was the comparison of modeled Flow Duration Curves (FDCs) between this impaired watershed and comparable attainment watersheds. A FDC graphs the percentage of time during a period that flow exceeds a certain value, with the low flow represented by the 95<sup>th</sup> percentile ( $Q_{95\%}$ ) and the high flow represented by the 5<sup>th</sup> percentile ( $Q_{0.3\%}$ ). The Program for Predicting Polluting Particles Passage through Pits, Puddles, and Ponds, Urban Catchment Model (P8) was used to model gauged and ungauged watersheds in Vermont to develop FDCs from which an area normalized high flow and low flow were extracted by drainage area. The percent change between impaired and attainment FDCs were used as a basis for the TMDL requirements. The high-flow ( $Q_{0.3\%}$ ) was determined to be relatively equivalent to the 1-year design storm flow. Therefore, all proposed BMPs are designed to the Channel Protection volume ( $CP_v$ ) storage standard to address the high-flow reduction target.

A future growth factor was included in the TMDL to account for future non-jurisdictional impervious growth within each watershed. Non-jurisdictional growth is by definition impervious area that does not require a stormwater permit and is not managed by a stormwater BMP. Therefore, the long term stormwater management plan must account for this type of growth as it will be unmanaged impervious area. VT DEC estimated a future growth of 15 acres in the watershed based on local development and projected growth for Stevens Brook. The approved TMDL flow targets for Stevens Brook are shown in Table 1.

**Table 1 TMDL targets for Stevens Brook**

<b>Target High Flow Q 0.3 (± %) Reduction</b>	<b>Target Low Flow Q 95 (± %) Increase</b>
<b>-24.4%</b>	<b>24.3%</b>

While the low flow goal is important to ensure flow during the dry summer months, it is not an actionable requirement in the EPA approved TMDL, and therefore was not the primary focus of the FRP BMP identification for this study.

Included in the 2012 MS4 permit issuance were new requirements for municipalities to develop FRPs to implement the stormwater TMDLs. The FRPs must be developed for each impaired watershed by October 1, 2016, and must include the following elements:

- 1) An identification of required controls
- 2) A design and construction schedule
- 3) A financial plan

- 4) A regulatory analysis
- 5) The identification of regulatory assistance
- 6) Identification of any third party implementation

The schedule shall provide for implementation of the required BMPs as soon as possible, but no later than 20 years from the effective date of the permit, before December 5, 2032.

### III.2 MS4 Allocation of Flow Targets

Allocation of the high-flow target by MS4 was approximated based on relative impervious area ownership within the watershed. Impervious cover calculations excluded railroads and agricultural areas.

St. Albans City owns the majority of impervious cover within the Stevens Brook Watershed (70.6%) and thus is responsible for the majority of high flow reductions (17.16%). The remaining impervious area is owned by St. Albans Town (22.7%), while VTrans owns the remaining 6.7%. The TMDL flow targets were allocated to each MS4 based on their impervious ownership where St. Albans Town is responsible for a 5.51% flow reduction and VTrans is responsible for the remaining 1.63% flow reduction (Table 2).

**Table 2 Stevens Brook flow targets allocated by MS4**

Owner	Total Watershed Area (acres)	Impervious Cover (acres)	% of Watershed Impervious Cover	Target High Flow Q 0.3 (± %) Reduction	Target Low Flow Q 95 (± %) Increase
St. Albans City	585.4	218.0	70.6%	-17.23%	17.16%
St. Albans Town	1081.8	70.0	22.7%	-5.53%	5.51%
VTrans	67.7	20.7	6.7%	-1.64%	1.63%
<b>Watershed Total</b>	<b>1734.9</b>	<b>308.7</b>		<b>-24.40%</b>	<b>24.30%</b>

## IV. Existing Data Review

### IV.1 Permit Review

As per subpart IV.C. of the approved MS4 general permit, all expired stormwater permits in the watershed were acquired and reviewed. Existing stormwater systems approved under an expired permit were field verified for compliance with the written permit (Table 3). Field retrofit assessments were then completed at each site with CPv detention structures for system upgrades to the 2002 Vermont Stormwater Management Manual (VTSWMM) design standards.

**Table 3 Expired permit stormwater BMPs**

Site Name	Permit #	Permit Expiration Date	Address	CPv Storage
<b>City of St. Albans</b>				
St. Albans Town Education Center	1-1206	12/31/1999	169 South Main Street	Y
The Switchyard	2-0907	7/1/1985	Lake & Pine Streets	Y*
St Albans Industrial Park Access Road	2-0147	7/1/1985	Lemnah Drive	---
Lower Welden Street Housing Project	2-0963	7/1/1985	94-100 Lower Welden ST	---
St Albans Industrial Park Lot #1	2-1157	7/1/1988	Lemnah Drive	---
Coote Field Industrial Park	1-0702	3/31/1993	Lake Street/Houghton St.	---
St Albans City Industrial Park Lot #4	1-1264	6/3/2001	Lemnah Drive	---
<b>Town of St. Albans</b>				
Northwestern Medical Center Campus	1-1477.0102	3/31/2006	Home Health Circle	Y
Grice Brook Retirement Community	1-1194	12/31/1999	Grice Brook Circle	Y
Hill Farm Estates	1-0650	12/31/1992	Hill Farm Estates Rd	---

\*It was determined that the Switchyard currently meets the CPv standard, despite its current expired permit, and was therefore proposed for retrofit.

## **IV.2 VT DEC BMPDSS Model Assessment**

The VT DEC worked with an external consultant (TetraTech) to develop a Vermont-specific hydrologic model, the Vermont BMPDSS, to predict progress toward the TMDL flow targets based on proposed BMP implementation scenarios. The BMPDSS model is used to predict peak flows at the watershed outlet for a Pre-2002 (baseline), Post-2002 (existing condition), and a Credit (BMP implementation) scenario. All models are compared to the Pre-2002 model on a percent change basis.

### **IV.2.1 Pre-2002 Model Revisions**

The following considerations were documented upon review of the Pre-2002 model:

- Combined sewer subwatersheds were included in the P8-UCM modeling effort by Tetra Tech, used to develop synthetic FDCs, from which the flow targets were derived. An estimated 205 additional acres of drainage to Stevens Brook was modeled by Tetra Tech, resulting in a potential over estimation of the high flow percent reduction. The VT DEC is aware of this matter.
- WCA’s subwatershed delineations (WCA 2009) for the City and Town of St. Albans were used by the VT DEC in the Vermont BMPDSS models. Therefore, combined sewer subwatersheds were excluded from the BMPDSS model.
- The Stevens-Rugg diversion structure was accounted for within the Pre-2002 model. The discharge coefficient (model parameter) was modified to ensure that water was routed

over the diversion. The discharge coefficient needs to be manually altered by the user in order for the model to operate properly.

The following revisions were made to the model:

- Drainage areas were revised for two existing BMPs, reducing the overall watershed area by 12 acres
- Five subwatersheds were augmented to account for new BMPs and field verified drainage paths.

#### IV.2.2 Post-2002 Model Revisions

Through a thorough assessment of the Post-2002 model, it was confirmed that all existing (non-expired) permitted sites were accounted for in the BMPDSS. The Post-2002 model was updated to include all BMPs installed after 2002 including:

- Five rain gardens on Rugg Street,
- Six rain gardens on Bishop Street,
- Five rain gardens on Quintin Court,
- Firehouse tree box filters,
- An infiltration trench on Driscoll Drive,
- A gravel wetland at the St. Albans park and ride (Figure 1),
- And pervious concrete sidewalks and proposed rain gardens at Taylor Park.



**Figure 1. Gravel Wetland at St. Albans Park & Ride**

There were several existing permitted sites that do not have volume based or infiltration BMPs and therefore those sites were not included in the model. There were two new pending permits, #6520-INDS and #6602-INDS, with proposed construction that were not included in the Post-2002 model because the permit was unavailable at the time of the plan development. The St. Albans Town Zoning Manager confirmed that the project covered under permit #5841-INDS was on hold indefinitely at the time of model revisions, and therefore the BMPs associated with this project were not added to the model.

Rain gardens for three, green-street projects were considered in the Post-2002 model (Bishop, Rugg, and Quintin). The sizes of drainage areas for individual rain gardens were too small to be counted in the model due to the low resolution of the Hydraulic Response Unit, which are 30 meters by 30 meters. Therefore, the drainage areas of these practices were lumped into one larger drainage area so that they could be incorporated into the model.

#### IV.2.3 Diversion Structure

The Stevens-Rugg diversion structure, first built in 1957, is a historic structure designed to address flooding issues in the City of St. Albans by diverting stream flow from Stevens Brook to Rugg Brook. After an extensive study of the structure in the early 2000s, a new water quality and

flood equalization system was constructed at the site to minimize increased stormwater flows to Rugg Brook and provide enhanced water quality treatment.

The VT DEC modeled the diversion structure in the Pre-2002 and Post-2002 models as a regulator which acts as a flow splitter, diverting flow from Stevens Brook to Rugg Brook. The existing structure was designed to divert flow from Stevens Brook to Rugg Brook during high flows by way of a culvert and weir structure. The discharge coefficient (model parameter) was reduced from the default value of 0.6 to a lower value of 0.37, in order to allow the model to divert flow from Stevens Brook. According to the Dubois & King design, 15% of the 1-year storm is to be diverted from Stevens Brook to Rugg Brook. Alterations to the diversion structure in 2006 are reflected in the Post-2002 model. WCA corresponded with the VT DEC about the parameters selected for the diversion, and it was determined that the structure was correctly modeled according to the diversion structure design parameters and therefore these inputs were not altered.

#### IV.2.4 Post-2002 Model Results

The VT DEC Post-2002 model estimated that existing BMPs in the watershed reduced high flows by 0.6% or 2.5% of the TMDL high flow targets. Following a re-running of the Post-2002 model with the revisions described above, the high flow reduction was increased to 0.92% or 3.8% of the high flow reduction target (Table 4).

**Table 4 Stevens Brook high flow target reduction progress with revised Post-2002 model run**

Owner	Target High Flow Q 0.3 (± %) Reduction	High Flow Q 0.3 (± %) Reduction Achieved with Post-2002 Model	High Flow Q 0.3 (± %) Reduction Remaining with Post-2002 Model	High Flow (Q 0.3) Target addressed (%)
St. Albans City	-17.23%	-0.24%	-16.99%	1.4%
St. Albans Town	-5.53%	-0.44%	-5.09%	8.0%
VTrans	-1.64%	-0.24%	-1.40%	14.8%
<b>Watershed Total</b>	<b>-24.40%</b>	<b>-0.92%</b>	<b>-23.48%</b>	<b>3.8%</b>

## V. Required Controls Identification

The process of BMP identification consisted of first assessing the existing BMPs with expired permits for retrofit potential to meet the 2002 VTSWMM design standards. Upon review of the existing BMPs, WCA determined that additional new BMPs would be required to meet the high flow target (Figure 2).

The team then conducted an initial desktop assessment of the watershed to identify open spaces ideal for BMP implementation with priority on City and Town owned land. In addition, the location of BMPs was considered so that storage could be provided throughout the watershed and focused on areas with a high percentage of impervious coverage where flows were expected to be highest. After an initial list of retrofits were identified, a field assessment was completed at each site documenting the engineering feasibility of each retrofit including utility conflicts, natural resources, transportation constraints, collateral benefits (visibility and pedestrian safety), ease of Operation and Maintenance (O&M), and the amount of impervious treated. The proposed BMPs were then designed using HydroCAD to meet the CP<sub>v</sub> storage criteria for warm waters. CP<sub>v</sub> estimates for each BMP are summarized in Table A-2 (Appendix 2), along with HydroCAD model outputs in Appendix 3.



**Figure 2. Five proposed swales for VTrans median in credits model**

WCA prepared conceptual designs for the recommend BMPs, designed to the 2002 VTSWMM design standards for CP<sub>v</sub> storage (1-year design storm), provided in Appendix 4. BMP feasibility was determined based on available space, mapped Natural Resources Conservation Service mapped soils, 1-foot topographic elevation contours derived from 2008 Rock River LIDAR, and mapped stormwater and wastewater infrastructure. Additional above ground utility constraints were noted in addition to land ownership, O&M, and safety considerations. An in-depth engineering assessment will still be required at each site to confirm the presence/absence of utilities, natural resource constraints, and potential transportation impacts, as part of the final design process.

### **V.1 BMPDSS Model Results**

The final recommended BMPs list was developed based on an iterative assessment using the BMPDSS modeling tool. An initial BMP list was assessed in the BMPDSS Credit 1 run, which included expired permit retrofits, was estimated to address 73% of the high flow reduction. The remainder of the watershed was then assessed for additional potential BMPs to address the remaining flow reduction. A revised model run (Credit 2) was completed with several additional BMPs, and estimated to address 98% of the high flow target. A final model run with the recommended BMP list and revised design estimated a -28.1% reduction in the high flow, addressing 115% of the flow target. A 15% factor of safety was estimated, suggesting that the proposed BMPs plan was conservative and may be reduced.

The results of the model runs are summarized in Table 5 below.



**Table 5 Stevens Brook BMPDSS Credit model results**

Model Run	Description	High Flow Reduction (%)
TMDL Target for Stevens Brook		-24.4%
VT DEC Post-2002 Condition Model	VT DEC's existing model, includes all Post-2002 BMPs (10/15/12)	-0.60%
WCA Revised Post-2002 Model	Revised Post-2002 model (4/12/13)	-0.92%
Percent of target managed with revised Post-2002 model		3.8%
Credit 1 model	Proposed BMP scenario with only retrofits to existing BMPs with expired permits. (6/25/13)	-18.0%
Percent of target managed with Credit 1 model run		73%
Credit 2 model	Proposed BMP scenario 2. (10/15/13)	-23.9%
Percent of target managed with Credit 2 model run		98%
Credit 3 model	Final proposed BMP scenario. (12/21/13)	-28.1%
Percent of target managed with Credit 3 model run		115%

Of this 115% high flow reduction, the City of St. Albans addressed 92.8% of their high flow target. The Town of St. Albans addressed 183.5% of their target (Table 6).

**Table 6 Stevens Brook BMPDSS final Credit model results allocated by MS4**

Owner	Target High Flow Q 0.3 (± %) Reduction	High Flow Q 0.3 (± %) Reduction Achieved with Credit Model	High Flow Q 0.3 (± %) Reduction Remaining with Credit Model	High Flow (Q 0.3) Target addressed (%)
St. Albans City	-17.80%	-16.52%	-1.28%	92.8%
St. Albans Town	-5.09%	-9.33%	4.25%	183.5%
VTrans	-1.52%	-2.25%	0.74%	148.5%
<b>Watershed Total</b>	<b>-24.40%</b>	<b>-28.10%</b>	<b>3.7%</b>	<b>115.2%</b>

The ultimate determination for implementation of projects providing benefit beyond the high-flow target (> 100%) will be made by the State of Vermont based on monitoring data or other relevant information (MS4 General Permit Sec. IV.J.3). Progress toward the TMDL flow targets with the proposed FRP scenario was allocated by MS4 based on impervious area coverage.

## **VI. Proposed Best Management Practices (BMPs)**

The final Credit model scenario included the addition of twelve new detention BMPs, nine new infiltration BMPs, and six retrofits to existing BMPs with expired permits. Credit toward the flow target is also from existing stormwater structures including four BMPs designed to Post-2002 standards, and eight LID infiltrative practices. Additional information is summarized for each BMP in Appendix 2 (Table A-2), including the impervious cover treated, percent impervious of the BMP drainage area, total area treated, and estimated CPv storage by the HydroCAD design model (Appendix 1).

The proposed BMPs are summarized in Table 7, including the impervious cover treated, drainage area, and CPv storage estimated by the HydroCAD® model. A map of the proposed BMP locations is included in Appendix A. The individual and cumulative percent of the high flow target mitigated is also included in Table 7.

**Table 7 Stevens Brook BMPDSS final Credit model BMPs**

Proposed BMP ID	Address	Model	BMP Type	BMP Land Ownership	Permit #	Impervious Cover Managed (acres)	Runoff Area (acres)	Channel Protection Volume		Percent of High Flow Target Managed	Cumulative Percent of High flow Target Managed
								CF	ac-ft	%	%
GMP Cooling Ponds Retrofit	Lower Welden Dr.	Proposed	Retrofit Basins	Private	NP	54.6	89.6	274428	6.30	9.28%	10.20%
Hungerford- Lower Basin	Rewes Rd.	Proposed	Basin	Private	NP	31.7	91.4	181340	4.16	5.38%	15.59%
NWMC-Main Pond (Hill Farm Estates)	Crest Rd., Hill Farm	Existing/Retrofit	Retrofit Basin	Private	1-1477, 1-0650	15.3	45.4	156816	3.60	2.60%	18.19%
St. Albans Town Education Center	169 South Main Street	Existing/Retrofit	Retrofit Basin	Private	1-1206	9.0	49.0	42253	0.97	1.52%	19.71%
Greenwood Cemetery	Upper Gilman St.	Proposed	Basin	City/Private	NP	5.2	22.6	48482	1.11	0.89%	20.60%
Lemnah Dr.	Lemnah Dr.	Proposed	Basin	City	NP	5.1	12.1	44257	1.02	0.87%	21.47%
65 Bishop St- Pocket Yard	65 Bishop St.	Proposed	Storage Chambers	City/Private	NP	4.9	32.9	28967	0.67	0.83%	22.30%
65 Bishop St- Pocket Yard	65 Bishop St.	Proposed	Storage Chambers	City/Private	NP	4.9	32.9	28967	0.67	0.83%	23.13%
Industrial Park (SB Collins)	Lemnah Dr.	Proposed	Basin	Private	2-1157	3.8	5.7	22651	0.52	0.64%	23.78%
NWMC-South Pond A	Crest Rd.	Existing/Retrofit	Retrofit Basin	Private	1-1477	3.8	5.6	32496	0.75	0.64%	24.41%
Upper Fairfield	Fairfield Hill Rd	Proposed	Basin	Private	NP	3.2	34.3	62421	1.43	0.55%	24.96%
Grice Brook Retirement Community	Grice Brook Rd	Proposed	Basin	Private	1-1194	2.8	18.8	58806	1.35	0.47%	25.43%
Homeland Security	79 Lower Weldon St.	Proposed	Storage Chambers	Federal	NP	2.8	2.8	13983	0.32	0.47%	25.90%
East View Subdivision - New Pond	East View Dr.	Proposed	Basin	Private	NP	2.7	13.1	9801	0.23	0.47%	26.37%
Fairfield	Fairfield Hill Rd/I-89	Proposed	Basin	VTrans	NP	2.2	28.4	31799	0.73	0.37%	26.74%
Houghton St.- State of VT	Houghton St.	Proposed	Basin	State	NP	1.5	2.4	9235	0.21	0.26%	27.00%

Stevens Brook Flow Restoration Plan

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Maple St.	La Salle/Maple St.	Proposed	Infiltration	Private	NP	1.0	1.3	6316	0.15	0.17%	27.17%
NWMC-South Pond B	Home Health Circle	Existing/Retrofit	Retrofit Basin	Private	1-1477	1.0	1.8	6708	0.15	0.16%	27.33%
Governor Smith Retrofit	Congress/Smith St.	Existing/Retrofit	Retrofit Basin	Private	NP	0.8	15.3	18513	0.43	0.14%	27.47%
SDC118	I-89	Proposed	Median	VTrans	NP	0.5	1.1	2544	0.06	0.09%	27.56%
Median A1	I-89	Proposed	Median	VTrans	NP	0.5	0.9	2468	0.06	0.09%	27.65%
SDC140b	I-89	Proposed	Median	VTrans	NP	0.5	1.0	2359	0.05	0.09%	27.74%
SDC105b	I-89	Proposed	Median	VTrans	NP	0.5	1.0	2333	0.05	0.08%	27.82%
SDC408	I-89	Proposed	Median	VTrans	NP	0.4	0.9	2047	0.05	0.07%	27.89%
SDC98b	I-89	Proposed	Median	VTrans	NP	0.4	0.9	1968	0.05	0.07%	27.96%
Median A2	I-89	Proposed	Median	VTrans	NP	0.4	0.7	1881	0.04	0.07%	28.03%
SDC105c	I-89	Proposed	Median	VTrans	NP	0.4	0.8	1799	0.04	0.07%	28.10%

## VI.1 City of St. Albans BMPs

### St. Albans Town Education Center Basin Retrofit (City/ Expired Permit)

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The St. Albans Town Education Center (SATEC) basin was permitted under expired permit 1-1206. The existing basin is undersized, and has limited outlet control (Figure 3). The proposed retrofit is to expand the pond, add additional flow control, and potentially treat water quality.



Figure 3. SATEC Basin

The site is located on the school property. The school and the City will need to decide if the expired permit will be incorporated into MS4 or the Residual Designation Authority (RDA) program. Assistance from VT DEC will be required to help determine the optimal regulatory approach.

### Green Mountain Power Cooling Ponds Retrofit (City):

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Abandoned cooling ponds owned by Green Mountain Power are proposed for use as a large scale water quality treatment and flow detention facility (Figure 4). A new storm line connection would be required from South Main Street to Allen Street along Lower Weldon. The design team estimated that the cooling ponds could be retrofitted to provide water quality treatment and mitigate over 6 acre-feet of runoff volume.



Figure 4. Green Mountain Power Cooling Ponds

The cooling ponds are located adjacent to the Green Mountain Power, St. Albans diesel plant substation, which is an active underground storage tank and diesel hazardous waste site (#20114205). A site investigation was completed during the summer of 2013, as follow up to the substation remediation. Green Mountain Power submitted a site investigation report in August 2013, which stated the investigation findings did not warrant additional remedial actions. The investigation is pending approval from the VT DEC sites management section. Landuse restrictions for the ponds will need to be determined before further development of this retrofit opportunity is completed.

The VT DEC Hazardous Waste Division will need to be engaged during development of this project. The ponds are privately owned therefore an easement or sale of the land would be needed for the project to move forward.

### **Hungerford Lower Basin (City):**

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A large scale retrofit project (feasibility and preliminary design completed under the Enterprise Resource Planning contract #29-18102) is proposed on the Hungerford property within the Town (Figure 5). Runoff is proposed to be routed from the Stevens Brook impaired watershed into a water quality treatment and flow detention structure on the Hungerford Family Trust property. The BMP is estimated to provide over 20% of the flow target reduction.



**Figure 5. Hungerford Lower Basin**

Environmental permitting feasibility and framework needs to be discussed in depth with the VT DEC. Land is privately owned and therefore an easement or sale of the land would be required.

### **65 Bishop Street Pocket Yard Swale**

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An underground storage system is proposed for implementation on a City owned parcel, located North of 65 Bishop Street, possibly extending onto adjacent private land (Figure 6). The site is one of few open spaces within the large residential area east of the City downtown. A new stormwater line would divert flow from an existing catch basin capturing a 33-acre drainage area. An easement would be required in order to implement the new stormwater line. Acquisition of adjacent private land would be required to accommodate the entire structure. The BMP is proposed on City owned land but also may extend onto adjacent private land. To route flow into the BMP, an easement would be required across private properties.



**Figure 6. An underground storage system**  
CR: [http://www.stormtech.com/images/pic\\_engineer.jpg](http://www.stormtech.com/images/pic_engineer.jpg)

## Greenwood Cemetery Basin

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The proposed BMP would be located on private open land adjacent to the existing Greenwood Cemetery (Figure 7). A water quality and flow detention BMP is proposed. It would capture runoff from a 23-acre area located in the residential district of the City. Flow from an existing stormwater line would be diverted into the facility and then discharged back to the same line.

The BMP is proposed on private land, which may be reserved for expansion of the existing cemetery. An alternative BMP design is possible within the City ROW, on Upper Gilman Road, if it is deemed infeasible to use the private land for the proposed BMP.



**Figure 7. Open land adjacent to the Greenwood Cemetery**

## Lemnah Drive Basin

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A water quality treatment and flow detention BMP is proposed along Lemnah Drive just south of the Stevens Brook crossing and parallel to the railroad. This BMP would serve to detain and treat runoff from the industrial area along Lemnah Drive and some City homes and streets.

The proposed project is on City owned land and redevelopment plans along Lemnah Drive could impact BMP placement. There is potential for incorporating the retrofit with the stormwater management needs of the planned Lemnah Drive redevelopment project.



**Figure 8. Lemnah Drive**

### Industrial Park Basin (City/Expired Permit)

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A water quality and flow detention basin is proposed for an existing drainage way, just east of the S.B. Collins property. The site currently collects drainage from an outlet pipe connected to a system of catch basins east of the railroad tracks, and from the S.B. Collins facility by a second pipe.

The industrial park including S.B. Collins holds an expired permit (#2-0147) as well as lot one, east of the railroad tracks (expired permit #2-1157). The permittee and the City will need to decide if the expired permit will be incorporated into the MS4 or RDA program. The site appears to be partially within the Central Vermont railroad ROW, which will require railroad approval. Additional assistance from the VT DEC will be required to help determine the optimal regulatory approach.



**Figure 9. Drainage way, east of S.B. Collins Property**

### Governor Smith Road Pond Retrofit (City)

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The existing Governor Smith Road subdivision pond was designed and implemented after 2002. The pond is not permitted under a state stormwater permit because the project was below the 1-acre threshold. The pond was modeled based on the record drawing and determined to be not up to the CPv standard. A proposed reduction in the low flow orifice would provide additional CPv storage and credit toward the flow targets.



**Figure 10. Governor Smith Road pond**

The pond is privately owned; therefore the Homeowner's Association would need to be engaged as a partner with the City in order to implement the proposed pond outlet retrofit.



### Homeland Security Storage Unit (City)

A subsurface storage unit is proposed for placement beneath the Homeland Security facility parking lot. With no available space for an open detention structure, an underground storage unit was determined to be the best option for this location. The storage unit would capture drainage from 2.8 acres of impervious area including the parking lot and roof of the facility.

As the parking lot is part of a federal facility, Homeland Security will need to be engaged as a partner with the City for implementing the retrofit project.



**Figure 11. Homeland Security facility parking lot**

### Houghton Street Basin (City)

An existing shallow swale, west of the State of Vermont facility, along Houghton Street currently captures runoff from the parking lot and roof of an adjacent building. The proposed retrofit would involve adding water quality improvements and flow control.

The project site is owned by the State of Vermont. Implementing a retrofit on State property would support the Vermont Governor’s Green Infrastructure Initiative.



**Figure 12. Project site by the State’s facility on Houghton Street**

### Maple Street Infiltration and Detention Basin (City)

An open lot just north of an existing parking lot along Maple Street was identified as an ideal site for a shallow infiltration and flow detention basin. The structure would capture runoff from 1.3 acres of impervious coverage on the existing privately owned lot.

The proposed project would be located on private land and within the City ROW. The landowner would need to be engaged as a partner with the City for project implementation.



**Figure 13. Open lot on Maple Street for shallow infiltration and flow detention**

## VI.2 Town BMPs

### NWMC Main Pond Expansion and Hill Farm Estates Retrofit (Expired Permit)

The existing Northwestern Medical Center (NWMC) main pond is permitted under expired permit #1-1477. Available open space adjacent to the existing stormwater pond and the expired permit make this site ideal for retrofit. The goal with the retrofit would be to route additional drainage to the expanded pond from the Hill Farm Estates subdivision (under expired permit #1-0650) north of the medical center, and upgrade the pond to 2002 VTSWMM standards.



Figure 14. NWMC's main pond

Assistance from the VT DEC is recommended to coordinate with the Hill Farm Estates Homeowners Association and the NWMC to determine the best regulatory approach in order to renew the expired permits, and develop a cost share to fund the pond retrofit. Additionally, it will be important to coordinate with the NWMC planning staff on their proposed expansion plans for the Center.

### Grice Brook Retirement Community Basin (Expired Permit)

The existing site is permitted under expired permit #1-1194. Runoff from the Grice Brook Retirement Community currently drains from the site via a series of swales and culverts to a steep embankment with significant erosion (see photo at right). Runoff eventually enters the SATEC pond, which is undersized and has limited outlet control. A new pond is proposed at the bottom of the slope to provide water quality benefit and flow control.



Figure 15. Eroded embankment by Grice Brook Retirement Community

The VT DEC wetlands program and the Army Corps of Engineers is to be engaged at the start for the project planning process to evaluate wetland presence, function, and value at the site location. The site is located on the Town's school property and therefore a land sale or easement would be required. Drainage area of the pond includes agricultural runoff as well as the permitted Grice Brook facility. A cost share is recommended between the Town and parties contributing drainage. The expired permittees and the Town will need to decide if expired permits for the Grice Brook facility will be incorporated into MS4 or the RDA program. Assistance from the VT DEC will be required to help determine the optimal regulatory approach.

### **NWMC North “Pond A” Retrofit (Town/ Expired Permit)**

The existing NWMC north “Pond A” was designed prior to 2002 VTSWMM standards. Retrofits to the pond include a reduction of the low flow orifice for additional flow control and potential installation of pretreatment forebays.

The site is located on private property. The permittee and the Town will need to decide if the expired permit will be incorporated into MS4 or the RDA program. Assistance from the VT DEC will be required to help determine the optimal regulatory approach.



**Figure 16. NWMC Pond A**

### **NWMC South “Pond B” Retrofit (Town/ Expired Permit)**

The existing NWMC south “Pond B” located south of the Franklin County Rehab Center was designed prior to 2002 VTSWMM standards. Retrofits to the pond include: reducing the low flow orifice to 1 inch and installation of pretreatment forebays.

The permittee and the Town will need to decide if the expired permit will be incorporated into MS4 or the RDA program. Assistance from the VT DEC will be required to help determine the optimal regulatory approach.



**Figure 17. NWMC Pond B**

### **East View Subdivision Basin (Town)**

The East View subdivision currently lacks a stormwater management system onsite. A water quality and detention basin is proposed to manage runoff from the development before discharging the runoff out of the impaired watershed.

The proposed project is located on private land and within the Town ROW. The HOA is to be engaged as a partner with the Town for project implementation. Plans for a new sidewalk along Congress Street will need to be considered with BMP implementation.



**Figure 18. East View subdivision**

### VI.3 VTrans BMPS

#### Upper Fairfield Basin (VTrans)

The proposed location for the Upper Fairfield retrofit site is located off of Fairfield Hill Road (VT-36, VTrans-owned) on a private parcel within the Town, capturing approximately 34 acres of drainage from VT-36, neighboring homes, and driveways. A water quality treatment and flow control basin is proposed.

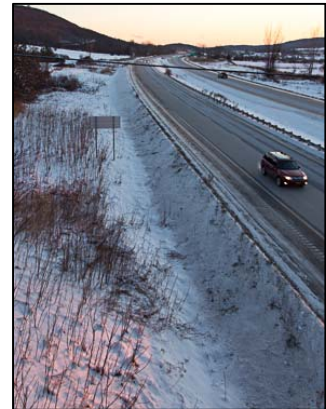


**Figure 19. Private land on Fairfield Hill Road**

Private land would need to be acquired in order to implement the BMP, and the land was advertised for sale as of November 2013. The benefit of the proposed facility location is the ability to control flow at the top of the watershed before stormwater flows enter the main stream channel and gain velocity and erosive strength.

#### Fairfield Road Basin (VTrans)

A water quality and flow detention retrofit is proposed within the I-89 ROW, designed to capture runoff from 28 acres including a portion of Fairfield Road (VT-36) and Town residences along the road (Figure 20). The structure will need to be designed according to Federal Highway Administration (FHWA) guidelines for safety. A new culvert under Fairfield Road would be required to route flow from the north side of VT-36 into the facility. The proposed BMP would treat runoff from VTrans and Town impervious cover, and therefore a cost share is recommended.



**Figure 20. I-89 ROW**

#### VTrans Median BMPs (8 Median Sites)

Eight sites within the VTrans I-89 ROW were identified as potential sites for water quality and flow detention BMPs to detain and treat runoff from I-89. The sites are all located in existing vegetated stormwater conveyances within the I-89 median. Key features of the structures include earthen check dams designed to create up to 1.5 feet of ponding depth behind each dam, amended soils consisting of a 50/50 blend of sand and native soil at the surface, and a pure sand filter below. The structures are designed with a perforated underdrain to be located below the sand filter, connected to the nearest downstream outlet structure or daylighted. A typical plan is attached under Appendix 4 to demonstrate the typical layout of the median sand filter BMP, which would be replicated for all median sites.



**Figure 21. VTrans owned land in I-89 ROW**

The sites are all on VTrans land. Environmental permitting including primarily potential wetland impacts needs to be considered for each site. Designs are required to comply with FHWA safety standards for the interstate system.

## VII.Design and Construction Schedule

A D&C schedule is a required element of the final approved FRP, providing an outline for the implementation of the proposed FRP over a 17-year timeframe. A D&C was prepared with the 16 projects that will be implemented by the Town of St. Albans and the City of St. Albans. The projects were spaced out over the timeframe in five separate phases. The first four phases consist of three year periods and the final phase includes four years. The timeline considered: effort for design, acquisition of necessary permits and/or regulatory approvals. The estimated total cost by MS4. It should be noted that both the Town of St. Albans and the City of St. Albans have projects proposed projects in multiple watersheds, and as such the schedule presented below may appear not well distributed across the timeframe. This is due to the schedule projects in Rugg Brook watershed. Summed project costs are shown by implementation phase in Table 8. The schedule by project is shown in Table 9 for the City of St. Albans and Table 10 for the Town of St. Albans. Two projects are seen on both Table 9 and 10 as these projects are shared between the Town and City. Only the portions of their allocated costs are included in Table 8. Adjustments to the flow targets may impact the schedule and full implementation of the proposed projects. Additionally, the D&C is a working document and will be revised based on new information about the projects and/or stream conditions.

**Table 8 Total cost by implementation phase for both MS4 entities**

MS4	Phase 1 (1-3 years)	Phase 2 (4-6 years)	Phase 3 (7-9 years)	Phase 4 (10-12 years)	Phase 5 (13-16 years)	Total Cost
St. Albans Town	--	\$277,000	\$25,000	\$91,000	\$362,250	\$755,250
St. Albans City	\$470,000	\$2,720,500	--	\$499,000	\$816,750	\$4,506,250

**Table 9 City of St. Albans proposed BMP implementation schedule**

Project Name	Impervious Acres	Proposed Implementation Schedule
St. Albans Town Education Center	9.0	Phase 1 (1-3 years)
Lemnah Dr.	5.1	Phase 1 (1-3 years)
Hungerford- Lower Basin	31.67	Phase 2 (4-6 years)
GMP Cooling Ponds Retrofit	54.6	Phase 2 (4-6 years)
Houghton St.- State of VT	1.5	Phase 4 (10-12 years)
Maple St.	1.0	Phase 4 (10-12 years)
Industrial Park (SB Collins)	3.8	Phase 4 (10-12 years)
Greenwood Cemetery	5.2	Phase 4 (10-12 years)
Governor Smith Retrofit	0.8	Phase 5 (13-16 years)
Homeland Security	2.8	Phase 5 (13-16 years)
65 Bishop St- Pocket Yard	4.9	Phase 5 (13-16 years)

**Table 10 Town of St. Albans Proposed BMP Implementation Schedule**

Project Name	Impervious Acres	Proposed Implementation Schedule
NWMC-Main Pond (Hill Farm Estates)	15.3	Phase 2 (4-6 years)
NWMC-South Pond A	3.8	Phase 3 (7-9 years)
NWMC-South Pond B	1.0	Phase 4 (10-12 years)
East View Subdivision - New Pond	2.7	Phase 4 (10-13 years)
Grice Brook Retirement Community	2.8	Phase 5 (13-16 years)
65 Bishop St- Pocket Yard	4.9	Phase 5 (13-16 years)

### **VII.1 Cost-Share Allocation**

A cost-share was applied for projects with multiple MS4 jurisdictions based on a percentage factor. This combined the percent runoff contribution and percent impervious surface ownership within the BMP drainage area into an overall percent allocation. The percent runoff contribution was determined using site specific HydroCAD models for each BMP drainage area. The percent impervious was determined through a GIS exercise, using 2011 impervious cover mapping prepared by the Lake Champlain Basin Program. The cost-share allocation applied provides one example for how the MS4s can share the financial responsibility for projects with contributing areas from multiple jurisdictions. The cost breakdown, percent runoff volume and percent impervious area are summarized in Appendix 7 for the following projects: St. Albans Town Education Center, 65 Bishop St- Pocket Yard, NWMC-Main Pond (Hill Farm Estates), Fairfield, and Upper Fairfield. It was determined that the Town of St. Albans does not bear responsibility for the St. Albans Town Education Center project after this analysis was completed. The table is still included in Appendix 7 for reference.

## **VIII. Financial Plan**

### ***City of St. Albans***

In order to maintain sustainable local tax and fee rates, and ensure the ability of local voters to pass any required bonds, the City of St. Albans assumes that significant state and federal funds will be available for final engineering and implementation of the BMPs listed by this FRP. The City is assuming at least an 50% match from external grant sources, such as the Clean Water Initiative. If sufficient external funds do not materialize, the City will have to delay the implementation of BMPs and update the schedules in this FRP. The City will spend the next 2 years exploring a stormwater utility as a source of local funding for the BMPs as well as the overall stormwater program associated with the MS4 permit and other related items.

In the case of multi-jurisdictional BMPs, the City is willing to pursue cost sharing of planning, construction, and O&M costs based on how much land is treated within the MS4 (City/Town/VTrans). For BMPs associated with expired stormwater permits, the City will pursue financial participation of the landowner on a case-by-case basis.

### ***Town of St. Albans***

The Town of St. Albans hopes to establish a Stormwater Utility prior to December 31, 2018. This Stormwater Utility will cover the entire town, not just the MS4 areas. The Town plans to create a comprehensive utility similar in scope to the existing South Burlington and Williston stormwater utilities and will integrate the Green Stormwater Infrastructure LID spreadsheet developed by VLCT. At this time, the Town assumes an annual assessment per single family dwelling at \$120. Based on 2010 census data, this should generate a maximum of ~\$350,000 annually prior to offering discounts for installing and or improving stormwater mitigation structures. Assuming a maximum discount of 25%, in the "best" case with all properties receiving a maximum discount, our stormwater utility would generate ~\$250,000 annually. At ~\$250,000 spread over 20 years nominally matches the expected cost for FRP implementation for the Town. Non-residential properties will be assessed at Equivalent Residential Unit (ERU) and based on square footage of building. This amount would be in addition to pursuing grants from State and Federal sources (i.e., the Clean Water Initiative) combined with negotiating fair cost sharing arrangements with all expired, existing, and future stormwater permit holders.

While the Town does expect to apply for grants and loans, the Stormwater Utility will ensure funding as it is assumed that all grant and loan programs will be extremely competitive. The Town expects to apply for any and all grant and loan programs that it may be eligible for, but the Town is also planning to have its own funding source from the utility to meet its MS4 obligation prior to 2032. The Town does expect to negotiate fair cost sharing arrangements with any and all expired, existing, and future stormwater permit holders on sharing the cost to rehabilitate and or reconstruct their stormwater mitigation structure and other associated facilities.

### VIII.1 BMP Cost Estimates

A spreadsheet-based method, originally developed by Horsley-Witten Group, was used to develop planning level costs for all proposed BMPs. The methodology was used in the development of the Centennial Brook FRP and provides consistent cost estimates for each BMP within the watershed. It is expected that these costs will change as further design is completed and site conditions and constraints are better understood. Cost estimates are based on limited site investigation, but are useful for planning purposes. All estimates presented are based on 2014 dollars.

The cost estimation is based on the design control volume as determined by HydroCAD models developed for each site, unit costs that take into account the type of BMP, a site adjustment factor that takes into account the difficulty of construction based on present development at a location, a factor for the design and permitting of the BMP, and a land acquisition cost.

**Unit Costs and Site Adjustment Factors:** construction costs were estimated using unit costs and a site adjustment factor summarized in Table 11 below. Unit costs were assigned for each BMP type, and a site adjustment multiplier was applied depending on the type of site.

**Table 11 Unit costs and adjustment factors for each BMP type**

BMP Type	Base Cost (\$/ft <sup>3</sup> )
Detention Basin	\$2
Infiltration Basin	\$4
Underground Chamber (infiltration or detention)	\$12
Bioretention	\$10
Green Infrastructure/ Underground Chamber Combo	\$22
Site Type	Cost Multiplier
Existing BMP retrofit	0.25
New BMP in undeveloped area	1
New BMP in partially developed area	1.5
New BMP in developed area	2
Adjustment factor for large aboveground basin projects	0.5

Derived from Horsley Witten Memorandum Dated January 9<sup>th</sup> 2014 (Page 11)

**Site Specific Costs:** Cost of significant utility or other work related to the construction of the BMP itself. Site specific costs are variable based on past experience.

**Base Construction Cost:** Calculated as the product of the design control volume, the unit cost, and the site adjustment factor.



**Permits and Engineering Costs:** Used either 20% (for largest storage volume projects), and 35% for smaller or complex projects.

**Land Acquisition Costs (*Modified*):** A variation from the HW method was applied. Based on an estimate from the City Assessor, the land acquisition cost was calculated as \$120,000 per acre required for the BMP, applied to projects on private land. It should be noted that this value is based on a limited estimate and not necessary an expected cost per acre.

**Total Project Cost:** Calculated as the sum of the base construction cost, permitting and engineering costs, and land acquisition costs.

**Cost per Impervious Acre:** Calculated as the construction costs plus the permitting and engineering costs divided by the impervious acres managed by the BMP.

**Operation and Maintenance:** The annual O&M was calculated as 3% of the base construction costs, with a maximum of \$10,000.

**Minimum Cost Adjustment:** After total project costs were determined for each proposed BMP based on the HW methodology, costs were reviewed and adjusted so that projects involving an outlet retrofit, such as a new outlet structure, were assigned a minimum cost of \$10,000, and a project involving an expansion retrofit were assigned a minimum cost of \$25,000.

### VIII.1.1 BMP Cost Estimates Tables

The total cost for implementation of the FRP projects was determined, with assumed cost sharing for the joint-MS4 projects based on managed impervious area and runoff volume (Table 12). This is an approximate estimate and is subject to change based on more refined design, and cost sharing agreements. The cost breakdown is relatively consistent with the impervious cover breakdown in the watershed.

**Table 12 Total project cost estimate for FRP projects by MS4, assuming cost sharing for joint-MS4 projects**

MS4	Total Project Cost
Town of St. Albans	\$919,000
City of St. Albans	\$4,506,250
<b>Total:</b>	<b>\$5,425,250</b>

Tables 13 and 14, below, include a summary of the project cost estimates by BMP by MS4.

**Table 13 City of St. Albans proposed BMP cost estimates**

Project Name	Impervious Area (Acres)	Design Control Volume (ac-ft)	Base Unit Cost (\$/cft)	Site Adjustment Factor	Permits & Engineering Contingency	Minimum Project Cost (\$10k for simple retrofits; \$25k otherwise)	Final Project Cost	Final Project Cost Rounded to Nearest \$1,000	St. Albans City Cost Allocation (% of total project cost)	St. Albans City Cost Allocation (\$)	Cost/ Impervious Acre
St. Albans Town Education Center**	9.0	0.78	\$2	1	\$47,750	\$25,000	\$220,180	\$220,000	100%	\$220,000	\$20,579
Lemnah Dr.	5.1	1.02	\$2	1.5	\$46,653	\$25,000	\$250,266	\$250,000	100%	\$250,000	\$35,353
Hungerford- Lower Basin	31.67	4.16	\$2	1	\$126,847	\$25,000	\$908,202	\$908,000	100%	\$908,000	\$15,449
GMP Cooling Ponds Retrofit	54.6	6.30	\$2	2	\$384,199	\$25,000	\$1,673,671	\$1,674,000	100%	\$1,674,000	\$27,141
NWMC-Main Pond (Hill Farm Estates)**	15.3	3.60	\$2	1	\$ 109,771	\$25,000	\$ 553,963	\$ 554,000	25%	\$138,500	\$27,637
Houghton St.- State of VT	1.5	0.21	\$2	1.5	\$5,489	\$25,000	\$60,531	\$61,000	100%	\$61,000	\$21,665
Maple St.	1.0	0.15	\$4	1.5	\$7,841	\$25,000	\$70,325	\$70,000	100%	\$70,000	\$47,045
Industrial Park (SB Collins)	3.8	0.52	\$2	2	\$31,712	\$25,000	\$159,516	\$160,000	100%	\$160,000	\$32,273
Greenwood Cemetery	5.2	1.11	\$2	1.5	\$29,011	\$25,000	\$207,786	\$208,000	100%	\$208,000	\$33,282
Governor Smith Retrofit	0.8	0.13	\$2	0.25	\$1,014	\$10,000	\$10,000	\$10,000	100%	\$10,000	\$4,712
Homeland Security	2.8	0.32	\$12	2	\$117,089	\$25,000	\$451,630	\$452,000	100%	\$452,000	\$164,229
65 Bishop St- Pocket Yard	4.9	0.67	\$12	1	\$122,578	\$25,000	\$472,800	\$473,000	75%	\$354,750	\$96,687
** Although this project is a retrofit of an existing BMP, it was determined that due to site specific complexity, costs would be comparable to a new BMP. As such, a site adjustment factor of 1 was used.							<b>Total</b>	<b>\$5,040,000</b>	<b>Total</b>	<b>\$4,506,250</b>	

**Table 14 Town of St. Albans proposed BMP cost estimates**

Project Name	Impervious Area (Acres)	Design Control Volume (ac-ft)	Base Unit Cost (\$/cft)	Site Adjustment Factor	Permits & Engineering Contingency	Minimum Project Cost (\$10k for simple retrofits; \$25k otherwise)	Final Project Cost	Final Project Cost Rounded to Nearest \$1,000	St. Albans Town Cost Allocation (% of total project cost)	St. Albans Town Cost Allocation (\$)	Cost/ Impervious Acre
NWMC-Main Pond (Hill Farm Estates)**	15.3	3.60	\$2	1	\$109,771	\$25,000	\$553,963	\$554,000	50%	\$277,000	\$27,637
NWMC-South Pond A	3.8	0.75	\$2	0.25	\$5,717	\$25,000	\$25,000	\$25,000	100%	\$25,000	\$5,881
NWMC-South Pond B	1.0	0.15	\$2	0.25	\$1,143	\$25,000	\$25,000	\$25,000	100%	\$25,000	\$4,643
East View Subdivision - New Pond	2.7	0.23	\$2	1.5	\$10,520	\$25,000	\$65,536	\$66,000	100%	\$66,000	\$14,809
Grice Brook Retirement Community	2.8	1.35	\$2	1	\$23,522	\$25,000	\$244,094	\$244,000	100%	\$244,000	\$51,322
65 Bishop St- Pocket Yard	4.9	0.67	\$12	1	\$122,578	\$25,000	\$472,800	\$473,000	25%	\$118,250	\$96,687
Fairfield	2.1	0.68	\$2	1	\$79,976	\$25,000	\$108,532	\$109,000	75%	\$81,750	\$51,904
Upper Fairfield	3.4	1.28	\$2	0.5	\$75,272	\$25,000	\$163,761	\$164,000	50%	\$82,000	\$48,235
** Although this project is a retrofit of an existing BMP, it was determined that due to site specific complexity, costs would be comparable to a new BMP. As such, a site adjustment factor of 1 was used.							<b>Total</b>	<b>\$1,660,000</b>	<b>Total</b>	<b>\$919,000</b>	

## **IX. Regulatory Analysis**

### ***City of St. Albans***

Stormwater runoff within the City of St. Albans's portion of the Stevens Brook watershed is regulated primarily by the VTDEC. There is no regulation by VTrans, since all streets within the City portion of the watershed are Class 1 roads. VTDEC regulates new developments through issuance of Stormwater Discharge Permits with technical requirements as outlined in the 2002 Vermont Stormwater Manual. The City is required by its MS4 permit to draft and adopt its own ordinances and bylaws for the regulation of stormwater management by new land development. The City intends to have the necessary ordinances and bylaws adopted in 2017. Once this is complete, no further modifications to the above regulatory framework should be required. The only potential issue concerning regulatory authority for implementation of the City's BMPs would be the Town of St. Albans's current Interim Stormwater Bylaw prohibiting new multi-user or offsite stormwater management facilities. This bylaw seems to effectively prohibit the proposed Hungerford-Lower Basin BMP, which would be located in land in the Town of St. Albans. The City will be able to pursue that BMP once the interim bylaw is expired, revised, or repealed.

The City has provided to the State a list of expired stormwater permits that will be incorporated into the City's MS4 permit and an additional list of permits of sites proposed for Residual Designation Authority (RDA) permitting through VT ANR. The City has incorporated two expired stormwater permits within the City's portion of the impaired Stevens Brook watershed. The City will assume O&M of the incorporated stormwater systems and will report on any pertinent activities as part of the MS4 requirements. The City requests that VTDEC RDA the 7 other permits, with the possibility that the St Albans Central School Expansion permit could be incorporated back into the MS4 once discussions take place with the school board. Ultimately the City hopes that implementation of the RDAs and any other stormwater permits by third parties (the landowners and VTDEC) will contribute to the community's water quality goals.

### ***Town of St. Albans***

The Town of St. Albans has decided that all expired stormwater permits be incorporated into the Town's MS4 permit. The Town does not request that the State exercise Residual Designation Authority (RDA) on any of the expired permits in Stevens Brook at this time. The Town is working diligently to contact the homeowners responsible for the expired permits to complete the needed maintenance and discuss the Town's intention of taking over the permits. In many cases this is a difficult and time consuming task given no homeowner associations exist. It remains a possibility that the Town may request RDA assistance from the Agency of Natural Resources if an agreement for the Town to take over an expired permit cannot be reached. Additional regulatory authorities will likely be required. The Town plans to establish a Stormwater Utility prior to December 31, 2018.

The Town does not expect to have any "third party" implementation beyond VTrans. However, the Town does expect financial participation from "third parties", namely the appropriate permit holders and/or current owners. The extent of financial participation from appropriate permit holders and/or owners will certainly vary, but the Town will be negotiating with the appropriate permit holders and/or owners during the Final Design and Permitting phase of each project.

## X. Glossary of Terms

A glossary of relevant terms is provided below.

**Best Management Practice (BMP)**- Generally, BMPs are defined as, “Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State and waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage” (MS4 Permit, 2012). In the context of the FRP, BMPs include prescribed stormwater flow control practices as defined in the computer-based BMPDSS model, in which various BMPs scenarios can be assessed.

**Best Management Practice Decision Support System (BMPDSS)**- A computer-based hydrologic model used to assess the impact of various stormwater Best Management Practice (BMP) scenarios. This tool was developed by a private consultant for the VT DEC to use as the assessment tool for the compliance of stormwater TMDLs.

**Channel Protection Volume (CPv)**- The stormwater volume generated from the 1-year, 24-hour rainfall event (1.9 inches). The VT stormwater CPv design standard requires 12 hours of extended detention storage of the CPv in warm-water fish habitat (24 hours for cold-water fish habitat), as a means to reduce channel erosion.

**Detention BMP**- A BMP, such as a pond or biofilter, which stores stormwater for a defined length of time before it eventually drains to the receiving body of water. Stormwater is not retained in the practice. Detention BMPs aim to reduce peak discharge ( $Q_p$ ) from the basin in the effort to reduce channel erosion and settle out pollutants from the stormwater.

**Flow Duration Curve (FDC)**- An FDC is a curve displaying the percentage of time during a period that flow exceeds a certain value, with the low flow represented by the 95<sup>th</sup> percentile ( $Q_{95\%}$ ) of the curve and the high flow represented by the 5<sup>th</sup> percentile ( $Q_{0.3\%}$ ).

**Flow Restoration Plan (FRP)**- The FRP is a required element of the MS4 general permit #3-9014, under section IV. C. 1., for stormwater discharges to impaired waters. The FRP is a 20-year implementation plan of stormwater flow control BMPs which meets the TMDL high flow target and return the impaired water to its attainment condition. The FRP is required to include a list of stormwater BMP controls, as well as modeling results from the VT BMPDSS model demonstrating compliance of the approved TMDL flow target with the proposed BMP list.

**Infiltration BMP**- A BMP which allows for the infiltration of stormwater into the subsurface soil as groundwater, which returns to the stream as baseflow. Mapped soils of Hydrologic group A or B (sandy, well-drained soils) are an indicator of infiltration potential. Infiltration reduces the amount of surface storage required. Typical BMP practices include infiltration basins, underground chamber systems, bioretention practices, etc.

**Non-Jurisdictional Impervious-** Non-jurisdictional growth is an impervious area that does not require a stormwater permit and it not managed by a stormwater BMP (where impervious growth is less than one acre).

**Residual Designation Authority (RDA)-** The State's authority to issue an RDA permit to discharges not covered by the MS4 Permit. The RDA permit is separate from the MS4 permit, held by the private landowner.

**Stormwater Management Plan (SWMP)-** A comprehensive program to manage stormwater discharges from the Municipal Separated Storm Sewer System as mandated by the MS4 General Permit #3-9014.

**Stormwater TMDL (TMDL)-** Vermont developed stormwater TMDLs for impaired watersheds using stormwater flow as a surrogate for pollutants. The basis for the flow based TMDL is the understanding that stormwater is the source of pollutant loading, therefore minimizing stormwater flows will reduce pollutant loading to streams and ultimately to Lake Champlain. The approved TMDL is defined by a reduction in high flows, defined as greater than the 1-year storm event (approximately 1.94 inches in St. Albans). The TMDL also includes a non-actionable low flow target which is an increase in baseflow.

**Total Maximum Daily Load (TMDL)-** A TMDL is a calculation of the maximum pollutant loading that a water body can accommodate and still meet Vermont Water Quality Standards. The term TMDL also refers to the regulated management plan, which defines who the water body will be regulated by and how it will be returned to its acceptable condition. This includes maximum loading, sources of pollution, and criteria for determining if the TMDL is met.

**TMDL High Flow Target-** The TMDL target is percent change between the baseline condition (Pre-2002) and the existing or proposed condition (Post-2002) high flow. The high flow is the flow rate in the stream that is exceeded only 0.3% of the time ( $Q_{0.3\%}$ ), over a 10-year simulation period. The  $Q_{0.3\%}$  has been equated to the 1-year design storm runoff.

**TMDL Low Flow Target-** The non-actionable TMDL target is the percent change between the baseline condition (Pre-2002) and the existing or proposed condition (Post-2002) low flow. The low flow is the flow rate in the stream that is exceeded 95% of the time ( $Q_{95\%}$ ), over a 10-year simulation period. The  $Q_{95\%}$  is considered baseflow which is the flow in a stream fed by groundwater.



## **XI. Appendices**