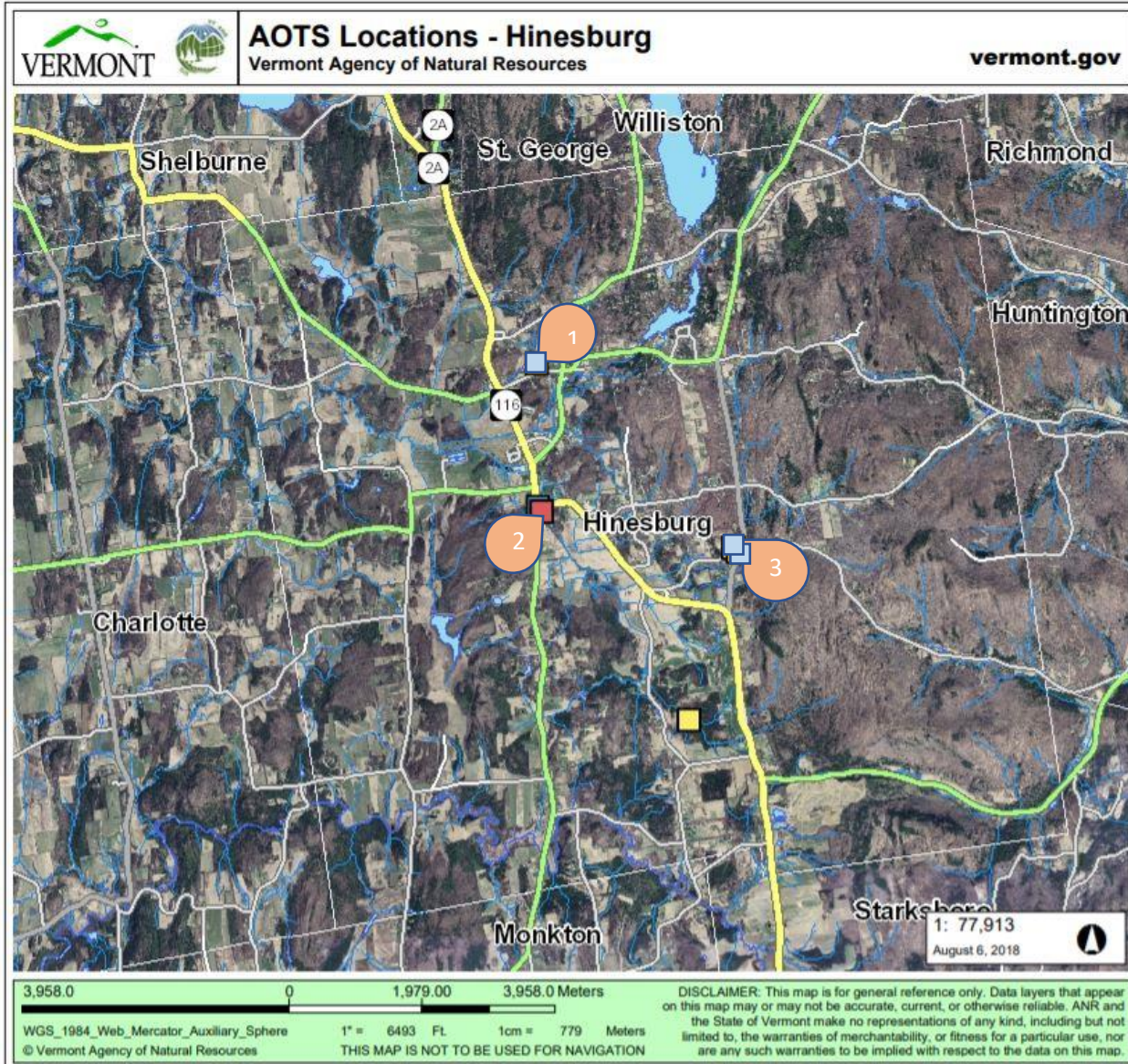


Ahead of the Storm Self-Guided Tour: Hinesburg



Site Location Key


- Design and Implementation complete
- Final design complete, "shovel-ready"
- Concept design complete


Tour Stops

1. CVU High School
2. HCS & Silver Street
3. Hinesburg Town Garage & Beecher Hill Brook Floodplain



Hinesburg Tour Stops

 45 minutes transit time

 15 minutes transit time

1. CVU High School

Bio-retention areas
Swale improvements
Infiltration trench
Plant buffers

369 CVU Road,
Hinesburg

From Route 116, head east on CVU Road. The school is on the left.



2. Hinesburg Community School & Silver Street

Rain Garden
Stone check dams
Upgraded swale

10888 VT-116, Hinesburg

From CVU, turn left onto CVU Road. Turn right onto Mechanicsville Road, and continue for 0.9 miles. Turn left on VT-116 South and continue for 0.5 miles. The destination is on the right at the intersection of 116 and Silver St

3. Hinesburg Town Garage & Beecher Hill Brook Floodplain

Bio-infiltration areas
Floodplain restoration

907 Beecher Hill Road

From HCS, head east on VT-116 South for 1.2 miles. Take a slight left onto Beecher Hill Road. The destination is on the left after 0.9 miles.





Ahead of the Storm

CVU High School Stormwater Retention

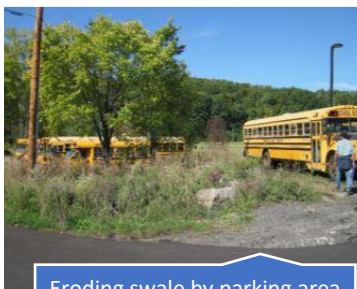
369 CVU Road, Hinesburg

Introduction

Ahead of the Storm (AOTS) grew out of a group of citizens from Charlotte, Hinesburg, and Shelburne who were concerned about the serious decline of Lake Champlain's health and water quality. Stormwater runoff from driveways, fields, parking areas, and lawns is a major factor in the deterioration of our water quality. Most impervious surfaces were created before regulations requiring water quality treatments were in place or fall below regulatory thresholds. Therefore, runoff is not managed to remove pollutants or slow flows and soils and phosphorus are mobilized and end up in Lake Champlain. AOTS helps communities change the way stormwater is managed on properties to reduce water pollution and be more prepared for extreme weather events and impacts of climate change. Fifteen municipal, educational, and private properties have been selected to become demonstration sites to showcase more optimal conservation practices in a variety of landscape settings. Monitoring and stewardship over time is crucial to successfully addressing water quality issues.

Why here?

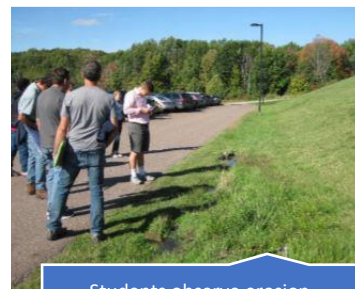
CVU is in the headwaters of the LaPlatte River, with runoff from the CVU school grounds draining either southwest to a tributary of the LaPlatte River or southeast to a tributary of Patrick Brook. The school property includes buildings, parking lots, roads, playing fields, lawns, and forest. The school holds a stormwater permit for 11.69 acres of impervious surface and maintains numerous treatment elements across the property. Water is collected in a series of grass swales, underdrains, roof drains, catchbasins, and pipes, and is directed to the fire pond or other smaller detention areas. This project expands existing treatment to reduce the volume and speed of stormwater runoff on the site to improve water quality and flood resiliency beyond the permit requirements to prepare for climate change. Students, teachers, and school staff assisted with the site assessment, alternatives analysis, and design.



Eroding swale by parking area presents opportunity for treatment



Discharge from upper playing fields has some erosion



Students observe erosion, puddling, and rutting between the playing field and parking lot



Design: how can we filter the water?

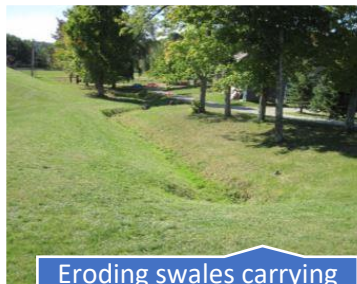
A collaborative process with students, teachers, school maintenance staff, and engineers identified problems at nine sites that if corrected would improve water quality and flood issues around the CVU campus. An alternatives analysis was performed and implementation information was summarized for treatment practices at each site. Students, with design support from staff and engineers, took ownership over seven of the sites and produced concept designs to address problems identified. A teacher, the maintenance staff, and principal have been involved in the project and have assigned priorities, timelines, and budget options for project implementation. Implementation has started.

Implementation

Revegetation has occurred at one site, and a swale bio-retention area was constructed off the north parking lot in 2020. Other sites are awaiting either final designs or implementation. Implementation of a stormwater treatment for the greenhouse, plant buffers near the cow pasture, swale improvements east of the school at the sports fields, vegetation plantings at the north parking lot snow storage area, and erosion control at the disk golf area are expected to occur in the next couple years, dependent on funding. Some projects will be included in the school maintenance budget.



Southwest portion of parking lot drains to eroding swale



Eroding swales carrying water from the upper playing fields



Existing fire pond provides some treatment for water quality

How much did it cost?

Funding for this project occurred in phases:

Survey and Concept Design (complete) \$15,000

Final Design (bio-retention swale) \$4,007

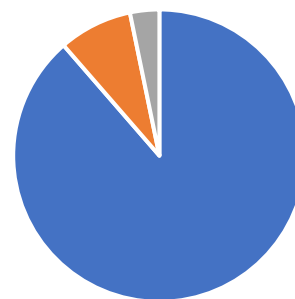
Implementation (bio-retention swale) \$40,718

(final design and implementation partially complete)

Total \$59,725



Funding Sources



■ Grants ■ School ■ Lewis Creek Association



Ahead of the Storm

Hinesburg Community School

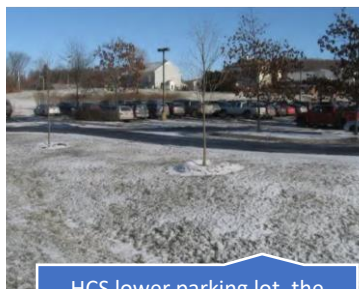
VT Route 116, Hinesburg

Introduction

Ahead of the Storm (AOTS) grew out of a group of citizens from Charlotte, Hinesburg, and Shelburne who were concerned about the serious decline of Lake Champlain's health and water quality. Stormwater runoff from driveways, fields, parking areas, and lawns is a major factor in the deterioration of our water quality. Most impervious surfaces were created before regulations requiring water quality treatments were in place or fall below regulatory thresholds. Therefore, runoff is not managed to remove pollutants or slow flows and soils and phosphorus are mobilized and end up in Lake Champlain. AOTS helps communities change the way stormwater is managed on properties to reduce water pollution and be more prepared for extreme weather events and impacts of climate change. Fifteen municipal, educational, and private properties have been selected to become demonstration sites to showcase more optimal conservation practices in a variety of landscape settings. Monitoring and stewardship over time is crucial to successfully addressing water quality issues.

Why here?

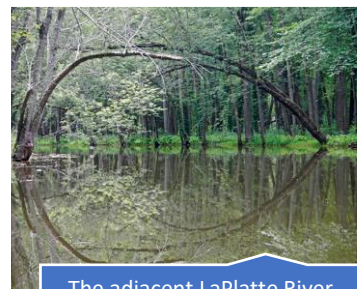
Hinesburg Community School is located at the intersection of VT Route 116 and Silver Street. Runoff is collected from 5.2 acres of existing impervious surfaces from the Route 116 corridor and the school parking lots, play areas, sidewalks, and buildings. The LaPlatte River is directly adjacent to the school and has shown elevated levels of phosphorus and sediment for years. This location presents an opportunity to treat a large amount of stormwater before it enters the LaPlatte River and will showcase optimal conservation practices for students and the Town of Hinesburg. There is already a rain garden on the corner of Silver Street and Route 116 (a different AOTS site called "The Silver Street Rain Garden") which collects and treats different existing impervious areas.



HCS lower parking lot, the proposed spot for stormwater design



Adjacent completed Silver Street rain garden



The adjacent LaPlatte River where all water and pollutants from the school flows



Design: how can we filter the water?

In order to improve water quality, engineers at Milone & MacBroom created preliminary designs to slow runoff, increase infiltration, and enhance vegetation in two key locations. West of the school, engineers propose a bio-retention area (rain garden) that will store water during large rain and snow melt events, and allow water to slowly infiltrate through soils to filter out excess nutrients before entering the LaPlatte River. South of that, engineers propose a bio-infiltration swale with a stone trench and tree mound check dams, which will slow down and filter water running off the school's impervious surfaces like the roof and parking lot.

Implementation

Final design and implementation are contingent on securing financing and will likely occur in the next 5 years.



Bio-infiltration trench example from Silver Street rain garden



Bio-infiltration swale with stone trench example from the Silver Street rain garden



Log check dam example in Hinesburg

How much did it cost?

Funding for this project occurred in phases:

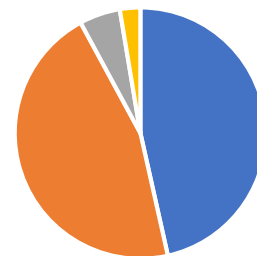
Concept Design \$6,000

Planning and Design Phase II \$12,000 (did not yet occur)

Implementation \$94,000 (estimated)



Funding Sources



■ Grants ■ School District (TBD)
■ Regional Planning Com. ■ Lewis Creek Association



Ahead of the Storm

Silver Street Rain Garden

Corner of Silver Street and Route 116, Hinesburg

Introduction

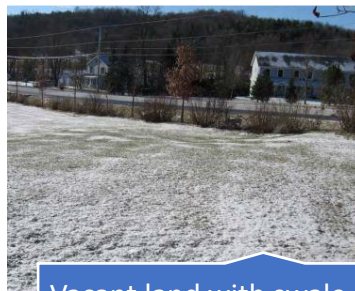
Ahead of the Storm (AOTS) grew out of a group of citizens from Charlotte, Hinesburg, and Shelburne who were concerned about the serious decline of Lake Champlain's health and water quality. Stormwater runoff from driveways, fields, parking areas, and lawns is a major factor in the deterioration of our water quality. Most impervious surfaces were created before regulations requiring water quality treatments were in place or fall below regulatory thresholds. Therefore, runoff is not managed to remove pollutants or slow flows and soils and phosphorus are mobilized and end up in Lake Champlain. AOTS helps communities change the way stormwater is managed on properties to reduce water pollution and be more prepared for extreme weather events and impacts of climate change. Fifteen municipal, educational, and private properties have been selected to become demonstration sites to showcase more optimal conservation practices in a variety of landscape settings. Monitoring and stewardship over time is crucial to successfully addressing water quality issues.

Why here?

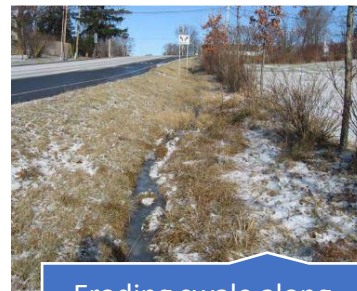
This site was identified as a potential stormwater treatment site as a result of an initial Town-wide hydrology study completed in 2011 and 2012. The site was considered a top priority for stormwater treatment because runoff from large amounts of impervious surface in the village center was discharging from three separate drainage systems to an eroding swale directly connected to the LaPlatte River. The entire project site was located on Town-owned land or the Town's right-of-way for Silver Street. This site is highly visible from the road and is directly adjacent to the Hinesburg Community School, making it an ideal location for education.



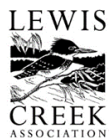
Storm drainage outfall looking east



Vacant land with swale along Silver Street



Eroding swale along Silver Street



Take a tour of the AOTS locations at lewis creek.org!

Design: how can we filter the water?

To mitigate stormwater runoff entering the LaPlatte River, engineers designed two treatments. The first is a two-celled bio-retention area, or rain garden, to slow and store water, promote infiltration, and filter sediment and nutrients. The second is swale improvements including reshaping and installation of stone check dams to mitigate active erosion. The bio-retention system was designed to treat stormwater runoff from a 6.7-acre urbanized watershed containing about 2.6 acres of impervious surface equal to 39% of the contributing area. The bio-retention system provides approximately 13,000 cubic feet (0.3 acre-feet) of runoff storage in a two-tiered configuration and is primarily designed to treat 1 inch of rainfall from the contributing drainage area and safely convey larger events.

Implementation

Construction of the bio-retention system took place over four weeks in September and October 2014. The Town of Hinesburg Public Works Department provided in-kind services to rough-grade the treatment cells and reshape the existing roadside drainage swale. Distinctive Landscaping of Charlotte, Vermont were contracted to install the various outlets and erosion control measures, finish grade the project site, place and amend topsoil as needed, install the herbaceous plants and shrubs, recover the site, and provide year 1 maintenance.



Completed swale and lower treatment looking north



Completed upper bio-retention cell looking east



Completed lower bio-retention cell looking west

How much did it cost?

Funding for this project occurred in phases:

Concept Design \$3,000

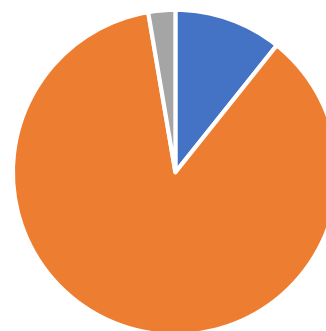
Final design and survey \$9,600

Implementation \$60,000

Total \$72,600



Funding Sources



■ Town In-Kind ■ Grants ■ Lewis Creek Association



Ahead of the Storm

Hinesburg Garage Stormwater Retention

Beecher Hill Road, Hinesburg

Introduction

Ahead of the Storm (AOTS) grew out of a group of citizens from Charlotte, Hinesburg, and Shelburne who were concerned about the serious decline of Lake Champlain's health and water quality. Stormwater runoff from driveways, fields, parking areas, and lawns is a major factor in the deterioration of our water quality. Most impervious surfaces were created before regulations requiring water quality treatments were in place or fall below regulatory thresholds. Therefore, runoff is not managed to remove pollutants or slow flows and soils and phosphorus are mobilized and end up in Lake Champlain. AOTS helps communities change the way stormwater is managed on properties to reduce water pollution and be more prepared for extreme weather events and impacts of climate change. Fifteen municipal, educational, and private properties have been selected to become demonstration sites to showcase more optimal conservation practices in a variety of landscape settings. Monitoring and stewardship over time is crucial to successfully addressing water quality issues.

Why here?

The Hinesburg Town Garage site redevelopment was recently completed to upgrade facilities for both the Town Garage and Chittenden Solid Waste District (CSWD) Drop-Off Center. The Town Garage drains 13 acres of land adjacent to Beecher Hill Brook, which is in poor geomorphic condition. The Stream Corridor Plan and Tactical Basin Plan recommend moving the Town garage operations out of the stream corridor and improving stormwater controls. Runoff from the existing buildings, parking lot, driveway, and some portions of the gravel pit flowed directly into Beecher Hill Brook untreated. Operations were located at the top of the stream bank with no buffer to help filter runoff from the 4.8 acres of impervious surface. Berms concentrated where runoff could leave the site. The redevelopment of the property presented a unique opportunity to improve stormwater runoff, water quality, and flood resiliency.



A CSWD drop off facility is on site



The garage area is mostly all impervious surface



Adjacent Beecher Hill Brook



Take a tour of the AOTS locations at lewis creek.org!

Design: how can we filter the water?

This project provided the site redevelopment with sound stormwater treatment and river corridor protection. To complement the site design by SAS Architects and Krebs & Lansing, engineers at Milone & MacBroom designed a series of swales and bio-infiltration basins to capture, filter, and infiltrate site runoff and reduce sediment entering Beecher Hill Brook. Soils at the site allowed for infiltration practices that recharge ground water and reduce the peak flows in streams. The project reduced the total impervious surface at the site by 1.6 acres and provided stormwater treatment for the 3.3 acres of remaining and redeveloped impervious surfaces. This is the first phase of a two-phase project; the second phase will address floodplain restoration of Beecher Hill Brook, and is described in the Ahead of the Storm project document "Hinesburg Garage Floodplain Restoration".

Implementation

The Town passed a bond vote to pay for the site redevelopment, including construction of the stormwater treatment elements. The garage facility was opened in fall of 2018 and stormwater treatment features have been built. Grant funding was obtained to help pay for the design of the stormwater features.



How much did it cost?

Funding for this project occurred in phases:

Concept Design \$4,200

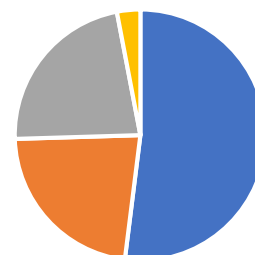
Final Design and Permitting \$33,200

Implementation \$124,000

Total \$161,400



Funding Sources



■ Town Bond ■ Town In-Kind
■ Grants ■ Lewis Creek Association



Ahead of the Storm

Hinesburg Garage Floodplain Restoration

Beecher Hill Road, Hinesburg

Introduction

Ahead of the Storm (AOTS) grew out of a group of citizens from Charlotte, Hinesburg, and Shelburne who were concerned about the serious decline of Lake Champlain's health and water quality. Stormwater runoff from driveways, fields, parking areas, and lawns is a major factor in the deterioration of our water quality. Most impervious surfaces were created before regulations requiring water quality treatments were in place or fall below regulatory thresholds. Therefore, runoff is not managed to remove pollutants or slow flows and soils and phosphorus are mobilized and end up in Lake Champlain. AOTS helps communities change the way stormwater is managed on properties to reduce water pollution and be more prepared for extreme weather events and impacts of climate change. Fifteen municipal, educational, and private properties have been selected to become demonstration sites to showcase more optimal conservation practices in a variety of landscape settings. Monitoring and stewardship over time is crucial to successfully addressing water quality issues.

Why here?

The Hinesburg Town Garage recently completed the site redevelopment to upgrade facilities for both the Town Garage and Chittenden Solid Waste District (CSWD) Drop-Off Center. The property is adjacent to Beecher Hill Brook, which is in poor geomorphic condition. The stream has incised and disconnected from its historic floodplain due to channel straightening and subsequent down-cutting. The disconnected stream has high velocities trapped in the channel banks, causing erosion and transporting sediment downstream. Since the Town Garage operations were moved out of the river corridor, this is a great opportunity to reconnect the brook with the historic floodplain so it can naturally meander, drop sediment and nutrients, and provide increased aquatic organism habitat.



A CSWD drop off facility is on site



Active excavation in the gravel pit area



Adjacent Beecher Hill Brook



Take a tour of the AOTS locations at lewisecreek.org!

Design: how can we filter the water?

In order for the stream to function properly, a healthy and accessible floodplain is necessary to reduce flood risk, reduce erosion risk, and improve water quality. To do this, engineers at Milone & MacBroom designed a plan to slightly raise the stream bed by adding boulders and logs that will capture sediment and naturally raise the stream, providing it access to the right floodplain. The right floodplain will also have fill and berms removed to make it more accessible, and will be planted with native riparian trees. A berm on the left floodplain will be removed, so in extreme weather events the stream can access the left bank, reducing risk of flooding and allowing water to spread out and drop sediment. This project will restore 1.4 acres of functioning riparian floodplain area adjacent to Beecher Hill Brook.

Implementation

Implementation occurred in 2019 and 2020, thanks to a Clean Water project grant from VT DEC and the Town of Hinesburg for tree and live stake plantings. The garage and CSWD buildings and operations have been moved by the Town to make space for this project. A Town bond vote provided funding for removing the infrastructure from the river corridor, native plantings, and stormwater improvements (see AOTS sheet Hinesburg Garage Stormwater Retention).



Stones added to raise the level of the river.



Fill and berms were removed to make space for the brook to spread out onto its restored and planted floodplain.



Log weir in place to trap sediment and raise stream bed.

How much did it cost?

Funding for this project occurred in phases:

Concept Design \$4,200

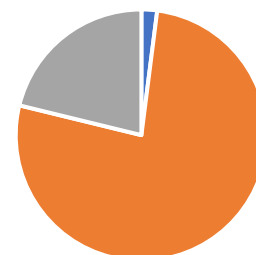
Survey, Model, Design, & Permitting \$58,400

Implementation \$425,000

Total \$487,600



Funding Sources



■ Lewis Creek Association ■ Grants
■ Town of Hinesburg