

Franklin County Stormwater Master Planning and Implementation



Services / Expertise

Stormwater Assessment & Permitting
Watershed Planning
Stormwater Retrofit Design

Markets

Local and Regional Government
NGOs

Project Location

Northwest Vermont

Date Completed

2011-2015

Project Owner

Friends of Northern Lake Champlain



Construction of a stormwater infiltration area at the intersection of Academy St. and Route 7 in the Village of Swanton. This green infrastructure practice treats flow from 3/4-acre of road surface.

STONE has developed comprehensive stormwater management plans (SWMPs) for eleven communities in Franklin County while working for the Friends of Northern Lake Champlain (FNLC). The SWMPs were designed to connect the concepts of stormwater management, floodplain management, river corridor protection, and land use in presenting the municipalities with a strategic plan and prioritized approach for town-wide stormwater improvement projects.

The first step in developing each plan was to gather and review existing reports, data, and plans germane to each municipality's watersheds, surface water(s), and stormwater management facilities, including, but not limited to: impervious surface mapping, stream geomorphic assessment work, bridge and culvert inventory data, and the Town Plan.

Our approach to identifying problem areas included:

- Strategic interviews with local officials, including the road foreman and/or public works manager and municipal administrator(s),
- Site visits to observe and document problem areas (with photos),
- Evaluation of soil conditions to understand erosion potential, and
- Reviewing local regulations to identify areas of planned growth.

Stone documented known problem areas that could be attributed to stormwater runoff (actively eroding sites, roadway flooding and/or ponding areas, culverts or structures with insufficient hydraulic capacity). We flagged areas where local conditions may make an area of town particularly sensitive to changes in hydrology often attendant with development. Stone used the data to prioritize actions and recommend practices with the

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potential to address each problem, considering the municipality's priorities and anticipated water quality benefits. Beginning in 2013, we completed practice design and implementation, including site-specific testing, cost estimation, engineering design, and construction oversight, for a range of high-priority projects, including a step pool conveyance system in Enosburg Falls and an infiltration facility in Swanton Village, as described below.

Step Pool Storm Conveyance System Design and Construction

Stone developed a SWMP for the Village of Enosburg Falls that identified a stormwater outfall near the Enosburg Village Garage as a high priority project. The outfall drains approximately 11 acres of largely impervious residential area in the downtown. Improvements to the channel below the outfall had been made in the 1990s as part of a sewer separation project, but heavy sediment loads and a lack of proper maintenance had led to clogging of the stone-lined channel. Recently, flows began to leave the banks of the existing stone-lined channel, causing significant erosion and damage to a walking trail.

FNLC retained Stone to design and oversee the construction of a retrofit practice to repair the outfall and replace the failing channel. A step pool stormwater conveyance (SPSC) system was identified as the preferred approach to address the existing erosion problem and to provide additional water quality benefits. The SPSC system is designed to safely convey peak stormwater flows while attenuating and treating for quality.

The system utilizes a series of constructed pools, riffle grade control structures, native vegetation, and an underlying filter bed composed of a sand/woodchip mix to convert surface storm flow to shallow groundwater flow. The project helps to reach water quality goals by reducing the amount of nitrogen, phosphorus, and sediment entering the nearby Missisquoi River. Stone's work involved performing hydrologic analysis of the drainage area, designing the step pool system including the sizing of pools and riffles, developing construction drawings, and overseeing construction. The stormwater modeling software HydroCAD was used to estimate discharge intensities for sizing purposes.



Photo of the step pool stormwater conveyance system, following construction and a rain event.

Swanton Village Traffic Island and Infiltration Area

Stone worked with the Friends of Northern Lake Champlain and the Village of Swanton on a stormwater retrofit project at the intersection of Academy Street and Grand Avenue (Vermont Route 7), next to the village green. The Village had planned to replace an existing, painted traffic island with a curbed island in order to better manage traffic flow. The Village's Public Works Director expressed an interest in incorporating stormwater management into the practice. The Friends of Northern Lake Champlain was able to secure grant funding from Vermont's Ecosystem Restoration Program to support the design and implementation, and hired Stone to develop and implement the design. Stone designed an infiltration area to treat the first inch rainfall from approximately 3/4-acre of road surface, as well as from the roofs of adjoining buildings.

The project included: Performing a physical feasibility assessment that defined the contributing area to the proposed practice, water table elevation, soil conditions, existing infrastructure, and pedestrian flow. Infiltration testing was completed, demonstrating that the soils were sandy and well-drained, and that under-draining the facility was not necessary. Sizing the pretreatment and treatment areas of the infiltration practice appropriately to ensure long-term performance of the system. Providing technical support and oversight during construction to ensure that the infiltration area met the project's water quality and quantity management objectives.