

Case Study: Town of Northfield

Vermont Municipal Green Infrastructure Toolkit

Green Infrastructure (GI) means different things to different people depending on the context in which it is used. In Vermont we define it as “a wide range of multi-functional, natural and semi-natural landscape elements located within, around, and between developed areas at all spatial scales.” This includes everything from forests and meadows to wetlands, floodplains, and riparian areas. For municipalities Green Infrastructure can be promoted in two ways: by using Low Impact Development (LID) concepts at both the macro-level of town planning and site design and by promoting the use of Green Stormwater Infrastructure (GSI) practices and techniques. LID seeks to maintain a site’s pre-development ecological and hydrological function through the protection, enhancement, or mimicry of natural processes.” GSI consists of systems and practices that restore and maintain natural hydrologic processes in order to reduce the volume and water quality impacts of the built environment while providing multiple societal benefits.”

Costly Runoff

The community of Northfield, located along the Dog River in central Vermont, has engaged over the past several years in a number of initiatives to protect water resources and community investments in private property and municipal infrastructure. Interest in green infrastructure approaches has developed both in reaction to damaging and costly precipitation events, as well as in anticipation of future emphasis by the State of Vermont on improving water quality.

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Northfield’s Village developed as a mill village, bisected by the Dog River. The community desires to take a role in removing pollutants and reducing and slowing stormwater flows. The Village has been subject to periodic flooding over the years, with severe consequences including business closings. Along with contributing to flood flows, runoff in and around the Village is problematic because the piping system drains to the wastewater treatment facility.

During excessive precipitation events, contaminated stormwater sometimes overflows to surface water discharge points, and the extra flow in the wastewater facility is particularly costly to treat.

Simple Steps, to Sophisticated Management

Motivated to address costs of stormwater treatment and mitigate future damage due to flood flows, the community identified simple first steps, which would eventually lead to more sophisticated water resources and infrastructure management. This began with a series of studies to understand hydrologic conditions as well as location and condition of stormwater infrastructure. In 2008 a Stormwater Drainage Study of the south end of the Village was conducted, and later a study of Northfield Falls Village.

Building on a better hydrologic understanding, Stormwater Infrastructure Mapping was conducted in partnership with Central Vermont Regional Planning Commission (CVRPC). Starting with locating catchbasins to facilitate cleaning & maintenance, the project also included mapping the paths that stormwater runoff traveled as it ran off impervious surfaces, and creation of Village “stormshed” maps. These maps included the

catchbasins and curb stops, stormwater pipes, swales, stormshed boundaries, and the surface flow direction of water across the ground.

The next phase of this project identified stormwater retrofit sites within the Village to allow disconnection of drainage lines to the wastewater treatment plant and redirection of runoff to green infrastructure treatment structures. Northfield has now had partial engineering (30%) designs developed for four of the recommended sites, and one has been brought to construction. The bioretention area depicted below is under construction on Central Street as this case study is being written.



This bioretention area on Central Street will catch runoff from the drainage areas of two catch basins.

Preventative Land Use Planning

Northfield has followed up this near-term, hands-on green stormwater infrastructure planning work with long-term planning and consideration of preventative land use regulations. Taking part in a statewide Green Infrastructure Outreach Initiative, Northfield's Town Plan and Zoning Bylaws were reviewed by CVRPC for opportunities for the community to undertake green infrastructure practices. CVRPC assisted the Planning Commission and Conservation Commission to draft flood resilience and stormwater background and policies for the Natural Resources Chapter of the Town Plan, which was adopted in 2014. Of recommendations put forth for the land use regulations, protection of riparian areas was of particular interest to Northfield. In response, CVRPC developed more specific recommendations for buffer setbacks and regulatory standards for Northfield to consider.

Next Steps

With the Town Plan adopted at the end of 2014, the community is now moving toward implementing the more specific green stormwater management tasks it sets out. The Planning Commission is reviewing recommended regulatory provisions for riparian buffers while Public Works and Town Administration complete the current Central Street installation. Final capping of the old catch basins to end flow of runoff to the wastewater treatment plant was completed in 2015. Following completion of this project the community is pursuing construction of additional bioretention structures. An Ecosystem Restoration Grant has been awarded to convert a municipal parking lot next to the Village Green into bioretention that will treat 14 acres of runoff area. During the next round of funding, Northfield will partner with CVRPC to apply for support of a bioretention installation on Water Street.

For more information on building Green Infrastructure in the Central Vermont region, please contact:
Central Vermont Regional Planning Commission at 802-229-0389 or info@cvregion.com

or, visit <http://vpic.info/GreenInfrastructureToolkit.html>