

Drainage Channel Restoration Designs on Route 14, Hardwick, Vermont



Services / Expertise

Urban Retrofit Planning
Stormwater Project Scoping
Stormwater Project Engineering and Design
Developed Lands Erosion Control
Open Channel Drainage System
Stakeholder Coordination

Markets

Watershed Organizations
Local and Regional Governments

Project Location

Hardwick, Vermont

Date Completed

2016-2020

Project Owner

Caledonia County Natural Resource
Conservation District

Stone Project ID#

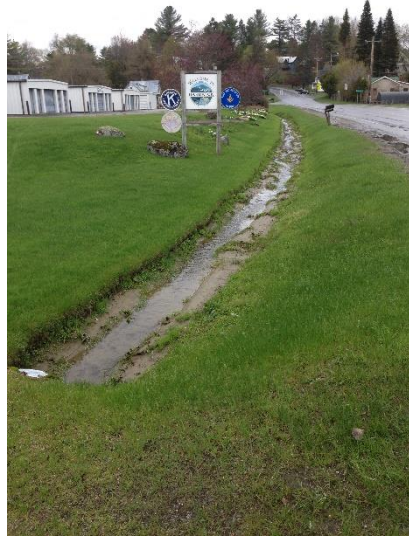
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Project Managers

Amy Macrellis (planning)
Gabe Bolin, PE (engineering)

Project Team

Gabe Bolin, PE
Peter Lazorchak, PE
Branden Martin, PE



The site includes an unnamed tributary that serves as a drainage ditch to convey stream flow and runoff from 111 acres.

STONE worked with the Caledonia County Natural Resources Conservation District (CCNRCD) to support the Town of Hardwick in identifying problem areas and developing strategic retrofit opportunities within a broad stormwater master plan for core areas within the town. Problem areas and retrofit opportunities were carried forward through a more detailed examination and prioritization process that considered possible regulatory changes, future growth, and the suitability of different types of best management practices to each identified problem area. As part of these stormwater master plans, Stone worked with each town, CCNRCD staff, and key stakeholders (including property owners, Vermont DEC, and VTTrans), to advance two high-priority projects to preliminary design, which included development of 30% engineering designs, opinions of probable cost, and identification of permitting needs.

Stone also developed final restoration designs for an eroding drainage channel along Route 14 near Bessette Storage in Hardwick, Vermont. The site includes an unnamed tributary to Coopers Brook, serving as a drainage ditch that conveys both intermittent stream flow and runoff from roughly 111 acres, as well as heavy sediment loads within the Fluvial Erosion Hazard Area of the brook. Stone's restoration design reestablishes this channel as a stream and includes a floodplain, stabilized bed, and banks. Design plans included resizing the channel and top of banks to accommodate full flows (i.e. the 1.6 to 2- year peak flow events) and the addition of floodplain benches to accommodate up to the 100-year peak flow event. A pool and step were included in the design on the upstream end to serve as a sediment forebay, as well as a vegetation plan specifying salt tolerant plants with limited growth heights to maintain highway sight distances.

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As the design evolved from concept design, Stone worked with project stakeholders to confirm resource conflicts were minimized, obstacles for permitting were addressed, operation and maintenance requirements were feasible, and landowner support was secured. Site meetings and consistent communication with adjoining landowners, the VTDEC Watershed Planner, VTDEC Rivers Program, VTDEC Wetlands Program, and VTrans (District Office and Maintenance & Operations Bureau), and other stakeholders to report progress and address concerns as they arose kept the work on track for completion. Project benefits include increased channel roughness, lower channel velocities, improved terrestrial organism passage, a significant increase in channel conveyance, and increased resiliency during storm events. Stone completed designs in 2019, provided construction specifications, bid documents and contractor selection support in early 2020, and helped to complete construction in the summer and fall of 2020.



Channel restoration practices near the end of construction, September 2020.