Plainfield Recreation Road Erosion and Gully Alternatives Analysis and Conceptual Designs

STONE ENVIRONMENTAL

Services / Expertise
Restoration / Water Quality Improvement
Hydrologic Study
UAV LiDAR Application
Gully Alternatives Analysis
ArcGIS Online Web Map
Stakeholder Coordination & Outreach
Site/Design Permitting Needs
Preliminary Conceptual (30%) Designs

Regulatory Compliance / Permitting
Flood Hazard and River Corridor permitting

Markets
Watershed Stewardship Organizations
Municipal Government

Project Location
Plainfield, Vermont

Date Completed
2018–Present

Project Owner
Friends of the Winooski River

Project Funding
Vermont DEC Clean Water Initiative Program, Ecosystem Restoration Grant; Vermont DEC Project Development Block Grant

Project ID#
18-093, 20-111

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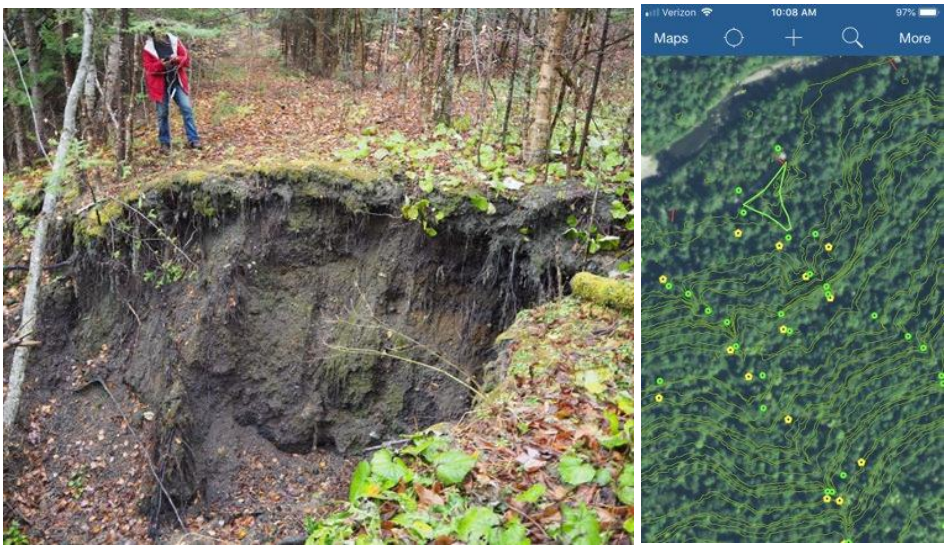

One of several headcuts across the abandoned rail bed identified during field survey (left). UAV LiDAR-derived topo contours and were loaded into a mobile field data collection app to quickly identify problem areas (right).

STONE worked with the Friends of the Winooski River and the Town of Plainfield to complete a hydrologic study and alternatives analysis for a steep drainage that extends from just above Lower Road to the Winooski River in Plainfield, Vermont. The project purpose was to determine runoff sources in an 80-acre drainage and develop concept designs addressing hillslope erosion and repeated damage to Recreation Field Road, resulting in sedimentation in wetlands and the Winooski River.

Stone utilized UAV capabilities to create a survey-quality LiDAR digital elevation model and topographic survey and allow efficient targeting of field assessments. We used an ArcGIS Online web map (http://arcg.is/SuazL), allowing our clients and partners to follow progress in real time. Stone used mobile devices to record observations while evaluating each gully. Following fieldwork, the drainage area boundaries and gully profiles were refined. Stone's professionals determined each of the gullies between Lower Road-Barre Hill Road. The Winooski River has, as its source, one of four cross culverts concentrating flow from and conveying runoff across Lower Road or Barre Hill Road. An abandoned rail bed concentrates and channelizes runoff, while blocked or failed culverts at the rail bed result in slope and embankment failures with gullies remaining in active and rapid adjustment—impacting Recreation Field Road, riparian wetlands, and the Winooski River.

Stone prepared 30% design plans, including sediment basins and log step channel stabilization practices. Following completion of the conceptual designs in 2019, we continue to work with the Friends and affected property owners to address concerns and build support for final design and construction of improvements to address critical instabilities in the eastern and central gullies.