

Success Pond Road Culvert Replacement and Aquatic Organism Passage



Services / Expertise

Culvert Replacement
Aquatic Organism Passage Design
Geomorphic Analysis
Stream Restoration
Channel Restoration Plan & Design
Hydrologic & Hydraulic Modeling
Sediment Analysis, Characterization, and Management
Infrastructure Stability Analysis
Erosion Prevention & Sediment Control Plan
Cost-Benefit Analysis of Select Alternatives
100% Design Plans & Opinion of Probable Cost
Stakeholder Collaboration & Stewardship
Permitting Support
Project Implementation

Markets

Watershed Protection Organizations
Site/Property Owners

Project Location

Success, New Hampshire

Date Completed

2020 – Present
Construction: Summer/Fall 2021

Project Owner

Androscoggin River Watershed Council /
Wagner Forest Management, Ltd.

Project ID#

20-113

Project Manager

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Project Team

Matt Schley, EIT



Downstream channel showing aquatic organism passage barrier at Alder Brook in Success, NH

THE Androscoggin River Watershed Council and Wagner Forest Management, Ltd. hired Stone to provide engineering design, permitting support, and construction management services for a series of three culvert replacements in Success, NH. The project area includes three crossings under Success Pond Road, each on a different stream including Alder Brook, South Branch (SB) Stearns Brook, and Clay Brook. Success Pond Road provides the sole access to nearly 15,000 acres of logging land and leased camps owned and managed by Wagner Forest Management, Ltd. Each of the three crossings is undersized relative to bankfull channel geometry and was identified in the 2018 Androscoggin Watershed Stream Crossing Project report (Newell, 2018) as a barrier to flow hydraulics, sediment transport, and aquatic organism passage. The goals of this project are therefore to improve hydraulic and sediment transport capacity, restore aquatic organism passage, improve connectivity between forest/stream patches on either side of Success Pond Road, and ensure long-term stability of the road crossings for future logging and recreational uses.

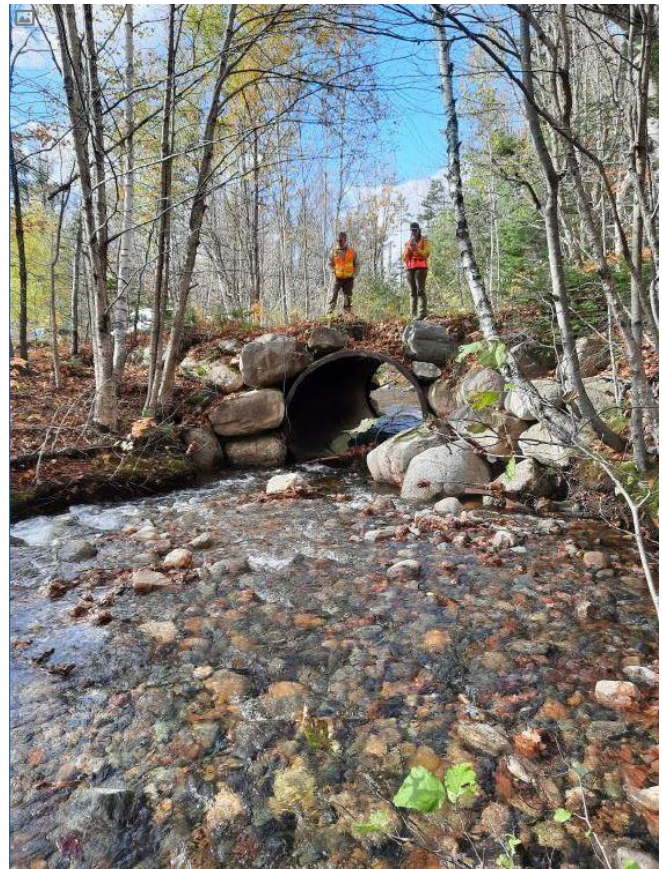
The Coos County NRCS provided Stone with a topographic survey of the three stream channels and with wetland delineation information for each of the three project areas. Per the project scope, Stone engineers supplemented this information with additional topographic surveys to validate the use of available LiDAR in the design process. Stone also completed a full geomorphic assessment at each site including stream longitudinal profile, cross sections, sediment sampling, and identification of bankfull channel indicators. Stone compiled hydrologic data from USGS StreamStats and available USGS gage data. Stone utilized a Log Pearson Type III transform to model stormflows for each crossing based on the best available gage data.

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Stone utilized this topographic, geomorphic, and hydrologic data to develop a proposed design for each of the three crossings. Each design includes a single-span steel stringer bridge installed on prefabricated Redi-Rock concrete abutments, and a reconstructed stream channel in congruence with upstream reference reach conditions. The proposed bridge and channel configurations were evaluated using a hydraulic model (HEC-RAS) to ensure the bridge structures allowed for proper freeboard during passage of the 100-year storm event, and to ensure the mobility/stability of bed and bank materials. The 100% design plans include these proposed bridge and channel configurations with additional, minor modifications to stream planform, bed features, and streambanks. The proposed designs will encourage the streams to naturally progress toward equilibrium slope conditions, and the restoration of open channels will result in high quality aquatic organism habitat and long-term system stability.

Stone provided permitting support for this project, including the processing, submission, and overall coordination for a New Hampshire Standard Dredge and Fill Wetland Permit and a US Army Corps of Engineers New Hampshire General Permit. Project construction is scheduled for the Summer/Fall of 2021.



Left: Downstream channel showing aquatic organism passage barrier at Clay Brook in Success, NH. Right: Upstream channel showing headwall and bank degradation at South Branch Sterns Brook