



Wood-Pawcatuck Watershed Association  
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January 24, 2024

Dear Richmond Town Councilors,

The Wood Pawcatuck Watershed Association (WPWA) is a Hope Valley based non-profit with 40 years of experience in all aspects of watershed management and education. In 2010, the Town of Richmond provided to WPWA the land control necessary to remove the town-owned Lower Shannock Falls Dam on the Pawcatuck River. With that trust, WPWA provided to the Town of Richmond a turn-key project which required no funding from the town and a minimal investment of time by the town's staff.

In more recent years, WPWA has been assisting watershed towns with increasing their flood resiliency, while also improving habitat and water quality. In 2015, WPWA, the Town of Richmond and all 13 other watershed towns completed the Wood Pawcatuck Flood Resiliency Management Plan which inventoried every bridge, dam, and culvert in the watershed. WPWA also participated in the Town of Richmond's 2021 Beaver River Watershed Assessment. Most recently, WPWA, the RI Nature Conservancy, and RIDEM partnered on a Cold Water Stream Restoration Plan.

All 3 of these plans ranked a culvert on Hillsdale Road (see attached) as having a significant negative impact on flooding, wildlife habitat and water quality. Our Cold Water Stream Restoration grant originates from the Congressional Bipartisan Infrastructure Law. That grant can provide additional funding in Oct. 2024 (or earlier) to implement projects identified in our Cold Water Stream Restoration Plan. The partners have ranked replacing the undersized culvert on Hillsdale Road as our top priority.

Therefore, WPWA would like your authorization tonight to secure additional funding to replace the Hillsdale Road culvert. In order for me to advocate for this funding, we would also need your approval for WPWA to implement the design, permitting, and construction of the proposed new culvert. Listed on the following page are project aspects important in your decision making.

Thank you for your time, consideration and your past and future partnerships with regard to improving this beautiful watershed. I look forward to answering any questions you may have. I am hopeful to have that opportunity at your Town Council Meeting on Tuesday February 6<sup>th</sup>, 2024.

Respectfully,

Chris Fox, Executive Director

*To Preserve and Protect the Lands & Waters of the Wood Pawcatuck Watershed  
for Our Natural and Human Communities*

## **Important Project Considerations**

- The existing undersized culvert has caused road flooding at least 2 separate times, by my observation, since December 2023.
- This project is consistent with Richmond's Comprehensive Plan:
  - "Services and Facilities Policy #3: Reduce the potential loss of life and property damage caused by natural hazards, including riverine flooding and severe storms."
  - "Public Services and Facilities Action #10: Make an inventory of the Town's stream crossing structures and identify ones in most immediate need of upgrade or replacement."
- This project is consistent with Richmond's Hazard Mitigation Plan
  - Identifies Hillsdale at Beaver River as an at-risk, flood-prone drainage system
- The federal funder is offering to provide full funding with no match requirement from the town.
- This culvert replacement proposal has the preliminary support of Richmond's EMA Director, Police Chief, DPW, Town Administrator, Planner, and Conservation Commission Chair.
- WPWA proposes to manage all the funding, hold all the engineering and construction contracts, and administer all related planning, permitting and construction.
- Upon final completion (2026) the new structure will be gifted to the Town of Richmond.
- Construction timetable will likely be 4-8 weeks. A temporary road closure during this period is anticipated, but the new structure ensures the road will never be closed due to flooding again.
- Cost to complete the engineering, design, permitting, and construction is not yet known, however, no matter the cost, none of that cost will be passed onto the Town of Richmond.

## **Approval Needed from the Richmond Town Council Meeting**

- 1) Authorization for WPWA to pursue all funding necessary to implement all aspects of the culvert replacement. With recognition that there will be no funding obligation of any kind from the town through project completion.
- 2) Approval for WPWA to serve as the turn-key project administrator on behalf of the Town of Richmond.
- 3) Appointment of town staff or staffers to actively participate in the planning and development of the project. Staffers can be added or removed, by the town, as the project develops.

## 2 Recommended Plan and Cost Estimate

### 2.1 Beaver River Culvert Removal

#### 2.1.1 Project Goals

The primary goal of the project is to replace the existing culvert that conveys the Beaver River beneath Hillsdale Road in the Town of Richmond with a cost-effective, open-bottom structure designed to enable aquatic organism passage, increase hydraulic capacity, and reduce flood/erosion risk. The Hillsdale Road culvert is owned by the Town of Richmond.

The existing stream crossing consists of three (3) circular concrete culverts, each approximately 3-feet wide by 3-feet high by 29-feet long. The combined width of the existing culverts is significantly narrower than the stream's bankfull width, severely constricting the stream and making the crossing susceptible to blockage by debris. The outlet of the crossing structure is undermined and perched (Figure 1). The downstream banks experience severe erosion, sufficient to expose the underlying rebar supporting the structure.

#### 2.1.2 Project Site and Field Data Collection

The project site is located on Hillsdale Road in the Town of Richmond, Washington County, Rhode Island. The crossing is within the Beaver River watershed in the lower reach of the Beaver River. The site is located in a rural area approximately 0.6 miles south of the intersection of Hillsdale Road and James Trail. Undeveloped, wooded areas owned by the Rhode Island Department of Environmental Management are located on both sides of the road upstream and downstream of the crossing.

Field reconnaissance and data collection was performed at the project site in July 2015 to collect information required for the road-stream crossing assessment phase. The field data collection procedures and forms were drafted prior to the inception of the North Atlantic Aquatic Connectivity Collaborative (NAACC) but follow similar assessment protocols for assessing aquatic connectivity. The road-stream crossing survey methods used for this project also incorporated assessment protocols for structural condition and evaluating geomorphic vulnerability, hydraulic capacity, and potential flooding impacts to infrastructure and public services. Stream bankfull width measurements were made at representative cross-sections outside of the influence of the existing culvert.

The proposed culvert removal involves replacing the existing circular culverts with a precast reinforced concrete open-bottom, three-sided frame with a larger opening, spanning 10 feet wide by 29 feet in length. The 10-foot wide open-bottom structure will span 1.20 times the estimated bankfull width of the stream and will be supported by shallow spread footings bearing on bedrock. The bottom of the stream channel through the replacement structure will be designed to approximate the slope, width, substrate, and water depth in the existing channel upstream and downstream of the crossing outside the influence of the crossing. The channel bottom will be roughened and armored to resist erosive velocities over a range of flows.

The existing horizontal and vertical roadway alignment, as well as the width of the existing roadway, will be maintained. Double box beam bridge rail for low volume roads will be used on the headwalls and wingwalls along both sides of the structure, transitioning to guide rail on the upstream side of the crossing where flared wingwalls are proposed. The replacement stream crossing structure, headwall, guide rail, and other appurtenances will be located primarily within the municipal right-of-way, with the exception of the upstream flared wingwalls and channel grading, which will extend outside of the right-of-way onto the adjacent RIDEM properties. Other grading and bank stabilization activities may involve work outside of the municipal right-of-way on municipal property.

The proposed project assumes road closure and an off-site detour, which is generally the most



Hillsdale Culvert Road Flooding (Jan. 13<sup>th</sup> 2024)





convenient and least costly alternative for traffic control from a construction perspective. An off-site detour generally allows for a simpler, less expensive, and faster construction process as compared to stage construction or a temporary on-site detour bridge and bypass road. An off-site detour would require up to a several-mile detour for local traffic, which may not be acceptable to the local residents and community.

If road closure and detour of traffic is not feasible during construction, two other options exist: 1) stage construction in which the construction is completed in stages or phases within the general footprint of the replacement crossing by constructing one half of the culvert at a time and keeping the other half open to one-way or two-way traffic, and 2) temporary detour bridge and bypass road which serves to keep the roadway operational during construction.

The costs associated with stage construction are difficult to estimate until the actual staging details are developed but can range from 10% to 30% of the estimated project cost (NYSDOT, 2019), while a temporary bridge and bypass road can increase the estimated project cost by up to 50% depending on the site conditions. The cost estimates presented in this memorandum would be refined during future phases of design to account for the selected method of temporary traffic control during construction.

### 2.1.3 Cost Estimate

Fuss & O'Neill developed an order-of-magnitude opinion-of-cost based on review of construction costs for similar items in past projects, applicable reference cost data, recent RIDOT and MASSDOT construction bids, and design and construction costs from recent similar stream crossing replacement projects in Rhode Island and Massachusetts. The order of magnitude cost estimate provided is based on numerous assumptions, which would be adjusted as the project progresses. Additionally, capital costs estimated here are expressed in 2023 dollars and do not account for inflation.

**The following is a list of the assumptions regarding the planning, design, and estimated cost for the removal of the Beaver River Culvert at Hillsdale Road:**

- Construction will occur in a single phase. Construction in multiple phases would increase costs.
- All proposed work is permissible under the Rhode Island General Freshwater Wetland Regulations (250-RICR-150-15-3).
- There is sufficient on-site space for stockpiling excavated culvert materials.
- The project poses no risk to infrastructure or utilities and no mitigation measures will be required.
- Any costs related to land acquisition/easements will be included.

Costs associated with the remaining design, permitting, and construction administration/inspection are estimated at 35% of the construction cost. A 30% contingency is also assumed to account for uncertainty associated with bidding and construction, future changes in unit costs, and scope or design changes that may arise in later phases of design.