



Town of Machias Downtown Waterfront Resilience and Renewal

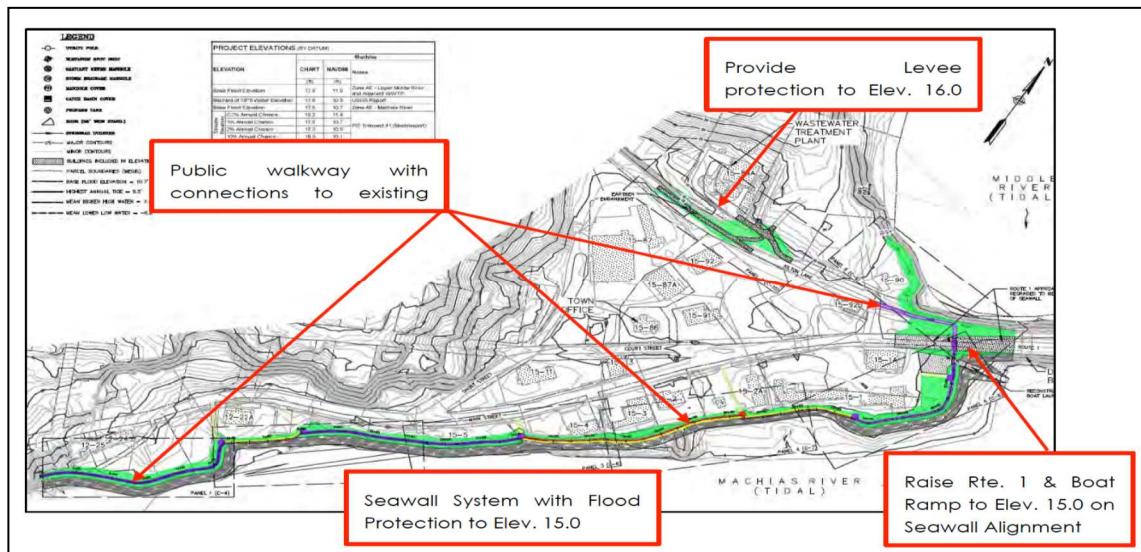


Figure 10: Downtown Resilience and Renewal: Preliminary Engineering Study, Town of Machias Maine
Baker Design Consultants

“The information gained through this study is critical for assessing future flood protection needs for downtown Machias. The town appreciates all the hard work and dedication from all the partners that made this possible”.
Christina Therrien, Machias Town Manager 2019

PARTNERS

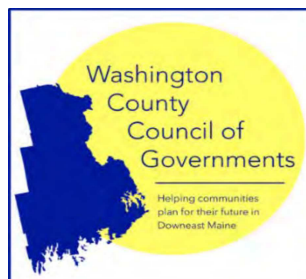
Washington County Council of Governments, University of Maine at Machias.
Consultants: Baker Design Consultants, Ransom Consulting Engineers and Scientists, West Falls Surveying

PROJECT DESCRIPTION (Project completed January 2019)

The Machias village center lies at the head of tide for the Machias River estuary. The Town is working to revitalize the downtown by improving waterfront access while making it more resilient to storm surges and sea level rise. This multi-year effort will involve significant changes to transportation infrastructure, water treatment, landscaping, and shoreline stabilization.

THE CHALLENGE and PROJECT APPROACH

Flooding threatens the health, safety, and welfare of the people of Machias. More specifically, downtown businesses and infrastructure are vulnerable to flooding under a variety of scenarios. The aging Machias dike is at risk of being overtopped by flooding (and possibly failing). The health of Machias, surrounding communities, and surrounding ecosystems



depends on effective wastewater treatment. Flooding of the sewage treatment plant could cause a release of raw sewage to the Machias River that would have multiple negative impacts on water quality and would result in closure of significant shellfish harvesting areas in Machias Bay.

The approach taken in this project was threefold including:

1. Creation of a conceptual design, next steps and cost estimates required to develop a final design and build for flood protection against future sea level rise while also meeting FEMA requirements to protect against the 1% annual chance flood so that the flood maps could be revised after it is built.
2. Quantifying the potential economic impacts of flooding and sea level rise and inform stakeholders as they will need to make complex and potentially contentious decisions.
3. Integrating seawall improvements into downtown revitalization efforts to restore historic wharf and riverfront access to the river including initial assembly of historical photographs and oral histories so that interpretation along the future river walk is grounded in the town's rich history.

RESULTS

The project generated a very useful set of products that are part of the larger initiative toward final construction of a flood protection structure; These included 1) detailed mapping of the Machias downtown using areal drone survey technology supplemented with ground measurements to determine building floor elevations, 2) a flood hazard synopsis that considered current conditions, historical events, and future sea level rise modelling to generate probability predictions for future flooding, 3) an inventory of downtown buildings to evaluate the impacts associated with flood inundation events ranging from BFE+0 feet to BFE+6 feet, 4) damage assessment modeling based on the same flood scenarios that were incorporated into a cost benefit analysis of the concept design, 5) assembly of oral histories and well attended community meetings, 6) a concept design for a seawall system that incorporates a river walkway, 7) an estimate of construction costs for the concept design, and, 8) preparation and submission of a FEMA Pre-Disaster Mitigation Advance Assistance Planning Grant.

NEXT STEPS AND OPPORTUNITIES

The decision on the FEMA Pre-Disaster Mitigation Advance Assistance Planning Grant is pending. If funded, this grant will take the project to the next step by allowing the town to:

- Assemble pre-engineering and design-build information for a flood protection structure
- Assess environmental impacts by wetland scientists and wildlife biologists
- Investigate subsurface conditions to obtain parameters necessary for final designs
- Review presence and extent of historical cribwork structures
- Evaluate existing stormwater and wastewater treatment facility piping network to determine final design
- Determine design basis for a pump system to operate in conjunction with the seawall in periods of flooding
- Complete seawall and walkway alignment optimization to achieve regulatory requirements.
- Review impact of new construction with local property owners to convey understanding of benefits of seawall (flood protection, reduced insurance premiums, coastal erosion control, shorefront walkway)
- Identify impacts to property frontage and right of way acquisition
- Meet with regulatory representatives at all levels to discuss permit requirements
- File application with property owner and stakeholder support
- Prepare design-build bid documents and support grant applications for future construction phase.

LESSONS LEARNED

The assemblage of oral histories, while of great interest and importance, is a task that went considerably beyond the scope of the initial project. It could not be completed but provided clear direction for future work. Inclusion of high-resolution survey and economic modelling was instrumental to our ability to prepare the conceptual design as well as the preliminary cost benefit analysis.

APPLICABILITY FOR OTHER MUNICIPALITIES

The approach taken is easily replicated by other coastal municipalities.

For additional information

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Project webpage hosted by WCCOG:
<https://www.wccog.net/machias-resilience.htm>

Final report available at:
<https://www.wccog.net/assets/MachiasResilience/17-59%20Machias%20Downtown%20Resilience%20Rprt1.30.19.pdf>

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