



Project Report

Matinicus Isle Plantation Working Waterfront Resilience Project

Matinicus, Maine

Submitted to:

Ms. Laurie Webber, Assessor
Matinicus Isle Plantation
17 South Road
Matinicus, ME 04851

Submitted by:

GEI Consultants, Inc.
5 Milk Street
Portland, ME 04101
207.797.8901

October 16, 2026
Project No. 2600016



Lisa Vickers
Senior Coastal Professional

Leila Pike, P.E.
Senior Civil Engineer

Table of Contents

Standard Limitations and Disclaimer	iv
Acronyms and Abbreviations	v
Executive Summary	vii
1. Background and Project Purpose	1
2. Existing Conditions	4
2.1. Overview	4
2.2. Site Assessment	4
2.3. Background Data Review	6
2.4. Tidal and Flood Elevations	7
2.4.1. FEMA Stillwater Elevation, Base Flood Elevation, and Wave Effects	8
3. Flood Risk Analysis	10
3.1. Regional Sea Level Rise	10
3.1.1. Maine Climate Council Sea Level Rise Recommendations	11
3.2. Flood Risk Methodology	12
3.2.1. Flood Scenarios	12
3.2.2. Topography Data	13
3.3. Flood Risk Results	13
3.4. Flood Risk Results Summary	19
4. Community Engagement and Priorities	20
5. General Adaptation Strategies	22
5.1. Flood Adaptation Strategies Overview	22
5.1.1. Protection	23
5.1.2. Accommodation	23
5.1.2.1. Elevation Increase	24
5.1.2.2. Wet Floodproofing	25
5.1.2.3. Temporary and Operational Interventions	25
5.1.2.4. Land Use and Floodplain Management Measures	26
5.1.3. Retreat	26
5.1.4. Do Nothing (Accept the Risk)	27
5.1.5. Selecting an Adaptation Strategy	27
5.2. Matinicus Harbor Working Waterfront Adaptation Strategies	28
5.2.1. Matinicus Harbor Working Waterfront Assets	28
5.2.2. Harbor Road and Adjacent Shoreline	31

5.2.2.1.	Protection – Harbor Road Elevation and Shoreline Stabilization	32
5.2.2.2.	Retreat - Secondary Upland Accessway	36
5.3.	Permitting Considerations	37
5.3.1.	USACE	37
5.3.2.	LUPC	38
5.3.3.	Maine DOT	39
5.4.	Funding Opportunities	39
5.5.	Recommended Next Steps and Implementation	43
5.5.1.	Evaluation of Harbor Access Alternatives	43
5.5.2.	Preliminary Investigations and Design	43
5.5.3.	Preliminary Implementation Schedule and Funding	44

6. References45

List of Tables

Table 2-1.	Tidal and Flood Elevations	7
Table 3-1.	MCC Sea Level Rise Estimates	11
Table 3-2.	Flood Scenario Summary	12
Table 3-3.	Matinicus Harbor Assets Flood Exposure (Depth Inundated, ft)	18
Table 5-1.	General Flood Adaptation Planning Matrix	27
Table 5-2.	Matinicus Harbor Asset Adaptation Strategies	30
Table 5-3.	Planning Level Cost Estimates	31
Table 5-4.	Engineer’s Opinion of Probable Cost	34
Table 5-5.	Flood Adaptation Grant Programs in Maine	41

List of Figures

Figure 1-1.	Overview Map of Matinicus Isle	1
Figure 1-2.	Matinicus Harbor in 1955	2
Figure 1-3.	Steamboat Wharf During January 2024 Storms	2
Figure 2-1.	Matinicus Harbor - Key Features	4
Figure 2-2.	Site Assessment Photographs from March 25, 2026	5
Figure 2-3.	Matinicus Harbor Base Flood Elevations	9
Figure 3-1.	Sea Level Rise Trend at NOAA Bar Harbor Tidal Station	10
Figure 3-2.	Sea Level Projection Curves Adopted by MCC	11
Figure 3-3.	Flood Inundation Map – Present Day	15
Figure 3-4.	Flood Inundation Map – 2050	16
Figure 3-5.	Flood Inundation Map – 2100	17
Figure 5-1.	Community functions supported by Matinicus Harbor	22
Figure 5-2.	Protection Adaptation Strategies	23
Figure 5-3.	Building Elevation Example	24
Figure 5-4.	Example of Wet Floodproofing -Red Circle Indicates Elevated Utilities	25
Figure 5-5.	Example of Building Retreat on Matinicus	27

Figure 5-6. Aerial View of connection between Harbor Road and Steamboat Wharf	32
Figure 5-7. Conceptual Overview Site Plan	33
Figure 5-8. Conceptual Section Detail for Harbor Road Improvements	34
Figure 5-9. Overview Rendering of Proposed Concept Design	35
Figure 5-10. Approximate location of Secondary Accessway	36

Appendices

Appendix A	Harbor Road Conceptual Design
Appendix B	Flood Inundation Maps
Appendix C	Harbor Road Visual Renderings

LCV/LAP:bdp
\\geiconsultants.com\data\Data_Storage\Working\MATINICUS ISLE PLANTATION\2600016 Matinicus Isle Working Waterfront Resilience Proj\01_ADMIN\Project
Report\Matinicus Project Report_Final_2026-10-16.docx

Standard Limitations and Disclaimer

This report was prepared exclusively for the use of Matinicus Isle Plantation. The findings and conclusions, if any provided by GEI Consultants, Inc. in this report, are based solely on the information reported to GEI as of the date of this report. Future investigations or additional information not provided to GEI at the time of this report may result in modification of this report. GEI's scope of work did not include verifying the completeness or accuracy of information provided by others. Accordingly, GEI shall not be liable for any damages, costs, or other consequences resulting from reliance on such information if it is later determined to be inaccurate or incomplete. GEI's professional services for this project have been performed in a manner consistent with that degree of skill and care ordinarily exercised by members of the same profession currently practicing in the same locality, performing similar services under similar conditions. GEI makes no other representations and no warranties, express or implied.

Acronyms and Abbreviations

1% SWEL	1% annual chance stillwater elevation
BFE	Base Flood Elevation
CDS	Congressionally Directed Spending
DEM	Digital Elevation Model
DFE	Design Flood Elevation
DMR	Department of Marine Resources
DOD	Department of Defense
EPA	Environmental Protection Agency
FEMA	The Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
GEI	GEI Consultants, Inc.
GIS	Geographic Information Systems
HAsT	Highest Astronomical Tide
IPaC	Information for Planning and Consultation
IRT	Innovative Readiness Training
LiDAR	Light Detection and Ranging
LUPC	Land Use Planning Commission
Maine DACF	Maine Department of Agriculture, Conservation, and Forestry
Maine DOT	Maine Department of Transportation
Matinicus	Matinicus Isle Plantation, Maine
MSFS	Maine State Ferry Service
MCC	Maine Climate Council
MDIFW	Maine Department of Inland Fisheries and Wildlife
MGS	Maine Geological Survey
MHW	Mean High Water
MHHW	Mean Higher High Water
MLW	Mean Low Water
MLLW	Mean Lower Low Water
NAVD88	The North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NOAA	The National Oceanic and Atmospheric Administration
NRPA	Natural Resources Protection Act
NWI	National Wetlands Inventory
NWP	USACE Nationwide Permit
RGP	Regional General Permit
SLR	Sea Level Rise
SWEL	Still Water Elevation
USACE	U.S. Army Corps of Engineers

USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
VDATUM	NOAA Vertical Datum Transformation tool

Executive Summary

Matinicus Isle Plantation retained GEI Consultants, Inc. (GEI) to evaluate coastal flood risk within Matinicus Harbor and identify adaptation strategies for critical working waterfront and access infrastructure. Matinicus Harbor serves as the island's primary connection to the mainland for vehicles, freight, fuel, commercial fishing, emergency response, and other essential services. The study included flood vulnerability analysis, community engagement, adaptation planning, regulatory coordination, and development of a conceptual resilience design for Harbor Road and the adjacent shoreline.



The assessment evaluated coastal flood risk during present-day, 2050, and 2100 sea level conditions using Maine Climate Council “Commit to Manage” sea level rise recommendations of 1.5 feet by 2050 and 4.0 feet by 2100. The flood risk identified Harbor Road near Steamboat Wharf and Steamboat Wharf as the highest-priority assets for adaptation within the study area. Under the 2050 1% annual-chance stillwater scenario, estimated flood depth would reach approximately 2.0 feet at Harbor Road and 1.6 feet at Steamboat Wharf; by 2100, those depths would likely increase to approximately 4.5 feet and 4.1 feet, respectively.

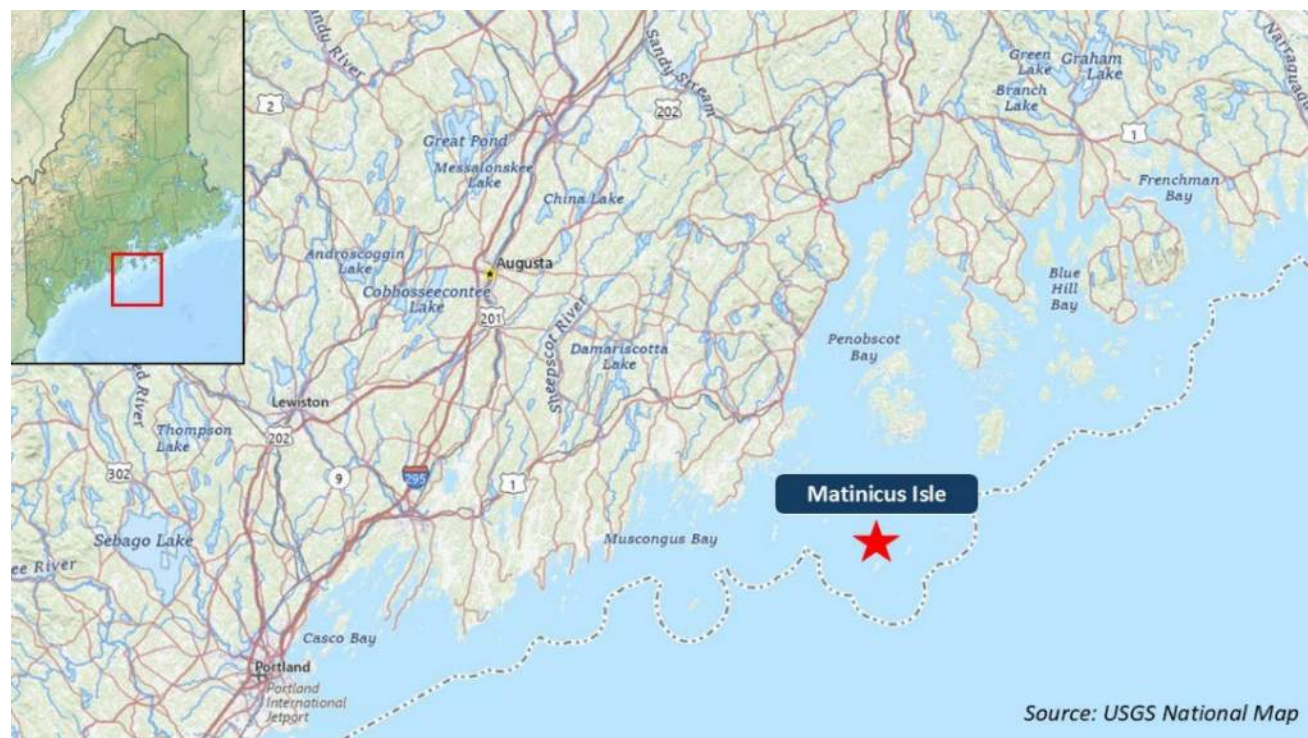
Based on these findings, GEI developed a conceptual adaptation strategy to reduce the impact of coastal flood risk for Harbor Road that includes roadway elevation, gray/green shoreline stabilization, drainage improvements, maintenance of waterfront access, and consideration of how these improvements can tie into the existing Steamboat Wharf. The study also identified a potential secondary upland accessway between Markey’s Beach Road and Harbor Road as an alternative long-term adaptation strategy for maintaining waterfront access.

Future work needed to advance adaptation design implementation likely includes detailed survey, property and easement confirmation, wetland delineation, geotechnical and coastal engineering, drainage analysis, floodplain evaluation, regulatory coordination, and refinement of project costs. This study is intended to support capital planning, funding applications, and phased implementation of resilience improvements at Matinicus Harbor.

1. Background and Project Purpose

Matinicus Isle Plantation (Matinicus) is one of Maine's most remote island communities and is located approximately 20 miles off the coast of Maine in Penobscot Bay (Figure 1-1). Matinicus encompasses Matinicus Island and several surrounding islands, with a small year-round population and a larger seasonal population. The community has a long maritime history shaped by its geographic location and dependence on the surrounding marine environment with commercial fishing continuing to be a foundation of the local economy.

Figure 1-1. Overview Map of Matinicus Isle



Although the island is accessible by both boat and air, Matinicus Harbor is the primary access for transporting vehicles, fuel, construction materials, heavy equipment, and other essential goods. The harbor supports the Maine State Ferry Service (MSFS), Maine Department of Transportation's (Maine DOT) Steamboat Wharf, commercial fishing operations, residential properties, and private working waterfront infrastructure. In addition, the US Army Corps of Engineers (USACE) maintains a breakwater to the north of the harbor which helps to provide protected moorage during severe coastal weather events. As a result, the continued operation of the harbor is critical to the community's economic vitality, public safety, emergency response, and year-round access to the mainland.

Figure 1-2. Matinicus Harbor in 1955



Source: Matinicus Island Historical Society (1955).

Like many coastal communities in Maine, Matinicus is increasingly vulnerable to coastal flooding due to storm surge and sea level rise. As sea levels rise, water levels associated with both routine tides and coastal storms are expected to reach farther inland and increase the frequency and severity of flooding impacts to low-lying waterfront infrastructure. The community experienced these vulnerabilities firsthand during the back-to-back coastal storms of January 2024, which produced record-breaking water levels, widespread erosion, and significant damage to coastal infrastructure throughout Maine, including Matinicus Harbor.

Figure 1-3. Steamboat Wharf During January 2024 Storms



Source: Matinicus

In 2025, Matinicus retained GEI Consultants, Inc. (GEI) to evaluate the vulnerability of Matinicus Harbor to coastal flooding and identify strategies to improve the resilience of the community's critical infrastructure. The objectives of this study were to assess the flood risks associated with existing and projected sea levels and coastal storm events, identify infrastructure assets vulnerable to flooding, and develop practical adaptation strategies to reduce future flood risk.

This assessment includes a flood vulnerability analysis, identification of priority infrastructure for adaptation, and development of conceptual resilience strategies for various infrastructure types, along with a concept adaptation design focused on a specific priority asset within the Harbor. The concept design focuses on Harbor Road and the adjacent shoreline and includes planning-level cost estimates and recommended implementation measures. The study also included community engagement to better understand local priorities and to collect feedback related to the future flood adaptation strategies. While the purpose of this assessment is to evaluate publicly owned infrastructure and harbor assets whose disruption would have an impact on community access, public safety, transportation, and working waterfront operations, the adaptation strategies presented in later sections of this report may also be applicable strategies to adjacent private properties and waterfront facilities facing similar flood risks.

The findings and recommendations presented in this report are intended to support future capital planning, grant funding opportunities, and long-term decision-making as Matinicus works to improve the resilience of Matinicus Harbor to current and future coastal flood hazards.

This project was funded through a Maine DOT Maine Infrastructure Adaptation Grant. GEI completed the assessment in partnership with Gabe McPhail of Resilient Communities L3C. Tandem Landscape Architecture prepared visual renderings of the Harbor Road adaptation concept to help illustrate how the proposed roadway, shoreline stabilization, and landscape improvements could be integrated into the existing working waterfront.

Elevations in this report are provided in the North American Vertical Datum of 1988 (NAVD88) unless otherwise stated.

2. Existing Conditions

2.1. Overview

The focus area for the flood risk assessment is Matinicus Harbor, located on the easterly side of Matinicus Isle and encompassing approximately 2.4 acres. The harbor contains a mix of public, private, and working waterfront infrastructure and harbor protection that collectively supports transportation and access, including emergency access, commercial fishing, and freight delivery. Existing infrastructure within the harbor includes the Maine DOT Steamboat Wharf, the MSFS Ferry Dock and Ramp, Harbor Road, a municipally owned hydraulic hoist, the existing USACE breakwater, privately owned working waterfront facilities, and nearby residential structures as identified on the map below (Figure 2-1). The area is also the site of a proposed future public wharf that would be located adjacent to the Steamboat Wharf (not identified on the map below).

Figure 2-1. Matinicus Harbor - Key Features



2.2. Site Assessment

To support the flood risk assessment, GEI completed an existing conditions assessment that included on-site observations. This assessment was conducted on March 25, 2026, and included GEI project team members, Gabe McPhail of Resilient Communities L3C, and Matinicus representatives. The assessment reviewed the harbor features, collected spot grade elevations, drone imagery, and photo documentation that is highlighted below in Figure 2-2. A brief follow-up site assessment was August 13, 2026 to review additional features within the Harbor area, mainly locating existing road drainage and a potential secondary access road to the harbor.

Figure 2-2. Site Assessment Photographs from March 25, 2026



During the initial site walk and subsequent review of data and discussion with stakeholders, several harbor assets were identified as priority assets for adaptation due to their exposure to coastal flooding, their importance to public access and working waterfront operations, and their role in supporting the broader island community. This includes the Maine DOT Steamboat Wharf, the MSFS Ferry Dock and Ramp, and Harbor Road. It should be noted that Matinicus does not own or control these priority assets. However, because these facilities are critical to the function of the harbor and the resilience of the island community, Matinicus intends to continue coordinating with state agencies, private landowners, and other harbor stakeholders to identify opportunities for collaborative planning, funding, design, and implementation of future adaptation measures.

2.3. Background Data Review

In addition to the in-person site assessment, GEI conducted a background data review to evaluate prior studies and available information to use for the assessment and adaptation planning portion of this project. The resources reviewed include the following:

- Prior Plans and Studies
 - Moody Wharf Rehabilitation Plans – existing asset elevations and configuration (Maine DOT, 1984).
 - Fender Replacement Plans – existing asset elevations and waterfront infrastructure information (Maine DOT, 2014).
 - Shoreland Alteration Permit – proposed public pier and associated asset elevations (Flycatcher, 2025).
- Flood and Coastal Hazard Information
 - Maine Geological Survey (MGS) - Highest Astronomical Tide (MGS, 2022).
 - Federal Emergency Management Agency (FEMA) - effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) information used to characterize mapped coastal flood hazards (FEMA, 2016a,b).
 - U.S. Geological Survey (USGS) - LiDAR-derived topographic information used to characterize existing ground elevations and support inundation mapping (USGS, 2021).
 - National Oceanic and Atmospheric Administration (NOAA) - tidal datum and water-level information used to establish tidal reference elevations (NOAA, 2026a,b,c).
- Natural Resources
 - U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) federally listed species and critical habitat (USFWS, 2026a).
 - U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) - mapped wetland and aquatic habitat information (USFWS, 2026b).
 - Maine Department of Inland Fisheries and Wildlife (MDIFW) Beginning with Habitat - mapped Significant Wildlife Habitat, Essential Wildlife Habitat, rare wildlife occurrences, and other conservation resources (MDIFW, 2026).
 - Maine Department of Marine Resources (DMR) GIS and environmental resource data - including eelgrass, shellfish growing areas, aquaculture, and other marine resource information.
 - Maine Geological Survey (MGS) - coastal geology, surficial geology, Highest Astronomical Tide, and other coastal hazard information.
 - Maine Land Use Planning Commission (LUPC) Land Use Guidance Map - applicable development and protection subdistricts, including flood-prone, fish and wildlife, shoreland, and wetland protection subdistricts (LUPC, 2026).

- Property and Right-of-Way Information
 - Boundary Survey for Richard R. Moody Estate, prepared by LaBranche Land Surveys (n.d.; date on plan is not legible.).
 - Maine DOT Right of Way Map, Matinicus Island, Moody’s Wharf (Maine DOT, 1989)

Relevant flood, natural resource, land use, and existing infrastructure information identified through the desktop review is incorporated, where applicable, into the report and existing conditions plans included in Appendix A.

2.4. Tidal and Flood Elevations

Several water-level references are relevant to Matinicus Harbor. This assessment uses three primary elevations to represent a range of conditions: Mean Higher High Water (MHHW) for typical high tides, Highest Astronomical Tide (HAsT) for unusually high predicted astronomical tides, and the 1% annual-chance stillwater elevation (SWEL) for coastal storm flooding. FEMA Base Flood Elevations (BFEs) are also presented as regulatory reference elevations but are not used as the water-surface elevations in the inundation scenarios because they incorporate localized wave effects.

A summary of tidal and flood elevations in Matinicus Harbor is provided in Table 2-1.

Table 2-1. Tidal and Flood Elevations

Elevation Reference	Vertical Datum		Source
	MLLW (ft)	NAVD88 (ft)	
Base Flood Elevation (BFE) Zone VE	+23.3	+18.0	FEMA FIRM 23013C0807D (Effective 7/6/2016) (FEMA, 2016a)
Base Flood Elevation (BFE) Zone VE	+20.3	+15.0	
Highest Observed Tide	+15.6	+10.3	NOAA Tidal Station 8413320, Bar Harbor, ME Date of Observation: January 13, 2024 (NOAA, 2026a)
1% Annual Chance Stillwater Elevation (1% SWEL)	+14.0	+8.7	FEMA FIS Knox County – Transect 74 (FEMA, 2016b)
Highest Astronomical Tide (HAsT)	+11.6	+6.3	MGS (2022)
Mean Higher High Water (MHHW)	+10.6	+5.3	NOAA Tidal Station 8415490, Rockland, ME (NOAA, 2026b)
Mean High Water (MHW)	+10.2	+4.9	
NAVD88	+5.3	0.0	
Mean Low Water (MLW)	+0.4	-4.9	

Notes:

1. The table references the tidal elevations or “datums” in NAVD88 and Mean Lower Low Water (MLLW). NAVD88 is commonly used for engineering, mapping, and floodplain studies. The MLLW datum is commonly used on navigation charts and tide tables. Both are included so that the values in this report can be compared to the concept plans, FEMA flood data, navigation charts, or tide information.
2. The National Oceanic and Atmospheric Administration’s (NOAA) Vertical Datum Transformation (VDATUM) tool was used to convert tidal elevations between NAVD88 and MLLW (NOAA, 2026c). The conversion is as follows: NAVD88 = MLLW – 5.3. For example, an elevation within this document of 8.7 ft NAVD88 is equal to 14.0 ft MLLW.

3. For this planning-level assessment, MHHW, MHW, MLW, and MLLW were estimated using NOAA's published tidal datums for the Rockland tide station (Station 8415490) as a regional reference. The Rockland station provides an established set of tidal datums referenced to the 1983–2001 National Tidal Datum Epoch (NTDE), based on a 14-year period of water-level observations from July 1973 through June 1987. These values are used to provide a planning reference for Matinicus Harbor but should be considered approximate because tidal datums are location-specific and NOAA does not publish equivalent accepted datums for Matinicus.

MHHW represents the average elevation of the higher of the two daily high tides over the applicable tidal datum period and provides a useful reference for typical daily high-water conditions. Because tidal datums vary by location, the Rockland values should be considered approximate when applied to Matinicus Harbor.

HAsT represents the highest predicted astronomical tide, excluding storm surge, wind, and other weather-related effects. The HAsT elevation of 6.3 feet NAVD88 was obtained from Maine Geological Survey (MGS, 2022). In addition to the predicted tide elevation, the HAsT also has regulatory relevance in Maine because it is used to help define the upper extent of coastal wetlands under NRPA.

The 1% annual-chance SWEL represents the coastal water level associated with a flood that has a 1% chance of being equaled or exceeded in any given year, before accounting for localized wave effects at the shoreline. This elevation is useful for understanding when low-lying harbor assets, such as roads, wharves, access areas, and working waterfront infrastructure, may be inundated by elevated coastal water levels. For this study, the SWEL also provides a consistent basis for comparing present-day and future flood scenarios. The 1% annual-chance SWEL value was obtained from the FEMA FIS for Knox County (FEMA, 2016b).

2.4.1. FEMA Stillwater Elevation, Base Flood Elevation, and Wave Effects

The effective FEMA FIRM and FIS were reviewed to identify coastal flood elevations for Matinicus Harbor, including the 1% annual-chance stillwater elevation (SWEL) and Base Flood Elevations (BFEs) (FEMA, 2016a,b).

FEMA's 1% annual-chance SWEL represents the underlying coastal water level associated with the 1% annual-chance event. In coastal areas, FEMA's BFE is a regulatory flood elevation that accounts for the additional effects of waves in coastal areas and may therefore be higher than the SWEL. The flood-inundation scenarios in this report use SWEL rather than BFE because the analysis does not model site-specific wave runoff or overtopping.

Wave action is an important consideration in coastal flood risk because flooding along exposed shorelines can extend above and beyond the 1% SWEL. During coastal storms, waves can increase the elevation reached by floodwaters, overtop infrastructure and shorelines, and contribute to erosion and damage to waterfront infrastructure.

For the FEMA transect nearest Matinicus Harbor, the effective FIS identifies a coastal total water level of approximately 12.2 feet, including stillwater elevation and effects of wave setup. FEMA's mapped VE Zones and BFEs of 15 and 18 feet indicate areas where significant wave action may occur during the 1% annual-chance coastal flood event.

Actual wave conditions within Matinicus Harbor will vary depending on storm conditions, water depth, shoreline exposure, and local coastal processes. Detailed modeling of nearshore waves, wave runup, and overtopping was not completed as part of this study. This information is included to illustrate that the flood depths and extents associated with elevated water levels may not represent the full range of coastal storm impacts. The flood scenarios evaluated in Section 3 are based on tidal elevations, stillwater storm elevations, and projected sea level rise. The mapped flood depths and inundation extents presented in this report do not include additional localized flooding that could result from wave runup or overtopping.

Matinicus Harbor includes FEMA VE Zones with BFEs of 15 and 18 feet NAVD88. VE Zones identify coastal areas where the 1% annual-chance flood is expected to include significant wave action. These BFEs are useful regulatory reference points and provide additional context when considering potential adaptation strategies discussed in Section 5. A portion of the effective FIRM for Matinicus Harbor is provided in Figure 2-3.

Figure 2-3. Matinicus Harbor Base Flood Elevations



Source: Section of FEMA FIRM 23013C0807D (Effective 7/6/2016)

3. Flood Risk Analysis

The purpose of the flood risk assessment was to identify areas and infrastructure within the project study area that would likely be at risk of flood inundation due to coastal storm surge or sea level rise for present-day or future conditions of sea level. A flood risk assessment is used to evaluate current vulnerabilities, anticipate future conditions, and inform planning decisions.

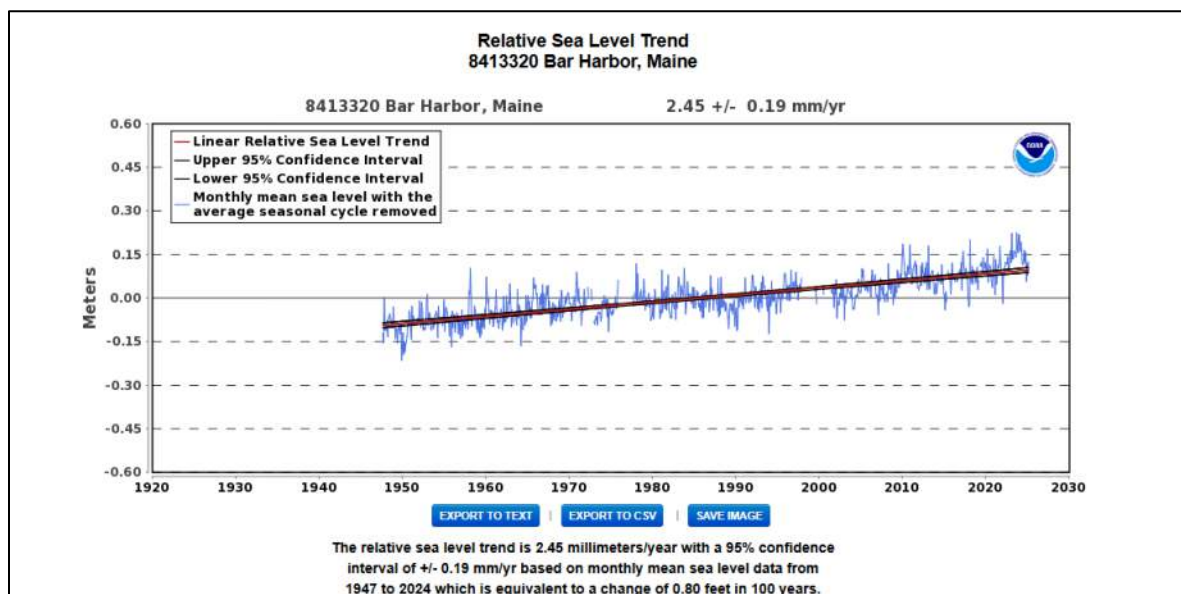
In this section we review regional sea level rise trends specific to Maine, recommendations from the Maine Climate Council (MCC) on sea level rise values to use for future time horizons, and the water elevations used for the flood scenarios we have included in this study. The flood scenarios are water levels that represent storm surge and/or sea level rise values for present-day and future conditions.

3.1. Regional Sea Level Rise

Advances in predictive scientific modeling of climate change in combination with over a century of historic data indicate that sea level rise is occurring and is likely to continue to occur and accelerate over the next century (NOAA, 2017). Global changes in sea level rise are associated with melting ice and warming seas. Matinicus Harbor, a vital lifeline for the community, faces increasing risk due to sea level rise driven by these climate change factors.

The trend of increasing sea level along the coast of Maine is well documented. At NOAA Station 8413320 in Bar Harbor, ME, which has been recording water levels since 1947, the documented sea level trend is an increase of 2.4 mm/year with a 95% confidence (Figure 3-1). This is equivalent to a change of 0.80 feet over a 100-year period. The degree to which sea level rise will continue and/or accelerate in the future carries a level of uncertainty. This uncertainty is addressed by considering scenario-based projections for future sea level rise that reflect a range of possible future trends.

Figure 3-1. Sea Level Rise Trend at NOAA Bar Harbor Tidal Station

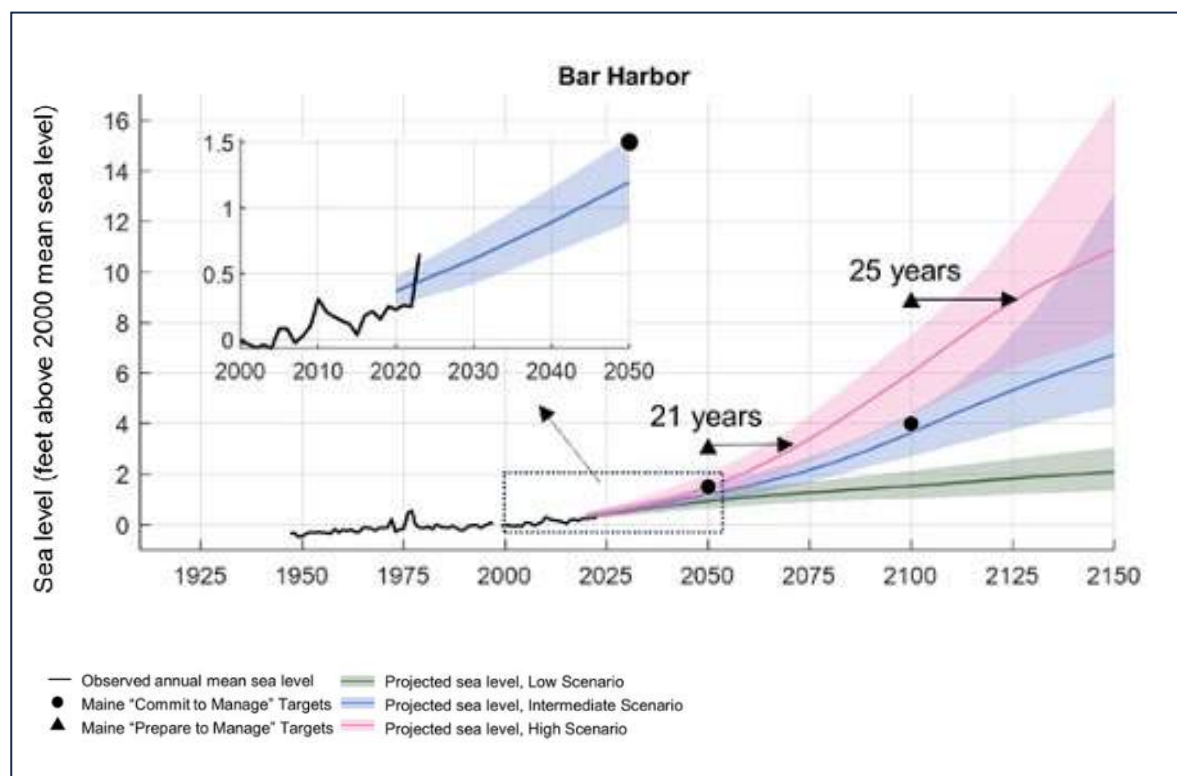


Source: NOAA, 2026a.

3.1.1. Maine Climate Council Sea Level Rise Recommendations

The MCC provides sea level rise (SLR) planning values, based on NOAA projections, for Maine municipalities to use to evaluate future flood risk and inform infrastructure planning and design for adaptation projects (MCC, 2024). The Scientific and Technical Subcommittee of the MCC recommended that municipalities “Commit to Manage” for a SLR amount that corresponds approximately with the intermediate rate from NOAA’s study and “Prepare to Manage” for a SLR amount that corresponds approximately with the high rate of sea level rise from NOAA’s study (Figure 3-2). We are using MCC’s “Commit to Manage” values in this study, which are 1.5 feet of SLR by 2050 and 4.0 feet by 2100. The two sea level rise values used in the flood risk assessment, corresponding to the 2050 and 2100 timeframes, are summarized in Table 3-1 below.

Figure 3-2. Sea Level Projection Curves Adopted by MCC



Source: MCC (2024).

Table 3-1. MCC Sea Level Rise Estimates

Year	Timeframe	“Commit to Manage” SLR Amount (ft)
2050	Near-Term	1.5
2100	Long-Term	4.0

Source: Sea level rise estimates obtained from the 2024 Update of the Scientific Assessment of Climate Change and its Effects in Maine (MCC, 2024).

3.2. Flood Risk Methodology

3.2.1. Flood Scenarios

Flood scenarios were developed by adding projected sea level rise values to present-day tidal and coastal storm elevations for Matinicus Harbor. These scenarios were developed for the “Commit to Manage” MCC future planning scenarios and include the near-term (2050) and the long-term (2100).

The tidal and storm elevations used for this analysis include MHHW, HAsT, and the 1% SWEL. These elevations were selected because they provide a range of flooding conditions, from more frequent high tide conditions (MHHW and HAsT) to less frequent but more severe coastal storm events (1% SWEL). Flood scenarios were developed by adding the estimated sea level rise for the near-term and long-term time horizon to each elevation. This provides a planning-level estimate of how today’s tidal and storm flood levels may change in the future and helps identify when harbor infrastructure may become more frequently exposed to flooding.

This resulted in nine flood scenarios that represent a range of potential stillwater elevations (i.e., without wave action) that the waterfront would likely experience during MHHW, HAsT, and 1% SWEL conditions for the time horizons included in this study. For reporting purposes, the flood scenarios in Table 3-2 and arranged from lowest water elevation (i.e., least severe flooding) to highest water elevation (i.e., most severe flooding).

Table 3-2. Flood Scenario Summary

Flood Scenario Description	Estimated SLR Amount (ft)	Estimated Water Surface Elevation (NAVD88, ft)
MHHW, Present-Day	0.0	5.3
HAsT, Present-Day	0.0	6.3
MHHW, Near-term (2050)	1.5	6.8
HAsT Near-term (2050)	1.5	7.8
1% SWEL, Present-Day	0.0	8.7
MHHW, Long-term (2100)	4.0	9.3
1% SWEL, Near-term (2050)	1.5	10.2
HAsT, Long-term (2100)	4.0	10.3
1% SWEL, Long-term (2100)	4.0	12.7

Note: Water surface elevations in this table do not include the effects of wave action. Wave heights vary depending on the intensity of the storm, direction of the wind, depth of the water, and topography along the shoreline. Wave heights would be expected to change non-linearly with sea level rise as the tidal range begins acting on more upland areas of the shoreline

The flood scenarios described above were used to evaluate which harbor assets may be exposed to flooding under present-day and future water level conditions. For each scenario, the projected water surface elevation was compared to existing infrastructure and ground surface elevations within the harbor.

Infrastructure elevations were determined using a combination of existing plans and studies, available topographic data, and spot elevation data collected during the site assessment in March 2026. Where the elevation of an asset or access area was lower than the water surface elevation for a given flood scenario, that asset was considered likely to be inundated under that scenario. This approach provides a planning-level assessment of flood exposure and is intended to identify relative vulnerability across harbor assets rather than predict exact flood depths at every location.

3.2.2. Topography Data

To create the terrain surface used in the evaluation of the inundation boundaries, the latest readily available Light Detection and Ranging (LiDAR) data for Matinicus were used, which is the U.S. Geological Survey (USGS) Midcoast Maine dataset (USGS, 2021). The data for this study were collected between May 9, 2021, and May 11, 2022. The LiDAR data were downloaded as a Digital Elevation Model (DEM) with a horizontal resolution of 1-meter, meaning the terrain is divided into 1-meter grids with each grid cell being represented by a single elevation value. The DEM was used to estimate ground elevations across the harbor area and to map the approximate extent of inundation under each flood scenario.

Because the USGS Midcoast Maine LiDAR dataset was collected before the January 2024 coastal storms, the DEM does not reflect storm-related changes to the shoreline, beach, dune, road surfaces, or other harbor features that may have occurred during or after those events. In addition, LiDAR-based ground surfaces may not fully capture narrow structures, vertical faces, pile-supported features, or other complex waterfront infrastructure. For this reason, the inundation mapping was supplemented with available plans and spot elevation data where available. Additional ground survey data should be collected as a next step for advancing waterfront design projects.

3.3. Flood Risk Results

We used the flood risk analysis combined with qualitative data around the criticality and sensitivity of flooding of each asset included in the study to indicate whether it is “high priority” or “low priority” in terms of adaptation.

For this study, we based each asset’s adaptation priority on more than just flood exposure. We also based priority on the importance of the asset and the consequences if flooding disrupts its use. Assets that support transportation, emergency access, commercial fishing, utilities, or other critical harbor functions may warrant a higher priority even if they flood less frequently. In evaluating asset criticality, we considered potential consequences such as structural damage, loss of access or use, disruption of transportation or emergency services, reduced economic activity, and other impacts described in this report.

We also considered each asset’s sensitivity to flooding. Some assets, such as gravel roadways, may tolerate shallow, short-duration flooding with limited damage, provided flooding does not cause erosion, washout, and/or prolonged saturation. Other assets, including electrical equipment, utilities, and mechanical systems, may be damaged or create safety or environmental concerns after relatively limited flood exposure. Assets that are more susceptible to damage or disruption generally receive a higher adaptation priority. Figures 3-3 through 3-5 show flood inundation boundaries for the harbor vicinity for present-day, 2050, and 2100, respectively. Full size versions of these maps are provided in Appendix B.

Following these figures, Table 3-3 summarizes the estimated flood exposure of the assets evaluated in this study. Flood exposure is reported as the estimated depth of water each asset is exposed to for the flood scenarios included in this study. Estimated flood depth was calculated by subtracting the asset elevation from the scenario water-surface elevation. Values are rounded to the nearest 0.1 foot. A dash indicates that the scenario water elevation does not exceed the listed asset elevation.

Figure 3-3. Flood Inundation Map – Present Day

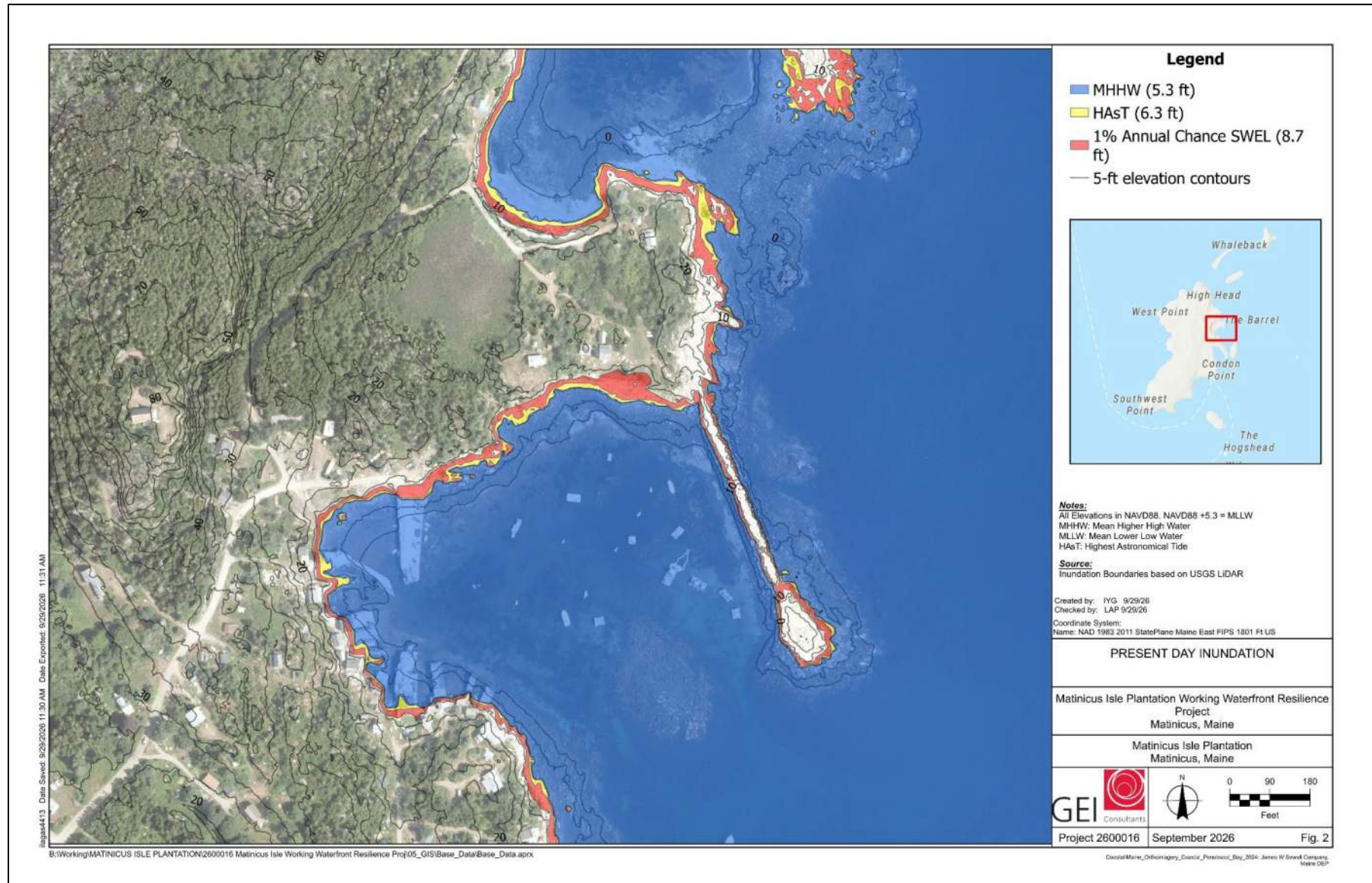


Figure 3-4. Flood Inundation Map – 2050

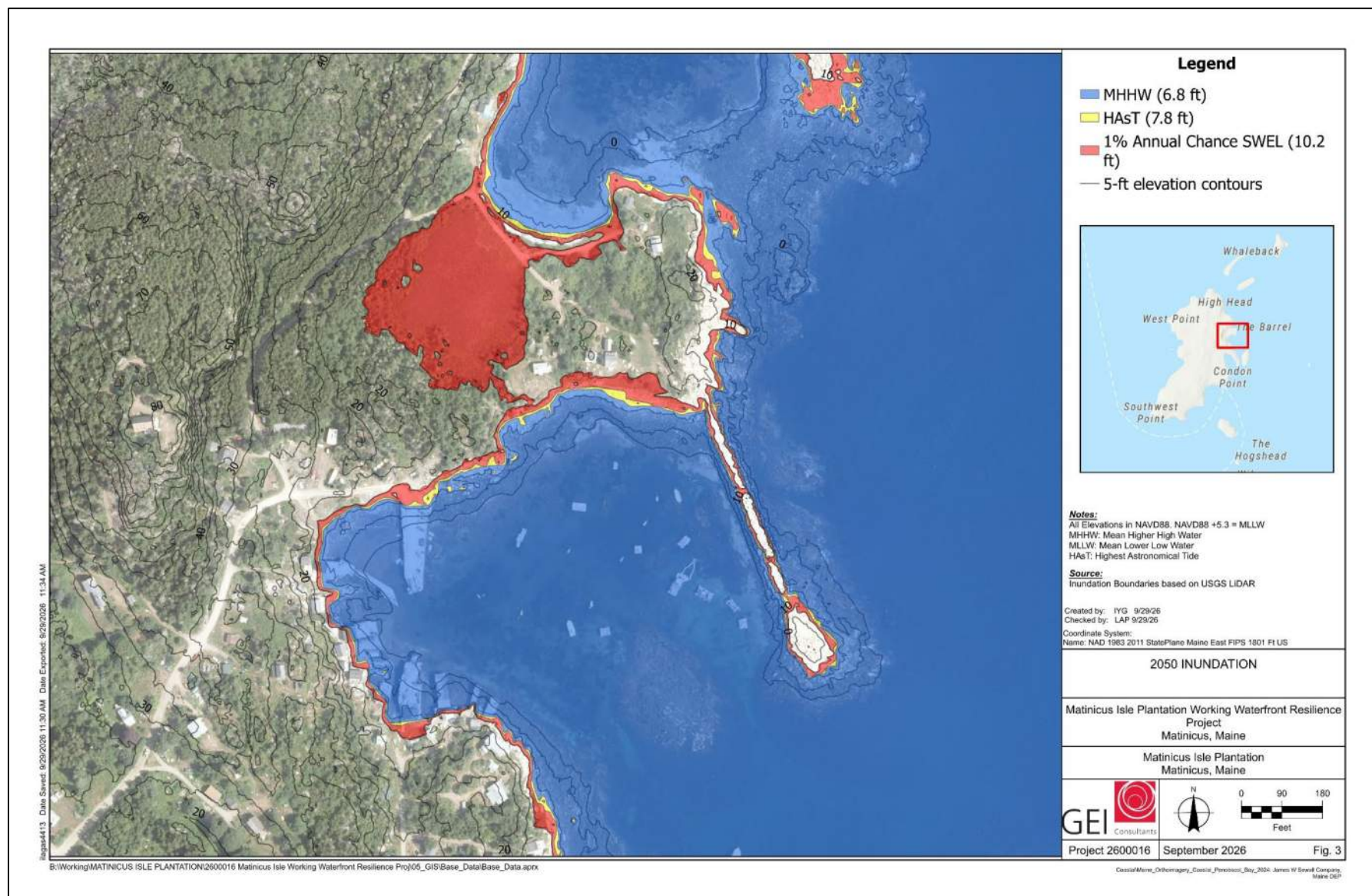


Figure 3-5. Flood Inundation Map – 2100

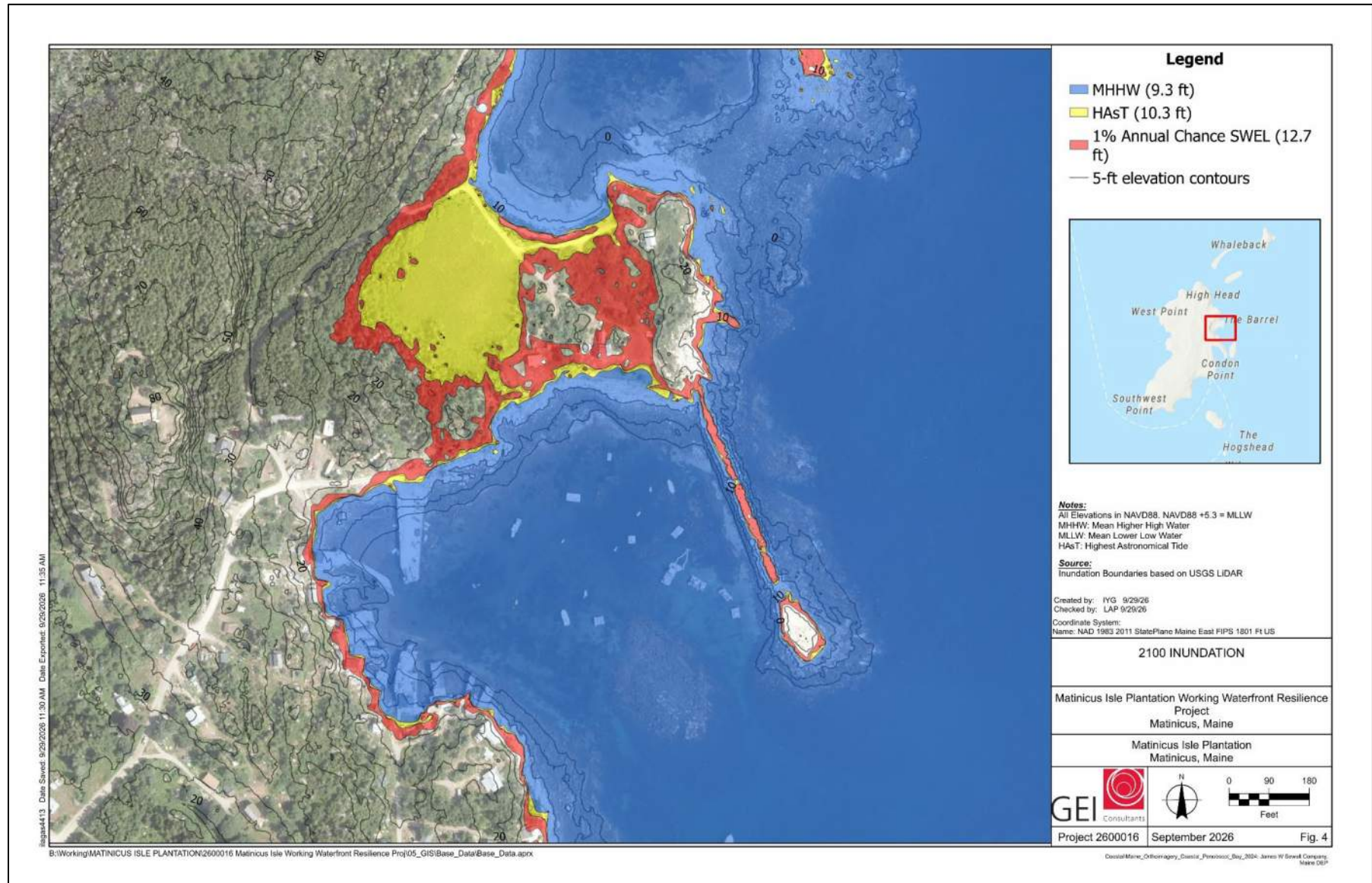
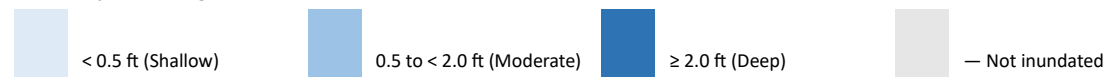


Table 3-3. Matinicus Harbor Assets Flood Exposure (Depth Inundated, ft)

Asset	Asset Elevation (ft NAVD88)	Adaptation Priority	Present-Day Water Elevations (ft NAVD88)			2050 Water Elevations (ft NAVD88)			2100 Water Elevations (ft NAVD88)		
			MHHW	HAst	1% SWEL	MHHW	HAst	1% SWEL	MHHW	HAst	1% SWEL
			5.3 ft	6.3 ft	8.7 ft	6.8 ft	7.8 ft	10.2 ft	9.3 ft	10.3 ft	12.7 ft
Harbor Road at Steamboat Wharf	8.2 ¹	High	-	-	0.5	-	-	2.0	1.1	2.1	4.5
Lowest Point of Breakwater Crest	8.4 ²	Low	-	-	0.3	-	-	1.8	0.9	1.9	4.3
Top of Steamboat Wharf	8.6 ³	High	-	-	0.1	-	-	1.6	0.7	1.7	4.1
MSFS Transfer Ramp	10.0 ⁴	Low	-	-	-	-	-	0.2	-	0.3	2.7
Proposed Matinicus Public Pier Deck	13.0 ⁵	Low	-	-	-	-	-	-	-	-	-

Flood-depth shading



Asset elevation sources:

1. Harbor Road elevation estimated from 2021 USGS LiDAR at the road connection to Steamboat Wharf (USGS, 2021)
2. Breakwater crest elevation estimated from 2021 USGS LiDAR (USGS, 2021)
3. Steamboat Wharf elevation from Maine DOT plans dated (Maine DOT, 2014)
4. MSFS transfer ramp elevation from Maine DOT plans dated 1984 (Maine DOT, 1984)
5. Proposed public pier elevation from Flycatcher, LLC plans dated 2025

3.4. Flood Risk Results Summary

The results indicate that Harbor Road near Steamboat Wharf and the top of Steamboat Wharf are the highest-priority assets for adaptation. Both are projected to experience limited flooding during the present-day 1% SWEL, with flood depths increasing under future sea level rise scenarios. By 2050, estimated flooding reaches approximately 2.0 feet at Harbor Road and 1.6 feet at the wharf during the 1% SWEL. By 2100, estimated flooding increases to approximately 4.5 feet at Harbor Road and 4.1 feet at the wharf under the same storm condition.

The lowest point of the breakwater crest is also exposed to flooding under the present-day 1% annual-chance storm and becomes increasingly inundated under future scenarios, but it was assigned a low adaptation priority based on its function and relative sensitivity. The MSFS transfer ramp is not projected to flood under present-day conditions and experiences only shallow flooding (i.e., less than 0.5 feet) under the 2050 1% SWEL and 2100 HAsT scenario. The elevation of the proposed Matinicus Public Pier deck would not likely be inundated for the flood scenarios included in this study, including the 1% SWEL in 2100.

Overall, the assessment shows that flood exposure within Matinicus Harbor is expected to increase over time, with the greatest areas of concern located at Harbor Road and Steamboat Wharf. These findings support prioritizing adaptation measures that maintain access and continued use of these critical harbor assets.

4. Community Engagement and Priorities

Community engagement is an important component of adaptation prioritization to help inform the proposed adaptation recommendations and confirm that the strategies reflect the community's values and priorities. Two community forums were held during the study to introduce the project, share preliminary findings, discuss potential adaptation approaches, and obtain community input on priorities for the Matinicus Harbor working waterfront. The forums were intended to support development of the flood risk assessment and adaptation recommendations.

The first forum was held virtually on April 28, 2026. The purpose was to introduce the goals of the project, review the study area, and highlight infrastructure being evaluated, including Harbor Road, the Maine DOT Steamboat Wharf, MSFS dock and transfer ramp, municipal hoist, USACE breakwater, and proposed public wharf. GEI presented the flood risk methodology and preliminary results, including present-day, 2050, and 2100 flood scenarios developed using MHHW, HAsT, the 1% SWEL, and Maine Climate Council "Commit to Manage" sea level rise projections. The forum also introduced the range of adaptation approaches considered in the study that include protection, accommodation, retreat, and acceptance of risk. Preliminary mitigation concepts for Harbor Road, the proposed public wharf, and other harbor infrastructure were presented. Potential funding opportunities and next steps for advancing the assessment, schematic design, regulatory coordination, and final report were also reviewed.

The second forum was held in person on August 13, 2026 and provided an update on the flood risk analysis and adaptation planning. The same near-, mid-, and long-term planning scenarios were reviewed, followed by a more detailed discussion of asset-specific vulnerabilities and potential adaptation strategies. The forum included review of a Harbor Road adaptation concept that considered roadway elevation, shoreline stabilization, drainage, maintenance of waterfront access, and incorporation of native vegetation. Visualizations and conceptual sections were used to help illustrate how these improvements could function within the existing harbor setting.



Discussion during the August forum also broadened the consideration of Harbor Road adaptation beyond protecting the existing road location. Community discussion identified a potential secondary upland access route between Markey's Beach Road and Harbor Road as an alternative means of maintaining access to the working waterfront if the existing shoreline roadway becomes increasingly vulnerable to flooding or erosion. This concept represents a potential managed-retreat strategy to maintain access and is discussed in more detail in Section 5.2.2.2.

Potential implementation and funding opportunities were also discussed. This included the U.S. Department of Defense Innovative Readiness Training (IRT) Program, which can pair eligible community infrastructure projects with military training missions. The program was identified as a potential nontraditional implementation resource for future Matinicus infrastructure improvements, particularly work such as roadway construction, grading, drainage, site preparation, or other activities associated with a secondary harbor access route. Participation would require further coordination to determine whether a proposed project provides appropriate military training value and meets program eligibility requirements.

Overall, the forums reinforced several recurring priorities: maintaining reliable access to the working waterfront, protecting the transportation, freight, commercial fishing, and emergency functions supported by the harbor, continuing communication with owners and agencies that maintain existing infrastructure, considering both near-term and long-term flood conditions, and pursuing adaptation approaches that are practical for Matinicus to implement and maintain. Community input from both forums and other project discussions were used to refine the adaptation recommendations and identify areas where additional feasibility evaluation, engineering, and regulatory coordination will be needed.

5. General Adaptation Strategies

This section presents a range of strategies that may be considered to reduce flood and erosion risks along the Matinicus Harbor waterfront. Flooding or damage to one waterfront asset may affect several community functions. Adaptation planning should therefore consider both the physical condition of individual infrastructure and the broader services that the harbor supports. Figure 5-1 provides an overview of the community functions supported by Matinicus Harbor and includes representative icons.

Figure 5-1. Community functions supported by Matinicus Harbor

 <p>Transportation Access</p> <p>Residents, visitors, vehicles, and service providers</p>	 <p>Commercial Fishing</p> <p>Vessel access and working waterfront operations</p>	 <p>Safe Harbor</p> <p>Protected waters for harbor users and vessels</p>
 <p>Freight and Supplies</p> <p>Fuel, materials, equipment, vehicles, and goods</p>	 <p>Essential Services</p> <p>Municipal operations and critical community needs</p>	 <p>Emergency Access</p> <p>Emergency response and medical transportation</p>

While some of the adaptation strategies presented may not be applicable to Matinicus Harbor area, they are included as general information for property owners located within coastal areas. The information is intended to support future planning by Matinicus, waterfront property owners, facility operators, and other harbor users.

Not every strategy will be appropriate for every location. The suitability of an adaptation measure will depend on site conditions, the type and importance of the asset, expected flood exposure, shoreline characteristics, regulatory requirements, cost, and the owner's tolerance for risk.

5.1. Flood Adaptation Strategies Overview

Coastal adaptation strategies generally fall into four categories: Protection, Accommodation, Retreat, or Do Nothing. These approaches do not have to be mutually exclusive and, in some cases, combining strategies will provide a longer-term and effective strategy. The following sections outline the different approaches with examples of each strategy.

5.1.1. Protection

Protection strategies are intended to reduce the likelihood that flooding, waves, or shoreline erosion will reach an asset. These strategies may include structural measures, nature-based features, or a combination of both as highlighted in Figure 5-2.

Figure 5-2. Protection Adaptation Strategies



Nature-based measures are generally most effective where wave exposure, water depth, available shoreline width, and substrate conditions are suitable. Because conditions vary throughout Matinicus Harbor, they may not be appropriate as a stand-alone strategy in more exposed areas.

5.1.2. Accommodation

Accommodation strategies allow an asset to remain in its current location while reducing potential damage, loss of function, or extended disruption when flooding occurs. Accommodation is often

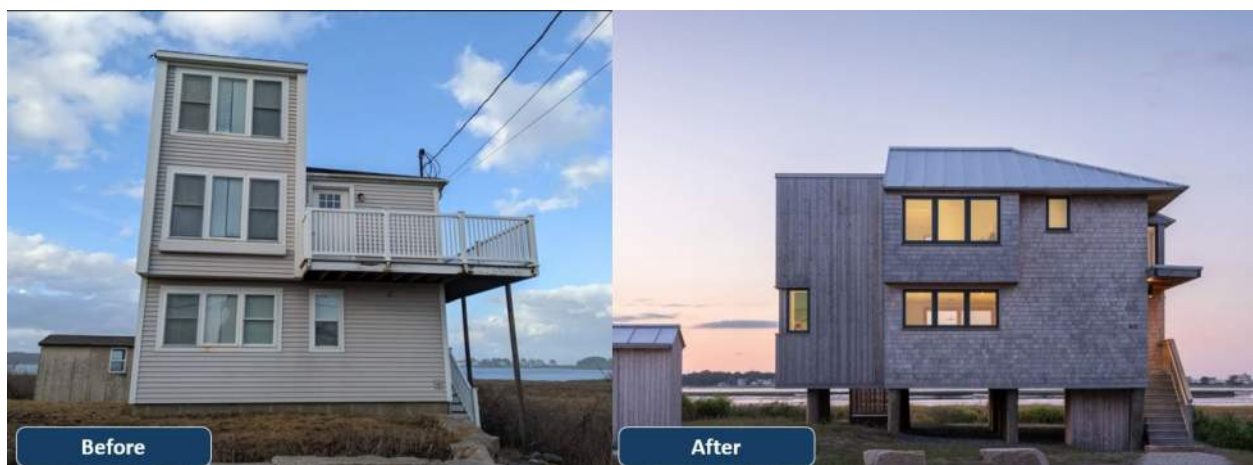
appropriate where an asset must remain near the waterfront because of its function or where relocation is not practical.

Examples of accommodation strategies include elevating structures, wet or dry floodproofing a structure to reduce damage, flood resistant materials, utility protection, or temporary barriers.

5.1.2.1. Elevation Increase

One of the most effective ways to reduce risk of flooding is to elevate structures sufficiently above predicted flood elevations such that they are less likely to be impacted by water levels resulting from storm surge or wave action. Figure 5-3 is an example of an existing coastal residence that was reconstructed and elevated approximately three feet and placed on new pilings to reduce vulnerability to rising water levels.

Figure 5-3. Building Elevation Example



Source: Woodhull, Second Tide Project, Biddeford Pool, Maine (Woodhull, n.d.).

Some municipalities use a Design Flood Elevation (DFE) to establish a higher elevation for flood-resistant design than otherwise mandated by the National Flood Insurance Program (NFIP). The DFE typically incorporates required or locally adopted freeboard above the BFE and establishes the elevation to which flood-resistant design requirements are applied. For example, a community may require buildings to be elevated one or more feet above the BFE to provide an additional margin of protection. Local requirements vary, and some communities adopt more protective standards based on their flood risk, past storm experience, or resilience objectives. Using a DFE above the minimum mapped flood elevation can also account for some of the uncertainty associated with future conditions and reduce the likelihood that relatively small increases in water level will result in damage.

The degree to which a building or asset is elevated will depend on applicable code and regulatory requirements, as well as the owner's tolerance for risk, which may support elevations above the minimum required level. The same general principle can be applied to infrastructure beyond buildings. Roads and pedestrian accessways may be raised to reduce the frequency and severity of flooding during storm events. Pier and wharf components may be elevated to improve their ability to remain operational during higher water levels. Mooring and guide piles may need additional height to maintain restraint of

floating docks during extreme high-water events, while marina gangways and access ramps may require modifications to maintain an appropriate operating range as water levels increase.

5.1.2.2. Wet Floodproofing

Wet floodproofing involves the adaptation of a building to accommodate exposure to floodwater while minimizing risk of damage to the structure and its contents. Wet floodproofing measures can include:

- Providing flood openings in walls to allow water to pass into and out of the structure.
- Elevating utilities and mechanical systems above the design flood elevation. This is highlighted in Figure 5-4 as an example of elevating utilities.
- Use of flood-resistant materials for flooring and building envelope construction that minimize risk of damage if exposed to floodwaters.
- Elevating internal building contents to minimize risk of exposure.

Wet floodproofing can reduce the risk of damage to buildings and contents from exposure to flooding but carries a greater risk of building serviceability and operability issues because water is still able to enter the structure during a flood event.

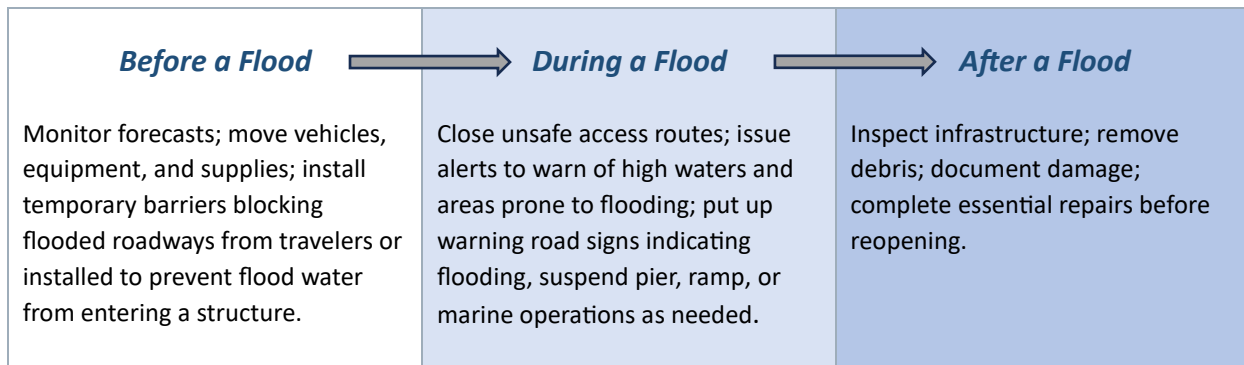
Figure 5-4. Example of Wet Floodproofing -Red Circle Indicates Elevated Utilities



Source: FEMA (2022).

5.1.2.3. Temporary and Operational Interventions

Temporary adaptation measures can be a cost-effective way to increase resilience in the near-term prior to the implementation of a long-term adaptation plan. Some examples of temporary flood risk reduction actions are listed below.



5.1.2.4. Land Use and Floodplain Management Measures

Land use and development standards can help reduce future flood risk by guiding where and how development occurs in areas exposed to coastal flooding. Because Matinicus is subject to the jurisdiction of the LUPC, changes to land use and development standards would generally need to be addressed through applicable LUPC zoning and permitting requirements rather than through a locally administered zoning ordinance. Potential measures could include increased structure elevations or freeboard, flood-resistant construction, protection of critical access routes, preservation of natural flood storage areas, and consideration of future flood conditions when reviewing improvements or redevelopment of vulnerable properties. Matinicus can also incorporate flood resilience priorities into local planning and coordinate with LUPC regarding measures that may be appropriate for the island.

5.1.3. *Retreat*

Retreat is an adaptation approach that includes the strategic relocation of buildings or assets from areas of high flood risk to areas of lower flood risk. In some instances, entire buildings have been relocated outside of flood-prone areas by moving to higher elevation and/or a further distance from flood zones. Retreat may also be considered for individual assets and uses. For example, critical equipment such as backup generators and HVAC units can be relocated to areas of lower flood risk and uses such as parking that are not dependent on a waterfront location may be able to be relocated to areas of lower flood risk.

Figure 5-5 is a local example of a new cottage that was constructed further landward and on higher ground than the existing cottage location. The original cottage is located directly at the top of the shoreline which is exhibiting signs of moderate to more severe erosion. The landowner constructed a new cottage further from the shoreline to reduce the potential for damage from coastal storm events and the intent is to eventually remove the existing house.

Figure 5-5. Example of Building Retreat on Matinicus



5.1.4. Do Nothing (Accept the Risk)

This approach involves accepting the risk and may be reasonable where flooding is infrequent, damage is expected to be limited, an asset can recover quickly, or the cost of adaptation would exceed the expected benefits. Risk acceptance may still include monitoring, regular maintenance, insurance, emergency procedures, closure thresholds, storm documentation, and periodic reevaluation as conditions change.

5.1.5. Selecting an Adaptation Strategy

The preferred strategy will vary by asset and location. Important considerations include flood frequency and depth, wave and erosion exposure, the asset's importance and sensitivity, availability of alternative access or services, remaining useful life, feasibility of elevation or relocation, cost, regulatory requirements, effects on adjacent properties, and community priorities. As previously stated, assets such as electrical equipment constitute an asset that is highly sensitive to flooding and would likely be damaged or inoperable if exposed to flood inundation. Assets like access paths and roads can usually withstand some level of flooding without damage and so are often considered not very sensitive to flooding in a structural sense. Infrastructure that could be easily relocated, elevated, or flood-proofed would be considered to have a high adaptive capacity. Infrastructure or assets that are not easy to relocate or flood-proof are often considered to have a low adaptive capacity. Consideration should also be given to the financial costs, community feedback, and the regulatory constraints to development. Table 5-1 summarizes a general planning matrix based on flood exposure, asset importance, and sensitivity.

Table 5-1. General Flood Adaptation Planning Matrix

Flood Exposure	Asset Importance	Sensitivity	Typical Planning Response
Low	Low	Low	Monitor conditions or accept risk
Moderate	High	Low	Accommodate flooding or improve operational procedures
Moderate	High	High	Elevate, protect, or relocate vulnerable components
High	High	High	Major protection, relocation, or phased replacement

5.2. Matinicus Harbor Working Waterfront Adaptation Strategies

This section focuses on maintaining reliable access to the Matinicus working waterfront. A specific adaptation strategy is presented for Harbor Road, which was identified as the primary adaptation priority through the flood risk assessment and community engagement process, based on the potential consequences of flooding, erosion, and loss of access to harbor operations and essential services.

The other harbor assets evaluated in the flood risk assessment are not developed into specific adaptation projects as part of this study. Instead, high-level planning considerations are provided in Table 5-2 to identify potential actions to consider as flood conditions change, infrastructure is repaired or replaced, or future capital improvements are planned.

Recommendations are provided regardless of asset ownership because the evaluated infrastructure functions collectively as the primary working waterfront and access system for Matinicus. Implementation responsibility will vary by asset and may require coordination between Matinicus and Maine DOT, MSFS, USACE, private property owners, and other facility operators. The recommendations are intended to guide future planning and do not constitute final engineering design or permit-ready improvements. Additional survey, geotechnical investigation, engineering analysis, environmental review, agency coordination, and/or permitting will be required before implementation. In most cases, the recommendations emphasize measures that address present-day and near-term flood risk through approximately 2050. Greater uncertainty is associated with long-term sea level rise projections. Conditions, projections, design criteria, and available adaptation technologies should therefore be reevaluated periodically.

5.2.1. *Matinicus Harbor Working Waterfront Assets*

The Matinicus Harbor Working Waterfront functions as an interconnected system that supports transportation access, commercial fishing, freight and supply delivery, safe harbor, essential services, and emergency access. Flooding or disruption of individual assets can therefore affect not only the asset itself, but also the broader ability of the harbor to serve residents, businesses, and visitors. Planning-level adaptation strategies were identified for the major assets evaluated in this study based on their flood exposure, function, and potential consequences of disruption.

Harbor Road and the Steamboat Wharf were identified as the highest priority assets for adaptation planning. Harbor Road is vulnerable to flooding, erosion, and potential loss of access to the working waterfront. Potential strategies include elevation of the roadway, stabilization of the adjacent shoreline, drainage and transition improvements, as well as consideration of an alternate upland access route. Because access to the harbor is a significant focus of this study, Harbor Road adaptation strategies are discussed further in Section 5.2.2. The Steamboat Wharf is also a high-priority asset because flooding of the wharf deck could disrupt transportation, freight movement, commercial fishing, and emergency and essential services. Future improvements should consider opportunities for elevation, flood accommodation, and operational adaptations in coordination with Maine DOT and facility users.

The USACE breakwater, the MSFS transfer ramp, the hoist, and proposed public pier were identified as lower priorities for near-term adaptation based on the conditions evaluated in this study. For the USACE breakwater, continued condition and post-storm monitoring is recommended, with concerns regarding

overtopping or structural performance communicated to USACE. For the MSFS transfer ramp, the primary consideration is maintaining its operating range as water levels rise; future modifications to the ramp, landing, or guide system may be appropriate if high-water conditions increasingly limit operations. The proposed public pier provides an opportunity to incorporate resilience before construction by confirming appropriate deck elevation, freeboard, and wave criteria as the design advances.

The potential strategies range from monitoring and operational measures to substantial capital improvements. The strategies are summarized in Table 5-2.

Table 5-2. Matinicus Harbor Asset Adaptation Strategies

Asset / Focus Area	Adaptation Priority	Functions Supported	Primary Concern	Planning-Level Strategy	Planning Level Cost Estimate ¹
Harbor Road and adjacent shoreline	High	   	Flooding, erosion, and loss of access	Elevate roadway and stabilize adjacent shoreline; coordinate transitions and drainage; review feasibility of secondary access route	\$\$\$
Steamboat Wharf	High	    	Deck inundation and operational disruption	Evaluate elevation, flood accommodation, and operational measures with Maine DOT and facility users	\$\$\$-\$\$\$\$
Breakwater	Low	 	Crest overtopping and long-term performance	Monitor condition and storm performance; evaluate crest or armor modifications if performance declines, communicate concerns with USACE	\$ (monitoring/coordination) Future structural modification = potentially \$\$\$ - \$\$\$\$
MSFS Transfer Ramp	Low	   	Future high-water access limitations	Monitor operating range and evaluate ramp, landing, or guide-system modifications as water levels rise	\$\$-\$\$\$
Proposed Public Pier Deck	Low	  	Long-term water level and wave criteria	Maintain proposed elevation and confirm final design elevation, freeboard, and wave criteria	\$\$\$



Transportation Access



Commercial Fishing



Safe Harbor



Freight and Supplies



Essential Services



Emergency Access

¹ See Table 5-3 for estimated planning-level costs estimates

Planning-level costs are expected to range from less than \$100,000 (in 2026 dollars) for targeted maintenance, monitoring, operational measures, or small improvements to several million dollars for major modifications to roadway, wharf, breakwater, or other waterfront infrastructure. These cost ranges are intended to provide a relative indication of the scale of investment and should not be interpreted as project-specific construction cost estimates. Additional engineering, coordination with asset owners, permitting, and cost development would be required before implementation.

Table 5-3. Planning Level Cost Estimates

Symbol	Planning-Level Cost Range	General Description
\$	Less than \$100,000	Limited improvement, maintenance activity, planning effort, or targeted retrofit that may be implemented as a small standalone project. Examples may include drainage improvements, localized erosion repairs, equipment protection or relocation, monitoring, operational planning, or preliminary engineering.
\$\$	\$100,000 to less than \$500,000	Moderate capital improvement that may require dedicated funding and design
\$\$\$	\$500,000 to less than \$5 million	Major infrastructure project likely requiring outside funding, engineering, and permitting
\$\$\$\$	\$5 million or more	Large, multi-year capital project likely requiring multiple funding sources and long-term planning

Note: Cost values are order of magnitude and are provided in 2026 dollars.

5.2.2. Harbor Road and Adjacent Shoreline

Harbor Road provides the primary connection between the island road network and the working waterfront facilities at Matinicus Harbor (Figure 5-6). Maintaining access along this roadway is important not only for routine transportation, but also for movement of freight and supplies, commercial fishing activities, municipal and essential services, and emergency access. Based on the flood risk assessment, Harbor Road and the adjacent shoreline were identified as a high-priority area for adaptation due to the combined risks of roadway flooding, shoreline erosion, and potential loss or disruption of access to the harbor.

Two different adaptation pathways were considered for maintaining long-term access to the Matinicus working waterfront. The first is the Protect approach, represented by the conceptual Harbor Road design developed as part of this study. That concept demonstrates how the existing roadway could be elevated and the adjacent shoreline stabilized to reduce the frequency of flooding and erosion while maintaining the current access.

During the August 13, 2026 community forum, discussion also identified a secondary upland accessway as an alternative approach. Rather than continuing to increase protection of the existing shoreline roadway as flood exposure increases, this strategy would shift the critical access function landward to a less exposed area while allowing Harbor Road to remain in use under normal conditions. This represents

a form of managed retreat for the access function rather than abandonment of Harbor Road or relocation of the working waterfront. Each potential strategy is discussed in the following sections.

Figure 5-6. Aerial View of connection between Harbor Road and Steamboat Wharf



Source: GEI (2025)

5.2.2.1. Protection – Harbor Road Elevation and Shoreline Stabilization

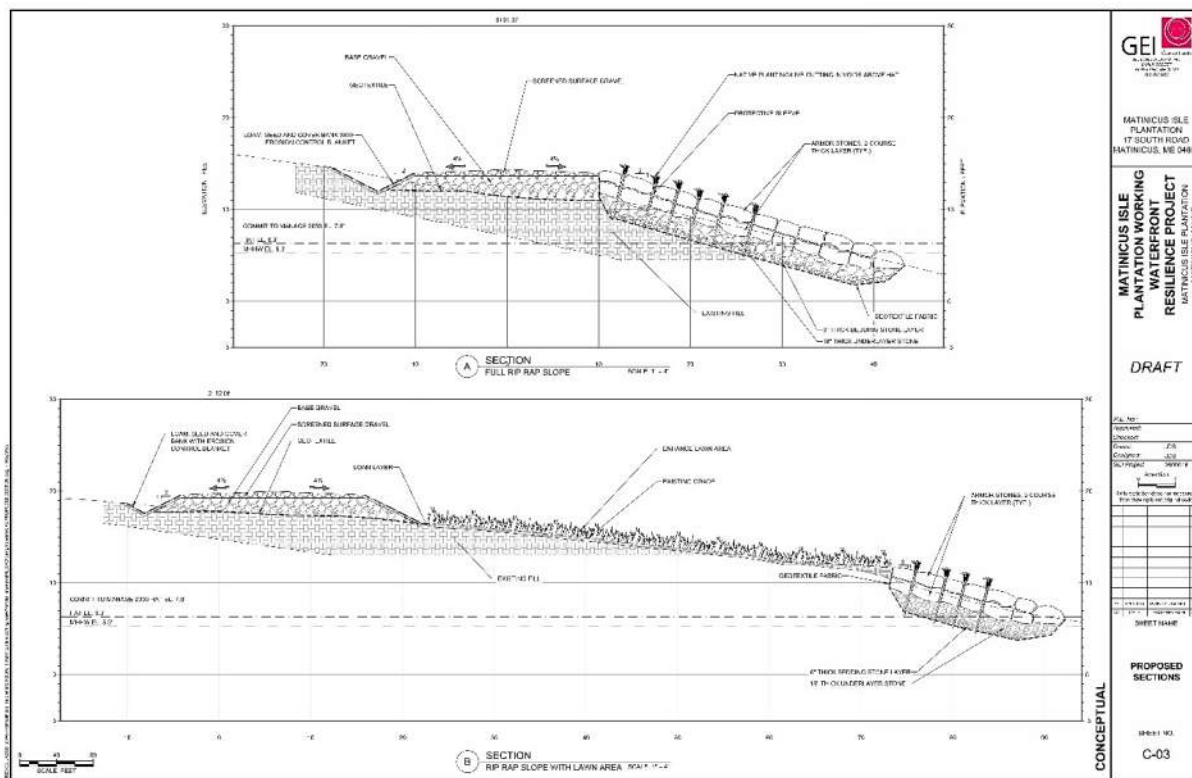
As part of this study, GEI developed a conceptual adaptation design for Harbor Road and the adjacent shoreline. The concept is intended to reduce the frequency of roadway flooding and improve shoreline stability while maintaining access to the existing working waterfront. The concept includes the following primary elements:

- Elevate Harbor Road using gravel fill and reconstruct the roadway surface to provide increased protection from present-day and future high-water conditions.
- Stabilize the harbor-facing shoreline with a gray/green stabilization system that includes toe stone armoring, vegetated riprap and native plantings.
- Maintain and improve existing waterfront access, including the informal existing access along the shoreline from Harbor Road to the cove.
- Consider drainage improvements to convey upland and roadway runoff, including ditching and an outfall pipe, to reduce the potential for ponding or unintended drainage impacts.
- Transition the roadway improvement into the existing wharf area to maintain a functional connection between Harbor Road and waterfront infrastructure.

These design elements are shown on the conceptual site plans included on Figures 5-7 and 5-8 with full size versions located in Appendix A. The typical sections on Figure 5-8 illustrate two potential shoreline configurations: a full riprap slope incorporating vegetation and a partial riprap slope using toe stones and

[illegible]

Figure 5-8. Conceptual Section Detail for Harbor Road Improvements



The concept design plans use the 2050 Commit to Manage HAST elevation of 7.8 feet NAVD88 as a reference condition shown on the drawings, compared with the present-day HAST elevation of 6.3 feet NAVD88 and MHHW elevation of 5.3 feet NAVD88. The intent is to improve the reliability and resilience of Harbor Road during more frequent tidal and coastal flooding while providing a design that can be further evaluated and refined as future conditions change.

A planning-level opinion of probable project cost was developed for the Harbor Road resilience concept as detailed in Table 5-4. The total project cost is estimated at approximately \$790,000.

Table 5-4. Engineer's Opinion of Probable Cost

Item	Estimated Cost
Mobilization, site preparation, bonding, and surveys	\$333,000
Shoreline stabilization and vegetation	\$212,000
Harbor Road improvements	\$65,000
Estimated Construction Subtotal	\$610,000
Contingency (15%)	\$92,000
Engineering, permitting, and other soft costs (15%)	\$92,000
Planning-Level Project Cost	\$794,000

Construction on Matinicus presents additional logistical considerations compared with mainland projects. The estimate therefore includes a substantial mobilization allowance associated with

transporting construction equipment, materials, and personnel to the island. Mobilization represents a significant portion of the estimated construction cost and will depend on the contractor's proposed means and methods, availability of barge transportation, material sourcing, and opportunities to coordinate work with other construction occurring on the island.

The estimate also includes a 15% construction contingency and a 15% estimate for engineering, permitting, and other soft costs. Because the project is currently at the conceptual design level, quantities, material requirements, construction methods, and regulatory requirements have not been fully developed. The estimate should therefore be considered a planning-level cost for budgeting and funding purposes and should be updated as the project advances through preliminary and final design.

To supplement the engineering drawings and to help communicate how the conceptual improvements could appear within the existing working waterfront, Tandem Landscape Architecture prepared visual renderings of the Harbor Road concept as shown on Figure 5-9. The renderings show the estimated 2070 HAST elevation of 8.7 ft NAVD88 as a longer-term reference to help illustrate how increasing tidal elevations may interact with the project over time. This additional elevation is included for visualization purposes and does not change the engineering basis of the conceptual design.

Figure 5-9. Overview Rendering of Proposed Concept Design



The renderings illustrate the proposed roadway improvements, shoreline stabilization, and integration of vegetation and upland lawn/meadow area. These renderings are intended to provide a visual representation of the planning-level concept design and should not be interpreted as depicting final design details, materials, grading, or vegetation. The full visual renderings are included in Appendix C.

Future design should include detailed topographic and boundary survey, confirmation of property ownership and available rights-of-way or easements, geotechnical evaluation, drainage analysis, coastal engineering evaluation, utility coordination, environmental review, and regulatory coordination. Final roadway and shoreline elevations, limits of fill, stone sizing, vegetation, drainage structures, and transitions to existing infrastructure should be established during subsequent design.

5.2.2.2. Retreat - Secondary Upland Accessway

During the community meeting held on August 13, 2026, an alternative approach was discussed that would establish a secondary accessway between Markey's Beach Road and Harbor Road (shown in red in Figure 5-10). Based on the community discussion, the secondary upland accessway is recommended for additional feasibility evaluation alongside the Harbor Road elevation and shoreline stabilization concept. This evaluation would allow Matinicus to compare the costs, benefits, and implementation considerations of each approach before selecting an adaptation strategy or determining whether the improvements could be advanced in phases.

Figure 5-10. Approximate location of Secondary Accessway



The secondary accessway represents a form of managed retreat for critical access infrastructure. Rather than relying on maintaining the existing roadway, this strategy would shift the existing access landward to a less exposed upland corridor. Harbor Road could remain in use under normal conditions, while the

secondary route would provide redundant access to the working waterfront when flooding, erosion, storm damage, or other conditions make the existing route impassable. Over the longer term, the alternative route could also provide greater flexibility to adapt how the existing shoreline roadway is maintained as coastal flood exposure increases.

This approach differs from traditional shoreline protection because it reduces reliance on infrastructure located directly along the vulnerable shoreline rather than attempting to fully protect that infrastructure in place. It may also reduce the extent of roadway fill, shoreline armoring, and other coastal improvements that would otherwise be needed to maintain reliable access along the existing Harbor Road alignment as sea levels rise. The strategy would not constitute abandonment of Harbor Road or retreat of the working waterfront itself; instead, it would provide a more resilient location for the essential transportation and access function that Harbor Road currently provides.

If this alternative is implemented, the selection of the appropriate location should consider both existing wetland resources and future flood exposure. Wetlands should be identified and delineated during subsequent feasibility evaluation so that the accessway can be located to avoid or minimize wetland impacts where practicable. The alignment should also consider the potential for future inundation to extend inland through existing low-lying wetland areas. As shown on the 2100 inundation mapping, portions of the low-lying area north of the working waterfront become increasingly connected to coastal inundation under future sea level rise and storm conditions. The secondary accessway should therefore be located within upland areas, where practicable, so that the route itself does not become vulnerable to the same potential future flooding.

Future work should include topographic and boundary survey, wetland and natural resource identification and delineation, evaluation of the 2100 inundation extents and site elevations along potential alignments, confirmation of property ownership and necessary easements or other access rights, drainage and stormwater analysis, geotechnical evaluation as appropriate, and identification of applicable permitting requirements.

5.3. Permitting Considerations

Projects located along the waterfront will most likely be subject to a local, state, and/or federal regulatory process. In some cases, multiple permits may be required for a specific project. A regulatory scoping meeting was held on September 17, 2026 with representatives from the USACE, LUPC, and Maine DOT and the topics discussed are summarized below.

5.3.1. USACE

Under Section 404 of the Clean Water Act, the USACE regulates waters of the U.S., and, under Section 10 of the Rivers and Harbors Act, the USACE regulates navigable waters of the U.S. Projects that are subject to these regulations may require a Nationwide Permit (NWP), regional general permit, or, for larger projects, an Individual permit. USACE indicated that the shoreline stabilization component would initially be evaluated under NWP 13 - Bank Stabilization. The conceptual shoreline treatment was estimated at approximately 250 linear feet, below the 500-linear-foot threshold discussed during the meeting, although final eligibility will depend on the completed design and quantified impacts. Quantities of fill and other impacts within USACE jurisdiction will also need to be calculated as the design advances.

The proposed emergency shoreline access may require authorization under the applicable regional general permit for boat ramps or similar access structures (ME – RGP-A- Boat Ramps). USACE noted potential limitations on fill volume, structure dimensions, and impacts to special aquatic sites that will need to be evaluated once the access design is further developed.

The proposed stormwater outfall would likely be evaluated under NWP 7 - Outfall Structures and Associated Intake Structures. USACE indicated that multiple Nationwide or General Permits may apply to different components of the same project, provided the applicable individual and overall thresholds are met. If the project cannot qualify under the available general permits, an Individual Permit may be necessary.

For the secondary access road alternative, USACE indicated that if the alignment requires wetland crossings, the project would likely be evaluated under NWP 14 - Linear Transportation Projects. A formal wetland delineation would be needed to characterize the wetland and determine the extent of potential impacts.

USACE also requested early notification if federal funding is secured for the project because another federal agency's involvement could affect coordination of the National Environmental Policy Act (NEPA) review.

5.3.2. LUPC

LUPC confirmed that the project area includes the General Development Subdistrict, Flood Prone Area Protection Subdistrict, and Wetland Protection Subdistrict as shown on the project plans in Appendix A. LUPC indicated that the Harbor Road and shoreline stabilization improvements would likely be reviewed as a unified project under a Development Permit.

The roadway improvements would likely be treated as a Level B road project, together with a shoreland alteration component. LUPC indicated that the permit application would likely include information from the shoreland alteration, wetland, and flood-prone area supplements.

LUPC identified two primary issues for the next phase:

- Title, right, or interest: Property ownership and easements will need to be clarified before permitting.
- Floodplain effects: Because portions of the project are within a FEMA-mapped flood hazard area, the project may need to evaluate whether proposed fill, shoreline stabilization, or roadway improvements would change the Base Flood Elevation or Special Flood Hazard Area boundary. LUPC indicated that the floodplain analysis could begin with a screening-level modeling approach. If that analysis demonstrates that the project would not materially affect the mapped flood hazard area, more detailed modeling may not be necessary. If potential effects are identified or cannot be ruled out, additional modeling may be required.

The secondary access road concept would also likely be reviewed through the Development Permit process, with wetland impacts evaluated if that alternative is advanced.

5.3.3. *Maine DOT*

Maine DOT indicated support for coastal resilience improvements and recommended continued early coordination as the project develops. Because Maine DOT owns Steamboat Wharf and may own or hold interests in portions of the adjacent property, future design should clearly identify property boundaries, easements, proposed improvements on this property, and the respective responsibilities of Maine DOT and Matinicus Isle Plantation.

It was recommended that in future phases, Matinicus should develop a preliminary project schedule and budget as the concept advances so that Maine DOT can evaluate the project within its planning and three-year work plan process. Future coordination with Maine DOT property, maintenance and operations, and MSFS staff will be needed as the project progresses into future phases.

5.4. Funding Opportunities

A range of state and federal funding programs may be applicable to future improvements at Matinicus Harbor. Because the harbor serves multiple community functions including transportation access, commercial fishing and working waterfront activities, freight and supply delivery, emergency access, and other essential services, the proposed improvements may be eligible under several different types of funding programs. Potential funding sources include programs focused on transportation resilience, working waterfront infrastructure, hazard mitigation, rural infrastructure, public access, economic development, and coastal resilience.

No single funding program should be assumed to support all components of the proposed improvements. Instead, implementation may benefit from a phased or coordinated funding strategy in which different sources are used for different project elements or stages of development. For example, one funding source may support survey, engineering, permitting, or final design, while a subsequent source supports construction. Depending on program eligibility and funding availability, individual components of the Harbor Road improvements could also potentially be advanced separately while remaining consistent with the overall adaptation concept.

Grant programs and funding priorities change over time. Programs may be modified, temporarily unavailable, replaced, or supplemented by new state or federal funding initiatives. Eligibility requirements, local match requirements, maximum awards, application schedules, and allowable project costs also vary considerably among programs. For these reasons, the funding programs summarized in Table 5-5 should be considered a planning-level resource rather than a comprehensive or permanent list of available funding.

As the project advances, Matinicus Isle Plantation should periodically review available funding opportunities and consider coordinating with Maine DOT, the MSFS, state resilience programs, and other potential partners where proposed improvements have overlapping transportation, working waterfront, or community resilience benefits. Grant applications should also be coordinated so that individual funding sources are assigned to clearly defined and eligible project costs and applicable restrictions on using multiple funding sources for the same costs are addressed.

Table 5-5 identifies several state and federal programs that may be relevant to future coastal infrastructure and resilience improvements at Matinicus Harbor. The applicability of each program should be confirmed at the time funding is pursued based on the project phase, proposed improvements, current program requirements, and availability of funding.

Table 5-5. Flood Adaptation Grant Programs in Maine

Grantor	Grant Name	Description of Qualifying Grant Uses
Maine Office of Community Affairs (MOCA)	Shore and Harbor Planning Grant	Shoreline access planning, waterfront and harbor planning, identification and resolution of waterfront use conflicts, and planning, feasibility, and design efforts for waterfront infrastructure. (This grant program should be reviewed in future years to determine if it will still be available).
MOCA	Coastal Communities Grant	Improve water quality, increase adaptation to erosion and flooding, restore coastal habitats, promote sustainable development, and enhance the coastal-dependent economy while preserving coastal natural resources within Maine's coastal zone.
MOCA	Community Action Grants	Work supporting the List of Community Actions, which fall into the categories of: Embracing the Future of Transportation, Modernizing Maine's Buildings, Reducing Emissions through Clean Energy Innovation, Grow Jobs and Protect Natural Resource Industries, Protect the Environment & Promote Natural Climate Solutions, Build Healthy & Resilient Communities, Invest in Climate-Ready Infrastructure, and Engage Maine People.
Maine Department of Agriculture, Conservation, and Forestry (DACF)	Maine Trails Program	Development and renovation of recreation trails. Projects can include boat launch/landing infrastructure, renovation of existing trails such as reconstruction of a trails base and surface, and bank stabilization, re-vegetation, and erosion control.
Maine DACF	Maine Boating Facilities Fund (BFF)	Supports the acquisition, development, improvement, and rehabilitation of public recreational boat launching facilities on both coastal and inland waters.
Maine DOT	Small Harbor Improvement Program (SHIP)	Projects promoting economic development, public access, improved commercial fishing opportunities and works to preserve and create infrastructure at facilities in tidewater and coastal communities.
Maine DOT	Maine Public Working Waterfront Infrastructure Fund	Projects that upgrade existing public working waterfront that provide access to or support commercial fishing, aquaculture, or other related marine activities. Projects should focus on adapting existing infrastructure to reduce vulnerabilities related to climate change, sea level rise, coastal flooding, and other potential impacts.
Maine DOT	Maine Infrastructure Adaptation Fund (MIAF)	Funding to help communities adapt critical infrastructure such as roads, culverts, stormwater systems, and wastewater facilities to reduce vulnerability to climate change
USFWS administered by Maine DOT	Boating Infrastructure Grant (BIG)	Projects to construct, renovate, and maintain tie-up facilities with features for transient boaters in vessels 26 feet or more in length.
Northern Border Regional Commission (NBRC)	Catalyst Program	Economic development initiatives, such as modernizing and expanding access to public water and wastewater services, revitalizing transportation infrastructure, establishing workforce development programs and facilities, growing outdoor recreation economy, and providing access to new childcare and healthcare facilities.
FEMA	Flood Mitigation Assistance (FMA)	Reduce or eliminate the risk of repetitive flood damage to buildings and structures insured under the National Flood Insurance Program.

Grantor	Grant Name	Description of Qualifying Grant Uses
FEMA	Hazard Mitigation Grant Program (HMGP)	Post-disaster grants to reduce disaster losses and protect life and property from future disaster damage in communities that have already experienced significant damages from a major natural disaster.
U.S. Department of Transportation	Bipartisan Infrastructure Law Grants	Several funding opportunities related to the transportation sector and improving public safety and climate resilience. The Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (PROTECT) funding should be confirmed if still available.
National Fish and Wildlife Foundation	Coastal Resilience Fund	Conservation projects that restore or expand natural features such as coastal marshes and wetlands, dune and beach systems, oyster and coral reefs, forests, coastal rivers and floodplains, and barrier islands that minimize the impacts of storms and other naturally occurring events on nearby communities.
U.S. Department of Agriculture	Community Facilities Direct Loan & Grant Program	Development of essential community facilities in rural areas, such as health care facilities, public facilities, community support services, public safety services, and utility services.
US Economic Development Administration	Disaster Supplemental Grant Program	This grant program offers three paths that include readiness path that builds local capacity and prepares for future implementation projects. The implementation path is for standalone construction and non-construction projects that help communities recover from declared major disasters. The industry transformation path is a coalition led, multi-project portfolios that funds a combination of construction and non-construction projects.
Land for Maine's Future	Public Access to Maine Waters Fund	This grant program provides funding to acquire land or conservation easements for recreation, public water access, ecological preservation, scenic landscapes, and working forests. LMF is currently accepting inquiries for the Public Access to Maine Waters Fund, which helps purchase access rights on small parcels of land to create or enhance access points to lakes, ponds, rivers, and coastal waters. Land for access could support a facility for trailered boats, or small, hand-launched craft (canoes, kayaks) and provide bank fishing, swimming, clamming, worming, or other water contact opportunities. Access is primarily intended for general public use.
Department of Defense	Innovative Readiness Training (IRT) Program	This program was mentioned at the community forum held on August 13, 2026. The IRT program provides opportunities for communities to partner with military units on projects that also provide mission-essential training for service members. Eligible construction missions can include road, utility, site, marine, and other public infrastructure improvements. Under an IRT partnership, military personnel and equipment may provide a substantial portion of the construction labor and services, while the community typically remains responsible for project design, permitting, property access, materials, and other project-specific costs. Because IRT projects must provide appropriate military training value and are selected through a competitive matching process, the program should be considered a potential implementation partnership rather than a guaranteed funding source.

Sources: Program descriptions were compiled from official state and federal program webpages, accessed September 2026. See Section 6 for program references. Program availability and requirements should be confirmed at the time funding is pursued.

In addition to established state and federal grant programs, Congressionally Directed Spending (CDS) may provide another potential funding pathway for implementation of larger resilience and infrastructure improvements. Through the annual federal appropriations process, Maine's Congressional delegation may request funding for eligible community projects, including infrastructure and flood mitigation projects. CDS is generally intended as a one-time federal investment rather than a recurring funding source, and funding availability, eligible project types, application requirements, and timing vary by federal fiscal year. The Plantation should consider coordinating with Maine's Congressional delegation as project concepts advance and cost estimates are refined to determine whether future improvements to Harbor Road or other critical harbor infrastructure may be appropriate candidates for CDS funding.

5.5. Recommended Next Steps and Implementation

The findings of this study provide a basis for Matinicus Isle Plantation to advance resilience improvements at Matinicus Harbor. Additional investigations, engineering, property coordination, and funding will be necessary before construction can proceed.

5.5.1. Evaluation of Harbor Access Alternatives

The Harbor Road elevation and shoreline stabilization concept represents one potential approach to maintaining waterfront access. The secondary upland accessway identified during community engagement provides another potential strategy that may reduce long-term reliance on the existing shoreline roadway.

These approaches are not necessarily mutually exclusive. However, Matinicus has not selected an implementation strategy or committed to constructing both improvements. Before advancing either alternative into final design, additional evaluation is recommended to compare construction costs, flood resilience benefits, property requirements, environmental impacts, permitting considerations, and long-term maintenance needs. The Harbor Road concept has a planning-level project cost of approximately \$793,000. The secondary accessway has not been developed sufficiently to establish a comparable construction cost estimate. Its estimated cost should be developed during the recommended feasibility evaluation.

5.5.2. Preliminary Investigations and Design

If the Harbor Road improvements are selected to move into the next phase, Matinicus should focus on confirming property ownership and available rights-of-way or easements, completing detailed topographic and boundary surveys, evaluating natural resources and wetlands, and undertaking geotechnical and coastal engineering investigations. These efforts would support refinement of the Harbor Road concept and further evaluation of the potential secondary upland accessway.

Because Matinicus does not own or control several of the critical harbor assets, implementation will require continued coordination with MaineDOT, the MSFS, private property owners, and other stakeholders. Early project development should include confirmation of property ownership, easements, rights-of-way, and agreements needed for design, permitting, construction, and long-term maintenance.

5.5.3. Preliminary Implementation Schedule and Funding

For planning purposes, the next phase of investigation, alternatives evaluation, and preliminary design could begin in 2027, followed by final design, permitting, and funding coordination in late 2027 or early 2028. Construction could potentially occur in 2028 or later, depending on the availability of funding, permitting timelines, property agreements, and coordination with MaineDOT.

The existing Harbor Road planning-level cost estimate provides an initial basis for discussions with MaineDOT regarding potential inclusion in its three-year work plan. The estimate should be updated as field investigations and design progress, particularly to account for refined quantities, construction mobilization, engineering requirements, and future cost escalation.

Potential funding opportunities include state coastal planning and infrastructure programs, MaineDOT funding initiatives, and federal economic recovery and resilience programs. Funding may be pursued in phases, with early grants supporting survey, engineering, and permitting and subsequent awards supporting eligible construction activities. Grant eligibility, ownership requirements, local match obligations, and funding availability should be confirmed before applications are submitted.

6. References

Department of Defense (DoD) (2026). Innovative Readiness Training (IRT) Program. Accessed August 2026 from: <https://irt.defense.gov/Community/1000/>.

Federal Emergency Management Agency (FEMA) (2016a). Flood Insurance Rate Map, Knox County, Maine, Panel 23013C0807D. Effective July 6, 2016.

Federal Emergency Management Agency (FEMA) (2016b). Flood Insurance Study, Knox County, Maine. Effective July 6, 2016.

Federal Emergency Management Agency (FEMA) (2022). Wet Floodproofing Requirements and Limitations. NFIP Technical Bulletin 7, May.
https://www.fema.gov/sites/default/files/documents/fema_nfip-technical-bulletin-7-wet-floodproofing-guidance.pdf.

Federal Emergency Management Agency (FEMA) (2026a). Flood Mitigation Assistance Grant Program. Accessed September 2026 from: <https://www.fema.gov/grants/mitigation/floods>.

Federal Emergency Management Agency (FEMA) (2026b). Hazard Mitigation Grant Program. Accessed September 2026 from: <https://www.fema.gov/grants/mitigation/hazard-mitigation>.

Flycatcher LLC (2025). Shoreland Alteration Permit on behalf of Matinicus Isle Plantation. September 2025.

LaBranche Land Surveys (n.d.). Boundary Survey for Richard R. Moody Estate. Date on plan is not legible.

Land for Maine's Future (LMF) (2026). Public Access to Maine Waters Fund. Accessed September 29, 2026 from: <https://www.maine.gov/dacf/lmf/funds/water-access.shtml>.

Maine Climate Council (MCC) (2024). Scientific Assessment of Climate Change and its Effects in Maine. Scientific and Technical Subcommittee.

Maine Department of Agriculture, Conservation and Forestry (Maine DACF) (2026). Maine Trails Program. Accessed September 29, 2026 from: <https://www.maine.gov/dacf/parks/grants/maine-trails-program.shtml>.

Maine Department of Agriculture, Conservation and Forestry (Maine DACF) (2026). Maine Trails Program. Accessed September 29, 2026 from:
https://www.maine.gov/dacf/parks/grants/boating_facilities_fund.shtml.

Maine Department of Agriculture, Conservation and Forestry (Maine DACF) (2026). Boating Facilities Fund. Accessed October 14, 2026 from: <https://www.maine.gov/dacf/parks/grants/maine-trails-program.shtml>.

Maine Department of Inland Fisheries and Wildlife (MDIFW) (2026). Beginning with Habitat Maps. Accessed March 2026 from: <https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/maps/index.html>.

Maine Department of Marine Resources (DMR) (2026). Interactive Maps and Data. Accessed March 2026 from: <https://www.maine.gov/dmr/science/data-and-maps/dmr-maps-data>.

Maine Department of Transportation (Maine DOT) (1984). Moody Wharf Rehabilitation. January 5.

Maine Department of Transportation (Maine DOT) (1989). Right of Way Map, Matinicus Island, Moody's Wharf.

Maine Department of Transportation (Maine DOT) (2014). Matinicus Ferry Terminal Fender Replacement. August 1.

Maine Department of Transportation (Maine DOT) (2026a). Small Harbor Improvement Program. Accessed September 29, 2026 from: <https://www.maine.gov/dot/about/funding/grants/small-harbor-improvement-program>.

Maine Department of Transportation (Maine DOT) (2026b). Maine Infrastructure Adaptation Fund. Accessed September 29, 2026 from: <https://www.maine.gov/dot/programs-services/environmental-efforts/climate-initiative/adaptation/miaf>.

Maine Department of Transportation (Maine DOT) (2026c). Maine Public Working Waterfront Infrastructure Fund. Accessed September 2026 from: <https://www.maine.gov/dot/programs-services/environmental-efforts/climate-initiative/adaptation>.

Maine Geological Survey (MGS) (2022). Maine Highest Astronomical Tide Line. Maine Department of Agriculture, Conservation and Forestry, Augusta, Maine.

Maine Land Use Planning Commission (LUPC) (2026). Land Use Guidance Maps and Digital Mapping Data. Accessed April 2026 from: https://www.maine.gov/dacf/lupc/plans_maps_data/digital_maps_data.html.

Maine Office of Community Affairs (MOCA) (2026a). Shore and Harbor Planning Grant. Accessed September 29, 2026 from: <https://www.maine.gov/moca/funding/shore-and-harbor-planning-grant>.

Maine Office of Community Affairs (MOCA) (2026b). Coastal Community Grant. Accessed September 2026 from: <https://www.maine.gov/moca/funding/coastal-community-grant>.

Maine Office of Community Affairs (MOCA) (2026c). Community Action Grant. Accessed September 2026 from: <https://www.maine.gov/moca/funding/community-action-grant>.

Matinicus Island Historical Society (1955). Matinicus Harbor historic photograph.

National Fish and Wildlife Foundation (NFWF) (2026). National Coastal Resilience Fund. Accessed September 2026 from: <https://www.nfwf.org/programs/national-coastal-resilience-fund>.

National Oceanic and Atmospheric Administration (NOAA) (2017). Global and Regional Sea Level Rise Scenarios for the United States. NOAA Technical Report NOS CO-OPS 083.

National Oceanic and Atmospheric Administration (NOAA) (2026a). Bar Harbor, Maine (Station ID 8413320), sea level trends and water-level information. Accessed May 14, 2026 from: https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8413320.

National Oceanic and Atmospheric Administration (NOAA) (2026b). Rockland, Maine (Station ID 8415490), tidal datums. Accessed May 2026 from: <https://tidesandcurrents.noaa.gov/datums.html?id=8415490>.

National Oceanic and Atmospheric Administration (NOAA) (2026c). Vertical Datum Transformation (VDATUM) Online Tool. Accessed March 2026 from: <https://vdatum.noaa.gov/vdatumweb/>.

Northern Border Regional Commission (NBRC) (2026). Catalyst Program. Accessed September 2026 from: <https://www.nbrc.gov/content/Catalyst>.

U.S. Army Corps of Engineers (USACE) (2015). Risk Management Strategies. <https://www.nad.usace.army.mil/CompStudy/Risk-Management-Strategies/>.

U.S. Department of Agriculture Rural Development (USDA RD) (2026). Community Facilities Direct Loan & Grant Program. Accessed September 2026 from: <https://www.rd.usda.gov/programs-services/community-facilities/community-facilities-direct-loan-grant-program>.

U.S. Department of Transportation (USDOT) (2026). Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Program. Accessed September 2026 from: <https://www.transportation.gov/rural/grant-toolkit/promoting-resilient-operations-transformative-efficient-and-cost-saving>.

U.S. Economic Development Administration (EDA) (2026). Fiscal Year 2025 Disaster Supplemental. Accessed September 2026 from: <https://www.eda.gov/funding/funding-opportunities/fiscal-year-2025-disaster-supplemental>.

U.S. Fish and Wildlife Service (USFWS) (2026a). Information for Planning and Consultation (IPaC). Accessed April 2026 from: <https://www.fws.gov/service/information-planning-and-consultation>.

U.S. Fish and Wildlife Service (USFWS) (2026b). National Wetlands Inventory, Wetlands Mapper. Accessed August 2026 from: <https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper>.

U.S. Fish and Wildlife Service (USFWS) (2026c). Boating Infrastructure Grant Program. Accessed September 2026 from: <https://www.fws.gov/program/boating-infrastructure>.

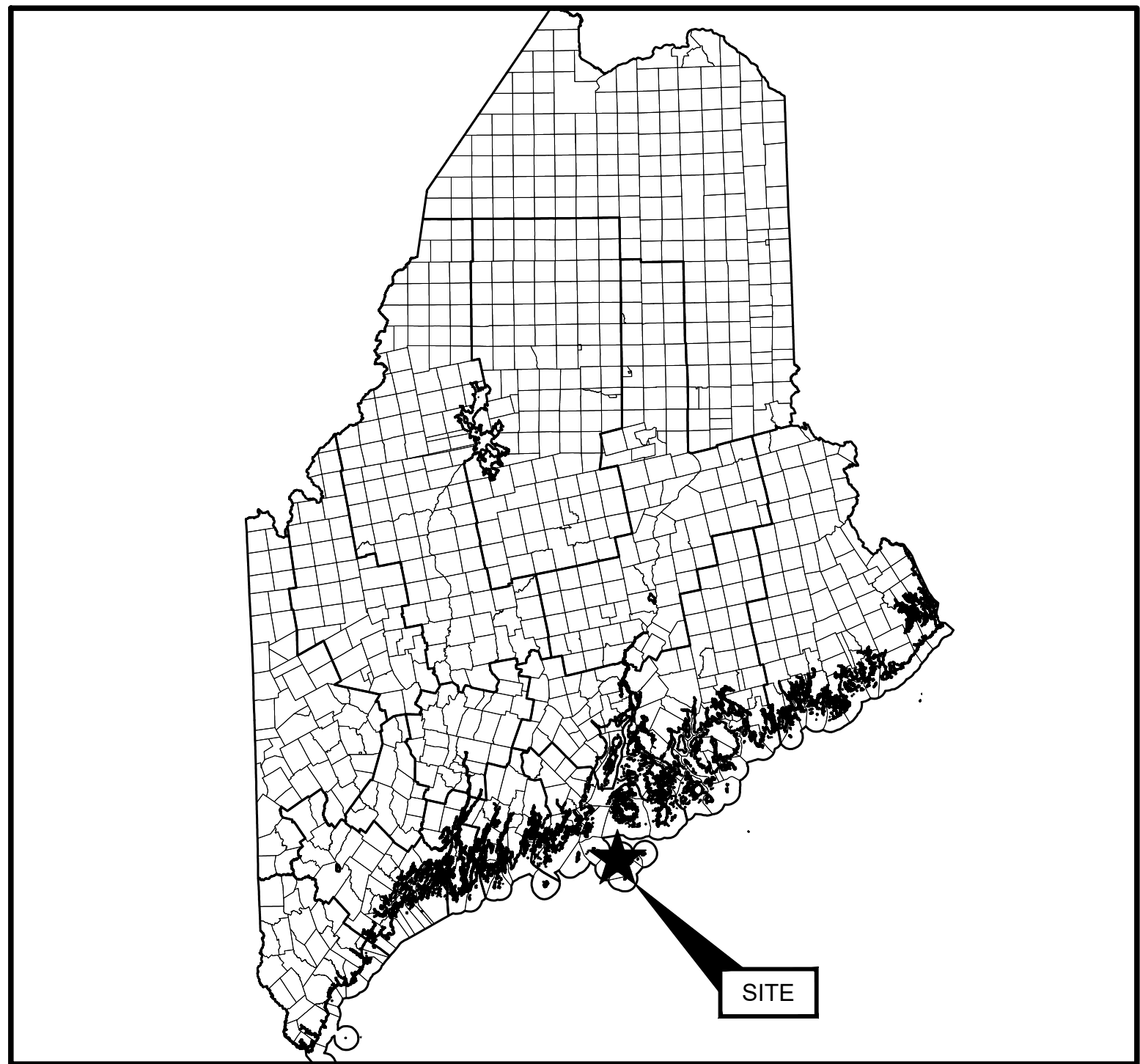
U.S. Geological Survey (USGS) (2021). USGS 1M ME MidCoast 2021 B21. Accessed February 2026 from: <https://apps.nationalmap.gov/downloader/>.

Woodhull (n.d.). Second Tide Project, Biddeford Pool, Maine. Figure source provided for building elevation example.

Appendix A Harbor Road Conceptual Design

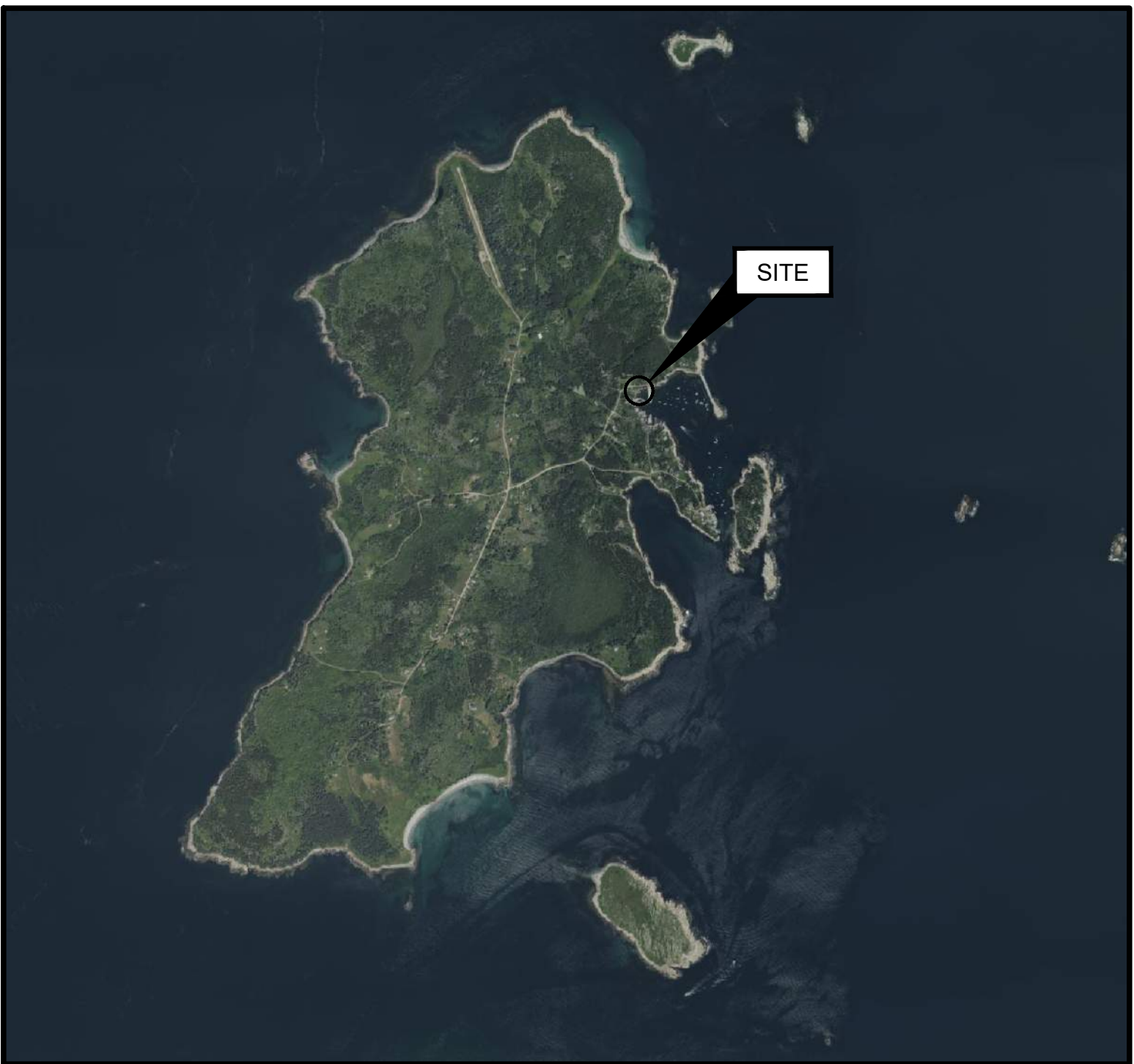
MATINICUS ISLE WORKING WATERFRONT RESILIENCE

MATINICUS ISLE PLANTATION, MAINE



SOURCE:
MaineGIS

STATE MAP
(NOT TO SCALE)



SOURCE:
BING AERIAL

SITE LOCATION MAP
(NOT TO SCALE)

SHEET INDEX

SHEET NO.	DRAWING NO.	TITLE
1	G-01	COVER SHEET
2	C-01	EXISTING CONDITIONS
3	C-02	PROPOSED SITE PLAN
4	C-03	TYPICAL SECTION

PREPARED FOR:

MATINICUS ISLE PLANTATION
17 SOUTH ROAD
MATINICUS, MAINE 04851

PREPARED BY:

GEI CONSULTANTS, INC.
5 MILK STREET
PORTLAND, ME 04101
(207)797-8901



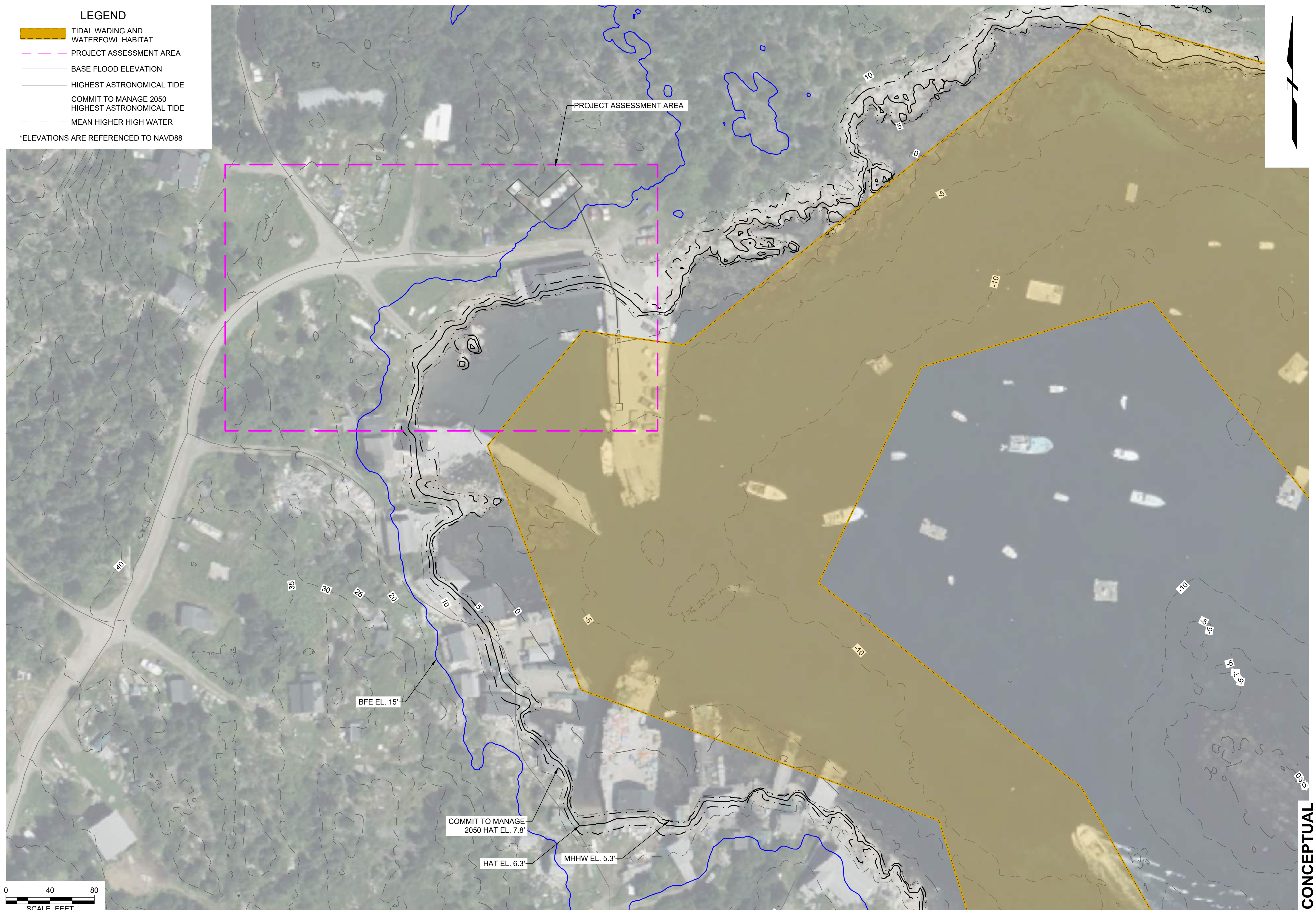
NOT FOR CONSTRUCTION

THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, IS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF GEI CONSULTANTS AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF GEI CONSULTANTS.

GEI PROJECT NO. 2600016

					DWG. NO. G-01
					SHEET NO. 1 OF 4
0	6/12/2026	CONCEPTUAL SET			
NO.	DATE	ISSUE/REVISION	APP		

STEEVES, JACOB b:\Working\matinicus isle plantation\2600016 matinicus isle working waterfront resilience proj\00_CAD\Design\Sheets\G-01 COVER SHEET.dwg - 9/29/2025



CONCEPTUAL



**MATINICUS ISLE
PLANTATION WORKING
WATERFRONT
RESILIENCE PROJECT**
MATINICUS ISLE PLANTATION
MATINICUS, MAINE

DRAFT

E. No.:

Improved

checked:

Sawn:

designed

El Project	2600016
------------	---------

Attention:

this scale bar does not measure 1
then drawing is not original scale.

[illegible]

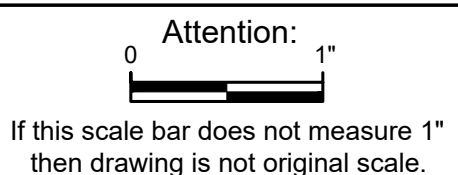
6/12/2026	CONCEPTUAL SET	
DATE	ISSUE/REVISION	APP

SHEET NAME

EXISTING CONDITIONS PLAN

SHEET NO.

C-01



0	6/12/2026	CONCEPTUAL SET	
NO.	DATE	ISSUE/REVISION	APP

PROPOSED SITE PLAN

C-02



STEEVES | ACOR | Working/matriculous isle plantation | 2600016 matriculous isle working waterfront resilience proj | 100 CAD | Design | Sheets | C-02 PROPOSED SITE PLAN dwg - 9/29/2026

SECTION
FULL RIP RAP SLOPE

B SECTION
RIP RAP SLOPE WITH LAWN AREA SCALE: 1" = 4'

5 CONCEPTUAL

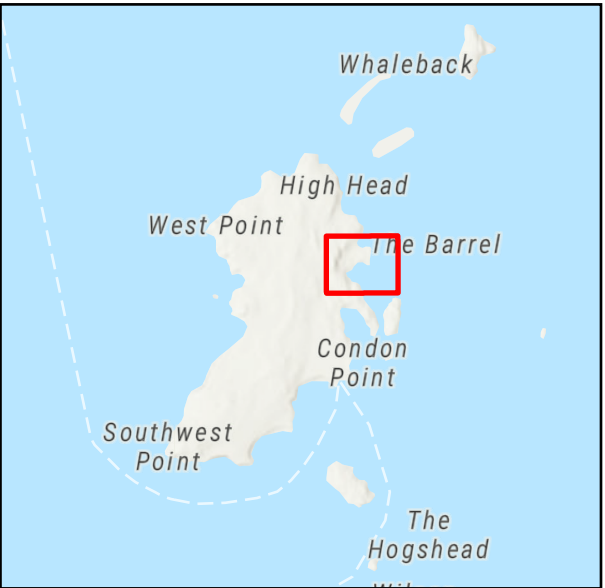
Appendix B Flood Inundation Maps

ilagas4413 Date Saved: 9/29/2026 11:30 AM Date Exported: 9/29/2026 11:31 AM



Legend

- MHHW (5.3 ft)
- HAsT (6.3 ft)
- 1% Annual Chance SWEL (8.7 ft)
- 5-ft elevation contours



Notes:
All Elevations in NAVD88. NAVD88 +5.3 = MLLW
MHHW: Mean Higher High Water
MLLW: Mean Lower Low Water
HAsT: Highest Astronomical Tide

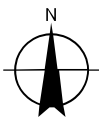
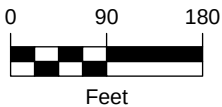
Source:
Inundation Boundaries based on USGS LIDAR

Created by: IYG 9/29/26
Checked by: LAP 9/29/26
Coordinate System:
Name: NAD 1983 2011 StatePlane Maine East FIPS 1801 Ft US

PRESENT DAY INUNDATION

Matinicus Isle Plantation Working Waterfront Resilience Project
Matinicus, Maine

Matinicus Isle Plantation
Matinicus, Maine

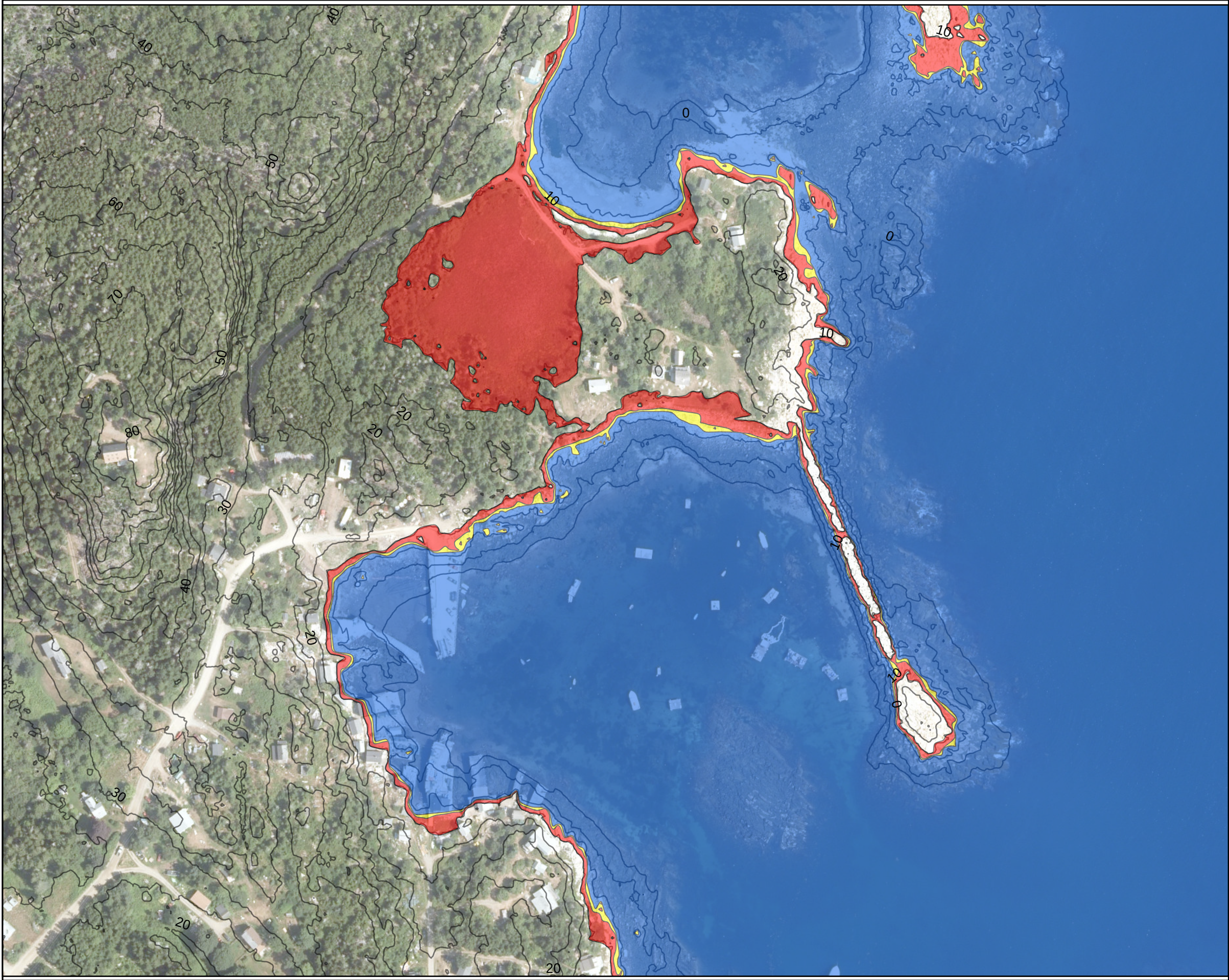


Project 2600016

September 2026

Fig. B-1

ilagas4413 Date Saved: 9/29/2026 11:30 AM Date Exported: 9/29/2026 11:34 A



Legend

- MHHW (6.8 ft)
- HAsT (7.8 ft)
- 1% Annual Chance SWEL (10.2 ft)
- 5-ft elevation contours



Notes:
All Elevations in NAVD88. NAVD88 +5.3 = MLLW
MHHW: Mean Higher High Water
MLLW: Mean Lower Low Water
HAsT: Highest Astronomical Tide

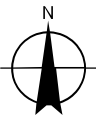
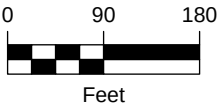
Source:
Inundation Boundaries based on USGS LIDAR

Created by: IYG 9/29/26
Checked by: LAP 9/29/26
Coordinate System:
Name: NAD 1983 2011 StatePlane Maine East FIPS 1801 Ft US

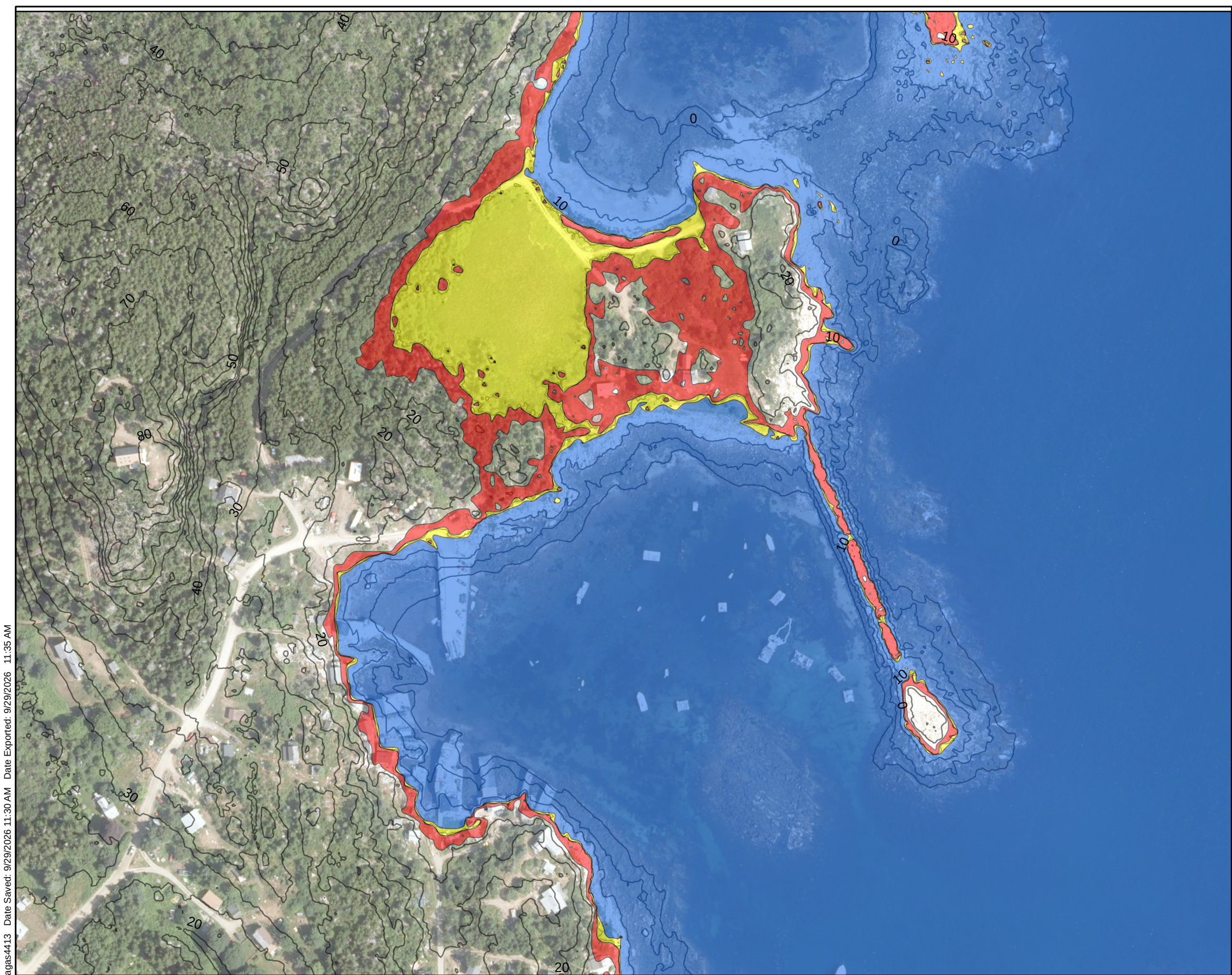
2050 INUNDATION

Matinicus Isle Plantation Working Waterfront Resilience Project
Matinicus, Maine

Matinicus Isle Plantation
Matinicus, Maine



ilagas4413 Date Saved: 9/29/2026 11:30 AM Date Exported: 9/29/2026 11:35 AM



Legend

- MHHW (9.3 ft)
- HAsT (10.3 ft)
- 1% Annual Chance SWEL (12.7 ft)
- 5-ft elevation contours



Notes:
All Elevations in NAVD88. NAVD88 +5.3 = MLLW
MHHW: Mean Higher High Water
MLLW: Mean Lower Low Water
HAsT: Highest Astronomical Tide

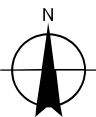
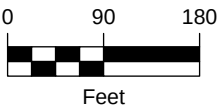
Source:
Inundation Boundaries based on USGS LIDAR

Created by: IYG 9/29/26
Checked by: LAP 9/29/26
Coordinate System:
Name: NAD 1983 2011 StatePlane Maine East FIPS 1801 Ft US

2100 INUNDATION

Matinicus Isle Plantation Working Waterfront Resilience
Project
Matinicus, Maine

Matinicus Isle Plantation
Matinicus, Maine



Appendix C Harbor Road Visual Renderings

MATINICUS ISLE SHORELINE RESILIENCE

BIRD'S EYE VIEW EXISTING

Tandem



Tandem
Landscape
Architects

BIRD'S EYE VIEW PROPOSED

Tandem



Elevated Gravel Road

Maintain Existing Access Road

Lawn Area

Stone Armor with Native Planting

Stone Armor

15' (BFE)

8.7' (2070 HAT)

6.3' (HAT)

5.3' (MHHW)

Tandem
Landscape
Architects

SECTION PROPOSED

