

Appendices

Overview Map of Wastewater Treatment Facilities

Wastewater Treatment Facility Plan and Profile

Pump Station Inundation Plan and Profile

Adaptation Strategies - Cost Considerations Matrix

FEMA Flood Insurance Rate Maps

Reference Resources

Wastewater Treatment Plant		Order of Magnitude Costs			General Considerations
Adaptation Strategy	BFE +3-FT + 1-FT SLR	BFE + 3-FT + 2-FT SLR	BFE + 6 Ft + 3-FT SLR	Comments	
Do Nothing				No pre-emptive capital improvement costs. Damage / Repair costs could be significant.	
Elevate Structures – Influent PS #6	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.	
Elevate Structures – Scum Well PS	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.	
Elevate Structures – Garage (Equip. & Tools)	\$\$	\$\$	\$\$	Elevation of structures, tools and equipment in the garage expected to be mounted higher on interior walls of the building. Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.	
Elevate Structures – Administration Building	\$\$\$	\$\$\$	\$\$\$	New pile supported or flood vent foundation wall construction with occupied space elevated above. Costs for ADA ramp versus man lift are comparable. Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.	
Waterproofing Structure – Process Building	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios. Structures are already designed for waterproofing of the interior wall surfaces. This measure is to prevent floodwater from penetrating the exterior of the walls and potentially causing structural damage.	
Waterproofing Structure – Sludge Storage Tank	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios. Structures are already designed for waterproofing of the interior wall surfaces. This measure is to prevent floodwater from penetrating the exterior of the walls and potentially causing structural damage.	
Waterproofing Structure – Chlorine Contact Tanks	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios. Structures are already designed for waterproofing of the interior wall surfaces. This measure is to prevent floodwater from penetrating the exterior of the walls and potentially causing structural damage.	
Waterproofing Structure – Sequencing Back Reactors	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios. Structures are already designed for waterproofing of the interior wall surfaces. This measure is to prevent floodwater from penetrating the exterior of the walls and potentially causing structural damage.	
Flood Proof Structures – Collection System SMHs	\$	\$	\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.	
Flood Proof Structures – SBR Septage Receiving and Area	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.	
Flood Proof Structures – Metering MH	\$	\$	\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.	

Order of Magnitude Costs are Represented as Follows: \$ = 1,000 - \$10,000 \$\$ = \$10,000 - \$100,000 \$\$\$ = \$100,000 - \$1,000,000 \$\$\$\$ = \$1,000,000 to \$25,000,000

Wastewater Treatment Plant (Cont.)

Order of Magnitude Costs

General Considerations

Adaptation Strategy	BFE +3-FT + 1-FT SLR	BFE + 3-FT + 2-FT SLR	BFE + 6 Ft + 3-FT SLR	Comments
Temporary Flood Protection of Building Penetrations (Doors & Windows) – Process Building	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.
Temporary Flood Protection of Building Penetrations (Doors & Windows) - Garage	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.
Temporary Flood Protection of Building Penetrations (Doors & Windows) - Garage	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.
Temporary Flood Protection of Building Penetrations (Doors & Windows) – Admin. Bldg.	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.
Increase Emergency Power Generation	\$\$	\$\$	\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios.
Shoreline Stabilization	\$\$\$	\$\$\$	\$\$\$	Heavy riprap of the shoreline along the northern side of the treatment facility, whether in combination or not with a sea wall system.
Barrier Protection (Sea Walls and Flood Gates)	\$\$\$ - \$\$\$\$	\$\$\$ - \$\$\$\$	\$\$\$ - \$\$\$\$	
Relocation of the WWTP	\$\$\$\$	\$\$\$\$	\$\$\$\$	

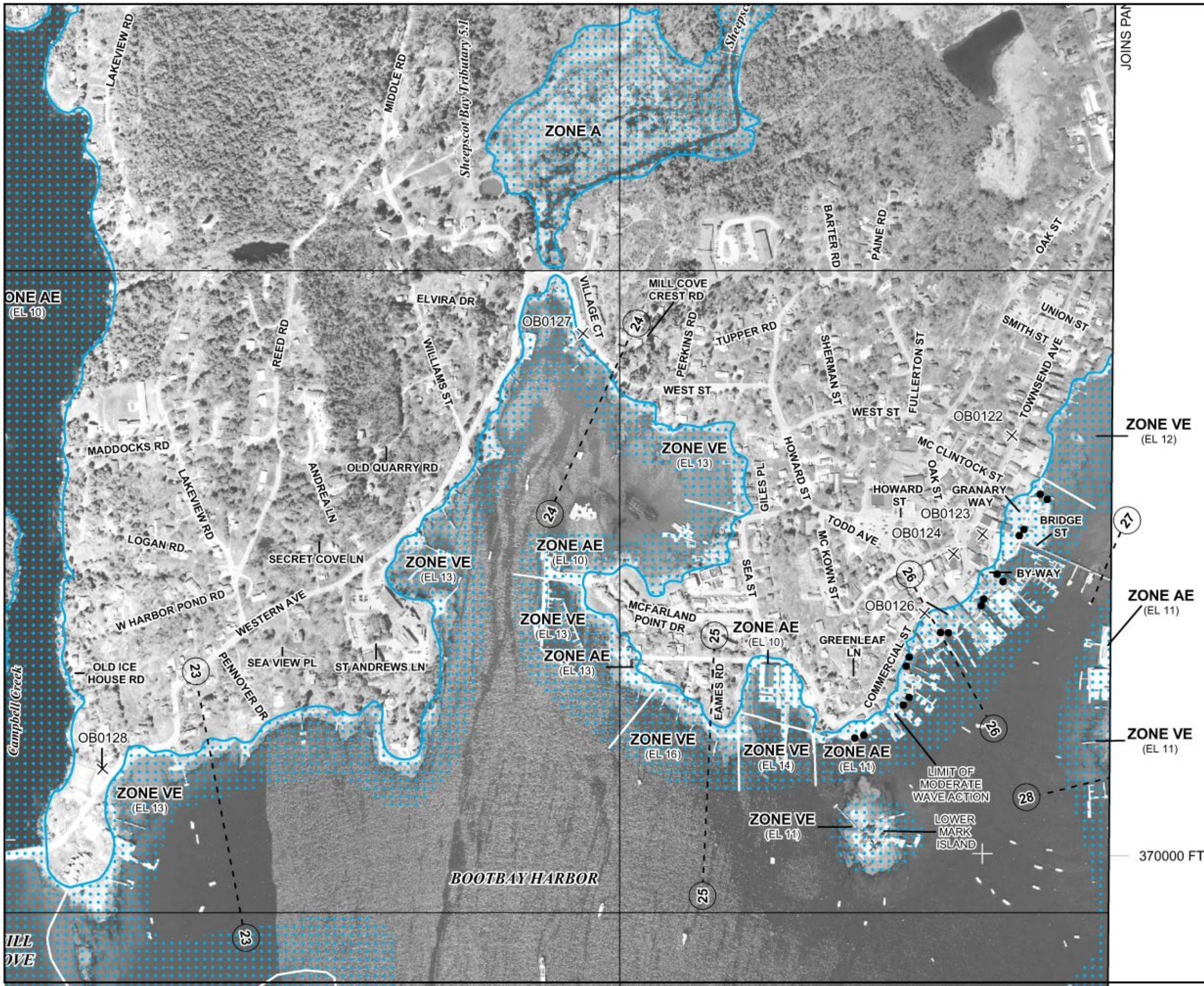
Pump Stations


Order of Magnitude Costs

General Considerations

Adaptation Strategy	BFE +3-FT + 1-FT SLR	BFE + 3-FT + 2-FT SLR	BFE + 6 Ft + 3-FT SLR	Comments
Do Nothing				No pre-emptive capital improvement costs. Damage / Repair costs could be significant.
Add Backup Generator - PS# 15, PS #13, PS #12, PS #2 and PS #7	\$\$ - \$\$\$	\$\$ - \$\$\$	\$\$ - \$\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios. Costs most likely to vary depending on land acquisition needs and if a support structure is needed, which type is selected.
Elevate electrical and control panels – All Pump Stations	\$\$ - \$\$\$	\$\$ - \$\$\$	\$\$ - \$\$\$	Costs are expected to be on the same order of magnitude for each of the three flood event planning scenarios. Costs can vary depending on the construction materials / aesthetics of the structure.
Abandon				No pre-emptive capital improvement costs.

Order of Magnitude Costs are Represented as Follows: \$ = 1,000 - \$10,000 \$\$ = \$10,000 - \$100,000 \$\$\$ = \$100,000 - \$1,000,000 \$\$\$\$ = \$1,000,000 to \$25,000,000





MAP SCALE 1" = 500'

250 0 500 1000 FEET METERS

NFIP

PANEL 0432D

FIRM

FLOOD INSURANCE RATE MAP

LINCOLN COUNTY, MAINE

(ALL JURISDICTIONS)


PANEL 432 OF 525

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOOTHBAY HARBOR, TOWN OF	230213	0432	D
BOOTHBAY, TOWN OF	230212	0432	D
SOUTHPORT, TOWN OF	230221	0432	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

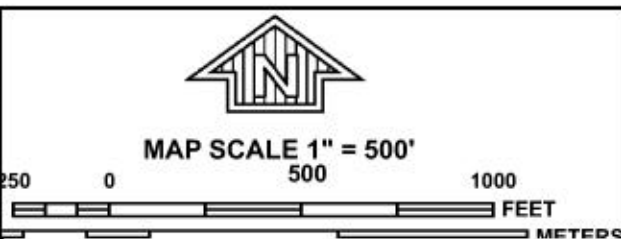
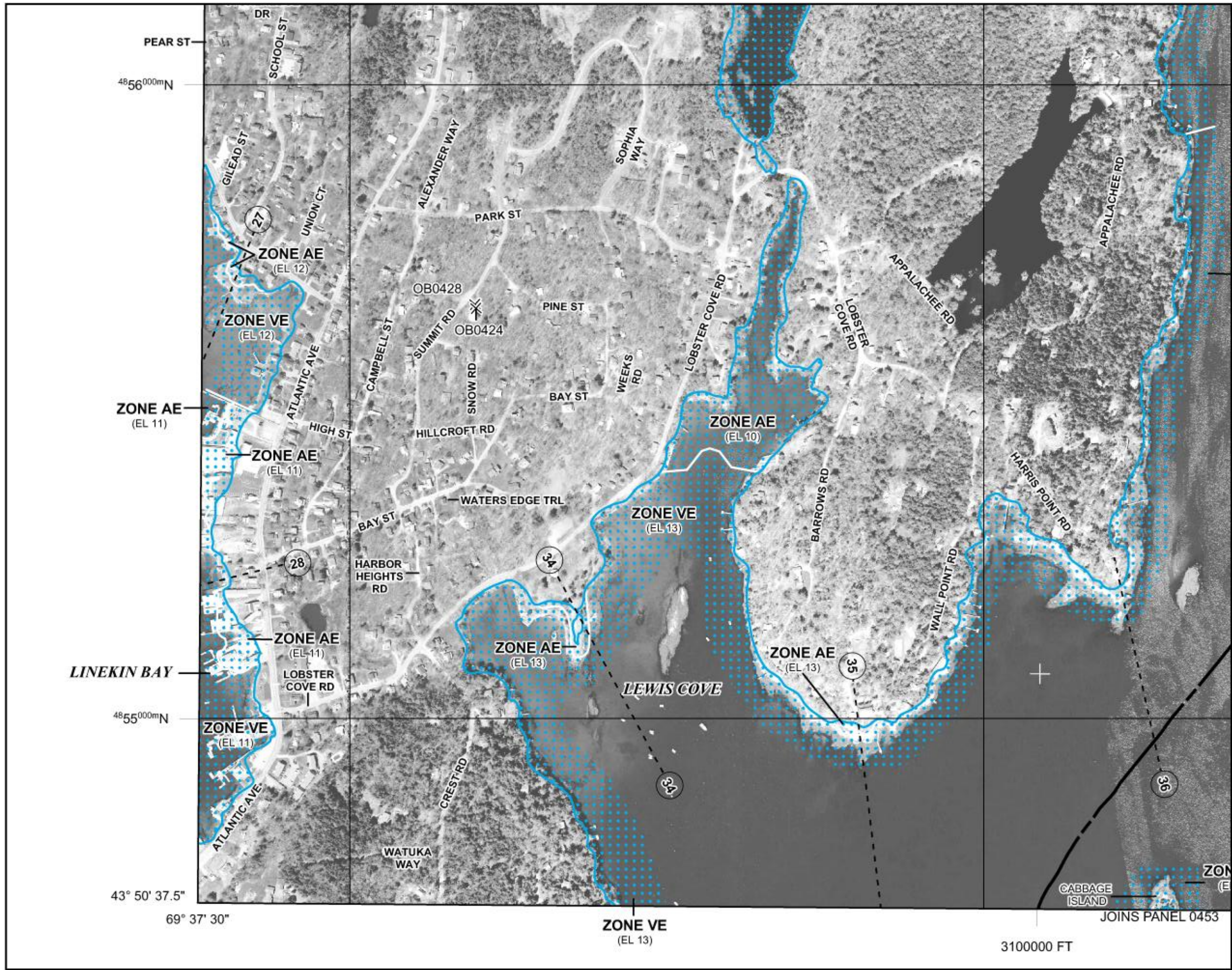



MAP NUMBER
23015C0432D

EFFECTIVE DATE
JULY 16, 2015

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov





NATIONAL FLOOD INSURANCE PROGRAM


PANEL 0451D

FIRM
FLOOD INSURANCE RATE MAP
LINCOLN COUNTY,
MAINE
(ALL JURISDICTIONS)

PANEL 451 OF 525
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOOTHBAY HARBOR, TOWN OF	230213	0451	D
BOOTHBAY, TOWN OF	230212	0451	D



MAP NUMBER
23015C0451D
EFFECTIVE DATE
JULY 16, 2015
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Reference Resources:

The following resource information supporting this report is as follows:

Sea, Lake, and Overland Surges for Hurricanes (SLOSH)

<http://www.nhc.noaa.gov/surge/slosh.php>

NOAA Tides and Currents

<https://tidesandcurrents.noaa.gov/>

USACOE Sea Level Rise Calculator

<http://www.corpsclimate.us/ccaceslcurves.cfm>

MaineDEP Highest Annual Tide Level for 2016

<https://www1.maine.gov/dep/land/slz/predictions.pdf>

FEMA Flood Zone

<https://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>

New England Interstate Water Pollution Control Commission

<http://www.neiwpcc.org/>

Maine Geological Survey

<http://www.maine.gov/dacf/mgs/>

EPA Flood Resilience Guide

<https://www.epa.gov/waterutilityresponse/flood-resilience-basic-guide-water-and-wastewater-utilities>

EPA Climate Resilience Evaluation and Awareness Tool (CREAT)

https://www.epa.gov/sites/production/files/2016-05/documents/creat_3_0_methodology_guide_may_2016.pdf



WRIGHT-PIERCE 
Engineering a Better Environment

Water
Wastewater
Infrastructure