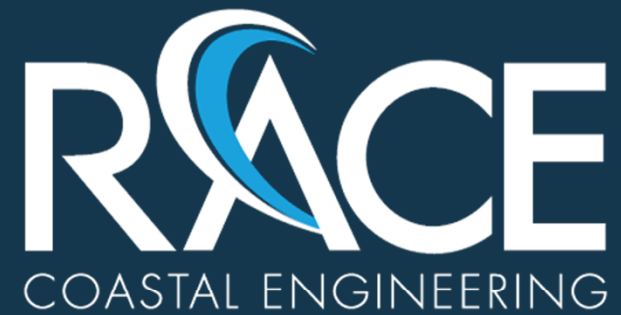
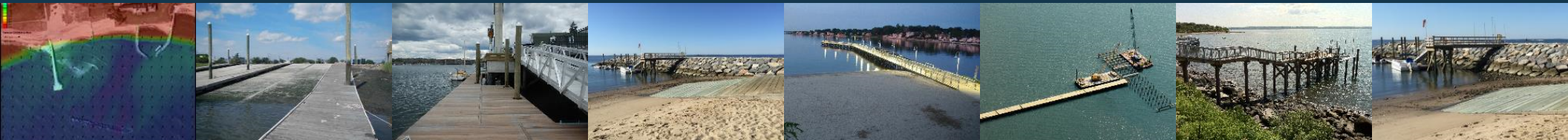


The LiMWA: Whose Line is it Anyway?



Devin Santa, PE
Azure Dee Sleicher, PE



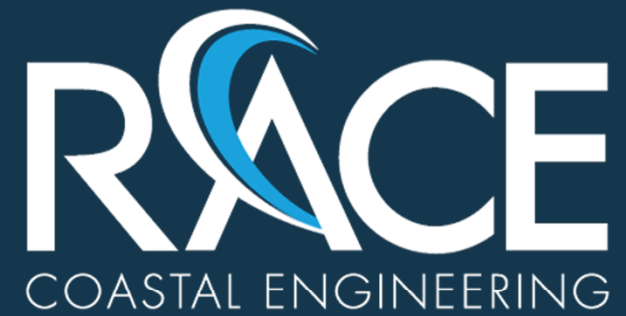
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Introduction

- What is the LiMWA?
- Regulatory Requirements
- Mapping Issues
- Challenges of Implementation



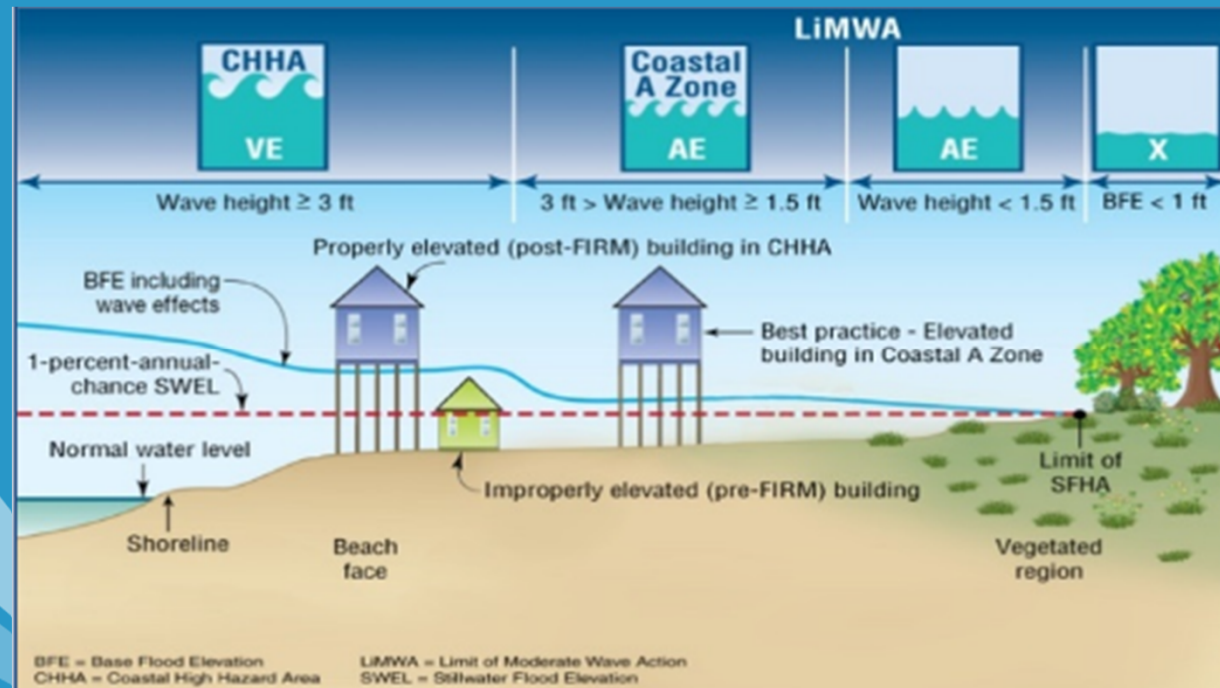
What is the LiMWA?



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Limit of Moderate Wave Action / “Coastal A” Zone

- Post-storm studies have shown that waves as small as 1.5’ can significantly damage buildings
- FEMA developed the LiMWA defined as $3' > \text{Waves} \geq 1.5'$
- Wave “breaks” when depth is 0.78 of the wave height
 $H_b = 0.78 d$, where H_b is breaking wave height and d is water depth
- $\pm 1.9'$ of water depth required for 1.5’ wave



Source: FEMA 2017

National Flood Hazard Layer FIRMette



73°11'11"W 41°10'10"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE)
Zone A, V, A99
 - With BFE or Depth *Zone AE, AO, AH, VE, AR*
 - Regulatory Floodway

- OTHER AREAS OF FLOOD HAZARD**
 - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
 - Future Conditions 1% Annual Chance Flood Hazard *Zone X*
 - Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
 - Area with Flood Risk due to Levee *Zone D*

- OTHER AREAS**
 - NO SCREEN Area of Minimal Flood Hazard *Zone X*
 - Effective LOMRs
 - Area of Undetermined Flood Hazard *Zone D*

- GENERAL STRUCTURES**
 - Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall

- CROSS SECTIONS**
 - 29.2 Cross Sections with 1% Annual Chance Water Surface Elevation
 - 17.5 Coastal Transect
 - Base Flood Elevation Line (BFE)
 - Limit of Study
 - Jurisdiction Boundary

- OTHER FEATURES**
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature

- MAP PANELS**
 - Digital Data Available
 - No Digital Data Available
 - Unmapped

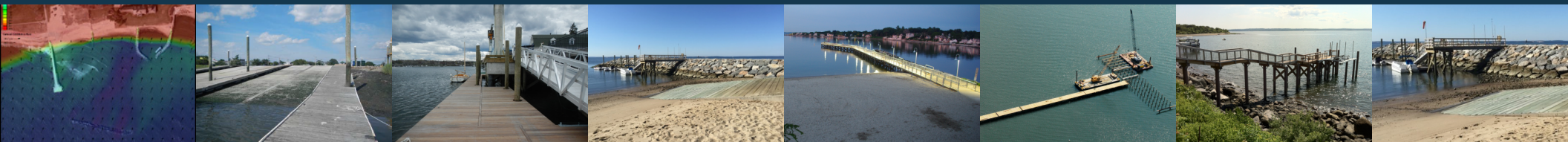
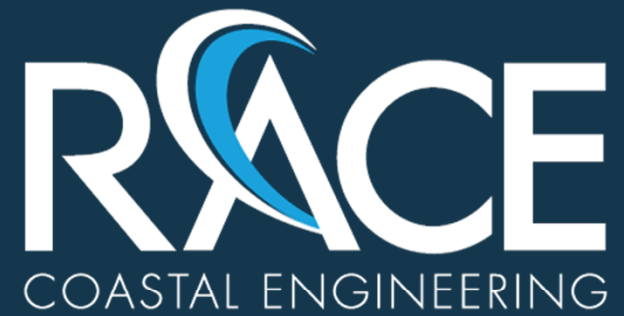
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2023 at 4:34 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



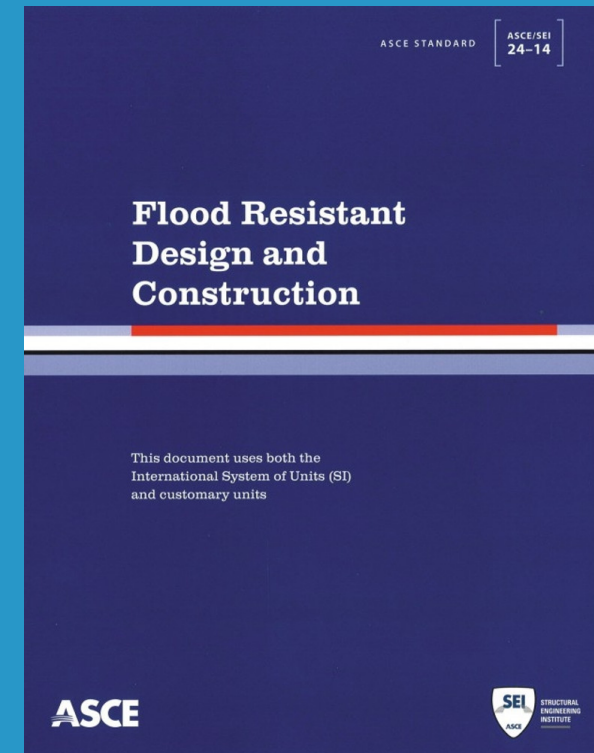
Regulatory Requirements



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Regulatory Requirements

- Not formally defined in the NFIP
- FEMA indicates the “LiMWA is an informational line...” – FEMA Fact Sheet May 2021
- Many local zoning ordinances do not define LiMWA/Coastal A or reference requirements
- Originally in 2005, communities were encouraged to adopt Zone VE standards in the Coastal A to receive CRS credits
- However, 2018 CT Building through reference to IBC through reference to ASCE 24-14 made it a requirement

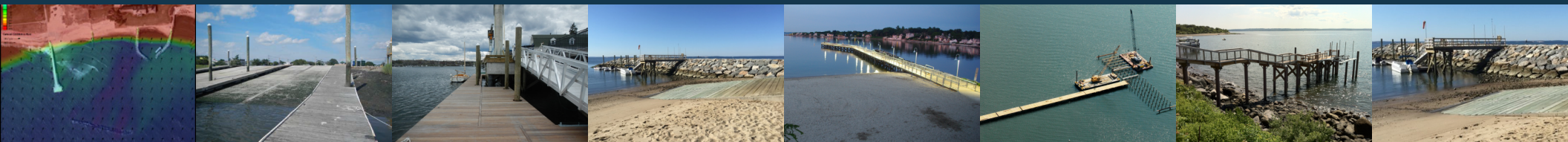
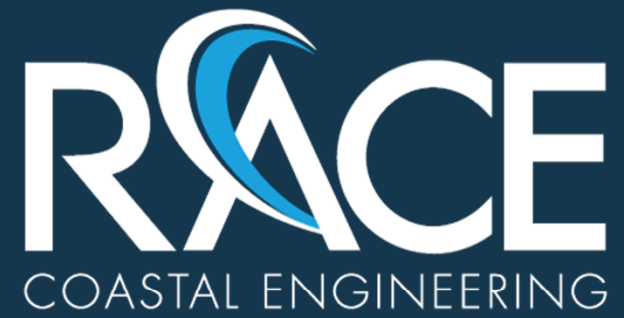


Construction Requirements

- Identical to VE Zones except for stem walls:
 - Open foundations elevated on piles or column foundations
 - Structural fill prohibited
 - Bottom of lowest horizontal structural member at or above BFE
 - Area below the BFE must meet free-of-obstruction requirements with breakaway walls and flood vents
 - Building design and construction certified by design professional

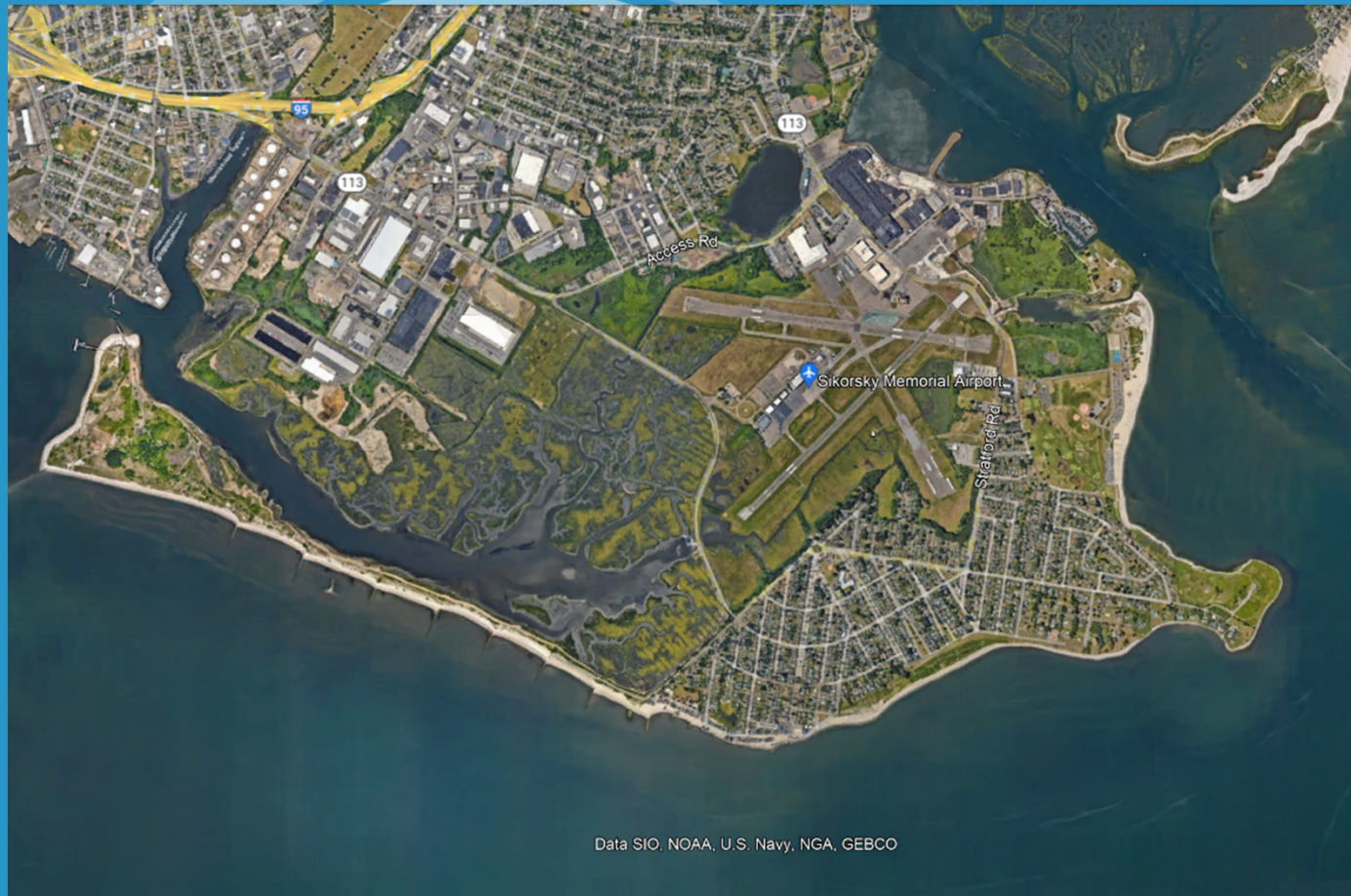


Mapping Issues



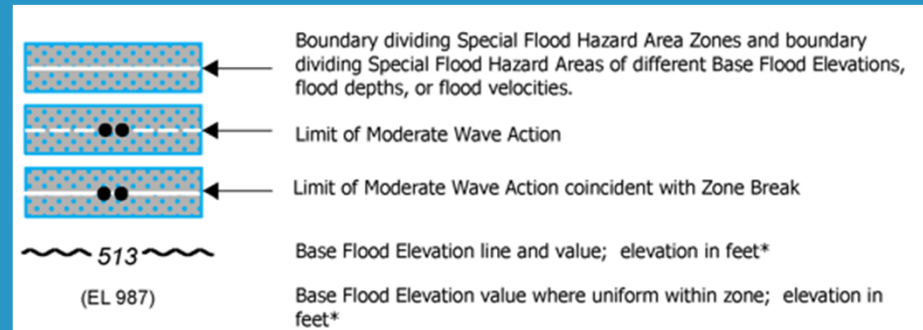
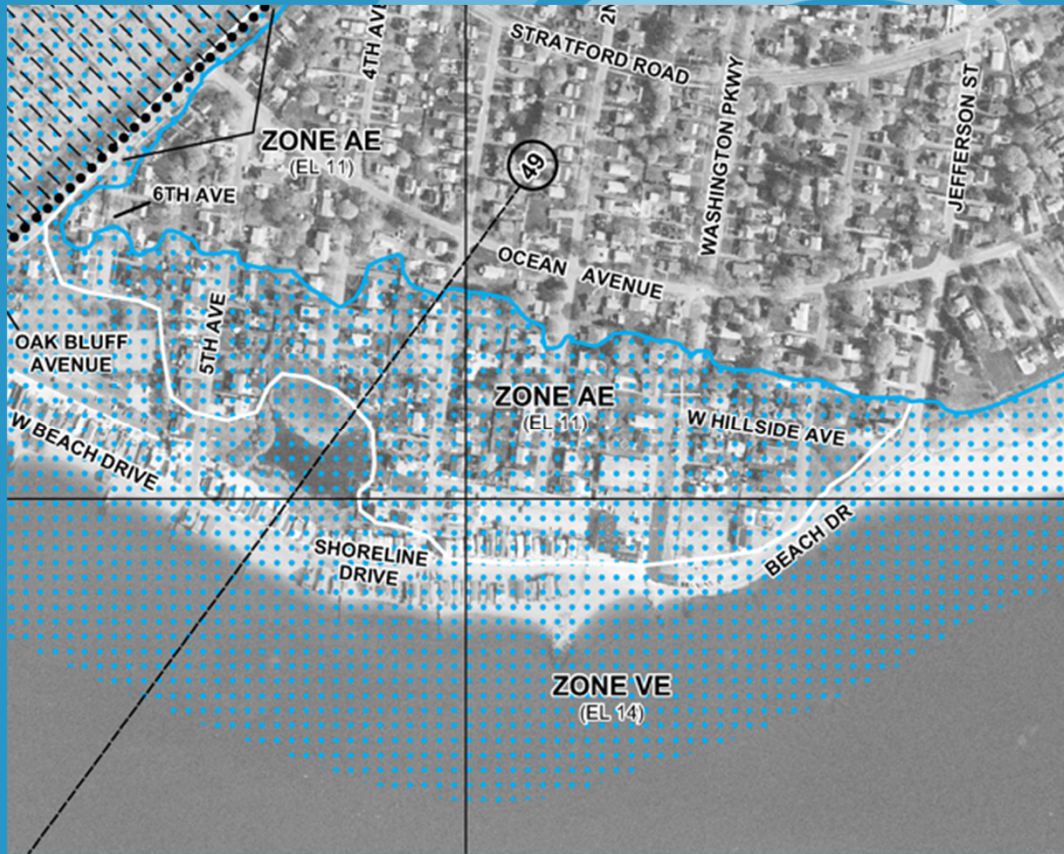
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Stratford, CT Example



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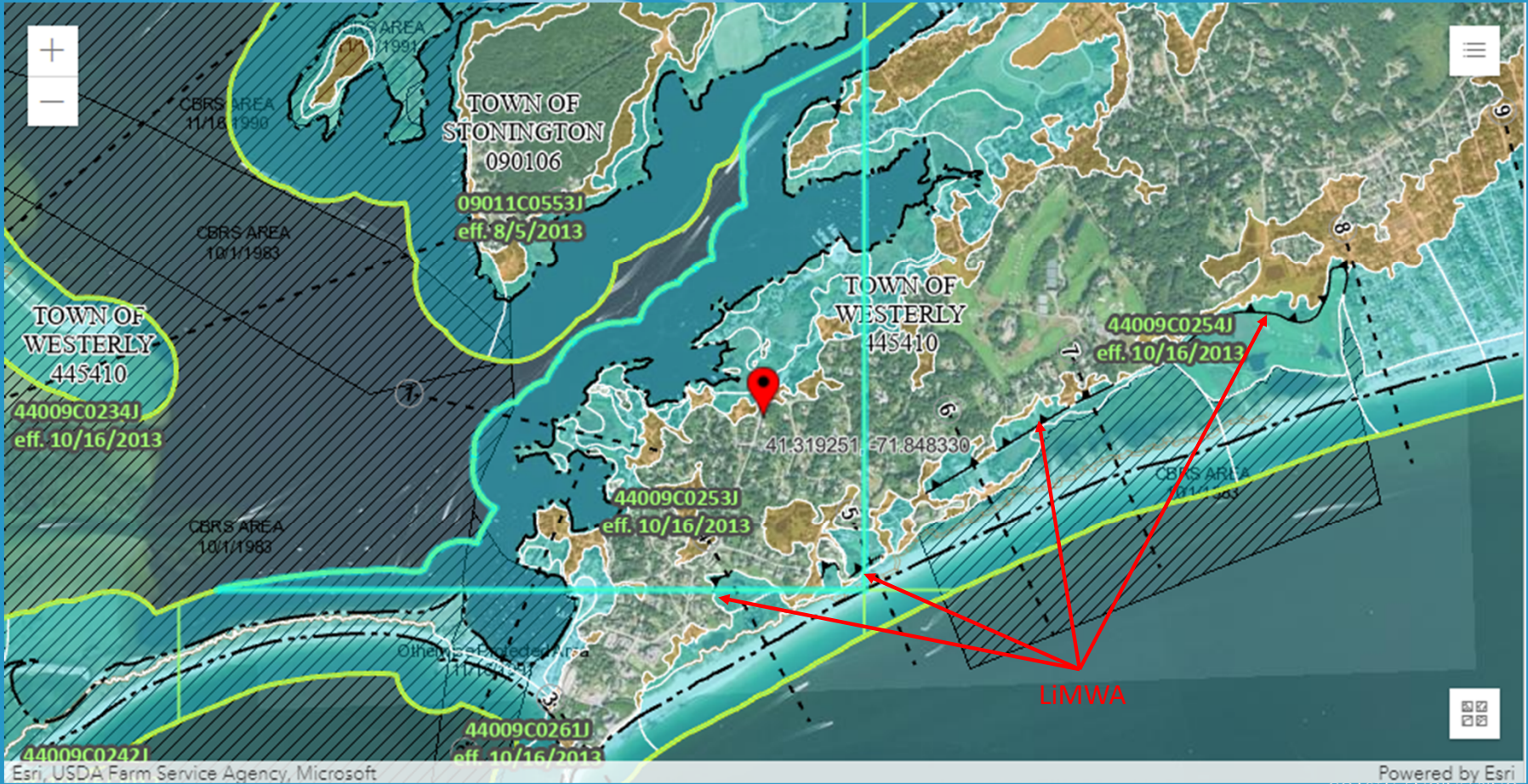
FIRM Panel from FEMA Map Service Center



FIRM Panel from FEMA Map Service Center



Westerly, RI Example



NFHL Viewer

FEMA's National Flood Hazard Layer (NFHL) Viewer with Web AppBuilder for ArcGIS

Find address or place

Zone VE (EL 13)

Zone AE (EL 13)

Zone AE (EL 12)

TOWN OF WESTERLY
445410
44009C0253J
eff. 10/16/2013

(3 of 3)

Flood Hazard Zones:AE /

DFIRM_ID	44009C
VERSION_ID	
FLD_AR_ID	44009C_2633
STUDY_TYP	NP
FLD_ZONE	AE
ZONE_SUBTY	
SFHA_TF	T
STATIC_BFE	13.00
V_DATUM	NAVD88
DEPTH	-9,999.00
LEN_UNIT	Feet
VELOCITY	-9,999.00
VEL_UNIT	
...	

Zoom to

200ft

-71.845 41.319 Degrees

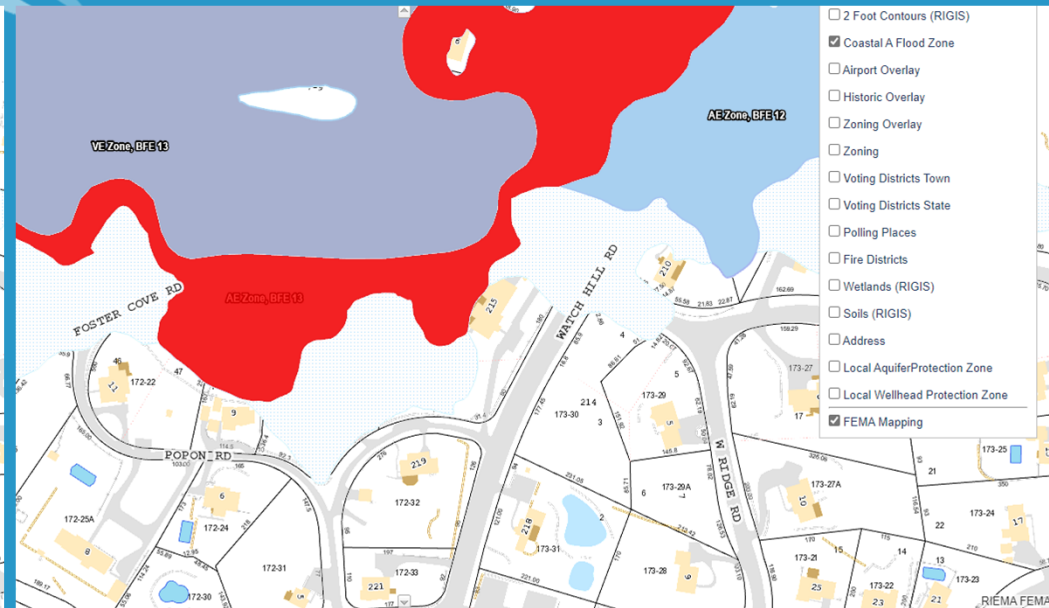
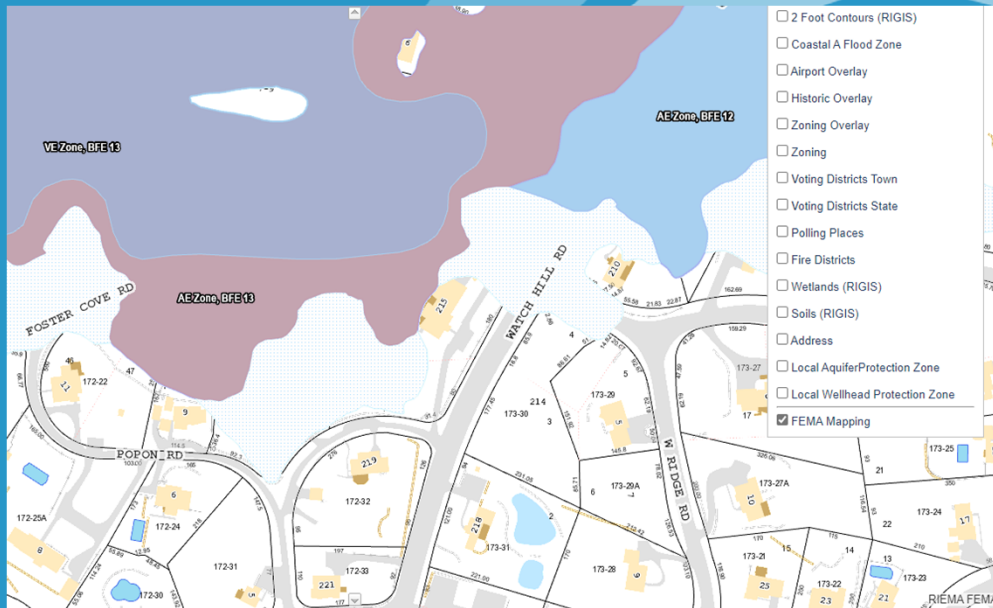
USGS, USDA | Esri, USDA Farm Service Agency

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COASTAL ENGINEERING

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Town GIS Mapping



Region 1 LiMWA Viewer



About

Welcome to the FEMA Region 1 Limit of Moderate Wave Action (LiMWA) viewer. The viewer presents the LiMWA data for all areas in New England where digital Flood Insurance Rate Map (FIRM) data is available. Unlike the FIRM panels, this viewer presents the "unbroken" LiMWA line, including areas where it coincides with VE zone boundaries (*users in Maine please see notes below). This data comes directly from the DFIRM database which is available from the FEMA Map Service Center (<https://msc.fema.gov>). This LiMWA data is current as of 10/18/2021 and will be updated by Regional staff when new data becomes available. This viewer is intended to be used as a supplemental tool to assist in understanding the location of the LiMWA line. **For official flood zone determinations please use FEMA FIRM panels located on the Map Service Center.**

*Notes for Maine users:

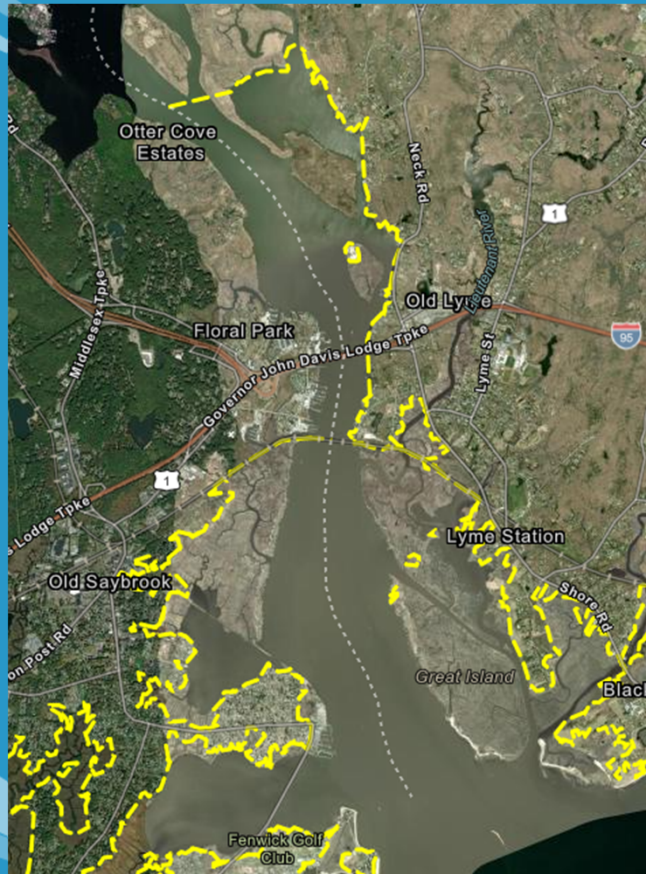
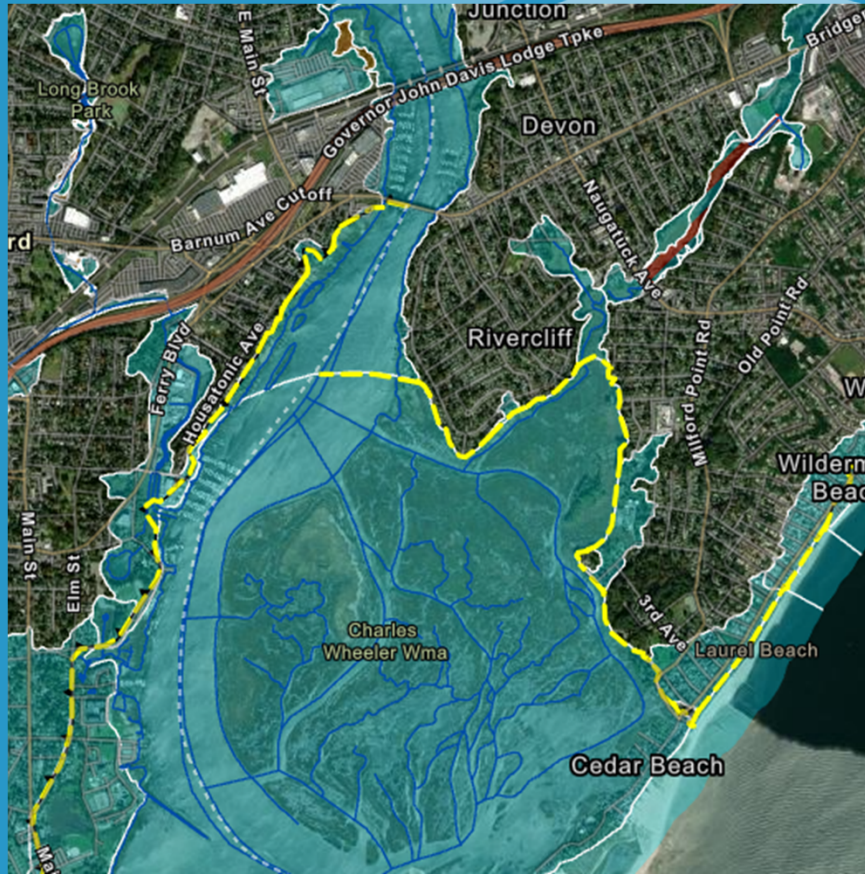
- 1) The "unbroken" LiMWA line is not available for Knox County and Waldo County, Maine. In these counties, the disconnected LiMWA lines are presented in this viewer, just as they are shown on the FEMA FIRMs and the FEMA National Flood Hazard Layer.
- 2) For York County and Cumberland County, there is no digital FIRM data available, so no LiMWA lines are depicted for these counties.

FEMA Map Service Center & NFHL vs. LiMWA Viewer

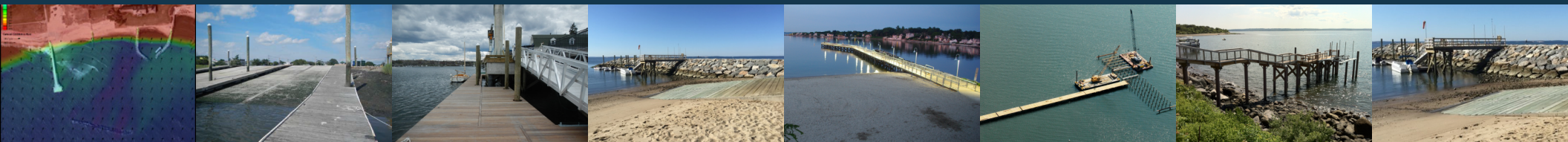
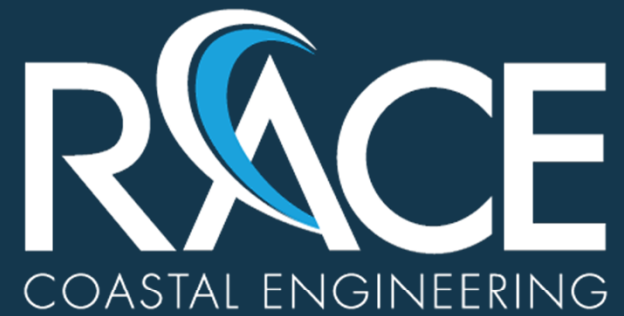


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Region 1 LiMWA Viewer



Challenges of Implementation



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Challenges of Implementation

- Not formally defined in the NFIP
- FEMA indicates the “LiMWA is an informational line”
- Difficulty in determining where it is on the maps
- FEMA’s mapping is inconsistent
- Most local ordinances reference the paper maps; not the GIS
- Most local ordinances are silent to requirements for the LiMWA
- FEMA won’t issue a Letter of Map Revision (LOMR) to relocate the LiMWA only; need to make some other change to the map
- FEMA will consider a CLOMR/LOMR to elevate and remove an area out of the LiMWA above the BFE although building code prohibits use of structural fill for support

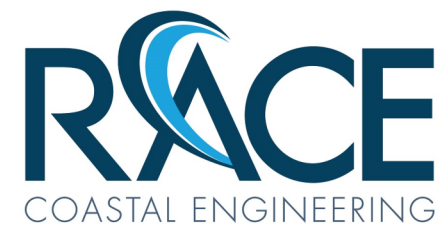


An aerial photograph of a coastal area. On the left, a long, narrow breakwater extends into the dark blue ocean. To the right, a wide, sandy beach curves along the coast. In the distance, a small town or village is visible on the shore. The sky is overcast with light grey clouds.

Thank You!

Devin Santa, PE
devin@racecoastal.com
203-377-0663

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The logo for RACE Coastal Engineering. The word "RACE" is written in a large, bold, blue sans-serif font. A stylized blue wave graphic is integrated into the letter 'A'. Below "RACE", the words "COASTAL ENGINEERING" are written in a smaller, blue, all-caps sans-serif font.

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