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# Flood Mitigation Design to Advance Groton Long Point's 5 Pillars of Resilience

## 30% Level Design of Flood Mitigation Alternatives

**PRESENTED BY:**  
Wayne Cobleigh, CPSM  
Michael Gardner, WEDG  
GZA GeoEnvironmental, Inc.  
Norwood, MA

# Agenda

- Grant Acknowledgement
- Project Background
- Project Work
- Challenges
- 30% Design
- Next Steps



# Grant Acknowledgement

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# Grant Acknowledgement

## Grant Requirements

- ✓ “Scoping and planning services for **sustainability and resilience focused projects**”
- ✓ “**Advance a community’s efforts to** anticipate, absorb, accommodate, and recover from the effects of **natural disturbances** (e.g., sea level rise, storms and other extreme events, and human impacts)”
- ✓ **Services must advance one or more of The 2020 LISS Comprehensive Conservation and Management Plan Implementation Actions (IA)s** of focus for the Long Island Sound Resilience Assistance Programs
  1. Clean waters and healthy watersheds
  2. Thriving and abundant wildlife
  3. **Sustainable and resilient communities**
  4. Sound science and inclusive management
- ✓ **Follow the "PERSISTS" framework** adapted and adopted from Connecticut Institute for Resilience and Climate Adaptation (2020) for the Resilient Connecticut Planning Framework.
  - **P – Permittable**
  - **E – Equitable (2020) Engaged (2025)**
  - **R – Realistic**
  - **S – Safe**
  - **I – Innovative**
  - **S – Scientific**
  - **T – Transferable**
  - **S - Sustainable**

# Background

## Project Area

- Located on a peninsula, with Fishers Island Sound to the South, marsh to the North
- The GLP study area is ~0.5 mi<sup>2</sup>
  - residential development;
  - sandy beaches;
  - salt and freshwater marshes;
  - a lagoon; and
  - wooded areas with nature trails.
- GLP harbor is protected by a sandy spit (containing West Shore Ave.); the upper portion of the lagoon forms a sheltered pond (Upper Lagoon)



# Background - GLPA Climate Resiliency Plan (2023)

Plan Retain GZA and Coastal Ocean Analytics Team

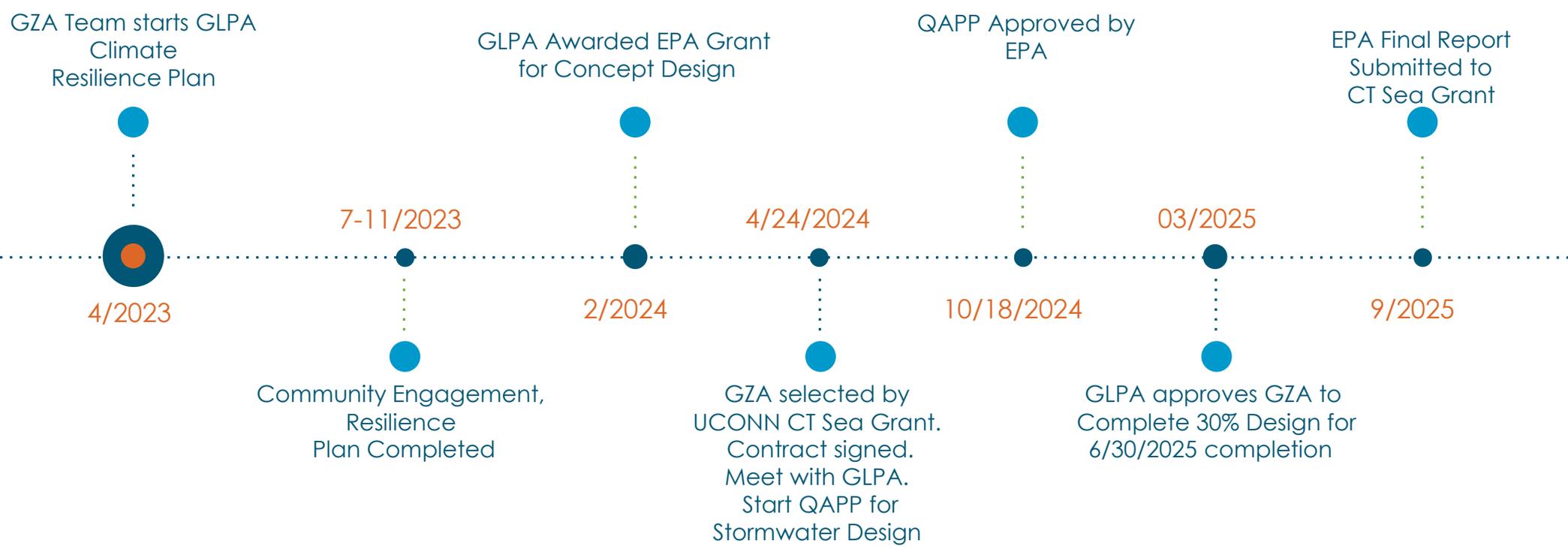
Vulnerability Assessment  
Community Engagement  
Recommendations

GLPA 5 Pillars of Resiliency  
Pursue Grants



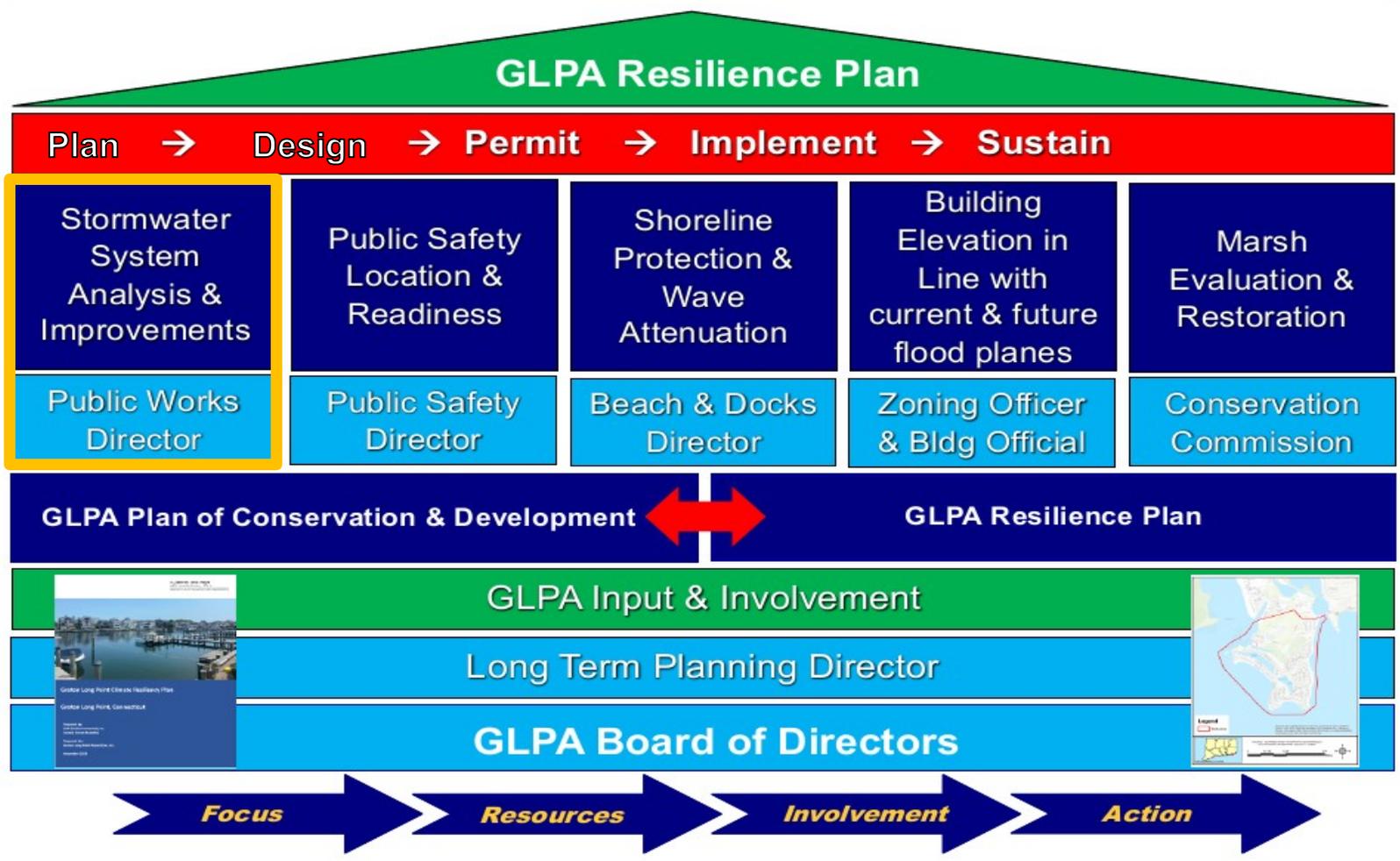
# Background – Project Timeline

## Groton Long Point Resilience Plan Results Project Progress Timeline 2023-2025



## GLPA

## Pillars of Resiliency



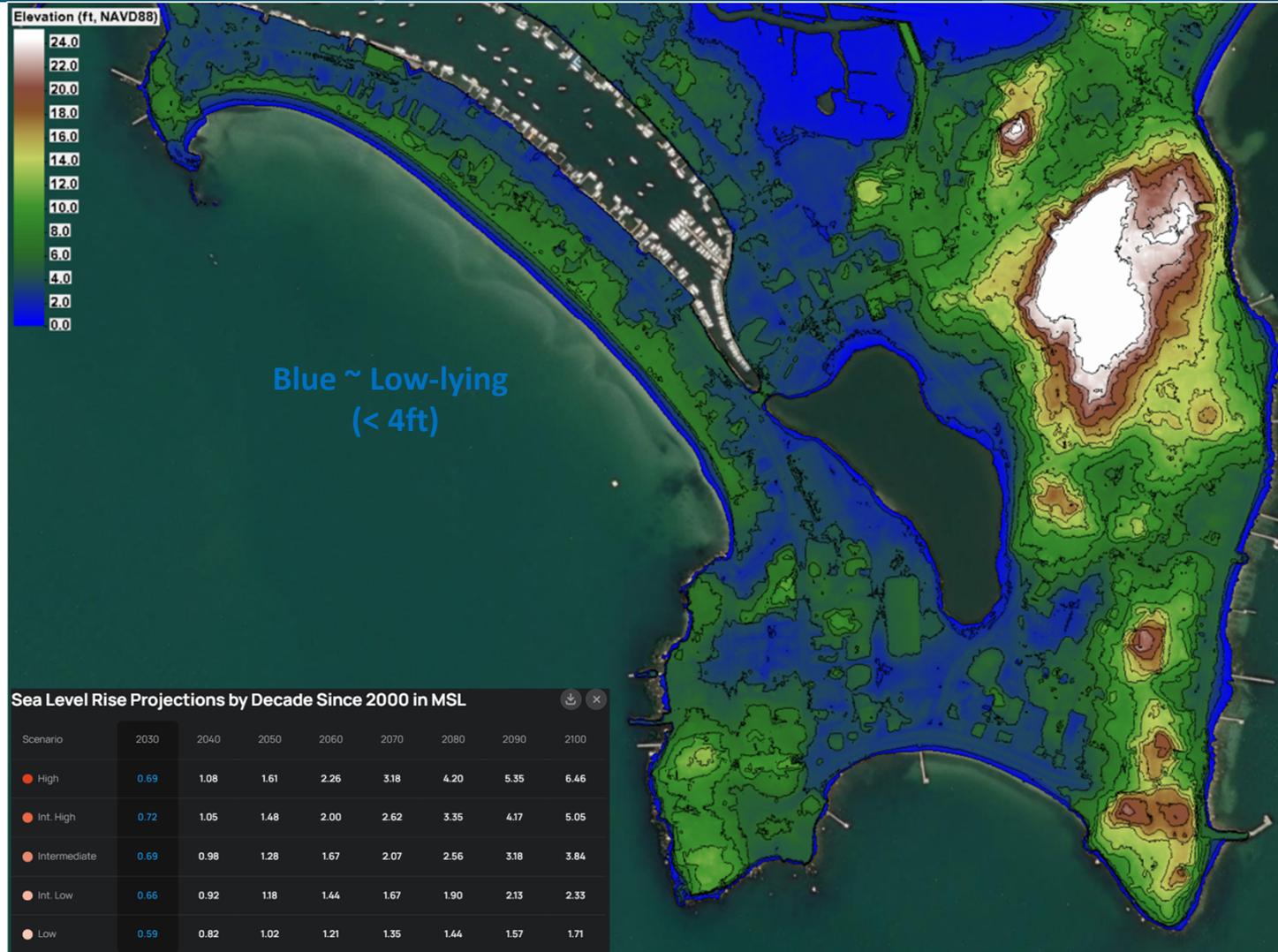
# Project Work - Metocean Data Analysis:

USACE NACCS and NOAA  
Mean Water Level (ft, NAVD88):

- MHHW 1.7
  - NOAA, present day (2025)
- 1YR 2.8 - 3.3
- 2YR 3.8 - 4.2
- 5YR 5.3
- 10YR 5.3 - 6.0

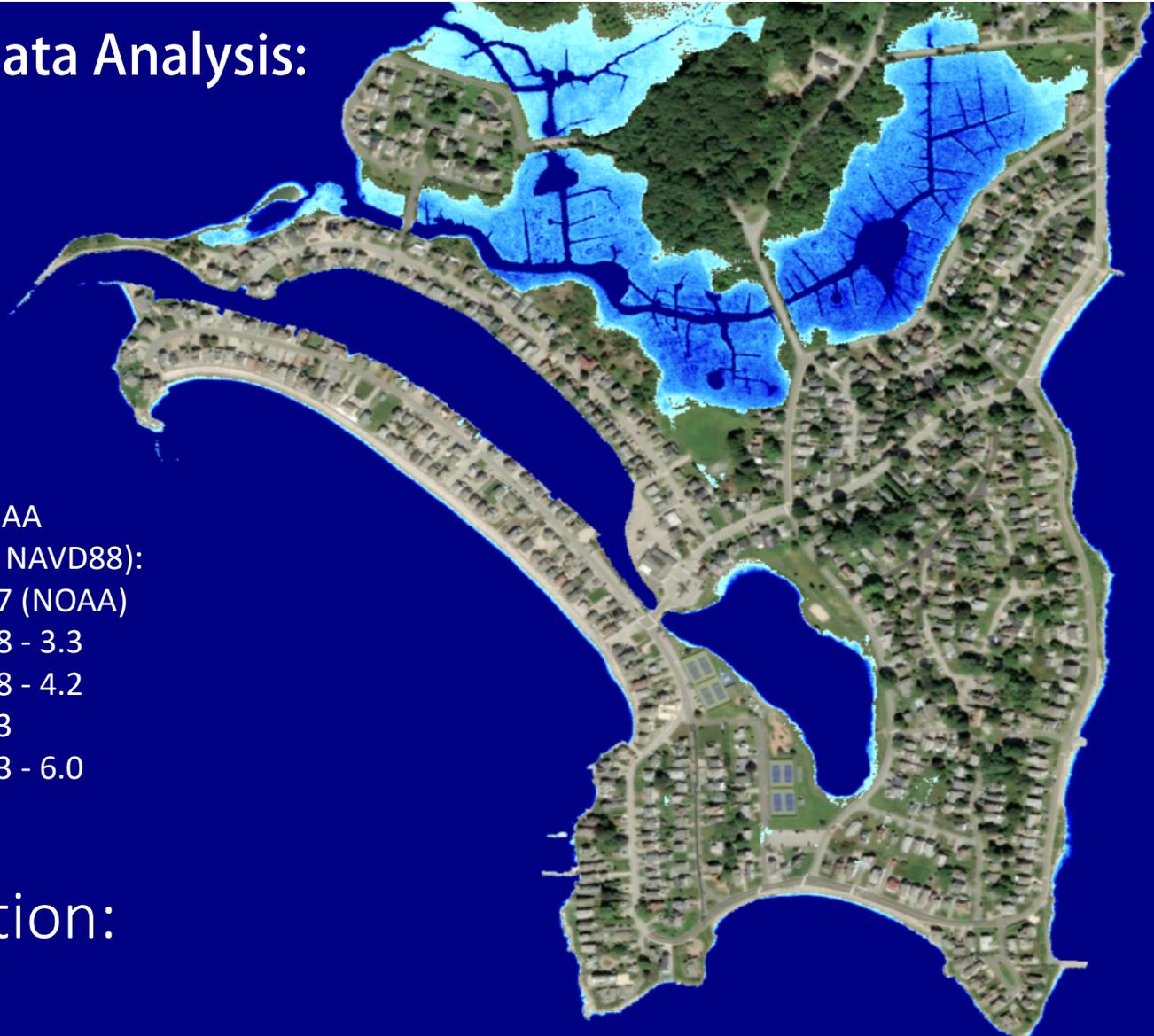
NOAA 2022 Projected  
Intermediate Sea Level Changes  
from 2030:

- 2040: + 0.3 ft
- 2050: + 0.6 ft
- 2060: + 1.0 ft
- 2070: + 1.4 ft
- 2080: + 1.9 ft



2016 CT DEM (Elevation, Feet)

# Metocean Data Analysis:



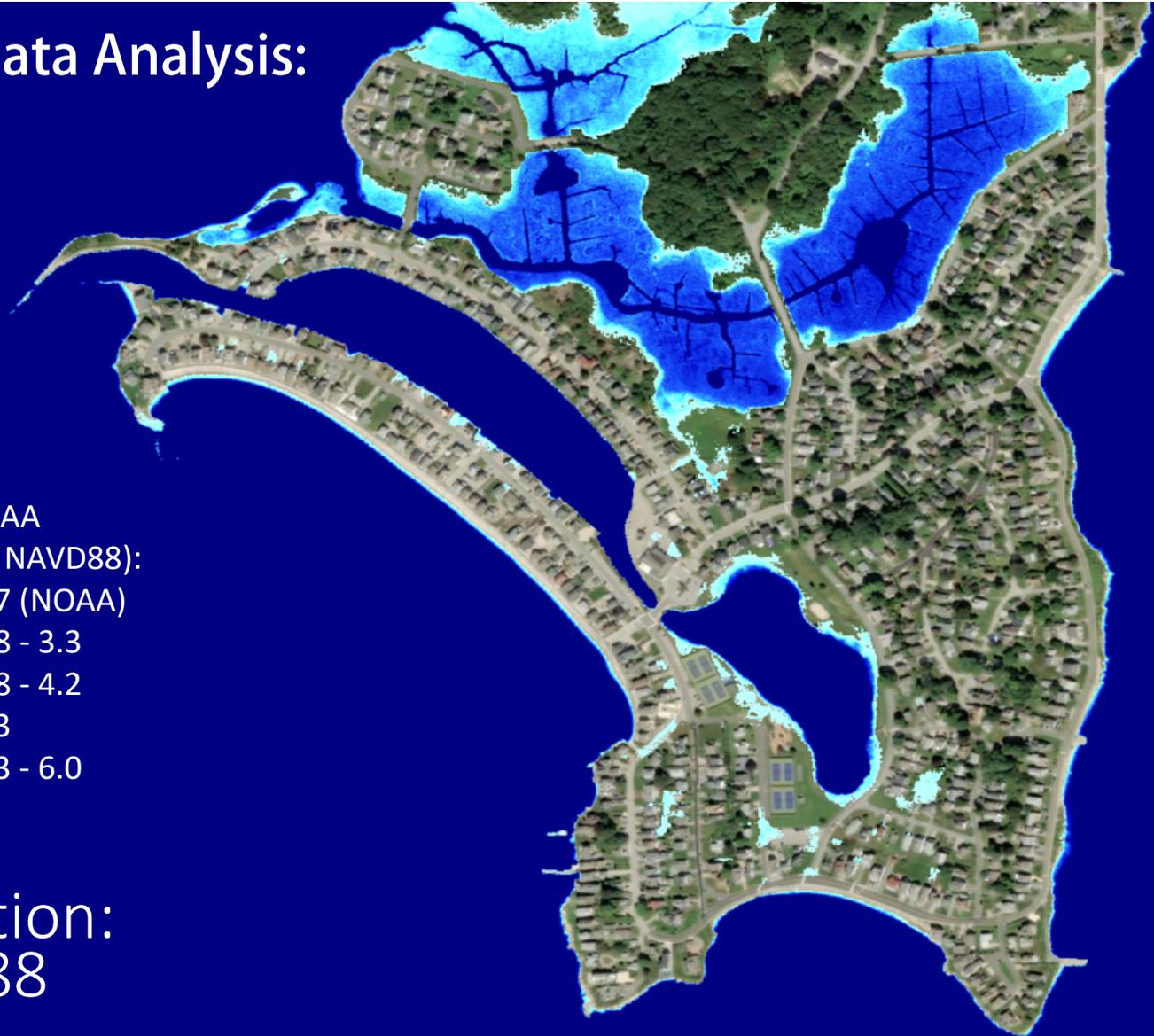
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- 1YR 2.8 - 3.3
- 2YR 3.8 - 4.2
- 5YR 5.3
- 10YR 5.3 - 6.0

Flood Elevation:  
2ft NAVD88

2016 CT DEM (Elevation, Feet)

# Metocean Data Analysis:



USACE NACCS and NOAA

Mean Water Level (ft, NAVD88):

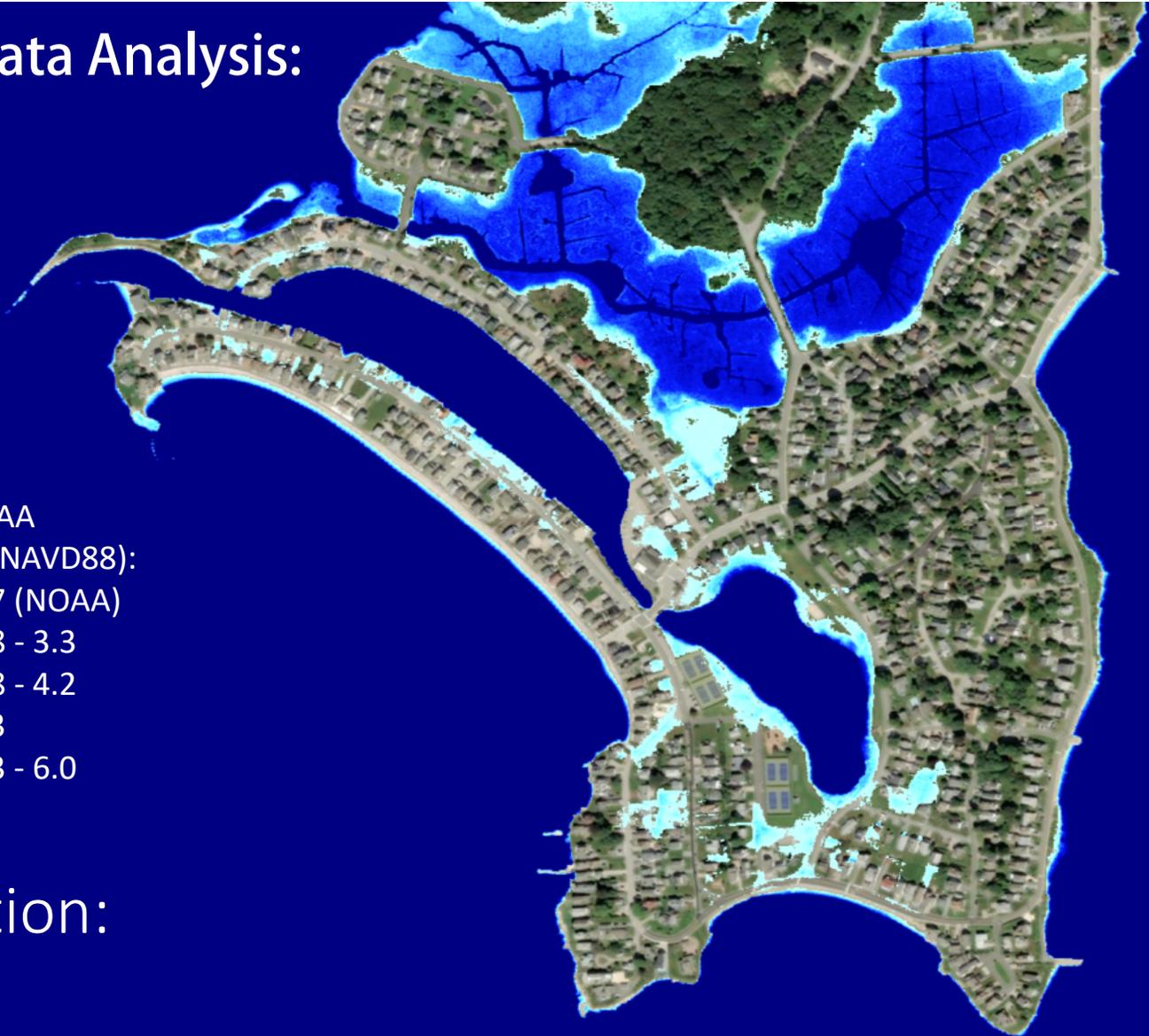
- MHHW 1.7 (NOAA)
- 1YR 2.8 - 3.3
- 2YR 3.8 - 4.2
- 5YR 5.3
- 10YR 5.3 - 6.0

Flood Elevation:  
2.5ft NAVD88

2016 CT DEM (Elevation, Feet)

# Metocean Data Analysis:

3.0  
2.5  
2.0  
1.5  
1.0  
0.5  
0.0



USACE NACCS and NOAA

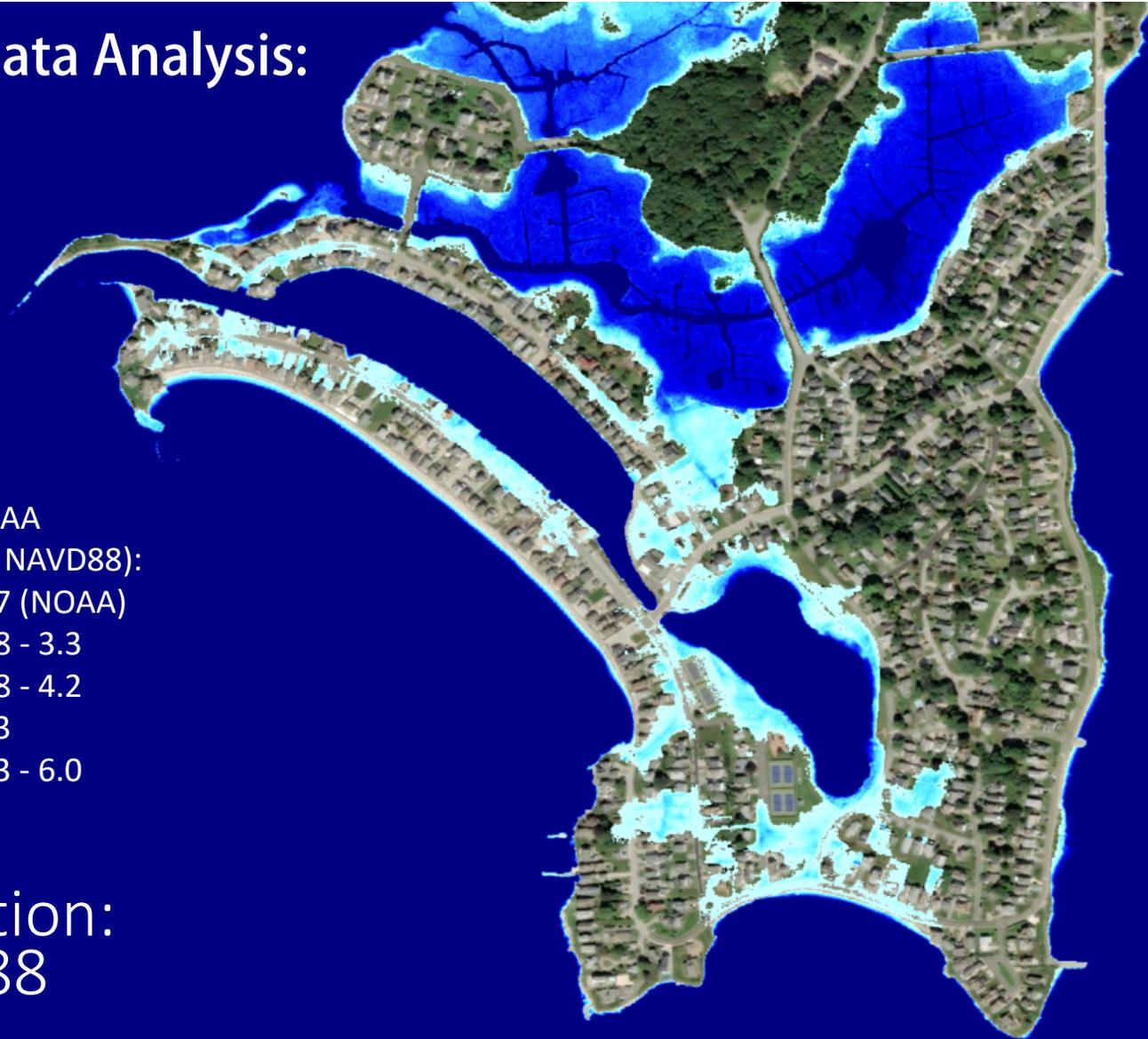
Mean Water Level (ft, NAVD88):

- MHHW 1.7 (NOAA)
- 1YR 2.8 - 3.3
- 2YR 3.8 - 4.2
- 5YR 5.3
- 10YR 5.3 - 6.0

Flood Elevation:  
3ft NAVD88

2016 CT DEM (Elevation, Feet)

# Metocean Data Analysis:



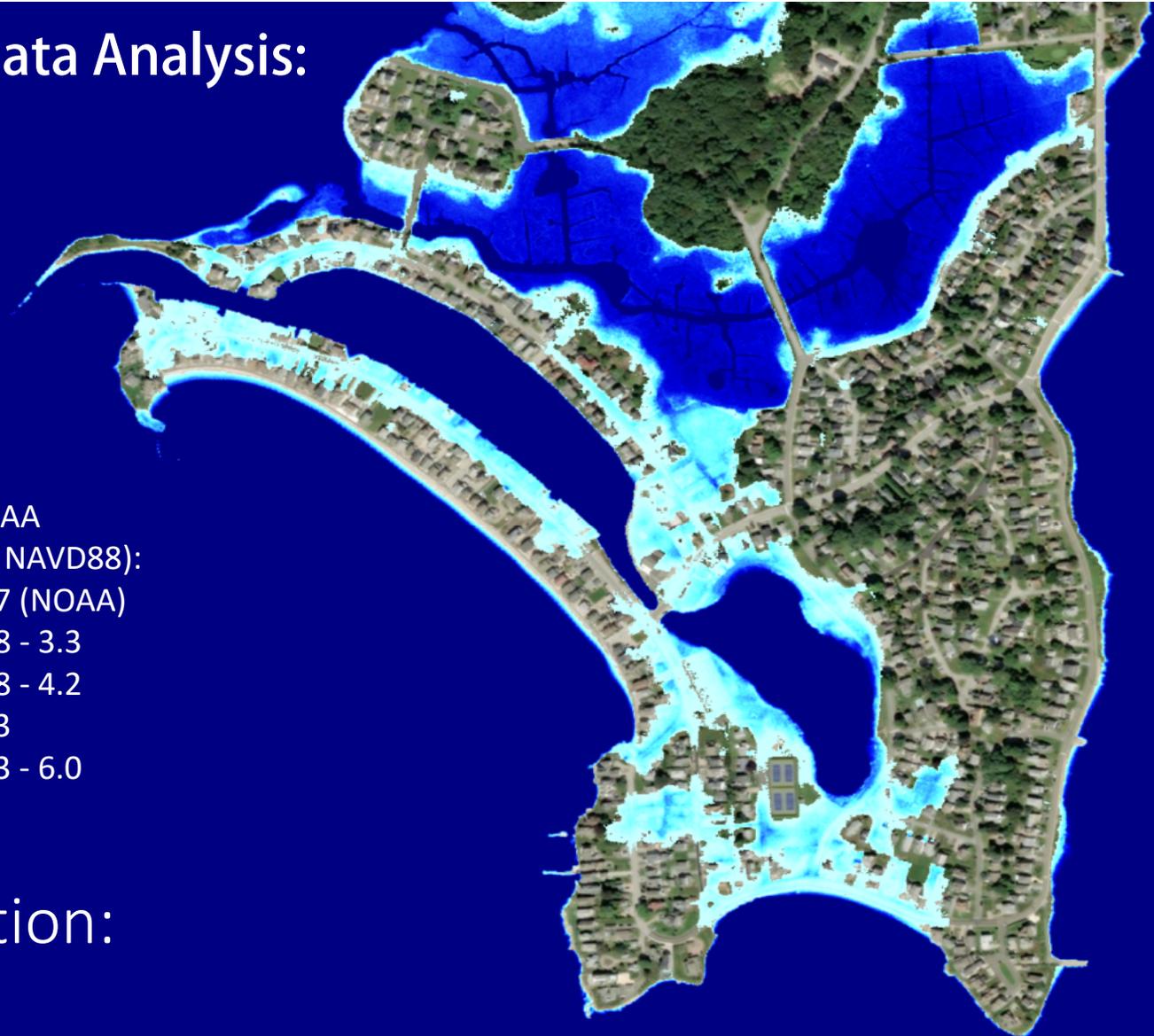
USACE NACCS and NOAA  
Mean Water Level (ft, NAVD88):

- MHHW 1.7 (NOAA)
- 1YR 2.8 - 3.3
- 2YR 3.8 - 4.2
- 5YR 5.3
- 10YR 5.3 - 6.0

Flood Elevation:  
3.5ft NAVD88

2016 CT DEM (Elevation, Feet)

# Metocean Data Analysis:



USACE NACCS and NOAA  
Mean Water Level (ft, NAVD88):

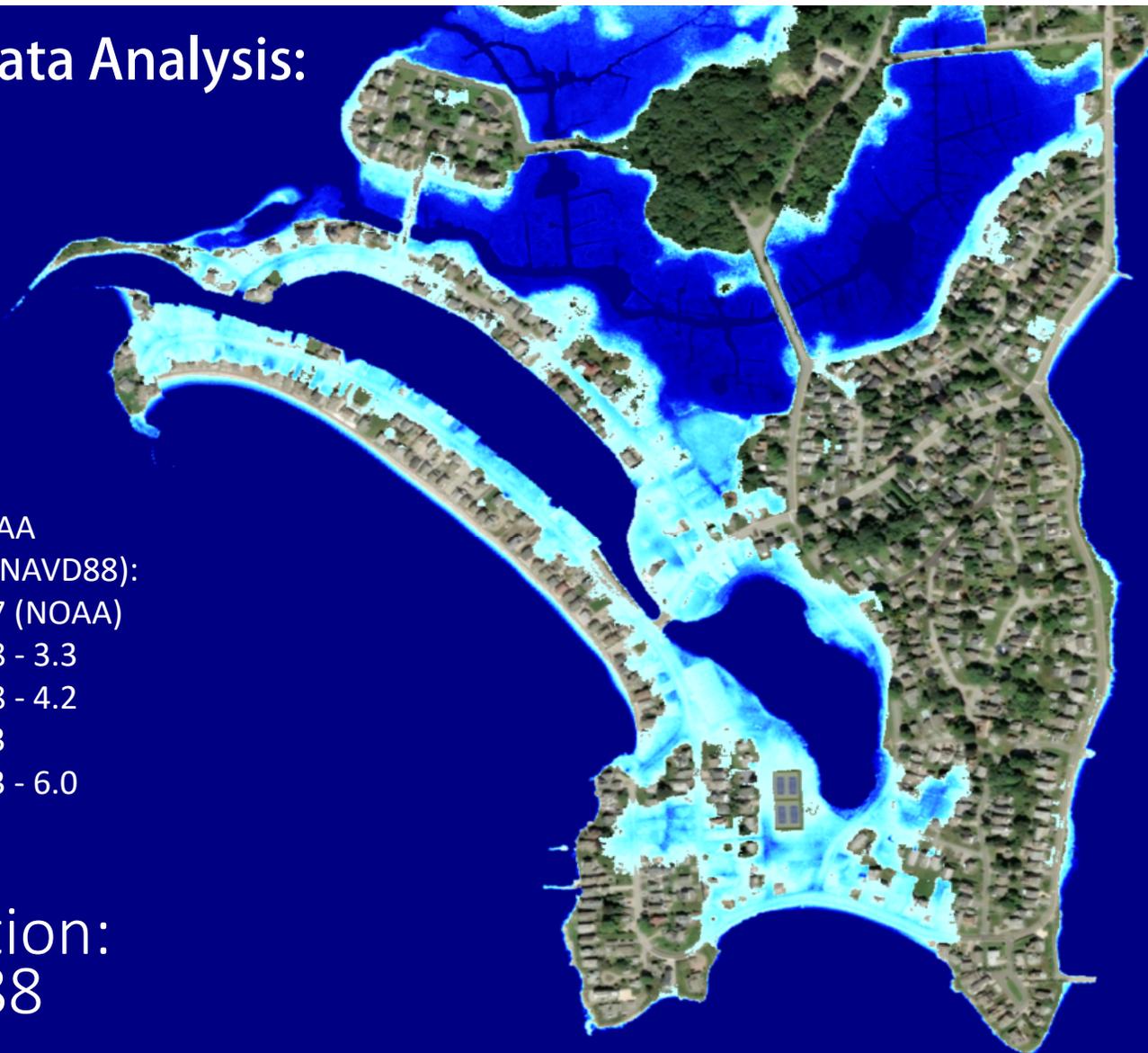
- MHHW 1.7 (NOAA)
- 1YR 2.8 - 3.3
- 2YR 3.8 - 4.2
- 5YR 5.3
- 10YR 5.3 - 6.0

Flood Elevation:  
4ft NAVD88

2016 CT DEM (Elevation, Feet)

# Metocean Data Analysis:

4.5  
4.0  
3.5  
3.0  
2.5  
2.0  
1.5  
1.0  
0.5  
0.0



USACE NACCS and NOAA

Mean Water Level (ft, NAVD88):

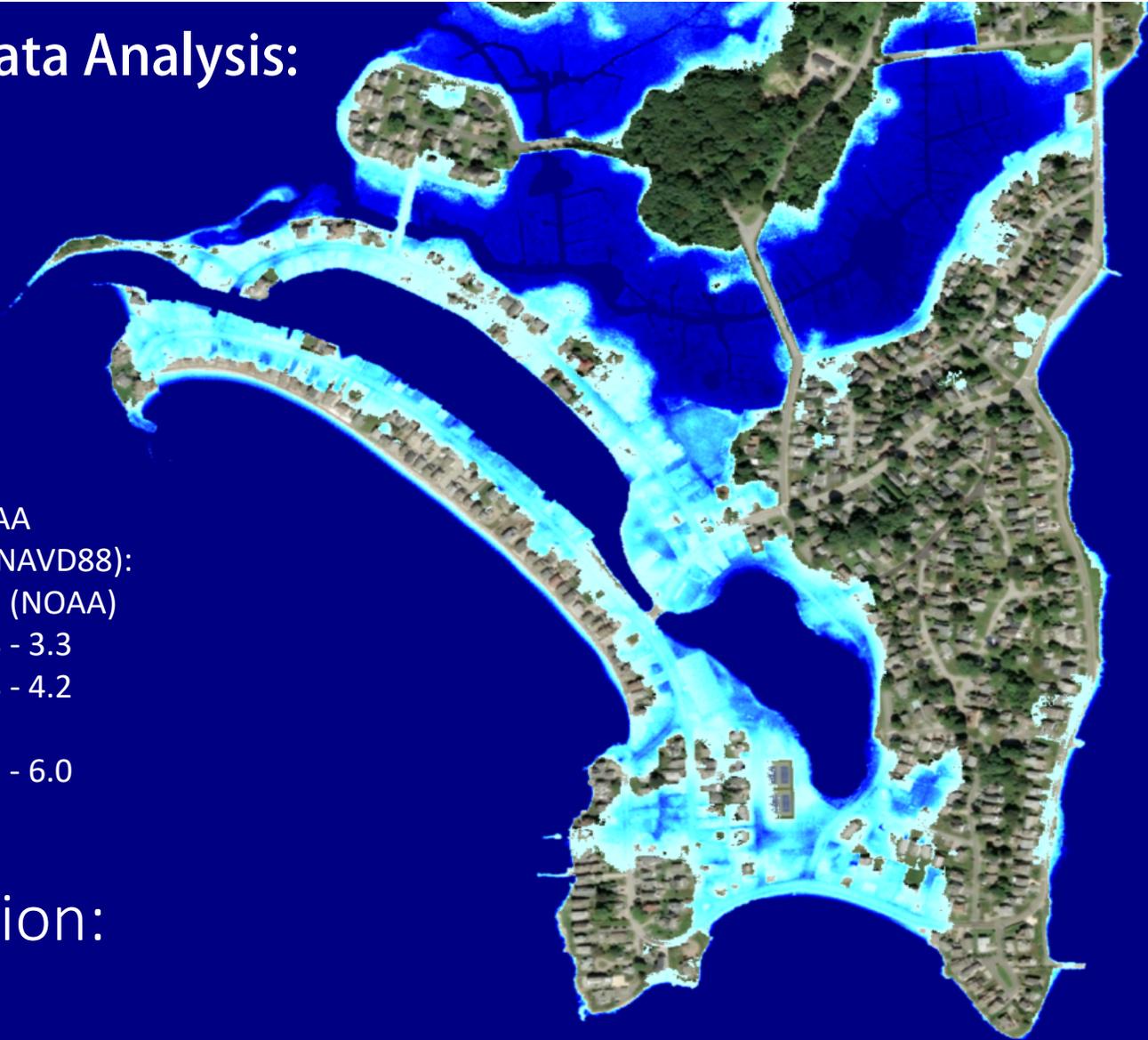
- MHHW 1.7 (NOAA)
- 1YR 2.8 - 3.3
- 2YR 3.8 - 4.2
- 5YR 5.3
- 10YR 5.3 - 6.0

Flood Elevation:  
4.5ft NAVD88

2016 CT DEM (Elevation, Feet)

5.0  
4.5  
4.0  
3.5  
3.0  
2.5  
2.0  
1.5  
1.0  
0.5  
0.0

# Metocean Data Analysis:



USACE NACCS and NOAA  
Mean Water Level (ft, NAVD88):

- MHHW 1.7 (NOAA)
- 1YR 2.8 - 3.3
- 2YR 3.8 - 4.2
- 5YR 5.3
- 10YR 5.3 - 6.0

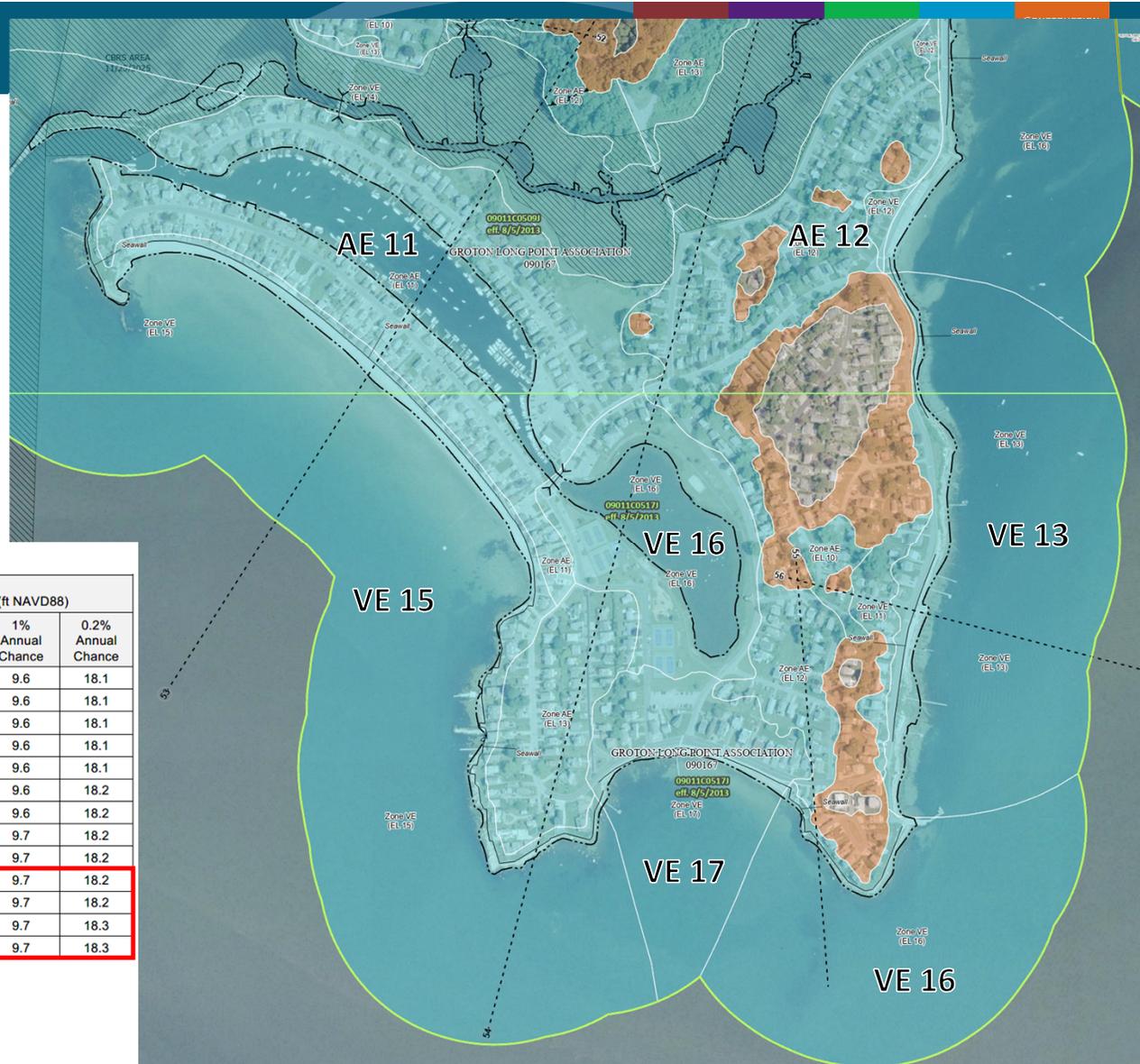
Flood Elevation:  
5ft NAVD88

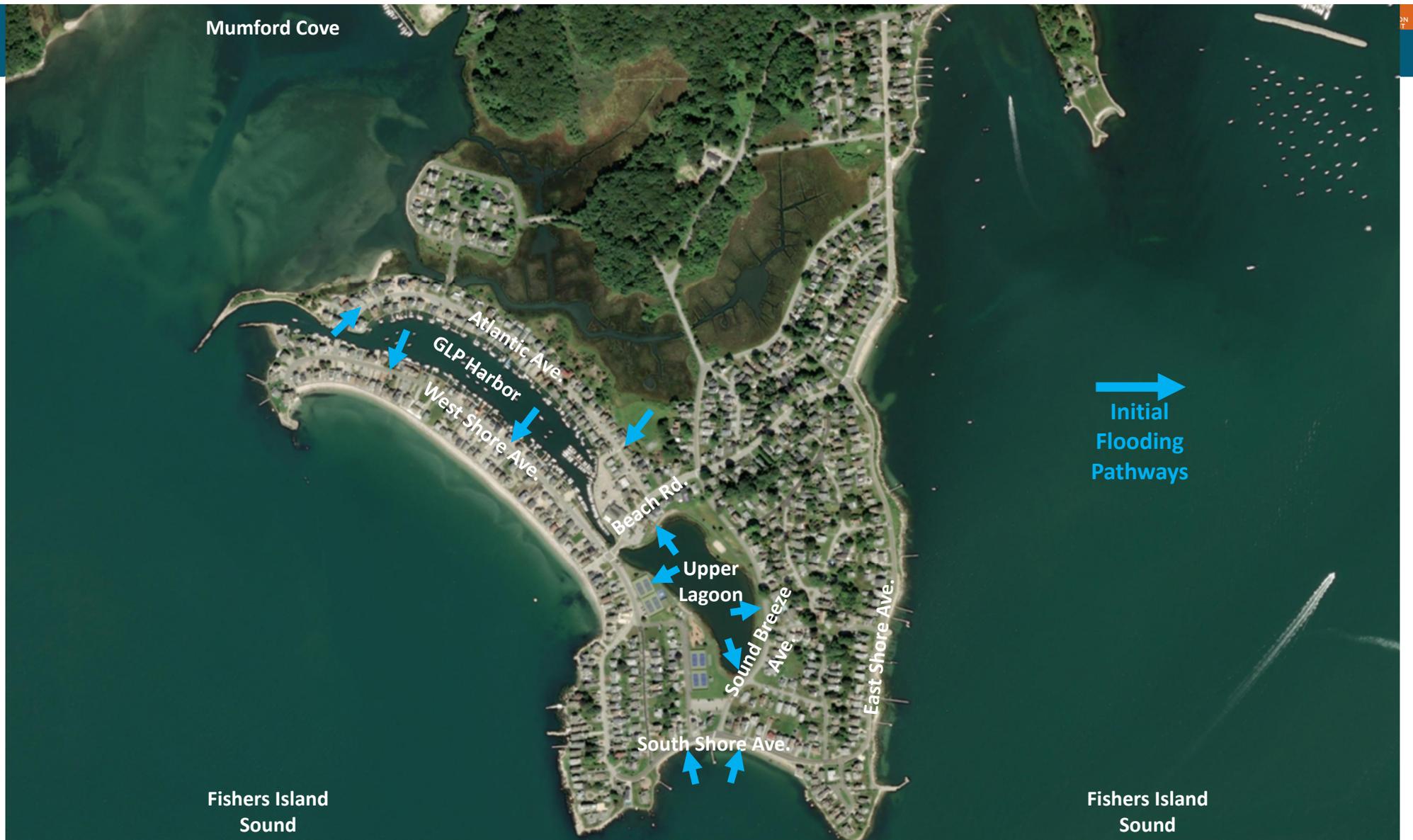
# Metocean Data Analysis:

## FEMA Flood Insurance Study

Table 16: Coastal Transect Parameters (continued)

Flood Source	Coastal Transect	Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations (ft NAVD88)				
		Significant Wave Height $H_s$ (ft)	Peak Wave Period $T_p$ (sec)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
New London Harbor	44	5.56	4.57	4.9	*	7.6	9.6	18.1
New London Harbor	45	11.95	5.37	4.9	*	7.6	9.6	18.1
Long Island Sound	46	11.37	5.19	4.9	*	7.6	9.6	18.1
Fishers Island Sound	47	8.77	4.37	4.9	*	7.6	9.6	18.1
Fishers Island Sound	48	7.15	4.80	4.9	*	7.6	9.6	18.1
Fishers Island Sound	49	11.39	5.20	4.9	*	7.6	9.6	18.2
Fishers Island Sound	50	7.20	3.83	4.9	*	7.6	9.6	18.2
Fishers Island Sound	51	8.83	5.66	4.9	*	7.6	9.7	18.2
Fishers Island Sound	52	6.60	4.95	4.9	*	7.6	9.7	18.2
Fishers Island Sound	53	10.92	5.05	4.9	*	7.6	9.7	18.2
Fishers Island Sound	54	11.26	6.34	4.9	*	7.6	9.7	18.2
Fishers Island Sound	55	6.32	3.51	4.9	*	7.6	9.7	18.3
Fishers Island Sound	56	7.12	3.80	4.9	*	7.6	9.7	18.3





Mumford Cove

Fishers Island  
Sound

Initial  
Flooding  
Pathways

Fishers Island  
Sound

# Challenges



- Low-Lying Community
- Low-Lying Stormwater Infrastructure
- Prone to Coastal and Precipitation Flooding
- Multiple Stormwater Ingress Routes
- Minimal to No Water Storage Capacity
- Community within Town of Groton
- Private Property



South Shore Ave During Hurricane Carol (1954)  
<https://www.weather.gov/media/okx/coastalflood/Groton%20impacts.pdf>



High Tide Culvert Flooding (10/20/2025)  
Photo Credit: Joe Orchard



High Tide Culvert Flooding (10/20/2025)  
Photo Credit: Mark White

# Initial Project Areas

1. Upper Lagoon Area Flooding
  - 1a. Stormwater Storage
  - 1b. Tide Gate
2. West Shore Ave
  - 2a. Stormwater Improvements
  - 2b. Roadway Flooding Action
3. Harbor Park Area
  - 3a. Low Berm at Sports Field

Note:

- Numbers do not indicate priority





# Upper Lagoon Area

- The Issue:
  - Flooding of the Upper Lagoon into properties, roadways, parking areas, and parks during heavy rainfall and coastal flooding.
- High-Level Approach:
  - Identify areas suitable for a raised berm
  - Review tide gate implementation at Beach Rd. bridge
  - Backflow prevention installation
  - Review current and potential storage capacity of upper lagoon
  - Utilize HEC-RAS software for storage volume estimate
- Field Visit:
  - Review of surrounding stormwater drains/ infrastructure
  - Identify challenges with potential berm locations
  - Beach Road culvert dimensions
  - Elevations around Lagoon



Photo Credit: Joe Orchardo





\*GZA GIS File

# West Shore Ave

- The Issue:
  - Sunny-day coastal flooding of roadway through storm drains and low-lying areas along GLP harbor
- High-Level Approach:
  - Evaluate stormwater outfalls for backflow prevention
  - Review flood wall installation potential at low spots along roadway
  - Evaluate potential to install tide gate at western inlet
  - Can tide gate work be done in conjunction with Upper Lagoon project area?
- Field Visit Needs:
  - Review outfall type/ connectivity
  - Measure outfall dimensions
  - Review low spot areas and elevations



High Tide Culvert Flooding (10/20/2025)  
Photo Credit: Joe Orchard





## Harbor Park Area



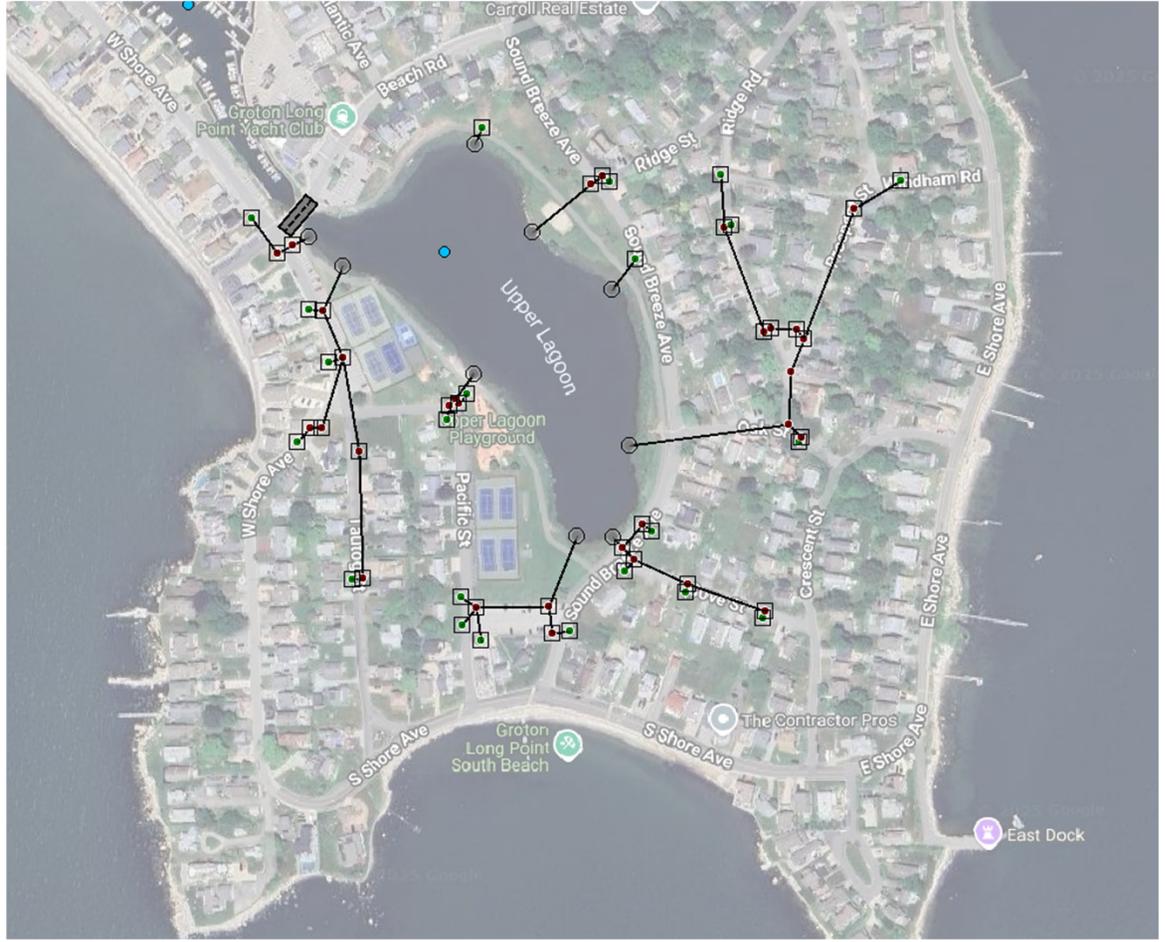
- The Issue:
  - Marsh and Inland flooding cause flooding of the park, adjacent homes, and roadway
- High-Level Approach:
  - Identify locations to tie-in a berm system around or within the park for flood storage capacity and to protect surrounding areas
  - Review flood storage capacity of park with and without a protective berm system
- Field Visit Needs:
  - Review existing elevation features, vegetation, and pathways

# Modeling:

## HEC-RAS Model

Present Day & 2050:

- Coastal Flooding
  - Mean Sea Level
  - Mean Higher High Water
  - 2-year AEP
  - 10-year AEP
- Rainfall
  - 2-year AEP
  - 10-year AEP



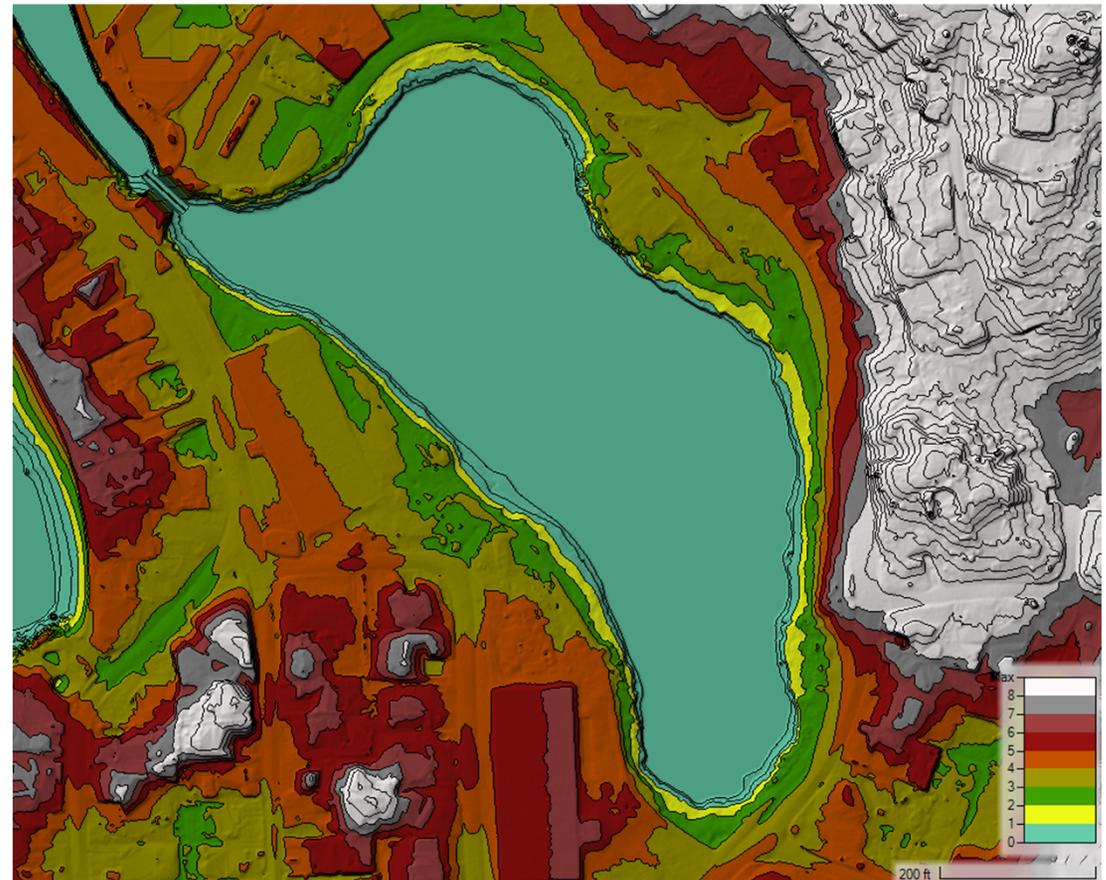
# Modeling:

## Model Results

WSE above NAVD88 (ft)

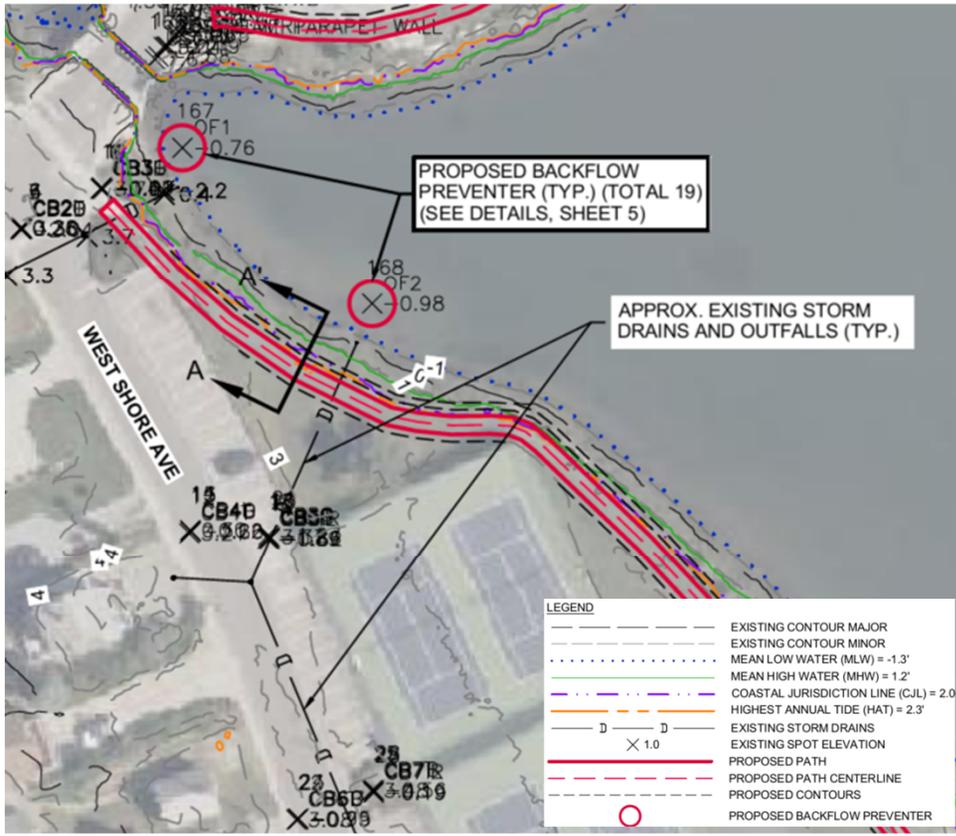
Present Day		
	2-yr Rainfall	10-yr Rainfall
MSL	0.3	1.5
MHHW	2.0	2.8
2-yr Storm Surge	4.0	4.2
10-yr Storm Surge	5.3	5.5

2050		
	2-yr Rainfall	10-yr Rainfall
MSL	1.9	2.7
MHHW	3.5	3.8
2-yr Storm Surge	5.4	5.6
10-yr Storm Surge	6.8	6.9

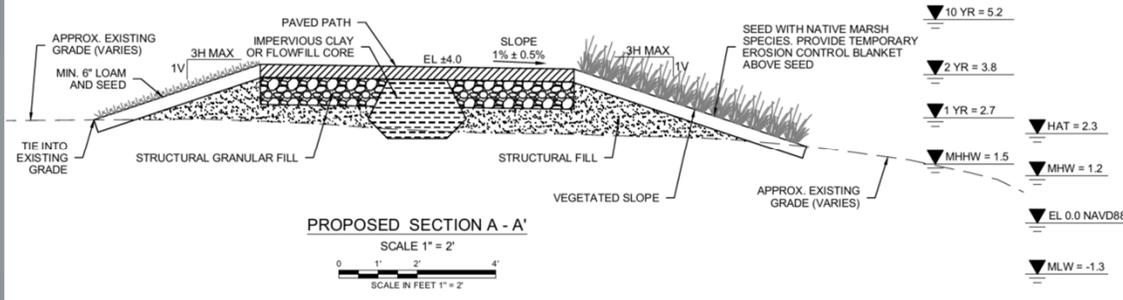


# 30% Design:

## 1. Upper Lagoon Stormwater Storage

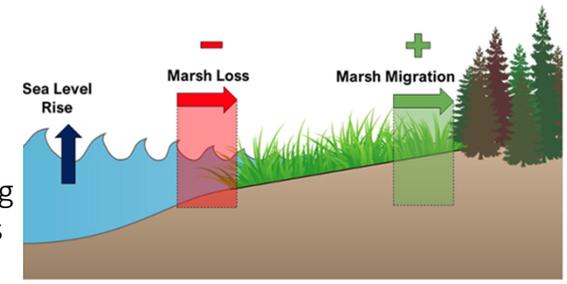


Raised Walking Path with backflow prevention



Marsh Migration Mound

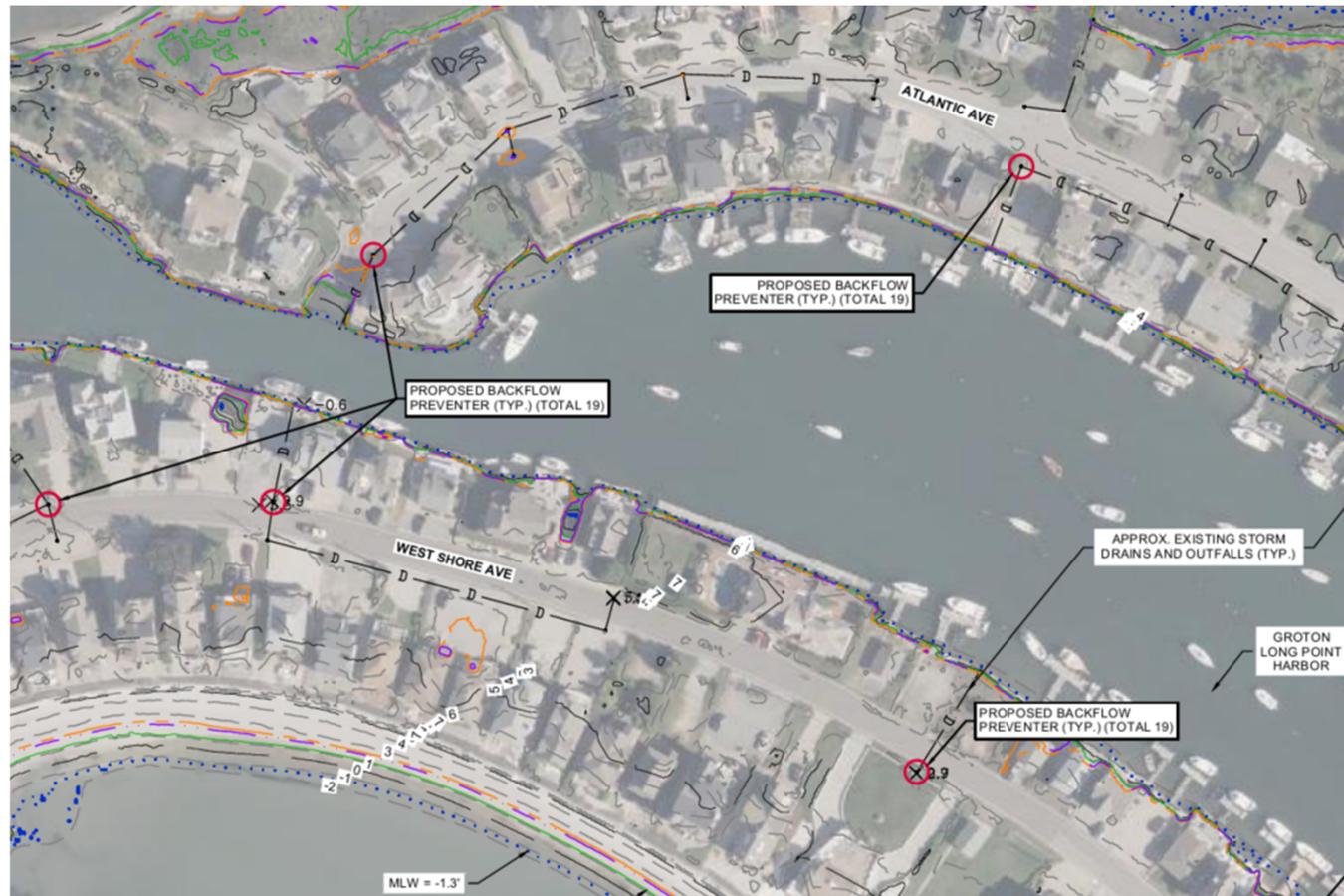
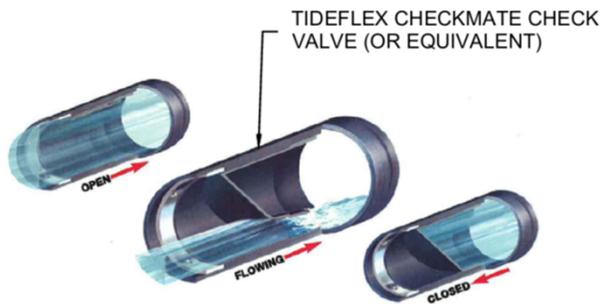
- Mitigate surrounding area flooding
- Reduce potential wetland impacts



# 30% Design:

## 2. Stormwater Improvements (W. Shore Ave)

- Catch Basin elevations range between EL. 2.7-3.5 ft NAVD88
- Water in most catch basins - Some of the storm mains may be obstructed
- Low-lying areas are dispersed across private property
- **Backflow prevention is necessary at most outfalls**



# Next Steps

- Applying to Long Island Sound Resilience Grant Writing Assistance Program (November 2025)
- Applying to the DEEP Climate Resilience Fund (January 2026)
- Advance 30% Designs



**Thank You!**  
**Questions?**

**Wayne Cobleigh, CPSM - [wayne.cobleigh@gza.com](mailto:wayne.cobleigh@gza.com)**  
**Michael Gardner, WEDG - [michael.gardner@gza.com](mailto:michael.gardner@gza.com)**  
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