Seacoast Transportation Corridor Vulnerability Assessment

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Assistant Director/
Transportation Program Manager

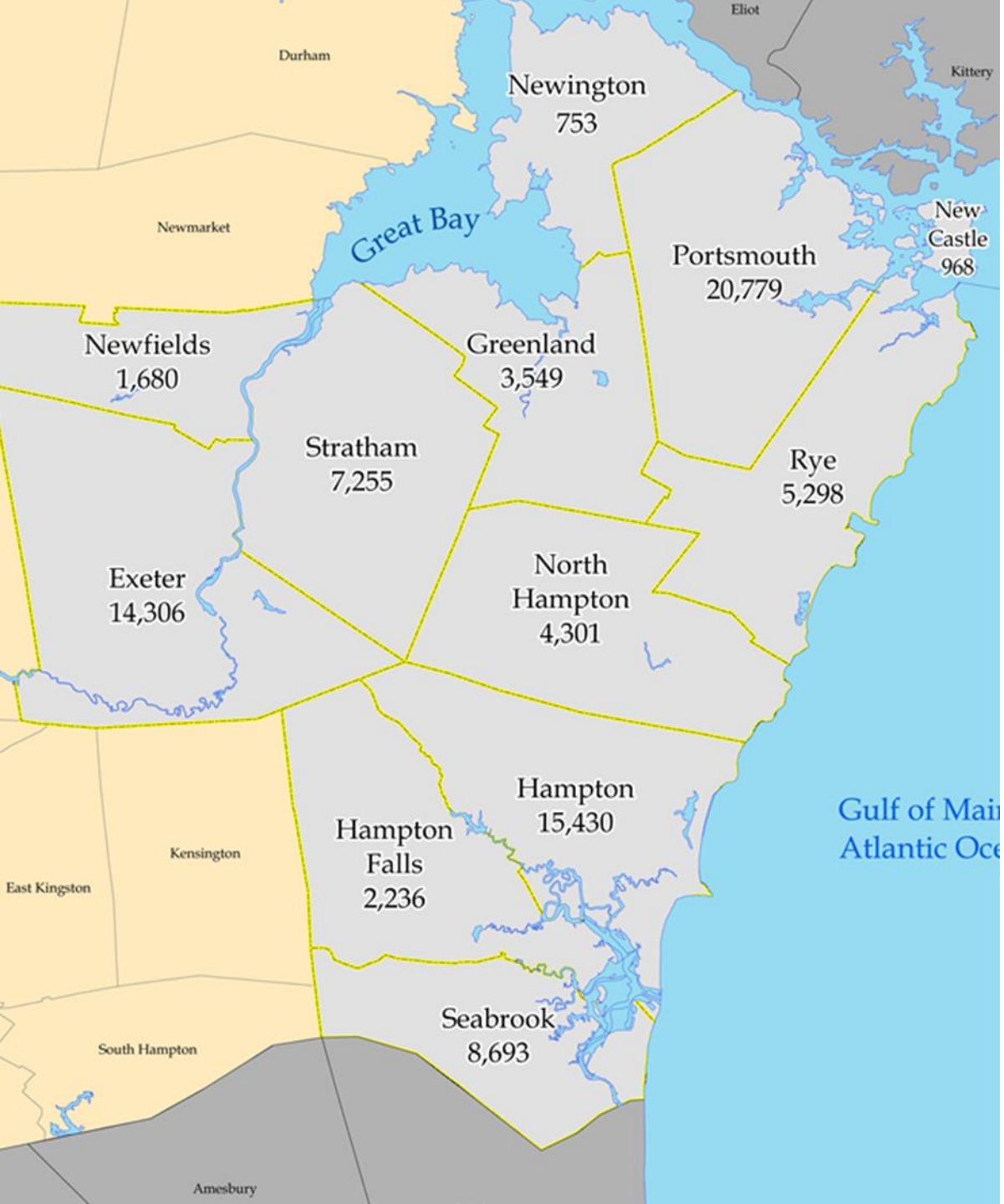
Community Updates & Engagement

Fall, 2021

Image Courtesy of EcoPhotography

Agenda

Project Summary	15 Minutes
Transportation Network Impacts	15 Minutes
Conceptual Adaptation Options	15 Minutes
Community Feedback	45 Minutes



Seacoast Transportation Corridor Vulnerability Assessment (STCVA)

- Funded as a 2019 NOAA Project of Special Merit
- A partnership between:
  - Rockingham Planning Commission
  - NH DES Coastal Program
  - NH Department of Transportation
  - University of New Hampshire
  - 10 NH coastal municipalities

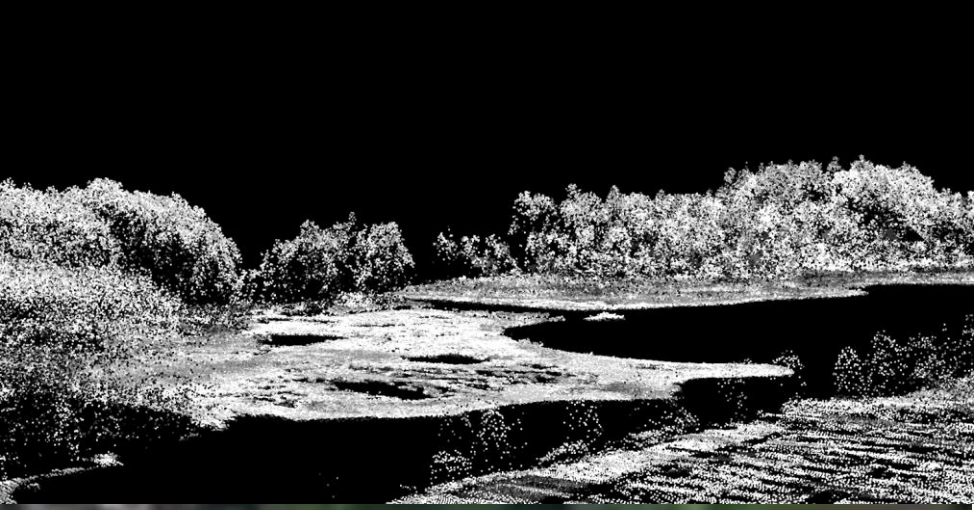
This project was funded,in part, by NOAA's Office for Coastal Management under the Coastal Zone Management Act in conjunction with the New Hampshire Department of Environmental Services Coastal Program.

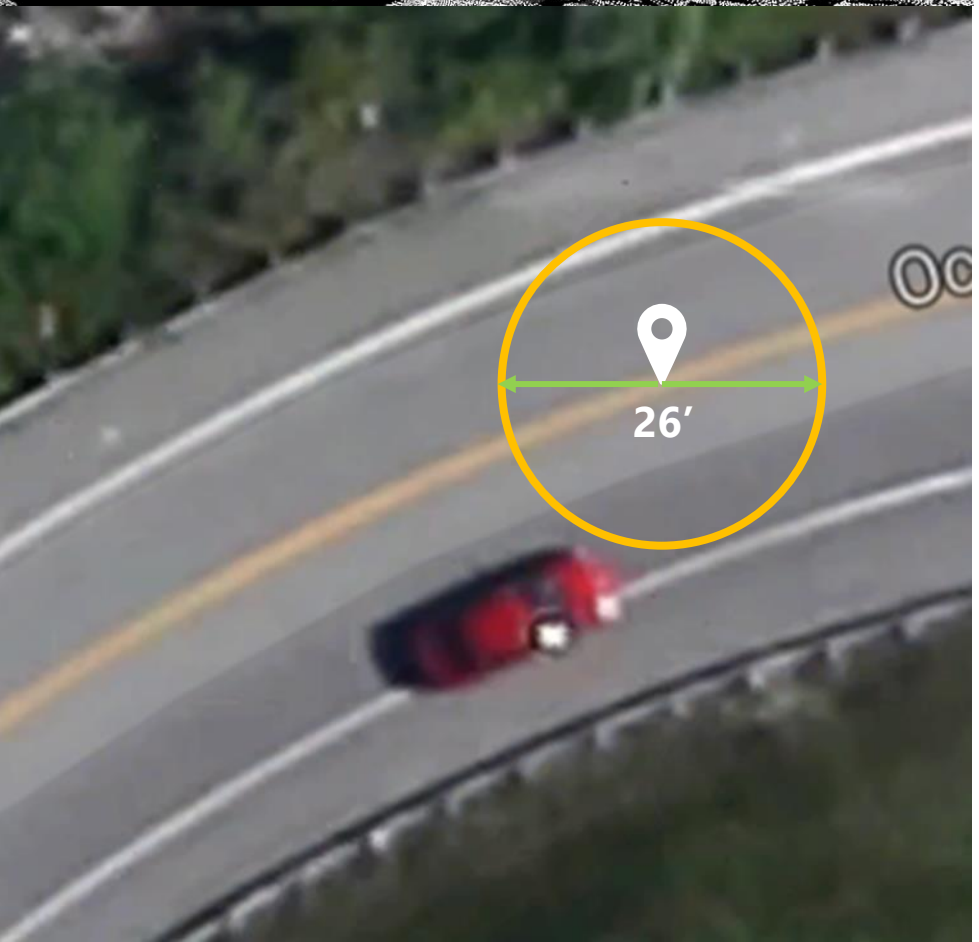
STCVA Goals

- Assess the impacts of projected sea-level rise on the seacoast transportation network (1', 1.7', 4', and 6.3' sea-level rise scenarios.
- Evaluate changes in traffic volume, travel patterns, road capacity, road conditions due to SLR
- Identify & prioritize sites impacted by flooding for further evaluation
- Identify adaptation and resilience strategies for priority sites
- Improve RPC/MPO decision making processes

STCVA Transportation Planning Outcomes

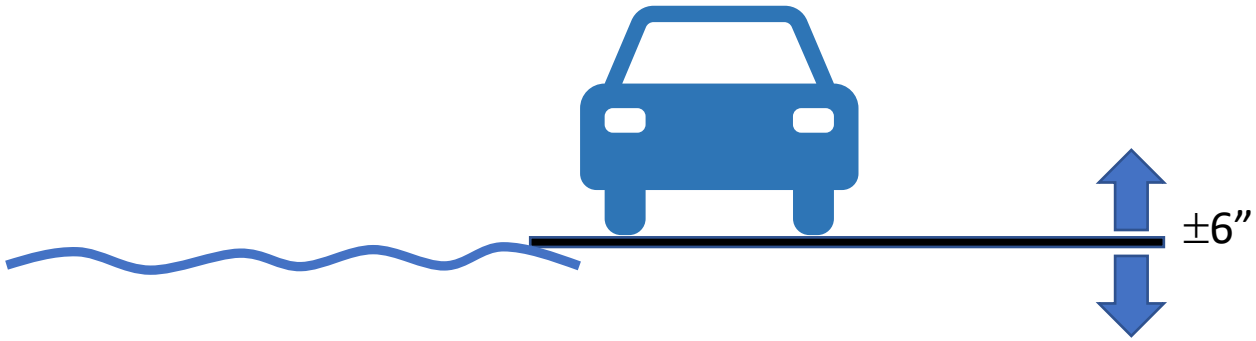
- Enhanced understanding of risks to transportation network from climate change
- Critical links identified and impacts of closures on the transportation network assessed
- Improvement concepts and costs developed for priority locations to better understand scope and scale of building a more resilient system
- Improved resiliency factors for the general project selection process
- Data and analysis available for other planning and project development efforts.
- Policies defined that can facilitate a more resilient transportation system





Data Accuracy

- Based on Light Detection and Ranging (LIDAR) data from 2011
- LIDAR data has roughly ±6” vertical accuracy
- Horizontal accuracy is roughly 13’ – We know the point is somewhere within a 26’ diameter circle
- Important to recognize when examining edges and smaller sites



Identifying & Prioritizing Impacted Roadways

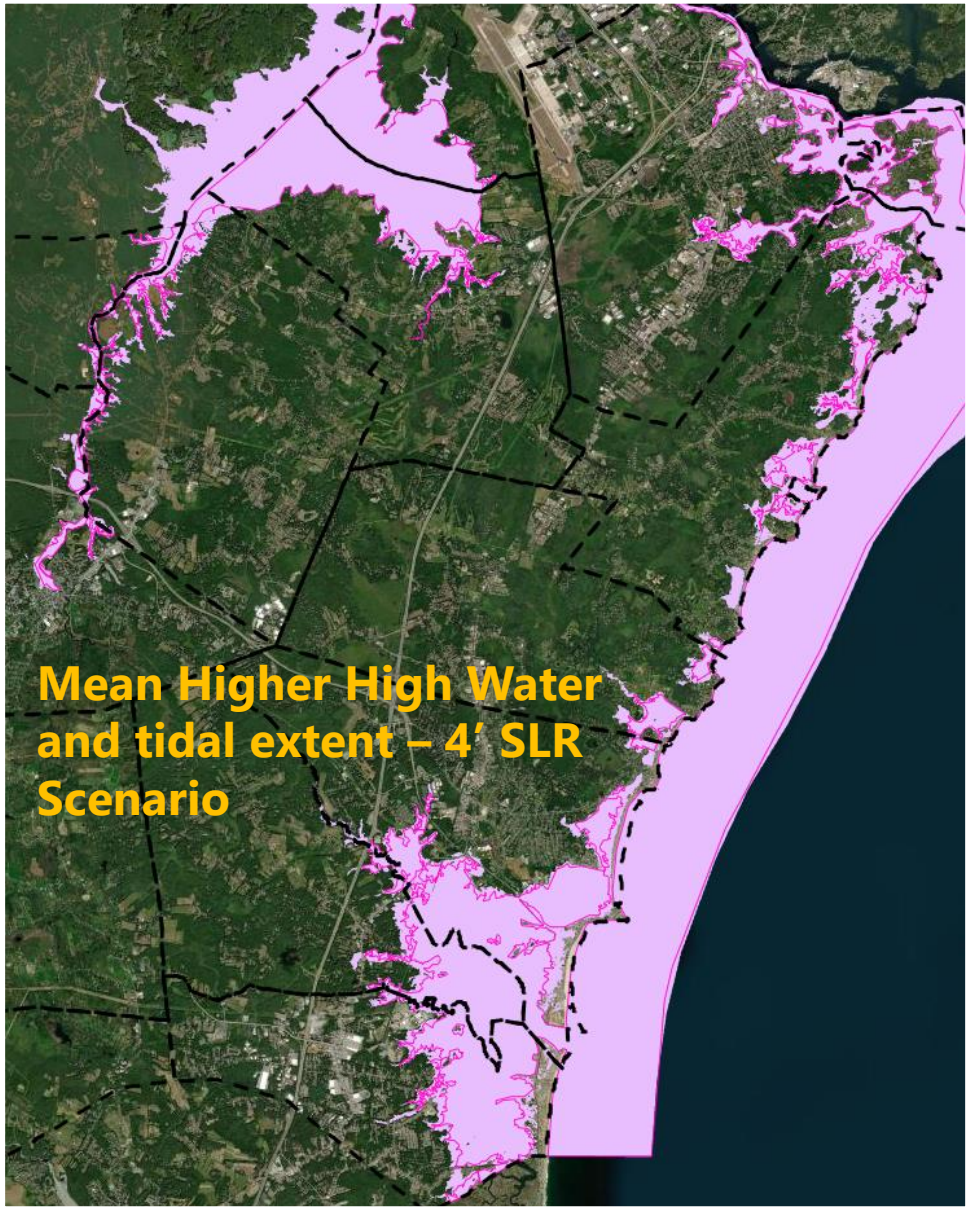
Previous Work on Sea Level Rise Impacts

- Tides to Storms
- Coastal Risks and Hazards Commission
- 2020 NH Science Summary

Regional Travel Demand Model

- Travel Patterns based on residential and employment distribution
- All State Roadways and many local Roads

Transportation System Impacts of Sea Level Rise



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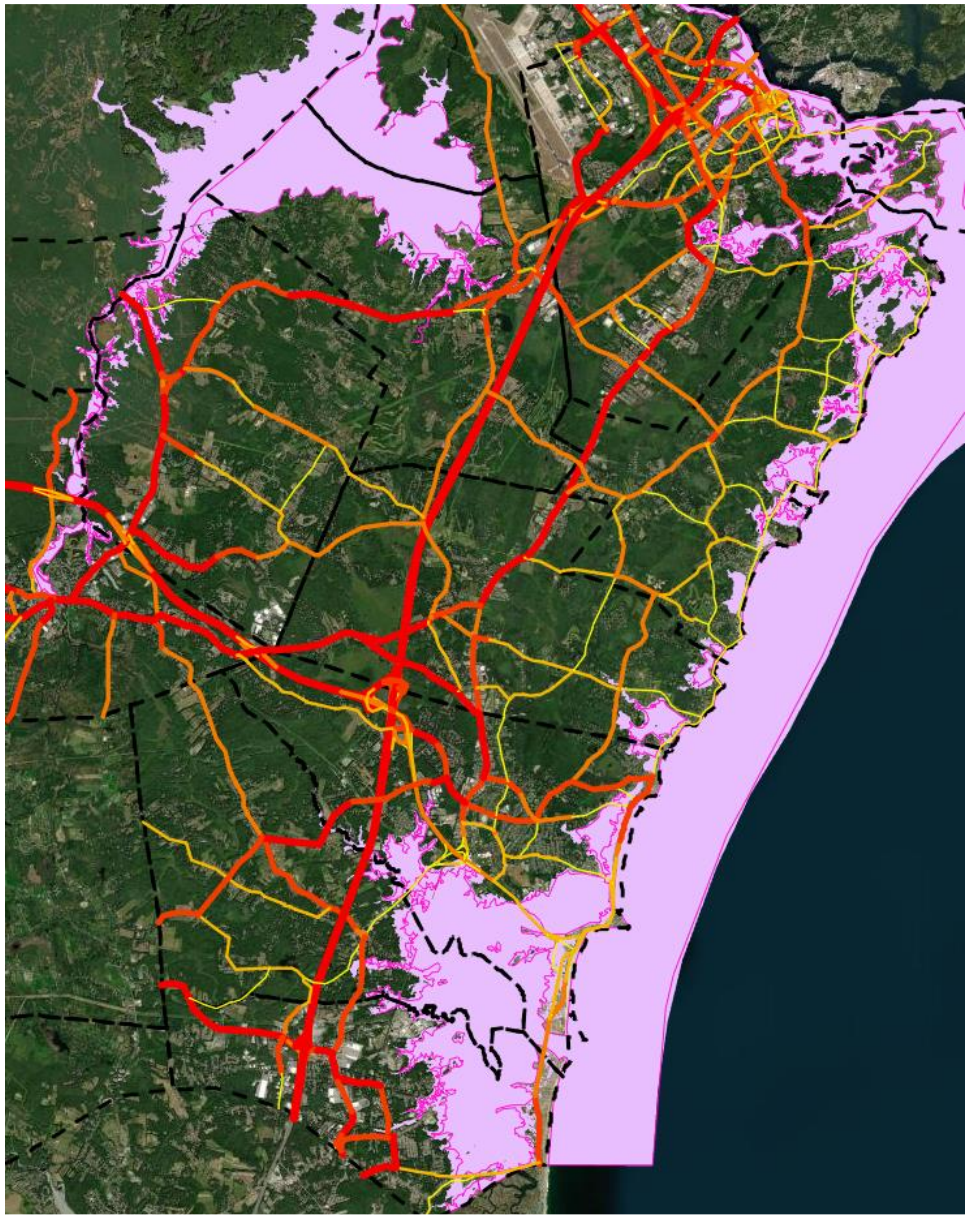

Travel Demand Model links – 4’ SLR Scenario

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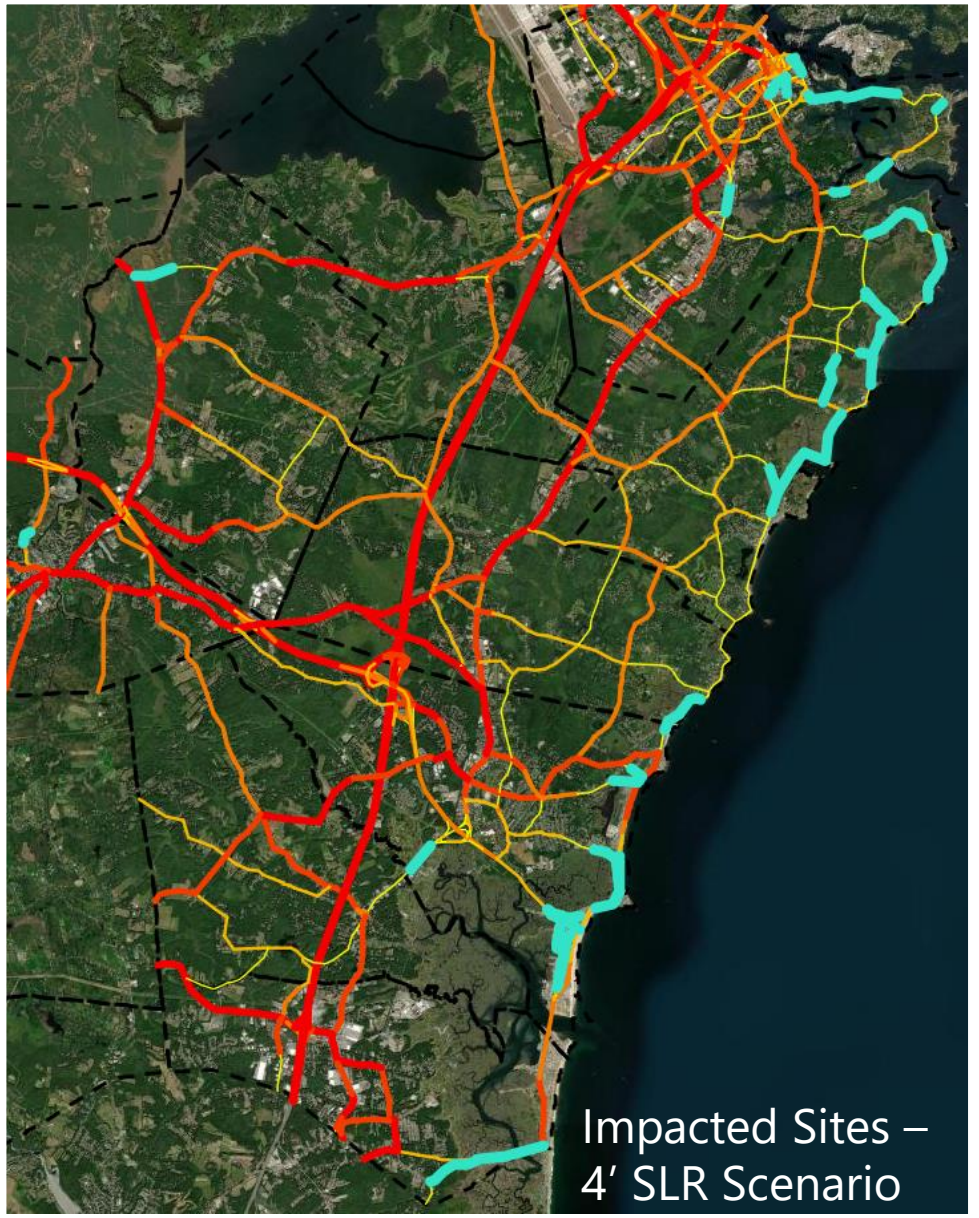


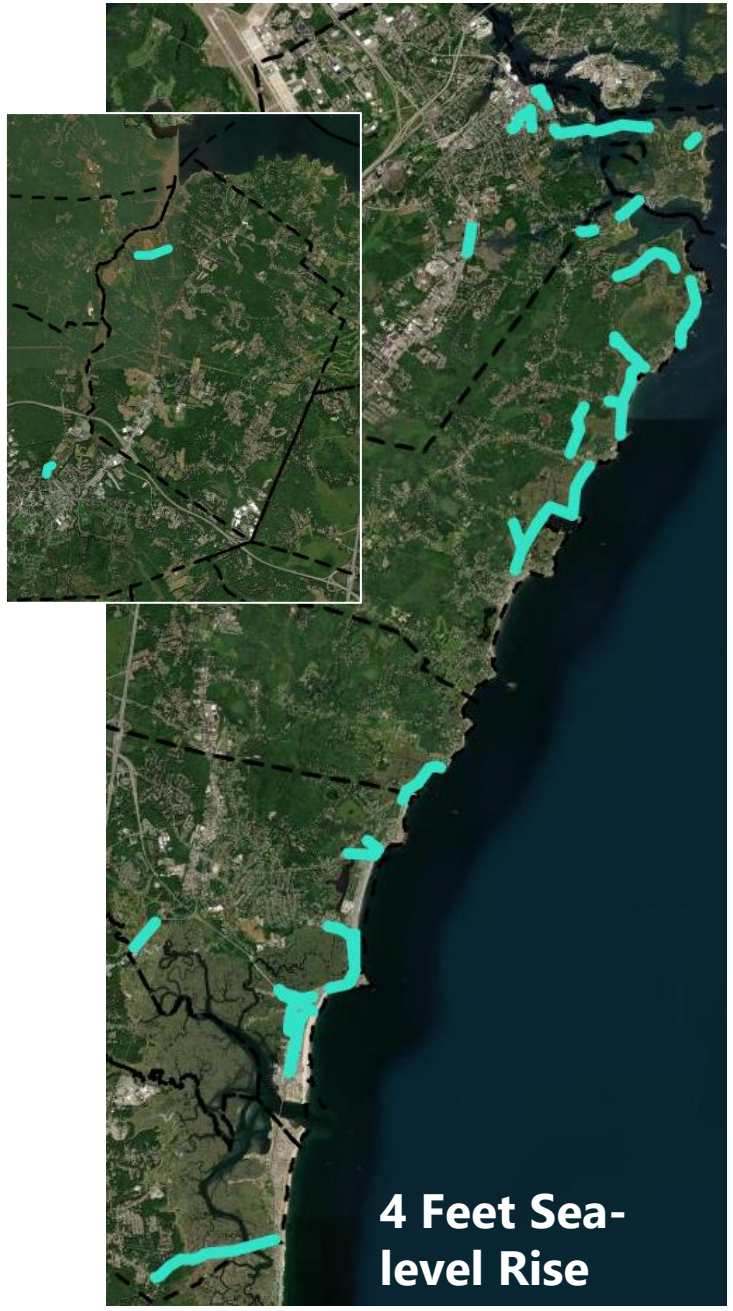
Impacted Sites – 4' SLR Scenario

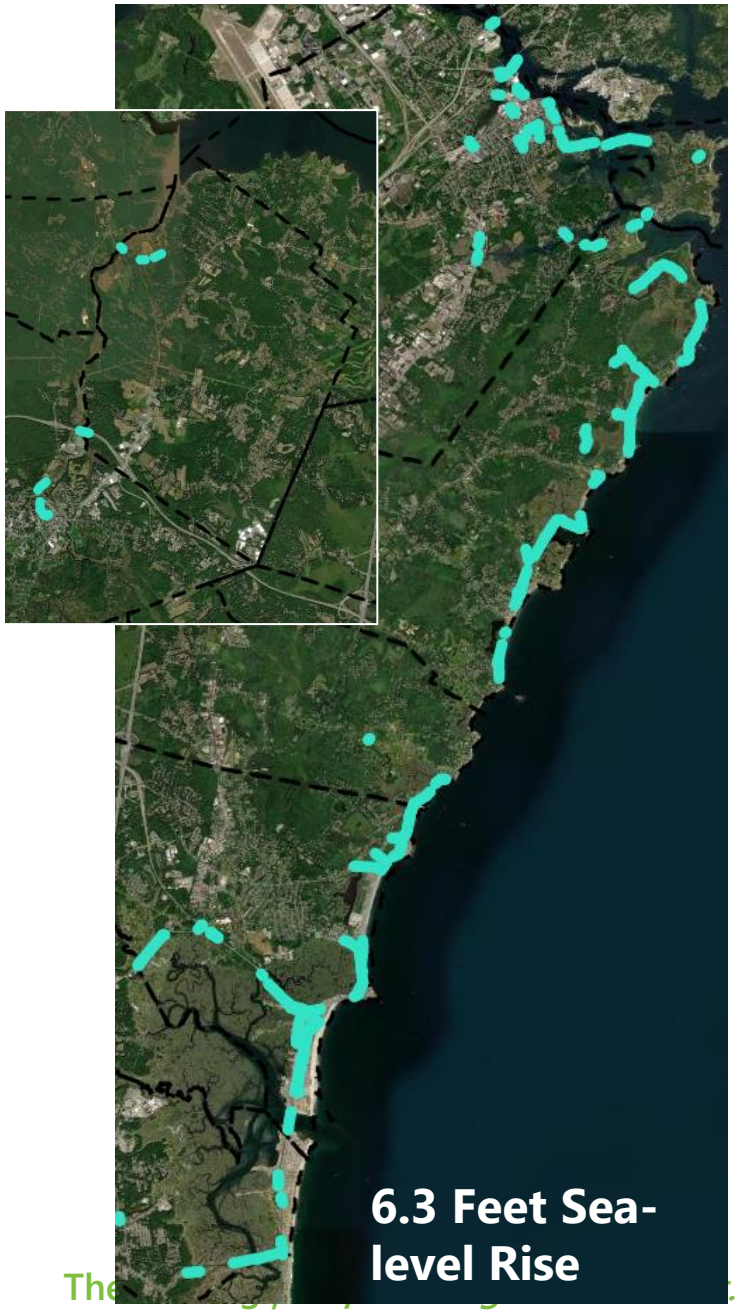

Inundated model links at 4′ SLR

Identify Segments Where Water and Roads intersect

Scenario	Impacted Locations	Approx. Miles Impacted
1′	4 model links	0.5
1.7′	13 model links	1.0
4′	126 model links	16.8
6.3′	259 model links	28.0

Areas of Anticipated Inundation





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Transportation System Impacts of Sea Level Rise

Direct Transportation Network Impacts

- Inundated Links
- Isolated Areas
- Impacts of flooding on infrastructure

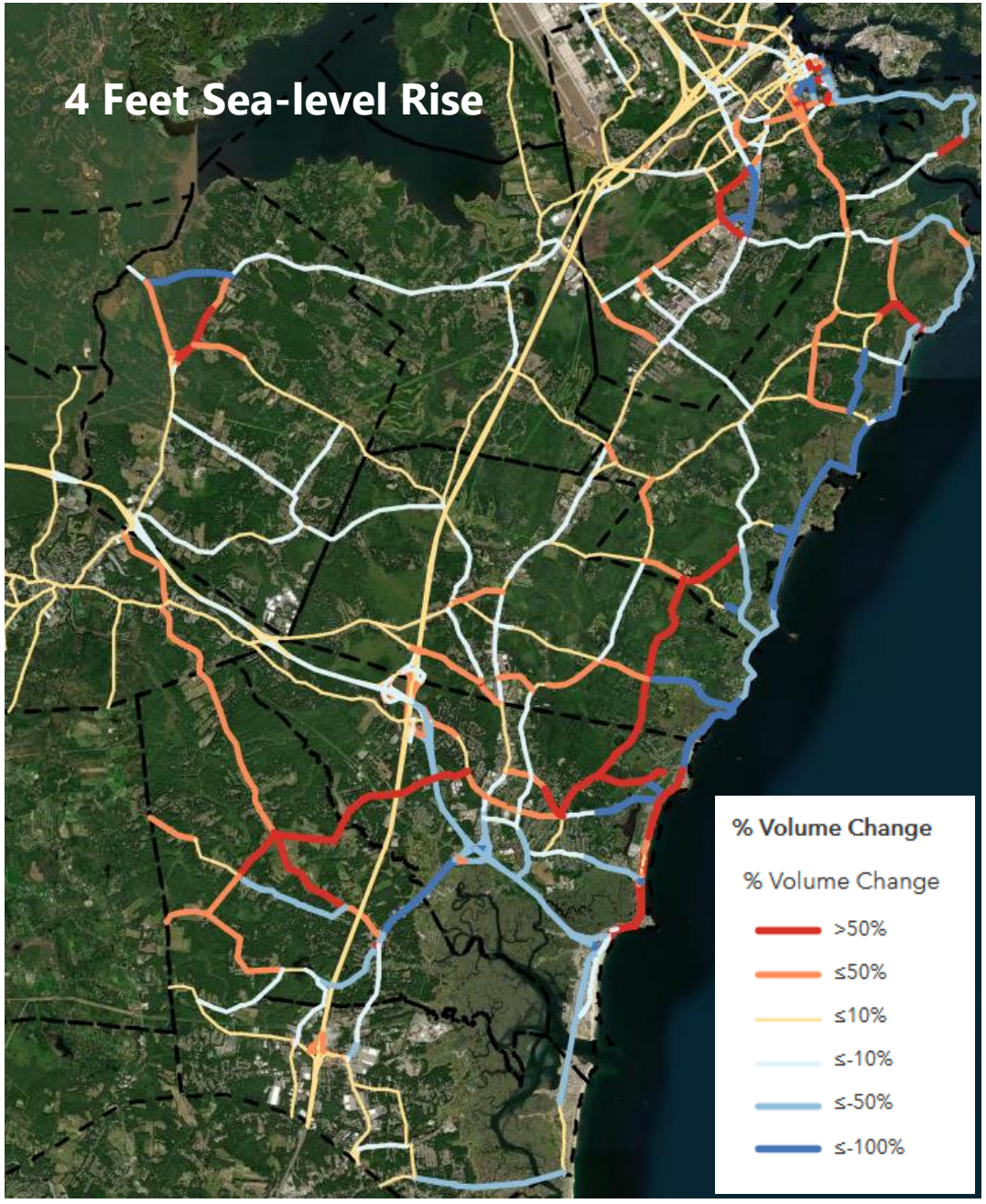
Indirect Transportation Network Impacts

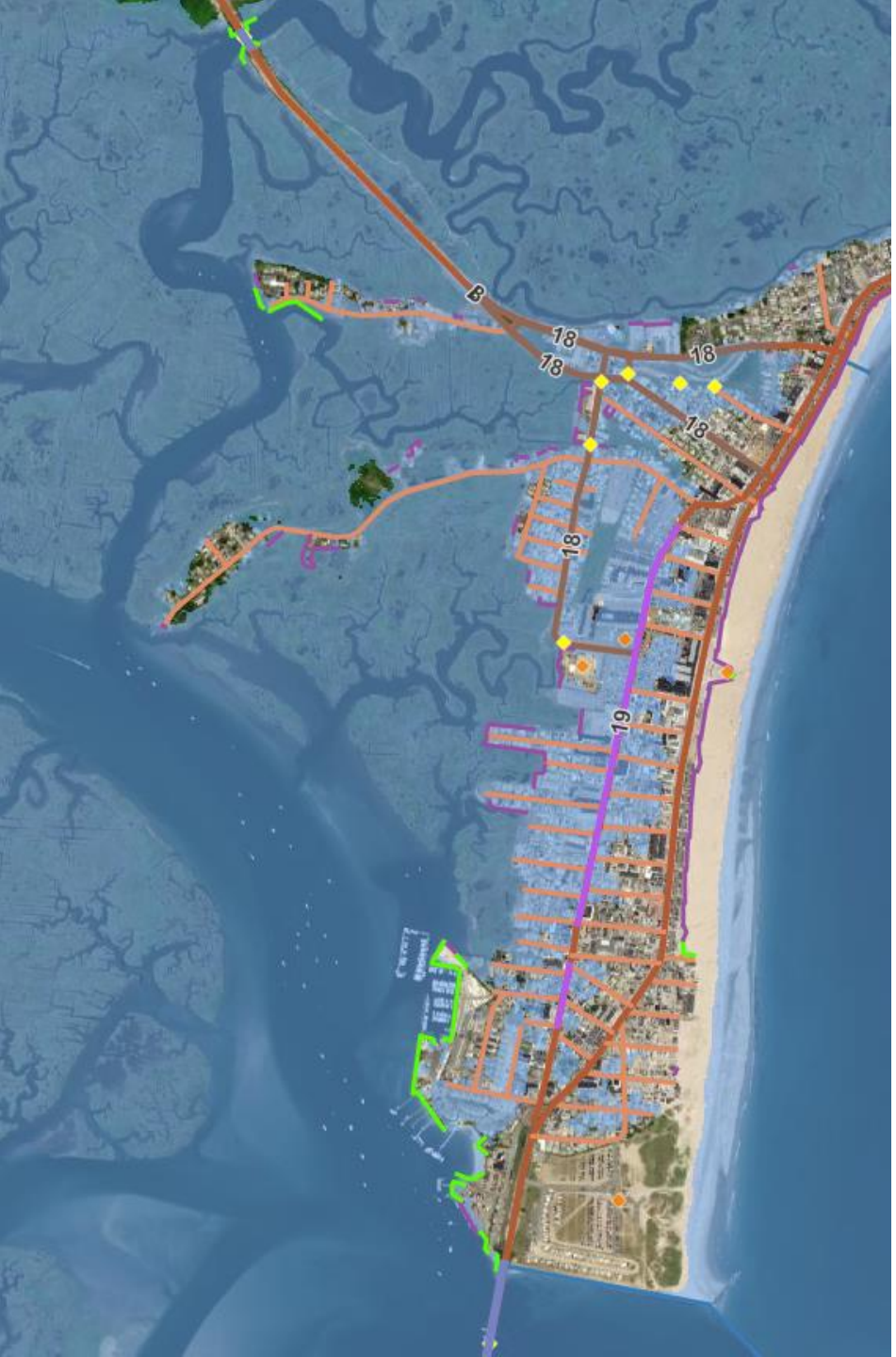
- Travel Pattern Changes
- Traffic Volume Changes
- Impacts on Roadway capacity and condition

Group Adjacent Impacted Links into Sites

Scenario	Impacted Locations	Sites
1 Foot	4 model links	3
1.7 Feet	13 model links	5
4 Feet	126 model links	25
6.3 Feet	259 model links	50+

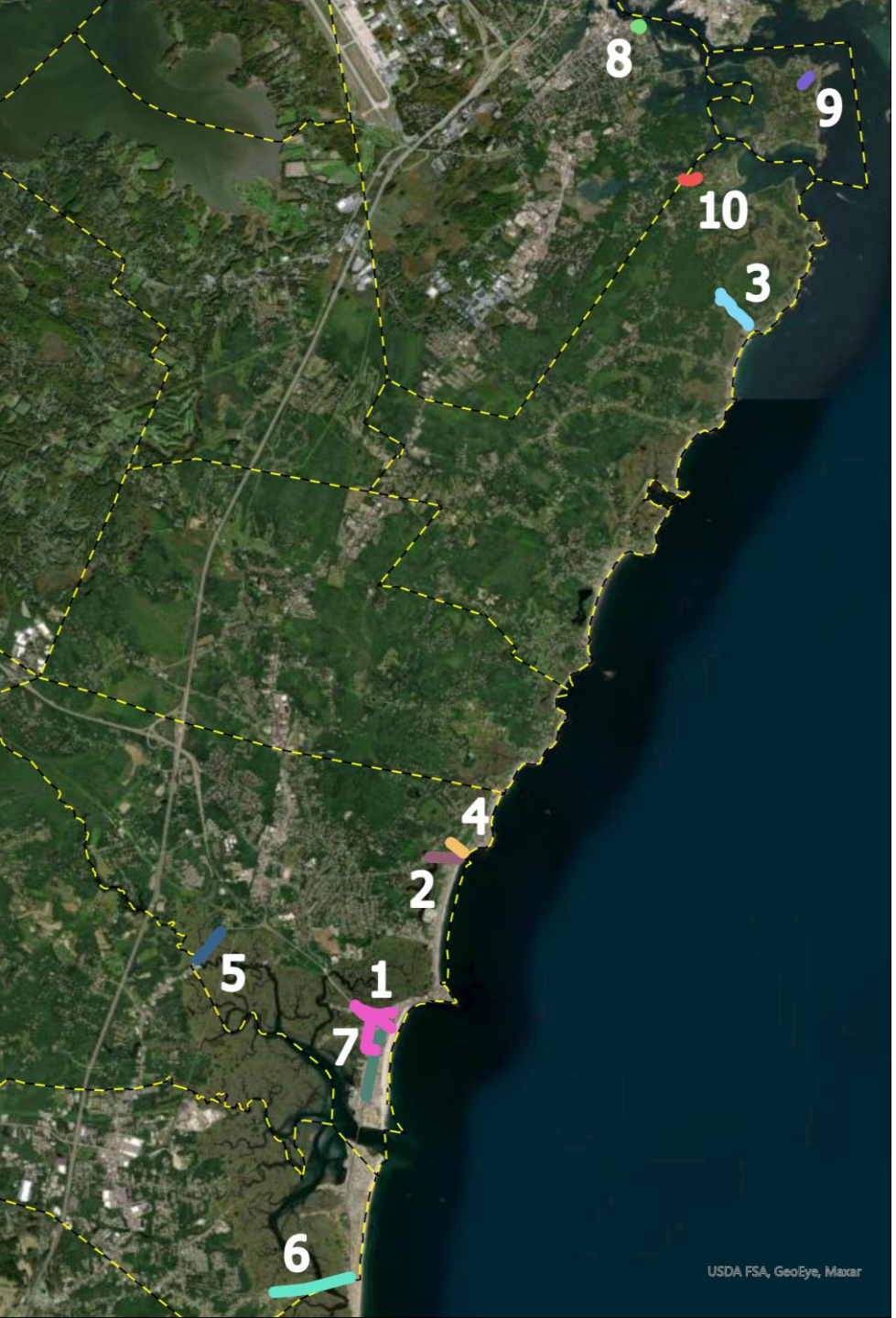
Estimate Traffic Impacts of Road Closures





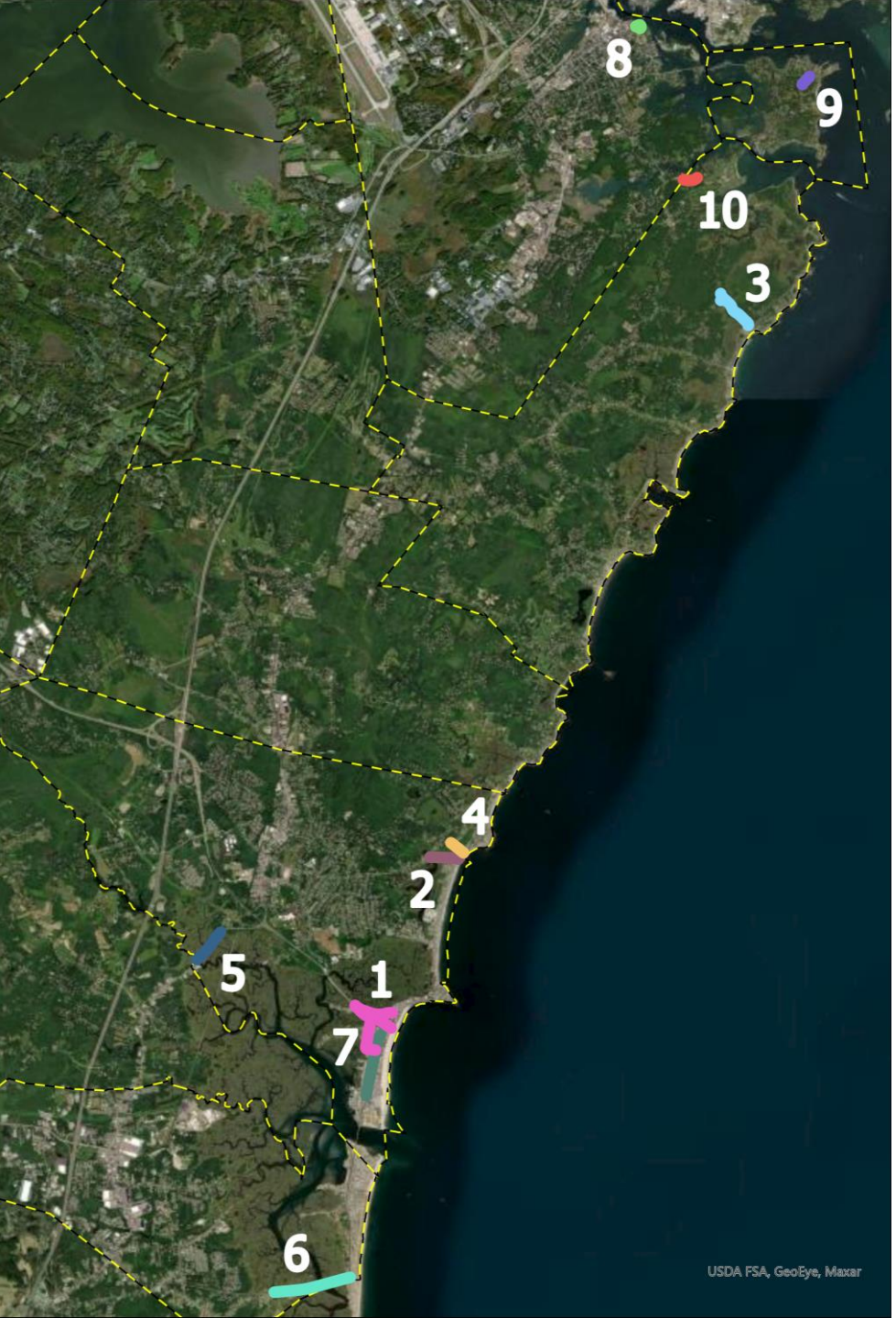
Score Sites Against Criteria to Determine Criticality

Criterion	Weight	
Functional Classification	20%	Operations
Average Daily Volume (AADT)	20%	
Distance to Emergency Services	15%	Health & Safety
Alternate Route Availability	15%	
Social Vulnerability Index (SVI)	10%	Socioeconomics
Distance to Community Facilities	10%	
Average Land Value per Acre	10%	



Identify Priority Sites for Evaluation

- Preliminary List of Priority Sites for further evaluation developed based on criteria
- List Sent to NHDOT and other partners for feedback
- 10 candidate sites Selected
  - Assemble site profiles
  - Assess types of impacts and potential adaptation measures
  - Develop conceptual design alternatives
  - Apply New Hampshire Coastal Flood Risk Guidance
- 2 sites selected for more detailed examination



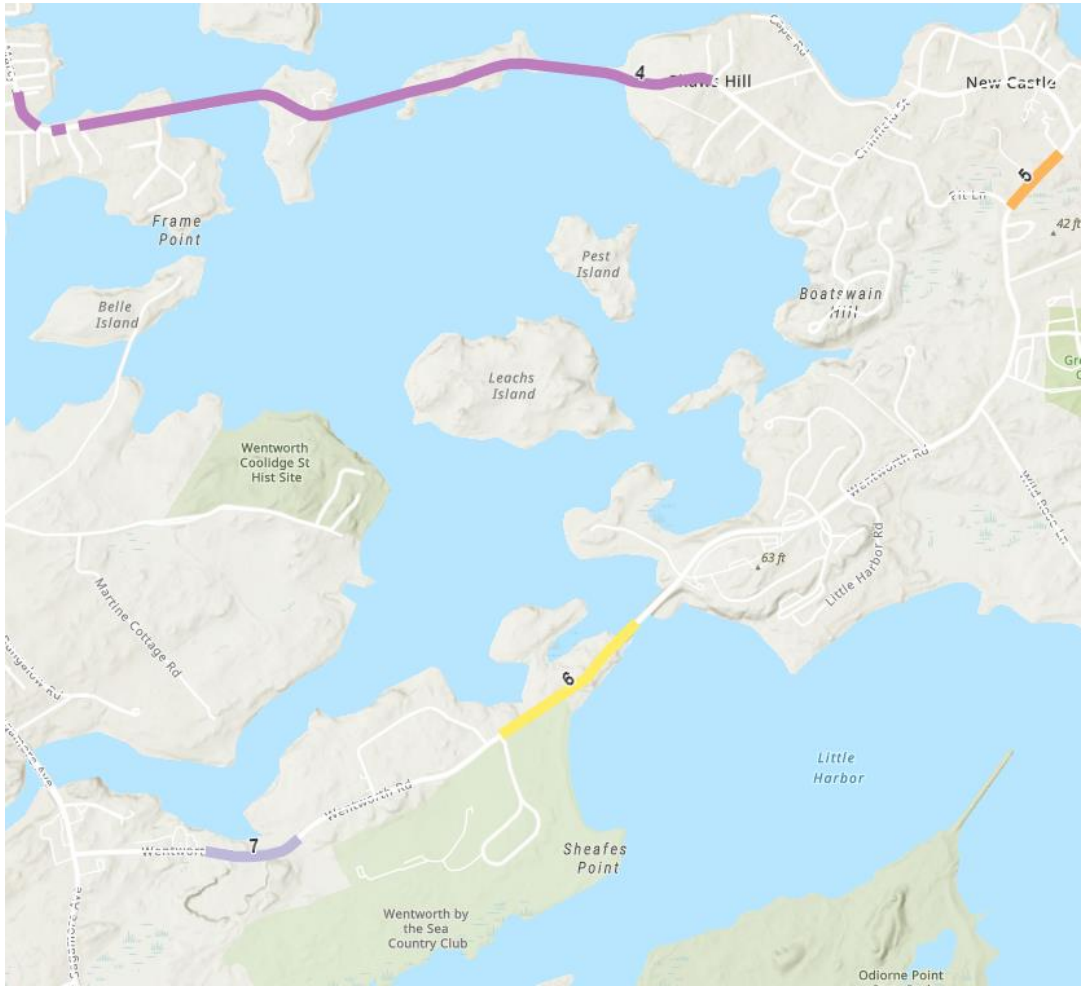
Priority Sites for Evaluation

Town	Site	SLR Impact level
New Castle/ Rye	Wentworth Rd/NH 1B	4'
Rye	Marsh Rd, Parsons Rd	1'
Rye	Ocean Blvd, Wallis Rd	4'
Rye	Locke Rd, Ocean Blvd	4'
Hampton	Cusack Rd	1.7'
Hampton	High St	1'
Hampton	NH 1A SB On ramp, Ocean Blvd, Winnacunnet Rd	4'
Hampton	Brown Ave, Church St, Glade Path, Highland Ave, NH Rt 101	1'
Hampton	Lafayette Rd	4'
Seabrook	South Main St/ NH 286	4'

New Castle Sites

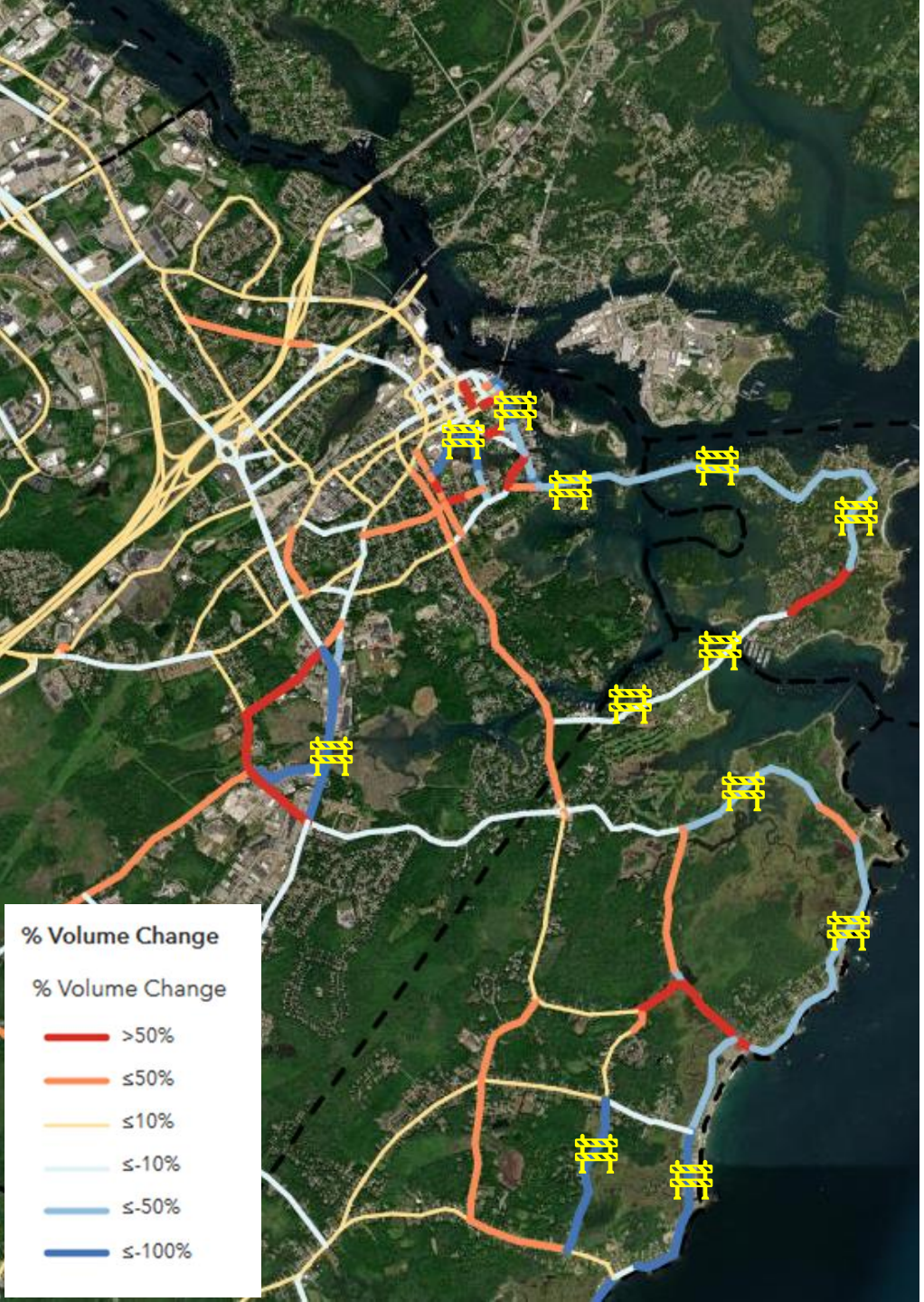
- NH 1B impacted between 2 and 4 feet of SLR
- Impacts in Rye at < 2 feet don't appear to impact traffic on NH 1B
- 4' Sees disruption of traffic patterns
- Both access points onto island are impacted

Town	Site	Map number	SLR Impact level
New Castle/ Portsmouth	New Castle Ave/ Portsmouth Ave (NH 1B)	4	4'
New Castle	Wentworth Road (NH 1B)	5	4'
Rye	Wentworth Road (NH 1B	6	4'
Rye	Wentworth Road (NH 1B)	7	4'



Traffic Impacts <2' SLR

- Marsh Road in Rye Impacted
- Shifts Traffic to alternate routes
- Minor impacts to Roads in Portsmouth (<10% change)
- 4% traffic volume increase on Sagamore Ave (NH 1A)
- 0.4 to 1% traffic volume increase on US 1



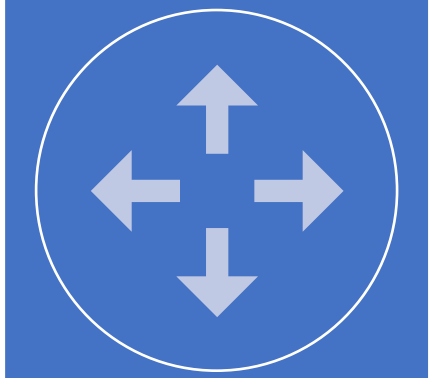
Traffic Impacts at 4' SLR

- US 1 closed at Sagamore Creek Crossing
- ~20% increase in traffic volume on Sagamore Road
  - Current Volume = 5,900 vehicles per day
  - Estimated Volume = 7,100 vehicles per day
- NH 1B inundated at multiple locations
  - Potentially limited to local circulation only at high tides or permanently depending on depth of flooding
  - Access to New Castle Island becomes intermittent
  - Emergency Services impacts

Actions Considered

No Action

Do nothing



Avoid

Prioritize investment out of the water's way

Accommodate

Options that allow you to better live with the water

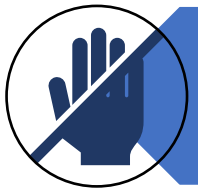
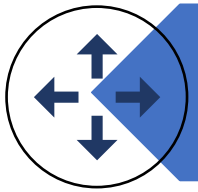
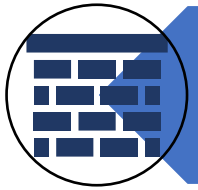
Resist

Options that keep the water away

Relocate

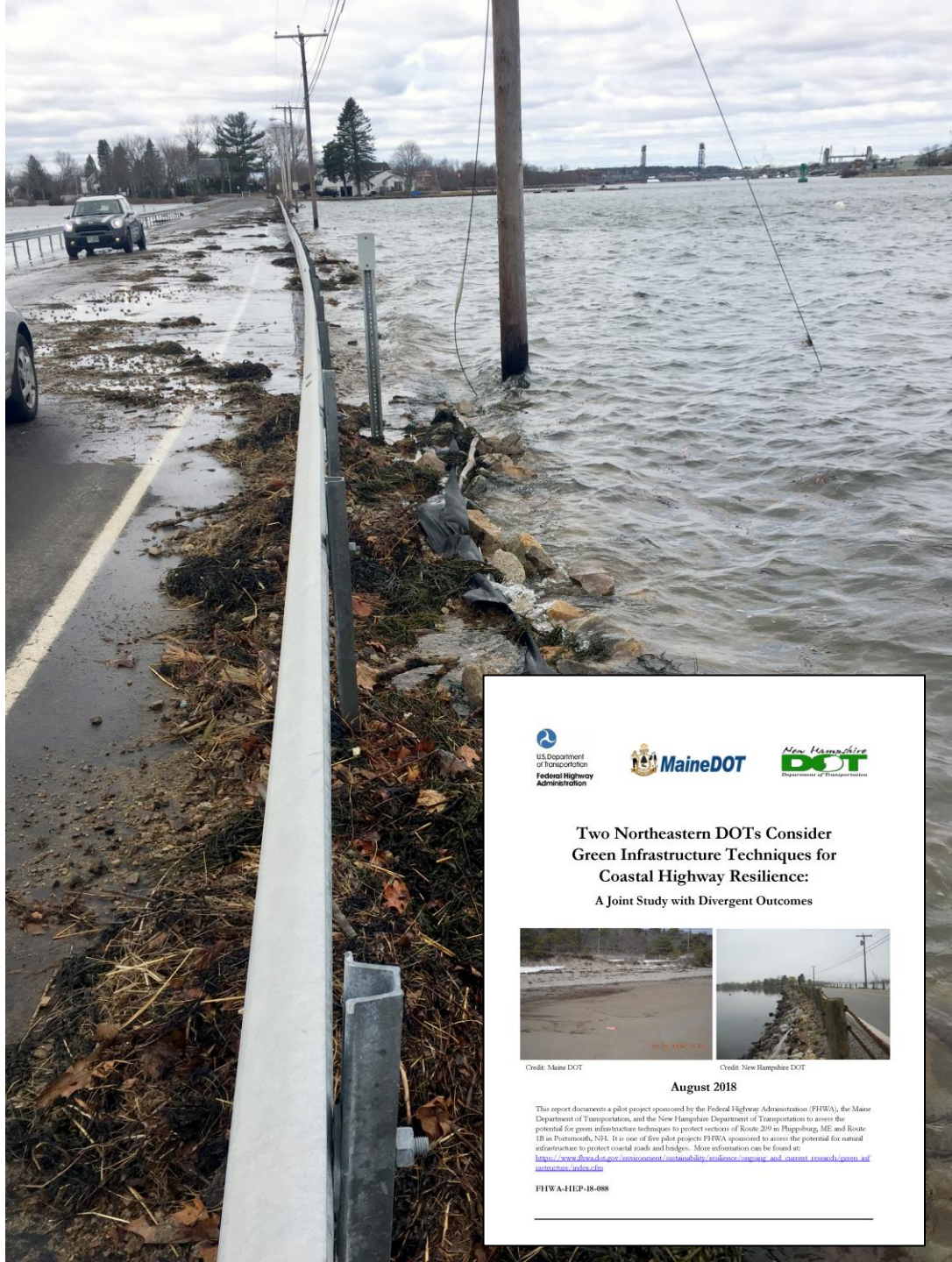
Move assets of facilitate retreat away from the water

Actions - Based on Coastal Flood Risk Guidance

	Level of Risk for Coastal Flooding	Tolerance for Flood Risk
 No Action	Very Low to Low	High
 Avoid	Very Low	Medium to Very Low
 Accommodate	Moderate	Medium
 Resist	High	Low to Very Low
 Relocate	High	Low to Very Low

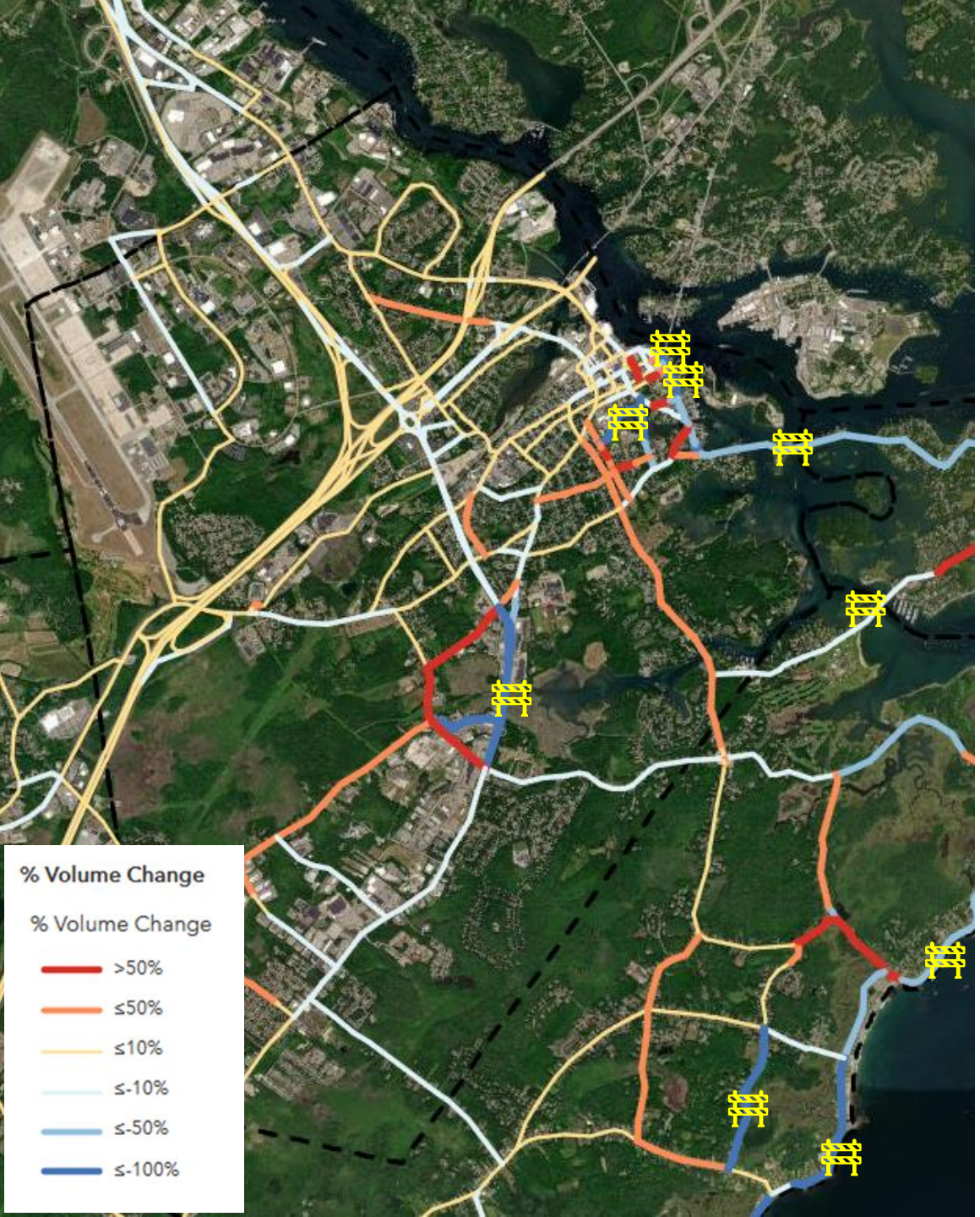
New Castle/ Portsmouth Ave

- **Accommodate**
  - Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
  - Causeway or Bridge – Not a viable option given short distances impacted
  - Detours – Alternate route also impacted
- **Resist**
  - Raising Causeway or Bridging
  - NHDOT evaluating causeway options (New Castle 29614)
- **Retreat/Relocate**
  - Not desired – Evacuation Route for New Castle
  - Retreat may be necessary at higher SLR



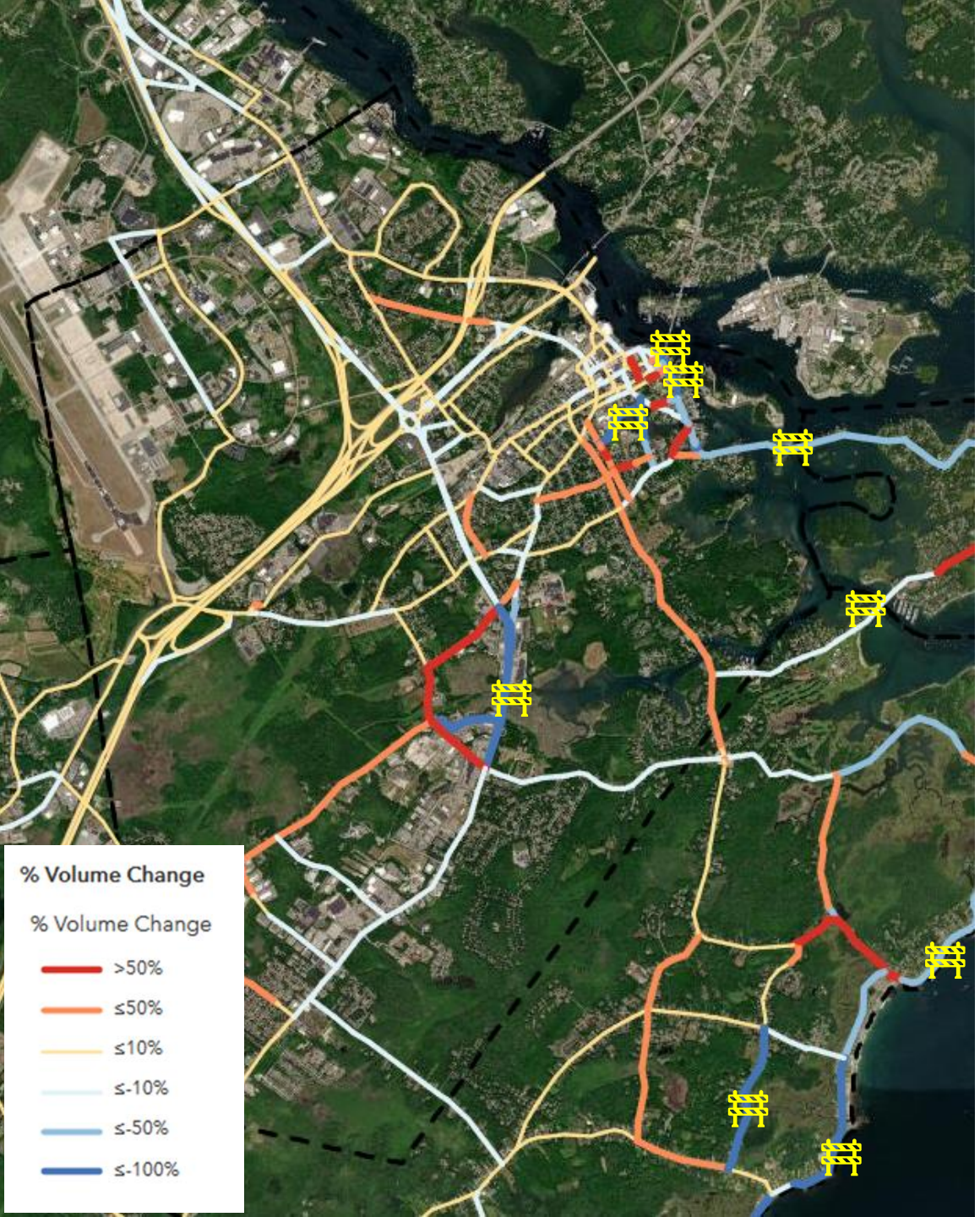
Wentworth Road (NH 1B)

- **Accommodate**
  - Reconstruct with more resilient materials
  - Evaluate utility of larger culverts
  - Causeway or Bridge – Not a viable option given short distances impacted
  - Detours – No alternate routes
- **Resist**
  - Roadway could be raised and rebuilt above expected SLR levels. This could require increased shoulder area – potential wetland impacts
  - Berms would simply shift the flooding elsewhere
- **Retreat/Relocate**
  - Not Desired – At least one access way to New Castle is required
  - Retreat may be necessary at higher SLR



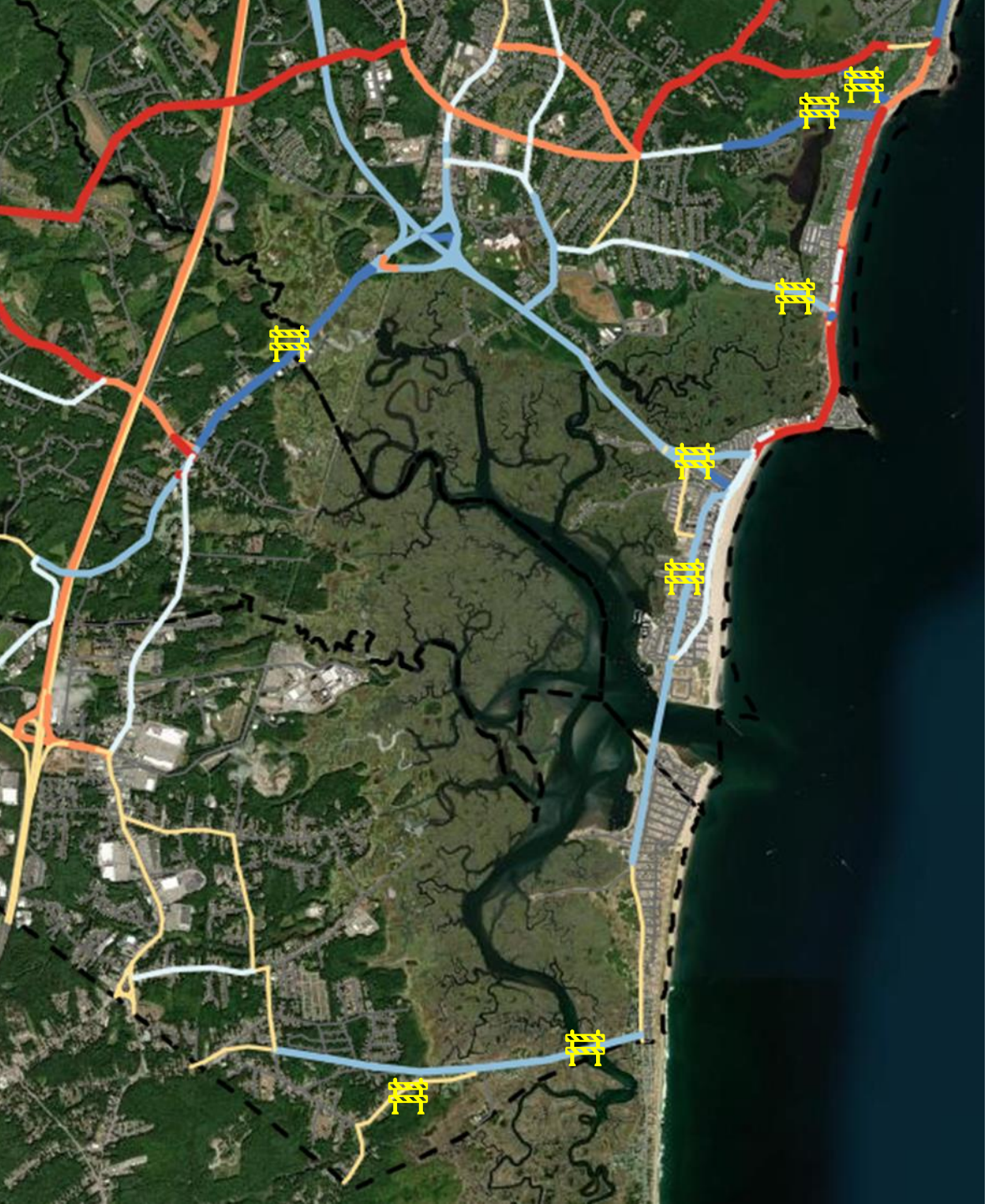
Next Steps

- Complete community meetings
- Development of site profiles
- Continue to refine traffic analysis (Some discussion of 6' SLR Impacts)
- Refining analysis of ten selected locations
- Completing in-depth look at two sites
  - Lafayette Road in Hampton
  - Marsh Rd/Parsons Road/NH 1A in Rye
- Public Meetings this winter
- Finalize project report for March 2022



Beyond the STCVA

- Integrate findings and potential transportation projects into Long Range Transportation Plan
- Refine resiliency criteria in project selection process
- Refine Travel Demand model to include more local roads in seacoast (Component of another study)
- Update and Integrate findings from State Hydrodynamic model after that is complete
- Look for additional grant opportunities to pursue further analysis, design, and engineering
    - Neil Pit Lane/Lavender Creek Culvert Analysis



Feedback

- General thoughts on project?
- Something that we missed?
- Options for addressing concerns?
- Output that would be helpful for community?
- Ideas for further analysis?

For More Information

RPC Project Staff

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https://www.therpc.org/STCVA