An aerial photograph of a coastal road, likely Highway 101 in California, showing the road curving along the coastline. The ocean is on both sides, and there are some buildings and trees visible on the land. The entire image has a blue color overlay.

Seacoast Transportation Corridor Vulnerability Assessment

David Walker
Assistant Director/
Transportation Program
Manager

**Community Updates &
Engagement**

Winter, 2022



Agenda



Project Summary

15 Minutes



Transportation
Network Impacts

15 Minutes



Conceptual
Adaptation Options

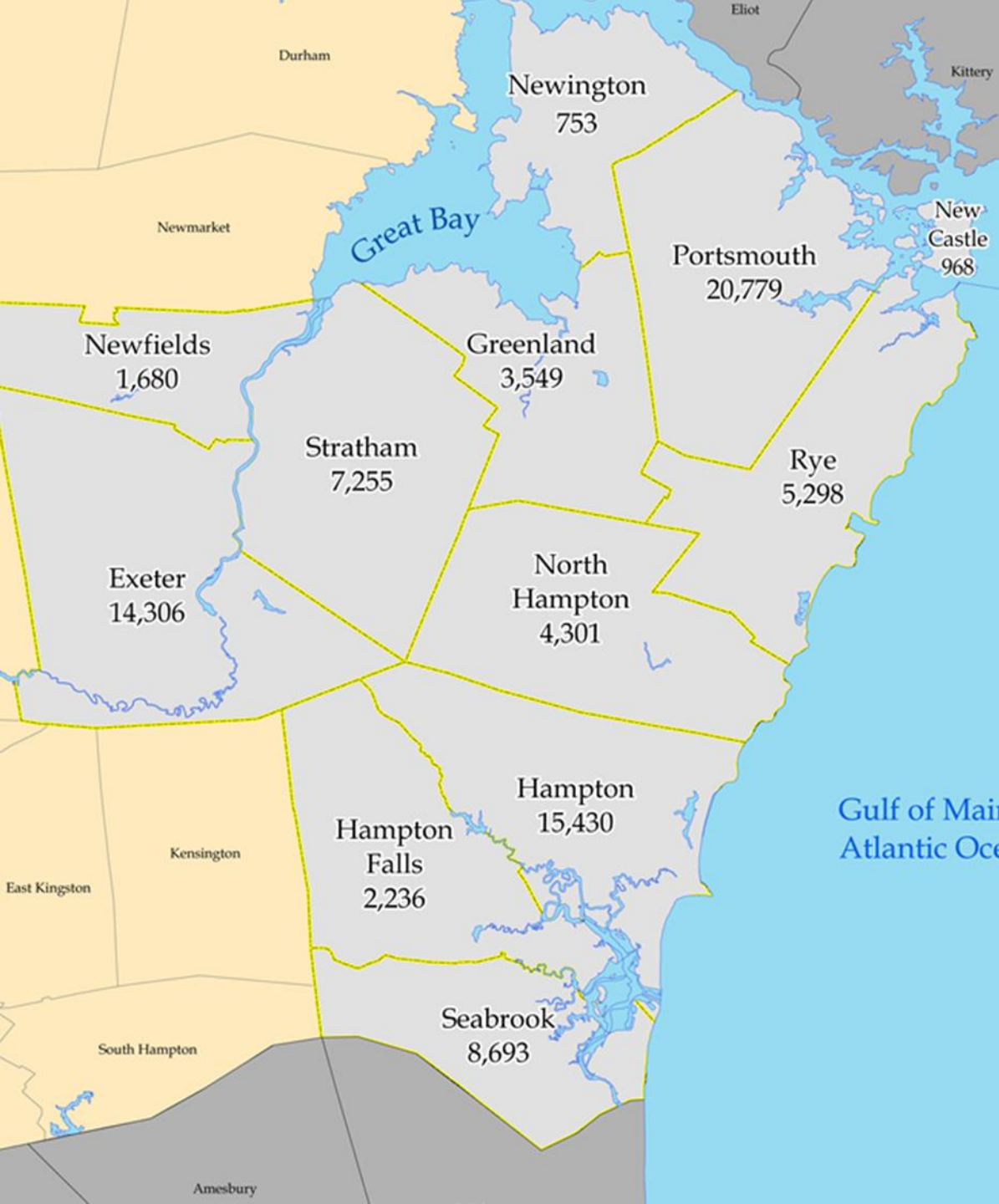
15 Minutes



Community
Feedback

30 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



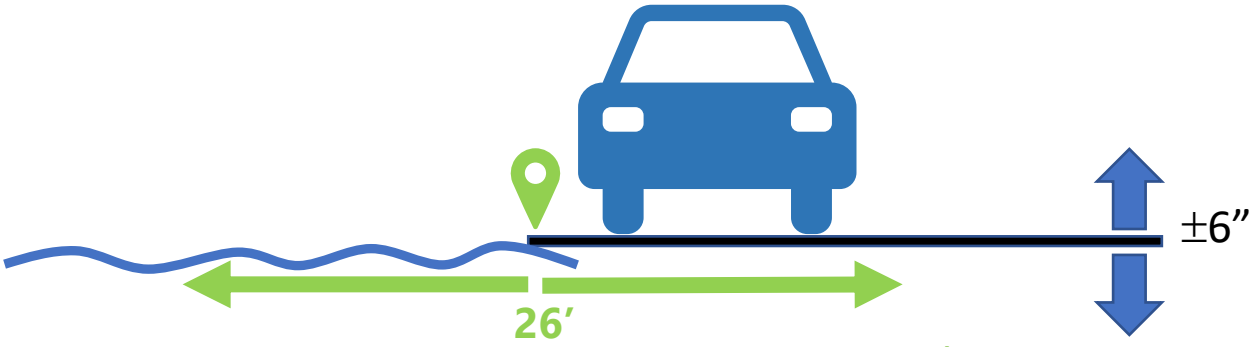
STCVA Transportation Planning Outcomes

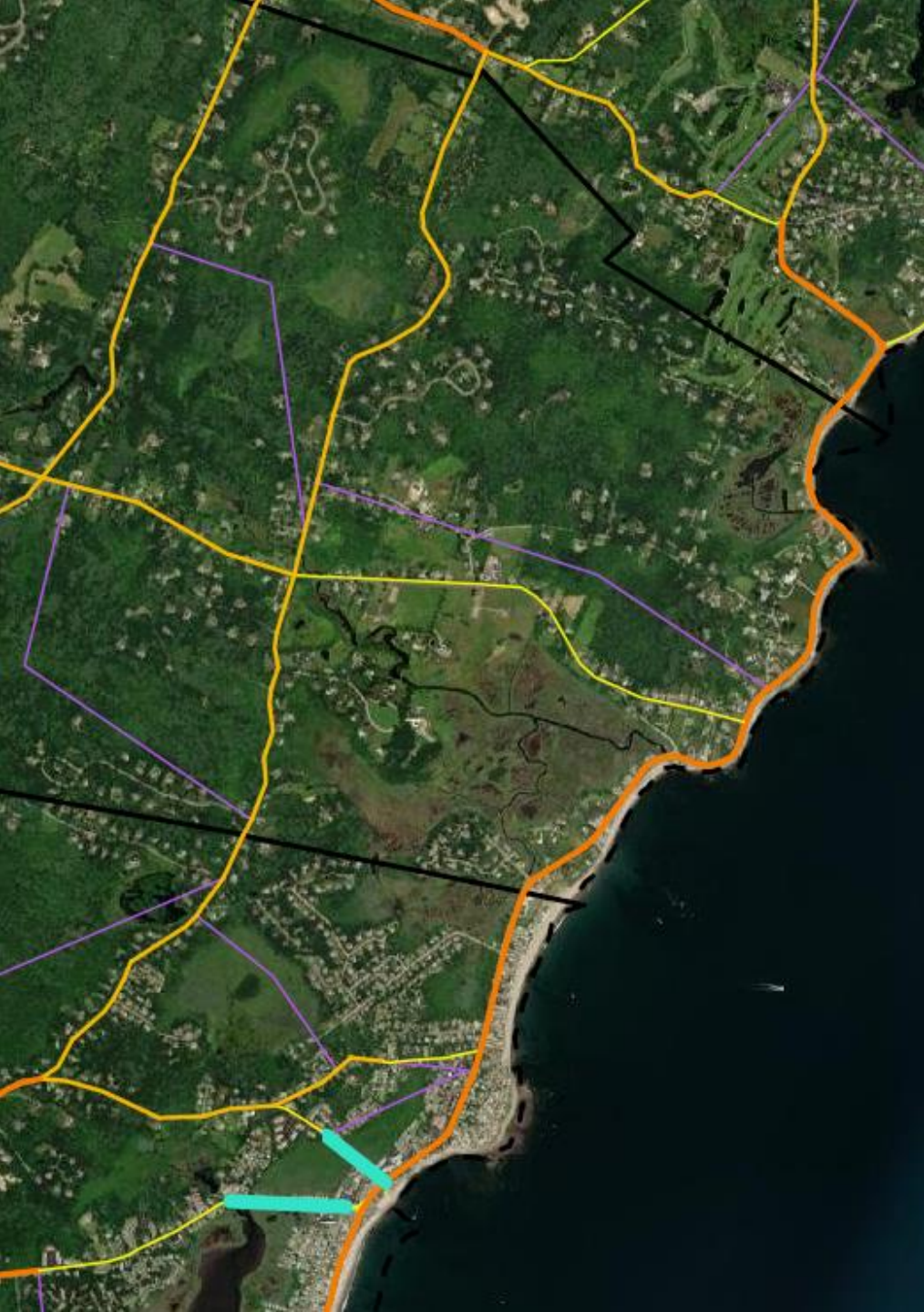
- Enhanced understanding of risks to transportation network from climate change
- Critical links identified and impacts of closures on the transportation network assessed
- Improvement concepts and costs developed for priority locations to better understand scope and scale of building a more resilient 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



LIDAR Data Accuracy

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





Travel Demand Model Caveats

- Model is primarily intended to look at big-picture traffic patterns but can provide insight into local movement
- Model includes many, but not all, local roadways
- Land use aggregated into zones (Houses create traffic, businesses receive it)
- Trips are loaded from zones to roadway network via load links (purple lines)
- Placement of load links can create odd outcomes
- What the model believes is the most efficient route can sometimes diverge from what is seen in real life

Identifying & Prioritizing Impacted Roadways

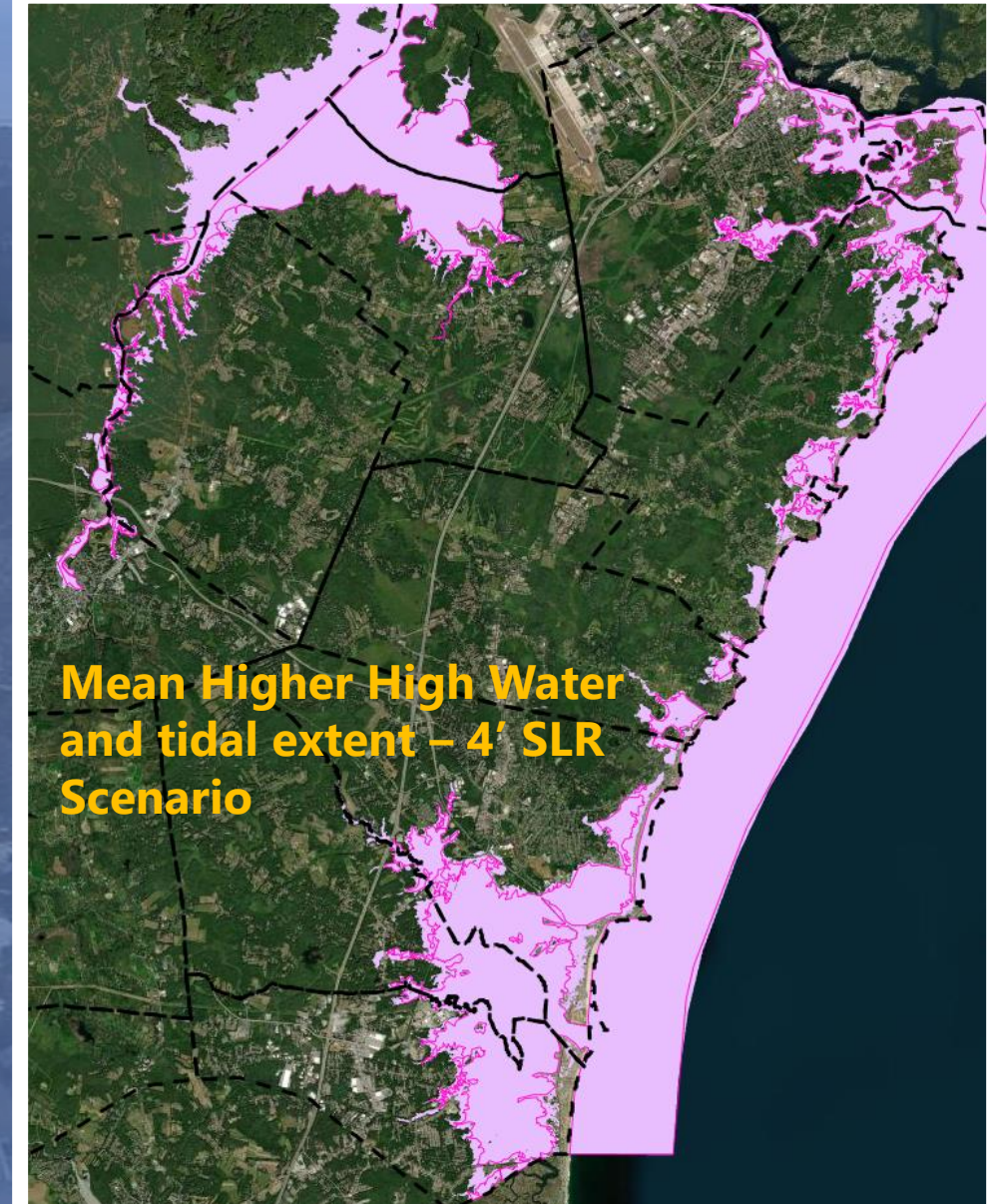
Previous Work on Sea Level Rise Impacts

- 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



Identifying & Prioritizing Impacted Roadways

Previous Work on Sea Level Rise Impacts

- Tides to Storms
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Regional Travel Demand Model

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

Transportation System Impacts of Sea Level Rise



Travel Demand Model links – 4' SLR Scenario

Identifying & Prioritizing Impacted Roadways

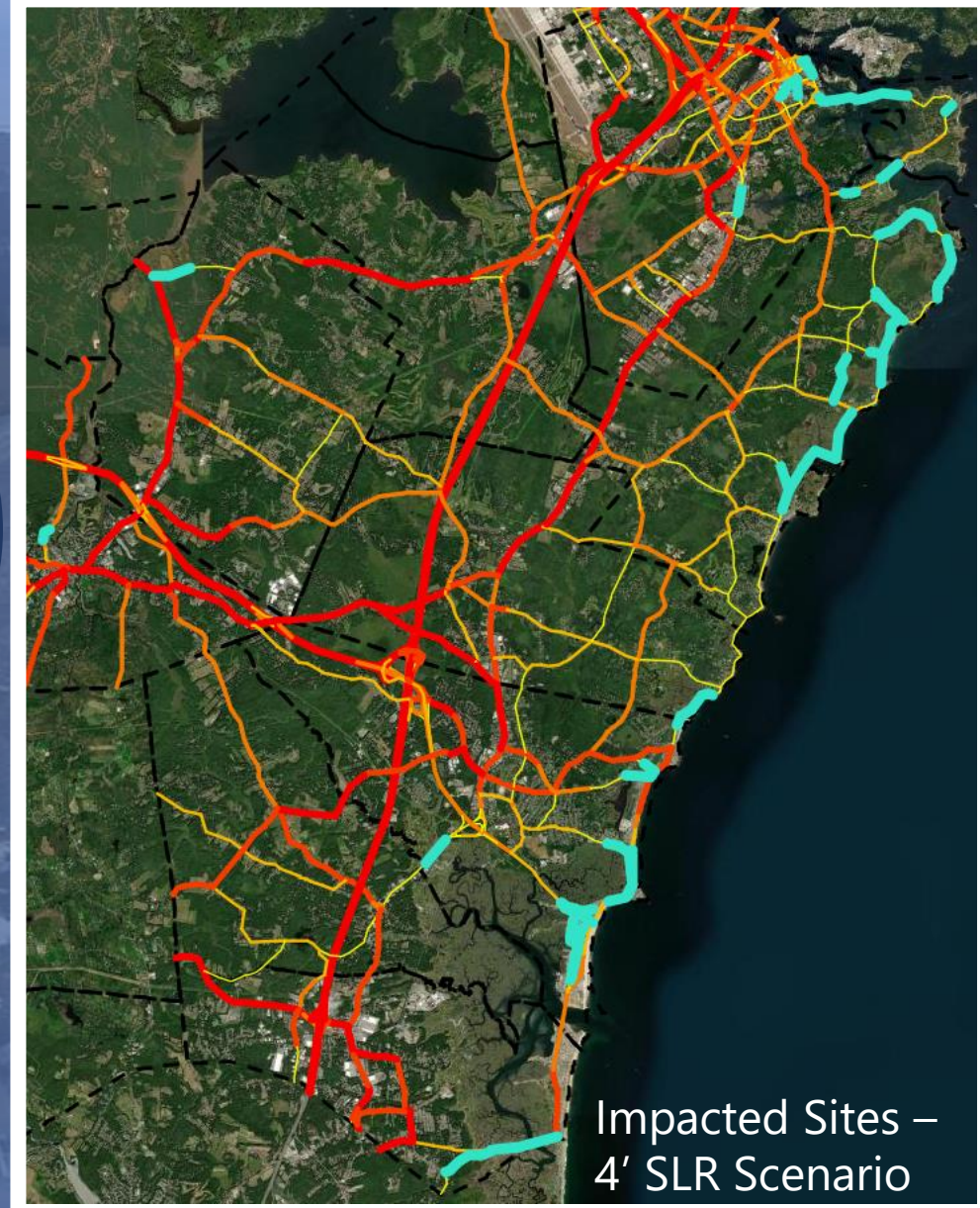
Previous Work on Sea Level Rise Impacts

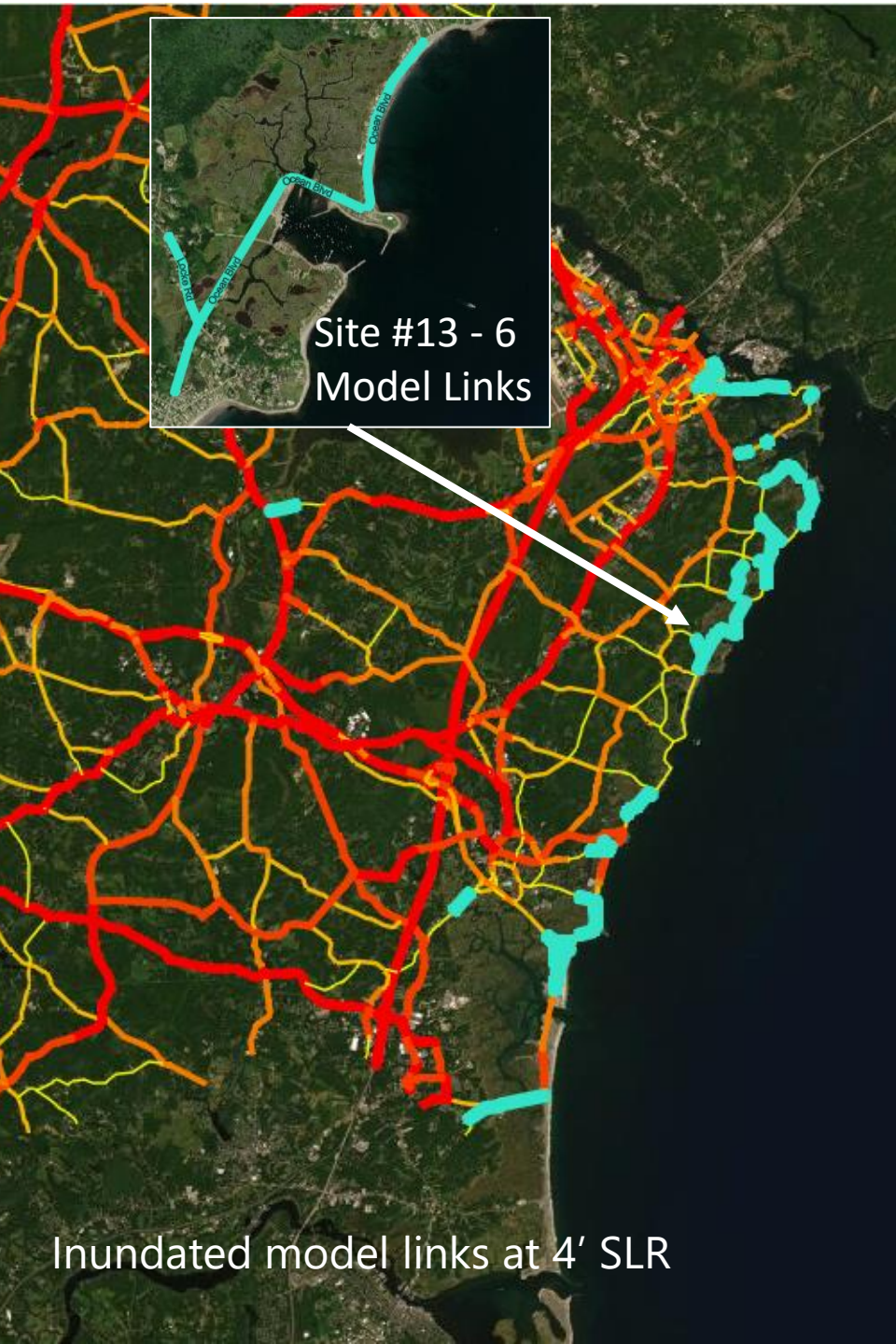
- Tides to Storms
- Coastal Risks and Hazards Commission
- 2020 NH Science Summary

Regional Travel Demand Model

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

Transportation System Impacts of Sea Level Rise





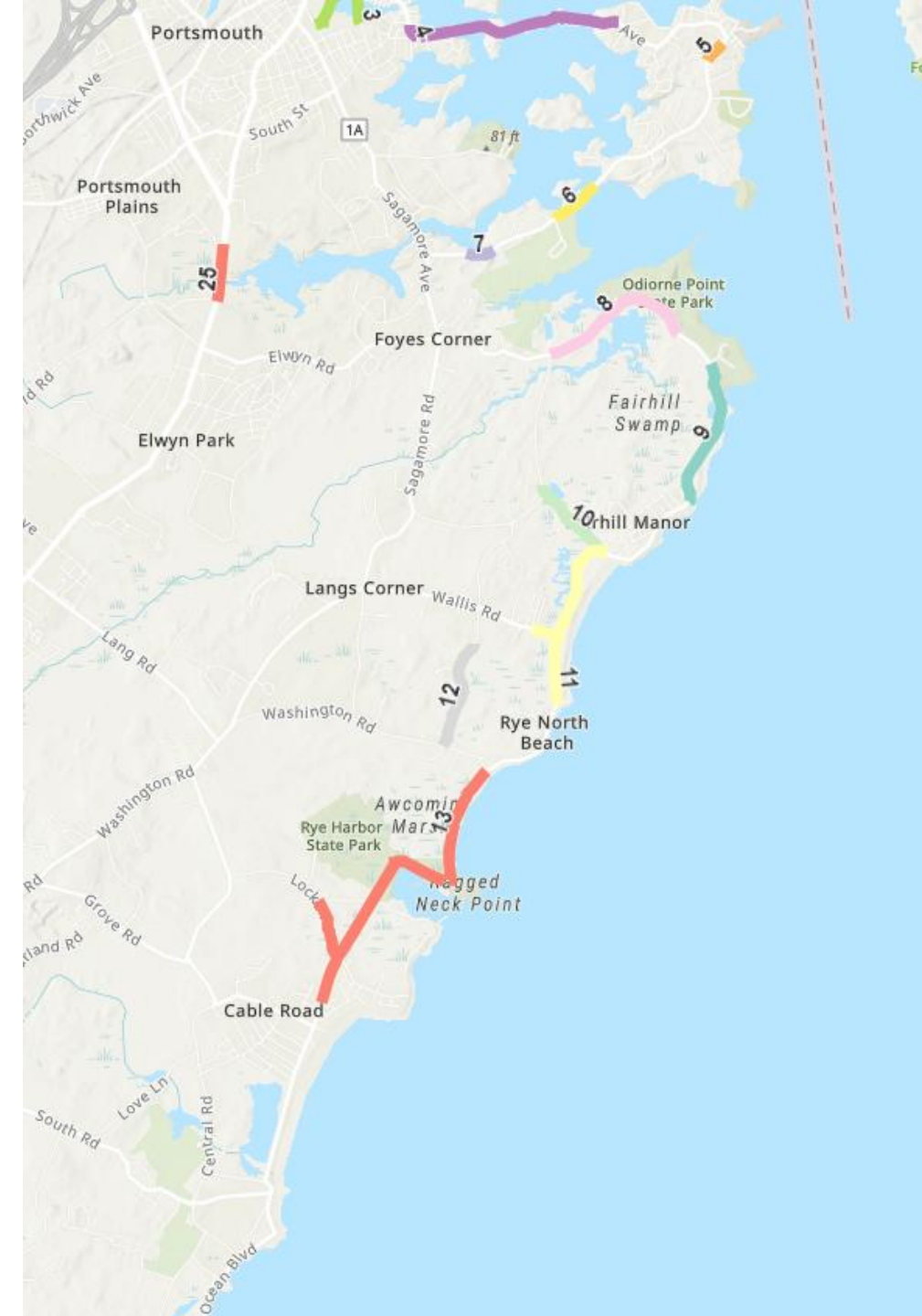
Identify Impacted Model Links and Group into Sites

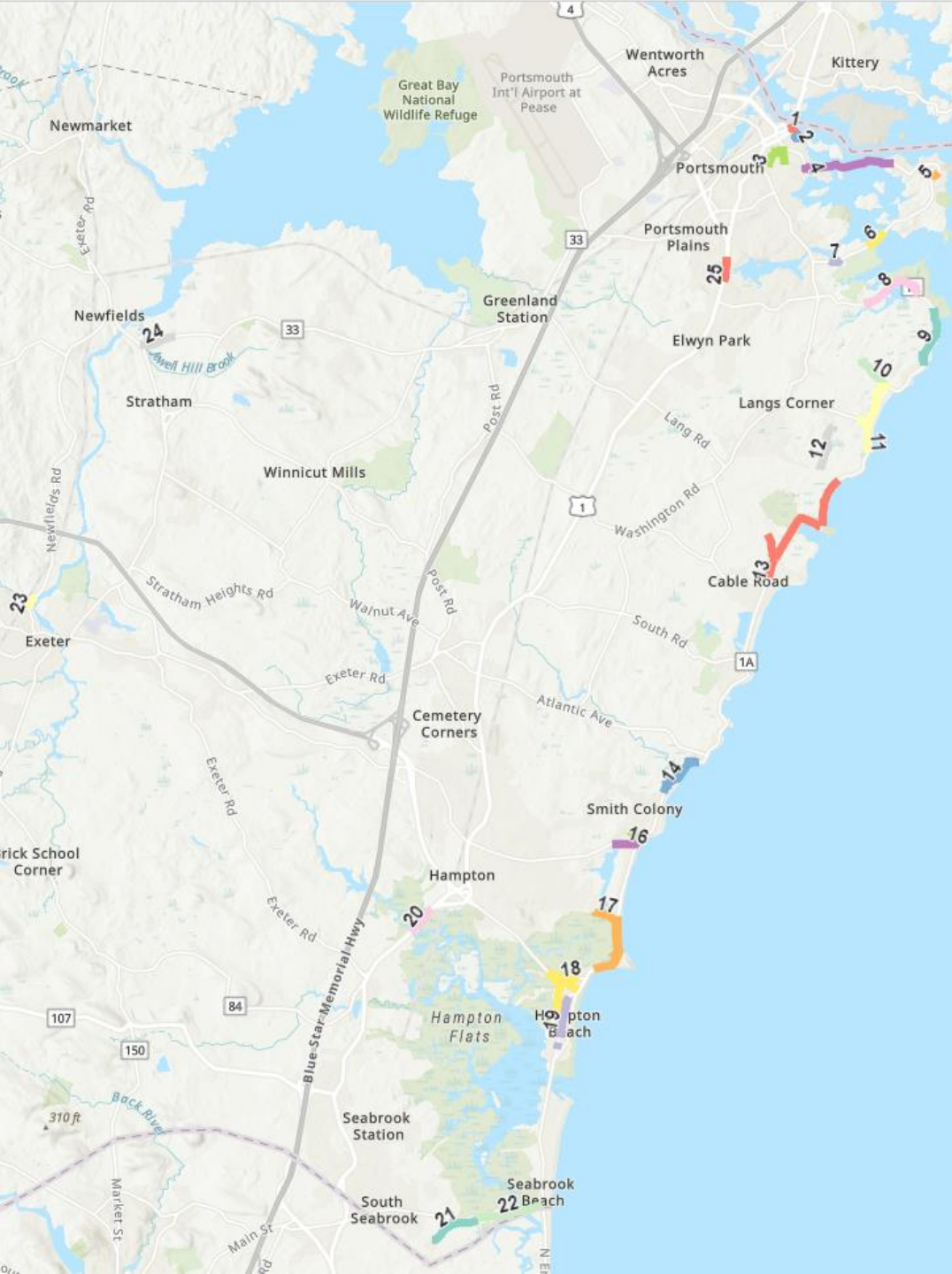
Scenario	Impacted Model Links	Approx. Miles Impacted	Evaluation Sites
1'	4 model links	0.5	3
1.7'	13 model links	1.0	5
4'	126 model links	16.8	25
6.3'	259 model links	28.0	50+

Rye Sites

- Marsh Road Impacts begin at 1' sea-level rise
- All others by 4' sea-level rise

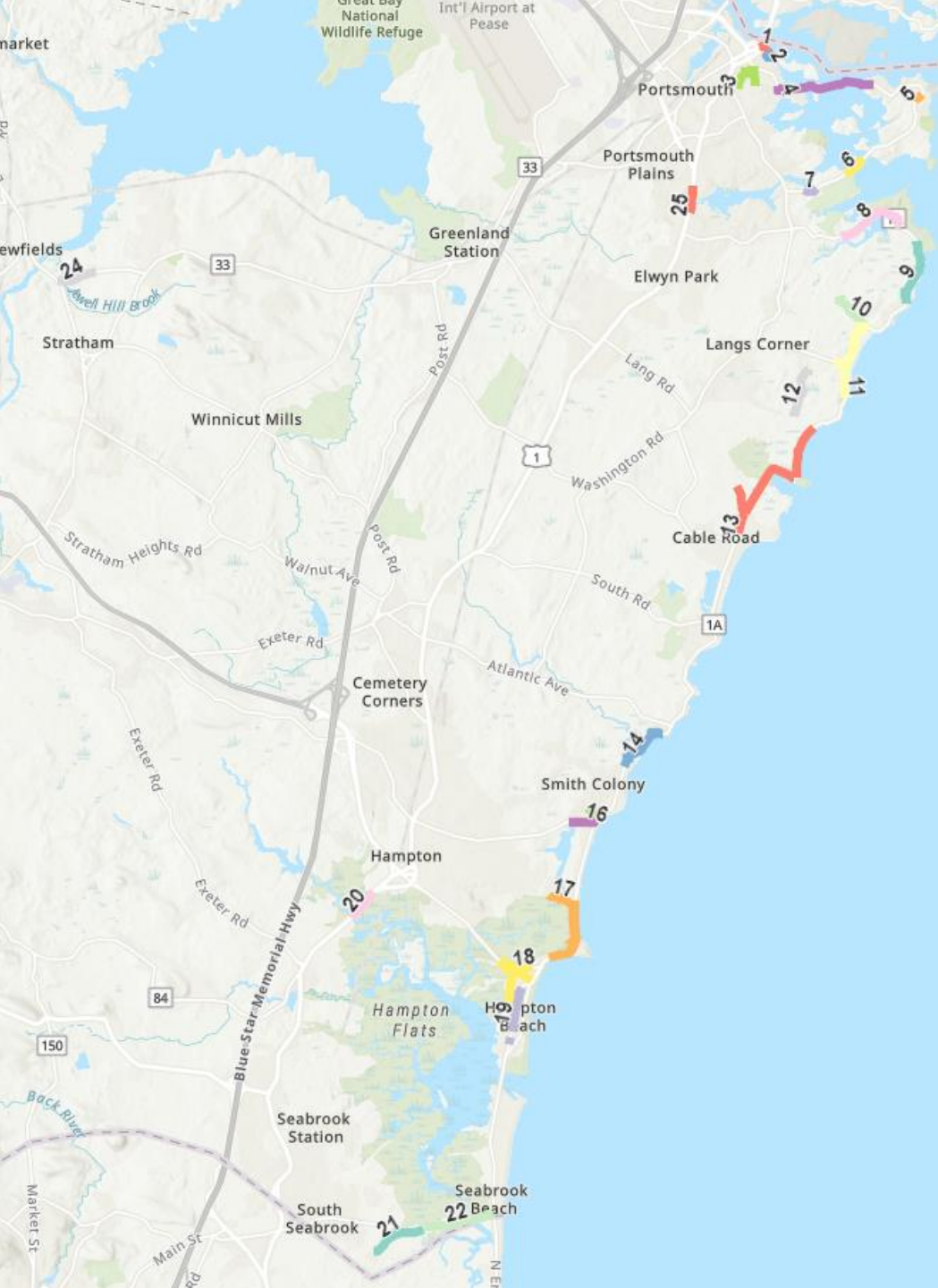
Town	Site	Map number	SLR Impact level
New Castle/Rye	NH 1B – Pitt Lane/Sanders Poynt/Portsmouth Marina	5,6,7	4'
Rye	NH 1A – Odiorne Point North	8	4'
Rye	NH 1A – Odiorne Point South	9	4'
Rye	Marsh Road/Parsons Road	10	1'
Rye	NH 1A/Wallis Road	11	4'
Rye	Brackett Road	12	4'
Rye	NH 1A/Locke Road/Rye Harbor	13	4'





Identify Priority Sites for Evaluation

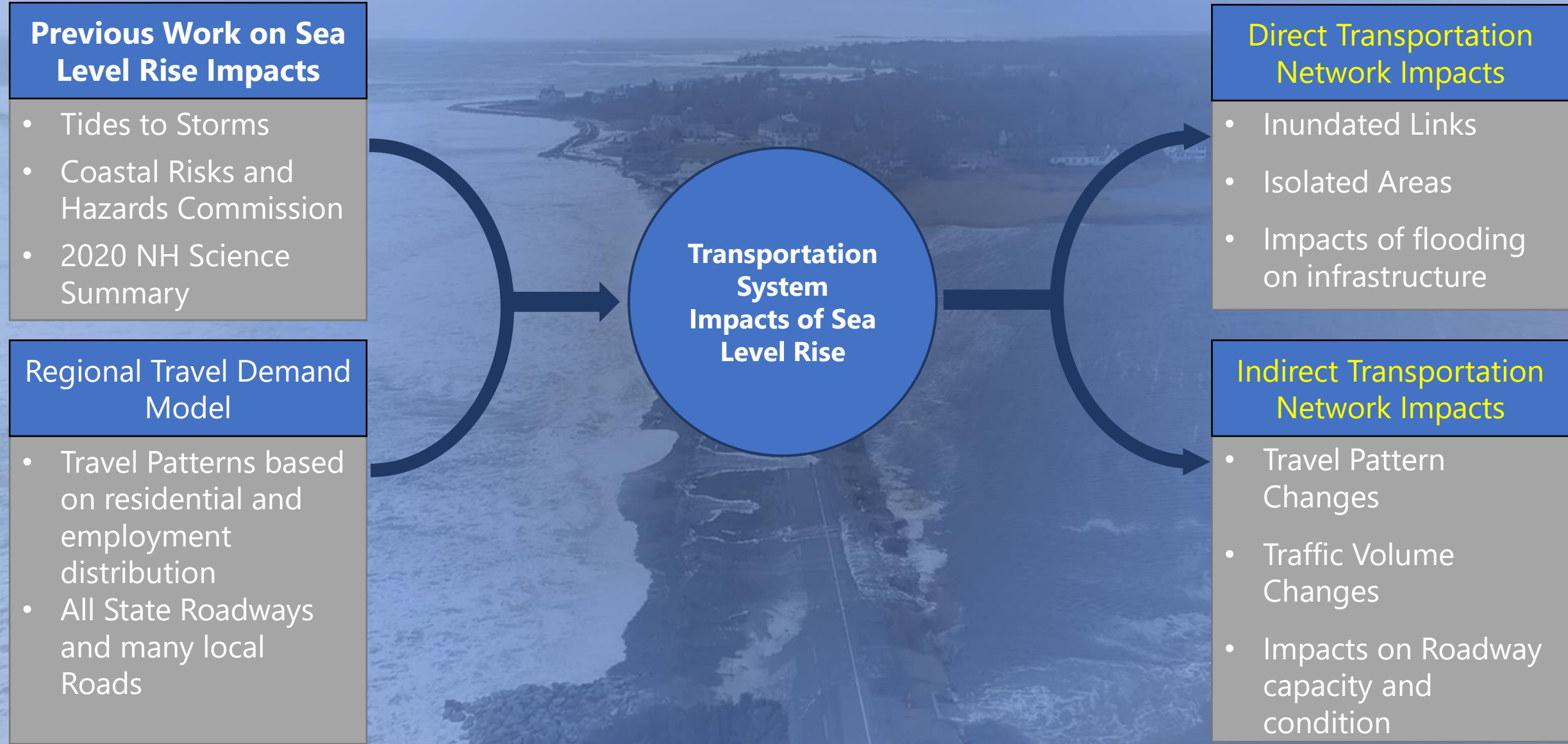
- Preliminary list of sites developed based on criteria composed of operational, health and safety, socio-economic factors
- List Sent to NHDOT and other partners for feedback
- 10 candidate sites Selected
 - Assemble site profiles
 - Assess types of impacts and potential adaptation measures
 - Apply New Hampshire Coastal Flood Risk Guidance
- 2 sites selected for more detailed examination



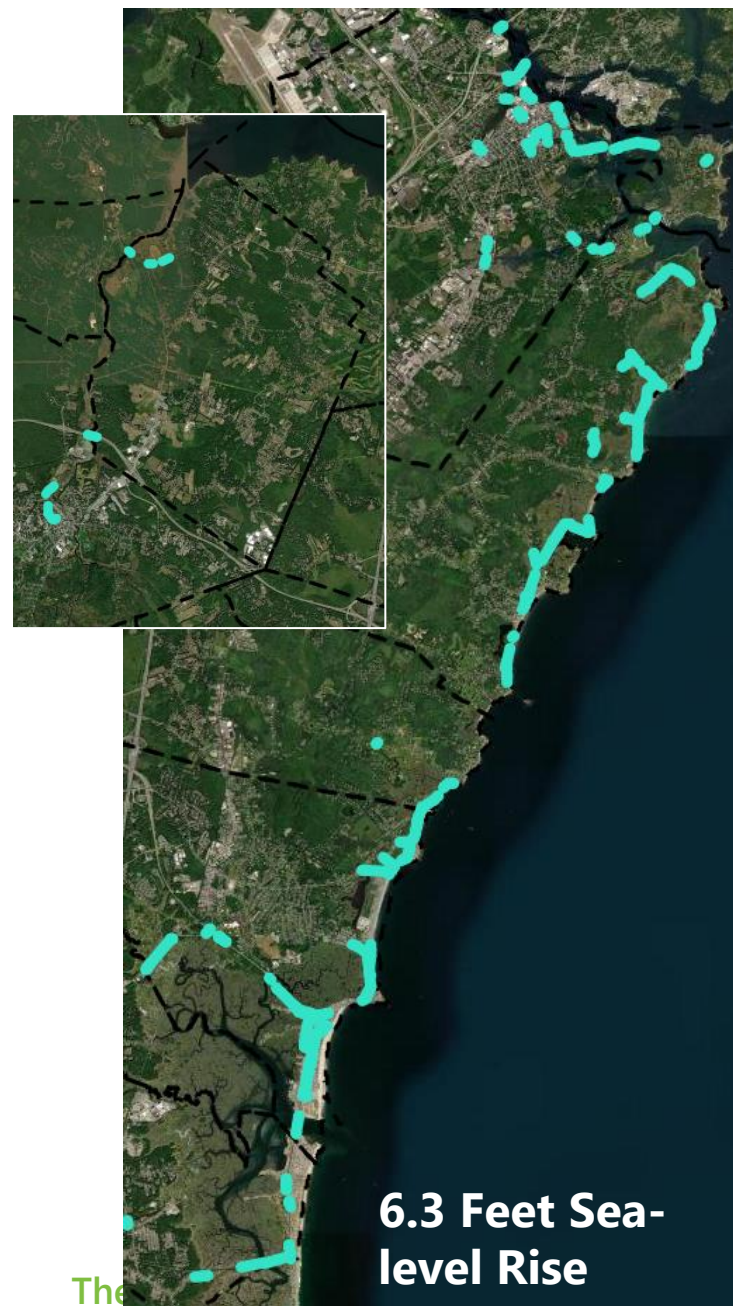
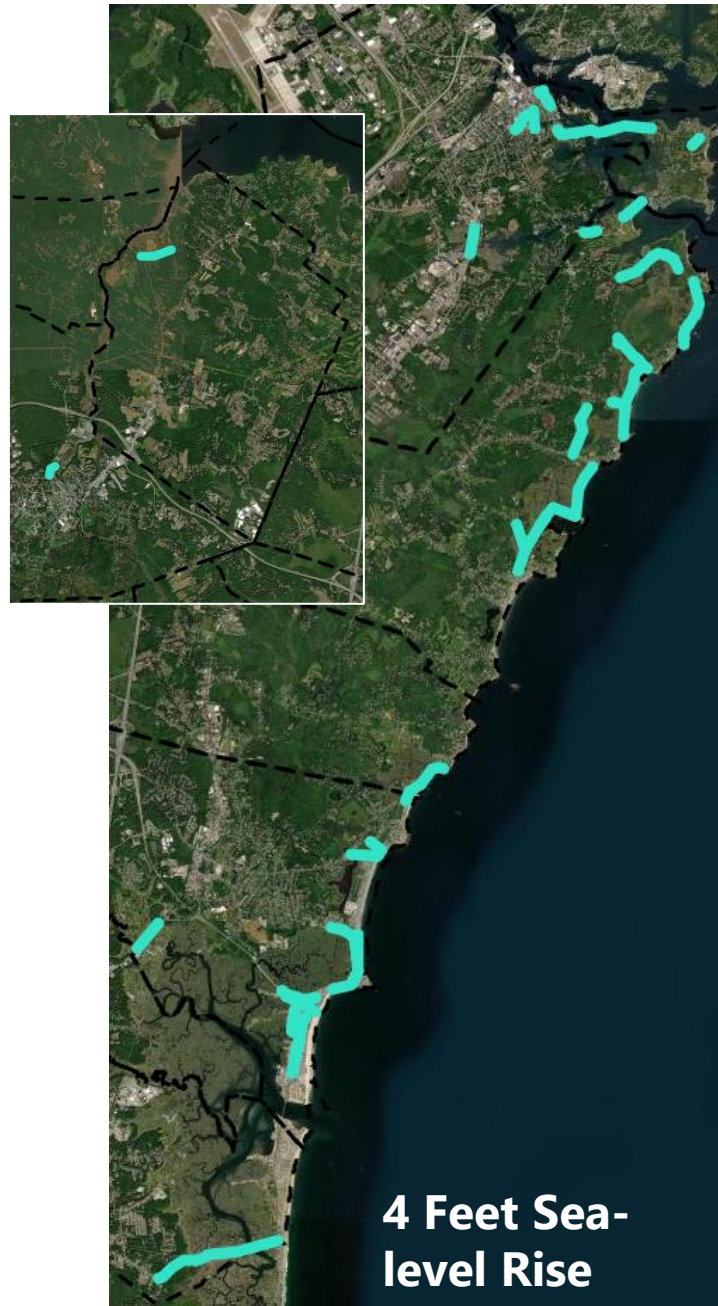
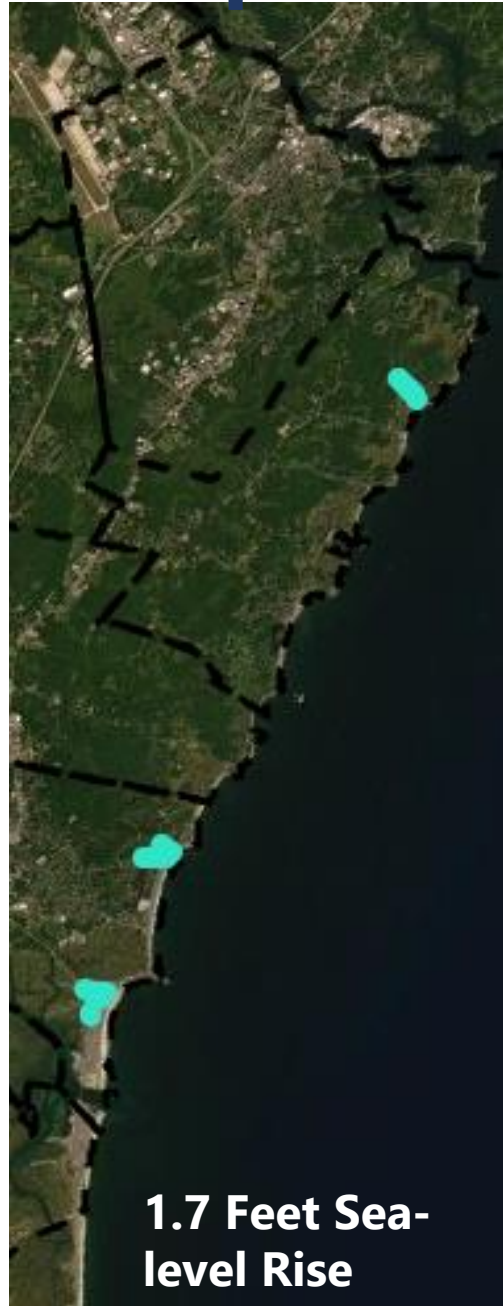
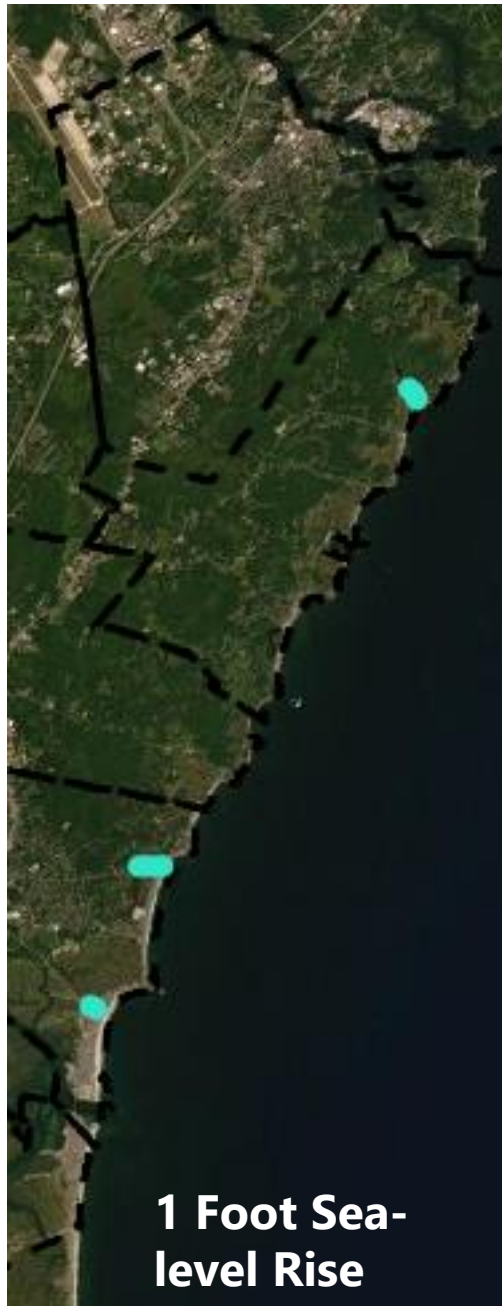
Priority Sites for Evaluation

Town	Site	Site #	SLR Impact level
New Castle/ Rye	Wentworth Rd/NH 1B	5,6,7	4'
Rye	Marsh Rd, Parsons Rd	10	1'
Rye	Ocean Blvd, Wallis Rd	11	4'
Rye	Locke Rd, Ocean Blvd	13	4'
Hampton	Cusack Rd	15	1.7'
Hampton	High St	16	1'
Hampton	NH 1A SB On ramp, Ocean Blvd, Winnacunnet Rd	17	4'
Hampton	Brown Ave, Church St, Glade Path, Highland Ave, NH Rt 101	18	1'
Hampton	Lafayette Rd	20	4'
Seabrook	South Main St/ NH 286	21,22	4'

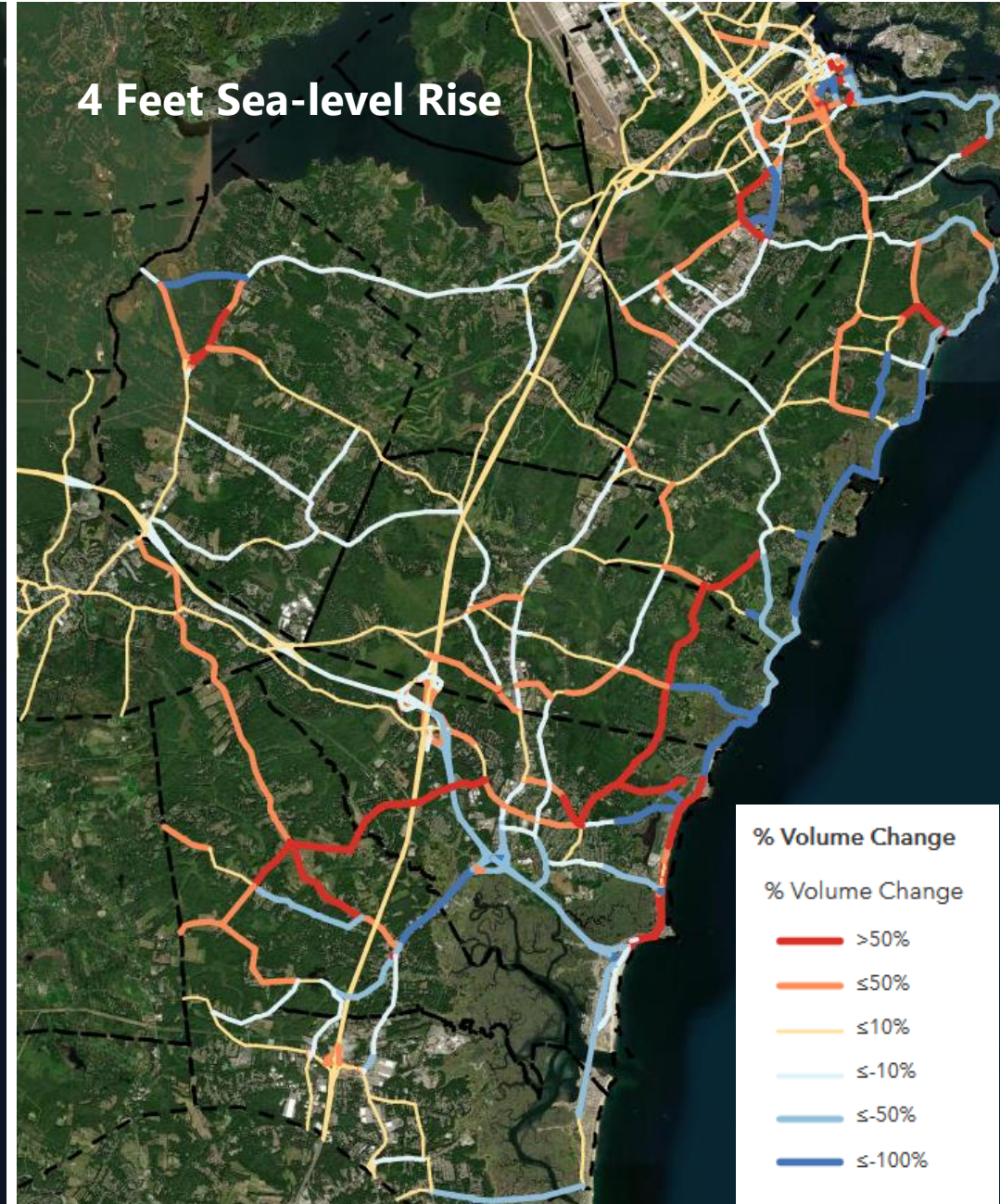
Transportation Impacts



Areas of Anticipated Inundation



Estimate Traffic Impacts of Road Closures



Traffic Impacts 1' SLR

- Marsh Road Impacted
 - Parsons Road still accessible
- Traffic shifts to:
 - Wallis Road: +80-100%
 - Brackett Road between Wallis and Clark: +64% volume.
 - Do not have volume counts available on this section
 - Clark Road: +50% volume to around 600 vehicles per day. Summer volumes closer to 1,000 vehicles per day.



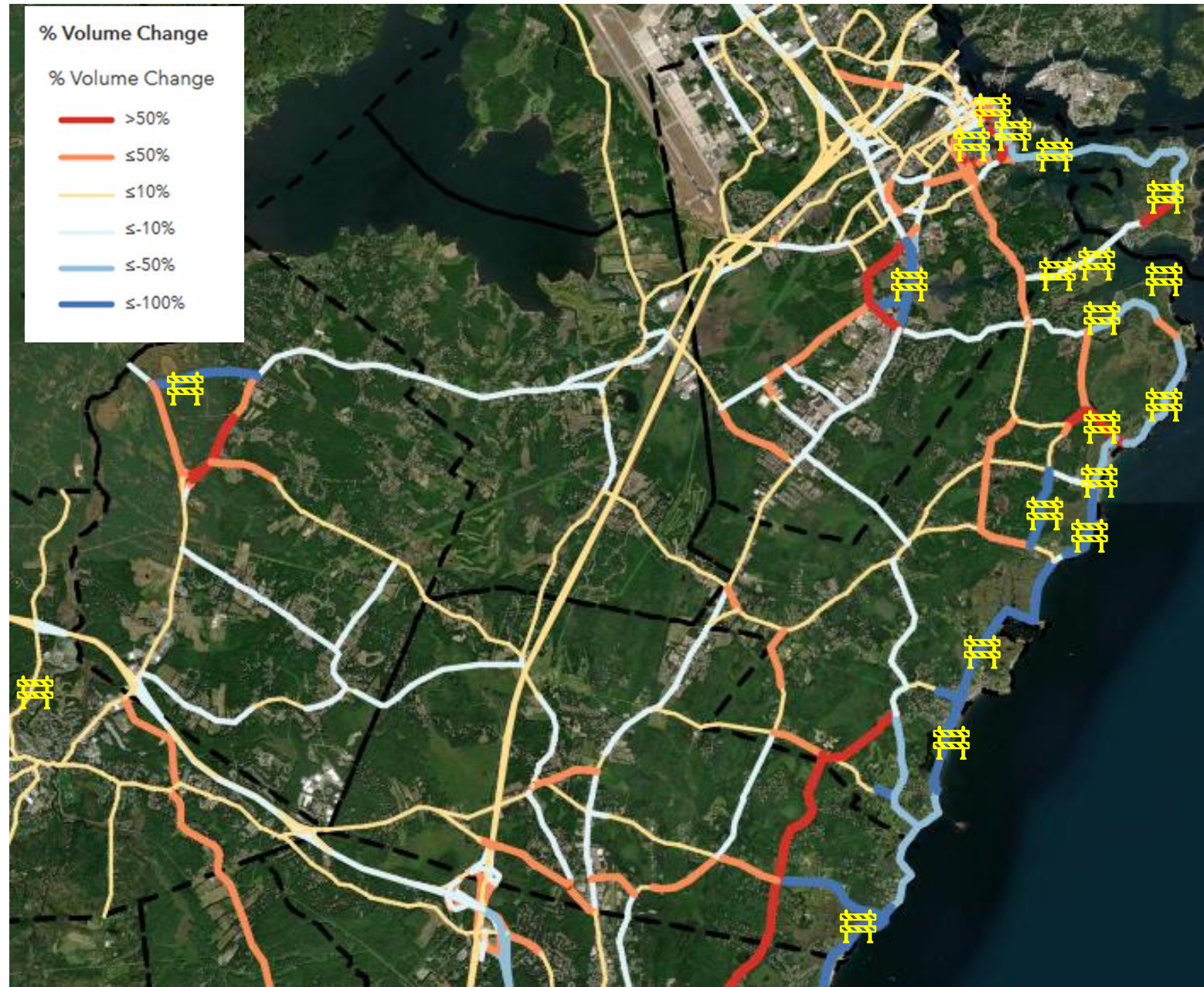


Traffic Impacts 1.7' SLR

- Marsh Road & Parsons Road Impacted
 - Only eastern portion of Parsons is accessible
- Continued shift of traffic south to Wallis Road, Brackett Road, and Clark Road.
- 10-15% increase on Sagamore Road as it takes traffic that may have used the northern part of Brackett Road
- Increases in central Rye as traffic reroutes around closures in Rye and Hampton.
 - Lang Road: +20% volume
 - Central Road: +35-90% volume

Traffic Impacts at 4' SLR

- New Castle Island Inaccessible
- Odiorne Point and Rye Harbor Inaccessible
- US 1 Impacted in Portsmouth
- Coastal access limited to Atlantic Avenue and a few other roads in Rye
- Portions of NH 1A inaccessible
- Coastal neighborhoods isolated from remainder of community – or inaccessible
- Inland impacts in Stratham and Exeter

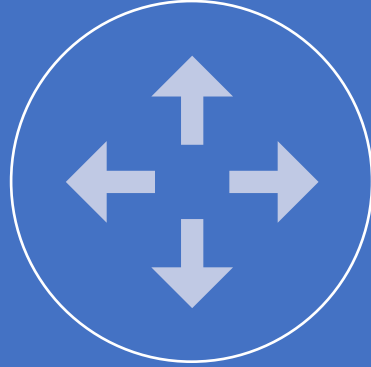


Actions Considered



No Action

Do nothing



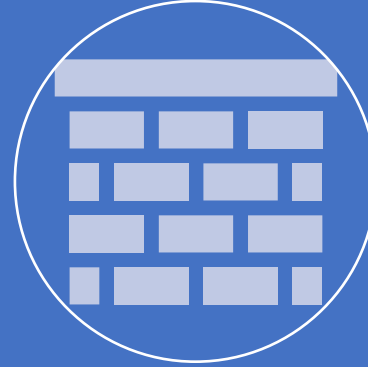
Avoid

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


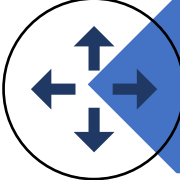

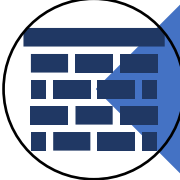
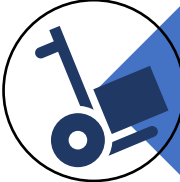


Relocate

Move assets of facilitate retreat away from the water



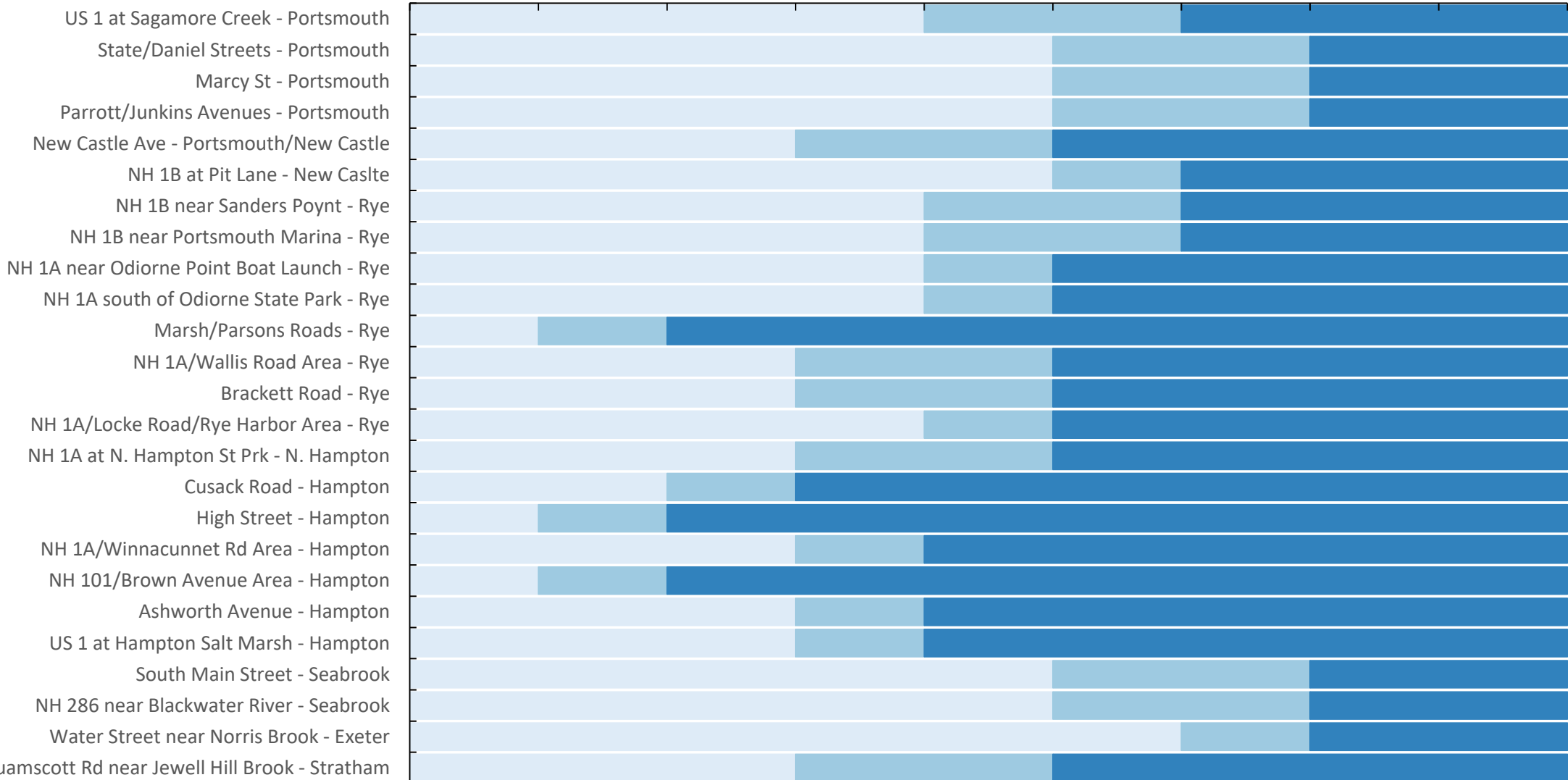
Actions - Based on Coastal Flood Risk Guidance

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

Planning Timeframes

Road Surface Status - Low Tolerance For Flood Risk

2020 2030 2040 2050 2060 2070 2080 2090 2100 2110



Open

Water on the Road

Inundated

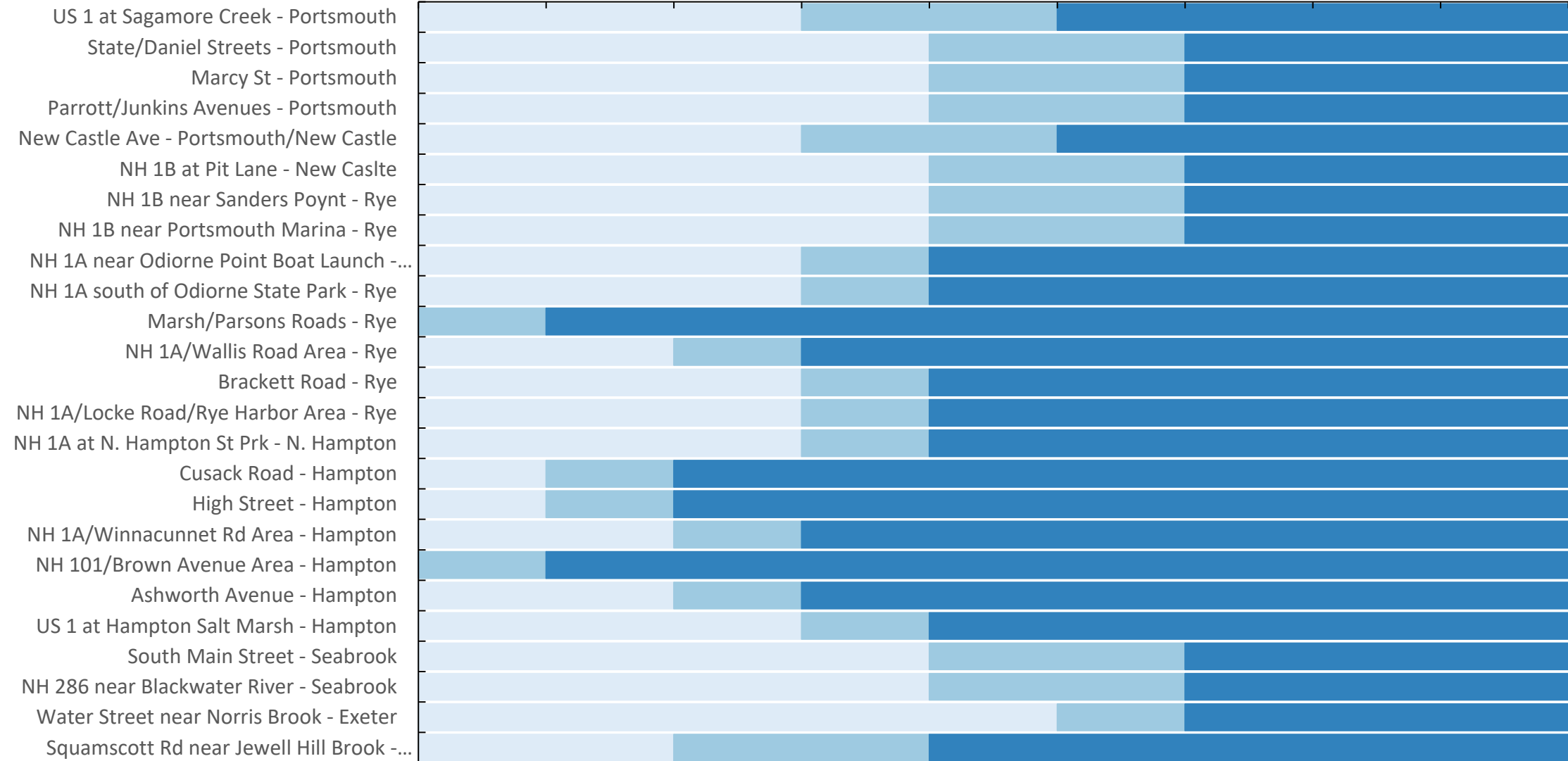
Estimated Sea-level Rise (ft)



Planning Timeframes

Road Surface Status - Very Low Tolerance For Flood Risk

2020 2030 2040 2050 2060 2070 2080 2090 2100 2110



Open

Water on the Road

Inundated

Estimated Sea-level Rise (ft)



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

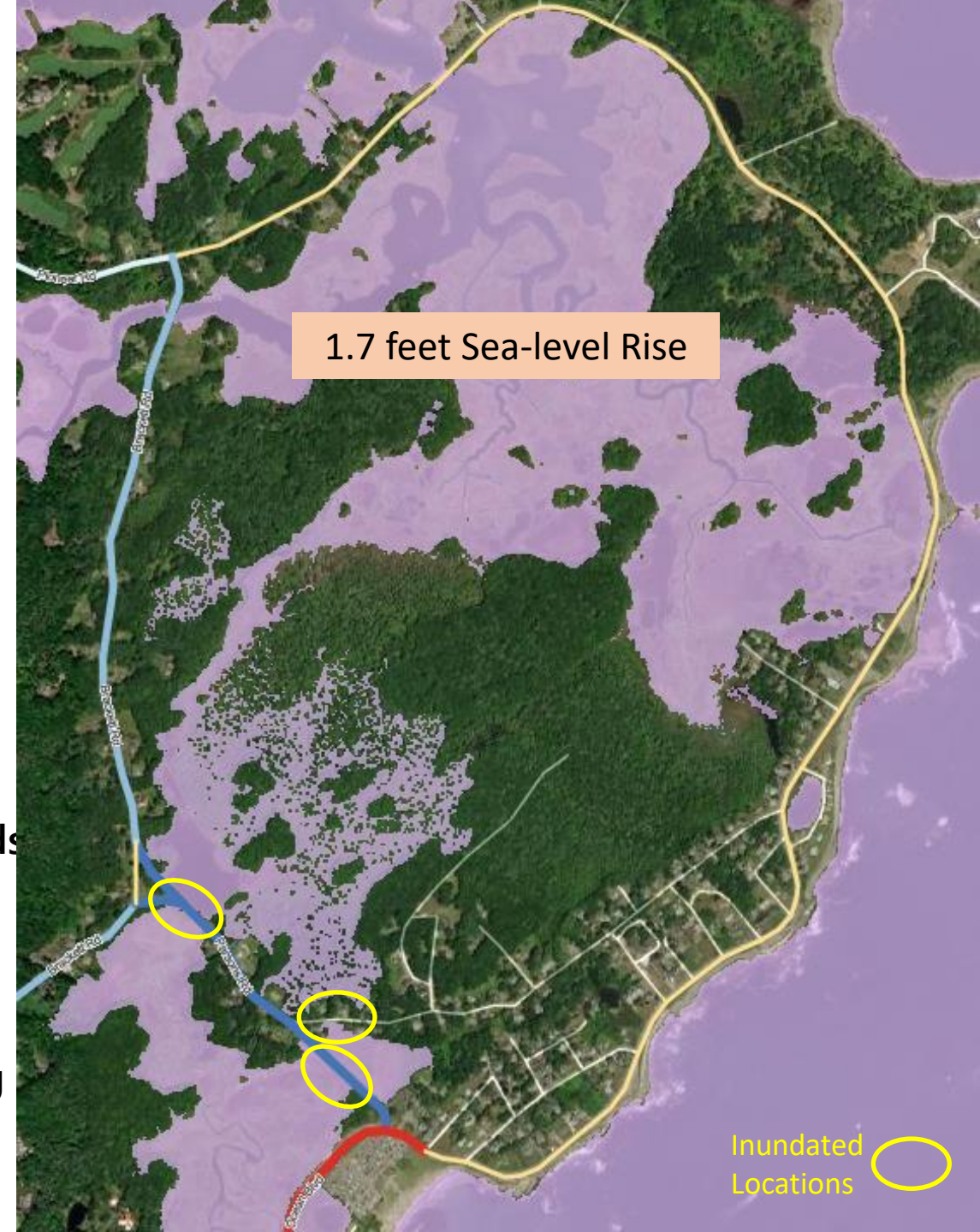
- **Retreat/Relocate**

- Not Desired – At least one access way to New Castle is required



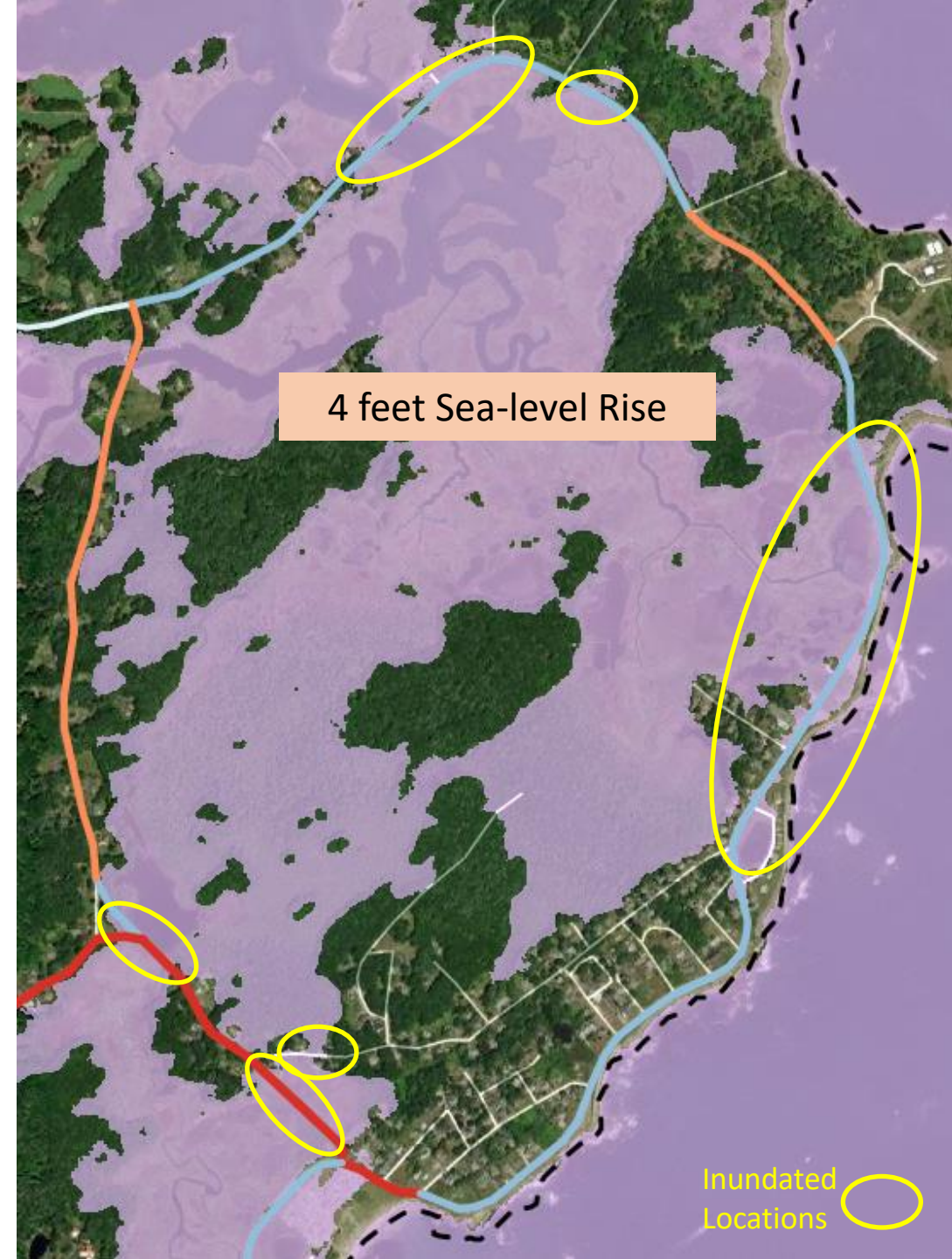
Marsh Rd/Parsons Rd

- **Accommodate**
 - Reconstruct roadway with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
 - Detours – Close Marsh Road/Parsons Road during high water. NH 1A alternative as alternative route
- **Resist**
 - Raising Roadway to elevate pavement surface above expected SLR. Likely impacts on adjacent wetlands and properties
 - Berms could be constructed to keep water off of the roadway but may also have impacts on adjacent wetlands and properties
- **Retreat/Relocate**
 - Part of Marsh Road could be abandoned without direct impacts to existing development. Parsons Road flooding impacts residents directly and isolates parts of the neighborhood.



Marsh Rd/Parsons Rd/NH 1A

- **Accommodate**
 - Bridge or Causeway on Marsh Road/Parsons Road
 - Culvert Redesign – Larger/Redesigned culverts will not mitigate the problem due to site conditions
 - Detours – Marsh/Parsons Roads as alternative to NH 1A
- **Resist**
 - Raising Marsh & Parsons roads to elevate pavement surface above expected SLR. Likely impacts on adjacent wetlands and properties
 - Raising NH 1A may be feasible (1+ mile needed)
 - Berms could be constructed to keep water off of the roadway but may also have impacts on adjacent wetlands and properties
- **Retreat/Relocate**
 - Abandon NH 1A North of Pollock Drive and West of Berrys Brook.



NH 1A/Wallis Road

- **Accommodate**

- Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
- Expand Culverts – Evaluate the effectiveness of increasing culvert size. Existing culverts on Wallis Road are moderate replacement priorities due to inundation.
- Detours – Close road during high water and redirect traffic to alternate routes. Install permanent signage/controls

- **Resist**

- Raising Roadway – Would keep water off of roadway but leave adjacent development still prone to flooding. Potential impacts to adjacent wetland areas.

- **Retreat/Relocate**

- Retreat on Wallis may be possible with limited impacts.
- Retreat on Ocean Blvd would need to be considered in conjunction with other impacted areas.



Brackett Road

- **Accommodate**
 - Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
 - Culvert along Brackett could be evaluated and potentially redesigned to increase capacity and prevent or decrease the level of flooding of the roadway and increase pavement drainage.
 - Detours – Alternate routes are available. A few residences may be inaccessible.
- **Resist**
 - Raising Roadway would limit roadway flooding but would not protect adjacent property. Potential wetland impacts.
 - Berms – would keep water off of the roadway but shift it into other areas. Potential wetland impacts.
- **Retreat/Relocate**
 - Retreat may be necessary at higher SLR



NH 1A/Locke Rd/Rye Harbor

- **Accommodate**

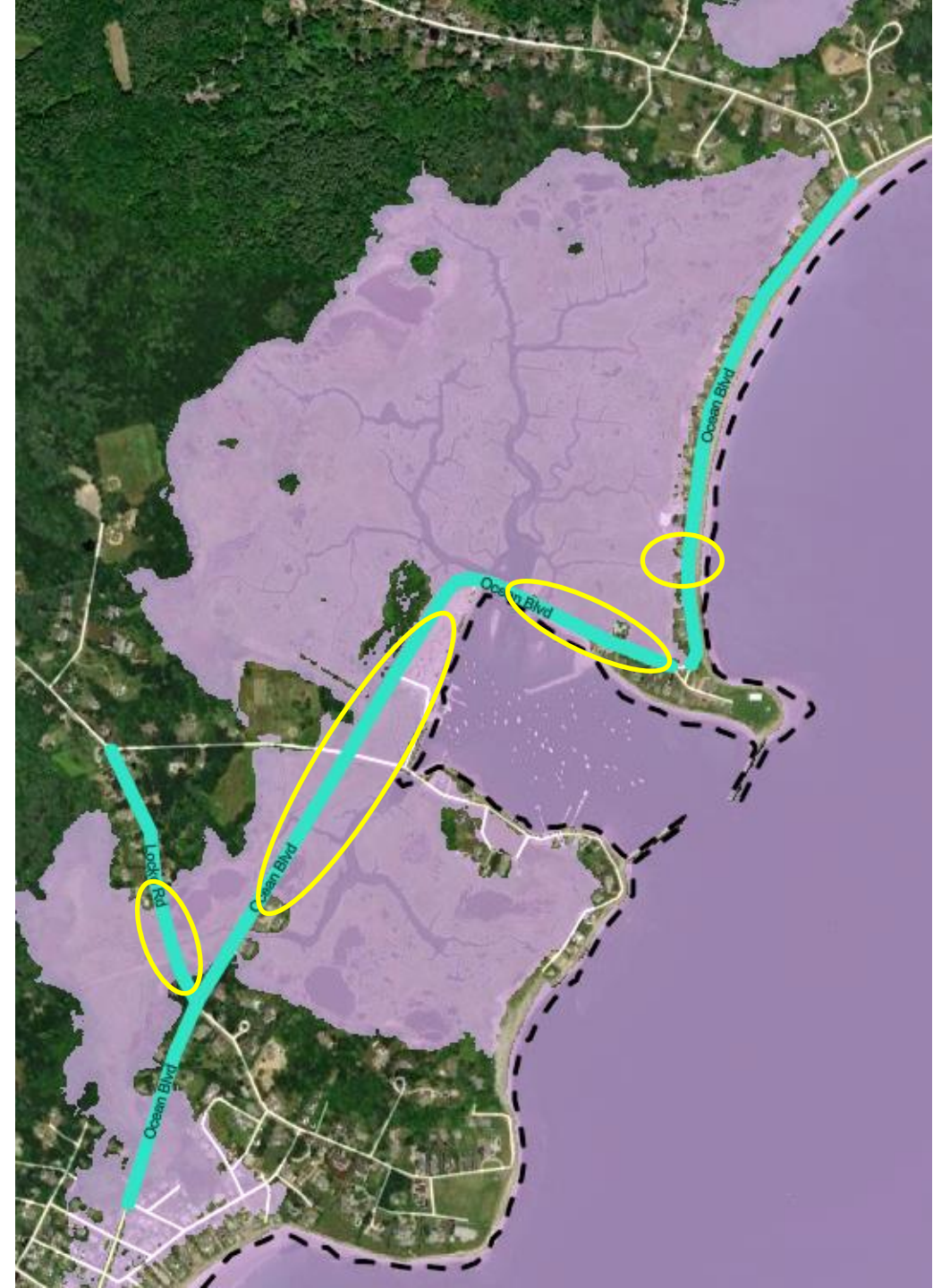
- Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
- Culvert along Locke Rd could be evaluated and potentially redesigned to increase capacity and prevent or decrease the level of flooding of the roadway and increase pavement drainage.
- Detours – Install permanent signage to facilitate regular detours around area in near term.

- **Resist**

- Raising Roadway would limit roadway flooding but would not protect adjacent property.
- Berms/Barriers – Extensive barriers along the marsh and harbor.

- **Retreat/Relocate**

- Possible along Locke Road given alternate access
- Retreat on Ocean Blvd is much more complicated



Next Steps

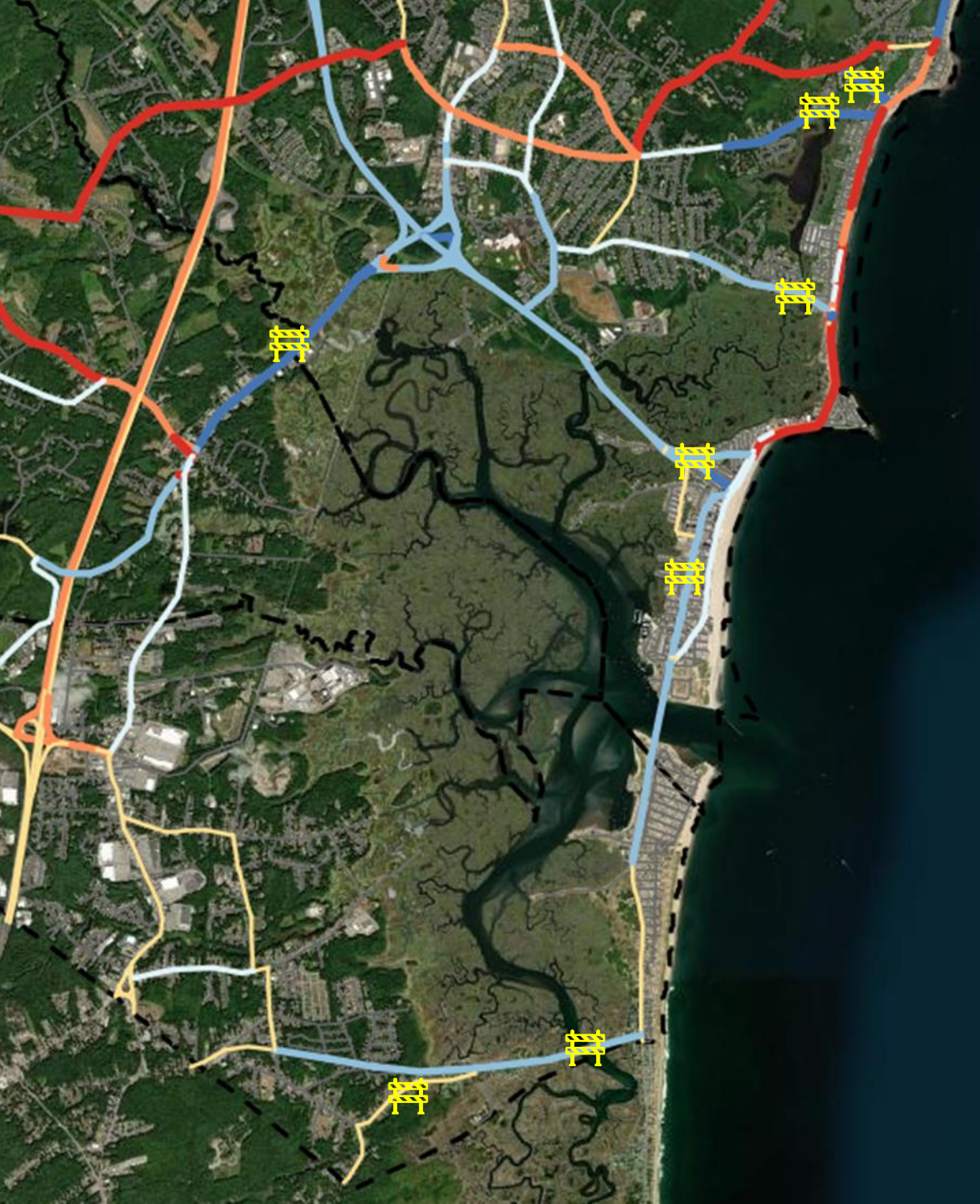
- Complete community meetings
- Development of site profiles
- Continue to refine traffic analysis (Some discussion of 6' SLR Impacts)
- Refining analysis of ten selected locations
- Completing in-depth look at two sites
 - Lafayette Road in Hampton
 - Marsh Rd/Parsons Road/NH 1A in Rye
- Public Meetings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

[RPC Project Staff](#)

Dave Walker
Assistant Director/Transportation
Program Manager
dwalker@therpc.org

For More Information

The screenshot shows the website for the Rockingham Planning Commission. The header includes the logo for theRPC.org, contact information (Phone: 603-778-0885, Fax: 603-778-9183), a 'Browse Our Document Library' button, and a search bar. The navigation menu includes Commission, Communities, Regional & Community Planning, Transportation, Environment, and Maps and Data. The breadcrumb trail is: Home >> Regional & Community Planning >> Climate Change >> Seacoast Transportation Corridor Vulnerability Assessment & Plan. The main content area features the title 'Seacoast Transportation Corridor Vulnerability Assessment & Plan' with a car icon. Below this is an 'Issue' section with a paragraph of text and a photograph of a flooded road with a 'HIGH WATER' sign. At the bottom of the page is an 'Area of Interest & Risk Summary' section.

Rockingham Planning Commission
theRPC.org

Phone: 603-778-0885
Fax: 603-778-9183


Browse Our Document Library

Search The Site:

Commission Communities Regional & Community Planning Transportation Environment Maps and Data


Home >> Regional & Community Planning >> Climate Change
>> Seacoast Transportation Corridor Vulnerability Assessment & Plan

Seacoast Transportation Corridor Vulnerability Assessment & Plan



Issue

Coastal storms and flooding already threaten state and local transportation infrastructure in New Hampshire's seacoast. These risks are expected to increase with sea-level rise, causing potential daily inundation of some transportation assets within the next 80 years. Sea-level rise and other climate change impacts will need to be considered as municipalities and NHDOT maintain or replace aging existing transportation assets and design and construct new systems. Effective adaptation to increasing coastal flood risks will depend upon coordination among transportation decision-makers, municipalities, regulators, and other authorities to share information and develop consistent (or complimentary) transparent methods to ensure a safe and functioning NH Seacoast Transportation Corridor (STC).



Area of Interest & Risk Summary

Regional & Community Planning

Regional Master Plan

Regional Impact Developments

Housing

Historical Resources

Economic Development

Agriculture

Hazard Mitigation

Climate Change

CRISE

High Water Mark Initiative

Setting Sail

Tides to Storms

State and Regional Efforts

Exeter Stormwater

<https://www.therpc.org/STCVA>