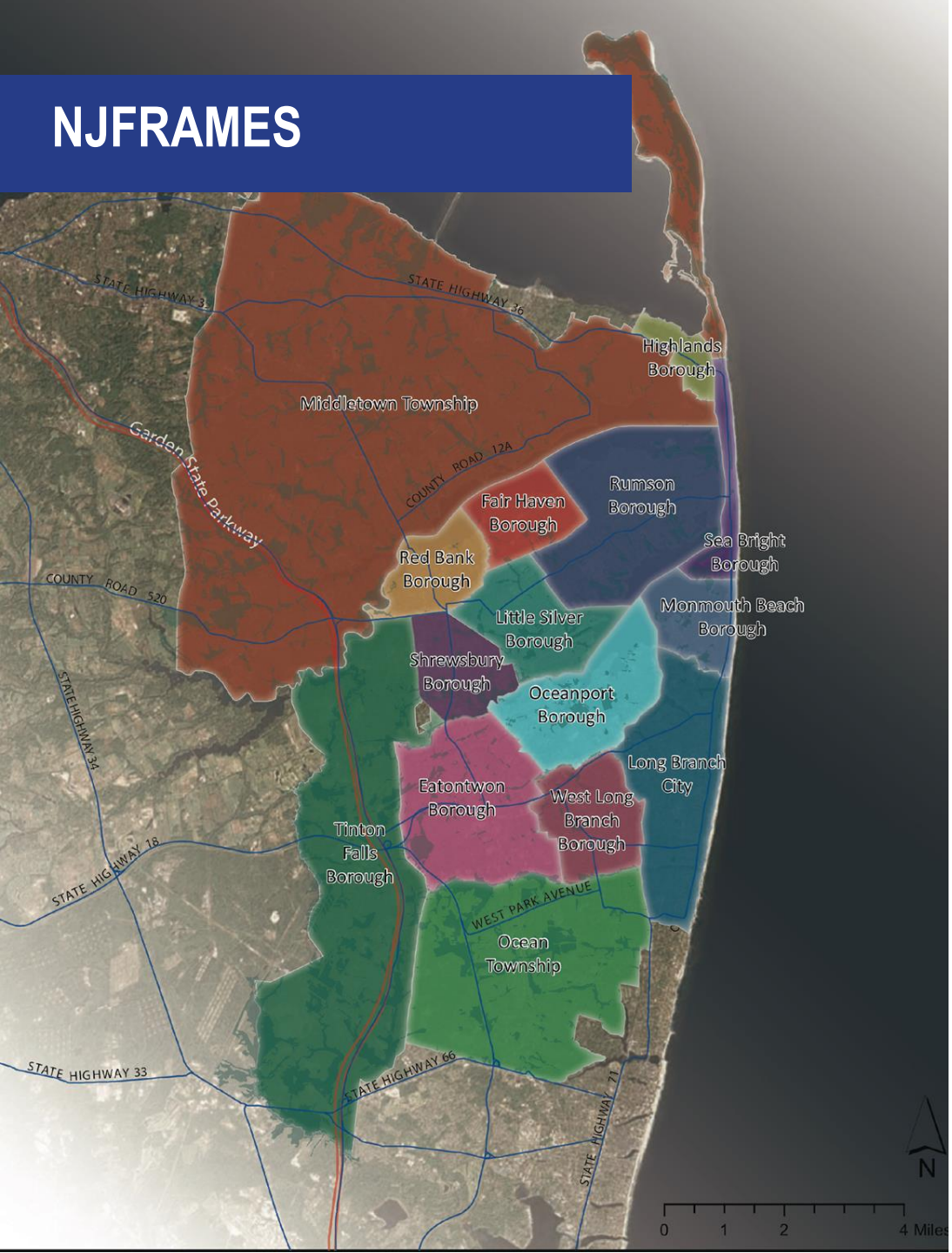
Project Overview

NJ FRAMES: Two Rivers, One Future
Advisory Group Meetings
August 28, 2018
Riverview Medical Center, Red Bank, NJ

NJFRAMES



National Oceanic and Atmospheric Administration
U.S. Department of Commerce

New Jersey Department of Environmental Protection

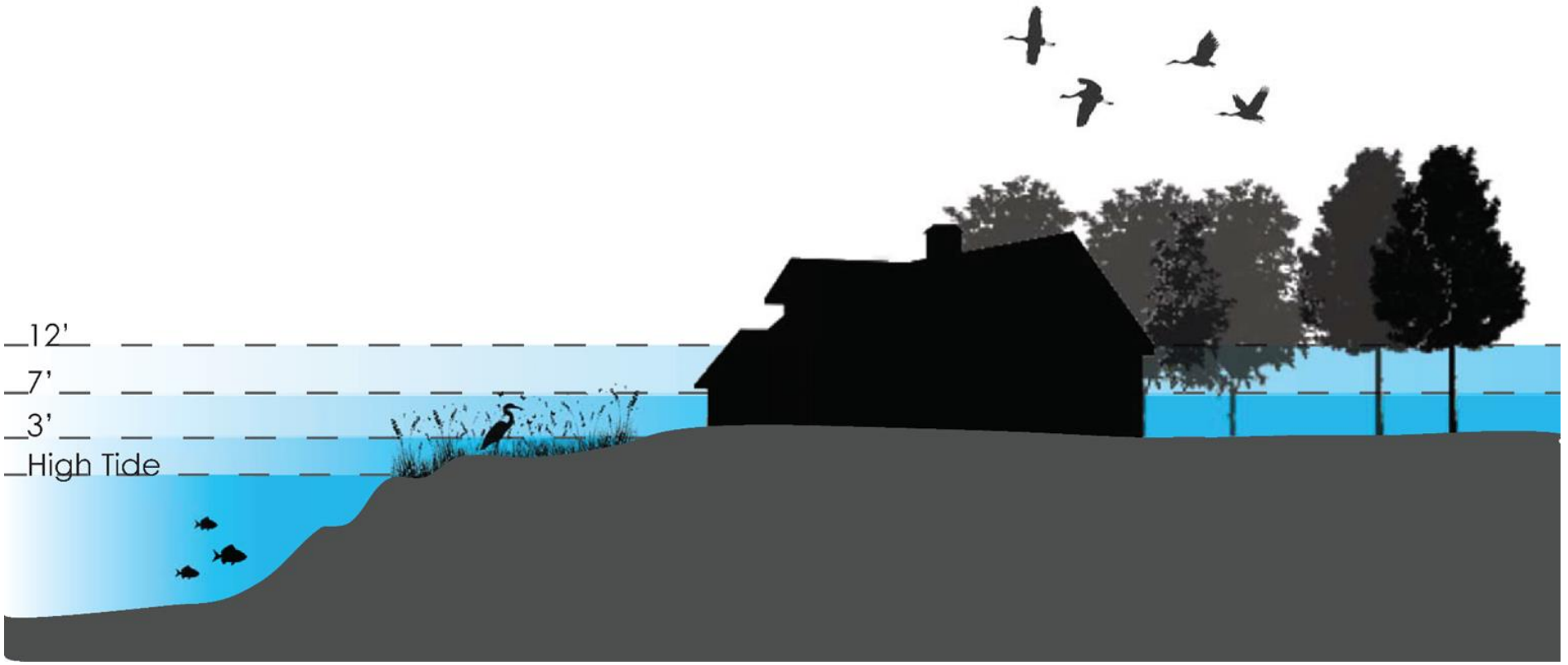
Jacques Cousteau National Estuarine Research Reserve

Incorporated • 1920
Borough of Oceanport

Louis Berger

Rutgers Climate Institute

What Are We Planning For?



Project Goal

Who Is Involved?

Municipalities

	Municipal Meeting OR Getting-to-Resilience	Public Event(s)	Steering Committee Participation
Eatontown			
Fair Haven	✓	✓	✓
Highlands	✓	✓	✓
Little Silver	✓	✓	✓
Long Branch		✓	
Middletown	✓	✓	✓
Monmouth Beach	✓	✓	✓
Oceanport	✓		
Ocean Township	✓		✓
Red Bank	✓	✓	✓
Rumson	✓		✓
Sea Bright	✓	✓	
Shrewsbury	✓		✓
Tinton Falls			
West Long Branch			

Constituents

Society and Health

- Hackensack Meridian Health - Riverview Medical Center
- Monmouth County Regional Health Commission
- Monmouth Arts

Ecology and Habitat

- American Littoral Society
- Clean Ocean Action
- Monmouth Conservation Foundation
- NY/NJ Baykeeper

Hazard Response

- Monmouth County Volunteer Organizations Active in Disaster (VOAD))
- SBP, Inc.

Infrastructure

- Monmouth University
- Naval Weapons Station Earle
- NJAFM

Economic Development

- EMACC - Eastern Monmouth Chamber of Commerce
- Fair Haven Yacht Works / Marine Trades Association NJ

Agencies

FEMA

NJTPA

NORTH JERSEY
TRANSPORTATION
PLANNING AUTHORITY

Engagement & Outreach

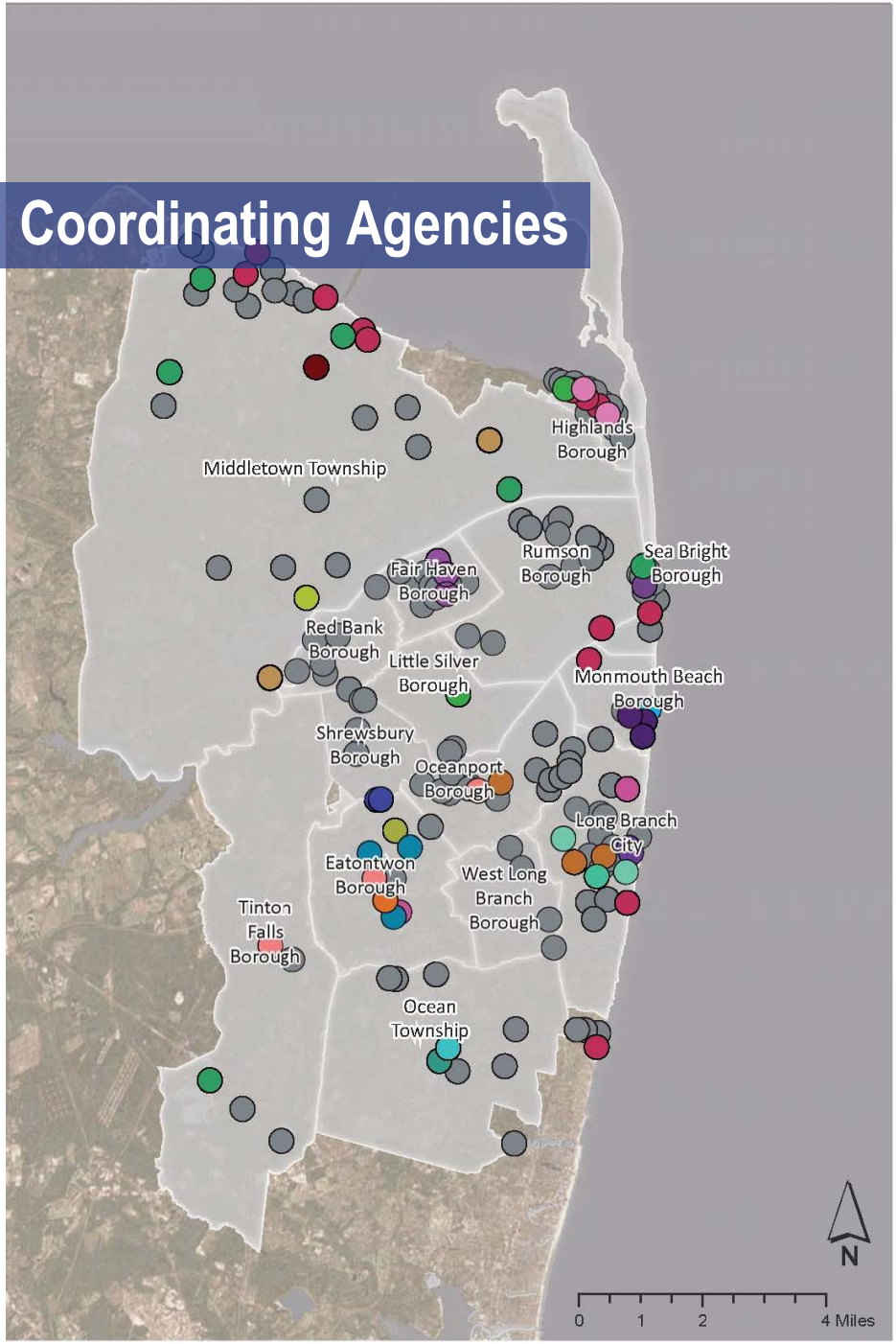
Kick Off

November 2016

Coordinating Agencies

January 2017

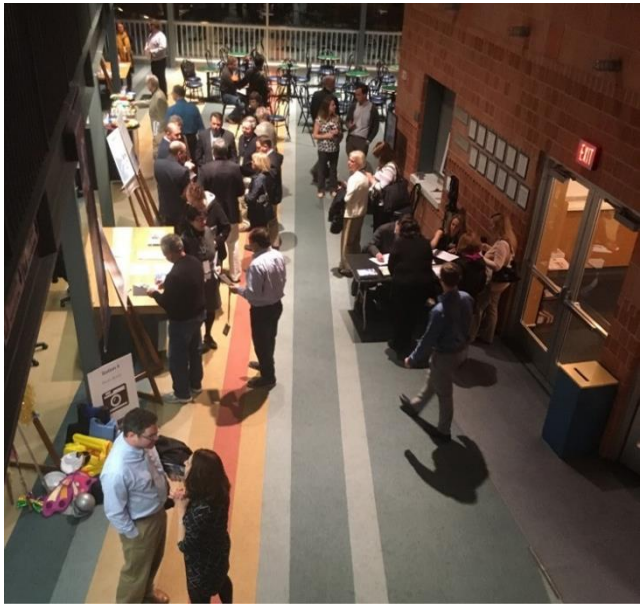
Coordinating Agencies

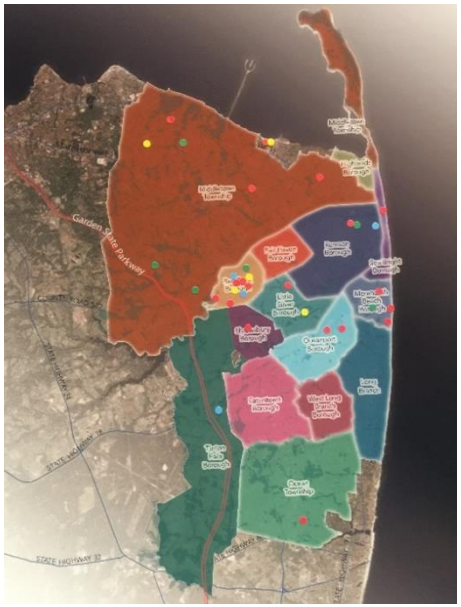


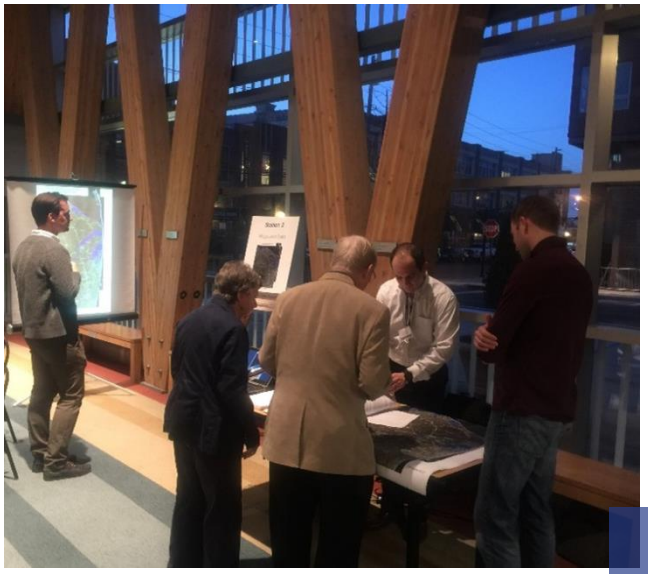
- Borough of Eatontown
- Borough of Highlands
- Borough of Sea Bright
- City of Long Branch
- Department of Community Affairs: Office of Smart Growth
- Eatontown Borough Affordable Housing Trust Fund, Monmouth County
- FMERPA
- Fair Haven Borough
- Fort Monmouth Economic Revitalization Planning Authority
- Monmouth Beach
- Monmouth County
- Monmouth County Park System
- NFWF
- NJ OEM
- NJDEP
- NJDOT
- NJOEM
- NJSGC
- NJTPA
- NY/NJ Baykeeper
- Ocean Twp
- Private Developer
- Rebuild by Design
- State Awarded Smart Growth Grant
- USACE
- Unknown

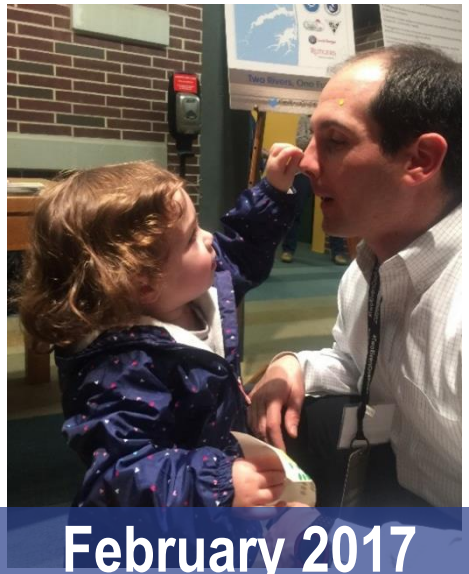
January 2017

Open House









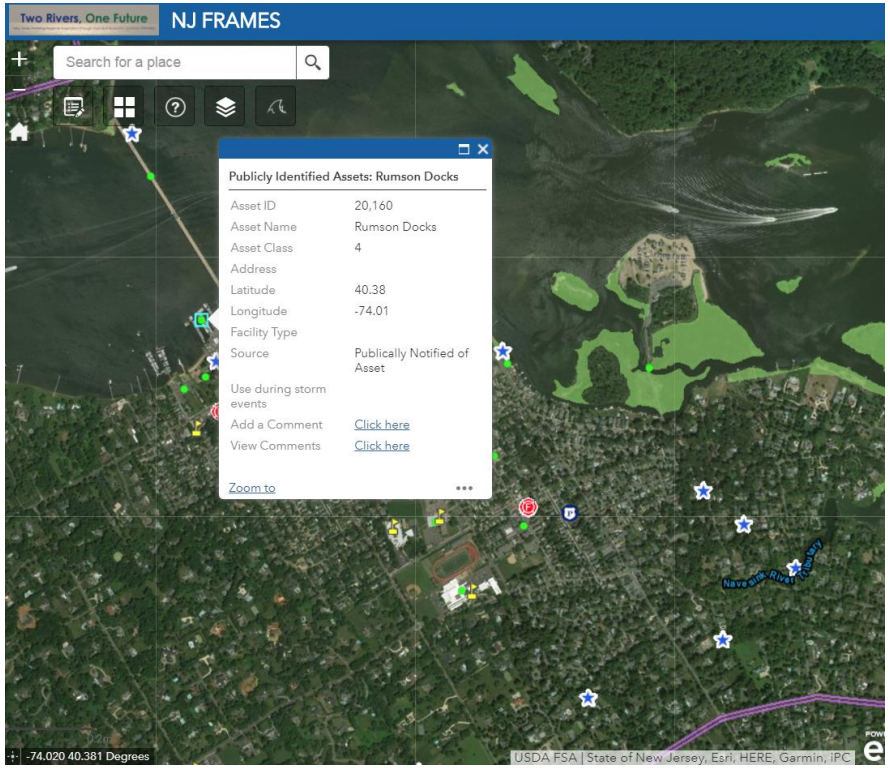
February 2017

Community Events

August - September 2017


Highlands Event
Tell us your favorite places in the Two Rivers region!
Inlet Cafe in Highlands
The best Ice cream Shops Yum!!
The French Market in Rumson
No More Sea Walls
Two River Theater
Rumson Docks
Pier Village
PARKS
the beach
Monmouth University
OPEN
Two Rivers, One Future
NJ FRAMES: A collaborative effort to address future flood vulnerability in the Two Rivers region
#TwoRiversOneFuture
http://www.nj.gov/dep/oclup/njframes.html
September 2017

Asset Mapping



Two Rivers, One Future

New Jersey Fostering Regional Adaptation through Municipal Economic Scenarios (FRAMES)

#MapWhatMatters to you in the Two Rivers region

Help us to map out the most important places in your community and help protect them from floodwaters.

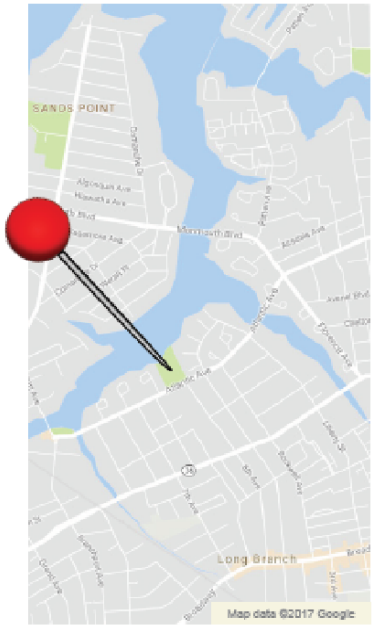
What places are most important to you? Do you value your town's library, outdoor concert venue, or a nearby hospital? Let us know!

The information you provide will help us make the Two Rivers region more resilient against flooding!

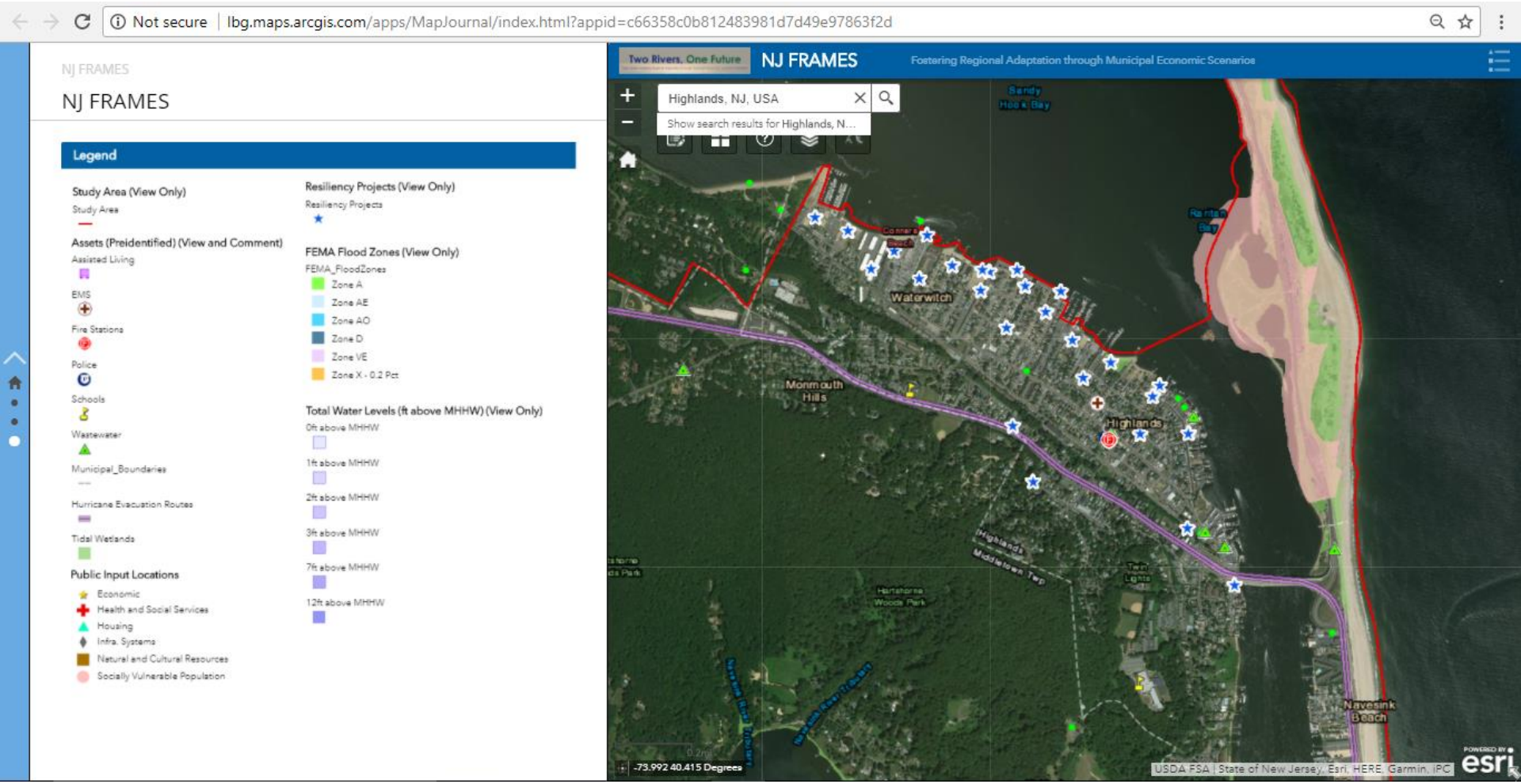
Here's how you can participate:

Visit **TwoRiversOneFuture.nj.gov** to learn more and start mapping.

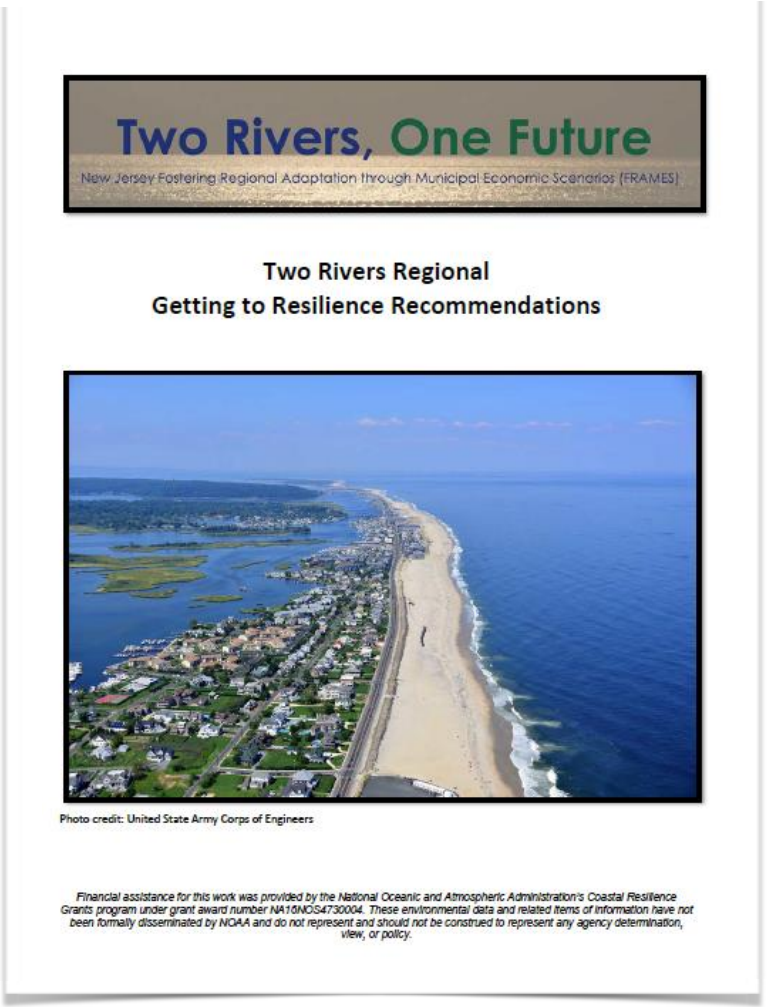
Or, use **#MapWhatMatters** and **#TwoRiversOneFuture** with images and info to tweet about your favorite places.



Asset Mapping



Municipal Meetings



Two Rivers, One Future

New Jersey Fostering Regional Adaptation through Municipal Economic Scenarios (FRAMES)

Two Rivers Regional
Getting to Resilience Recommendations

Photo credit: United State Army Corps of Engineers

Financial assistance for this work was provided by the National Oceanic and Atmospheric Administration's Coastal Resilience Grants program under grant award number NA16NOS4730004. These environmental data and related items of information have not been formally disseminated by NOAA and do not represent and should not be construed to represent any agency determination, view, or policy.

Constituent Meeting

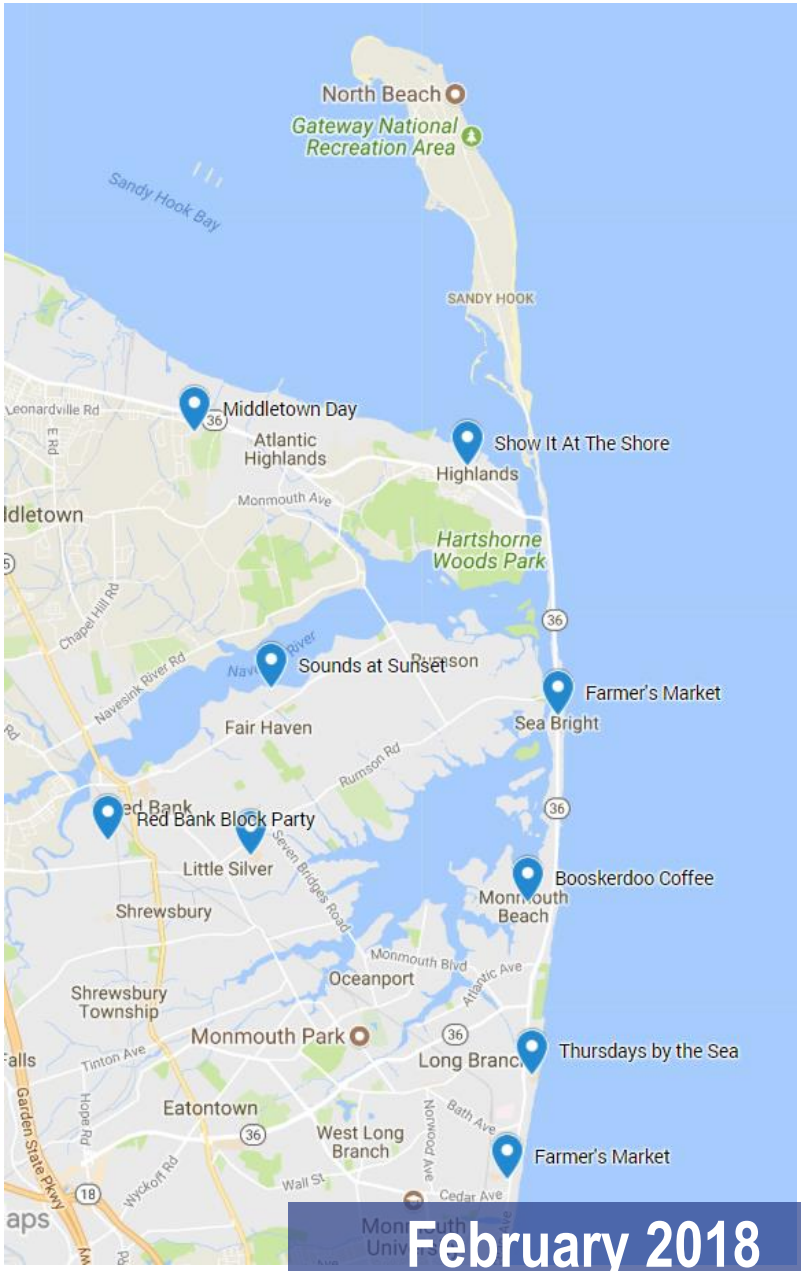
September 2017

Interviews

Social Service Organizations

- Parker Health Clinic
- Monmouth Conservation Foundation
- Coastal Communities Family Success Center
- St. Anthony of Padua Church
- Lunch Break
- Oasis
- Family Promise
- Affordable Housing Alliance

#MapWhatMatters Outreach Locations

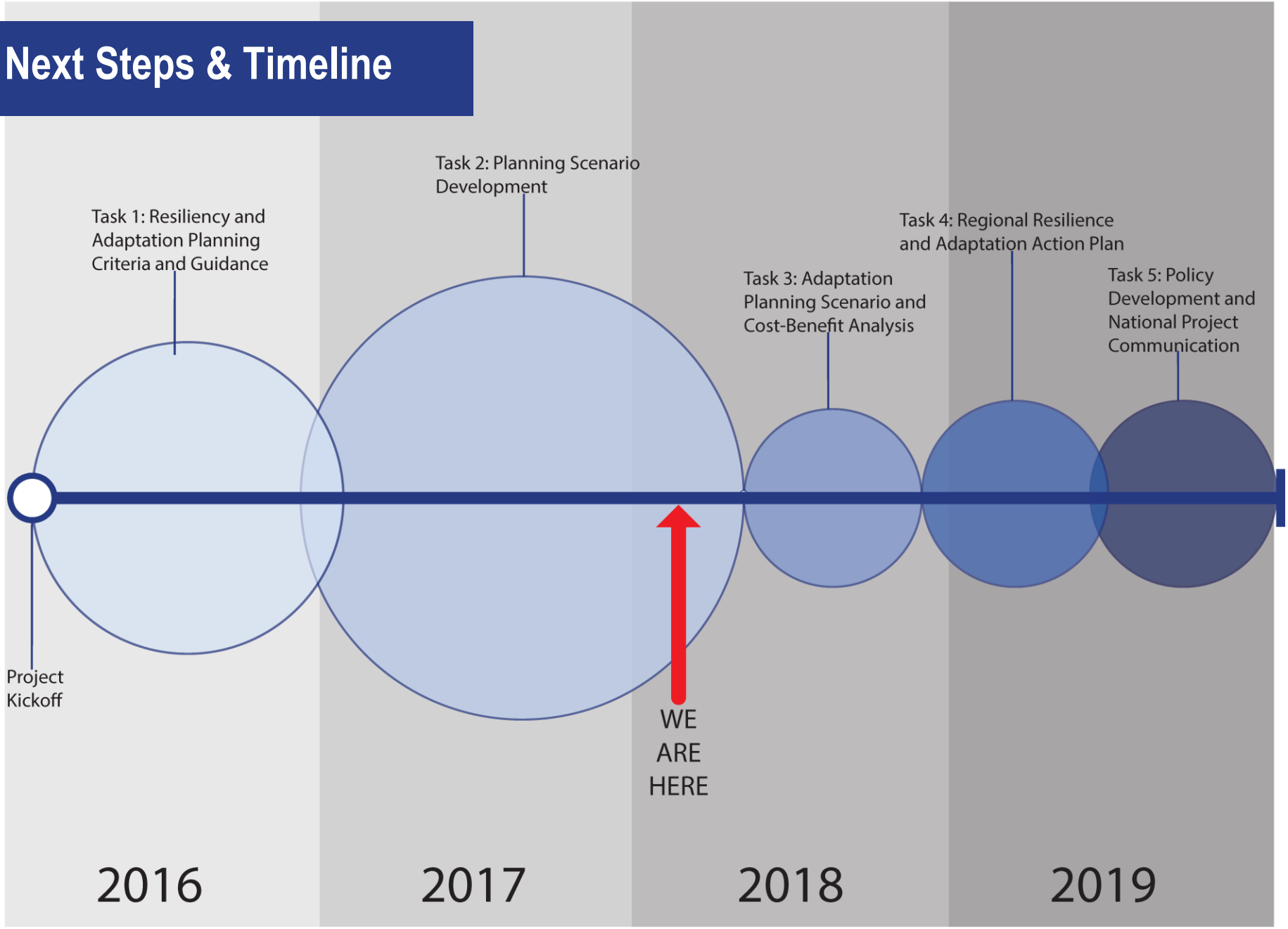


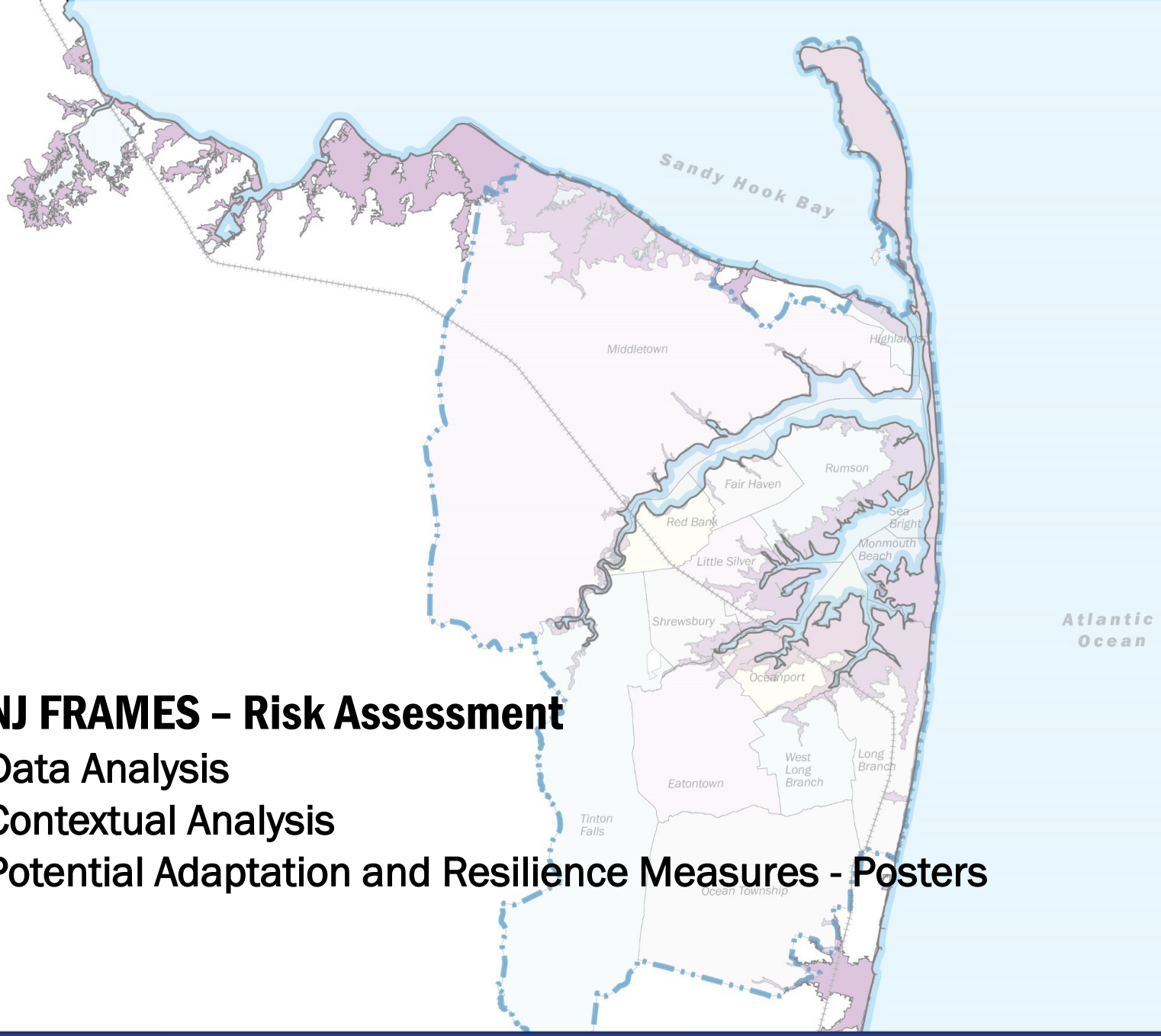
February 2018

Steering Committee

March & August 2018

Next Steps & Timeline



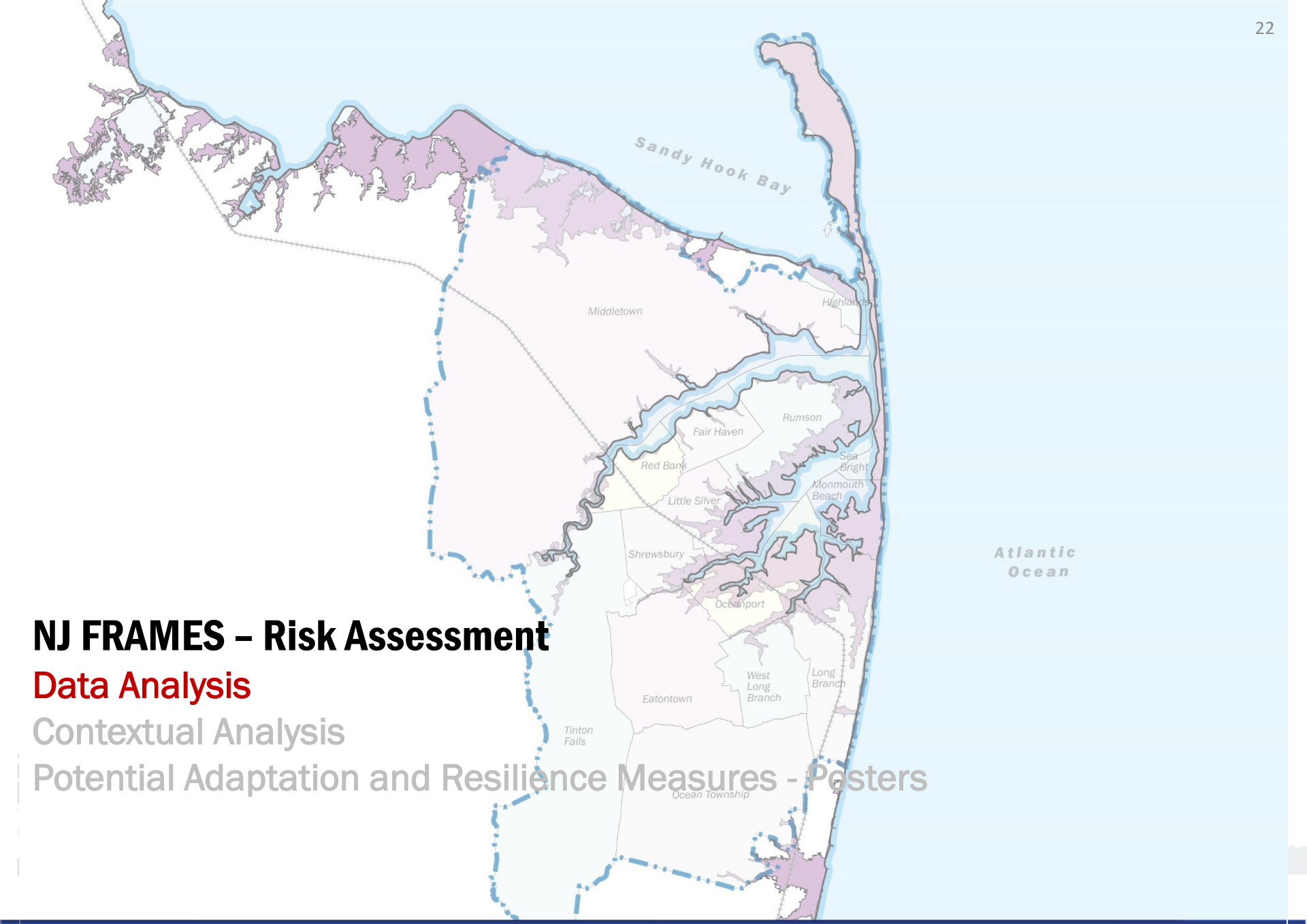


NJ FRAMES – Risk Assessment

Data Analysis

Contextual Analysis

Potential Adaptation and Resilience Measures - Posters



NJ FRAMES – Risk Assessment

Data Analysis

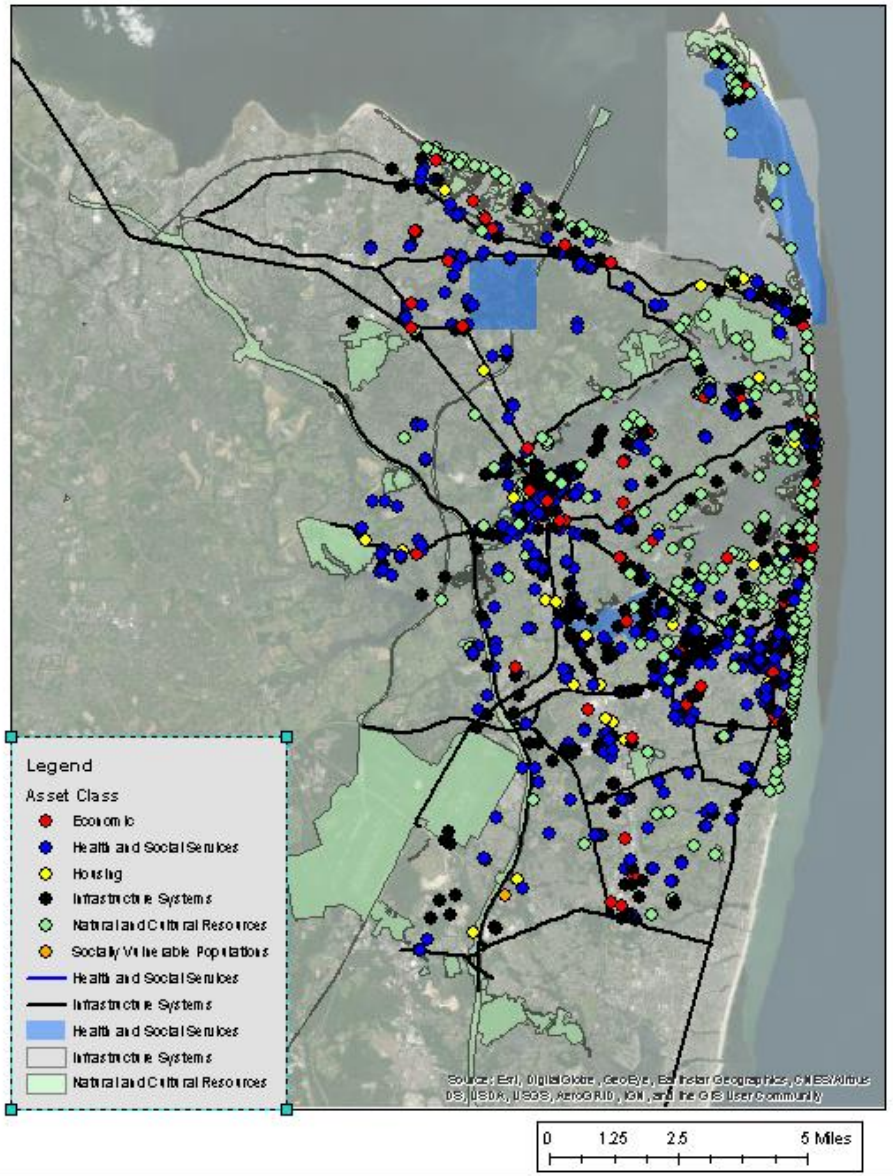
Contextual Analysis

Potential Adaptation and Resilience Measures - Posters

Asset Collection

- Economic
- Health and Social Services
- Housing
- Infrastructure Systems
- Natural/Cultural Resources
- Socially Vulnerable Populations

Identified Assets in Study Area



Risk Assessment

Baseline Risk Assessment and Methodology

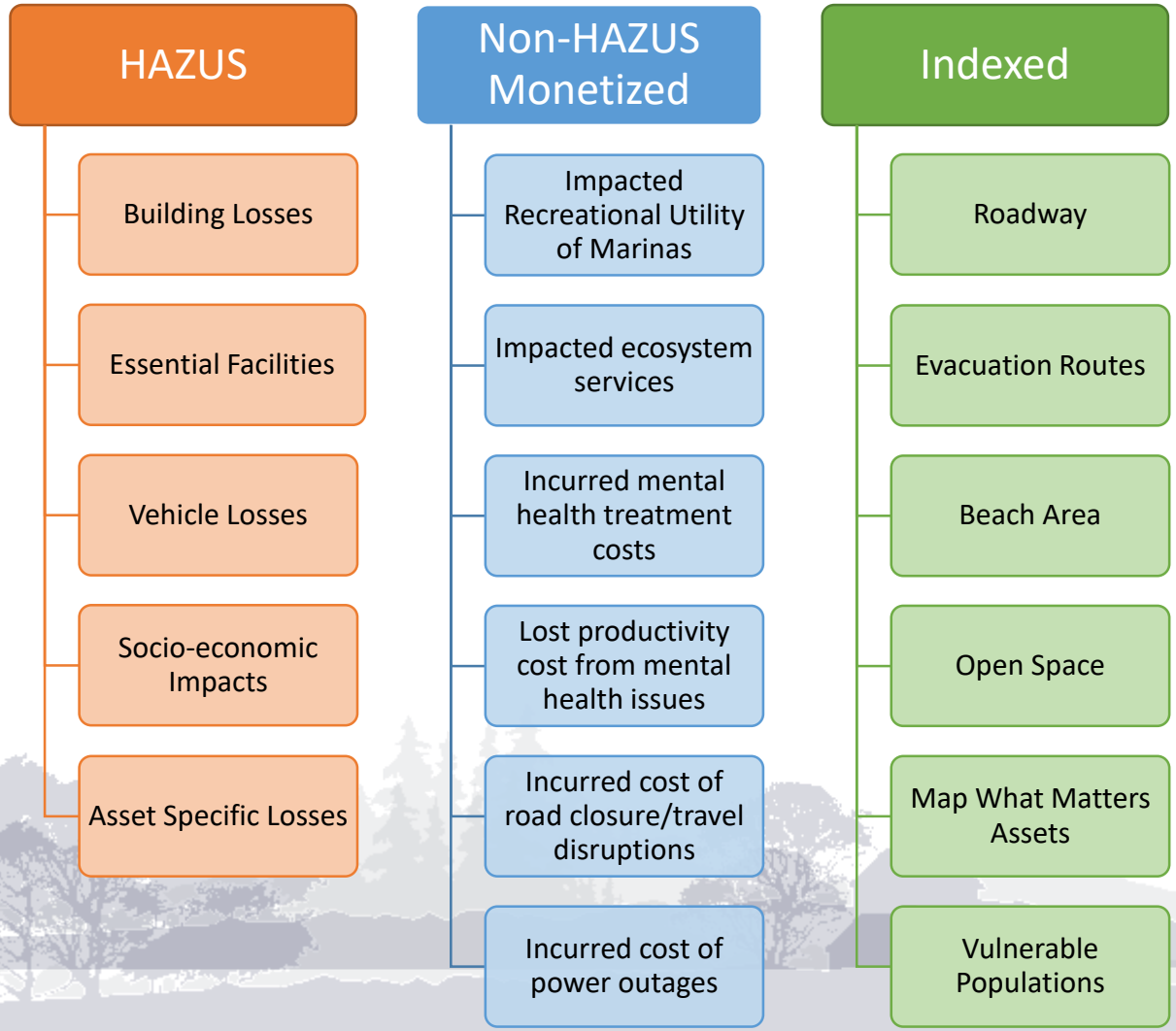
- Completed June 2018
- Outputs for Risk Assessment: Annualized risk in 2017 $
- Assumes 5.3 feet of Sea Level Rise by 2100

Annual Frequencies (Probability of flood level) for Base and Forecast Years

Flood Event (Above MHHW)	2020 Annual Frequency	2030 Annual Frequency	2050 Annual Frequency	2100 Annual Frequency
3.0	72%	90%	100%	100%
7.0	1.5%	2%	4%	100%
12.0	.1%	.1%	.2%	1%

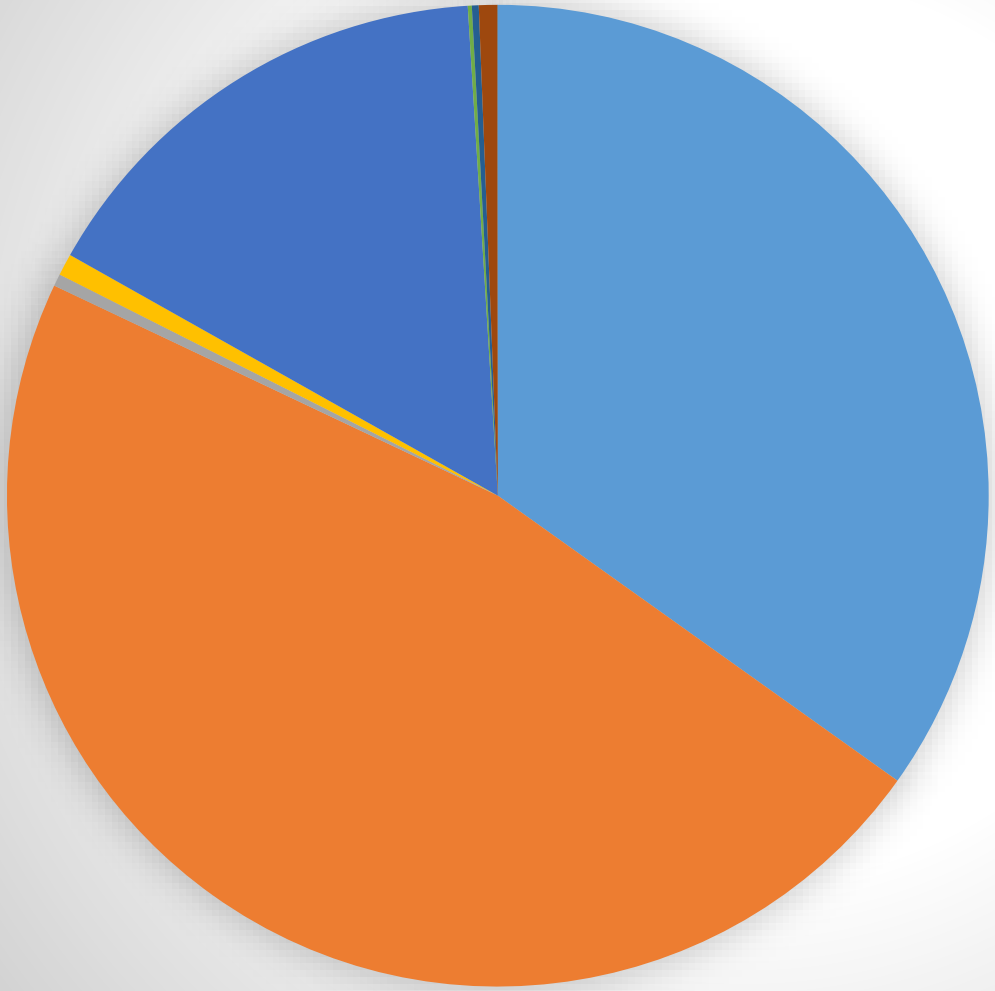
February 8, 2016 Nor'easter Flooding Corresponds to a 3ft flood level, occurring approximately once every 2 years

Quantified Impacts*



*Impacts Reflect Coastal Flooding Impacts to the listed assets.

HAZUS Analysis – Total Impacts (baseline 2020)



Impacts at 3ft: $

Impacts at 7ft: $$

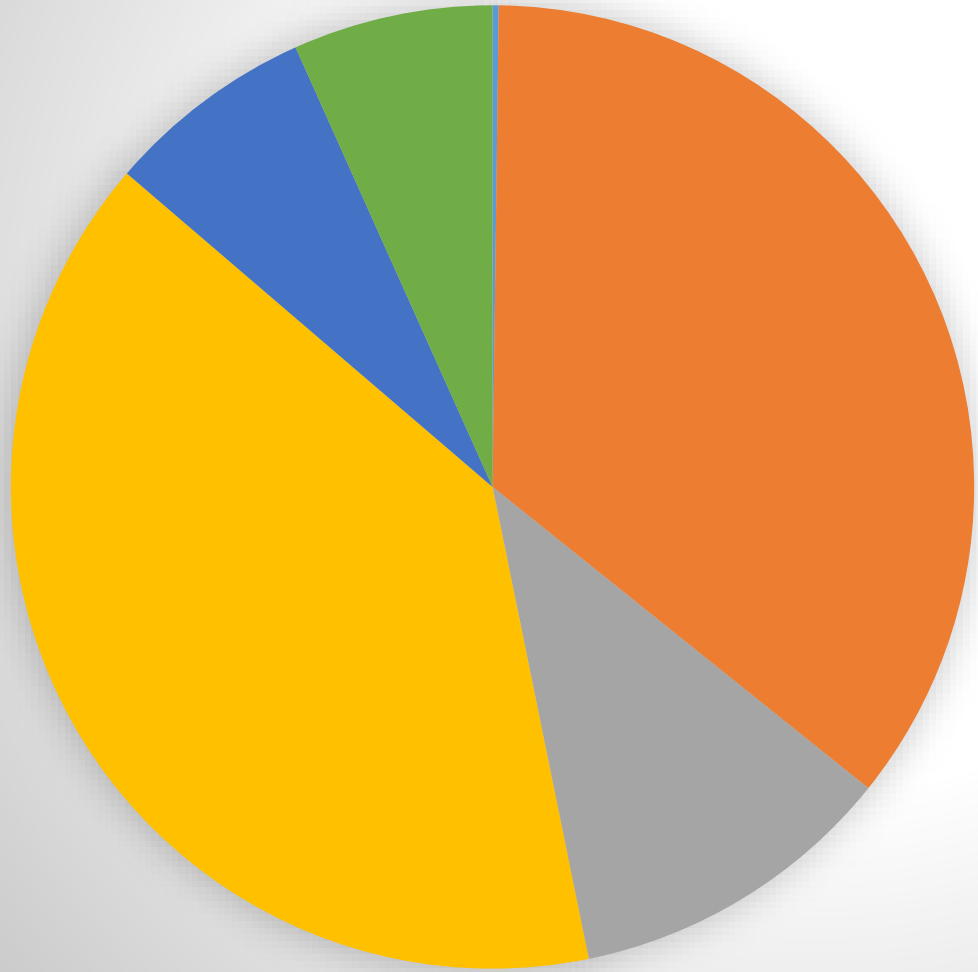
Impacts at 12ft: $$$

Non-HAZUS Impacted Services (baseline 2020)

Impacts at 3ft: $

Impacts at 7ft: $$

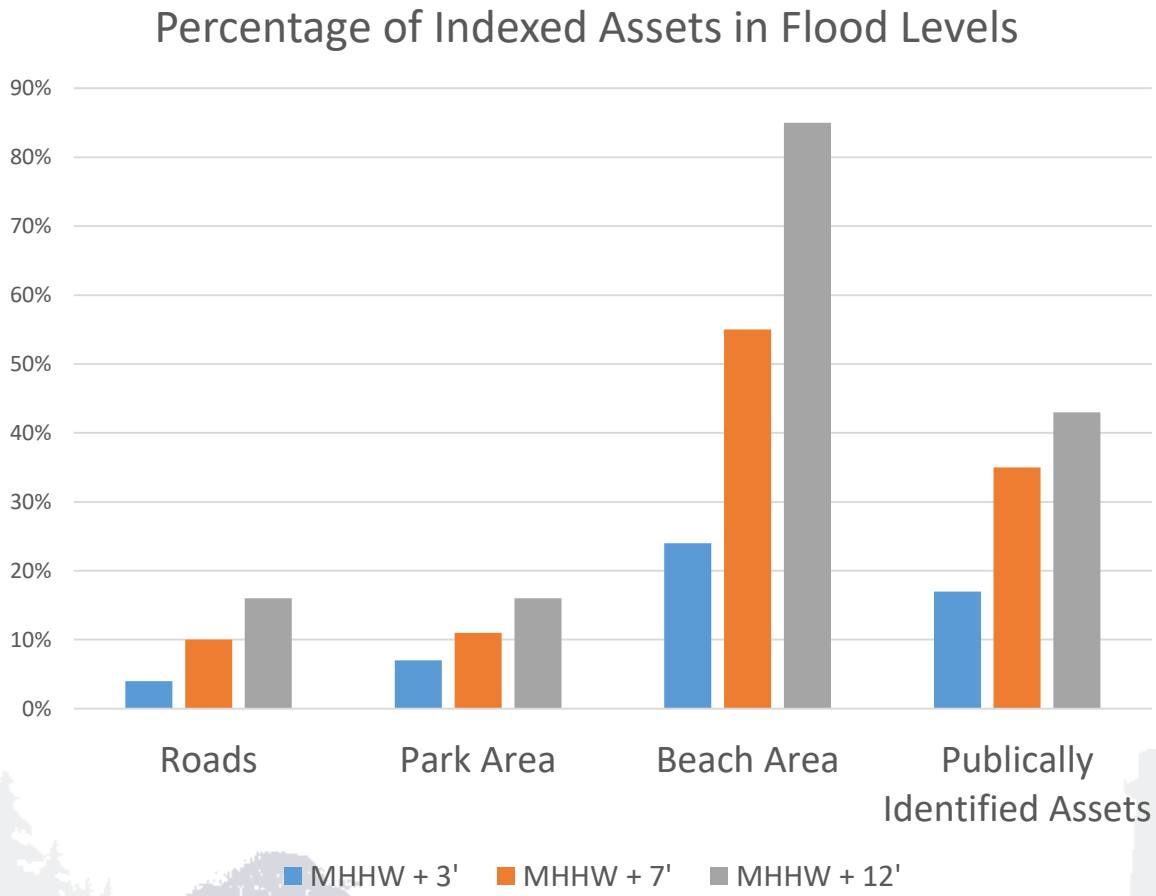
Impacts at 12ft: $$$



Indexed Impacts (Non-Monetized)

St. Georges by the River, one of over 200 publically identified assets in the study area. St. George's is impacted by the mapped flood levels.

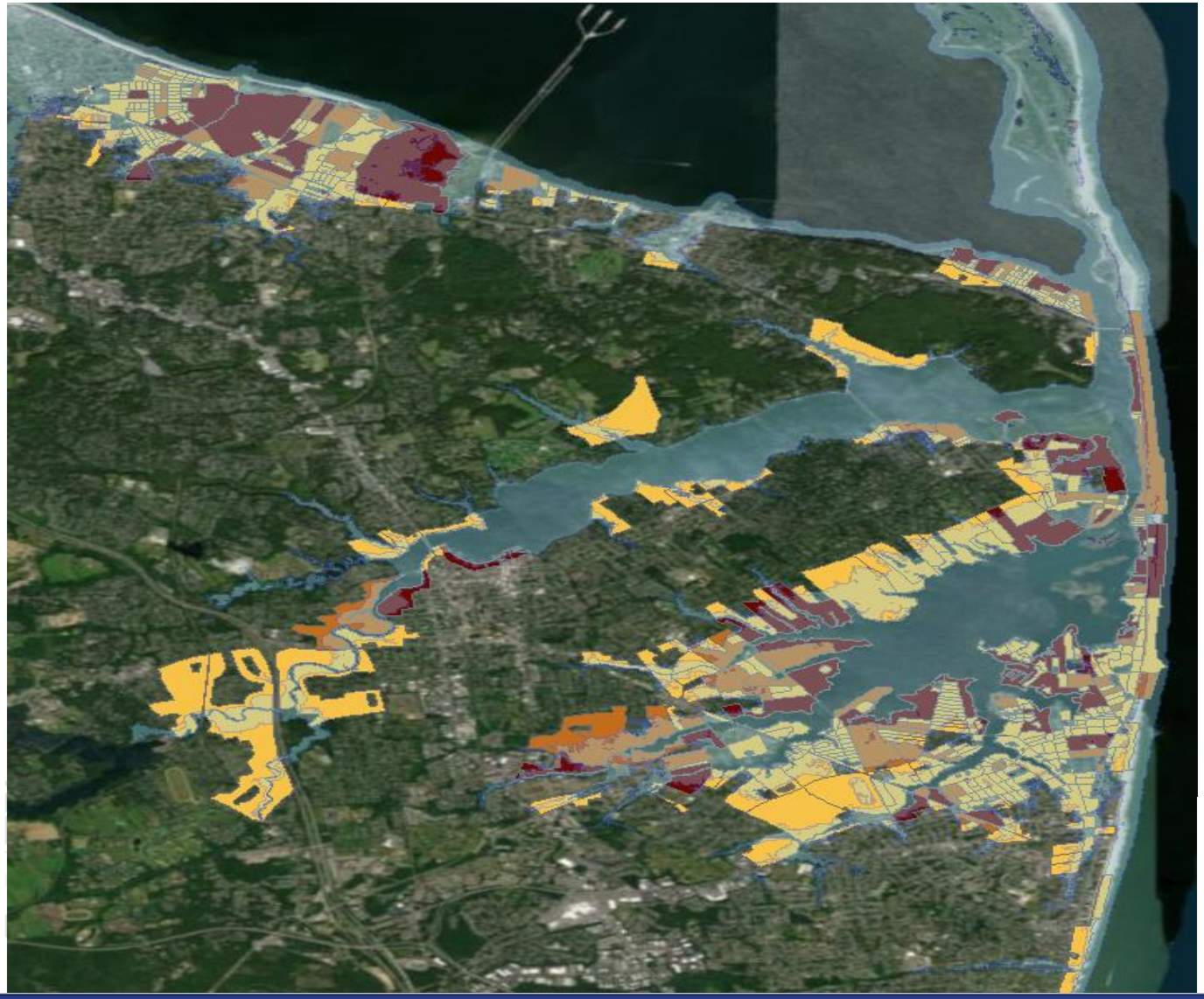
Locust Landing Apartments in Red Bank. Adjacent to the Navesink River, the apartments are impacted by the mapped flood levels.



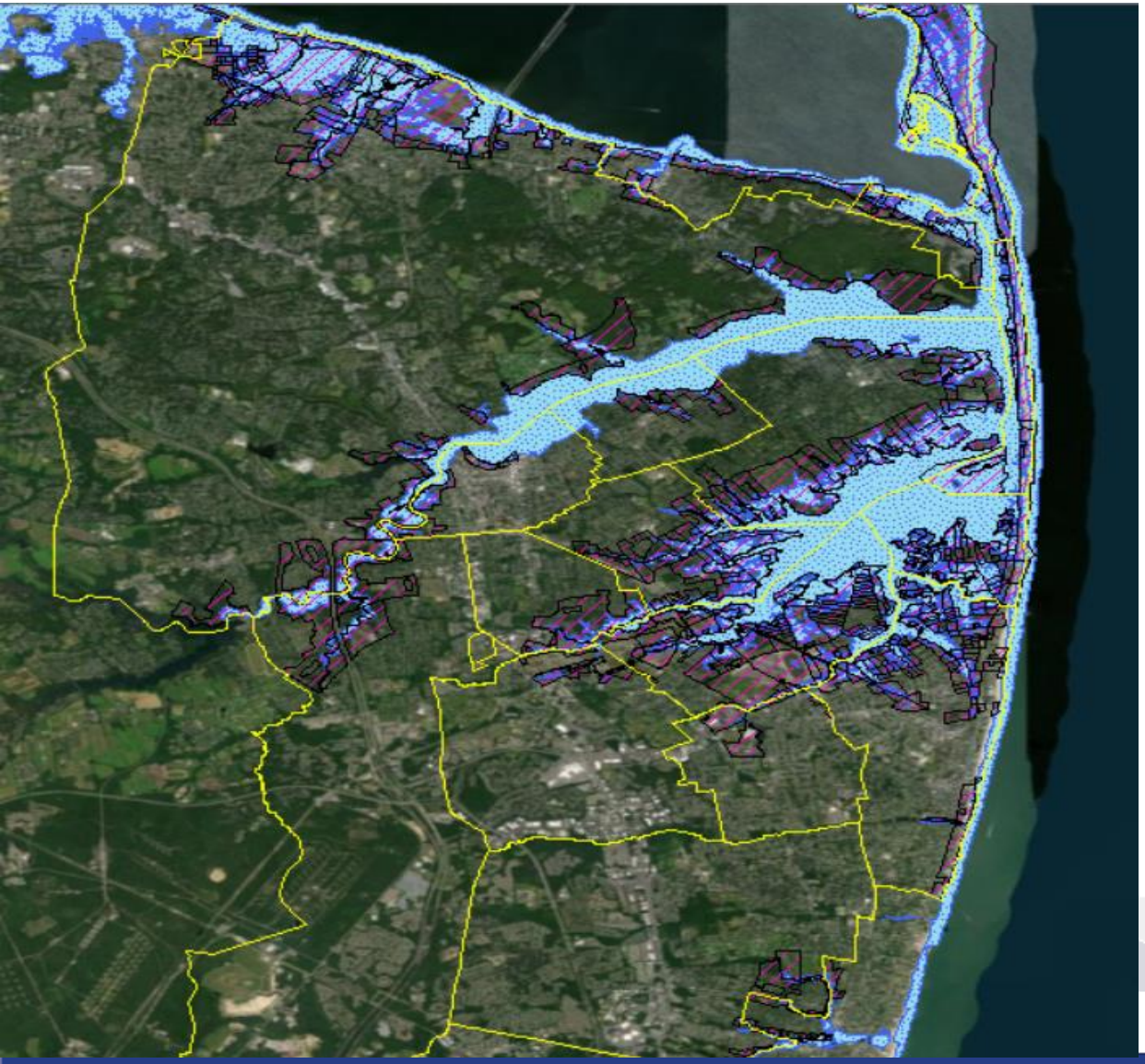
Study Area – 3ft HAZUS Total Building Impacts (2020)

Study Area – 7ft HAZUS Total Building Impacts (2020)

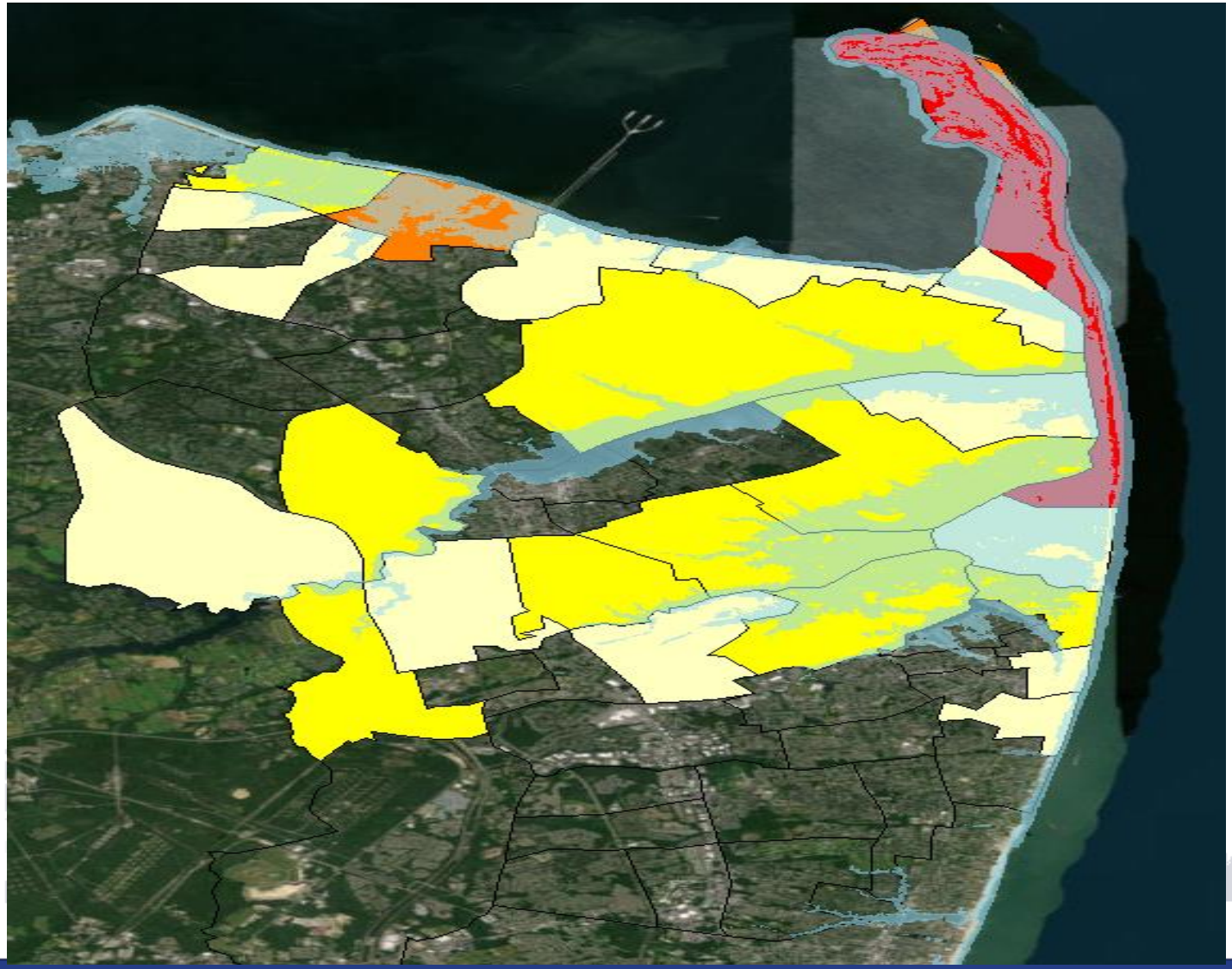
Study Area – 12ft HAZUS Total Building Impacts (2020)



Permanent Inundation at 5.3 ft SLR (2100)



Ecosystem Services – 7ft Risk of Loss (2017 $)

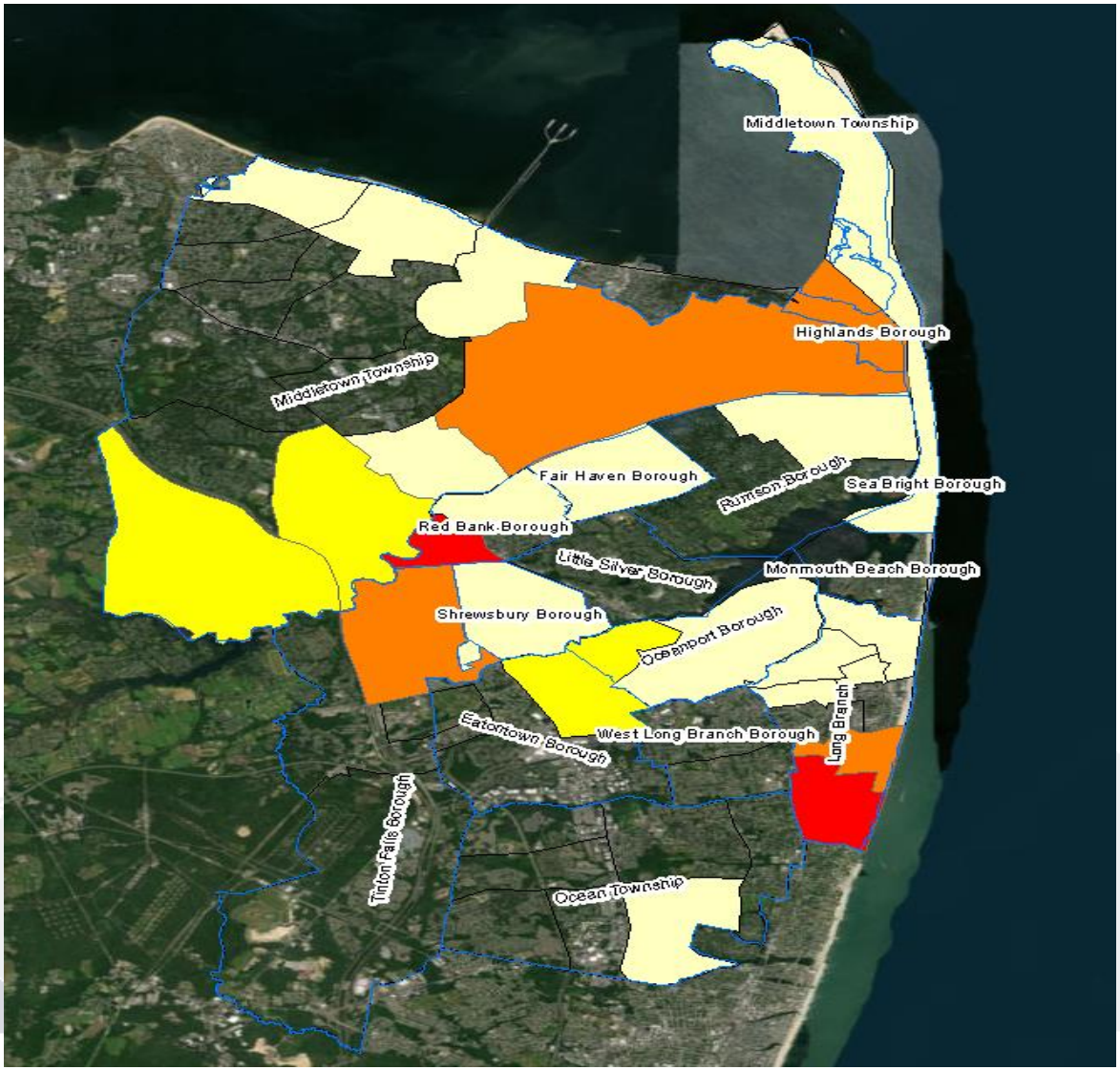


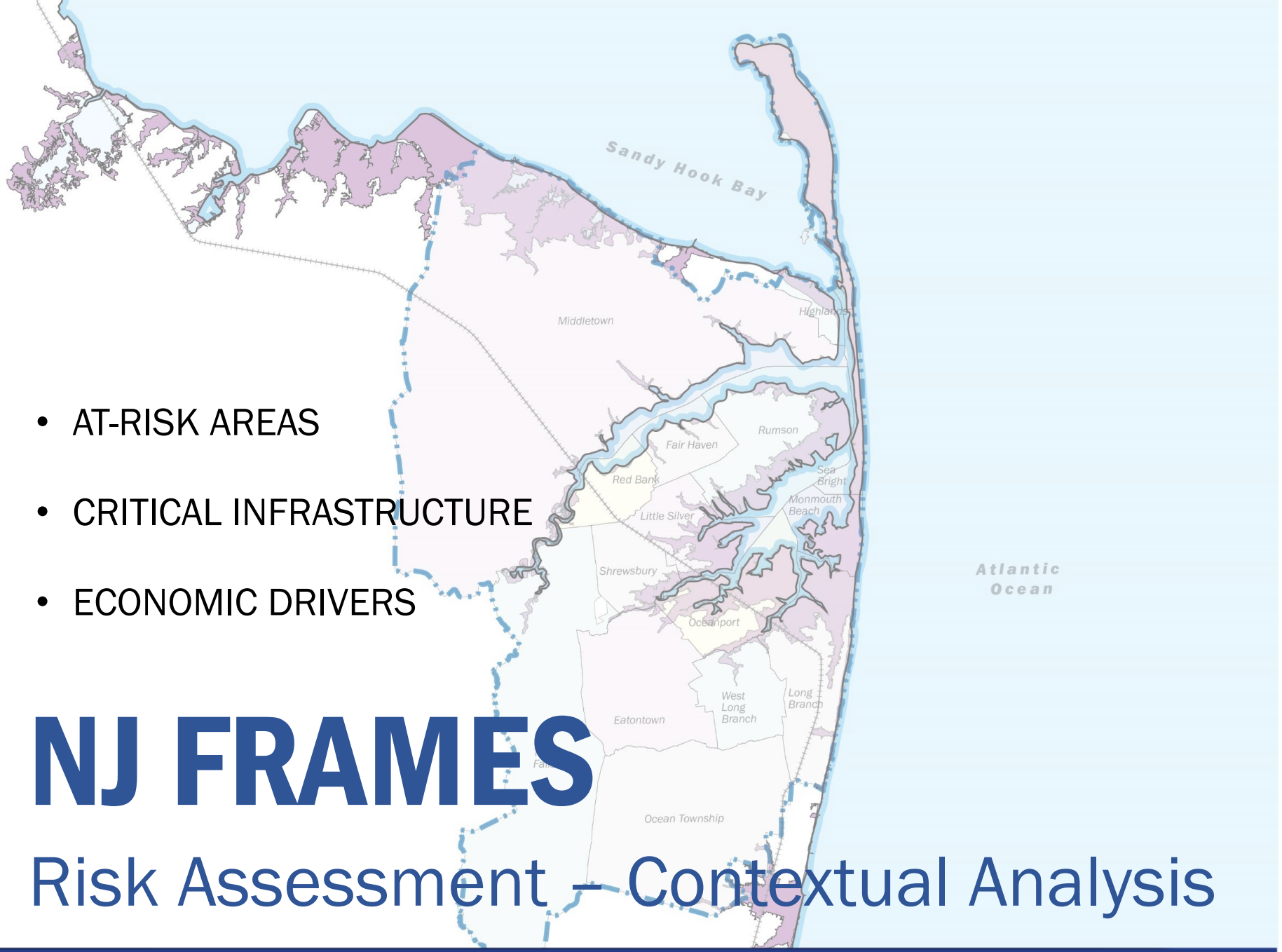
Based on previous research for the state (Costanza 2006)

Social Impact Scale by Census Tract

-Based on the CDC's Social Vulnerability Index, considers themes like:

- -Income levels
- -Vehicle access
- -Household crowding





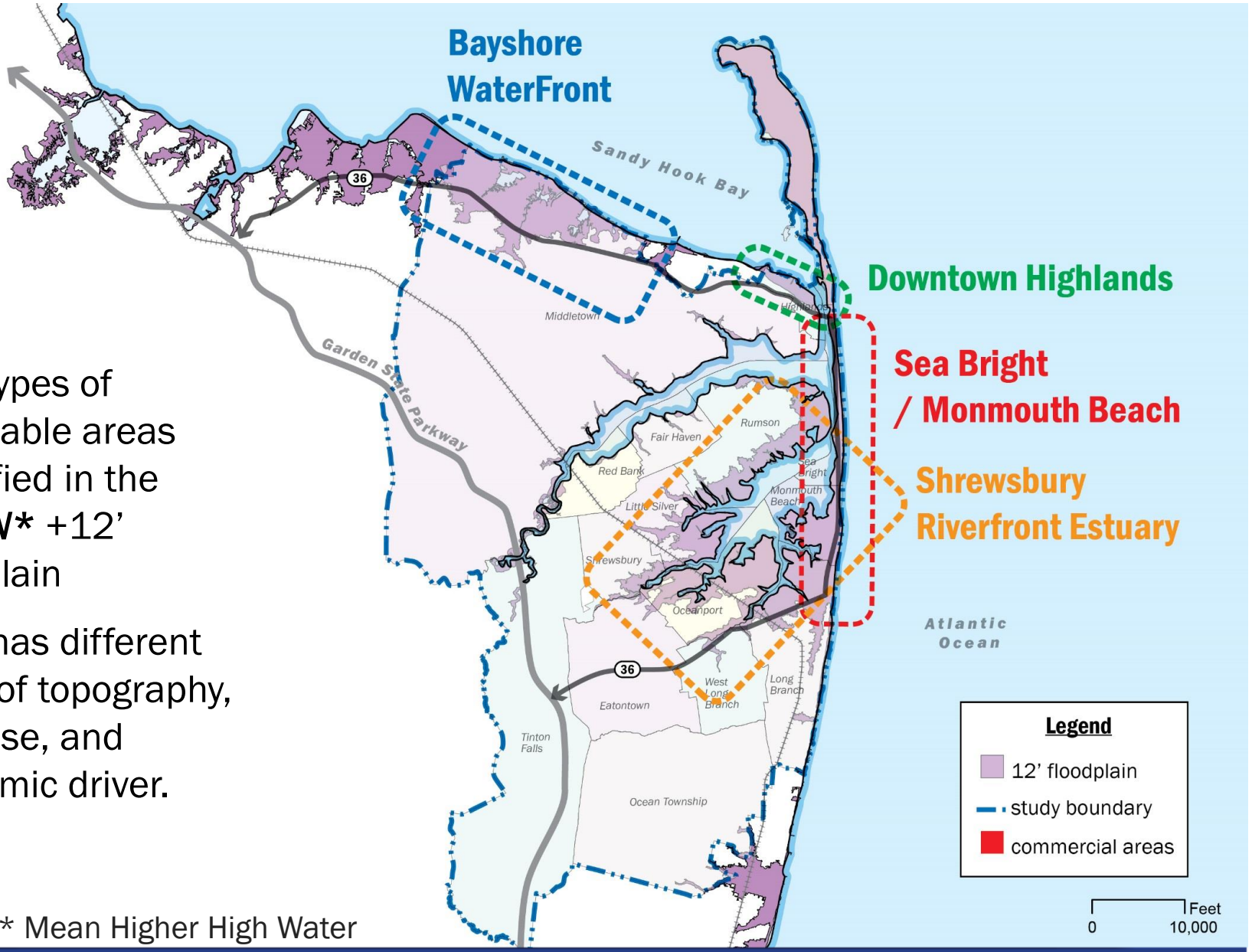
- AT-RISK AREAS
- CRITICAL INFRASTRUCTURE
- ECONOMIC DRIVERS

NJ FRAMES

Risk Assessment – Contextual Analysis

FOUR PRIMARY AT-RISK AREAS

- Four types of vulnerable areas identified in the **MHHW*** +12' floodplain
- Each has different types of topography, land use, and economic driver.

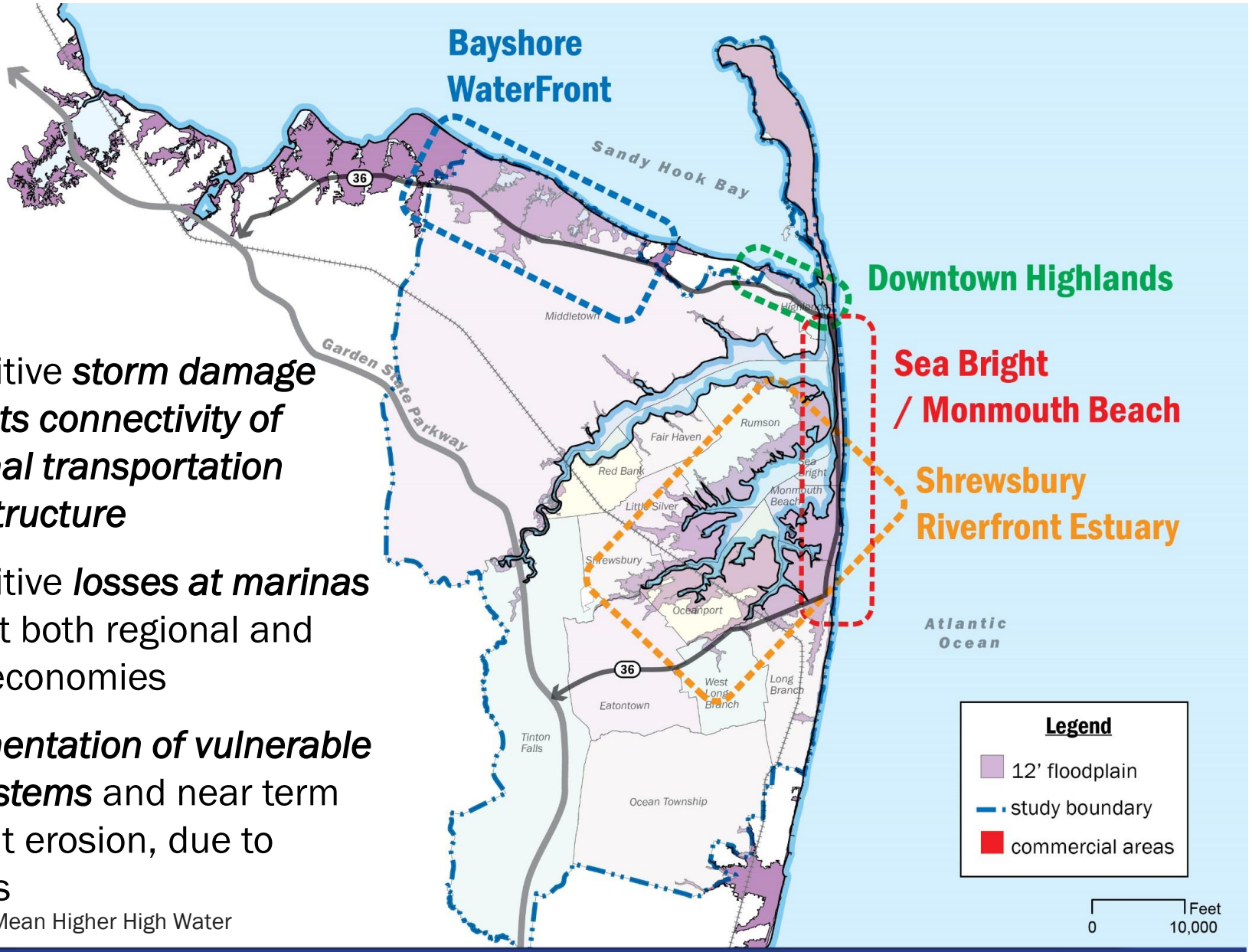


MHHW* Mean Higher High Water

FOUR PRIMARY AT-RISK AREAS

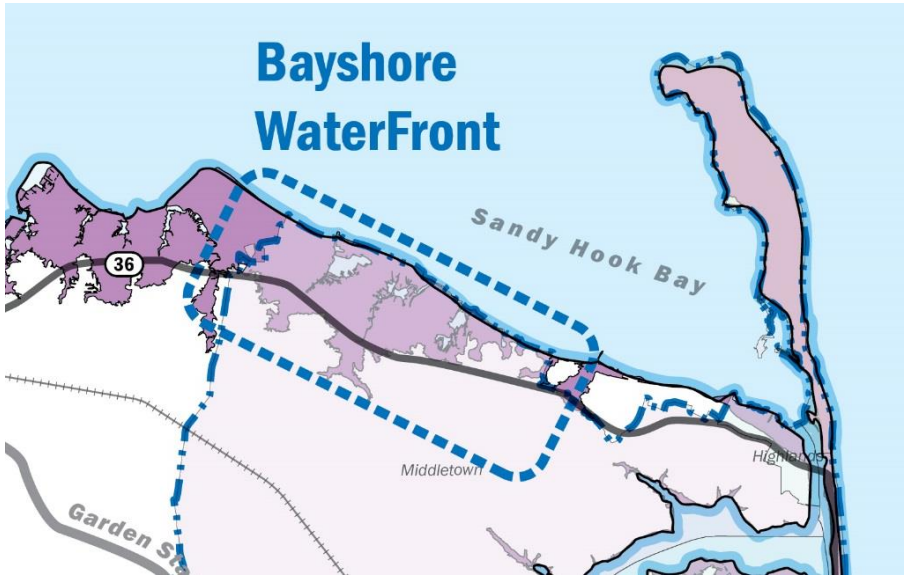
- Repetitive ***storm damage impacts connectivity of regional transportation infrastructure***
- Repetitive ***losses at marinas*** impact both regional and local economies
- ***Fragmentation of vulnerable ecosystems*** and near term habitat erosion, due to storms

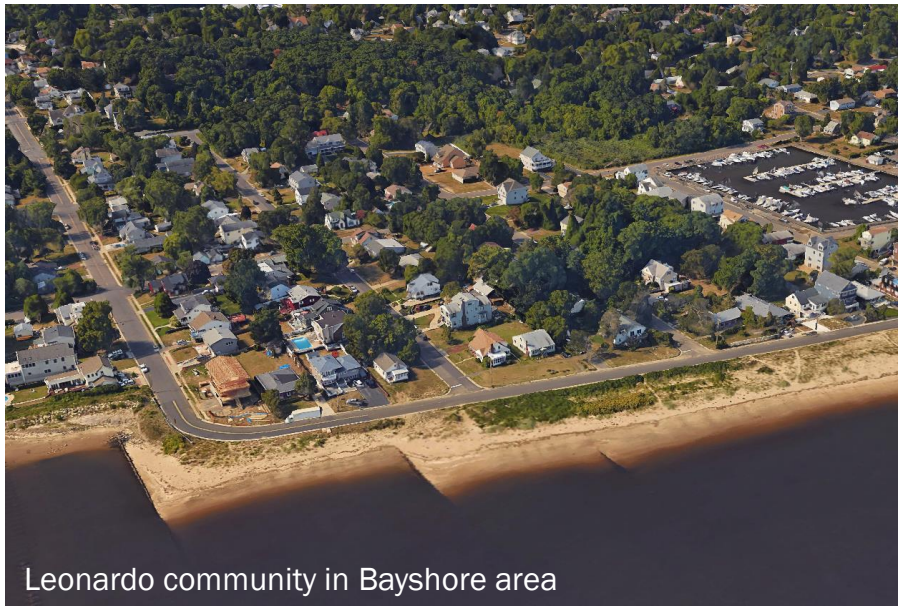
MHHW* Mean Higher High Water



AT-RISK AREA: BAYSHORE WATERFRONT

- **Low-lying coastal plain**
- **Landscape**: salt marshes, maritime shrub lands, tidal creeks, dunes, public beaches
- **Land Use**: single family homes, and low density condos, marinas
- **Waterfront** largely made up of public beaches, with some privately-owned sections with bulkheads

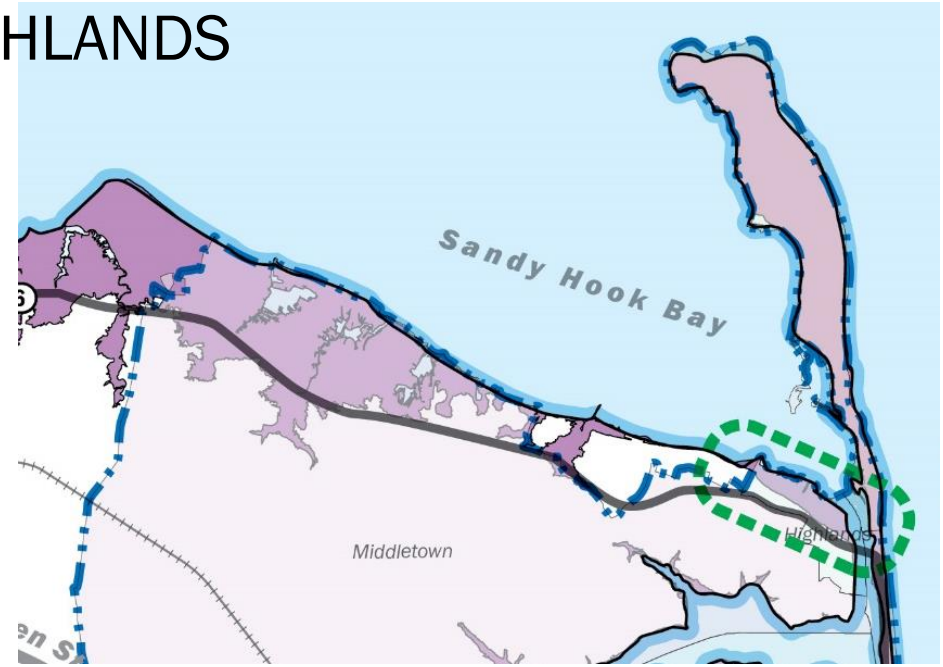



Leonardo community in Bayshore area


Beach access in Leonardo community

AT-RISK AREA: DOWNTOWN HIGHLANDS

- **Located at "pinch point"** of Sandy Hook Bay
- Downtown backed up against area of higher topography***; water cannot leave unless tide is low***
- **Land Use:** relatively compact grid of single-family homes with some low-density garden apartment buildings
- **Waterfront** largely privately-owned, with mix of beaches and bulkheads

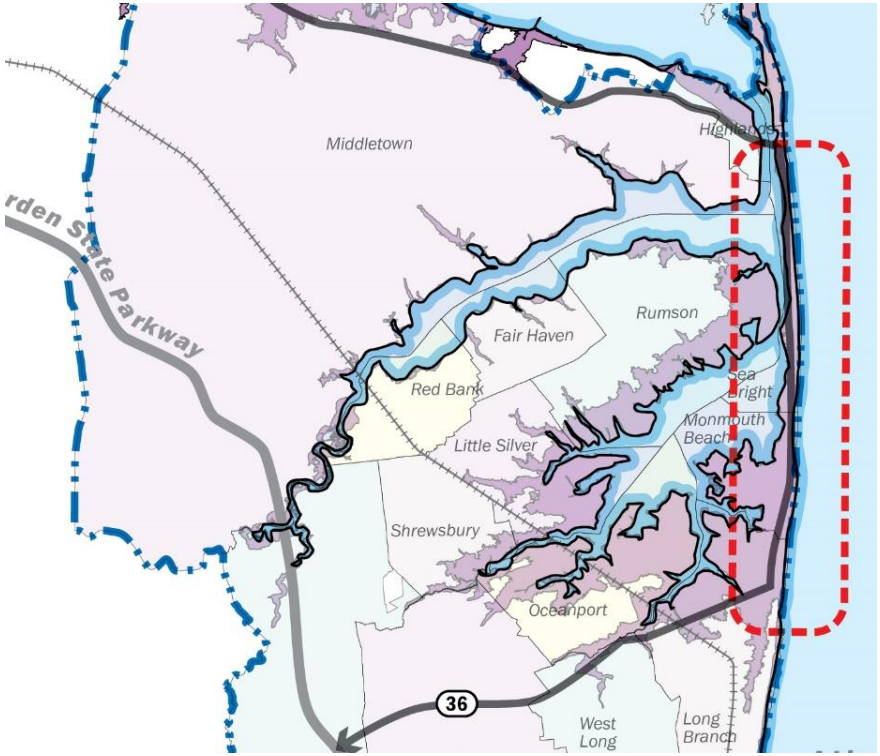


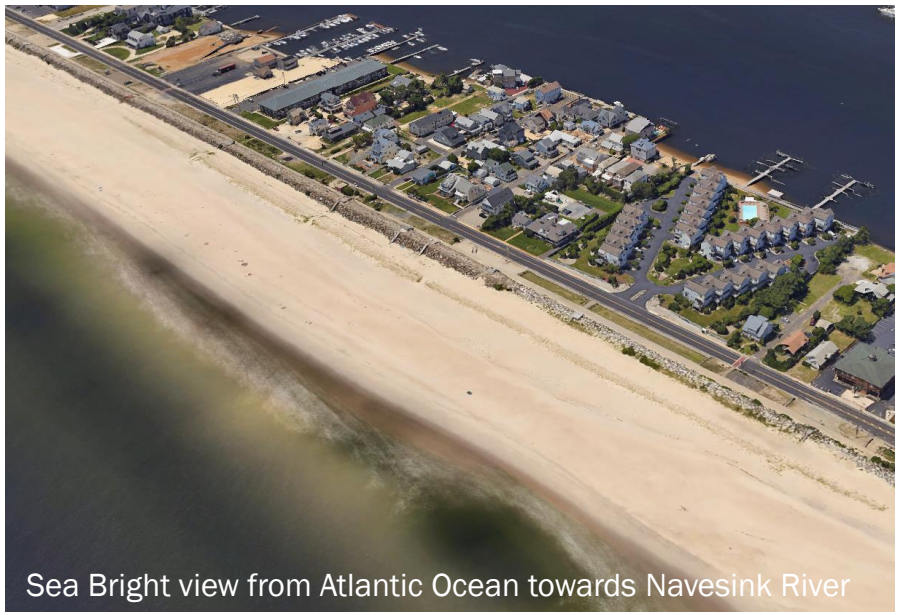

Highlands view from Shrewsbury River


Shore Dr commercial area

AT-RISK AREA- SEA BRIGHT/MONMOUTH BEACH

- **Barrier island,** exposed to velocity rush on both ocean and bay sides
- **Ocean side**: mix of public and private beaches; **Bayside:** privately-owned, mix bulkheads and marinas

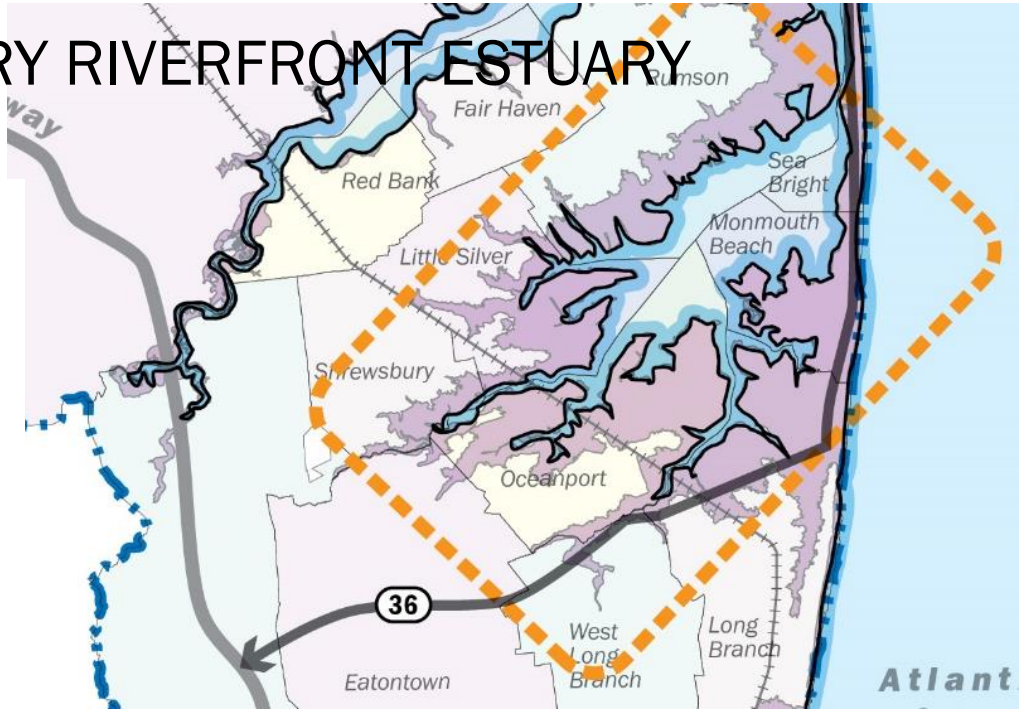


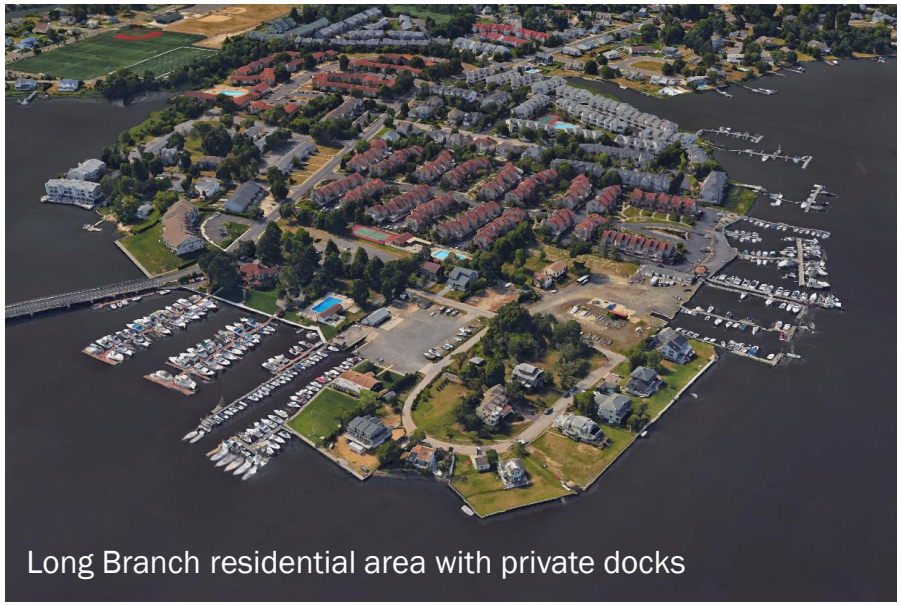

Sea Bright view from Atlantic Ocean towards Navesink River


Sea Bright residential area in Warren St

AT-RISK AREA- SHREWSBURY RIVERFRONT ESTUARY

- Low-lying river plain, subject to high erosion
- **Land Use**: large single family homes, water's edge is largely privately owned
- **Waterfront** largely privately-owned with mix of bulkheads and wetlands

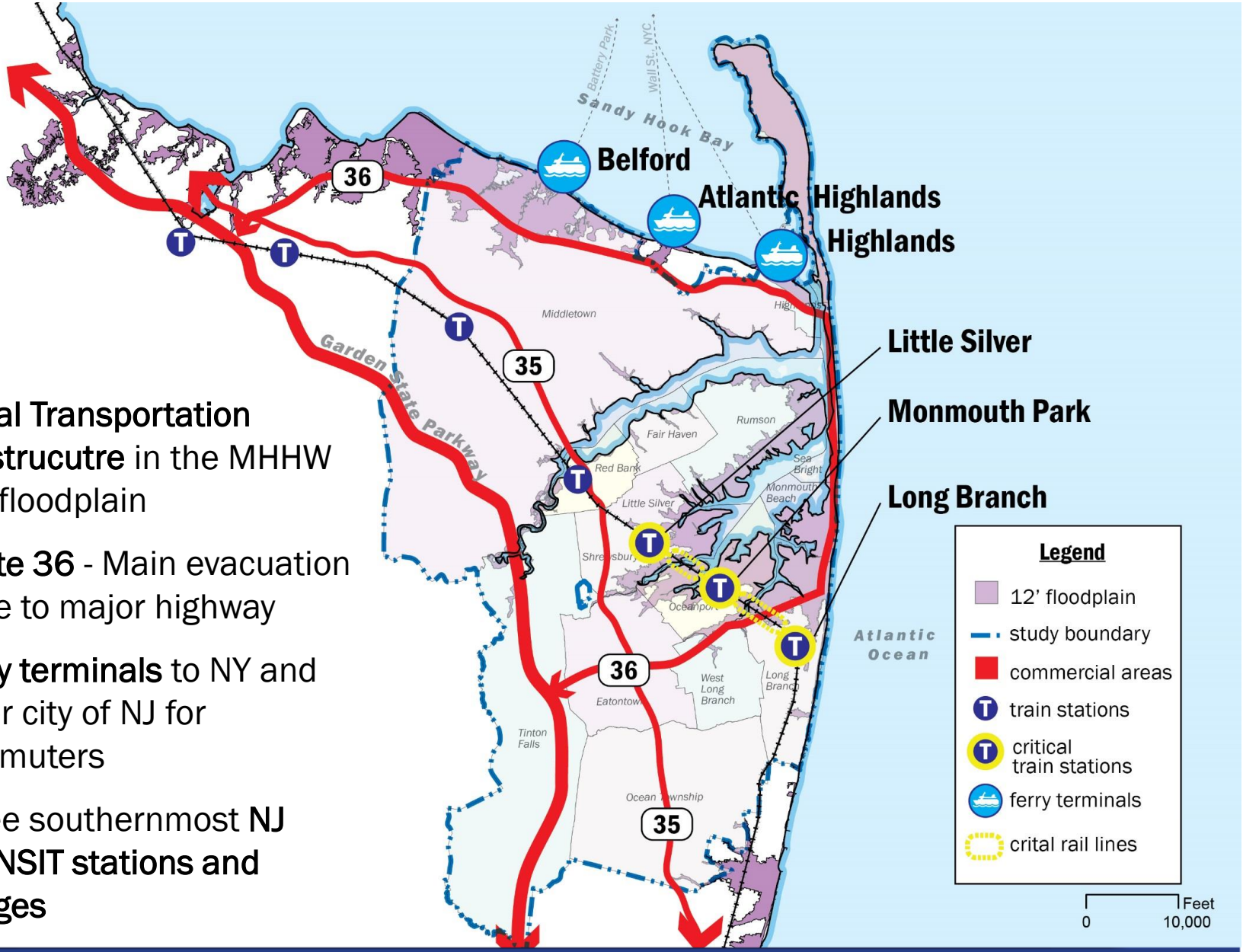




Long Branch residential area with private docks

Riverfront residence in Oceanport

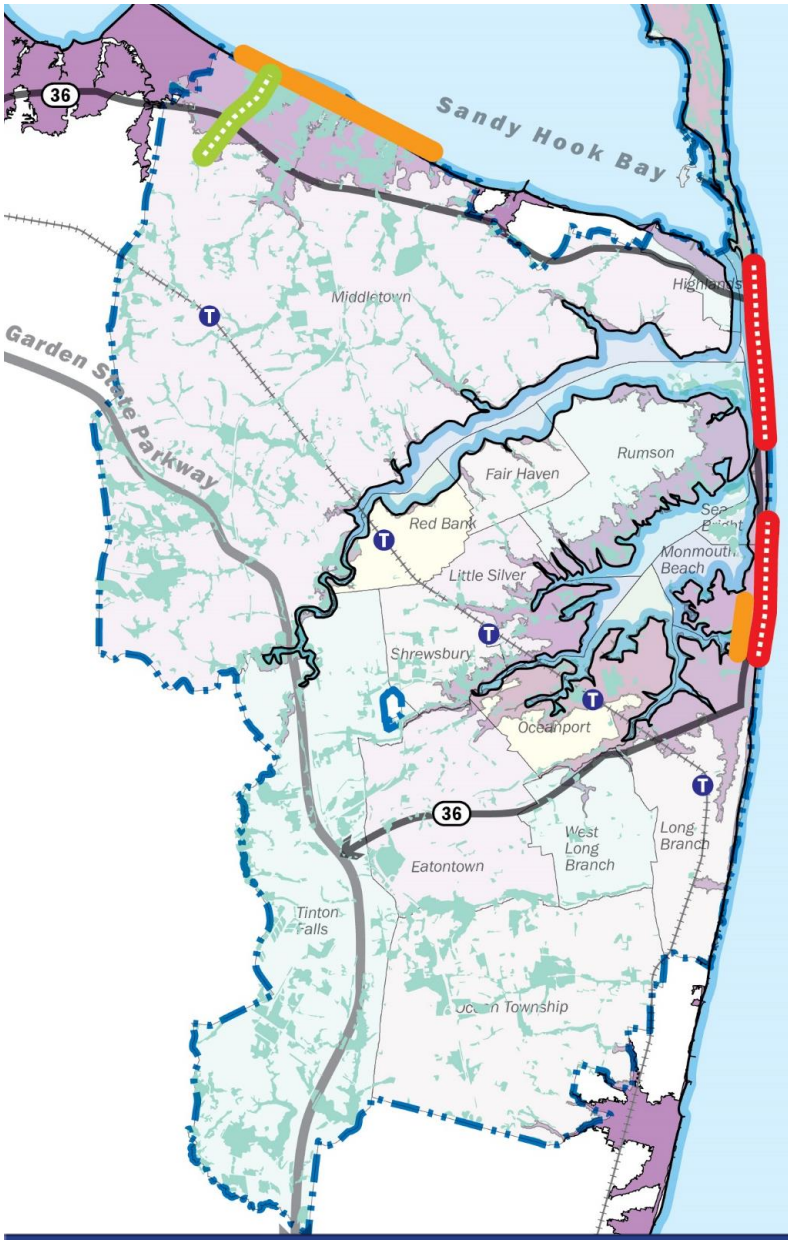
CRITICAL INFRASTRUCTURE - TRANSPORTATION



- **Critical Transportation Infrastrucutre** in the MHHW +12' floodplain
  - **Route 36** - Main evacuation route to major highway
  - **Ferry terminals** to NY and other city of NJ for commuters
  - Three southernmost **NJ TRANSIT stations and bridges**

NJ FOSTERING REGIONAL ADAPTATION THROUGH MUNICIPAL ECONOMIC SCENARIOS (NJ FRAMES)

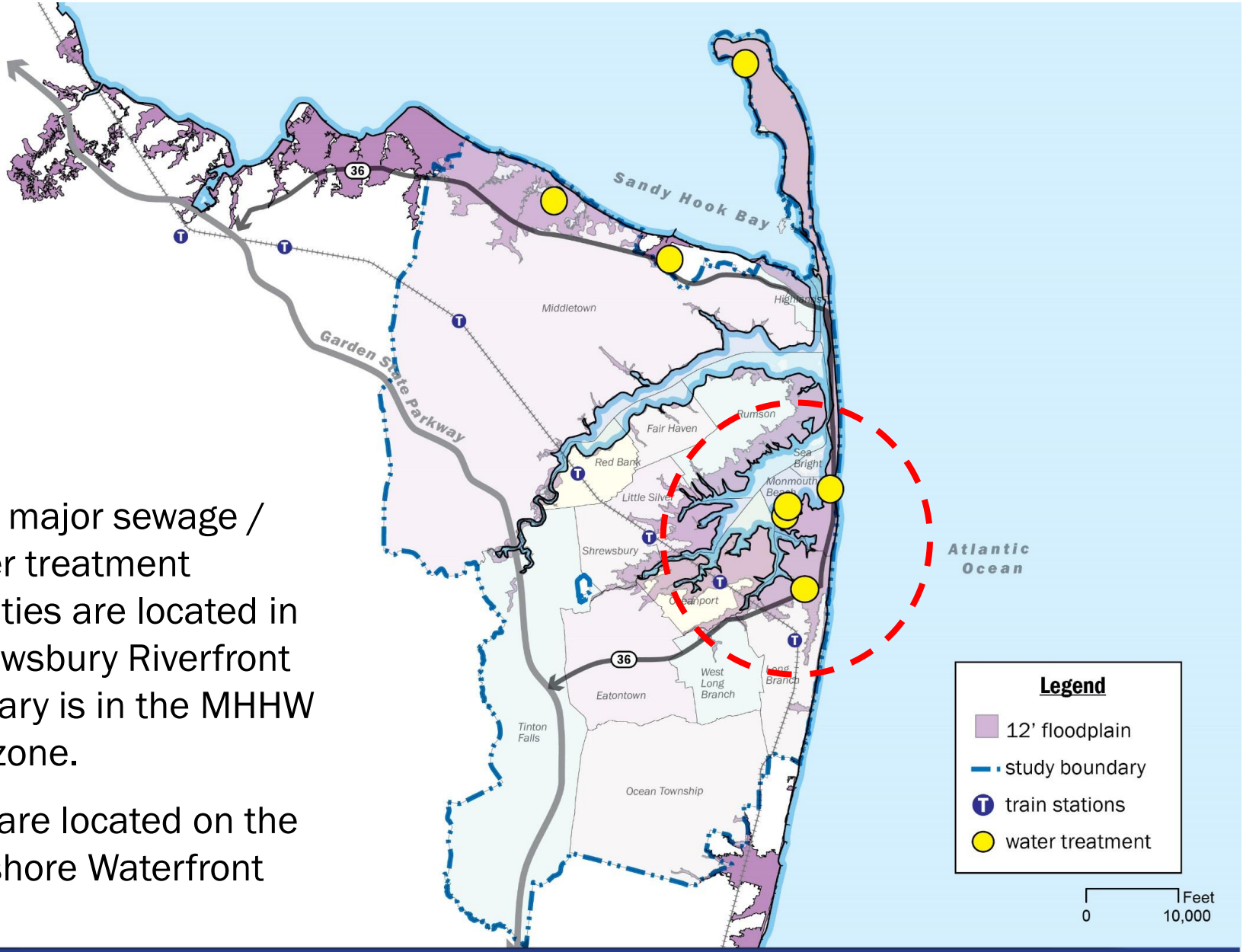
CRITICAL INFRASTRUCTURE – COASTAL PROTECTION



- Critical **flood protection infrastructure**
  - **Seawalls**
  - **Levees**
  - **Dunes**
  - **Wetlands**

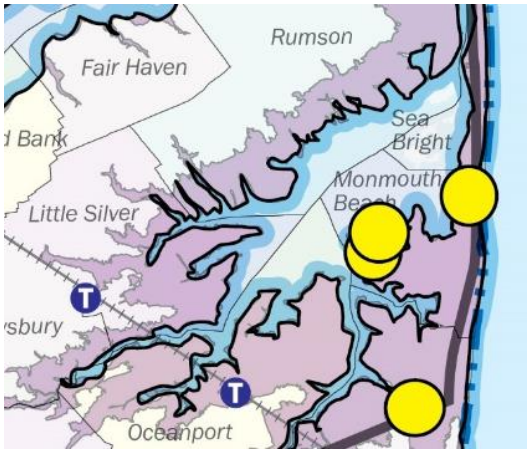
CRITICAL INFRASTRUCTURE – SEWAGE AND WATER TREATMENT FACILITIES

- Four major sewage / water treatment facilities are located in Shrewsbury Riverfront Estuary is in the MHHW 12’ zone.
- Two are located on the Bayshore Waterfront



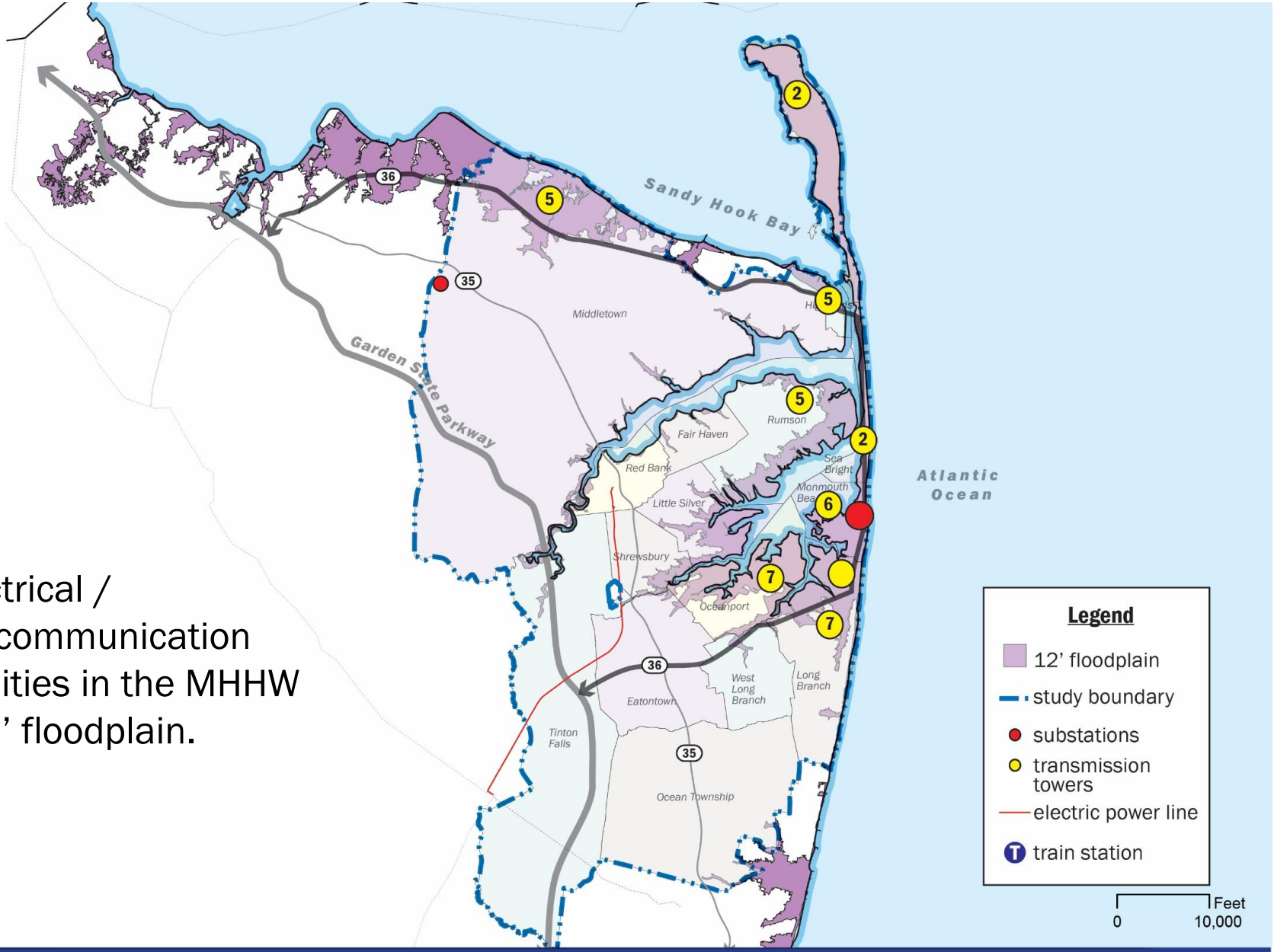
CRITICAL INFRASTRUCTURE – SEWAGE AND WATER TREATMENT FACILITIES

Two River Water Reclamation Plant

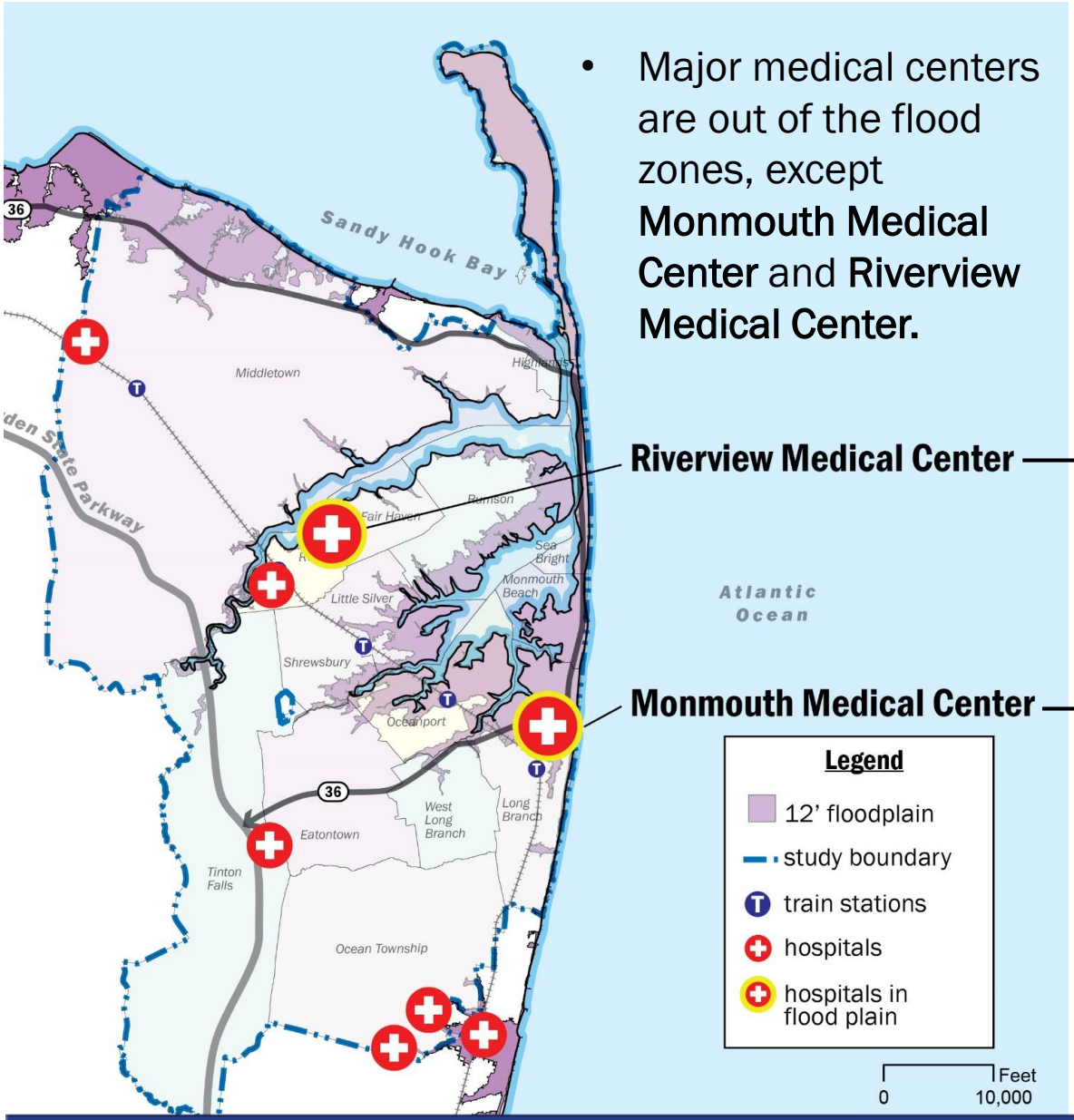


CRITICAL INFRASTRUCTURE – ELECTRIC FACILITIES

- Electrical / telecommunication facilities in the MHHW +12’ floodplain.



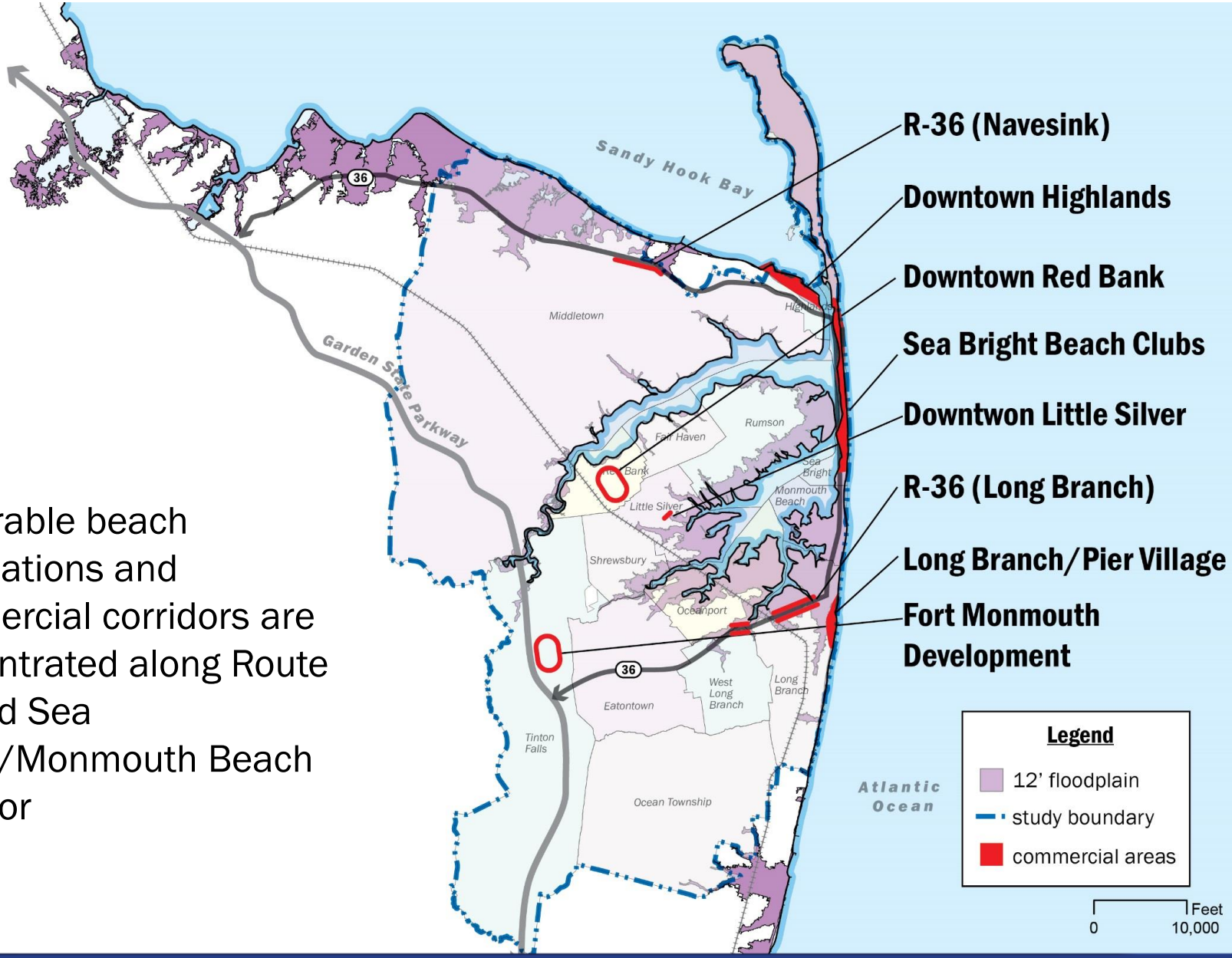
CRITICAL INFRASTRUCTURE - MEDICAL FACILITIES



- Major medical centers are out of the flood zones, except **Monmouth Medical Center** and **Riverview Medical Center.**

ECONOMIC DRIVERS - COMMERCIAL CORRIDOR

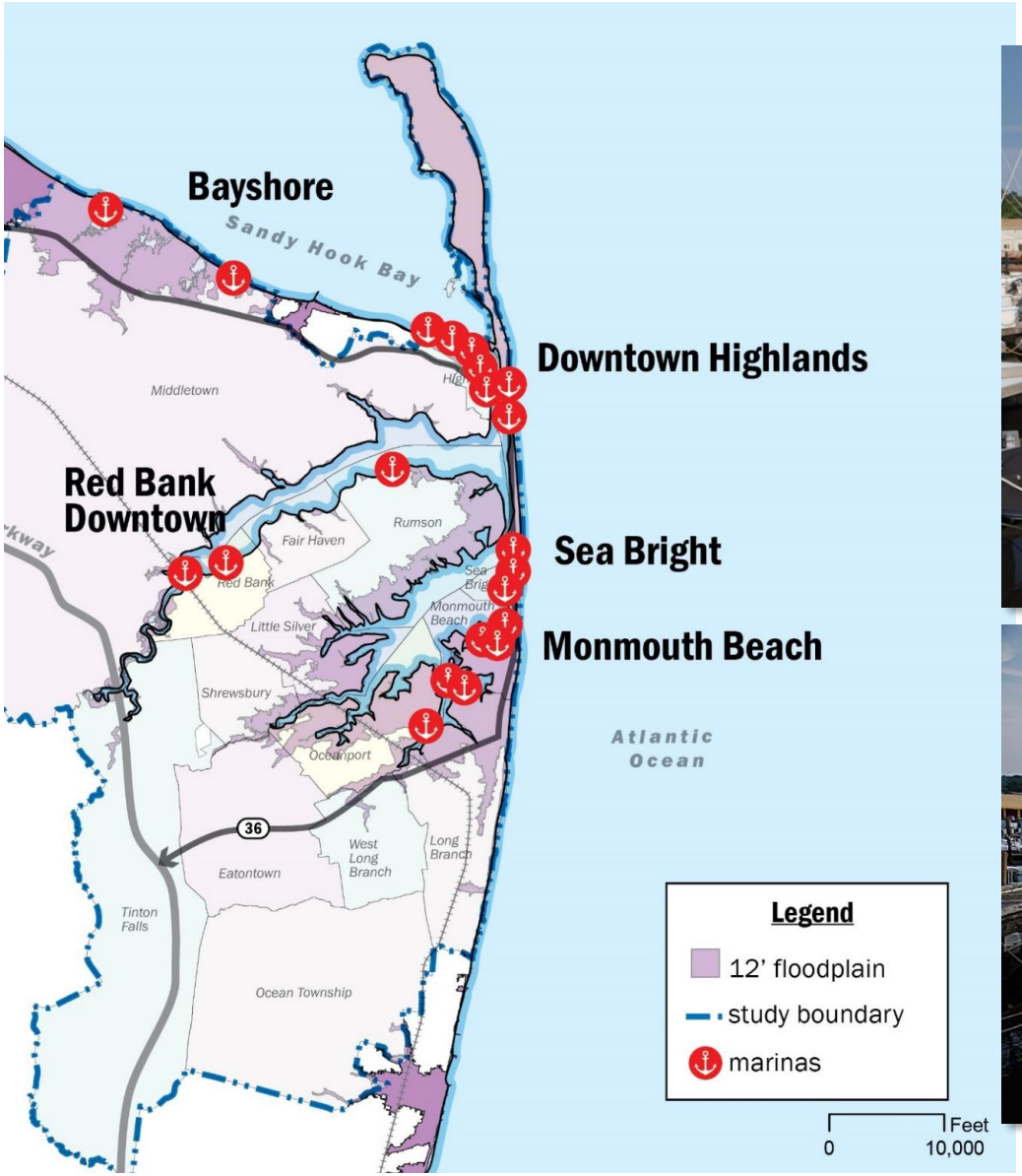
- Vulnerable beach destinations and commercial corridors are concentrated along Route 36 and Sea Bright/Monmouth Beach Corridor



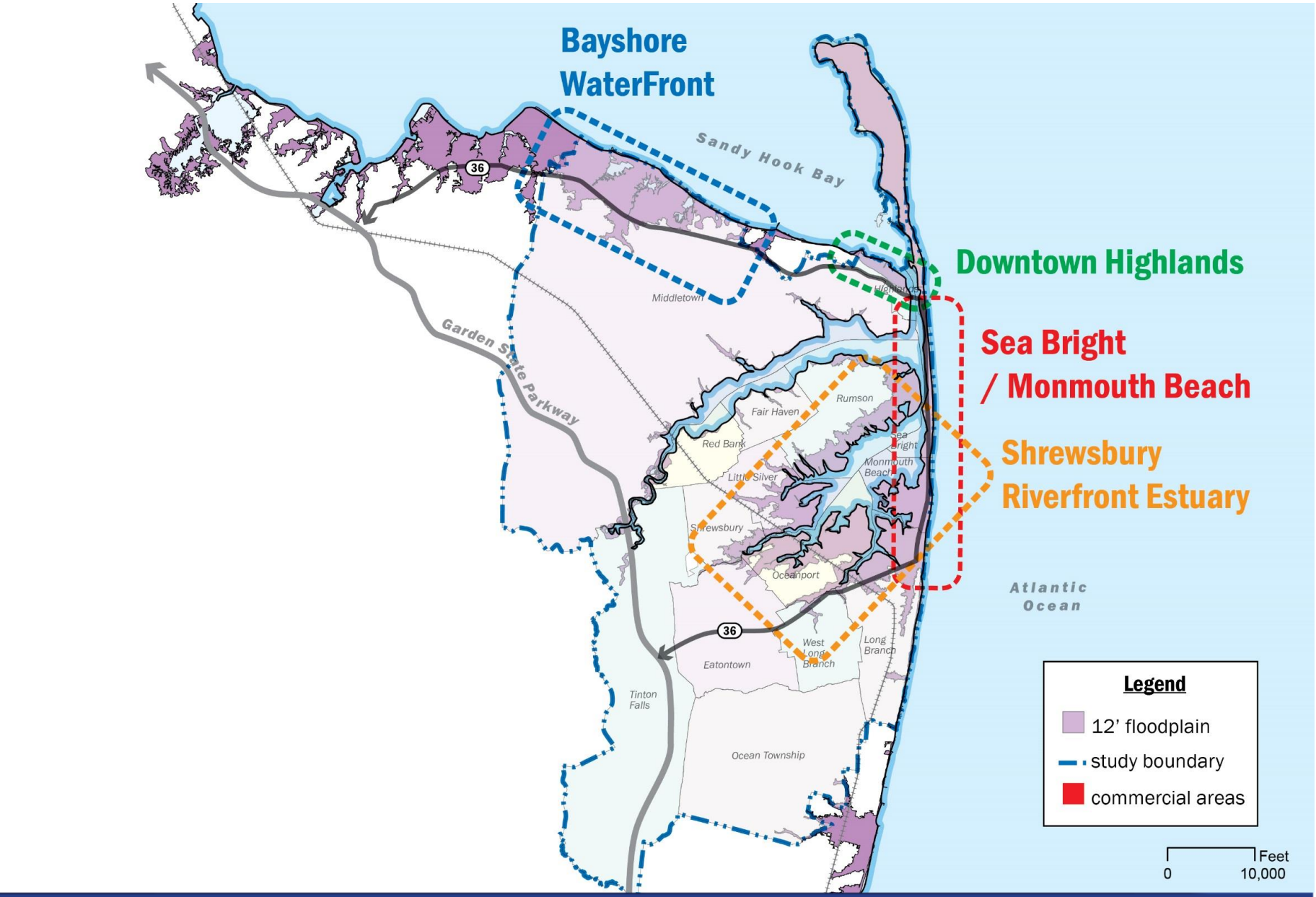

Super
Foodtown
©2017 Google

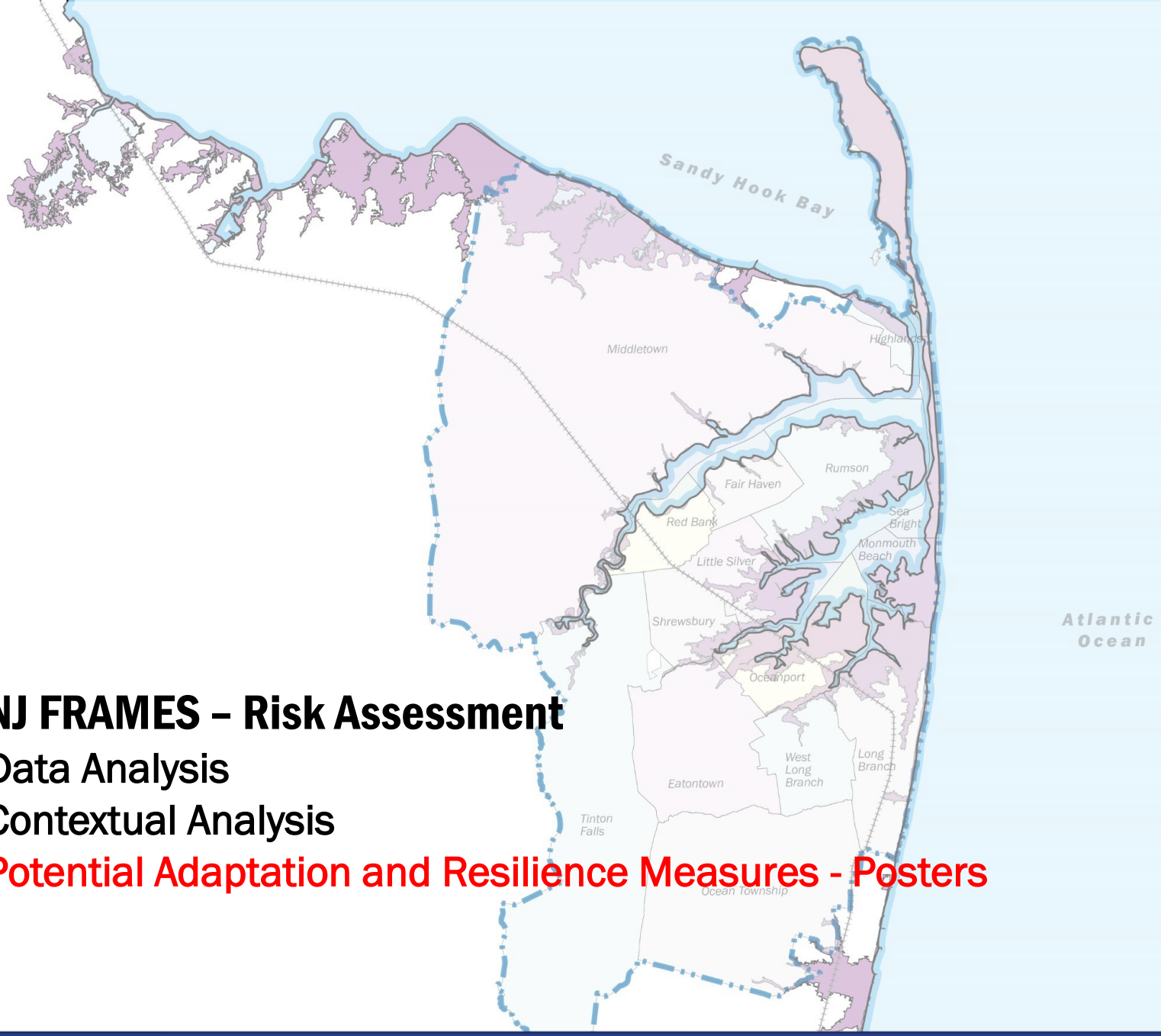
Pier Village vibrant commercial and residential community

ECONOMIC DRIVERS - MARINAS



FOUR PRIMARY AT-RISK AREAS





NJ FRAMES – Risk Assessment

Data Analysis

Contextual Analysis

Potential Adaptation and Resilience Measures - Posters

Structural and Nature-based Measures — RESILIENCY TOOLS

Beach Nourishment

Building Retrofits

Coastal Construction Guidelines

Dune Management

- Sand dunes are important defense against coastal storms and can reduce losses suffered by inland coastal development
- The Beach-Dune Performance Assessment of New Jersey Beach Profile Network Sites assessed beaches pre- and post-Sandy, and it found that beaches with higher, wider dunes protected better against the storm

Floodable Development

Floodproofing Infrastructure

Moveable Buildings

Shoreline Protection Techniques

Wetland Restoration

Living Shorelines

Coastal Restoration

Living Breakwater

Urban Forest and Urban Tree Management

- A single tree may store 100 gallons or more of rainfall, and it is estimated that the urban forest can reduce annual runoff by 2 to 7 percent
- Other benefits of street trees (e.g., shade, beautification)
- "Stormwater to Street Trees" provides case studies in stormwater management tree systems

Coastal Habitat Conservation

Local Policy & Regulations — RESILIENCY TOOLS

Coastal Hazard Disclosure Policy

Conservation Overlay Ordinance

Dune and Beach Protection Ordinance

Development Fees in Vulnerable Areas

Flood Damage Prevention Ordinance

Floor Area Ratio (FAR) Ordinance

- An FAR ordinance may entice residents to reconstruct or elevate their homes or use the space underneath for garages and parking
- Parking under homes not only reduces off-site parking, but also reduces lot coverage and encourages more green space on residential lots (which can be used for stormwater absorption and management)

Landscaping and Vegetation Ordinance

Lot Size Averaging Ordinance

Noncontiguous Parcel Clustering

Open Space Preservation

Residential Cluster Development Ordinance

Rolling Easement

Stormwater Management Ordinance

Transfer of Development Rights (TDR)

Education & Awareness and Incentives Programs — RESILIENCY TOOLS

Digitize Community Knowledge of Past Storms

- Community knowledge and memories of past storms is essential for making sound plans, and they are an important supplement to documentation prepared by state and federal agencies
- The knowledge must be collected and organized in a way that turns individual anecdotes into useful data
- Individual knowledge of location an extent of past floods and community responses can aid in the targeting of resources for mitigation, formulation of evacuation plans, and preservation of necessary emergency response resources

Jacques Cousteau National Estuarine Research Reserve, 2013.

Insert preference here:

Erosion Data Maintenance

- Communities can receive 20 Community Rating System points for updating data on coastal erosion rates and regulatory maps at most every five years.
- Maintenance of erosion data encourages sound decisions about what areas to preserve and develop.
- Ongoing monitoring of erosion may assist communities when applying for funding for shoreline restoration projects, as well as in evaluating the success of projects implemented to date

Association of State Floodplain Managers. 2017. Erosion Data Maintenance.

Insert preference here:

FEMA and Coastal Management Trainings

- FEMA offers extensive training in all areas of disaster prevention and response through its Emergency Management Institute
- NJ Office of Emergency Management's (OEM's) Training and Exercise Unit offers emergency management training
- NJ Association for Floodplain Management offers a free Certified Floodplain Manager Certification program for all NJ residents, although priority is given to government officials

FEMA. 2017. Community Flood Resiliency Toolkit—New Jersey.

Insert preference here:

Program for Public Information (PPI)

- National Flood Insurance Community Rating System offers credit to communities that establish a Program for Public Information (PPI). Points are available for public information related to hazard disclosure, flood protection information and assistance, open space preservation, and drainage system maintenance
- PPI is an ongoing local effort to identify, prepare, implement, and monitor a range of public information activities on hazard awareness
- Examples: City of Somers Point has a PPI, and the Atlantic Cape Coastal Commission is setting up a multi-jurisdictional PPI

FEMA CRS 2017. Coordinator's Manual. Photo: John Kinley

Insert preference here:

StormReady Community Status

- Voluntary program, administered by the National Weather Service, to recognize both communities and individual sites that have implemented communication and safety measures to protect against future storms.
- Five requirements must be completed:
  - Establish a 24-hour warning point and Emergency Operations Center
  - Have more than one way to receive severe weather warnings and to alert the public
  - Create a system that monitors local weather conditions
  - Promote the importance of public readiness through community seminars
  - Develop a formal hazardous water plan, including training sever weather spotters and holding emergency exercise

National Weather Service 2017. NWS StormReady Program

Insert preference here:

FEMA Community Rating System (CRS)

- A FEMA-run, optional program for communities that participate in the National Flood Insurance Program (NFIP)
- CRS seeks to reduce damages and payouts by incentivizing a comprehensive approach to floodplain management, scoring and classifying towns based on steps they've taken to mitigate the risks of flood hazards; communities that earn more "points" under CRS may have lower flood insurance premiums
- As of October 2016, highest-rated CRS communities are Avalon, Beach Haven, Brigantine, Lincoln Park, Long Beach, Longport, Mantoloking, Margate, Ocean City, Pequannock, Pompton Lakes, Sea Isle, Stafford, Stone Harbor, and Surf City…all with 25% discounts on flood insurance

FEMA. 2016. Community Rating System, National Flood Insurance Program

Insert preference here:

Local Plans — RESILIENCY TOOLS

Capital Improvement Plan (CIP)

Climate Adaptation Plan (CAP)

Dune Vegetation Management Plan (DVMP)

Environmental Resource Inventory (ERI)

Green Infrastructure Plan (GIP)

Hazard Mitigation Plan (HMP)

Build-Out Analysis Within a Hazard Mitigation Plan

Incorporating Climate Adaptation into a Master Plan

Long-Term Recovery or Post Disaster Redevelopment Plan

Open Space and Recreation Plan

Resilience Plan

Shoreline Protection or Management Plan

Sustainability Plan

Stay Informed

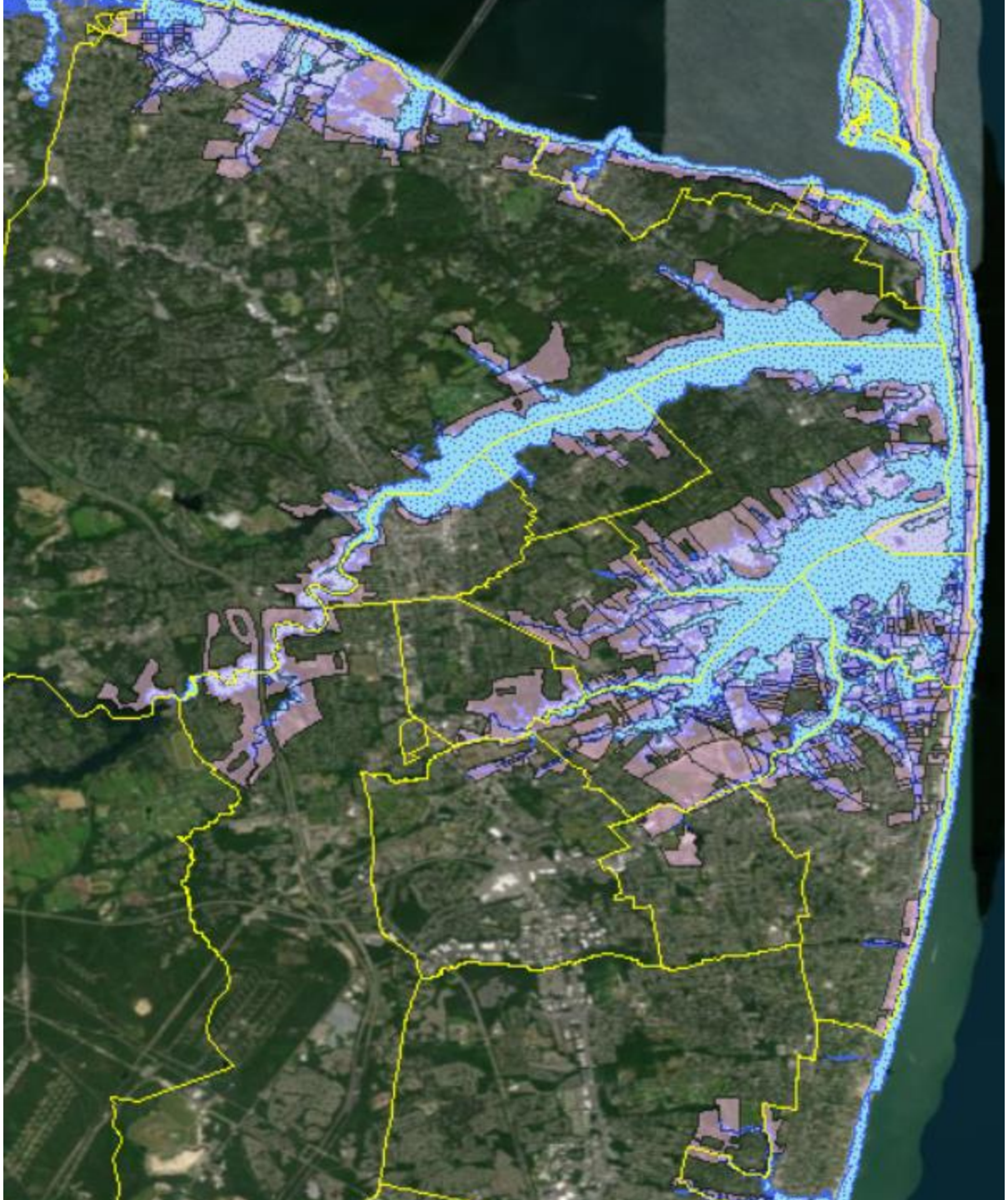
http://www.tworiversonefuture.nj.gov

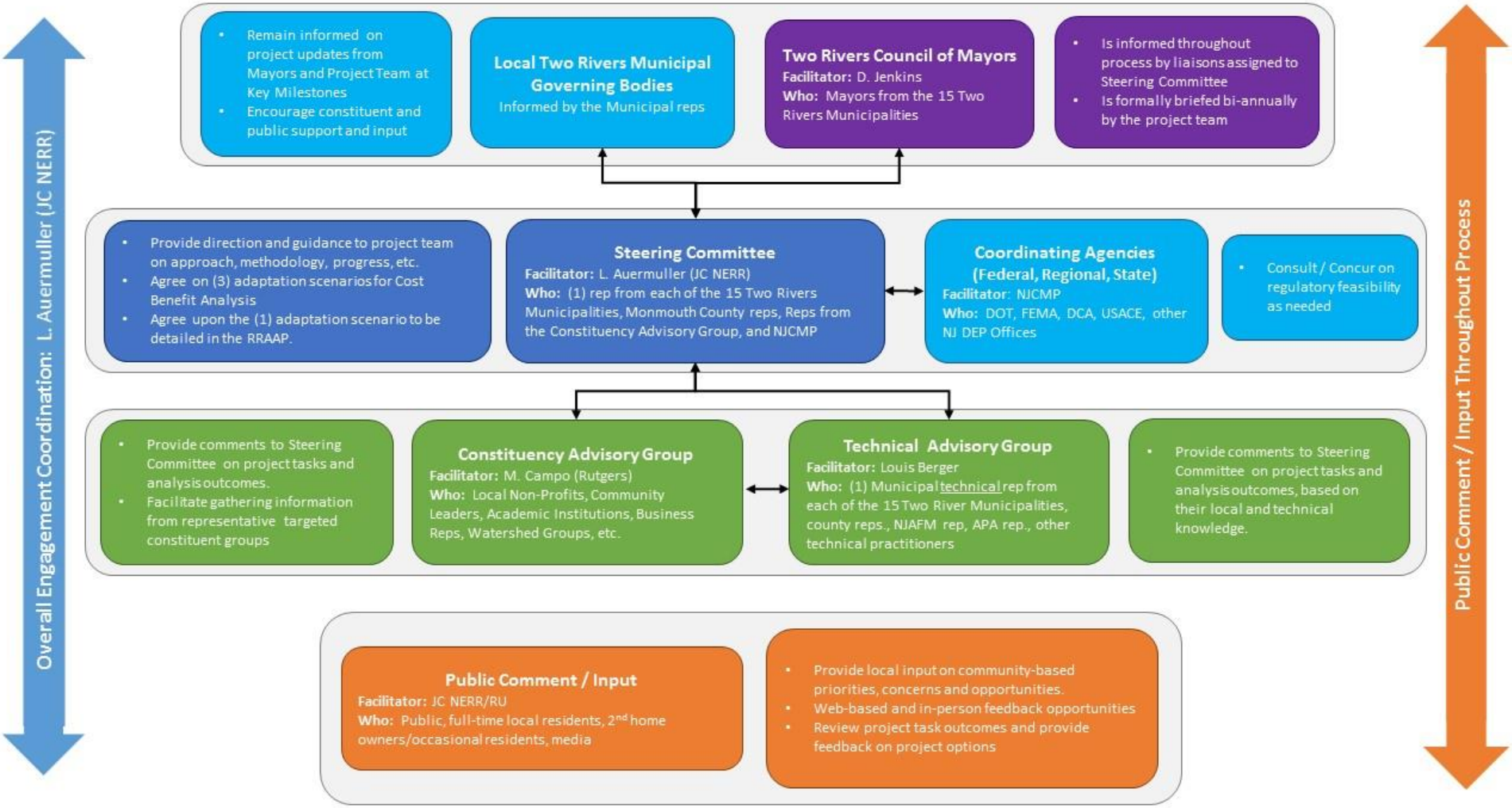
#TwoRiversOneFuture

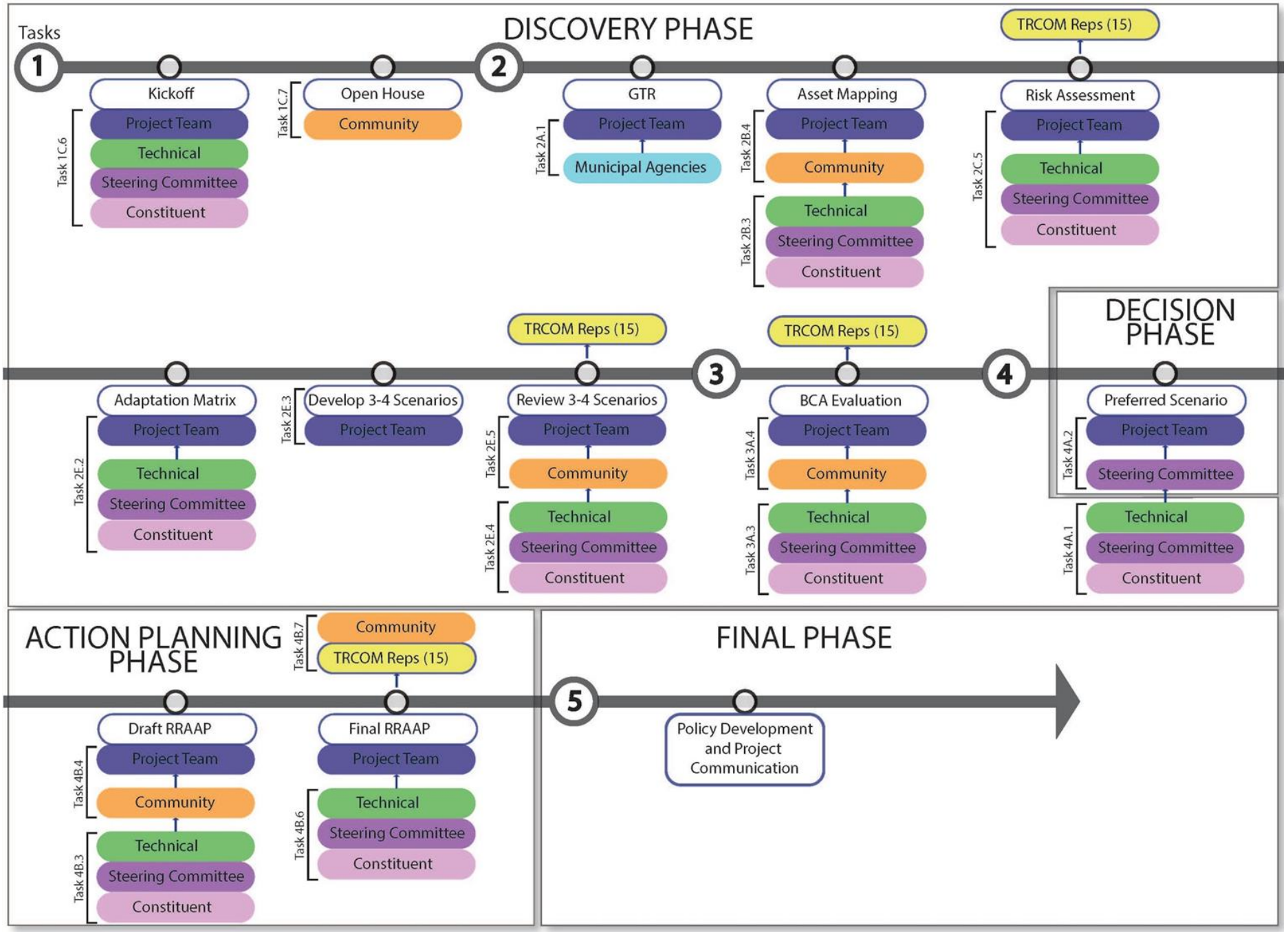
Thank you!

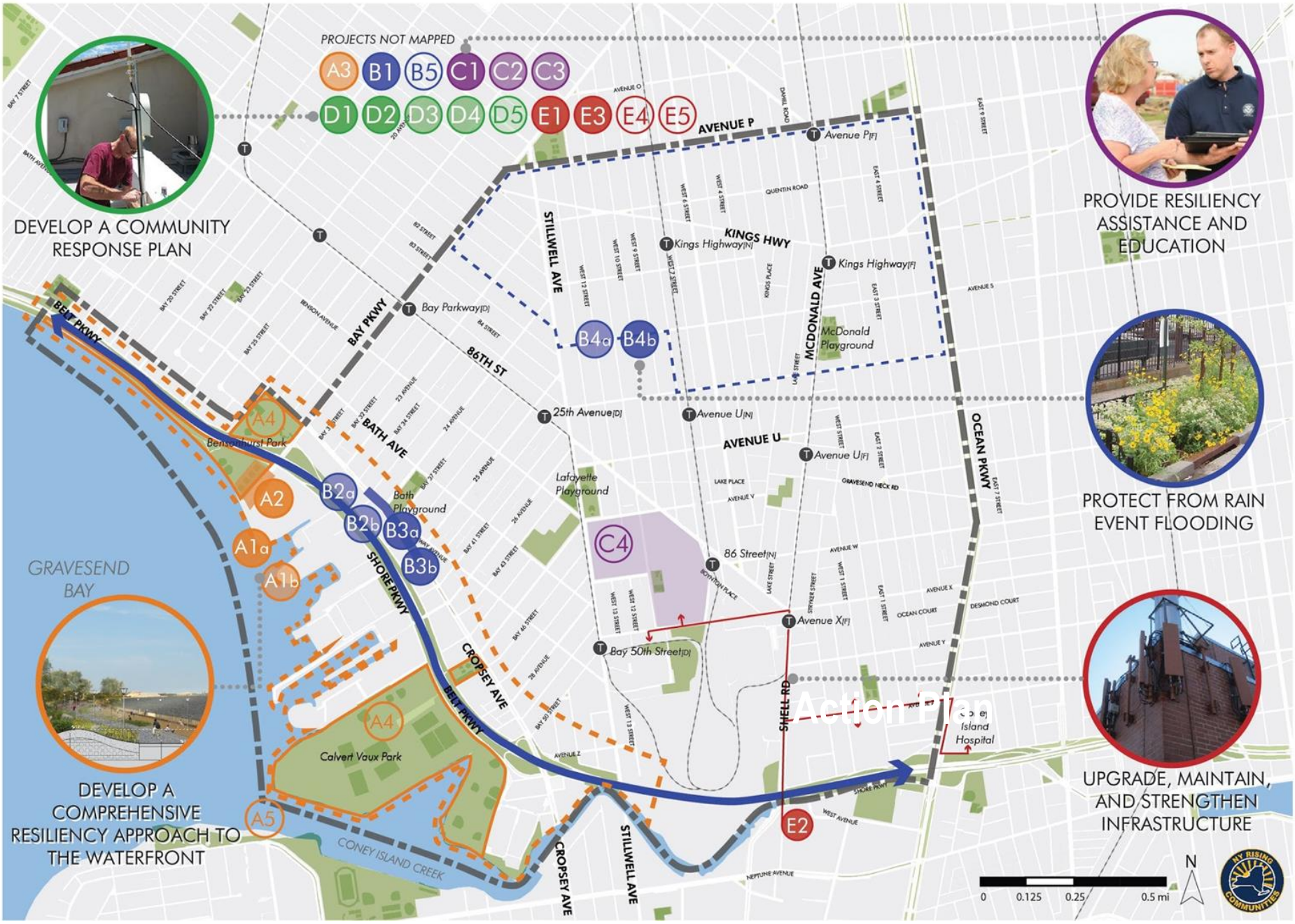
Kelly Pflicke
Office of Coastal and Land Use Planning
Kelly.Pflicke@dep.nj.gov
njframes@dep.nj.gov

@NJCoastalManagement




Overall Engagement Coordination: L. Auermuller (JC NERR)
Public Comment / Input Throughout Process
Remain informed on project updates from Mayors and Project Team at Key Milestones
Encourage constituent and public support and input
Local Two Rivers Municipal Governing Bodies
Informed by the Municipal reps
Two Rivers Council of Mayors
Facilitator: D. Jenkins
Who: Mayors from the 15 Two Rivers Municipalities
Is informed throughout process by liaisons assigned to Steering Committee
Is formally briefed bi-annually by the project team
Provide direction and guidance to project team on approach, methodology, progress, etc.
Agree on (3) adaptation scenarios for Cost Benefit Analysis
Agree upon the (1) adaptation scenario to be detailed in the RRAAP.
Steering Committee
Facilitator: L. Auermuller (JC NERR)
Who: (1) rep from each of the 15 Two Rivers Municipalities, Monmouth County reps, Reps from the Constituency Advisory Group, and NJCMP
Coordinating Agencies (Federal, Regional, State)
Facilitator: NJCMP
Who: DOT, FEMA, DCA, USACE, other NJ DEP Offices
Consult / Concur on regulatory feasibility as needed
Provide comments to Steering Committee on project tasks and analysis outcomes.
Facilitate gathering information from representative targeted constituent groups
Constituency Advisory Group
Facilitator: M. Campo (Rutgers)
Who: Local Non-Profits, Community Leaders, Academic Institutions, Business Reps, Watershed Groups, etc.
Technical Advisory Group
Facilitator: Louis Berger
Who: (1) Municipal technical rep from each of the 15 Two River Municipalities, county reps., NJAFM rep, APA rep., other technical practitioners
Provide comments to Steering Committee on project tasks and analysis outcomes, based on their local and technical knowledge.
Public Comment / Input
Facilitator: JC NERR/RU
Who: Public, full-time local residents, 2nd home owners/occasional residents, media
Provide local input on community-based priorities, concerns and opportunities.
Web-based and in-person feedback opportunities
Review project task outcomes and provide feedback on project options


Tasks
DISCOVERY PHASE
1
2
3
4
5
Kickoff
Project Team
Technical
Steering Committee
Constituent
Task 1C.6
Open House
Community
Task 1C.7
GTR
Project Team
Municipal Agencies
Task 2A.1
Asset Mapping
Project Team
Community
Technical
Steering Committee
Constituent
Task 2B.4
Task 2B.3
TRCOM Reps (15)
Risk Assessment
Project Team
Technical
Steering Committee
Constituent
Task 2C.5
DECISION PHASE
Adaptation Matrix
Project Team
Technical
Steering Committee
Constituent
Task 2E.2
Develop 3-4 Scenarios
Project Team
Task 2E.3
TRCOM Reps (15)
Review 3-4 Scenarios
Project Team
Community
Technical
Steering Committee
Constituent
Task 2E.5
Task 2E.4
TRCOM Reps (15)
BCA Evaluation
Project Team
Community
Technical
Steering Committee
Constituent
Task 3A.4
Task 3A.3
Preferred Scenario
Project Team
Steering Committee
Task 4A.2
Technical
Steering Committee
Constituent
Task 4A.1
ACTION PLANNING PHASE
Community
TRCOM Reps (15)
Task 4B.7
Draft RRAAP
Project Team
Community
Technical
Steering Committee
Constituent
Task 4B.4
Task 4B.3
Final RRAAP
Project Team
Technical
Steering Committee
Constituent
Task 4B.6
FINAL PHASE
Policy Development and Project Communication


PROJECTS NOT MAPPED
A3 B1 B5 C1 C2 C3
D1 D2 D3 D4 D5 E1 E3 E4 E5
DEVELOP A COMMUNITY RESPONSE PLAN
PROVIDE RESILIENCY ASSISTANCE AND EDUCATION
PROTECT FROM RAIN EVENT FLOODING
UPGRADE, MAINTAIN, AND STRENGTHEN INFRASTRUCTURE
DEVELOP A COMPREHENSIVE RESILIENCY APPROACH TO THE WATERFRONT
Action Plan
BELT PKWY
BAY PKWY
86TH ST
BATH AVE
SHORE PKWY
CROPSEY AVE
STILLWELL AVE
KINGS HWY
MCDONALD AVE
AVENUE P
AVENUE U
OCEAN PKWY
SHELL RD
Bay Parkway[D]
Kings Highway[N]
Kings Highway[F]
Avenue P[F]
Avenue U[N]
Avenue U[F]
25th Avenue[D]
86 Street[N]
Avenue X[F]
Bay 50th Street[D]
McDonald Playground
Lafayette Playground
Bath Playground
Bensonhurst Park
Calvert Vaux Park
Island Hospital
GRAVESEND BAY
CONEY ISLAND CREEK
A1a A1b A2 A4 A5
B2a B2b B3a B3b
B4a B4b
C4
E2
0 0.125 0.25 0.5 mi
N

Proposed and Featured Projects

A
Develop a Comprehensive Resiliency Approach to the Waterfront

- A1a Develop a Comprehensive Waterfront Master Plan for Coastal Protection
- A1b Implementation of Coastal Defenses *Featured Project
- A2 Redevelopment of the Bensonhurst Park Tennis Center Site
- A3 Study the Feasibility of a Multi-purpose Pier with Resilient Dock *Featured Project

B
Protect the Community from Flooding During Significant Rain Events

- B1 Analyze Hydrologic and Hydraulic Systems for Improved Stormwater Management
- B2a Belt Parkway Drainage Study (Phase I) *Featured Project
- B2b Improve Stormwater Drainage along the Belt Parkway (Phase II) *Featured Project
- B3a Cropsey Avenue Drainage Study (Phase I)
- B3b Improve Stormwater Drainage along Cropsey Avenue
- B4a Green Street Infrastructure Siting Analysis in Combined Sewer Area *Featured Project
- B4b Implement Green Infrastructure Pilot Project in Combined Sewer Area

C
Provide Resiliency Assistance and Education for Homeowners, Renters, and Business Owners

- C1 Develop a Residential and Commercial Property Technical Assistance and Education Program
- C2 Establish Housing Loan Program for Resiliency Retrofits *Featured Project
- C3 Establish Commercial Loan Program for Resiliency Retrofits *Featured Project

D
Develop a Coordinated Community Response Plan During Times of Extreme Weather

- D1 Create a Community Disaster Recovery Training and Workforce Development Program
- D2 Development of a COAD to create a Community Disaster Recovery Plan
- D3 Expand Emergency Communications Network for First Responders *Featured Project
- D4 Establish Resource and Recovery Center at an Existing Social Service Facility *Featured Project

E
Upgrade, Maintain, and Strengthen Community Infrastructure

- E1 Install Backup Power Supply for Critical Facilities and Infrastructure
- E2 Expand Feasibility Study for Energy Resiliency for NYCHA and Mitchell-Lama Properties into Gravesend-Bensonhurst
- E3 Develop a Wireless Mesh Network as a Backup Communications Network

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Additional Resiliency Recommendations

- A4 Support Resilient Improvements at City Parks Along or Near the Waterfront
- A5 Support Coney Island Creek Feasibility Study
- B5 Support Zoning Education and Enforcement for Permeable Pavements
- C4 Support Resiliency Retrofits at Marlboro Houses
- D5 Support the Capacity Increase of the Local Community Emergency Response Teams (CERT)
- E4 Support Sewer Infrastructure Maintenance Project
- E5 Support Backup Power for Telecommunications Infrastructure

LOT SIZE AVERAGIN

ACTION: Local Planning and Land Use Regulations
DESIRED Outcome: Design Flexibility; Protection of Environment

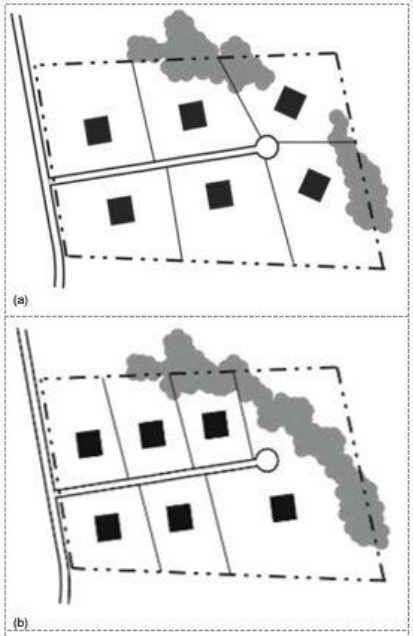


Figure 13. Conventional Large Lot Zoning (a) vs. Lot Size Averging (b)
Source: NJFuture, 2013b

Lot size averaging is a planning technique that allows the lot size of a parcel of land to vary, while the density or number of permitted units stays constant. By providing flexibility in lot size, lot size averaging may allow for greater clustering of development – preserving natural areas at no cost to the public or reducing the profitability of the development. However, this technique only provides the flexibility for lot sizes to vary and does not explicitly mandate the preservation of environmentally sensitive areas or that individual landowners would be good stewards of the land (ANJEC, 2007). Approved in 2013, the Cluster Development Act amended the MLUL to

OVERLAY ZONI

ACTION: Local Planning and Land Use Regulations
DESIRED OUTCOME: Conserve or Restore Environ
Development in High Hazardous Areas

An overlay is a mapped zone that is applied over an existing zoning district, which establishes an additional set of standards to properties that go beyond the underlying zoning. Overlay zoning is commonly used by communities to protect areas of public interest such as historic areas, floodplains and riparian areas, steep slopes, or waterfronts (APA, 2016). Within an overlay district, development may only occur under the conditions of both zones (ANJEC, 2007).

Overlay zoning could be applied as a hazard mitigation technique by limiting or restricting a specific type of development or use within an area identified as highly vulnerable to coastal hazards. For example, a community may decide to create an overlay ordinance that establishes a conservation area that preserves and protects environmentally unique or sensitive areas. Conserving open space or restoring natural areas such as floodplains to function properly can greatly reduce the vulnerability of a community to flooding. According to the National Wildlife Federation (NWF), floodplains are among the most valuable ecosystems on earth - reducing flood damage, improving water quality, and providing essential wildlife habitat. It is estimated that one acre of floodplain saturated with a foot of water can hold 330,000 gallons of water, which could reduce the potential flooding impact to nearby homes and businesses (NWF, 2013).

Overlay ordinances, have also been proposed to address sea level rise (SLR). The Georgetown Climate Institute developed a model SLR overlay ordinance for Maryland, another home rule state, and potential barriers to implementation (Grannis, 2012; Grannis et al., 2012). The model ordinance proposes the establishment of subzones within an SLR overlay zone, that would establish different standards for development and use based on: 1) the vulnerability of the area to coastal hazards, specifically increased flooding associated with sea level rise and storm events; and 2) the community's adaptation goal's for each area. Examples and of subzones could include an:

- Accommodation Zone: this zone would allow development but require higher design standards, such as: increased setbacks and/or elevation, limit the citing of critical facilities or intense uses, and/or limit the size and height of structures.

FLOOD DAMAGE PREVENTION ORDINANCE

ACTION: Local Planning and Land Use Regulations
DESIRED OUTCOME: Flood Hazard Risk Reduction; Reduced Vulnerability to Community Assets and Tax base

Figure X. Elevated home in Manasquan,
Source: Patti Sapone, The Star-Ledger

All communities that wish to participate in or remain in good standing with the National Flood Insurance Program (NFIP) must adopt and enforce a flood damage prevention ordinance. The aim of this ordinance (and more broadly, the establishment of the federally backed insurance program) is to reduce future flood risks to new construction in flood prone areas and provide protection to property owners against potential losses (FEMA, 2011).

The New Jersey Department of Environmental Projection (NJDEP), Bureau of Dam Safety and Flood Control provides model flood damage prevention ordinances that are designed to meet the minimum standards established by the NFIP and tailored to meet the needs of an individual community. However, communities may incorporate more restrictive measures that go above and beyond the federal standards. Because of ever increasing costal hazards and the uncertainty in the affordability of flood insurance premiums in the near future (due to a gradual shift by the federal government away from subsidized to more risk-based insurance rates), communities should assess whether it is appropriate to incorporate more restrictive measures in their local flood prevention ordinances. By incorporating measures that exceed the federal standards and through participation in the Community Rating System (CRS), communities may qualify for reduced insurance premiums (NJAFM, 2015).

One opportunity for communities to incorporate more restrictive standards in their flood prevention ordinances is to increase elevation or "freeboard" standards for new and reconstructed structures within floodprone areas. Elevating homes above the base flood elevation (BFE) or providing freeboard often compensates for many of the unknown factors (such as wave action, debris-blocked culverts or bridges, or development in the floodplain) that could contribute to an increase in flooding levels within a community (FEMA, 2014).

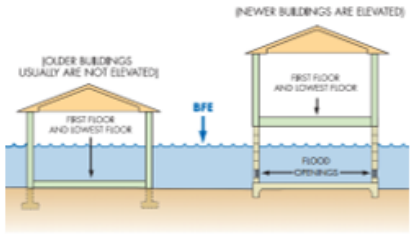
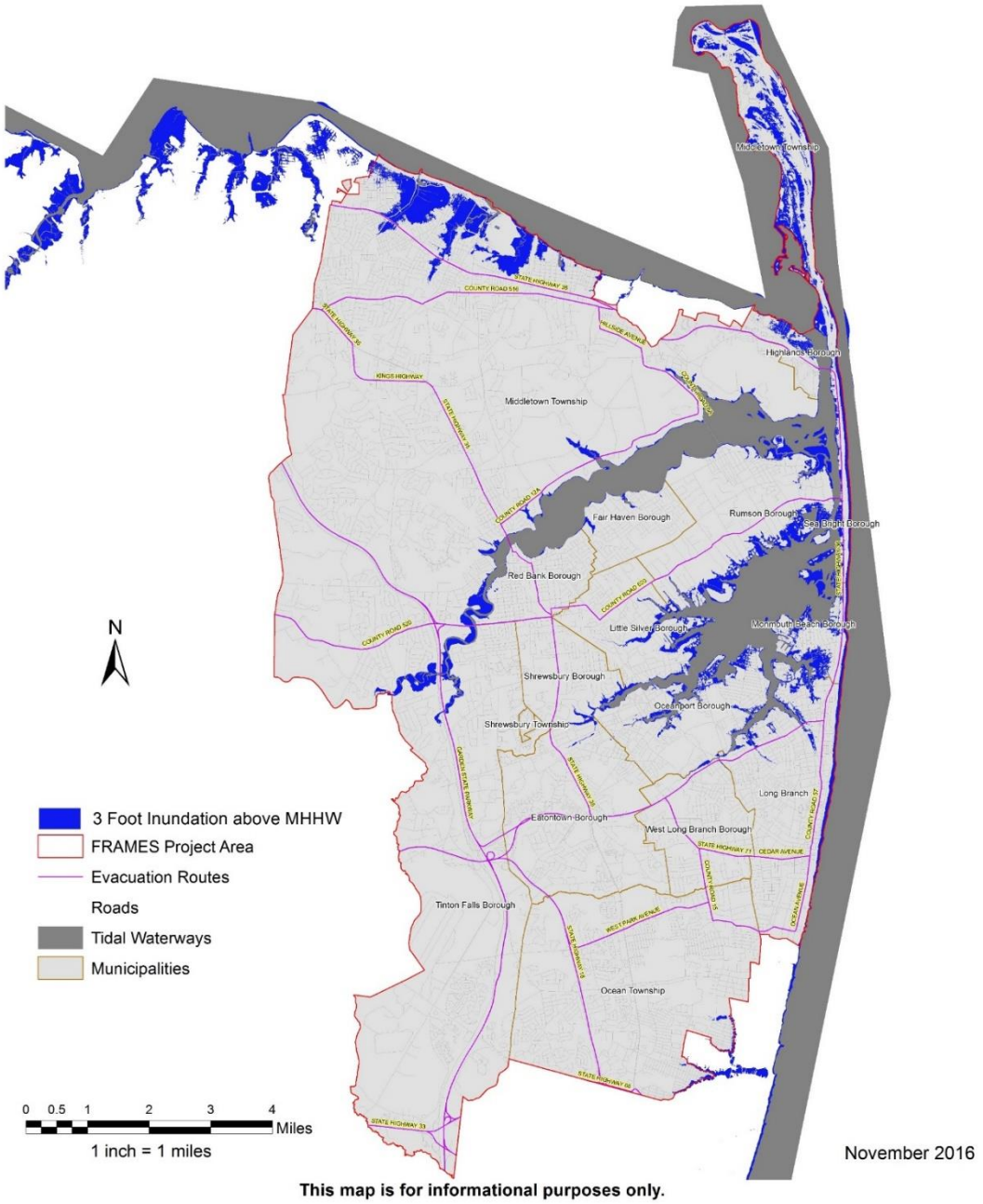


Figure X. Elevated structures and the BFE
Source: NJAFM, 2015

	Rounded Water Level	What High Water Level Condition Does This Height Represent?
Permanent Inundation / Coastal Flooding	3 ft.	• 2030 Annual Flood - 1-in-20 chance HE – 2.7ft • 2050 Annual Flood - LE/HE - 3.0ft • 2100 Permanent Inundation – HE - 3.4ft
Coastal Storm Flooding	7 ft.	• Current 100 Year Flood – 6.7ft • 2100 10% Chance Flood – HE - 7.3ft • 2100 Annual Flood - 1-in-20 chance HE – 6.9ft
Coastal Storm Flooding	12 ft.	• 2100 1% Chance Flood - 1-in-20 chance HE – 12ft. • 2100 Hurricane Sandy water level - HE – 11.7ft

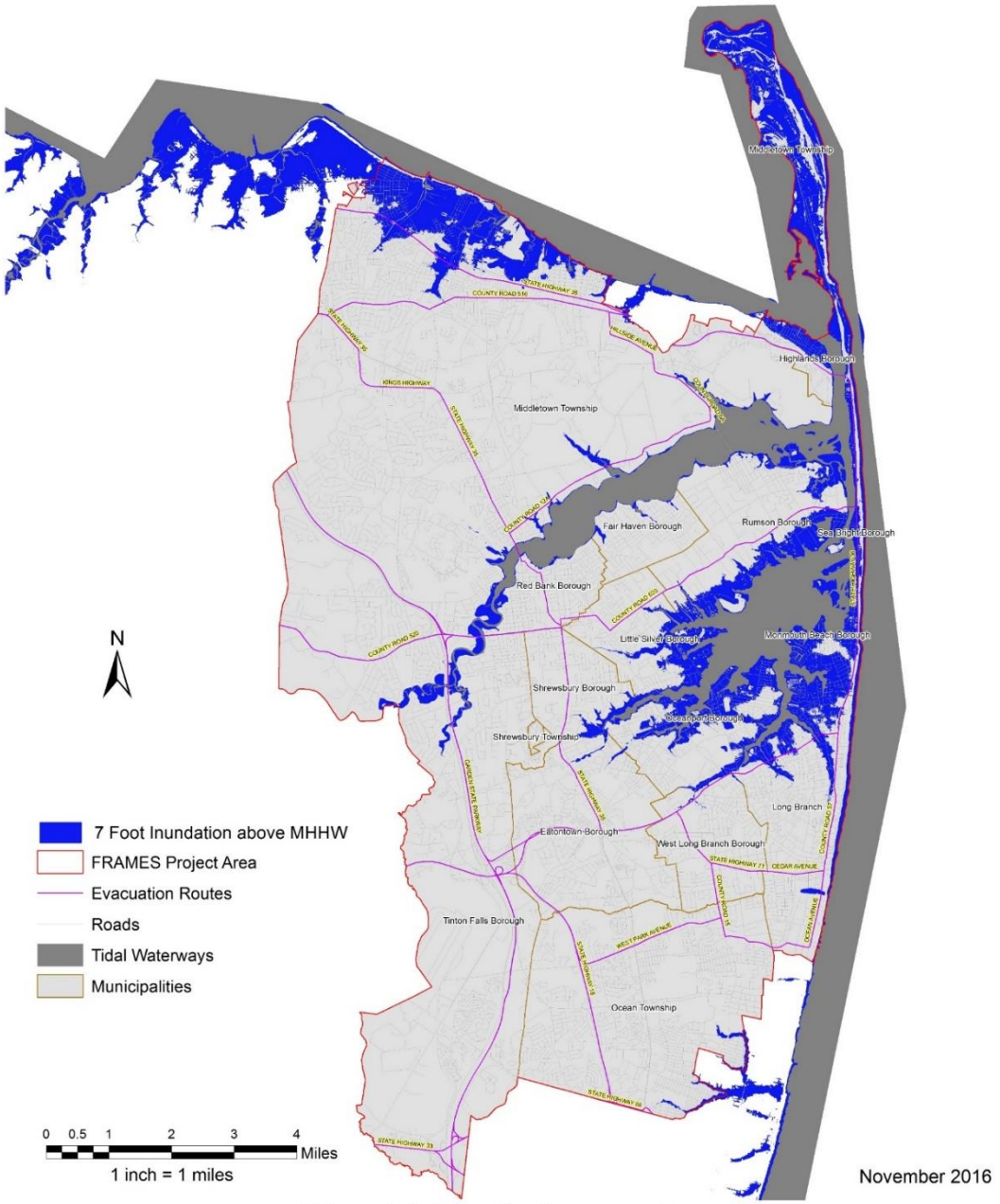
3 foot inundation

- 2030 Annual Flood (99% Chance) & SLR Scenario (1-in-20 chance) – 2.7ft
- 2050 Annual Flood (99% Chance) & SLR Scenario (LE/HE) - 3.0ft
- 2100 Permanent Inundation (MHHW) & SLR Scenario (HE) - 3.4ft



7 foot inundation

- Current 100 Year Flood (1% Chance) – 6.7ft
- 2100 10 Year Flood (10% Chance) & SLR Scenario (HE) - 7.3ft
- 2100 Annual Flood (99% Chance) & SLR Scenario (1-in-20 chance HE) – 6.9ft



12 foot inundation

- 2100 100 Year Flood (1% Chance) & SLR Scenario (1-in-20 chance HE) – 12ft
- 2100 Hurricane Sandy & SLR Scenario (HE) – 11.7ft