



BUILDING ECOLOGICAL SOLUTIONS TO COASTAL COMMUNITY HAZARDS (BESCCH)

Coastal Vulnerability Assessment and Getting to Resilience: Lower Township, NJ January 2017

Prepared by the Environmental Analysis and Communications Group, Rutgers University,
for the Township of Lower

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PARTNERS



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I. Introduction

This project was funded by the National Fish and Wildlife Foundation in support of the New Jersey Department of Environmental Protection, Coastal Zone Management Program

As stated in the 2011 NJDEP document *New Jersey's Coastal Vulnerability Assessment and Mapping Protocol*, vulnerability is defined as the degree of exposure and inability of a human or natural system to cope with the effects of a natural hazard, including changing variability and extremes in weather and climate. By assessing vulnerabilities, communities can plan for future exposures and develop strategies for mitigating long-term risk; making communities more resilient.

This report assesses community vulnerability to sea level rise projected for the year 2050 along with a category 1 coastal storm surge.

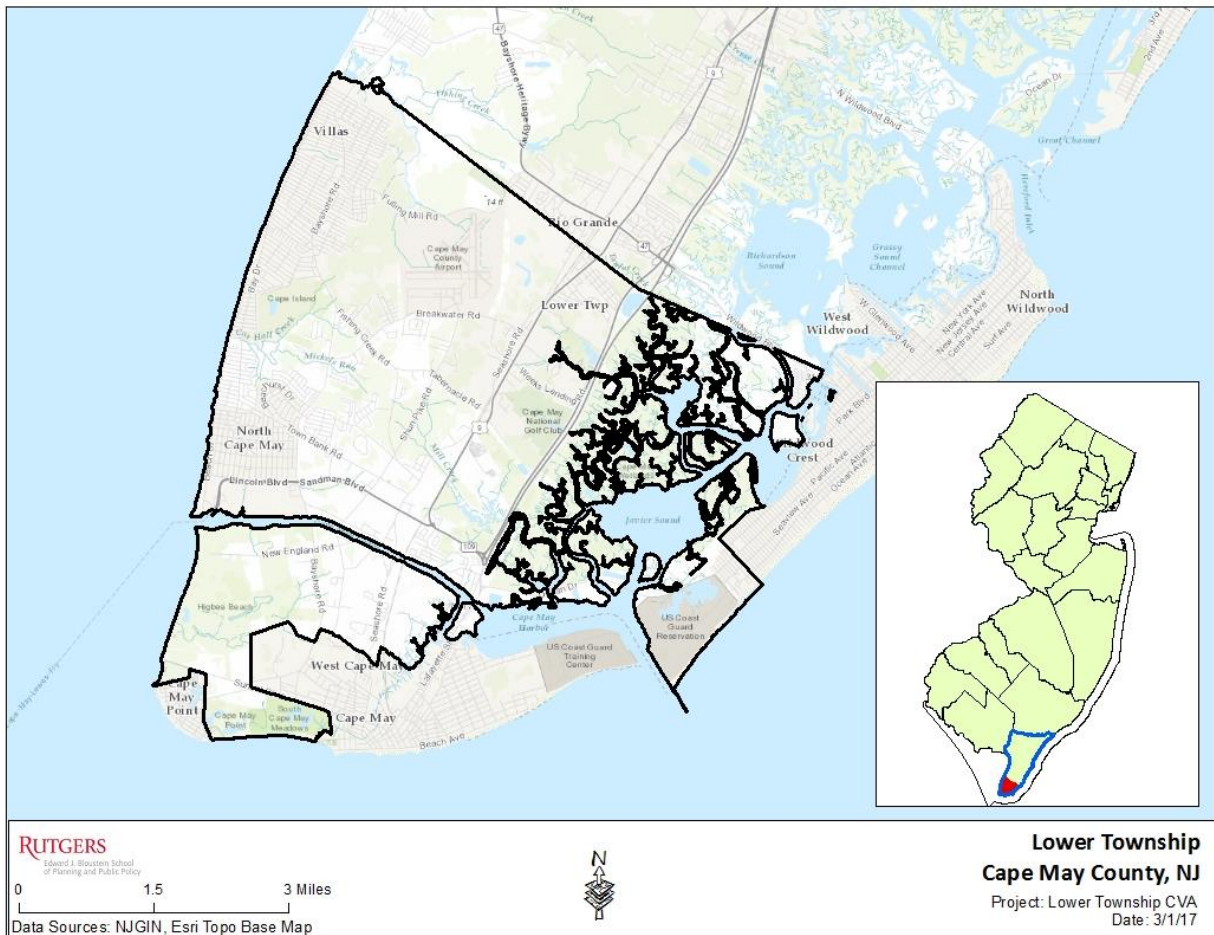
The sea level rise projection data used is taken from the publication *A geological perspective on sea-level rise and its impacts along the U.S. mid-Atlantic coast* (Miller et al, 2013). This publication calls for a central projection of 1.5 feet of sea level rise along the shore in 2050.

Category 1 storm surge data was mapped using the Sea, Lake, and Overland Surge from Hurricanes (SLOSH) data developed by the National Weather Service/NOAA to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes, taking into account the atmospheric pressure, size, forward speed, and track data of storms. According to the National Hurricane Center, Category 1 storm characteristics include:

- Sustained winds of 74-95 mph
- Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters.
- Large branches of trees will snap and shallow rooted trees may be toppled.
- Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.

II. Community Profile

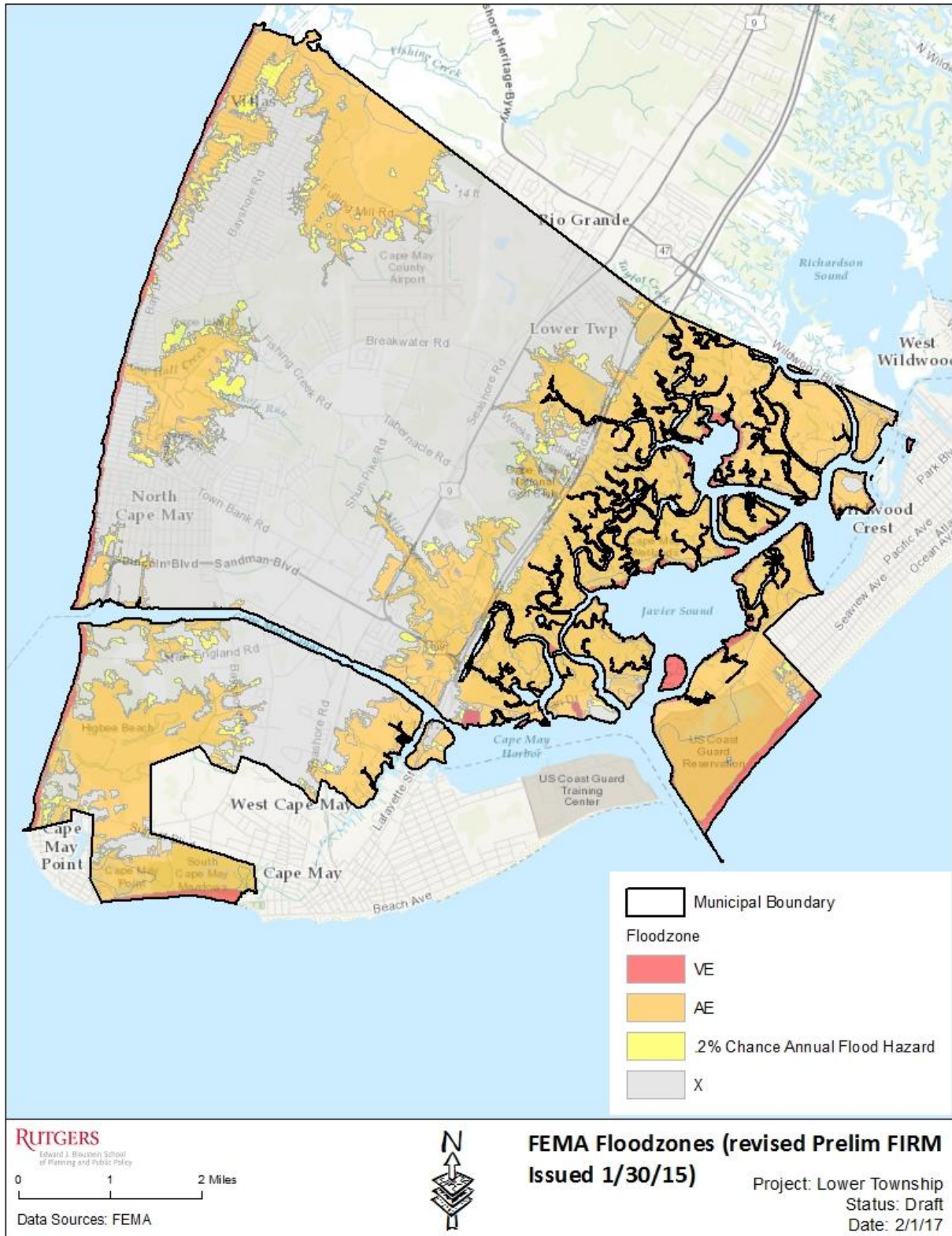
Map 1: Lower Township, Cape May County – NJ



Lower Township is a Cape May County community with the Delaware Bay to the West and the Atlantic Ocean to the East, with multiple creeks, sounds, and the Cape May Harbor also located along the eastern portion of the township.

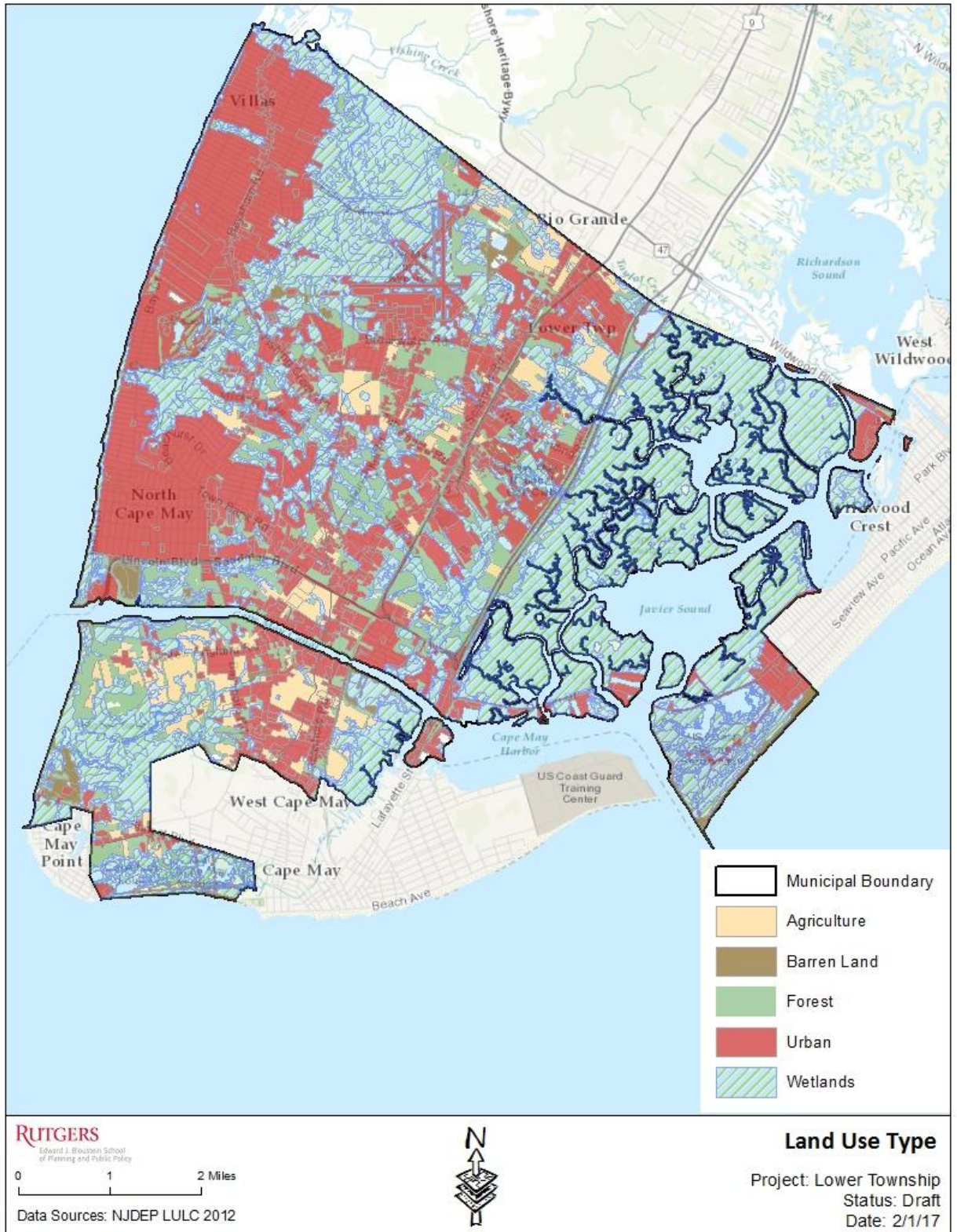
According to the 2015 American Community Survey 5-Year population Estimates, the population of Lower Township was 22,125, making it the most populated of 16 municipalities in Cape May County. During the summer time, the population balloons to over 99,000 people. The Township is a total of 31 square miles of land with a median household income of \$51,101 and median age of 46.5 years. The largest racial group in the Borough is White at 94.24%.

Map 2: FEMA Flood Zones



FEMA has designated a large portion of land in Lower Township as Zone X, or areas of minimum flood hazard. Areas subject to inundation by the 1% annual-chance flood event are designated as AE, where Base Flood Elevations (BFEs) are shown, mandatory flood insurance purchase requirements and floodplain management standards apply. A smaller amount of the Borough is designated as being in the 2% chance annual flood zone. These are areas outside the 1% annual chance floodplain, there are no Base Flood Elevations or depths are shown within this zone and insurance purchase is not required. Land immediately adjacent to the coast is designated as Zone VE, which are generally considered the most hazardous of the Special Flood Hazard Area due to wave velocity. Flood insurance is mandatory in this zone.

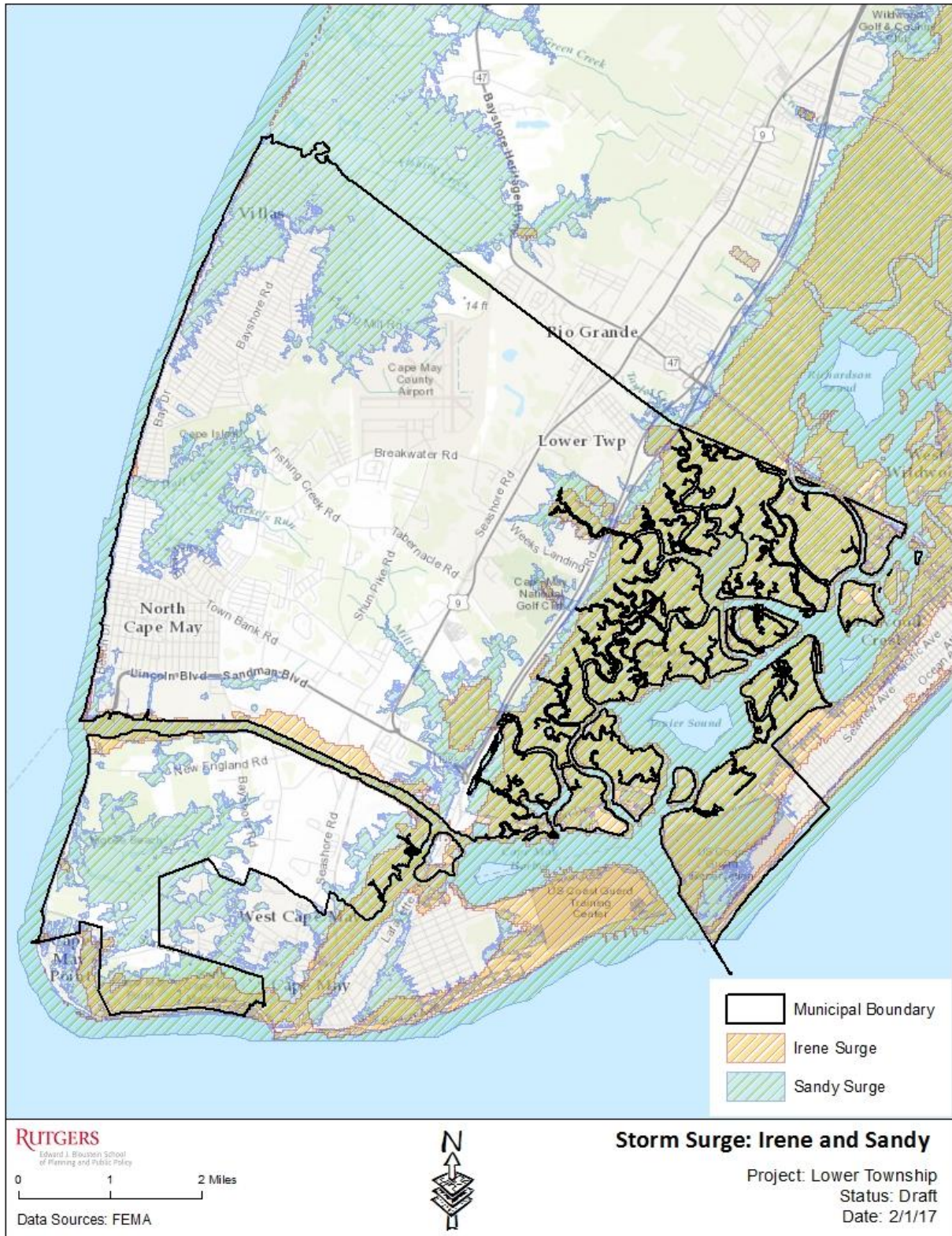
Map 3: Land Use Type



As seen in the map #3, land use type in Lower Township varies from more developed, urban development, to areas of agriculture and wetlands. The vast majority of the coastline along the Delaware Bay is urbanized.

According to the NJ Farmland Preservation Program, as of February 2017, there were 10 preserved farms in Lower Township, totaling nearly 250 acres.

Map 4: Storm Surge: Hurricane Irene and Superstorm Sandy



FEMA modeling shows storm surge from Superstorm Sandy to have inundated not only some of the wetland and agricultural areas in town, but also some of the developed areas, particularly, the North West portion of the township known as Villas. Likewise, storm surge from Hurricane Irene in 2011 impacted much of the eastern portion of the town in the wetland area east of the Garden State Parkway.

III. CVA Methodology

Prior to the first meeting, staff at Rutgers University mapped initial assets to create draft mapping in preparation of the CVA meeting with municipal officials. The CVA/GTR meeting was held on February 27th at town hall. Municipal personnel in attendance to assist in identifying critical assets and finalizing mapping included:

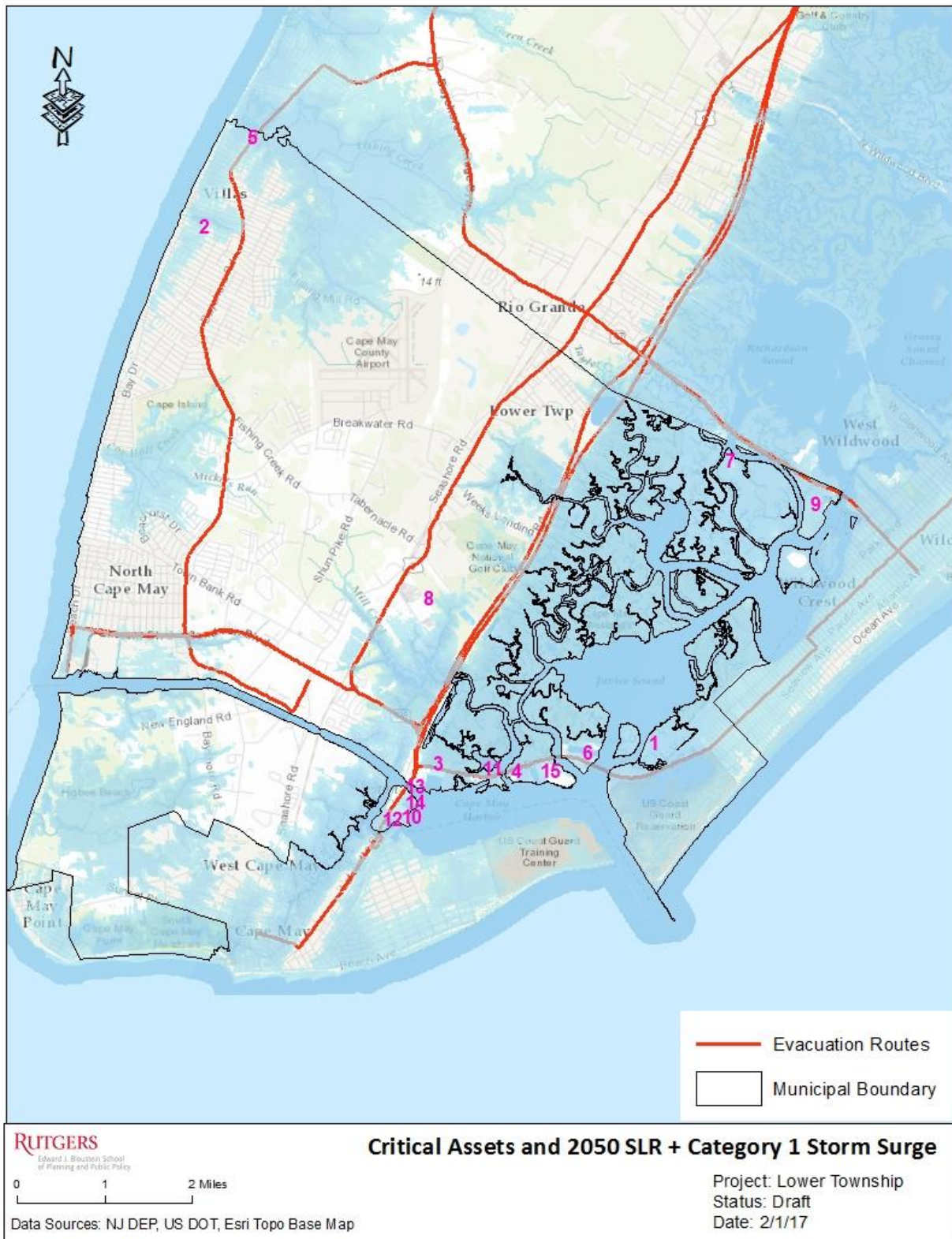
Gary Douglass, Public Works Superintendent
Bill Galestok, Township Planner
James Ridegeway, Township Manager

When a CVA is completed, community assets from four general areas are indexed in a matrix and then used to support the development of the mapping, these areas include:

- Community Resources
- Critical Infrastructure and Facilities
- Natural Resources
- Vulnerable Sites and Populations.

After deliberation, West Cape May's final list of assets consisted of 15 asset locations and 6 local evacuation routes.

Map 5: Vulnerable Assets with Sea Level Rise for 2050 and Category 1 Storm Surge



After identifying the assets, depth projections were mapped and listed using combined data provided by the New Jersey Department of Protection for the storm surge from a category 1 storm coupled with sea level rise projected for the year 2050.

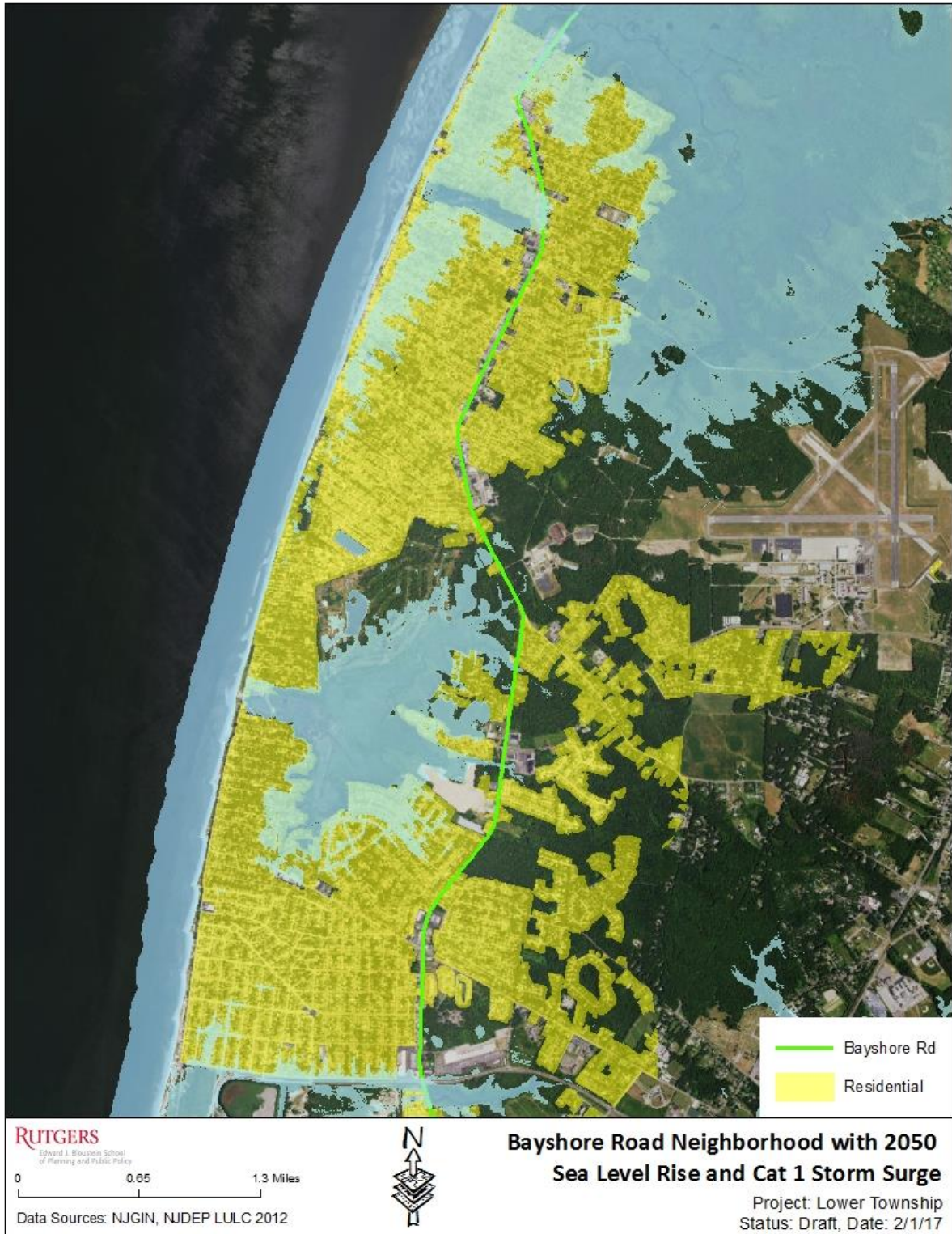
Table 1. Vulnerable Assets and Depth Projections

Asset.....	Depth Projection (Feet)
1. 2 Mile Landing	4-8
2. Bayshore Estates neighborhood.....	0-5
3. Canyon Club Resort/Marina.....	0-3
4. Harbor View Marina.....	3-7
5. Millman Community Center.....	1-2
6. Mud Hen/Lund's.....	3-5
7. Pier 47 Marina.....	2-5
8. Regional School.....	0-2 on eastern field, 0-3 Surrounding southeast building
9. Shawcrest Neighborhood.....	3-6
10. Schellengers Landing/Schooner American Lobster House.....	4-7
11. Snug Harbor Marina.....	3-5
12. South Jersey Marina.....	3-5
13. Utsch's Marina.....	3-5
14. Whale Research Center.....	1-3
15. Yacht Basin.....	5-8
 Evacuation Routes.....	 Depth Projection (Feet)
• County 603 (Bayshore Rd).....	0-4 from W Miami to Bay Ave, 0-2 from W bates to Matthews Ave, 1-2 at intersection with Rt. 9
• County 621 (Ocean Dr.).....	2-7 around Coast Guard Reservation, 2-5 from Coast Guard Reservation to 109
• Garden State Parkway.....	0-3 in area of Mill Creek, 0-1 area east of Cape Island, 0-3 at area of Warren Creek between wetlands and Golf Club, 0-2 at area of Mill Creek
• US 9.....	0-4 at Mill Creek Tributary, 0-3 from Beach Dr. to intersection with 603,
• State Highway 43 (Wildwood Blvd.).....	1-3 at north end of Shawcrest Neighborhood
• State Highway 109 (S Canal Ave).....	0-3 from Rt. 9 to GSP, 0-3 on Schellenger Landing

IV. Findings and Recommendations

Bayshore Road Neighborhood

Map 6: Bayshore Road Neighborhood with 2050 Sea Level Rise and Cat 1 Storm Surge



Discussion with municipal officials noted the residential neighborhoods located along Bayshore Road as the most critical asset. According to municipal officials, most of the homes along the shore in this area are not elevated and those located directly along the coastline have been designated by FEMA as being located in the VE Zone, or extremely vulnerable to flood and wave damage. Also, there are areas of marsh and also creeks located to the north and in the center of the Bayshore area. The northern marsh area was drained prior to Superstorm Sandy, certainly lessening the damage seen at Bayshore Estates. This is a great example of how the marsh serves as natural flood protection and stormwater storage.

The Lower Township Master Plan has not been updated since the 1970's. It is recommended that the community update its Master Plan to include protections and strategies for mitigating flood impacts and land uses in the Bayshore area.

Recommendations from the Cape May County Hazard Mitigation Plan that are in line with the CVA and the Bayshore Neighborhood include:

According to the Cape May County Hazard Mitigation Plan Update, Lower Township should consider the following action:

- *Where appropriate, support purchase, relocation, or retrofitting of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Identify facilities that are viable candidates for retrofitting based on cost-effectiveness versus relocation. Where retrofitting is determined to be a viable option, consider implementation of that action based on available funding.*
 - Municipal officials stated that there is no interest in the Blue Acres Program by Township residents but efforts to retrofit are ongoing.
- *Bayshore Estates (drainage system, pump station) to mitigate flooding in this area.*
 - This is a locally funded, ongoing effort.
- *Dune beach replenishment*
 - This effort is in progress.

National Flood Insurance Program (NFIP) and the Community Rating System (CRS)

According to FEMA, as of 2015 Lower Township is not participating the CRS but does, however, participate in NFIP with 1,603 policies in force. There are 2 Repetitive Loss Properties and 2 Severe Repetitive Loss Properties located in the Borough.

The Township considers to weight the cost vs. benefits of participating in the CRS Program.

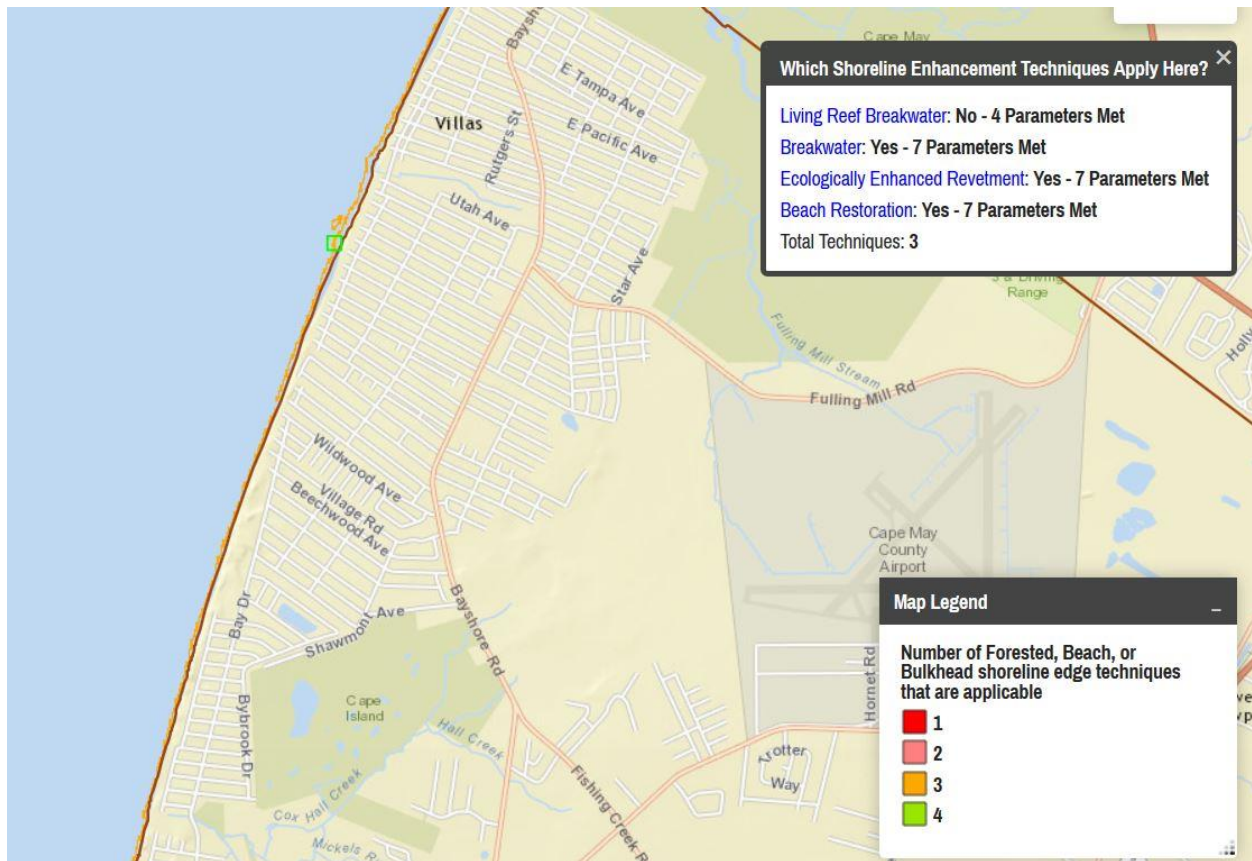
Getting to Resilience (GTR)

The Township completed the GTR online assessment at Borough Hall on February 27th. The complete list of linkages and recommendations is available upon request. Chosen relevant recommendations are listed on the following page.

- *Conduct a Shoreline Change Analysis*

A GIS Shoreline Change Analysis along the Bay Shore would illustrate how the shore line has eroded over the years and may continue to change into the future. This data will be useful in projecting needed beach replenishment projects or opportunities for living shorelines. It may also assist municipal officials in planning future areas for development and conservation.

- *Utilize The Nature Conservancy's Restoration Explorer*



Graphic 1. Screenshot from the Restoration Explorer

TNC's Restoration Explorer identifies 3 shoreline restoration techniques for the coastline of the Bayshore Road residential neighborhoods in the Township. These techniques include breakwaters, ecologically enhanced revetment, and beach restoration.

- *Track and Map Repetitive and Severe Repetitive Loss Properties*

According to FEMA, there are 2 Repetitive Loss Properties and 2 Severe Repetitive Loss Properties located in the Borough. Mapping these properties could assist the municipality in targeting not only outreach programs to perhaps a specific neighborhood, but could also focus areas for mitigation projects.

- *Reflect Future Sea Level Rise and Storm Events in Municipal Plans*

As the municipal Master Plan is currently due to be updated, reflecting future projected storm surge and sea level rise, as with tracking repetitive loss, would assist the municipality in focusing areas for mitigation projects and also planning for future areas of development and conservation, particularly in the Bayshore Road area.