

Coastal Vulnerability Assessment: Perth Amboy, NJ February 2017

Prepared by the Environmental Analysis and Communications Group, Rutgers University,
for the City of Perth Amboy

The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. government or the National Fish and Wildlife Foundation and its funding sources. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government, or the National Fish and Wildlife Foundation or its funding sources.

PARTNERS



NFWF



Content

	Page
I. Introduction.....	3
II. Community Profile.....	3
Map 1: Perth Amboy, Middlesex County – NJ.....	4
Map 2: FEMA Flood Zones.....	5
Map 3: Land Use.....	6
Map 4: Storm Surge: Irene and Sandy.....	7
III. CVA Methodology.....	7-8
Map 5: Vulnerable Assets with Sea Level Rise for 2050 and Category 1 Storm Surge.....	9
Table 1. Vulnerable Assets and Depth Projections.....	10
IV. Findings and Recommendations	10-15
Map 6: Waterfront Path.....	11
Map 7: Waterfront Land Uses/Accessibility.....	12
Map 8: Harbortown Residential Site.....	13
Map 9: Waterfront Infrastructure Sites.....	14
Recommendations from the Middlesex County Hazard Mitigation Plan that are in line with the CVA.....	14
Community Rating System (CRS).....	15

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:

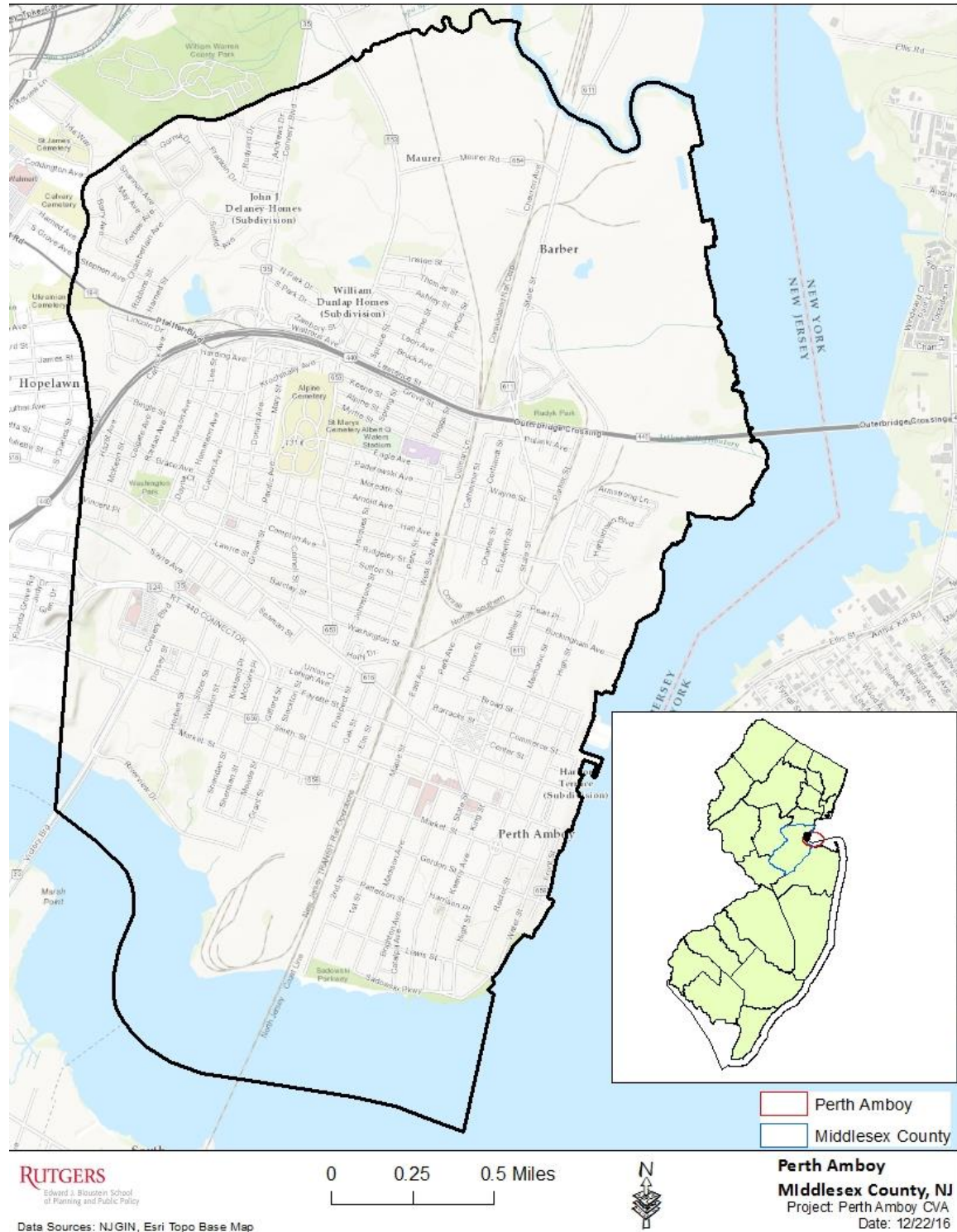
- Sustained winds of 74-95 mph
- Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters.
- Large branches of trees will snap and shallow rooted trees may be toppled.
- Extensive damage to power lines and poles likely will result in power outages that could last a few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

II. Community Profile

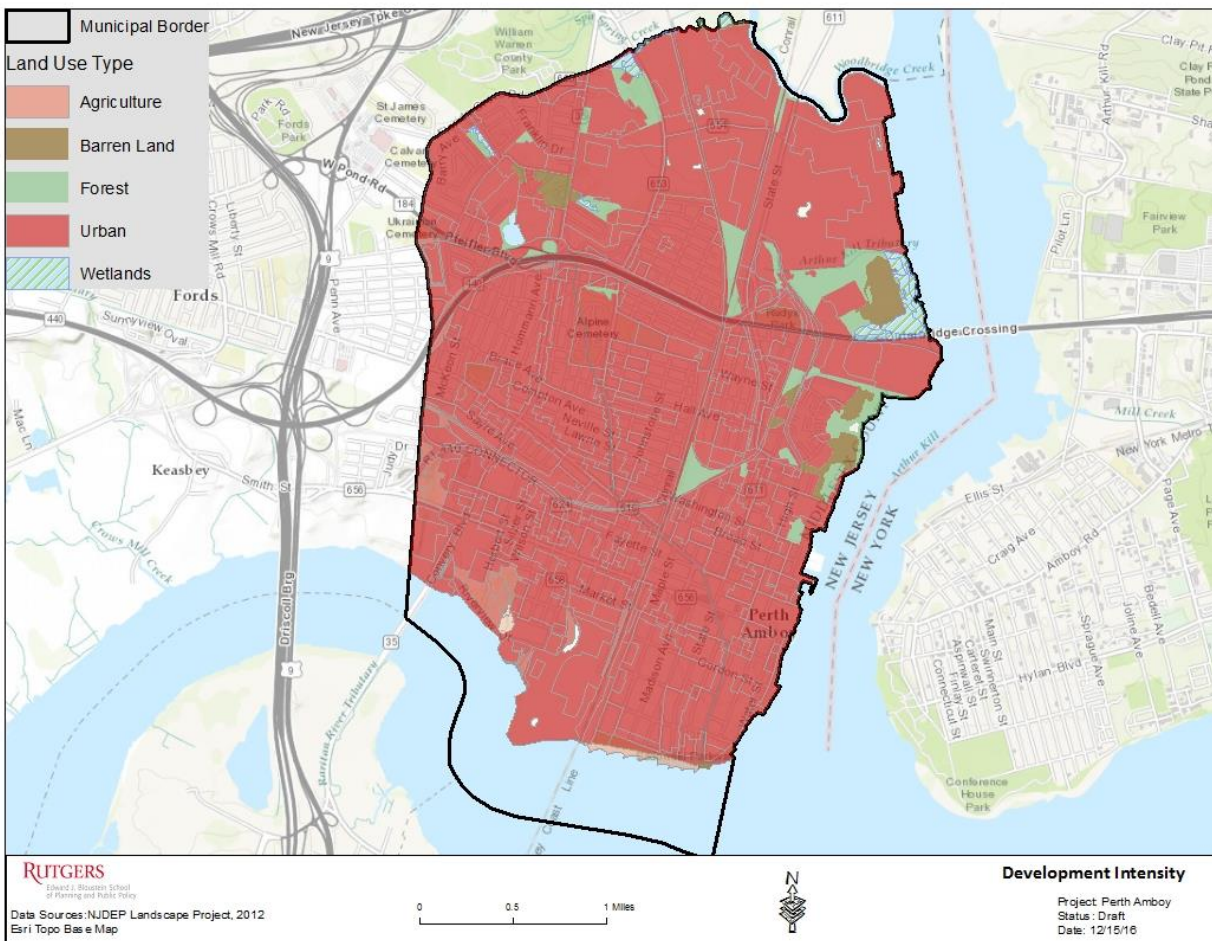
Perth Amboy City's boundary is defined on three sides by waterways: Woodbridge Creek to the north, Arthur Kill to the east and the Raritan River as it reaches the Raritan Bay at its southern border. In total, the City has 6.4 miles of shoreline.

According to the 2010 US Census, the population of Perth Amboy City was 50,814, making it the 6th most populated of 25 municipalities in Middlesex County. The City is a total of 4.7 square miles of land with a median household income of \$47,696 and median age of 32.4 years. Hispanic or Latino residents make up the largest portion of the population at 70%.

Map 1: Perth Amboy, Middlesex County – NJ

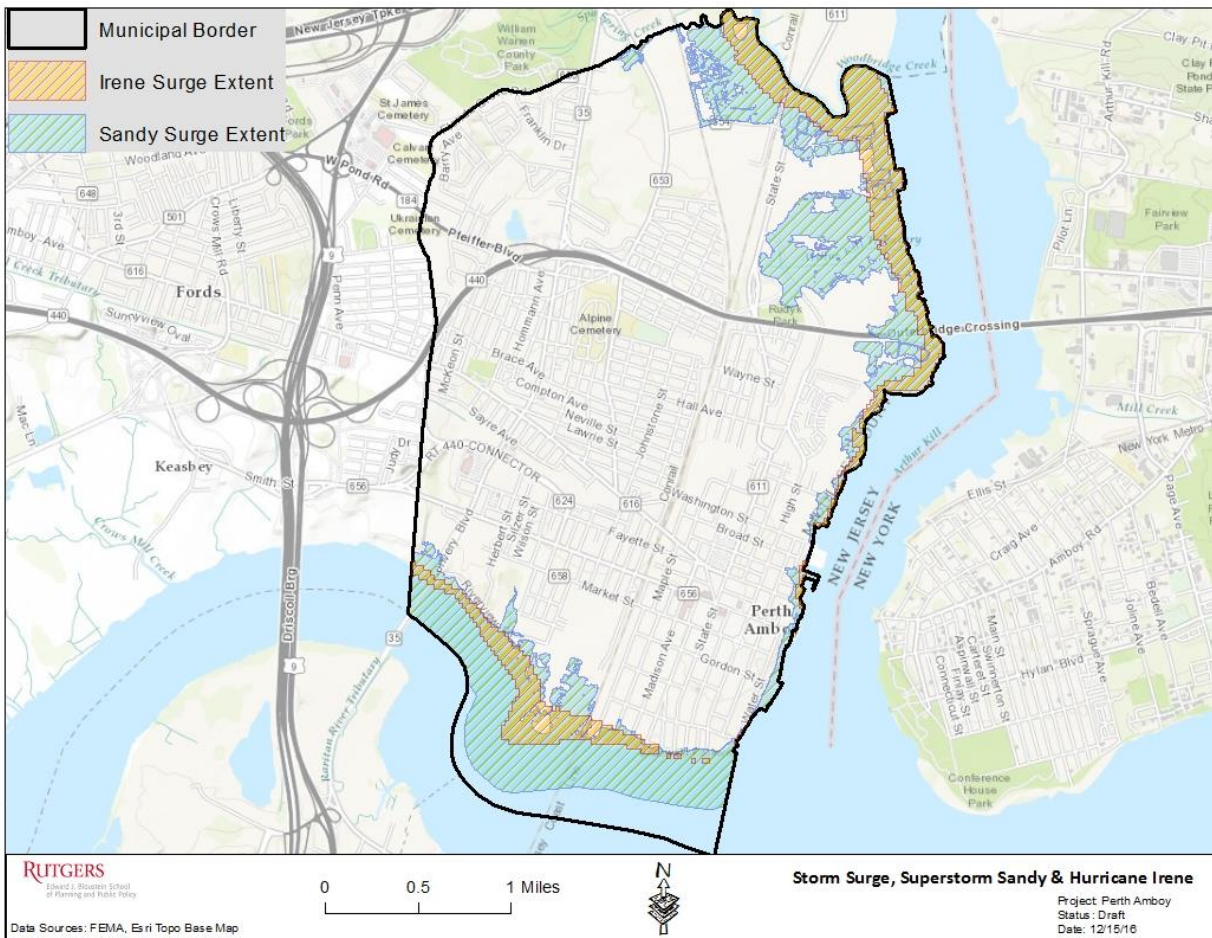


Map 3: Land Use



As seen in the map above, land use type in Perth Amboy consists mostly of urban development, even along the coast and surrounding the small areas of wetland and forest.

Map 4: Storm Surge: Irene and Sandy



In recent years, hurricane Irene and Superstorm Sandy have resulted in storm surge in Perth Amboy. Due to the City's elevation, the extent of storm surge has generally remained along the City's waterfront.

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 meeting was held on January 10th at town hall. Municipal personnel in attendance to assist in identifying critical assets and finalizing mapping included:

Larry Cattamo, OEM
 Adam Cruz, Administrator
 Frank Hoffman, Public Works Director
 Luis Perez Jimenez, Water and Sewer Utilities Director
 Lance Nelson, Zoning/Land Use Administrator
 Matthew Nieves, Parks Supervisor
 Jess Rauch, City Engineer
 Jamie Rios, Flood Manager

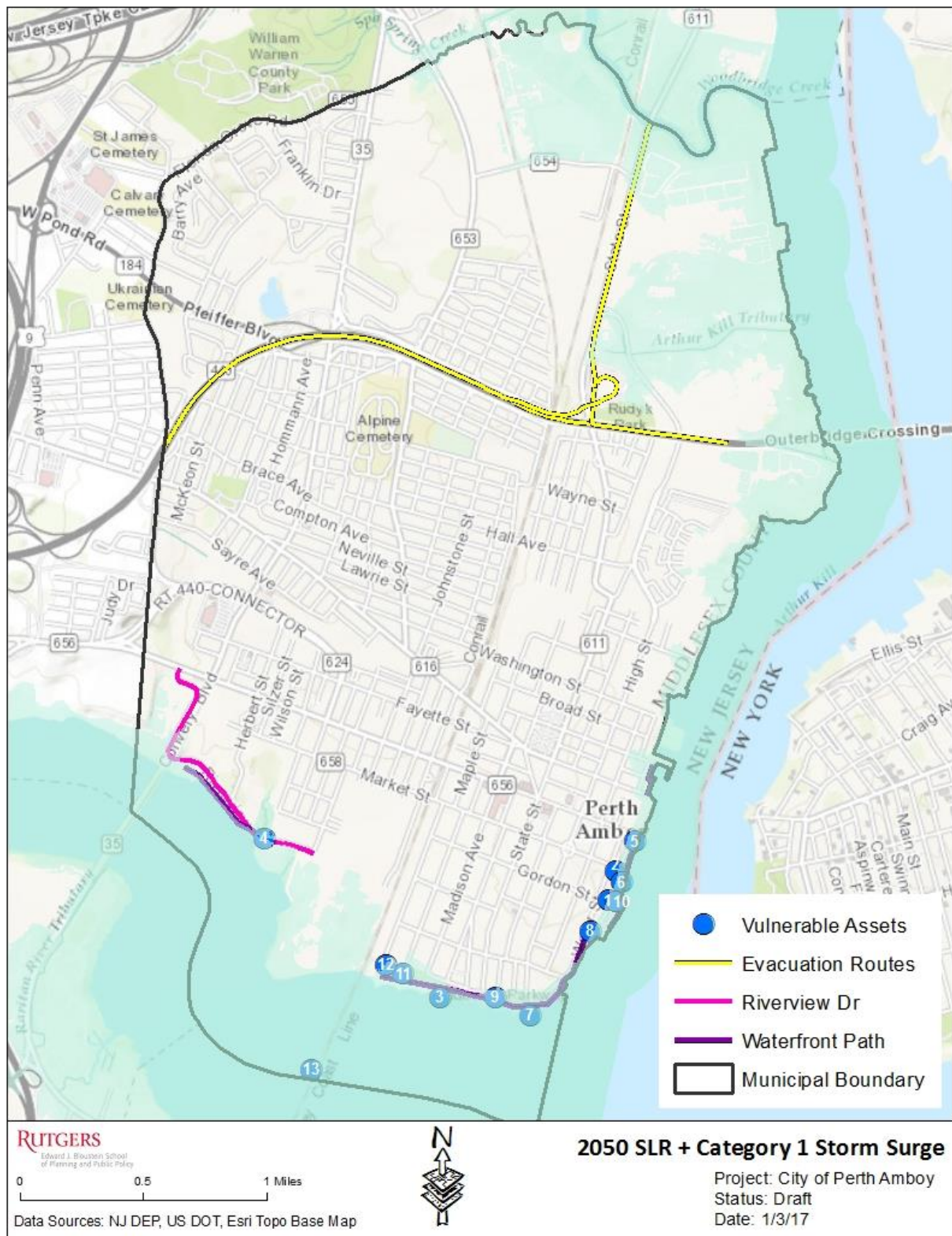
Frank Wild, Marina

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, Perth Amboy's final list of assets consisted of the 13 asset locations and 3 roadways, including 2 state evacuation routes, mapped on the following page.

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 #	Name	Projected Inundation Depth (Ft.)
1	Barge Restaurant	3 to 5
2	Bayview Park	7
3	Brighton Ave Municipal Fishing Pier	13
4	Cornucopia Cruise Lines	0 to 5
5	Ferry Slip	4
6	Harborside Marina and Front St. Pump Station	7
7	High St Municipal Fishing Pier	14
8	Raritan Yacht Club	6
9	Veterans Memorial Park	1
10	Seabra Armory Restaurant	6 to 9
11	2nd St Park	4
12	2nd St Pump Station	4
13	Raritan River Draw Bridge	N/A, but storms cause electrical damage causing the bridge to become inoperable
	Waterfront Path	0-5 along Riverview, 0-7 along Sadowski, 7-9 along Front
	County Route 611	0 to 7 at north end, 0 to 2 north of the State St circle
	Riverview Drive	0 to 2 ft at curve with Convery Blvd and 0 to 3 ft in front of cruise dock,

IV. Findings and Recommendations

During the project meeting and throughout discussions with municipal officials, the waterfront stood out as the most critical asset to the City due to its societal and economic value, but also because of its level of vulnerability and need for protection.

The 2013 Master Plan Recreation Element notes that Hurricane Irene in 2011 and Super Storm Sandy in 2012 both caused extensive damage to the parks along the waterfront.² According to the City's Strategic Recovery Planning Report, for Super Storm Sandy, FEMA eligible damages for the marina and waterfront walkways totaled \$5,759,413.18, which is 67% of the total reported damages to public facilities in the City (\$8,611,775.12).³

² City of Perth Amboy, Middlesex County, New Jersey Master Plan Recreation Element (2012), Introduction.

³ City of Perth Amboy Strategic Recovery Planning Report (2014), page 5.

Due to the City's historic urban and industrial nature, the enhancement of the waterfront remains the most vital public space for City residents and visitors. While there is no official waterfront business district, there are many local commercial assets that are important to the City, including marine commercial and restaurants.

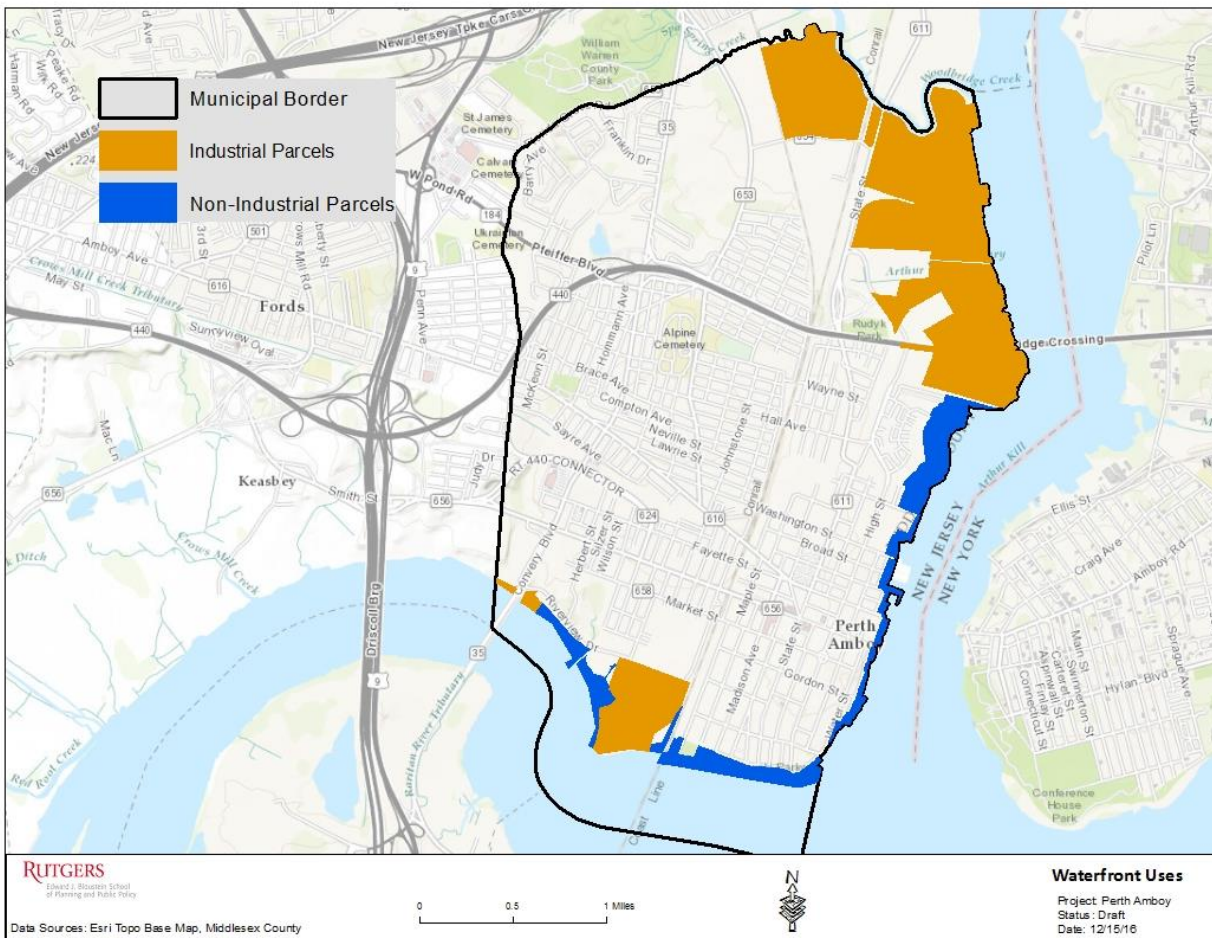
The City has expressed interest in a walking/biking path spanning the entire length of the waterfront. Since not all of the waterfront lands are publicly owned, the City will have to work with private land owners to address the need for waterfront access at currently inaccessible sites. The map below illustrates the existing pathway.

Map 6: Waterfront Path



Based on a desktop GIS review of Middlesex County Parcel Mapping, a large amount of the waterfront area consists of industrial uses including barges and possible toxic chemicals/contaminated sites.

Map 7: Waterfront Land Uses/Accessibility



During discussions with City officials, it was learned that the Harbortown Residential Site will experience ongoing redevelopment. While the market rate apartments are built above the BFE, the City should consider the projected future inundation at the site and ensure future development remains in line with coastal vulnerability.

Map 8: Harbortown Residential Site

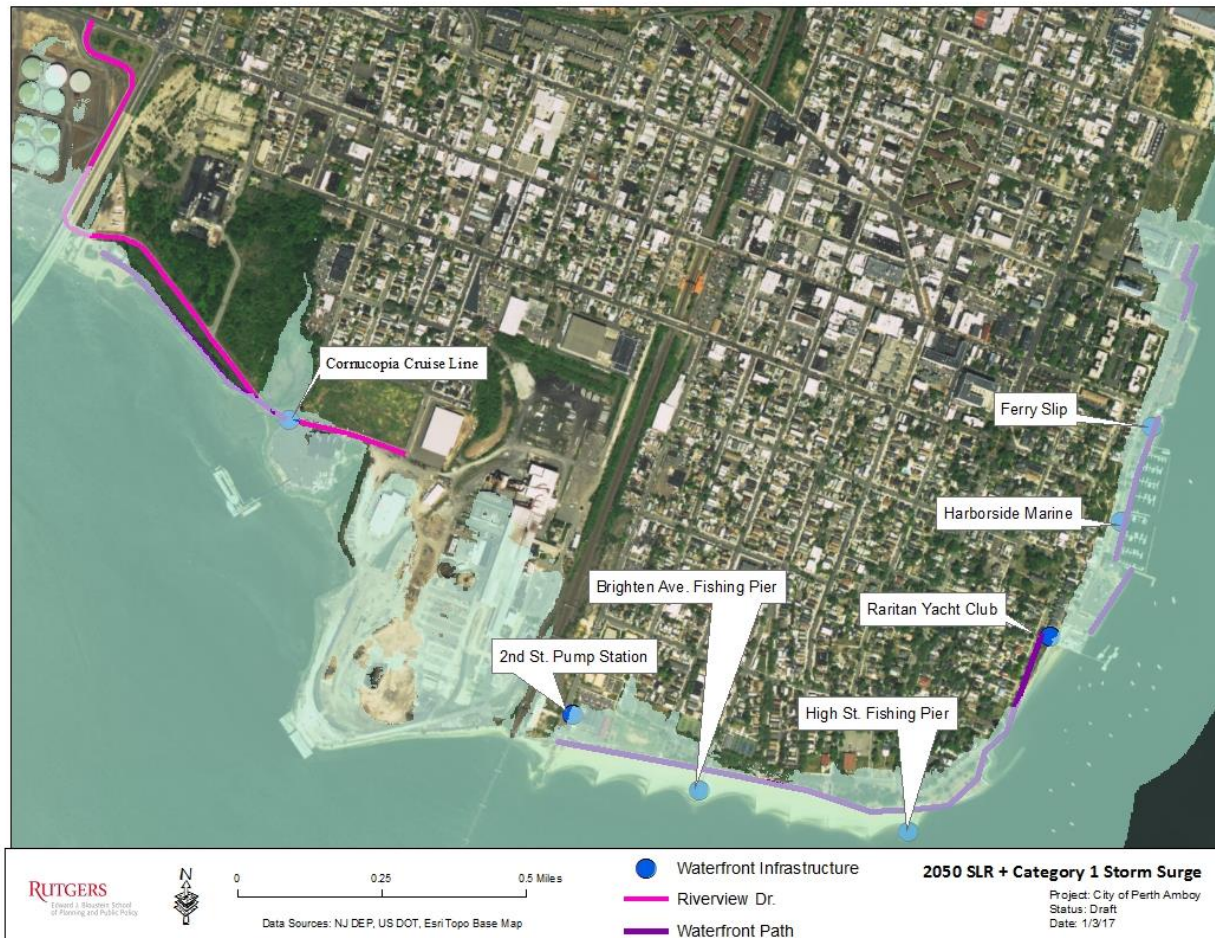


The Nature Conservancy’s Restoration Explorer, for example, lists this areas as being conducive to five different shoreline restoration project options: a nature based living shoreline, a living reef breakwater, a marsh sill, a breakwater, and an ecologically enhanced revetment. More information on the details of each technique can be found at <http://www.maps.coastalresilience.org/newjersey/#>.

City officials stated that the waterfront gazebos and piers have all been reconstructed post-Sandy and sand was replenished for almost the entire length of the beach area. The 2nd St. Pump Station has also been mitigated post-Sandy. City officials noted that Riverview Dr. will needs to be rebuilt and will impact the walking path north of the Cornucopia Cruise Line site.

Shoreline restoration will continue to be a part of the City’s future to ensure the stability and resilience of their waterfront infrastructure.

Map 9: Waterfront Infrastructure Sites



Although an important asset to Perth Amboy and the entire State, the Raritan River Draw Bridge was left out as a final, critical asset in need of recommendations because NJ Transit is currently funded to rehabilitate the bridge in the coming years. This project is critical to Perth Amboy because electrical damage done during Superstorm Sandy made the bridge inoperable, not only impacting NJ Coastline train service, but also making the Cornucopia Cruise Ship and other large vessels unable to pass through the bridge.

Recommendations from the Middlesex County Hazard Mitigation Plan that are in line with the CVA:

According to the Middlesex County Hazard Mitigation Plan Update, Perth Amboy City should consider the following action:

- *Update all Waterfront Redevelopment Plans to incorporate resiliency to storm surge and flood risk*
 - Since Superstorm Sandy, Perth Amboy has applied for grant funding from the American Planning Association's Community Planning Assistance Program to create a Redevelopment Taskforce, conduct public outreach, and develop a waterfront area plan that will lead the repair and redevelopment of the waterfront.

Community Rating System (CRS)

Perth Amboy is not currently a CRS participating community. The City does, however, participate in the National Flood Insurance Program (NFIP), with 40 policies in force. There are 3 Repetitive Loss Properties and 1 Severe Repetitive Loss Properties located in the Township. The average repetitive loss claim in the city is \$92,827 and average SRL claim is \$6,351.⁴

There are CRS points available for special structural and nonstructural efforts to solve existing flooding problems related to coastal erosion. This can include implementing coastal erosion dune, and beach regulations which it is recommended to be included in the City's future waterfront area plan.

⁴ Middlesex County Hazard Mitigation Plan, 2015