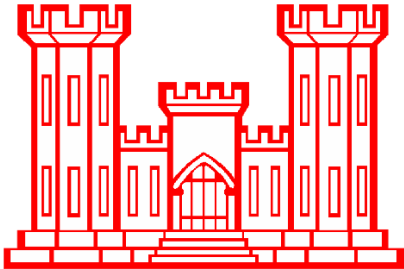


PLANNING ASSISTANCE TO STATES PROGRAM

SECTION 22 of WRDA 1974, as amended

New Jersey Coastal Coalition



**U.S. Army Corps of Engineers
Philadelphia District**



February 2023

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**PLANNING ASSISTANCE TO STATES
SECTION 22 PROGRAM**

New Jersey Coastal Coalition

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1 Background

The New Jersey Department of Environmental Protection (NJDEP) is partnering with the United States Army Corps of Engineers (USACE) on this effort in order to support the New Jersey Coastal Coalition's (NJCC) goal of assisting municipalities and their residents with coastal flooding. In January 2019, the NJCC reached out to the USACE for assistance under the Planning Assistance to States (PAS) authorization to assist in diagnosing high frequency flood locations and their origins of flooding and potential solutions. NJCC is a 501(c)(3) Charitable Trust incorporated in the State of New Jersey and dedicated to assisting municipalities and their residents with flood mitigation issues. Formed in the aftermath of Hurricane Sandy, the NJCC has met monthly since January 2013 to work and cooperate with each participant community, using a regional concept to face the challenges presented by coastal flooding in all its different forms.

1.1 Authority

Section 22(a)(1) of the Water Resources Development Act of 1974 (WRDA 1974), as amended (42 U.S.C. 1962d-16), authorizes the USACE to cooperate with a State, a group of States, or a non-Federal interest working with a State or a group of States in the preparation of comprehensive plans for the development, utilization, and conservation of the water and related resources of drainage basins, watersheds, or ecosystems, including plans to comprehensively address water resource challenges. A comprehensive plan may extend across State boundaries provided that all States agree. The amounts allocated to Section 22(a) assistance count against the maximum of not more than \$5,000,000 in Federal funds that may be expended in any one year in any one State.

In addition, Section 22(a)(2) of WRDA 1974, as amended, authorizes the Corps to provide technical assistance to a governmental agency or non-Federal interest in managing water resources, including the provisions and integration of hydrologic, economic, and environmental data and analyses.

1.2 Location

In their January 2019 letter to the USACE, the NJCC identified 13 municipalities (including Woodbridge in Middlesex County) as priority locations to investigate under this PAS study. The effort is smaller in scale than a large regional General Investigation (GI) and/or Continuing Authorities Program (CAP) effort and is more geared to flood events driven by high frequency storms and higher tides that do not normally cause extreme structural damages. Per Figures 1 and 2 below, these 13 municipalities include: Egg Harbor Township, Ocean City, Upper Township, Sea Isle City, Avalon, Stone Harbor, North Wildwood, West Wildwood, Wildwood Crest, Cape May City, Cape May Point, Downe Township, and Woodbridge Township. Specific flooding hot spots have been identified in each municipality by the NJCC, with support and assistance from NJDEP. These communities experience periodic flooding from high frequency storm events and tidal fluctuations (Figure 3). These events could be driven by strong winds during spring tides, rain events that impound water due to improper interior drainage, or the increase in water surface elevations as a result of relative sea level change (RSLC). The PAS study is not intended to evaluate flood risk management (FRM) opportunities (or make recommendations) for the communities for low frequency/low probability storm events such as the 1962 Ash Wednesday storm, the December 1992 storm, or Hurricane Sandy.



Figure 1. Study Area - 12 of the 13 Municipal Locations



Figure 2. Study Area – 1 of the 13 Municipal Locations



Figure 3. Example of High Frequency Flooding (Ocean City, NJ)

The following municipalities share jurisdictional borders (from North to South):

- Egg Harbor Township – Upper Township & Ocean City
- Upper Township – Ocean City
- Upper Township – Sea Isle City
- Sea Isle City – Avalon Borough
- Avalon Borough – Stone Harbor Borough
- Stone Harbor Borough – North Wildwood
- North Wildwood – West Wildwood

The following municipalities do not share jurisdictional borders (from North to South):

- Woodbridge Township
- Downe Township
- Wildwood Crest Borough
- Cape May City
- Cape May Point

1.3 Problems and Opportunities

The problems include:

1. There are several municipalities with inconsistent FRM levels along the back bay corridors.
 - a. Inconsistencies include uneven bulkhead heights, discontinuous bulkheads, exposed essential services, lack of and/or inferior pump stations, no audible warning systems, clogged outfalls, little to no storm drainage, and no advanced monitoring services for flood waters.
 - b. Inconsistencies have resulted in shoreline management that is not uniform, which has, in turn, resulted in a higher frequency of flooding, increased damages and an increased risk of life loss.
2. Local ordinances are inconsistent from municipality to municipality.
 - a. Differences in road raising, home raising, grading, bulkhead heights and construction requirements are the culmination of inconsistent future planning among barrier island communities.
 - b. These issues are based upon individual local council decisions without input from adjacent municipalities in which there are neighboring jurisdictional borders.
3. Limited and/or ineffective communication of high risk flood areas.
 - a. Lack of signage on streets, poorly identified evacuation route signage, no FEMA information at City Halls, and nothing within welcome packs for seasonal renters.

There are opportunities to develop a cohesive management plan for bordering municipalities and for regularly occurring multi-municipality meetings to discuss the development of future ordinances, signage, and advanced monitoring techniques.

1.4 Stakeholders and Beneficiaries

Stakeholders in this project are the non-federal sponsor (NJDEP), the NJCC, and all 13 participating municipalities:

- Egg Harbor Township, NJ
- Ocean City, NJ

- Upper Township, NJ
- Sea Isle City, NJ
- Avalon, NJ
- Stone Harbor, NJ
- North Wildwood, NJ
- West Wildwood, NJ
- Wildwood Crest, NJ
- Cape May City, NJ
- Cape May Point, NJ
- Downe Township, NJ
- Woodbridge Township, NJ

The combined funding for this effort was \$75,000, consisting of a 50/50 cost share between the USACE and NJDEP with each agency contributing \$37,500. NJDEP provided cost share matching funds to the USACE on June 9, 2021.

Beneficiaries include all those individuals or groups who currently receive or in the future will receive benefits from the study findings, but who have not provided financial or in-kind support to the development of or implementation of this PAS effort. Beneficiaries of this project include homeowners, local business owners, renters, and others as well as investors who may see increased revenue as a result of the study findings.

1.5 Municipal Representatives & Project Participants

Table 1. Municipal Representatives & Project Participants

Municipality	Representatives
Egg Harbor Township	Robert Watkins
Ocean City	Frank Donato, Vincent Bekier & Neil Byrne
Upper Township	Paul Dietrich
Sea Isle City	Neil Byrne & George Savastano
Avalon	Scott Wahl & Thomas Thornton
Stone Harbor	Jon Lakose, Kim Stevenson & Ray Poudrier
North Wildwood	Ron Simone, Ralph Petrella Jr., Jim Verna & Nic Long
West Wildwood	Carl O’Hala & Matt Ksiazek
Wildwood Crest	Constance Mahon & Marc DeBlasio
Cape May City	Lou Belasco
Cape May Point	Catherine Bush & Anita VanHeeswyk
Downe Township	Bob Campbell & Tom Tedesco
Woodbridge Township	Thomas Flynn & Michael Gelin
Other	
New Jersey Coastal Coalition	Tom Quirk
New Jersey Resiliency Institute	Dr. William Thomas
New Jersey Dept. of Env. Protection	Andrew McTague, Lena Stinson & Julia Keiser
U.S. Army Corps of Engineers	Joel V. Dohm

2 Purpose, Objectives & Data Gathering

2.1 Purpose

The purpose of this report is to document the cause of high frequency and/or tidal flooding problems within 13 identified municipalities, including identification of potential measures to address the problems, an evaluation of the feasibility of remedial measures, and potentially conceptual solutions.

2.2 Objectives

The study objectives are primarily focused on high frequency flooding, extraordinary rain events, water impoundment, improper interior drainage, increased water elevations due to RSLC, wind and wave driven flooding, as well as nuisance tides.

1. Investigate the existing conditions regarding topography and probable sources of flooding for the 13 municipalities.
2. Evaluate potential measures and their feasibility.
3. Conceptualize preliminary solutions.

2.3 Data Gathering

The data gathering process included scoping conducted via NJCC meetings with the participating municipalities. Additional scoping methods included face-to-face meetings with municipality representatives, municipal website data searches, site visits to various high frequency flooding locations, aerial & GIS-based research and coordination with the NJDEP.

3 Existing Conditions

3.1 Flooding Locations

Flooding locations were identified during the data gathering sequence of the project.

Table 2. Flooding Locations

Municipality	Flooding Locations
Egg Harbor Township	1) Black Horse Pike & Bay Dr. in west Atlantic City between Frankfort Ct. and Fox Pl. 2) Anchorage Point adjacent to the Longport Causeway 3) Somers Point Rd. at English Creek
Ocean City	1) Simpson and Haven Avenues from 56 th St. to 52 nd St. 2) West Ave from 59 th St. to 56 th St.
Upper Township	1) Bayview Dr. from Prescott Rd. to Willard Ave
Sea Isle City	1) 2 nd St. at Commonwealth Ave 2) 38 th St. at Knease Ave 3) 40 th St. at Central Ave 4) 55 th St. at Central Ave 5) Landis Ave from 37 th St. to 30 th St.
Avalon	1) 7 th St. at Ocean Dr. 2) 20 th St. at Dune Ave 3) 26 th St. at Ocean Dr. 4) Avalon Ave from 25 th St to 17 th St. 5) Ocean Dr. south of 62 nd St.
Stone Harbor	1) 3 rd Ave from 106 th St. to 80 th St. 2) 3 rd Ave from 86 th to 89 th St. & 92 nd to 96 th St. 3) 104 th St. from 3 rd Ave to Golden Gate Dr. 4) Sunset Dr. from Berkely Rd. to 86 th St. 5) Sunset Dr., Corinthian Dr. and 104 th St.
North Wildwood	1) Delaware Ave 2) New York Ave 3) New Jersey Ave 4) 100W, 200W, 300S/W, 400 W/SW, 500W/SW blocks of 26 th Ave to 1 st Ave
West Wildwood	1) The entire municipality
Wildwood Crest	1) Bayview Ave at Jefferson Ave 2) New Jersey Ave at Louisville Ave 3) Park Blvd. at Aster Rd. 4) Lake Rd. at Buttercup Rd. 5) Lake Rd. at Cresse Ave
Cape May City	1) Bank St. 2) Venice Ave 3) Elmira St. 4) Beach Dr. 5) Yacht Ave 6) Frog Hallow Neighborhood
Cape May Point	1) Alexander Ave at Chrystal Ave

	<ul style="list-style-type: none"> 2) Harvard Ave at Lehigh Ave 3) Oxford Ave from Lighthouse Ave to Lake Dr. 4) Cambridge Ave from Lighthouse Ave to Lake Dr. 5) Cape Ave from Sunset Blvd. to Lake Dr.
Downe Township	<ul style="list-style-type: none"> 1) Haleyville Rd. 2) Maple Ave 3) Landing Rd. 4) Fortescue Rd. 5) Newport Neck Rd. 6) Gandys Ave
Woodbridge Township	<ul style="list-style-type: none"> 1) Lyman Ave 2) McFarlane Rd. at N. Hill Rd. 3) Woodbridge Ave (East of NJTP) 4) Port Reading Ave (East of NJTP) 5) Port Reading Ave (West of NJTP) 6) South Robert St. (South of Woodbridge) 7) Borman Ave (East toward Woodbridge) 8) Crampton Ave (East of Bamford) 9) Jordan Rd. (Between Sandy and Inman)

3.2 Flooding Locations with 2030 & 2080 Sea Level Curve Projections

The following group of maps illustrate the USACE, High - Sea Level Curve at Mean High High Water (MHHW) and the 5 Year Recurrence Interval for the years 2030 and 2080.

The water surfaces were generated from a point file with water surface heights in NAVD88. The next step was to develop a depth grid raster using tools within ArcGIS. The floodplain layer was derived from the depth grid raster and cleaned up to remove various outliers such as high and low spots. It was then colorized and laid upon the Flooding Locations identified in Section 3.1.

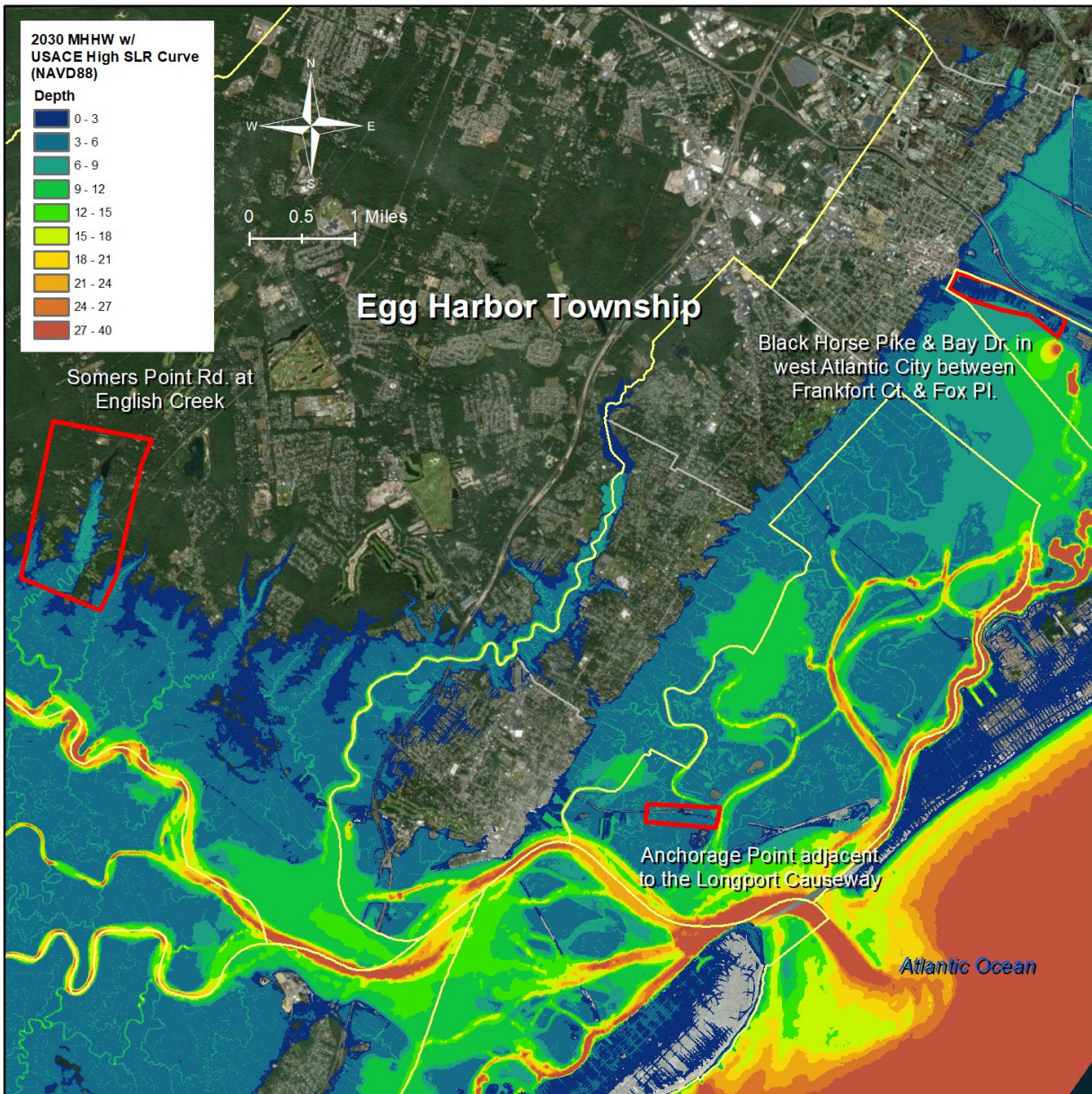


Figure 4. Egg Harbor Township 2030 MHHW

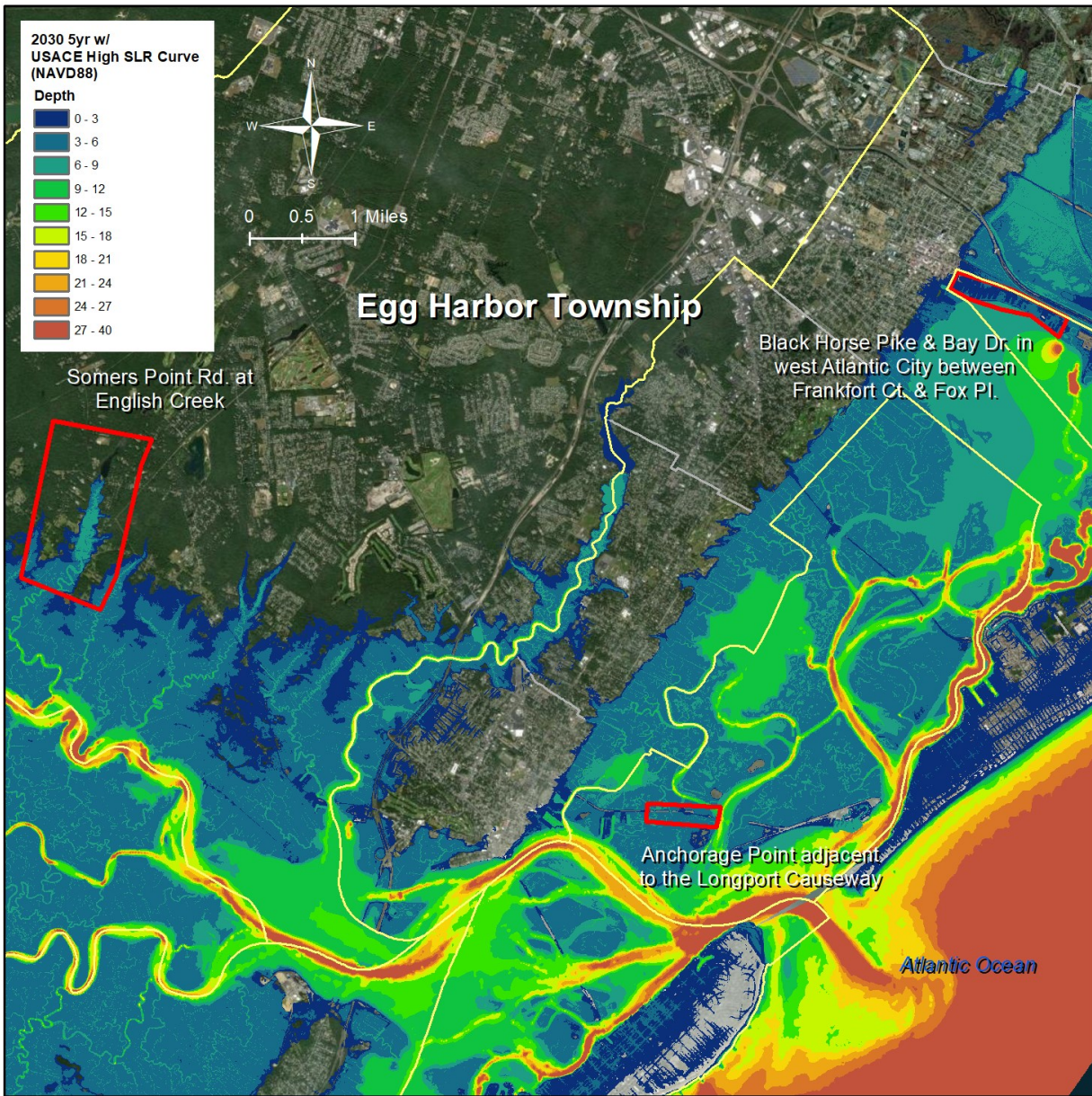


Figure 5. Egg Harbor Township 2030 5yr

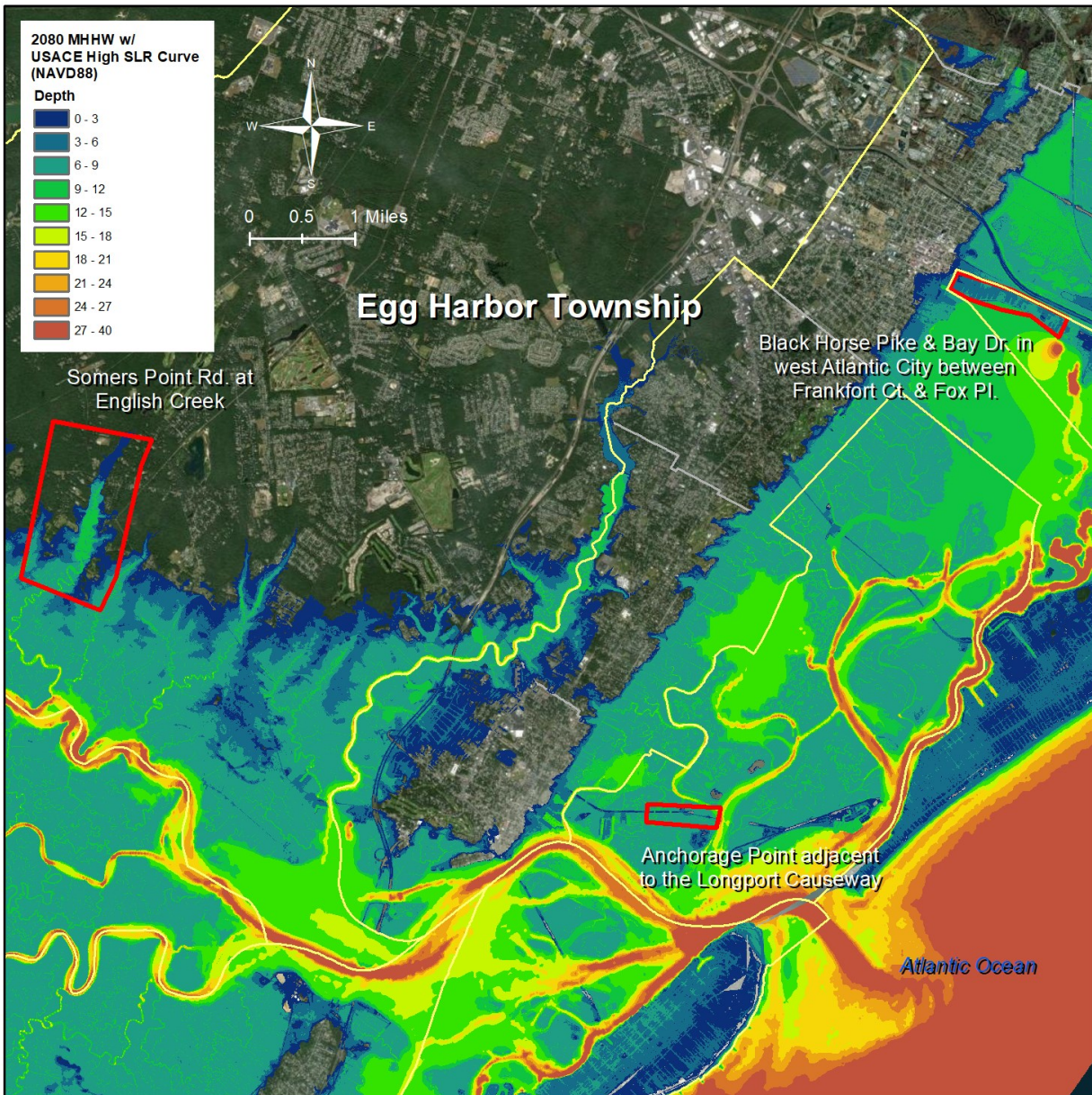


Figure 6. Egg Harbor Township 2080 MHHW

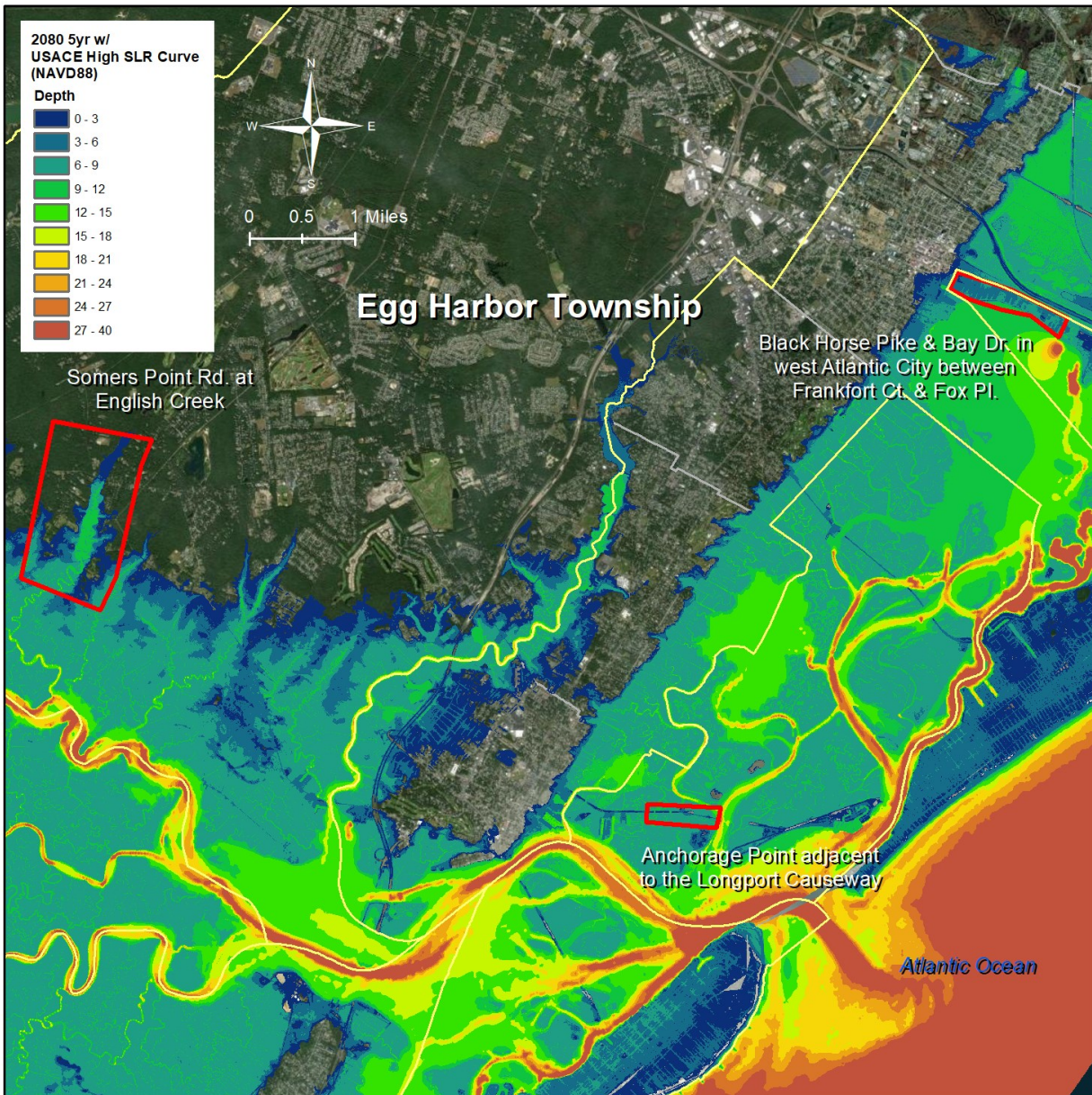


Figure 7. Egg Harbor Township 2080 5yr

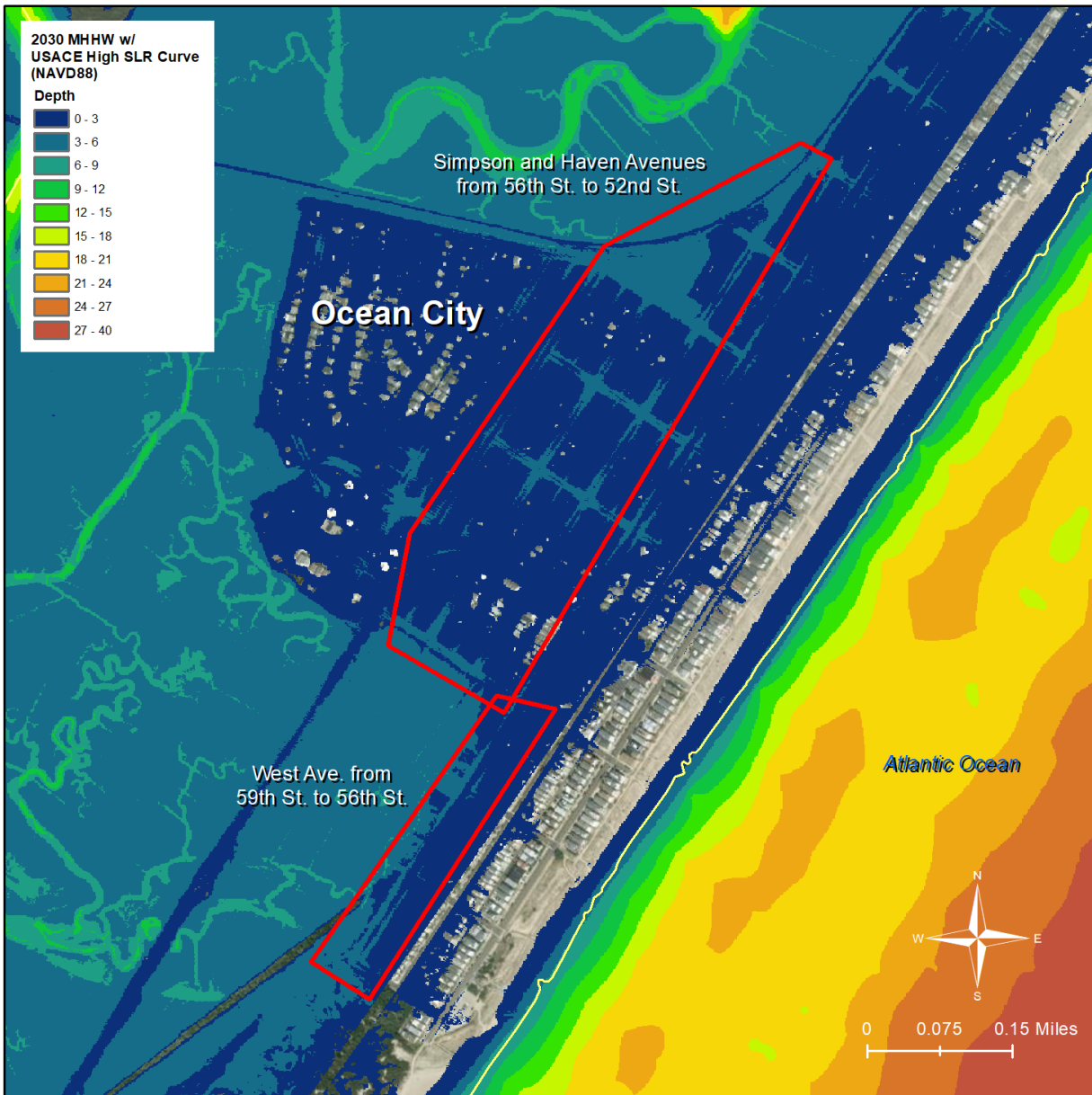


Figure 8. Ocean City 2030 MHHW

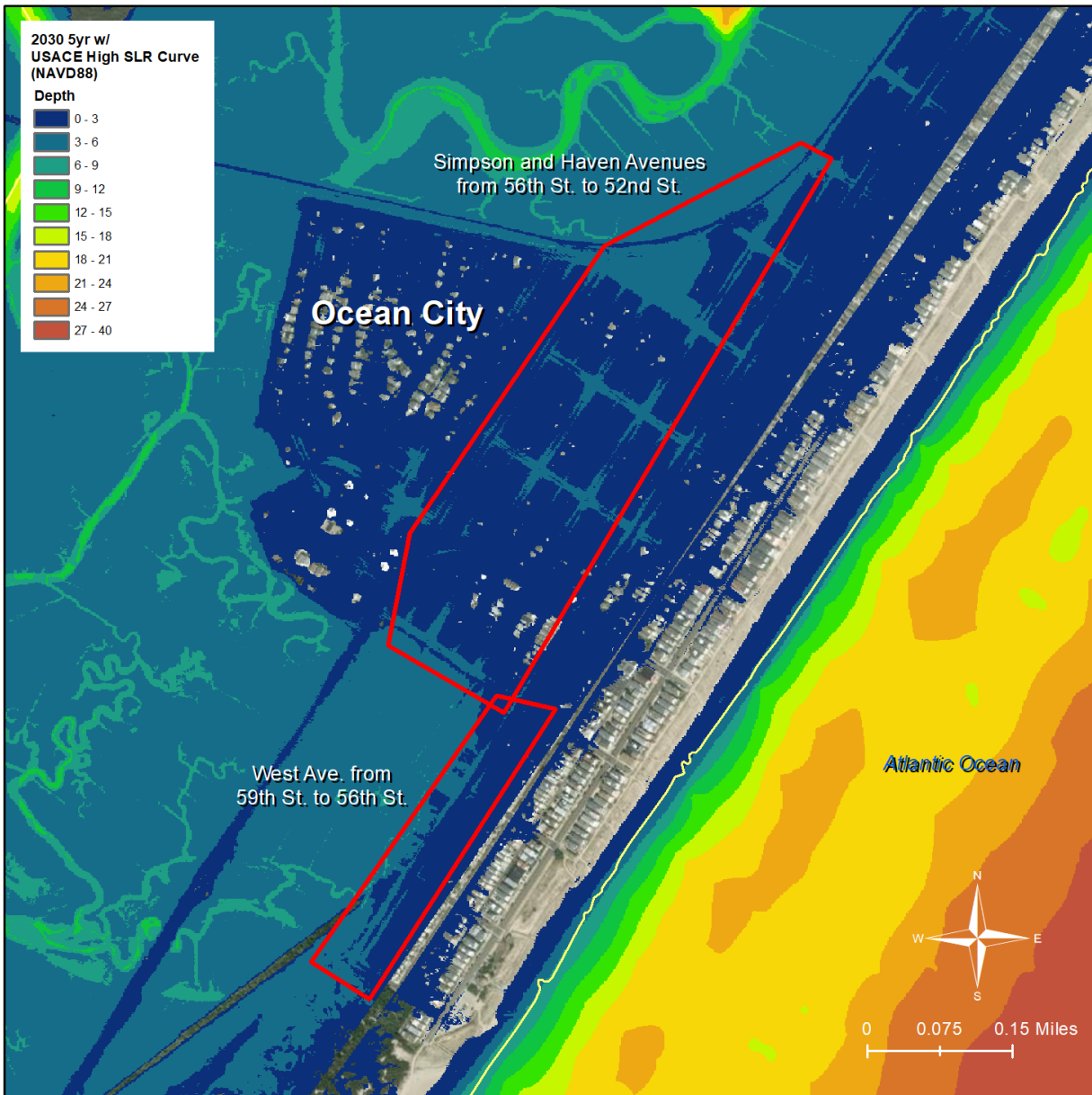


Figure 9. Ocean City 2030 5yr

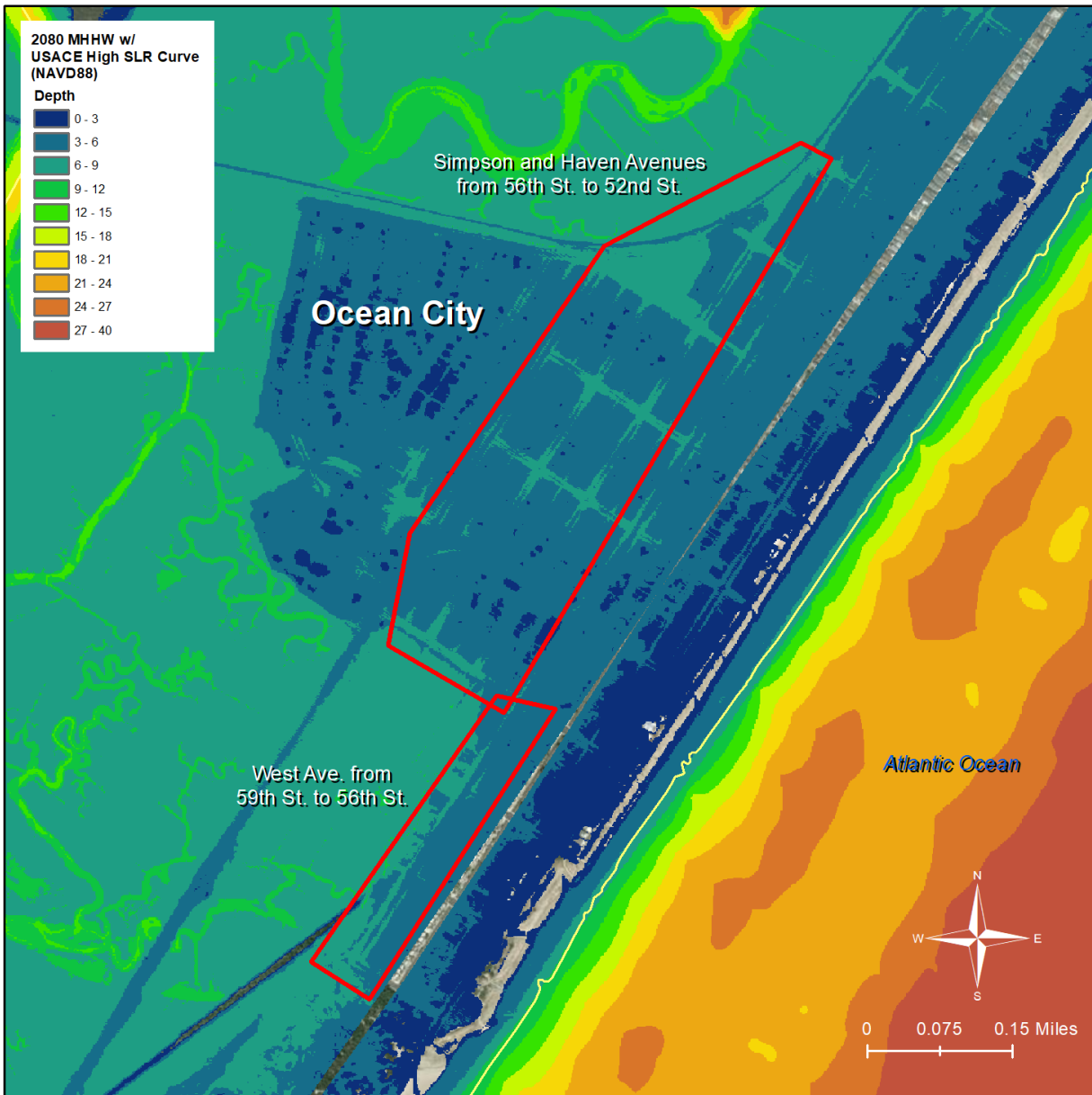


Figure 10. Ocean City 2080 MHHW

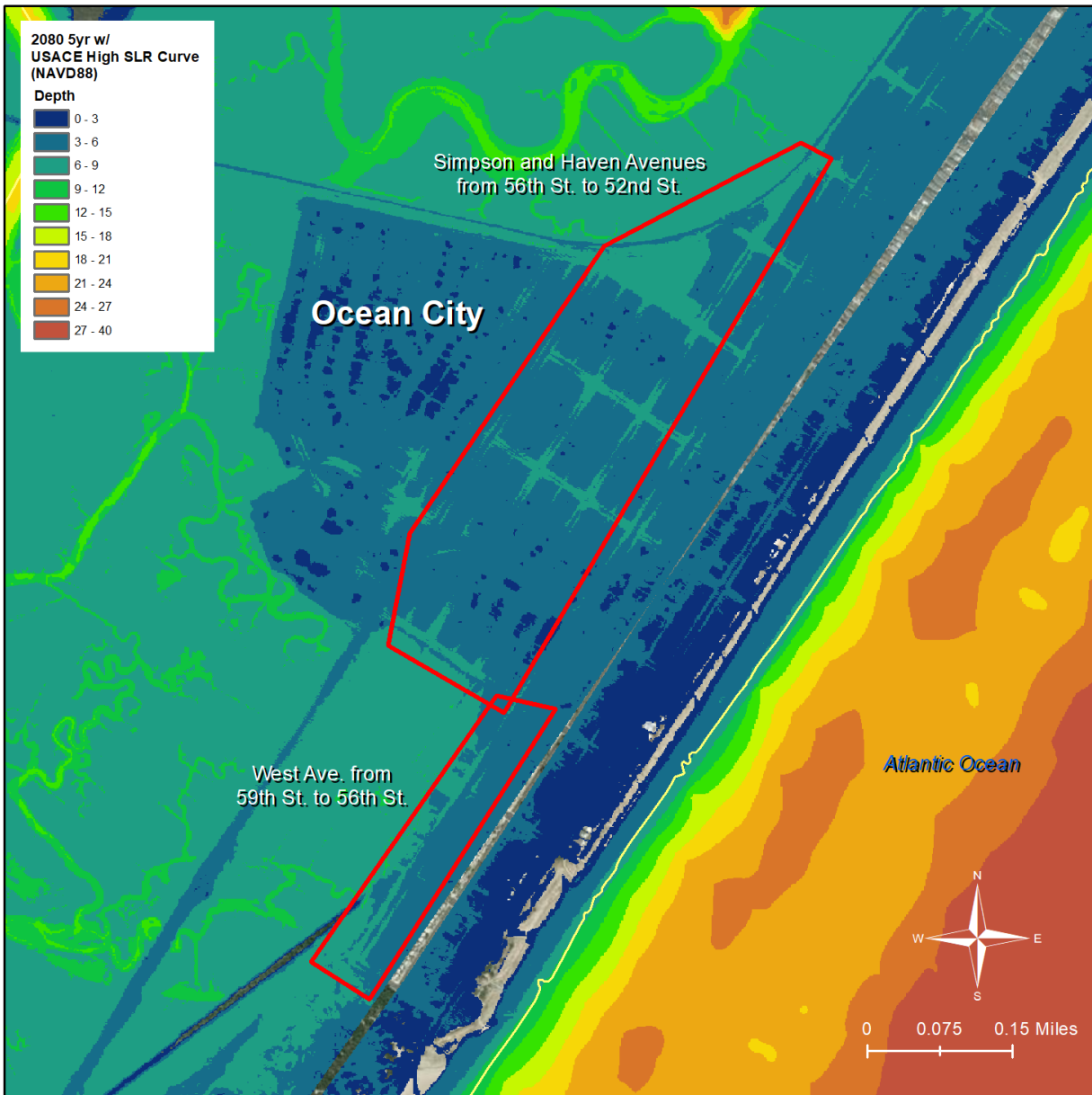


Figure 11. Ocean City 2080 5yr

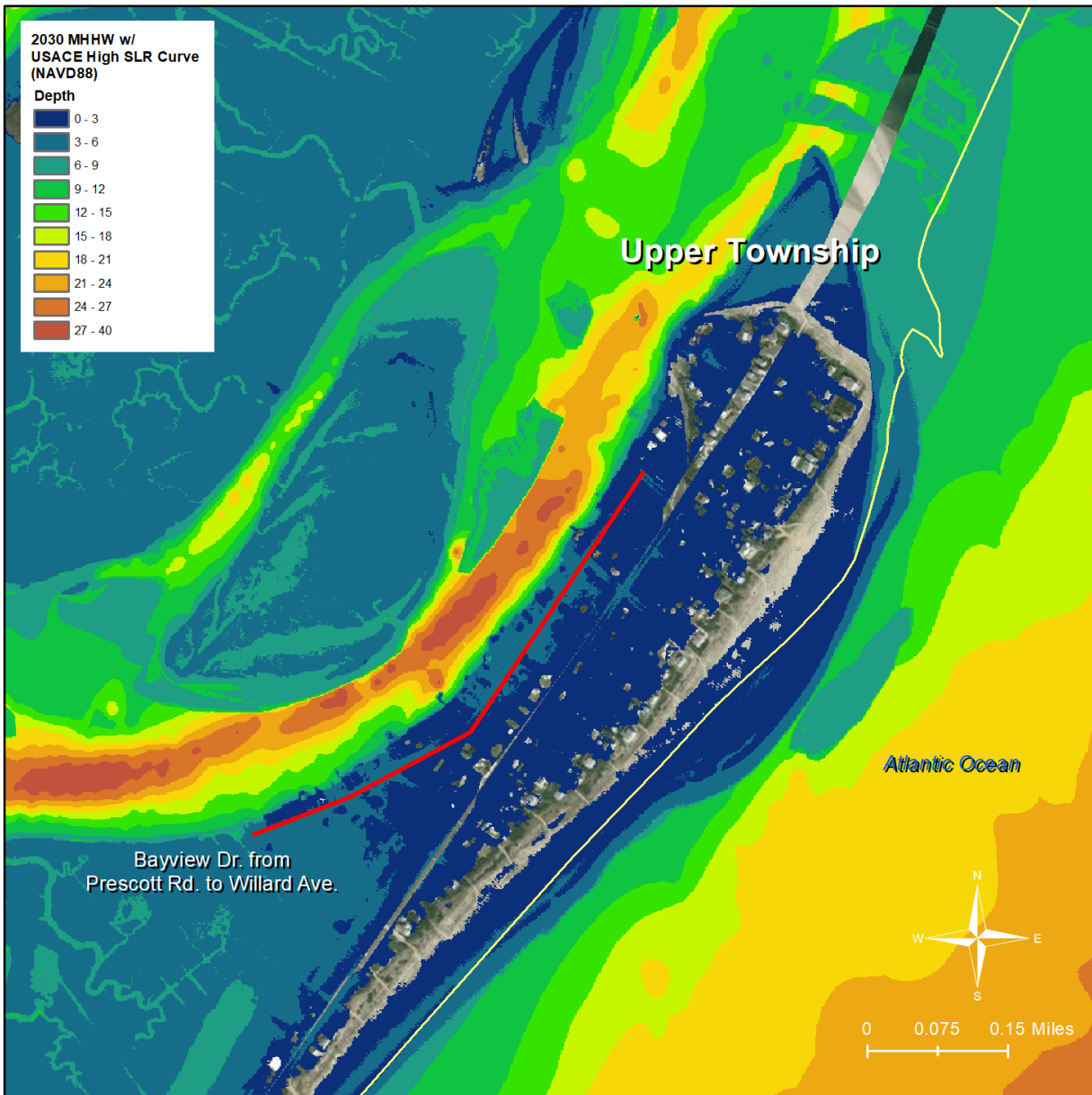


Figure 12. Upper Township 2030 MHHW

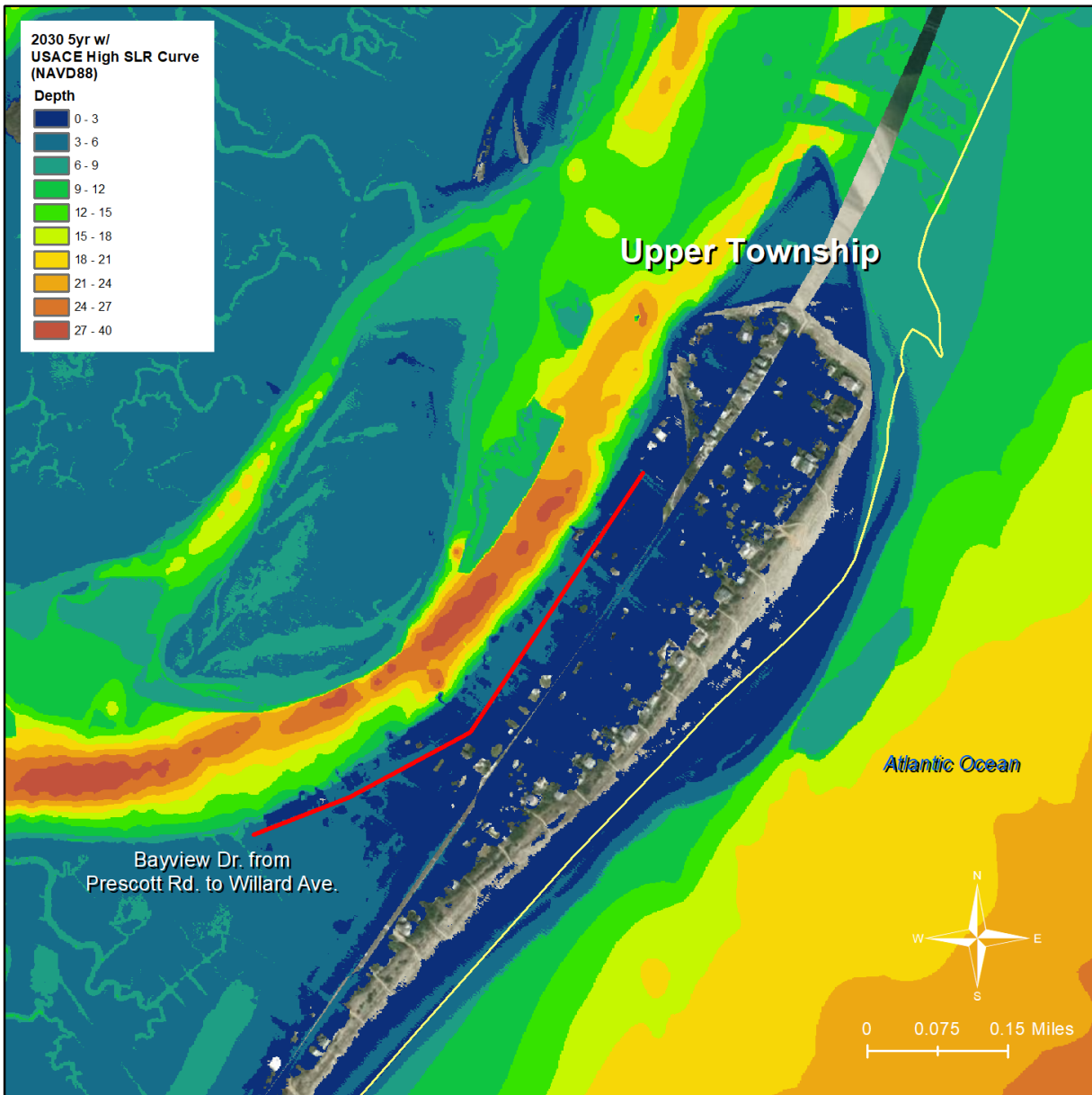


Figure 13. Upper Township 2030 5yr

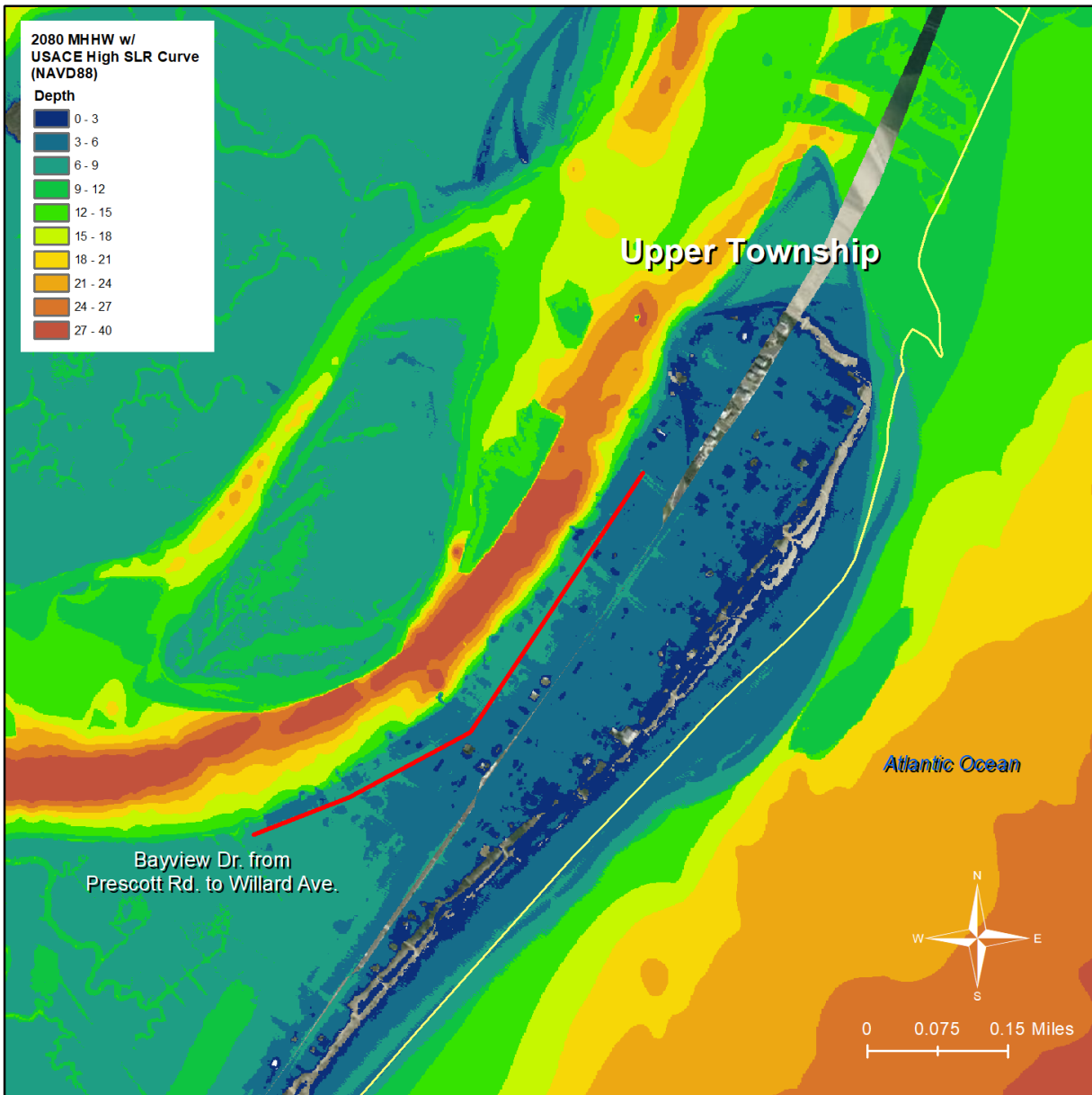


Figure 14. Upper Township 2080 MHHW

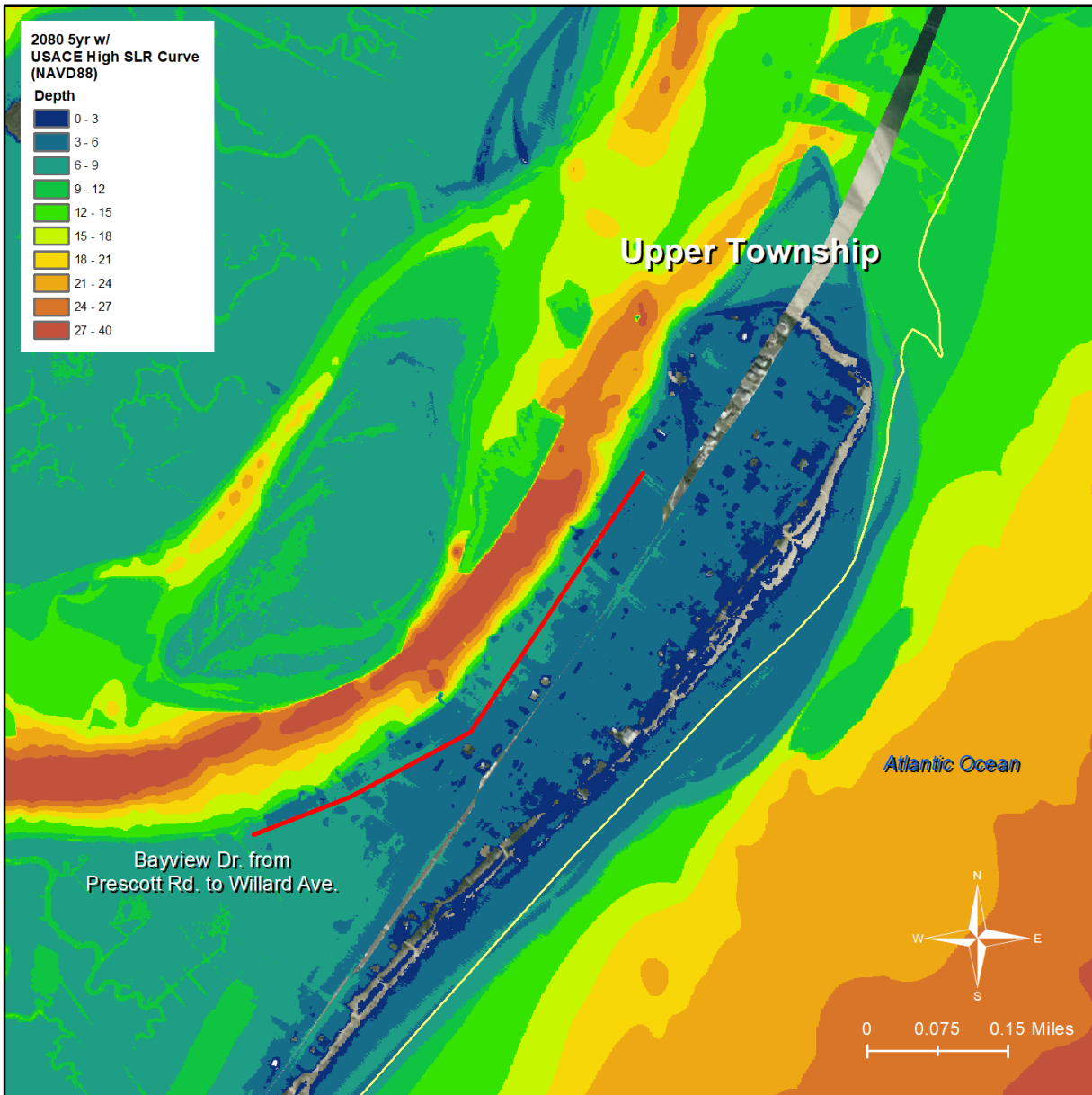


Figure 15. Upper Township 2080 5yr

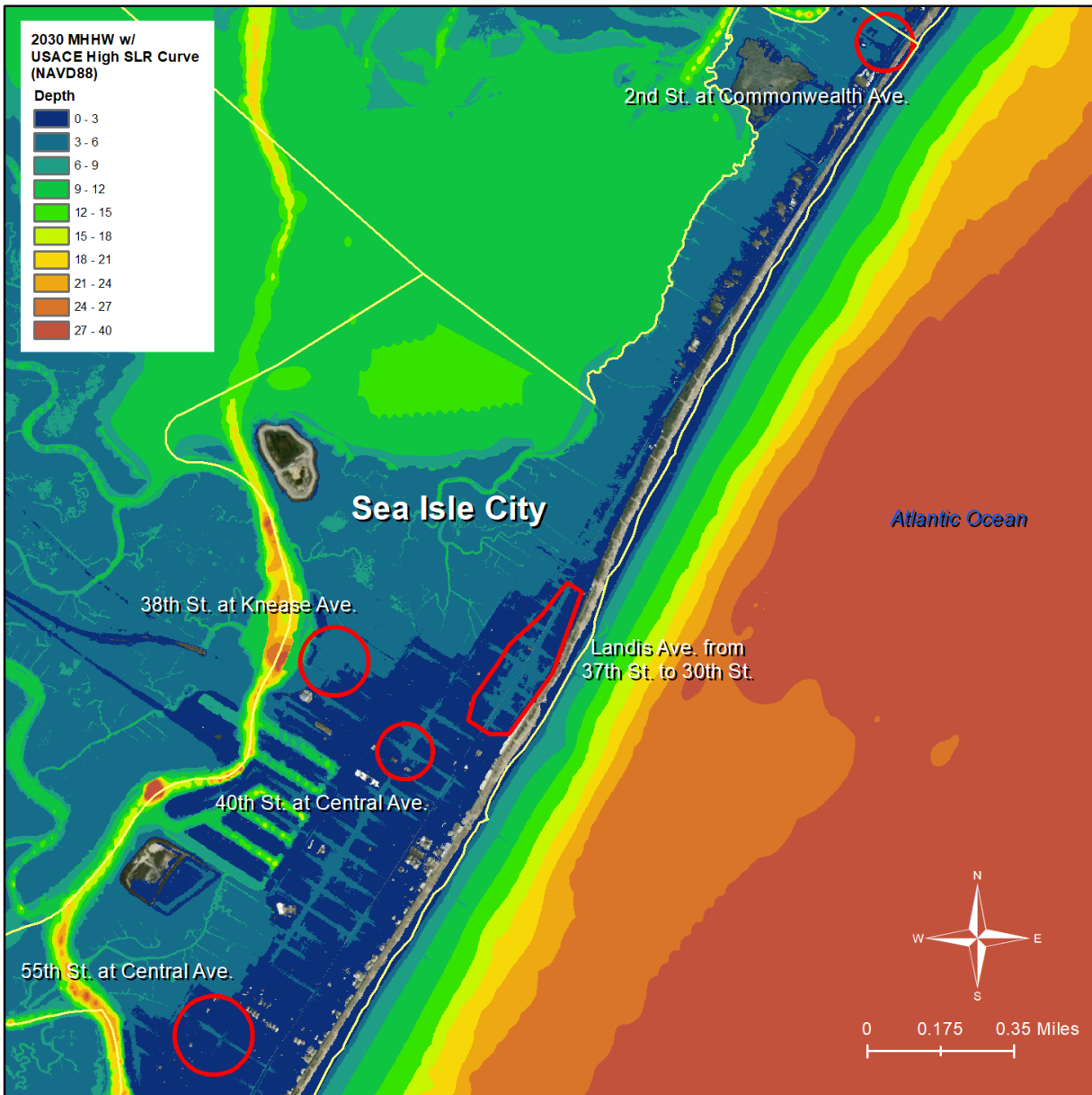


Figure 16. Sea Isle City 2030 MHHW

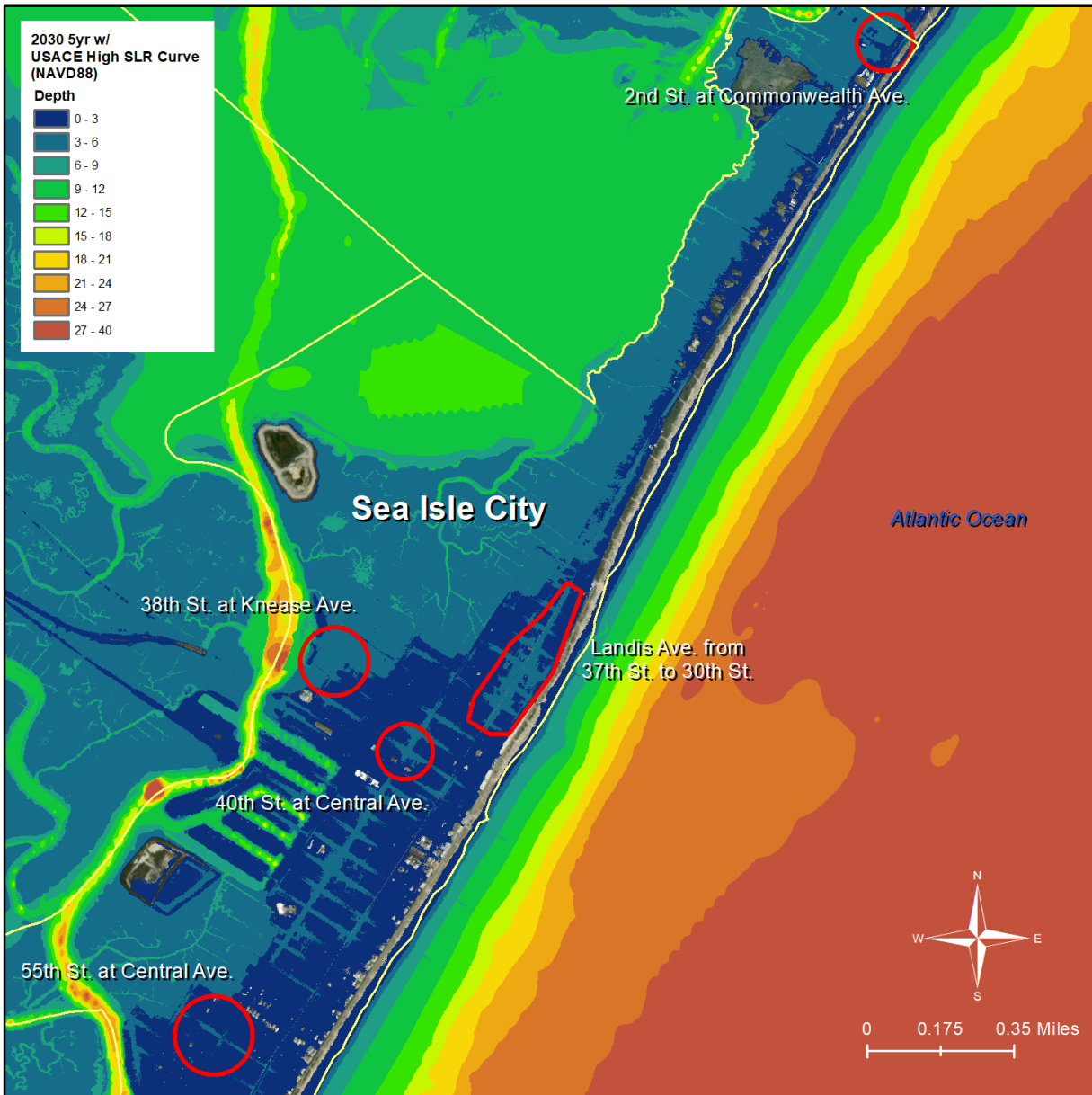


Figure 17. Sea Isle City 2030 5yr

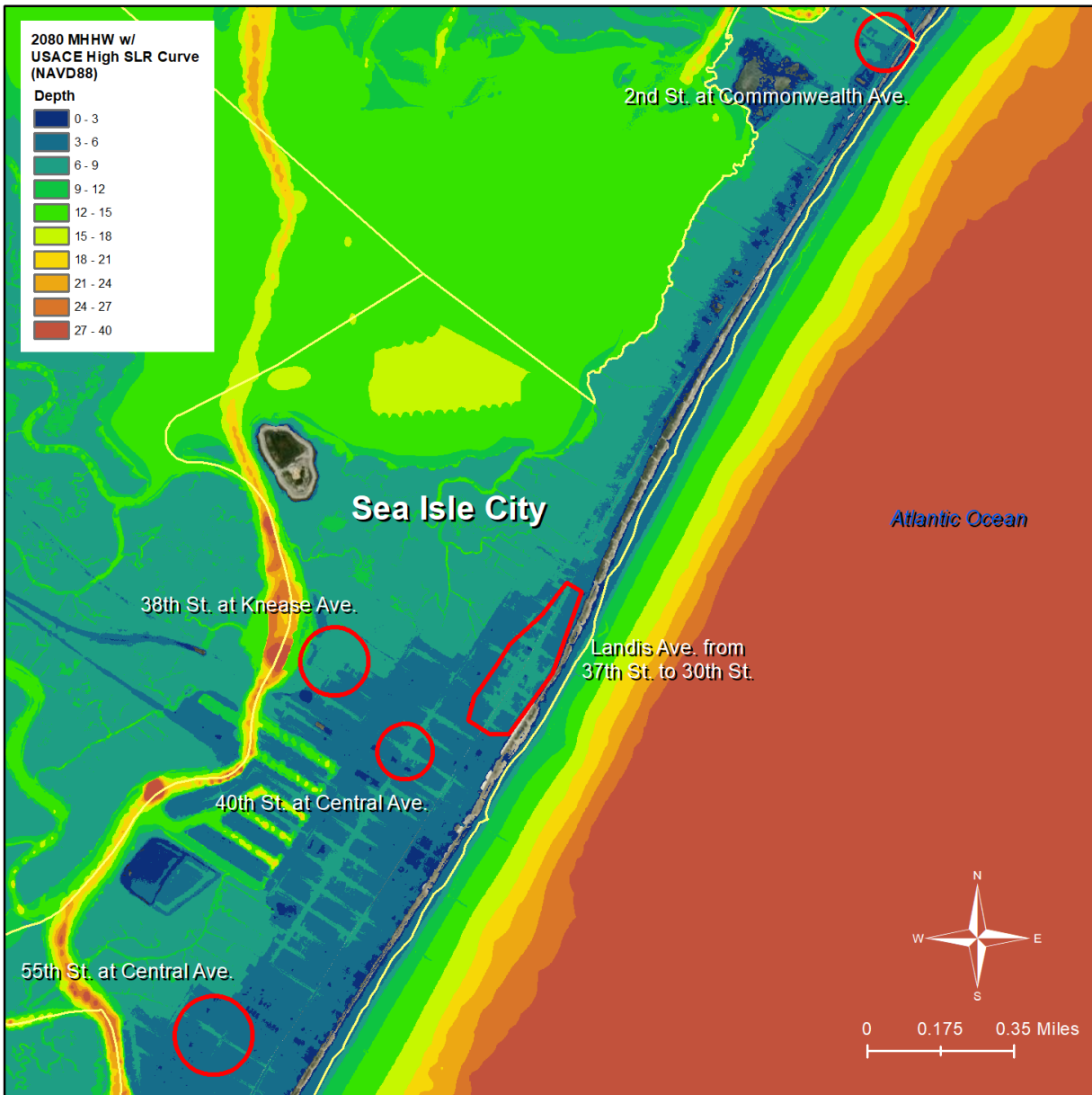


Figure 18. Sea Isle City 2080 MHHW

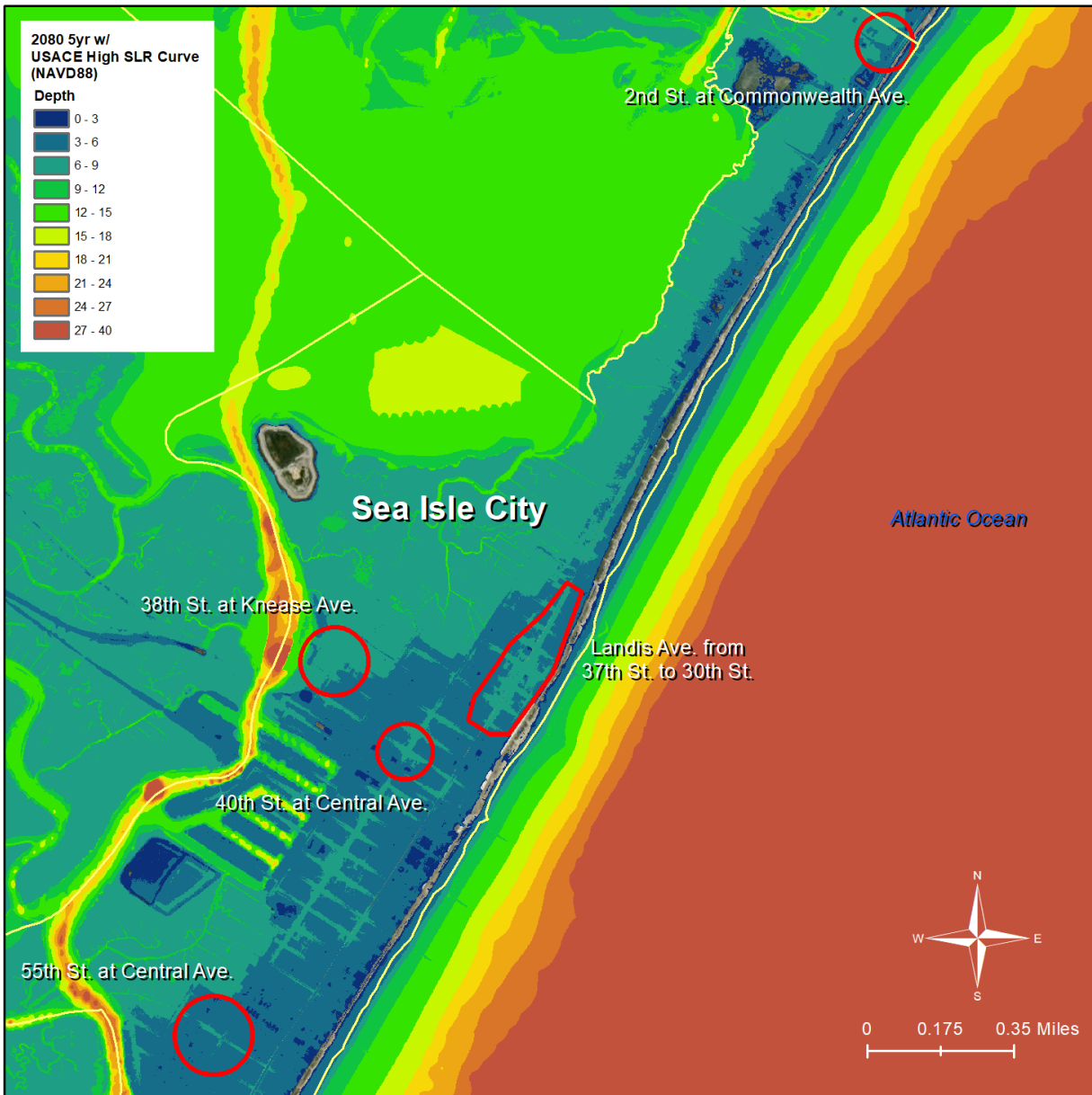


Figure 19. Sea Isle City 2080 5yr

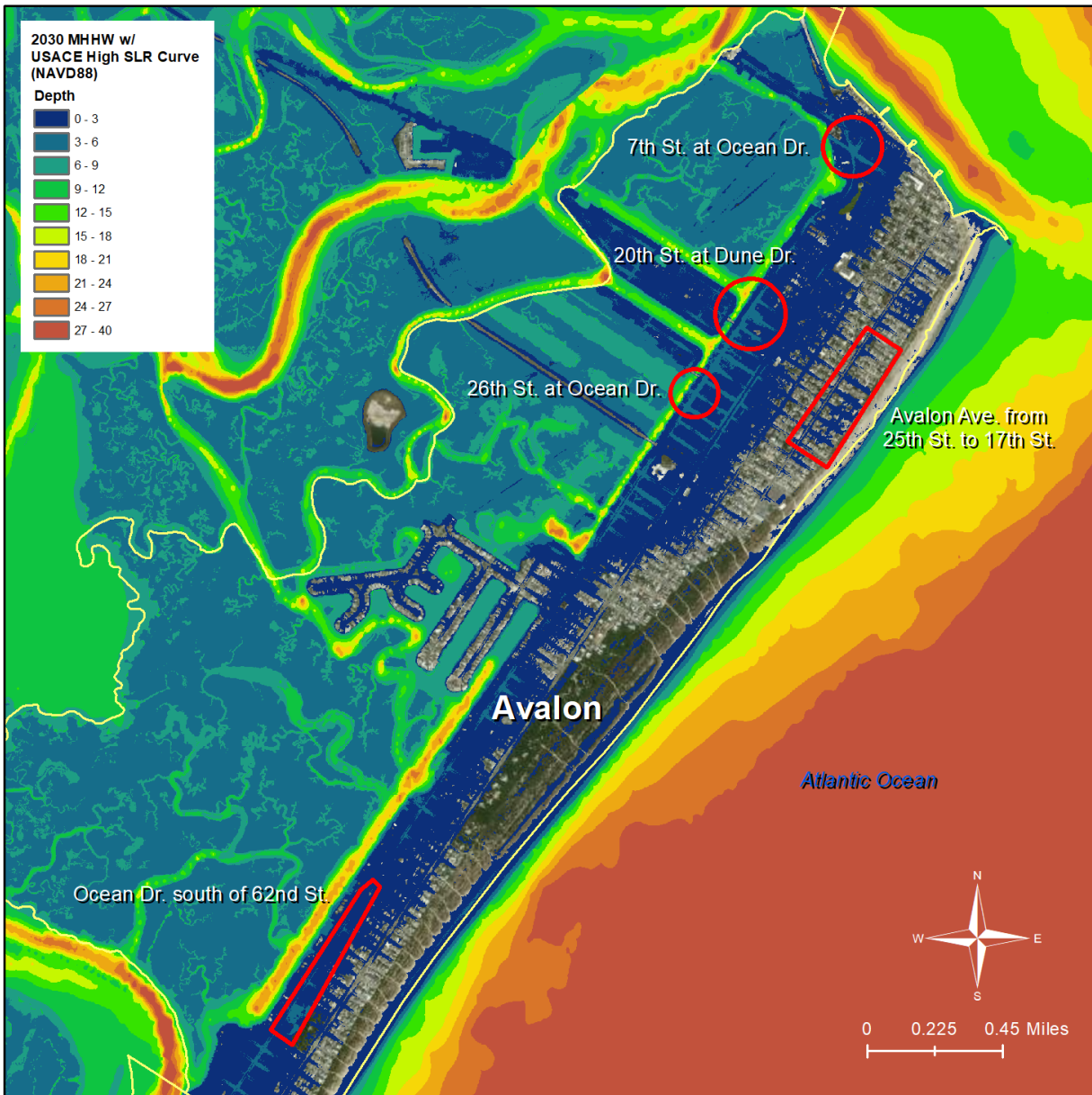


Figure 20. Avalon 2030 MHHW

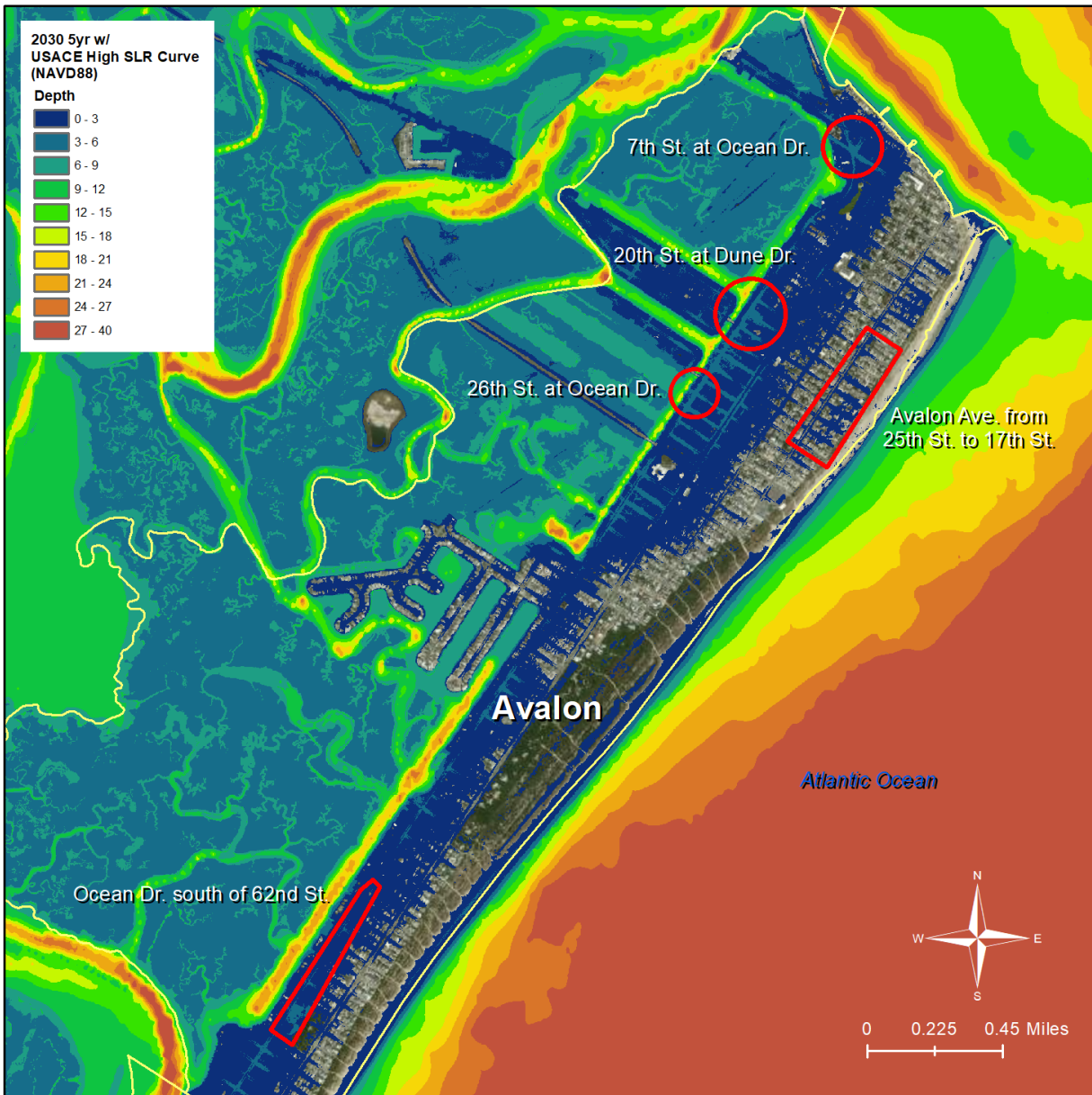


Figure 21. Avalon 2030 5yr

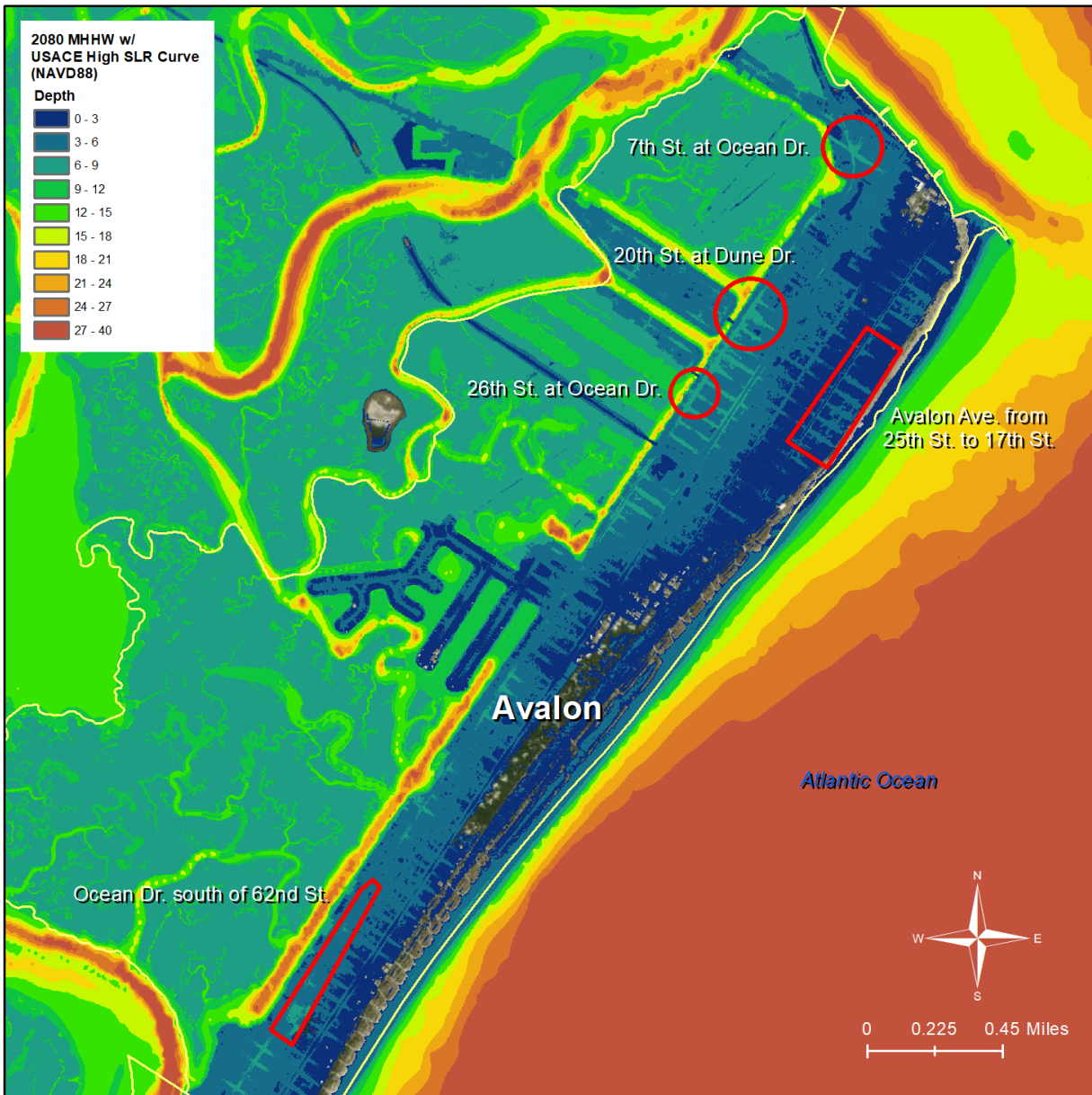


Figure 22. Avalon 2080 MHHW

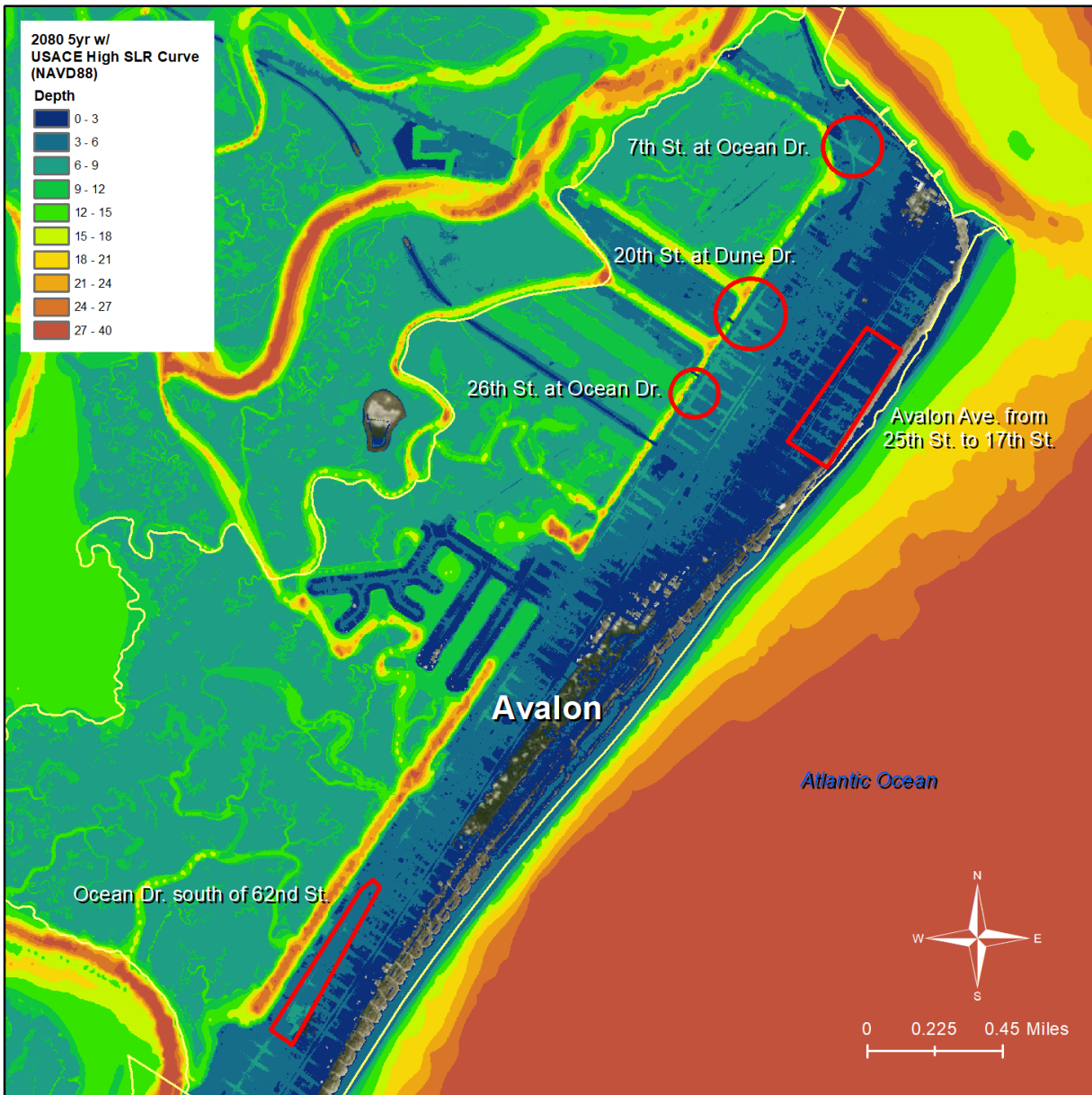


Figure 23. Avalon 2080 5yr

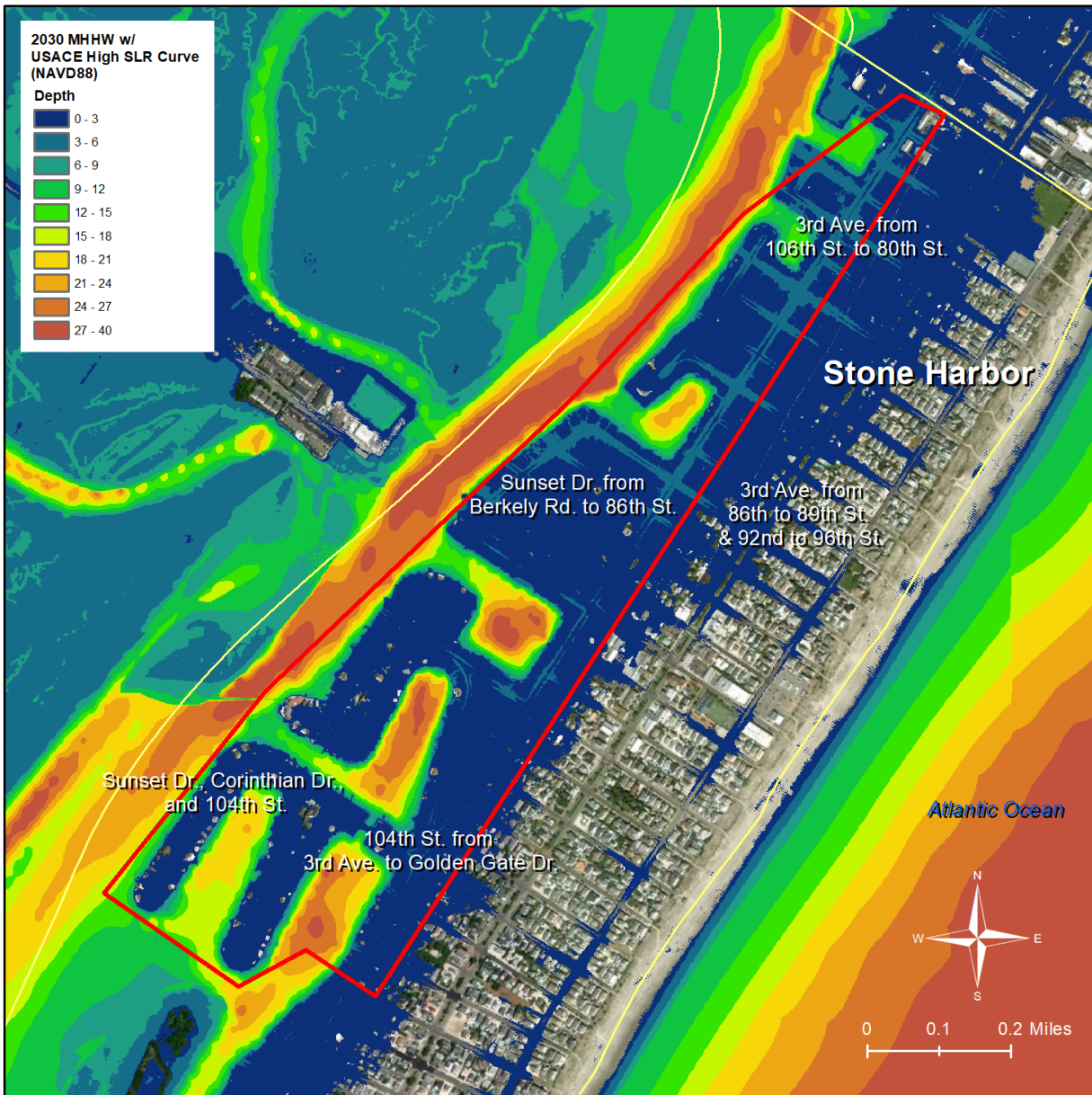


Figure 24. Stone Harbor 2030 MHHW

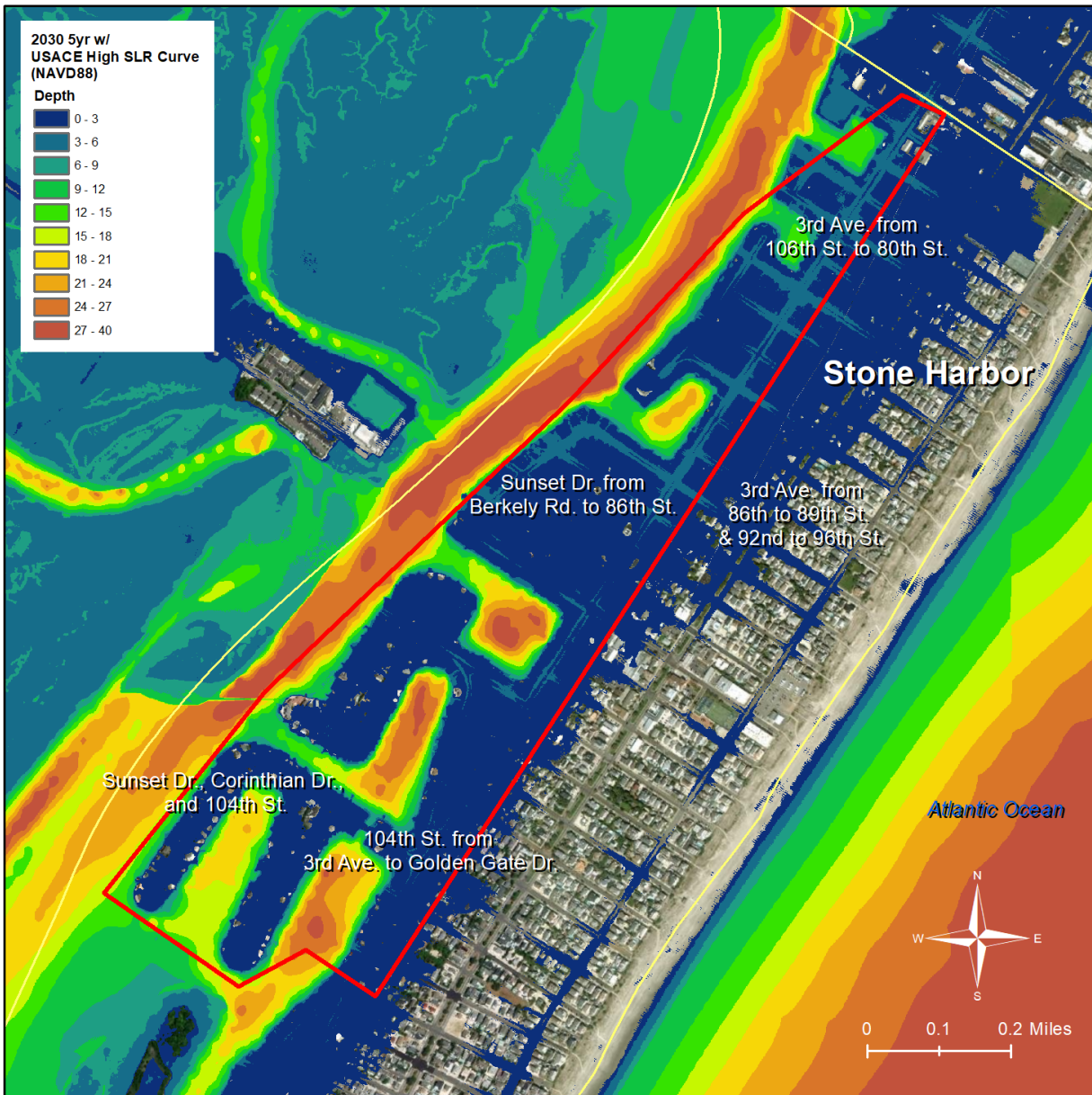


Figure 25. Stone Harbor 2030 5yr

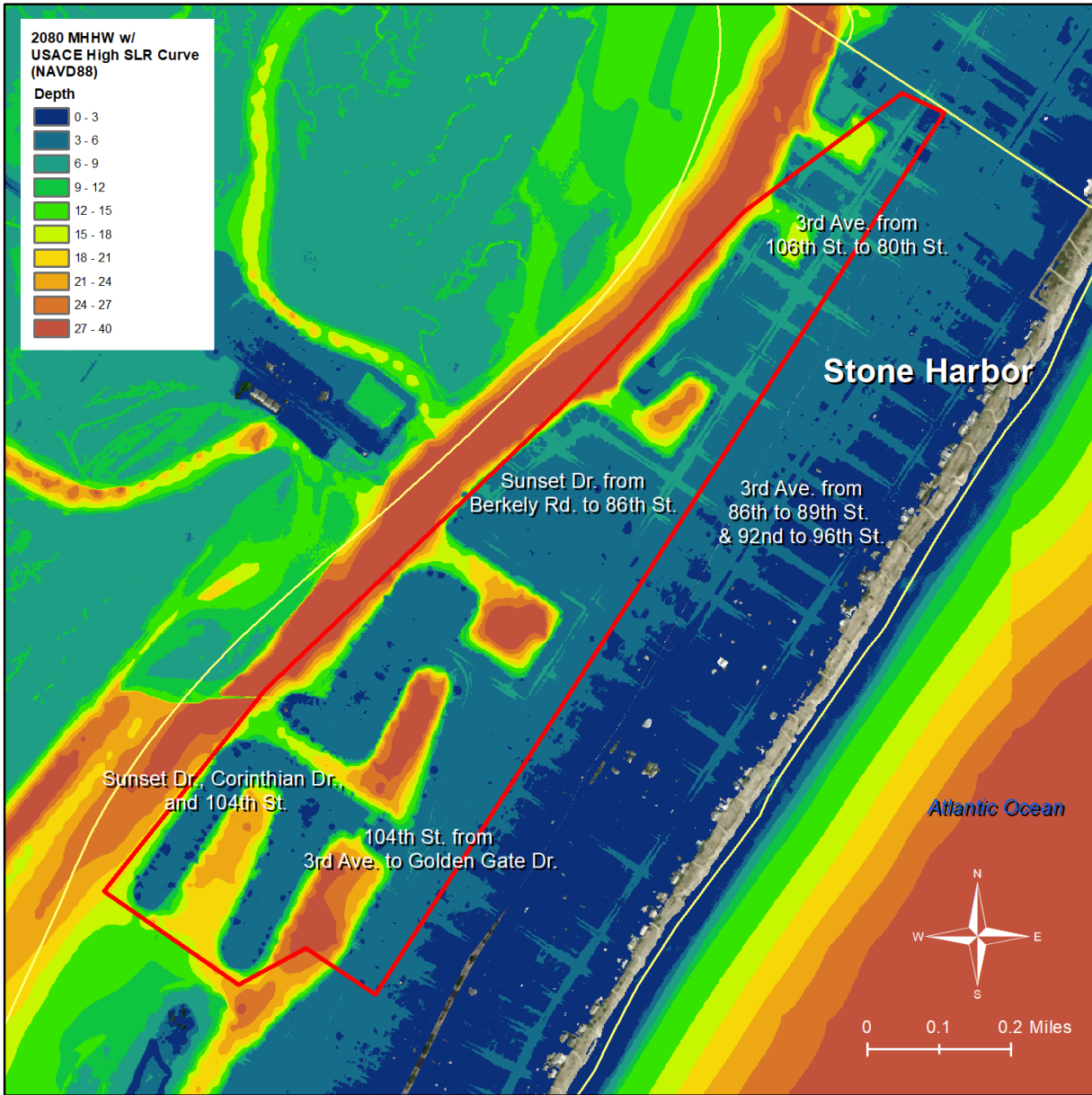


Figure 26. Stone Harbor 2080 MHHW

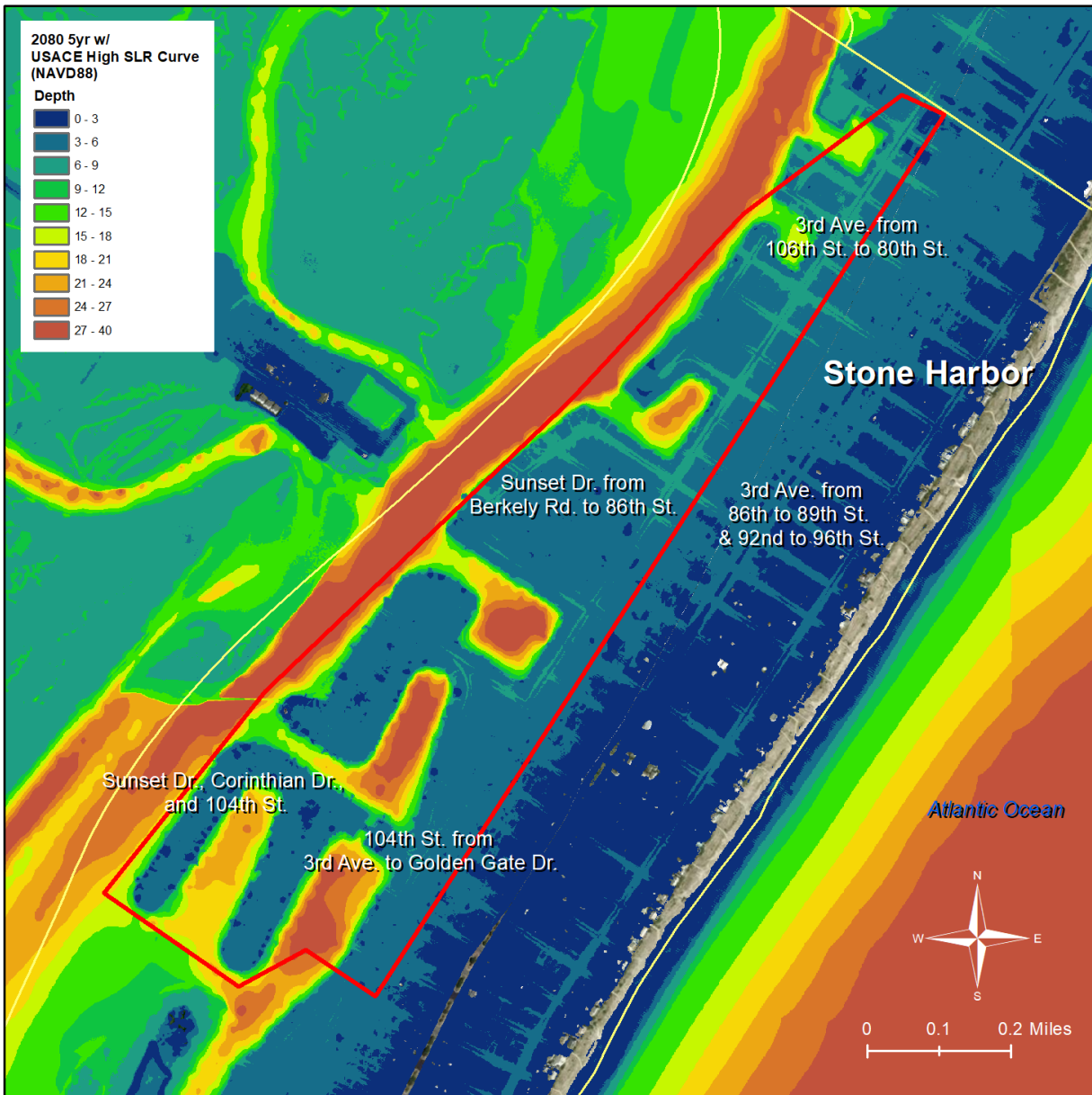


Figure 27. Stone Harbor 2080 5yr

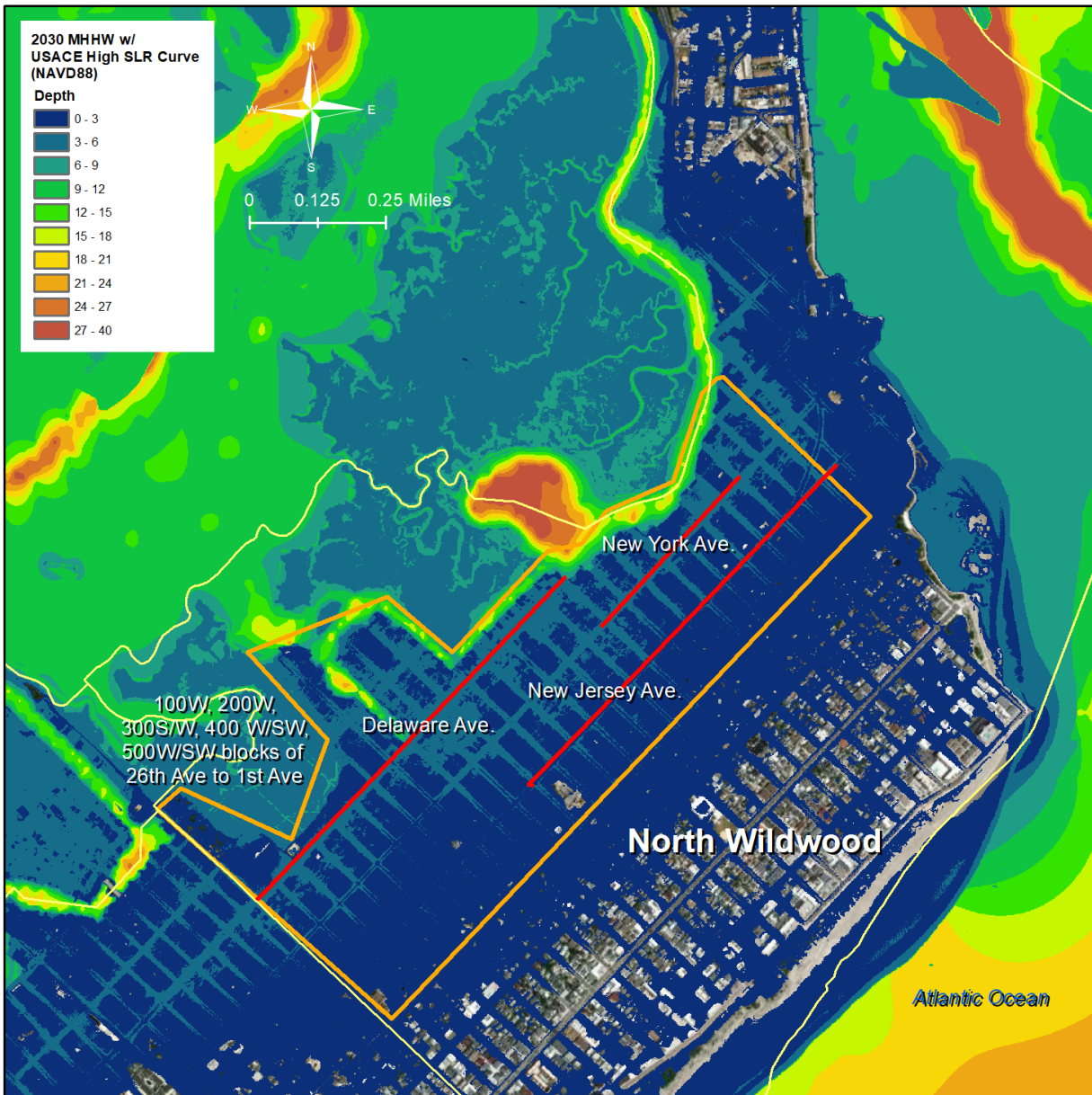


Figure 28. North Wildwood 2030 MHHW

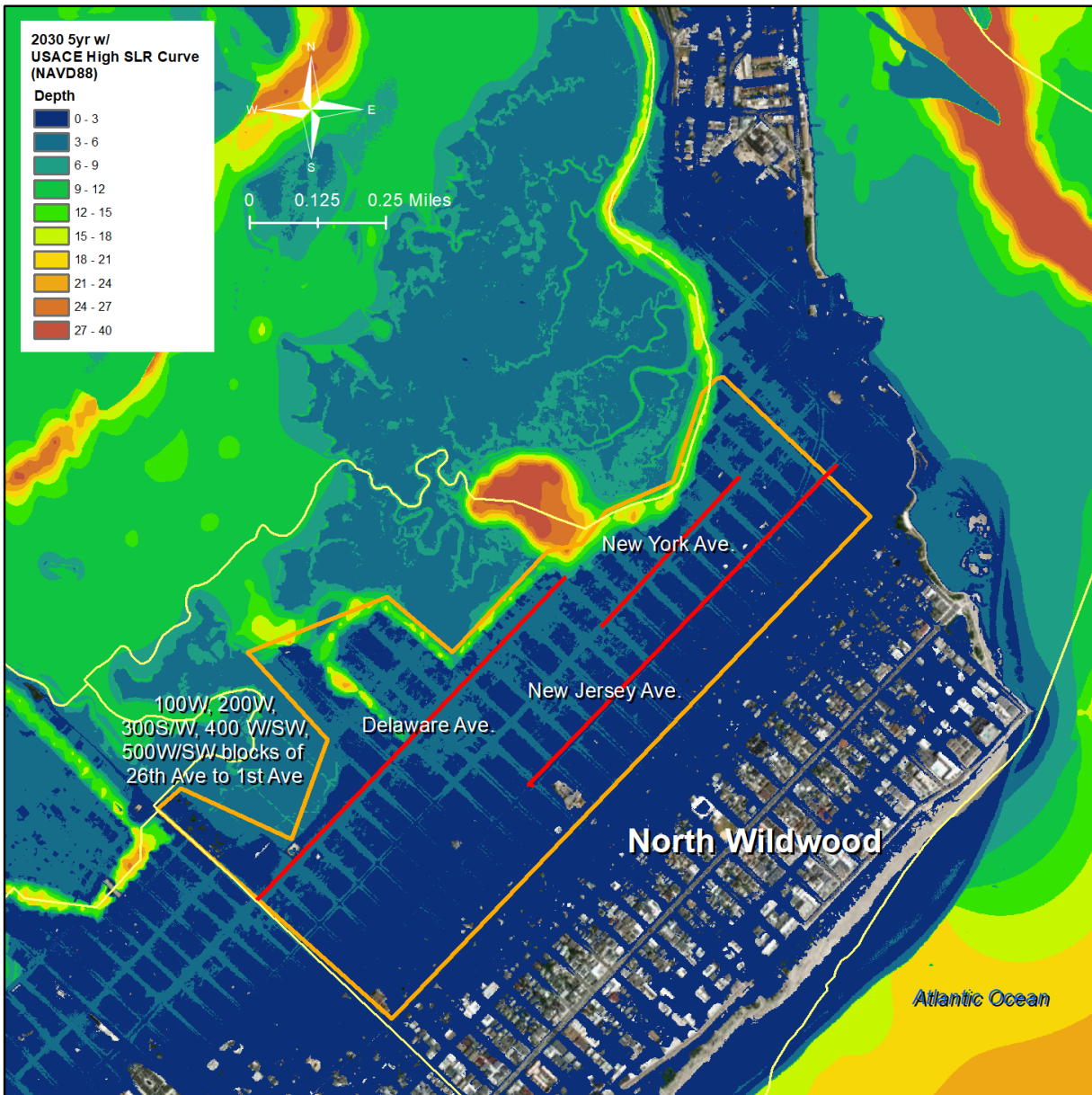


Figure 29. North Wildwood 2030 5yr

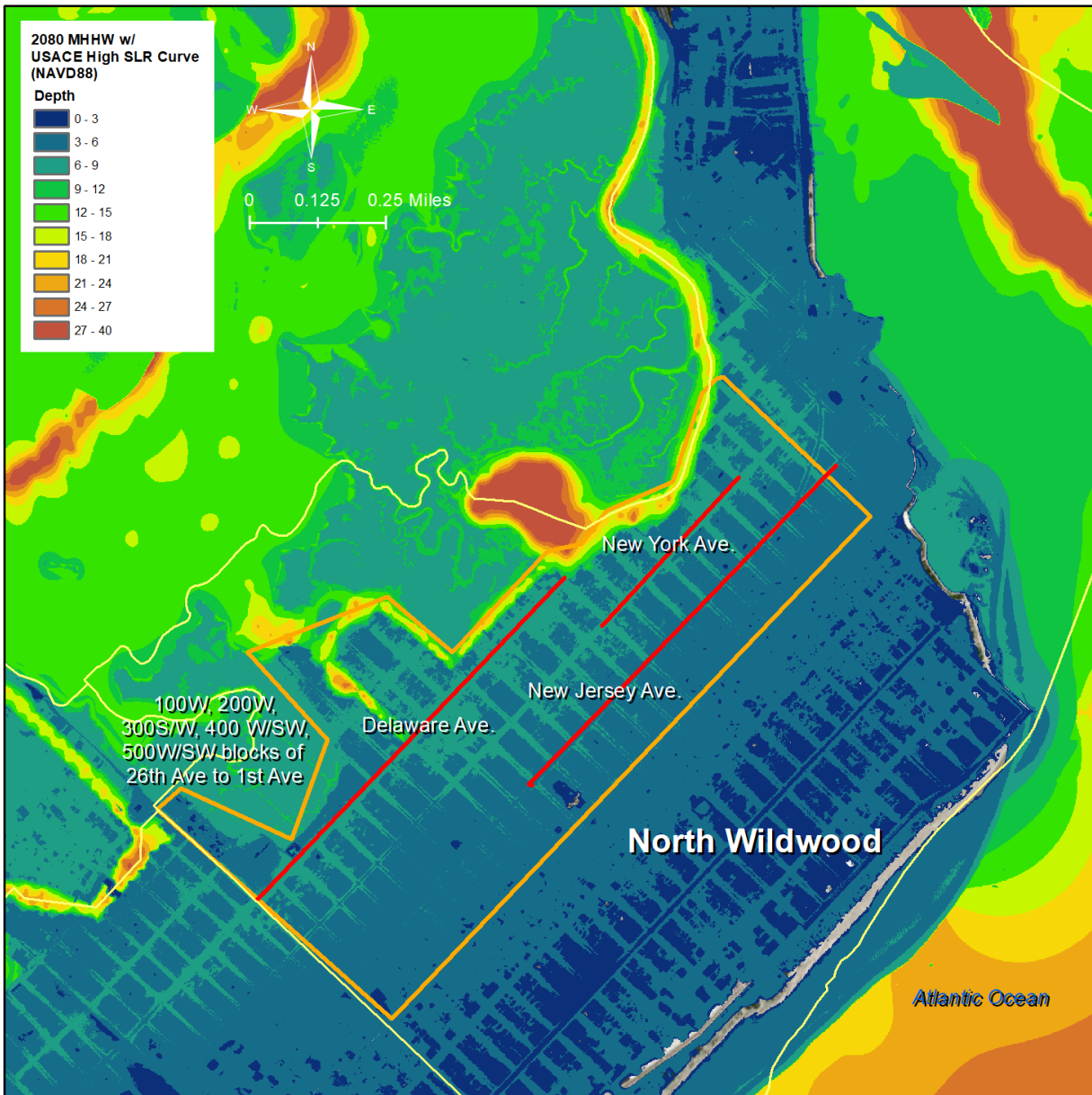


Figure 30. North Wildwood 2080 MHHW

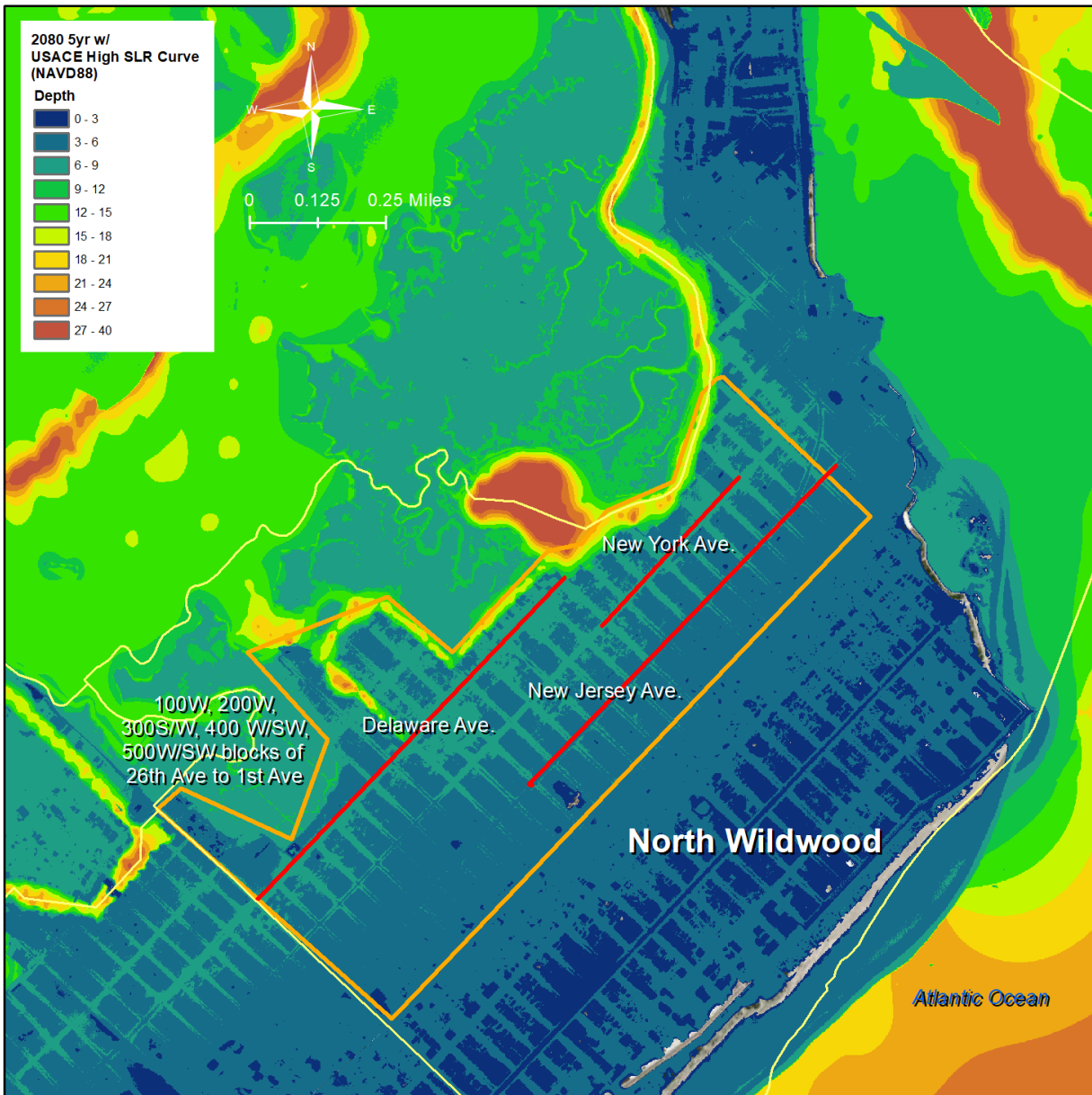


Figure 31. North Wildwood 2080 5yr

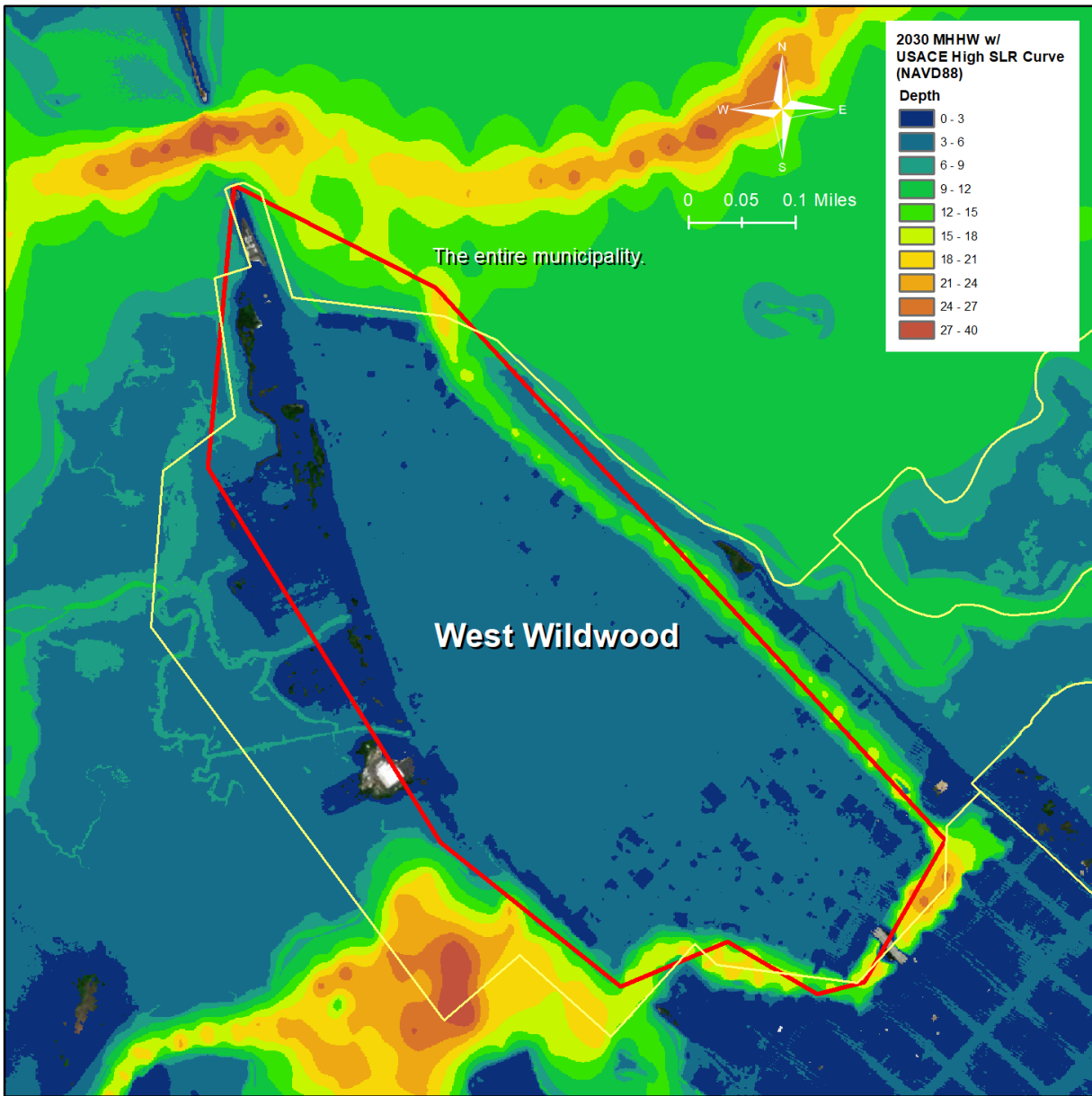


Figure 32. West Wildwood 2030 MHHW

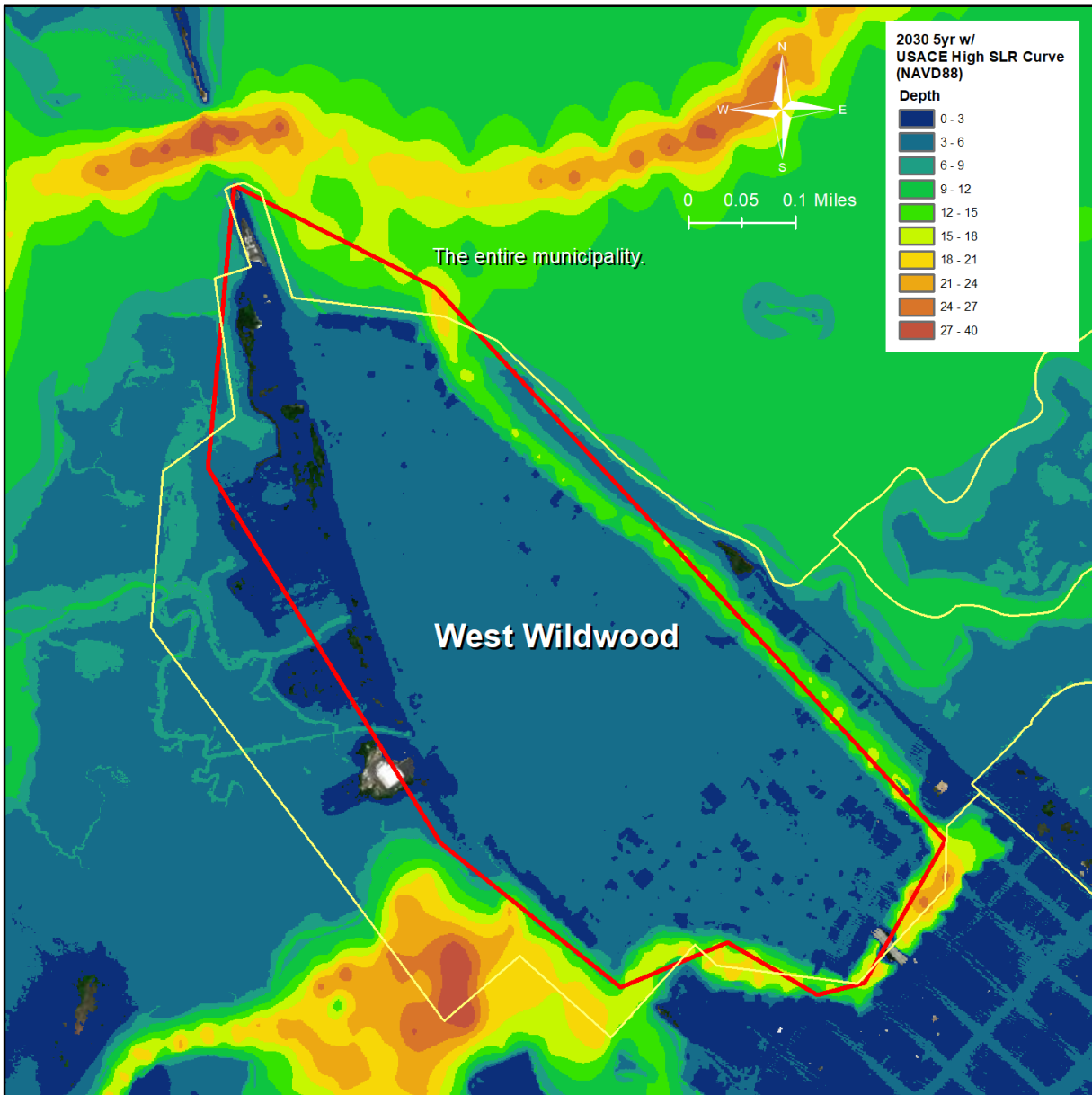


Figure 33. West Wildwood 2030 5yr

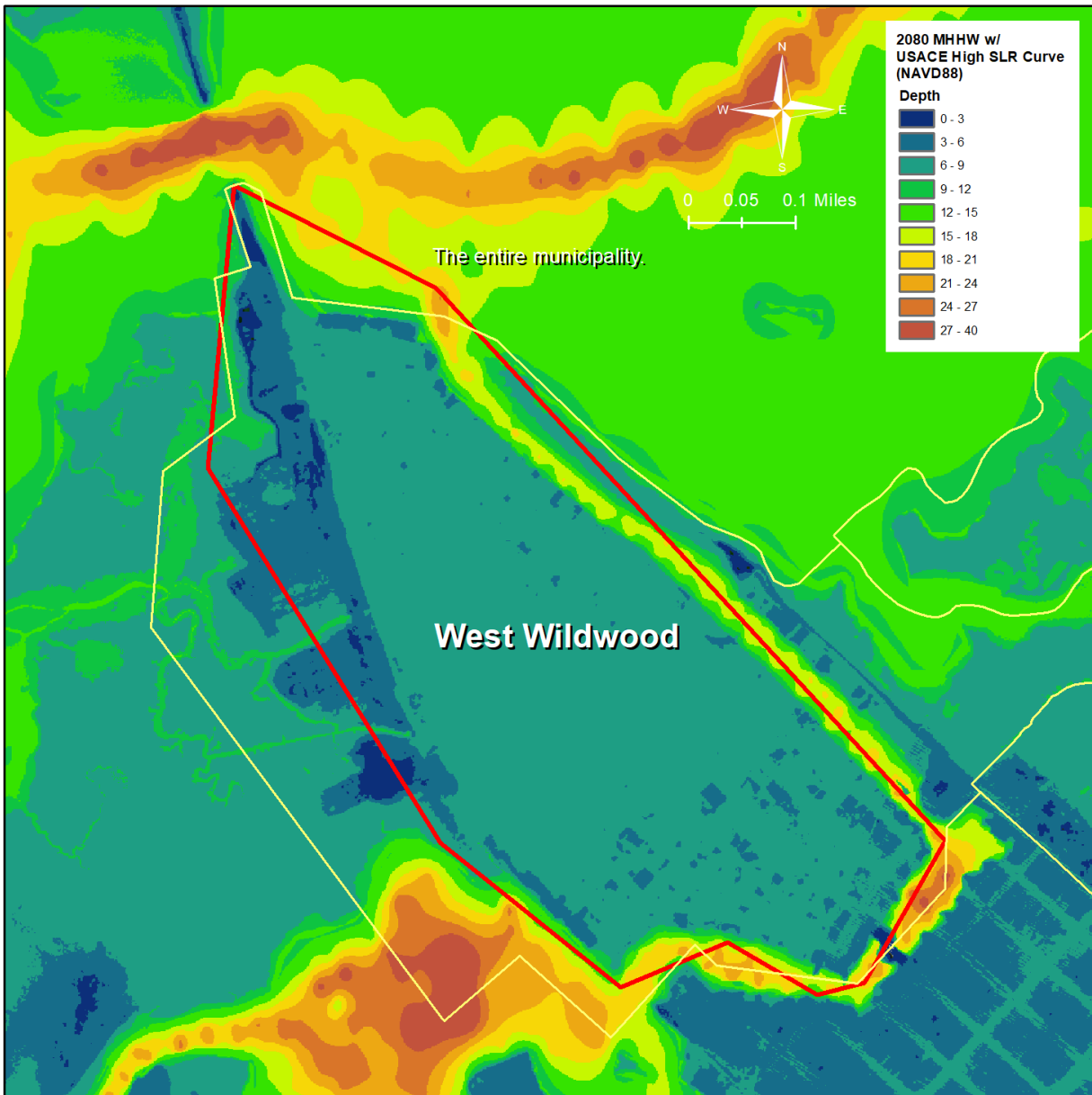


Figure 34. West Wildwood 2080 MHHW

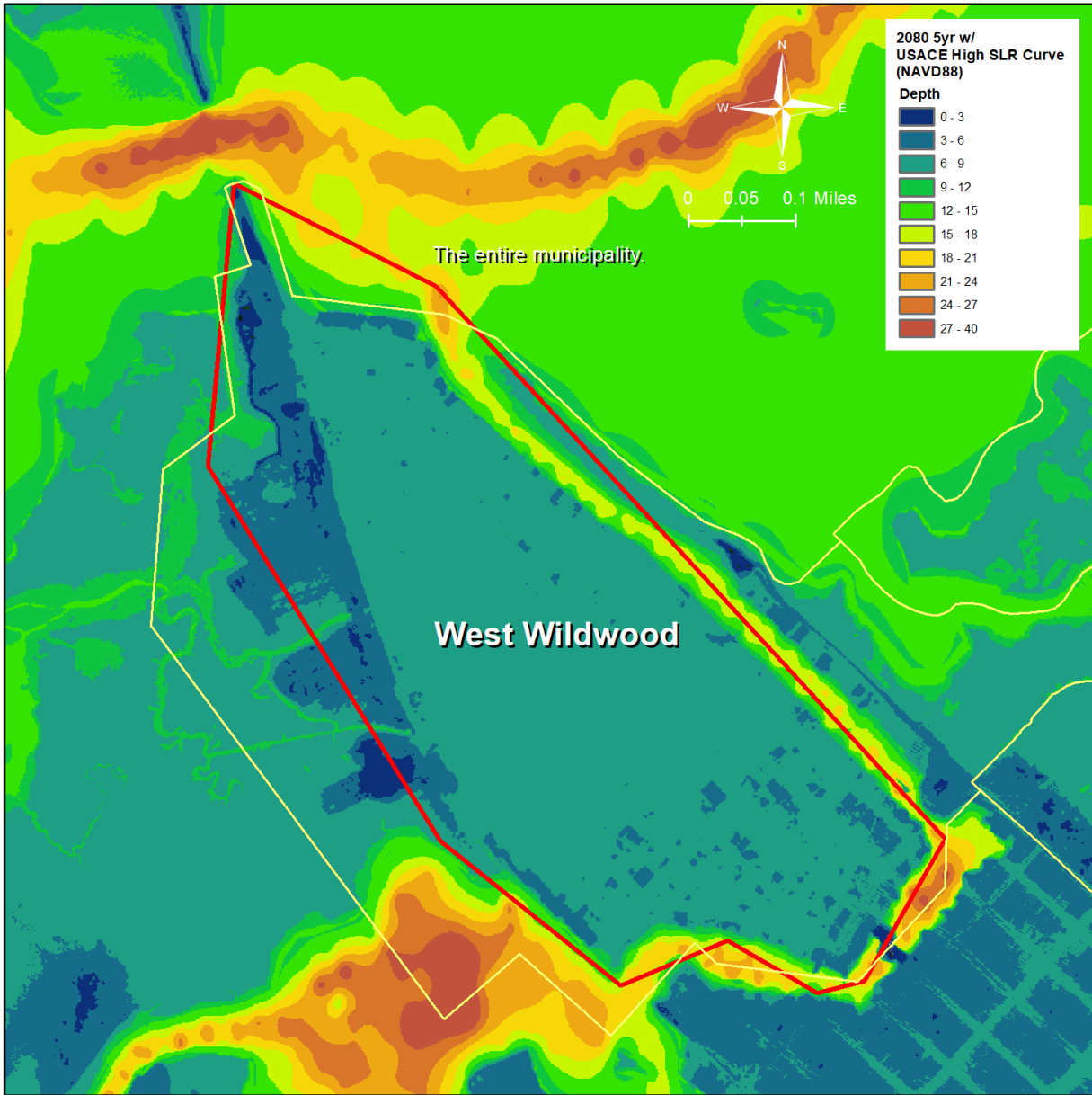


Figure 35. West Wildwood 2080 5yr

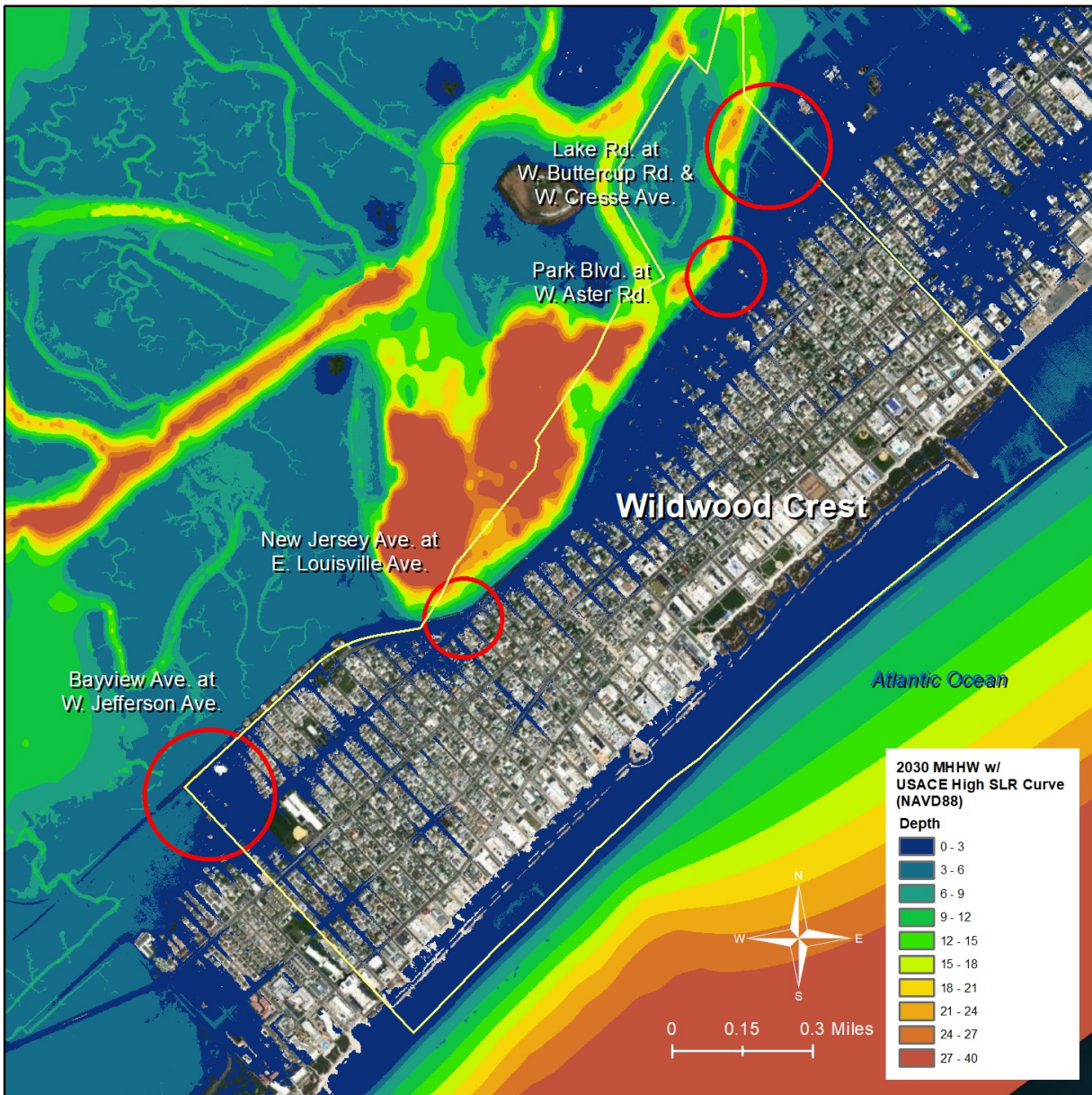


Figure 36. Wildwood Crest 2030 MHHW

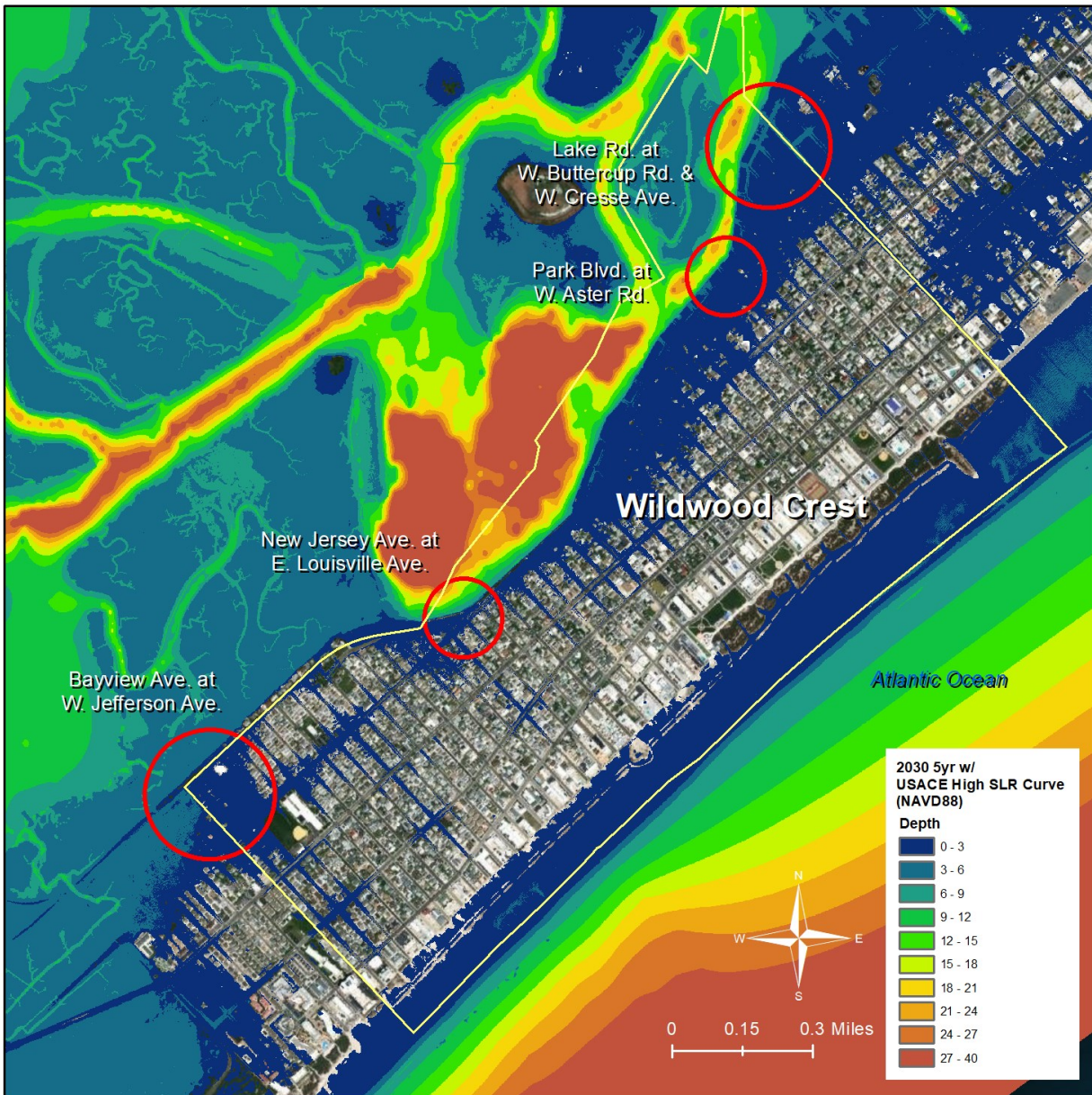


Figure 37. Wildwood Crest 2030 5yr

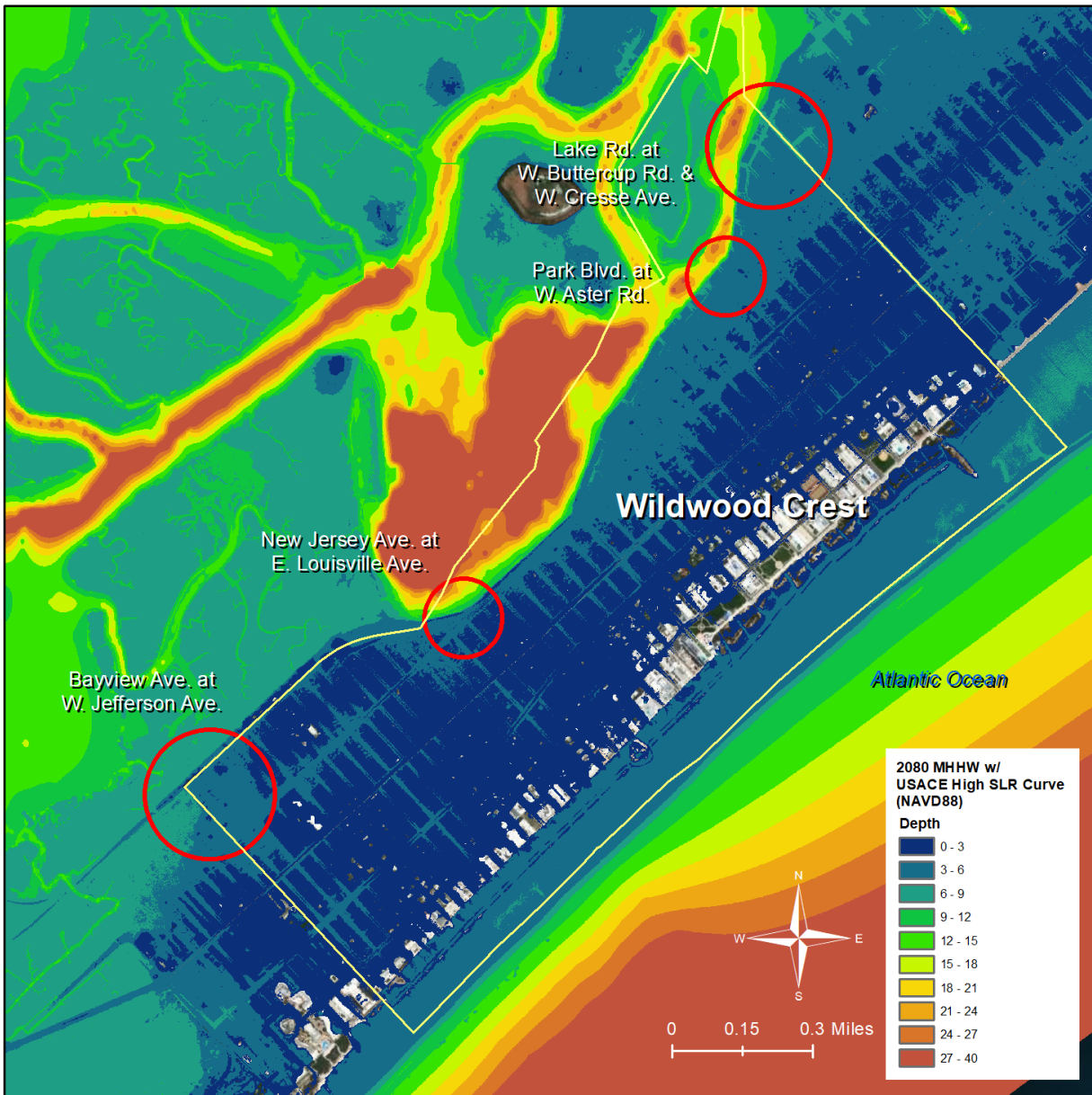


Figure 38. Wildwood Crest 2080 MHHW

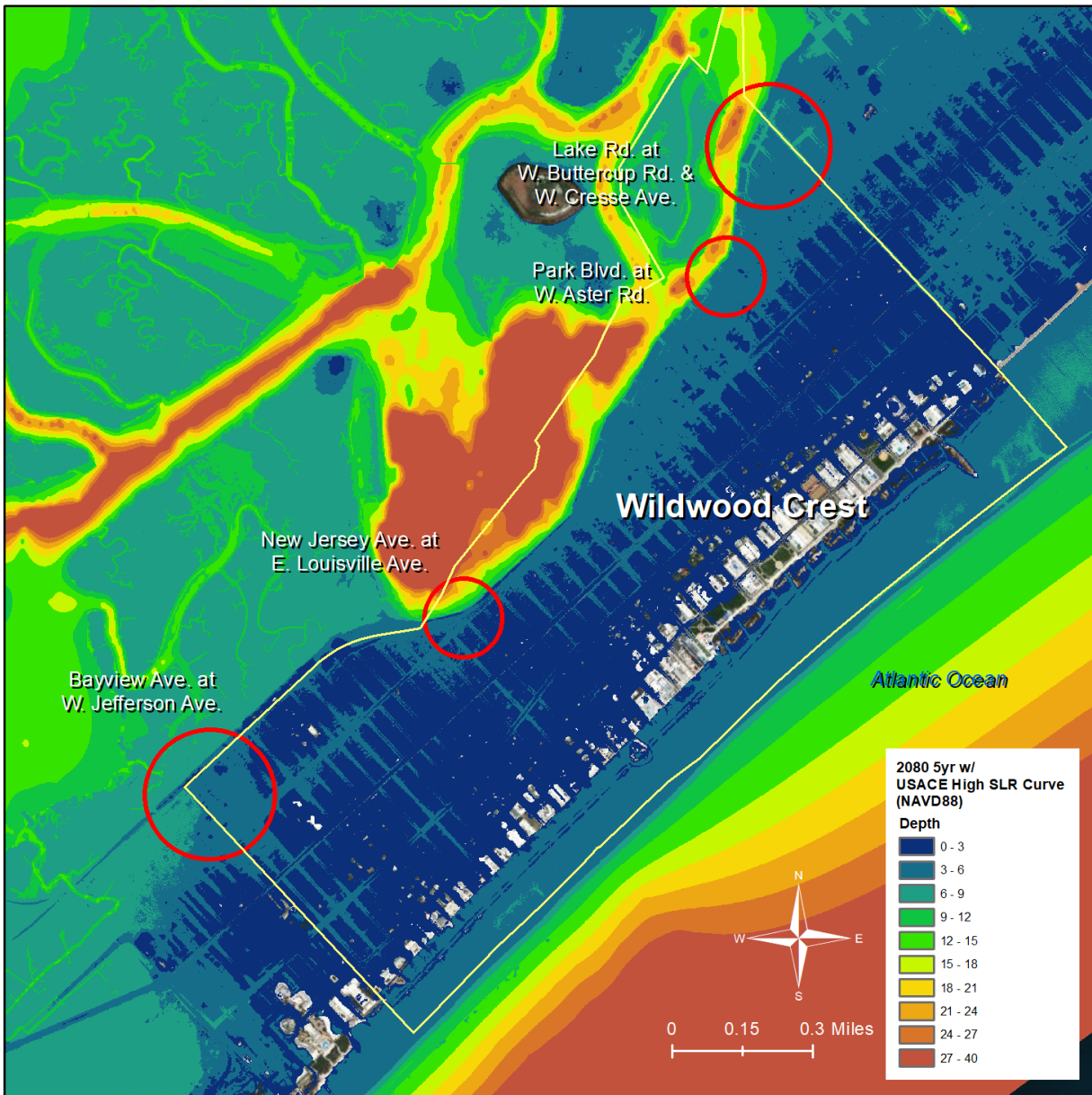


Figure 39. Wildwood Crest 2080 5yr

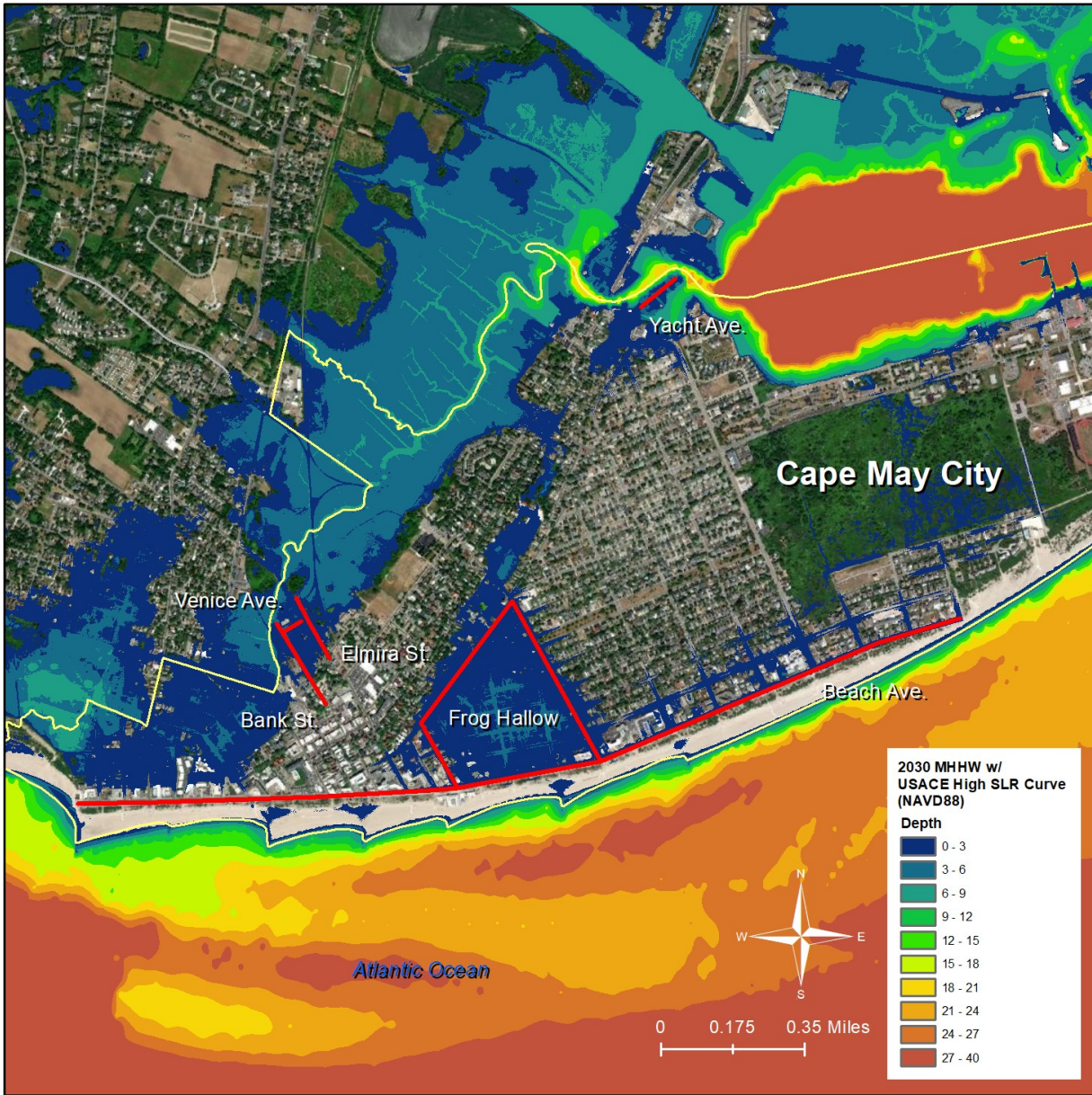


Figure 40. Cape May City 2030 MHHW

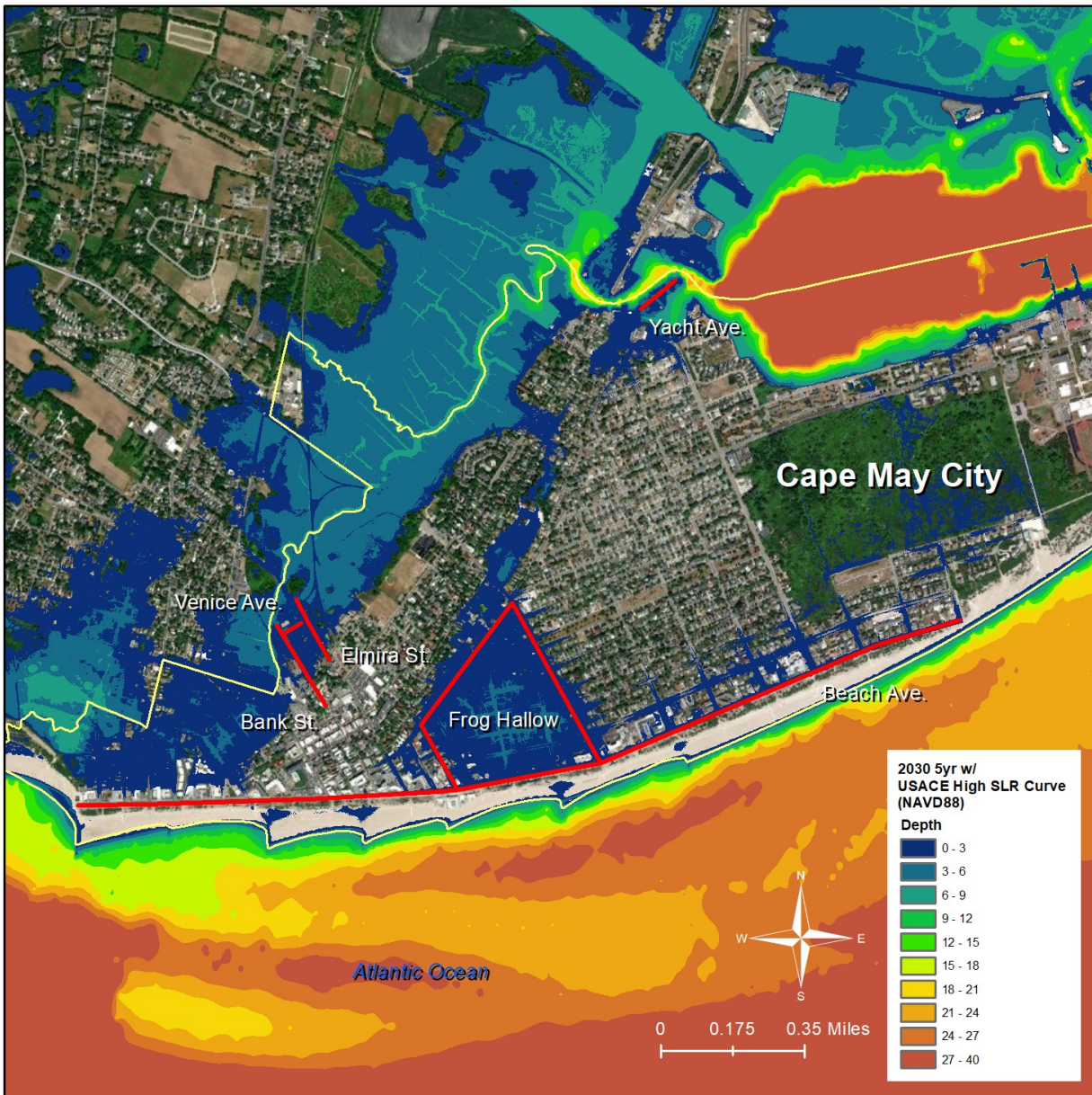


Figure 41. Cape May City 2030 5yr

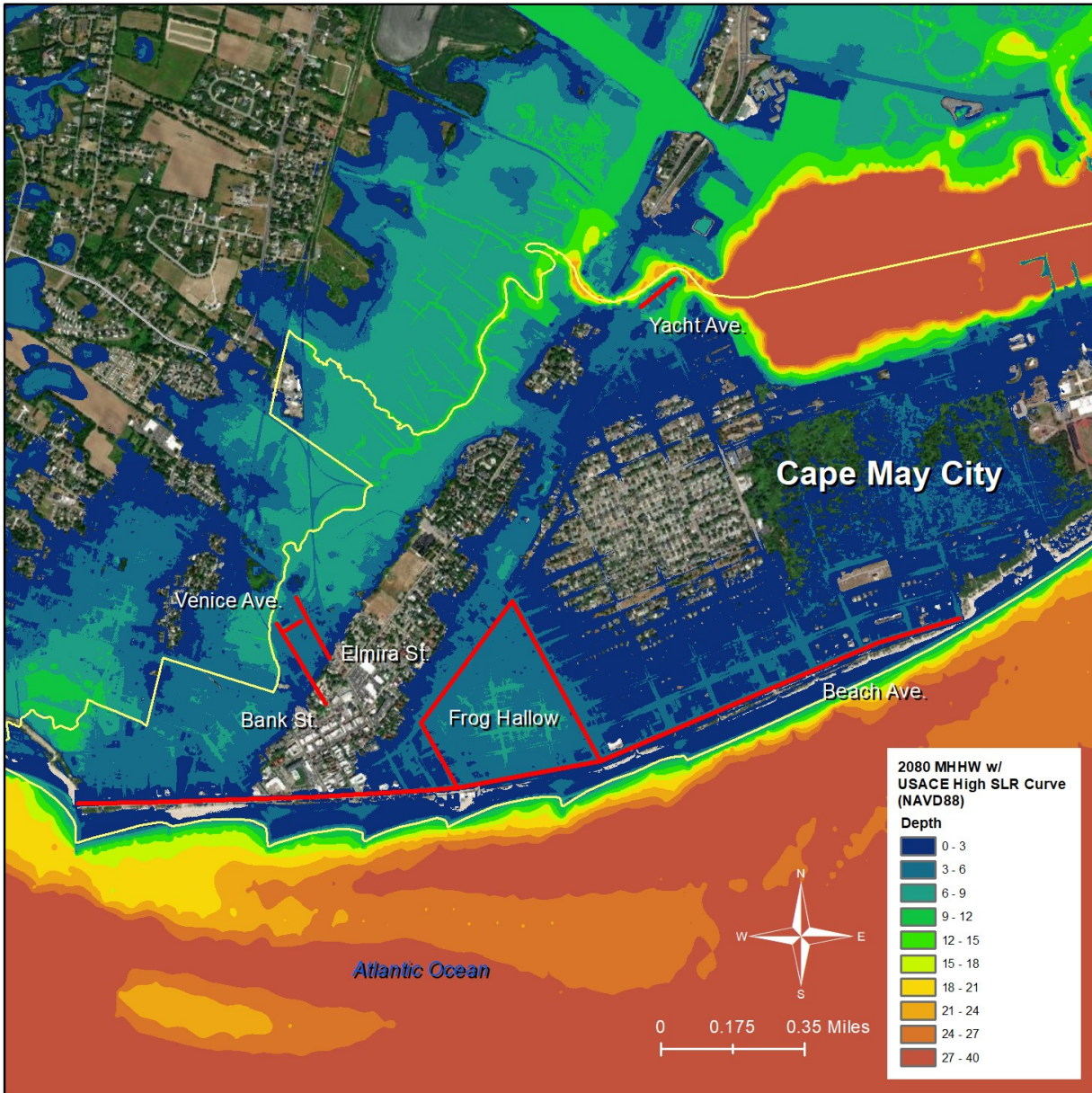


Figure 42. Cape May City 2080 MHHW

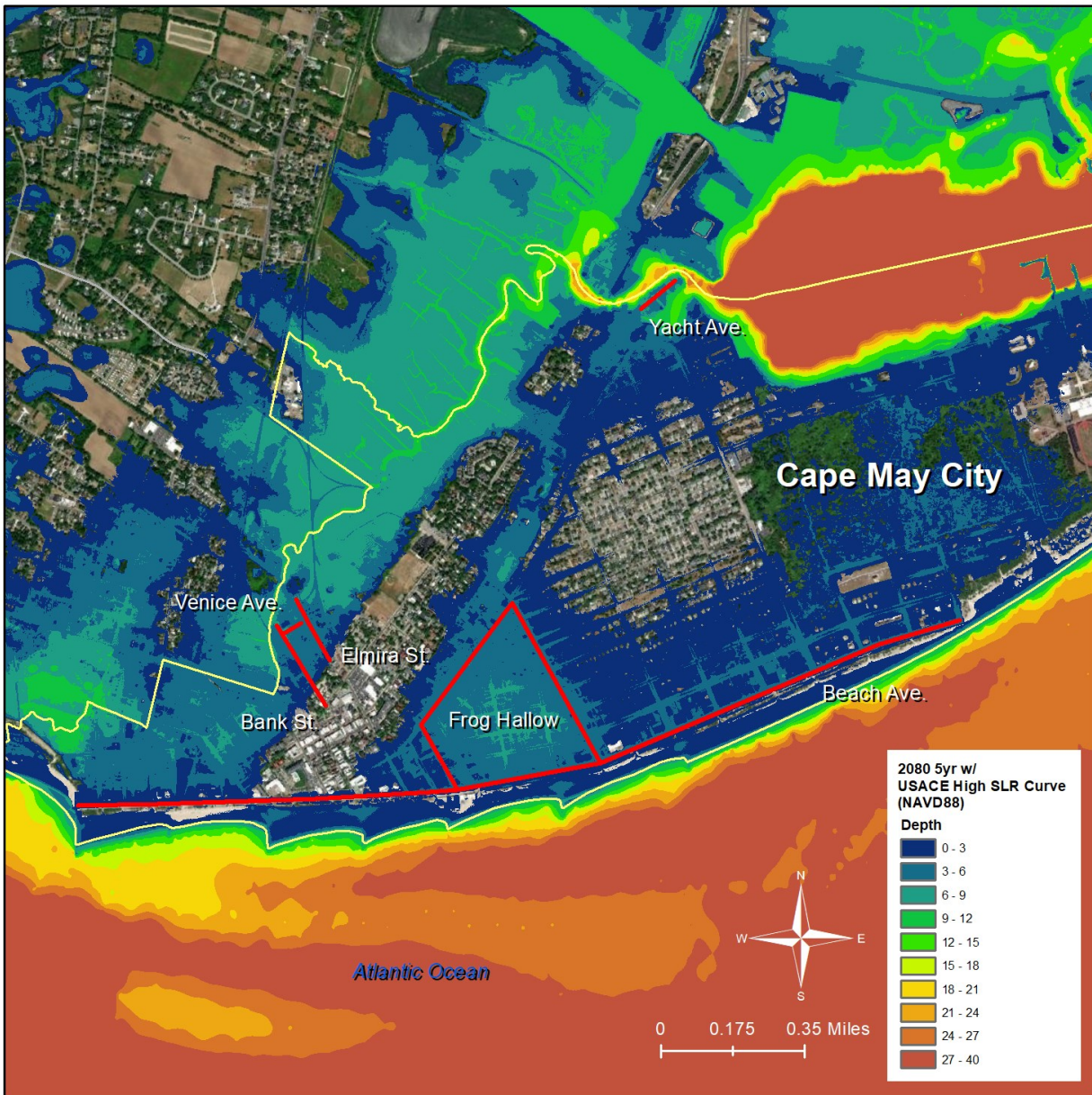


Figure 43. Cape May City 2080 5yr

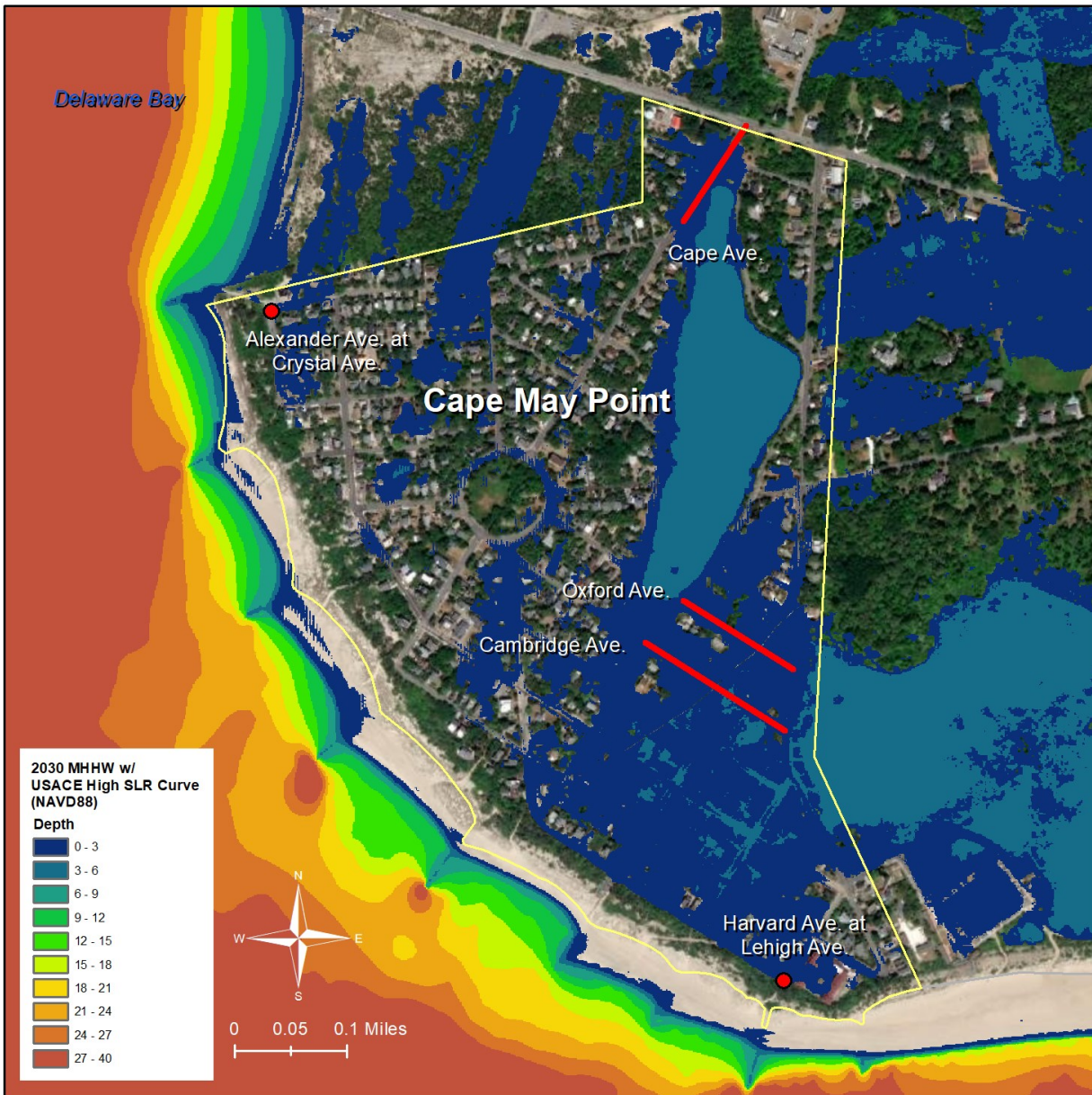


Figure 44. Cape May Point 2030 MHHW

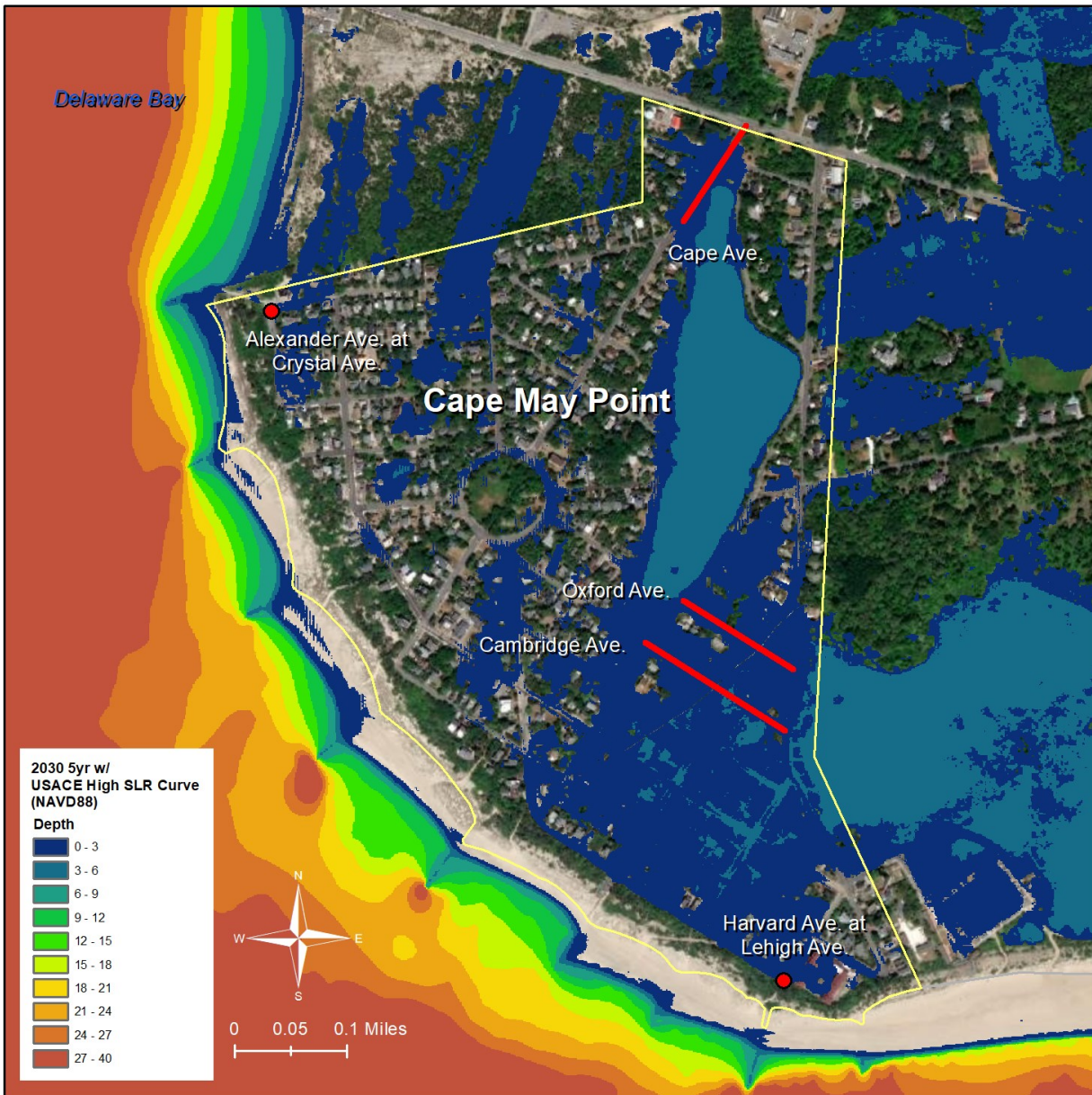


Figure 45. Cape May Point 2030 5yr

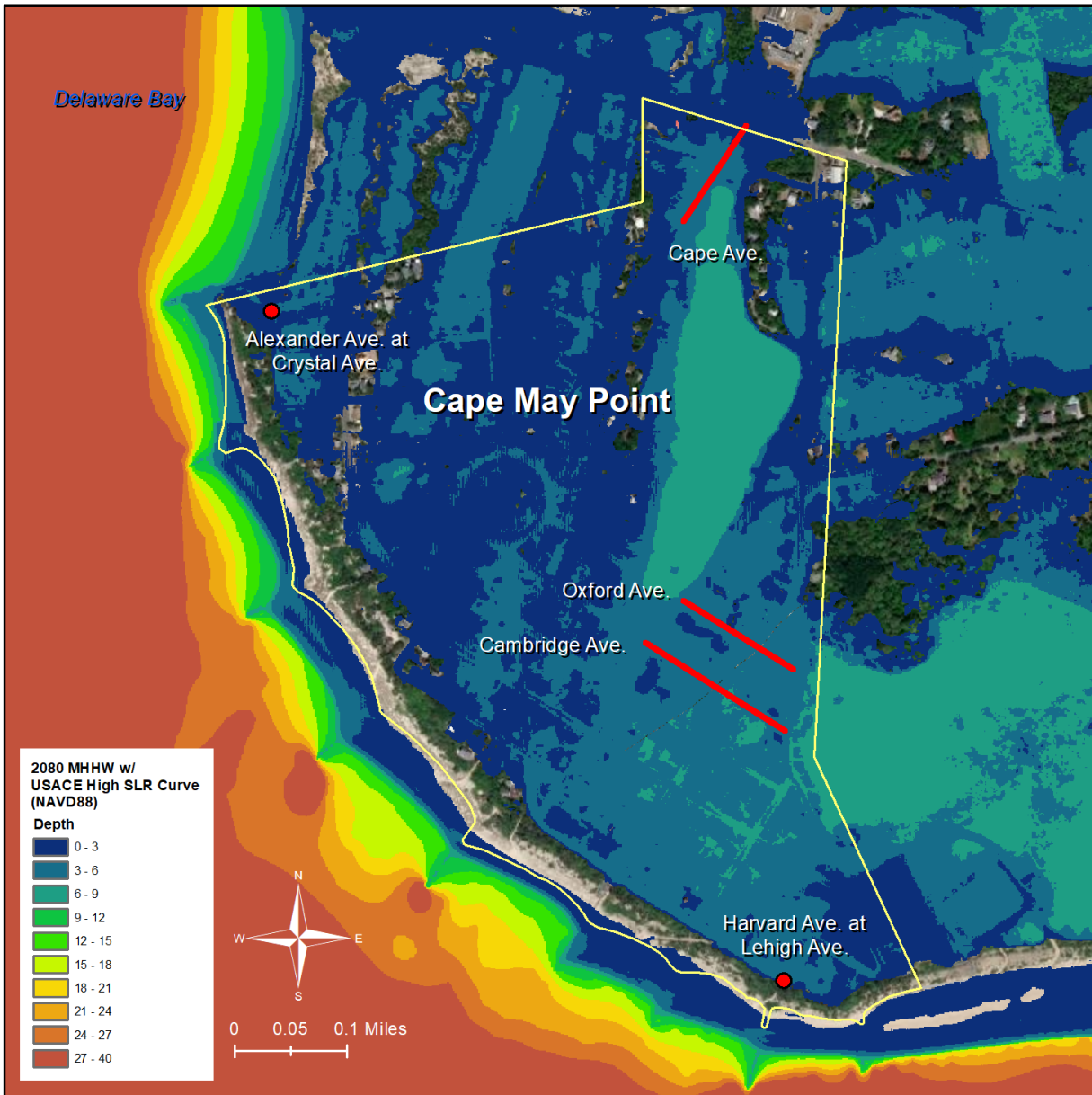


Figure 46. Cape May Point 2080 MHHW

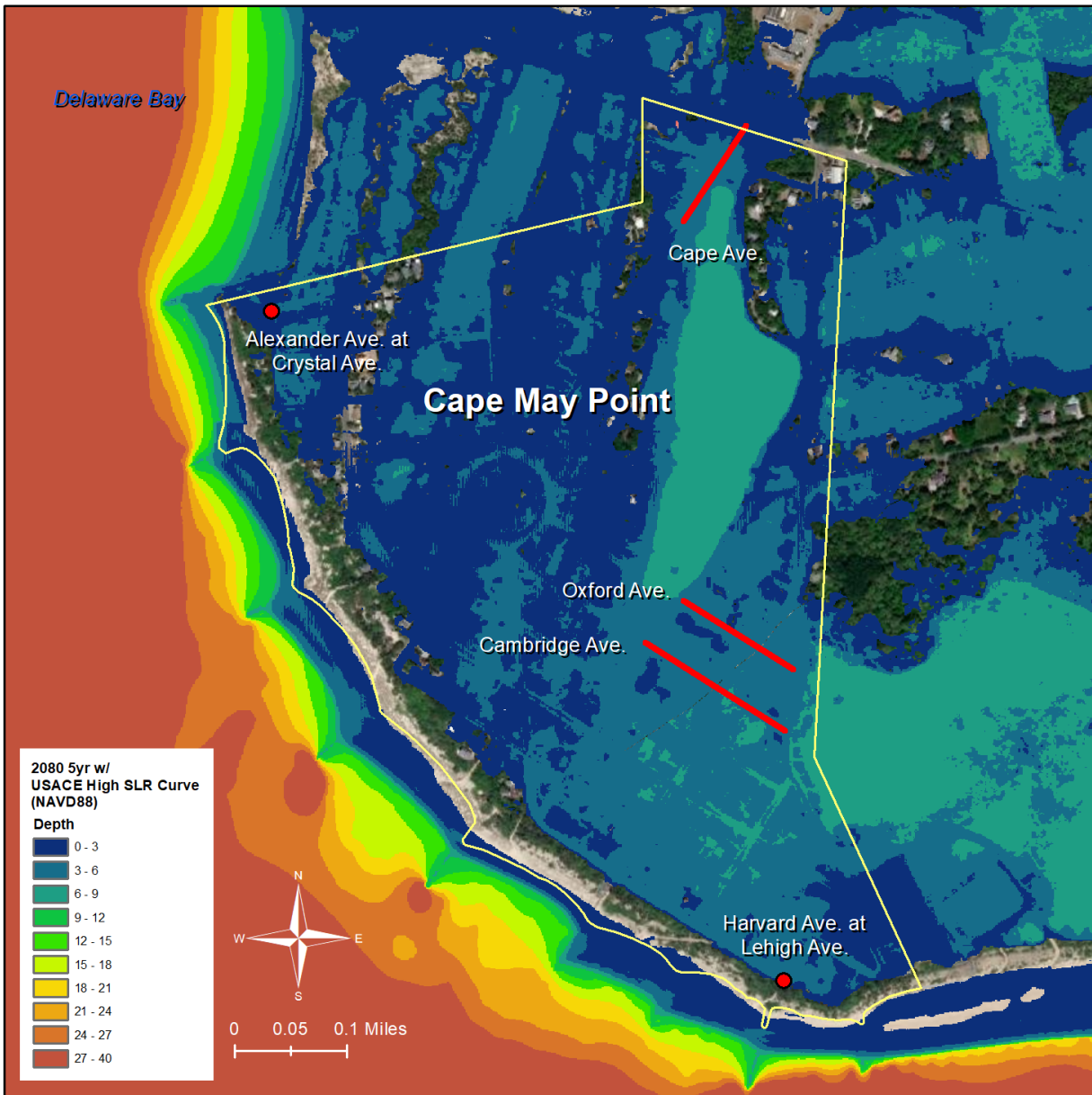


Figure 47. Cape May Point 2080 5yr

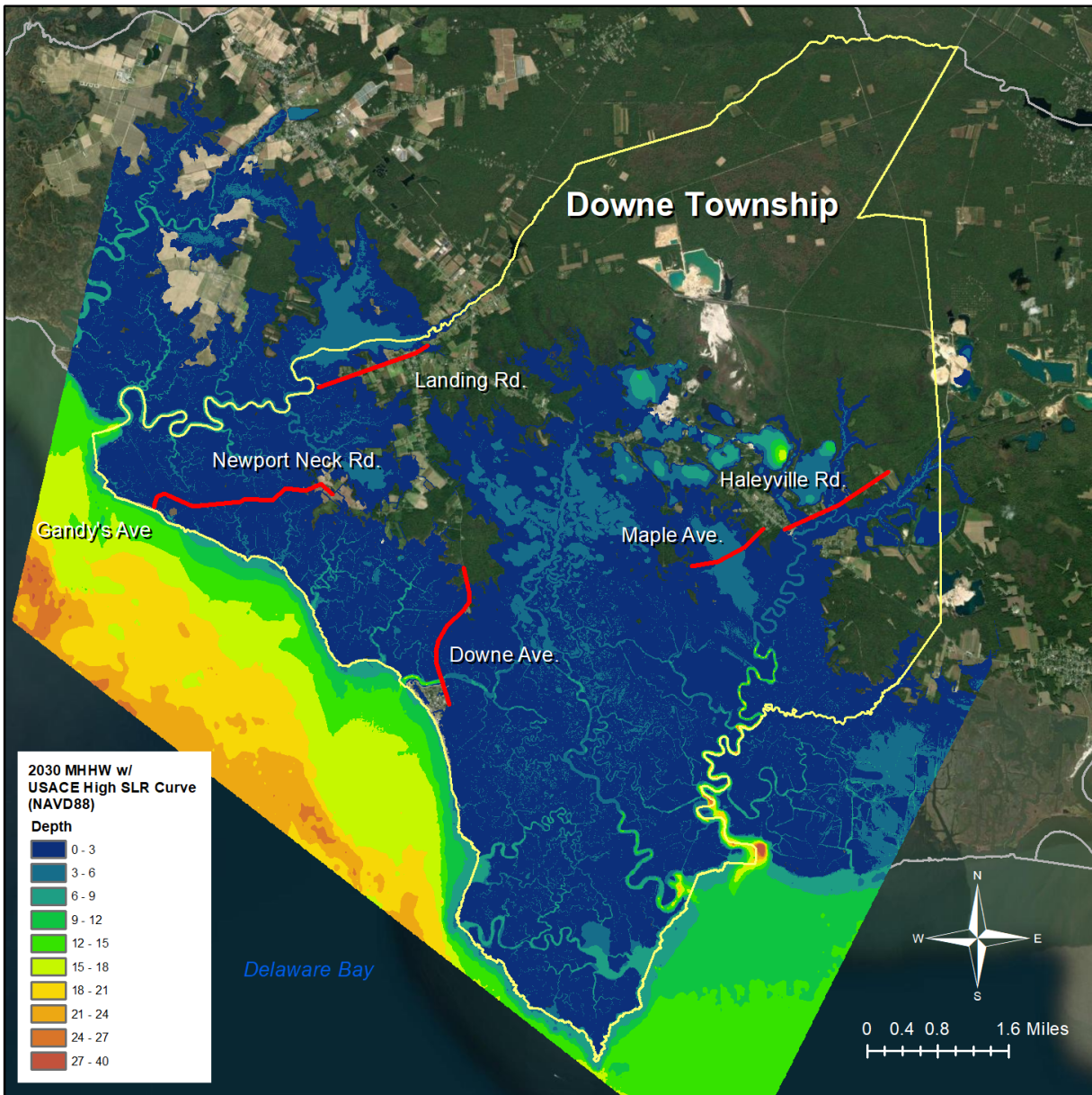


Figure 48. Downe Township 2030 MHHW

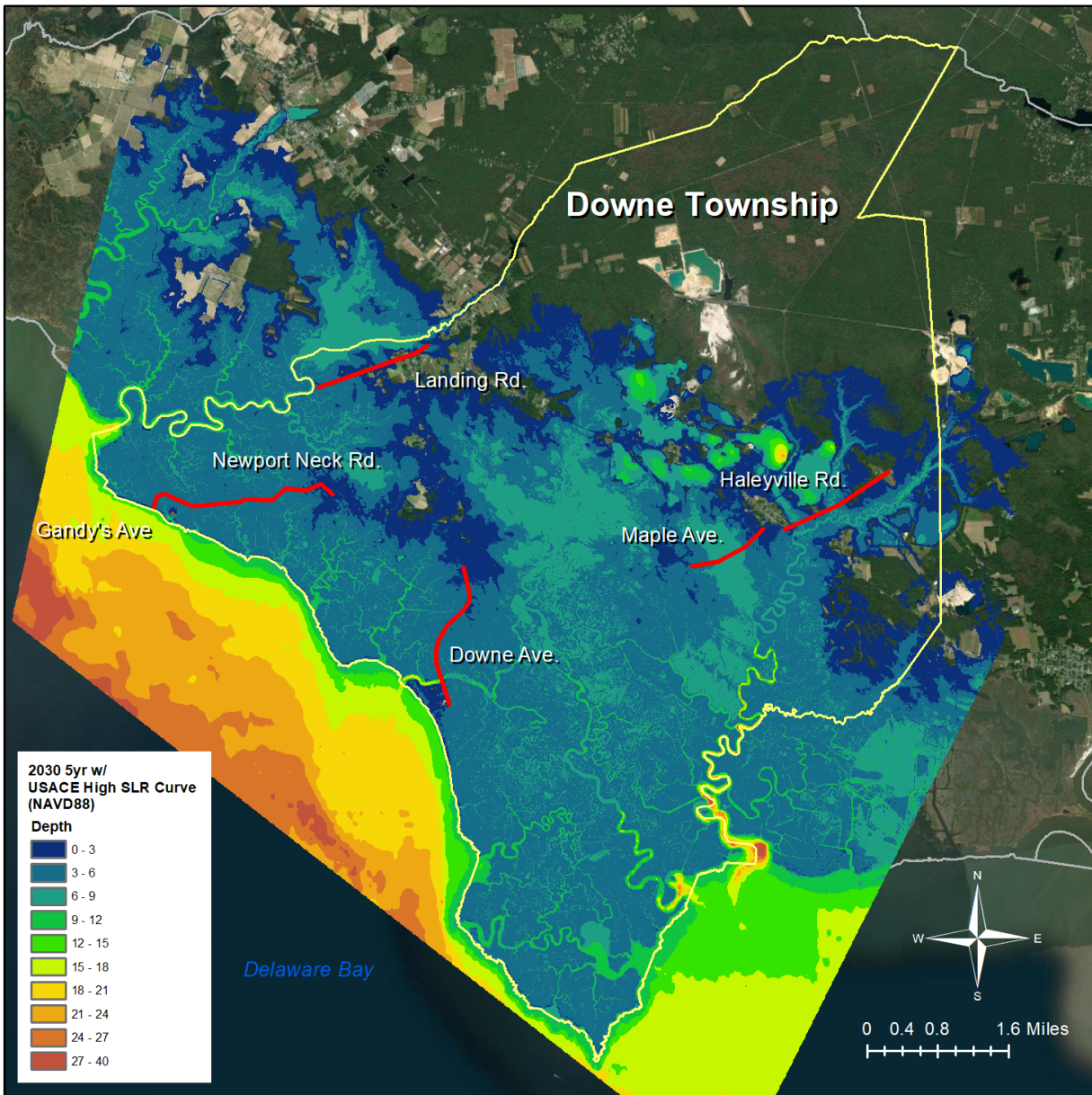


Figure 49. Downe Township 2030 5yr

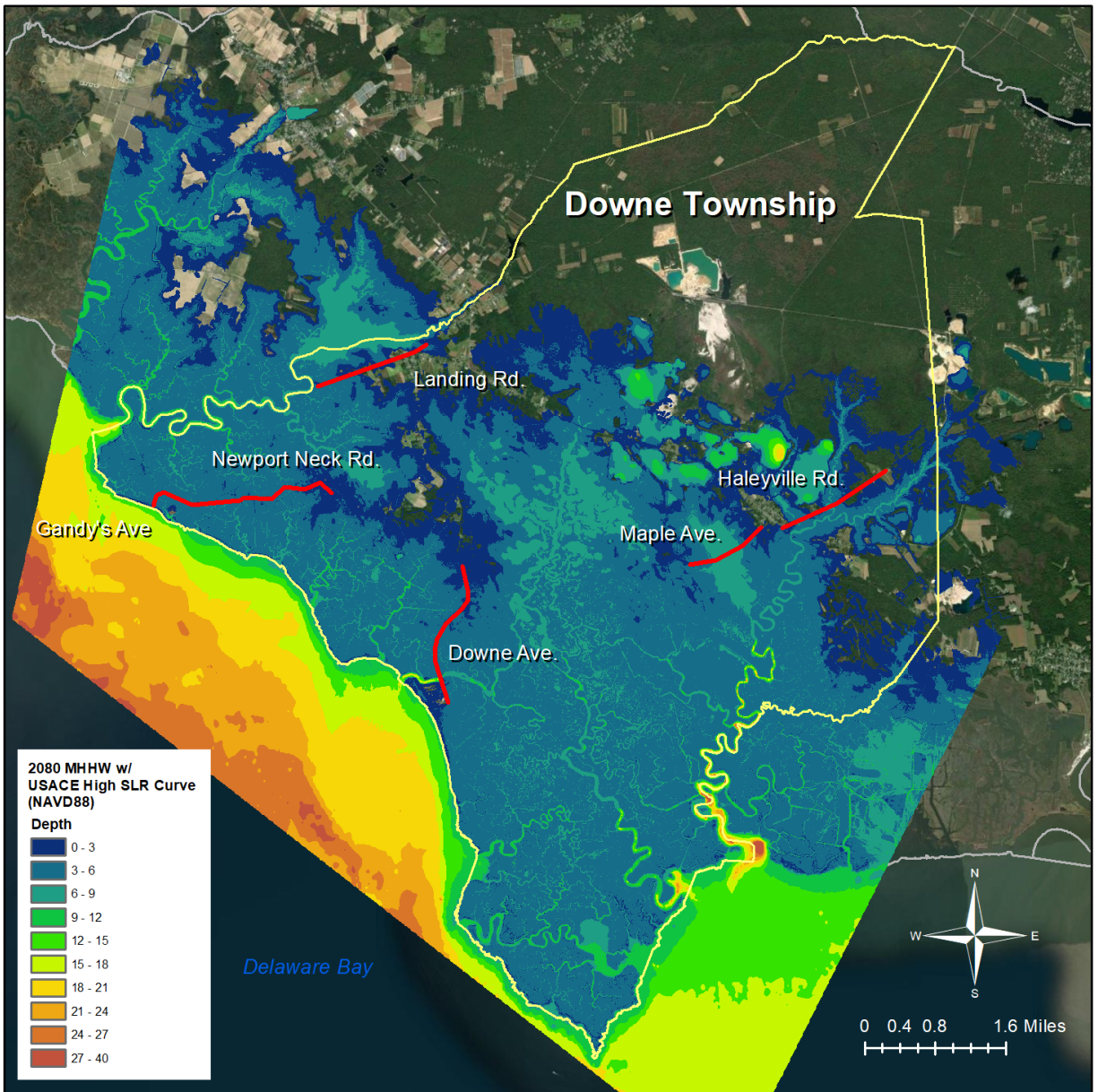


Figure 50. Downe Township 2080 MHHW

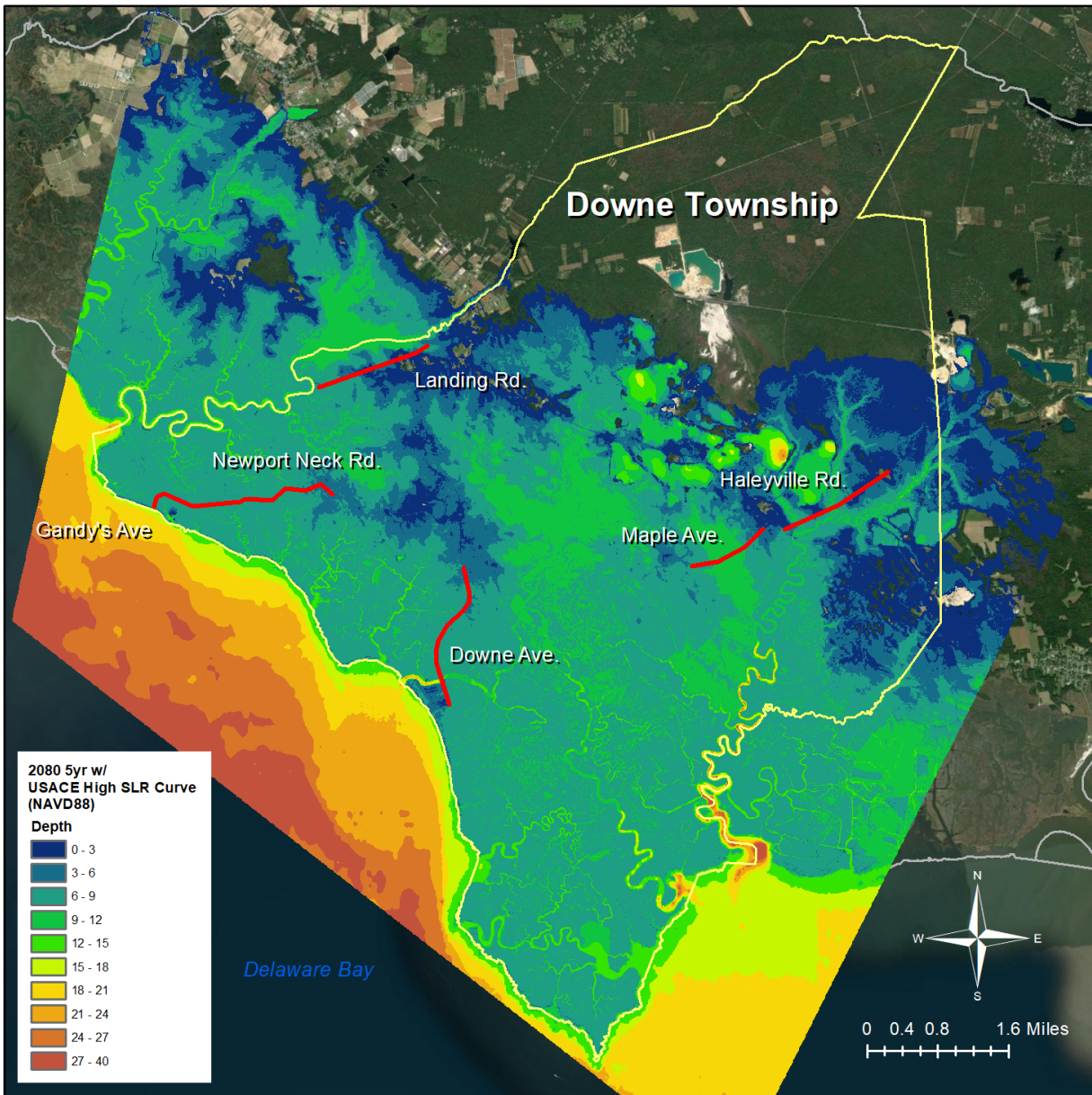


Figure 51. Downe Township 2080 5yr

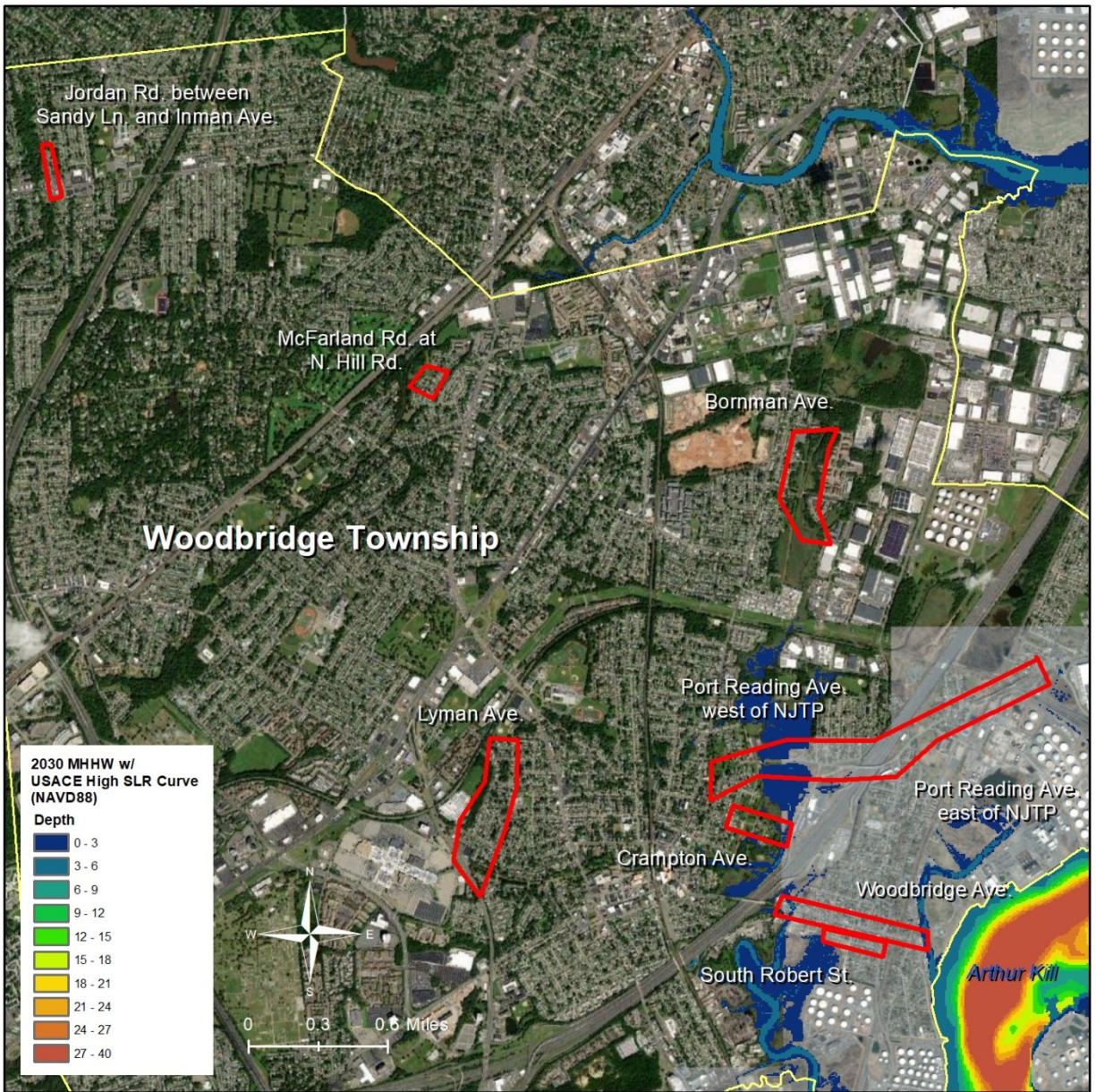


Figure 52. Woodbridge Township 2030 MHHW

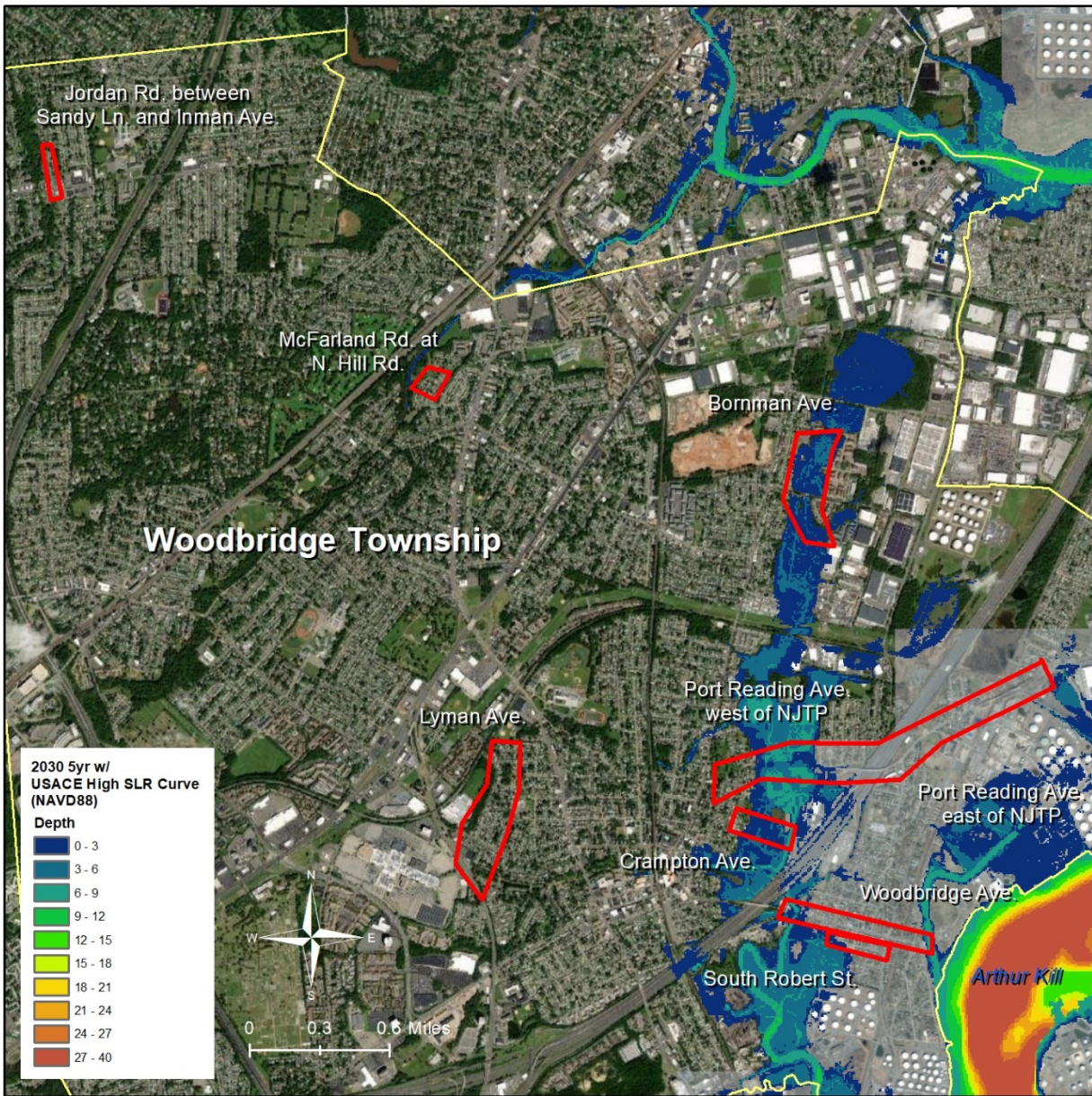


Figure 53. Woodbridge Township 2030 5yr

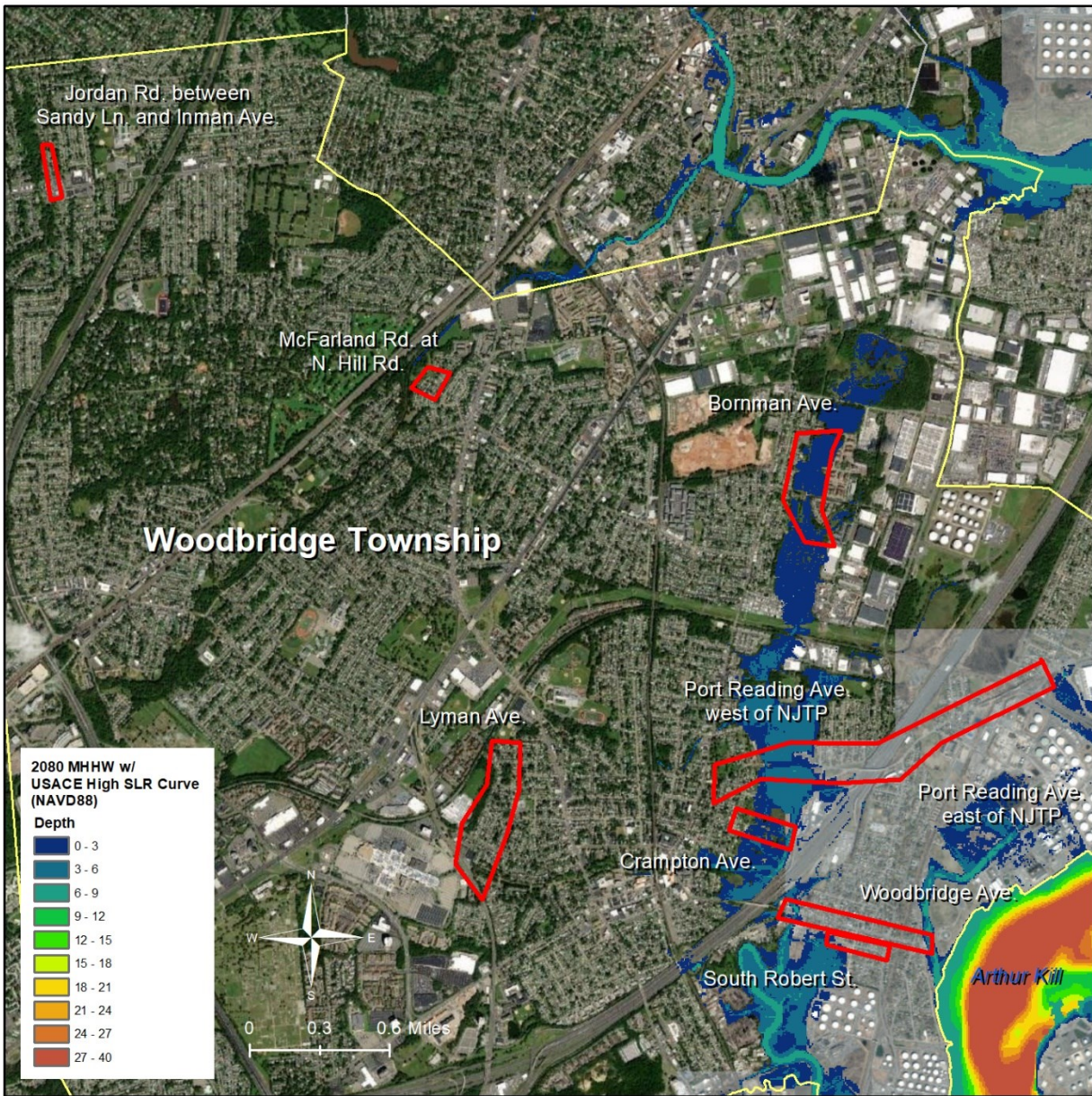


Figure 54. Woodbridge Township 2080 MHHW

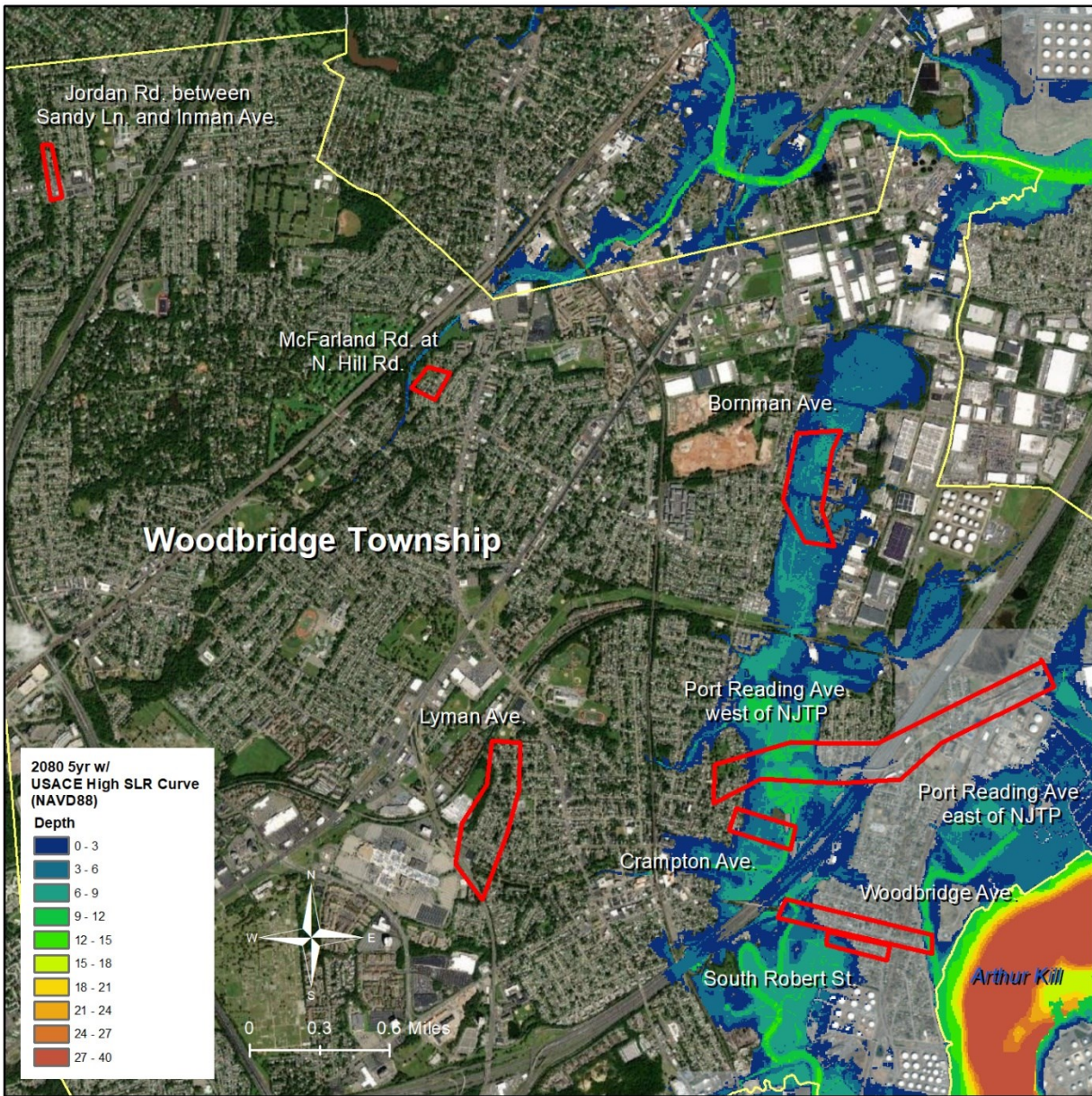


Figure 55. Woodbridge Township 2080 5yr

3.3 Evacuation Routes

Evacuation routes were also identified during the data gathering sequence of the project. All 13 municipalities have reported efficient evacuations and successful attempts by emergency services to support the removal of residents and visitors from flooding locations within the respective municipality.

Table 3. Evacuation Routes

Municipality	Evacuation Routes
Egg Harbor Township	1) Garden State Parkway 2) Black Horse Pike (NJ-40)
Ocean City	1) West Ave 2) Central Ave 3) Roosevelt Blvd. (CR 623)
Upper Township	1) Ocean Dr. (CR 619) 2) Tuckahoe Rd. (CR 631) 3) Roosevelt Blvd. (CR 623) 4) Route 50 at Garden State Parkway
Sea Isle City	1) Sea Isle Blvd. (CR 625)
Avalon	1) Avalon Blvd. (CR 601) 2) 30 th St. from Dune Dr. to Ocean Dr. 3) Ocean Dr. Bridge at Townsends Inlet
Stone Harbor	1) 96 th St. Bridge (CR 657) 2) Ocean Dr. from North Wildwood and Stone Harbor 3) Ocean Dr. and 2 nd Ave Northbound into Avalon
North Wildwood	1) North Wildwood Blvd. (NJ-147)
West Wildwood	1) Glenwood Ave Bridge (CR 614)
Wildwood Crest	1) Wildwood Blvd. (NJ-47)
Cape May City	1) Lafayette St. Bridge (NJ-109) 2) Elmira St. Bridge
Cape May Point	1) Sunset Blvd. (CR 606) 2) Seagrove Ave
Downe Township	1) Fortescue Rd. (CR 637) 2) Newport Neck Rd. (CR 643)
Woodbridge Township	1) Rahway Ave 2) West Ave 3) Port Reading Ave

3.4 Population

Population data for the year 2020.

Table 4. Population

Municipality	Population (Census Year¹)
Egg Harbor Township	42,578 (2020)
Ocean City	11,065 (2020)
Upper Township	11,857 (2020)
Sea Isle City	2,122 (2020)
Avalon	1,456 (2020)
Stone Harbor	876 (2020)
North Wildwood	3,794 (2020)
West Wildwood	409 (2020)
Wildwood Crest	3,073 (2020)
Cape May City	3,446 (2020)
Cape May Point	165 (2020)
Downe Township	1,183 (2020)
Woodbridge Township	103,639 (2020)

¹Population numbers were made available through Census.gov "QuickFacts" and reflect census data from April 1, 2020.

3.5 Environmentally Sensitive Areas

Environmentally Sensitive Areas are identified as adjacent locations to the identified flooding locations outlined in **Table 3.1**. These adjacent locations have the potential to contain Migratory, Threatened and Endangered species that incur high frequency and/or tidal flooding.

Table 5. Environmentally Sensitive Areas

Municipality	Location
Egg Harbor Township	None documented
Ocean City	None documented
Upper Township	None documented
Sea Isle City	<ol style="list-style-type: none"> 1) Northwestern portions of the city between 40th St. to 29th St. and west of Knease, Cini., and Central Avenues 2) Western portions of the city between 56th St. to 47th Pl. and west of Roberts and Central Avenues
Avalon	<ol style="list-style-type: none"> 1) 25th St. Bridge 2) 53rd St. – USFWS project involving Terrapin Turtles 3) 7th St.
Stone Harbor	None documented
North Wildwood	<ol style="list-style-type: none"> 1) Bayside from 26th Ave to 11th Ave
West Wildwood	<ol style="list-style-type: none"> 1) Conservation lots on the southern end of the municipality 2) 26th St.
Wildwood Crest	<ol style="list-style-type: none"> 1) CDF Island
Cape May City	None documented
Cape May Point	<ol style="list-style-type: none"> 1) Lighthouse Pond 2) Lake Lily 3) Cape May Point State Park
Downe Township	<ol style="list-style-type: none"> 1) The entire municipality
Woodbridge Township	<ol style="list-style-type: none"> 1) Critical habitat was identified by Rutgers University 2) Blue Acres (NJDEP) purchased approximately 160 homes and intends to rezone the lots for no new construction; end goal is to establish new habitat

3.6 Areas of Little or No Flood Risk Management

The locations identified below are areas of little or no FRM within the respective municipality.

Table 6. Areas of Little or No Protection

Municipality	Location
Egg Harbor Township	1) No flooding during nor'easters within municipal 100 year flood plain
Ocean City	Nothing noted during the municipal meeting
Upper Township	1) Bayview Dr., Strathmere <ul style="list-style-type: none"> - Most nuisance location - 1st location to flood - Outfalls have tide flex valves and the bulkheads leak - Strathmere is the only location in the Township that experiences nuisance flooding 2) Other <ul style="list-style-type: none"> - Several county outfalls within the Township are without tide valves - All Upper Township owned outfalls have tide valves and some are in better condition than others
Sea Isle City	1) Back bay segments of the municipality
Avalon	1) 54 th St. <ul style="list-style-type: none"> - Water comes in frequently 2) 7 th St. <ul style="list-style-type: none"> - Water impoundment during nor'easters
Stone Harbor	1) Municipal boat ramp <ul style="list-style-type: none"> - Has grandfathered bulkheads 2) 3 rd Ave 3) 92 nd St. & 93 rd St. at Sunset Dr.
North Wildwood	1) Back bay segments from 26 th Ave to 11 th Ave
West Wildwood	1) The western end of the municipality
Wildwood Crest	1) Park Blvd. at Rosemary Rd. <ul style="list-style-type: none"> - Passive Park
Cape May City	1) Yacht Ave <ul style="list-style-type: none"> - Worst and 1st to flood
Cape May Point	No documented locations
Downe Township	1) The entire municipality
Woodbridge Township	1) Lyman Ave 2) McFarlane Rd. at N. Hill Rd. 3) Woodbridge Ave (East of NJTP) 4) Port Reading Ave (East of NJTP) 5) Port Reading Ave (West of NJTP) 6) South Robert St. (South of Woodbridge) 7) Borman Ave (East toward Woodbridge) 8) Crampton Ave (East of Bamford) 9) Jordan Rd. (Between Sandy and Inman)

3.7 Essential Services

Essential Services are identified as locations which provide necessary welfare services to the residents of the municipality. The Essential Services documented below have been impacted by flooding.

Table 7. Essential Services

Municipality	Location
Egg Harbor Township	1) #1 Firehouse – Location is on septic and confined to small areas of low lying water
Ocean City	None documented
Upper Township	1) Firehouse – Ocean Dr.
Sea Isle City	1) Police Station (Rebuilt after Hurricane Sandy) 2) City Hall (Rebuilt after Hurricane Sandy) 3) ACME Grocery Store (Rebuilt above flood grade)
Avalon	1) Police Station – Dune Dr. 2) Firehouse – Dune Dr.
Stone Harbor	None documented
North Wildwood	1) Shopping Center – 25 th Ave & Delaware Ave 2) Pumping Station – 10 th Ave & Delaware Ave 3) Pumping Station – Chestnut Ave & Delaware Ave
West Wildwood	1) Borough Hall
Wildwood Crest	None documented
Cape May City	1) A/C Electric Substation – Venice Ave (Currently being updated with raised and enclosed equipment)
Cape May Point	1) Water Utility Building – Sunset Blvd. (Under low budget fortification)
Downe Township	1) Firehouses (Newport, Dividing Creek, Fortescue) 2) Gas Station – Main St. & Baptist Rd. 3) Market – Main St. & Baptist Rd. 4) Fuel dock in Fortescue 5) USCG Seasonal Trailer
Woodbridge Township	1) A 2014 Coastal Vulnerability Assessment (conducted by CDM Smith) identified areas that are vulnerable to flooding, but the municipality has no documentation of buildings actually flooding.

3.8 Alarms

Alarms are identified as audible or cellular device applications or services which provide awareness of danger to the residents of the municipality. The Alarms documented below are currently in use to notify residents of flooding.

The three most commonly deployed Alarms are defined as follows.

Code Red: OnSolve CodeRED is a cloud-based, public alerting and residential safety product for government agencies to send geo-targeted urgent alerts to their communities. (<https://www.onsolve.com/platform-products/critical-communications/codered-public-alerting/>)

IPAWS: The Integrated Public Alert & Warning System (IPAWS) is FEMA's national system for local alerting that provides authenticated emergency and life-saving information to the public through mobile phones using Wireless Emergency Alerts to radio and television via the Emergency Alert System and on the National Oceanic and Atmospheric Administration's Weather Radio. (<https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system>)

NIXLE: Is an emergency notification system that can keep your community up-to-date with important information from your local public safety departments and schools. Its service offers information that is immediately delivered to your residents by text message, phone call, email, web, and social media. (<https://www.nixle.com/>)

Table 8. Alarms

Municipality	Alarm Services
Egg Harbor Township	1) Code Red 2) Police Department
Ocean City	1) Code Red 2) 7 equidistant sirens (voice and siren)
Upper Township	1) Code Red 2) Flood Warning System (currently inoperable)
Sea Isle City	1) NIXLE 2) Email (accomplished via the EM Office) 3) Text Alerts (accomplished via the EM Office)
Avalon	1) Code Red 2) Audible siren (not effective enough for evacuations) 3) Siren (tested daily at Noon & PD actuated) 4) Avalon.org 5) AM Radio 6) Social Media
Stone Harbor	1) IPAWS (awaiting NJ State Patrol approval) 2) Audible siren 3) Social Media 4) NOAA Stream Gauge Alert sent to EM Office
North Wildwood	1) Code Red 2) Audible siren 3) Social Media 4) Intentions to adopt the NJCC App
West Wildwood	1) Code Red

	2) Audible siren (tested daily at Noon & PD actuated)
Wildwood Crest	1) NIXLE 2) Audible siren (located at firehouse)
Cape May City	1) Code Red (currently) 2) Audible siren (Human powered, not automated) 3) NIXLE (migrating to) 4) Social Media
Cape May Point	1) Code Red 2) Audible siren 3) Town firetruck 4) Reverse 911
Downe Township	1) NIXLE 2) Fire and Rescue knock on doors
Woodbridge Township	1) Code Red 2) Flood depth monitoring system alert sent to EM Office

3.9 Pumping Stations

Pumping Stations are identified as a sanitary sewer, or a storm water facility designed to relocate sewage or excess captured water away from one location. This service provides protection to the residents of the municipality during heavy rain events. The Pumping Stations documented below are currently in use.

Table 9. Pumping Stations

Municipality	Location
Egg Harbor Township	1) Near flood zone at elevation 15' with emergency generator
Ocean City	1) Merlon Park 2) 26 th to 34 th St. 3) 1 st to 8 th St. 4) Four new pump projects in development
Upper Township	1) Northern end of Strathmere (small at 400gpm)
Sea Isle City	1) 38 th St. 2) Two new pump projects in development
Avalon	1) Numerous sanitary and storm pumps in back bay designed for nuisance flooding 2) 58 th St. at Ocean Dr. (sanitary above grade) 3) 74 th St at Ocean Dr. (sanitary above grade) 4) 7 th St. at Ocean Dr. (sanitary sub grade) 5) 21 st St. at Ocean Dr. (sanitary sub grade) 6) 25 th St. at Ocean Dr. (sanitary sub grade) 7) One new pump project in development
Stone Harbor	1) Pump in development at 93 rd St.
North Wildwood	1) 10 th Ave at Delaware Ave 2) Chestnut Ave at Delaware Ave
West Wildwood	1) 26 th St. (sanitary & County owned) 2) 26 th St. (storm) 3) Stand-alone diesel generated portable pump
Wildwood Crest	None documented
Cape May City	1) Frog Hallow
Cape May Point	None documented
None documented	None documented
Woodbridge Township	1) One sanitary pump

3.10 Outfalls

Outfalls are identified as discharge points of a waste stream which provide relief to excess sanitary sewer and storm water collection. Existing outfall conditions and locations are documented below.

Table 10. Outfalls

Municipality	Location
Egg Harbor Township	1) Outfalls were replaced as part of the gabion project 2) One tide flex valve is going in at Anchorage Point
Ocean City	None documented
Upper Township	None documented
Sea Isle City	1) City and County outfalls are susceptible to filling in with sediment 2) 42 nd to 44 th St. at Central (priority for replacement) 3) 46 th to 48 th St. at Central (priority for replacement) 4) Regular maintenance plan includes checking bills and valves and working with the Mosquito Commission to clean out ditches
Avalon	1) Numerous tide check valves are being replaced 2) 25 th St. outfall is the first to fail and creates subsequent issues at 24 th St. at Harbor Ave
Stone Harbor	1) Duckbill flaps are in working condition 2) Check valves have become an expensive nuisance
North Wildwood	1) Duckbill flaps periodically clog 2) NJ-147 flex valves are failing – DOT notified
West Wildwood	1) Check valves are a common problem 2) Knife style flood gate are a common problem 3) Tide flex valves are in decent condition and are routinely maintained 4) Numerous manually operated gates have been removed
Wildwood Crest	1) Tide flex valves are periodically replaced 2) Tide flex valves have become an expensive nuisance
Cape May City	1) Flooding comes up through the storm drains 2) Tide flex valves are County and City owned 3) Beachfront outfalls are constantly under maintenance
Cape May Point	1) Storm drains have consistently poor drainage
Downe Township	1) There are six total outfalls which discharge into the meadows with little to no problem
Woodbridge Township	None documented

3.11 Cameras

Cameras are identified as streaming and recording video surveillance relaying a signal to predetermined broadcasting service, either private or public. Cameras are utilized to create awareness for the residents of the municipality. The cameras documented below are currently or intended to be used to notify residents or emergency services of flooding.

Table 11. Cameras

Municipality	Location
Egg Harbor Township	1) No active camera(s) 2) Three cameras requested from NJCC
Ocean City	1) Multiple cameras in the municipality which include DOT, local network, and private 2) Human operated drone available
Upper Township	1) Camera on the beach 2) No DOT cameras 3) No internet capability to support new cameras
Sea Isle City	1) NJCC camera 2) Working to gain access to Police, real estate, and private cameras
Avalon	1) In the police budget there's a camera program 2) Estimated \$100-\$150k in the budget 3) Unsure of the total number of cameras 4) Currently not available for public use-
Stone Harbor	None documented
North Wildwood	1) 15 th Ave Surf Cam 2) 16 th Ave Surf Cam (not working) 3) North Wildwood Surf Cam 4) North Wildwood Bay Flood Cam
West Wildwood	1) The only camera on the island is on the Borough Hall 2) Six cameras are proposed with funding through Urban Enterprise Zone
Wildwood Crest	1) One Beach Cam
Cape May City	None documented
Cape May Point	1) Cameras with access are available, but these cameras do not support remote access (internet capable) and are not currently hooked up 2) Would like an NJCC camera at Sunset Ave at the Bayshore.
Downe Township	1) Fortescue Creek Inlet (Rutgers owned/operated)
Woodbridge Township	1) Only private cameras

3.12 NOAA Stations

NOAA Stations are identified as the “*authoritative source for accurate, reliable and timely tides, water levels, currents, and other coastal oceanographic and meteorological information.*” Through these stations, NOAA provides both “*historic and real-time data, forecasts, predictions, and scientific analysis that protect life, the economy, and the environment*” along the coast.

Table 12. NOAA Stations

Municipality	NOAA Station ID
Egg Harbor Township	
Ocean City	
Upper Township	Cape May Station ID: 8536110
Sea Isle City	
Avalon	Atlantic City Station ID: 8534720
Stone Harbor	
North Wildwood	Sandy Hook Station ID: 8531680
West Wildwood	
Wildwood Crest	
Cape May City	
Cape May Point	
Downe Township	
Woodbridge Township	https://tidesandcurrents.noaa.gov/map/index.html?type=active&region=New%20Jersey

3.13 USGS Stations

USGS Stations are identified as the source for water-related data as it pertains to surface water, groundwater, springs, atmospheric and other. Identified below are the National Water Information System sites that each municipality uses for predicting, monitoring and historical flooding events.

Table 13. USGS Stations

Municipality	USGS Station ID
Egg Harbor Township	Not tied into gauges for warnings Municipality relies upon NJCC Flood App
Ocean City	NWIS Site: 01411320
Upper Township	NWIS Site: 01411300, 01411318, 01411320, 01411350
Sea Isle City	NWIS Site: 01411350
Avalon	NWIS Site: 390639074440301
Stone Harbor	NWIS Site: 390325074455401
North Wildwood	NWIS Site: 01411370
West Wildwood	Not tied into gauges for warnings
Wildwood Crest	Not tied into gauges for warnings Municipality relies upon amateur weather stations
Cape May City	NWIS Site: 385655074532601
Cape May Point	Not tied into gauges for warnings
Downe Township	Not tied into gauges for warnings
Woodbridge Township	NWIS Site: 01396060

Source: <https://waterdata.usgs.gov/nwis>

3.14 Severe Repetitive Loss

As defined by FEMA, Severe Repetitive Loss (SRL) is an NFIP-insured single family or multi-family residential building:

- That has incurred flood-related damage for which four or more separate claim payments have been made, with the amount of each claim (including building and contents payments) exceeding \$5,000, and with the cumulative amount of such claim(s) payments exceeding \$20,000; or
- For which at least two separate claims payments (building payments only) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the building.

In both instances, at least two of the claims must be within 10 years of each other, and claims made within 10 days of each other will be counted as one claim. In determining SRL status, FEMA considers the loss history since 1978, or from the building’s construction if it was built after 1978, regardless of any changes in the ownership of the building. The term “SRL Property” refers to either an SRL building or the contents within an SRL building, or both.

The table below represents municipal responses to the question of how many SRL and RL properties are within the municipality. Note that a “No Response” indicates the municipality is not in direct contact with a FEMA Regional representative and was unable to furnish a response.

Table 14. Severe Repetitive Loss

Municipality	RL	SRL
Egg Harbor Township	Unknown	40-50 Unconfirmed
Ocean City	200	24
Upper Township	No response	
Sea Isle City	Entire municipality	
Avalon	Unknown	0
Stone Harbor	93	Unknown
North Wildwood	Entire municipality	
West Wildwood	Entire municipality	
Wildwood Crest	No response	
Cape May City	No response	
Cape May Point	No response	
Downe Township	Entire municipality	
Woodbridge Township	No response	

Source: https://www.fema.gov/sites/default/files/2020-05/fim_appendix-i-severe-repetitive-loss-properties_apr2020.pdf

3.15 Flood and Wake

Flood and Wake is described as conditions exacerbated by vehicle traffic, emergency responses and other means of disturbance during and following a flood event, which cause additional flooding and wave action against a home's structure. Identified below are condition, occurrence and/or the location of flood and wake events.

Table 15. Flood and Wake

Municipality	Condition, Occurrence, and/or Location
Egg Harbor Township	1) The western side of Atlantic City, flood, and wake
Ocean City	1) Barricades are placed in front of areas that suffer from flood and wake 2) No areas of stagnant water
Upper Township	None Reported
Sea Isle City	1) Barricades are placed based on forecasts and impassible roads 2) Ordinance in place to prevent/prohibit the wake with heavy enforcement
Avalon	1) NJ Transit creates flood and wake damage by not avoiding flooded roads and routes 2) Barricading not mentioned
Stone Harbor	1) NJ Transit and local vehicles create flood and wake damage by not avoiding roads and routes 2) Barricading not mentioned
North Wildwood	1) NJ Transit creates flood and wake damage by not avoiding flooded roads and routes
West Wildwood	1) Local vehicles travelling on and off the island create flood and wake damages
Wildwood Crest	1) Cones are placed in front of areas that suffer from flood and wake 2) Minor flood and wake issues
Cape May City	1) Minor to no issues
Cape May Point	No issues to report
Downe Township	No issues to report
Woodbridge Township	1) Jordan Rd., Port Reading Rd., and Avenel St. suffer from flood and wake

3.16 Other Comments

This category includes notable topics and descriptions made available during the interview, which did not fit within the staged interview questions. The comments are considered relevant to Section 3.0 of this report. Listed below are those comments.

Table 16. Other Comments

Municipality	Location
Egg Harbor Township	<ol style="list-style-type: none"> 1) Very minor to insignificant flooding occurs at the boat ramp 2) Flooding at Anchorage Point comes up through the pipes and then over the roadway, not around the roadway 3) Gabions were installed at Bay Dr., and they are effective, but do not allow trapped water to flow back to the bay 4) Adjacent Pleasantville has zero protection
Ocean City	<ol style="list-style-type: none"> 1) No free flow of water at the Tennessee Municipal Boat ramp unless above moderate flooding, not typically a factor with local flooding 2) Underground stormwater infrastructure network includes elevation of roads, sidewalks, and curbs – FEMA funded project 3) Use a predictive service, USGS tide gauge (which doesn't send alerts), 59th St. weather station, which is tied to the wind network, which is owned by the wind alert network
Upper Township	<ol style="list-style-type: none"> 1) The top of the Strathmere boat ramp is @ 4' NAVD88 2) Flooding begins @ 4' NAVD88 3) The southern end is all marshland and unprotected 4) NFWF and NJDEP have a project down in the southern marshland 5) Upper Township wants vegetated berms along the back bay, some in marsh and some upland, but USFWS says no and identifies a permitting issue 6) USFWS requests green solutions with no impacts 7) Minor flooding begins @ 3' NAVD88 on Bayview Dr. 8) It occurs 5 to 6 times annually with moderate to severe flooding 9) When it's moderate it becomes a real flooding problem
Sea Isle City	<ol style="list-style-type: none"> 1) The boat ramp at the end of JFK is a flood-prone area with no residential structures 2) Flooding above 5.5' NAVD88 flows beyond the top of the boat ramp 3) This area is closed off during large predicted storms 4) No shelter on the island, but the County shelter is in Woodbine 5) Steven's University tide gauge is utilized by the municipality
Avalon	<ol style="list-style-type: none"> 1) Currently receive USGS updates from the station location 2) @ 3.5' NAVD88 updates are every 6 minutes 3) Have their own weather station 30' above the town hall, which is 75' NAVD88 4) Will be upgrading to Hughs Net in 2023 5) Moderate tidal flooding north of 30th St. at Ocean Dr. where it goes across the roadway 6) 25th St. at Harbor Ave there are significant flooding issues 7) The Bay Park Marina has moderate flooding issues

Stone Harbor	<ol style="list-style-type: none"> 1) There are periodic flooding issues at the municipal boat ramp due to the low elevation of the top of the boat ramp and the parking lot 2) A deployable Aquafence floodwall was purchased to prevent back bay floodwaters from breaching the top of the municipal boat ramp, this Aquafence installs between two existing wooden bulkheads and installation time is approximately 2 hours 3) The boat ramp parking lot will be refinished, raised, and pitched towards the boat ramp so water can quickly egress back to the bay
North Wildwood	<ol style="list-style-type: none"> 1) Some municipal and some private bulkheads are not watertight due to holes, cracks or gaps 2) NJDOT closes roads frequently and is always on top of the road closure role and responsibility
West Wildwood	<ol style="list-style-type: none"> 1) The southern side of the island has the highest elevation 2) Public Works, Office of Emergency Management, Fire Department and Pump Station are on the southern side of the island 3) During Jonas the water came in over the bulkheads 4) The bulkheads are @ 8.5' NAVD88
Wildwood Crest	<ol style="list-style-type: none"> 1) 52 times a year there's a rain or tide event in the municipality 2) Need funds to raise roads and homes 3) Water surfaces greater than 3' NAVD88 percolate through the inlets 4) The height in the bay becomes the height in the streets 5) There's a master plan for storm sewer (in conjunction with Stone Harbor)
Cape May City	<ol style="list-style-type: none"> 1) Anything above 4' NAVD88 would and has covered the roads
Cape May Point	<ol style="list-style-type: none"> 1) Water is often in meter pits ¾ of the year 2) Groundwater intrusion and rain events create floods 3) Typically, there's 24hrs of the standing water 4) In the meadow, to the east the duckbill valve gate (which is a concrete box) is too high, if it was lowered and had a pump the standing water timeframe would decrease 5) From Lake Lily to the Lighthouse, there's a weir to prevent reverse flooding 6) A modification to the weir would be ideal, but a reverse flood scenario has not yet become a reality, but doesn't mean it wont 7) Need to pitch the pipe that enters Lower Lake 8) The pipe to the bay has a hole, which is approximately 50yds offshore, which prevents the deposit of pumped water from flowing out of the intended pipe end much further out
Downe Township	<ol style="list-style-type: none"> 1) There are 4 public boat launches and all of them are at risk to tidal flooding; Fortescue, Gandys, Money Island and Higbee 2) The Fortescue weather station has no weblink no tide alert 3) Tidal flooding reaches and inundates two county roads; Fortescue Rd. and Newport Neck Rd. 4) Money Island Rd. is eroding, and the sides slopes are not serviced 5) 8 inches of water on top of Money Island Rd. is typical during a high tide with rain event

	<ul style="list-style-type: none"> 6) Maple Rd. has significant tidal issues; the road shoulder is gone, and the road surface is caving in at spot locations 7) There's no hazard mitigation plan for the municipality 8) The Downe Initiative is to spend \$2M on septic repairs
Woodbridge Township	<ul style="list-style-type: none"> 1) Small undersized pipes are remnants from the 1950s and they create bottle-necks; it's a hydraulic and size issue 2) After flood events the municipality and FEMA inspect and judge severe damage 3) Apartments and living spaces are individually assessed and if only a few are damaged then the rest of the living spaces count against the value for teardown/removal.

4 Tourism

According to the New Jersey Division of Travel and Tourism's 2021 Tourism Economic Impact Study, the following table provides visitation numbers by county. The focus below is on the counties in which the 13 participating municipalities can be found. The numbers within the year columns reflect the number of visitors in millions.

Table 17. Tourism

County	2021	2020	2019	2018
Atlantic	20.3	16.2	23	20.6
Egg Harbor Township				
Cape May	10.3	8.1	10.2	9.8
Ocean City				
Upper Township				
Sea Isle City				
Avalon				
Stone Harbor				
North Wildwood				
West Wildwood				
Wildwood Crest				
Cape May City				
Cape May Point				
Cumberland	0.8	0.7	0.9	0.9
Downe Township				
Middlesex	4.9	4.4	5.9	5.8
Woodbridge Township				
Total	36.3	29.4	40	37.1

Source: https://visitnj.org/sites/default/files/Economic_Impact_of_Tourism_in_New_Jersey_2021_Final.pdf?tag=itinerary

4.1 Social Media

Social Media is defined as an application or website which enables users to participate, share and create content in a social networking atmosphere. Social Media is a municipal marketing feature which allows for the immediate transmission of content to end-users. Municipalities often deploy content in the event of danger or when awareness is advantageous to the municipality and end-user. Listed below are the Social Media available from each municipality.

Table 18. Social Media

Municipality	Weblinks
Egg Harbor Township	1) https://www.ehtgov.org/ 2) https://www.facebook.com/EggHarborTownshipGovernment/
Ocean City	1) https://www.ocnj.us/
Upper Township	1) https://uppertownship.com/ 2) https://www.facebook.com/uppertownshipnj 3) https://twitter.com/uppertownship (ACCOUNT DELETED) 4) https://www.youtube.com/user/uppertownship
Sea Isle City	1) https://www.seaislecitynj.us/ 2) https://www.facebook.com/visitsicnj/ 3) https://twitter.com/seaislenj 4) https://www.youtube.com/seaislecitynj
Avalon	1) https://avalonboro.net/ 2) https://www.facebook.com/Avalon-New-Jersey-The-Official-Page-of-the-Borough-of-Avalon-125693695195/
Stone Harbor	1) https://stoneharbornj.org/ 2) https://www.facebook.com/stoneharbor.rec
North Wildwood	1) https://northwildwood.com/ 2) https://www.facebook.com/North-Wildwood-Recreation-and-Tourism-268155922823/
West Wildwood	1) https://westwildwood.org/
Wildwood Crest	1) https://wildwoodcrest.org/ 2) https://www.facebook.com/WildwoodCrestNJ/ 3) https://twitter.com/Wildwood_Crest 4) https://www.youtube.com/channel/UCOfTj838QwPw-gOPbaCaMbQ 5) https://www.instagram.com/wildwoodcrest/
Cape May City	1) https://www.capemaycity.com/ 2) https://www.facebook.com/capemaycity/ 3) https://twitter.com/capemaycity?lang=en 4) https://www.youtube.com/channel/UCAtPCycY--kEI5fA4Bmp8dw/featured
Cape May Point	1) https://capemaypoint.org/
Downe Township	1) https://downetwpnj.org/
Woodbridge Township	1) https://twp.woodbridge.nj.us/ 2) https://www.facebook.com/MayorJohnMcCormac 3) https://twitter.com/WoodbridgeNJ 4) https://www.youtube.com/channel/UCO-HP4e9LQLcTh6O_VnbNnw 5) https://www.instagram.com/mayorjohnemccormac/

4.2 Signage

Signage is defined as a print or digital object used to convey instructions or information. During the interview process, signage was discussed in terms of its utilization for warnings, evacuations, and/or events related to nuisance flooding and storms. Listed below are the signage used within each municipality.

Table 19. Signage

Municipality	Signage
Egg Harbor Township	Coastal Evacuation Signage
Ocean City	Coastal Evacuation Signage
Upper Township	Coastal Evacuation Signage
Sea Isle City	<ol style="list-style-type: none"> 1) Two types of signs are visible across the municipality 2) The first type of sign is a reflective yellow sign with yellow flashing lights mounted to the perimeter of the sign. These signs are activated one of two ways: <ul style="list-style-type: none"> - by a flow switch triggered by a float near the curb - wirelessly activated by via the Police 3) The second type of sign is a reflective yellow sign with the words "Area Floods". These signs are mounted onto numerous poles throughout the municipality.
Avalon	Coastal Evacuation Signage
Stone Harbor	Coastal Evacuation Signage <ol style="list-style-type: none"> 1) Not typically welcome by homeowners or Realtors Association
North Wildwood	Coastal Evacuation Signage
West Wildwood	<ol style="list-style-type: none"> 1) A digital sign is located at the entrance/exit bridge to the island and has the capability of displaying text in the form of warnings, temperature, time, etc. The sign faces the east warning those coming onto the island
Wildwood Crest	Coastal Evacuation Signage
Cape May City	Coastal Evacuation Signage
Cape May Point	Coastal Evacuation Signage
Downe Township	Coastal Evacuation Signage
Woodbridge Township	Coastal Evacuation Signage

4.3 Other Comments

This category includes notable topics and descriptions made available during the interview, which did not fit within the staged interview questions. The comments are considered relevant to Section 4.0 of this report. Listed below are those comments.

Table 20. Other Comments

Municipality	Location
Egg Harbor Township	Nothing to report
Ocean City	1) 20 year old homes are considered old by city officials and potentially a liability
Upper Township	1) SLR will place numerous culverts under water during what now are current flood elevations 2) Upper Township is 68 square miles and 60% of it is wetlands
Sea Isle City	Nothing to report
Avalon	1) Many of the homes in Avalon are second home or seasonal 2) In 2008 Avalon created a flood pamphlet
Stone Harbor	1) A welcome pack is available at the Post Office, Tourism Center, and RE Office 2) The welcome pack is also available online and within the local newsletter
North Wildwood	Nothing to report
West Wildwood	Nothing to report
Wildwood Crest	Nothing to report
Cape May City	1) A welcome pack is available online
Cape May Point	Nothing to report
Downe Township	Nothing to report
Woodbridge Township	1) Utilizes expertise of local academia for research

5 Ordinances

5.1 Master Plan

Master Plan is defined as an infrastructure and land use analysis document covering policies, zoning, hazards, transportation, population, economy, objectives, established goals, and recommendations. A Master Plan is a guide for long term physical development of a municipality. It may contain and reference maps, tables, and illustrations designed to assist in decision making.

Table 21. Master Plan

Municipality	Master Plan
Egg Harbor Township	Web https://www.ehtgov.org/community/forms.php#outer-784sub-2606 PDF https://cms9files.revize.com/eggharbornj/Land%20Use/2017%20Master%20Plan%20Re-Examination%20Report.pdf
Ocean City	Web https://www.ocnj.us/planning-zoning-frequently-asked-questions PDF https://www.ocnj.us/media/KnightBuilding/PlanningZoning/OC_REEXAM_REPORT-ADOPTED_1-9-19.pdf
Upper Township	Web https://uppertownship.com/boards/planning-board/planning-board-reports/ PDF https://uppertownship.com/wp-content/uploads/2021/08/Upper-Reexamination-Report-March-12-2020-Draft.pdf
Sea Isle City	Web https://www.seaislecitynj.us/MasterPlan PDF https://drive.google.com/file/d/12A9D8hpf34is4hCL1ODIMmGZ6RuXjUPh/view
Avalon	Web https://avalonboro.net/government/department-of-administration/avalon-planning-zoning-board/ PDF https://avalonboro.net/wp-content/uploads/2022/08/Master-Plan-Re-examination-Amendment-8-9-2022.pdf
Stone Harbor	Web https://stoneharbornj.org/ PDF https://stoneharbornj.org/wp-content/uploads/2020/06/2019-Reexamination-of-the-Master-Plan.pdf
North Wildwood	Web https://www.northwildwood.com/departments/master-plan/ PDF https://northwildwood.com/wp-content/uploads/2022/10/Master-Plan-Re-exam-2018.pdf

West Wildwood	<p>Web https://westwildwood.org/public-documents/master-plan/</p> <p>PDF https://westwildwood.org/wp-content/uploads/2021/12/MASTER-PLAN-TABLE-OF-CONTENTS.pdf</p>
Wildwood Crest	<p>Web https://wildwoodcrest.org/planningzoning.php</p> <p>PDF https://wildwoodcrest.org/images/misc/masterplanreexamination2022.pdf</p>
Cape May City	<p>Web https://www.capemaycity.com/planning-zoning-board</p> <p>PDF https://www.capemaycity.com/media/Planning%20Board/REEXAM_Report2019wAppendixADOPTED2019_0312(1).pdf</p>
Cape May Point	<p>Web https://www.capemaypoint.org/government/document-center/planning-board-forms-documents/</p> <p>PDF https://www.capemaypoint.org/government/document-center/planning-board-forms-documents/1178-2017-master-plan-reexamination-report/file.html</p>
Downe Township	<p>Web Not Available Online</p> <p>PDF https://downetwpnj.org/wp-content/uploads/2016/08/Downe-Township-Master-Plan.pdf</p>
Woodbridge Township	<p>Web https://www.twp.woodbridge.nj.us/261/Planning-and-Zoning-Documents</p> <p>PDF https://www.twp.woodbridge.nj.us/DocumentCenter/View/728/Township-Master-Plan-PDF</p>

5.2 Code

Code is defined as a collection of laws passed by a local municipal body to govern the public. Listed below are the websites and chapters of Code used within each municipality that discuss Home Raising (Elevations), Grading and Bulkheads.

Table 22. Code

Municipality	Code
Egg Harbor Township	https://ecode360.com/EG0915 <ul style="list-style-type: none"> - Chapter 113 – Flood Damage Prevention covers Home Raising (Elevation) and Grading - Chapter 173 – Property Maintenance covers Bulkheads - Chapter 225 – Zoning covers Home Raising (Elevation) and Bulkheads
Ocean City	https://ecode360.com/OC4044 <ul style="list-style-type: none"> - Chapter 22 – Construction of Bulkheads covers Bulkheads - Chapter 25 – Zoning and Land Development covers Home Raising (Elevation), Grading and Bulkheads
Upper Township	https://ecode360.com/UP4118 <ul style="list-style-type: none"> - Chapter 11 – Property Maintenance cover Grading - Chapter 17 – Construction of Bulkheads covers Bulkheads - Chapter 18 – Flood Damage Control covers Home Raising (Elevation) - Chapter 20 – Zoning covers Home Raising (Elevation), Bulkheads and Grading
Sea Isle City	https://ecode360.com/SE4116 <ul style="list-style-type: none"> - Chapter 12 – Property Maintenance covers Grading - Chapter 14 – Flood Damage Prevention cover Home Raising (Elevation) - Chapter 22 – Bulkheads and Waterways cover Bulkheads - Chapter 26 – Zoning covers Home Raising (Elevation) and Grading
Avalon	https://ecode360.com/AV0783 <ul style="list-style-type: none"> - Chapter 16 – Property Maintenance covers Grading - Chapter 19 – Flood Damage Prevention covers Home Raising (Elevation) - Chapter 20 – Building and Construction covers Bulkheads - Chapter 26 – Grading covers Grading - Chapter 27 – Zoning covers Home Raising (Elevation) and Bulkheads
Stone Harbor	https://ecode360.com/ST2163 <ul style="list-style-type: none"> - Chapter 200 – Bulkheads, Construction and Repair of covers Bulkheads - Chapter 300 – Flood Damage Prevention covers Home Raising (Elevation) and Grading - Chapter 560 – Zoning covers Grading
North Wildwood	https://ecode360.com/NO0238 <ul style="list-style-type: none"> - Chapter 178 – Bulkheads covers Bulkheads - Chapter 252 – Flood Damage Prevention cover Home Raising (Elevations) and Grading - Chapter 276 – Land Development covers Grading

West Wildwood	https://westwildwood.org/public-documents/land-use-ordinance/ - Section IX – Design Standards for Subdivisions & Site Plans covers Home Raising (Elevations), Grading and Bulkheads
Wildwood Crest	https://ecode360.com/WI0226 - Chapter 17 – Bulkheads covers Bulkheads - Chapter 36 – Flood Hazard Areas covers Home Raising (Elevations) and Grading - Chapter 65 – Soil Removal covers Grading - Chapter 85 – Land Development Ordinance covers Grading, Bulkheads
Cape May City	https://ecode360.com/CA1942 - Chapter 258 – Flood Damage Prevention covers Home Raising (Elevations) and Grading - Chapter 445 – Subdivision of Land covers Home Raising (Elevations), Grading and Bulkheads - Chapter 525 – Zoning covers Bulkheads
Cape May Point	https://ecode360.com/CA0524 - Chapter 76 – Construction Site Standards covers Grading - Chapter 90 – Flood Damage Prevention covers Home Raising (Elevations) and Grading
Downe Township	https://downtwpnj.org/government/mayor-and-committee/ordinances-resolutions/
Woodbridge Township	https://ecode360.com/WO0861 - Chapter 22 – Flood Damage Prevention covers Home Raising (Elevation) and Grading - Chapter 150 – Land Use and Development Ordinance covers Bulkheads and Grading

5.3 Road Raising

Roads are identified as a specially prepared surface which is accessible by numerous modes of transportation owned and maintained by the State, County, and local municipality. Road Raising involves elevating the road surface profile to avoid entrenchment and inundation from flood waters. The Road Raising discussed below includes local municipality planning efforts (both current and future).

Table 23. Road Raising

Municipality	Location
Egg Harbor Township	None planned
Ocean City	1) W. 52 nd St. was backfilled with 1-2' of material to prevent overland flow 2) List of raisings available
Upper Township	1) County plans to raise Tuckahoe Rd.
Sea Isle City	None planned
Avalon	None planned
Stone Harbor	1) There is road program that will raise the crest of roads 2) Current plans include raising 89 th St. @ Bay and elevating the parking lot by the boat ramp
North Wildwood	None planned
West Wildwood	1) Small section of Q, R and S Streets were raised 2'
Wildwood Crest	None planned
Cape May City	None planned
Cape May Point	None planned
Downe Township	None planned
Woodbridge Township	None planned

5.4 Bulkheads

Bayside bulkheads are defined as a dividing wall or barrier between the bay and the mainland. Listed below are the bayside bulkhead ordinance or lack thereof for each municipality.

Table 24. Bulkheads

Municipality	Location
Egg Harbor Township	No Ordinance
Ocean City	Ordinance in place <ul style="list-style-type: none"> - 7' NAVD88 is required if a bulkhead fails - New construction and raised homes do not require new bulkheads - Myriad of non-compliant (failing) bulkheads throughout the municipality
Upper Township	Ordinance in place <ul style="list-style-type: none"> - 8' NAVD88 by 2029
Sea Isle City	Ordinance in place <ul style="list-style-type: none"> - 7' NAVD88 for repairs and new construction
Avalon	Ordinance in place <ul style="list-style-type: none"> - 7' NAVD88 for repairs and new construction - Currently replacing 3-4 street-end bulkheads annually - Funds are dedicated to the annual replacement
Stone Harbor	Ordinance in place <ul style="list-style-type: none"> - 6' NAVD88 by 2020 - 8' NAVD88 by 2050
North Wildwood	Ordinance in place <ul style="list-style-type: none"> - 6' NAVD88 by 2030 - 8' NAVD88 by 2050 - Uniformity goal with Wildwood and Wildwood Crest - Myriad of privately owned low heights documented
West Wildwood	Ordinance in place <ul style="list-style-type: none"> - 8.5' NAVD88 adopted, but no mandate/enforcement - New construction required 8.5' NAVD88 compliance - Not all street-ends are at 8.5" NAVD88
Wildwood Crest	Ordinance in place <ul style="list-style-type: none"> - 6.7' NAVD88 for repairs and new construction - and no lower than the adjacent borough street-end - Conditions and heights are inconsistent - 2020 proposal of 8' NAVD88
Cape May City	No Ordinance
Cape May Point	No Ordinance
Downe Township	No Ordinance
Woodbridge Township	Ordinance in place <ul style="list-style-type: none"> - Very few if any industrial sites along the river have protection - It is more likely that there is no protection

5.5 Community Rating System

The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program (NFIP).

In CRS communities, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community's efforts that address the three goals of the program:

1. Reduce and avoid flood damage to insurable property
2. Strengthen and support the insurance aspects of the NFIP
3. Foster comprehensive floodplain management

Flood insurance premium rates in CRS communities are discounted in increments of 5%. A Class 10 community is not participating in the CRS and receives no discount. A Class 9 community receives a 5% discount for all policies in its Special Flood Hazard Area (SFHA), a Class 8 receives a 10% discount, all the way to Class 1 community, which receives a 45% premium discount.

Table 25. Community Rating System Points, Credits and Premium Discounts

Credit Points	Class	Premium Reduction SFHA	Premium Reduction Non-SFHA*
4,500+	1	45%	10%
4,000-4,499	2	40%	10%
3,500-3,999	3	35%	10%
3,000-3,499	4	30%	10%
2,500-2,999	5	25%	10%
2,000-2,499	6	20%	10%
1,500-1,999	7	15%	5%
1,000-1,499	8	10%	5%
500-999	9	5%	5%
0-499	10	0	0

**Preferred Risk Policies are available only in B, C and X Zones for properties that are shown to have a minimal risk of flood damage. The Preferred Risk Policy does not receive premium rate credits under the Community Rating System because it already has a lower premium than other policies. The Community Rating System credit for AR and A99 Zones are based on non-Special Flood Hazard Areas (non-SFHAs) (B, C and X Zones).

Source: <https://www.fema.gov/floodplain-management/community-rating-system>

Table 26. Community Rating System

Municipality	Rating Number
Egg Harbor Township	5
Ocean City	4
Upper Township	5
Sea Isle City	3
Avalon	3
Stone Harbor	5
North Wildwood	6
West Wildwood	10

Wildwood Crest	6
Cape May City	5
Cape May Point	6
Downe Township	10
Woodbridge Township	5

5.6 Other Comments

This category includes notable topics and descriptions made available during the interview, which did not fit within the staged interview questions. The comments are considered relevant to Section 5.0 of this report. Listed below are those comments.

Table 27. Other Comments

Municipality	Notable Comment(s)
Egg Harbor Township	<ol style="list-style-type: none"> 1) Suggest additional bulkheading at Anchorage Point and O'Brien Rd, 1,000' linear feet needed 2) North side of Black Horse Pike floods the worst 3) Hotels are so low and have filed numerous claims
Ocean City	Nothing to report
Upper Township	<ol style="list-style-type: none"> 1) Strathmere is on septic, which would facilitate the raising of structures 2) 2020 Ordinance: First finished floor must be @ 7' NAVD88 3) Same goes for new construction and substantially improved structures 4) Culverts under NJ Route 9 create flooding further inland 5) NJ Route 9 was impassible during Sandy and Jonas 6) Tide valves are in flood plain
Sea Isle City	<ol style="list-style-type: none"> 1) County has a regular maintenance program for County funded and constructed elements of protection
Avalon	<ol style="list-style-type: none"> 1) Wetlands institute is working on remediation project ideas where they reuse dredge material 2) Currently, no differentiation or sorting of the material at the local CDF site
Stone Harbor	<ol style="list-style-type: none"> 1) Hearty board, AZAC, mops and street smarts are keeping businesses open
North Wildwood	<ol style="list-style-type: none"> 1) https://www.nj.gov/dep/dwg/pdf/NJWB_FFY21-SFY22_cwpl_ProplUP.pdf 2) \$15M pump station project (HUD Grant)
West Wildwood	<ol style="list-style-type: none"> 1) Potential for USACE 566 living shoreline at 26th St. peninsula
Wildwood Crest	Nothing to report
Cape May City	Nothing to report
Cape May Point	Nothing to report
Downe Township	Nothing to report
Woodbridge Township	<ol style="list-style-type: none"> 1) Huge issue resides with the mobile home residents who were given permits to stay in the flood zone 2) The residents are not currently in the homes or habituating the property 3) Raritan River flooding is tidal and exacerbated by overland flow rain events 4) Master Plan shows that anything from 2-100 year flooding creates a drainage problem

6 Recommendations

The list of potential conceptual recommendations is defined below.

6.1 Structural

Structural alternatives are approaches to flood proofing and intended to prevent flooding by altering the flow of the floodwater. Structural features are structures designed and constructed to have appreciable and dependable effects in preventing damage cause by irregular and unusual rises in water level. Structural features may include levees, channels, floodwalls, dams and Federally authorized and constructed hurricane or shore coastal storm risk management (CSR) structures.

1) Raised Roads:

Existing road networks may be raised pending permeability properties to function as levees and reduce risk to flooding and also serve as evacuation routes during high tides and/or coastal storms. Raised roads can also enhance local evacuation plans and public safety by providing safer routes out of the municipality. Road raising could also be more acceptable to residents in some communities since it reduces the need for structural alterations to individual buildings that may disrupt the owner's lives and affect perceptions of property value.

2) Levees:

A structure, normally of earth or stone, built generally parallel to a body of water to manage risk from flooding. A levee is a complete unit with an impervious core, designed and intended for FRM. A levee (excluding ring levee) is always tied to high ground at both ends. Levees often require large tracts of real estate due to the large footprint. Additional armoring may be needed if the shoreline environment is erosive.

3) Floodwall:

A floodwall is a type of structural feature usually constructed of stone or reinforced concrete, and which may occasionally have plastic or steel components. Floodwalls are generally constructed in urban areas where insufficient land exists to construct earthen levees. Floodwalls are vertical structures with a smaller footprint and often desired when space is limited. The two most common types of floodwalls are cantilevered I-walls and pile supported T-walls.

4) Ringwall:

Ringwalls are typically scaled-down levees or floodwalls applied to individual buildings. Ringwalls are designed to encircle a specific area to reduce the risk of flooding for an individual or several structures. They are constructed in such a way that a flood prone structure is surrounded with a short wall designed to keep shallow floodwaters away from the structure. Gates or walkovers are provided for access. Ringwalls are beneficial because they manage risk to the building without substantial alteration to the structure. While ringwalls cannot be made to look like a natural landscape feature, they can be constructed in a way that will complement the appearance of the structure and its site.

5) Deployable Floodwalls:

Deployable floodwalls are vertical structures that can be rapidly deployed during a storm event to reduce the risk of flooding. Deployable floodwalls are particularly useful for FRM in smaller areas

and are usually considered for areas where access to the waterfront is essential to the economy or character of a community.

6) Crown Walls:

Crown walls are a relatively small reinforced concrete walls constructed on top of a new or existing vertical structure (bulkhead, seawall, curb, or gravity wall) to reduce the risk of flooding. Crown walls are relatively small structures, 1 to 3 ft., which are drilled and grouted to connect to the existing concrete surface.

7) Bulkheads:

Bulkheads are vertical structures with the primary purpose of retaining land and preventing the sliding of land at the shoreline and are impermeable to water and soil transport from in front of and behind the wall. Bulkheads are normally constructed in the form of a vertical wall built in concrete, stone, steel, or timber. The concrete, steel or timber walls can be piled and anchored walls, whereas the concrete and stone walls can also be constructed as gravity walls. Their use is limited to those areas where wave action can be resisted by such materials. In areas of intense wave action, massive concrete seawalls are generally required. Bulkheads, unlike floodwalls and levees, are generally constructed at or near the existing grade and FRM is of secondary importance.

8) Seawalls:

Seawalls are typically massive structures constructed along the shoreline whose primary purpose is interception of waves, reduction of upland erosion and reduction of wave-induced overtopping and flooding. If constructed with impermeable materials (not just stone), seawalls may also reduce flood risk to low-lying coastal areas.

9) Revetments:

Revetments are sloped structures with the principal function of managing risk to the shoreline from erosion. Revetments typically constructed with cladding of stone, concrete, or asphalt to armor sloping natural shoreline profiles. Existing revetments may be retrofitted with an impermeable concrete L-wall at the top of the revetment to increase the elevation of the structure by 1 to 3 ft. and reduce flood risk.

10) Storm Water System Drainage Improvements:

Storm water system and drainage improvements carry water away via conveyance systems during times of heavy rainfall or high tidal water. Conveyance systems utilize measures such as pump stations, culverts, drains, and inlets to remove water from a site quickly and send it to larger streams. Storage facilities are used to store excess water until the storm or flood event has ended. As an example, ecological methods such as wetland development would be helpful in storing water. An alternative as evidenced at Lake Lily in Cape May Point is to lower the lake's water levels prior to storm events to provide additional storage capacity. Improvements may also include retrofitting existing culverts and outfalls with flap gates and tide valves to prevent back flow during storm surge events, clearing storm drains. Tide levels have the potential to increase coastal flooding during non-storm events through increased water level superimposed on normal tidal ranges from RSLC. Plan formulation that focuses on tidal encroachment, not flooding from overland flow from rainfall events, should be evaluated as part of the formulation process as it is likely to increase with long term increases in sea level.

11) Riprap:

A protective layer of durable rock fragments that is usually well-graded within wide size limits and placed to minimize erosion, beaching, scour, or sloughing of an underlying slope.

6.2 Non-Structural

Non-structural alternatives are methods that encourage FRM by changing the way the shoreline is used. Society has developed ways to adapt to coastal hazards by setting requirements for the elevation of buildings, providing insurance, and planning for continual erosion with setback limits for new construction. Non-structural measures reduce human exposure or vulnerability to a flood hazard without altering the nature or extent of that hazard. Hazard, in this case refers to water associated with flooding in a coastal or riverine setting that can cause harm. Exposure is defined as who or what would be impacted by a hazard. Vulnerability is how susceptible exposed people and properties are to damage or harm from the hazard.

1) Elevation:

This non-structural technique lifts an existing structure to an elevation which is at least equal to or greater than the 1% annual chance flood elevation. In many elevation scenarios, the cost of elevating a structure an extra foot or two is less expensive than the first foot, due to the cost incurred for mobilizing equipment. Elevation can be performed using fill material, on extended foundation walls, on piers, post, piles, and columns. Elevation is also a very successful technique for slab on grade structures.

2) Relocation:

This non-structural technique requires physically moving the at-risk structure and buying the land upon which the structure is located. It makes the most sense when structures can be relocated from a high flood hazard area to an area that is located completely out of the floodplain.

3) Acquisition:

This non-structural technique consists of buying the structure and the land. The structure is either demolished or is sold to others and relocated to a site external to the floodplain. Development sites, if needed, can be part of a proposed project in order to provide locations where displaced people can build new homes within an established community.

4) Wet Floodproofing:

This non-structural technique is applicable as either a stand-alone measure or as a measure combined with other measures such as elevation. As a stand-alone measure, all construction materials and finishing materials need to be water resistant and all utilities must be elevated above the design flood elevation. Wet floodproofing is quite applicable to commercial and industrial structures when combined with a flood warning and flood preparedness plan. This measure is generally not applicable to large flood depths and high velocity flows.

5) Dry Floodproofing:

This non-structural technique consists of waterproofing the structure. This can be done to residential homes as well as commercial and industrial structures. This measure achieves FRM, but it is not recognized by the NFIP for any flood insurance premium rate reduction if applied to a

residential structure. Based on laboratory tests, a “conventional” built structure can generally only be dry floodproofed up to 3-feet in elevation. A structural analysis of the wall strength would be required if it was desired to achieve higher FRM. A sump pump and perhaps French drain system should be installed as part of the measure. Closure panels are used at openings. This concept does not work with basements, nor does it work with crawl spaces. For buildings with basements and/or crawlspaces, the only way that dry floodproofing could be considered to work is for the first floor to be made impermeable to the passage of floodwater.

6) Berms and Floodwalls:

This non-structural technique is applicable on a small-scale basis. As non-structural measures, berms and floodwalls should be constructed to no higher than 6 feet above grade and should not be considered for certification through the NFIP, meaning that flood insurance and floodplain management requirements of the NFIP are still applicable in areas where these berms or floodwalls are constructed. These non-structural measures are intended to reduce the frequency of flooding but not eliminate floodplain management and flood insurance requirements. These measures can be placed around a single structure or a small group of structures. Since application of these measures are considered non-structural in nature, they cannot raise the water surface elevation of the 100-year flood by any more than 0.00 feet.

7) Land Use Regulations:

Land use regulations within a designated floodplain are effective tools in reducing flood risk and flood damage. The basic principles of these tools are based nationally in the NFIP which requires minimum standards of floodplain regulation for those communities that participate in the NFIP. For example, land use regulations may identify where development can and cannot occur, or to what elevation structures should locate their lowest habitable floor to.

8) Flood Emergency Preparedness Plans:

Local governments, through collaboration with USACE, FEMA and other interested federal partners, are encouraged to develop and maintain a Flood Emergency Preparedness Plan (FEPP) that identifies flood hazards, risks and vulnerabilities, identifies and prioritizes mitigation actions, and encourages the development of local mitigation. The FEPP should incorporate the community’s response to flooding, location of evacuation centers, primary evacuation routes, and post flood recovery processes.

6.3 Other

1) Welcome Packets:

A welcome packet is a free set of pre-determined materials which could include the following information:

- FEMA Protecting Buildings Utility Systems From Flood Damage
- FEMA Protecting Manufactured Homes from Floods and Other Hazards
- FEMA National Flood Insurance Program
- Municipal Evacuation Routes
- Municipal Emergency Preparedness
- Municipal Parking Options
- Municipal Flood Hazards

- Weather Radio Stations
- Ways in which to protect your private property

2) Water Activated Lights:

Water activated lights are lights that signal or flash in the event where flood waters reach a pre-determined height of a vertical structure. The lights attached to the vertical structure send out a visual warning indicating the area immediately adjacent to the vertical structure is flooded.

3) Modified Beach Tags:

A modified beach tag is an access pass that is required for admission to a beach. Etched onto the backside of the tag is a QR code. This QR Code has the opportunity to link tag holders to local tide and weather reporting, local emergency operations warnings, and/or municipal social media.

4) Block Captains:

Block Captains are elected neighborhood leaders who represent, establish, and strengthen partnerships with neighbors, neighborhood associations, local councils, and emergency services to provide a safe community to live, work and play.

5) Uniform Bulkhead Ordinance:

Coastal, back bay and interior waterway communities are recommended to consider legislation which compliments adjacent municipal bulkhead ordinance. Each municipal authority is recommended to enact bulkhead ordinance with code which uniformly address bulkheads with adjacent municipalities.

6) Updated Annual Code Inspections for Rentals:

AirBNB, Vrbo, Booking.com, Agoda Homes, Sonder, Blueground, and The Plum Guide are examples of online rental booking agencies which have minimal or no emergency preparedness information within their residential rental agreements or cancellation policies. The requirement of a welcome packet (booklet, binder, and/or poster) with emergency weather info, evacuation routes, police numbers (emergency and non), emergency shelter addresses, and/or a QR code to tide/weather data would greatly reduce the risk to tourists with little or no background on the existing flood risks within a municipality. Additional warning and guidance may be posted on the back of doors, front of a refrigerator, next to the WIFI password or be a required signature component to a rental disclaimer.

7) NJCC Monitoring:

Monthly requirements of the NJCC to discuss the ongoing issues of discontinuous and non-uniform bulkheads. This shall include think tanks, workshops, and NJCC attendance during municipal hearings and municipal council voting. Monthly requirements of the NJCC to discuss solutions in which to work hand-in-hand with the respective NJ County Realtors Associations until annual code inspections are updated and implemented.

8) Annual Education Events:

Annual Education Events shall be structured as multi-school events shall be designed to educate students and parents on evacuation routes, weather awareness with emphasis on the co-existence of nuisance flooding, nor'easters, and hurricanes. The incorporation of existing

members of NJCC (volunteers or elected) as well as local elected official to work positions designed for participation. Annual Education Events shall be live streamed and cataloged online across all municipal social media.

6.4 Implementable Solutions by Municipality

1) **Egg Harbor Township**

- A. Black Horse Pike & Bay Dr. in west Atlantic City between Frankfort Ct. & Fox Pl.
- B. Anchorage Point adjacent to the Longport Causeway
- C. Somers Point Rd. at English Creek

Structural:

- Raised Roads – A, B, C
- Levees – C
- Floodwall – C
- Ringwall – C
- Deployable Floodwalls – A, B, C
- Crown Walls – A, B, C
- Bulkheads – A, B, C
- Seawalls
- Revetments – A, B
- Storm Water System Drainage Improvements – A, B, C
- Riprap – C

Non-Structural:

- Elevation – A, B, C
- Relocation – A, B, C
- Acquisition – A, B, C
- Wet Floodproofing – A, B, C
- Dry Floodproofing – A, B
- Berms and Floodwalls – C
- Land Use Regulations – A, B, C
- Flood Emergency Preparedness Plans – A, B, C

Other:

- Welcome Packets – A, B, C
- Water Activated Lights – A, B, C
- Modified Beach Tags
- Block Captains – A, B, C
- Uniform Bulkhead Ordinance – A, B
- Updated Annual Code Inspections for Rentals – A, B, C
- NJCC Monitoring – A, B, C
- Annual Education Events – A, B, C

2) Ocean City

- A. Simpson and Haven Avenues from 56th St. to 52nd St.
- B. West Ave from 59th St. to 56th St.

Structural:

- Raised Roads – A, B
- Levees
- Floodwall – A, B
- Ringwall
- Deployable Floodwalls – A, B
- Crown Walls – A, B
- Bulkheads – A, B
- Seawalls
- Revetments – A, B
- Storm Water System Drainage Improvements – A, B
- Riprap – A, B

Non-Structural:

- Elevation – A, B
- Relocation – A, B
- Acquisition – A, B
- Wet Floodproofing – A, B
- Dry Floodproofing
- Berms and Floodwalls – A, B
- Land Use Regulations – A, B
- Flood Emergency Preparedness Plans – A, B

Other:

- Welcome Packets – A, B
- Water Activated Lights – A, B
- Modified Beach Tags – A, B
- Block Captains – A, B
- Uniform Bulkhead Ordinance – A, B
- Updated Annual Code Inspections for Rentals – A, B
- NJCC Monitoring – A, B
- Annual Education Events – A, B

3) Upper Township

A. Bayview Dr. from Prescott Rd. to Willard Ave

Structural:

- Raised Roads – A
- Levees
- Floodwall – A
- Ringwall
- Deployable Floodwalls – A
- Crown Walls – A
- Bulkheads – A
- Seawalls
- Revetments – A
- Storm Water System Drainage Improvements – A
- Riprap – A

Non-Structural:

- Elevation – A
- Relocation – A
- Acquisition – A
- Wet Floodproofing – A
- Dry Floodproofing – A
- Berms and Floodwalls – A
- Land Use Regulations – A
- Flood Emergency Preparedness Plans – A

Other:

- Welcome Packets – A
- Water Activated Lights – A
- Modified Beach Tags – A
- Block Captains – A
- Uniform Bulkhead Ordinance – A
- Updated Annual Code Inspections for Rentals – A
- NJCC Monitoring – A
- Annual Education Events – A

4) **Sea Isle City**

- A. 2nd St. at Commonwealth Ave
- B. 38th St. at Knease Ave
- C. 40th St. at Central Ave
- D. 55th St. at Central Ave
- E. Landis Ave from 37th St. to 30th St.

Structural:

- Raised Roads – A, B, C, D, E
- Levees – A, B, D
- Floodwall – A, B, D
- Ringwall
- Deployable Floodwalls – A, B, C, D, E
- Crown Walls – A, B, C, D, E
- Bulkheads – A, B, D
- Seawalls – E
- Revetments – A, B, D
- Storm Water System Drainage Improvements – A, B, C, D, E
- Riprap – A, B, D

Non-Structural:

- Elevation – A, B, C, D, E
- Relocation – A, B, C, D, E
- Acquisition – A, B, C, D, E
- Wet Floodproofing – A, B, C, D, E
- Dry Floodproofing – C, E
- Berms and Floodwalls – A, B, D
- Land Use Regulations – A, B, C, D, E
- Flood Emergency Preparedness Plans – A, B, C, D, E

Other:

- Welcome Packets – A, B, C, D, E
- Water Activated Lights – A, B, C, D, E
- Modified Beach Tags – A, B, C, D, E
- Block Captains – A, B, C, D, E
- Uniform Bulkhead Ordinance – A, B, D
- Updated Annual Code Inspections for Rentals – A, B, C, D, E
- NJCC Monitoring – A, B, C, D, E
- Annual Education Events – A, B, C, D, E

5) Avalon

- A. 7th St. at Ocean Dr.
- B. 20th St. at Dune Ave
- C. 26th St. at Ocean Dr.
- D. Avalon Ave from 25th St to 17th St.
- E. Ocean Dr. south of 62nd St.

Structural:

- Raised Roads – A, B, C, D, E
- Levees
- Floodwall
- Ringwall
- Deployable Floodwalls – A, B, C, D, E
- Crown Walls
- Bulkheads – A, B, C, E
- Seawalls – D
- Revetments
- Storm Water System Drainage Improvements – A, B, C, D, E
- Riprap

Non-Structural:

- Elevation – A, B, C, D, E
- Relocation – A, B, C, D, E
- Acquisition – A, B, C, D, E
- Wet Floodproofing – A, B, C, D, E
- Dry Floodproofing – A, B, D
- Berms and Floodwalls
- Land Use Regulations – A, B, C, D, E
- Flood Emergency Preparedness Plans – A, B, C, D, E

Other:

- Welcome Packets – A, B, C, D, E
- Water Activated Lights – A, B, C, D, E
- Modified Beach Tags – A, B, C, D, E
- Block Captains – A, B, C, D, E
- Uniform Bulkhead Ordinance – A, B, C, E
- Updated Annual Code Inspections for Rentals – A, B, C, D, E
- NJCC Monitoring – A, B, C, D, E
- Annual Education Events – A, B, C, D, E

6) Stone Harbor

- A. 3rd Ave from 106th St. to 80th St.
- B. 3rd Ave from 86th to 89th St. & 92nd to 96th St.
- C. 104th St. from 3rd Ave to Golden Gate Dr.
- D. Sunset Dr. from Berkely Rd. to 86th St.
- E. Sunset Dr., Corinthian Dr. and 104th St.

Structural:

- Raised Roads – A, B, C, D, E
- Levees
- Floodwall
- Ringwall
- Deployable Floodwalls – A, B, C, D, E
- Crown Walls
- Bulkheads – A, C, D, E
- Seawalls
- Revetments
- Storm Water System Drainage Improvements – A, B, C, D, E
- Riprap

Non-Structural:

- Elevation – A, B, C, D, E
- Relocation – A, B, C, D, E
- Acquisition – A, B, C, D, E
- Wet Floodproofing – A, B, C, D, E
- Dry Floodproofing – A, C
- Berms and Floodwalls
- Land Use Regulations – A, B, C, D, E
- Flood Emergency Preparedness Plans – A, B, C, D, E

Other:

- Welcome Packets – A, B, C, D, E
- Water Activated Lights – A, B, C, D, E
- Modified Beach Tags – A, B, C, D, E
- Block Captains – A, B, C, D, E
- Uniform Bulkhead Ordinance – A, C, D, E
- Updated Annual Code Inspections for Rentals – A, B, C, D, E
- NJCC Monitoring – A, B, C, D, E
- Annual Education Events – A, B, C, D, E

7) North Wildwood

- A. Delaware Ave
- B. New York Ave
- C. New Jersey Ave
- D. 100W, 200W, 300S/W, 400 W/SW, 500W/SW blocks of 26th Ave to 1st Ave

Structural:

- Raised Roads – A, B, C, D
- Levees
- Floodwall
- Ringwall
- Deployable Floodwalls – A, B, C, D
- Crown Walls
- Bulkheads – A, B
- Seawalls
- Revetments
- Storm Water System Drainage Improvements – A, B, C, D
- Riprap

Non-Structural:

- Elevation – A, B, C, D
- Relocation – A, B, C, D
- Acquisition – A, B, C, D
- Wet Floodproofing – A, B, C, D
- Dry Floodproofing – A, B, C, D
- Berms and Floodwalls
- Land Use Regulations – A, B, C, D
- Flood Emergency Preparedness Plans – A, B, C, D

Other:

- Welcome Packets – A, B, C, D
- Water Activated Lights – A, B, C, D
- Modified Beach Tags – A, B, C, D
- Block Captains – A, B, C, D
- Uniform Bulkhead Ordinance – A, B
- Updated Annual Code Inspections for Rentals – A, B, C, D
- NJCC Monitoring – A, B, C, D
- Annual Education Events – A, B, C, D

8) **West Wildwood**

A. The entire municipality

Structural:

- Raised Roads – A
- Levees
- Floodwall – A
- Ringwall
- Deployable Floodwalls – A
- Crown Walls – A
- Bulkheads – A
- Seawalls
- Revetments
- Storm Water System Drainage Improvements – A
- Riprap

Non-Structural:

- Elevation – A
- Relocation – A
- Acquisition – A
- Wet Floodproofing – A
- Dry Floodproofing – A
- Berms and Floodwalls – A
- Land Use Regulations – A
- Flood Emergency Preparedness Plans – A

Other:

- Welcome Packets – A
- Water Activated Lights – A
- Modified Beach Tags
- Block Captains – A
- Uniform Bulkhead Ordinance – A
- Updated Annual Code Inspections for Rentals – A
- NJCC Monitoring – A
- Annual Education Events – A

9) **Wildwood Crest**

- A. Bayview Ave at Jefferson Ave
- B. New Jersey Ave at Louisville Ave
- C. Park Blvd. at Aster Rd.
- D. Lake Rd. at Buttercup Rd.
- E. Lake Rd. at Cresse Ave

Structural:

- Raised Roads – A, B, C, D, E
- Levees
- Floodwall – A
- Ringwall
- Deployable Floodwalls – A, B, C, D, E
- Crown Walls
- Bulkheads – A, B, C, D, E
- Seawalls
- Revetments – A
- Storm Water System Drainage Improvements – A, B, C, D, E
- Riprap – A

Non-Structural:

- Elevation – A, B, C, D, E
- Relocation – A, B, C, D, E
- Acquisition – A, B, C, D, E
- Wet Floodproofing – A, B, C, D, E
- Dry Floodproofing – A
- Berms and Floodwalls – A
- Land Use Regulations – A, B, C, D, E
- Flood Emergency Preparedness Plans – A, B, C, D, E

Other:

- Welcome Packets – A, B, C, D, E
- Water Activated Lights – A, B, C, D, E
- Modified Beach Tags – A, B, C, D, E
- Block Captains – A, B, C, D, E
- Uniform Bulkhead Ordinance – A, B, C, D, E
- Updated Annual Code Inspections for Rentals – A, B, C, D, E
- NJCC Monitoring – A, B, C, D, E
- Annual Education Events – A, B, C, D, E

10) Cape May City

- A. Bank St.
- B. Venice Ave
- C. Elmira St.
- D. Beach Dr.
- E. Yacht Ave
- F. Frog Hallow Neighborhood

Structural:

- Raised Roads – A, B, C, D, E
- Levees – A, B, C
- Floodwall – A, B, C
- Ringwall
- Deployable Floodwalls – A, B, C, D, E
- Crown Walls – A, B, C
- Bulkheads – E
- Seawalls – D
- Revetments – A, B, C
- Storm Water System Drainage Improvements – A, B, C, D, E
- Riprap – A, B, C

Non-Structural:

- Elevation – A, B, C, D, E
- Relocation – A, B, C, D, E
- Acquisition – A, B, C, D, E
- Wet Floodproofing – A, B, C, D, E
- Dry Floodproofing – A, B, C, D, E
- Berms and Floodwalls – A, B, C
- Land Use Regulations – A, B, C, D, E
- Flood Emergency Preparedness Plans – A, B, C, D, E

Other:

- Welcome Packets – A, B, C, D, E
- Water Activated Lights – A, B, C, D, E
- Modified Beach Tags – A, B, C, D, E
- Block Captains – A, B, C, D, E
- Uniform Bulkhead Ordinance – E
- Updated Annual Code Inspections for Rentals – A, B, C, D, E
- NJCC Monitoring – A, B, C, D, E
- Annual Education Events – A, B, C, D, E

11) Cape May Point

- A. Alexander Ave at Chrystal Ave
- B. Harvard Ave at Lehigh Ave
- C. Oxford Ave from Lighthouse Ave to Lake Dr.
- D. Cambridge Ave from Lighthouse Ave to Lake Dr.
- E. Cape Ave from Sunset Blvd. to Lake Dr.

Structural:

- Raised Roads – A, B, C, D, E
- Levees
- Floodwall – C, D, E
- Ringwall
- Deployable Floodwalls – A, B, C, D, E
- Crown Walls
- Bulkheads
- Seawalls
- Revetments
- Storm Water System Drainage Improvements – A, B, C, D, E
- Riprap

Non-Structural:

- Elevation – A, B, C, D, E
- Relocation – A, B, C, D, E
- Acquisition – A, B, C, D, E
- Wet Floodproofing – A, B, C, D, E
- Dry Floodproofing
- Berms and Floodwalls – C, D, E
- Land Use Regulations – A, B, C, D, E
- Flood Emergency Preparedness Plans – A, B, C, D, E

Other:

- Welcome Packets – A, B, C, D, E
- Water Activated Lights – A, B, C, D, E
- Modified Beach Tags
- Block Captains – A, B, C, D, E
- Uniform Bulkhead Ordinance
- Updated Annual Code Inspections for Rentals – A, B, C, D, E
- NJCC Monitoring – A, B, C, D, E
- Annual Education Events – A, B, C, D, E

12) Downe Township

- A. Haleyville Rd.
- B. Maple Ave
- C. Landing Rd.
- D. Fortescue Rd.
- E. Newport Neck Rd.
- F. Gandys Ave

Structural:

- Raised Roads – A, B, C, D, E, F
- Levees – B, D, E, F
- Floodwall – A, B, C, D, E, F
- Ringwall – A, C
- Deployable Floodwalls – A, C, D
- Crown Walls – B, D, E, F
- Bulkheads
- Seawalls
- Revetments
- Storm Water System Drainage Improvements – A, B, C, D, E, F
- Riprap

Non-Structural:

- Elevation – A, C, D, F
- Relocation – A, C, D, F
- Acquisition – A, C, D, F
- Wet Floodproofing – A, C, D, F
- Dry Floodproofing
- Berms and Floodwalls – A, B, C, D, E, F
- Land Use Regulations – A, B, C, D, E, F
- Flood Emergency Preparedness Plans – A, B, C, D, E, F

Other:

- Welcome Packets – A, C, D, F
- Water Activated Lights – A, B, C, D, E, F
- Modified Beach Tags
- Block Captains – A, C, D, F
- Uniform Bulkhead Ordinance
- Updated Annual Code Inspections for Rentals – A, C, D, F
- NJCC Monitoring – A, B, C, D, E, F
- Annual Education Events – A, B, C, D, E, F

13) Woodbridge Township

- A. Lyman Ave
- B. McFarlane Rd. at N. Hill Rd.
- C. Woodbridge Ave (East of NJTP)
- D. Port Reading Ave (East of NJTP)
- E. Port Reading Ave (West of NJTP)
- F. South Robert St. (South of Woodbridge)
- G. Borman Ave (East toward Woodbridge)
- H. Crampton Ave (East of Bamford)
- I. Jordan Rd. (Between Sandy and Inman)

Structural:

- Raised Roads – A, B, C, D, E, F, G, H, I
- Levees – C, E, F, G, H
- Floodwall – B, C, D, E, F, G, H
- Ringwall
- Deployable Floodwalls – A, B, C, D, E, F, G, H, I
- Crown Walls – B, C, D, E, F, G, H
- Bulkheads
- Seawalls
- Revetments – B, C, D, E, F, G, H
- Storm Water System Drainage Improvements – A, B, C, D, E, F, G, H, I
- Riprap – B, C, D, E, F, G, H

Non-Structural:

- Elevation – A, B, C, D, E, F, G, H, I
- Relocation – A, B, C, D, E, F, G, H, I
- Acquisition – A, B, C, D, E, F, G, H, I
- Wet Floodproofing – A, B, C, D, E, F, G, H, I
- Dry Floodproofing – A, C, D, E, G, I
- Berms and Floodwalls – B, C, D, E, F, G, H
- Land Use Regulations – A, B, C, D, E, F, G, H, I
- Flood Emergency Preparedness Plans – A, B, C, D, E, F, G, H, I

Other:

- Welcome Packets – A, B, C, D, E, F, G, H, I
- Water Activated Lights – A, B, C, D, E, F, G, H, I
- Modified Beach Tags
- Block Captains – A, B, C, D, E, F, G, H, I
- Uniform Bulkhead Ordinance
- Updated Annual Code Inspections for Rentals – A, B, C, D, E, F, G, H, I
- NJCC Monitoring – A, B, C, D, E, F, G, H, I
- Annual Education Events – A, B, C, D, E, F, G, H, I

6.5 Partnering with the U.S. Army Corps of Engineers

Partnering with the U.S. Army Corps of Engineers: A Guide For Communities, Local Governments, States, Tribes, and Non-Governmental Organizations provides a general introduction to the programs and processes available for non-federal partners and U.S. Army Corps of Engineers (USACE) representatives to work together to address the Nation's water resource problems. The Guide includes an overview of the USACE Civil Work Program and describes how USACE can work with local, State, Tribal, and Federal agencies and other non-Federal partners on activities ranging from technical services and advice to planning and constructing water resources projects. The goal of this document is to outline the key processes and paths to engagement with USACE.

<https://planning.erdc.dren.mil/toolbox/library/IWRServer/2019-R-02.pdf>