



# FLOODPLAIN MANAGEMENT PLAN

Township of Ocean  
Ocean County, New Jersey



## Document Title

Date

### Prepared for:

Township of Ocean  
Ocean County, New Jersey

### Prepared by:



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*The original of this document was signed  
and sealed in accordance with New Jersey Law*

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## Executive Summary

This plan is intended to identify and assess flood hazards within Ocean Township, establish goals and objectives for floodplain management, and to present a series of actions designed to minimize flooding and mitigate the impacts from flooding in the future. This Floodplain Management Plan was funded using Phase II- Post Sandy Planning Assistance Grant Funding from the New Jersey Department of Community Affairs and will be incorporated as an element of the Township's Master Plan.

This plan has been organized according to the guidelines of the 2013 National Flood Insurance Program Community Rating System Coordinator's Manual to maximize the amount of points available for credit in the Community Rating System Program and follows the 10-step planning process outlined in the manual. The planning process was conducted through a committee consisting of public members as well as Township employees and officials. The committee met frequently throughout the planning process to discuss each step of the plan and provide input on suggested activities and actions.

To assess the problems and flood hazards impacting Ocean Township, a review was done of all relevant planning studies, documents, and relevant zoning ordinances. Outside stakeholder agencies were contacted to see if they had any input on the planning process. Historical flooding events, repetitive loss properties and known flood hazards were reviewed to determine problem areas within the Township.

Possible activities to mitigate the impacts of flooding in the community were discussed. The committee determined a list of goals for the Ocean Township Floodplain Management Plan and determined a prioritized list of action items from the list of possible activities, using the goals as guidance.

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## I. INTRODUCTION

### PURPOSE AND SCOPE

This plan has been prepared as Ocean Township's Floodplain Management Plan (FMP) and will be incorporated as an element of the Township's Master Plan. The FMP identifies and assesses flood hazards within the Township, establish the goals and objectives for floodplain management in Ocean Township, and presents a series of actions designed to minimize flooding and mitigate the impacts from flooding in the future. The FMP also evaluates the need and potential options for wetland restoration and maintenance and/or other engineering control measures to mitigate potential storm surge in those areas of the Township that may be vulnerable. The FMP also includes recommendations for the Township's current Floodplain Development Protection Ordinance.

This Floodplain Management Plan is designed to maximize points available under the Community Rating System Program.

### FLOODPLAIN MANAGEMENT PLANNING

Floodplain management is defined by FEMA as the operation of a community program of preventive and corrective measures to reduce the risk of current and future flooding, resulting in a more resilient community. While FEMA has minimum floodplain management standards for communities participating in the National Flood Insurance Program (NFIP), adopting higher standards will lead to safer, stronger, more resilient communities.

### COMMUNITY RATING SYSTEM

The Community Rating System (CRS) is a voluntary incentive program of the National Flood Insurance Program (NFIP) that provides participating communities with discounted flood insurance premium rates for undertaking community floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premium rates are discounted in increments of 5%, reflecting the reduced flood risk resulting from community actions in four categories: public information, mapping and regulations, flood damage reduction, and flood preparedness. The three goals of the Community Rating System Program are:

1. Reduce flood damage to insurable property;
2. Strengthen and support the insurance aspects of the NFIP; and
3. Encourage a comprehensive approach to floodplain management.

## **ORGANIZATION OF THE PLAN**

This plan has been organized according to the guidelines of the 2013 National Flood Insurance Program Community Rating System Coordinator’s Manual to maximize the amount of points available for credit in the Community Rating System Program. This Floodplain Management Plan follows the 10- step planning process outlined in the manual:

- Step 1: Organize
- Step 2: Involve the public
- Step 3: Coordinate
- Step 4: Assess the hazard
- Step 5: Assess the problem
- Step 6: Set goals
- Step 7: Review possible activities
- Step 8: Draft an action plan
- Step 9: Adopt the plan
- Step 10: Implement, evaluate, revise



## II. OCEAN TOWNSHIP PROFILE

Ocean Township is located in central Ocean County along the western shore of the Barnegat Bay. It is approximately 21 square miles and is bordered to the north by Lacey Township, to the south and west by Barnegat Township and to the east by Barnegat Bay. The southern portion of Island Beach State Park and the Township of Barnegat Light are located across the bay from Ocean Township and are separated by the Barnegat Inlet. Ocean Township is a predominately rural-suburban residential community.

The Garden State Parkway runs north and south through Ocean Township, dividing the Township. Land to the west of the Parkway falls within the Pinelands, and land to the east of the Parkway is regulated by CAFRA. US Highway Route 9 is located east of the Garden State Parkway and also runs north and south through the Township. Most of Ocean Township’s commercial and residential development has occurred along the Route 9 corridor, with land to the west of the Garden State Parkway in the Pinelands region having minimal development.

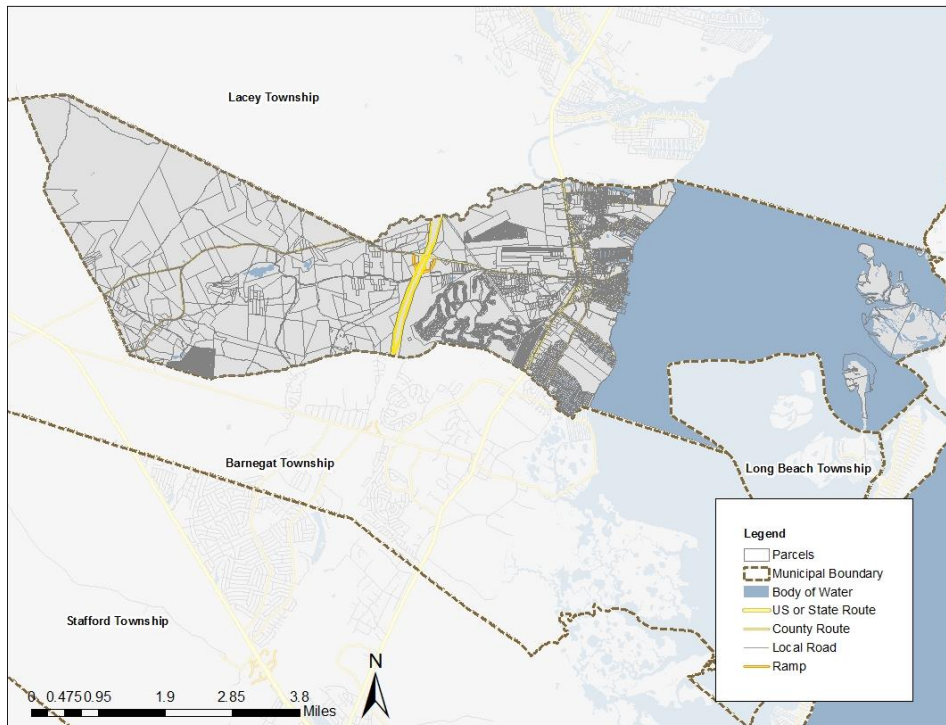


Figure 1. Township Map

The Township is located in the Outer Coastal Plain on unconsolidated sediments laid down since the Cretaceous period and extending to the continental shelf. There are a number of streams running through the Township; including Oyster Creek on the northern Township border, Waretown Creek cutting through the middle of Ocean

Township, and Lochiel Creek on the southern border of the Township. All three of these streams are generally tidally influenced in the developed portions of Ocean Township.

### **POPULATION TRENDS**

The population of Ocean Township has continued to grow at a tremendous pace since 1930, with an average rate of 30% each decade. The period of largest population growth for Ocean Township was between 1950 and 1980. This is most likely due to the construction of the Garden State Parkway, which allowed travelers faster, more direct access to Ocean Township from New York City and Northern New Jersey. According to the U.S. Census Bureau's American Community Survey, the 2013 population estimate for Ocean Township was 8,444. At the 2010 census the median age in Ocean Township was 49.6. There were 3,483 total households, averaging 2.39 people each.

### III. PROJECT ORGANIZATION & PUBLIC MEETINGS

T & M Associates assisted the Township of Ocean in preparing this Floodplain Management Plan. The planning process was conducted under the supervision of a New Jersey licensed professional planner.

The planning process was conducted through a Steering Committee consisting of both Township staff and representatives of the public. The Committee was formed by Township Committee Resolution 2015-91 and met on a bi-weekly basis from March to April 2015 to discuss the existing hazards and problems related to flooding in the Township, review potential goals and hazard mitigation activities, and make recommendations to revise existing Township Ordinances. Outlines of all steering committee meetings can be found in Appendix A. The following are members of the Committee:

- Louis Fisher- Construction Official
- Diane B. Ambrosio- Municipal Clerk
- Laurie Cune- Planning/ Zoning
- Renee Dronebarger- Code Enforcement
- Lt. George Thomas or designee- Police/ OEM
- Adele Shaw or designee- Historical Society
- William Sneddon- Planning Board
- John Petroselli- Zoning Board
- Kevin Harnett- Resident
- Chris West- Resident
- Matt Ambrosio- DPW/Parks & Recreation
- Patrick Jeffery- T&M Associates

In addition to the Steering Committee meetings, a separate public information meeting was held during the initial stages of planning on March 23, 2015. This meeting was publicly advertised and open to all members of the public. The public was informed of the proposed Floodplain Management Plan and was given the opportunity to provide input and recommendations.

A second open public meeting was held on April 20, 2015. The proposed Floodplain Management Plan was presented to the Board and the public was encouraged to provide input on the recommended plan.

Additional information on these meetings can be found in Appendix B.

## IV. FLOOD HAZARD ASSESSMENT

### EXISTING DOCUMENTS

It is important to coordinate floodplain management goals with other planning and community development goals in Ocean Township. As part of the planning process, the following documents were reviewed:

- 1982 Master Plan
- 1999 Master Plan Update
- 2005 Master Plan
- 2005 Waretown Town Center Goals and Objectives
- 2006 Land Use Plan Element Amendment- Environmental Conservation and Bayfront Conservation Areas
- 2010 Emergency Operating Plan
- 2012 Floodplain Management Plan
- 2014 Strategic Recovery Planning Report

Information from the following documents was identified as important to the floodplain management planning process:

#### 1982 Master Plan

The following goals of the 1982 Master Plan are relevant to this Floodplain Management Plan:

- Provide for cluster subdivision design to conserve open space and natural amenities in residential areas and to reduce road and utility cost.
- Develop a system of secondary streets in built-up and urbanizing areas which improve access to individual areas and reduce use of Route 9 for internal trips.
- Improve local streets and drainage where poor conditions and problems exist.
- Provide for the expansion of public sewer and water systems to serve all built-up areas and future development generally east of Route 9.
- Restrict unsewered development in all areas with less than five (5) foot depth to seasonal high water table.
- Establish a system of conservation areas which are designed to limit or restrict development in wetlands, along streams, and in undeveloped bay front locations; promote appropriate recreational uses in these conservation areas.

### **1999 Master Plan Update**

The following goals of the 1999 Master Plan Update are relevant to this Floodplain Management Plan:

- Encourage the use of best management policies for all development to ensure the least negative impact on the overall quality of residential life and the environment in the Township.
- Review and continually update, as needed, the various codes and development standards and maintain an aggressive code enforcement policy to ensure the highest quality of life within the Township.
- Review and continually update the permitted uses within each zone to ensure that only those uses compatible with the land capacity to support them are permitted.
- Ensure that any conversion of seasonal residential units to year-round residential uses is accomplished in a manner consistent with all applicable codes and standards.
- Encourage development of new residential housing units in areas that are served with adequate infrastructure including water, sewer, stormwater management, and streets, so as to minimize any negative environmental impacts.
- Maximize the economic benefit of resource-based development with the lowest possible negative environmental impact.

### **2005 Master Plan Recommendations**

The following goals of the 2005 Master Plan Reexamination Report are relevant to this Floodplain Management Plan:

- Reduce residential development that has a negative financial impact on the Township.
- Encourage, through land development standards, the protection of open space.
- Continue to balance all forms of development through the use of smart growth principles and sustainability planning.

### **2005 Waretown Town Center Goals and Objectives**

The goal of the 2005 Master Plan Reexamination was to provide the planning framework and foundation for the implementation of the Township's proposed Waretown Town Center, which was included in the Township's application for Plan Endorsement from the New Jersey State Planning Commission. The following goals specific to the Waretown Town Center were added to the master plan with the 2005



Master Plan Reexamination Report and are relevant to this Floodplain Management Plan:

- Protect environmentally sensitive lands and direct growth towards areas of Township with existing infrastructure.

### **2006 Land Use Plan Element Amendment- Environmental Conservation and Bayfront Conservation Areas**

This amendment created an Environmental Conservation (EC) district and expanded an existing Bayfront Conservation (BC) district in an effort to focus development from environmentally sensitive areas east of the Garden State Parkway within Ocean Township into the Town Center, which is more appropriate for development. Other benefits include the preservation of the environmental and open space amenities for all residents in the Center and surrounding areas and to create a green belt around the Center to delineate its boundaries.

### **2010 Emergency Operating Plan**

This Plan, approved in 2010, sets forth the general policies and procedures to be carried out by municipal and volunteer entities (such as the Fire Department and EMS) in order to provide the citizens of the Township with an effective integrated emergency response plan designed to minimize the loss of life and property during an emergency. The manual is comprised of the Basic Plan and the following list of annexes providing response plans for such emergency situations as: alerting, warning, and communications; damage assessment; emergency operating centers; emergency public information; evacuation; fire and rescue; hazardous materials; law enforcement; public health; public works; radiological protection; resource management; shelter, reception, and care; social services; and terrorism and weapons of mass destruction.

The purpose of the Emergency Operating Plan is to protect life and property in emergencies by coordinating response activities of municipal and volunteer entities to ensure their optimum use. It provides for actions to be taken to mitigate, prepare for, respond to, and recover from the effects of an emergency. The plan is an “all-hazards” approach to emergency management and covers natural disasters, technological disasters, and national security crises.

## 2012 Floodplain Management Plan

In 2011 the Township adopted ordinances authorizing the preparation of a Floodplain Management Plan and the creation of a Floodplain Management Plan Committee, consisting of officials responsible for implementing the plan, a local resident for the bayfront hazard area and a professional planner. Plan drafting began in 2012, and it was adopted in April 2012. The Plan's goals include:

- Reducing loss from flood damage through codes and standards.
- Educating decision makers and the public about stormwater and floodplain management.
- Coordinating and prioritizing maintenance of the stormwater management system.

The plan also seeks to:

- Ensure that a comprehensive review of possible activities and mitigation measures is conducted so that the most appropriate solutions are used to address the hazard.
- Ensure that the recommended activities meet the goals and objectives of the Township.
- Educate residents about the hazards, loss-reduction measures, and the natural and beneficial functions of floodplains.
- Build public and political support for projects that prevent new problems, reduce losses, and protect the natural and beneficial functions of floodplains.

This existing floodplain management plan will help to guide the floodplain management plan update.

## Strategic Recovery Planning Report

As a response to Hurricane Sandy, Ocean Township adopted a Strategic Recovery Planning Report in 2014. The purpose of the Strategic Recovery Planning Report is to outline a recommended set of actions to guide the township in promoting recovery from the impacts of Hurricane Sandy and resiliency to future storms. The SRPR identified the community vulnerabilities exacerbated by Sandy and opportunities created by Sandy.

Vulnerabilities identified included the vulnerability of homeowners and business owners located in low-lying areas in close proximity to the flooded waterways that border and run through Ocean Township. The loss of power exposed residents to the

dangers of cold fall nights. Furthermore, the damage to the pump stations threatened the health of residents by failing to prevent the backflow of raw sewage into flooded Township streets. Additionally, the land to the east of Route 9 is mostly built out, and the Township faced limited options for relocating debris. In the event of another storm, the Township would have minimal land to dump debris; the building that houses the zoning and construction departments has no generator; the Township Hall's generator is 30 years old; and the Township's community center has no generator and is in a flood zone. Furthermore, the storm has also exacerbated the Township's vulnerability to Barnegat Bay. These identified vulnerabilities will be important to take into consideration during the floodplain management planning process.

### **2014 Ocean County Multi-Jurisdictional Natural Hazard Mitigation Plan**

The 2014 Multi-Jurisdictional All Hazard Mitigation Plan is intended to provide a blueprint for saving lives and reducing property damage from the effects of natural and man-made disasters in Ocean County, as well as to improve community resiliency following disastrous events. The Multi-Jurisdictional All Hazard Mitigation Plan is also intended to fulfill state and federal legislative requirements related to local hazard mitigation planning, and facilitate access to pre- and post-disaster grant funding.

The Multi-Jurisdictional All Hazard Mitigation Plan is comprehensive in scope, and outlines a mitigation strategy that is centered on the following countywide goals and objectives:

- Encourage sustainable development to protect people, property, community resource and the environment from natural and human-made disasters.
  - Meet and exceed minimum standards of the National Flood Insurance Program.
  - Manage building code, land use code, ordinance and other planning mechanisms to prevent and mitigate the impact of disasters on people and property.
  - Improve information available for mitigation planning.
  - Coordinate and increase applications for federal and state grant programs.
  - Integrate and leverage other planning mechanisms from: neighboring jurisdictions; local, county and regional organizations; and, state partnerships to implement the plan.
  - Improve shelter management.
- Build and rebuild structures and infrastructure to protect people, and to reduce impacts of future disasters.

- Increase the number of residential properties protected from hazards.
- Increase the number of community resources and amount of infrastructure protected from hazards.
- Improve the ability of critical facilities and infrastructure to safely operate during storms and utility interruptions.
- Improve evacuation capability.
- Protect and restore the natural environment to support disaster resiliency.
  - Improve the health of natural systems to safely and naturally accommodate flooding and wildfire.
  - Improve the health of natural systems used to protect residential properties and other community resources.
  - Plan for increased open space in the most vulnerable areas.
  - Promote appropriate urban-wild land interface for wildfire mitigation.
- Promote education, awareness and outreach before, during and after disaster.
  - Improve and expand information and opportunities for input available by television, radio, websites, social media, newsletters, and meetings.
  - Increase participation in mitigation programs, including the Community Rating System, StormReady, and FireWise programs.
  - Tailor timely messages for audiences, including children, parents, community groups, universities, seniors and other groups.
  - Improve alert and warning systems.

To support the implementation of the 2014 Multi-Jurisdictional All Hazard Mitigation Plan in Ocean Township, the plan recommends that the Township use it (i.e., the 2014 Multi-Jurisdictional All Hazard Mitigation Plan) to implement the mitigation strategies and actions as outlined in the Plan.

## **COORDINATION WITH OUTSIDE AGENCIES**

Notices were sent to the following groups, commissions, municipalities, and agencies soliciting data or information related to flooding, as well as any specific actions the agency or organization has undertaken that may affect flooding. Agencies and organizations who were contacted are as follows:

- The Township of Barnegat
- The Township of Lacey
- Barnegat Light
- Island Beach State Park

- Ocean County Department of Parks and Recreation
- Ocean County Sheriff Department Office of Emergency Management
- Ocean County Planning Department
- Township of Ocean Police Department
- Waretown First Aid Squad
- Waretown Volunteer Fire Co #1
- Township of Ocean Environmental Commission
- Ocean County Soil Conservation District
- North Jersey Transportation Planning Authority
- Natural Resources Conservation Service
- NJ Coastal Management Program
- US Army Corp of Engineers
- American Red Cross
- Jacques Cousteau National Estuarine Research Reserve
- Shore Builders Association of Central Jersey
- Comcast Cable
- New Jersey American Water
- New Jersey Department of Environmental Protection, State Floodplain Manager
- Barnegat Bay Partnership
- Save Barnegat Bay
- Atlantic City Electric
- New Jersey Natural Gas

A spreadsheet of all agencies contacted along with their response and a sample of the letter sent to each can be found in Appendix C. Many agencies responded and discussed information that could be beneficial to the Township's Plan. An example of this work is the various mapping provided by the Jacques Cousteau Reserve and the Rutgers University Center for Remote Sensing and Spatial Analysis (CRSSA).

## **FLOODING HISTORY**

### **Description of Known Flood Hazards**

The Flood Insurance Rate Map (FIRM) for the Township of Ocean is currently in the process of being updated. The Effective FIRM maps dated September 25, 2009 can be found in Appendix D. The Advisory Base Flood Maps, which were adopted shortly after Superstorm Sandy, can be found in Appendix E. The new Preliminary FIRM maps issued on January 31, 2014 indicates that the entire coastline along the Barnegat Bay as

well as the portion of the Township located along Oyster Creek is located within the Special Flood Hazard Area. None of Ocean Township’s critical facilities are located within a floodplain on the Preliminary FIRM. The Preliminary FIRM map for the Township is identified in Figure 2 below and in Appendix F.

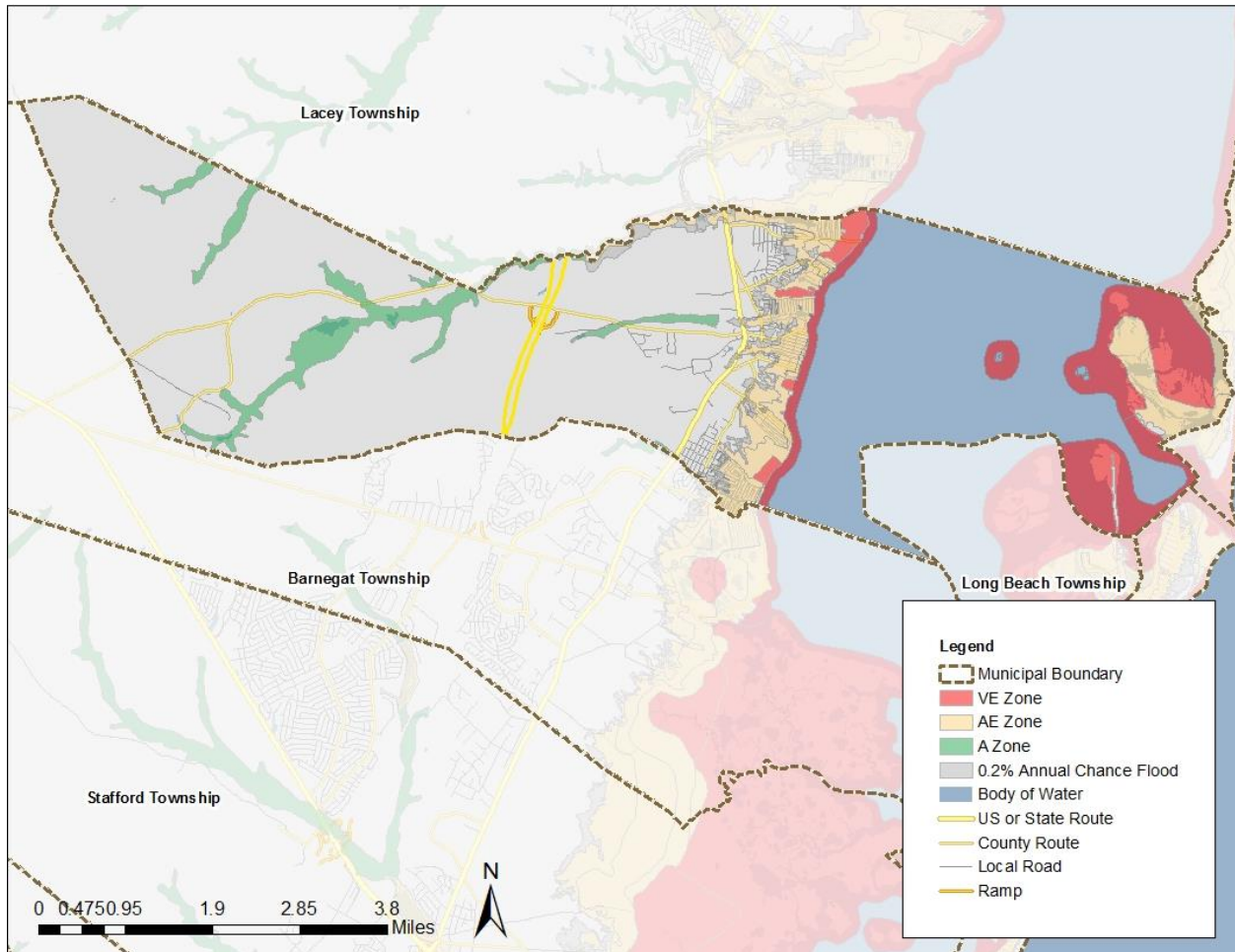


Figure 2. Preliminary FIRM

Flooding in Ocean Township generally takes place east of the Garden State Parkway, along the Barnegat Bay and Oyster Creek, with impacts most felt in the densely populated Bayfront neighborhoods. Land along the Barnegat Bay is vulnerable to erosion, which is often exacerbated by storm events.

Superstorm Sandy made landfall along the coast of New Jersey on October 29, 2012, causing major flooding and destruction. This event has become the storm of record (the highest flood recorded) for much of New Jersey and New York. Sandy surge elevations

were recorded by FEMA. Where available, Superstorm Sandy Surge Elevations were mapped throughout Ocean Township and surrounding communities. These maps can be found in Appendix G. In many parts of the Township, Sandy surge elevations are slightly lower than the Preliminary FIRM area in which they are located. If residents build to their required BFE, they should prevent some future flood occurrences.

### Historical Flooding Events

Ocean Township is susceptible to flooding from the Barnegat Bay and has flooded repeatedly throughout time. Some of the major storm events that have affected the Township and the greater Ocean County area, causing flooding and damage in the Township of Ocean are:

- September 14 – 15, 1944: A category 2 hurricane passed within 47 miles of the coast of New Jersey in September 1944, producing wind velocities over 100 mph and a maximum tidal elevation of 7.4 feet at the gage in Sandy Hook.
- Hurricane Donna: On September 12, 1960 Hurricane Donna was classified as a Category 2 hurricane when it reached Ocean County. Wind speeds of up to 110 mph were recorded as was a maximum tidal elevation of 8.6 feet at Sandy Hook.
- The Ash Wednesday Storm: A nor'easter struck the coast of New Jersey lasting 3 days and 5 tidal cycles from March 6- 8, 1962 and causing massive amounts of destruction including 10 deaths in the state of New Jersey.
- Hurricane Belle: On August 9, 1976, Hurricane Belle impacted New Jersey as a Category 1 hurricane with wind speeds of up to 90 mph. In Asbury Park, 2.56 inches of rain was recorded as having fallen in a 24-hour period.
- March 1984: This nor'easter coincided with astronomically high tides and caused flooding, erosion, and damage to roads and boardwalks.
- Hurricane Gloria: On September 27, 1985, Hurricane Gloria came onshore in Long Island, NY as a Category 2 hurricane. The storm caused extensive power outages through New Jersey and forced people to be evacuated from their homes. However, coastal flooding was minimized as the peak storm surge arrived during low tide.
- The Perfect Storm: The Perfect Storm, also known as the Halloween Storm, was a nor'easter that caused coastal flooding on October 31, 1991.
- The Storm that Stole Christmas: A nor'easter struck the coast of New Jersey on December 11, 1992 and continued to impact the area through eleven (11) tidal cycles, causing extensive beach erosion and 3 to 5 ft. storm surge.

- Tropical Storm Floyd: Tropical Storm Floyd impacted New Jersey on July 16, 1999. Heavy rains coincided with high tide to exacerbate flooding. However, the greatest impacts were felt away from coastal areas in Bergen and Somerset Counties.
- Tropical Storm Irene: Tropical Storm Irene produced heavy rains from August 27-28, 2011, causing tidal flooding and beach erosion, making it the costliest storm in New Jersey after Hurricane Floyd prior to Superstorm Sandy.
- Superstorm Sandy: Superstorm Sandy made landfall in Brigantine on October 29, 2012, becoming the costliest natural disaster in the State of New Jersey and second only to Hurricane Katrina nationwide. The coastal areas of Monmouth and Ocean Counties were among the hardest hit with record breaking high tides and wave action. Many homes throughout the coastal communities were destroyed or impacted by severe flooding. All communities within Ocean County faced power outages, some lasting up to two (2) weeks.

### **Storms with Repetitive Loss**

Using repetitive loss data provided by FEMA, seven areas in throughout Ocean Township were identified as being particularly prone to flood events. A repetitive loss property is classified as one which has experienced two or more claims of more than \$1,000 that have been paid by the National Flood Insurance Program (NFIP) within any 10 year period since 1978. To protect the privacy of homeowners, individual repetitive loss properties were not mapped, but rather a 200 foot buffer was created around each repetitive loss property and any parcel falling in that buffer was categorized as in an area generally affected by flooding. The Repetitive Loss Areas map can be found in Appendix H. The general areas are as follows:

- 1) The western edge of the Sands Point neighborhood along Oyster Creek;
- 2) The eastern edge of the Sands Point neighborhood along Oyster Creek;
- 3) The Holiday Harbor neighborhood along the Barnegat Bay;
- 4) The eastern edge point Hornblower Drive, along the Barnegat Bay;
- 5) The Bay Haven and Bryant Beach neighborhoods;
- 6) The Barnegat Beach neighborhood; and
- 7) The western portion of the Pebble Beach neighborhood.

The highest concentration of repetitive loss properties are located in the Sands Point neighborhood, Bay Haven and Bryant Beach neighborhood, and the Barnegat Beach neighborhood of the Township, which consists of many lagoons along the Barnegat Bay. Numerous homes in this area were substantially damaged during Superstorm



Sandy. The two storms prior to Superstorm Sandy which produced the majority of repetitive losses in Ocean Township were The Perfect Storm, or Halloween Storm, of October 31, 1991 and the winter storm of December 11, 1992. Both of these storms were nor'easters lasting through multiple tidal cycles.

## **DESCRIPTION OF FUTURE EVENTS FOR OTHER HAZARDS**

In addition to flooding, Ocean Township is susceptible to a number of other hazards. While the intent of this plan is to focus on flood hazards, it is important to identify and recognize other hazards that impact the Township. Information on other hazards was taken from the 2014 Ocean County Multi-Jurisdictional All-Hazards Mitigation Plan.

### **Coastal Erosion**

Coastal erosion occurs when more sediment is lost than is gained at a particular location. Coastal erosion can result from natural or man-made causes, including sea level rise, flooding, strong wave action or large storms, some types of shore protection structures, some land uses, and other alterations to the natural environment. Coastal erosion can occur gradually, as shorelines recede over a period of time or can be caused by a rapid recession of shoreline due to another hazard event. Erosion increases the vulnerability of near-shore structures to damage from storms and flooding events.

Ocean Township is susceptible to erosion along the Barnegat Bay. The impacts of coastal erosion can be lessened by implementing living shoreline techniques and undertaking a variety of shoreline protection measures.

### **Climate Change**

Ocean Township will be affected by increasing sea levels along the Barnegat Bay. The effects of sea level rise will be more pronounced in low-lying, marshy areas of the Township and will exacerbate problems with flooding. Additionally, severe storm events are predicted to become more frequent as the climate warms. The impacts of climate change in the future will depend on the rate which sea level rises and human actions and response to the threats caused by climate change.

### **Drought**

A drought is a period of low or no precipitation in a given area. The severity of the drought depends on the length of time, geographic reach, regional water supply demands, and the impact of other hazards, such as extreme heat. There is a low probability of severe drought conditions occurring in Ocean, due to Township's

relatively low elevation and abundant groundwater supply; although short term, less severe droughts may be more likely. If extended drought conditions do occur in Ocean Township, the Township may be subject to restricted water usage and other regulations. Recent periods of drought in New Jersey include:

- October 1997
- 1998- 1999
- October 2001- 2002
- August- September 2008
- August to October 2010

### **Earthquake**

The probability of a significant, damaging earthquake in Ocean Township is low. While low magnitude earthquakes do occur throughout New Jersey on a fairly regular basis, most earthquakes impacting Ocean Township will have only minor effects. The greatest probability of an earthquake occurrence in New Jersey exists in the northern portion of the State near the Ramapo Fault.

### **Extreme Temperature**

Ocean Township is highly susceptible to both extreme heat and extreme cold events. Long periods of extreme temperatures can overstress power supply systems, resulting in brown-outs or black outs and leaving residents without heat or air conditioning. Generally, the impact on humans of extreme temperature events is minimal, with the exception of the very young and elderly populations, who are more susceptible to the health impacts of extreme temperatures. If the population of Ocean Township continues to age, the vulnerability to extreme temperature events will increase. Improved weather forecasting, community warnings, and community preparedness can help to reduce the risks of extreme temperature events, as well as other hazard events such as flooding, to vulnerable populations.

### **Extreme Cold**

Extreme cold events often accompany a winter storm or occur soon after. Prolonged exposure to the cold can cause frostbite or hypothermia. Recent periods of extreme cold in Ocean Township include:

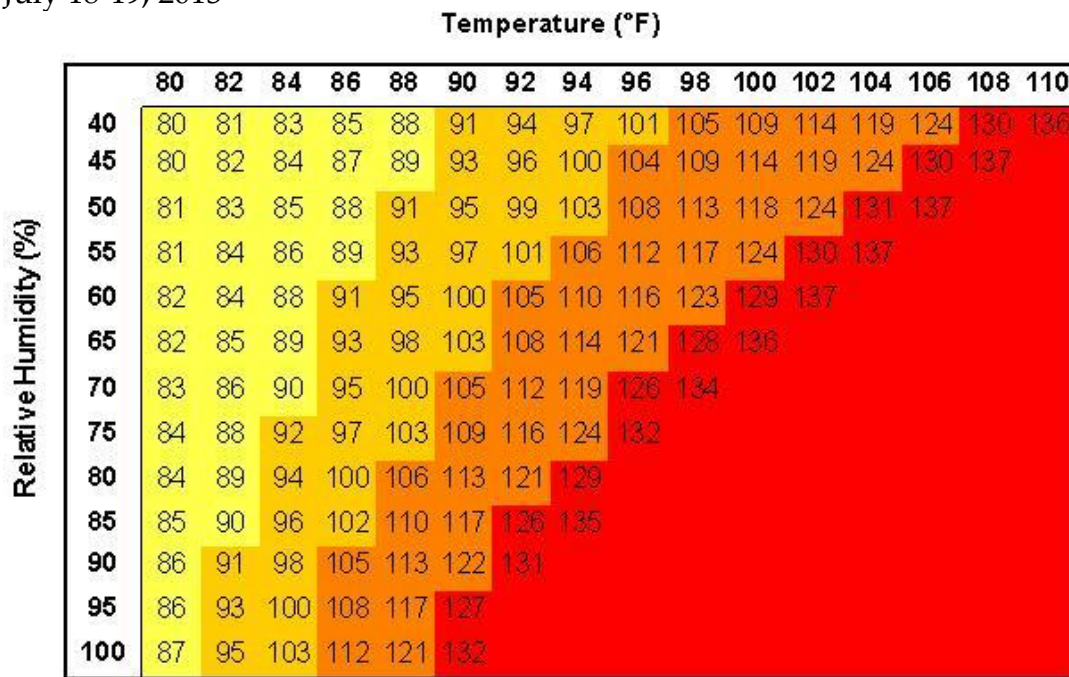
- Jan 14- 29, 2003
- Jan 9-11, 2004
- Jan 16- 18, 2009
- Jan 23, 2014

- Jan 4, 7, & 22, 2014

**Extreme Heat**

Ocean Township is more likely to experience extreme heat than extreme cold events. Extreme heat events occur during the summertime when the weather in Ocean is substantially hotter and/or more humid than the Township average for that time of year. Recent periods of extreme heat include:

- July 4- 11, 1999
- August 1-3, 2006
- June 7-10, 2008
- July 5-7, 2010
- July 21- 24, 2011
- July 17- 18, 2012
- July 18-19, 2013



**Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity**

■ Caution   
 ■ Extreme Caution   
 ■ Danger   
 ■ Extreme Danger

Figure 3. NOAA National Weather Service Heat Index

### **Extreme Wind**

Extreme wind can occur alone or with other natural hazards, often occurring during thunderstorms. The impacts of extreme winds can be critical and can include flying debris and downed trees and power lines. The probability of future extreme wind events is high, with an average of 5- 10 extreme wind events occurring each year in the Central New Jersey region. Recent extreme wind events near Ocean County, New Jersey include:

- Thunderstorm on September 9, 1998
- Thunderstorm on August 7, 2000
- Thunderstorm on August 2, 2002
- Thunderstorm on July 22, 2003
- January 18, 2006
- Thunderstorm on August 17, 2007
- February 13, 2008
- March 5, 2008
- March 13, 2010
- Hurricane Irene, August 27- 28, 2011
- Superstorm Sandy, October 29, 2012

### **Hurricanes, Tropical Storms, & Nor'easters**

Hurricanes, tropical storms, and nor'easters are events consisting of a number of damaging hazards including heavy precipitation, high winds, wave action, storm surge, coastal flooding, and coastal erosion. All of New Jersey, including the Township of Ocean Township, falls within the Hurricane Susceptible Region, and there is a 24- 36% chance of experiencing a tropical storm or hurricane event between June and November of any given year in Ocean County. Ocean County lies within a design Zone II, meaning that shelters and critical facilities should be designed to withstand a 3 second wind gust of up to 160 mph. Nor'easters generally occur during the winter months and are named after the wind direction of the storm. They tend to last for more than one tidal cycle, often generating flooding events. Severe storms that have impacted the Township of Rumson with flood damages were discussed in the Historical Flooding Events section of this document.

### **Lightning**

Ocean Township is susceptible to lightning events, but not as much as other areas of the United States, particularly the Southeast. The probability of future lightning events in

Ocean Township is certain, however, lightning often occurs with other natural hazards, such as thunderstorms.

### **Storm Surge**

All coastal areas are at high risk for storm surge. The severity of storm surge is generally related to the severity of the storm making landfall, as well as the tidal and lunar cycles.

### **Tornado**

The probability of a tornado in Ocean Township is low. If a tornado is to occur, it is mostly likely to do so between March and August, forming in the late afternoon or early evening at the trailing edge of a thunderstorm.

### **Wave Action**

All immediate coastal and shoreline areas along the Atlantic Ocean and Barnegat Bay are at risk from wave action. Waves are generally caused by wind and storm events, even those which remain offshore, and generally the more severe the storm, the more destructive waves become. Future occurrences of wave action will affect the areas of Ocean Township located along the Barnegat Bay in the coastal flood hazard zone.

### **Wildfire**

Wildfires typically occur in unoccupied, rural, or forested areas and happen during the fall and spring when it is hot and dry. In New Jersey, 99% of wildfires are caused by human activity. The probability of wildfires occurring in the Pinelands is extremely high, as the Pinelands are categorized as Fuel Model B, which indicates a high hazard fuel. Ocean Township contains 8,501 acres of land within the Pinelands, or 64.4% of the Township's total land area. Therefore, the probability of wildfires occurring in the western portion of Ocean Township is high. Wildfires have occurred in the Pinelands of Ocean County on the following:

- Sept. 7-10, 1938
- April 15, 1977
- April 30, 2001
- May 1, 2001
- March 10, 2002
- February 19, 2011

## Winter Storms

Although Ocean Township is located south of the typical boundary between freezing and non-freezing precipitation during the wintertime, there is a high probability of occurrence of winter storms in Ocean Township, with Coastal Ocean County averaging approximately 15 inches of snowfall annually. Winter storms generally occur from November through mid- April, with the peak season being December through March. Winter storms can consist of blizzards, heavy snow, sleet, and/or ice storms.

Winter storms can result in downed trees, damaged vegetation, transportation accidents, road closings, stranded travelers, power outages, and a depletion of heating supplies. They can cause major disruptions to transportation, commerce, and electrical power. Recent winter storm events that have impacted Ocean Township include:

- January 6-8, 1996
- February 16-17, 2003
- January 22, 2005
- February 17, 2007
- December 26, 2010
- November 7-8, 2012

## SPECIAL FLOOD RELATED HAZARDS

There are many special localized situations in which flooding or flood-related problems do not fit the national norm for riverine and coastal floodplain management. These special flood-related hazards include:

### Uncertain Flow Paths

Alluvial fans, moveable bed streams, channel migration, and other floodplains where the channel shifts during a flood are classified as uncertain flow paths. This hazards is not an issue in Ocean Township

### Closed Basin Lakes

Lakes that have a small or no outlet that may stay above flood stage for weeks, months, or years are called closed basin lakes. This hazard is not relevant to Ocean Township.

### Ice Jams

Ice jams, also known as ice dams, typically occur in late winter or early spring when a frozen river begins to thaw. Blocks of ice break free and can accumulate at bends in the

river, mouths of tributaries, or near structures such as bridge piers. The ice can restrict the flow of a river and cause flooding upstream. A flash flood type event can also occur downstream if the ice jam suddenly breaks free. Although the Barnegat Bay has been known to freeze in winter months, the threat of flooding from ice jams in the Ocean Township is low due to the width, depth and tidal nature of the rivers. However, there is a high likelihood of damage to structures such as bulkheads, docks and piles from floating ice.

### **Land Subsidence**

Along the East Coast, land is sinking towards sea-level in a process known as subsidence. This will accelerate the impacts of sea level rise, causing actual water levels to be much higher than some predicted estimates.

### **Mudflow hazards**

Mudflow hazards are identified as a river, flow, or inundation of liquid mud down a hillside, usually as a result of a dual condition of loss of brush over and the subsequent accumulation of water on the ground, preceded by a period of unusually heavy or sustained rain. This is not considered to be a threat in Ocean Township.

### **Coastal Erosion**

This hazard was discussed in the previous section. It has a large impact on Ocean Township.

### **Tsunamis**

Tsunamis are large ocean waves typically caused by an earthquake, landslide, or underwater volcano. Although Tsunamis are far more likely on the west coast, there are three DART (Deep-ocean Assessment and Reporting of Tsunamis) monitoring stations off the coast of New Jersey, near the Hudson Canyon.

### V. PROBLEM ASSESSMENT

FEMA is currently in the process of updating the Flood Insurance Rate Map (FIRM) for Ocean Township. The Preliminary FIRM indicates that the perimeter of the Township along the Barnegat Bay and Oyster Creek is located within the Special Flood Hazard Area. There are no critical facilities located within the Special Flood Hazard Area in Ocean Township. A total of 1,537 residential properties and 40 commercial properties are located within the SFHA. Table 1 below indicates the total structures, properties and land area located within both the 100-year and 500-year floodplains. The table also shows the percentage of each category that is located within the 100-year floodplain to get a better understanding of how much of the Township is vulnerable to flooding.

Table 1. Floodplain Property Data

Item	Township Total	100-Year Floodplain	500-Year Floodplain <sup>1</sup>	100-Year + 500-Year Floodplain	Percent Located within the 100-Year Floodplain
Properties	10,197	2328	329	2657	22.83%
Land Area (acres) <sup>2</sup>	12,975.44	2,404.24	258.53	2,662.77	18.53%

1. This does not include the area within the 100-year floodplain.  
 2. Land area only includes land parcel areas. Waterways and roads are not included in this area.

Flooding generally occurs in Ocean Township as coastal flooding due to the Township’s location on the Barnegat Bay and along the Township’s borders, including Oyster Creek, Waretown Creek, Warrens Creek, and Lochiel Creek. Coastal flooding generally occurs along the Bayfront and in the backwater, intertidal areas along the creeks. Flooding can also be caused by the stormwater management system being overwhelmed by excessive rainfall, being undersized, or clogged. While none of Ocean Township’s critical facilities are located within the floodplain, it is important to be aware of their location in regards to flood hazard areas. A map showing the Township’s critical facilities and the Special Flood Hazard Areas can be found in Appendix I. The map also indicates which roads have potential for flooding during a 100- year flood event.

### HAZARD IMPACT

Township residents and first responders are particularly vulnerable to the impacts of flooding in Ocean Township. Residents who live within the SFHA should be encouraged to take all necessary precautions to ensure their homes are safe from flood



hazards. Additionally, those residents who do not live within the SFHA, but live in areas which are known to flood should take similar precautions as their neighbors living within the SFHA. In addition to the possible damage to buildings and other infrastructure, there is the possibility of injury or even death to residents or responders who could get trapped in a flooded building or swept away in fast moving floodwaters. The Township and its residents must also be aware of the potential impacts to public health from flooding. Mold will quickly develop in many structures and cause respiratory issues for those attempting to rebuild. Debris from damaged and demolished structures could also contain hazardous materials such as mold, lead or asbestos. Early warning and evacuation, as well as making the necessary preparations to protect facilities from flooding, can protect the health and safety of residents and emergency workers and facilitate a rapid response and recovery from future flood events.

Many of the hazards to which Ocean Township is vulnerable generally occur concurrently with flooding. Areas that are susceptible to flooding will only increase in their vulnerability as impacts due to sea level rise become greater in the future. Homes which are not raised above the base flood elevation are particularly vulnerable to flood related hazards, as are areas prone to flooding but not located within the SFHA. Ocean Township should work with FEMA to ensure that all flood maps illustrate an accurate portrayal of flood risk within the community.

Category 1, 2, & 3 SLOSH models for Ocean Township were run by the Jacques Cousteau National Estuarine Research Reserve (JCNERR) to estimate storm surge heights and wind resulting from historical, hypothetical, or predicted hurricanes. SLOSH is a computer model developed by the National Weather Service (NWS) and stands for Sea, Lake, and Overland Surge from Hurricanes. It is important to note that the SLOSH model does not include rainfall amounts, river flow, or wind-driven waves and accuracy is generally within 20% (NOAA).

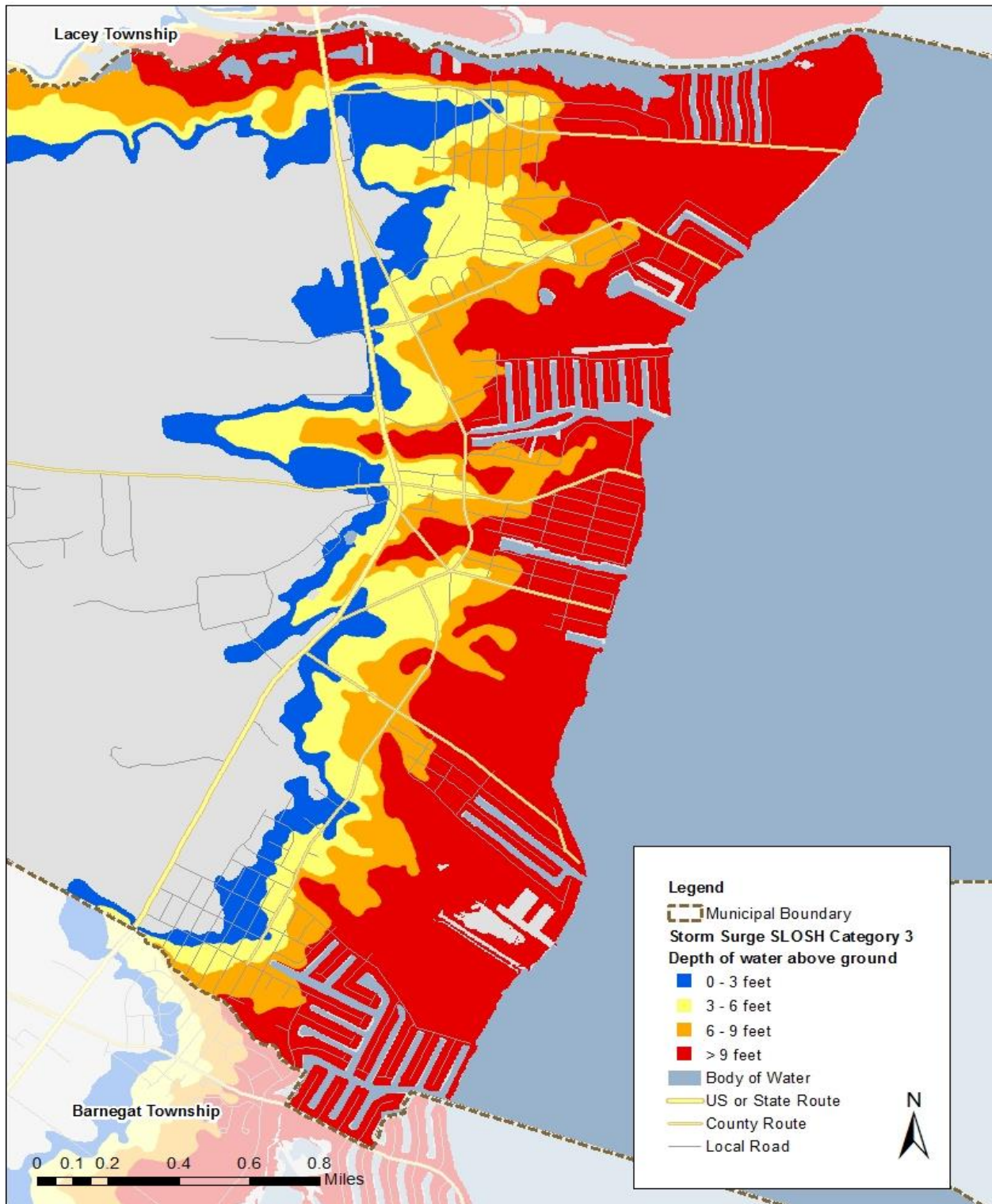


Figure 4. Category 3 SLOSH Model Map

As depicted in the maps found in Appendix J, during a Category 1 storm event storm surge would be above ground level along the Barnegat Bay and into the lagoon communities. During a Category 2 storm event, storm surge would further inundate the Township along the banks of the Barnegat Bay, with storm surge reaching over 9 feet in some waterfront areas. As shown above in Figure 4, a category 3 storm event would produce storm surge along all of the Township's shoreline, within inundation reaching Route 9 in most of the Township. Additionally, the entirety of the Bayfront and most of the lagoon neighborhoods would have surge levels over 9 feet in height.

The impacts of Sea Level Rise on Ocean Township were also analyzed by JCNERR. With a one foot increase in sea level rise, some small areas within the Bayfront lagoons would be underwater. Much of the tidal marsh will remain, however in these areas there would be slight uninhibited marsh retreat, as well as the loss of some land area from the sedge islands located off Island Beach State Park within the Township's boundaries. With two feet of sea level rise, water will further encroach on lagoons bordering the Barnegat Bay. Much of the tidal marsh will remain however there will be some areas of uninhibited marsh retreat in the more upland areas of the lagoon communities. Additionally, in a small portion of the sedge islands located off Island Beach State Park within the Township's boundaries, marsh will convert to open water. Three feet of sea level rise will further encroach on the land area bordering the Barnegat Bay. The impacts of sea level rise on the Barnegat Bayshore will be more severe neighboring municipalities than in Ocean Township. Much of the tidal marsh will continue to remain; however areas of uninhibited marsh retreat in the more upland areas of the lagoon communities will continue to expand westward. Additionally, in large portions of the sedge islands will convert from marshland to open water. Maps indicating Sea Level Rise and Marsh Retreat can be found in Appendix K & L respectively.

Ocean is a predominately residential community, and as such, much of the areas that will be affected by storm surge and/or sea level rise are residential areas. The eastern portion of the Township, near the Bayfront, contains some of the highest densities of single family homes throughout the community. This is also the area that is and will continue to be most impacted by storm and flooding events.

Due to the high build-out in the eastern portion of the Township and the Pinelands regulations in the west, there are not many viable options for major changes to zoning and development regulations. However, the Township should consider adopting stricter regulations to limit the impacts of flooding and protect those residents building in flood zones.

## **HISTORICAL DAMAGE**

Superstorm Sandy caused the most damage of any storm in recent history. During Superstorm Sandy, Ocean Township experienced major impacts from wind, storm surge, and flooding. Entire neighborhoods along the bayfront were flooded. The storm exposed many of the Township's vulnerabilities, including that the land to the east of Route 9 is largely built-out and is the most flood prone area of the Township.

One census tract in Ocean Township contained homes which sustained severe or major damage as a result of Superstorm Sandy, with 10% of the homes in that tract sustaining severe or major damage. A total of 87 properties within the Township sustained substantial damage during the storm. A structure is considered substantially damaged when the total costs of restoring the structure to its before damaged condition would equal or exceed 50% of the structure market value. Most of these properties were located to the east of Route 9 along the Bayfront.

Residents of Ocean Township faced power outages for 14 days due to downed trees following Superstorm Sandy. The JCP&L electric substation on Route 9 by St. Stephen's Church went offline. In addition, many residents lost cell phone power, and Township personnel relied on radios for communication for three days following the storm. Entire neighborhoods in the Bayfront area faced damage from flooding, and the Township building and community center sustained roof damage due to heavy winds.

Superstorm Sandy also affected the Township's sewage pump stations, causing five pump stations to go offline due to damage from Superstorm Sandy. The pump stations that went offline were located at: the intersection of Bay Parkway and Dock Avenue, the intersection of Lighthouse Drive at Anchor Drive, the intersection of Marine Road and Lagoon View Road, 262 Bayshore Drive, and 225 Seneca Boulevard.

## **ECONOMIC IMPACTS**

Due to the residential character of the Township, the majority of flood damage within Ocean has been, and will continue to be, to single family homes. The cost of flood damage to residential property is generally covered by insurance pay-outs and owner out of pocket expenses. If property owners can no longer pay their taxes or decide to abandon their property, there could be a potential impact on the tax base of the Township due to flooding events.

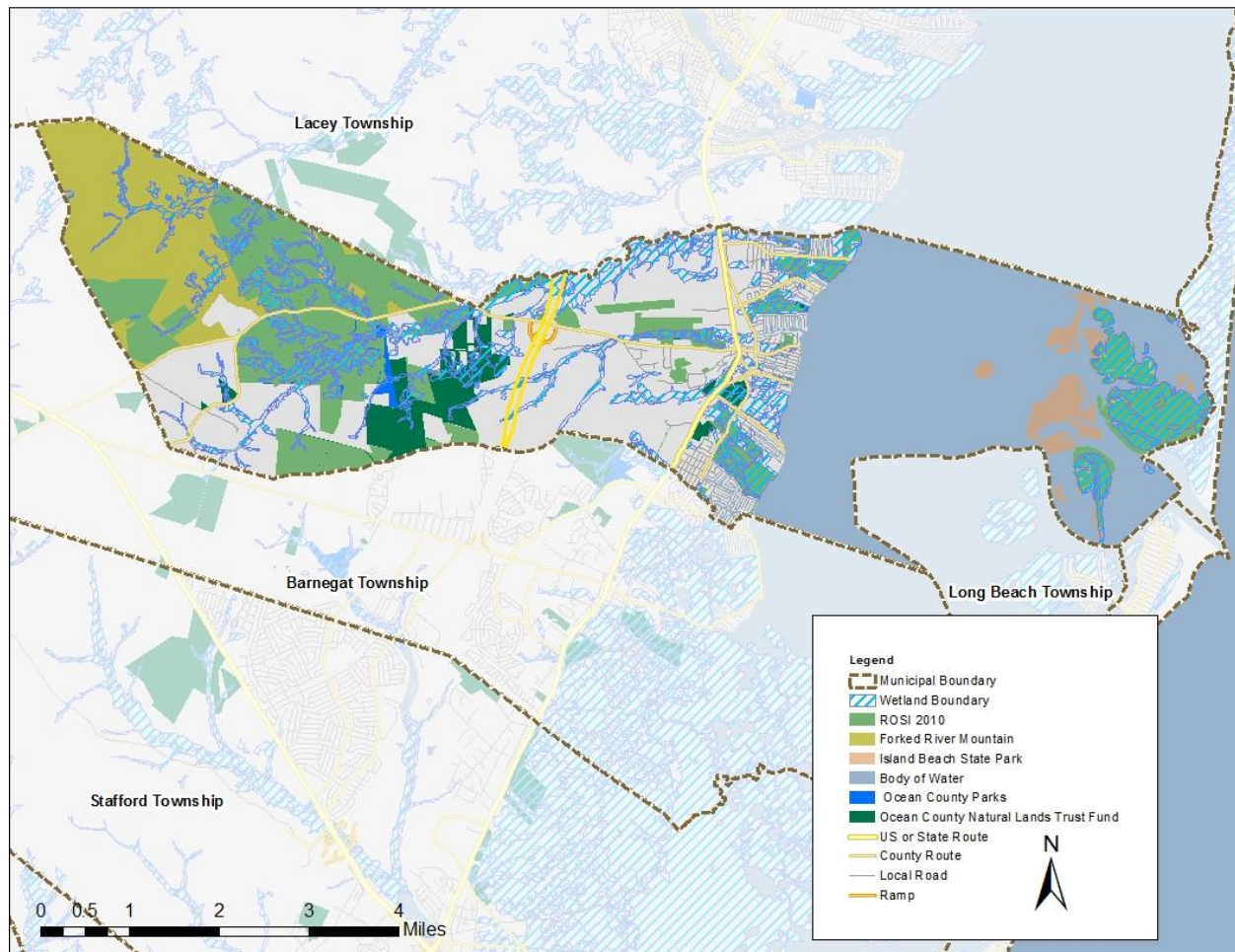
Impacts of flooding on businesses within Ocean Township would be realized mostly in the form of lost profits for times when they are not able to operate. Most of the

businesses within the Township that are located within the flood zone are marinas and other marine related businesses. They may experience flood damage in addition to lost revenue. During Sandy many of these businesses were flooded. However, most have reopened their doors since.

The largest economic impact of flooding to the Township is the cost of debris removal, municipal facility repair, and personnel costs during the event. The impact of costs to the community would depend on the severity and longevity of the event as well as reductions in the tax base due to property loss or migration.

### **NATURAL FEATURES**

Ocean Township is located entirely within the Pinelands and CAFRA regulatory areas, with lands to the west of the Parkway located in the Pinelands and lands to the east located in CAFRA. Much of the land to the west of the Parkway in the Pinelands region has been preserved and strict development regulations limit development in areas that have not been officially preserved. The Forked River Mountains are also located in the western portion of the Township. There are a number of County Natural Lands Trust Fund owned preserved lands throughout Ocean Township, with the largest holdings in the western portion of the Township. Wells Mills County Park is a 910 acres park located within the Township as well. The map below, and found in Appendix M, shows areas of natural features throughout the Township.



**Figure 5. Natural Features**

Much of the development within Ocean Township is located on the eastern side of the Parkway, along the Barnegat Bayfront. However, there are significant areas of natural space in the Bayfront Conservation districts. Additionally, Island Beach State Park is across the Barnegat Bay and acts like a natural buffer, protecting Ocean Township from storm surge and reducing the direct impacts of storm events.

Within the Bayfront Conservation Areas and along the bayside of Island Beach State Park there are many areas of natural wetlands, located in Ocean Township. These wetlands can help to help to store water and reduce the impacts of flooding on the surrounding areas.

### **FUTURE FLOODING IMPACTS**

As previously indicated, there is little future development potential in Ocean Township due to the Pinelands regulations to the west and the built out nature of many of the

eastern lagoon communities. The Township should continue to enforce existing development standards, making changes where necessary to allow residents to rebuild to higher resiliency standards. The Township should continue to maintain and pursue open space acquisitions and encourage the use of living shoreline and green infrastructure techniques. This is critical to maintaining permeable surfaces and limiting stormwater runoff.

However, as sea level rises and marshes retreat, Ocean Township will become more vulnerable to impacts from flooding. The overall impacts of flooding on the community will be contingent on how effectively the Township mitigates current vulnerabilities and plans for future conditions. It is imperative that the Township utilize this Floodplain Management Plan as a valuable tool to plan for the future.

## VI. GOALS

Over the course of the various Floodplain Management Plan Steering Committee meetings, the Committee discussed the goals that the Township would like to achieve with the Floodplain Management Plan to increase resiliency and mitigate future storm events. The following is a list of the goals agreed upon by the Committee:

1. Reduce loss from flood damage through codes and standards;
2. Educate decision makers and the public about stormwater management and floodplain management;
3. Coordinate and prioritize maintenance of the stormwater management system;
4. Protect existing properties by encouraging property owners to build higher than the base flood elevation;
5. Protect health and safety;
6. Improve the quality of life in Ocean Township;
7. Ensure that public funds are used in the most efficient manner.



## VII. POSSIBLE FLOODPLAIN MANAGEMENT ACTIVITIES

As part of the planning process, all existing and potential floodplain management activities and measures to mitigate property damage and impacts to community infrastructure were reviewed. The benefits, costs and general feasibility of each action were considered prior to making a recommendation to proceed with the action. Many of the proposed activities coincide with actions recommended in the 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation Plan and 2015 Master Plan Reexamination Report. All activities and measures have been grouped into the following six mitigation strategies: Preventative Measures, Property Protection, Natural Resource Protection, Emergency Services, Structural Projects and Public Information. The findings are as follows.

### PREVENTATIVE MEASURES

#### Planning and Zoning

The Township of Ocean Township can develop Geographic Information Systems (GIS) to increase the community's resiliency and enable them to better prepare for, respond to and recover from disasters. The components of the GIS should support facilities and public works infrastructure, land information, and floodplain management- related data layers and applications. This will be done as part of Round 2 Post-Sandy Planning Assistance Grant program.

#### Open Space Preservation

There are significant open space holdings within the SFHA, including holdings owned by the U.S. Government as part of the Barnegat National Wildlife Refuge. There are other large tracts owned by the New Jersey Department of Environmental Protection and the Ocean County Natural Land Trust for natural land preservation. The Township should continue to support acquisitions made by the State, County, and land trusts for open space preservation. Residents looking to pursue buyouts through the Blue Acres or NRCS programs should be encouraged to do so.

#### Floodplain Regulations

A Stormwater Management Ordinance is in place in accordance with the Stormwater permit requirements and Pinelands requirements. Additionally, state regulation for coastal areas (CAFRA) freshwater wetlands, coastal wetlands, waterfront development

and dam safety as well as Flood Hazard regulations (formerly Stream Encroachment) are all in place. Ocean Township has a Stormwater Management Plan as required by the Township's general discharge permit.

Ocean Township will adopt a Floodplain Management Ordinance as an outcome of this plan. Additionally, zoning regulations affecting the residential districts within the Special Flood Hazard Area will be looked at as part of the Phase 2 Post-Sandy Planning Assistance Grant. The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan recommends that Ocean Township accept the FEMA Advisory BFE floodplain maps to support pro-active floodplain management to assist property owners in rebuilding at or above regulatory standards when the new floodplain maps become effective. Ocean Township has adopted the Advisory BFEs.

### **Erosion Setbacks**

The Township of Ocean Township could adopt an erosion setback ordinance based on erosion rates along the Barnegat Bay. An erosion setback ordinance would reduce the need for erosion control structures along the shoreline, minimize property damage due to erosion, and maintain the natural shoreline dynamics. In order to maintain effective setback requirements, good scientific data must be used. Additionally, erosion rates change over time and would require a periodic reevaluation of the setback lines along the riverfronts.

### **Planning and Zoning**

Most of the Township area within the SFHA is built out or zoned for conservation. Zoning amendments have been suggested as part of the Phase 2- Post Sandy Planning Grants to allow for rebuilding to the new BFEs in the older, built out, waterfront communities without the need for variances. Additionally, waivers for permits were extended to October 30, 2013 post- Sandy. The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan recommends that Ocean Township continue participation in the CRS program and consider upgrading to the next class level.

### **Stormwater Management**

Ocean Township could adopt a recharge requirement for other than major developments.

### **Drainage System Maintenance**

The public works department maintains the Townships storm sewers, ditches and outfalls in accordance with the stormwater pollution prevention plan.

### **Building Codes**

Ocean Township has a Flood Damage Prevention Ordinance in place in accordance with the FEMA requirements. The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan recommends Ocean Township continue to enforce building codes to require building, renovations, and re-building meets or exceeds the Uniform Construction Code thus protecting homes from risk related to hazards including flooding, fire, wind, earthquake, and winter storm.

## **PROPERTY PROTECTION**

### **Acquisition**

Within Ocean Township, the main areas of flooding concern and therefore potential for acquisition are along the Bayfront. However, wholesale acquisition of properties within flood prone areas is not practical. Residents looking to pursue buyouts through the Blue Acres or NRCS programs should be encouraged to do so. If homes are to be acquired for floodplain protection, they should be done strategically, as selectively removing or relocating houses located throughout the Bayfront areas may isolate the remaining properties and would not reduce the need for municipal services. The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan recommends that one repetitive loss Bayfront home on Bryant Road be acquired and then the structures on the property removed from the floodplain permanently.

### **Relocation**

The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan recommends relocating a streetlight at Bryant Road that is located near the bayfront on a repetitive loss property to maintain light for responders during flood related hazards.

### **Building Elevation**

The Township of Ocean Township should require that newly constructed or substantial damaged buildings in SFHAs must comply with the most up-to-date base flood elevations.

The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan actions for Ocean Township include elevation projects for 203 homes to elevate and build to higher

standards that will mitigate impact of flood related hazards while maintaining residents in the community.

### **Retrofitting**

The Township should make information available about different floodproofing techniques in the construction office and encourage the floodproofing of non-residential buildings within the floodzone that do not meet the new BFEs. Dry floodproofing is most applicable to commercial structures which already have a substantial structural design. Most flood prone houses within Ocean Township are of a frame design with open crawl space making flood proofing a difficult operation. Wet flood proofing is currently recommended where a non-residential building is below the base flood elevation.

The Township should also make sure elevation certificates are accurate and complete for all structures within the SFHA area as well as require elevation certifications prior to starting construction and after completion of work.

### **Flood Insurance**

Ocean Township participates in the National Flood Insurance Program. Homeowners are encouraged to maintain flood insurance to protect against loss of structure and contents in case of flooding. The Township of Ocean Township can reduce the flood insurance rates for property owners by increasing their participating in the Community Rating System program. This plan is intended to gain points towards that program.

## **NATURAL RESOURCE PROTECTION**

### **Wetlands Protection**

There are many areas throughout the Township that contain wetlands. The wetlands are classified as deciduous wetlands, disturbed wetlands, herbaceous wetlands, managed wetlands, phragmites dominant wetlands and salt marshes. These wetlands provide the Township a vital asset during storms and floods. Not only do wetlands provide a natural buffer between buildings and the rivers, but they also slow the speed of surging floodwaters and provide an area for retention and recharge. State regulations through the NJDEP freshwater and coastal wetland permit programs are currently in place to limit development in these areas. The Township should continue to support and enforce these programs. The Township should also consider further

investigation of living shorelines to augment these areas and provide additional shoreline stabilization.

### **Erosion and Sediment Control**

The Standards for Soil Erosion and Sediment Control in New Jersey are regulated by the New Jersey Department of Agriculture and locally enforced through the Ocean County Soil Conservation District. The Township should continue to support and enforce these standards for all applicable development.

### **Natural Area Preservation**

Much of the land in Ocean Township along the bay is publically owned for conservation.

### **Natural Area Restoration**

The Township could also implement living shoreline or other restoration projects for specific areas within the floodplain as needed.

### **Coastal Barrier Protection**

There are a couple of small public and private bay beaches along the bayfront. There are no dunes associated with those beaches and most are less than 30 feet wide. Ocean Township extends to the mouth of Barnegat Bay and there are some islands that have small beach heads associated with them. These are uninhabited and controlled by the state of New Jersey as open space within the Island Beach State Park system.

### **Best Management Practices**

Best Management Practices are techniques that have been developed to address the adverse impacts that result from unmanaged land development. These methods serve to control not only the storm water quantity but also the quality and groundwater recharge in order to mitigate the adverse effects on the hydraulic system and to replicate the natural run off patterns. Best management practices are mandated through the Township's Stormwater management Ordinance. These are in place.

## **EMERGENCY SERVICES**

### **Hazards Warning**

Ocean Township already alerts its residents to hazards through a Reverse 911 calling system. The Police and Fire Departments notify residents of emergencies via loudspeakers and an Emergency Broadcast System is utilized in Ocean County.

### **Hazards Response Operations**

The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan recommends that Ocean Township undertake the following actions in regards to hazards response operations:

- Develop and implement Shelter Management Plans to mitigate the impact of hazards that require evacuation on residents.
- Continue CERT to improve outreach and community member capability for disaster mitigation, preparedness, response and recovery
- Continue “We Care” Program to look out for residents with special needs during emergencies. This program assists in getting the right information and assistance to community members who need additional assistance during a disaster and may not receive information effectively from other outlets.

### **Critical Facilities Protection**

The municipal building, police department, fire and first aid and both Township schools are located outside of the 100 year floodplain.

### **Health and Safety Maintenance**

The Police Department is primarily responsible, after flooding events, to patrol evacuated areas to prevent looting. Clearing streets and removing debris is performed through the Township Department of Public Works. Vaccinating of the residents would be handled by the Ocean County Health Department.

## **STRUCTURAL PROJECTS**

### **Levees/ floodwalls**

Levees and floodwalls are not considered a feasible method of protection because of the many inlets, lagoons, and backbay areas of the bay front. The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan recommends installing riprap along the shoreline to protect from erosion and flood related hazards.

### **Storm Drain Improvements**

The Ocean Township Department of Public Works should be encouraged to be more proactive in cleaning, repairing, and upgrading storm sewer and other conveyance types such as ditches, as well as identify areas of ponding and other problem areas. Storm water structures should be upgraded if necessary and when possible.

## **PUBLIC INFORMATION**

### **Map Information**

Flood insurance rate maps are available for review in the Construction Office for residents who want to determine whether their property is in a flood zone. A log is kept of information provided to residents who come in to view maps or who call with questions. Mapping can be obtained from the FEMA website by inputting the address of the property of interest.

### **Outreach Projects**

The Floodplain Management Plan Committee can set up a booth at local events. Additionally, information on flood hazards can be mailed out annually with tax bills. Depending on the information included on the pamphlets, this activity could be eligible for CRS credit. The 2014 Ocean County Multi-Jurisdictional All Hazards Mitigation plan recommends the following outreach actions for Ocean Township:

- Continue police outreach programs in schools to include children in outreach and improve families capability for disaster mitigation, preparedness, response, and recovery

- Continue Junior Police Academy Program to include youth in hazard related education and to support them in conducting effective, relevant outreach to community
- Continue “We Care” Program to look out for residents with special needs during emergencies. This program assists in getting the right information and assistance to community members who need additional assistance during a disaster and may not receive information effectively from other outlets.
- Maintain, improve, and expand education and awareness programs to provide effective and relevant information to community members

### **Real Estate Disclosure**

Form is provided to local realtors approximately twice per year

### **Library**

The Ocean County Library System should keep current FEMA publications on flooding. The Township should check the Waretown Branch to ensure all FEMA publications are up to date.

### **Technical Assistance**

The construction office has several pamphlets and booklets concerning flood preparedness and the National Flood Insurance Program, flood venting, etc. It was discussed as a way to improve the dissemination of information that an additional information rack be placed at the Committee Room so the public would have enhanced access to the information available.

### **Environmental Education**

To increase environmental awareness and knowledge of flood risks, the Township should coordinate with the Environmental Commission to raise awareness about environmental and flooding within the community.



## VIII. ACTION PLAN

The previous chapter presented a wide range of possible floodplain management activities to address the goals established by the Floodplain Management Plan Steering Committee. This chapter presents an Action Plan that describes which activities should be implemented, who is responsible for implementing the activity, the deadline for completing the activity, the proposed budget and the funding source. The Committee realizes that there are many proposed activities, and that not all activities can be completed immediately based on available funds. The Township should initially focus on those projects that are economically feasible and will aid in the recovery and resiliency of the Township. The following priority levels were therefore established:

- High Priority – Activities in this category are critical to protecting the Township’s critical facilities and creating a more resilient community. The benefits of these activities far outweigh the costs. Funding for these projects is currently in place or there is the high likelihood for grant funds to be secured in the near future. It is recommended that the majority of these projects be completed prior to the next hurricane season.
- Medium Priority – Activities in this category are necessary to increase the Township’s resiliency and provide flood protection. Benefits outweigh the costs; however, funding has not yet been secured for those activities with physical improvements. The Township should continue to seek grants and other funding sources for these activities. It is recommended that these projects be completed in the next three years as funding becomes available.
- Low Priority – Activities in this category will mitigate hazard risks for the Township and are cost-effective. However, it is understood that these projects are not as critical as those identified as high or medium priority and that funding may be difficult to obtain for some of the larger construction projects.
- Ongoing – Activities in this category are required on a continuous or regular basis to be effective. These activities do not require special funds outside of the Township’s standard budget.

The following is the recommended Action Plan for the Township of Ocean:

**PREVENTATIVE MEASURES**

Action Item	Priority	Responsible Party	Target Deadline	Budget	Funding Source
Prepare a 5-year Capital Improvement Plan	High	Township Staff and T&M Associates	July 2015	\$30,000	NJDCA Grant (secured)
Create an automated and expedited system for zoning and construction permit administration	High	Township Staff and T&M Associates	July 2015	\$25,000	NJDCA Grant (secured)
Develop a Geographic Information System (GIS) Program	High	Township Staff and T&M Associates	July 2015	\$50,000	NJDCA Grant (secured)
Update Zoning Ordinances in the waterfront development districts as they relate to resiliency	High	Township Staff and T&M Associates	August 2015		Township General Funds
Continue to support open space preservation throughout the Township	Low	County, State, Federal, and nonprofit partners	Ongoing	Township Staff Time	TBD
Increase participation in the Community Rating System (CRS) Program	Medium	Township Staff	October 2015	Township Staff Time	Township General Funds
Enforce the Township Stormwater Management Plan & Ordinance	Ongoing	Planning, Zoning, Code Enforcement & Construction Departments	Ongoing	Township Staff Time	Township General Funds

**PROPERTY PROTECTION**

Action Item	Priority	Responsible Party	Target Deadline	Budget	Funding Source
Update the Township's Flood Damage Prevention Ordinance	High	Township Staff	August 2015	Township Staff Time	Township General Funds
Relocate a streetlight at Bryant Road	High	Township Staff			HMGP
Acquire one repetitive loss bayfront home on Bryant Road and remove structures from the	High	Township staff			HMGP

floodplain permanently.					
Elevate 203 homes and build to higher standards	High	Township Staff			HMGP

**NATURAL RESOURCE PROTECTION**

Action Item	Priority	Responsible Party	Target Deadline	Budget	Funding Source
Continue to enforce NJDEP and soil erosion and sediment control standards for all development	Ongoing	Planning, Zoning, Code Enforcement & Construction Departments	Ongoing	Township Staff Time	Township General Funds

**EMERGENCY SERVICES**

Action Item	Priority	Responsible Party	Target Deadline	Budget	Funding Source
Develop and implement Shelter Management Plans to mitigate the impacts of hazards that require evacuation of residents					
Continue CERT to improve outreach and community member capability for disaster mitigation, preparedness, response, and recovery					
Continue “we care” program to look out for residents with special needs during emergencies. This program assists in getting the right information and assistance to community members who need additional assistance during a disaster and may not receive information effectively from other outlets.					
Install emergency backup generators at Town Hall, The Department of Public Works, Construction and Zoning Office, and First-Aid	High	Township Staff/Contractor			HMGP Grant

Install a SCADA system	High	Township Staff/Contractor			HMGP Grant
Allocate a place for debris removal		Township Staff/Contractor			
Provide more radios for emergency communication		Township Staff/Contractor			

**STRUCTURAL PROJECTS**

Action Item	Priority	Responsible Party	Target Deadline	Budget	Funding Source
Install riprap along the shoreline to protect from erosion and flood related hazards		Township Staff/Contractor			Possible HMGP Grant
Storm drain and channel maintenance	Ongoing	Township Staff	Ongoing	Township Staff Time	Township General Funds

**PUBLIC INFORMATION**

Action Item	Priority	Responsible Party	Target Deadline	Budget	Funding Source
Implement the GIS program and make available to the public	High	Township Staff and T&M Associates	July 2015	Township Staff Time	Township General Funds
Continue police outreach programs in schools to include children in outreach and improve families capability for disaster mitigation, preparedness, response, and recovery	Low	Township Staff		Township Staff Time	Township General Funds
Continue Junior Police Academy Program to include youth in hazard related education and to support them in conducting effective, relevant outreach to community	Low	Township Staff		Township Staff Time	Township General Funds
Continue "We Care" Program to look out for residents with special	Low	Township Staff		Township Staff	Township General Funds

<p>needs during emergencies. This program assists in getting the right information and assistance to community members who need additional assistance during a disaster and may not receive information effectively from other outlets.</p>				<p>Time</p>	
<p>Maintain, improve, and expand education and awareness to provide effective and relevant information to community members</p>	<p>Low</p>	<p>Township Staff</p>		<p>Township Staff Time</p>	<p>Township General Funds</p>

## IX. PLAN IMPLEMENTATION & MAINTENANCE

This floodplain management plan is intended to be a dynamic document, adapting to changes in flood hazards and the needs of the Township of Ocean. The recommendations and actions identified in this plan should be implemented by the designated lead for each action item as funding and resources become available. Changes in future conditions and funding availability may determine the timeline for when some actions get implemented. As the plan is evaluated each year and updated every five, the goals and objectives of this plan should also be evaluated and revised as necessary.

The Township's CRS Coordinator will be responsible for monitoring the plan and ensuring that the floodplain management plan committee will meet at least once per year to aid with the yearly plan evaluation. The original members of the committee will remain, unless they wish to be replaced. Then a like representative will replace them. The committee will review the plan on annual basis to evaluate changes to hazard conditions, goals and objectives, and progress made towards objectives. The committee will identify any necessary changes or revision to the plan. The annual review will include:

- A review of the original plan;
- Identification of any flood, hurricane, or other disaster that has impacted Ocean since the last review;
- Review of action items from the original plan, including what has been accomplished;
- Discussion on why actions have not been completed;
- Where vulnerabilities have increased, identify why and what additional measures can be taken to decrease the vulnerability of that area to flood hazards;
- Recommendations for new projects or revised action items; and
- Survey of available resources to address action items.

This Floodplain Management Plan will be updated every five years and reviewed for CRS credit according to the CRS Coordinator's Manual in effect at the time. The 5-year update must include the following steps to retain CRS credit:

- The update must be conducted by a committee;
- A public meeting must be conducted to review and receive comments on the draft update;

- Review of new studies, reports, and technical information of the Township's needs, goals, and plans for the area;
- New floodplain or hazard mapping;
- Identification of additional repetitive loss properties or completed mitigation projects;
- Discuss any major flood or other disasters that have occurred since the plan was adopted;
- Any other changes in flooding conditions or development exposed to flooding or other hazards;
- Goals must be evaluated to determine if they are still appropriate;
- The action plan will be revised to account for projects that have been completed, dropped, or changed, and for changes in the hazard and problem assessments; and
- The update will be adopted by the Township's governing body.

## **Appendix A: Steering Committee Meeting Outlines**



**Appendix B: Public Meetings Information**

## **Appendix C: Sample Letter to Outside Agencies**

**Appendix D: Effective FIRM Maps**

**Appendix E: Advisory Base Flood Map**

## **Appendix F: Preliminary FIRM Map**

## **Appendix G: Superstorm Sandy Surge Elevation Maps**

**Appendix H: Repetitive Loss Areas Map**

**Appendix I: Critical Facilities Map**



**Appendix J: SLOSH Maps**

**Appendix K: Sea Level Rise Maps**

**Appendix L: Marsh Retreat Maps**

**Appendix M: Natural Features Map**

