



CITY OF LONG BEACH

New York

Floodplain Management Plan

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EXECUTIVE SUMMARY

The City of Long Beach (the city) has significant exposure to flooding as one of New York State’s barrier island communities. The city is bordered by the Atlantic Ocean to the south and the Reynolds Channel to the north, and is impacted by heavy rainfall events. Historically and most recently, storm events such as Superstorm Sandy have demonstrated how the City of Long Beach can be significantly impacted by flooding.

The City of Long Beach is subject to multiple sources of flooding and is continuing to improve its floodplain management by developing more detailed information on the frequency, location, and damages caused by flooding to support planning, mitigation actions, and regulations to reduce future impacts of this hazard.

Although the city participates in the Nassau County Multi-Jurisdictional Hazard Mitigation Plan—which includes an analysis of flood risks and flood mitigation actions—Long Beach is continually seeking additional ways to enhance floodplain management and mitigate flood impacts. Additionally, the City of Long Beach participates in the federal Community Rating System (CRS) Program. This floodplain management plan demonstrates a concerted effort to develop a more detailed and updated strategy for reducing flood insurance premiums.

What is a Floodplain Management Plan?

Recognizing that there is no one solution for mitigating flood hazards, planning provides a mechanism to identify the best alternatives within the capabilities of a jurisdiction. A floodplain management plan sets the course for reducing the risk associated with flooding by:

- Ensuring that all possible floodplain management activities are reviewed and implemented so that local problems are addressed by the most appropriate and efficient solutions.
- Ensuring that floodplain management activities are coordinated with one another and with other community goals and activities, preventing conflicts and reducing the cost of implementing each individual activity.
- Coordinating local floodplain management activities with federal, state, and regional programs.
- Educating residents on the flooding hazard, loss reduction measures, and the natural and beneficial functions of a floodplain.
- Building public and political support for mitigation projects.
- Fulfilling planning requirements for obtaining state or federal assistance.
- Providing a framework and basis for city decision makers such as the Architectural Review Board and Zoning Board of Adjustment to make decisions affecting development and use of floodplains.
- Facilitating the implementation of floodplain management and mitigation activities through an action plan that has specific tasks, staff assignments, and deadlines.

The City of Long Beach Floodplain Management Plan identifies 55 flood hazard mitigation initiatives, chosen through a facilitated process that focused on meeting the objectives outlined above.

The Community Rating System Program

The CRS Program is a voluntary program within the National Flood Insurance Program (NFIP) that encourages floodplain management activities that exceed the minimum requirements of the NFIP. The CRS Program outlines creditable activities that fulfill the program goals of reducing flood losses, facilitating accurate insurance ratings, and promoting awareness of flood insurance. The activities are organized in the following four categories:

- Public information





- Mapping and regulations
- Flood damage reduction
- Flood preparedness

Flood insurance premiums in participating communities are discounted to reflect the reduced flood risk resulting from community actions developed to meet the CRS goals. A Class 1 community receives a 45-percent premium discount for properties within the special flood hazard area (SFHA), and a Class 9 community receives a 5-percent discount. Discounts for classifications between those two vary in 5-percent increments. Class 10 communities are those that do not participate in the CRS; they receive no discount. The City of Long Beach currently is a Class 7 community in the CRS Program, resulting in a 15-percent discount for eligible policy holders. The city goes through an annual recertification and a re-verification process every 5 years to maintain or improve its rating. This floodplain management plan will help the city maximize its credit potential under the CRS.

Plan Development Methodology

The City of Long Beach Floodplain Management Plan (FMP) was developed using the following ten-step methodology described in the 2017 CRS Coordinator’s Manual:

- **Step 1. Organize to prepare the plan:** A Planning Committee consisting of government officials, members of the public, and representative stakeholders in the city was assembled to oversee the development of the plan. The committee met six times over a 3-month period to provide guidance and oversight to the planning process. Coordination with regional, state, and federal agencies involved in flood hazard mitigation occurred throughout the plan’s development. The committee completed a comprehensive review of existing plans and programs that can support flood hazard mitigation.
- **Step 2. Involve the public:** The Planning Committee developed and implemented a public involvement strategy that included public meetings, multiple media releases, and surveys of the public and stakeholder groups to provide the public an opportunity to participate in the planning process. Planning Committee meetings were open to the public and advertised.
- **Step 3. Coordinate:** The FMP incorporates other plans and other agencies’ efforts. The Planning Committee contacted other agencies and organizations to determine whether (1) they had studies, plans, or information pertinent to the City of Long Beach FMP; (2) their programs or initiatives may affect the city’s program; and (3) they could support the city’s efforts.
- **Step 4. Assess the hazard:** The Planning Committee reviewed, analyzed, and summarized existing data regarding the city’s flood hazards. The Committee focused on the sources, frequency, extent, and causes of flooding.
- **Step 5. Assess the problem:** The Planning Committee collected and summarized data on the city assets at risk to flooding and the impacts of flooding on people, property, infrastructure, the local economy, and natural floodplain functions.
- **Step 6. Set goals:** The Planning Committee identified a series of goals and objectives to guide the development of an action plan. The goals were established to be consistent with other community goals.
- **Step 7. Review possible activities:** The Planning Committee reviewed and provided input on the types of activities that could be used to prevent or reduce the severity of the problems established in Step 5.
- **Step 8. Draft an action plan:** After reviewing the alternatives for activities, a balanced action plan was developed to specify the activities appropriate to the community’s resources, hazards, and vulnerable properties. Actions included activities that might prevent flood problems from getting worse and to protect new construction from the effects of natural hazards.



- **Step 9. Adopt the plan:** A pre-adoption draft of the plan will be sent for review and comment to the Insurance Services Office (ISO), the contractor for the CRS Program. After the ISO grants pre-adoption approval, the final adoption phase will begin, and the FMP will be adopted by the City Council.
- **Step 10. Implement, evaluate, and revise:** This plan includes an implementation and maintenance section that details the formal process for ensuring that the plan remains an active and relevant document. The maintenance process includes a schedule for monitoring and evaluating the plan's progress annually and revising it every 5 years. The implementation and maintenance process includes continued public involvement and incorporating recommendations within this plan into other planning mechanisms of the city, such as the Comprehensive Plan, Emergency Operations Plan, and the Nassau County Hazard Mitigation Plan.

The Flood Hazard Risk Assessment

Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards such as flooding. It allows emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets. The risk assessment for this plan used the best-available data, science, and technology, with tools that included geographic information system (GIS) and Federal Emergency Management Agency's (FEMA) risk assessment platform, Hazards U.S.—Multi-Hazard (HAZUS-MH). HAZUS-MH is a program that includes extensive inventory data, such as demographics, building stock, and critical facilities. It uses multiple models to estimate potential losses from natural disasters. The program maps hazard areas and estimates damage and economic losses for buildings and infrastructure. Some key findings from the risk assessment of this plan are listed below:

- The risk assessment profiles several types of flood hazards within the City of Long Beach: flooding in FEMA-designated SFHAs, coastal flooding and storm surge, coastal erosion, stormwater/urban drainage flood areas, and increased flooding due to sea level rise.
- There have been 19 flood related events in Nassau County that have caused sufficient damage to trigger a presidential disaster declaration since 1953. This equates to a significant flood event approximately every 3.5 years.
- Nearly all of the City of Long Beach is located in the SFHA (AE and VE zones) with the remaining areas located in the 0.2-percent annual chance floodplain (X zone).
- The risk assessment estimated \$3.14 billion in replacement cost value of building exposure to the 1-percent annual chance flood, representing 35.48 percent of the total replacement cost of the City of Long Beach.
- The analysis identified 30 critical facilities exposed to floods up to the Sea, Lake, and Overland Surges from Hurricanes model (SLOSH) Category 4 storm event.
- A 1-percent annual chance flood event in the City of Long Beach could displace 33,498 individuals, with nearly all of the residents of the city requiring short-term sheltering.
- The analysis estimates that a 1-percent annual chance flood event in the City of Long Beach could cause damage to almost 7,047 structures, totaling over \$1.12 billion in property damage.
- A 1-percent annual chance flood event in the City of Long Beach could generate almost 45,300 tons of building-related (excluding contents) debris.

Mitigation Goals, and Objectives

The Planning Committee identified goals and objectives for the FMP. Table ES-1 presents the goals and objectives for the city FMP. These goals and objectives provide a framework within which the Planning Committee worked to create a plan focused on the needs of the city.



Table ES-1. City of Long Beach Floodplain Management Plan Goals and Objectives

Goals	Objectives
<p>Goal 1: Protect the City of Long Beach’s built environment from flooding and sea level rise.</p>	Objective 1.1 Prevent backflow from all outfalls.
	Objective 1.2 Prevent backflow flooding of the storm drain on Laurelton and West Bay Drive.
	Objective 1.3 Protect West Park Avenue from flooding due to high tide and/or heavy rainfall.
	Objective 1.4 Protect the area at Riverside Boulevard and Pine Street from flooding.
	Objective 1.5 Protect the intersection of National Boulevard and Park Avenue from stormwater flooding due to heavy rainfall.
	Objective 1.6 Protect Park Avenue, between New York Avenue and Nevada Avenue, from flooding.
	Objective 1.7 Stabilize and protect the bayfront on the northern side of the city from high tides, storm surge, and stormwater flooding from heavy rainfall events.
	Objective 1.8 Enhance the city’s stormwater management system to protect against the 100-year storm event.
	Objective 1.9 Protect critical city facilities from flooding to ensure they continue to operate during a flood event.
	Objective 1.10 Protect the West End from storm and flood damage similar to the effects of Superstorm Sandy.
	Objective 1.11 Protect Long Beach Boulevard from storm surge.
	Objective 1.12 Protect the area near State Street and Franklin Boulevard from flooding.
	Objective 1.13 Protect the area near Laurelton Boulevard and West Bay Drive from flooding.
	Objective 1.14 Protect the area from the canals to Franklin Boulevard and from East Park Avenue to East Hudson Street from flooding.
<p>Goal 2: Make the City of Long Beach more resilient to flooding and sea level rise.</p>	Objective 2.1 Update the city’s strategy for maintaining a resilient community.
	Objective 2.2 Update city regulations to foster additional resilience.
	Objective 2.3 Ensure that the city’s businesses can continue to operate after a flood event.
<p>Goal 3: Protect the natural environment from the impacts of flooding.</p>	Objective 3.1 Protect the city from erosive processes.
	Objective 3.2 Maintain Jones Inlet to prevent wind against tide/tidal stacking.
	Objective 3.3 Maximize open space throughout the city.
	Objective 3.4 Stabilize and protect the dune system on the oceanfront to provide storm protection and natural habitat.
<p>Goal 4: Educate the public, officials, and other stakeholders about the flood hazard and what can be done to mitigate its impacts.</p>	Objective 4.1 Ensure that local officials attend current training on regulatory issues and best practices.
	Objective 4.2 Ensure that public information efforts are coordinated among city department and stakeholder groups.
	Objective 4.3 Provide information to individuals throughout the city on the flood hazard and property protection measures they can take.
	Objective 4.4 Increase flood insurance coverage held by individuals and businesses.
<p>Goal 5: Ensure effective response to flood events to save lives and protect property.</p>	Objective 5.1 Ensure that an effective warning system is in place in the city.
	Objective 5.2 Enhance the public’s capabilities of responding to flood events.
	Objective 5.3 Enhance the emergency response and emergency management community’s capabilities to respond to flood events.



These planning components all directly support one another. The mitigation initiatives identified achieve multiple objectives.

Mitigation Initiatives

The action plan is a key element of the floodplain management plan. Through the implementation of the action plan, the City of Long Beach can strive to become flood-disaster resilient. The action plan includes an assessment of the capabilities of the city to implement hazard mitigation initiatives and a mitigation strategy matrix and prioritization matrix that identify the following:

- Description of the action
- Estimated costs
- Objectives met
- Timeline for implementation
- Lead implementation agency (or agencies)
- Funding sources
- Estimated benefits
- Prioritization

For the purposes of this document, mitigation initiatives are defined as activities designed to reduce or eliminate losses resulting from the impacts of flooding.

Although the CRS Program was one of the driving influences for preparing this plan, this plan does not focus solely on CRS credits. It was important to the city and the Planning Committee to examine initiatives that would work through all phases of emergency management. Some of the initiatives outlined in this plan fall outside CRS credit criteria, and CRS creditability was not the focus of their selection. Rather, the focus was on the initiatives’ effectiveness in achieving the goals of the plan and whether they are within the city’s capabilities. Table ES-2 presents a summary of the hazard mitigation initiatives identified in the action plan.

Table ES-2. Flood Hazard Mitigation Initiatives Identified

Initiative Number	Initiative	Priority (High, Med., Low)
1	Adopt appropriate enhanced regulatory standards, specifically those that account for future flood conditions and climate change, such as: <ul style="list-style-type: none"> • Increasing bulkhead elevation requirements. • Increasing freeboard requirement to 3 feet. • Establishing cumulative substantial improvements • Establishing threshold lower than 50% for substantial damages. • Establishing limitations on enclosures beneath elevated structures. • Requiring raising of lots on new development or substantial improvements. • “Green Zoning” focusing on coastal resiliency and green infrastructure enhancements. • Establishing a bayfront overlay zone to guide development in critical waterfront areas. • Removing restrictions on green infrastructure currently in place in the city Code of Ordinances. 	High
2	Adopt an updated comprehensive plan that integrates hazard mitigation, embraces resiliency, and includes a Local Waterfront Revitalization Program and comprehensive stormwater flood management study. Subsequently, update zoning based on the adopted comprehensive plan.	High
3	Participate in regional watershed management and develop a Watershed Management Plan.	Low



Initiative Number	Initiative	Priority (High, Med., Low)
4	Support updates to the Nassau County Hazard Mitigation Plan (HMP) and incorporate floodplain management plan actions into the City of Long Beach’s annex within the HMP.	High
5	Support the U.S. Army Corps of Engineers (USACE) Nassau County Back Bays Coastal Storm Risk Management Feasibility Study and work with USACE to implement identified projects. Specifically, support projects that will provide adequate protection from future flooding conditions.	Low
6	Maintain the all-hazards Emergency Operations Plan.	High
7	Develop CRS-credited Flood Warning and Response Plan and incorporate Stevens Flood Advisory System into emergency operations, outreach, and the city website. Explore implementing an automated flood warning system using the following tide gage locations for forecasting: <ul style="list-style-type: none"> East Rockaway Inlet: http://hudson.dl.stevens-tech.edu/sfas/d/index.shtml?station=U207 Reynolds Channel at Point Lookout: http://hudson.dl.stevens-tech.edu/sfas/d/index.shtml?station=U206 	High
8	Implement and participate in regional precipitation monitoring networks and other programs that enhance flood threat recognition capability.	Low
9	Conduct regular citywide tests of emergency warning system and include the public in tests whenever possible.	High
10	Develop a CRS User Group for Nassau County South Shore communities.	Medium
11	Increase the capabilities of city staff by having staff undergo training, including FEMA Emergency Management Institute (EMI) training and Certified Floodplain Manager (CFM) certification.	High
12	Promote open space or flood-compatible land uses in identified flood hazard areas via techniques such as: easements, setbacks, sensitive area tracts, community education, natural resource inventory; comprehensive planning; zoning provisions; floodplain protection ordinance; and the environmental review process.	High
13	Develop and maintain a CRS credited Program for Public Information to better organize, implement, and review outreach for flooding and other hazards.	High
14	Develop and maintain a CRS credited Pre-Flood Plan. Include actions within the Plan that discuss post-flooding disaster building requirements.	High
15	Add flood information outreach into the city’s “Resident Welcome Package” for new residents.	Medium
16	Expand outreach programs in schools to include children in outreach and to improve families’ disaster response capabilities. Schools within the City of Long Beach include: <ul style="list-style-type: none"> Long Beach Public Schools Long Beach Catholic Regional School Montessori School of Long Beach Torah High School Other educational institutions 	High
17	Expand outreach through designed outreach videos and social media posts on flooding. Identify and complete targeted outreach efforts.	High
18	Work with civic organizations, non-profit organizations, houses of worship, and realtors to expand stakeholder-delivered outreach.	High
19	Provide information on residential, business, and natural resource grant programs to residents.	High
20	Maintain city website for pre-storm information dissemination, including shelter locations.	High
21	Re-establish signage of coastal evacuation routes.	High
22	Promote flood insurance for commercial properties, including contents coverage. Work with realtors, insurers, and civic organizations to increase delivery of messaging.	High



Initiative Number	Initiative	Priority (High, Med., Low)
23	Promote flood insurance for rental properties, including contents coverage for renters. Work with realtors, insurers, and civic organizations to increase delivery of messaging.	High
24	Promote flood insurance for homeowners, including contents. Work with realtors, insurers, and civic organizations to increase delivery of messaging.	High
25	Provide education for acquisition or elevation of repetitive loss properties. Urge Nassau County to provide additional support for potential grant applications.	High
26	Educate residents on green infrastructure upgrades that can be made to residential properties to help reduce risk to flooding and other hazards.	Medium
27	Explore the use of green infrastructure to reduce urban flooding.	Medium
28	Construct stormwater wetlands to maximize removal of pollutants from stormwater runoff.	Low
29	Install a bio retention system in lawns, median strips, parking lot islands, unused lot areas, certain easements, or other areas that would benefit from stormwater mitigation.	Medium
30	Remove un-utilized or under-utilized impervious surfaces with native or maintained vegetation. Where possible, redirect runoff to these new pervious surfaces.	Low
31	Maintain and improve dunes and natural beach habitat through diverse native plantings (including tree plantings on the backside of the dune) to protect critical habitat of endangered and threatened species, strengthen the integrity of the dune, and encourage beach and dune growth for storm protection.	High
32	Support the USACE beach repair, restoration, and replenishment projects. This also includes oceanfront groin and jetty repairs and modifications.	High
33	Support dredging, revetments, or channelization where appropriate.	Medium
34	Work with USACE, local education institutions, and civic organizations to develop an erosion monitoring program.	Medium
35	Work with USACE, New York State (NYS), and the Coast Guard to ensure channels and local inlets are properly marked and dredged.	Low
36	Install/upgrade backflow prevention flaps or valves at Edwards Boulevard, from Park Avenue to Broadway.	High
37	Install/upgrade backflow prevention flaps or valves at National Boulevard, from Park Avenue to Broadway.	High
38	Install/upgrade backflow prevention flaps or valves at the intersection of Riverside Boulevard and Pine Street.	High
39	Install/upgrade backflow prevention flaps or valves at West Park Avenue, from New York Avenue to Nevada Avenue.	High
40	Install/upgrade backflow prevention flaps or valves at the intersection of State Street and Franklin Boulevard.	High
41	Install/upgrade backflow prevention flaps or valves at the intersection of Laurelton Boulevard and West Bay Drive.	High
42	Install/upgrade backflow prevention flaps or valves at Franklin Boulevard, between East Park and Hudson.	High
43	Maintain stormwater system through regular/emergency cleaning and provide outreach to residents to ask them to alert Public Works of clogs and to educate them on how the valves work and how to help keep storm drains free of trash and debris that can clog the valves.	High
44	Consider new stormwater system technologies to mitigate stormwater pollution and prevent potential damage to backflow prevention devices.	Medium
45	Continue to regrade and upgrade urban flooding prone roadways to increase runoff and increase water retention.	Medium
46	Install pump stations (including backup generators) at appropriate locations to decrease urban flooding.	High
47	Complete pump station construction on Tennessee Avenue.	High



Initiative Number	Initiative	Priority (High, Med., Low)
48	Work with utility providers (Public Service Enterprise Group Inc. [PSEG], National Grid, Verizon, etc.) to protect utilities. Upgrade underground utilities (water, sewer, drainage, gas, and electric) as major sections of streets are reconstructed.	Medium
49	Explore installation of a sea wall along North Shore. Consider modified sea wall with green infrastructure components such as pocket wetlands and oyster reef habitat to strengthen the system with natural features and allow for natural protection from future flood conditions. Consider greenway features adjacent to sea wall including vegetation capable of absorbing stormwater and robust enough to survive saltwater intrusion.	Low
50	Locate new (or retrofit existing) critical facilities—including lifeline facilities such as fire stations, wells, stormwater pumps, and sewer lift stations—above the 500-year flood level (where possible) to allow for continuity of operations under current and future flood conditions. Include retrofitting to prevent buoyancy of slabs during flood events.	High
51	Identify critical facilities/infrastructure that require early notification during flood responses.	High
52	Purchase temporary storm surge barriers to be deployed around critical facilities that cannot be raised or retrofit to protect from flooding.	Medium
53	Complete North Shore Critical Infrastructure Project on the shoreline from Park Avenue to Monroe Boulevard. Specifically: <ul style="list-style-type: none"> Stabilize the shoreline through installation of bulkheading to the BFE. Install stormwater pump station at Riverside. Complete utility upgrades and new roadways. 	High
54	Repair and install bulkheads on public waterfront to protect from coastal erosion. This includes new public bulkheads connecting existing private bulkheads in the West End from Ohio Avenue and California Street as well as on street end on Lindell Boulevard, a bulkhead extending from Washington Boulevard to Magnolia Boulevard, and two bulkheads along the eastern border of the two western canals.	High
55	Elevate/protect critical roadways, particularly evacuation routes such as Long Beach Boulevard (north of Park Avenue) to account for current and future flooding conditions.	Low

Implementation

Full implementation of the recommendations of this plan will require time and resources. This plan reflects an adaptive management approach in that specific recommendations and plan review protocols are provided to evaluate changes in vulnerability and action plan prioritization after the plan is adopted. The true measure of the plan’s success will be its ability to adapt to the ever-changing needs of hazard mitigation. Funding resources are always evolving, as are programs based on state or federal mandates.

The City of Long Beach has a long-standing tradition of proactive response to issues that may impact its citizens. The city’s commitment to proactive floodplain management is evidenced by the development of this plan. The framework established by this plan will help maintain this tradition in that it identifies a strategy that maximizes the potential for implementation based on available and potential resources. It commits the city to pursue initiatives when the benefits of a project exceed its costs. The city developed this plan with public input. These techniques will set the stage for successful implementation of the recommendations in this plan. The City Council will assume responsibility for adopting the recommendations of this plan and committing city resources toward its implementation as the city’s budget permits.

Plan Maintenance Procedures

Floodplain management planning is an ongoing process. Section 7 (Plan Maintenance) of this plan presents procedures for FMP monitoring, integration, evaluation, and updating. The Planning Committee will continue ongoing mitigation efforts to implement the FMP and revise and update the FMP as necessary.





To monitor implementation of the FMP, Planning Committee members will meet annually to discuss the status of FMP implementation and will prepare a report summarizing the status of actions outlined in the FMP and any needed updates. The mitigation evaluation will address changes as new flood events occur, as the area is developed and redeveloped, and as more information is learned about flood hazards and their impacts. The evaluation will include an assessment of (1) whether the planning process and actions have been effective, (2) whether development or other issues warrant changes to the FMP or its priorities, (3) the progress toward achievement of the city’s goals, and (4) whether changes are warranted. The FMP will be updated at a minimum within a 5-year cycle.

Point of Contact

To request information or provide comments regarding this FMP, please contact the City of Long Beach Department of Public Works. Specific contact information is provided below:

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1 West Chester Street
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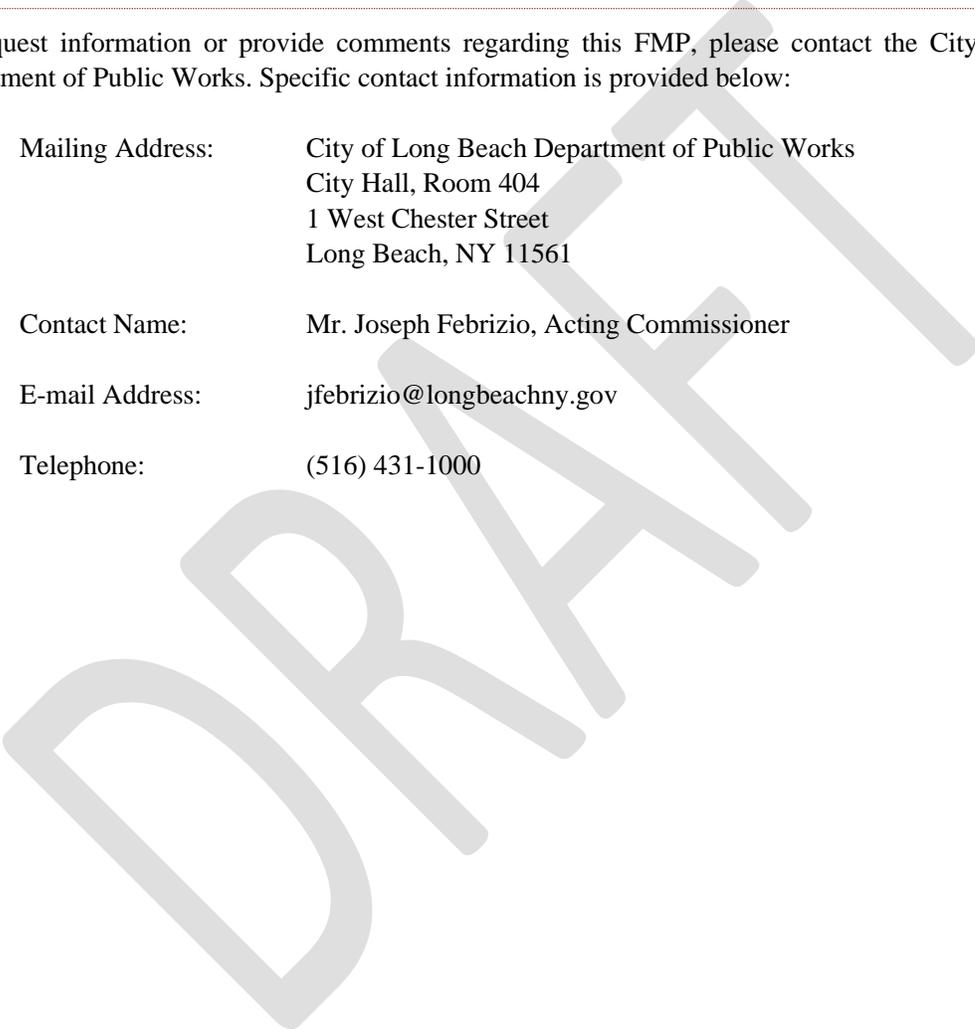




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SECTION 1. INTRODUCTION

1.1 WHY PREPARE THIS PLAN?

Flood hazard mitigation is a way to reduce or alleviate the loss of life, personal injury, and property damage that can result from flooding through long- and short-term strategies. It involves strategies such as planning, policy changes, programs, projects, and other activities that can mitigate the impacts of floods. The responsibility for flood hazard mitigation lies with many, including private property owners, business, industry, and local, state, and federal government.

Numerous state and federal programs and regulations promote flood hazard mitigation planning. Notable among these are two programs of the Federal Emergency Management Agency (FEMA): The National Flood Insurance Program (NFIP) and the Community Rating System (CRS) Program. These programs provide benefits in the form of flood insurance (NFIP) and flood insurance premium reductions (CRS Program) for communities that meet minimum requirements for floodplain management. The City of Long Beach (the city) participates in the NFIP and the CRS Program.

The city has prepared this new floodplain management plan (FMP) as an up-to-date tool for flood preparedness and flood hazard mitigation. Elements and strategies in this plan were selected because they meet various state or federal program requirements as well as address the flood risk to the City of Long Beach and its citizens.

This plan identifies resources, information, and strategies for reducing risk from flood hazards. It will help guide and coordinate mitigation activities. The plan was developed to meet the following objectives:

- Increase the flood resilience for the City of Long Beach.
- Meet the needs of the City of Long Beach as well as state and federal requirements.
- Meet planning requirements allowing the City of Long Beach to remain in the CRS program by earning credit under Activity 510.
- Coordinate existing plans and programs so that high-priority initiatives and projects to mitigate possible disaster impacts are funded and implemented.
- Create a linkage between the FMP and established plans of the City of Long Beach and Nassau County to ensure they can work together in achieving successful mitigation.

All citizens, businesses, and visitors of the City of Long Beach are the ultimate beneficiaries of this plan. Participation in development of the plan by key stakeholders helped ensure that outcomes will be mutually beneficial. The plan's goals and recommendations can lay groundwork for the development and implementation of local mitigation activities and partnerships.

1.2 GUIDELINES FOR FLOOD PLANNING

The priority for this plan is to benefit the citizens of the City of Long Beach by providing the greatest possible protection against the hazard posed by potential flooding. In addition, the plan has been developed to follow as closely as feasible the guidelines for flood planning presented by FEMA for the CRS program.



1.2.1 CRS Steps for Comprehensive Floodplain Management Plans

Developing a comprehensive FMP is among the activities that earn CRS credits toward reduced flood insurance rates. To earn CRS credit for an FMP, the community’s process for developing the plan must include the following steps:

- Planning process steps:
 - Step 1. Organize
 - Step 2. Involve the public
 - Step 3. Coordinate
- Risk assessment steps:
 - Step 4. Assess the hazard
 - Step 5. Assess the problem
- Mitigation strategy steps:
 - Step 6. Set goals
 - Step 7. Review possible activities
 - Step 8. Draft an action plan
- Plan maintenance steps:
 - Step 9. Adopt the plan
 - Step 10. Implement, evaluate, and revise

Hazard Mitigation is any sustained action taken to reduce or eliminate the long-term risk and effects that can result from specific hazards.

FEMA defines the **Community Rating System** as a program developed by FEMA to provide incentives for those communities in the Regular Program that have gone beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding.

1.3 BACKGROUND

The City of Long Beach is vulnerable to flooding and has experienced devastating losses over the years. The city has developed this FMP to identify the city’s known flood problem areas; establish goals, objectives, policies, and implementation programs to reduce flooding and flood-related hazards; and ensure the natural and beneficial functions of the floodplains are protected.

1.3.1 CRS Origins

The NFIP provides federally backed flood insurance to encourage communities to enact and enforce floodplain regulations. The NFIP's CRS was implemented in 1990 as a mechanism for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. The National Flood Insurance Reform Act of 1994 codified the CRS in the NFIP. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

There are 10 CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction. A community that does not apply for the CRS or that does not obtain the minimum number of credit points is a class 10 community. The CRS recognizes 18 creditable activities, organized under four categories numbered 300 through 600: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness (FEMA 2018).



1.3.2 Organizations Involved in the Mitigation Planning Effort

The City of Long Beach intends to implement this FMP with the participation of its various departments, organizations, and governing body, as well as by coordinating with relevant federal, state, and private entities. Coordination helps to ensure that stakeholders are identified and have established communication channels and relationships necessary to support mitigation planning and mitigation actions included in Section 6.

1.3.3 Multiple Agency Support for Hazard Mitigation

Primary responsibility for the development and implementation of mitigation strategies and policies lies with local governments. However, local governments are not alone; various partners and resources at the regional, state, and federal levels are available to assist communities in the development and implementation of mitigation strategies. Additional input and support for this planning effort was obtained from a range of agencies and through public involvement (as discussed in Section 3). Oversight for the preparation of this plan was provided by the City of Long Beach FMP Planning Committee (the Planning Committee), which includes representatives from the following organizations:

- City of Long Beach Government Representatives
 - Manager’s Office
 - Building Department
 - Department of Community Development and Sustainability
 - Economic Development and Planning
 - Parks & Recreation
 - Police Department/Office of Emergency Management
 - Department of Public Works
 - Zoning Board of Appeals
- Non-government Representatives
 - City Community Organizations Active in Disaster (COAD)
 - Engel and Völkers
 - Gallinaro Design Architecture
 - Long Beach Chamber of Commerce
 - Long Beach Environmental Advisory Board
 - Long Beach Schools
 - Long Beach Volunteer Fire Department
 - North East Bay and Canal Civic Association
 - O’Toole Insurance
 - Private Developer
 - Westholme and Walks Civic Association

The City of Long Beach Department of Economic Development and Planning is responsible for the city’s land use and comprehensive planning. The city’s floodplain administrator is the Building Commissioner; the City Building Department was represented on the Planning Committee.

This FMP was prepared in accordance with the following regulations and guidance:

- 44 Code of Federal Regulations part 78.5 - Flood Mitigation Plan Development in accordance with the National Flood Insurance Act of 1968 (42 U.S.C. 4104c et seq.).
- CRS Coordinator’s Manual (OMB No. 1660-0022, expires March 31, 2020).
- DMA 2000 (Public Law 106-390, October 30, 2000).



- 44 Code of Federal Regulations (CFR) Parts 201 and 206 (including: Feb. 26, 2002, Oct. 1, 2002, Oct. 28, 2003, and Sept. 13, 2004 Interim Final Rules).
- FEMA. 2004. “How-To Guide for Using HAZUS-MH for Risk Assessment.” FEMA Document No. 433. February.
- FEMA Mitigation Planning How-to Series (FEMA 386-1 through 4, 2002), available at: <http://www.fema.gov/fima/planhowto.shtm>.

1.3.4 Implementation of the Planning Process

To support the planning process to develop this FMP, the City of Long Beach has accomplished the following:

- Developed a Planning Committee composed of a variety of government and non-government stakeholders that guided the planning process and provided information and feedback
- Profiled the flood hazard
- Estimated the inventory at risk and potential losses from flood hazards
- Perform a comprehensive review of mitigation alternatives
- Developed mitigation actions and goals that address the various hazards that impact the city
- Developed mitigation plan maintenance procedures to be executed after adoption of the plan

To address the requirements of CRS and better understand their potential vulnerability to and losses associated with hazards of concern, the City of Long Beach used the Hazards U.S. – Multi-Hazard (HAZUS-MH) software package (discussed in greater detail later in this FMP) supplemented by local data, as feasible, to support the risk assessment and vulnerability evaluation. HAZUS-MH is a FEMA-sanctioned risk assessment platform that assesses risk and estimates potential losses for certain hazards, including flood hazards. It produces outputs that will communicate flood risk and assist state and local governments, communities, and the private sector in implementing emergency response, recovery, and mitigation programs, including the development of FMPs.

As required by CRS, the planning process has engaged the public throughout, providing opportunities for public comment and input. In addition, numerous agencies and stakeholders have participated as core or support members, providing input and expertise throughout the planning process.

This FMP documents the process and outcomes of the city’s efforts. Additional information on the planning process is included in Section 3, Planning Process. Documentation that the prerequisites for plan approval have been met is included in Appendix H.

1.3.5 Benefits of Floodplain Management Planning

The long-term benefits of floodplain management planning include:

- An increased understanding of flood hazards faced by the City of Long Beach
- A more sustainable and disaster-resistant community
- Financial savings through partnerships that support planning and mitigation efforts
- Focused use of limited resources on hazards that have the biggest impact on the community
- Reduced long-term impacts and damages to human health and structures and reduced repair costs



1.3.6 Benefits of Participating in the Community Rating System

The goals of the CRS Program are to (1) reduce and avoid flood damage to insurable property, (2) strengthen and support the insurance aspects of the NFIP, and (3) foster comprehensive floodplain management. To do this, the CRS provides insurance premium rate discounts to policy holders in recognition that their communities implement activities that work toward its three goals of reducing flood damage, supporting the insurance part of the NFIP, and pursuing a broad approach to floodplain management.

In this process, the “community” part of the CRS Program includes state and regional agencies and private organizations that support and assist city, county, and tribal governments that are participants in the NFIP. How communities can implement these three goals is summarized as follows:

1. **Reduce flood damage to insurable property.** Communities are encouraged to map and provide regulatory flood data for all their flood hazards. The data should be used in their regulatory programs and shared with all users and inquirers. New buildings in mapped floodplains should be protected from the known local flood hazards, which may require setting standards higher than the minimum national criteria of the NFIP. Communities are encouraged to reduce the exposure of existing buildings to flood damage, especially repetitive loss properties.
2. **Strengthen and support the insurance aspects of the NFIP.** Communities should encourage their residents to be aware of their flood risk and to purchase and maintain a flood insurance policy to protect themselves from the financial impacts of flooding. Communities should also help make the program more financially sound by implementing mapping and information programs that help to accurately evaluate the individual property risk for flood insurance rating purposes, expand the policy base, and reduce repetitive losses.
3. **Encourage a comprehensive approach to floodplain management.** Insurable property is not the only floodplain management concern of communities, so the CRS recognizes efforts that protect lives; further public health, safety, and welfare; and protect natural floodplain functions.

A community’s staff should understand the physical and biological processes that form and alter floodplains and watersheds and take steps to deal with flooding, erosion, habitat loss, water quality, and special flood-related hazards. A comprehensive approach includes planning, public information, regulations, financial support, open space protection, public works activities, emergency management, and other appropriate techniques (CRS Coordinator’s Manual, 2017).

1.3.7 How to Use This Plan

This FMP is organized into the following primary parts:

Section 1, Introduction: Overview and summary of the City of Long Beach FMP.

Section 2, Plan Adoption: A description of the plan adoption process.

Section 3, Planning Process: A description of the planning methodology and plan development process, Planning Committee and stakeholder involvement efforts, and how this FMP will be incorporated into existing programs.

Section 4, City Profile: An overview of the City of Long Beach, including: (1) general information, (2) population and demographics, (3) general building stock inventory, (4) land use trends, (5) future growth and development, and (6) critical facilities.



Section 5, Risk Assessment: Documentation of flood hazard and results of the vulnerability assessment (estimates of the impact of flood events on life safety and health, general building stock, critical facilities, the economy, and future growth and development). Description of the status of local data and planned steps to improve local data to support mitigation planning.

Section 6, Mitigation Strategies: Information regarding the mitigation goals, objectives, capability assessment, and mitigation action items identified by the city in response to flood problems in the City of Long Beach.

Section 7, Plan Maintenance Procedures: The system established by the City of Long Beach to monitor, evaluate, maintain, and update the FMP.

The following appendices provided at the end of the FMP include information or explanations to support the main content of the plan:

- Appendix A – References
- Appendix B – A glossary of acronyms and definitions
- Appendix C – Planning Committee Resolution and Charter
- Appendix D – Meeting Documentation
- Appendix E – Public and Stakeholder Outreach Documentation
- Appendix F – Progress Report Template
- Appendix G – Plan Adoption Resolution
- Appendix H – Plan Crosswalk



SECTION 2. PLAN ADOPTION

This section contains information regarding adoption of the Floodplain Management Plan (FMP) by the City of Long Beach.

2.1 PLAN ADOPTION BY CITY COUNCIL

Adoption by City Council demonstrates the commitment of the City of Long Beach to fulfill the goals and objectives outlined in this FMP. Adoption legitimizes the plan and authorizes responsible agencies to execute their responsibilities.

The City of Long Beach will proceed with formal adoption proceedings after the Insurance Services Office, Inc. (ISO) provides conditional approval of this plan. Following adoption of the plan, the City of Long Beach will submit a copy of the resolution showing formal adoption (acceptance) of the FMP to ISO.

The resolution issued to adopt the plan is included as Appendix G: Plan Adoption Resolution.

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SECTION 3. PLANNING PROCESS

Section 3 of City of Long Beach FMP describes the planning process, including the following steps delineated in the 2017 CRS Coordinator’s Manual (FEMA 2017):

1. Organize to prepare the plan
2. Involve the public
3. Coordinate
4. Assess the hazard
5. Assess the problem
6. Set goals
7. Review possible activities
8. Draft an action plan
9. Adopt the plan

The final step (Step 10) in the CRS Coordinator’s Manual, “Implement, evaluate, and revise,” is carried out after the FMP is adopted by City Council. The process the city will use to carry out Step 10 is described in Section 7 (Plan Maintenance).

The following sections describe each of the nine steps listed above, and the process by which the city will be carry out each step.

3.1 Organize to Prepare the Plan

The City of Long Beach FMP Planning Committee (Planning Committee) initiated and oversees the planning project. The Planning Committee was established by City Council resolution, when City Council hired Tetra Tech, Inc. (Tetra Tech) to assist in the development and implementation of the FMP. The resolution and the Planning Committee charter are included in Appendix C. The Planning Committee consisted of the individuals listed in Table 3-1, equally representing both government departments and non-government stakeholders.

Table 3-1. Planning Committee Members

Name	Organization	Alternate
<i>City of Long Beach Government Representatives</i>		
Bourne, Patricia	Economic Development and Planning	Steiner, Rebecca
Brand, Joe	Parks and Recreation	N/A
Corbett, Richard	Police Department/Office of Emergency Management	N/A
Febrizio, Joe	Department of Public Works	N/A
Huffman, Tyler	Community Development	N/A
McTiernan, Ryan	Department of Community Development and Sustainability	N/A
Morrelli, Rocco	Zoning Board of Appeals	N/A
Schuh, Rich	Building Department	N/A
Tepper, Gordon	Manager’s Office	N/A
<i>Non-Voting City of Long Beach Government Representatives</i>		
Butler, Rita	Department of Public Works	N/A
Mirando, John	Acting City Manager	N/A



Name	Organization	Alternate
Non-Government Representatives		
Bochner, Scott	Environmental Advisory Board	N/A
Danby, Ian	Long Beach Chamber of Commerce	N/A
Gallagher, Dr. Jennifer	Superintendent of Long Beach Schools	N/A
Gallinaro, Joseph	Gallinaro Design Architecture	N/A
Kemins, Scott	City of Long Beach Volunteer Fire Department	N/A
Knag, Tom	Westholme and Walks Civic Association	N/A
O'Toole, Edwin	O'Toole Insurance	N/A
Rector, Anthony	Developer	N/A
Reilly, Kevin	North East Bay and Canal Civic Association, also representing the city Community Organizations Active in Disaster (COAD)	N/A

The Department of Economic Development and Planning is the city’s office responsible for land use and comprehensive planning. Representatives of Economic Development and Planning attended each meeting of the Planning Committee. The six categories of activities reviewed in Step 7 of the planning process were also represented by members of the Planning Committee, as shown in Table 3-2.

Table 3-2. Activity Category Representation on the Planning Committee

Name	Preventive Measures	Property Protection	Natural Resource Protection	Emergency Services	Structural Flood Control Projects	Public Information
Bochner, Scott			X			
Bourne, Patricia	X					
Butler, Rita		X			X	
Corbett, Richard				X		
Febrizio, Joe		X			X	
Huffman, Tyler			X			
McTiernan, Ryan	X					
Mirando, John		X			X	
Reilly, Kevin				X		
Schuh, Rich	X	X				
Steiner, Rebecca	X					
Tepper, Gordon						X

The planning process began at the FMP project kickoff meeting held on October 2, 2019. At least one meeting of the Planning Committee was held for each step of the planning process from Step 4 (Assess the hazard) through Step 8 (Draft an action plan). The dates of those meetings are shown in Table 3-3. A quorum of Planning Committee members was present at each meeting. Meeting documentation is provided in Appendix D.



Table 3-3. Planning Committee Meetings

Step	Planning Committee Meeting Date
Step 4: Assess the hazard	November 6, 2019
Step 5: Assess the problem	December 4, 2019
Step 6: Set goals	December 18, 2019
Step 7: Review possible activities	January 8, 2020
Step 8: Draft an action plan	January 29, 2020

3.2 Involve the Public

The City of Long Beach took great care to ensure that the public was involved in the planning effort. This effort began with the composition of the Planning Committee itself. As shown in Table 3-1 above, half of the members of the Planning Committee were from outside of the City of Long Beach city government. In addition, as shown in the meeting documentation in Appendix D (Meeting Documentation), Planning Committee meetings were posted on the Calendar of Events and News portions of the city website, and announcements were posted to invite members of the general public to attend the meetings. Members of the general public attended meetings held on the January 8 and January 29, 2020. The Planning Committee Charter (Appendix C) included provisions for receiving comments from members of the general public who attended Planning Committee meetings.

To provide further opportunity for public participation in the planning process, the city conducted the following three additional public meetings:

1. November 6, 2019 – public meeting to provide information on the FMP and the planning process, and to solicit information on the nature of flooding in the City of Long Beach.
2. December 18, 2019 – public meeting to review the results of the risk assessment portion of the planning process (Steps 4 and 5), and to gather additional data for inclusion in the FMP.
3. February 19, 2020 – public meeting to review the content of the draft of the FMP, and to answer questions and receive comments on the FMP for review, consideration, and potential change to the FMP draft.
4. **TBD** – public meeting to review the completed FMP, updated following ISO’s review of the initial draft.

The Planning Committee also conducted the following activities to involve the public in the planning process:

- Provided information about the CRS Program, FMP, and the planning process, and solicited feedback at the meeting of the Long Beach Chamber of Commerce held on December 16, 2019.
- Provided information about the CRS Program, FMP, and the planning process, and solicited feedback at a resident meeting held at The Bungalow East on October 21, 2019.
- Developed online information-gathering surveys and sent links electronically to the following audiences:
 - Business and commerce
 - Emergency services organizations
 - General public

Documentation of the above activities is provided in Appendix D.



3.3 Coordinate

Throughout the planning process, studies, reports, and technical information and data from a wide variety of federal, state, county, and local sources were used to analyze the flood hazard in the City of Long Beach and determine a strategy for reducing vulnerability to flooding. The discussions in Section 4 (City Profile), Section 5 (Risk Assessment), and Section 6 (Mitigation Strategies) include citations of these sources, which are listed in Appendix A (Authorities and References).

In addition, the Planning Committee sent letters to the following organizations, providing information about the planning process and requesting any relevant input (Appendix D includes copies of the letters):

- Town of Hempstead
- Village of Island Park
- New York State Department of Environmental Conservation (NYS DEC) Region 1
- New York State Division of Homeland Security and Emergency Services (NYS DHSES) mitigation division
- Nassau County Office of Emergency Management
- FEMA Region II mitigation planner
- USACE New York District Office

3.4 Assess the Hazard and Assess the Problem

In these steps of the planning process, the City of Long Beach assessed the nature and impacts of flooding within the city. The City requested information from the public at the public information meeting on November 6, 2019; the public risk assessment review meeting in December 2019; and at Planning Committee meetings in November and December 2019, and January 2020. A full description of the methodology used to assess the flood hazard and the problems caused by flooding in the city is provided in Section 5 (Risk Assessment).

3.5 Set Goals

The City used the information gathered from the risk assessment, public and Planning Committee meetings, and the previous planning process to update the City of Long Beach Comprehensive Plan¹ in 2018 to identify a set of goals and objectives for the FMP (City of Long Beach 2018). Goal setting and objectives were discussed at the Planning Committee meeting on December 18, 2019. A set of goals and objectives was developed and was again discussed at the Planning Committee meeting held on January 8, 2020. Table 3-4 presents the goals and objectives for the city FMP. Further description of the process used to develop goals and objectives is provided in Section 6 (Mitigation Strategies).

Table 3-4. City of Long Beach Floodplain Management Plan Goals and Objectives

Goals	Objectives	
Goal 1: Protect the City of Long Beach’s built environment from flooding and sea level rise.	Objective 1.1	Prevent backflow from all outfalls.
	Objective 1.2	Prevent backflow flooding of the storm drain on Laurelton and West Bay Drive.
	Objective 1.3	Protect West Park Avenue from flooding due to high tide and/or heavy rainfall.
	Objective 1.4	Protect the area at Riverside Boulevard and Pine Street from flooding.

¹ <https://www.longbeachny.gov/complan>



Goals	Objectives	
	Objective 1.5 Protect the intersection of National Boulevard and Park Avenue from stormwater flooding due to heavy rainfall.	
	Objective 1.6 Protect Park Avenue, between New York Avenue and Nevada Avenue, from flooding.	
	Objective 1.7 Stabilize and protect the bayfront on the northern side of the city from high tides, storm surge, and stormwater flooding from heavy rainfall events.	
	Objective 1.8 Enhance the city’s stormwater management system to protect against the 100-year storm event.	
	Objective 1.9 Protect critical City facilities from flooding to ensure they continue to operate during a flood event.	
	Objective 1.10 Protect the West End from storm and flood damage similar to the effects of Superstorm Sandy.	
	Objective 1.11 Protect Long Beach Boulevard from storm surge.	
	Objective 1.12 Protect the area near State Street and Franklin Boulevard from flooding.	
	Objective 1.13 Protect the area near Laurelton Boulevard and West Bay Drive from flooding.	
	Objective 1.14 Protect the area from the canals to Franklin Boulevard and from East Park Avenue to East Hudson Street from flooding.	
	Goal 2: Make the City of Long Beach more resilient to flooding and sea level rise.	Objective 2.1 Update the city’s strategy for maintaining a resilient community.
		Objective 2.2 Update City regulations to foster additional resilience.
		Objective 2.3 Ensure that the city’s businesses can continue to operate after a flood event.
	Goal 3: Protect the natural environment from the impacts of flooding.	Objective 3.1 Protect the city from erosive processes.
Objective 3.2 Maintain Jones Inlet to prevent wind against tide/tidal stacking.		
Objective 3.3 Maximize open space throughout the city.		
Objective 3.4 Stabilize and protect the dune system on the oceanfront to provide storm protection and natural habitat.		
Goal 4: Educate the public, officials, and other stakeholders about the flood hazard and what can be done to mitigate its impacts.	Objective 4.1 Ensure that local officials attend current training on regulatory issues and best practices.	
	Objective 4.2 Ensure that public information efforts are coordinated among City department and stakeholder groups.	
	Objective 4.3 Provide information to individuals throughout the city on the flood hazard and property protection measures they can take.	
	Objective 4.4 Increase flood insurance coverage held by individuals and businesses.	
Goal 5: Ensure effective response to flood events to save lives and protect property.	Objective 5.1 Ensure that an effective warning system is in place in the city.	
	Objective 5.2 Enhance the public’s capabilities of responding to flood events.	
	Objective 5.3 Enhance the emergency response and emergency management community’s capabilities to respond to flood events.	

3.6 Review Possible Activities

Once the goals and objectives were set by the Planning Committee, the committee met again (on January 8, 2020) to review the types of mitigation activities that could be used to meet each goal and objective. The City’s contract consultant provided a catalog of sample mitigation actions organized by the possible activities to the Planning Committee, and members provided input on which of the following possible activities should be used to address each of the goals and objectives. The types of mitigation activities that were determined to meet each goal and objective are listed below:

- Preventive Measures
- Property Protection
- Natural Resource Protection



- Emergency Services
- Structural Flood Control Projects
- Public Information

The mitigation catalog is included in Section 6 (Mitigation Strategies). Documentation is provided in the meeting materials in Appendix D (Meeting Documentation). Further descriptions of the process used to review possible activities are provided in Section 6 (Mitigation Strategies).

3.7 Draft an Action Plan

The City of Long Beach’s contract consultant developed a set of actions based on the Planning Committee’s review of the possible activities and the catalog of mitigation actions. The Planning Committee reviewed this set of actions and provided feedback at a Planning Committee Meeting held on January 29, 2020. Documentation of the meeting is provided in Appendix D (Meeting Documentation). The contract consultant finalized the action plan based on the committee’s feedback. The action plan consists of 55 actions, representing all six of the mitigation categories. The content of the FMP was reviewed with the public at a meeting conducted on February 19, 2020, where the committee solicited feedback on the information provided. The action plan and more information regarding the process used to develop it are provided in Section 6.

3.8 Adopt the Plan

Following ISO’s review of this FMP, the City of Long Beach updated the FMP to address ISO’s comments, and presented the final version of the FMP to the residents and business owners of the City of Long Beach at a public meeting held on TBD. At this meeting, the city solicited final feedback on the FMP in preparation for presentation of the FMP to City Council.

The FMP was submitted to City Council on TBD. City Council voted to adopt the FMP on TBD. A copy of the adoption resolution is provided in Appendix G (Plan Adoption Resolution).

3.9 INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

The City of Long Beach FMP Planning Committee made every effort to use the best-available technical information, plans, studies, and reports throughout the planning process to support flood hazard profiling; risk and vulnerability assessment; review and evaluation of mitigation capabilities; and the identification, development, and prioritization of flood mitigation actions.

The asset and inventory data used for the risk and vulnerability assessments are presented in Section 4 of the FMP (City Profile). Details regarding data sources—along with technical information on how the data were used to develop the risk and vulnerability assessment—are presented in the Risk Assessment Section (Section 5), specifically within Section 5.1 (Data and Methodology). Further, sources of technical data and information used can be found in Appendix A (References).

Plans, reports, and other technical information were identified and provided directly by the city, Nassau County, Planning Committee members, and numerous stakeholders involved in the planning effort, as well as through independent research by the planning consultant.

A partial listing of the plans, reports, and technical documents reviewed while preparing this plan is included in Table 3-5.



Table 3-5. Record Review

Existing Plans, Programs, or Technical Documents	Jurisdictional Applicability
2009 FEMA Flood Insurance Study for Nassau County	Countywide
2014 Nassau County Hazard Mitigation Plan	Countywide
2018 Draft Comprehensive Plan	City of Long Beach
2019 New York State Hazard Mitigation Plan	New York State
2019 U.S. Army Corps of Engineers Beach Protection Project	City of Long Beach
2019 U.S. Army Corps of Engineers Nassau County Back Bays Coastal Storm Risk Management Feasibility Study	Countywide
Stormwater Management Regulations	City of Long Beach
Building Code, including Article XII (Flood Hazard Zones)	City of Long Beach
Plumbing Code	City of Long Beach

3.10 Integration with Existing Planning Mechanisms and Programs

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making processes. The City of Long Beach maintains many existing plans and programs that support flood risk management; therefore, it is critical that this FMP integrate, coordinate with, and complement those existing plans and programs.

The Capability Assessment section of Section 6 of this FMP (Mitigation Strategy) provides a summary and description of the existing plans, programs, and regulatory mechanisms at different levels of government (federal, state, county, and local) that support flood mitigation within the city.

A further summary of these continued efforts to develop and promote a comprehensive and holistic approach to flood risk management and mitigation is presented in Section 7 (Plan Maintenance).

3.11 Continued Public Involvement

The City of Long Beach is committed to the continued involvement of the public. Therefore, copies of the FMP are available for review on the city’s public website (<https://www.longbeachny.gov/flood>), as well as at the Department of Public Works, 1 West Chester Street, Long Beach, New York.

After completion of the FMP, implementation and ongoing maintenance will become a function of the Planning Committee. The Planning Committee will review the FMP and accept public comment as part of an annual review and as part of 5-year FMP updates.

A notice regarding annual updates of the FMP and the location of FMP copies will be publicized annually after the Planning Committee’s annual evaluation and posted on the public web site.

Mr. Joseph Febrizio, Acting Commissioner of Public Works, has been identified as the ongoing FMP Coordinator (Section 7), and is responsible for receiving, tracking, and filing public comments regarding this FMP. Contact information is listed below:

Joseph Febrizio, Acting Commissioner of Public Works
Long Beach City Hall, Room 404
1 West Chester Street
Long Beach, NY 11561
Phone: (516) 431-1000



The public will have an opportunity to comment on the FMP as a part of the annual plan evaluation process and the 5-year plan update. The FMP Coordinator is responsible for coordinating the plan evaluation portion of the meeting, soliciting feedback, collecting and reviewing the comments, and ensuring their incorporation in the 5-year plan update as appropriate; however, members of the Planning Committee will assist the FMP Coordinator. Additional meetings may also be held as deemed necessary by the FMP Coordinator. The purpose of these meetings would be to provide the public an opportunity to express concerns, opinions, and ideas about the FMP.

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SECTION 4. CITY PROFILE

Profile information for the City of Long Beach is presented and analyzed to develop an understanding of the city, including the economic, structural, and population assets at risk and the particular concerns that may be related to the flood hazards analyzed later in this plan (e.g., areas prone to flooding or areas with a high percentage of vulnerable persons). This section describes general information regarding the City of Long Beach (government, physical setting, population and demographics, general building stock, land use, and population trends) and critical facilities located within the city.

4.1 GENERAL INFORMATION

Long Beach is a city in Nassau County, New York. Geographically, the city is within the Town of Hempstead, but Long Beach is politically independent and self-governing. It is situated on Long Beach Barrier Island, the westernmost of the outer barrier islands off Long Island’s South Shore. Long Beach was founded in 1880 when the first Long Beach Hotel was built, and became a city 1922. The major attraction in its development was the location. Long Beach is an oceanfront island along Long Island’s south shore, which has a moderating effect on its climate. Long Beach averages 10 degrees warmer in the winter and 10 degrees cooler in the summer than inland communities on Long Island and New York City. With the Atlantic Ocean on one side and the bay on the other, Long Beach developed as a seaside community. The City of Long Beach is south of Island Park and shares the island with Atlantic Beach to the west and Lido Beach to the east.



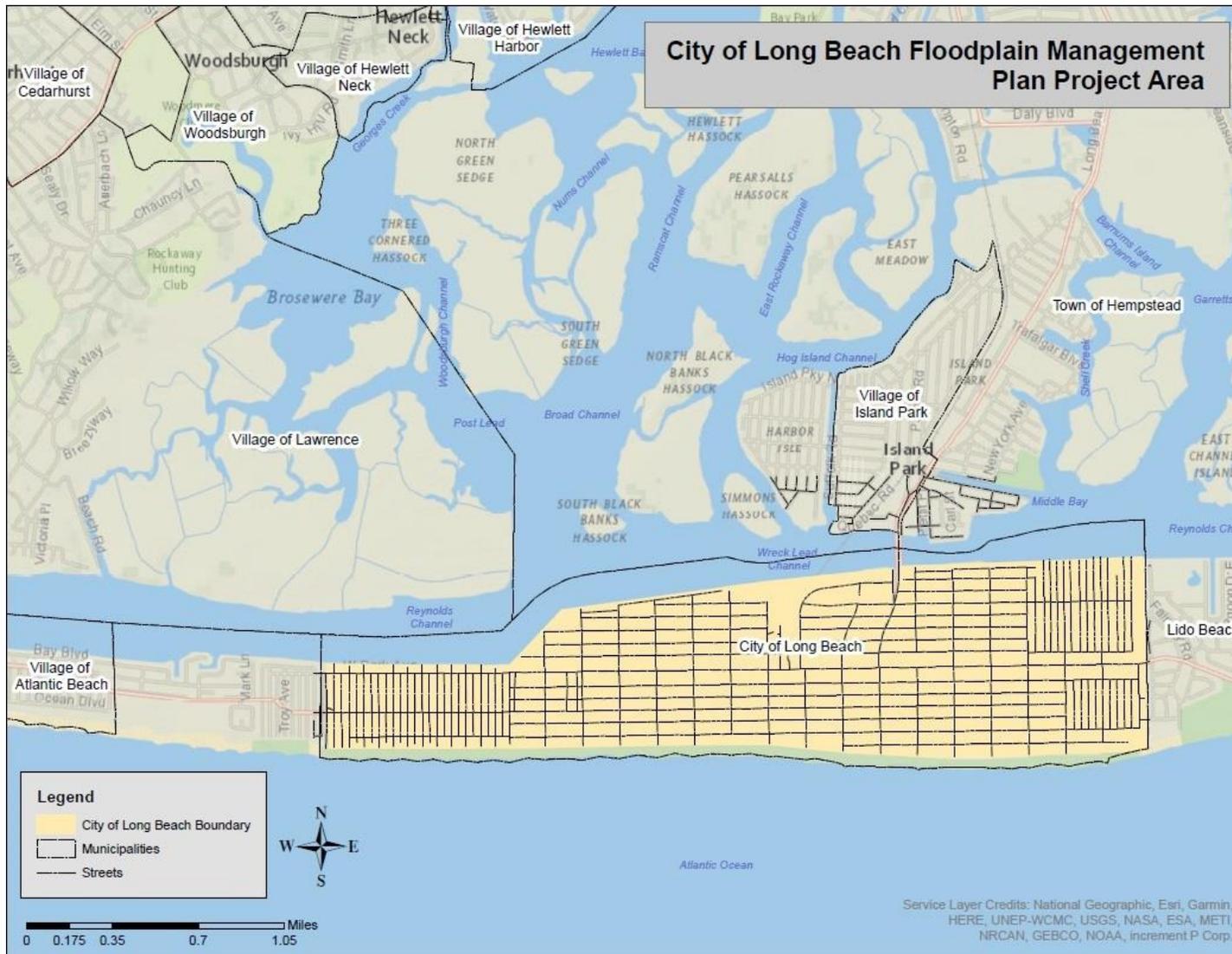
4.2 PHYSICAL SETTING

This section describes the physical setting of Long Beach, including its location, topography, hydrography and hydrology, climate, and land use and land cover.

4.2.1 Location

The City of Long Beach is just south of Long Island and is in the eastern-most part of New York State, extending east-northeastward surrounded by the Atlantic Ocean. The City of Long Beach covers 5 square miles, is separated from Long Island by the Great South Bay, and connects to Long Island by bridges. Figure 4-1 provides the location of the City of Long Beach.

Figure 4-1. Location of the City of Long Beach, New York



Source: NYS GIS 2014, 2015; NYS Cyber Security and Critical Infrastructure Coordination (CSCIC) 2008; City of Long Beach 2019



4.2.2 Topography and Geology

Topography

The geography and topography of the land that encompasses the City of Long Beach owes most of its formation to the thawing of glaciers during the last glaciation. Along the south shore of Long Island, waves and ocean currents have reworked deposits along uplifted shoreline to form the barrier beaches on which the City of Long Beach is located. Sand and silt deposited by wind, streams, salt-water currents, and storms fill the bays behind the barrier beaches. The topography of the city ranges in elevations from a low as 7 feet above sea level near the Bay, to 10 feet above sea level on the rest of the island.

Geology

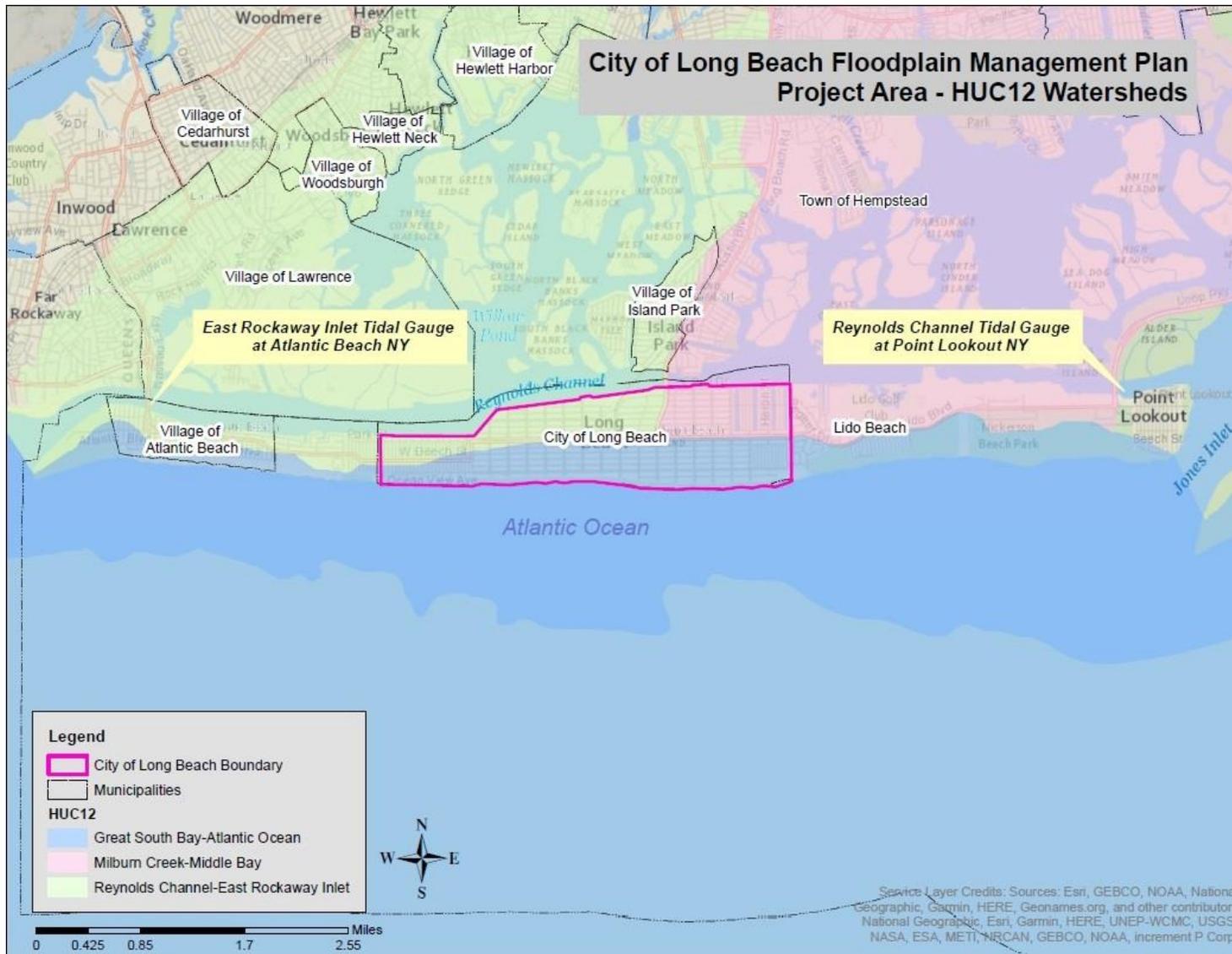
Long Island’s bedrock is made of metamorphic rock ranging from 200 to 1,700 feet below sea level. The upper portion of the geologic layers consist of sedimentary elements like gravels, sand, and clay, which were all deposited by glaciers. On Long Island, the North Shore tends to be hillier and rockier whereas the South Shore –to which the City of Long Beach is attached—is flat and sandy. Because of its low elevation, the City of Long Beach is subject to flooding and threatened by sea level rise. Waves and ocean currents have reworked the deposits along the South Shore’s shoreline to form offshore barrier beaches. The barrier beaches (including the City of Long Beach) are continually changing from ocean currents (USGS 2019).

4.2.3 Hydrography and Hydrology

Nassau County’s North Shore is surrounded by Little Neck Bay, Manhasset Bay, Hempstead Harbor, Oyster Bay, Cold Spring Harbor, and the Hempstead Bay composite on the South Shore Bay. The north shore bays are connected or mixed with waters of the Long Island Sound, while the south shore bays mix with waters of the Atlantic Ocean. Long Island Sound is an estuary in which saltwater from the ocean mixes with freshwater from rivers, streams, and land (Nassau County 2010).

The City of Long Beach is located within the Atlantic Ocean/Long Island Sound Watershed. The Watershed encompasses all marine waters in New York Harbor, Long Island Sound, Block Island Sound, and along the South Shore of Long Island, as well as the fresh waters that drain into them. It is located in the southeast corner of New York State. The Atlantic Ocean/Long Island Sound Watershed contains 522 miles of freshwater rivers and streams. The major tributary watersheds within it include the Bronx River, Mamaroneck River, Mianus River, and the Peconic River. The Watershed covers 6,728 acres and contains 132 significant freshwater lakes, ponds, and reservoirs including the Kensico Reservoir and Lake Ronkonkoma. Figure 4-2 shows the HUC12 Watershed.

Figure 4-2. HUC12 Watersheds in Long Beach



Source: NYS DEC n.d.



4.2.4 Climate

Due to its proximity to the ocean and low altitude, the climate of the City of Long Beach is classified as mixed-humid. The city has cold winters and hot summers with precipitation well distributed throughout the year. Long Beach is one of the warmest places in New York with the average annual temperature of 51 degrees Fahrenheit. Temperatures in January are an average of 25.4 degrees, while temperatures in July are an average of 81.9 degrees. Annual precipitation averages 44.38 inches. Annual snowfall averages 23 inches, which makes Long Beach one of the least snowy places in New York.

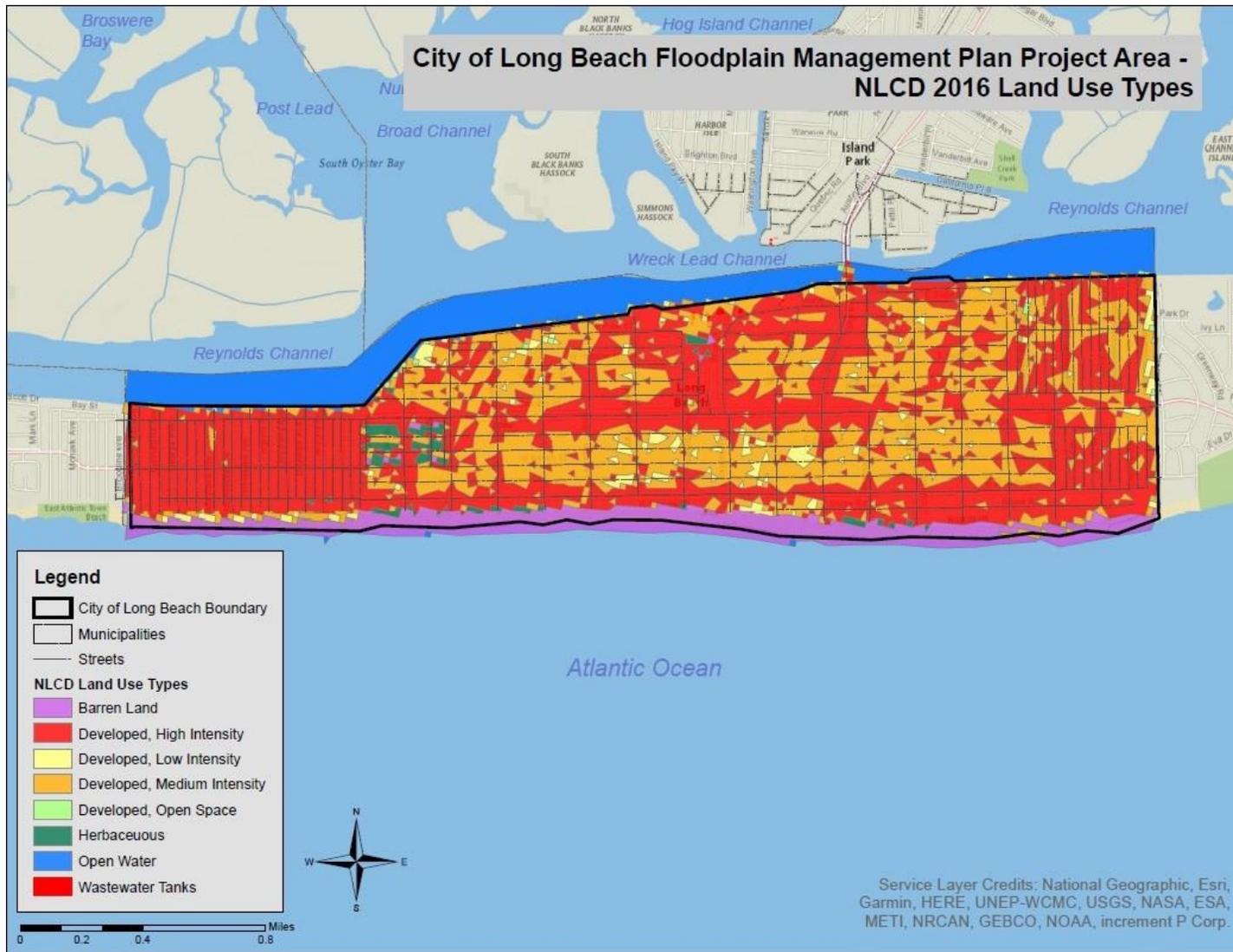
4.2.5 Land Use and Land Cover

The City of Long Beach was designed with a traditional grid pattern with wide boulevards and narrow side streets. The City's total residential land area is 81 percent; however, several commercial areas and parks and recreational areas are situated throughout the city. Figure 4-3 illustrates the City of Long Beach's land use types, and describes development as high to medium intensity.

Many of the city's higher-density residential areas are located along the oceanfront along Broadway, along Shore Road, and in the North Park neighborhood located in the northern part of the city. In the West End, the parcels and houses are much smaller and compact with a mix of both single-family and multi-family residences. The City of Long Beach has two main commercial corridors: Park Avenue and Monroe and Beech Street. Most of the key infrastructure and utility properties are located within proximity to Reynolds Channel.

The south side of the island is home to the city's largest park, Ocean Beach Park, along with its 2.25-mile boardwalk. The City of Long Beach also has several parks and recreational amenities. The Recreation Center, Veteran's Memorial Park, Leroy Conyers Park, Sherman Brown Park, and Clark Playground are frequently-used facilities located close to the bayfront.

Figure 4-3. City of Long Beach Land Use Types



Source: NYS GIS 2014; NYS CSCIC 2008; City of Long Beach 2019; USGS 2019



4.3 POPULATION AND DEMOGRAPHICS

4.3.1 Statistics

Various Census Bureau products were used as sources for the population trends section. The Decennial Census is the official population count taken every 10 years. American Community Survey 5-Year Estimates are used to show annual population changes, but it is not an official population count. 5-Year Estimates are used because they are the most accurate form of American Community Survey with the largest sample size, which allows for greater accuracy at smaller geographic areas. The American Community Survey 5-Year Estimate products were used to establish annual changes in population. The numbers provided are not official census counts but are official estimates provided to communities so that they may have a greater understanding in population changes within their jurisdictions.

An understanding of the city’s population characteristics provides a foundation for deciphering the impacts of the flood hazards in the City of Long Beach. As noted in Section 5.1 (Methodology) of this plan, modeling of the impacts of the flood hazards on the population was performed using FEMA’s Hazards U.S. Multi-Hazard (HAZUS-MH). HAZUS-MH uses available population information including the 2010 U.S. Decennial Census data (U.S. Census 2010), which indicates a City population of 33,275. However, more current data (from U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimate) estimates a population of approximately 33,657, which is an increase in population since 2010 (U.S. Census 2018). A detailed population table for the 2010 Census is shown below in Table 4-1. Table 4-2 shows the 2013-2017 American Community Survey 5-Year Estimate. The 2013-2017 American Survey data were used as they are the best data available at the time of the FMP

development.

Table 4-1. Long Beach 2010 Population Statistics

Municipality	Total	Pop. 65+	% Pop. 65+	Pop. Under 5 ¹	% Pop. Under 5
City of Long Beach	33,275	2,052	6.2%	812	2.4%

Source: U.S. Census 2010

Note: Pop. = population

Table 4-2. Long Beach 2017 Population Statistics

Municipality	2017 American Community Survey 5-Year Estimates*				
	Total	Pop. 65+	% Pop. 65+	Pop. Under 5	% Pop Under 5
City of Long Beach	33,657	6,025	17.9%	1,435	4.3%

Source: American Community Survey 2017

Note: Pop. = population

4.3.2 Population Trends

This section discusses population trend information used to estimate future shifts that could significantly change the character of the area. Population trends can provide a basis for making decisions on the type of mitigation approaches to be considered and the locations in which these approaches should be applied. This information can also be used to support planning decisions regarding future development in vulnerable areas.

According to both the 2010 and the 2017 U.S. Census information, the City of Long Beach experienced a 1.15-percent increase in population, from 33,275 in 2010 to 33,657 in 2017. The City of Long Beach experienced a spike in population in 2000 to 35,462 people. It steadily increased throughout the early 2000s then decreased from 35,889 in 2009 to 33,275 in 2010 (Biggest U.S. Cities 2018). The population of the City of Long Beach





has increased since 2010 by 1.1 percent, which is geographically uniform throughout Nassau County. Nassau County population has also increased since 2010 by 1.7 percent.

Table 4-3. Long Beach Historical Population

Population	Historical		
	1990	2000	2010
Long Beach	33,518	35,462	33,275

Source: U.S. Census 2010

4.3.3 Vulnerable Populations

Socially vulnerable populations can be more susceptible to flood events based on a number of factors, including their physical and financial ability to react or respond during a flood and the location and construction quality of their housing. For the purpose of this FMP, the vulnerable populations include (1) the elderly (persons aged 65 and over) and (2) those living in low-income households. Identifying concentrations of vulnerable populations can assist the city in targeting preparedness, response, and mitigation actions.

Populations with a higher level of vulnerability can be more seriously affected during an emergency or disaster. Vulnerable populations have unique needs that need to be considered by public officials to help ensure the safety of demographics with a higher level of risk.

Age

The elderly are more likely to lack the physical and economic resources necessary for response to flood events and are more likely to suffer health-related consequences. Those living on their own may have more difficulty evacuating their homes. The elderly also are more likely to live in senior care and assisted-living facilities where emergency preparedness occurs at the discretion of facility operators. According to the 2013-2017 American Community Survey 5-Year Estimates, the median age in Long Beach was 44.3 years, 15.5 percent of Long Beach population is under the age of 18, and 17.9 percent of the city’s population is over the age of 65.

Income

The 2013-2017 American Community Survey 5-Year Estimates provides that the median household income in Long Beach was \$85,619 and the per capita income was \$49,005. The U.S. Census Bureau identifies households with two adults and two children with an annual household income below \$24,339 per year as *low income* (U.S. Census 2016). The 2013-2017 American Community Survey 5-Year Estimates indicates 7.7 percent of the population in the City of Long Beach lives below the poverty level. As the American Community Survey does not determine low-income levels or poverty thresholds per census block, it was assumed based on a review of the area that a household of two that makes less than \$60,000 is considered low income.

4.4 GENERAL BUILDING STOCK

According to 2017 U.S. Census estimates, 14,467 households are located in Long Island. A household includes all the people who occupy a housing unit as their usual residence. A housing unit is a house, apartment, mobile home or trailer, a group of rooms, or a single room occupied as separate living quarters (or if vacant, intended for occupancy as separate living quarters). According to the 2017 American Community Survey, the majority of housing units (36.3 percent) in Long Beach are classified as one-unit detached homes. The median price of a single-family home in Long Beach was estimated at \$463,200 based on the 2017 American Community Survey (U.S. Census 2017). The City of Long Beach has a diverse housing stock with significant variations in residential density, age, and housing typologies compared to the rest of Long Island.



For the purposes of this plan, approximately 7,081 structures were identified by the tax data and spatial data available. These structures account for a replacement cost value of approximately \$1.9 billion. Approximately 96.4 percent of the total buildings in Nassau County are residential, which make up approximately 78.0 percent of the total building stock value. Table 4-4 presents building stock statistics by occupancy class for the City of Long Beach.

Table 4-4. Building Stock Count and Replacement Cost Value (RCV) by Occupancy Class

Municipality	Total		Residential		Commercial		Industrial	
	Count	RCV	Count	RCV	Count	RCV	Count	RCV
City of Long Beach	7,081	\$1,923,941,315	6,826	\$1,500,910,948	189	\$278,136,135	7	\$46,242,883

Source: NYS Information Technology Services (ITS) GIS 2017; NYS 2018; City of Long Beach 2019

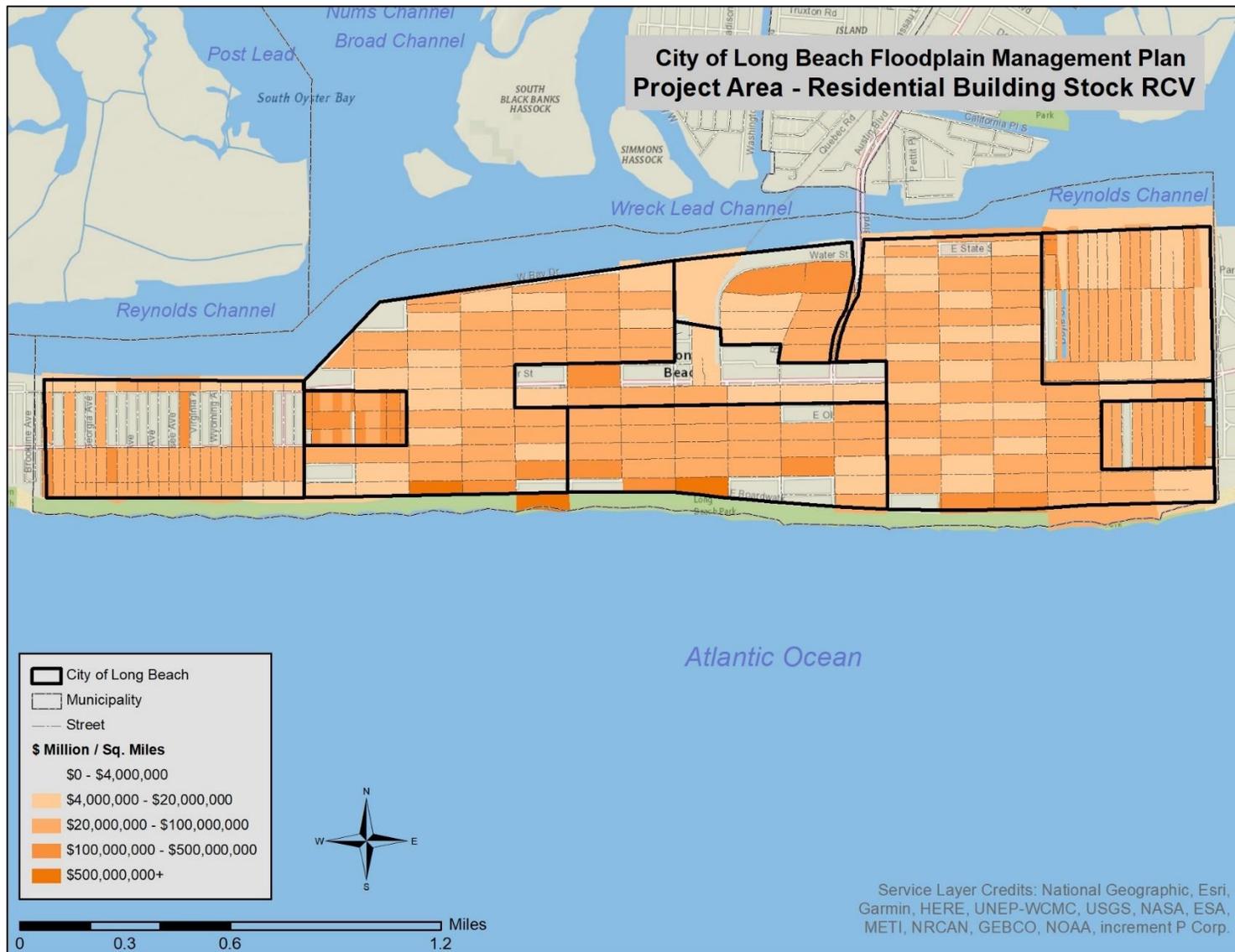
Notes: Industrial includes buildings associated with public utilities parcels (categorized as IND5)

Tax assessor data did not show government property classes.

The total number of structures assessed does not include building footprints that have an area less than 600 square feet and buildings that were missing an assigned property class due to data gaps in tax assessor data.

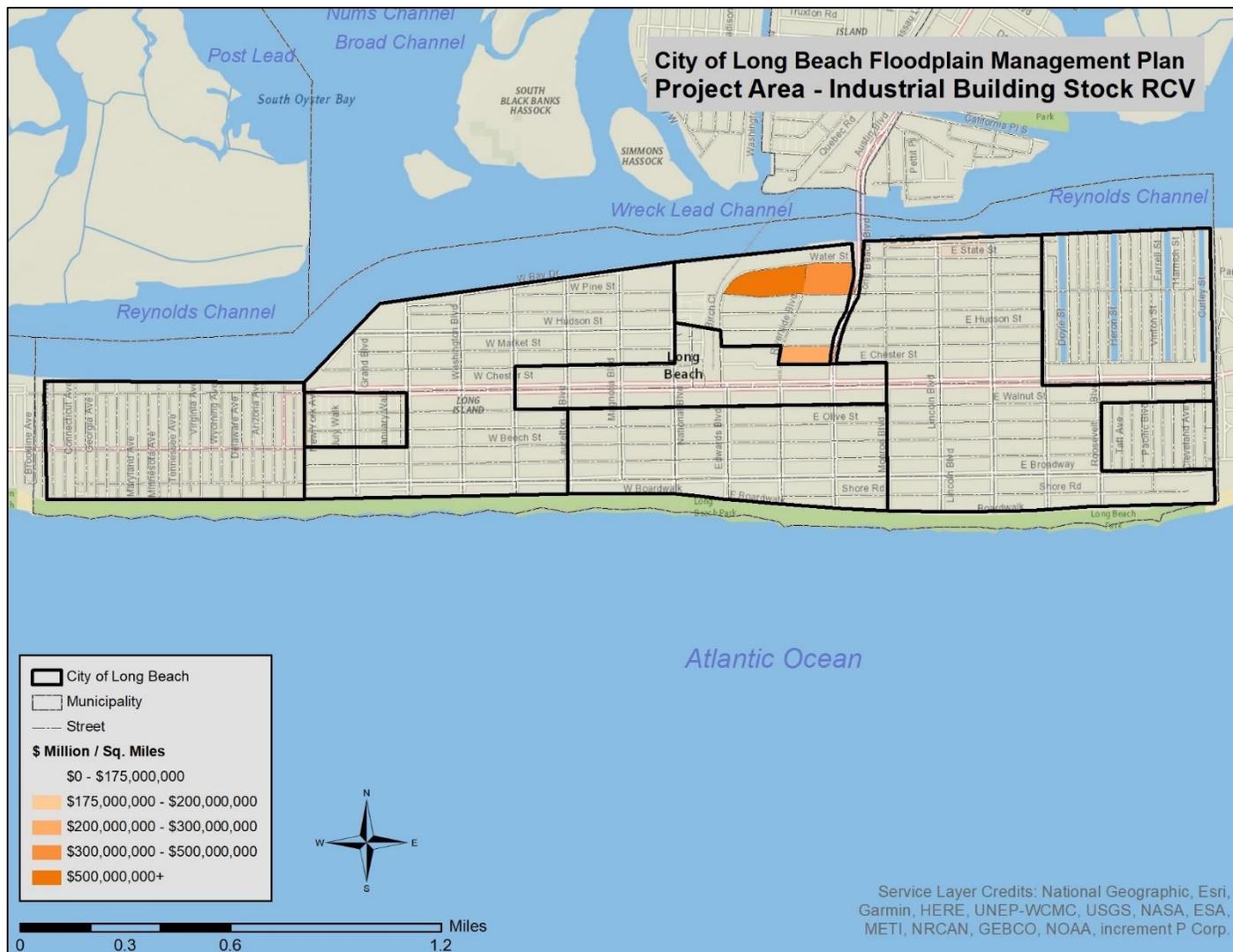
Figure 4-4, Figure 4-5, and Figure 4-6 show the distribution and exposure density of residential, commercial, and industrial buildings in the city of Long Beach based on the New York State Department of Taxation and Finance Property Class Code. Exposure density is considered the dollar value of structures per unit area, including building content value. The densities are shown in units of \$1,000 (\$K) per square mile. Viewing exposure distribution maps, such as those used for Figure 4-4 through Figure 4-6, can assist the city in visualizing areas of high exposure and in evaluating aspects of the city in relation to specific hazard risks.

Figure 4-4. Distribution of Residential Building Stock and Value Density in Long Beach



Source: NYS GIS 2014; NYS CSCIC 2008; City of Long Beach 2019; NYS ITS GIS 2017; NYS 2018

Figure 4-6. Distribution of Industrial Building Stock and Value Density in Long Beach



Source: NYS GIS 2014; NYS CSCIC 2008; City of Long Beach 2019; NYS ITS GIS 2017; NYS 2018



4.5 LAND USE TRENDS

Land use regulatory authority is vested in New York State's towns, villages, and cities. However, many development and preservation issues transcend location political boundaries. Communities should consider land use trends, which can impact the need for and prioritization of mitigation options over time. Land use trends significantly impact exposure and vulnerability to flood hazards.

This sections provides information on general land use trends and types of development occurring within the city. An understanding of these development trends can assist in planning for further development and ensuring that appropriate mitigation, planning, and preparedness measures are in place to protect human health and community infrastructure.

4.5.1 Land Use Trends

The City of Long Beach's population has fluctuated in recent decades. The City of Long Beach's 2018 Comprehensive Plan has identified revitalization and redevelopment of key areas in Nassau County as a priority to attract and grow business (City of Long Beach 2018).

Economy

The City's unemployment rate rose from 3.7 percent in the 2010 Census, to 5.9 percent according to the 2017 American Community Survey.

Long Beach is located in a prime location on Long Beach Barrier Island. The location provides easy access to transportation corridors, metropolitan areas, and a variety of recreational and tourism destinations. Tourism is one of the largest industries in the city. Some of the tourist attractions include the Long Beach Boardwalk, which that is lined with entertainment, recreation, shopping, and dining, as well as Ocean Beach Park, Pacific Playground, and Long Beach Municipal Fishing Pier.

The 2017 U.S. Census Bureau's County Business Patterns data identified 3,347 business establishments employing approximately 18,464 people in Long Beach. The educational services, and health care and social assistance has the highest number of employees with 5,411. This is followed by the professional, scientific, management, administrative, and waste management services with 2,550 employees; and finance, insurance, and real estate (rental and leasing) with 2,223 employees. Other popular industries include retail trade with 1,678 employees; arts, entertainment, recreation, accommodation, and food services with 1,243 employees; and construction with 1,164 employees (U.S. Census 2017).

The different occupations include management, business, science, and arts with 8,572 employees; sales and office occupations with 4,933 employees; service occupations with 2,935 employees; natural resources, construction, and maintenance occupations with 1,140 employees; and production, transportation, and material-moving occupations with 884 employees (U.S. Census 2017).

4.5.2 Future Growth and Development

The City of Long Beach is built out but has potential areas (such as brownfields) that may be redeveloped. The three areas explored in the City of Long Beach's 2018 Comprehensive Plan for potential redevelopment include the Bayfront, the Central Business District, and the Oceanfront. The potential areas for redevelopment will be centered around environmental resilience, productive and sustainable economy, transportation and mobility, and implementation strategies.



4.6 CRITICAL FACILITIES

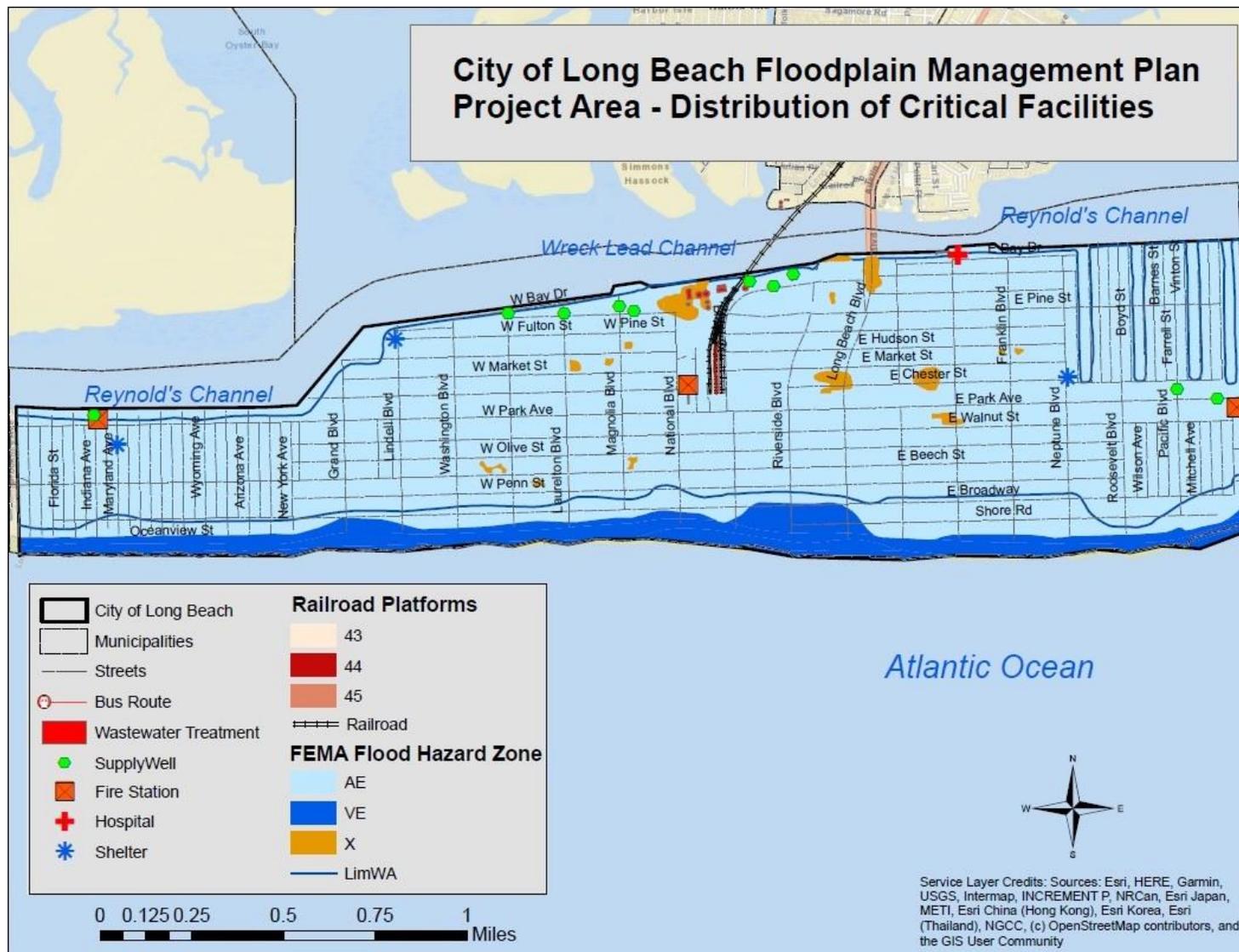
Critical facilities and infrastructure are those that are essential to the health and welfare of the population. These become especially important after any hazard event. Critical facilities are typically defined to include police and fire stations, schools, and emergency operations centers. Critical infrastructure can include the roads and bridges that provide ingress and egress and allow emergency vehicles access to those in need and the utilities that provide water, electricity, and communication services to the community.

A comprehensive inventory of critical facilities in the City of Long Beach was developed from various sources, including input from the Planning Committee. The inventory of critical facilities presented in this section represents the current status of this effort at the time of the FMP publication, and the inventory was used for the risk assessment provided in Section 5 (Risk Assessment). Figure 4-7 shows the locations of critical facilities in the City of Long Beach.

Critical facilities are those facilities considered critical to the health and welfare of the population and that are especially important following a hazard. As defined for this FMP, critical facilities include essential facilities, transportation systems, lifeline utility systems, and high-potential loss facilities.

Essential facilities are a subset of critical facilities that include those facilities that are important to ensure a full recovery following the occurrence of a hazard event. For the risk assessment, this category was defined to include police, fire, emergency medical services (EMS), schools/colleges, shelters, senior facilities, and medical facilities.

Figure 4-7. Critical Facilities in Long Beach



Source: NYS GIS 2014; NYS CSCIC 2008; Long Beach 2019; Homeland Infrastructure Foundation-Level Data 2019



4.6.1 Essential Facilities

This section provides information on emergency facilities, hospital and medical facilities, schools, shelters, and senior care and living facilities. For the purposes of this plan, emergency facilities include police, fire, emergency medical services (EMS), and emergency operations centers (EOC). Figure 4-7 displays the location of the essential facilities in the City of Long Beach.

Emergency Facilities

The Office of Emergency Management’s newly completed Emergency Operations Center (EOC) is located on the sixth floor of City Hall. The EOC is a protected and secure office in City Hall and is outfitted with emergency office equipment, including electrical panels tied to a roof-top generator, fixed emergency communication console, and hard-wired telecommunication systems. During emergency events, the office will be staffed with City, County and State officials, as well as utility providers to restore service to residents.

There are three fire stations located within the City of Long Beach. The fire department headquarters staff are volunteers, and the headquarters is located on West Chester Street. Station 1 is on Maple Boulevard, and Station 2 is on West Park Avenue. An ambulance is stationed at each facility.

Law enforcement and public safety are maintained by the City of Long Beach Police Department located in the East Wing of City Hall. All facets of law enforcement are provided including patrol functions, traffic division, warrants, identification, training bureau, detectives, patrol, and full investigative services.

Hospitals and Medical Facilities

The City of Long Beach residents can receive medical care at the Long Beach Medical Center, Beach Terrace Care Center, Park Avenue Extended Care Facility, along with hospital-affiliated clinics and other facilities in neighboring communities. The City of Long Beach has established an EMS partnership with South Nassau Communities Hospital to bolster ambulance service. Previously, the city’s Fire Department responded to all calls for emergency medical services.

Schools

The City of Long Beach is home to 12 schools, with a mixture of public and private schools ranging from pre-k to 12th grade schools. The City is home to Rabbinical College of Long Island located at 205 West Beech Street. In times of need, schools can function as shelters and are an important resource for the community.

Senior Care and Living Facilities

The City of Long Beach has 8 senior care facilities including Grandell Rehabilitation and Nursing Center, Komanoff Center for Geriatric and Rehab Medicine, and Long Beach Memorial Nursing Home. The 2013-2017 American Community Survey 5-Year Estimates identified 6,025 people over the age of 65 living within the City of Long Beach. The Nassau County Office of the Aging is responsible for developing county-wide plans and services that help the elderly remain independent as long as possible. They support and recommend positive legislation for the elderly, serve as a funding agency for over 70 programs, and maintain senior centers, adult day service centers, and senior lunch programs.

4.6.2 Transportation Systems

The City of Long Beach transportation network offers residents and employees various options for transportation throughout the city and the region. The transportation system includes an extensive network of roads, county bus service, a trolley service, and an extensive walking and biking trail system.



The streets and highways on Long Island are maintained by the various levels of municipal government, including the Nassau Highway Department and Department of Public Works.

Bus and Other Transit Facilities

Residents of the City of Long Beach have the option of using public transportation through the Nassau Inter-County Express (NICE) bus service; the official public transportation agency of Nassau County. These buses serve the County of Nassau, including service to and from the City of Long Beach. NICE bus service has 278 fixed route vehicles that accommodate an average of 445 scheduled trips a day. NICE bus services 90,000 passengers a day, Able-Ride; another transportation service, usually has 10,000 customers providing 320,000 trips a year (Long Island Weekly 2019). The City of Long Beach also has a Trolley system that has stops at the train station (eastbound), Maple Street (westbound), Edwards Street (westbound), and Nevada Street (eastbound) (City of Long Beach Transportation 2019).

Railroad Facilities

The Long Island Railroad (LIRR) is publicly owned by the Metropolitan Transportation Authority and is a commuter rail system going from Manhattan to the eastern tip of Suffolk County on Long Island. There are 11 lines and 124 stations with 700-mile total track length. LIRR has an average weekday ridership of 354,800 passengers (Manhattan Transportation Authority [MTA] 2020). LIRR tracks east to the Long Beach Boulevard Bridge, where there are 19 acres of potential land including private, public, and utility-owned land for redevelopment (City of Long Beach 2018).

Airports

The only airport facility in the City of Long Beach is the Long Beach Memorial Hospital Heliport.

4.6.3 Lifeline Utility Systems

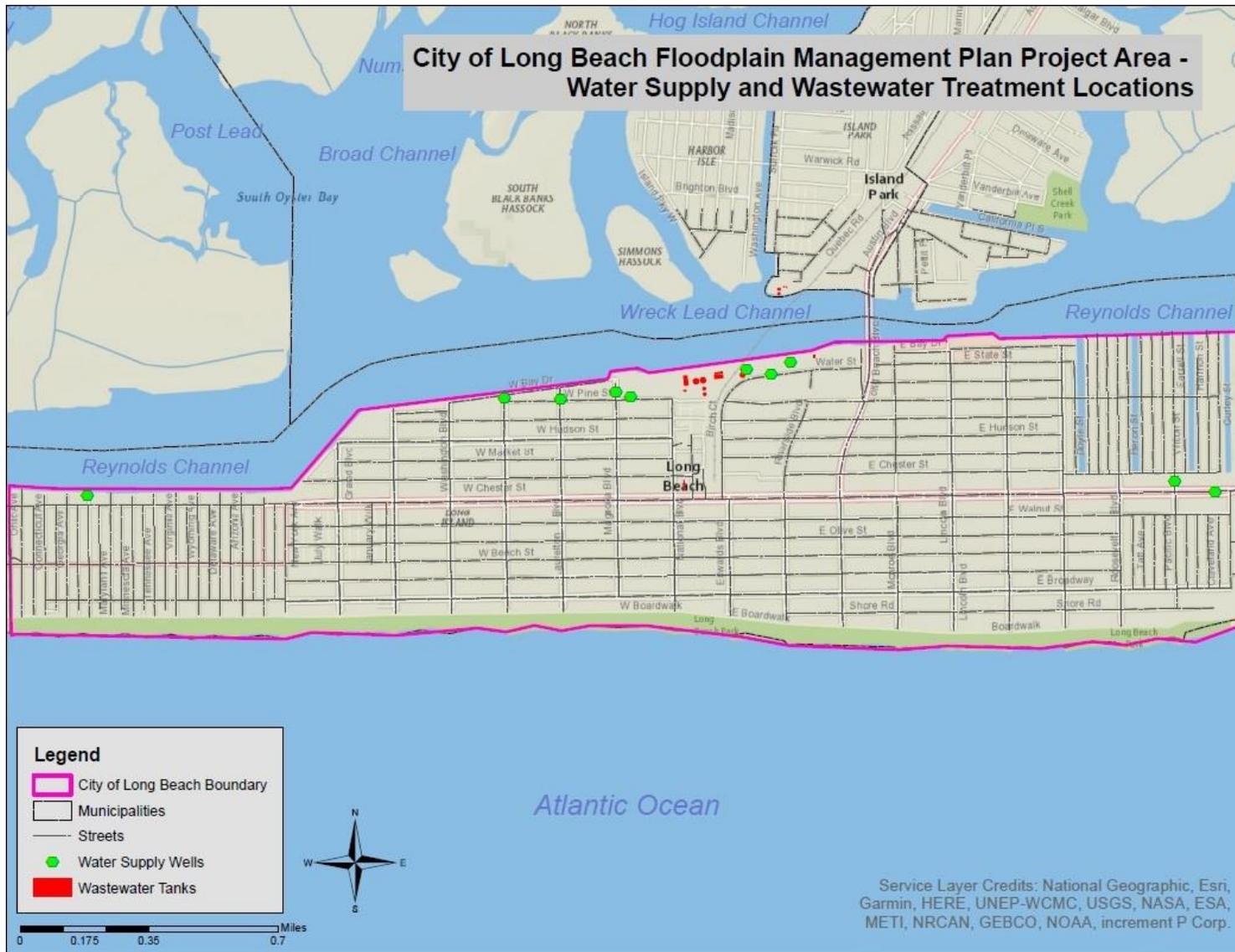
This section presents data and information on potable water, wastewater, energy resources, and communication utility systems. Due to heightened security concerns, local utility lifeline data, needed to complete the analysis, have only partially been obtained. Long Beach contains numerous critical lifeline utility facilities including several wells and wastewater treatment facilities. Figure 4-7 shows the location of these lifeline facilities.

Potable Water

The City of Long Beach relies on groundwater from the Lloyd Aquifer which is pumped from eight public wells throughout the city. Water is provided as a public service or through private supplies, such as wells.

Figure 4-8 identifies the areas served by public supply and private wells in the City of Long Beach. Large industries may have their own supply source and treatment facilities, and fire departments often have an alternate water source for firefighting.

Figure 4-8. Long Beach Potable Water Supply and Wastewater Treatment Map



Source: NYS GIS 2014; NYS CSCIC 2008; Long Beach 2019; Homeland Infrastructure Foundation-Level Data 2019



Wastewater Facilities

The City of Long Beach has ten wastewater facilities including three pump stations. The City’s wastewater collection system serves all Long Beach as well as a portion of Lido Beach. Sewer service is dependent on the size of the treatment plant, age of the infrastructure, and quantity being produced compared to the discharge point.

Energy Resources

Gas and electric power in Long Island are transmitted and distributed by various companies including PSEG Long Island, Direct Energy, Con Edison, BlueRock Energy, Global Energy, Plymouth Rock Energy, and National Grid.

Communications

The City of Long Beach is served by a variety of communications systems, including traditional landline, fiber optic, and cellular service provided by multiple companies, such as AT&T, Cell City, Verizon, T-Mobile, and Sprint. Each carrier has individual plans for emergency situations during hazard events and post-disaster recovery efforts. In addition to landline, fiber optic, and cellular communications systems, the City of Long Beach has an extensive radio communications network that is utilized by emergency services agencies, hospitals, law enforcement, public works, transportation, and other supporting organizations.

4.6.4 High-Potential Loss Facilities

High-potential loss facilities include dams, levees, hazardous materials (HAZMAT) facilities, nuclear power plants, and military installations.

HAZMAT Facilities

A Superfund site consists of land in the United States that has been contaminated by hazardous waste and identified by the U.S. Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health and/or the environment. These sites are placed on the National Priorities List (NPL). The NPL is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.

Abandoned hazardous waste sites placed on the federal NPL include those that the EPA has determined present “a significant risk to human health or the environment,” with the sites being eligible for remediation under the Superfund Trust Fund Program. As of November 2019, the City of Long Beach has no hazardous sites in the federal Superfund Program that are listed on the NPL (US EPA 2019).

Superfund sites are contaminated locations requiring a long-term response to clean up hazardous materials; NPL sites are included. The EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) (Superfund) Public Access Database (CPAD) reports that there are currently no Superfund sites located in the City of Long Beach (US EPA 2019).

Dams and Levees

No dams or levees are located in the City of Long Beach (USGS 2020; USACE 2020).



SECTION 5 RISK ASSESSMENT

This section provides a profile and vulnerability assessment for the flood hazard in order to quantify the description, location, extent, history, probability, and impact of flood events in the City of Long Beach. For the purpose of this FMP, coastal/tidal/sea level rise and urban/stormwater are the main flood types of concern for the City of Long Beach. The city is vulnerable to other natural and man-made hazards which are addressed in the Nassau County Multi-Jurisdictional All Hazard Mitigation Plan.

5.1 Hazard Description

A flood is the inundation of normally dry land resulting from the rising and overflowing of a body of water. They can develop slowly over a period of days or develop quickly, with disastrous effects that can be local (impacting a neighborhood or community) or regional (affecting entire river basins, coastlines, multiple counties, or states) (FEMA 2007). As defined in the New York State (NYS) Hazard Mitigation Plan (HMP) (NYS Division of Homeland Security and Emergency Services [DHSES] 2019), flooding is an overland flow of water from oceans, rivers, groundwater, or rainfall that submerges areas that are usually dry. Flooding is the primary natural hazard in New York State. Floods are frequent and costly natural hazards in New York in terms of human hardship and economic loss, particularly to communities that lie within flood-prone areas or floodplains of a major water source.

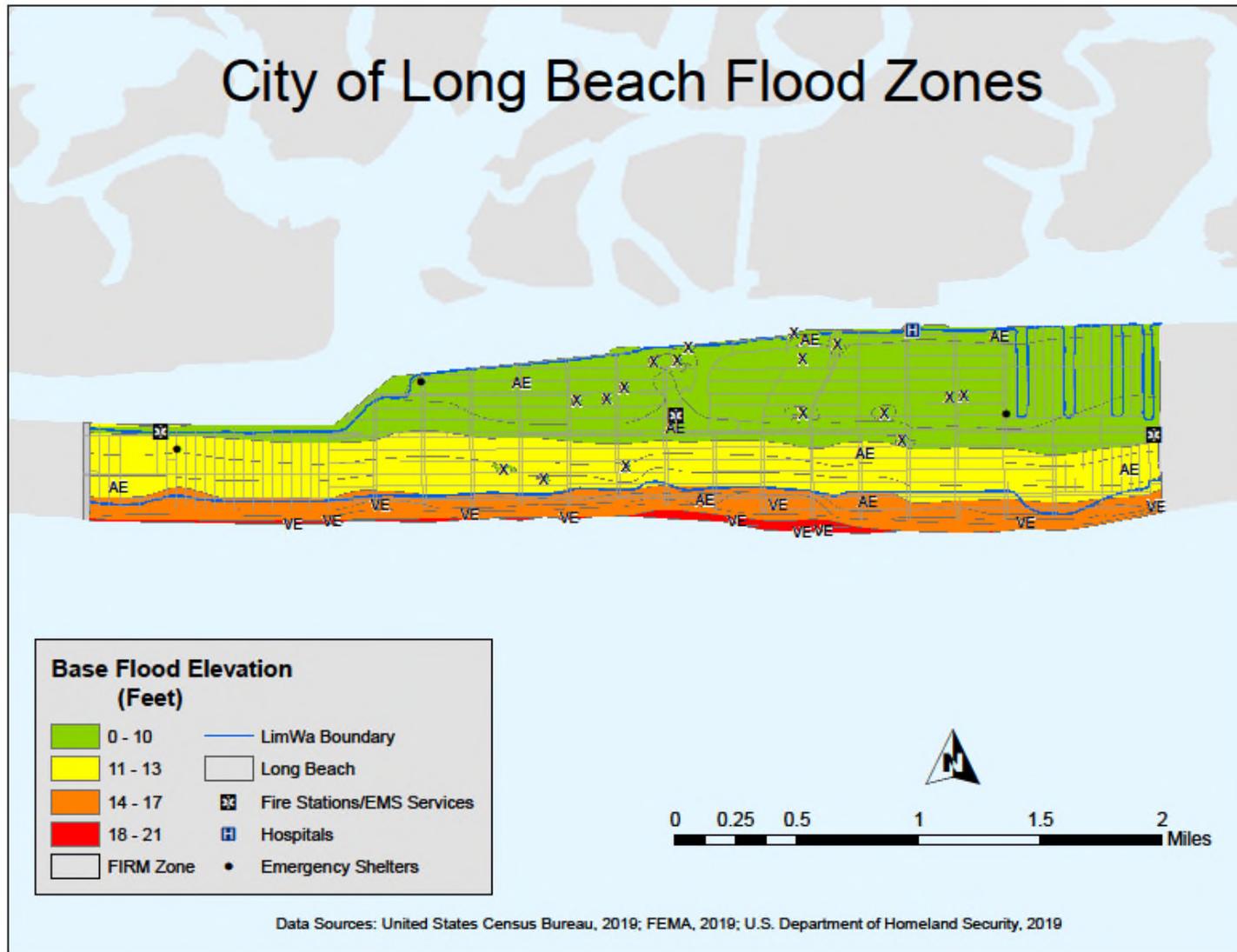
Most floods fall into three categories: riverine, coastal, and shallow (FEMA 2008). Other types of floods may include ice-jam floods, alluvial fan floods, dam failure floods, and floods associated with local drainage or high groundwater (as indicated in the previous flood definition). For the purpose of this Floodplain Management Plan (FMP) and as deemed appropriate by the City of Long Beach FMP Planning Committee (Planning Committee), coastal/tidal and urban/stormwater are the main flood types of concern for the city. Additionally, the impacts of coastal erosion, storm surge, and sea level rise will also be discussed. These types of flood are further discussed below.

Special Flood Hazard Area

A floodplain is defined as the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that becomes inundated with water during a flood. Most often floodplains are referred to as 100-year floodplains. Defined in further detail in the 'Frequency' subsection of this profile, the 100-year flood (also known as the 1-percent annual chance flood) has a 1-percent chance of being equaled or exceeded each year. This 1-percent annual chance flood is now the standard used by most federal and state agencies and by the National Flood Insurance Program (NFIP) and is referred to as the Special Flood Hazard Area or SFHA (FEMA 2005).



Figure 5-1. FEMA Flood Hazard Areas in the City of Long Beach



Source: NY GIS 2014, City of Long Beach 2019, Homeland Infrastructure Foundation-Level Data 2019, FEMA 2018





Special Flood Hazard Area Location

Although flooding can occur anywhere in the City of Long Beach, certain locations are more vulnerable or more likely to experience flooding than others in the city. Reynolds Channel is the most frequent source of coastal flooding in the city, based off previous occurrences and storm events. Very severe storm events can result in overwash from the Atlantic Ocean. Generally, tide levels in Reynolds Channel will be lower than those recorded in the Atlantic Ocean (FEMA FIS 2009).

Much of the city has already been developed for residential, business, or other use, increasing the City of Long Beach’s vulnerability to urban flooding. While the city has stormwater management systems in place in its residential neighborhoods, the capacity of the stormwater systems is not always sufficient. While more recently developed and renovated neighborhoods typically have systems with sufficient capacity, older neighborhoods frequently have stormwater management systems that have not been updated to handle current needs and populations, leading to insufficient drainage. Minor coastal flooding combined with stormwater also results in flooding in many streets.

All of the City of Long Beach is considered flood-prone. The main bodies of water (and sources of flooding) in the city include the Atlantic Ocean and Reynolds Channel. The City is located in Atlantic Ocean/Long Island Sound watershed (NYS DEC Date Unknown). For details regarding the watershed management area and the watersheds, please refer to Section 4 (City Profile).

Special Flood Hazard Area Severity

Generally, the severity of coastal flooding can be measured by the stillwater elevations for a water source. Stillwater elevations are the projected elevation of floodwaters in the absence of waves resulting from wind or seismic effects. In coastal areas, stillwater elevations are determined when modeling coastal storm surge; the results of overland wave modeling are used in conjunction with the stillwater elevations to develop base flood elevations. Table 5-1 shows the stillwater elevations identified in the effective FIS for the City of Long Beach.

Table 5-1. Summary of Stillwater Elevations for Waterways Adjacent to the City of Long Beach

Source/Location	Elevation (feet NAVD)			
	10-Year	50-Year	100-Year	500-Year
Atlantic Ocean (Shoreline within the Town of Hempstead from Silver Point to about 5,000 feet west of Jones Inlet)	6.7	8.8 – 8.9	9.9 – 10.2	12.0 – 12.5
Atlantic Ocean (Shoreline within the Town of Hempstead from Silver Point to about 5,000 feet west of Jones Inlet to Jones Inlet)	6.6	8.5	9.4	11.2
Atlantic Ocean (Shoreline from Jones Inlet within the Town of Hempstead to the Oyster Bay/Babylon corporate limits)	6.7	8.9 – 9.0	10.2 – 10.3	12.6 – 12.7
Reynolds Channel (Southern Shoreline within the Village of Lawrence)	6.7	8.6	9.4 - 9.6	11.1 – 11.4

Source: FEMA FIS 2009
NAVD North American Vertical Datum of 1988

While riverine flooding severity can be measured by discharge rates, FEMA evaluates the potential impact of a flood event along the coastline through coastal hydraulic analysis, which consists of a combination of transect layout, field reconnaissance, erosion analysis, and overland wave modeling. Transects show the elevation of the ground both onshore and offshore, and they are the locations where the overland wave height modeling occurs. Transects are selected through consideration of local topography, land use, shoreline features, and shoreline





orientation to capture the most useful data. The transects selected for the analysis recorded in the FIS are the sites of primary flooding in both the City of Long Beach and Nassau County. In addition to considering wave heights, the coastal hydraulic analysis also evaluated stillwater elevations. Table 5-2 provides the transect data from the city’s most recent FEMA FIS.

Table 5-2. Transect Data in the City of Long Beach

Flood Source	Transect	Coordinates	Elevation (feet NAVD)		
			100-Year	Wave Setup	1-Percent Annual Chance Wave Crest
Atlantic Ocean	53	N 40.582874 W 73.697850	10.1	4.0	21.7
Atlantic Ocean	54	N 40.583064 W 73.682320	9.9	3.9	21.2
Atlantic Ocean	55	N 40.583008 W 73.665643	10.1	3.9	21.4
Atlantic Ocean	56	N 40.582465 W 73.656742	10.1	3.8	21.3
Atlantic Ocean	57	N 40.582380 W 73.646681	10.1	3.7	21.2

Source: FEMA FIS 2009

N North W West NAVD North American Vertical Datum of 1988

The U.S. Geological Survey (USGS) provides other resources for tracking the severity and potential incidents for a coastal flooding event. There are two tide gauges located at each end of Long Beach Island which track elevations.

The USGS 01310740 Reynolds Channel at Point Lookout gauge was active from January 1974 to June 1994. The records for that period reside with the Town of Hempstead Department of Conservation & Waterways. The gauge was reactivated in December 1997 and has run to the present. The period of record is October 2004 to present. This gage recorded a maximum elevation of 9.90 feet (NGVD 1929) on October 29, 2012 during Superstorm Sandy, and a minimum elevation of an estimated -4.28 feet (NGVD 1929) on March 9, 2005. Information provided by Town of Hempstead Department of Conservation & Waterways indicates that a storm tide on September 27, 1985 reached an elevation of 7.3 feet with a minimum elevation of -4.9 feet recorded on January 11, 1978 and March 16, 1980. Elevation observations and tidal predictions for this station are reported to NGVD 1929. To convert data to NAVD 1988, subtract 1.13 feet. To convert data to MHHW datum, subtract 3.35 feet. To convert data to MLLW datum, add 1.27 feet. These corrections vary from site to site (USGS 2020).

The USGS 01211145 East Rockaway Inlet at Atlantic Beach gage was first active from November 1972 to October 1998. The records for that period reside with the Town of Hempstead Department of Conservation & Waterways. The gage was reactivated in August 2002 and has run to the present. The most recent activation represents the period of record. This gage recorded a maximum elevation of 10.80 feet (NGVD 1929) on October 29, 2012 during Superstorm Sandy, and a minimum elevation of an estimated -4.77 feet (NGVD 1929) on March 9, 2005. Information provided by Town of Hempstead Department of Conservation & Waterways indicates that storm tides of Oct. 31, 1991, and Dec. 11, 1992, reached elevations of 6.7 and 7.7 feet, respectively, with a minimum elevation of -5.0 feet recorded on January 10, 1978. Elevation observations and tidal predictions for this station are reported to NGVD 1929. To convert data to NAVD 1988, subtract 1.10 feet. To convert data to MHHW datum, subtract 3.48 feet. To convert data to MLLW datum, add 1.51 ft (USGS 2020).

The oldest tide gage in the region is found at the Battery in New York City which has a record dating back to 1893. While flooding events can have substantial differences in severity from location to location, the additional 80 years of history at the Battery gage can be used to note major flood events that likely impacted the City of



Long Beach that are not in the period of record for the two local gages. Hurricane Donna in 1960, a nor'easter in 1953, a nor'easter in 1950, and the Ash Wednesday Storm of 1962 are the second, fourth, sixth, and seventh worst flood events on record at the Battery (NOAA 2018). Other historical storms of note that are not part of the official flood record due to lack of precise instrumentation include a hurricane in August 1635 which resulted in a storm surge 14 feet above high tide and the Norfolk Long Island Hurricane of September 1821 which resulted in 21 deaths (Nassau County 2014).

Additionally, the severity of a flood depends not only on the amount of water that accumulates in a period of time, but also on the land's ability to manage this water. The infiltration rates of soil is a significant factor. When it rains, soil acts as a sponge. When the land is saturated or frozen, infiltration rates decrease and any more water that accumulates must flow as runoff (Harris 2001). Long Beach also has a high water table which limits the rate of saturation.

Special Flood Hazard Area Frequency

The 1 percent annual chance flood, which is the standard used by most federal and state agencies, is used by the NFIP as the standard for floodplain management and to determine the need for flood insurance. A structure located within a SFHA shown on a NFIP map has a 26% chance of suffering flood damage during the term of a 30-year mortgage.

The extent of flooding associated with a 1-percent annual chance flood (the base flood or 100-year flood) is used as the regulatory boundary by many agencies. Also referred to as the SFHA, this boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities. Many communities have maps that show the extent and likely depth of flooding for the base flood. Corresponding water-surface elevations describe the water elevation resulting from a given discharge level, which is one of the most important factors used in estimating flood damage.

The term “500-year flood” is the flood that has a 0.2 percent chance of being equaled or exceeded each year. The 500-year flood could occur more than once in a relatively short period of time. Statistically, the 0.2% annual chance flood has a 6% chance of occurring during a 30-year period of time, the length of many mortgages. The 500-year floodplain is referred to as the Shaded X Zone on flood insurance rate maps (FIRM). Base flood elevations or depths are not shown within this zone and insurance purchase is not required in this zone.

Special Flood Hazard Area Warning Time

Potential flood-level events are monitored, and warnings are issued to residents when flooding is forecast or tide gages detect significant rises in waterways. Information on flooding levels for minor, moderate, and major events, are presented under the ‘Warning Time’ subsection further in this profile.

Special Flood Hazard Area Secondary Hazards

Secondary hazards associated with the SFHA are largely determined by the source of flooding. Additional information on secondary hazards is detailed in the coastal flooding, coastal erosion, storm surge, and sea level rise hazard sections below.

Coastal Flooding Hazard

Coastal flooding occurs along the coasts of oceans, bays, estuaries, coastal rivers, and large lakes. Coastal floods are the submersion of land areas along the ocean coast and other inland waters caused by seawater over and above normal tide action. Coastal flooding is a result of the storm surge where local sea levels rise often resulting



in weakened or destroyed coastal structures. Hurricanes and tropical storms (tropical cyclones), and Nor'easters cause most of the coastal flooding in New York.

Hurricanes and Tropical Storm

A tropical cyclone is characterized by a low-pressure center and numerous thunderstorms that produce strong winds and heavy rain. Tropical depressions, tropical storms, and hurricanes are all considered tropical cyclones. Tropical cyclones strengthen when water evaporated from the ocean is released as the saturated air rises, resulting in condensation of water vapor contained in the moist air. These storms rotate counterclockwise in the northern hemisphere around the center and are accompanied by heavy rain and strong winds (National Weather Service [NWS] 2013). Almost all tropical storms and hurricanes in the Atlantic basin (which includes the Gulf of Mexico and Caribbean Sea) form between June 1 and November 30 (hurricane season). August and September are peak months for hurricane development (NOAA 2013).

Tropical cyclones are fueled by a different heat mechanism than other cyclonic windstorms such as Nor'easters and polar lows. The characteristic that separates tropical cyclones from other cyclonic systems is that at any height in the atmosphere, the center of a tropical cyclone will be warmer than its surroundings; a phenomenon called "warm core" storm systems (NOAA 2013).

The National Weather Service (NWS) issues hurricane and tropical storm watches and warnings. These watches and warnings are issued or will remain in effect after a tropical cyclone becomes post-tropical, when such a storm poses a significant threat to life and property. The NWS allows the National Hurricane Center (NHC) to issue advisories during the post-tropical stage. The following are the definitions of the watches and warnings:

- *Hurricane/Typhoon Warning* is issued when sustained winds of 74 mph or higher are expected somewhere within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the warning is issued 36 hours in advance of the anticipated onset of tropical storm force winds (24 hours in the western north Pacific). The warning can remain in effect when dangerously high water or combination of dangerously high water and waves continue, even though winds may be less than hurricane force.
- *Hurricane Watch* is issued when sustained winds of 74 mph or higher are possible within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the hurricane watch is issued 48 hours prior to the anticipated onset of tropical storm force winds.
- *Tropical Storm Warning* is issued when sustained winds of 39 to 73 mph are expected somewhere within the specified area within 36 hours (24 hours for the western north Pacific) in association with a tropical, subtropical, or post-tropical storm.
- *Tropical Storm Watch* is issued when sustained winds of 39 to 73 mph are possible within the specified area within 48 hours in association with a tropical, sub-tropical, or post-tropical storm (NWS 2013).

Nor'Easter

A Nor'Easter is a cyclonic storm that moves along the East Coast of North America. It is called a Nor'Easter because the damaging winds over coastal areas blow from a northeasterly direction. Nor'Easters can occur any time of the year, but are most frequent and strongest between September and April. These storms usually develop between Georgia and New Jersey within 100 miles of the coastline and typically move from southwest to northeast along the Atlantic Coast of the United States (NOAA 2013b). A Nor'Easter event can cause storm surges, waves, heavy rain, heavy snow, wind, and coastal flooding. Nor'Easters have diameters that can span 1,200 miles, impacting large areas of coastline. The forward speed of a Nor'Easter is usually much slower than



a hurricane, so with the slower speed, a Nor'Easter can linger for days and cause tremendous damage to those areas impacted. In order to be called a Nor'Easter, a storm must have the following conditions, as per the Northeast Regional Climate Center (NRCC):

- Must persist for at least a 12-hour period
- Have a closed circulation
- Be located within the quadrilateral bounded at 45°N by 65° and 70°W and at 30°N by 85°W and 75°W
- Show general movement from the south-southwest to the north-northeast
- Contain wind speeds greater than 23 miles per hour (mph)

The intensity of a Nor'Easter can rival that of a tropical cyclone in that, on occasion, it may flow or stall off the mid-Atlantic coast resulting in prolonged episodes of precipitation, coastal flooding, and high winds.

Coastal Flooding Location

Coastal communities are vulnerable to the damaging impacts of major storms along the coastline of New York. New York's coastal waters include the Atlantic Ocean and Long Island Sound and all connecting water bodies, bays, harbors, shallows, and wetlands (NYS DEC Date Unknown). All of the City of Long Beach is subject to coastal flooding.

Storm surge, detailed below, also contributes to coastal flooding. Storm surges inundate coastal floodplains by dune overwash, tidal elevation rise in inland bays and harbors, and backwater flooding through coastal river mouths. Strong winds can increase in tide levels and water-surface elevations. Storm systems generate large waves that run up and flood coastal beaches. The combined effects create storm surges that affect the beach, dunes, and adjacent low-lying floodplains. Shallow, offshore depths can cause storm-driven waves and tides to pile up against the shoreline and inside bays. Based on an area's topography, a storm surge may inundate only a small area (along sections of the northeast or southeast coasts) or storm surge may inundate coastal lands for a mile or more inland from the shoreline.

Coastal Flooding Severity

Coastal flooding has many of the same problems identified for riverine flooding but also has additional problems such as beach erosion; loss or submergence of wetlands and other coastal ecosystems; saltwater intrusion; high water tables; loss of coastal recreation areas, beaches, protective sand dunes, parks, and open space; and loss of coastal structures. Coastal structures can include sea walls, piers, bulkheads, bridges, or buildings (FEMA 2011).

There are several forces that occur with coastal flooding:

- *Hydrostatic forces* against a structure are created by standing or slowly moving water. Flooding can cause vertical hydrostatic forces, or flotation. These types of forces are one of the main causes of flood damage.
- *Hydrodynamic forces* on buildings are created when coastal floodwaters move at high velocities. These high-velocity flows are capable of destroying solid walls and dislodging buildings with inadequate foundations. High-velocity flows can also move large quantities of sediment and debris that can cause additional damage. In coastal areas, high-velocity flows are typically associated with one or more of the following:
 - Storm surge and wave run-up flowing landward through breaks in sand dunes or across low-lying areas
 - Tsunamis
 - Outflow of floodwaters driven into bay or upland areas
 - Strong currents parallel to the shoreline, driven by waves produced from a storm
 - High-velocity flows



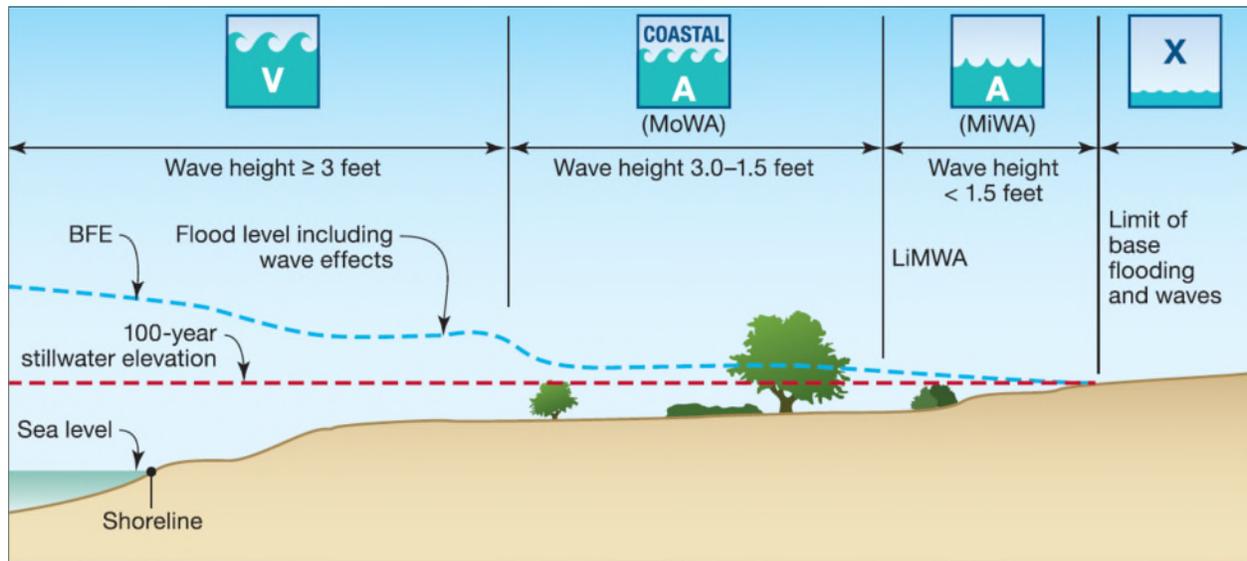
High-velocity flows can be created or exacerbated by the presence of man-made or natural obstructions along the shoreline and by weak points formed by roads and access paths that cross dunes, bridges or canals, channels, or drainage features.

- *Waves* can affect coastal buildings from breaking waves, wave run-up, wave reflection and deflection, and wave uplift. The most severe damage is caused by breaking waves. The force created by these types of waves breaking against a vertical surface is often at least 10 times higher than the force created by high winds during a coastal storm.
- *Flood-borne debris* produced by coastal flooding events and storms typically includes decks, steps, ramps, breakaway wall panels, portions of or entire houses, heating oil and propane tanks, cars, boats, decks and pilings from piers, fences, erosion control structures, and many other types of smaller objects. Debris from floods are capable of destroying unreinforced masonry walls, light wood-frame construction, and small-diameter posts and piles (FEMA 2011).

According to the 2011 Coastal Construction Manual, FEMA P-55, Zone V (including Zones VE, V1-30, and V) identifies the Coastal High Hazard Area. This is the portion of the special flood hazard area (SFHA) that extends from offshore to the inland limit of a primary frontal dune along an open coast and any other portion of the SFHA that is subject to high-velocity wave action from storms or seismic sources. The boundary of Zone V is generally based on wave heights (3 feet or greater) or wave run-up depths (3 feet or greater). Zone V can also be mapped based on the wave overtopping rate (when waves run up and over a dune or barrier). Zone A or AE, identify portions of the SFHA that are not within the Coastal High Hazard Area. These zones are used to designate both coastal and non-coastal SFHAs. Regulatory requirements of the NFIP for buildings located in Zone A are the same for both coastal and riverine flooding hazards. Zone AE in coastal areas is divided by the limit of moderate wave action (LiMWA). The LiMWA represents the landward limit of the 1.5-foot wave (FEMA 2011). The LiMWA is indicated on the city's Effective FIRM dated September 11, 2009.

The area between the LiMWA and the Zone V limit is known as the Coastal A-Zone (CAZ) (for building codes and standard purposes) and as the Moderate Wave Action area (by FEMA flood mappers). This area is subject to wave heights between 1.5 and 3 feet during the base flood. The area between the LiMWA and the landward limit of Zone A is known as the Minimal Wave Action area, and is subject to wave heights less than 1.5 feet during the base flood (FEMA P-55 2011). Figure 5-2 shows a typical transect illustrating Zone V, the Coastal A-Zone and Zone A, and the effects of energy dissipation and regeneration of a wave as it moves inland. Wave elevations are decreased by obstructions such as vegetation and rising ground elevation (FEMA 2011). Since the LiMWA is delineated on the FIRM, the 2016 Uniform Construction Code requires new buildings and substantially improved buildings to comply with the requirements for Zone V. However, federal flood insurance in CAZs is rated using Zone A rates (lower than Zone V rates (NJAFM Quick Guide 2015)).

Figure 5-2. Transect Schematic of Zone V, Coastal A-Zone, Zone A, and Zone X



Source: FEMA 2011

< Less than

≥ Greater than or equal to

BFE Base Flood Elevation

LiMWA limit of moderate wave action

MiWA Minimal Wave Action area

MoWA Moderate Wave Action area

Coastal Flood Frequency

Coastal flooding frequency is tied to the frequency of coastal storm events.

Coastal Flood Warning Time

Due to the sequential pattern of meteorological conditions needed to cause serious flooding, it is unusual for a flood to occur without warning. Warning times for floods can be between 24 and 48 hours. Flash flooding can be less predictable, but potential hazard areas can be warned in advanced of potential flash flooding danger.

Each watershed has unique qualities that affect its response to rainfall or coastal flooding. A hydrograph, which is a graph or chart illustrating stream flow or tidal height in relation to time (see Figure 5-3 and Figure 5-4) is a useful tool for examining a stream's response to rainfall or tidal water's response to storm surge.

The potential warning time a community has to respond to a flooding threat is a function of the time between the first measurable rainfall or start of storm surge and the first occurrence of flooding. The time it takes to recognize a flooding threat reduces the potential warning time for a community that has to take actions to protect lives and property. Another element that characterizes a community's flood threat is the length of time floodwaters remain above flood stage.

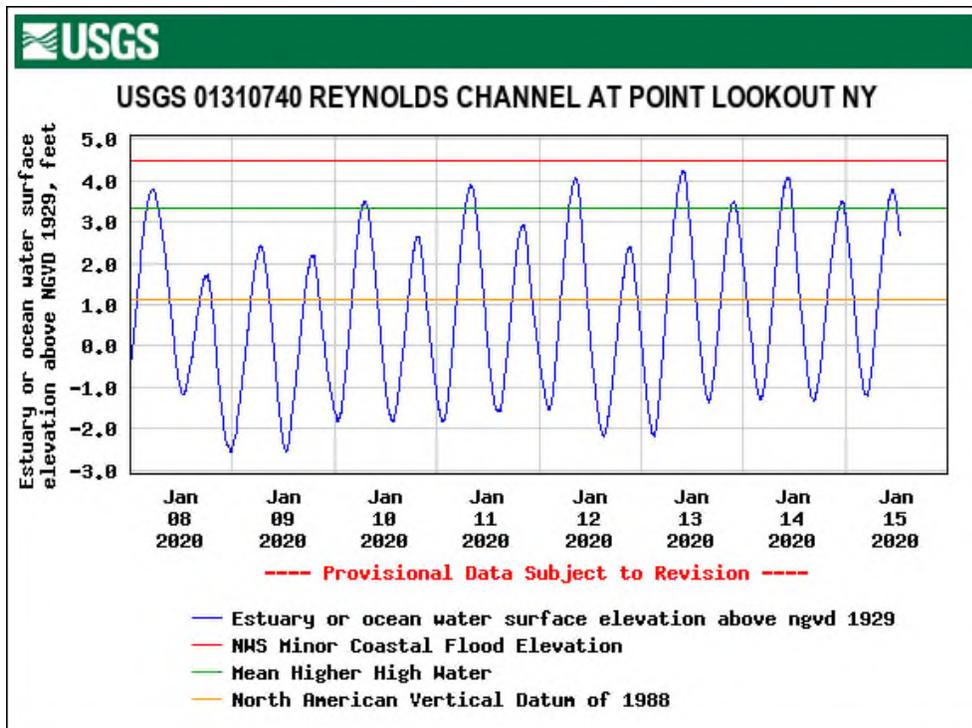
The city's flood threat systems consist of tide gages along the coastline that constantly monitor and report stream levels. This information is fed into a USGS forecasting program, which assesses the flood threat based on the amount of flow in the stream (measured in cubic feet per second). These gages are maintained by the USGS. For more information on these tide gages, please refer to the 'Severity' subsection earlier in this Flood Profile. In addition to this program, data and flood information is provided by the NWS. All of this information is analyzed to evaluate the flood threat and possible evacuation needs.



Local tide gauges are also utilized in the Stevens Flood Advisory System. The System provides coastal flooding forecasts for each gauge four days into the future, taking into account astronomical tidal forecast and storm surge modeling (Stevens Institute of Technology 2020).

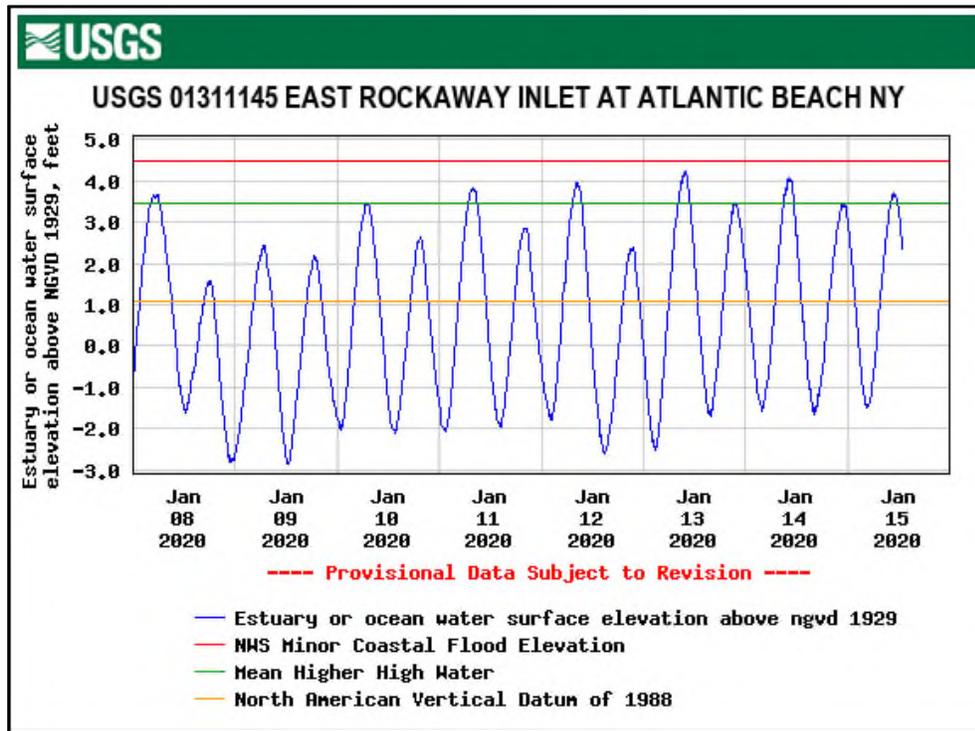
The following figures consist of hydrographs for the two closest tidal gages near the City of Long Beach. These gages are outside corporate limits but are located at either end of Long Beach Island. The hydrographs provide real-time data with action levels, minor, moderate, and major flood stages in relation to current river heights.

Figure 5-3. USGS 01310740 Reynolds Channel at Point Lookout NY Hydrograph



Source: NOAA NWS 2020

Figure 5-4. USGS 01211145 East Rockaway Inlet at Atlantic Beach NY Hydrograph



Source: NOAA NWS 2020

The NWS issues watches and warnings when forecasts indicate rivers may approach bank-full levels. The flood extent or severity categories used by the NWS include minor flooding, moderate flooding, and major flooding. Each category has a definition based on property damage and public threat:

- Minor Flooding - minimal or no property damage, but possibly some public threat or inconvenience.
- Moderate Flooding - some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.
- Major Flooding - extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations (NWS 2011).

When a watch is issued, the public should prepare for the possibility of a flood. When a warning is issued, the public is advised to stay tuned to a local radio station for further information and be prepared to take quick action if needed. A warning means a flood is imminent, generally within 12 hours, or is occurring. Local media broadcast NWS warnings. Thresholds for flood warnings have been established for coastal areas of Nassau County based on available tidal gage information, as follows:

- USGS 01310740 Reynolds Channel at Point Lookout NY
 - Near flood state is 4.03 feet NGVD 29
 - Minor flooding/Initial flood stage is 4.53 feet NGVD 29
 - Moderate flooding is 5.53 feet NGVD 29
 - Major flooding is 6.53 feet NGVD 29
- USGS 01211145 East Rockaway Inlet at Atlantic Beach NY
 - Near flood state is 4.0 feet NGVD 29
 - Minor flooding/Initial flood stage is 4.5 feet NGVD 29



- Moderate flooding is 5.5 feet NGVD 29
- Major flooding is 6.5 feet NGVD 29

Coastal Flooding Secondary Hazards

The most problematic secondary hazard for flooding is coastal erosion, which in some cases can be more harmful than actual flooding. Hazardous materials spills are also a secondary hazard of flooding if storage tanks rupture and spill into waterways.

Coastal Erosion Hazard

Along with flooding, coastal erosion is one of the primary coastal hazards leading to loss of lives or damage to property and infrastructure in damaged coastal areas. Many natural factors affect erosion of the shoreline, including shore and nearshore morphology, shoreline orientation, and the response of these factors to storm frequency and sea-level rise. Coastal shorelines change constantly in response to wind, waves, tides, sea-level fluctuation, seasonal and climatic variations, human alteration, and other factors that influence the movement of sand and material within a shoreline system.

Unsafe tidal conditions, as a result of high winds, heavy surf, erosion, and fog, are ordinary coastal hazard phenomena. Some or all of these processes can occur during a coastal storm, resulting in an often-detrimental impact on the surrounding coastline. Factors including: (1) storms such as Nor'easters and hurricanes, (2) decreased sediment supplies, and (3) sea-level rise contribute to these coastal hazards.

Coastal erosion can result in significant economic loss through the destruction of buildings, roads, infrastructure, natural resources, and wildlife habitats. Damage often results from an episodic event with the combination of severe storm waves and dune or bluff erosion.

Historically, some of the methods used by municipalities and property owners to stop or slow down coastal erosion or shoreline change have actually exacerbated the problem. Attempting to halt the natural process of erosion with shore parallel or perpendicular structures such as seawalls (groins and jetties) and other hard structures typically worsens the erosion in front of the structure (i.e. walls), prevents or starves any sediment behind the structure (groins) from supplying down-drift properties with sediment, and subjects down-drift beaches to increased erosion. Since most sediment transport associated with erosion and longshore drift has been reduced, some of the state's greatest coastal assets and attractions—beaches, dunes, barrier beaches, salt marshes, and estuaries—are threatened and will slowly disappear as the sediment sources that feed and sustain them are eliminated.

Sandy barrier/bluff coastlines are constantly changing as the result of wind, currents, storms, and sea-level rise. Because of this, developed sandy shorelines are often stabilized with hardened structures (seawalls, bulkheads, revetments, rip-rap, gabions, and groins) to protect coastal properties from erosion. While hardened structures typically prove to be beneficial in reducing property damage, the rate of coastal erosion typically increases near stabilization structures. This increased erosion impacts natural habitats, spawning grounds, recreational activity areas, and public access (Frizzera 2011). Long Beach is home to a number of shoreline structures, both along the Atlantic Ocean and inland bays, including groins and bulkheads.

To counteract the negative impact of hard structures, alternative forms of shoreline stabilization that provide more natural forms of protection can be used. Along the New York coast, beach nourishment and dune restoration are now the main forms of shoreline protection. The sheltered coastlines in New York consist of tidal marshlands and a few narrow, sandy beaches—all of which naturally migrate inland as the sea level rises. Experts have stated that marshes can keep pace with a 0.1 inch per year (inch/year) rate of sea level rise; however, the



state's current rate is approximately 0.12 inch/year, a rate that is predicted to continue increasing (Frizzera 2011, NYSERDA 2014). Currently, bulkheads and revetments are the primary form of shore protection along these tidal areas. As the sea level rises and coastal storms increase in intensity, coastal erosion and requests for additional shoreline stabilization measures are likely to increase (Frizzera 2011).

Erosion results in the transfer of sediment from one location to another. The addition of sediment to a location is referred to as accretion. Accretion can be beneficial if it strengthens a shoreline, leading to wider beaches and more material for dune building. However, accretion can also result in the narrowing and shoaling of channels and inlets. This can ultimately lead to a potential increase of coastal flooding risk.

Coastal Erosion Location

Although structural and other measures can be taken to reduce the impact or frequency of this hazard, all shorelines in the city are vulnerable to coastal erosion. The properties most at risk to coastal erosion will be those located within 200 feet of the erodible shoreline and beaches.

The Atlantic Ocean coastline of Long Island is designated by NYS DEC as an area that is at risk to coastal erosion from natural and human activities and is therefore regulated. DEC has two programs focused on the protection of coastal erosion: Coastal Erosion Hazard Area (CEHA) permit program and the United States Army Corps of Engineers (USACE) Civil Works Program. The CEHA program regulates and issues permits for activities within a coastal erosion hazard area. DEC works with US ACE to study coastal erosion problems along coastlines and to develop coastal erosion solutions. These are usually large-scale projects that impact entire communities (NYS DEC 2020).

New York State prevents and reduces coastal erosion by:

- promoting and preserving the natural protective features such as dunes and bluffs, beaches and nearshore areas of coastal regions;
- restricting or prohibiting activities or development in natural protective feature areas
- ensuring new construction or structures are a safe distance from areas of active coastal erosion and the impact of coastal storms;
- regulating the placement and construction of coastal erosion protection structures, when justified, to minimize damage to property, natural protective features and other natural resources;
- restricting development involving public investment in services, facilities, or activities (for example, extending public water supply and sewer services) which are likely to encourage new permanent development in coastal erosion hazard areas;
- requiring publicly financed coastal erosion protection structures intended to minimize coastal erosion damage to be used only where necessary to protect human life or where the public benefits of such structures clearly outweigh the public expenditures;
- encouraging administration of coastal erosion management programs by coastal municipalities and establishing procedural standards for local program implementation; and establishing standards for the issuance of coastal erosion management permits (NYS DEC 2020).

The City of Long Beach's vulnerability to coastal erosion was highlighted during Superstorm Sandy. The city worked with the USACE and NYS DEC to address coastal erosion through beach replenishment, dune construction, and groin construction.

More than 3.2 million cubic yards of sand, the equivalent of 970 Olympic-sized swimming pools, has been placed on the beach. Dunes were constructed and planted with dune grass and supplemented with other vegetation by local groups and the city. To protect the dune, walkovers were constructed using decking. Existing



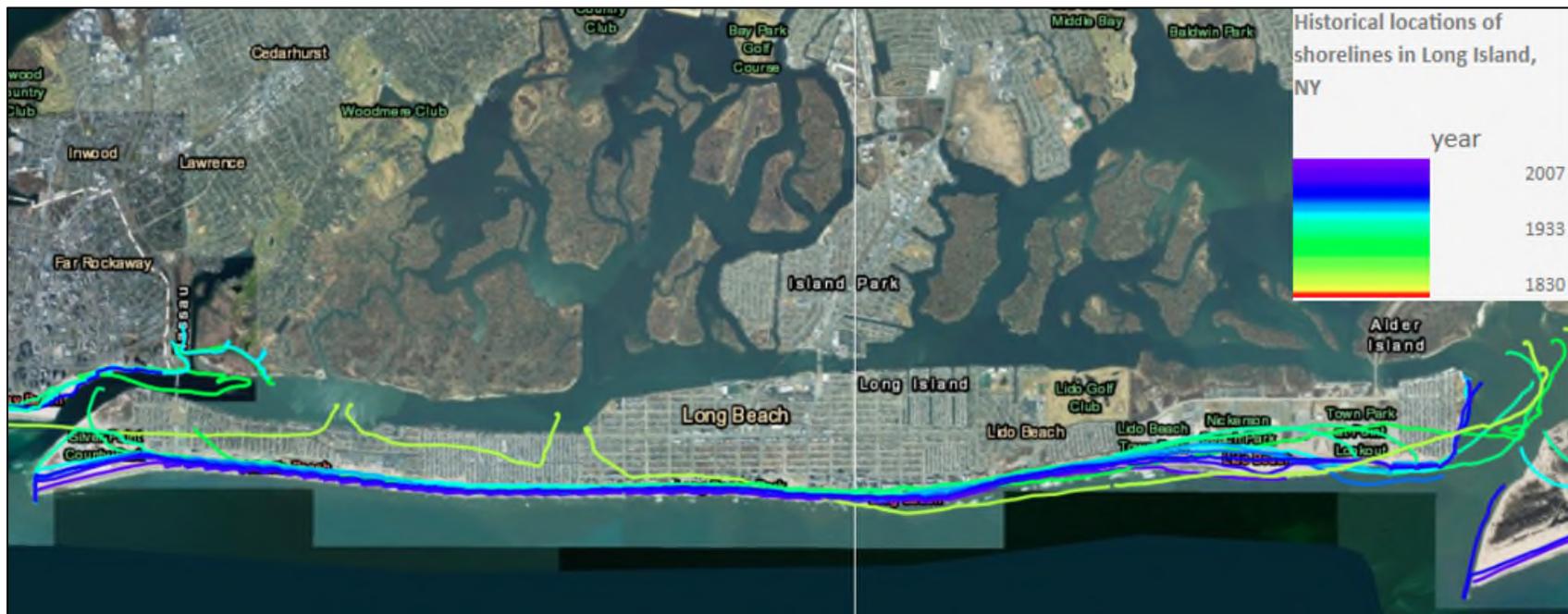
groins, commonly referred to as jetties, were extended to prevent lateral movement of sediment along the beach, referred to as longshore drift of littoral transport. In April 2019, the USACE announced that all projects in the City of Long Beach were complete (Long Beach 2019).

In New York State, Coastal Storm Risk Reduction Projects are constructed through a three-way partnership. The U.S. Army Corps of Engineers is the federal partner, DEC is known as the "Non-Federal Sponsor" and the local municipality is the project's Local Sponsor. These projects are typically cost shared between the three parties (Federal, State, and local), but under certain circumstances the Federal government may undertake these projects at a 100% Federal expense (NYS DEC 2019).

Barrier islands are notably prone to large impacts from erosion. Erosion is responsible for the position and shape of most barrier islands, outside of human influence. Longshore transport of eroded sediment can result in the migration of a barrier island or barrier spit, typically with one end of the island or spit lengthening due to accretion. USGS monitors the location of shoreline to determine long term erosional trends. Figure 5-5 shows historical shoreline positions for the oceanfront of the City of Long Beach that have been plotted by USGS. While the shoreline position has been relatively stable in recent history, shoreline positions from prior to 1900 show two inlets previously existed on the present Long Beach Island. Variations in shoreline position on the eastern half of the island, landward and seaward, have also been observed in the past 150 years. Accretion of sediment in Reynolds Channel and local inlets from sediment transport has been noted by the Planning Committee and has required dredging in the past to maintain navigational channels.



Figure 5-5. Historical Shoreline Positions for Long Beach, NY



Source: USGS 2020

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Coastal Erosion Severity

Coastal erosion is measured as the rate of change in the position or horizontal displacement of a shoreline over a period of time. It is generally caused by storm surges, hurricanes, windstorms, and flooding. Coastal erosion may be exacerbated by human activities, such as boat wakes, shoreline hardening, and dredging (FEMA 1996). In barrier islands and barrier spits, severe erosion can result in the formation of tidal inlets.

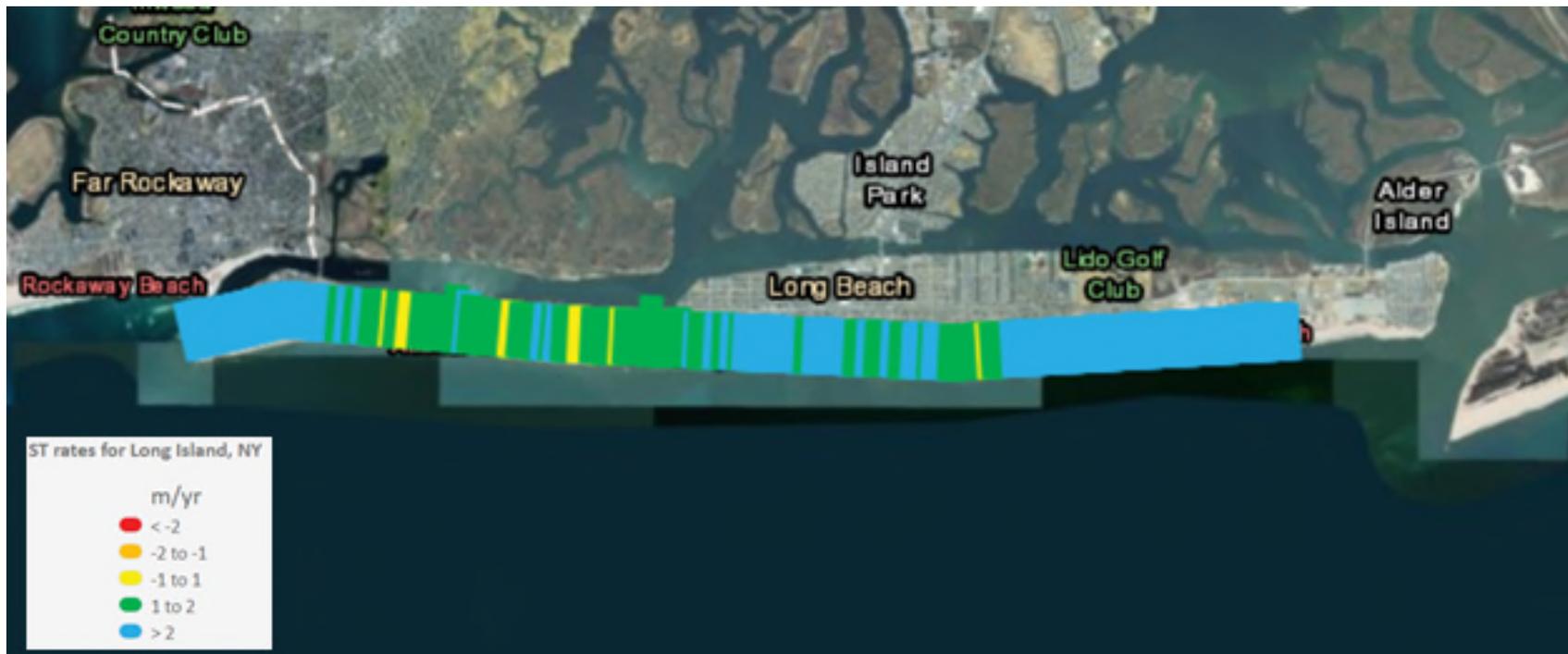
Natural recovery after erosion events can take months or years. If a dune or beach does not recover quickly enough via natural processes, coastal and upland property may be exposed to further damage in subsequent events. Coastal erosion can cause the destruction of buildings and infrastructure (FEMA 1996).

The USGS Coastal Change Hazards Portal hosts a short term (30 years) change mapper which displays the rate of average shoreline change on coastal shorelines. The Portal indicates that, over the past 30 years, Long Beach had a shoreline change of -1 meter to 2 meters per year. Figure 5-6 displays short term shoreline change rates for Long Beach Island.

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Figure 5-6. Shoreline Change Rates for Long Beach, NY



Source: USGS 2020



Coastal Erosion Frequency

Coastal erosion is a frequent event and occurs because of both natural and human activities. All beaches are affected by coastal erosion, but the rate and severe erosion events vary in frequency. Chronic erosion is the gradual recession of a shoreline over a period of decades and will be impacted by wave heights, wave angles, climate changes, and human causes such as development, removal of vegetation, runoff from development, and impacts of hard structures in the coastal zone (NYS DEC 2020). Episodic erosion occurs in response to flood events or coastal storms, such as Superstorm Sandy, and is characterized by a rapid recession of the shoreline. Because coastal erosion is tied closely to other activities, frequency rates and severity levels are best evaluated in conjunction with other related hazards' probabilities and by analyzing secondary impacts from storms, human actions, and other factors.

Long Beach's oceanfront beaches were replenished by the USACE in 2019. The USACE has informed the city that monitoring of coastal erosion will take place for the near future.

Coastal Erosion Warning Time

Meteorologists can often predict the likelihood of weather events that can impact shoreline communities in the short term and ultimately the shoreline. NOAA's NWS monitors potential events, and provides forecasts and information, sometimes several days in advance of a storm, to help prepare for an incident. With the number of structures increasing along the coast, the shoreline becomes increasingly modified. Impact from weather incidents will continue to influence the state's coastal areas, intensifying and exacerbating the coastal erosion situation.

Coastal Erosion Secondary Hazard

Coastal erosion is typically a sporadic event and most typically associated with another hazard event, such as a hurricane. Additionally, erosion rates are influenced by local geographic features and man-made structures. Although most typically associated with flooding, coastal erosion can also be caused by windstorm events, which can blow beach and dune sand overland into adjacent low-lying marshes, upland habitats, inland bays, and communities. If related to a flood event, erosion is typically seen when extreme rainfall scours and erodes dunes and when inland floodwaters return through the dunes and beach face into the ocean (FEMA 1996).

Shore protection structures such as seawalls and revetments often are built to attempt to stabilize the upland property. However, typically they eliminate natural wave run-up and sand deposition processes and can increase reflected wave action and currents at the waterline. Increased wave action can cause localized scour in front of structures and prevent settlement of suspended sediment (FEMA 1996).

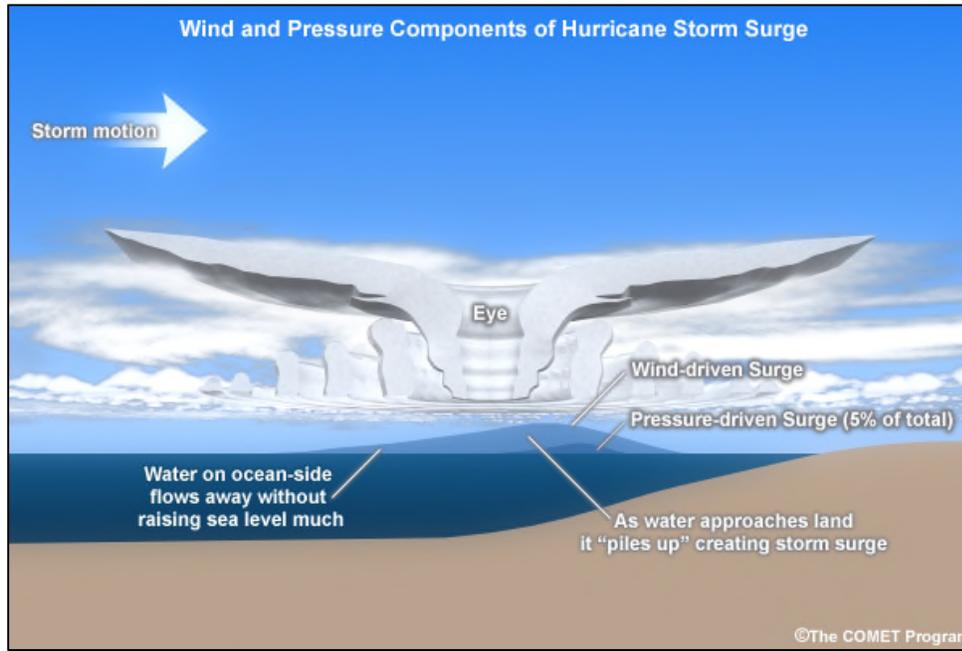
Coastal erosion is a frequent secondary hazard during coastal flooding events in Nassau County and the City of Long Beach. Although not usually listed as an isolated event, coastal erosion is frequently included in a summary of damages.

Storm Surge Hazard

Storm surges inundate coastal floodplains by dune overwash, tidal elevation rise in inland bays and harbors, and backwater flooding through coastal river mouths. Strong winds can cause an increase in tide levels and water-surface elevations. Storm systems generate large waves that run up and flood coastal beaches. The combined effects create storm surges that affect the beach, dunes, and adjacent low-lying floodplains. Shallow, offshore depths can cause storm-driven waves and tides to pile up against the shoreline and inside bays.

Based on an area’s topography, a storm surge may inundate only a small area (along sections of the northeast or southeast coasts) or a storm surge may inundate coastal lands for a mile or more inland from the shoreline. Figure 5-7 depicts a storm surge.

Figure 5-7. Storm Surge



Source: NWS Date Unknown

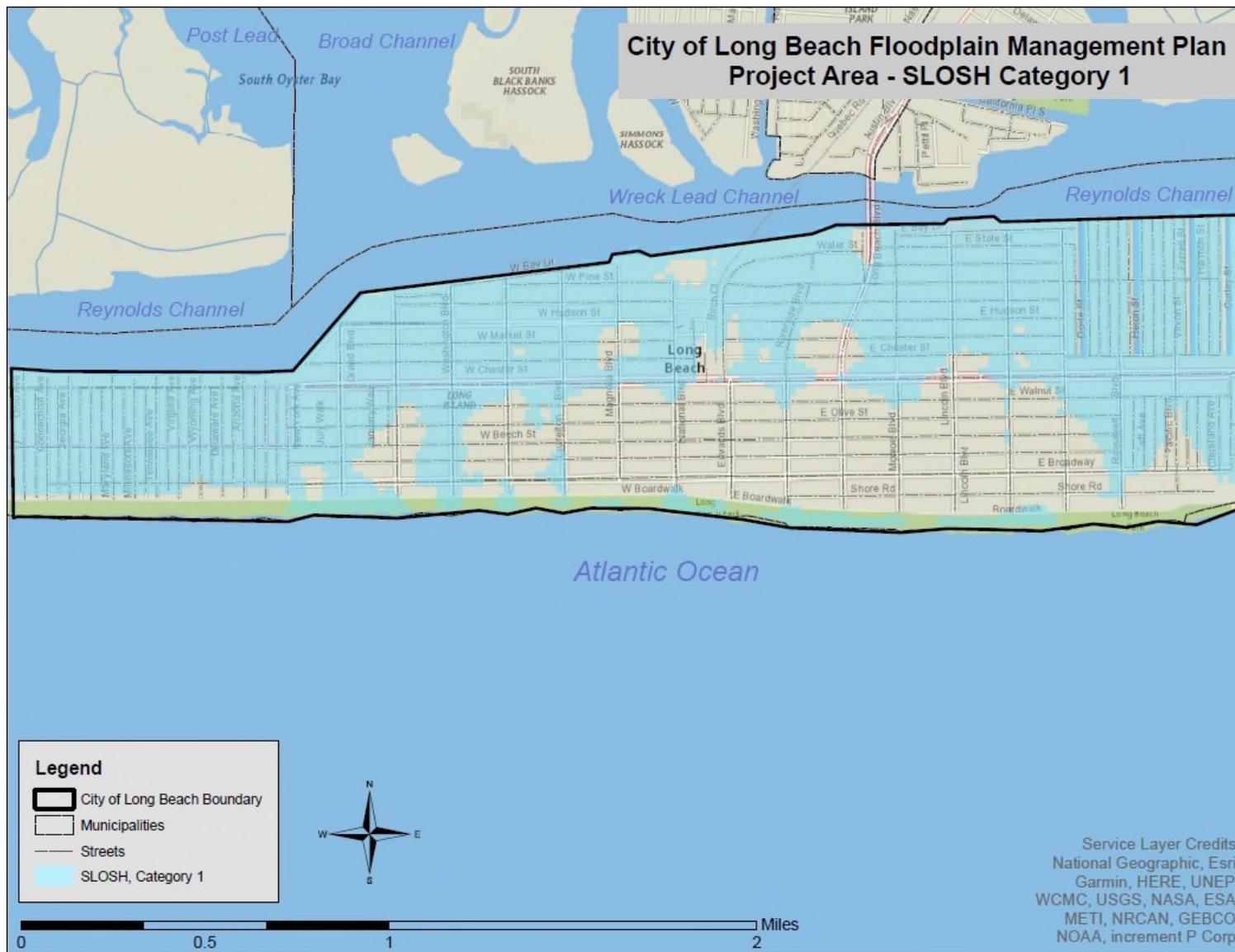
Storm Surge Location

As noted above, inundation from storm surge has devastating impacts on coastal communities. The USACE, in cooperation with FEMA, initially prepared Sea, Lake and Overland Surge from Hurricanes (SLOSH) inundation maps. SLOSH maps represent potential flooding from worst-case combinations of hurricane direction, forward speed, landfall point, and high astronomical tide. It does not include riverine flooding caused by hurricane surge or inland freshwater flooding. The mapping was developed for the coastal communities in New York using the computer model to forecast surges that occur from wind and pressure forces of hurricanes coastline topography. In New York, hurricane category is the predominant factor in worst-case hurricane surges though individual storm factors (speed, size, angle of attack) can result in higher category storms having lower storm surges. The resulting inundation areas are grouped into Category 1 and 2 (dangerous), Category 3 (devastating), and Category 4 (catastrophic) classifications. The hurricane category refers to the Saffir/Simpson Hurricane Intensity Scale, summarized below.

FEMA Region IV Risk Analysis Team developed storm surge inundation grids for the State of New Jersey in a spatial format from the maximum of maximums outputs from the SLOSH model. These represent the worst-case storm surge scenarios for each hurricane category (1 through 4). To assess the city’s exposure to the hurricane/tropical surge, a spatial analysis was conducted using the SLOSH model. Refer to the ‘Vulnerability Assessment’ presented later in this section. The SLOSH boundaries do not account for any inland flash flooding. Figure 5-8 through Figure 5-11 illustrate the SLOSH zones and anticipated flood depths above ground level for Category 1-4 Hurricanes in the City of Long Beach



Figure 5-8. Long Beach SLOSH Model: Category 1

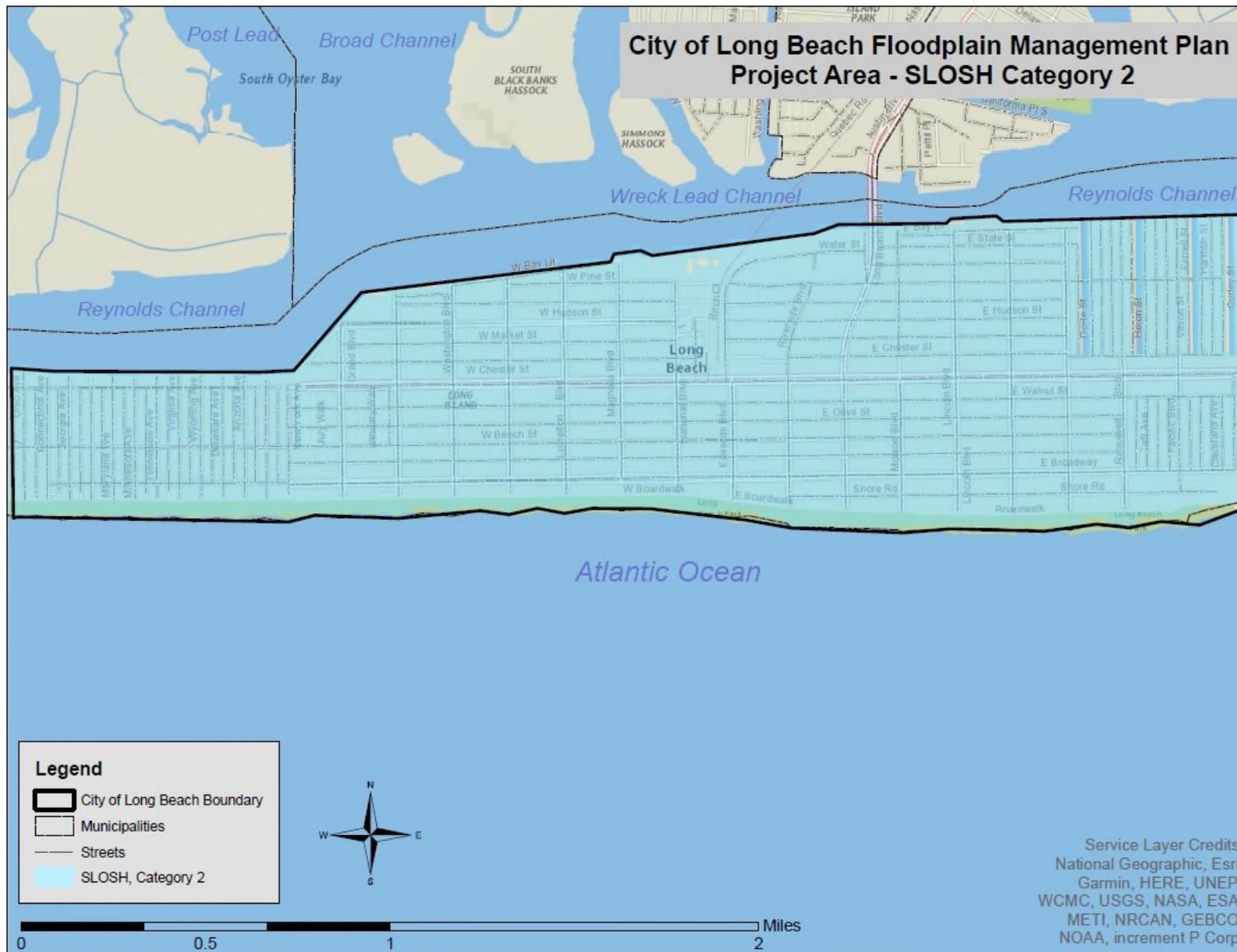


Source: NYS GIS 2014. City of Long Beach 2019. NYS ITS 2017, NYS 2018, NHC 2016





Figure 5-9. Long Beach SLOSH Model: Category 2

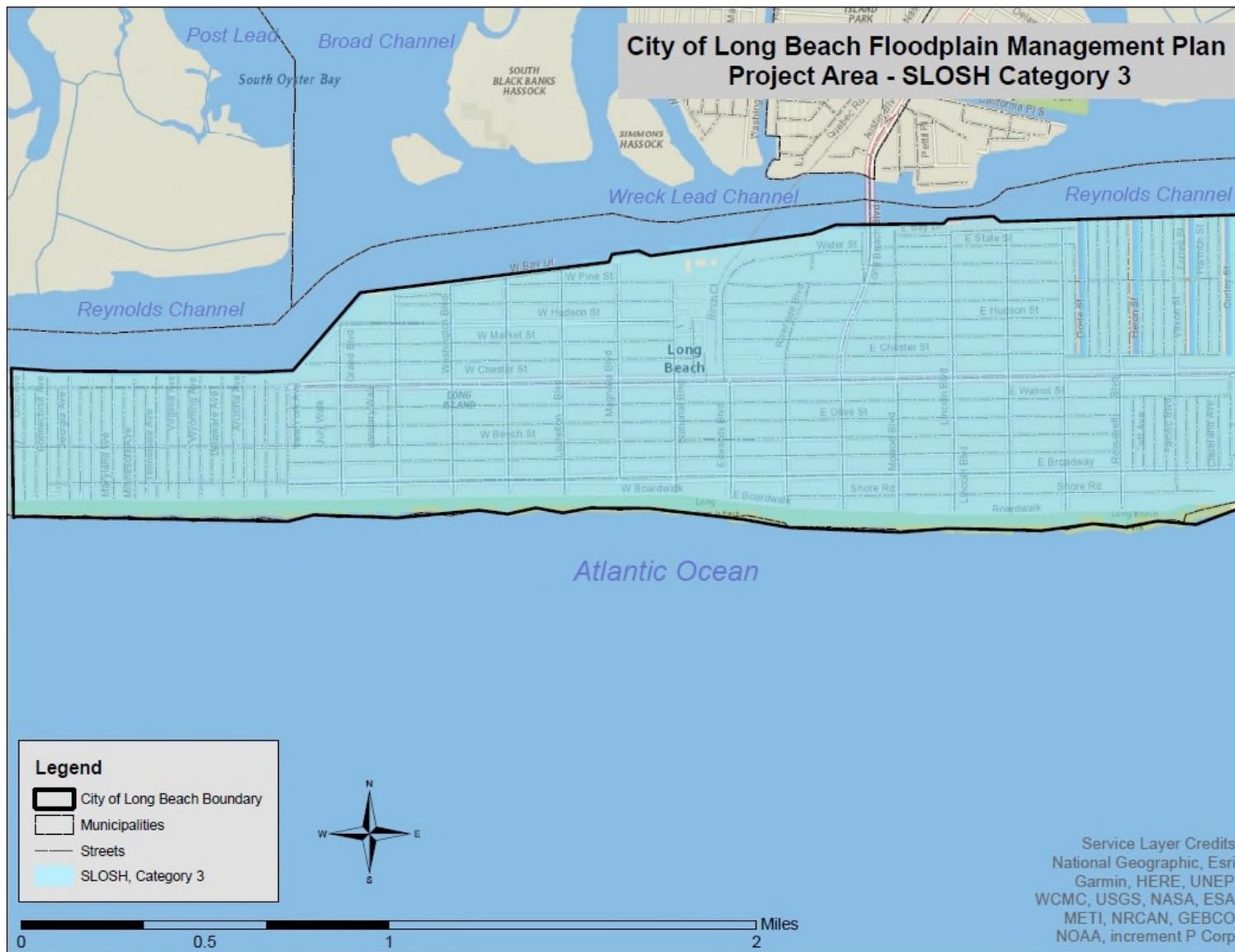


Source: NYS GIS 2014. City of Long Beach 2019. NYS ITS 2017, NYS 2018, NHC 2016





Figure 5-10. Long Beach SLOSH Model: Category 3

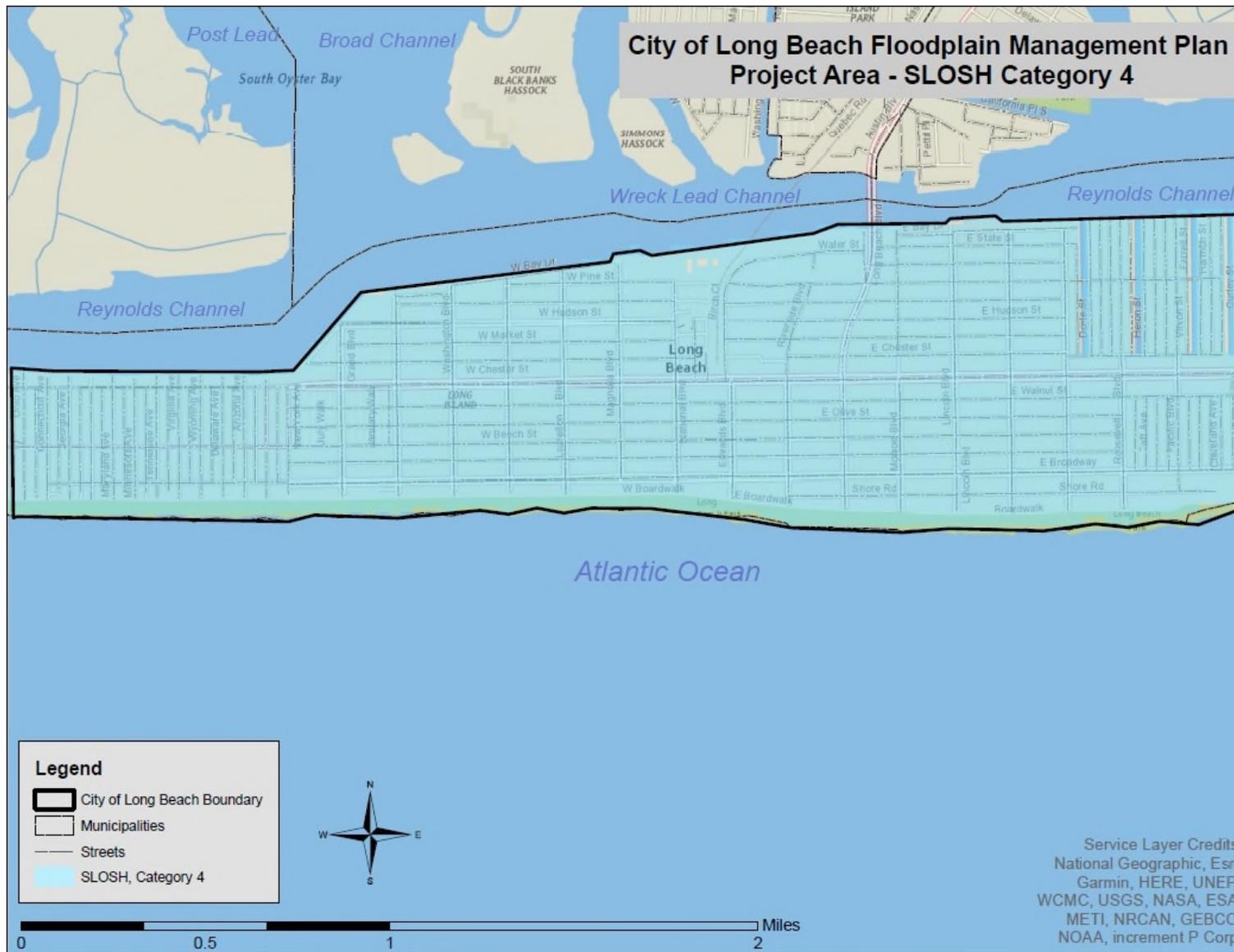


Source: NYS GIS 2014. City of Long Beach 2019. NYS ITS 2017, NYS 2018, NHC 2016





Figure 5-11. Long Beach SLOSH Model: Category 4



Source: NYS GIS 2014. City of Long Beach 2019. NYS ITS 2017, NYS 2018, NHC 2016





Storm Surge Frequency

Like coastal erosion, storm surge frequencies are tied to other hazard events. Storm surge most often occurs as a secondary threat from a hurricane or severe storm. In general, the severity of a storm can be used to roughly predict the existence of storm surge (in that a very severe storm or hurricane will likely lead to storm surge), although specific factors and details, such as the storm’s intensity, approach, and angle to the shoreline, and the local coastline’s geography, also play a significant role in the occurrence of storm surge.

Storm Surge Severity

Typically, storm surge is estimated by subtracting the regular/astronomical tide level from the observed storm tide. Storm surge heights can more than 25 feet. The exact height of the storm surge and which coastal areas will be flooded depends on many factors: strength, intensity, and speed of the hurricane or storm; the direction it is moving relative to the shoreline; how rapidly the sea floor is sloping along the shore; the shape of the shoreline; and the astronomical tide. Storm surge is the most damaging when it occurs along a shallow sloped shoreline, during high tide, in a highly populated, and developed area with little or no natural buffers (for example, barrier islands, coral reefs, and coastal vegetation).

The most common reference to a return period for storm surges has been the elevation of the coastal flood having a 1-percent chance of being equaled or exceeded in any given year. Detailed hydraulic analyses include establishing the relationship of tide levels with wave heights and wave run-up. The storm surge inundation limits for the 1-percent annual chance coastal flood event are a function of the combined influence of the water surface elevation rise and accompanying wave heights and wave run-up along the coastline.

A storm surge associated with storms of longer recurrence intervals may result in more storm surge flooding, higher water levels, larger waves, and an increased likelihood of dune overwash, wave damage, and possible breaching of barrier islands.

Storm Surge Warning Time

Storm surge is most frequently associated with severe coastal storms and hurricanes. To help identify and visualize areas most at risk from life-threatening surge, the National Hurricane Center (NHC) began issuing operationally a storm surge watch/warning graphic beginning in 2017 for tropical cyclones affecting the Gulf and Atlantic coasts of the United States. This graphic is intended to separate the watch/warning for life-threatening storm surge inundation from the previously existing wind watch/warning and serve as a call to action (NOAA NHC 2019).

- **Storm Surge Watch:** A storm surge watch is defined as the possibility of life-threatening inundation from rising water moving inland from the shoreline somewhere within the specified area, generally within 48 hours, in association with a tropical, subtropical, or post-tropical cyclone. The watch may be issued earlier when other conditions, such as the onset of tropical storm-force winds, are expected to limit the time available to take protective actions for surge (e.g., evacuations). The watch may also be issued for locations not expected to receive life-threatening inundation, but which could potentially be isolated by inundation in adjacent areas (NOAA NHC 2019).
- **Storm Surge Warning:** A storm surge warning is defined as the danger of life-threatening inundation from rising water moving inland from the shoreline somewhere within the specified area, generally within 36 hours, in association with a tropical, subtropical, or post-tropical cyclone. The warning may be issued earlier when other conditions, such as the onset of tropical storm-force winds, are expected to limit the time available to take protective actions for surge (e.g., evacuations). The warning may

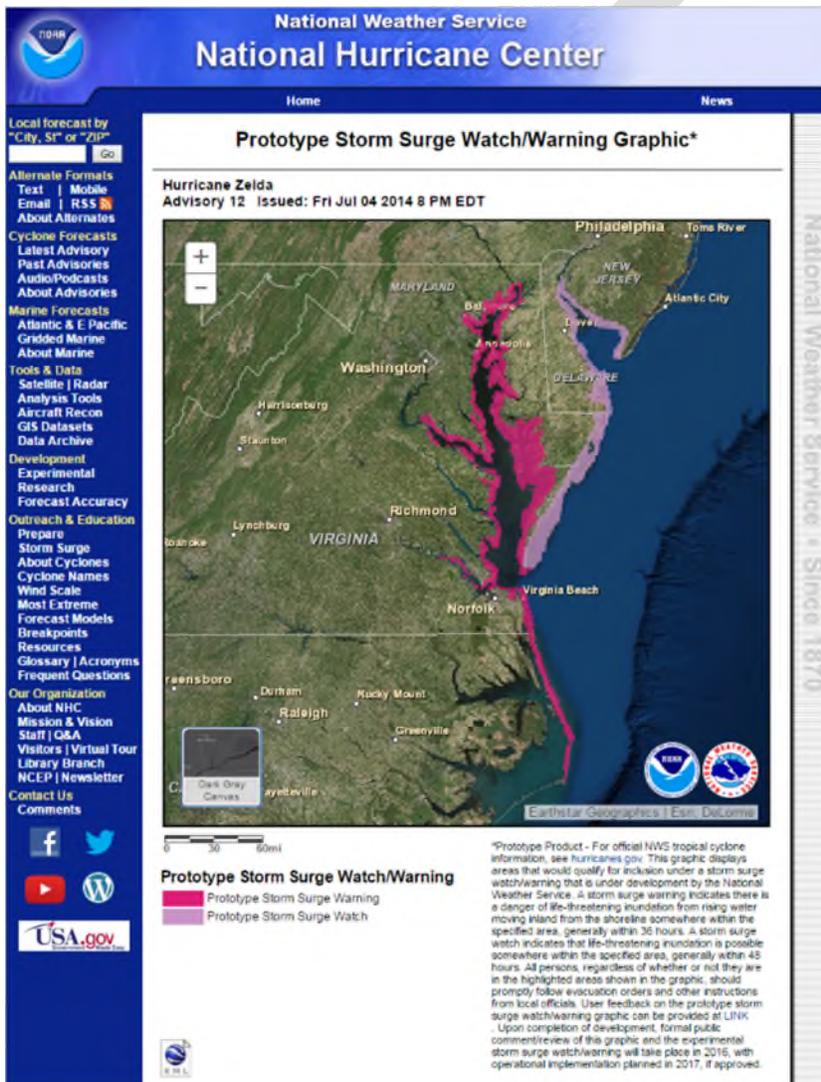
also be issued for locations not expected to receive life-threatening inundation, but which could potentially be isolated by inundation in adjacent areas (NOAA NHC 2019).

The Potential Storm Surge Flooding Map is based on the forecast track, intensity, and size of a tropical storm or hurricane. The storm surge watch/warning graphic takes into account:

- Flooding due to storm surge from the ocean, including adjoining tidal rivers, sounds, and bays
- Normal astronomical tides
- Land elevation
- Uncertainties in the track, landfall location, intensity, forward speed, and size of the cyclone
- Flooding inside levees, overtopping of levees, or flooding resulting from levee failures

The storm surge watch/warning graphic does not take into account wave action or freshwater flooding from rainfall (NOAA NHC 2019).

Figure 5-12. Prototype Storm Surge Watch/Warning Graphic



Source: NOAA NHC 2019



Storm Surge Secondary Hazard

Storm surge is considered the greatest threat to life and property from a hurricane. In fact, storm surge is usually the cause behind most hurricane-related deaths. Although Hurricane Katrina did not occur in New York, it provides a powerful example of the potential effect of storm surge indicating the potential extensive impact on life safety during similar events in New York and specifically the City of Long Beach. According to the National Hurricane Center, at least 1,500 people lost their lives either directly or indirectly from the storm surge associated with Hurricane Katrina. Storm surge can cause significant property damage both by power and momentum of waves crashing into property and by eroding, undermining, and weakening structural foundations. This second form also contributes to additional coastal erosion and the destruction of roadways.

The National Hurricane Center notes that the maximum potential for storm surge depends on a number of locational and event factors, including storm intensity, forward speed of the storm, size of the storm, the storm's angle of approach to the coast, central pressure, the width and slope of the continental shelf, and the shape and characteristics of coastal features.

Storm surge is a frequent secondary hazard during coastal flooding events in Nassau County and the City of Long Beach. Although this event is sometimes categorized individually by NOAA and other hazard-tracking databases, it may also be included under a general flooding event in the summary of damages.

Stormwater and Urban Drainage Flooding

Stormwater flooding is a result of local drainage issues and high groundwater levels. Locally, heavy precipitation, especially during high lunar tide events may produce flooding in areas other than delineated floodplains or along recognizable channels due to the existence of storm system outfalls which are inadequate to provide gravity drainage into the adjacent body of water. If local conditions cannot accommodate intense precipitation through a combination of infiltration and surface runoff, water may accumulate and cause flooding problems. During winter and spring, frozen ground and snow accumulations may contribute to inadequate drainage and localized ponding. Flooding issues of this nature generally occur in areas with flat gradients and generally increase with urbanization which speeds the accumulation of floodwaters because of impervious areas. Shallow street flooding can occur unless channels have been improved to account for increased flows (FEMA 1997). There are numerous areas within the City of Long Beach that experience Stormwater flooding and contribute to street and structure inundation several times a year within the city.

Heavy rainfall that overwhelms a developed area's stormwater infrastructure causing flooding is commonly referred to as urban flooding. Urban flooding can be worsened by aging and inadequate infrastructure and over development of land. The growing number of extreme rainfall events that produce intense precipitation are resulting in increased urban flooding (Center for Disaster Resilience 2016). While riverine and coastal flooding is mapped and studied by FEMA, urban flooding is not.

NOAA defines urban flooding as the flooding of streets, underpasses, low lying areas, or storm drains. (NOAA 2009). Urban drainage flooding is caused by increased water runoff due to urban development and inadequate drainage systems. Drainage systems are designed to remove surface water from developed areas as quickly as possible to prevent localized flooding on streets and other urban areas. The systems make use of a closed conveyance system that channels water away from an urban area to surrounding water bodies. This bypasses the natural processes of water filtration through the ground, containment, and evaporation of excess water (Harris 2008).



High groundwater levels can be a concern and cause problems even where there is no surface flooding. Basements are susceptible to high groundwater levels. Seasonally high groundwater is common in many areas, while elsewhere high groundwater occurs only after a long period of above-average precipitation (FEMA 1996).

Sea Level Rise Hazard

There is evidence that the global sea is rising at an increased rate and will continue rising over the next century. The two major causes of sea level rise are thermal expansion caused by the warming of the oceans and the loss of land-based ice (glaciers and polar ice caps) due to increased melting. Thermal expansion can account for 50% of sea level rise and is a result of warming atmospheric temperatures and subsequent warming of ocean waters causing the expansion. Since 1900, records and research have shown that the sea level has been steadily rising at a rate of 0.04 to 0.1 inches per year (National Oceanic and Atmospheric Administration [NOAA] 2013).

There are two types of sea level: global and relative. Global sea level rise refers to the increase currently observed in the average global sea level trend (primarily attributed to changes in ocean volume due to ice melt and thermal expansion). The melting of glaciers and continental ice masses can contribute significant amounts of freshwater input to the earth's oceans. In addition, a steady increase in global atmospheric temperature creates an expansion of salt water molecules, increasing ocean volume.

Local sea level refers to the height of the water as measuring along the coast relative to a specific point on land. Water level measurements at tide stations are referenced to stable vertical points on the land and a known relationship is established. Measurements at any given tide station include both global sea level rise and vertical land motion (subsidence, glacial rebound, or large-scale tectonic motion). The heights of both the land and water are changing; therefore, the land-water interface can vary spatially and temporally and must be defined over time. Relative sea level trends reflect changes in local sea level over time and are typically the most critical sea level trend for many coastal applications (coastal mapping, marine boundary delineation, coastal zone management, coastal engineering, and sustainable habitat restoration) (NOAA 2013).

Short-term variations in the sea level typically occur on a daily basis and include waves, tides, or specific flood events. Long-term variations in the sea level occur over various time scales, from monthly to yearly and may be repeatable cycles, gradual trends, or intermittent differences. Seasonal weather patterns (changes in the Earth's declination), changes in coastal and ocean circulation, anthropogenic influences, vertical land motion, and other factors may influence changes in the sea level over time. When estimating sea level trends, a minimum of 30 years of data are used in order to account for long-term sea level variations and reduce errors in computing sea level trends based on the monthly mean sea level (NOAA 2013).

Sea Level Rise Location

Generally speaking, sea level rise is an important factor to consider when reviewing future flood impact on coastal communities. It will impact any area in the City of Long Beach that is vulnerable to coastal flooding. However, there are two specific mechanisms which influence the location and extent of sea level rise. First, sea level rise can result in the permanent submergence of low-lying coastal areas. At the most basic level, one can assume that a one-foot rise in sea level will inundate areas with an elevation of one foot or less. This assumption does not consider any natural processes such as coastal erosion or marsh migration that may occur due to sea level rise nor does it take into account any increased rates of coastal erosion, although these rates typically increase with sea level rise. Second, in addition to permanent submergence, sea level rise can exacerbate the impact of temporary severe coastal flood events. In addition to affecting the frequency and duration of coastal flood events, sea level rise increases the inland extent of coastal floodplains.



The New York State Energy Research and Development Authority (NYSERDA) notes that sea level rise on New York State’s coastline has ranged from 0.86 to 1.5 inches per decade, average 1.2 inches per decade since 1900. NYSERDA has provided projections for sea level rise scenarios based on low, middle, and high estimates for Montauk Point, New York City, and Troy Dam. New York City is the closest location to the City of Long Beach and has the most similar characteristics which impact local sea level rise.

Projections are based on a 6-component approach that incorporates both local and global factors. The model-based components are from 24 GCMs and two Representative Concentration Pathways. Shown are the low-estimate (10th percentile), middle range (25th percentile to 75th percentile), and high-estimate (90th percentile). Projections are relative to the 2000-2004 base period. Like all projections, these climate projections have uncertainty embedded within them. Sources of uncertainty include data and modeling constraints, the random nature of some parts of the climate system, and limited understanding of some physical processes. Levels of uncertainty are characterized using state-of-the-art climate models, multiple scenarios of future greenhouse gas concentrations, and recent peer-reviewed literature. Even so, the projections are not true probabilities, so the specific numbers should not be emphasized, and the potential for error should be acknowledged (NYSERDA 2014)

Table 5-3 below summarizes the three NYSERDA sea level rise scenarios available for the City of Long Beach. The high-end estimate for sea level rise by the 2080’s is 58 inches. As decades progress, the expansion of the possible ranges of sea level rise is driven by uncertainty in land-based ice mass change, ocean thermal expansion, and regional ocean dynamics (NYSERDA 2014).

For impacts, refer to the ‘Vulnerability Assessment’ portion found later in this plan.

Table 5-3. NOAA Sea Level Rise Scenarios for New York City

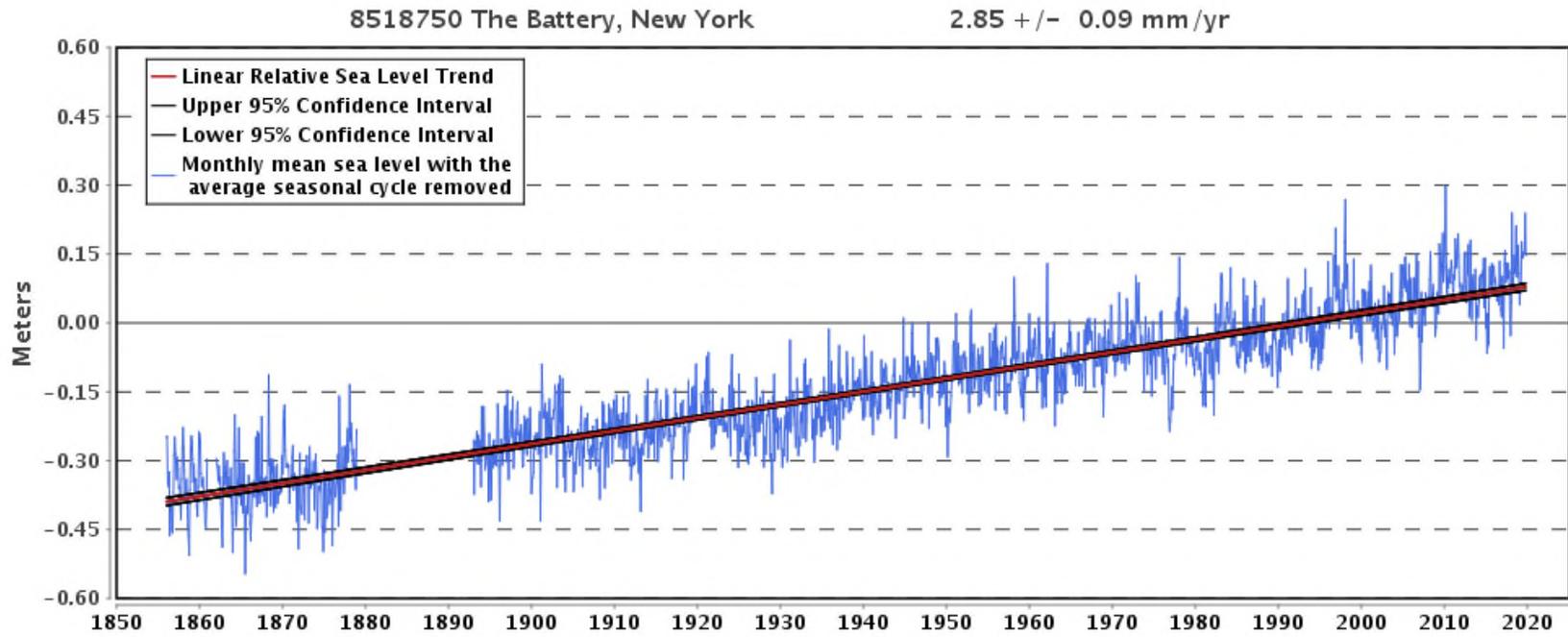
Baseline (2000-2004) 0 inches	Low Estimate (10th Percentile)	Middle Range (25th to 75th Percentile)	High Estimate (90th Percentile)
2020s	2 in	4 to 8 in	10 in
2050s	8 in	11 to 21 in	30 in
2080s	13 in	18 to 39 in	58 in
2100	15 in	22 to 50 in	75 in

Source: NYSERDA 2014

The recorded sea level rise trend is more clearly indicated by the graph in Figure 5-13, showing the recorded sea levels taken at the Battery tide gauge in New York City and the linear mean sea level trend for that station.



Figure 5-13. Linear Mean Sea Level Trend-The Battery, New York



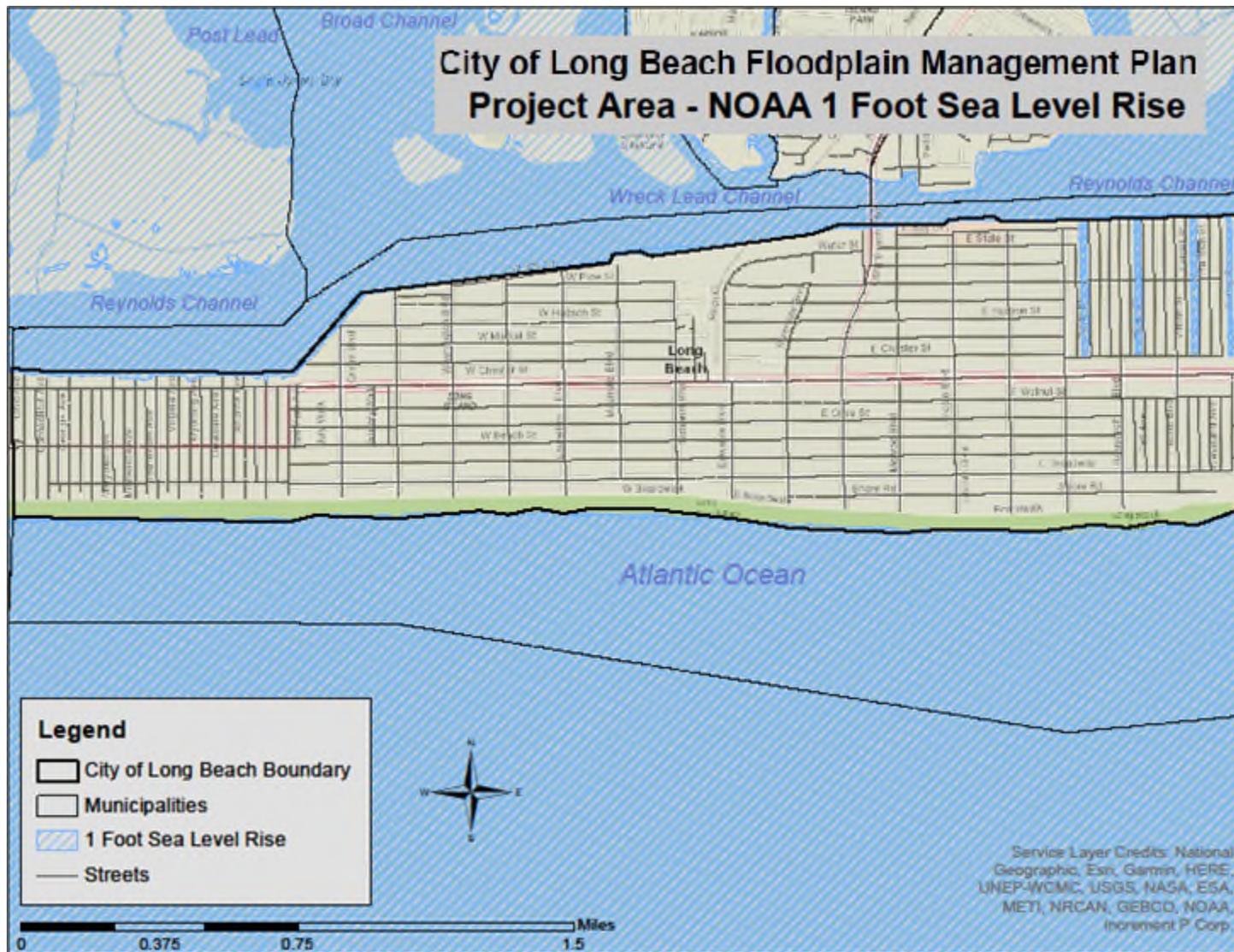
Source: NOAA 2020

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Figure 5-14. 1 Foot Sea Level Rise Scenario for the City of Long Beach

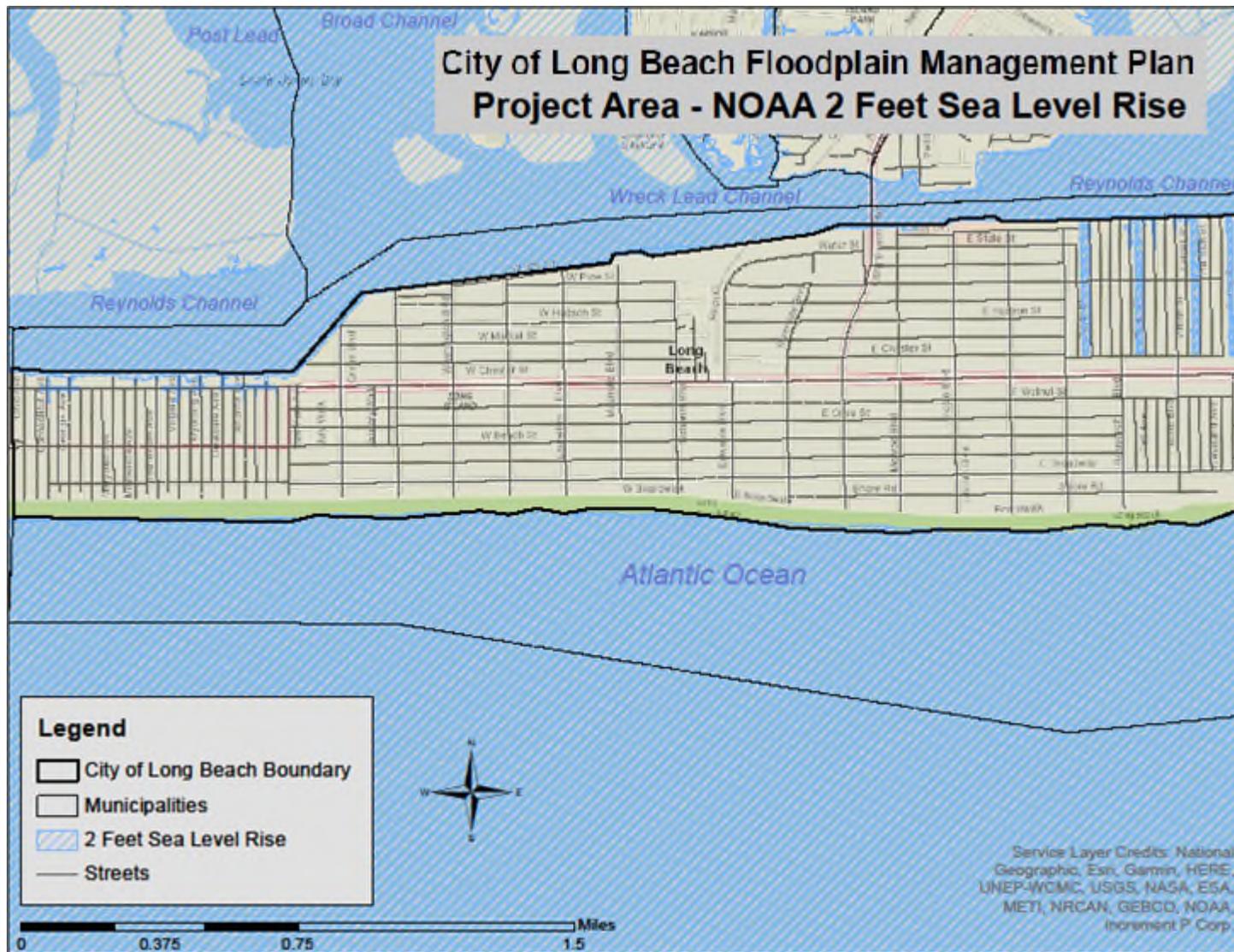


Source: NYS GIS 2014, City of Long Beach 2019, NYS ITS GIS Program Office 2017, NOAA 2018.





Figure 5-15. 2 Feet Sea Level Rise Scenario for the City of Long Beach

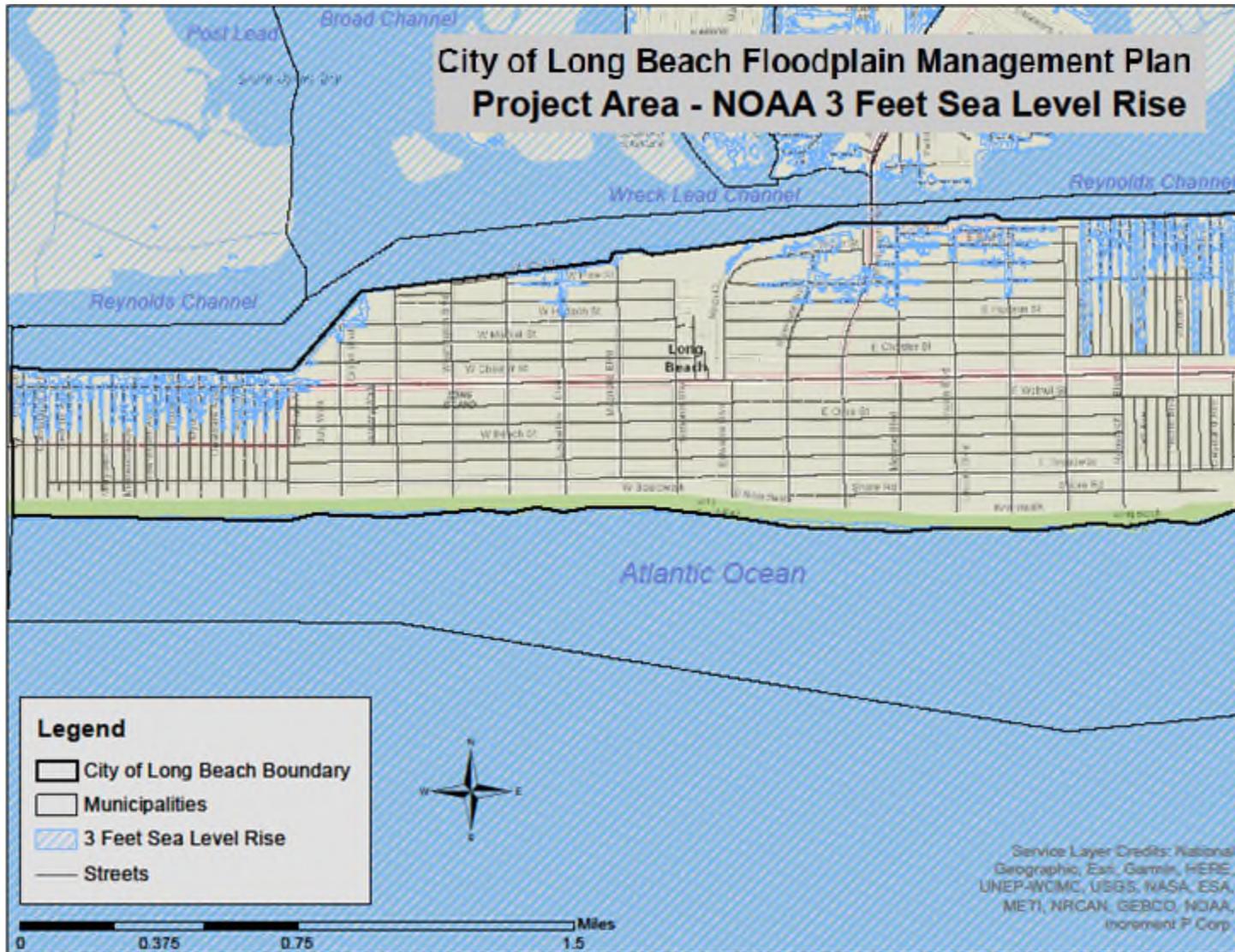


Source: NYS GIS 2014, City of Long Beach 2019, NYS ITS GIS Program Office 2017, NOAA 2018.





Figure 5-16. 3 Feet Sea Level Rise Scenario for the City of Long Beach

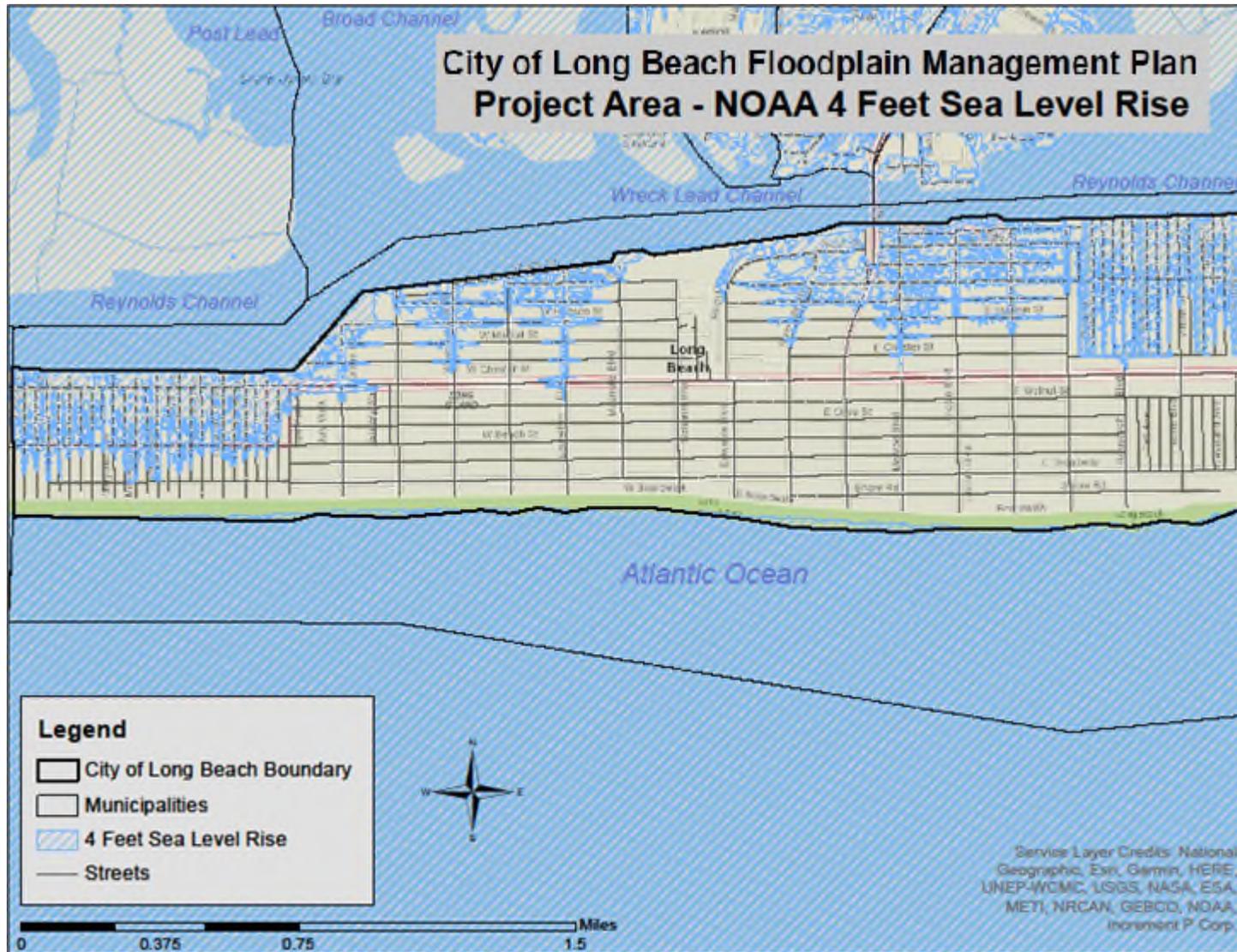


Source: NYS GIS 2014, City of Long Beach 2019, NYS ITS GIS Program Office 2017, NOAA 2018.





Figure 5-17. 4 Feet Sea Level Rise Scenario for the City of Long Beach



Source: NYS GIS 2014, City of Long Beach 2019, NYS ITS GIS Program Office 2017, NOAA 2018.





One foot of sea level rise has little to no flooding impact in the City of Long Beach. Two feet of sea level rise results in very minor flooding occurring on street ends along Reynolds Channel in the western portion of the city and along some waterfront areas in the canals area of the city. Three feet of sea level rise results in flooding, mainly of roadways, along Reynolds Channel. Of note, Long Beach Boulevard, which connects Long Beach to the mainland, experiences a band of flooding. Four feet of sea level rise results in flooding for roughly 40% of the northern half of the city.

Sea Level Rise Frequency

Sea level change is an ongoing process and can be monitored on both long-term and shorter-term scales. Global sea level changes are due to the changes in the volume of water in ocean basins through thermal expansion, glacial melt, or net changes in the size of ocean basins. In fact, global sea rise has been occurring for the past 20,000 years as a natural result of glacial maximum decline.

Local and shorter-term sea level rise frequency is not as continuous but can still be predicted by surrounding factors. Permanent sea level rise will be more noticeable and frequent in low-lying areas already close to sea level or bayside locations. The landward side of open-coast barrier island communities are more likely to experience sea level rise as they are at a greater vulnerability for coastal erosion, which can impact sea levels near land. Sea level rise frequency can be partially predicted by nearby human activity, as mitigation measures like sea walls, levees, or dikes can affect the location and extent of the sea level rise.

Sea Level Rise Severity

Sea level rise severity is attributed to the number of feet sea level rises and the rate at which sea level rise takes place. A faster rate of sea level rise results in less ability of coastal municipalities to protect from and adapt to higher water levels and increased coastal flooding frequency.

Sea Level Rise Warning Time

Through NOAA, the Center for Operational Oceanographic Products and Services has measured sea level heights and rates for more than 150 years. The center calculates the mean sea level. This is calculated with sea level rises and falls, at 210 long-term water level stations. The center averages results at a monthly level to remove the effect of higher frequency phenomena and to determine a linear sea level trend.

NOAA identifies multiple factors that influence both short- and long-term sea level changes. While short-term variations fluctuate daily and include waves, tides, or flood events, long-term variations occur on a larger scale, most typically months to years. Long-term sea level changes can include gradual trends, repeatable cycles, or intermittent anomalies, and they may be influenced by seasonal weather patterns, variations in the Earth's declination, changes in coastal and ocean circulation, anthropogenic influences (such as dredging), vertical land motion, and the El Niño Southern Oscillation. Thus, while short-term sea level rises may have little warning time, long-term and consistent sea level rises are gradual and can be predicted through detailed observations, typically allowing for ample warning.

Sea Level Rise Secondary Hazard

According to NOAA, sea level rise can amplify factors that currently contribute to coastal flooding: high tides, storm surge, high waves, and high runoff from rivers and creeks. Other secondary hazards that could occur along the mid-Atlantic coast in response to sea-level rise include:

- *Bluff and upland erosion* – shorelines composed of older geologic units that form headland regions of the coast will retreat landward with rising sea level. As sea level rises, the uplands are eroded and sandy



materials are incorporated into the beach and dune systems along the shore and adjacent compartments (Gutierrez et al. 2007).

- *Overwash, inlet processes, shoreline retreat, and barrier island narrowing* – as sea-level rise occurs, storm overwash will become more likely. Tidal inlet formation and migration will become important components of future shoreline changes. Barrier islands are subject to inlet formation by storms. If the storm surge produces channels that extend below sea level, an inlet may persist after the storm. The combination of rising sea level and stronger storms can create the potential to accelerate shoreline retreat in many locations. Assessments of shoreline change on barrier islands have shown that barrier island narrowing has been observed on some islands over the last 100 years (Gutierrez et al. 2007).
- *Threshold behavior* – changes in sea level rise can lead to conditions where a barrier system becomes less stable and crosses a geomorphic threshold; making the potential for rapid barrier-island migration or segmentation/disintegration high. Unstable barriers may be defined by rapid landward recession of the ocean shoreline, decrease in barrier width and height, increased overwashing during storms, increased barrier breaching and inlet formation, or chronic loss of beach and dune sand volume. With the rates of sea-level rise and climate change, it is very likely that these conditions will worsen (Gutierrez et al. 2007).
- *Loss of critical habitat* – natural ecosystems may be impacted by warmer temperatures and associated changes in the water cycle. The changes could lead to loss of critical habitat and further stresses on some threatened and endangered species (NJ DEP 2013).

Previous Occurrences and Losses

Many sources provided flooding information regarding previous occurrences and losses associated with flooding events throughout the City of Long Beach. With multiple sources reviewed for the purpose of this Flood Management Plan, loss and impact information for many events could vary depending on the source and the accuracy of monetary figures is based on information available at the time of development of this plan.

FEMA Major Disasters and Emergency Declarations

Between 1954 and 2020, FEMA included Nassau County in 19 flood-related major disaster (DR) or emergency (EM) declarations classified as one or a combination of the following disaster types: severe storms, flooding, hurricanes, tropical depressions, heavy rains, landslides, ice storms, high tides, Nor'easters, tornadoes, snowstorms, severe winter storms, and inland/coastal flooding. Table 5-4 lists FEMA DR and EM declarations that have been declared for Nassau County related to the flood hazard.

Table 5-4. FEMA DR and EM Declarations for Flood Events in Nassau County, 1965 to 2020

FEMA Declaration Number	Date(s) of Event	Date of Declaration	Event Type
DR-311	September 13, 1971	September 13, 1971	Severe Storms and Flooding
DR-520	September 3, 1976	September 3, 1976	Hurricane Belle
DR-702	March 28 – April 8, 1984	April 17, 1984	Coastal Storms & Flooding
DR-750	September 27, 1985	October 18, 1985	Hurricane Gloria
DR-974	December 10-14, 1992	December 21, 1992	Coastal Storm, High Tides, Heavy Rain, & Flooding
EM-3107	March 13-17, 1993	March 17, 1993	New York Severe Blizzard
DR-1083	January 6-12, 1996	January 12, 1996	New York Blizzard
DR-1146	October 19-20, 1996	November 19, 1996	New York Severe Storms/Flooding
DR-1244	September 7, 1998	September 11, 1998	New York Severe Weather
DR-1296	September 16-18, 1999	September 19, 1999	New York Hurricane Floyd
EM-3184	February 17-18, 2003	March 27, 2003	New York Snowstorm
DR-1534	May 13 – June 17, 2004	August 3, 2004	New York Severe Storms and Flooding



FEMA Declaration Number	Date(s) of Event	Date of Declaration	Event Type
DR-1869	November 12-14, 2009	December 31, 2009	New York Severe Storms and Flooding Associated with Tropical Depression Ida and a Nor'easter
DR-1899	March 13-31, 2010	April 16, 2010	New York Severe Storms and Flooding
DR-1957	December 26-27, 2010	February 18, 2011	New York Severe Winter Storm and Snowstorm
EM-3328	August 25 – September 5, 2011	August 26, 2011	New York Hurricane Irene
DR-4020	August 26 – September 5, 2011	August 31, 2011	New York Hurricane Irene
EM-3351	October 27 – November 8, 2012	October 28, 2012	New York Hurricane Sandy
DR-4085	October 27 – November 8, 2012	October 30, 2012	New York Hurricane Sandy

Source: FEMA 2020

Flood Events

Known flood events, including FEMA disaster declarations, which have impacted the City of Long Beach between 1950 and 2020 are identified in Table 5-5.

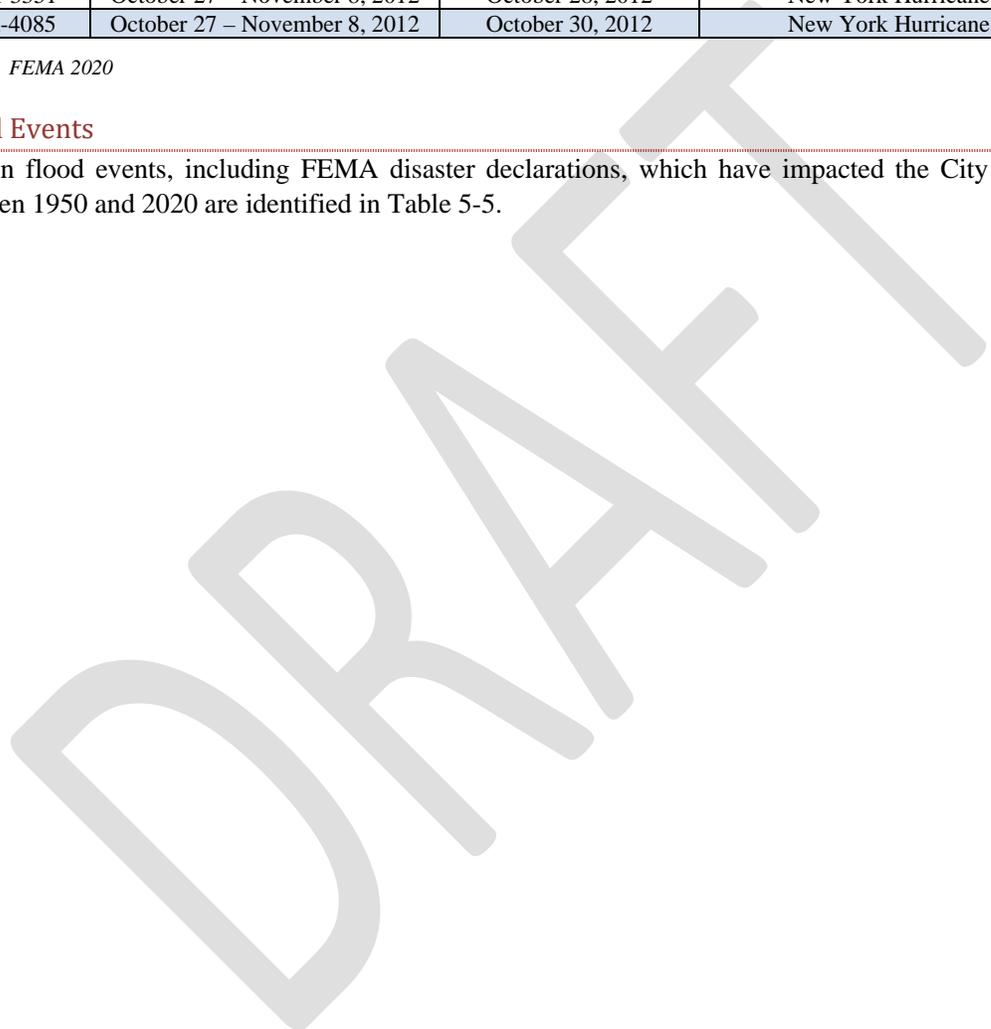




Table 5-5. Flooding Events in the City of Long Beach, 1950 to 2020

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Nassau County Designated?	Estimated Damages and/or Losses
August 1954	Hurricane Carol	DR-26	No	Hurricane Carol impacted Long Island, leading to property damage, road closures, and damages approximately \$3 million.
September 1960	Hurricane Donna	N/A	N/A	Hurricane Donna impacted Long Island, leading to \$1.9 million in damages.
September 13, 1971	Severe Storms and Flooding	DR-311	Yes	DR-311 was declared for severe storms and flooding
June 1972	Tropical Storm Agnes	DR-338	No	Tropical Storm Agnes resulted in statewide impacts of 5,000 homes destroyed or damaged, 24 deaths, and damage of \$703 million.
September 3, 1976	Hurricane Belle	DR-520	Yes	DR-520 was declared for Hurricane Belle.
March 28 – April 8, 1984	Coastal Storms & Flooding	DR-702	Yes	DR-702 was declared for coastal storms and flooding.
September 27, 1985	Hurricane Gloria	DR-750	Yes	Hurricane Gloria heavily impacted Long Island resulting in flooding and property damages totaling \$48.5 million. DR-750 was declared.
August 1991	Hurricane Bob	DR-918	No	Hurricane Bob resulted in flooding on Long Island.
December 10-14, 1992	Coastal Storm, High Tides, Heavy Rain, & Flooding	DR-974	Yes	A coastal nor'easter resulted in statewide damages of \$31.2. DR-974 was declared.
March 13-17, 1993	New York Severe Blizzard	EM-3107	Yes	EM-3107 was declared for a severe blizzard event.
December 14, 1993	Coastal Storm	N/A	N/A	A low-pressure center generated tides about two feet above normal and very rough seas. Coastal flooding occurred during the morning set of high tides although it was relatively minor.
January 4, 1994	Coastal Storm	N/A	N/A	A persistent onshore flow caused water to pile-up along the coast. Tides rose between three and five feet above normal and this led to significant coastal flooding and serious beach erosion.
January 6-12, 1996	Blizzard, Flood	DR-1083	Yes	Flooding associated with a blizzard occurred throughout Nassau County. DR-1083 was declared.
January 27-28, 1996	Flood	DR-1095	No	Flooding was reported throughout Nassau County. Statewide, the event resulted in road closures, property damages, 10 deaths, and statewide damages at \$160 million.
April 16, 1996	Flood	N/A	N/A	Flooding was reported throughout Nassau County.
June 3, 1996	Flood	N/A	N/A	Flooding was reported throughout Nassau County.
July 31, 1996	Flash Flood	N/A	N/A	Clusters of thunderstorms developed north of an approaching warm front in a moist unstable airmass. As these thunderstorms moved northeast, they produced torrential rain. The axis of heaviest rainfall extended from Northeast Middlesex County, NJ northeast across Central Nassau County. From 2 to 5 inches of rain fell across this area during 3 hours from late morning through early afternoon. Water was up to 2 feet deep



Table 5-5. Flooding Events in the City of Long Beach, 1950 to 2020

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Nassau County Designated?	Estimated Damages and/or Losses
				in several streets at Long Beach, where several basements flooded. The Wantagh and Meadowbrook State Parkways were closed near East Meadow as well as Bellmore Ave. Widespread street flooding was also reported in Wantagh.
October 19-20, 1996	Severe Storms, Flash Flooding	DR-1146	Yes	Heavy flood producing rains along with minor to major coastal flooding occurred. Rain began during the early morning on the 19th and ended shortly after midnight on the 20th. Three to five inches of rain fell, with isolated higher amounts. County: from 1.66 inches at Levittown to 4.90 inches at Lynbrook. DR-1146 was declared.
January 10, 1997	Coastal Flood	N/A	N/A	A low-pressure system intensified as it moved north along the coast. High astronomical tides combined with brief easterly gales that developed in advance of the approaching low and caused water to pile-up along sections of the coast during Friday morning's high tide. In Nassau County, moderate tidal flooding occurred in Freeport.
August 20, 1997	Coastal Flooding	N/A	N/A	Sustained wind speeds reached 44 knots at the Ambrose Light Tower at 3 am on August 21st and 29 knots from 11 pm on August 20th through 4 am on the 21st at Bouy 44025 (about 20 miles south of Fire Island Inlet). Over land, wind speeds ranged from 15 to 25 mph with gusts over 30 mph. Strong east to southeast winds combined with astronomical high tides caused tidal piling that resulted in moderate coastal flooding across parts of coastal Long Island during two high tide cycles. This storm also brought heavy rain to the area. Rainfall amounts generally ranged from 1 to 3 inches.
January 23-24, 1998	Flood	N/A	N/A	Precipitation began in the form of snow flurries from 4 am to 7 am. It quickly changed to sleet then rain before noon. As the low moved toward NYC, heavy showers and thunderstorms formed and spread north across the region. Heavy rainfall from 2 to just over 4 inches resulted in widespread flooding of low-lying and poor drainage areas.
March 8-9, 1998	Flood	N/A	N/A	This system produced widespread heavy rainfall including thunderstorms that caused widespread urban and small stream flooding across the region. Many low-lying and poor drainage areas, including streets were flooded throughout the area. For example, significant street flooding occurred on Wellwood Ave. in North Lindenhurst (Nassau County). Rainfall began around noon on March 8th and became heavy producing flooding by the times indicated above. This system also produced strong wind gusts from 40 to 50 mph that in combination with the heavy rain caused some tree limbs to fall along with scattered power outages. 2-3 inches of rain fell in Nassau County.
June 12-13, 1998	Flash Flooding	N/A	N/A	Thunderstorms produced torrential flash flooding rains and frequent lightning. Torrential rains resulted in widespread serious flooding of streets, poor drainage and low-lying areas, home basements, and small streams. Lightning struck two houses in



Table 5-5. Flooding Events in the City of Long Beach, 1950 to 2020

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Nassau County Designated?	Estimated Damages and/or Losses
				Long Beach. One stroke knocked off a chunk of stucco and another hit the peak of the roof.
September 7, 1998	New York Severe Weather	DR-1244	Yes	DR-1244 was declared for severe weather.
January 3, 1999	Flash Flood	N/A	N/A	Rain fell on a frozen ground surface at rates as high as 3 inches per hour. This resulted in rapid runoff that caused widespread serious flooding of low-lying and poor drainage areas. In Nassau County, from 3.69 inches at Sea Cliff to 5.02 inches at Merrick.
September 16-18, 1999	New York Hurricane Floyd	DR-1296	Yes	Torrential record rainfall, which caused serious widespread urban, small stream, and river flooding, preceded the remnants of Hurricane Floyd, which passed over Western Suffolk County of Long Island from 7 pm to 9 pm on September 16th. Serious widespread flooding of low-lying and poor drainage areas resulted in the closure of many roads and basement flooding across the entire region.
March 30, 2001	Flood	N/A	N/A	A low-pressure system moved northeast along the mid-Atlantic coast and produced widespread heavy rain across the New York City metropolitan area and Long Island. Two to three inches of rain were common across much of southeast New York, with some localized amounts up to four inches, particularly across portions of Nassau and Suffolk counties. This created widespread urban and highway flooding during the Friday morning commute, which continued into the early afternoon hours.
June 17, 2001	Flash Flood	N/A	N/A	On Sunday, June 17th, abundant moisture from the remnants of tropical storm Allison, combined with a cold front approaching from the west, produced extremely heavy rainfall across much of southeast New York during the early morning hours. Rainfall rates of up to 3 inches per hour produced widespread street and highway flooding, in addition to some flash flooding of small streams. There were also numerous reports of street and highway flooding in the New York City area, as well as Nassau and Suffolk Counties on Long Island, which led to several major road and highway closings. In Nassau County, 5 inches of rain fell at Lido Beach.
August 29, 2002	Flash Flood	N/A	N/A	Rain developed during the day Wednesday, August 28th as a low-pressure wave formed along the Mid Atlantic Coast. A 1 to 2-inch rainfall preceded the arrival of areas of very heavy rain as this wave moved north along the New Jersey Coast during Thursday morning, August 29th. With wet antecedent conditions in place, periods of torrential rain resulted in widespread and significant flooding of low lying and poor drainage areas. In Nassau County, street flooding was reported in Lido Beach.
February 17-18, 2003	New York Snowstorm	EM-3184	Yes	EM-3184 was declared for a snowstorm.



Table 5-5. Flooding Events in the City of Long Beach, 1950 to 2020

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May 13 – June 17, 2004	New York Severe Storms and Flooding	DR-1534	Yes	DR-1534 was declared for severe storms and flooding.
October 14, 2005	Flash Flood	N/A	N/A	Periods of heavy rain continued throughout the day. Bands of torrential rain produced widespread and significant flash flooding of low lying and poor drainage areas, including streets, basements, roofs, and ceilings throughout Nassau and Suffolk Counties. Preliminary damage cost estimates were \$22 million for Long Island.
November 12-14, 2009	New York Severe Storms and Flooding Associated with Tropical Depression Ida and a Nor'easter	DR-1869	Yes	DR-1869 was declared for severe storms and flooding associated with the combined impacts of Tropical Depression Ida and a nor'easter.
March 13-31, 2010	New York Severe Storms and Flooding	DR-1899	Yes	DR-1899 was declared for severe storms and flooding.
December 26-27, 2010	New York Severe Winter Storm and Snowstorm	DR-1957	Yes	DR-1957 was declared for a severe winter storm.
April 16, 2011	Coastal Flood	N/A	N/A	Winds acted to pile waters along the shoreline, with widespread minor flooding and areas of moderate flooding during the times of high tide on the night of April 16. Water levels rose to 5.47 feet NGVD, 0.47 feet above the stage for moderate flooding at the USGS tidal gage in Hudson Bay at Freeport.
May 16-17, 2011	Coastal Flood	N/A	N/A	Persistent east winds over several days between broad low pressure over the Southeast United States and stubborn high pressure over Southeast Canada caused water to pile up along the coast. This tidal surge in conjunction with astronomically high tides created several bouts of widespread minor and some locally moderate coastal flooding during the times of high tide along the Southeast NY coast between the fourteenth and nineteenth of May. On the evening of 5/16, water levels rose to 5.12 feet NGVD at the USGS tidal gauge at Hudson Bay in Freeport, 0.12 feet above the threshold for moderate flooding. On the evening of 5/17, water levels rose to 5.20 feet NGVD at the USGS tidal gauge at Hudson Bay in Freeport, 0.20 feet above the threshold for moderate flooding.
August 26 – September 5, 2011	New York Hurricane Irene	DR-4020, EM-3328	Yes	DR-4020 and EM-3328 were declared for the impacts of Hurricane Irene.
September 29, 2011	Coastal Flood	N/A	N/A	A persistent east wind developed between low pressure drifting through the Great Lakes and high pressure anchored over the Canadian Maritimes. The surge created by these winds, combined with astronomically high Spring tides, resulted in widespread minor with isolated moderate coastal flooding during the morning high tide cycles of



Table 5-5. Flooding Events in the City of Long Beach, 1950 to 2020

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				September 28 and September 29. The coastline adjacent to Western Long Island Sound, New York Harbor, and the southern bays of Long Island, Queens and Brooklyn were the most affected. The USGS tidal gauge at Hudson Bay at Freeport recorded a water level of 6.03 ft. MLLW during the morning high tide cycle of September 29, 2011. This is .23 ft. above the threshold for moderate coastal flooding established by the National Weather Service.
October 27, 2011	Coastal Flood	N/A	N/A	A persistent southerly flow ahead of a slow-moving cold front resulted in tidal departures of one half to one foot above normal. This combined with spring tides resulted in widespread minor and locally moderate coastal flooding during the morning and early afternoon high tides on October 27th and 28th. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 5.85 ft. MLLW during the morning high tide cycle of October 27, 2011. This is .05 ft. above the threshold for moderate coastal flooding established by the National Weather Service.
October 28, 2011	Coastal Flood	N/A	N/A	A persistent southerly flow ahead of a slow-moving cold front resulted in tidal departures of one half to one foot above normal. This combined with spring tides resulted in widespread minor and locally moderate coastal flooding during the morning and early afternoon high tides on October 27th and 28th. The USGS tidal gauge at Freeport recorded a water level of 5.8 ft. MLLW during the morning high tide cycle of October 28, 2011. This is the threshold for moderate coastal flooding established by the National Weather Service.
June 4, 2012	Coastal Flood	N/A	N/A	<p>An unusual cutoff low-pressure system for June, resulted in a period of strong northeast winds across the region June 4 into June 5. The combination of the resultant surge and astronomically high spring tides created widespread minor coastal flooding and areas of moderate coastal flooding during the time of high tide the night of June 4. Widespread minor and only localized moderate coastal flooding was experienced during the times of high tide the night of June 5 as low pressure moved out to sea and winds weakened. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 6.15 ft. MLLW during the evening high tide cycle of June 4, 2012. This is .35 ft. above the threshold for moderate coastal flooding at this location established by the National Weather Service.</p> <p>The USGS tidal gauge in Reynolds Channel at Point Lookout recorded a water level of 6.7 ft. MLLW during the evening high tide cycle of June 4, 2012. This is .1 ft. above the threshold for moderate coastal flooding at this location established by the National Weather Service.</p>



Table 5-5. Flooding Events in the City of Long Beach, 1950 to 2020

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				<p>The USGS tidal gauge in East Rockaway Inlet at Atlantic Beach recorded a water level of 7.1 ft. MLLW during the evening high tide cycle of June 4, 2012. This is .1 ft. above the threshold for moderate coastal flooding at this location established by the National Weather Service.</p>
<p>June 5, 2012</p>	<p>Coastal Flood</p>	<p>N/A</p>	<p>N/A</p>	<p>An unusual cutoff low-pressure system for June, resulted in a period of strong northeast winds across the region June 4 into June 5. The combination of the resultant surge and astronomically high spring tides created widespread minor coastal flooding and areas of moderate coastal flooding during the time of high tide the night of June 4. Widespread minor and only localized moderate coastal flooding was experienced during the times of high tide the night of June 5 as low pressure moved out to sea and winds weakened. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 5.81 ft. MLLW during the evening high tide cycle of June 5, 2012. This is .01 ft. above the threshold for moderate coastal flooding at this location established by the National Weather Service.</p>
<p>October 27 – November 8, 2012</p>	<p>New York Hurricane Sandy</p>	<p>DR-4085, EM-3351</p>	<p>Yes</p>	<p>Coastal communities along Southern Nassau County experienced four successive tidal cycles with at least moderate coastal flooding. The peak of this surge occurred Monday Night as Sandy made landfall in Southern New Jersey, with widespread record coastal flooding occurring along the Western Great South Bay exceeding the FEMA 100-year base flood elevations. Peak storm tides surpassed all previously documented high-water marks, including the October 31, 1991 and December 11, 1992 nor'easters and the recorded peaks from Hurricane Irene in 2011.</p> <p>The storm tide levels along the Southern Nassau County shore resulted from a peak storm surge of about 8 to 9 feet that coincided with normal high tides. This resulted in up to 2 to 5 feet of inundation of communities in and along Southern Nassau County. The majority of locations south of Merrick Road and Atlantic Avenue were completely inundated, with waterfront communities along creeks and streams being inundated up to Sunrise Highway. Areas of major residential damage were experienced across low lying areas such as Inwood, Meadowmere Park, Bay Harbor, Island Park, Baldwin Harbor, Freeport, and Massapequa.</p> <p>The most widespread major damage was experienced along the barrier beach communities, where the surge was amplified by the runup and setup from 15 to 20-foot breakers along the Atlantic Ocean coast. Numerous homes and Atlantic Ocean facing</p>



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Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Nassau County Designated?	Estimated Damages and/or Losses
				structures, such as boardwalks and piers, in Long Beach and Lido Beach were completely destroyed.
November 8, 2012	Coastal Flood	N/A	N/A	This nor'easter came on the heels of Superstorm Sandy. Strong north to northeast winds resulted in widespread minor and some moderate coastal flooding during the times of high tides. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 5.84 ft. MLLW during the early morning high tide cycle of November 8, 2012. This is .04 ft. above the threshold for moderate coastal flooding established by the National Weather Service.
December 27, 2012	Coastal Flood	N/A	N/A	Low pressure taking shape over the Southern Plains and Lower Mississippi Valley on Christmas Day intensified into a nor'easter as it moved into the Tennessee Valley on the 26th, passing just south of Long Island the morning of the 27th and then moving to Nova Scotia on the 28th. This system brought strong east winds to the region the 26th into the morning of 27th, which resulted in 3 to 5 feet of storm surge and widespread minor to moderate coastal flooding along the coast. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 5.96 ft. MLLW during the early morning high tide cycle on December 27th. This is .16 ft. above the threshold for moderate coastal flooding established by the National Weather Service.
February 9, 2013	Coastal Flood	N/A	N/A	A powerful blizzard affected the region Friday February 8th into Saturday February 9th. Strong northeast winds resulted in generally 1 1/2 to 2 1/2 feet of surge during the Friday evening and Saturday morning high tide cycles causing widespread minor to locally moderate coastal flooding. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 5.81 ft. MLLW during the early morning high tide cycle on Saturday February 9th. This is .01 ft. above the threshold for moderate coastal flooding established by the National Weather Service.
March 7, 2013	Coastal Flood	N/A	N/A	Surface low pressure moved off the southern Mid Atlantic coast the morning of March 6th and continued moving slowly east into the north Atlantic through March 9th while intensifying. A prolonged period of strong north to northeast winds and easterly swells, resulted in several days of minor coastal flooding March 6th through March 10th. Locally moderate coastal flooding occurred during this time along the southern and eastern bays of Long Island. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 6.0 ft. MLLW during the early morning high tide cycle on March 7th. This is .2 ft. above the threshold for moderate coastal flooding established by the National Weather Service.
March 9, 2013	Coastal Flood	N/A	N/A	Surface low pressure moved off the southern Mid Atlantic coast the morning of March 6th and continued moving slowly east into the north Atlantic through March 9th while



Table 5-5. Flooding Events in the City of Long Beach, 1950 to 2020

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Nassau County Designated?	Estimated Damages and/or Losses
				intensifying. A prolonged period of strong north to northeast winds and easterly swells, resulted in several days of minor coastal flooding March 6th through March 10th. Locally moderate coastal flooding occurred during this time along the southern and eastern bays of Long Island. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 6.0 ft. MLLW during the evening high tide cycle on March 9th. This is .2 ft. above the threshold for moderate coastal flooding established by the National Weather Service.
April 29, 2014	Coastal Flood	N/A	N/A	Strong persistent east winds ahead of a slow-moving approaching frontal system resulted in widespread minor and localized moderate coastal flooding during the evening high tides. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 6.1 feet above MLLW during the evening high tide cycle on Tuesday April 29th. This is 0.3 feet above the threshold for moderate coastal flooding established by the National Weather Service.
December 9, 2014	Coastal Flood	N/A	N/A	An intensifying low-pressure system, tracking up the coast towards Long Island on the early morning into afternoon hours of December 9, produced a 12 hour period of northeast gales. The surge from these gale force winds and preceding 36 hours of northeast flow, combined with morning high tide, resulted in widespread minor coastal flooding along the New York coastline. Locally moderate coastal flooding was experienced across vulnerable communities along the south shore bays of Western and Central Long Island. The USGS tidal gauge in Hudson Bay at Freeport recorded a water level of 5.8 ft. MLLW during the morning high tide cycle. This is the threshold for moderate coastal flooding established by the National Weather Service. Roads south of Atlantic Avenue were reported inundated and impassable during the time of high tide.
August 21, 2015	Flash Flood	N/A	N/A	A strong cold front crossed the region during the early morning hours of August 21. High precipitable water and storm motion parallel to the front combined to produce heavy rain that led to flash flooding over parts of Nassau County. Park Street was closed from Suffolk Boulevard to Cayuga Avenue in Atlantic Beach due to flash flooding.
October 2, 2015	Coastal Flood	N/A	N/A	Strong high pressure over New England and a stalled frontal boundary to the south of the area resulted in persistent northeast winds of 20 to 25 mph with 30 to 35 mph gusts. The resultant surge combined with high astronomical tides coming off a full moon, resulted in widespread minor coastal flooding along southern and western coastal areas of Long Island on September 30th through October 3rd. On October 2, locally moderate coastal flooding occurred along the most vulnerable south shore locales of Nassau



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				County. The USGS tidal gauge in Hudson Bay at Freeport recorded a peak water level of 5.88 ft. MLLW at 1112 am EST. The moderate coastal flood threshold of 5.8 ft. MLLW was exceeded from 1042 to 1148 am EST. This moderate coastal flooding threshold was established by the National Weather Service, based on impact analysis and collaboration with the USGS and local emergency management.
January 10, 2016	Coastal Flood	N/A	N/A	Strong high pressure over Southeast Canada and low pressure drifting off the Mid Atlantic coast resulted in 2 days of persistent northeast winds Jan 8th and 9th. This was followed by 12 to 18 hours of east to southeast winds of 15 to 20 mph with gusts to 30 to 35 mph leading into high tides on Jan 10th. The resultant surge combined with high astronomical tides, resulted in widespread minor to moderate coastal flooding along southern and western coastal areas of Long Island and New York City on the morning of January 10th. The USGS tidal gauge in Hudson Bay at Freeport recorded a peak water level of 6.4 ft. MLLW at 812 am EST. The moderate coastal flood threshold of 5.8 ft. MLLW was exceeded from 718 to 924 am EST. The USGS tidal gauge in East Rockaway recorded a peak water level of 7.2 ft. MLLW at 806 am EST. The moderate coastal flood threshold of 7.0 ft. MLLW was exceeded from 724 to 842 am EST. The USGS tidal gauge at Point Lookout recorded a peak water level of 6.6 ft. MLLW at 800 am EST. The moderate coastal flood threshold of 6.6 ft. MLLW was exceeded from 800 to 812 am EST.
January 23-24, 2016	Coastal Flood	N/A	N/A	Low pressure developed along the southern mid Atlantic coast on the evening of the 23rd and then rapidly intensified as it slowly tracked northeast, south of Long Island, through the night of the 24th. The resulting surge from 36 hours of gale to storm force north to northeast winds, combined with high astronomical tides, resulted in widespread minor to moderate coastal flooding for three consecutive tidal cycles the morning of the 23d into the morning of the 24th along the southern coastal areas of Long Island. Areas of minor to localized moderate coastal flooding occurred along Long Island Sound and East End portions of Long Island during this time period as well. In addition, widespread dune toe erosion and localized wash overs were reported along the Atlantic Ocean facing beaches of Long Island. The USGS tidal gauge in Hudson Bay at Freeport recorded a peak water level of 6.0 ft. MLLW at 812 pm EST. The moderate coastal flood threshold of 5.8 ft. MLLW was exceeded from 718 pm to 848 pm EST. The USGS tidal gauge in East Rockaway recorded a peak water level of 7.0 ft. MLLW, the moderate coastal flood threshold, from 742 pm to 812 pm am EST.
February 8-9, 2016	Coastal Flood	N/A	N/A	Low pressure that developed off the Florida coast on early February 7th, intensified into a large intense offshore storm which slowly tracked northeast up the coast through the



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				<p>night of February 8th. The large fetch around the storm and slow movement resulted in 2 to 3 feet of surge on top of astronomically high tides. This resulted in widespread minor to moderate coastal flooding during the morning high tides of February 8th and 9th. Moderate coastal impacts were mainly along the south shore bays of New York City and Long Island.</p> <p>The USGS tidal gauge in East Rockaway recorded a peak water level of 7.3 ft. MLLW at 742 am EST. The moderate coastal flood threshold of 7.0 ft. MLLW was exceeded from 700 to 812 am EST. The USGS tidal gauge at Point Lookout recorded a peak water level of 6.6 ft. MLLW at 800 am EST. The moderate coastal flood threshold of 6.6 ft. MLLW was exceeded from 718 to 806 am EST. In Long Beach, minor flooding occurred on Virginia Avenue and West Park Avenue.</p>
May 5-6, 2016	Coastal Flood	N/A	N/A	<p>Three days of widespread minor to localized moderate coastal flooding occurred in response to periods of northeast winds and the highest spring tides of the year. In fact, some places were touching NWS minor flooding thresholds just from the high astronomical tides. Water levels peaked with the evening tides of 5/5 and 5/6. The USGS tidal gauge in Hudson Bay at Freeport recorded a peak water level of 6.1 ft. MLLW at 748 pm EST. The moderate coastal flood threshold of 5.8 ft. MLLW was exceeded from 612 to 736 pm EST.</p>
January 23-24, 2017	Coastal Flood	N/A	N/A	<p>A slow-moving Nor'easter impacted successive high tide cycles with widespread minor to locally moderate coastal flooding on the evening of 1/23 and widespread moderate to locally major coastal flooding the morning of 1/24. Thirty-six hours of east-northeast gale to storm force winds helped build surge values to 3 to 4 feet above astronomical tides for the 1/24 morning high tide cycle. This caused widespread moderate to locally major coastal flooding along the southern and eastern bays and beachfront communities of Long Island. Coastal communities across the rest of the Tri-State area mainly experienced minor impacts.</p> <p>Coastal flood watches, warnings and advisories were issued and IDSS performed well in advance to warn coastal community residents of the potential impacts. In addition, widespread beach and dune erosion occurred at Atlantic Ocean beaches from elevated waters levels and an east to west sweep of 8 to 12 feet of surf Monday into Tuesday. On the 23rd, the USGS tidal gauge in Hudson Bay at Freeport recorded a peak water level of 5.8 ft. MLLW at 600 pm EST. The moderate coastal flood threshold of 5.8 ft. MLLW was reached from 548pm to 618pm EST. On the 24th, the moderate coastal flood</p>



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				<p>threshold of 5.8 ft. MLLW was exceeded from 330 to 654 am EST. The USGS tidal gauge at East Rockaway Inlet at Atlantic Beach recorded a peak water level of 7.3 ft. MLLW at 442 am EST. The moderate coastal flood threshold of 7.0 ft. MLLW was exceeded from 418 to 554 am EST. The USGS tidal gauge at Reynold Channel at Point Lookout Inlet recorded a peak water level of 6.8 ft. MLLW at 518 am EST. The moderate coastal flood threshold of 6.6 ft. MLLW was exceeded from 406 to 606 am EST.</p>
<p>March 14, 2017</p>	<p>Coastal Flood</p>	<p>N/A</p>	<p>N/A</p>	<p>A rapidly deepening low-pressure system tracking up the eastern seaboard on Tuesday March 14th brought gale to storm force winds to the area waters, resulting in 2 to 4 feet of surge during the Tuesday morning high tidal cycle. This resulted in widespread minor to moderate coastal impacts to the region. Erosion impacts to the beachfront were mainly minor. The USGS tidal gauge at East Rockaway Inlet at Atlantic Beach recorded a peak water level of 6.9 ft. MLLW at 936 am EST. This is within one tenth of a foot of the moderate coastal flood threshold of 7.0 ft. MLLW. The USGS tidal gauge at Reynold Channel at Point Lookout Inlet recorded a peak water level of 6.4 ft. MLLW at 1006 am EST. This is within 2 tenths of a foot of the moderate coastal flood threshold of 6.6 ft. MLLW. This water level resulted in 1 to 2 feet of inundation along East Pine Street in Long Beach during the time of high tide, as well as a road closure on the northbound Wantagh State Parkway at Bay Parkway due to flooding.</p>
<p>October 30, 2017</p>	<p>Coastal Flood</p>	<p>N/A</p>	<p>N/A</p>	<p>A southern low rapidly intensified as it raced up the East coast Sunday, and over NYC Sunday Night. This low brought a rapid onset but relatively brief period of SE gale to storm force winds Sunday evening, shifting to WNW gales Monday morning. High seas built into Monday Morning.</p> <p>Moderate coastal flooding occurred along the Great South Bay with the Monday morning high tide. Surge continued to increase well after peak onshore winds, with water levels receding briefly or not at all during low tide. The westerly wind shift helped slosh surge into eastern portions of the Great South Bay, with recession below flood levels taking several hours after high tide.</p> <p>The USGS tidal gauge in Hudson Bay at Freeport recorded a peak water level of 6.6 ft. MLLW at 418 am EST. The moderate coastal flood threshold of 6.2 ft. MLLW was exceeded from 342 to 448 am EST.</p>
<p>March 2-4, 2018</p>	<p>Coastal Flood</p>	<p>N/A</p>	<p>N/A</p>	<p>A powerful coastal storm impacted the region Friday through Sunday with North to Northeast Gale to Storm force winds. This resulted in several tidal cycle of minor to</p>



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				<p>moderate coastal flooding Friday morning through Sunday morning, with the most widespread moderate to locally major impacts occurring with the Saturday Night high tidal cycle. In addition, prolonged high surf from energetic easterly swells during this time period resulted in widespread areas of dune erosion and localized washovers along the Atlantic Ocean beachfront. The USGS tidal gauge in Hudson Bay at Freeport recorded a peak water level of 6.5 ft. MLLW at 800 am EST. The moderate coastal flood threshold of 6.2 ft. MLLW was exceeded from 706 to 854 am EST. The USGS tidal gauge in Reynolds Channel recorded a peak water level of 6.8 ft. MLLW at 930 am EST. The moderate coastal flood threshold of 6.8 ft. MLLW was touched from 912 to 942 am EST. The USGS tidal gauge in East Rockaway recorded a peak water level of 7.3 ft. MLLW at 936 pm EST. The moderate coastal flood threshold of 7.0 ft. MLLW was exceeded from 842 to 1024 pm EST.</p>
September 9, 2018	Coastal Flood	N/A	N/A	<p>The USGS tidal gauge in Hudson Bay at Freeport recorded a peak water level of 6.5 ft. MLLW at 754 pm EST. The moderate coastal flood threshold of 6.2 ft. MLLW was exceeded from 654 to 832 pm EST.</p>
November 25, 2018	Coastal Flood	N/A	N/A	<p>Minor to moderate coastal flooding was caused by a low-pressure system that rapidly deepened just south of Long Island early Sunday morning. Several hours of 35 to 45 kt east to southeast winds resulted in a quick buildup of around 3 ft of storm surge for the Sunday morning high tide. An approaching warm front, increased southeast winds once again Monday morning, resulting in minor to locally moderate coastal flooding for the Monday morning high tide cycle.</p>
December 21-22, 2018	Coastal Flood	N/A	N/A	<p>A peak water level of 6.3 ft MLLW occurred at the USGS tidal gauge at Hudson Bay at Freeport from 2018-12-21 06:12 EST to 2018-12-21 07:00 EST. The moderate coastal flood threshold of 6.2 ft MLLW was exceeded from 2018-12-21 05:54 EST to 2018-12-21 07:12 EST. A peak water level of 6.3 ft MLLW occurred at the USGS tidal gauge at Hudson Bay at Freeport from 2018-12-22 07:06 EST to 2018-12-22 07:18 EST. The moderate coastal flood threshold of 6.2 ft MLLW was exceeded from 2018-12-22 06:42 EST to 2018-12-22 07:36 EST.</p>
January 20, 2019	Coastal Flood	N/A	N/A	<p>Deepening low pressure tracked from the southeast United States on Saturday January 19, 2019 to the northeast on Sunday January 20, 2019. The low produced moderate coastal flooding along parts of the south shore of Long Island and New York City, and along western Long Island Sound, during the morning high tide cycle of the 20th. A peak water level of 6.5 ft MLLW occurred at the USGS tidal gauge at Hudson Bay at Freeport from 2019-01-20 06:48 EST to 2019-01-20 07:18 EST. The moderate coastal</p>



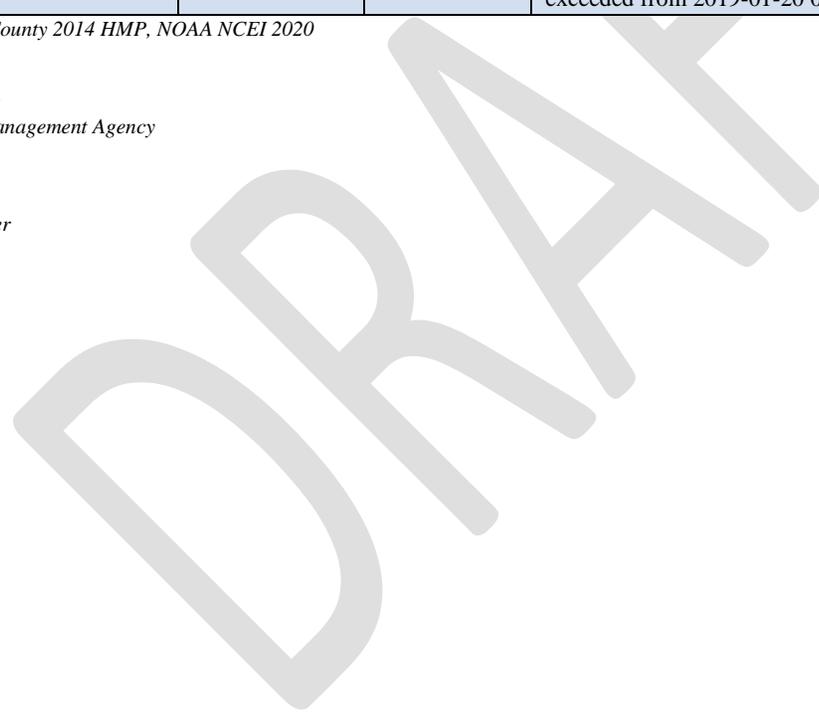
Table 5-5. Flooding Events in the City of Long Beach, 1950 to 2020

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Nassau County Designated?	Estimated Damages and/or Losses
				<p>flood threshold of 6.2 ft MLLW was exceeded from 2019-01-20 06:12 EST to 2019-01-20 07:48 EST.</p> <p>The moderate coastal flood threshold of 6.8 ft MLLW was touched at the USGS tidal gauge at Reynolds Channel from 2019-01-20 06:48 EST to 2019-01-20 06:54 EST, and again from 2019-01-20 07:12 EST to 2019-01-20 07:18 EST. A peak water level of 10.6 ft MLLW occurred at the NOS tidal gauge at Kings Point from 2019-01-20 10:12 to 2019-01-20 10:36. The moderate coastal flood threshold of 10.5 ft MLLW was exceeded from 2019-01-20 09:00 to 2019-01-20 10:48.</p>

Source: FEMA 2020, Nassau County 2014 HMP, NOAA NCEI 2020

Notes:

- EST Eastern Standard Time
- FEMA Federal Emergency Management Agency
- ft feet
- kt knot(s)
- mph miles per hour
- MLLW Mean Lower Low Water
- N/A Not Applicable





Probability of Future Occurrences

Given the history of flood events that have impacted the City of Long Beach it is apparent that future flooding of varying degrees will occur. The fact that the elements required for flooding exist and that major flooding has occurred throughout the county in the past suggests that many people and properties are at risk from the flood hazard in the future. It is estimated that the city will continue to experience direct and indirect impacts of flooding events annually that may induce secondary hazards such as coastal erosion, storm surge in coastal areas, infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents, and inconveniences.

Floods are typically described in terms of their extent and their recurrence interval. The recurrence interval or return period is the average number of years between floods of a certain size. The actual number of years between floods of any given size varies because of the naturally changing climate (USGS Date Unknown). Table 5-6 describes the recurrence intervals and probabilities of occurrences for flood events.

Table 5-6. Recurrence Intervals and Probabilities of Occurrences

Recurrence Interval (in years)	Percent Chance of Occurrence in Any Given Year
100	1
50	2
25	4
10	10
5	20
2	50

Source: USGS Date Unknown

Coastal Erosion

Coastal erosion is measured as the rate of change in the position or horizontal displacement of a shoreline over a specific period of time, measured in units of feet or meters per year. Erosion rates vary as a function of shoreline type and are influenced primarily by episodic events. Monitoring of shoreline change based on a relatively short period of record does not always reflect actual conditions and can misrepresent long-term erosion rates due to storm frequency.

A number of factors determine whether a community exhibits greater risk of long-term erosion or accretion:

- Exposure to high-energy storm waves
- Sediment size and composition of eroding coastal landforms feeding adjacent beaches
- Near-shore bathymetric variations that direct wave approach
- Alongshore variations in wave energy and sediment transport rates
- Relative sea-level rise
- Human interference with sediment supply (such as revetments, seawalls, and jetties) (Woods Hole Sea Grant 2003)

The long-term patterns of coastal erosion are difficult to detect because of substantial and rapid changes in coastlines in the short-term (that is, over days or weeks from storms and natural tidal processes). It is usually severe short-term erosion events, occurring either singly or cumulatively over a few years, that cause concern and lead to attempts to influence the natural processes. Analysis of both long- and short-term shoreline changes are required to determine which is more reflective of the potential future shoreline configuration (FEMA 1996).





Storm Surge

As noted earlier, no storm-surge specific scales exist due to the concern that no scale can adequately represent the storm surge’s potential impact. Because of the threat posed by storm surge, the National Hurricane Center continues to develop more accurate methods of analyzing and predicting storm surge, particularly those associated with tropical storms, hurricanes, and Nor’easters. The National Hurricane Center also includes the probability of surge heights to be exceeded. The New York coastal weather forecast offices typically provide impact graphics for storm surge watches and warnings.

In the City of Long Beach, storm surge will remain a concern for many coastal flooding and hurricane events. Although the level of severity for storm surge may not always be accurate, the events are usually easy to predict since they are often a secondary effect from another hazard event (most typically hurricanes, severe storms, and coastal flooding).

Sea Level Rise

Sea level rise is a long term and ongoing hazard. Unlike other floods, sea level rise occurs gradually and does not occur as individual episodes which would allow for probability to be calculated. With climate change continuing to raise global temperatures, leading to melting land ice and warming ocean temperatures, sea level rise will continue to take place and is likely to accelerate in the next century.

Climate Change Impacts

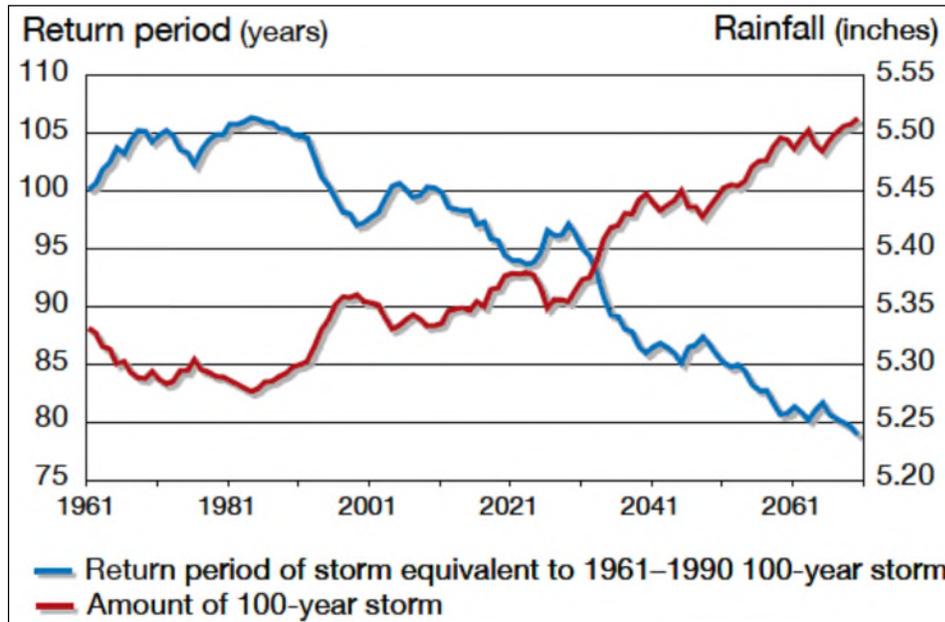
Climate change refers to changes over a long period of time in patterns of temperature, precipitation, humidity, wind, and seasons. Climate change is expected to have significant impacts on the mid-Atlantic and Northeast regions by the mid-21st century. Climate plays a fundamental role in shaping ecosystems and the human economies and cultures that depend on them. It is generally perceived that climate change will have a measurable impact on the occurrence and severity of flooding. As hydrology changes, what is currently considered a 100-year flood may strike more often, leaving many communities at greater risk. Planners will need to factor a new level of safety into the design, operation, and regulation of flood protection facilities such as dams, floodways, bypass channels and levees, as well as the design of local sewers and storm drains. Climate change impacts have the potential to affect the City of Long Beach, as well as the entire New York coastal region.

The climate of New York is already changing and will continue to change over the course of this century. Since 1900, temperatures in New York have increased approximately 2.0 degrees Fahrenheit (°F). As of 2015, the year 2012 was the hottest on record for New York, with a statewide average temperature of 48.9°F, more than 4°F above the long-term average (44.5°F) (NOAA 2019).

In the New York City and Long Island ClimAID region (Region 4), in which the City of Long Beach is located, is estimated that precipitation totals will increase between 4 and 11 percent by the 2050s and 5 to 13 percent by the 2080s (baseline of 49.7 inches, mid-range projection) (NYSERDA 2011). The projected increase in precipitation is expected to fall in heavy downpours and less in light rains. The increase in heavy downpours has the potential to affect drinking water; heighten the risk of riverine flooding; flood key rail lines, roadways and transportation hubs; and increase delays and hazards related to extreme weather events (NYSERDA 2011).

Increasing air temperatures intensify the water cycle by increasing evaporation and precipitation. This can cause an increase in rain totals during events with longer dry periods in between those events. These changes can have a variety of effects on the State’s water resources (NYSERDA 2011). Figure 5-18 displays the projected rainfall and frequency of extreme storms in New York State. The amount of rainfall in a 100-year event is projected to increase, while the number of years between such storms (return period) is projected to decrease. Rainstorms will become more severe and more frequent (NYSERDA 2011).

Figure 5-18. Projected Rainfall and Frequency of Extreme Storms



Source: NYSERDA 2011

With this increase in frequency of precipitation, New York, Nassau County, and the City of Long Beach may experience more flooding events.

Coastal Erosion

Coastal areas may be impacted by climate change in different ways. Coastal areas are sensitive to sea level rise, changes in the frequency and intensity of storms, increase in precipitation, and warmer ocean temperatures. According to National Aeronautics and Space Administration (NASA), warmer temperatures may lead to an increase in frequency of storms, thus leading to more weather events that cause coastal erosion.

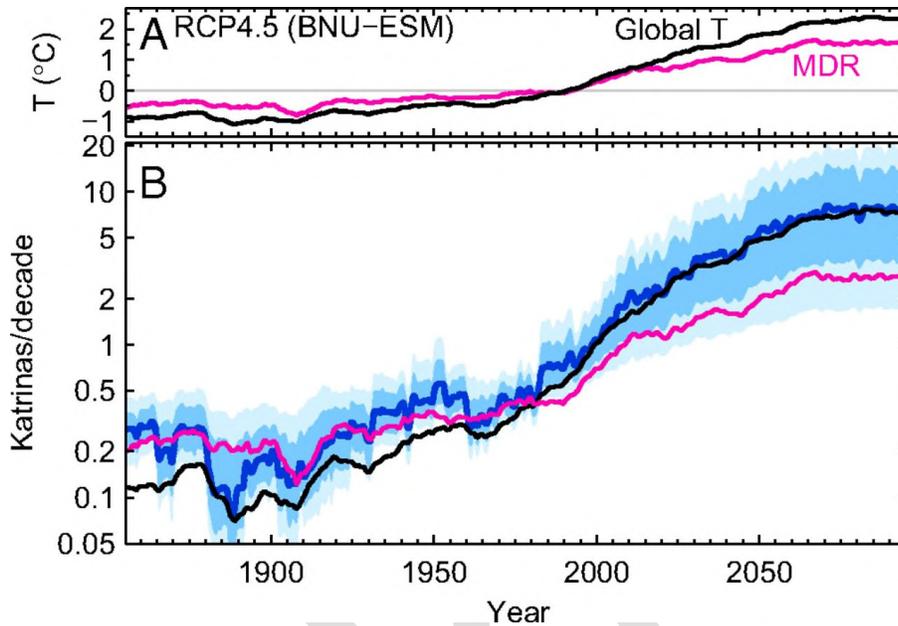
A study on increased storm wave heights from climate change indicated that coastal erosion and flooding may occur twice as fast from sea level rise alone and up to four times as fast as a doubling of the frequency of major El Niño events. Should all these potential subsequent events from climate change occur simultaneously, there could be up to an order of magnitude increase in both coastal erosion and flood frequency (compared against the current rate of those processes). While erosion rates would still be partially dependent on beach slopes and dune crest elevations, this possibility highlights the importance of incorporating climate change and climate control into mitigation practices (Ruggiero 2008).

Storm Surge

Storm surges are generated by the strong winds and intense low pressure associated with tropical cyclones, hurricanes, and severe storms. While not all severe storms will have devastating impacts or create significant levels of storm surge, the surge index record shows a significant positive trend between warmer years and extreme events (i.e., Hurricane Katrina-level events). While surge levels will vary because of situational factors, projected changes in hurricane surge levels above the mean sea level are more likely to increase than decrease. In fact, one study projects that category 4 and 5 frequency in the Atlantic basin could increase by 40% to 90% in the 21st century, for a sea surface temperature increase of about 1.7 degrees Celsius (3.1 degrees Fahrenheit). (Knutson et al, 2013).

More extreme projections have been postulated as shown in the figure below which provides a visual representation of the number of Hurricane Katrina-magnitude surge events per decade hindcast (i.e., past events are modeled to see how well the output matches known results) and projected changes. Each line shows the results based off different modeling techniques and data contributions. Although there is some variation depending on the model, the results show an overall positive correlation between temperature/climate increase and storm surge frequency (Grinsted 2013). This information is provided to indicate the more extreme projections of the scientific community and not the probability of occurrence.

Figure 5-19. Surge Event Frequency over Time and Climate Changes



Source: Grinsted 2013

Sea Level Rise

Changes in global temperatures, hydrologic cycles, coverage of glaciers and ice sheets, and storm frequency and intensity are captured in long-term sea level records. Sea levels provide a key to understanding the impact of climate change (NOAA 2013).

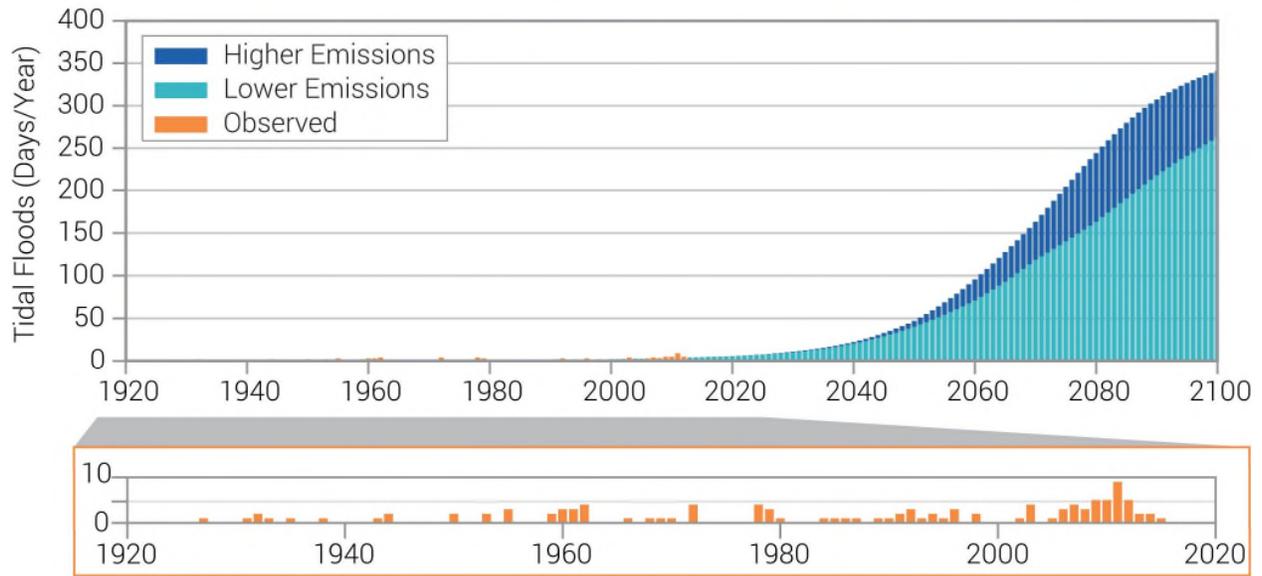
Sea level rise increases the risks coastal communities face from coastal hazards (floods, storm surges, and chronic erosion). It may also lead to the loss of important coastal habitats. In fact, sea level rise may have a stronger influence on hazard occurrences than an increase in El Niño events (Ruggiero 2008). Even if storm patterns remain the same, sea level rise will increase the frequency, extent, and severity of coastal flooding (NOAA 2019)

Figure 5-20 shows the observed and projected annual number of tidal floods for Battery Park, NY. The number of tidal flood days per year for the observed record (orange bars) and projections for two possible futures: lower emissions (light blue) and higher emissions (dark blue) are displayed. Sea level rise has caused an increase in tidal floods associated with nuisance-level impacts. Nuisance floods are events in which water levels exceed the local threshold (set by NOAA’s National Weather Service) for minor impacts, such as road closures and overwhelmed storm drains. The greatest number of tidal flood days (all days exceeding the nuisance level threshold) occurred in 2011 in Battery Park. Projected increases in tidal floods are large even under a lower

emissions pathway. Near the end of the century, under a higher emissions pathway, some models (not shown here) project tidal flooding nearly every day of the year (NOAA 2019)

Figure 5-20. Observed and Projected Annual Number of Tidal Flood for Battery Park, NY

Observed and Projected Annual Number of Tidal Floods for Battery Park, NY



Source: NOAA 2019

Future Trends

The City of Long Beach has established a clear commitment to furthering hazard mitigation and resilience efforts in the community. The City has worked to secure additional backup generators for power redundancy, implemented beach erosion and stabilization control projects in high risk areas and areas subject to storm surge scouring, implemented resilient (i.e., greater than pre-Superstorm Sandy levels) beach replenishment measures, installed man-made flood control structures, and more. The City of Long Beach plans to continue these efforts through additional infrastructure upgrades and enhancements, a Comprehensive Plan update to incorporate more mitigation integration, economic development, communication and education, capital improvement, and efforts to increase the city’s standing in the Community Rating System (CRS) program.

The City of Long Beach’s draft comprehensive plan “Creating Resilience: A Planning Initiative; City of Long Beach Comprehensive Plan” identifies general goals and objectives for natural hazard planning. These include increasing resilient infrastructure to reduce vulnerability to storms and flooding, redevelopment of the Bayfront, increase green space, and ensure safety for current and future residents. The City’s participation and adoption of the Nassau County HMP also contributes to its interest in flood management, as the HMP includes goals, objectives, policies, and actions focused on frequently flooded areas. The City also has several other plans and initiatives designed to promote healthy watersheds and manage stormwater. These plan components strive to steer future trends in development away from increasing flood risks in the City of Long Beach. Additionally, the City of Long Beach participates in the NFIP and has adopted flood damage prevention regulations in response to its requirements. The City of Long Beach has committed to maintaining its good standing under the NFIP through initiatives identified in this plan. The city exceeds the requirements of the NFIP through participation in the Community Rating System. As of January 2020, the city is a Class 7 community within the program.



The City of Long Beach has a population of 33,275, based on the 2010 U.S. Census, a decrease of 6.2% from the city’s 2000 U.S. Census population (35,462). The 2013-2017 American Community Survey estimates that the population has rebounded slightly to 33,657. The City’s 2009 Brownfield Opportunity Area study indicated that there is a potential for development of a number of brownfields along the Reynolds Channel.

Scenario

The primary waterways and the coastline in the planning area have the potential to flood at regular intervals, generally in response to hurricanes, Nor’easters, or other severe storms. Storm patterns of warm, moist air usually occur between early November and late March; Nor’easters are most typical during winter months; and hurricane season officially runs from June 1 to November 30. A series of such weather events can cause severe flooding in the planning area. The worst-case scenario is an event similar to Superstorm Sandy with rainfall rates typically associated with a tropical system, i.e., a severe hurricane or a series of storms that leads to both coastal flooding and flash flooding. In addition to rain falling faster than the ground and waterways can absorb it, this type of event would cause secondary effects of coastal erosion and storm surge. This could overwhelm response and floodplain management capabilities within the planning area. Major roads could be blocked, preventing evacuation and critical access for many residents and critical functions. High in-channel flows could cause water courses to scour, possibly washing out roads and creating more isolation problems. In the case of a series of storms, the City of Long Beach may not be able to make repairs quickly enough to restore critical facilities and infrastructure. The floodplain of the City of Long Beach, which is essentially the entire City, will continue to be impacted by these floods.

Issues

Important issues associated with flood hazards in the planning area include but are not limited to the following issues identified by the Planning Committee and members of the public:

- Erosion rates on the oceanfront are not well documented from year to year.
- The City of Long Beach has 98 stormwater outfalls. Only half of these outfalls have tide flex valves to prevent backflow.
- Backflow prevention devices get clogged and may result in increased flooding from rain events when not properly functioning.
- Backflow devices which stop functioning may allow unrestricted backflow.
- Outreach efforts are not currently well organized.
- The City’s flood information is dispersed throughout the website and is difficult to find.
- The City does not have a Pre-Flood Plan for messaging to be released prior to, during, and after a flood event.
- The City does not have a flood warning system or a Flood Warning and Response Plan.
- Deposition of sand in Jones Inlet is an issue for navigation and can lead to “wind against tide/tidal stacking” where coastal flooding is exacerbated.

Numerous locations in the city were identified as being flood-prone. The Planning Committee and members of the public noted the following flood-prone locations:

- West Park Avenue is prone to high tide flooding and flooding from heavy rainfall.
- The Canals through Neptune and Franklin Boulevard (at Hudson) flood from a combination of coastal flooding and heavy rainfall.
 - North of Park Avenue was noted as highly prone.
- Riverside Boulevard and Pine Street are prone to flooding.



- National Boulevard and Park Avenue intersection floods during heavy rainfall.
- Laurelton and the bay floods during coastal flood events
- Park Avenue, between New York Avenue and Nevada Avenue, often experiences flooding.
- The Committee noted that the worst damage from Superstorm Sandy took place at the West End.
- Committee members noted that sea level rise has been noticeable in the City, especially in the Canals section.
- The Canals and North Shore lack protection and erosion is taking place.
- The waterfront along Reynolds Channel on the northern side of the city is prone to flooding.
- The northern coast is vulnerable to high tide, storm surge, and rainfall events.
- Long Beach Boulevard floods during storm surge events.
- State Street at Franklin and the waterfront is prone to flooding.
- Long Island has seen heavier rainfall events in recent years which are overwhelming the stormwater system, causing flooding and a higher than normal water table.
- Backflow occurs in the storm drain on Laurelton and West Bay Drive, causing flooding during high tide events.

5.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable in the identified hazard area. For the flood hazard, the hazard areas include the 1-percent and 0.2-percent annual chance flood zones, Category 1-4 Sea-Lake Overland Surge from Hurricane (SLOSH), and sea-level rise scenarios of 1, 2, 3, and 4 feet. The following text evaluates and estimates the potential impact of these hydrologic hazards for the City of Long Beach including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

The flood hazard is a significant concern for the City of Long Beach. As discussed, this includes coastal/tidal/sea level rise and urban/stormwater flooding. In addition, coastal erosion is a significant coastal hazard to the city as well. To assess flood vulnerability, exposure to the 1- and 0.2-percent annual chance flood events was examined using the FEMA FIRM released in September 2009. Potential losses were also calculated for 1-percent annual chance flood event. The flood hazard exposure and loss estimate analysis is presented below.

For the City of Long Beach, storm surge from coastal storm events is a major concern. Storm surge along the oceanfront and Reynolds Channel may cause erosion and damage to the city's infrastructure and buildings. The SLOSH hazard exposure and loss estimate analysis is presented below.

Lastly, sea level rise was evaluated. Based on review of available sea level rise scenarios from NOAA and NYSERDA, four sea level rise scenarios (1, 2, 3, and 4 feet) were evaluated to estimate short term through long term sea level rise exposure to the city.



Data and Methodology

The 1- and 0.2-percent annual chance flood events were examined to evaluate the city's risk to the flood hazard. These flood events are generally those considered by planners and evaluated under federal programs such as the NFIP. The FEMA FIRMs released in September 2009 were used to evaluate the city's exposure to this hazard. The data used for this analysis is shown in Figure 5-21.

To estimate potential losses, the FEMA Hazards U.S. Multi-Hazard (HAZUS-MH) flood model was used. The default building inventory in HAZUS-MH 4.2 was updated and replaced with a custom building inventory developed for the City of Long Beach. The most current city-provided parcel and building footprint shapefiles that were joined to current tax assessor data for Nassau County. The attributes from these files were aligned with HAZUS-MH's Comprehensive Data Management System's required building stock fields. Where data was not available, reasonable assumptions were made. The user-defined table in HAZUS-MH was updated and a building-specific analysis was conducted. The 1-percent annual chance depth grid generated using the FEMA FIRM data for the City of Long Beach project area, which was integrated into the HAZUS-MH flood model and then run to estimate potential losses at the structure level using the HAZUS-MH default damage functions.

The National Hurricane Center's SLOSH model, which represents potential flooding from worst-case combinations of hurricane direction, forward speed, landfall point, and high astronomical tide was used to estimate exposure. The model forecasts surges that occur from wind and pressure forces of hurricanes, considers only storm surge height and does not consider the effects of waves. The FEMA Coastal Flood Loss Atlas storm surge inundation depth grids generated in GIS format from SLOSH Maximum of Maximums (MOMs) outputs per hurricane category were integrated into the HAZUS-MH flood model to estimate losses. Figure 5-8 through Figure 5-11 illustrate the data used for this analysis.

To assess the city's vulnerability to sea level rise, a spatial analysis was conducted using a variety of sea level rise possibilities which reasonably exist by 2100. 1 foot, 2 feet, 3 feet, and 4 feet sea level rise scenarios were selected to account for the full range of potential impacts. Figure 5-14 through Figure 5-17 illustrate the data used for this analysis. There are no depth grids associated with these scenarios, so estimated losses were not calculated in HAZUS-MH. As nearly all of the City of Long Beach is located in the 1% floodplain, it can safely be assumed that even minor amounts of sea level rise would result in 100% of the city being included in the Special Flood Hazard Area.

Figure 5-22 illustrates the flood hazard vulnerable critical facilities in the City of Long Beach.



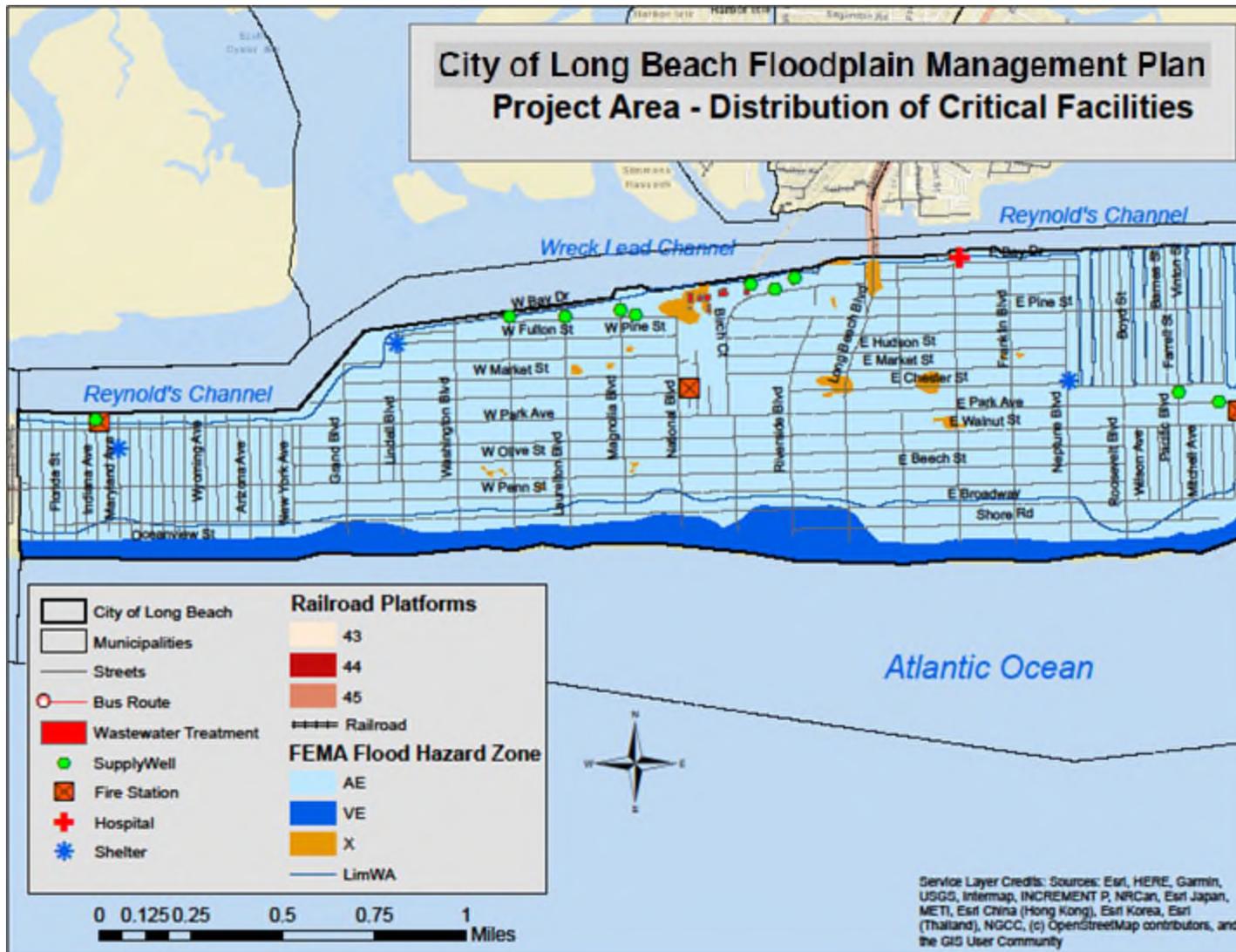
Figure 5-21. FEMA Flood Hazard Vulnerability to the City of Long Beach



Source: NY GIS 2014, City of Long Beach 2019, Homeland Infrastructure Foundation-Level Data 2019, FEMA 2018



Figure 5-22. Critical Facilities in Long Beach



Source: NYS GIS 2014, NYS CSCIC 2008, Long Beach 2019, Homeland Infrastructure Foundation-Level Data 2019





Natural and Beneficial Floodplain Areas

Although typically associated as a hazard area, floodplains also serve beneficial and natural functions (on ecological/environmental, social, and economic levels). Disruption of these natural systems can have long-term consequences on entire regions; however, this potential impact has only recently been noted. Some of the more well-known water-related functions for floodplains include:

- Natural flood and erosion control
 - Provide flood storage and conveyance
 - Reduce flood velocities
 - Reduce flood peaks
 - Reduce sedimentation
- Surface water quality maintenance
 - Filter nutrients and impurities from runoff
 - Process organic wastes
 - Moderate temperatures of water
- Groundwater recharge
 - Promote infiltration and aquifer recharge
 - Reduce frequency and duration of low surface flows (FEMA 1997)

Areas in the floodplain that typically provide these natural functions are wetlands, riparian areas, sensitive areas, and habitats for rare and endangered species. In the City of Long Beach, floodplain areas with natural functions are located along the oceanfront on the beach and dune system.

Warning and Evacuation

The city’s Emergency Operations Plan is currently used assist the community in ensuring timely identification of impending flood threats and disseminating warnings to appropriate floodplain occupants in addition to coordinating flood response activities to reduce the threat to life and property. Further information may be obtained from the City of Long Beach Office of Emergency Management.

Impact on Life, Health and Safety

The impact of the hydrologic hazards on life, health, and safety is dependent upon several factors including the severity of the event and whether or not adequate warning time is provided to residents. Exposure represents the population living in or near the hazard areas that could be impacted should an event occur. Additionally, exposure should not be limited to only those who reside in a defined hazard zone, but everyone who may be affected by the cascading impacts of a hazard event (e.g., people are at risk while traveling in flooded areas, or their access to emergency services is compromised during an event).

Cascading impacts may also include exposure to pathogens such as mold. As a result of repetitive flooding, mold has the potential to develop endangering the health of residents, especially those with already compromised immune systems (e.g., people with HIV infection, cancer patients receiving chemotherapy, and individuals who have received an organ transplant) along with other vulnerable populations, including infants, children, the elderly, and pregnant women. The degree of that impact will vary and is not strictly measurable. Molds can grow in as short a period as 24-48 hours in wet and dam areas of buildings that have not been cleaned after flooding. Very small mold spores can easily be inhaled, creating the potential for allergic reactions, asthma episodes, and other respiratory problems. Buildings should be properly cleaned and dried out to safely prevent mold growth (Centers for Disease Control and Prevention [CDC], 2019).



Molds and mildews are not the only public health risk associated with flooding. Floodwaters can be contaminated by pollutants such as sewage, human and animal feces, pesticides, fertilizers, oil, asbestos, and rusting building materials. Common public health risks associated with flood events also include:

- Unsafe food
- Contaminated drinking and washing water and poor sanitation
- Mosquitos and animals
- Carbon monoxide poisoning
- Secondary hazards associated with re-entering/cleaning flooded structures
- Mental stress and fatigue

Current loss estimation models such as HAZUS are not equipped to measure public health impacts. The best level of mitigation for these impacts is to be aware that they can occur, educate the public on prevention, and be prepared to deal with these vulnerabilities in responding to flood events.

To estimate the population exposed to the hazard areas, the 1- and 0.2-percent floodplain boundaries, SLOSH zones, and sea-level rise scenarios were overlaid upon the American Community Survey 2013-2017 population data in GIS (U.S. Census 2017). The 2017 Census tract data was referenced to assign average number of persons per household based upon the number of residential properties identified within that tract (e.g., 1000 persons in total population for census tract #XXX, 500 residential properties in census tract #XXX = 1000 persons / 500 residential properties = 2 persons per household). Next, the analyst overlaid the hazard areas over the building stock to extract out the number of residential household building footprints that intersect the hazard area in each census tract. Then, the average persons per household for each census tract was multiplied against the number of exposed residential building footprints to calculate the estimated population exposed. The total population of the City of Long Beach is 75,075 (U.S. Census 2010).

The calculation of the 0.2-percent annual chance flood event results is cumulative in nature, as the population exposed to the 1-percent flood event will also be exposed to the 0.2-percent annual chance flood event. The SLOSH and sea-level rise analyses for the exposure of population, general building stock, and critical facilities are also cumulative in nature. For example, if residential households are located within the Category 1 SLOSH zone, they are also located within the Category 2 SLOSH zone. The assumption is that if residential households are affected by a Category 1 storm, they would also be affected by a Category 2, 3, or 4 storm event.

Using this approach, it is estimated that 33,498 people are located in the 1-percent annual chance event and 33,657 people are exposed to the 0.2-percent annual chance flood event. It is estimated that 22,319 people are located in the Category 1 SLOSH zone, 33,643 people are located in the Category 2 SLOSH zone, 33,643 people are located in the Category 3 SLOSH zone, and 33,643 people are located in the Category 4 SLOSH zone. There are an estimated 15 people who are located in the 1 foot sea-level rise scenario delineated area, 94 people who are located in the 2 feet sea level rise scenario, 2,549 people who are located in the 3 feet sea level rise scenario, and 7,781 people who are located in the 4 feet sea level rise scenario area. Refer to Table 5-7 and Figure 5-21 through Figure 5-31 for the results by hazard.

Table 5-7. Estimated ACS 2013-2017 Population Exposure to All Hazard Areas

Hazard	Total Number Exposed	% of Total
1-percent Annual Chance Flood Event	33,498	99.53%
0.2% Annual Chance Flood Event	33,657	100%
SLOSH Category 1	22,319	66.31%



Hazard	Total Number Exposed	% of Total
SLOSH Category 2	33,643	99.96%
SLOSH Category 3	33,643	99.96%
SLOSH Category 4	33,643	99.96%
1 foot, Sea Level Rise	15	0.05%
2 feet, Sea Level Rise	94	0.28%
3 feet, Sea Level Rise	2,549	7.57%
4 feet, Sea Level Rise	7,781	23.12%

Source: NYS ITS GIS 2017, NYS 2018, NOAA NHC 2016, NOAA 2018, U.S. Census 2017
 Note: % - Percent

Table 5-8. Estimated Population Over 65 and Low-Income Population Exposure to All Hazard Areas

Hazard	Total Elderly Population	Total Number Exposed	% of Total	Total Low-Income Population	Total Number Exposed	% of Total
1-percent Annual Chance Flood Event	6,025	6,025	100%	5,010	5,010	100%
0.2% Annual Chance Flood Event	6,025	6,025	100%	5,010	5,010	100%
SLOSH Category 1	6,025	6,025	100%	5,010	4,715	94%
SLOSH Category 2	6,025	6,025	100%	5,010	5,010	100%
SLOSH Category 3	6,025	6,025	100%	5,010	5,010	100%
SLOSH Category 4	6,025	6,025	100%	5,010	5,010	100%
1 foot, Sea Level Rise	6,025	2,923	49%	5,010	1,435	29%
2 feet, Sea Level Rise	6,025	3,881	64%	5,010	1,510	30%
3 feet, Sea Level Rise	6,025	3,881	64%	5,010	2,100	42%
4 feet, Sea Level Rise	6,025	4,421	73%	5,010	2,745	55%

Source: NYS ITS GIS 2017, NYS 2018, NHC 2016, FEMA 2018, NOAA 2018, U.S. Census 2017
 Note: % - Percent

Of the population exposed, the most vulnerable include the economically disadvantaged and the population over the age of 65. Economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions to evacuate based on the net economic impact to their family. The population over the age of 65 is also more vulnerable because they are more likely to seek or need medical attention which may not be available to due isolation during a flood event and they may have more difficulty evacuating. Special consideration should be taken when planning for disaster preparation, response, and recovery for these vulnerable groups.

Review of mapping of the 1-percent annual chance flood event and SLOSH model mapping for Category 1-4 storms shows that even in the most minor of the flooding conditions (SLOSH Category 1), the majority of the City of Long Beach is flooded. This includes all evacuation routes from the city. As Long Beach is a barrier island community and is also prone to dangerous overwash and wave damage during large coastal storms, evacuations of the entire City are likely to be ordered under each flooding scenario, resulting in the need for short-term sheltering, outside of municipal boundaries.

The total number of injuries and casualties resulting from flooding is generally limited based on advance weather forecasting, blockades and warnings. Therefore, injuries and deaths generally are not anticipated if proper warning and precautions are in place. Ongoing mitigation efforts should help to avoid the most likely cause of injury, which results from persons trying to cross flooded roadways or channels during a flood.



Impact on General Building Stock

After considering the population exposed and potentially vulnerable to the hazard areas, the built environment was evaluated. Exposure includes those buildings located in the hazard areas. Potential damage is the modeled loss that could occur to the exposed inventory, including structural and content value.

Overall, there are a total of 7,081 structures in the city with a total replacement cost value of greater than \$1.9 billion. To provide a general estimate of the building value exposed to the flood hazards, the 1- and 0.2-percent floodplain boundaries, SLOSH zones, and sea-level rise scenarios were overlaid upon the city’s updated building stock inventory at the structure level. Building footprints that intersected the hazard areas were totaled. Table 5-9 and Table 5-10 and Figure 5-23 through Figure 5-31 summarize these results.

Table 5-9. General Flood Exposure in the City of Long Beach

Hazard	Number of Structures Exposed	% of Total	Total RCV Exposed	% of Total
1-percent Annual Chance Flood Event	7,047	99.52%	\$1,915,363,898.89	99.55%
0.2% Annual Chance Flood Event	7,081	100%	\$1,923,941,315.08	100%
SLOSH Category 1	5,480	77.39%	\$1,381,484,144.23	71.80%
SLOSH Category 2	7,076	99.93%	\$1,922,883,535.97	99.95%
SLOSH Category 3	7,076	99.93%	\$1,922,883,535.97	99.95%
SLOSH Category 4	7,076	99.93%	\$1,922,883,535.97	99.95%
1 foot, Sea Level Rise	7	0.10%	\$3,029,678.59	0.16%
2 feet, Sea Level Rise	33	0.47%	\$8,446,481.44	0.44%
3 feet, Sea Level Rise	819	11.57%	\$204,199,485.40	10.61%
4 feet, Sea Level Rise	2,319	32.61%	\$545,171,044.83	28.34%

Source: NYS ITS GIS 2017, NYS 2018, NHC 2016, NOAA 2018, FEMA 2018, U.S. Census 2017

Note: % - Percent

RCV – Replacement Cost Value

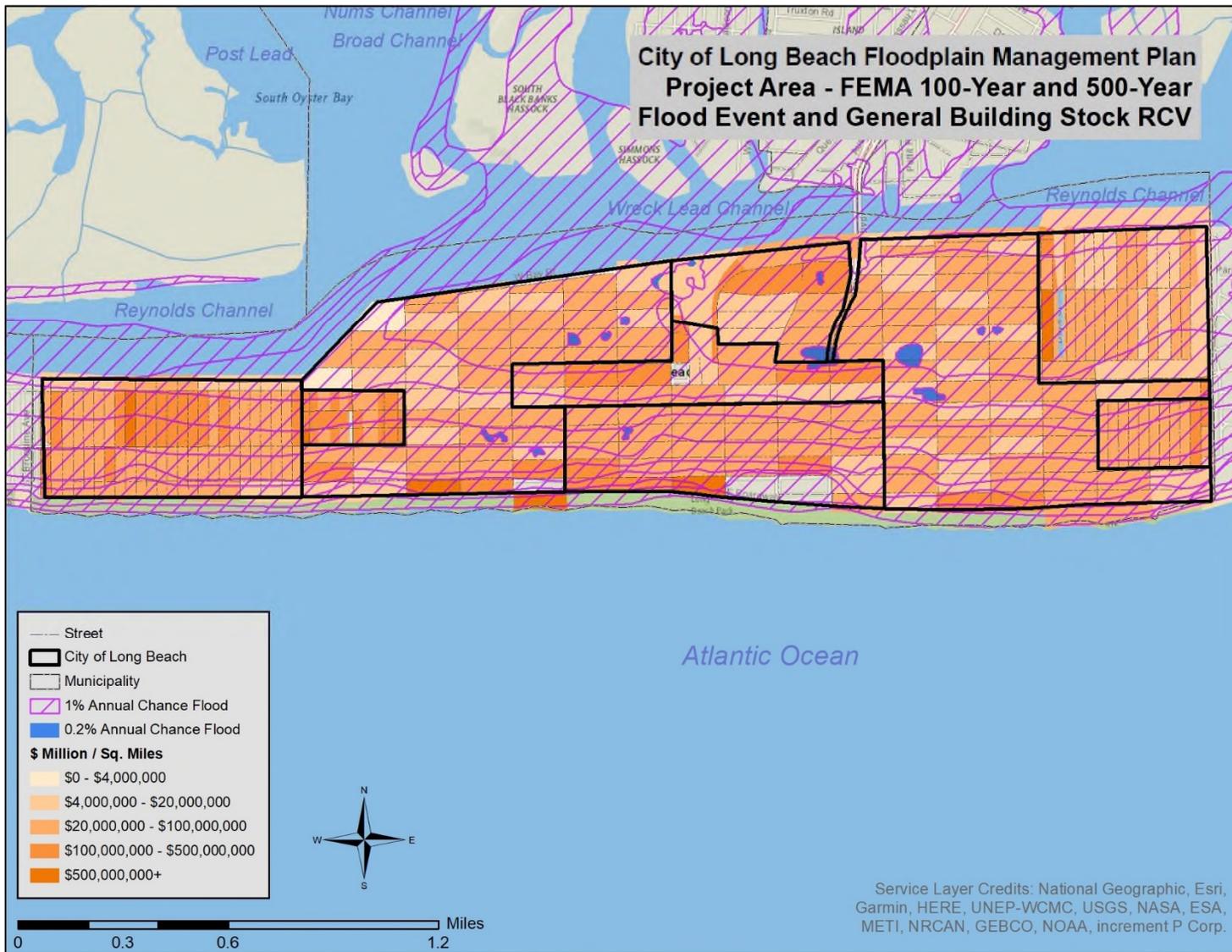
Table 5-10. Flood Exposure by Structure Type in the City of Long Beach

Hazard	Number of Residential Structures	Number of Commercial Structures	Number of Industrial Structures	Number of Education Structures	Number of Religion/ Non-Profit Structures
1-percent Annual Chance Flood Event	6,794	188	6	14	45
0.2% Annual Chance Flood Event	6,826	189	7	14	45
SLOSH Category 1	5,290	159	6	7	18
SLOSH Category 2	6,821	189	7	14	45
SLOSH Category 3	6,821	189	7	14	45
SLOSH Category 4	6,821	189	7	14	45
1 foot, Sea Level Rise	6	0	0	1	0
2 feet, Sea Level Rise	32	0	0	1	0
3 feet, Sea Level Rise	804	14	0	2	1
4 feet, Sea Level Rise	2,238	61	1	3	4

Source: NYS ITS GIS 2017, NYS 2018, NHC 2016, NOAA 2018, FEMA 2018, U.S. Census 2017



Figure 5-23. Estimated General Building Stock Exposure to Flood Hazard Areas

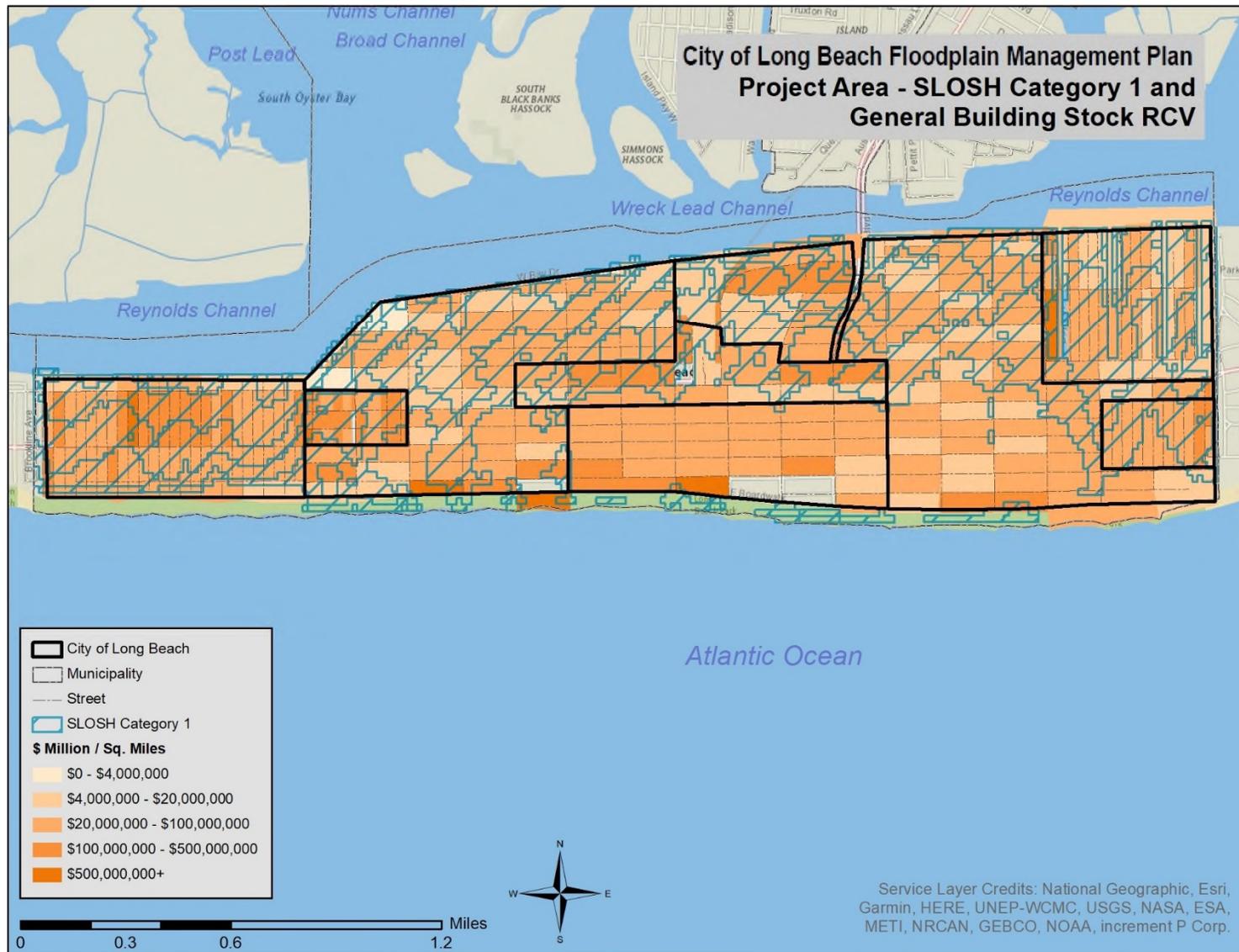


Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018





Figure 5-24. Estimated General Building Stock Exposure to SLOSH Category 1 Hazard Areas

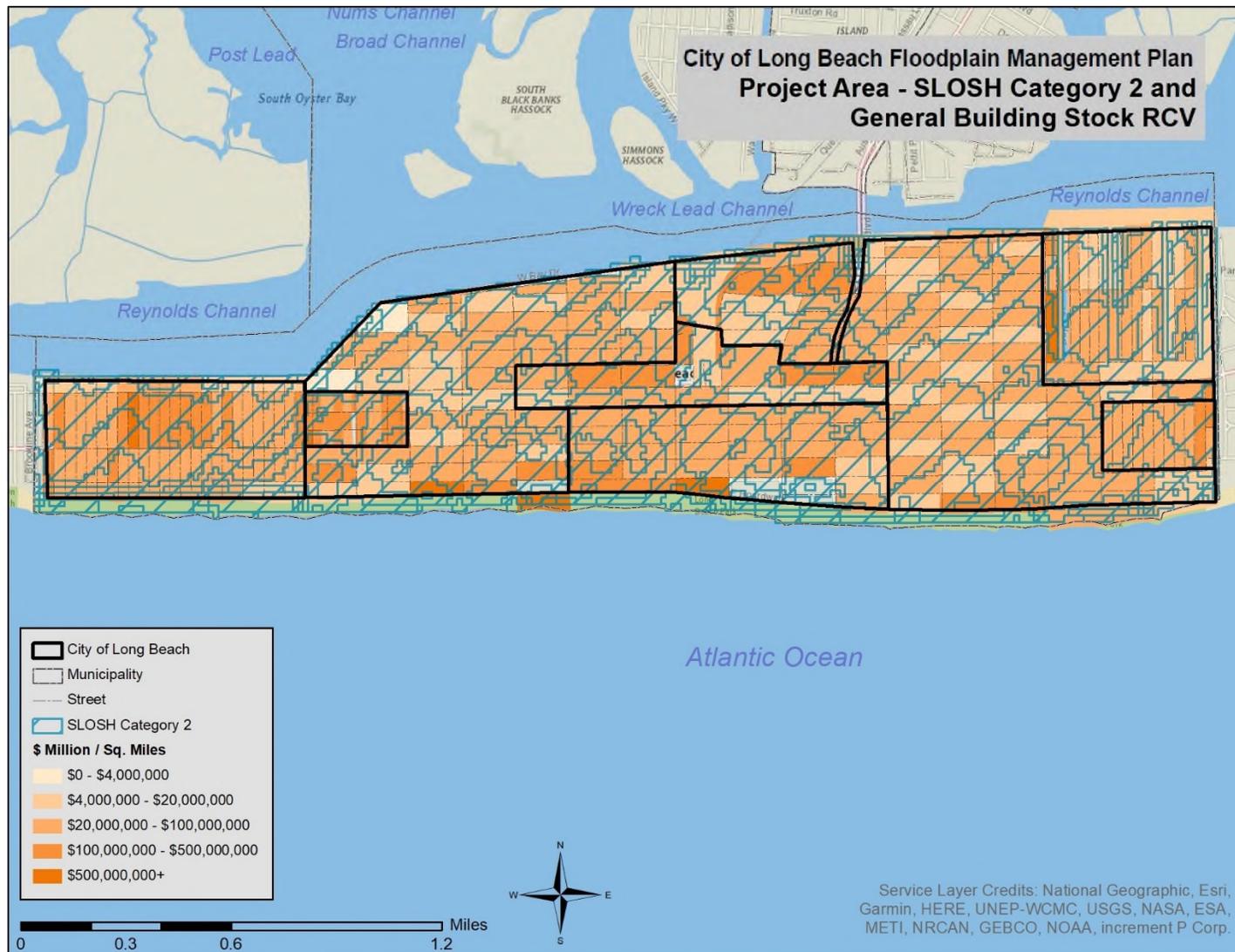


Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018





Figure 5-25. Estimated General Building Stock Exposure to SLOSH Category 2 Hazard Areas

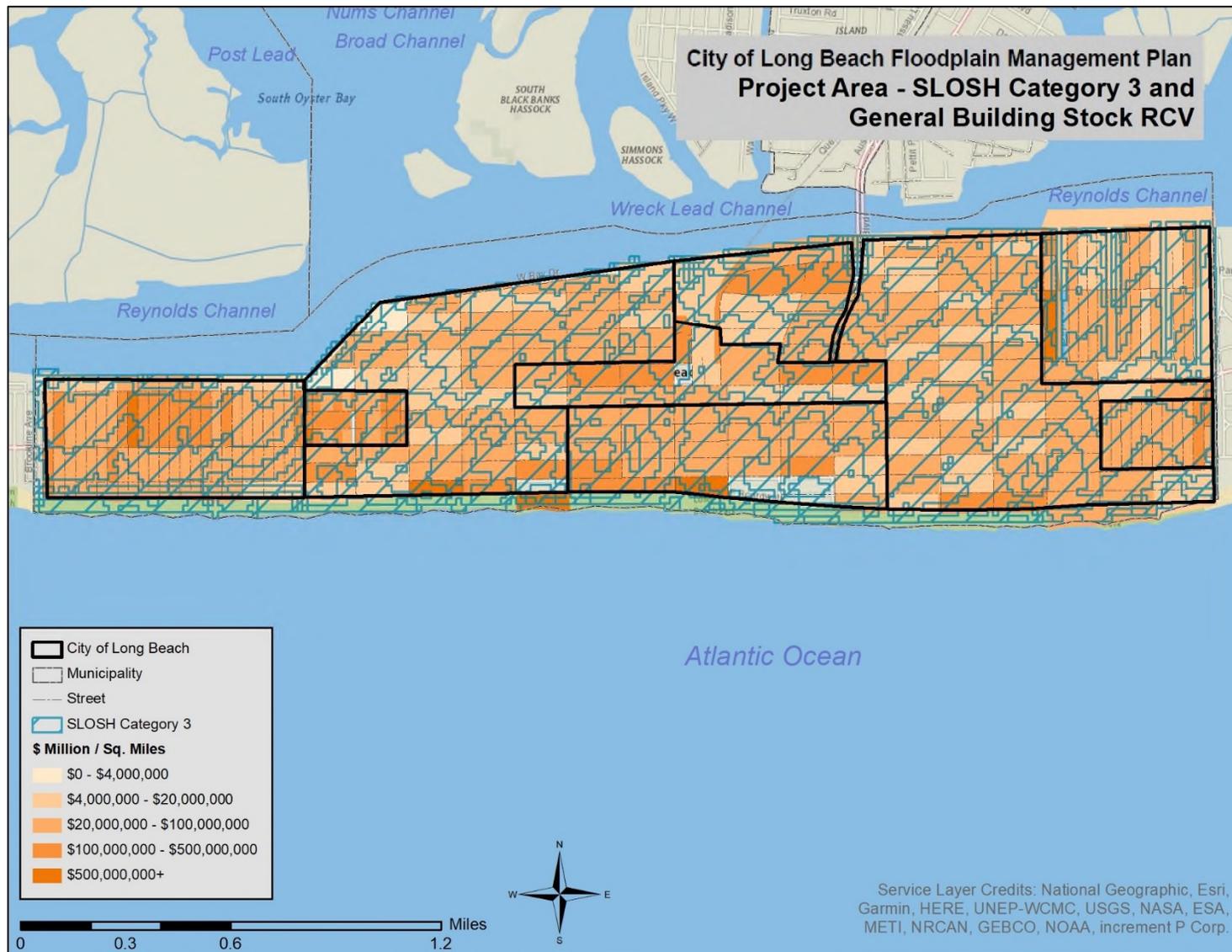


Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018





Figure 5-26. Estimated General Building Stock Exposure to SLOSH Category 3 Hazard Areas

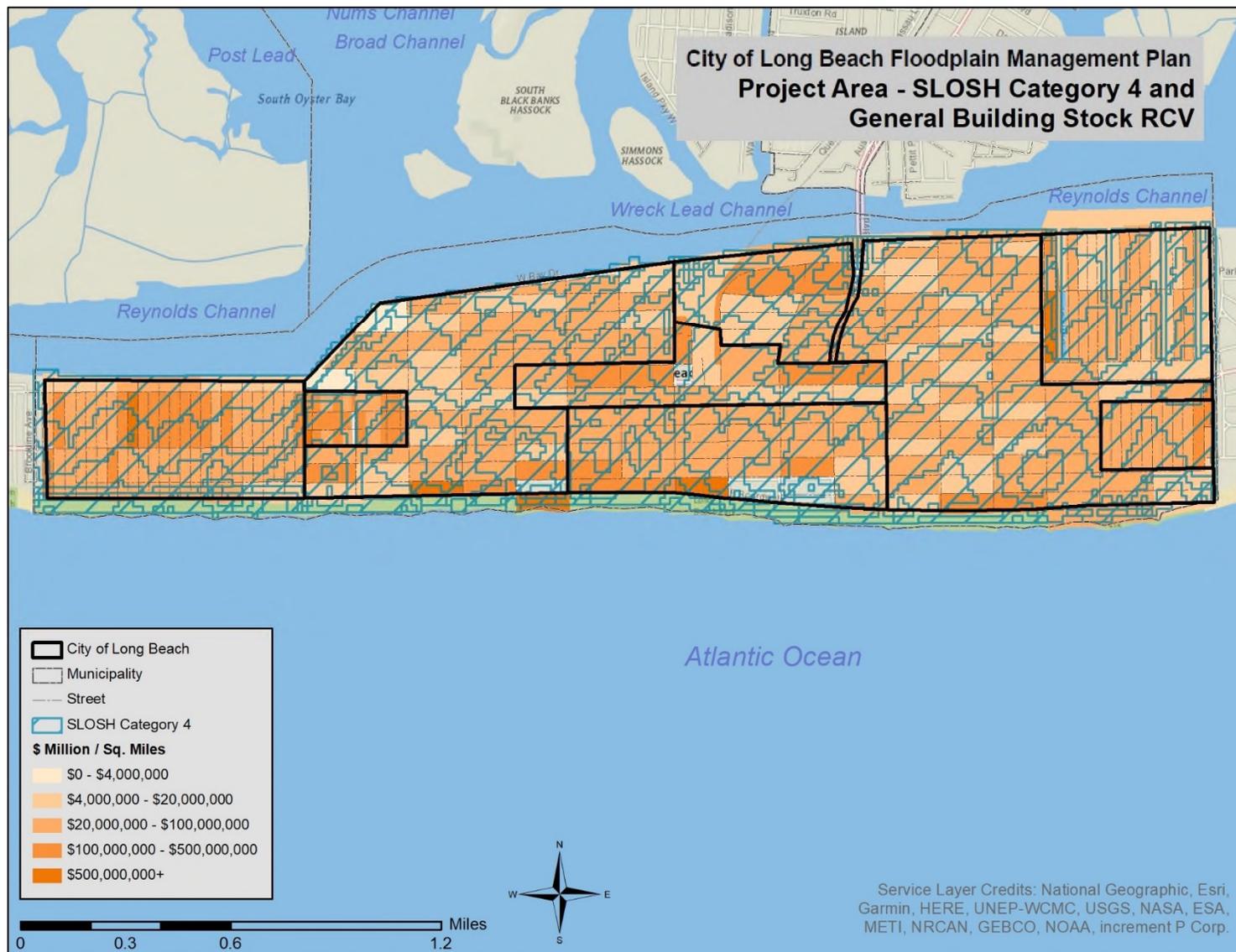


Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018





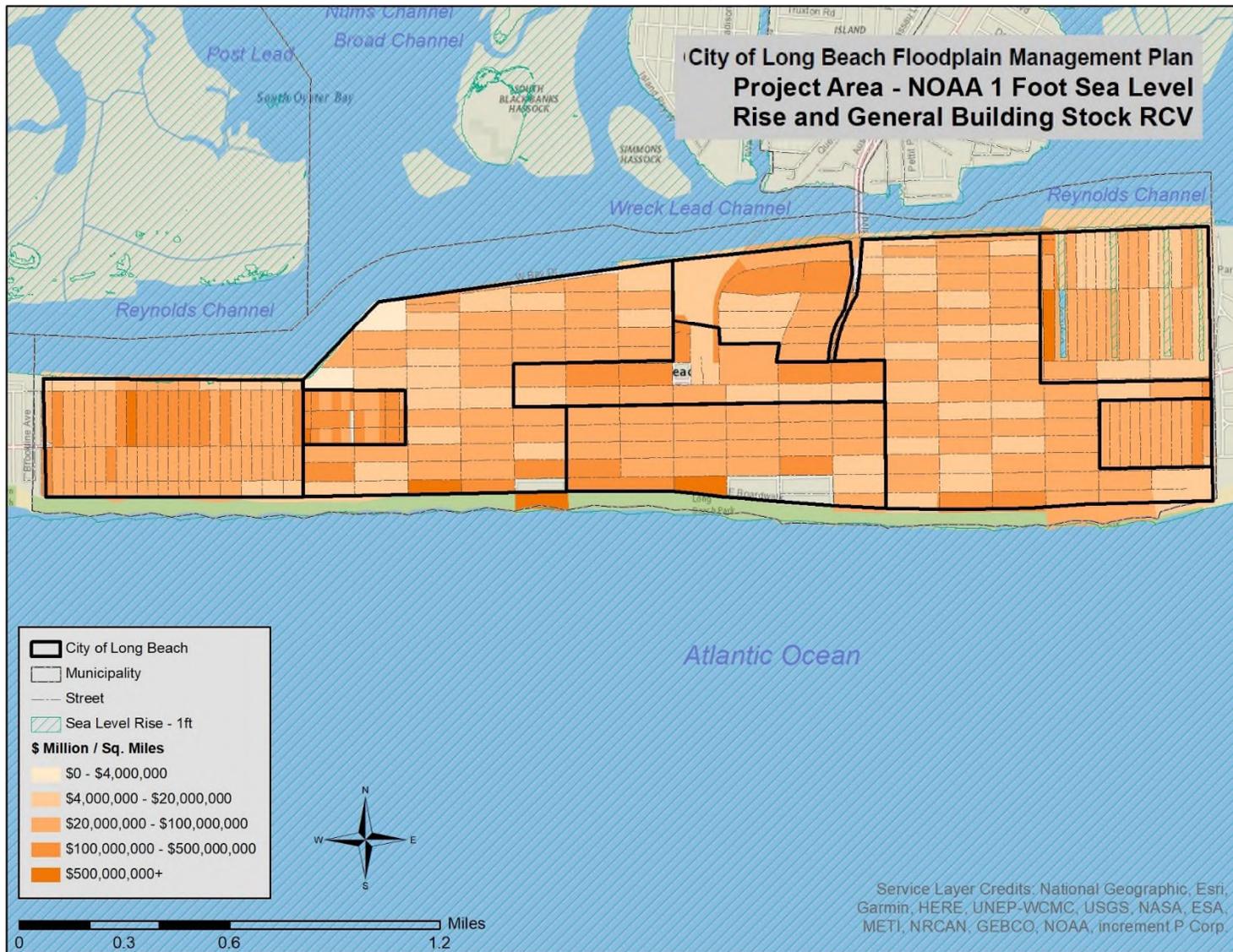
Figure 5-27. Estimated General Building Stock Exposure to SLOSH Category 4 Hazard Areas



Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018



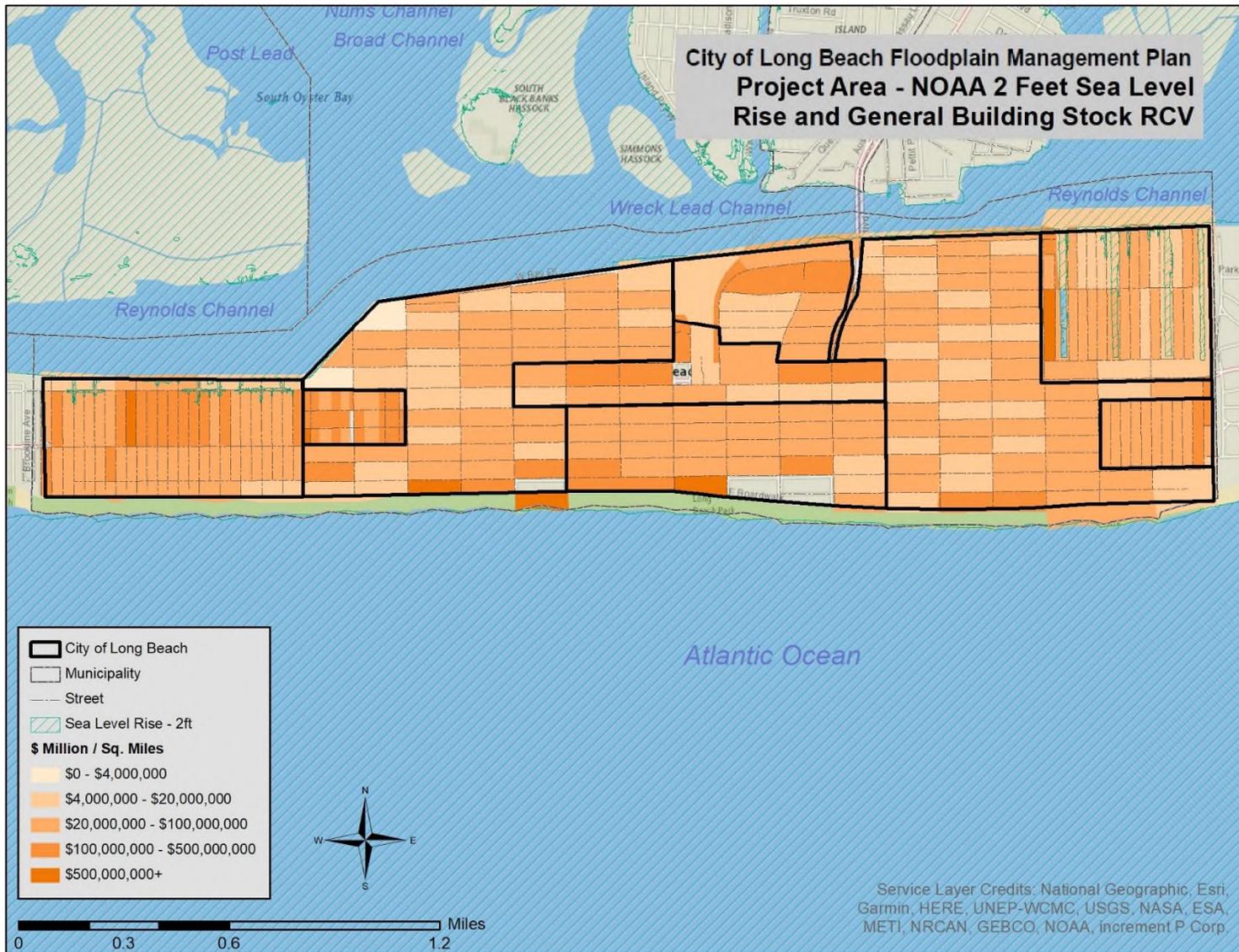
Figure 5-28. Estimated General Building Stock Exposure to One Foot Sea-Level Rise Hazard Area



Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018



Figure 5-29. Estimated General Building Stock Exposure to Two Feet Sea-Level Rise Hazard Area

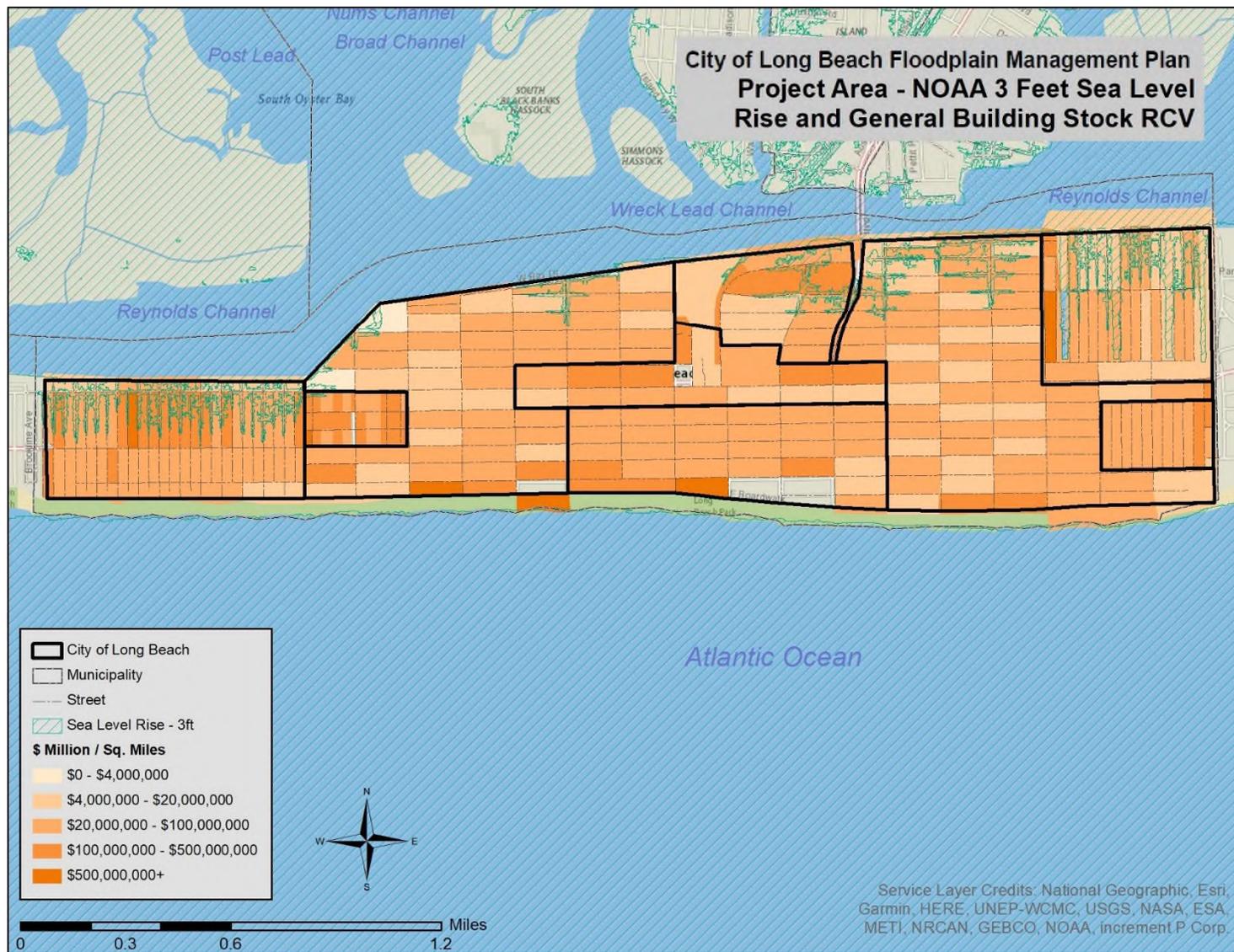


Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018





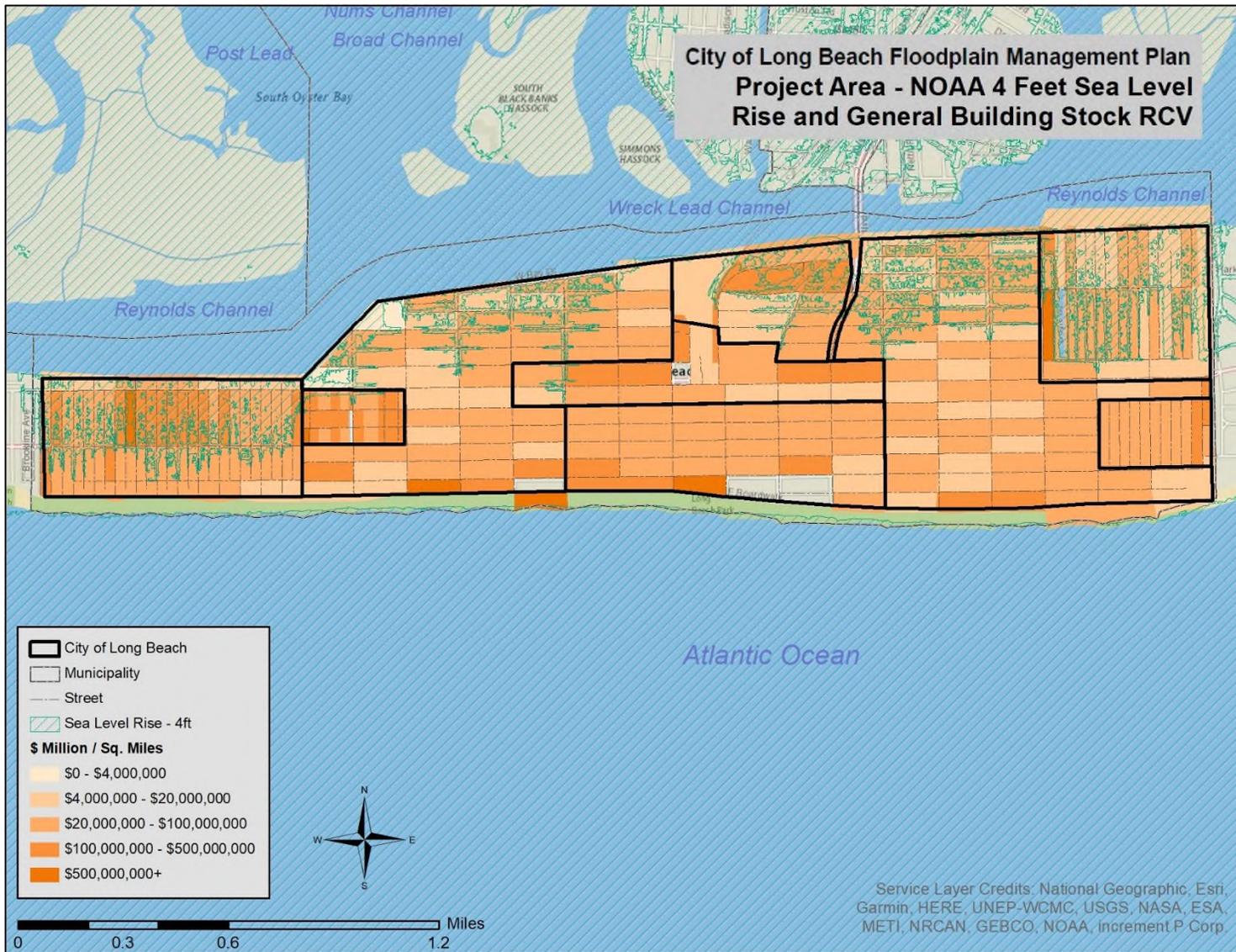
Figure 5-30. Estimated General Building Stock Exposure to Three Feet Sea-Level Rise Hazard Areas



Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018



Figure 5-31. Estimated General Building Stock Exposure to Four Feet Sea-Level Rise Hazard Areas



Sources: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018



The HAZUS-MH model estimated potential damages to the buildings in the City of Long Beach at the structure level using the custom structure inventory developed for this plan. The potential damage estimated by HAZUS-MH to the general building stock inventory associated with the 1-percent annual chance flood is approximately \$1.1 billion or 35.48-percent of the total building stock replacement cost value. HAZUS-MH also estimated 16.31-percent, 78.04-percent, 83.61-percent, and 86.76-percent of the city’s total building stock replacement cost value for the Category 1, Category 2, Category 3, and Category 4 inundation areas, respectively.

Table 5-11. Estimated General Building Stock Potential Loss to the 1-percent Annual Chance Flood Event

Occupancy Type	Total Replacement Cost Value	1-percent Annual Chance Event			
		Total Estimated Loss	Estimated Building Loss	Estimated Contents Loss	% of Total RCV
All Occupancies	\$3,143,669,439.50	\$1,115,424,691.62	\$673,253,869.64	\$442,170,821.98	35.48%
Residential	\$2,251,366,381.99	\$968,643,234.69	\$638,596,757.55	\$330,046,477.14	43.02%
Commercial	\$579,393,149.86	\$81,331,105.79	\$23,274,974.84	\$58,056,130.95	14.04%
Industrial	\$115,607,207.22	\$13,156,521.51	\$3,771,926.93	\$9,384,594.58	11.38%
Religious/non-profit	\$111,968,356.45	\$33,142,313.48	\$4,652,329.93	\$28,489,983.55	29.60%
Education	\$85,334,343.98	\$19,151,516.15	\$2,957,880.39	\$16,193,635.76	22.44%

Source: HAZUS-MH 4.2
 Note: % - Percent

Table 5-12. Estimated General Building Stock Exposed to the SLOSH Hazard for All Occupancy Classes

Hazard Area	Total Replacement Cost Value	Estimated Loss	Estimated Building Loss	Estimated Contents Loss	% of Total
SLOSH Category 1	\$3,143,669,439.50	\$512,627,115.54	\$307,510,347.98	\$205,116,767.56	16.31%
SLOSH Category 2	\$3,143,669,439.50	\$2,453,209,507.95	\$1,421,423,283.52	\$1,031,786,224.43	78.04%
SLOSH Category 3	\$3,143,669,439.50	\$2,628,517,075.43	\$1,525,865,655.11	\$1,102,651,420.32	83.61%
SLOSH Category 4	\$3,143,669,439.50	\$2,727,476,055.79	\$1,611,604,219.27	\$1,115,871,836.52	86.76%

Source: HAZUS-MH 4.2
 Note: % - Percent

NFIP Policy, Claim and Repetitive Loss Statistics

In addition to total building stock modeling, individual data available on flood policies, claims, Repetitive Loss (RL) properties and severe RL (SRL) properties were analyzed. FEMA Region 2 provided a list of properties with NFIP policies, past claims and multiple claims (RL and SRLs). According to the metadata provided: “The (sic National Flood Insurance Program) NFIP Repetitive Loss File contains losses reported from individuals who have flood insurance through the Federal Government. A property is considered a repetitive loss property when there are two or more losses reported which were paid more than \$1,000 for each loss. The two losses must be within 10 years of each other & be as least 10 days apart. Only losses from (sic since) 1/1/1978 that are closed are considered.”



SRLs were then examined for the City of Long Beach. According to section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a, an SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- Has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.
- For both of the above, at least two of the referenced claims must have occurred within any 10- year period, and must be greater than 10 days apart.

Table 5-13 summarizes the NFIP policies, claims and repetitive loss statistics for City of Long Beach. Due to FEMA’s ongoing data migration, specific property information for repetitive loss structures was unavailable for this plan.

Table 5-13. NFIP Policies, Claims and Repetitive Loss Statistics

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Policies Rated in the 1-percent Flood Boundary (3)
City of Long Beach	7,852	7,610	\$423,199,864	987	4,625

Source: FEMA Region 2, 2019, ISO 2019

(1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA Region 2, and are current as of 9/30/2019. Please note the total number of repetitive loss properties includes the severe repetitive loss properties. Severe Repetitive Loss property information was unavailable from FEMA due to ongoing data migration. The number of claims represents claims closed by 9/30/2019.

(2) Total building and content losses from the claims file provided by FEMA Region 2.

(3) The policies inside and outside of the flood zones is based on the flood insurance rating data provided by ISO.

Notes: FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Repetitive Loss Area Analysis (RLAA)

A repetitive loss area analysis was performed to enhance the information in this plan to support targeted outreach and more effective floodplain management for the community. The repetitive loss area includes both repetitive loss properties, as determined by FEMA, and properties that may undergo repetitive flood damage but are not technically considered repetitive loss properties by the NFIP. Properties that may undergo repetitive flood damage but are not classified as NFIP RLs or SRLs can occur for a variety of reasons, including the following:

- Property owners may not have flood insurance. Only properties within the floodplain and with a federally-backed mortgage are required to carry flood insurance.
- Owners of a flooded property may choose not to file a claim, even if the owner has flood insurance.
- The flood damage may not meet the minimum \$1,000 threshold necessary for repetitive loss, but the property may still undergo recurring flood damage.

In the City of Long Beach, there are 987 repetitive loss properties as of September 2019. These repetitive loss properties are located in the SFHA. The cause of repetitive flooding at these properties is commensurate with the flood risk reflected on the current FIRM for the community. In many cases there may be multiple causes of flooding as homes in the floodplain also experience stormwater flooding caused by inadequate flow with respect





to issues related to local topography and drainage issues related to the low relative elevation of outfalls with respect to water surface elevations at high tide. The city has identified one repetitive loss area, designated by the municipal boundaries of the City of Long Beach and includes the entirety of the city’s 7,081 structures based on the methodology detailed below.

RLAA Methodology

Rationale

Nearly all of the City of Long Beach is located in the SFHA and areas that are not in the SFHA have minor differences in elevation that keep them above the SFHA. 7,852 structures in the city have NFIP flood insurance. As of September 30, 2019, the city has 7,610 closed paid losses, totaling \$423,199,864. There have been 1,169 substantial damage closed paid losses. The City has 411 minus rated properties (those properties that are rated with the lowest floor one foot or more below the base flood elevation).

As past flood damages have been dispersed throughout the city and the floodplain includes virtually all of the city’s structures, it was determined that the entire municipal boundary of the City of Long Beach would be designated as a repetitive loss area.

Impact on Critical Facilities

An exposure analysis of critical facilities was completed by overlaying hazard zones to shapefile points of the critical facilities.

Table 5-14. Number of Critical Facilities Located in the Hazard Areas

Facility Type	Hazard									
	1-percent Annual Chance Event	0.2% Annual Chance Event	SLOSH Category 1	SLOSH Category 2	SLOSH Category 3	SLOSH Category 4	1 foot sea level rise	2 feet sea level rise	3 feet sea level rise	4 feet sea level rise
Fire Station	3	3	3	3	3	3	0	0	0	0
Hospital	1	1	1	1	1	1	0	0	0	1
Shelter	3	3	3	3	3	3	0	0	1	2
Wastewater Treatment Facility	13	13	8	11	11	11	0	0	2	5
Water Supply Well	10	10	10	10	10	10	0	0	1	4
Total	30	30	25	28	28	28	0	0	4	12

Source: NYS ITS GIS 2017, NYS 2018, FEMA 2018, U.S. Census 2017, NYS GIS Program Office 2014, City of Long Beach 2019, NYS 2018, NHC 2016

Notes: Cumulative analysis conducted.

Impact on the Economy

For impact on economy, estimated losses from a flood event are considered. Losses include but are not limited to general building stock damages, business interruption, impacts to tourism and tax base to the city. Estimated damages to the general building stock can be quantified using HAZUS-MH as discussed above. Other economic components such as loss of facility use, functional downtime and social economic factors are less measurable with a high degree of certainty.





Flooding can cause extensive damage to public utilities and disruptions to the delivery of services. Loss of power and communications may occur; and drinking water and wastewater treatment facilities may be temporarily out of operation. As indicated in Table 5-14, 30 facilities are located in the 1-percent annual chance flood hazard area. There are 25 facilities located in the Category 1 SLOSH inundation area, 28 facilities in the Category 2 SLOSH inundation area. No additional facilities are located in the Category 3 and Category 4 SLOSH inundation areas. All of the inundation areas are cumulative in nature.

In terms of sea level rise, there are no facilities located in the one foot or two feet sea-level rise scenario inundation areas, four (4) additional facilities exposed to the three feet sea-level rise scenario inundation area, and 12 facilities exposed to the four feet sea-level rise scenario inundation area. In addition to critical facility potential damages and loss of function, flooded streets and roadblocks make it difficult for emergency vehicles to respond to calls for service. Floodwaters can wash out sections of roadway and bridges. In addition to travel along the roadways, public transit will be greatly impacted, causing problems for emergency responders.

Direct building losses are the estimated costs to repair or replace the damage caused to the building. Refer to the ‘Impact on General Building Stock’ subsection which discusses these potential losses. These dollar value losses to the city’s total building inventory replacement value, in addition to damages to roadways and infrastructure, would greatly impact the local economy.

HAZUS-MH estimates the amount of debris generated from the 1-percent annual chance flood event. The model breaks down debris into three categories: 1) finishes (dry wall, insulation, etc.); 2) structural (wood, brick, etc.) and 3) foundations (concrete slab and block, rebar, etc.). The distinction is made because of the different types of equipment needed to handle the debris. The HAZUS-MH Flood Model focuses on building-related debris and does not estimate debris generated for building contents such as household appliances (e.g., ovens or refrigerators), electronics and other personal items, or environmental (trees, shrubs, sediment etc.) debris. Table 5-15 summarizes the debris HAZUS-MH 4.2 estimates for these events. As a result of the 1-percent event, HAZUS-MH estimates a total of approximately 45,289.41 tons of debris will be generated. As a result of the Category 1 storm surge scenario, HAZUS-MH estimates approximately 8,458.05 tons of debris. HAZUS-MH also estimates approximately 188,155.65 tons, 422,601.88 tons, and 535,849.49 tons of debris as a result of the Category 2, Category 3, and Category 4 storm surge scenarios, respectively.

Please note this table only represents estimated debris generated by coastal flooding and does not include additional potential damage and debris which may be generated with the presence of wind.

Table 5-15. Estimated Debris Generated from the 1-Percent Flood Event and SLOSH Category 1-4 Scenarios

Hazard	1-percent Flood Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
1-percent Annual Chance Event	45,289.41	25,170.99	12,326.84	7,791.59
SLOSH Category 1	8,458.05	7,997.62	282.20	178.23
SLOSH Category 2	188,155.65	69,524.46	72,595.64	46,035.56
SLOSH Category 3	422,601.88	109,226.10	182,033.71	131,342.07
SLOSH Category 4	535,849.49	123,064.19	237,497.84	175,287.45

Source: HAZUS-MH 4.2

Notes: Losses are ran using HAZUS User Defined Facility Damage Analysis.
Debris Analysis ran using General Building Stock damage analysis.



*24 buildings not analyzed in 1-percent annual chance event based on gaps in depth grid; missing structures are in canals of the project area.
Method for assumed losses of 86 buildings used MAX DAMAGE PERCENT to calculate building and content losses for these structures in SLOSH Categories 2 – 4.
Only 6,995 out of 7,081 buildings can be analyzed for losses based on data gaps in NOAA SLOSH depth grids within the canals of the project area.*

Differences between Flood Management Plan and the Nassau County HMP (2014)

While the 2014 Nassau County Hazard Mitigation Plan (HMP) used the same Census data (2010) and FEMA FIRM data (2009), the plan noted that sufficient data was not available at the time of the study to estimate damages due to flooding for the FEMA Mapped 100-year floodplain. For storm surge and wave action, damages were determined on a county wide level. Damages specific to the City of Long Beach were not presented. Sea level rise was not profiled in the 2014 Nassau County HMP.

Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by the type, frequency and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of extremes such as flood events and hurricanes. While predicting changes of flood events and the prevalence or intensity of hurricanes under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (U.S. Environmental Protection Agency [EPA], 2006).

Future Growth and Development

Any areas of growth could be potentially impacted by the flood hazard if located within the identified hazard areas. It is the intention of the City of Long Beach to discourage development in vulnerable areas or to encourage higher regulatory standards.

Additional Data and Next Steps

A HAZUS-MH flood analysis was conducted for the City of Long Beach using the most current and best available data including updated building and critical facility inventories, and DFIRM. As additional FEMA Risk Mapping, Assessment, and Planning (Risk MAP) products become available, these may be used to further enhance this assessment (e.g. depth grids for additional recurrence intervals). Further, as additional climate change and sea-level rise scenarios and depth grids are generated, these may also be incorporated into HAZUS-MH and potential losses calculated.

Specific mitigation actions addressing improved data collection and further vulnerability analysis is included in Section 6 of this plan.



SECTION 6. MITIGATION STRATEGIES

This section presents mitigation strategies for the City of Long Beach to reduce potential exposure and losses identified as concerns in the risk assessment portion of this plan (Section 5). The Planning Committee reviewed the risk assessment to identify and develop these mitigation actions, which are presented herein.

This section includes:

1. Background and Past Mitigation Accomplishments
2. General Mitigation Planning Approach
3. City Mitigation Goals and Objectives (CRS Step 6)
4. City Capability Assessment
5. Identification, Analysis, and Implementation of Potential Mitigation Actions (CRS Step 7)
6. Proposed Hazard Mitigation Actions (CRS Step 8)

Hazard mitigation reduces the potential impacts of, and costs associated with, emergency and disaster-related events. Mitigation actions address a range of impacts, including impacts on the population, property, the economy, and the environment.

Mitigation actions can include activities such as: revisions to land-use planning, training and education, and structural and nonstructural safety measures.

6.1 BACKGROUND AND PAST MITIGATION ACCOMPLISHMENTS

This section is a discussion regarding past mitigation activities and an overview of past efforts, which is provided as a foundation for understanding the mitigation goals, objectives, and activities outlined in this Floodplain Management Plan (FMP). The city, through previous and ongoing activities, has demonstrated that it is proactive in protecting its physical assets and residents against losses from flooding.

The city has worked to improve flood mitigation and foster resilience efforts throughout the community and plans to continue these efforts through additional infrastructure upgrades and enhancements, updated mitigation planning, and assistance to impacted property owners. Examples of previous and ongoing actions, projects, and capabilities include the following:

- **County Hazard Mitigation Plan (HMP):** The city participates in the development of and has adopted the Nassau County HMP, which includes goals, objectives, policies, and actions focused on reducing the extent, frequency, and impacts of flooding.
- **Flood Insurance:** The city participates in the National Flood Insurance Program (NFIP) and has adopted flood damage prevention regulations.
- **Community Rating System (CRS):** The city participates in the NFIP administered CRS Program to improve floodplain management and reduce flood insurance premiums for policy holders in recognition of community activities that exceed the minimum NFIP requirements.
- **Regulatory Tools:** The city utilizes a number of local ordinances to regulate the use, design, and site planning of development projects, including: Stormwater Management Ordinance, Floodplain Management Ordinance, Permit/Site Plan Review, Zoning Ordinance, Subdivision Ordinance, and Building Code.
- **Climate Smart Communities (CSC):** In September 2019, the City of Long Beach was designated as a CSC by New York State. CSC is a New York State program that helps local governments take action to reduce greenhouse gas emissions and adapt to a changing climate. The city accomplished an array of projects to achieve the designation, such as building a greenhouse gas inventory, upgrading streetlights to more efficient LED technology, adopting rooftop solar on government buildings, conducting a



climate vulnerability assessment, participating in the NFIP’s CRS, hosting climate-related public events, and much more.

- Open Space Preservation: Open space preservation efforts have been underway for many years in the city and have successfully preserved approximately 190 acres including beaches, dunes, and parks.
- Beach Replenishment: Working with the U.S. Army Corps of Engineers (USACE), the city has implemented resilient (i.e., greater than pre-Superstorm Sandy levels) beach replenishment measures, including construction of 15’ high and 70 feet wide dunes and the extension of existing groins for erosion reduction.
- Social Media: The city provides storm and hazard updates via social media.
- Technical Assistance: The City Building Department provides assistance to residents who inquire about regulations, potential mitigation actions, and more.
- Current and Future Projects: The city has also undertaken several recent projects including:
 - Cleaning, repair, and replacement of tideflex valves on outfall pipes and installation of tideflex valves on currently unprotected outfall pipes along Reynolds Channel.
 - Installing and upgrading bulkheading. This includes new public bulkheads connecting existing private bulkheads in the West End from Ohio Avenue and California Street as well as one street end on Lindell Boulevard, a bulkhead extending from Washington Boulevard to Magnolia Boulevard, and two bulkheads along the eastern border of the two western canals.
 - A stormwater pump station on Tennessee Avenue. The pump station will include a back-up diesel generator to ensure continuity of operations.
 - Establishment of a state-of-the-art Emergency Operations Center at City Hall, including a dedicated back-up power system, which also houses space for local utility companies.
- These past and ongoing activities have contributed to the city’s understanding of its preparedness and future mitigation activity needs, costs, and benefits. These efforts provide a foundation for the Planning Committee to use in developing this FMP.

6.2 GENERAL MITIGATION PLANNING APPROACH

The general mitigation planning approach used to develop this plan is based on five steps, which were used to support mitigation planning. These steps are listed below and presented in more detail in the following sections.

- Assess the hazard
- Assess the problem
- Set goals
- Review possible activities
- Draft an action plan

6.3 FLOOD MITIGATION GOALS AND OBJECTIVES

This section documents the city’s efforts in identifying the flood mitigation goals and objectives to reduce or avoid long-term vulnerabilities to the flood hazard. From the goals and objectives identified, recommended mitigation initiatives were selected and prioritized. These planning components all directly support one another. Mitigation initiatives were prioritized based on meeting multiple objectives.



Goals and Objectives

The Planning Committee developed mitigation goals based on the risk assessment results, discussions, research, and input from among the committee, existing authorities, policies, programs, resources, stakeholders, and the public. For the purpose of this plan, goals are defined as follows:

Goals are general guidelines that explain what is to be achieved. They are usually broad, long-term, policy-type statements and represent global visions. Goals help define the benefits the FMP is trying to achieve. The success of the FMP, once implemented, should be measured by the degree to which its goals have been met (that is, by the actual benefits in terms of hazard mitigation).

The City of Long Beach FMP goals are compatible with the needs and goals expressed in other available community planning documents, including:

- State of New York Hazard Mitigation Plan
- Nassau County Hazard Mitigation Plan

Objectives are short-term aims, which when combined form a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable. The objectives were developed by the Planning Committee through its knowledge of the city, review of past efforts, findings of the risk assessment, qualitative evaluations, and identification of mitigation options. The objectives are used to (1) measure the success of the FMP once implemented, and (2) to help prioritize identified mitigation actions.

Table 6-1 presents the goals and objectives for the FMP.

Table 6-1. City of Long Beach Floodplain Management Plan Goals and Objectives

Goals	Objectives
Goal 1: Protect the City of Long Beach’s built environment from flooding and sea-level rise.	Objective 1.1 Prevent backflow from all outfalls.
	Objective 1.2 Prevent backflow flooding of the storm drain on Laurelton and West Bay Drive.
	Objective 1.3 Protect West Park Avenue from flooding due to high tide and/or heavy rainfall.
	Objective 1.4 Protect the area at Riverside Boulevard and Pine Street from flooding.
	Objective 1.5 Protect the intersection of National Boulevard and Park Avenue from stormwater flooding due to heavy rainfall.
	Objective 1.6 Protect Park Avenue, between New York Avenue and Nevada Avenue, from flooding.
	Objective 1.7 Stabilize and protect the bayfront on the northern side of the city from high tides, storm surge, and stormwater flooding from heavy rainfall events.
	Objective 1.8 Enhance the city’s stormwater management system to protect against the 100-year storm event.
	Objective 1.9 Protect critical city facilities from flooding to ensure they continue to operate during a flood event.
	Objective 1.10 Protect the West End from storm and flood damage similar to the effects of Superstorm Sandy.
	Objective 1.11 Protect Long Beach Boulevard from storm surge.
	Objective 1.12 Protect the area near State Street and Franklin Boulevard from flooding.
	Objective 1.13 Protect the area near Laurelton Boulevard and West Bay Drive from flooding.
	Objective 1.14 Protect the area from the canals to Franklin Boulevard and from East Park Avenue to East Hudson Street from flooding.



Goals	Objectives
Goal 2: Make the City of Long Beach more resilient to flooding and sea-level rise.	Objective 2.1 Update the city’s strategy for maintaining a resilient community.
	Objective 2.2 Update city regulations to foster additional resilience.
	Objective 2.3 Ensure that the city’s businesses can continue to operate after a flood event.
Goal 3: Protect the natural environment from the impacts of flooding.	Objective 3.1 Protect the city from erosive processes.
	Objective 3.2 Maintain Jones Inlet to prevent wind against tide/tidal stacking.
	Objective 3.3 Maximize open space throughout the city.
	Objective 3.4 Stabilize and protect the dune system on the oceanfront to provide storm protection and natural habitat.
Goal 4: Educate the public, officials, and other stakeholders about the flood hazard and what can be done to mitigate its impacts.	Objective 4.1 Ensure that local officials attend current training on regulatory issues and best practices.
	Objective 4.2 Ensure that public information efforts are coordinated among city department and stakeholder groups.
	Objective 4.3 Provide information to individuals throughout the city on the flood hazard and property protection measures they can take.
	Objective 4.4 Increase flood insurance coverage held by individuals and businesses.
Goal 5: Ensure effective response to flood events to save lives and protect property.	Objective 5.1 Ensure that an effective warning system is in place in the city.
	Objective 5.2 Enhance the public’s capabilities of responding to flood events.
	Objective 5.3 Enhance the emergency response and emergency management community’s capabilities to respond to flood events.

6.4 CAPABILITY ASSESSMENT

According to FEMA 386-3, a capability assessment is an inventory of a community’s missions, programs, and policies and an analysis of its capacity to carry them out. This assessment is an integral part of the planning process. The assessment process enables identification, review, and analysis of current local and state programs, policies, regulations, funding, and practices that could either facilitate or hinder mitigation.

During the planning process, the city identified and assessed its capabilities in the areas of planning and regulatory, administrative and technical, and fiscal. By completing this assessment, the Planning Committee learned how or whether they would be able to implement certain mitigation actions by determining the following:

- Limitations that could exist on undertaking actions;
- The range of local and state administrative, programmatic, regulatory, financial, and technical resources available to assist in implementing their mitigation actions;
- Actions deemed infeasible, as they are currently outside the scope of capabilities;
- Types of mitigation actions that could be technically, legally (regulatory), administratively, politically, or fiscally challenging or infeasible; and
- Opportunities to enhance local capabilities to support long-term mitigation and risk reduction.

6.4.1 Planning and Regulatory Capability

Planning and regulatory capabilities are based on the implementation of ordinances, policies, local laws and state statutes, and plans and programs that relate to guiding and managing growth and development. The City of Long Beach has various federal, state, county, and local policies, programs, and plans available to promote and support mitigation and reduce future damages.



6.4.2 Federal Floodplain Management Programs

Hazard Mitigation Assistance

Federal mitigation grant funding (Stafford Act 404 and 406) is available to all communities with a current hazard mitigation plan (such as the Nassau County Hazard Mitigation Plan); however, most of these grants require a “local share” in the range of 10-25% of the total grant amount. FEMA’s Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the following HMA grant programs: 1) Flood Mitigation Assistance (FMA); 2) Hazard Mitigation Grant Program; and 3) Pre-Disaster Mitigation (PDM).

Participation in FEMA 404 Hazard Mitigation Grant Program (HMGP) may cover mitigation activities including raising, removing, relocating or replacing structures within flood hazard areas.

National Flood Insurance Program (NFIP)

Established in 1968, the NFIP provides federally-backed flood insurance to residents of communities that enact and enforce regulations that more carefully regulate development within floodplain areas. For individual property owners to be eligible to buy the federally-backed flood insurance, their property must be located within a community that participates in NFIP. In New York, the NFIP is administered at the state-level by the New York State Department of Environmental Conservation (NYSDEC).

The three components of the program are: flood insurance, floodplain management, and flood hazard mapping. The NFIP makes federally-backed flood insurance available to homeowners, renters, and business owners in the participating communities. Community participation in the NFIP is voluntary. Gaining municipality participation in the NFIP and encouraging property owners to purchase flood insurance significantly reduces disaster costs. Together these programs systematically reduce flood exposure to people and their property. The NFIP Coordinator works closely with FEMA to educate and inform communities of their responsibilities to maintain compliance. For a community to be eligible in NFIP, it must adopt and enforce a floodplain management ordinance to regulate proposed development in floodplains and officially designate a local floodplain coordinator/administrator. The intent of the program is to ensure that new construction does not exacerbate existing flood hazards and is designed to better withstand flooding.

The City of Long Beach participates in the NFIP. The community also has Flood Insurance Rate Maps (FIRMs) that show FEMA Special Flood Hazard Areas (SFHA), flood zones, base flood elevations, and the Limit of Moderate Wave Action (LimWA). Mitigation activities related to this program are included in this section and data from FEMA Region II regarding NFIP Insurance Reports was used in the risk assessment for the flood hazard included in Section 5. The city’s floodplain manager has also been involved in the planning process, reviewed the plan documents, and provided direct input to the FMP.

Cumulative Substantial Improvements/Damages: The NFIP allows improvements valued at up to 50 percent of the building’s pre-improvement market value to be permitted without meeting the current (as of the date of development) flood damage prevention ordinance requirements. Over the years, a community could issue a succession of permits for different repairs or improvement to the same structures. This can greatly increase the overall flood damage potential for structures within a community. The community might wish to deem *substantial improvement* cumulatively so that once a threshold of improvement within a certain length of time is reached, the structure is considered to be substantially improved and must meet flood protection requirements.



NFIP Community Rating System (CRS)

The NFIP's CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

CRS is a voluntary program designed to reward participating jurisdictions for their efforts to create more disaster-resistant communities using the principles of sustainable development and management. The City of Long Beach has developed this plan as a means of enhancing their standing in the CRS program, in addition to strengthening their local flood control programs. By participating in CRS, the city works to leverage greater flood protection while receiving flood insurance discounts.

As of January 2020, the City of Long Beach has a Class 7 rating in the CRS, resulting in a 15% reduction in premiums for eligible policy holders.

FEMA Risk MAP Program

Risk MAP, defined as Risk Mapping, Assessment, and Planning, is a FEMA program that provides communities with flood information and tools to enhance their mitigation plans and take action to protect their citizens. It builds on flood hazard data and maps produced during the Flood Map Modernization (Map Mod) program. Through more precise flood mapping products, risk assessment tools, and planning and outreach support, Risk MAP strengthens local ability to make informed decisions about reducing risk. It combines quality engineering with state-of-the-art flood hazard data to assist communities in planning and preventing risk using the most current information.

Risk MAP collaborates with state, tribal, and local governments and delivers quality data that increases public awareness and leads to action that reduces risk to property and life. Risk MAP focuses on products and services beyond the traditional FIRMs and works with officials to help put flood risk data and assessment tools to use. Risk MAP also helps effectively communicate risk to citizens and enable communities to enhance their mitigation plans and actions (FEMA 2012).

Full and complete information on the program can be found on the FEMA website: <http://www.fema.gov/risk-mapping-assessment-planning>

FEMA Region II Coastal Analysis and Mapping

Under its Risk MAP Program, FEMA is providing quality flood hazard information to help communities plan for and reduce the risk from flooding. After Superstorm Sandy in order to help in rebuilding and recovery efforts, FEMA released Advisory Base Flood Elevation (ABFE) maps, which were based on the partially completed flood study for certain communities. Additional information on FEMA Region II's coastal analysis and mapping can be found at: <https://sites.google.com/site/region2coastal/>.

U.S. Geological Survey Tidal Gauge Monitoring

The U.S. Geological Survey (USGS) maintains a network of gauges across New York that continuously measure tidal levels. Funding for these gauges comes from both federal and state monies. These data sets are transmitted to the USGS and made available over the Internet. As project needs and funding levels change, gauges may be added or deactivated, and deactivated gauges may be reactivated. Additional information can be found at: <http://waterdata.usgs.gov/ny/nwis/nwis>



These gauges and the data they collect are occasionally used by outside groups to develop flood models, such as the Stevens Flood Advisory System which utilizes coastal USGS tidal gauges in the northeast. Additional information can be found at: <http://hudson.dl.stevens-tech.edu/SFAS/>

U.S. Army Corps of Engineers

Congress allocated \$5.35 billion to the USACE, including \$20 million to undertake the North Atlantic Coast Comprehensive Study. The purpose of the study is to address the flood risks of vulnerable coastal populations in the areas affected by Sandy, including New York. After completion of the North Atlantic Comprehensive Study, the USACE began back bay studies throughout the region including the Nassau County Back Bays Coastal Storm Risk Management Feasibility Study which is currently underway (USACE 2019). The city coordinates with USACE on coastal studies and projects.

6.4.3 State Floodplain Management Programs

New York State Division of Homeland Security and Emergency Services (NYS DHSES)

For more than 50 years, NYS DHSES and its predecessor agencies have been responsible for coordinating the activities of all state agencies to protect New York's communities, the state's economic well-being, and the environment from natural and man-made disasters and emergencies. NYS DHSES routinely assists local governments, voluntary organizations, and private industry through a variety of emergency management programs, including hazard identification, loss prevention, planning, training, operational response to emergencies, technical support, and disaster recovery assistance.

NYS DHSES administers the FEMA mitigation grant programs in the state and supports local mitigation planning in addition to developing and routinely updating the NYS HMP. NYS DHSES prepared the current NYS HMP, working with input from other state agencies, authorities, and organizations. The plan was approved by FEMA in 2019 and enables NYS to remain eligible for recovery assistance in all Public Assistance Categories A through G and HMA in each of the Unified Hazard Mitigation Assistance Program's five grant programs.

New York State Department of Environmental Conservation (NYSDEC) – Division of Water - Bureau of Flood Protection and Dam Safety

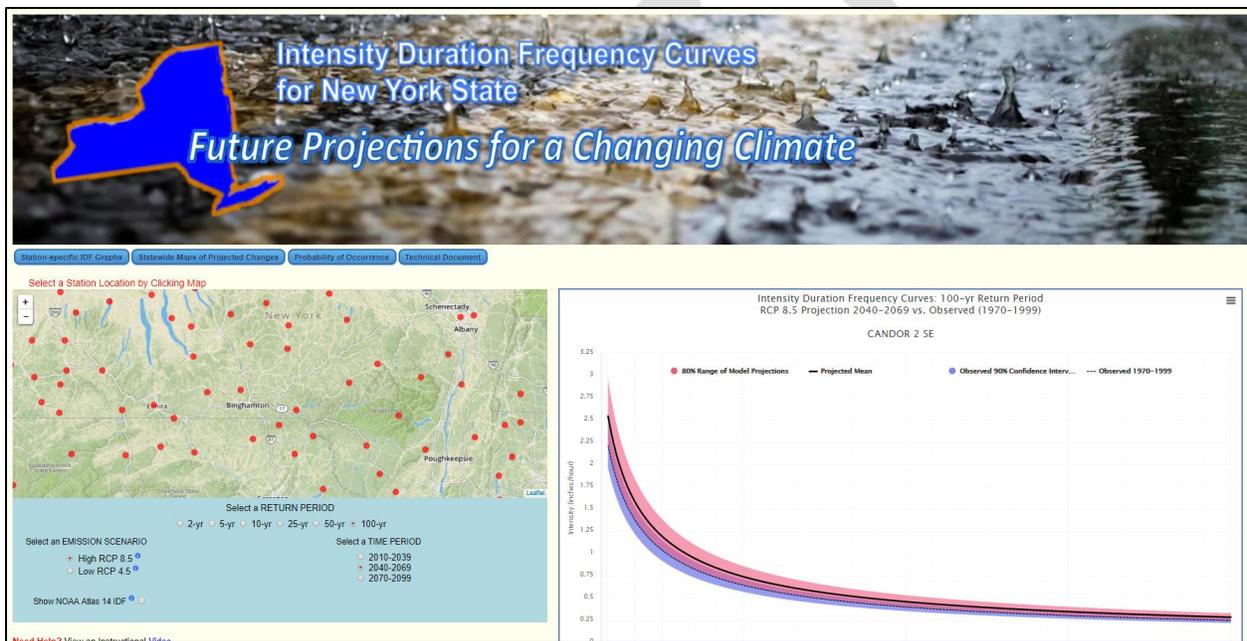
Within the NYSDEC, the Division of Water's Bureau of Flood Protection and Dam Safety (<http://www.dec.ny.gov/about/61432.html>) cooperates with federal, state, regional, and local partners to protect lives and property from floods, coastal erosion, and dam failures through both structural and nonstructural means of floodplain management and provides support for information technology needs in the division. The bureau consists of the following sections:

- Coastal Management: Works to reduce coastal erosion and storm damage to protect lives, natural resources, and properties through structural and nonstructural means.
- Dam Safety: Responsible for reviewing repairs and modifications to dams and assuring that dam owners operate and maintain dams in a safe condition through inspections, technical reviews, enforcement, and emergency planning.
- Flood Control Projects: Responsible for reducing flood risk to life and property through construction, operation, and maintenance of flood control facilities.
- Floodplain Management: Responsible for reducing flood risk to life and property through proper management of activities including, development in flood hazard areas and review and development of revised flood maps.

Northeast Regional Climate Center

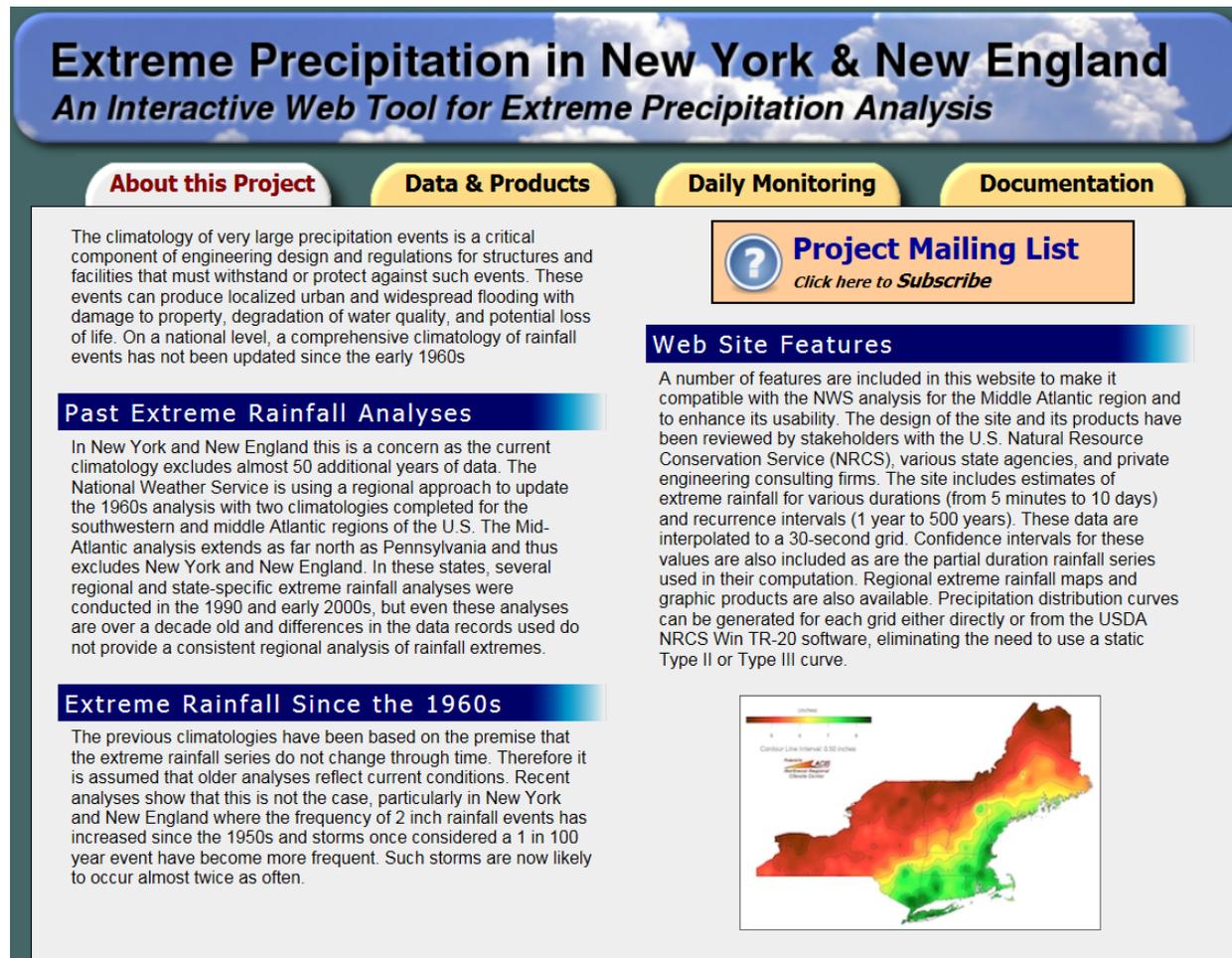
The Northeast Regional Climate Center (NRCC) partnered with the New York State Energy Research and Development Authority (NYSERDA) to compare various methods of downscaling global climate model (GCM) output and create extreme precipitation projections for New York State. These projections will ultimately be incorporated into climate change adaptation planning. Climate change is resulting in an increase in the frequency of heavy rainfall events. To help NYS communities plan for effects of climate change, new graphics are now available showing the increased likelihood of heavy precipitation events. These graphs, called Intensity Duration Frequency (IDF) curves, show anticipated increases of storm events from 2- to 100-year intervals and are projected into the future as far as 2099. These products are designed for use by municipal officials, researchers, planners, highway departments, and other decision-makers who need to take storm events into account. These IDF curves display how precipitation events are being affected by NYS’s rapidly changing climate (NRCC 2020). Figure 6-1 displays the screenshot of the website.

Figure 6-1. Screenshot of the IDF Curves for New York State



NRCC also maintains the Extreme Precipitation in New York & New England website, an interactive tool for extreme precipitation analysis. The site includes estimates of extreme rainfall for various durations (5 minutes to 10 days) and recurrence intervals (1 year to 500 years). These data are interpolated to a 30-second grid. Confidence intervals for these values are included as are the partial duration rainfall series used in their computation. Regional extreme rainfall maps and graphic products are available. Precipitation distribution curves can be generated for each grid either directly or from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Win TR-20 software, eliminating the need to use a static Type II or Type III curve (NRCC & NRCS 2020). This tool can be used by municipalities to assist them in the design and feasibility assessment of future projects and allow them to see the future intensity and frequency of rain events. Figure 6-2 shows a screenshot of the website.

Figure 6-2. Screenshot of the Extreme Precipitation in New York & New England website



Department of State’s Division of Code Enforcement and Administration (DCEA)

Technical Bulletins for the 2010 Codes of New York State

The DCEA has published 14 technical bulletins, including two recent bulletins with guidance related to flood hazard areas: Electrical Systems and Equipment in Flood-damaged Structures and Accessory Structures. One archived bulletin from January 2003, Flood Venting in Foundations and Enclosures Below Design Flood Elevation, refers to the out-of-date edition of FEMA Technical Bulletin 1 and the American Society of Civil Engineers (ASCE) 24-98, which is not the edition referenced by the current codes.

Forms and Publications

The DCEA posts several model reporting forms and related publications on its webpage. The Building Permit Application requests the applicant to indicate whether the site is or is not in a floodplain and advises checking with the jurisdiction’s clerk or NYSDEC. The General Residential Code Plan Review form includes a reminder to “add 2’ freeboard.” Sample Flood Hazard Area Review Forms, including plan review checklists and inspection checklists for Zone A and Zone V, are based on the forms in Reducing Flood Losses through the International Code Series published by International Code Council and FEMA (2008).



New York State Floodplain Management

The following two departments have statutory authorities and programs that affect floodplain management at the local jurisdiction level in New York State: the NYSDEC and the Department of State's Division of Code Enforcement and Administration (DCEA).

The NYSDEC is charged with conserving, improving, and protecting the state's natural resources and environment, and preventing, abating, and controlling water, land, and air pollution. Programs that have bearing on floodplain management are managed by the Bureau of Flood Protection and Dam Safety, which cooperates with federal, state, regional, and local partners to protect lives and property from floods, coastal erosion, and dam failures. These objectives are accomplished through floodplain management and both structural and nonstructural means.

The Dam Safety Section is responsible for "reviewing repairs and modifications to dams and assuring [sic] that dam owners operate and maintain dams in a safe condition through inspections, technical reviews, enforcement, and emergency planning." The Flood Control Projects Section is responsible for reducing flood risk to life and property through construction, operation, and maintenance of flood control facilities.

The Floodplain Management Section is responsible for reducing flood risk to life and property through management of activities, such as development in flood hazard areas, and for reviewing and developing revised flood maps. The section serves as the NFIP State Coordinating Agency and in this capacity is the liaison between FEMA and New York communities that elect to participate in the NFIP. The section provides a wide range of technical assistance.

Local Waterfront Revitalization Program

The Waterfront Revitalization of Coastal Areas and Inland Waterways Act offers local governments the opportunity to participate in the state's Coastal Management Program (CMP) on a voluntary basis by preparing and adopting a Local Waterfront Revitalization Program (LWRP) and providing more detailed implementation of the state's CMP through use of such existing broad powers as zoning and site plan review (New York State Office of Planning & Development 2020).

When an LWRP is approved by the New York State Secretary of State, state agency actions are required to be consistent with the approved LWRP to the maximum extent practicable. When the federal government concurs with the incorporation of an LWRP into the CMP, federal agency actions must be consistent with the approved addition to the CMP. Title 19 of New York Codes, Rules, and Regulations (NYCRR) Part 600, 601, 602, and 603 provide the rules and regulations that implement each of the provisions of the Waterfront Revitalization of Coastal Areas and Inland Waterways Act, including but not limited to the required content of an LWRP, the processes of review and approval of an LWRP, and LWRP amendments (New York State Division of Planning 2018).

An LWRP consists of a planning document prepared by a community and the program established to implement the plan. An LWRP could be comprehensive and address all issues that affect a community's entire waterfront, or it might address the most critical issues facing a significant portion of its waterfront. An approved LWRP reflects community consensus and provides a clear direction for appropriate future development. It establishes a long-term partnership among local government, community-based organizations, and the state. Also, funding to advance preparation, refinement, or implementation of LWRP is available under Title 11 of the NYS Environmental Protection Fund LWRP, among other sources (NYS Division of Planning 2018).

Any village, town, or city located along the state's coast or designated inland waterway can prepare a new or amend an existing LWRP. Municipalities are encouraged to address local revitalization issues in a broader



context, aligned with regional economic development strategies and regional resource protection and management programs (NYS Division of Planning 2018).

As of the date of this plan update, the City of Long Beach does not have a current adopted LWRP. However, the city previously adopted a LWRP in 2009. A draft LWRP was recently developed for the city in concert with the draft Comprehensive Plan in order for the plans to have a consistent set of visions, goals, objectives, policies, and actions. The New York Department of State provides a list of all approved LWRPs:

https://www.dos.ny.gov/opd/programs/WFRevitalization/LWRP_status.html

Freeboard: By law, NYS requires Base Flood Elevation (BFE) plus 2 feet (BFE+2) for all construction. When there is a BFE available, the lowest floor—including any basement—must be at or above the BFE plus 2 feet. Elevation could be by means of properly compacted fill, a solid slab foundation, or a crawl space foundation, which contains permanent openings to let flood waters in and out. Non-residential structures might be flood-proofed in lieu of elevation. Where a local floodplain administrator has information to estimate a BFE, such as historic flood records or a hydraulic study, that elevation must be used. If the development consists of more than 5 acres or more than 50 lots, the permit applicant must develop a BFE and build accordingly (NYSDEC 2018). Communities could go beyond this requirement, providing for additional freeboard. In most New York communities, new structures must have the lowest floor 3 feet or more above the highest adjacent grade.

6.4.4 County and Local Floodplain Management Programs

Nassau County Planning Commission

The Nassau Planning Commission's vision is to oversee the orderly growth and development of the County, seeking to balance economic growth with environmental protection and historic preservation. The Nassau County Planning Commission is mandated by law to approve subdivision of land within the unincorporated areas of the County and offer recommendations to municipalities on zoning referrals. The Planning Department staff processes and reviews subdivision applications and zoning referrals, and makes recommendations to the Planning Commission. The Department is also charged with advising the County Executive, the County Legislature, and County departments in regard to the physical development of the County (Nassau County Planning Date Unknown).

Long Island Regional Planning Council

The Long Island Regional Planning Council (LIRPC) is established to represent the various interests and needs of all Long Islanders in providing education, research, planning, advocacy, and leadership on important issues affecting the physical, economic and social health, and overall quality of life of the region and its residents.

In furtherance of its goals, the LIRPC shall disseminate valuable information, serve as a regional forum for discourse and debate on key issues affecting Long Island, identify and address impediments and obstacles to resolving such issues, utilize the inherent powers entrusted to it to effectuate positive change, and assemble the available resources necessary to develop a comprehensive plan which shall serve as a blueprint for implementation of the Region's long-range planning goals and strategies (Nassau County Planning Date Unknown).

Nassau County Department of Public Works

The Nassau Department of Public Works (DPW) has five functional areas: Administration, Engineering, Operations, Fleet, and Real Estate.

- The Administration Division provides overall leadership and direction of the Department.



- The Engineering Division administers and coordinates engineering activities related to the public infrastructure of Nassau County.
- The Operations Division administers and coordinates operational activities related to the public infrastructure of Nassau County.
- The Fleet Management Division administers and coordinates the County's fleet, vehicle-related equipment, machinery, and resources, e.g., fuel for all County departments except Police.
- The Real Estate Division administers and coordinates all real estate matters on behalf of the County (Nassau County Date Unknown).

Nassau County Planning Federation

The Nassau County Planning Federation was formally established in May of 2004 pursuant to the recommendation of the County Executive and the support of the Planning Commission. The Mission of the Planning Federation is to assist local town, village, and city governments in the development and implementation of sound and effective planning policies and practices through training programs, the sharing of information on legislation, grants, recent trends, natural resources, publications, and various networking services.

The Planning Federation is a voluntary membership organization open to elected or appointed municipal officials, staff, attorneys, planning boards, zoning boards of appeal, and others with a role or responsibility in the delivery of planning services such as site approvals, zoning, land use planning, legal review, open space preservation, environmental protection, and compliance (Nassau County Planning Date Unknown).

Nassau County Office of Emergency Management

Nassau County's Office of Emergency Management (OEM) has the statutory responsibility to coordinate all County emergency response plans. OEM's responsibilities are to identify vulnerabilities, effectively mitigate disasters, provide public education, respond to all-hazard emergency situations, protect Nassau County's first responders, ensure continuity of government and business, and facilitate an effective recovery. OEM will coordinate with local, state, and federal agencies, as well as private entities to develop, maintain, and implement the Emergency Operations Plan (EOP). The Emergency Management website includes information on weather advisories, hurricane preparedness, flood zone maps, coastal tidal information, and other education and outreach (Nassau OEM 2020).

Nassau County Department of Health

Nassau County Department of Health promotes and protects the health of all who live, work, and play in Nassau County. The mission is accomplished through direct services and community partnerships in the following areas:

- Development and maintenance of individual and community preparedness for public health hazards and events.
- Investigation, prevention, and control of communicable diseases.
- Prevention of environmental health hazards through assessment, regulation, and remediation.
- Promotion of healthy lifestyles through outreach and education.
- Provision for evaluation and services to individuals, children, and families that have developmental delays and concerns (Nassau County Date Unknown).

City of Long Beach Department of Economic Development & Planning

The Department of Economic Development and Planning (DEDP) is responsible for economic development in support of the business community, the Long Beach Local Development Council (LDC), planning, many city grants, marketing and support for the newly forming arts council. It also works on environmental issues such as



remediating brownfields, protection of the Lloyd Aquifer and implementing complete streets policies, which include the creation of bike lanes to foster a healthier and less auto-dependent community (Long Beach 2019).

The DEDP was awarded three state grants to update the Comprehensive Plan and LWRP without any cost to the city. These two documents project out both short and long-term goals for the city, focusing on resiliency and economic development, parking, affordable housing and preventing overdevelopment. The process included hiring expert consultants, extensive community outreach, and a rigorous review process. The DEDP has completed the final draft plan (Long Beach 2019).

City of Long Beach Department of Public Works

The goal of the department is to provide timely and effective critical services throughout the city and maintain a high quality of life for all of Long Beach’s residents and visiting guests. Public Works is instrumental to the city’s mission to rebuild Long Beach stronger, smarter, and safer in the wake of Superstorm Sandy, by keeping resiliency and sustainability in mind to protect the city’s residents from future storms.

The Department of Public Works serves as the infrastructure arm of the city. The Department provides a wide range of infrastructure-based services throughout the city and specializes in the planning, design, and construction oversight of public projects throughout Long Beach. Additionally, the Department is responsible for maintenance and repair of all city buildings, parks, roads, beach and boardwalk, sewers, and water mains. Public Works oversees a cadre of diverse and essential divisions to accomplish these goals. Tasks related to flood mitigation include beach maintenance, sewer maintenance, street maintenance, tree planting, stormwater runoff management, and street sweeping (Long Beach 2019).

City of Long Beach Building Department

The Building Department is the city’s resource for homeowners, businesses, contractors, electricians, plumbers, and architects. It administers and enforces regulations pertaining to the use of property and the construction of buildings in accordance with the city Code of Ordinances and the Zoning Board of Appeals’ recommendations. It is also responsible for issuing building permits and Certificates of Occupancy for buildings. The Building Department also inspects and enforces zoning, electrical, plumbing, and sanitation codes, including property and building complaint intake & processing (Long Beach 2019).

The Building Department works to provide easier access to the permitting process for homeowners and businesses, to build and maintain resilient and sustainable buildings that are in compliance with state law and the city’s Building Code of Ordinances in an efficient, safe manner. The Building Department was an integral part of the city’s effort to rebuild stronger, smarter, and safer after Superstorm Sandy, as many homeowners relied on the permitting process to obtain reconstruction reimbursements through the state’s New York Rising program (Long Beach 2019).

City of Long Beach Office of Emergency Management

The goal of the OEM is to lead disaster planning; disseminate upcoming storm actions; coordinate emergency operations for larger hazard events such as floods; establish a secure office in City Hall with connection to back-up power; and connect to the county, state and, if necessary, federal groups involved in emergency management (Long Beach 2019).

The OEM is responsible for planning for disaster recovery and training applicable responders in disaster planning; providing training on new critical emergency communications equipment such as satellite capability for weather and emergency communications; aiding in establishment of agreements for related organizations and vendors to provide post-disaster services; coordinating with the Long Island Voluntary Organizations Active



in Disaster (LIVOAD) of Nassau County to streamline efforts and maximize coverage; coordinating fire, police, and emergency service personnel and equipment; preparing emergency response logistics for large events; Resiliency Design Guidelines, in English and Spanish, to educate homeowners on resiliency, elevation, and sustainability options in a neighborhood context; and establishing a protected and secure office in City Hall and outfit with emergency office equipment (Long Beach 2019).

Upon completion, the OEM will operate the Emergency Operations Center (EOC) on the sixth floor of City Hall. The EOC will establish a protected and secure office in City Hall and outfit with emergency office equipment, including electrical panels tied to a rooftop generator, fixed emergency communication console, and hard-wired telecommunication systems. During emergency events, the office will be staffed with city, county and state officials as well as utility providers to restore service to residents. The project was fully funded by the Governor's Office of Storm Recovery as a proposed project in the Long Beach Community Reconstruction Plan developed with community input in 2014, which will help the city bridge communication gaps after Superstorm Sandy (Long Beach 2019).

City of Long Beach Office of Public Relations

The Office of Public Relations is responsible for keeping the residents informed of upcoming events, programs and matters of public interest. Duties also include social media & website administration, preparation, and distribution of press releases, brochures, and citywide newsletters (Long Beach 2019).

6.4.5 Fiscal Capabilities – State and Federal

The New York State Capabilities section of the 2019 NYS HMP provides information pertaining to the various funding sources available for mitigation projects, which can be found at: <https://mitigateny.availabs.org/capabilities/administerfunding>.

Empire State Development

Empire State Development offers a wide range of financing, grants, and incentives to promote business and employment growth and real estate development throughout the state. Several programs address infrastructure construction associated with project development, acquisition, and demolition associated with project development and brownfield remediation and redevelopment. Additional information regarding Empire State Development is available on the website: <https://esd.ny.gov/>.

New York State Department of Environmental Conservation (NYSDEC)

Climate Smart Communities (CSC) Program

The CSC program is jointly sponsored by the following six NYS agencies: Department of Environmental Conservation; Energy Research and Development Authority; Public Service Commission; Department of State; Department of Transportation; and the Department of Health. The program encourages municipalities to minimize the risks of climate change and reduce long-term costs through actions that reduce greenhouse gas (GHG) emissions and adapt to a changing climate. The program offers free technical support on energy and climate and guidance tailored to NYS communities. As of January 2020, there are 290 registered CSC in NYS. In September 2019, the City of Long Beach was designated as a Climate Smart Community.

Benefits of participating in the program include saving taxpayer dollars, improving operations and infrastructure, increasing energy independence and security, demonstrating leadership, and positioning for economic growth. Registered CSC receive notification of state and federal assistance that they can leverage to help adopt low-carbon technologies, and of programs and support for efficiency improvements and energy conservation. Further,



they receive an advantage in accessing some state assistance programs. They can call on the help of other local governments that already have adopted climate smart practices and policies, and their climate smart accomplishments receive statewide recognition. Key elements of the CSC program are described below.

For additional information regarding the CSC program, please refer to:
<http://www.dec.ny.gov/energy/50845.html>

Climate Smart Communities (CSC) Certification Program

The CSC Certification Program enables high-performing registered communities to achieve recognition for their leadership. Designed around the existing ten pledge elements, the certification program recognizes communities achieving any on over 130 total possible actions through a rating system leading to four levels of award: Certified, Bronze, Silver, and Gold. Recertification of completed actions is required every five years. Details of the program and the specific documentation required for each action are described in the CSC Certification Manual at http://www.dec.ny.gov/docs/administration_pdf/certman.pdf.

Climate Smart Communities (CSC) Grant Program

In April 2016, NYSDEC announced an expansion of the Environmental Protection Fund to support communities ready to reduce greenhouse gas emissions and prepare for the effects of climate change. CSC Implementation grants support mitigation and adaptation projects and range from \$100,000 to \$2 million. Competitive grants ranging from \$25,000 to \$100,000 will provide support for local governments to become certified CSC. All counties, cities, towns, and villages of the State of New York are eligible to receive funding. The CSC grant program will provide 50/50 matching grants for eligible projects in the following categories.

Funding is available for implementation projects that advance a variety of climate adaptation and mitigation actions, including the following:

- Construction of natural resiliency measures
- Relocation or retrofit of climate-vulnerable facilities
- Conservation or restoration of riparian areas and tidal marsh migration area
- Reduction of flood risk
- Clean transportation
- Reduction or recycling of food waste

In scoring grant applications, increasing points are awarded to communities who have already taken the CSC Pledge and to those that have achieved certification status. All grant recipients must take the CSC Pledge within the terms of their grant contract. For climate mitigation projects, grant recipients must provide a report of estimates of emissions reduction. Certification actions must adhere to the requirements and standards described in the *Climate Smart Communities Certification Manual* that is available on the website:

<http://www.dec.ny.gov/energy/96511.html>.

For implementation projects involving property (construction, improvements, restoration, rehabilitation), grant recipients that do not have ownership of the property must obtain a climate change mitigation easement.

The CSC Toolkit was developed to educate New York communities on recommended practices that will help to reduce greenhouse gas emissions and adapt to the effects of climate change, specifically in the areas of land use, transportation policy, green buildings, infrastructure investment, green infrastructure, housing policy, adaptation, and resilience. The Climate Smart Communities Guide to Local Action contains overviews of possible community actions, how-to's and case studies to help communities implement the CSC Pledge. The CSC Toolkit allows New York communities to find recommended practices that will help to reduce greenhouse



gas emissions in the areas of land use, transportation policy, green building, infrastructure investment, green infrastructure, and housing policy.

Water Quality Improvement Project (WQIP) Program

The WQIP program is a competitive reimbursement grant program that funds projects that directly address documented water quality impairments. The competitive statewide grant program is open to local governments and not-for-profit corporations. Grant recipients can receive up to 75 percent of the project costs for high priority wastewater treatment improvement, non-agricultural nonpoint source abatement and control, land acquisition for source water protection, aquatic habitat restoration, and municipal separate storm sewer system projects; up to 50 percent for salt storage projects; and up to 40 percent for general wastewater infrastructure improvement projects. Eligible activities include:

- Wastewater treatment improvement
- Non-agricultural nonpoint source abatement and control
- Land acquisition for source water protection
- Salt storage
- Aquatic habitat restoration
- Municipal separate storm sewer systems (MS4)

Details regarding this program are available here - <https://www.dec.ny.gov/pubs/4774.html>.

New York State Department of Environmental Conservation (NYSDEC)/Environmental Facilities Corporation (EFC) Wastewater Infrastructure Engineering Planning Grant (EPG)

The DEC, in conjunction with the NYS EFC, offers grants to municipalities to help pay for the initial planning of eligible Clean Water State Revolving Fund (CWSRF) water quality projects.

The Wastewater Infrastructure EPG will assist municipalities with the engineering and planning costs of CWSRF-eligible water quality projects. Municipalities with a Median Household Income (MHI) of \$65,000 or less in regional economic development council (REDC) regions of Capital District, Southern Tier, North Country, Mohawk Valley, Central NY, Finger Lakes, or Western NY OR with a Median Household Income of \$85,000 or less in REDC regions of Long Island, New York City or Mid-Hudson are eligible to apply. Grants with a 20 percent required local match will be provided to finance activities, including engineering and/or consultant fees for engineering and planning services for the production of an engineering report.

The goal of the EPG program is to advance water quality projects to construction so successful applicants can use the engineering report funded by the grant to seek financing through the CWSRF program, WQIP program, or other funding entities to further pursue the identified solution. Funding priorities go to projects that are:

- Required by an executed Order on Consent; or
- Required by a draft or final State Pollutant Discharge Elimination System (SPDES) permit; or
- Upgrading or replacing an existing wastewater system; or
- Constructing a wastewater treatment and/or collection system for an area with failing onsite septic systems; or
- Identified in a Total Maximum Daily Load (TMDL) Implementation Plan.

Details regarding this program can be found here - <https://www.dec.ny.gov/pubs/81196.html>.

New York State Department of Transportation

BRIDGE NY

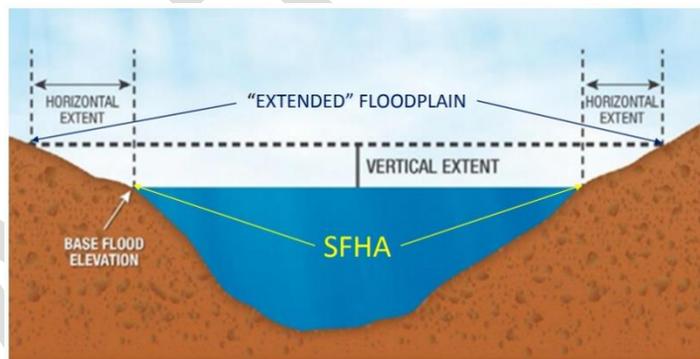
The BRIDGE NY program, administered by the New York State Department of Transportation (NYSDOT), is open to all municipal owners of bridges and culverts. Projects will be awarded through a competitive process and will support all phases of project development. Projects selected for funding under the BRIDGE NY Initiative will be evaluated based on the resiliency of the structure, including such factors as hydraulic vulnerability and structural resiliency; the significance and importance of the bridge including traffic volumes, detour considerations, number and types of businesses served and impacts on commerce; and the current bridge and culvert structural conditions. Information regarding the program can be found here:

<https://www.dot.ny.gov/BRIDGENY>

Community Risk and Resiliency Act (CRRA)

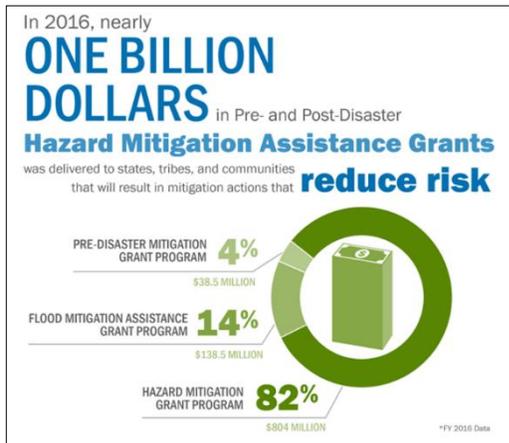
The CRRA was enacted in 2014 in response to extreme flooding that has occurred in NYS. The purpose of the act is to ensure that state monies and permits include consideration of the effects of climate risk and extreme weather events, specifically flooding, storm surge, and sea-level rise. CRRA includes five major provisions:

- Official Sea-Level Rise Projections – CRRA requires the DEC to adopt science-based sea-level rise projections into regulation.
- Consideration of Sea-Level Rise, Storm Surge and Flooding – CRRA requires applicants for permits or funding in a number of specified programs to demonstrate that future physical climate risk due to sea-level rise, storm surge, and flooding have been considered, and that DEC consider incorporating these factors into certain facility-siting regulations.
- Smart Growth Public Infrastructure Policy Act Criteria – CRRA adds mitigation of risk due to sea-level rise, storm surge and flooding to the list of smart growth criteria to be considered by state public infrastructure agencies.
- Guidance on Natural Resiliency Measures – CRRA requires DEC, in consultation with the Department of State (DOS), to develop guidance on the use of natural resources and natural processes to enhance community resiliency.
- Model Local Laws Concerning Climate Risk – CRRA requires DOS, in cooperation with DEC, to develop model local laws that include consideration of future risk due to sea-level rise, storm surge and/or flooding. These model local laws must be based on available data predicting the likelihood of extreme weather events, including hazard-risk analysis (NYSDEC Date Unknown).



CRRA requires NYSDEC, in consultation with DOS, to prepare guidance on implementation of the statute. DEC developed the State Flood Risk Management Guidance (SFRMG) to fulfill this requirement. SFRMG provides guidance to state agencies on consideration of flooding risk by applicants for projects involving new and substantially improved structures or repair of substantially damaged structures in New York State (NYSDEC Date Unknown). For additional details on the CRRA, refer to: <https://www.dec.ny.gov/energy/102559.html>

Federal Hazard Mitigation Funding Opportunities



Source: FEMA, 2018

As noted on the FEMA HMA website (<https://www.fema.gov/hazard-mitigation-assistance>), Currently, FEMA administers three programs that provide funding for eligible mitigation planning and projects that reduces disaster losses and protect life and property from future disaster damages. The three programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program.

HMGP assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration. PDM provides funds for hazard mitigation planning and projects on an annual basis. FMA provides funds for planning and projects to reduce or eliminate risk of flood

damage to buildings that are insured under the NFIP on an annual basis

HMGP funding is generally 15 percent of the total amount of federal assistance provided to a state, territory, or federally-recognized tribe following a major disaster declaration. PDM and FMA funding depends on the amount Congress appropriates each year for those programs.

Individual homeowners and business owners may not apply directly to FEMA. Eligible local governments may apply on their behalf (FEMA 2019).

Table 6-2 provides an overview of program funding eligibility and cost share, and Table 6-3 presents HMA eligible activities by program.

Table 6-2. FEMA HMA Grant Cost Share Requirements

Programs	Mitigation Activity (Percent of Federal/Non-Federal Share)	Recipient Management Costs (Percent of Federal/Non-Federal Share)	Subrecipient Management Costs (Percent of Federal/Non-Federal Share)
HMGP	75/25	100/0	-/-(¹)
PDM	75/25	75/25	75/25
PDM – Subrecipient Is Small and Impoverished Community	90/10	90/10	90/10
PDM – Tribal Recipient/Subrecipient Is Small and Impoverished	90/10	90/10	90/10
FMA – Insured Properties and Planning Grants	75/25	75/25	75/25
FMA – Repetitive Loss Property ⁽²⁾	90/10	90/10	90/10
FMA – Severe Repetitive Loss Property ⁽²⁾	100/0	100/0	100/0

Source: FEMA HMA Guidance 2019

- (1) Sub applicants should consult their State Hazard Mitigation Officer (SHMO) for the amount of percentage of HMGP subrecipient management cost funding their State has determined to be passed through subrecipients.
- (2) To be eligible for an increased federal cost share, a FEMA-approved state or tribal (standard or enhanced) mitigation plan that addressed repetitive loss properties must be in effect at the time of award, and the property is being submitted for consideration must be a repetitive loss property.

Table 6-3. FEMA HMA Grant Eligible Activities by Program

Eligible Activities	HMGP	PDM	FMA
1. Mitigation Projects	✓	✓	✓
Property Acquisition and Structure Demolition	✓	✓	✓
Property Acquisition and Structure Relocation	✓	✓	✓
Structure Elevation	✓	✓	✓
Mitigation Reconstruction	✓	✓	✓
Dry Flood-Proofing of Historic Residential Structures	✓	✓	✓
Dry Flood-Proofing of Non-residential Structures	✓	✓	✓
Generators	✓	✓	
Localized Flood Risk Reduction Projects	✓	✓	✓
Non-localized Flood Risk Reduction Projects	✓	✓	
Structural Retrofitting of Existing Buildings	✓	✓	✓
Safe Room Construction	✓	✓	
Wind Retrofit for One- and Two-Family Residences	✓	✓	
Infrastructure Retrofit	✓	✓	✓
Soil Stabilization	✓	✓	✓
Wildfire Mitigation	✓	✓	
Post-Disaster Code Enforcement	✓		
Advance Assistance	✓		
5 Percent Initiative Projects	✓		
Miscellaneous/Other ⁽¹⁾	✓	✓	✓
2. Hazard Mitigation Planning	✓	✓	✓
Planning Related Activities	✓		
3. Technical Assistance			✓
4. Management Cost	✓	✓	✓

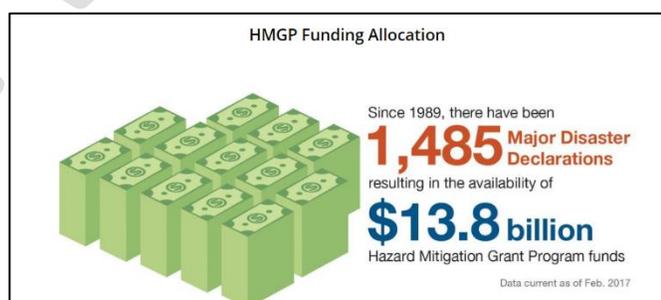
Source: FEMA HMA Guidance 2019

(1) Miscellaneous/Other indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects will be approved provided funding is available.

Hazard Mitigation Grant Program (HMGP)

The HMGP is a post-disaster mitigation program. FEMA makes these grants available to states by after each federal disaster declaration. The HMGP can provide up to 75 percent funding for hazard mitigation measures and can be used to fund cost-effective projects that will protect public or private property or that will reduce the likely damage from future disasters in an area covered by a federal disaster declaration. Examples of projects include acquisition and demolition of structures in hazard-prone areas, flood-proofing or elevation to reduce future damage, minor structural improvements, and development of state or local standards. Projects must fit into an overall mitigation strategy for the area identified as part of a local planning effort. All applicants must have a FEMA-approved HMP.

Figure 6-3. FEMA HMGP Funding Allocation



Source: FEMA 2018

Applicants who are eligible for the HMGP are state and local governments, certain nonprofit organizations or institutions that perform essential government services, and Indian tribes and authorized tribal organizations. Individuals or homeowners cannot apply directly for the HMGP; a local government must apply on their behalf. Applications are submitted to NYS DHSES, placed in rank order for available funding, and submitted to FEMA

for final approval. Eligible projects not selected for funding are placed in an inactive status and could be considered as additional HMGP funding becomes available. Additional information regarding the HMGP is available on the FEMA website: <https://www.fema.gov/hazard-mitigation-grant-program>.

Figure 6-4. FEMA HMGP Applicant/Subapplicant Process



Source: FEMA 2018

Flood Mitigation Assistance (FMA) Program

The FMA Program combines the previous Repetitive Flood Claims and Severe Repetitive Loss Grants into one grant program. The FMA provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. The FMA is funded annually; no federal disaster declaration is required. Only NFIP-insured homes and businesses are eligible for mitigation in this program. Funding for FMA is very limited and, as with the HMGP, individuals cannot apply directly for the program. Applications must come from local governments or other eligible organizations. The federal cost share for an FMA project is at least 75 percent. For the non-federal share, at most 25 percent of the total eligible costs, must be provided by a non-federal source; of this 25 percent, no more than half can be provided as in-kind contributions from third parties. At minimum, a FEMA-approved local flood mitigation plan is required before a project can be approved. The FMA funds are distributed from FEMA to the state. The NYS DHSES serves as the grantee and program administrator for the FMA Program.

The FMA Program is detailed on the FEMA website: <https://www.fema.gov/flood-mitigation-assistance-grant-program>

Pre-Disaster Mitigation (PDM) Program

The PDM Program is an annually funded, nationwide, competitive grant program. No disaster declaration is required. Federal funds will cover 75 percent of a project's cost up to \$3 million. As with the HMGP and FMA, a FEMA-approved local HMP is required to be approved for funding under the PDM Program.

In some cases, whereby the local HMP is under development but not formally approved by FEMA, the jurisdiction can request a Letter of Extraordinary Circumstance to enable consideration of the grant application. According to the FEMA HMA Guidance (2018), for HMGP project subawards, the FEMA Regional Administrator might grant an exception to the local mitigation plan requirement in extraordinary circumstances when justification is provided. If this exception is granted, a local mitigation plan must be approved by FEMA within 12 months of the award of the project subaward to that community. For PDM and FMA project subawards, the FEMA Region could grant an exception to the local mitigation plan requirement in extraordinary circumstances.



The PDM Program is detailed on the FEMA website: <https://www.fema.gov/pre-disaster-mitigation-grant-program>

Disaster Recovery Reform Act (DRRA) of 2018

FEMA and its partners are working on the development and implementation of DRRA Section 1234: National Public Infrastructure Pre-Disaster HMGP. This program, Building Resilient Infrastructure and Communities (BRIC), will be funded through the Disaster Relief Fund as a 6 percent set-aside from estimated disaster grant expenditures. This program will encourage community-wide mitigation of critical lifelines; prioritize resilient infrastructure projects; lead to competitive, risk-informed projects; and build capacity and capabilities in communities.

Extraordinary Circumstances

For PDM and FMA project subawards, the FEMA Region might apply extraordinary circumstances when justification is provided and with concurrence from FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) prior to granting an exception. If this exception is granted, a local mitigation plan must be approved by FEMA within 12 months of the award of the project subaward to that community.

For HMGP, PDM, and FMA, extraordinary circumstances exist when a determination is made by the applicant and FEMA that the proposed project is consistent with the priorities and strategies identified in the State (Standard or Enhanced) Mitigation Plan and that the jurisdiction meets at least one of the criteria below. If the jurisdiction does not meet at least one of these criteria, the region must coordinate with FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) for HMGP; however, for PDM and FMA the region must coordinate and seek concurrence prior to granting an exception. The criteria are as follows:

- The jurisdiction meets the small impoverished community criteria (Part VIII, B.2 of HMA Unified Guidance).
- The jurisdiction has been determined to have had insufficient capacity due to lack of available funding, staffing, or other necessary expertise to satisfy the mitigation planning requirement prior to the current disaster or application deadline.
- The jurisdiction has been determined to have been at low risk from hazards because of low frequency of occurrence or minimal damage from previous occurrences as a result of sparse development.
- The jurisdiction experienced significant disruption from a declared disaster or another event that impacts its ability to complete the mitigation planning process prior to award or final approval of a project award.
- The jurisdiction does not have a mitigation plan for reasons beyond the control of the state, federally-recognized tribe, or local community, such as Disaster Relief Fund restrictions that delay FEMA from granting a subaward prior to the expiration of the local or tribal mitigation plan.

For HMGP, PDM, and FMA, the applicant must provide written justification that identifies the specific criteria or circumstance listed above, explains why there is no longer an impediment to satisfying the mitigation planning requirement, and identifies the specific actions or circumstances that eliminated the deficiency.

When an HMGP project funding is awarded under extraordinary circumstances, the recipient shall acknowledge in writing to the Regional Administrator that a plan will be completed within 12 months of the subaward. The recipient must provide a work plan for completing the local or tribal mitigation plan, including milestones and a timetable, to ensure that the jurisdiction will complete the plan in the required time. This requirement shall be incorporated into the award (both the planning and project subaward agreements, if a planning subaward is also awarded).



Federal and State Disaster and Recovery Assistance Programs

Following a disaster, various types of assistance could be made available by local, state, and federal governments. The types and levels of disaster assistance depend on the severity of the damage and the declarations that result from the disaster event. The following sections detail the general types of assistance that might be provided should the President of the United States declare the event a major disaster.

Individual Assistance (IA)

Individual Assistance (IA) provides help for homeowners, renters, businesses, and some nonprofit entities after disasters occur. This program is largely funded by the U.S. Small Business Administration. For homeowners and renters, those who suffered uninsured or underinsured losses could be eligible for a Home Disaster Loan to repair or replace damaged real estate or personal property. Renters are eligible for loans to cover personal property losses. Individuals are allowed to borrow up to \$200,000 to repair or replace real estate, \$40,000 to cover losses to personal property, and an additional 20 percent for mitigation. For businesses, loans could be made to repair or replace disaster damages to property owned by the business, including real estate, machinery and equipment, inventory, and supplies. Businesses of any size are eligible. Nonprofit organizations, such as charities, churches, and private universities are eligible. An Economic Injury Disaster Loan provides necessary working capital until normal operations resume after a physical disaster but are restricted by law to small businesses only. IA is detailed on the FEMA website: <https://www.fema.gov/individual-disaster-assistance>.

Public Assistance (PA)

Public Assistance (PA) provides cost reimbursement aid to local governments (state, county, local, municipal authorities, and school districts) and certain nonprofit agencies that were involved in disaster response and recovery programs or that suffered loss or damage to facilities or property used to deliver government-like services. This program is largely funded by FEMA with both local and state matching contributions are required. PA is detailed on the FEMA website: <https://www.fema.gov/public-assistance-local-state-tribal-and-non-profit>.

Small Business Administration (SBA) Loans

The Small Business Administration (SBA) provides low-interest disaster loans to homeowners, renters, businesses of all sizes, and most private nonprofit organizations. SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.

Homeowners can apply for up to \$200,000 to replace or repair their primary residence. Renters and homeowners can borrow up to \$40,000 to replace or repair personal property—such as clothing, furniture, cars, and appliances that were damaged or destroyed in a disaster. Physical disaster loans of up to \$2 million are available to qualified businesses or most private nonprofit organizations. Additional information regarding SBA loans is available on the SBA website: <https://www.sba.gov/managing-business/running-business/emergency-preparedness/disaster-assistance>.

Social Services Block Grant Program (SSBG)

The Social Services Block Grant (SSBG) is a flexible funding source that allows States and Territories to tailor social service programming to their population’s needs. Through the SSBG, States provide essential social services that help achieve a myriad of goals to reduce dependency and promote self-sufficiency; protect children and adults from neglect, abuse and exploitation; and help individuals who are unable to take care of themselves to stay in their homes or to find the best institutional arrangements. Additional information regarding the SSBG program is available on the website: <https://www.acf.hhs.gov/ocs/programs/ssbg>.



Homeland Security Grant Program (HSGP)

The Homeland Security Grant Program (HSGP) plays an important role in the implementation of the National Preparedness System by supporting the building, sustainment, and delivery of core capabilities essential to achieving the National Preparedness Goal of a secure and resilient nation. The FY 2019 HSGP provides funding to states, territories, urban areas, and local and tribal governments to prevent, protect against, mitigate, respond to, and recover from potential terrorist attacks and other hazards. It supports core capabilities across the five mission areas of prevention, protection, mitigation, response, and recovery based on allowable costs. HSGP also supports the goal to strengthen national preparedness and resilience (FEMA 2019).

HSGP is composed of three interconnected grant programs, including the State Homeland Security Program (SHSP), Urban Areas Security Initiative (UASI), and the Operation Stonegarden (OPSG). Together, these grant programs fund a range of preparedness activities, including planning, organization, equipment purchase, training, exercises, and management and administration. Additional information regarding HSGP is available on the website: <https://www.fema.gov/homeland-security-grant-program>.

Community Development Block Grants (CDBG)

Community Development Block Grants (CDBG) are federal funds intended to provide low and moderate-income households with viable communities, including decent housing, a suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, roads and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, and planning and administration. Public improvements could include flood and drainage improvements. In limited instances and during the times of “urgent need” (e.g., post-disaster) as defined by the CDBG National Objectives, CDBG funding could be used to acquire a property located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event. Additional information regarding CDBG is available on the website: <https://www.hudexchange.info/programs/cdbg-entitlement/>.

U.S. Economic Development Administration

The U.S. Economic Development Administration (USEDA) is an agency of the U.S. Department of Commerce that supports regional economic development in communities around the country. It provides funding to support comprehensive planning and makes strategic investments that foster employment creation and attract private investment in economically distressed areas of the United States. Through its Public Works Program, USED A invests in key public infrastructure, such as traditional public works projects, including water and sewer systems improvements, expansion of port and harbor facilities, brownfields, multitenant manufacturing and other facilities, business and industrial parks, business incubator facilities, redevelopment technology-based facilities, telecommunications facilities, and development facilities. Through its Economic Adjustment Program, USED A administers its Revolving Loan Fund Program, which supplies small businesses and entrepreneurs with the gap financing needed to start or expand their business in areas that have experienced or are under threat of serious structural damage to the underlying economic base. Additional information is available on the USED A website: <https://www.eda.gov/>.

Federal Highway Administration - Emergency Relief (FHWA-ER)

Federal Highway Administration – Emergency Relief (FHWA-ER) is a grant program that can be used for repair or reconstruction of federal-aid highways and roads on federal lands that have suffered serious damage as a result of a disaster. NYS is serving as the liaison between local municipalities and FHWA. For information regarding FHWA-ER, please refer to: <https://www.fhwa.dot.gov/programadmin/erelief.cfm>.



Federal Transit Administration - Emergency Relief (FTA-ER)

Federal Transit Administration-Emergency Relief (FTA-ER) is a grant program that funds capital projects to protect, repair, reconstruct, or replace equipment and facilities of public transportation systems. Administered by the Federal Transit Authority at the U.S. Department of Transportation, this transportation-specific fund was created as an alternative to FEMA PA. Currently, a total of \$5.2 billion has been allocated to NYS-related entities. Additional information regarding FTA-ER is available on the website:

<https://www.transit.dot.gov/funding/grant-programs/emergency-relief-program/emergency-relief-program>.

Emergency Watershed Protection Program

The purpose of the Emergency Watershed Protection Program (EWP) was established by Congress to respond to emergencies created by natural disasters. The EWP Program is designed to help people and conserve natural resources by relieving imminent hazards to life and property caused by floods, fires, drought, windstorms, and other natural occurrences. The U.S. Department of Agriculture's NRCS administers the EWP Program, EWP-Recovery, and EWP-Floodplain Easement. Additional information regarding the EWP is detailed below and available on the website:

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/>.

EWP - Recovery

The EWP - Recovery Program is a recovery effort program aimed at relieving imminent hazards to life and property caused by floods, fires, windstorms, and other natural occurrences. Public and private landowners are eligible for assistance but must be represented by a project sponsor that must be a legal subdivision of the state, such as a city, county, township, or conservation district, and Native American Tribes or Tribal governments. NRCS will pay up to 75 percent of the construction cost of emergency measures. The remaining 25 percent must come from local sources and can be in the form of cash or in-kind services.

EWP work is not limited to any one set of measures. It is designed for installation of recovery measures to safeguard lives and property as a result of a natural disaster. NRCS completes a Damage Survey Report, which provides a case-by-case investigation of the work necessary to repair or protect a site.

Watershed impairments that the EWP Program addresses are debris-clogged stream channels, undermined and unstable streambanks, jeopardized water control structures and public infrastructures, wind-borne debris removal, and damaged upland sites stripped of protective vegetation by fire or drought.

EWP - Floodplain Easement (FPE)

Privately owned lands or lands owned by local and state governments might be eligible for participation in EWP- Floodplain Easement (EWP-FPE). To be eligible, lands must meet one of the following criteria:

- Lands that have been damaged by flooding at least once within the previous calendar year or have been subject to flood damage at least twice within the previous 10 years.
- Other lands within the floodplain are eligible, provided the lands would contribute to the restoration of the flood storage and flow, provide for control of erosion, or that would improve the practical management of the floodplain easement.
- Lands that would be inundated or adversely impacted as a result of a dam breach.

EWP-FPE easements are restored to the extent practicable to the natural environment and can include both structural and nonstructural practices to restore the flood storage and flow, erosion control, and improve the practical management of the easement.



Structures, including buildings, within the floodplain easement must be demolished and removed or relocated outside the 100-year floodplain or dam breach inundation area.

6.4.6 Fiscal Capabilities – County and Local

Municipal Fiscal Capabilities

The City of Long Beach funds flood mitigation projects through the existing local budget, local appropriations (including referendums and bonding), and a variety of federal and state loan and grant programs.

6.4.7 Potential Mitigation Funding Sources

While it is important to recognize the mitigation strategies for the City of Long Beach to help achieve the mitigation goals and objectives of the FMP, it is also important to provide sources for funding to implement these strategies. Table 6-4 below provides a list of programs, descriptions, and links for those seeking funding sources. Please note that this table is not intended to be a comprehensive list, but rather a starting point to help identify potential sources of funding for the identified mitigation strategies.

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Table 6-4. Mitigation Funding Sources

Program	Description	Lead Agency	Website
Federal			
Hazard Mitigation Assistance (HMA)	Grants to provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages – includes FMA, HMGP, PDM.	FEMA	https://www.fema.gov/hazard-mitigation-assistance
Flood Mitigation Assistance (FMA)	Program grants to states and communities for pre-disaster mitigation planning and projects to help reduce or eliminate the long-term risk of flood damage to structures insurable under the National Flood Insurance Program.	FEMA	https://www.fema.gov/flood-mitigation-assistance-grant-program
Hazard Mitigation Grant Program (HMGP)	Grants to states and communities for planning and projects providing long-term hazard mitigation measures following a major disaster declaration.	FEMA	https://www.fema.gov/hazard-mitigation-grant-program
Pre-Disaster Mitigation (PDM) Competitive Grant Program	Grants to states and communities for planning and projects that provide long-term hazard pre-disaster mitigation measures.	FEMA	https://www.fema.gov/pre-disaster-mitigation-grant-program
Public Assistance: Hazard Mitigation Funding Under Section 406	Hazard mitigation discretionary funding available under Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act following a Presidentially declared disaster.	FEMA	https://www.fema.gov/news-release/2017/05/03/4309/fema-hazard-mitigation-grants-404-and-406
Disaster Housing Program	Emergency assistance for housing, including minor repair of home to establish livable conditions, mortgage, and rental assistance.	HUD	https://www.hud.gov/program_offices/public_indian_housing/publications/dhap
HOME Investment Partnerships Program	Grants to local and state government and consortia for permanent and transitional housing, (including financial support for property acquisition and rehabilitation for low-income persons).	HUD	https://www.hud.gov/program_offices/complanning/affordablehousing/programs/home/
HUD Disaster Recovery Assistance	Grants to fund gaps in available recovery assistance after disasters (including mitigation).	HUD	https://www.hud.gov/info/disasterresources
Section 108 Loan Guarantee	Enables states and local governments participating in the Community Development Block Grant (CDBG) program to obtain federally guaranteed loans for disaster-distressed areas.	HUD	https://www.hudexchange.info/programs/section-108/
Smart Growth Implementation Assistance (SGIA) program	The SGIA program focuses on complex or cutting-edge issues, such as stormwater management, code revision, transit-oriented development, affordable housing, infill development, corridor planning, green building, and climate change. Applicants can submit proposals under four categories: community resilience to disasters, job creation, the role of manufactured homes in sustainable neighborhood design or medical and social service facilities siting.	EPA	https://www.epa.gov/smartgrowth
Partners for Fish and Wildlife	Financial and technical assistance to private landowners interested in pursuing restoration projects affecting wetlands and riparian habitats.	U.S. Fish and Wildlife Service	https://www.fws.gov/partners/
FHWA Emergency Relief Program	Fund for the repair or reconstruction of Federal-aid highways that have suffered serious damage as a result of (1) natural disasters or (2) catastrophic failures from an external cause.	U.S. Department of Transportation (DOT)	https://www.fhwa.dot.gov/programadmin/relief.cfm



Program	Description	Lead Agency	Website
Transportation Investment Generating Economic Recovery (TIGER)	Investing in critical road, rail, transit, and port projects across the nation.	U.S. DOT	https://www.transportation.gov/tags/tiger-grants
Community Facilities Direct Loan & Grant Program	This program provides affordable funding to develop essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area and does not include private, commercial, or business undertakings.	USDA	https://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program
Emergency Loan Program	USDA's Farm Service Agency (FSA) provides emergency loans to help producers recover from production and physical losses due to drought, flooding, other natural disasters, or quarantine.	USDA	https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/emergency-farm-loans/index
Emergency Watershed Protection (EWP) Program	Provide assistance to relieve imminent hazards to life and property caused by floods, fires, drought, windstorms, and other natural occurrences.	NRCS	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/
Financial Assistance	Financial assistance to help plan and implement conservation practices that address natural resource concerns or opportunities to help save energy, improve soil, water, plant, air, animal, and related resources on agricultural lands and non-industrial private forest land.	NRCS	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/
Emergency Management Performance Grants (EMPG) Program	Assist local, tribal, territorial, and state governments in enhancing and sustaining all-hazards emergency management capabilities.	U.S. DHS	https://www.fema.gov/emergency-management-performance-grant-program
Land & Water Conservation Fund	Matching grants to states and local governments for the acquisition and development of public outdoor recreation areas and facilities (as well as funding for shared federal land acquisition and conservation strategies).	National Park Service	https://www.nps.gov/subjects/lwcf/index.htm
State			
Local Government Records Management Improvement Fund (LGRMIF) Disaster Recovery Grants	Grants for disaster recovery projects related to damage caused by a sudden, unexpected event involving fire, water, man-made, or natural phenomena where a timely response is necessary to prevent the irretrievable loss of vital or archival records, or to ensure reasonable, timely access to vital records.	New York State Archives/New York State Education Department	http://www.archives.nysed.gov/grants/grants_lgrmif.shtml
The New York State Emergency Services Revolving Loan	Repair of firefighting apparatus, ambulances, or rescue vehicles; Renovation, rehabilitation, or repair of facilities that house firefighting equipment, ambulances, rescue vehicles, and related equipment.	NYS DHSES	http://www.dhSES.ny.gov/ofpc/services/loan/
Environmental Protection Fund (EPF)	Matching grants for the acquisition, planning, development, and improvement of parks, historic properties.	New York State Parks, Recreation & Historic Preservation (NYSOPRHP)	https://www.dec.ny.gov/about/92815.html
Recreational Trails (RTP)	Program Matching grants for the acquisition, development, rehabilitation, and maintenance of trails and trail-related projects.	NYSOPRHP	https://parks.ny.gov/grants/recreational-trails/default.aspx



Program	Description	Lead Agency	Website
Environmental Protection & Improvement Grants	Competitive grants for environmental protection and improvement; available for municipalities, community organizations, not-for-profit organizations, and others.	New York State Department of Environmental Conservation	https://www.dec.ny.gov/about/92815.html
Clean Water Act Section 604(b) Water Quality Planning Grants	Provide funding to implement regional comprehensive water quality management planning activities as described in Section 604(b) of the federal Clean Water Act. 604(b) funds are to be used for water quality management planning activities, including tasks to determine the nature, extent, and causes of point and nonpoint source water pollution problems, and to develop plans to resolve these problems.	NYSDEC	https://www.dec.ny.gov/lands/53122.html
Water Quality Improvement Project (WQIP) Program	The WQIP program is a competitive, reimbursement grant program that funds projects that directly address documented water quality impairments. Applications are typically available each spring through the Consolidated Funding Application.	NYSDEC	https://www.dec.ny.gov/pubs/4774.html
New York State DEC/EFC Wastewater Infrastructure Engineering Planning Grant (EPG)	The New York State Department of Environmental Conservation (NYSDEC), in conjunction with the New York State Environmental Facilities Corporation (EFC), will offer grants to municipalities to help pay for the initial planning of eligible Clean Water State Revolving Fund (CWSRF) water quality projects. The ultimate goal of the EPG program is to advance water quality projects to construction, so successful applicants can use the engineering report funded by the grant to seek financing through the CWSRF program, Water Quality Improvement Project program, or other funding entities to further pursue the identified solution.	NYSDEC	https://www.dec.ny.gov/pubs/81196.html
Climate Smart Communities (CSC) Grant Program	The CSC Grant program was established in 2016 to provide 50/50 matching grants to cities, towns, villages, and counties (or boroughs of New York City) of the State of New York for eligible climate adaptation and mitigation projects.	NYSDEC	https://www.dec.ny.gov/energy/109181.html
New York State Climate Resilient Farming (CRF) Program	The state provides funds to farms to reduce greenhouse gas emissions, promote energy savings, and mitigate water and soil quality concerns.	New York State Department of Agriculture and the New York State Soil and Water Conservation Committee	https://www.nys-soilandwater.org/programs/crf.html



6.5 MITIGATION STRATEGY DEVELOPMENT

This subsection discusses the identification, prioritization, analysis, and implementation plan of mitigation actions for the City of Long Beach Floodplain Management Plan.

6.5.1 Mitigation Alternatives

The planning team developed a catalog of flood hazard mitigation alternatives through a facilitated process with the Planning Committee. A session held on January 8, 2020 to review possible actions was the basis for the alternatives considered as well as the mitigation initiatives selected for implementation. The catalog represents the comprehensive range of alternatives considered for complying with Step 7 of the CRS 10-step process. The Planning Committee reviewed this catalog in conjunction with the findings of public outreach efforts, the risk assessment results, and the Nassau County HMP. The catalog was enhanced based on this review and then used by the Planning Committee to select hazard mitigation initiatives.

Catalogs of flood hazard mitigation alternatives were developed that present a broad range of alternatives to be considered for use in the planning area (CRS Step 7). The catalog is listed in Table 6-5 through Table 6-7. The catalogs present alternatives that are categorized in two ways:

- By what the alternative would do:
 - Manipulate a hazard
 - Reduce exposure to a hazard
 - Reduce vulnerability to a hazard
 - Build local capacity to respond to or be prepared for a hazard
- By who would have responsibility for implementation:
 - Individuals (Personal Scale)
 - Businesses (Corporate Scale)
 - City of Long Beach (Government Scale)

Flood hazard mitigation initiatives recommended in this plan were selected from among the alternatives presented in the catalogs. The catalogs provide a baseline of mitigation alternatives that are backed by a planning process, are consistent with the goals and objectives, and are within the capabilities of the City of Long Beach to implement. However, not all the alternatives meet all the selection criteria.

Table 6-5. Mitigation Catalog: Personal Scale

Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build Local Capacity to Respond to or Be Prepared for the Hazard
Personal Scale			
<ul style="list-style-type: none"> • Clear storm drains and culverts 	<ul style="list-style-type: none"> • Relocate homes outside of the flood hazard area 	<ul style="list-style-type: none"> • Retrofit structures (e.g. elevate structures above the regulatory flood elevation) 	<ul style="list-style-type: none"> • Buy flood insurance
<ul style="list-style-type: none"> • Install local stormwater capture systems 	<ul style="list-style-type: none"> • Elevate utilities and/or other mechanicals above the regulatory flood elevation 	<ul style="list-style-type: none"> • Elevate items within homes above the regulatory flood elevation 	<ul style="list-style-type: none"> • Develop household mitigation plans, such as retrofit savings, communication capability with outside sources, and 72-hour self-sufficiency during and after an event



Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build Local Capacity to Respond to or Be Prepared for the Hazard
<ul style="list-style-type: none"> Use low-impact development techniques 	<ul style="list-style-type: none"> Use low-impact development technique 	<ul style="list-style-type: none"> Construct new homes above the regulatory flood elevation 	<ul style="list-style-type: none"> Understand the location of evacuation routes in the community
	<ul style="list-style-type: none"> Assess projects to determine if they may inadvertently increase flood risk 	<ul style="list-style-type: none"> Floodproof existing structures 	<ul style="list-style-type: none"> Educate self on flood risk from related hazards such as coastal storms and severe rain events
			<ul style="list-style-type: none"> Participate in Community Emergency Response Team (CERT) training

Table 6-6. Mitigation Catalog: Corporate Scale

Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build Local Capacity to Respond to or Be Prepared for the Hazard
Corporate Scale			
<ul style="list-style-type: none"> Clear stormwater drains and culverts 	<ul style="list-style-type: none"> Relocate critical facilities or functions outside of flood area 	<ul style="list-style-type: none"> Build redundancy for critical functions or retrofit critical buildings 	<ul style="list-style-type: none"> Support and implement hazard disclosure for the sale/re-sale of property in identified flood areas
<ul style="list-style-type: none"> Install local stormwater capture systems 	<ul style="list-style-type: none"> Institute low-impact development techniques on property 	<ul style="list-style-type: none"> Provide flood-proofing measures when new critical infrastructure must be located in floodplains 	<ul style="list-style-type: none"> Solicit cost-sharing through partnerships with private-sector stakeholders on projects with multiple benefits
<ul style="list-style-type: none"> Use low-impact development techniques 	<ul style="list-style-type: none"> Assess projects to determine if they may inadvertently increase flood risk 		<ul style="list-style-type: none"> Increase capability by having cash reserves for reconstruction
	<ul style="list-style-type: none"> Use porous pavement, vegetative buffers, and islands in large parking areas 		<ul style="list-style-type: none"> Buy flood insurance
	<ul style="list-style-type: none"> Raise utilities or other mechanical devices above regulatory flood elevation 		

Table 6-7. Mitigation Catalog: Government Scale

Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build Local Capacity to Respond to or Be Prepared for the Hazard
Government Scale			
<ul style="list-style-type: none"> Work with USACE, NYS, and the U.S. Coast Guard to ensure channels of the Jones Inlet are properly marked and dredged 	<ul style="list-style-type: none"> Promote open space uses in identified high-hazard areas via techniques such as: planned unit developments, easements, setbacks, greenways, and sensitive area tracks 	<ul style="list-style-type: none"> Increase floodplain standards within municipal ordinances, and include provisions for enforcing best practice standards within floodplains and using FEMA flood maps 	<ul style="list-style-type: none"> Utilize the city’s status as a Climate Smart Community to apply for grant funding (e.g., CSC Grant Program)



Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build Local Capacity to Respond to or Be Prepared for the Hazard
Government Scale			
<ul style="list-style-type: none"> Enhance stormwater management regulations and master planning Clear stormwater drains and culverts 	<ul style="list-style-type: none"> Install additional tide flex valves to prevent backflow Locate or relocate critical facilities outside of flood hazard area 	<ul style="list-style-type: none"> Increase size of undersized bridges and culverts Implement higher regulatory standards such as higher freeboard and lower substantial damage threshold 	<ul style="list-style-type: none"> Develop and implement a public information strategy Develop a flood information page on the city's website
	<ul style="list-style-type: none"> Acquire or relocate identified repetitive loss properties 	<ul style="list-style-type: none"> Identify critical infrastructure such as those on single-entry roads and prioritize for replacement or resizing 	<ul style="list-style-type: none"> Provide outreach to residents to inform them on how to notify Public Works of backflow device clogs
	<ul style="list-style-type: none"> Work with local universities and schools to develop erosion documentation program 	<ul style="list-style-type: none"> Provide redundancy for critical functions and infrastructure 	<ul style="list-style-type: none"> Educate residents on how backflow valves work and how to help keep storm drains free of trash and debris
	<ul style="list-style-type: none"> Institute low-impact development techniques on property 	<ul style="list-style-type: none"> Review stormwater management regulations and master planning 	<ul style="list-style-type: none"> Develop a flood warning system using the Stevens flood modeling system
	<ul style="list-style-type: none"> Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff 	<ul style="list-style-type: none"> Adopt "no-adverse impact" floodplain management policies that strive to not increase the flood risk on downstream communities 	<ul style="list-style-type: none"> Develop a Flood Warning and Response Plan
	<ul style="list-style-type: none"> Enforce more stringent parking standards to ensure vehicles are not being parked in floodprone areas or acquired properties 	<ul style="list-style-type: none"> Require accounting for sea-level rise in all applications for new development in shoreline areas 	<ul style="list-style-type: none"> Provide better communication systems and back-up communication systems to inform public of hazards and to communicate during the hazard event
	<ul style="list-style-type: none"> Preserve undeveloped and vulnerable shoreline 	<ul style="list-style-type: none"> Implement standards for bulkhead replacement (required height) 	<ul style="list-style-type: none"> Develop an adaptive management plan to address long-term impacts of sea-level rise
	<ul style="list-style-type: none"> Restore existing flood control and riparian corridors 		<ul style="list-style-type: none"> Consider the probable impacts of climate change on the risk associated with the flood hazard
	<ul style="list-style-type: none"> Utilize alternative funding sources for property buyouts that do not have the same restrictions as FEMA buyout programs 		<ul style="list-style-type: none"> Work with insurance agencies and real estate agents to provide workshops on tools and resources to get more information on flood hazard zones and FIRMs
			<ul style="list-style-type: none"> Enact tools to help manage development in hazard areas (stronger controls, tax incentives, information)
			<ul style="list-style-type: none"> Incorporate retrofitting/replacement of critical system elements in capital improvement plan
			<ul style="list-style-type: none"> Develop strategy to take advantage of post-disaster opportunities



Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build Local Capacity to Respond to or Be Prepared for the Hazard
Government Scale			
			<ul style="list-style-type: none"> Warehouse critical infrastructure components
			<ul style="list-style-type: none"> Maintain existing data and gather new data needed to define risks and vulnerability
			<ul style="list-style-type: none"> Enforce NFIP requirements
			<ul style="list-style-type: none"> Create an elevation inventory of structures in the floodplain
			<ul style="list-style-type: none"> Charge a hazard mitigation fee on all new permits to create a hazard mitigation funding source for grant cost share requirements
			<ul style="list-style-type: none"> Integrate floodplain management policies into other planning mechanisms within the community
			<ul style="list-style-type: none"> Be proactive in buyouts for contiguous open space
			<ul style="list-style-type: none"> Establish incentives to promote flood hazard mitigation of private property
			<ul style="list-style-type: none"> Join National Weather Service (NWS) "Storm Ready" Program
			<ul style="list-style-type: none"> Disseminate evacuation procedures
			<ul style="list-style-type: none"> Ensure public safety personnel and ambulance drivers know safe evacuation routes Install rain gauge/flood warning system
			<ul style="list-style-type: none"> Capture/survey high-water marks during flood events
			<ul style="list-style-type: none"> Produce municipal post-disaster manuals to provide efficient recovery procedures and reimbursement of funds
			<ul style="list-style-type: none"> Develop better education and outreach regarding flood insurance and NFIP programs
			<ul style="list-style-type: none"> Floodproof/harden critical infrastructure
			<ul style="list-style-type: none"> Provide mitigation outreach campaign for businesses
			<ul style="list-style-type: none"> Promote available mitigation-related training in the area
			<ul style="list-style-type: none"> Where applicable, have municipal officials attend FEMA flood training and provide incentive for officials to get training
			<ul style="list-style-type: none"> Work on engaging the public with progress on flood mitigation projects to demonstrate progress
			<ul style="list-style-type: none"> Conduct proactive planning for buyouts to ensure more comprehensive buyout programs



6.5.2 City Mitigation Strategy Development

Throughout the course of the planning process, city mitigation actions have been identified. These were identified through the following:

- Review of the results and findings of the risk assessment;
- Review of available regional and local plans, reports and studies;
- Direct input from city departments and other county and regional agencies, including:
 - City of Long Beach Economic Development and Planning
 - City of Long Beach Parks & Recreation
 - City of Long Beach Police Department/Office of Emergency Management
 - City of Long Beach Department of Public Works
 - City of Long Beach Department of Community Development and Sustainability
 - City of Long Beach Building Department
 - City of Long Beach Manager’s Office
 - City of Long Beach Zoning Board of Appeals
 - City of Long Beach Environmental Advisory Board
 - City of Long Beach Volunteer Fire Department
 - Long Beach Chamber of Commerce
 - North East Bay and Canal Civic Association
 - City Community Organizations Active in Disaster (COAD)
- Input received through the public and stakeholder outreach process.

The Planning Committee determined that some initiatives from the flood hazard mitigation catalog could be implemented to provide flood mitigation benefits. Table 6-9 lists the recommended initiatives, the lead agency for each, and the proposed timeline. The parameters for the timeline are as follows:

- Short-term – to be completed in one to five years
- Long-Term – to be completed in greater than five years
- Ongoing – currently being funded and implemented under existing programs

Benefit/Cost Review

The action plan is prioritized according to a benefit/cost analysis of the proposed projects and their associated costs (CRS Step 8). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under the HMGP and PDM grant program. A less formal approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects.

Costs are the total cost for the action or project, and may include administrative costs, construction costs (including engineering, design and permitting), and maintenance costs.

Benefits are the savings from losses avoided attributed to the implementation of the project, and may include life-safety, structure and infrastructure damages, loss of service or function, and economic and environmental damage and losses.



When available, the city was asked to identify the actual or estimated dollar value for project costs and associated benefits. Having defined costs and benefits allows a direct comparison of benefits versus costs, and a quantitative evaluation of project cost-effectiveness. Often, however, numerical costs and/or benefits have not been identified or may be impossible to quantitatively assess.

For the purposes of this planning process, the city was tasked with evaluating project cost-effectiveness with both costs and benefits assigned to “High,” “Medium,” and “Low” ratings. Where quantitative estimates of costs and benefits were available, ratings/ranges were defined as:

- Low < \$10,000
- Medium \$10,000 to \$100,000
- High > \$100,000

Where quantitative estimates of costs and/or benefits were not available, qualitative ratings using the following definitions were used:

Table 6-8. Qualitative Cost and Benefit Ratings

Costs	
High	Existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (e.g., bonds, grants, and fee increases).
Medium	The project could be implemented with existing funding but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Low	The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.
Benefits	
High	Project will have an immediate impact on the reduction of risk exposure to life and property.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property.
Low	Long-term benefits of the project are difficult to quantify in the short-term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly.

For some of the City of Long Beach initiatives identified, the Planning Committee may seek financial assistance under FEMA’s HMGP or HMA programs. These programs require detailed benefit/cost analysis as part of the application process. These analyses will be performed when funding applications are prepared, using the FEMA benefit/cost analysis model process. The Planning Committee is committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the Planning Committee reserves the right to define “benefits” according to parameters that meet its needs and the goals and objectives of this FMP.

Prioritization

Table 6-10 lists the priority of each initiative as assigned by the planning team, using the same parameters used in selecting the initiatives. A qualitative benefit-cost review was performed for each of these initiatives. The priorities are defined as follows:

High Priority—A project that meets multiple objectives, has benefits that exceed cost, has funding secured or is an ongoing project and meets eligibility requirements for a grant program. High priority projects can be completed in the short-term (1 to 5 years). The key factors for high priority projects are that they have funding secured and can be completed in the short-term.



Medium Priority—A project that meets goals and objectives, that has benefits that exceed costs, and for which funding has not been secured but that is grant eligible. Project can be completed in the short-term, once funding is secured. Medium priority projects will become high priority projects once funding is secured. The key factors for medium priority projects are that they are eligible for funding, but do not yet have funding secured, and they can be completed within the short-term.

Low Priority—A project that will mitigate the risk of a hazard, that has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for FEMA grant funding, and for which the timeline for completion is long-term (1 to 10 years). Low priority projects may be eligible for grant funding from other programs. Low priority projects are “blue-sky” projects. How they will be financed is unknown, and they can be completed over a long-term.

Analysis of Mitigation Initiatives

Each recommended initiative was classified based on the hazard it addresses and the type of mitigation it involves. Mitigation types used for this categorization are as follows:

Prevention—Government, administrative, or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.

Property Protection—Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.

Public Education and Awareness—Actions to inform citizens and elected officials about flood hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.

Natural Resource Protection—Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

Emergency Services—Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.

Structural Projects—Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

Table 6-9 and Table 6-10 present the results of this analysis and prioritization.



Table 6-9. Flood Mitigation Initiatives

Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives met	Project category	Priority (High, Med., Low)
1	<p>Adopt appropriate enhanced regulatory standards, specifically those that account for future flood conditions and climate change, such as:</p> <ul style="list-style-type: none"> Increasing bulkhead elevation requirements. Increasing freeboard requirement to 3 feet. Establishing cumulative substantial improvements Establishing threshold lower than 50% for substantial damages. Establishing limitations on enclosures beneath elevated structures. Requiring raising of lots on new development or substantial improvements. “Green Zoning” focusing on coastal resiliency and green infrastructure enhancements. Establishing a bayfront overlay zone to guide development in critical waterfront areas. Removing restrictions on green infrastructure currently in place in the City Code of Ordinances. 	City Code Official/Engineer, Planning	City budget	Short	1.8, 2.2	PR, PP	High
2	Adopt an updated comprehensive plan that integrates hazard mitigation, embraces resiliency, and includes a Local Waterfront Revitalization Program and comprehensive stormwater flood management study. Subsequently, update zoning based on the adopted comprehensive plan.	City of Long Beach Planning	City budget	Short	1.8, 2.1, 2.2	PR	High
3	Participate in regional watershed management and develop a Watershed Management Plan.	City of Long Beach Engineering, City of Long Beach Planning, CRS Coordinator	City budget, NYS DEC	Ongoing	3.3	NRP	Low
4	Support updates to the Nassau County Hazard Mitigation Plan (HMP) and incorporate floodplain management plan actions into the City of Long Beach’s annex within the HMP.	City Manager, OEM	City budget	Ongoing	2.1	PR, PP, NRP, SP, PI	High
5	Support the U.S. Army Corps of Engineers (USACE) Nassau County Back Bays Coastal Storm Risk Management Feasibility Study and work with USACE to implement identified projects. Specifically, support projects that will provide adequate protection from future flooding conditions.	USACE, City Manager	USACE, city budget, HMGP, PDM, FMA	Long	Potential for all objectives exists.	SP, PP, NRP	Low



Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives met	Project category	Priority (High, Med., Low)
6	Maintain the all-hazards Emergency Operations Plan.	City of Long Beach OEM	City budget	Ongoing	5.3	PR, ES	High
7	Develop CRS-credited Flood Warning and Response Plan and incorporate Stevens Flood Advisory System into emergency operations, outreach, and the city website. Explore implementing an automated flood warning system using the following tide gage locations for forecasting: <ul style="list-style-type: none"> East Rockaway Inlet: http://hudson.dl.stevens-tech.edu/sfas/d/index.shtml?station=U207 Reynolds Channel at Point Lookout: http://hudson.dl.stevens-tech.edu/sfas/d/index.shtml?station=U206 	City of Long Beach OEM, CRS Coordinator	City budget, USGS Silver Jackets, HSGP	Short	5.1	PI, ES	High
8	Implement and participate in regional precipitation monitoring networks and other programs that enhance flood threat recognition capability.	City of Long Beach Engineering, OEM, City Manager	City budget, NYS DEC, USGS	Long	5.1	ES, PI	Low
9	Conduct regular citywide tests of emergency warning system and include the public in tests whenever possible.	City of Long Beach OEM, Public Relations, Neighborhood Emergency Team (NET)	City budget, EMPG, HSGP	Ongoing	5.1	ES	High
10	Develop a CRS User Group for Nassau County South Shore communities.	Administration, CRS Coordinator, Nassau County	City budget, County budget	Short	2.1, 4.1, 5.3	PR	Medium
11	Increase the capabilities of city staff by having staff undergo training, including FEMA Emergency Management Institute (EMI) training and Certified Floodplain Manager (CFM) certification.	Long Beach Administration	City budget, FEMA EMI	Ongoing	4.1	NRP	High
12	Promote open space or flood-compatible land uses in identified flood hazard areas via techniques such as: easements, setbacks, sensitive area tracts, community education, natural resource inventory; comprehensive planning; zoning provisions; floodplain protection ordinance; and the environmental review process.	City of Long Beach Planning, City of Long Beach Public Works	City budget, HMGP, PDM, FMA, Clean Water Act Water Quality Grants, WQIP, Climate Smart, EPF	Ongoing	3.3	NRP, SP, PR, PI	High



Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives met	Project category	Priority (High, Med., Low)
13	Develop and maintain a CRS credited Program for Public Information to better organize, implement, and review outreach for flooding and other hazards.	Public Relations, CRS Coordinator	City budget	Ongoing	4.2, 2.3, 5.2	PI	High
14	Develop and maintain a CRS credited Pre-Flood Plan. Include actions within the Plan that discuss post-flooding disaster building requirements.	City of Long Beach OEM, CRS Coordinator	City budget	Ongoing	4.2, 2.3, 5.2	PI	High
15	Add flood information outreach into the city’s “Resident Welcome Package” for new residents.	Clerk, Public Information	City budget	Short	4.2, 4.3	PI	Medium
16	Expand outreach programs in schools to include children in outreach and to improve families’ disaster response capabilities. Schools within the City of Long Beach include: <ul style="list-style-type: none"> • Long Beach Public Schools • Long Beach Catholic Regional School • Montessori School of Long Beach • Torah High School • Other educational institutions 	Public Relations, Boards of Education, City Police	City budget, Long Beach Boards of Education	Ongoing	4.2, 4.3, 5.2	PI, ES	High
17	Expand outreach through designed outreach videos and social media posts on flooding. Identify and complete targeted outreach efforts.	Public Relations	City budget	Ongoing	4.2, 5.2	PI	High
18	Work with civic organizations, non-profit organizations, houses of worship, and realtors to expand stakeholder-delivered outreach.	Public Relations	City budget, Civic organizations, non-profits, houses of worship, realtors	Ongoing	4.2, 5.2	PI	High
19	Provide information on residential, business, and natural resource grant programs to residents.	City Planning, Building Department	City budget	Ongoing	4.3, 5.2	PI	High
20	Maintain city website for pre-storm information dissemination, including shelter locations.	Public Relations	City budget	Ongoing	4.3, 5.2	PI, ES	High
21	Re-establish signage of coastal evacuation routes.	OEM, Public Works	City budget, NWS	Short	5.2	PI, ES	High
22	Promote flood insurance for commercial properties, including contents coverage. Work with realtors, insurers, and civic organizations to increase delivery of messaging.	Public Relations, Floodplain Administrator, Realtors	City budget, Realty agencies, Civic organizations	Ongoing	2.3	PI	High



Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives met	Project category	Priority (High, Med., Low)
23	Promote flood insurance for rental properties, including contents coverage for renters. Work with realtors, insurers, and civic organizations to increase delivery of messaging.	Public Relations, Floodplain Administrator, Realtors	City budget, Realty agencies, Civic organizations	Ongoing	1.10, 4.4	PI	High
24	Promote flood insurance for homeowners, including contents. Work with realtors, insurers, and civic organizations to increase delivery of messaging.	Public Relations, Floodplain Administrator, Realtors	City budget, Realty agencies, organizations	Ongoing	4.4	PI	High
25	Provide education for acquisition or elevation of repetitive loss properties. Urge Nassau County to provide additional support for potential grant applications.	City of Long Beach Planning, Nassau County	City budget, HMA/FMA	Short	1.10, 1.14, 4.3	SP, PP	High
26	Educate residents on green infrastructure upgrades that can be made to residential properties to help reduce risk to flooding and other hazards.	Department of Community Development and Sustainability, Public Relations	City budget	Short	2.1, 3.3, 4.2, 4.3	PP, NRP	Medium
27	Explore the use of green infrastructure to reduce urban flooding.	City of Long Beach Engineering, City of Long Beach Office of Sustainability	Clean Water Act Water Quality Grants, WQIP, Climate Smart	Short	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.10, 1.11, 1.12, 1.13, 1.14	SP, NRP	Medium
28	Construct stormwater wetlands to maximize removal of pollutants from stormwater runoff.	City of Long Beach Planning, BTMUA	HMGP, PDM, FMA, Clean Water Act Water Quality Grants, WQIP, EPF	Short	3.3	NRP	Low
29	Install a bio retention system in lawns, median strips, parking lot islands, unused lot areas, certain easements, or other areas that would benefit from stormwater mitigation.	City of Long Beach Planning, BTMUA	HMGP, PDM, FMA, Clean Water Act Water Quality Grants, WQIP, EPF	Short	3.3	NRP	Medium
30	Remove un-utilized or under-utilized impervious surfaces with native or maintained vegetation. Where possible, redirect runoff to these new pervious surfaces.	City of Long Beach Planning, BTMUA	HMGP, PDM, FMA, Clean Water Act Water Quality Grants, WQIP, EPF	Short	3.3	SP, NRP	Low



Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives met	Project category	Priority (High, Med., Low)
31	Maintain and improve dunes and natural beach habitat through diverse native plantings (including tree plantings on the backside of the dune) to protect critical habitat of endangered and threatened species, strengthen the integrity of the dune, and encourage beach and dune growth for storm protection.	City of Long Beach Engineering	City budget, Environmental non-profits, HMGP, PDM, FMA, EPF	Ongoing	3.4	NRP, SP	High
32	Support the USACE beach repair, restoration, and replenishment projects. This also includes oceanfront groin and jetty repairs and modifications.	City of Long Beach Engineering, City Manager	HMGP, PDM, FMA	Ongoing	3.1	NRP, SP	High
33	Support dredging, revetments, or channelization where appropriate.	City of Long Beach Engineering	HMGP, PDM, FMA, USACE	Ongoing	3.1, 3.2	SP	Medium
34	Work with USACE, local education institutions, and civic organizations to develop an erosion monitoring program.	City Manager, City of Long Beach Engineering	City budget, USACE, Private organization budgets	Ongoing	3.1	PI	Medium
35	Work with USACE, New York State (NYS), and the Coast Guard to ensure channels and local inlets are properly marked and dredged.	City Manager, City of Long Beach Engineering	USACE, NYS, Coast Guard	Ongoing	3.2	NRP, PI	Low
36	Install/upgrade backflow prevention flaps or valves at Edwards Boulevard, from Park Avenue to Broadway.	City of Long Beach Engineering	City budget, Capital Improvements, HMGP, PDM	Short	1.1, 1.6	SP	High
37	Install/upgrade backflow prevention flaps or valves at National Boulevard, from Park Avenue to Broadway.	City of Long Beach Engineering	City budget, Capital Improvements, HMGP, PDM	Short	1.1, 1.3	SP	High
38	Install/upgrade backflow prevention flaps or valves at the intersection of Riverside Boulevard and Pine Street.	City of Long Beach Engineering	City budget, Capital Improvements, HMGP, PDM	Short	1.1, 1.4	SP	High
39	Install/upgrade backflow prevention flaps or valves at West Park Avenue, from New York Avenue to Nevada Avenue.	City of Long Beach Engineering	City budget, Capital Improvements, HMGP, PDM	Short	1.1, 1.6	SP	High
40	Install/upgrade backflow prevention flaps or valves at the intersection of State Street and Franklin Boulevard.	City of Long Beach Engineering	City budget, Capital Improvements, HMGP, PDM	Short	1.1, 1.12	SP	High



Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives met	Project category	Priority (High, Med., Low)
41	Install/upgrade backflow prevention flaps or valves at the intersection of Laurelton Boulevard and West Bay Drive.	City of Long Beach Engineering	City budget, Capital Improvements, HMGP, PDM	Short	1.1, 1.13	SP	High
42	Install/upgrade backflow prevention flaps or valves at Franklin Boulevard, between East Park and Hudson.	City of Long Beach Engineering	City budget, Capital Improvements, HMGP, PDM	Short	1.1, 1.12	SP	High
43	Maintain stormwater system through regular/emergency cleaning and provide outreach to residents to ask them to alert Public Works of clogs and to educate them on how the valves work and how to help keep storm drains free of trash and debris that can clog the valves.	Public Relations, Public Works	City budget	Ongoing	1.1	PI	High
44	Consider new stormwater system technologies to mitigate stormwater pollution and prevent potential damage to backflow prevention devices.	Public Works	City budget, Clean Water Act Water Quality Grants, WQIP	Short	1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14	SP, NRP	Medium
45	Continue to regrade and upgrade urban flooding prone roadways to increase runoff and increase water retention.	City of Long Beach Engineering	City budget, Work with utilities to cover costs when utilities require roadwork	Ongoing	1.3, 1.4, 1.5, 1.6	SP	Medium
46	Install pump stations (including backup generators) at appropriate locations to decrease urban flooding.	City of Long Beach Engineering	HMGP, PDM, FMA	Short	1.6	SP	High
47	Complete pump station construction on Tennessee Avenue.	City of Long Beach Engineering	HMGP, PDM, FMA	Short	1.6	SP	High
48	Work with utility providers (Public Service Enterprise Group Inc. [PSEG], National Grid, Verizon, etc.) to protect utilities. Upgrade underground utilities (water, sewer, drainage, gas, and electric) as major sections of streets are reconstructed.	City Manager	City budget, EPG, utility providers	Ongoing	1.7	PP and SP	Medium



Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives met	Project category	Priority (High, Med., Low)
49	Explore installation of a sea wall along North Shore. Consider modified sea wall with green infrastructure components such as pocket wetlands and oyster reef habitat to strengthen the system with natural features and allow for natural protection from future flood conditions. Consider greenway features adjacent to sea wall including vegetation capable of absorbing stormwater and robust enough to survive saltwater intrusion.	City of Long Beach Engineering	City budget, HMGP, PDM, FMA, LWRP	Long	1.7	SP	Low
50	Locate new (or retrofit existing) critical facilities—including lifeline facilities such as fire stations, wells, stormwater pumps, and sewer lift stations—above the 500-year flood level (where possible) to allow for continuity of operations under current and future flood conditions. Include retrofitting to prevent buoyancy of slabs during flood events.	City of Long Beach Planning	HMGP, PDM, FMA, EPG	Ongoing	1.9, 2.1	SP, ES, PP	High
51	Identify critical facilities/infrastructure that require early notification during flood responses.	City of Long Beach OEM	City budget	Ongoing	1.9, 5.1	PP, ES	High
52	Purchase temporary storm surge barriers to be deployed around critical facilities that cannot be raised or retrofit to protect from flooding.	City of Long Beach OEM	EMPG, City budget	Short	1.9, 5.3	ES	Medium
53	Complete North Shore Critical Infrastructure Project on the shoreline from Park Avenue to Monroe Boulevard. Specifically: <ul style="list-style-type: none"> Stabilize the shoreline through installation of bulkheading to the BFE. Install stormwater pump station at Riverside. Complete utility upgrades and new roadways. 	Administration, Public Works	FEMA 404 Mitigation	Short	1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.13	PP	High
54	Repair and install bulkheads on public waterfront to protect from coastal erosion. This includes new public bulkheads connecting existing private bulkheads in the West End from Ohio Avenue and California Street as well as on street end on Lindell Boulevard, a bulkhead extending from Washington Boulevard to Magnolia Boulevard, and two bulkheads along the eastern border of the two western canals.	City of Long Beach Engineering	HMGP, PDM, FMA, GOSR	Ongoing	3.1	NRP, SP	High
55	Elevate/protect critical roadways, particularly evacuation routes such as Long Beach Boulevard (north of Park Avenue) to account for current and future flooding conditions.	City of Long Beach Engineering, Nassau County	HMGP, PDM, FMA, TIGER	Long	1.11, 1.12, 1.13	ES, SP	Low

Notes:
 HMGP-Hazard Mitigation Grant Program
 PDM-Pre-Disaster Mitigation Program





FMA-Flood Mitigation Assistance Program
WQIP-Water Quality Improvement Project Program
EPG-New York State DEC/EFC Wastewater Infrastructure Engineering Planning Grant
EPF-Environmental Protection Fund
LWRP-Local Waterfront Revitalization Program

Timeframe

Short 1-5 years
Long 5 years or greater
Ongoing Ongoing or annual project

Priority

High A project that meets multiple plan objectives, benefits exceed cost, has funding secured under existing programs or authorizations, or is grant eligible, and can be completed in 1 to 5 years (i.e., short-term project) once project is funded.
Medium A project that meets at least one plan objective, benefits exceeds costs, funding has not been secured and would require a special funding authorization under existing programs, grant eligibility is questionable, and can be completed in 1 to 5 years once project is funded.
Low Any project that will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, project is not grant eligible, and timeline for completion is considered long-term (5 to 10 years).

Project Category

Prevention - PR
Property Protection - PP
Natural Resource Protection - NRP
Emergency Services - ES
Structural Projects - SP
Public Information/Outreach - PI

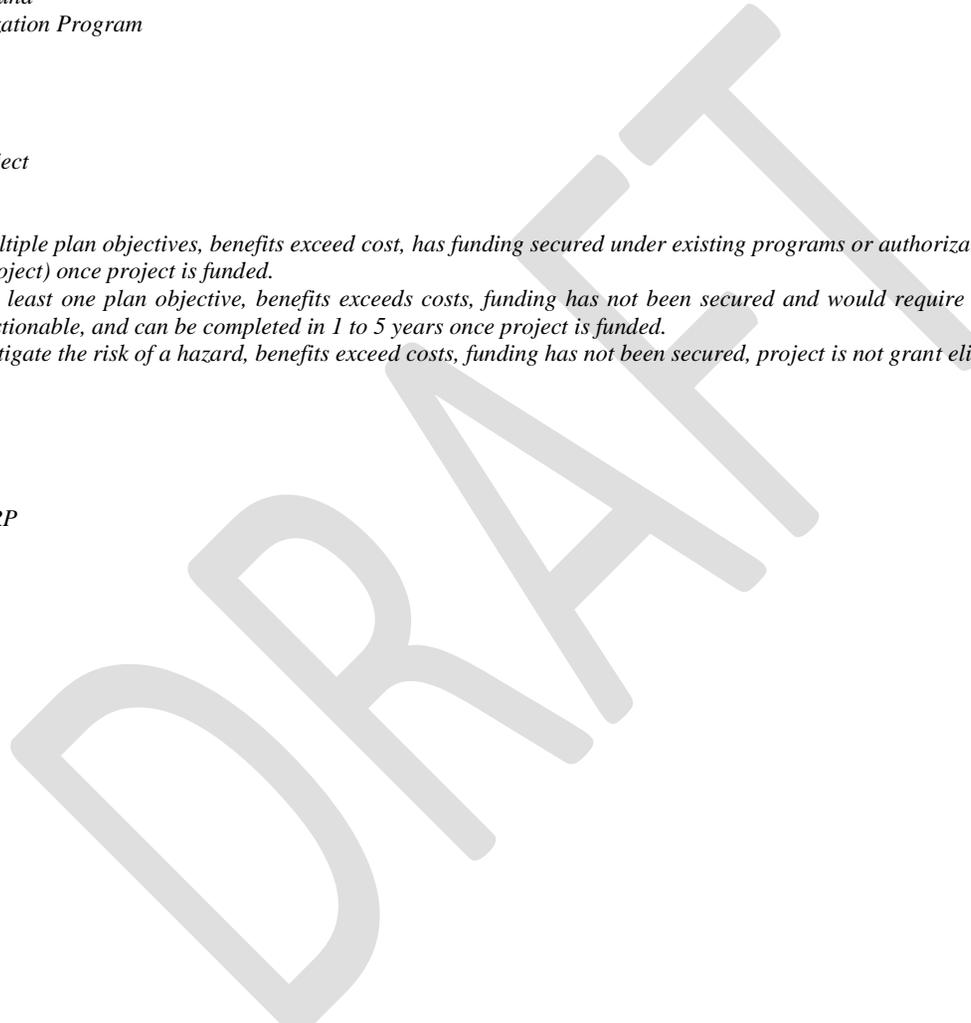




Table 6-10. Prioritization of Mitigation Initiatives

Initiative Number	# of Objectives Met (Specific Objective Numbers in Parentheses)	Benefits	Costs	Do Benefits Equal or Exceed Costs? (Y or N)	Is Project Grant Eligible? (Y or N)	Can Project Be Funded Under Existing Programs/Budgets? (Y or N)	Priority (High, Med., Low)
1	2 (1.8, 2.2)	Medium	Low	Y	N	Y	High
2	3 (1.8, 2.1, 2.2)	Medium	Low	Y	N	Y	High
3	1 (3.3)	Low	Low	Y	Y	N	Low
4	1 (2.1)	Medium	Low	Y	Y	Y	High
5	Potential for all objectives exists.	Low	Low	Y	Y	N	Low
6	1 (5.3)	High	Low	Y	Y	Y	High
7	1 (5.1)	High	Low	Y	N	Y	High
8	1 (5.1)	Low	Low	Y	Y	Y	Low
9	1 (5.1)	Medium	Low	Y	N	Y	High
10	3 (2.1, 4.1, 5.3)	Low	Low	Y	Y	Y	Medium
11	1 (4.1)	Medium	Low	Y	Y	Y	High
12	1 (3.3)	Medium	Low	Y	Y	Y	High
13	3 (4.2, 2.3, 5.2)	Medium	Low	Y	N	Y	High
14	3 (4.2, 2.3, 5.2)	Medium	Low	Y	N	Y	High
15	2 (4.2, 4.3)	Medium	Low	Y	N	Y	Medium
16	3 (4.2, 4.3, 5.2)	Medium	Low	Y	Y	Y	High
17	2 (4.2, 5.2)	Medium	Low	Y	N	Y	High
18	2 (4.2, 5.2)	Medium	Low	Y	Y	Y	High
19	2 (4.3, 5.2)	Medium	Low	Y	Y	Y	High
20	2 (4.3, 5.2)	Medium	Low	Y	N	Y	High
21	1 (5.2)	Medium	Low	Y	Y	Y	High
22	1 (2.3)	Medium	Low	Y	N	Y	High
23	2 (1.10, 4.4)	Medium	Low	Y	N	Y	High
24	1 (4.4)	Medium	Low	Y	N	Y	High
25	3 (1.10, 1.14, 4.3)	High	High	Y	Y	N	High
26	4 (2.1, 3.3, 4.2, 4.3)	Low	Low	Y	N	Y	Medium
27	12 (1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.10, 1.11, 1.12, 1.13, 1.14)	Medium	Low	Y	Y	N	Medium
28	1 (3.3)	Medium	Medium	Y	Y	N	Low
29	1 (3.3)	Medium	Medium	Y	Y	N	Medium
30	1 (3.3)	Medium	Medium	Y	Y	N	Low
31	1 (3.4)	Medium	Low	Y	Y	Y	High
32	1 (3.1)	High	High	Y	Y	N	High
33	2 (3.1, 3.2)	Medium	Medium	Y	Y	N	Medium
34	1 (3.1)	Medium	Low	Y	Y	N	Medium
35	1 (3.2)	Medium	Low	Y	Y	N	Low
36	2 (1.1, 1.6)	High	Medium	Y	Y	N	High
37	2 (1.1, 1.3)	High	Medium	Y	Y	N	High
38	2 (1.1, 1.4)	High	Medium	Y	Y	N	High
39	2 (1.1, 1.6)	High	Medium	Y	Y	N	High
40	2 (1.1, 1.12)	High	Medium	Y	Y	N	High
41	2 (1.1, 1.13)	High	Medium	Y	Y	N	High
42	2 (1.1, 1.12)	High	Medium	Y	Y	N	High
43	1 (1.1)	Medium	Low	Y	N	Y	High
44	1 (1.1)	High	Medium	Y	Y	N	Medium
45	4 (1.3, 1.4, 1.5, 1.6)	High	High	Y	Y	N	Medium
46	1 (1.6)	High	High	Y	Y	Y	High
47	1 (1.6)	High	High	Y	Y	Y	High
48	1 (1.7)	Medium	Low	Y	N	Y	Medium



Initiative Number	# of Objectives Met (Specific Objective Numbers in Parentheses)	Benefits	Costs	Do Benefits Equal or Exceed Costs? (Y or N)	Is Project Grant Eligible? (Y or N)	Can Project Be Funded Under Existing Programs/Budgets? (Y or N)	Priority (High, Med., Low)
49	1 (1.7)	High	High	Y	Y	N	Low
50	2 (1.9, 2.1)	High	Medium	Y	Y	Y	High
51	2 (1.9, 5.1)	High	Low	Y	N	Y	High
52	2 (1.9, 5.3)	High	Medium	Y	Y	N	Medium
53	10 (1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.13)	High	High	Y	Y	Y	High
54	1 (3.1)	High	High	Y	Y	Y	High
55	3 (1.11, 1.12, 1.13)	High	High	Y	Y	N	Low

Notes:

**"Yes" indicates the strategy is likely to fall within the objectives of the city budget or grant program. Does not indicate a project will automatically be funded.*

Benefits

High Project will have an immediate impact on the reduction of risk exposure to life and property.

Medium Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.

Low Long-term benefits of the project are difficult to quantify in the short-term.

Cost

High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Medium Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.

Low Possible to fund under existing budget. Project is part of or can be part of an existing ongoing program.

Timeframe

Short 1-5 years

Long 5 years or greater

Ongoing Ongoing or annual project

Priority

High A project that meets multiple plan objectives, benefits exceed cost, has funding secured under existing programs or authorizations, or is grant eligible, and can be completed in 1 to 5 years (i.e., short-term project) once project is funded.

Medium A project that meets at least one plan objective, benefits exceeds costs, funding has not been secured and would require a special funding authorization under existing programs, grant eligibility is questionable, and can be completed in 1 to 5 years once project is funded.

Low Any project that will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, project is not grant eligible, and timeline for completion is considered long-term (5 to 10 years).



SECTION 7. PLAN MAINTENANCE PROCEDURES

This section details the formal process that will ensure that the Floodplain Management Plan (FMP) remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the plan on an ongoing basis and producing an updated plan every 5 years. In addition, this section describes how public participation will be integrated throughout the plan maintenance and implementation processes. It explains how the action plan outlined in Section 6 will be incorporated into existing planning mechanisms and programs, such as comprehensive planning processes, capital improvement planning, and building code enforcement and implementation. The plan's format allows sections to be reviewed and updated when new data become available, resulting in a plan that will remain current and relevant.

7.1 Monitoring, Evaluating, and Updating the Plan

This section presents the plan maintenance process that includes the following (CRS Step 10):

- A section describing the method and schedule of monitoring, evaluating, and updating the FMP over a 5-year cycle
- A process by which the city incorporates the requirements of the FMP into other planning mechanisms, when appropriate
- A discussion on how the city will continue public participation in the plan maintenance process.

The plan maintenance strategy is the formal process used to ensure that the FMP remains active and relevant, and that the City of Long Beach maintains credit for the FMP in the Community Rating System (CRS) Program. It includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every 5 years. The strategy also describes how public participation will be integrated throughout the plan maintenance and implementation processes. It explains how the mitigation strategies outlined in this plan will be incorporated into existing planning mechanisms and programs, such as comprehensive land-use planning processes, capital improvement planning, and building code enforcement and implementation. The plan's format allows sections to be reviewed and updated when new data become available, resulting in a plan that will remain current and relevant.

7.1.1 Monitoring

The Planning Committee will be responsible for monitoring progress on and evaluating the effectiveness of the FMP as well as documenting annual progress. The Planning Committee will meet at least quarterly to discuss floodplain management issues.

Understanding that individual commitments change over time, each member of the Planning Committee is responsible for informing the City of Long Beach CRS Coordinator of any changes in participation by formal letter. The CRS Coordinator will strive to keep the Planning Committee a uniform representation of planning partners and stakeholders within the city, such that at least half of the members of the Planning Committee come from outside city government. The CRS Coordinator will maintain the current membership of the Planning Committee in publicly accessible city records.

The Planning Committee representatives will be expected to document the following, as needed and as appropriate:

- Flood-related hazard events and losses occurring in the city, including their nature and extent, and the effects that flood mitigation actions have had on impacts and losses;



- Progress on the implementation of actions, including efforts to obtain outside funding;
- Any obstacles or impediments to the implementation of actions;
- Additional actions believed to be appropriate and feasible; and
- Public and stakeholder input and comment on the FMP.

7.1.2 Evaluating

The evaluation of the FMP is an assessment of whether the planning process and actions have been effective, if the FMP goals are being reached, and whether changes are needed. The FMP will be evaluated on a quarterly basis to determine the effectiveness of the actions, and to reflect changes that may affect priorities or available funding. Quarterly Planning Committee meetings will include the following topics:

- Summary of any flood hazard events that occurred during the performance period and the impact these events had on the planning area;
- Review of mitigation success stories;
- Review of continuing public involvement;
- Brief discussion about why targeted strategies were not completed;
- Re-evaluation of the action plan to determine if the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term one because of new funding);
- Recommendations for new projects;
- Changes in or potential for new funding options (grant opportunities); and
- Impact of any other planning programs or initiatives that involve flood-related hazard mitigation.

The CRS Coordinator will prepare an annual progress report to document action updates to the FMP based on the quarterly plan review meetings. The progress report will be publicly available and should be:

- Posted on the city website page dedicated to floodplain management;
- Provided to the local media through a press release;
- Presented to the City of Long Beach City Council to inform them of the progress of mitigation initiatives implemented during the reporting period;
- Provided to the public library; and
- Provided as part of the CRS annual re-certification package.

The CRS Program requires an annual recertification to be submitted by October 1 of every calendar year for which the community has not received a formal audit. To meet this recertification timeline, the Planning Committee will strive to complete progress reports between June and September each year. A template progress report is included in Appendix F.

7.1.3 Updating

The City of Long Beach intends to update the FMP on a 5-year cycle from the date of initial plan adoption (CRS Step 10). Full updates of the FMP will be initiated in the fourth year following plan approval, to ensure that the updated FMP can be adopted prior to the existing FMP's expiration. This cycle may be accelerated to less than 5 years based on the following triggers:

- A Presidential Disaster Declaration that impacts the city;
- Implementation of a mitigation project that greatly modifies the flood hazard;
- A hazard event that causes loss of life; or
- Adoption of an update to the city's comprehensive plan.



Updates to the FMP will, at a minimum, include the following elements:

- The update process will be convened through the FMP Planning Committee.
- The risk assessment will be reviewed and, if necessary, updated using best available information and technologies.
- The action plan will be reviewed and revised to account for any initiatives completed, dropped, or changed and to account for changes in the risk assessment or new policies identified under other planning mechanisms (such as the comprehensive plan).
- The draft update will be sent to appropriate agencies and organizations for comment.
- The public will be given an opportunity to comment on the update prior to adoption.
- The City of Long Beach City Council will adopt the updated plan.

7.2 Plan Implementation

The effectiveness of the FMP depends on its implementation and incorporation of its action items into existing local plans, policies, and programs. Together, the action items in the FMP provide a framework for activities that the City of Long Beach can implement over the next 5 years. The Planning Committee has established goals and objectives and have prioritized mitigation initiatives that will be implemented through existing plans, policies, and programs. Further, the sample adoption resolution (located in Appendix G) includes an item stating the intent of the City Council to incorporate the FMP as an integral component of government and partner operations.

The principal role of the Planning Committee in this plan maintenance strategy will be to review the progress reports and provide input to the CRS Coordinator on possible enhancements to be considered at the next update. Future plan updates will be overseen by the Planning Committee.

7.2.1 Incorporation into Other Planning Mechanisms

The information on hazard, risk, vulnerability, and mitigation contained in this plan is based on the best science and technology available at the time this plan was prepared. The City of Long Beach Comprehensive Plan (2016 draft) is considered to be an integral part of this plan. Additionally, the city, through adoption of a flood damage prevention ordinance incorporated into the city building code, has planned for the impact of flooding. The plan development process provided the opportunity to review and expand on policies in these planning mechanisms. The draft comprehensive plan and the FMP are complementary documents that work together to achieve the goal of reducing risk exposure. Adoption of the comprehensive plan draft may trigger an update to the FMP.

The City of Long Beach will create a link between the FMP and the comprehensive plan by identifying a mitigation initiative and giving that initiative a high priority. Other planning processes and programs to be coordinated with the recommendations of the FMP include the following:

- Nassau County Hazard Mitigation Plan
- City of Long Beach Comprehensive Plan
- Emergency Operations Plan
- Capital improvement plans
- City codes and ordinances
- Community design guidelines
- Community recovery and resiliency plans
- Watershed management plans
- Stormwater management plans



Some action items do not need to be implemented through regulation. Instead, they can be implemented through the creation of new educational programs, continued interagency coordination, or improved public participation. As information becomes available from other planning mechanisms that can enhance this plan, that information will be incorporated during the update process.

7.3 Continued Public Involvement

The public will continue to be apprised of the plan’s progress through the City of Long Beach flood information website and by providing copies of the progress reports to the media. The website will not only house the final plan and progress reports, it will become the one-stop shop for information regarding the plan and plan implementation. Copies of the plan and progress reports will be available at the City of Long Beach Department of Public Works and in the Long Beach Public Library.

The City of Long Beach CRS Coordinator will be responsible for receiving, tracking, and filing public comments on the FMP. The public will have the opportunity to comment on the plan at the review meeting of the FMP and during the 5-year plan update. Additional meetings may also be held as deemed necessary by the Committee. The purpose of these meetings would be to provide an opportunity for the public to express concerns, opinions, and ideas about the plan.

During future FMP updates, a new public involvement strategy will be initiated based on guidance from a new Planning Committee. This strategy will be based on the needs and capabilities of the City of Long Beach at the time of the update. At a minimum, this strategy will include the use of local media outlets within the city.

DRAFT



Appendix A: References

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ACRONYMS AND DEFINITIONS

This resource identifies the acronyms and abbreviations used in or support the Floodplain Management Plan. These are based on documents included in the reference section, with modifications as appropriate to address the City of Long Beach specific identifications and requirements.

0.2 % flood (500-year flood) – A flood that has a 0.2-percent chance of being equaled or exceeded in any one year.

1% flood (100-year flood) – A flood that has a 1-percent chance of being equaled or exceeded in any given year. This flood event is also referred to as the base flood. The term "100-year flood" can be misleading; it is not the flood that will occur once every 100 years. Rather, it is the flood elevation that has a 1- percent chance of being equaled or exceeded each year. Therefore, the 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management to determine the need for flood insurance.

ABFE Advisory Base Flood Elevation

ACS American Community Survey

Aggregate Data – Data gathered together across an area or region (for example, census tract or census block data).

ASCE American Society of Civil Engineers

Asset – Any man-made or natural feature that has value, including but not limited to people, buildings, infrastructure (such as bridges, roads, and sewer and water systems), and lifelines (such as electricity and communication resources or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks).

At-Risk – Exposure values that include the entire building inventory value in census blocks that lie within or border the inundation areas or any area potentially exposed to a hazard based on location.

Base Flood – Flood that has a 1-percent probability of being equaled or exceeded in any given year. It is also known as the 100-year flood.

Base Flood Elevation – Elevation of the base flood in relation to a specified datum, such as the National Geodetic Vertical Datum of 1929. The BFE is used as the standard for the National Flood Insurance Program.

Benefit – Net project outcomes, usually defined in monetary terms. Benefits may include direct and indirect effects. For the purposes of conducting a benefit-cost analysis of proposed mitigation measures, benefits are limited to specific, measurable, risk reduction factors, including a reduction in expected property losses (building, content, and function) and protection of human life.

Benefit-cost analysis (BCA) – Benefit-cost analysis is a systematic, quantitative method of comparing the projected benefits to projected costs of a project or policy. It is used as a measure of cost effectiveness.

BFE Base Flood Elevation

BRIC Building Resilient Infrastructure and Communities



Building – A structure that is walled and roofed, principally aboveground and permanently fixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.

Building Codes – Regulations that set forth standards and requirements for construction, maintenance, operation, occupancy, use, or appearance of buildings, premises, and dwelling units. Building codes can include standards for structures to withstand natural disasters.

Capability Assessment – An assessment that provides a description and analysis of a community or state’s current capacity to address the threats associated with hazards. The capability assessment attempts to identify and evaluate existing policies, regulations, programs, and practices that positively or negatively affect the community or state’s vulnerability to hazards or specific threats.

CAZ	Coastal A-Zone
CDBG	Community Development Block Grant
CDC	Centers for Disease Control and Prevention
CERT	Community Emergency Response Team
CFM	Certified Floodplain Manager
CFR	Code of Federal Regulations

Climate – The meteorological elements, including temperature, precipitation, and wind, that characterizes the general conditions of the atmosphere over a period of time (typically 30-years) for a particular region.

CMP	Coastal Management Program
COAD	Community Organizations Active in Disaster

Community Rating System (CRS) – CRS is a program that provides incentives for National Flood Insurance Program communities to complete activities that reduce flood hazard risk. When the community completes specific activities, the insurance premiums of these policyholders in communities are reduced.

Comprehensive Plan – A document, also known as a “general plan”, covering the entire geographic area of a community and expressing community goals and objectives. The plan lays out the vision, policies, and strategies for the future of the community, including all of the physical elements that will determine the community’s future development. This plan can discuss the community’s desired physical development, desired rate and quantity of growth, community character, transportation services, location of growth, and siting of public facilities and transportation. In most states, the comprehensive plan has no authority in and of itself, but serves as a guide for community decision-making.

CRS	Community Rating System
CRF	Climate Resilient Farming (New York State)

Critical Facility – Facilities that are critical to the health and welfare of the population and that are especially important following a hazard. Critical facilities include essential facilities, transportation systems, lifeline utility systems, high-potential loss facilities, and hazardous material facilities. As defined for the Otsego County risk assessment, this category includes police stations, fire and/or EMS stations, major medical care facilities, and emergency communications.



CRRA	Community Risk and Resiliency Act
CSC	Climate Smart Communities
CWSRF	Clean Water State Revolving Fund
DCEA	Department of State’s Division of Code Enforcement and Administration

Debris – The scattered remains of assets broken or destroyed during the occurrence of a hazard. Debris caused by a wind or water hazard event can cause additional damage to other assets.

DEDP	Department of Economic Development and Planning
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map

Digital Elevation Model – U.S. Geological Survey (USGS) Digital Elevation Model (DEM) data files that are digital representations of cartographic information in a raster form. DEMs include a sampled array of elevations for a number of ground positions at regularly spaced intervals. These digital cartographic/geographic data files are produced by USGS as part of the National Mapping Program.

Digital Flood Insurance Rate Map (DFIRM) – These maps are used to calculate the cost insurance premiums, establish flood risk zones and base flood elevations to mitigate against potential future flood damages to properties.

Disaster Mitigation Act of 2000 (DMA 2000) – Law that requires and rewards local and state pre-disaster planning, promotes sustainability as a strategy for disaster resistance, and is intended to integrate state and local planning with the aim of strengthening state-wide mitigation planning.

DOS	Department of State
DPW	Department of Public Works
DMA 2000	Disaster Mitigation Act of 2000
DR	Major Disaster Declaration (FEMA)
Duration – The length of time a hazard occurs.	
EDT	Eastern Daylight Time
EM	Emergency Declaration (FEMA)
EMI	Emergency Management Institute
EMPG	Emergency Management Performance Grants program
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EOP	Emergency Operations Plan



EPF	Environmental Protection Fund
EPG	Engineering Planning Grant
ES	Emergency Services

Essential Facility – A facility that is important to ensure a full recovery of a community or state following the occurrence of a hazard. These facilities can include: government facilities, major employers, banks, schools, and certain commercial establishments (such as grocery stores, hardware stores, and gas stations). For the Otsego County risk assessment, this category was defined to include schools, colleges, shelters, adult living and adult care facilities, medical facilities and health clinics, hospitals.

EST	Eastern Standard Time
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Exposure – The number and dollar value of assets that are considered to be at risk during the occurrence of a specific hazard.

EWP	Emergency Watershed Protection Program
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Extent – The size of an area affected by a hazard or the occurrence of a hazard.

Federal Emergency Management Agency (FEMA) – Independent agency (now part of the Department of Homeland Security) created in 1978 to provide a single point of accountability for all federal activities related to disaster mitigation and emergency preparedness, response, and recovery.

FEMA	Federal Emergency Management Agency
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FHWA	Federal-aid Highways Association
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FIRM	Flood Insurance Rate Map
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FIS	Flood Insurance Study
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Flash Flood – A flood occurring with little or no warning where water levels rise at an extremely fast rate.

Flood – A general and temporary condition of partial or complete inundation of normally dry land areas resulting from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.

Flood Depth – Height of the flood water surface above the ground surface.

Flood Elevation – Height of the water surface above an established datum (for example, the National Geodetic Vertical Datum of 1929, North American Vertical Datum of 1988, or mean sea level).

Flood Hazard Area – Area shown to be inundated by a flood of a given magnitude on a map.

Flood Insurance Rate Map (FIRM) – Map of a community, prepared by the FEMA that shows both the special flood hazard areas and the risk premium zones applicable to the community.

Flood Insurance Study (FIS) – A study that provides an examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations in a community or communities.



Flood Mitigation Assistance (FMA) Program – A program created as a part of the National Flood Insurance Report Act of 1994. FMA provides funding to assist communities and states in implementing actions that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other NFIP insurance structures, with a focus on repetitive loss properties.

Floodplain – Any land area, including a watercourse, susceptible to partial or complete inundation by water from any source.

Flood Polygon – A geographic information system vector file outlining the area exposed to the flood hazard. HAZUS-MH generates this polygon at the end of the flood computations in order to analyze the inventory at risk.

FMA Flood Mitigation Assistance

FMP Floodplain Management Plan

FPA Floodplain Administrator

FPE Floodplain Easement

Frequency – A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average, and would have a 1-percent chance of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered.

FSA Farm Service Agency

Geographic Information Systems (GIS) – A computer software application that relates data regarding physical and other features on the earth to a database to be used for mapping and analysis.

Geology – The scientific study of the earth, including its composition, structure, physical properties, and history.

GFM Global Climate Model

GHG Greenhouse Gas

GIS Geographic Information System

GIS Shape Files – A type of GIS vector file developed by ESRI for their ArcView software. This type of file contains a table and a graphic. The records in the table are linked to corresponding objects in the graphic.

Goals – General guidelines that explain what you want to achieve. They are usually broad policy-type statements, long term in nature, and represent global visions.

Hazard – A source of potential danger or an adverse condition that can cause harm to people or cause property damage. For this risk assessment, priority hazards were identified and selected for the pilot project effort. A natural hazard is a hazard that occurs naturally (such as flood, wind, and earthquake). A man-made hazard is one that is caused by humans (for example, a terrorist act or a hazardous material spill). Hazards are of concern if they have the potential to harm people or property.

Hazard Identification – The process of identifying hazards that threaten an area.



Hazardous Material Facilities – Facilities housing industrial and hazardous materials, such as corrosives, explosives, flammable materials, radioactive materials, and toxins.

Hazard Mitigation – Sustained actions taken to reduce or eliminate the long-term risk and effects that can result from the occurrence of a specific hazard. For example, building a retaining wall can protect an area from flooding.

Hazard Mitigation Grant Program (HMGP) – Authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster.

Hazard Mitigation Plan – A collaborative document in which hazards affecting the community are identified, vulnerability to hazards assessed, and consensus reached on how to minimize or eliminate the effects of these hazards.

Hazard Profile – A description of the physical characteristics of a hazard, including a determination of various descriptors including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.

Hazards U.S. (HAZUS) – A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA. HAZUS was replaced by HAZUS-MH (see below) in 2003.

Hazards U.S. – Multi-Hazard (HAZUS-MH) – A GIS-based nationally standardized earthquake, flood, and wind loss estimation tool developed by FEMA. The purpose of this pilot project is to demonstrate and implement the use of HAZUS-MH to support risk assessments

HAZMAT	Hazardous Materials
HAZUS	Hazards U.S.
HAZUS-MH	Hazards U.S. – Multi-Hazard

HAZUS-MH Risk Assessment Methodology – This analysis uses the HAZUS-MH modules (earthquake, wind--hurricane and flood) to analyze potential damages and losses. For this pilot project risk assessment, the flood and hurricane hazards were evaluated using this methodology.

HAZUS-MH-Driven Risk Assessment Methodology – This analysis involves using inventory data in HAZUS-MH combined with knowledge such as (1) information about potentially exposed areas, (2) expected impacts, and (3) data regarding likelihood of occurrence for hazards. For this risk assessment, a HAZUS-Driven Risk Assessment Methodology could not be used to estimate losses associated with any hazards because of a lack of adequate data. However, the methodology was used, based on more limited data to estimate exposure for the dam failure, urban fire, fuel pipeline breach, and HazMat release hazards.

High Potential Loss Facilities – Facilities that would have a high loss associated with them, such as nuclear power plants, dams, and military installations.

HIV	Human Immunodeficiency Virus
HMA	Hazard Mitigation Assistance



HMGF	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HUD	Housing and Urban Development

Hurricane – An intense tropical cyclone, formed in the atmosphere over warm ocean areas, in which wind speeds reach 74 miles-per-hour or more and blow in a large spiral around a relatively calm center or "eye." Hurricanes develop over the North Atlantic Ocean, northeast Pacific Ocean, or the South Pacific Ocean (east of 160°E longitude). Hurricane circulation is counter-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

Hydraulics – That branch of science, or of engineering, which addresses fluids (especially, water) in motion, its action in rivers and canals, the works and machinery for conducting or raising it, its use as a prime mover, and other fluid-related areas.

Hydrology – The science of dealing with the waters of the earth (for example, a flood discharge estimate is developed through conduct of a hydrologic study).

IA Individual Assistance

IDF Intensity Duration Frequency

Infrastructure – The public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, transportation system (such as airports, heliports; highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, dry docks, piers and regional dams).

Intensity – A measure of the effects of a hazard occurring at a particular place.

Inventory – The assets identified in a study region. It includes assets that can be lost when a disaster occurs and community resources are at risk. Assets include people, buildings, transportation, and other valued community resources.

ISO Insurance Services Office

kt Knot

LDC Local Development Council

LED Light-emitting diode

Level 1 Analysis – A HAZUS-MH analysis that yields a rough estimate or preliminary analysis based on the nationwide default database included in HAZUS-MH. A Level 1 analysis is a great way to begin the risk assessment process and prioritize high-risk communities without collecting or using local data.

Level 2 Analysis – A HAZUS-MH analysis that requires the input of additional or refined data and hazard maps that will produce more accurate risk and loss estimates. Assistance from local emergency management personnel, city planners, GIS professionals, and others may be necessary for this level of analysis.

Level 3 Analysis – A HAZUS-MH analysis that yields the most accurate estimate of loss and typically requires the involvement of technical experts such as structural and geotechnical engineers who can modify



loss parameters based on the specific conditions of a community. This level analysis will allow users to supply their own techniques to study special conditions such as dam breaks and tsunamis. Engineering and other expertise is needed at this level.

LGRMIF Local Government Records Management Improvement Fund

Lifelines – Critical facilities that include utility systems (potable water, wastewater, oil, natural gas, electric power facilities and communication systems) and transportation systems (airways, bridges, roads, tunnels and waterways).

LimWA Limit of Moderate Wave Action

LIRPC Long Island Regional Planning Council

LIRR Long Island Railroad

LIVOAD Long Island Voluntary Organizations Active in Disaster

Loss Estimation – The process of assigning hazard-related damage and loss estimates to inventory, infrastructure, lifelines, and population data. HAZUS-MH can estimate the economic and social loss for specific hazard occurrences. Loss estimation is essential to decision making at all levels of government and provides a basis for developing mitigation plans and policies. It also supports planning for emergency preparedness, response, and recovery.

Lowest Floor – Under the NFIP, the lowest floor of the lowest enclosed area (including basement) of a structure. For the HAZUS-MH flood model, this information can be used to assist in assessing the damage to buildings.

LPR Local Plans and Regulations

LWRP Local Waterfront Revitalization Program

Magnitude – A measure of the strength of a hazard occurrence. The magnitude (also referred to as severity) of a given hazard occurrence is usually determined using technical measures specific to the hazard. For example, ranges of wind speeds are used to categorize tornados.

Major Disaster Declarations – Post-disaster status requested by a state’s governor when local and state resources are not sufficient to meet disaster needs. It is based on the damage assessment, and an agreement to commit state funds and resources to the long-term recovery. The event must be clearly more than the state or local government can handle alone.

Mean Return Period (MRP) – The average period of time, in years, between occurrences of a particular hazard (equal to the inverse of the annual frequency of exceedance).

MHHW Mean Higher High Water

mi Mile

Mitigation Actions – Specific actions that help you achieve your goals and objectives.

Mitigation Goals – General guidelines that explain what you want to achieve. They are usually broad policy-type statements, long term, and represent global visions.



Mitigation Objectives – Strategies or implementation steps to attain the identified goals. Unlike goals, objectives are specific and measurable.

Mitigation Plan – A plan that documents the process used for a systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in a state or community. The plan includes a description of actions to minimize future vulnerability to hazards. This plan should be developed with local experts and significant community involvement.

MiWA	Minimal Wave Action area
MLLW	Mean Lower Low Water
mph	Miles per Hour
MoWA	Moderate Wave Action area
MTA	Metropolitan Transportation Authority
NASA	National Aeronautics and Space Administration

National Flood Insurance Program (NFIP) – Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum floodplain management regulations in 44 Code of Federal Regulations (CFR) §60.3.

NAVD	North American Vertical Datum of 1988
NCEI	National Centers for Environmental Information

New York State Division of Homeland Security & Emergency Services (NYS DHSES) – NYS DHSES and its predecessor agencies have been responsible for coordinating the activities of all State agencies to protect New York's communities, the State's economic well-being, and the environment from natural and man-made disasters and emergencies. NYS DHSES routinely assists local governments, voluntary organizations, and private industry through a variety of emergency management programs including hazard identification, loss prevention, planning, training, operational response to emergencies, technical support, and disaster recovery assistance.

NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHC	National Hurricane Center
NICE	Nassau Inter-County Express
NOAA	National Oceanic and Atmospheric Administration

Nor'Easter – Named for the strong northeasterly winds blowing in ahead of the storm, are also referred to as a type of extra-tropical cyclones (mid-latitude storms, or Great Lake storms). A Nor'Easter is a macro-scale extra-tropical storm whose winds come from the northeast, especially in the coastal areas of the Northeastern U.S. and Atlantic Canada.

NPL	National Priorities List
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NRCC	Northeast Regional Climate Center
NRCS	Natural Resources Conservation Service
NRP	Natural Resources Protection
NWS	National Weather Service
NY	New York
NYCRR	New York Codes Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
NYSDPC	New York State Disaster Preparedness Commission
NYS DHSES	New York State Division of Homeland Security & Emergency Services
NYS EFC	New York State Environmental Facilities Corporation
NYSERDA	New York State Energy Research and Development Authority
NYSOPRH	New York State Parks, Recreation & Historic Preservation

Objectives – Objectives define strategies or implementation steps to attain the identified goals. Unlike goals, objectives are specific and measurable.

Occupancy Classes – Categories of buildings used by HAZUS-MH (for example, commercial, residential, industrial, government, and “other”).

OEM Office of Emergency Management

OMB Office of Management and Budget

Ordinance – A term for a law or regulation adopted by local government.

PA Public Assistance

PDM Pre-Disaster Mitigation Program

Planning – The act or process of making or carrying out plans; the establishment of goals, policies and procedures for a social or economic unit.

PP Property Protection

PI Public Information

Post-disaster mitigation – Mitigation actions taken after a disaster has occurred, usually during recovery and reconstruction.



PR Preventive Measures

Presidential Disaster Declaration – A post-disaster status that puts into motion long-term federal recovery programs, some of which are matched by state programs, and designed to help disaster victims, businesses, and public entities in the areas of human services, public assistance (infrastructure support), and hazard mitigation. If declared, funding comes from the President’s Disaster Relief Fund and disaster aid programs of other participating federal agencies.

Preparedness – Actions that strengthen the capability of government, citizens, and communities to respond to disasters.

Provided Data – The databases included in the HAZUS-MH software that allow users to run a preliminary analysis without collecting or using local data.

Probability – A statistical measure of the likelihood that a hazard event will occur.

PSEG Public Service Enterprise Group

Public Education and Outreach Programs – Any campaign to make the public more aware of hazard mitigation and mitigation programs, including hazard information centers, mailings, public meetings, etc.

RCV Replacement Cost Value

Recovery – The actions taken by an individual or community after a catastrophic event to restore order and lifelines in the community.

Recurrence Interval – The average time between the occurrences of hazardous events of similar size in a given location. This interval is based on the probability that the given event will be equaled or exceeded in any given year.

REDC Regional Economic Development Council

Regulation – Most states have granted local jurisdictions broad regulatory powers to enable the enactment and enforcement of ordinances that deal with public health, safety, and welfare. These include building codes, building inspections, zoning, floodplain and subdivision ordinances, and growth management initiatives.

Repetitive Loss Property – A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than ten days apart) of at least \$1,000 each have been paid within any 10-year period since 1978.

Replacement Value – The cost of rebuilding a structure. This cost is usually expressed in terms of cost per square foot and reflects the present-day cost of labor and materials to construct a building of a particular size, type and quality.

Resolutions – Expressions of a governing body’s opinion, will, or intention that can be executive or administrative in nature. Most planning documents must undergo a council resolution, which must be supported in an official vote by a majority of representatives to be adopted. Other methods of making a statement or announcement about a particular issue or topic include proclamations or declarations.

Resources – Resources include the people, materials, technologies, money, etc., required to implement strategies or processes. The costs of these resources are often included in a budget.



Risk – The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard occurring and resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate or low likelihood of sustaining damage above a particular threshold due to occurrence of a specific type of hazard. Risk also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Risk Assessment – A methodology used to assess potential exposure and estimated losses associated with priority hazards. The risk assessment process includes four steps: (1) identifying hazards, (2) profiling hazards, (3) conducting an inventory of assets, and (4) estimating losses.

Risk Factors – Characteristics of a hazard that contribute to the severity of potential losses.

RiskMAP Risk Mapping, Assessment, and Planning

Riverine – Of or produced by a river (for example, a riverine flood is one that is caused by a river overflowing its banks).

RL Repetitive loss

RLAA Repetitive loss area analysis

RTP Recreational Trails Program

SBA Small Business Administration

Scale – A proportion used in determining a dimensional relationship; the ratio of the distance between two points on a map and the actual distance between the two points on the earth’s surface.

Scour – Removal of soil or fill material by the flow of floodwaters. This term is frequently used to describe storm-induced, localized, conical erosion around pilings and other foundation supports where the obstruction of flow increases turbulence.

Severe Repetitive Loss Property – A structure that is currently insured for which four or more National Flood Insurance Program losses (including building and contents) of at least \$5,000 each, and with the cumulative amount of claim payments exceeding \$20,000; or for which two separate claim payments (building only) have been made with the cumulative amount of claim payments exceeding the market value of the structure.

SFHA Special Flood Hazard Area

SFRMG State Flood Risk Management Guidance

SGIA Smart Growth Implementation Assistance program

SHMO State Hazard Mitigation Officer

SLOSH Sea, Lake, and Overland Surges from Hurricanes model

SP Structural Projects

SPDES State Pollutant Discharge Elimination System



Special Flood Hazard Area (SFHA) – An area within a floodplain having a 1-percent or greater chance of flood occurrence in any given year (that is, the 100-year or base flood zone); represented on FIRMS as darkly shaded areas with zone designations that include the letter “A” or “V.”

Sq. Mi. Square mile

SRL Severe Repetitive Loss

Stafford Act – The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law (PL) 100-107 was signed into law on November 23, 1988. This law amended the Disaster Relief Act of 1974, PL 93-288. The Stafford Act is the statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and its programs.

Stakeholder – Stakeholders are individuals or groups, including businesses, private organizations, and citizens, that will be affected in any way by an action or policy.

State Hazard Mitigation Officer (SHMO) – The representative of state government who is the primary point of contact with FEMA, other state and Federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.

Structure – Something constructed (for example, a residential or commercial building).

Substantial Damage – Damage of any origin sustained by a structure in a SFHA, for which the cost of restoring the structure to its pre-hazard event condition would equal or exceed 50 percent of its pre-hazard event market value.

Tetra Tech Tetra Tech, Inc.

TIGER Transportation Investment Generating Economic Recovery

TMDL Total Maximum Daily Load

Topographic – Map that shows natural features and indicate the physical shape of the land using contour lines based on land elevation. These maps also can include man-made features.

Transportation Systems – One of the lifeline system categories. This category includes: airways (airports, heliports, highways), bridges, tunnels, roadbeds, overpasses, transfer centers; railways (tracks, tunnels, bridges, rail yards, depots), and waterways (canals, locks, seaports, ferries, harbors, dry docks, piers).

Tropical Cyclone – A generic term for a cyclonic, low-pressure system over tropical or sub-tropical waters containing a warm core of low barometric pressure which typically produces heavy rainfall, powerful winds and storm surge.

Tropical Depression – An organized system of clouds and thunderstorms with a defined surface circulation and maximum sustained winds of less than 38 mph. It has no “eye”(the calm area in the center of the storm) and does not typically have the organization or the spiral shape of more powerful storms.

Tropical Storm – An organized system of strong thunderstorms with a defined surface circulation and maximum sustained wind between 39 to 73 mph.

US EPA U.S. Environmental Protection Agency

USACE U.S. Army Corps of Engineers





USDA U.S. Department of Agriculture

USGS U.S. Geological Survey

Utility Systems – One of the lifeline systems categories. This category includes potable water, wastewater, oil, natural gas, electric power facilities and communication systems.

Vulnerability – Description of how exposed or susceptible an asset is to damage. This value depends on an asset’s construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power. If an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect affects can be much more widespread and damaging than direct affects.

Vulnerability Assessment – Evaluation of the extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment should address impacts of hazard occurrences on the existing and future built environment.

Watershed – Area of land that drains down gradient (from areas of higher land to areas of lower land) to the lowest point; a common drainage basin. The water moves through a network of drainage pathways, both underground and on the surface. Generally, these pathways converge into streams and rivers, which become progressively larger as the water moves downstream, eventually reaching an estuary, lake, or ocean.

WQIP Water Quality Improvement Project (NYSDEC)

Zone – A geographical area shown on a National FIRM that reflects the severity or type of flooding in the area.

Zoning Ordinance – Designation of allowable land use and intensities for a local jurisdiction. Zoning ordinances consist of two components: a zoning text and a zoning map.

September 3, 2019

Item No. 5
Resolution No. 72/19

The following Resolution was moved by Mr. Mandel
and seconded by Mr. Bendo :

Resolution Authorizing the Acting City Manager to Enter into
an Agreement for Professional Engineering Services to Assist
the City with Community Rating System (CRS) Cycle
Verification and to Develop a Floodplain Management Plan.

WHEREAS, the Community Rating System (CRS) is a voluntary program for
National Flood Insurance Program (NFIP) participating communities and the goals of CRS are to
reduce flood damages, strengthen and support the insurance aspects of the NFIP, and encourage
a comprehensive approach to floodplain management; and

WHEREAS, the CRS was developed to provide incentives in the form of
premium discounts for communities that go beyond the minimum floodplain management
requirements to develop extra measures to provide protection from flooding; and

WHEREAS, pursuant to Resolution No. 3/14, the City entered into an agreement
with Tetra Tech, Inc., 240 Continental Drive, Newark, Delaware 19713, for a thorough review of
the floodplain management program in effect for the City, including a scoring evaluation in
accordance with the 2013 Community Rating System (CRS) Manual; and

WHEREAS, on November 12, 2014, the City received notification that it received
an improvement of the CRS classification from a Class 8 to a Class 7, which translated into a
15% reduction in flood insurance premiums for City residents; and

WHEREAS, the City of Long Beach participates in the Nassau County
Multijurisdictional Hazard Mitigation Plan (NCMHMP) which satisfies a critical pre-requisite
identified in Section 510 (Floodplain Management Planning) of the CRS Coordinator's Manual;
and

WHEREAS, it very recently came to the City's attention that the NCMHMP is
expiring and therefore cannot be utilized to satisfy the CRS pre-requisite requirements, requiring
the City to request proposals from qualified professional consulting engineering firms to assist
the City with the CRS and to develop a Floodplain Management Plan; and

WHEREAS, one proposal was received in the Office of the Commissioner of
Public Works on August 22, 2019 from Tetra Tech, Inc., 240 Continental Drive, Newark,
Delaware 19713 to provide the above services, at a cost of \$96,050.12; and

WHEREAS, in order to have the Floodplain Management Plan adopted by
December 3, 2019, a City Floodplain Management Planning Committee must be established as a
temporary Advisory Body to the City Council pursuant to the Community Rating System (CRS)
Activity 510 planning requirements; and

WHEREAS, the Floodplain Management Planning Committee shall be composed of representatives from the following offices: City Manager, Building Department, Public Works, Community Development, Economic Development, Emergency Management, Public Relations, Recreation and the Zoning Board of Appeals, as well as representatives of other interested agencies, organizations and associations, and shall be selected by the Commissioner of Public Works, who shall serve as the chairperson of the Committee; and

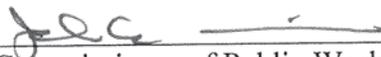
WHEREAS, the Floodplain Management Planning Committee shall deliberate the advantages and disadvantages of a permanent organization to coordinate mitigation activities in the City and include its recommendation in the hazard mitigation plan by December of 2019, after which time, it is expected the Committee will be disbanded;

NOW, THEREFORE, be it

RESOLVED, by the City Council of the City of Long Beach, New York that the Acting City Manager be and he hereby is authorized to enter into an agreement with Tetra Tech, Inc., 240 Continental Drive, Newark, Delaware 19713 for professional consulting services to assist the City with the CRS Cycle Verification and to develop a Floodplain Management Plan, at a cost of \$96,050.12. Funds are available in Account No. A1990.54406 (Contingency); and be it further

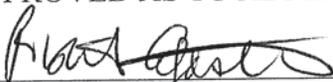
RESOLVED, that the Floodplain Management Planning Committee is hereby established as a temporary advisory body to the City Council.

APPROVED:



Commissioner of Public Works

APPROVED AS TO ADMINISTRATION:



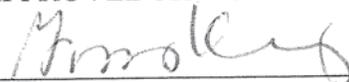
Acting City Manager

APPROVED AS TO FUNDS:



City Comptroller

APPROVED AS TO FORM & LEGALITY:



Assistant Corporation Counsel

VOTING:

Council Member Diamond - AYE

Council Member Eramo - ABSENT

Council Member Mandel - AYE

Vice President Bendo - AYE

President Moore - AYE



CITY OF LONG BEACH
2020 FLOODPLAIN MANAGEMENT PLAN
PLANNING COMMITTEE CHARTER

PURPOSE OF THE PLANNING COMMITTEE

The name of this organization shall be the City of Long Beach 2020 Floodplain Management Plan Planning Committee, hereafter referred to as the Planning Committee (PC). The purpose of the PC shall be to:

- Serve as an advisory body to oversee the planning process.
- Provide guidance and leadership, and act as the point of contact for the various organizations interested in this planning effort.
- Solicit a wide range of input into the planning process and advocate for public involvement.
- Educate all participants in flood mitigation planning.

Members of the PC were selected to represent a cross-section of views and interests within the City of Long Beach (the City). Through this inclusion of diverse interests, the PC will strive to strengthen the planning effort and build support for floodplain management activities across numerous stakeholder groups. A successful planning effort will result in the adoption and approval of the floodplain management plan to reduce adverse impacts of flooding in the City, through activities and strategies embraced by both elected officials and their constituents.

CHAIRPERSON AND ALTERNATE CHAIRPERSON

Mr. Joseph Febrizio, Acting Commissioner of the City of Long Beach Department of Public Works will serve as the chairperson (the Chair). Rich Schuh of the Building Department will serve as the alternate chairperson (Alternate Chair). The role of the Chair is to:

- Ensure agendas are followed and meetings adjourn on-time;
- Allow all members to be heard during discussions;
- Moderate discussions between members with differing points of view; and
- Be a sounding board for staff in the preparation of agendas and how to best involve the full committee in work plan tasks.

The role of the Alternate Chair is to assume the duties of the Chair when the Chair is not able to attend a meeting or forum. The Alternate Chair will act as the designated alternate for the Chair. The Alternate Chair will designate an alternate as described below, in the event he/she is serving as the Chair. If neither the Chair nor Alternate Chair can attend a scheduled meeting, the meeting will be re-scheduled to a date where one or both seats are able to attend.

QUORUM

A quorum for the PC will be 50% plus one of the voting committee membership, and the Chair or Alternate Chair must be present during the vote. There are 18 voting members on the PC, therefore 10 members denote a quorum. Members may also delegate their voting power to other members of the PC to vote in their absence. Committee members may abstain from voting if they have a conflict of interest on the matter. PC members and alternates get only one vote (when primary members are assigned as an alternate) and there is only one vote given per organization (where multiple agency representatives attend the meeting). To vote by proxy, PC members must inform the Chair at least one week in advance.

ALTERNATES

It was the decision of the PC to allow for designated alternates for PC members, if desired. Designated alternates shall be considered official members of the PC. Alternates are welcome to attend any and all scheduled meetings. They will receive copies of all meeting materials as well as meeting agendas and summaries to keep informed. PC members and alternates are interchangeable, and alternates will have full voting rights, but only when the primary PC member is not in attendance. Coordination of who attends scheduled PC meetings is the sole responsibility of the primary member and their designated alternate. Those PC members that choose to designate alternates shall notify the Chair no later than one week prior to the next scheduled PC meeting.

DECISION-MAKING

As the PC provides advice and guidance on the plan, it will reach its recommendations primarily through consensus. Consensus is defined as a recommendation that may not be ideal for each committee member, but every member can accept. If consensus cannot be reached, the PC members will vote to reach a ruling, with the majority of the votes deciding the vote. Members may abstain from voting if they choose. The City is able to accept the direction of the PC or not. It is the City's choice. Designated alternates for PC members are interchangeable and have full voting rights on behalf of the PC member. In either case, the meeting summaries will record minority dissent and that the PC chose to note such opinions in their final recommendations.

RECOMMENDATIONS

The committee's recommendations will be recorded in the meeting summaries and reflected in the plan as appropriate. The PC may also be asked to assist in public presentations of the plan and its recommendations.

SPOKESPERSONS

Ideally the PC will present a united recommendation after considering the different viewpoints of its members, recognizing that each member might have made a somewhat different recommendation as an individual. To consistently represent the committee's united recommendations to participating organizations, the public, and the media, the committee spokesperson will be the City of Long Beach Public Information Officer (PIO), who serves on the PC. In the PIO's absence, the PC Chair will serve as the spokesperson.

In addition, each member should have a responsibility to represent the PC's recommendation when speaking on plan-related issues as a committee member. Any differing personal or organizational viewpoints should be clearly distinguished from the committee's work. Finally, committee members will need to assist with presentations given to organizations within the City as well as during public meetings or presentations.

MEETING DATES

Meetings generally will be conducted approximately monthly as necessary on Wednesdays from 3:00 to 5:00 p.m. at the City of Long Beach City Hall at 1 West Chester Street, Long Beach, New York. The exact room may fluctuate due to availability and will be listed on the agenda for each meeting. Maps will be distributed as needed. Members of the PC may also participate via conference call. Conference call information will be sent with the calendar invitation and agenda approximately one week prior to the meeting. Meetings will be open to the public and advertised as such with the location of the PC meeting publicly advertised on the project website.

ATTENDANCE

Participation of all PC members in meetings is important and members should make every effort to attend each meeting. If committee members cannot attend, they should inform the Chair before the meeting is conducted. If a primary member and his or her alternate miss two consecutive meetings over the course of the planning process, the member will be relieved of his or her membership on the PC. If a member of the PC needs to resign from the committee, and there is a designated alternate, the alternate will be asked to take his or her place on the PC as the primary member. As a new primary member, an alternate may be designated. If there is no designated alternate, the PC will seek to find a replacement PC member.

PUBLIC INVOLVEMENT

All PC meetings will be open to the public. Members of the public wishing to address the PC at a meeting may do so based on the following protocol:

- Requests to be heard must be made to the Chair of the PC by submitting a completed speaker request form to the chairperson before the meeting is called to order. Speaker request forms will be available at all PC committee meetings. The speaker request form asks the following information:
 - Agenda item number to be discussed or public comment
 - If the person is in favor/opposed to the agenda item (if applicable)
 - Person's name
 - Person's telephone number (optional)
 - Person's address (optional)
 - Name of organization (if applicable)
 - A brief summary of the person's position on the matter (optional).
- Persons wishing to speak on items listed on the agenda will be heard when the Chair or Alternate Chair calls for comments from the audience and must have relevance to the floodplain management plan and the City. Relevance will be determined by the Chair or Alternate Chair.
- The Chair may specify the number of minutes each person will be permitted to speak based on the number of persons wishing to speak and the time available.
- After the public has commented, the item is closed to further public comment and brought to the PC for discussion and action. There is no further comment permitted from the audience unless invited by the PC.

The PC will strive to post meeting agendas on the City's floodplain management website one week prior to all scheduled meetings.

COURTESY

PC members should treat each other with respect, listen to each other, work cooperatively, and allow all members to voice their opinions.

ADA AND TITLE VI ACCOMMODATIONS

Individuals requiring reasonable accommodations, interpretation services, and materials in other languages or in an alternate format may contact Ms. Rita Butler of the Department of Public Works at (516) 431-1011. Requests must be made one week in advance of the scheduled meeting date. Individuals with hearing or speech impairment may use the New York State relay service Dial 711.

PLANNING COMMITTEE MEMBERSHIP

Name	Organization	Alternate Name
City of Long Beach Government Representatives		
Bourne, Patricia	Economic Development and Planning	Steiner, Rebecca
Brand, Joe	Parks & Recreation	
Corbett, Richard	Police Department/Office of Emergency Management	
Febrizio, Joe	Department of Public Works	
Huffman, Tyler	Community Development	
McTiernan, Ryan	Department of Community Development and Sustainability	
Morrelli, Rocco	Zoning Board of Appeals	
Schuh, Rich	Building Department	
Tepper, Gordon	Manager's Office	
Non-Voting City of Long Beach Government Representative		
Butler, Rita	Department of Public Works	
Mirando, John	Acting City Manager	
Non-government Representatives		
Bochner, Scott	Environmental Advisory Board	
Danby, Ian	Long Beach Chamber of Commerce	
Gallagher, Dr. Jennifer	Superintendent of Long Beach Schools	
Kemins, Scott	City of Long Beach Volunteer Fire Department	
Knag, Tom	Westholme and Walks Civic Association	
O'Toole, Edwin	O'Toole Insurance	
Rector, Anthony	Developer	
Reilly, Kevin	North East Bay and Canal Civic Association, also representing the City Community Organizations Active in Disaster (COAD)	
Tozer, Leah	Engel and Völkers	



MEETING NOTES

Meeting	City of Long Beach Floodplain Management Plan (FMP) Planning Committee Kickoff Meeting		
Date	October 2, 2019	Time	3:00 – 5:10 p.m.
Location	Long Beach City Hall, 1 West Chester Street, Long Beach, New York		
Attendees	John Mirando, Acting City Manager, City of Long Beach		
	Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works		
	Scott Bochner, Environmental Advisory Board		
	Patricia Bourne, Director, City of Long Beach Department of Economic Development and Planning		
	Joe Brand, Director, City of Long Beach Department of Parks and Recreation		
	Rita Butler, City of Long Beach Department of Public Works		
	Richard Corbett, City of Long Beach Police Department		
	Ian Danby, Long Beach Chamber of Commerce		
	Tyler Huffman, Environmental Coordinator, City of Long Beach		
	Tom Knag, Westholme and Walks Civic Association		
	Ryan McTiernan, City of Long Beach Department of Community Development and Sustainability		
	Ed O'Toole, Insurance Agent		
	Anthony Rector, Local Developer		
	Kevin Reilly, Vice President, North East Bay and Canal Civic Association, also representing the City Community Organizations Active in Disaster (COAD)		
	Rich Schuh, City of Long Beach Building Department		
	Rebecca Steiner, Planner, City of Long Beach Department of Economic Development and Planning		
	Gordon Tepper, Public Information Officer, City of Long Beach Manager's Office		
	Leah Tozer, Real Estate Agent, Engel and Völkers		
	Chris Huch, Planner, Tetra Tech, Inc. (Tetra Tech)		
	Tony Subbio, Project Manager, Tetra Tech		

Discussion Points

This section summarizes each discussion point addressed during the Planning Committee Kickoff Meeting.

Introductions

Mr. Mirando and Mr. Febrizio welcomed attendees to the meeting. Attendees introduced themselves. Mr. Febrizio stated that Nassau County's hazard mitigation plan, for which the City was receiving Community Rating System (CRS) points, has expired. The City needs to earn CRS credit in



MEETING NOTES

Activity 510 through a Floodplain Management Plan (FMP) or Repetitive Loss Area Analysis (RLAA) to maintain its CRS rating. The City chose Tetra Tech to develop an FMP. The City would like to upgrade its class rating from a Class 7 to a Class 6.

Project Scope Review

Mr. Subbio reviewed the scope of the project.

Review Certification Documentation

The City of Long Beach (the City) received CRS credit in accordance with the scoring elements in the 2013 CRS Coordinator's Manual. The City's programs will now be scored against the 2017 CRS Coordinator's Manual. Mr. Febrizio provided Tetra Tech a copy of the verification report from Garrett Byma, the CRS Specialist at the Insurance Services Office (ISO), prior to the meeting. This report shows the number of points by CRS activity. Mr. Subbio requested that Mr. Febrizio obtain detailed scoring worksheets that show the number of points awarded for the specific individual elements within each activity so that Tetra Tech can determine the number of points the City may earn for its existing programs.

Develop a Floodplain Management Plan (FMP)

Planning Committee

The Planning Committee includes a representative from the City's planning staff. The Planning Committee members have expertise in the six categories of mitigation activities. The Planning Committee was established by resolution of the City Council. There were 11 City staff members and 7 other stakeholders represented on the Planning Committee. To earn all 60 CRS points for the committee membership, the committee needs to have more stakeholders than City employees. Ms. Tozer will reach out to Dr. Gallagher for representation of the school district on the Planning Committee. A representative of a volunteer fire department will also be added. Mr. Subbio will send Mr. Febrizio information on additional stakeholders to include on the Planning Committee. All Planning Committee meetings need a quorum of over one-half of the members present. Planning Committee meetings will be open to the public and advertised. Public input will be taken in writing at the end of the Planning Committee meetings. Planning Committee meetings will be scheduled on Wednesdays from 3:00–5:00 p.m.

Stakeholder Outreach

In addition to the Planning Committee meetings being open to the public, Tetra Tech will conduct three public meetings separate from the Planning Committee meetings and meetings of City Council. One meeting will be held at the beginning of the planning process to provide information about the planning process to the public. The second public meeting will be held after the risk assessment is complete. The third public meeting will be to present the completed draft for public comment at least two weeks prior to the FMP's adoption by City Council.



MEETING NOTES

The City will leverage existing outreach methods to distribute information about the FMP planning process, including the following:

- An annual flood awareness bulletin
- Annual mailings from the building department to insurance agents

There are five civic associations in the City; they can be provided information and distribute the information to the public. Any stakeholder meeting (e.g., civic association meetings) can be leveraged to provide outreach related to the FMP. Copies of the agenda, sign-in sheet, and meeting notes are required.

A procedure for documenting outreach by organizations represented on the Planning Committee needs to be developed. Outreach will be coordinated through Mr. Tepper.

Tetra Tech will develop a 1–2-page flyer describing the CRS Program and the FMP planning effort. This flyer can be distributed throughout the planning process. Tetra Tech will also develop a questionnaire to gather input from City residents.

The City's website will be used to provide information to the public.

Risk Assessment

Mr. Subbio had provided Mr. Febrizio with a template letter to send to the Federal Emergency Management Agency (FEMA) to request National Flood Insurance Program (NFIP) flood insurance policy and claims information. Mr. Subbio reviewed the Geographic Information Systems (GIS) Data Wish List that had been provided prior to the meeting to Mr. Febrizio.

The City has over 900 Repetitive Loss Properties (RLP). They have been mapped in GIS by the City. Because the entire City is in the mapped floodplain, the entire City can be treated as one repetitive loss area.

Remaining Planning Process

Mr. Subbio described the remainder of the planning process. Each step in the process will have an associated Planning Committee meeting.

Adoption

The Planning Committee will continue to meet after the FMP is approved. Additional CRS points are available for meeting beyond adoption of the plan.

Prepare CRS Verification Documentation

Tetra Tech will compile the required documentation for each activity for which the City will earn CRS points. Mr. Schuh will provide Tetra Tech the City's Building Code Effectiveness Grading Schedule



MEETING NOTES

(BCEGS) rating. Mr. Febrizio will provide a list of all parcels that the City considers open space so that the credit for Open Space Preservation can be calculated.

Participate in CRS Verification Visit – December 17, 2019

Mr. Subbio and Mr. Huch will join City staff at the CRS Verification Visit to support the City and provide context to ISO.

Recommendations for Improved Class Status

Tetra Tech will review the City's programs to identify additional activities and programs that may earn CRS points. Tetra Tech will request a "What If" analysis from ISO.

Project Schedule Review

Mr. Subbio reviewed the project schedule with the Planning Committee. Mr. Febrizio will schedule a call with the CRS Specialist at ISO to discuss the deadline by which to have the FMP completed and adopted.

Next Steps

- Mr. Febrizio will request the detailed scoring worksheets from Garrett Byma at ISO.
- Mr. Subbio will send Mr. Febrizio a list of additional members of the Planning Committee.
- Mr. Febrizio will schedule a call with Garrett Byma at ISO to discuss the verification visit and deadline for completion of the FMP.
- Tetra Tech will develop a 1–2-page flyer describing the CRS Program and FMP planning effort.
- Mr. Schuh will provide the City's BCEGS rating to Tetra Tech.
- Tetra Tech will request a "What If" analysis from ISO.
- Tetra Tech will draft the flood hazard profile after the required GIS data has been received.



AGENDA

City of Long Beach Community Rating System (CRS) Support Planning Committee Kickoff Meeting

Wednesday, October 2, 2019 | 3:00 – 5:00 p.m.

1. Introductions

2. Project Scope Review

- a. Review Certification Documentation
- b. Prepare CRS Verification Documentation
- c. Participate in CRS Verification Visit – December 17, 2019
- d. Develop a Floodplain Management Plan
 - i. Planning Committee
 - ii. Stakeholder Outreach
 - iii. Risk Assessment
 - iv. Vulnerability Assessment
 - v. Public Involvement
 - vi. Goals, Objectives, and Actions
 - vii. Plan Maintenance
 - viii. Development of the Plan
 - ix. Review Period
 - x. Adoption
- e. Recommendations for Improved Class Status

3. Project Schedule Review

4. Next Steps

- a. Document Request
- b. Crosswalk
- c. Geographic Information System (GIS) Data – Wish List
- d. National Flood Insurance Program (NFIP) Data
 - i. Policies/Claims
 - ii. Repetitive Loss/Severe Repetitive Loss Properties
 - iii. CRS What-If Analysis
- e. Flood Hazard Profile
- f. Impact Analysis Report

5. Questions

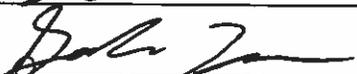
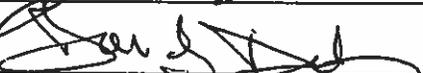
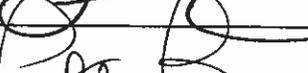
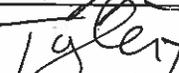


City of Long Beach Community Rating System (CRS) Support – Project Schedule – Original

Task Name	Start	Finish	Aug '19	Sep '19	Oct '19	Nov '19	Dec '19	Jan '20	Feb '20
City of Long Beach CRS Support - Original Schedule	Mon 9/16/19	Fri 1/3/20							
Task 1 - Review Certification Documentation	Mon 9/16/19	Fri 11/29/19							
Review 2014 Package	Mon 9/16/19	Fri 9/20/19							
2017 Crosswalk	Mon 9/16/19	Fri 9/27/19							
Impact Analysis Report	Mon 9/16/19	Fri 11/29/19							
Assemble Technical Review Documentation	Mon 11/4/19	Fri 11/29/19							
Task 2 - Prepare CRS Verification Document	Mon 9/16/19	Fri 11/29/19							
Task 3 - Participate in CRS Verification Visit	Tue 12/17/19	Fri 1/3/20							
Attend Visit	Tue 12/17/19	Tue 12/17/19							
Draft Response to Follow-up Request	Wed 12/18/19	Fri 1/3/20							
Task 4 - Develop an FMP	Mon 9/16/19	Tue 12/31/19							
Organize the Resources	Mon 9/16/19	Fri 10/4/19							
Planning Committee Kickoff Meeting	Thu 9/26/19	Thu 9/26/19							
Review Programs	Mon 9/16/19	Fri 10/4/19							
Risk Assessment	Mon 9/16/19	Wed 10/23/19							
Develop Flood Hazard Profile	Mon 9/16/19	Tue 10/8/19							
Planning Committee Meeting About Flood Profile	Wed 10/9/19	Wed 10/9/19							
Conduct Vulnerability Assessment	Mon 9/16/19	Mon 10/21/19							
Planning Committee Meeting About the Vulnerability Assessment	Wed 10/23/19	Wed 10/23/19							
Public Involvement Strategy	Mon 9/16/19	Tue 12/31/19							
Public Informational Meeting - with Flood Profile PC Mtg	Wed 10/9/19	Wed 10/9/19							
Risk Assessment Review Public Meeting - with VA mtg	Wed 10/23/19	Wed 10/23/19							
Draft Plan Review	Fri 11/15/19	Fri 11/15/19							
Goals, Objectives, and Review Actions	Tue 10/22/19	Fri 11/15/19							
G&O Meeting of Planning Committee	Wed 10/30/19	Wed 10/30/19							
SWOO Meeting to Review Possible Acti	Thu 11/7/19	Thu 11/7/19							
Plan Maintenance Strategy	Mon 9/16/19	Fri 11/15/19							
Develop the Plan	Mon 9/16/19	Fri 11/15/19							
Review Period	Fri 11/15/19	Thu 11/28/19							
Review, Implement, and Adopt the Plan	Fri 11/29/19	Tue 12/3/19							
Submit to City Council	Fri 11/29/19	Fri 11/29/19							
Support Adoption	Tue 12/3/19	Tue 12/3/19							
Task 5 - Provide Recommendations for Improved Class Status	Mon 11/4/19	Fri 11/29/19							

City of Long Beach Community Rating System (CRS) Support – Project Schedule – Updated

Task Name	Start	Finish	Oct '19				Nov '19			Dec '19			Jan '20			Feb '20		
			E	B	M	E	B	M	E	B	M	E	B	M	E	B	M	
City of Long Beach CRS Support - Updated Schedule	Wed 10/2/19	Tue 2/4/20																
Task 1 - Review Certification Documentation	Wed 10/2/19	Fri 11/29/19																
Review 2014 Package	Wed 10/2/19	Tue 10/8/19																
2017 Crosswalk	Wed 10/2/19	Tue 10/15/19																
Impact Analysis Report	Wed 10/2/19	Fri 11/29/19																
Assemble Technical Review Documentation	Mon 11/4/19	Fri 11/29/19																
Task 2 - Prepare CRS Verification Documentation	Wed 10/2/19	Fri 11/29/19																
Task 3 - Participate in CRS Verification Visit	Tue 12/17/19	Fri 1/3/20																
Attend Visit	Tue 12/17/19	Tue 12/17/19																
Draft Response to Follow-up Request	Wed 12/18/19	Fri 1/3/20																
Task 4 - Develop an FMP	Wed 10/2/19	Tue 2/4/20																
Organize the Resources	Wed 10/2/19	Fri 10/25/19																
Planning Committee Kickoff Meeting	Wed 10/2/19	Wed 10/2/19																
Review Programs	Wed 10/2/19	Fri 10/25/19																
Risk Assessment	Wed 10/2/19	Tue 11/12/19																
Develop Flood Hazard Profile	Wed 10/2/19	Tue 10/22/19																
Planning Committee Meeting About Flood Profile	Wed 10/23/19	Wed 10/23/19																
Conduct Vulnerability Assessment	Wed 10/2/19	Fri 11/8/19																
Planning Committee Meeting About the Vulnerability Assessment	Tue 11/12/19	Tue 11/12/19																
Public Involvement Strategy	Wed 10/2/19	Fri 1/31/20																
Public Informational Meeting	Wed 10/23/19	Wed 10/23/19																
Risk Assessment Review Public Meeting	Tue 11/12/19	Tue 11/12/19																
Draft Plan Review	Thu 1/9/20	Thu 1/9/20																
Goals, Objectives, and Review Actions	Mon 11/11/19	Tue 12/10/19																
G&O Meeting of Planning Committee	Wed 11/20/19	Wed 11/20/19																
SWOO Meeting to Review Possible Actions	Tue 12/10/19	Tue 12/10/19																
Plan Maintenance Strategy	Wed 10/2/19	Fri 11/15/19																
Develop the Plan	Wed 10/2/19	Wed 1/15/20																
Review Period	Thu 1/16/20	Wed 1/29/20																
Review, Implement, and Adopt the Plan	Thu 1/30/20	Tue 2/4/20																
Submit to City Council	Thu 1/30/20	Thu 1/30/20																
Support Adoption	Tue 2/4/20	Tue 2/4/20																
Task 5 - Provide Recommendations for Improved Class Status	Mon 11/4/19	Fri 11/29/19																

NAME	SIGNATURE
Anthony Rector	
Ed O'Toole	
* Gordon Tepper	
Ian Danby	
* Joe Brand	
* Joe Febrizio	
* John Mirando	
Kevin Reilly	
Leah Tozer	
* Patricia Bourne	
* Rebecca Steiner	
* Rich Schuh	
* Richard Corbett	
Rocco Morrelli	
* Ryan McTiernan	
Scott Bochner	
* Scott Kemins	
Tom Knag	
* Tyler Huffman	
Tony Subbio	

Chris Hoch

Christopher Hoch

* City Employees



MEETING NOTES

Meeting	City of Long Beach Floodplain Management Plan (FMP) Planning Committee Flood Hazard Assessment Meeting		
Date	November 6, 2019	Time	3:00 – 4:30 p.m.
Location	Long Beach City Hall, 1 West Chester Street, Long Beach, New York		
Attendees	John Mirando, Acting City Manager, City of Long Beach		
	Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works		
	Scott Bochner, Environmental Advisory Board		
	Patricia Bourne, Director, City of Long Beach Department of Economic Development and Planning		
	Joe Brand, Director, City of Long Beach Department of Parks and Recreation		
	Rita Butler, City of Long Beach Department of Public Works		
	Richard Corbett, City of Long Beach Police Department		
	Ian Danby, Long Beach Chamber of Commerce		
	David Fraser, City of Long Beach		
	Joseph Gallinaro, Architect (non-governmental)		
	Tyler Huffman, Environmental Coordinator, City of Long Beach		
	Scott Kemis, City of Long Beach Fire Department		
	Tom Knag, Westholme and Walks Civic Association		
	Ryan McTiernan, City of Long Beach Department of Community Development and Sustainability		
	Ed O’Toole, Insurance Agent		
	Kevin Reilly, Vice President, North East Bay and Canal Civic Association, also representing the City Community Organizations Active in Disaster (COAD)		
	Rich Schuh, City of Long Beach Building Department		
	Rebecca Steiner, Planner, City of Long Beach Department of Economic Development and Planning		
	Leah Tozer, Real Estate Agent, Engel and Völkers		
	Chris Huch, Planner, Tetra Tech, Inc. (Tetra Tech)		

Discussion Points

This section summarizes each discussion point addressed during the Planning Committee Meeting.



MEETING NOTES

Project Updates

Mr. Huch and Mr. Febrizio welcomed attendees to the meeting and updated attendees with the following information:

- Mr. Huch explained that representatives from the City and Tetra Tech spoke on the phone with Mr. Garrett Byma, ISO representative. The call involved preparing for the Community Rating System (CRS) visit and discussing the timeline for the Floodplain Management Plan process. The phone call was productive; Mr. Byma agreed on a timeline of completion for the Floodplain Management Plan, to be completed by February 2020.
- Tetra Tech is beginning the risk assessment.

Outreach Efforts

Outreach efforts discussed at the meeting are summarized below:

- Mr. Huch explained that the committee should perform outreach efforts where possible.
- Leah Tozer noted that she had discussed the Floodplain Management Plan effort at a recent meeting, and presented Mr. Huch with the sign-in sheet from the meeting.
- Mr. Huch explained that the first public meeting would be taking place in the evening after the completion of the Committee meeting, and would aim to gather input from the public on flood-prone locations at that time.

Planning Committee Charter Draft Review

Mr. Huch presented the Committee with a draft Planning Committee Charter. The Charter is designed to designate non-voting members, define a quorum, and establish procedures for the public to be heard during Committee meetings.

Assess the Flood Hazard

Mr. Huch asked for the Committee to help to identify flood-prone locations, sources of flooding, extent of flooding, and past damages from flooding to enhance the Risk Assessment. The Committee noted the following:

- West Park Avenue is prone to high-tide flooding and flooding from heavy rainfall.
- The Canals through Neptune and Franklin at Hudson flood from a combination of coastal flooding and heavy rainfall.
 - North of Park Avenue was noted as highly prone.
- Riverside and Pine Street are prone to flooding.
- The intersection of National Boulevard and Park Avenue floods during heavy rainfall events.
- Laurelton and the bay floods during coastal flood events.



MEETING NOTES

- The City has 98 outfalls. Only half have tide-flex valves to prevent backflow.
 - The outfalls need constant maintenance.
 - The public needs education on how the valves work and how to help keep storm drains free of trash and debris, which can clog the valves.
- The Boardwalk barrier was noted as a recent change to the flood risk of the City as it protects the oceanfront from overwash and wave damages.
- The Neptune Avenue reconstruction project north of Park Avenue is a \$4 to 5 million project and will involve installation of sub-surface drains.
- Park Avenue between New York and Nevada often experiences flooding. The City is installing a pump station on Tennessee Avenue.
- The North Shore Project will involve installation of a pump station on Riverside.
- The City has 1,800 catch basins, and tries to clean about 20% each year.
- The City's Draft Comprehensive Plan discussed permeable pavement. Adopting the updated plan would allow changes to the City's zoning regulations.
- The Committee noted that the worst damage to the City from Superstorm Sandy took place at the West End.
- The City's installation of soft shoulders on roadways seems to be working to increase flood absorption; however, the City noted the need to consider the newest flood-absorption options (blue stone) and to see how often that option needs to be used.
- Committee members noted that sea-level rise has been noticeable in the City, especially in the Canals section.
- The Canals and North Shore lack protection and erosion is taking place. Bids are due to build bulkhead and put in pump station (3,000 feet).
- The Committee noted the loss of marsh over time.
 - The Committee noted that neighboring Hempstead is looking to implement thin-layer deposition.
- In Point Lookout at the eastern end of Hempstead, the jetties have been extended.
- Deposition of sand in Jones Inlet is an issue.
 - Additional sand contributes to the "wind against tide (tidal stacking)" phenomenon.

The Planning Committee identified the following plans, studies, and projects that might provide data and context for the Floodplain Management Plan:

- U.S. Army Corps of Engineers (USACE) Back Bay Study: Funding for the study has recently been paused, stopping the continuation of the study.
- U.S. Department of Housing and Urban Development's (HUD) Rebuild by Design for Mill Creek to the north: Funding has been stopped.
- Mid-Atlantic Regional Ocean Council (MARCO): MARCO provides information on currents and waves that may be useful.



MEETING NOTES

- The Superstorm Sandy Task Force Study focused on Suffolk County, but may contain relevant information.
- The Nature Conservancy may have additional information.
- Hempstead Conservation of Waterways may have additional information.
- Historical maps can provide information regarding old inlets and bogs.

Next Steps

Mr. Huch noted that the first Public Information Meeting would take place following the completion of the Planning Committee meeting. Mr. Huch asked the committee to review the draft Planning Committee Charter for a vote at the start of the next meeting. Mr. Huch confirmed the City is aiming to have the Floodplain Management Plan completed by February 2020. Tetra Tech is working to complete the risk assessment and will work with the City to schedule the next Planning Committee Meeting.

Questions

Mr. Febrizio answered several questions regarding the schedule and scope for the upcoming stormwater projects.

The meeting adjourned at 4:25 pm.



AGENDA

City of Long Beach Community Rating System (CRS) Support Planning Committee Flood Hazard Assessment Meeting

Wednesday, November 6, 2019 | 3:00 – 4:30 p.m.

1. Project Updates

2. Outreach efforts

3. Planning Committee Charter Draft Review

4. Assess the Flood Hazard

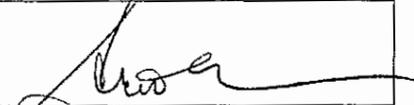
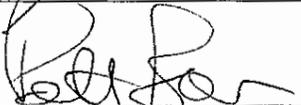
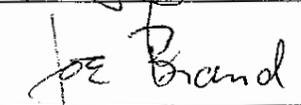
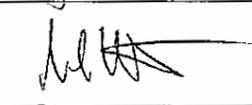
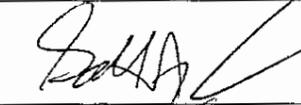
- a. Sources/Causes of Flooding
- b. Frequency of Flooding
- c. Flooding Extent
- d. Flood Prone Locations
 - i. Coastal flooding locations
 - ii. Roadways prone to urban flooding/stormwater flooding

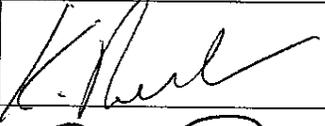
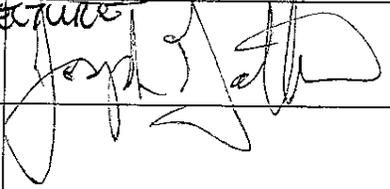
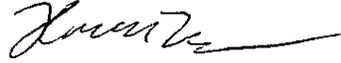
5. Next Steps

- a. Public Information Meeting
- b. Finalize Planning Committee Charter
- c. Complete risk assessment
- d. Next meeting

6. Questions



DAY: <i>Wednesday</i>	DATE: <i>Nov. 6 2019</i>	
NAME	REPRESENTATIVE OF	SIGNATURE
<i>Bochner, Scott</i>	Environmental Association	
<i>Bourne, Patricia</i> ✓	City of Long Beach Economic Development	
<i>Brand, Joe</i>	City of Long Beach Park & Recreation	
<i>Corbett, Richard</i>	City of Long Beach OEM/Police	
<i>Danby, Ian</i> ✓	Chamber of Commerce	
<i>Febrizio, Joe</i>	City of Long Beach Dept. of Public Works	
<i>Gallagher, Jennifer Dr.</i>	Superintendent of Long Beach Schools	
<i>Huch, Chris</i>	Tetra Tech	
<i>Huffman, Tyler</i> ✓	City of Long Beach Community Development	
<i>Kemins, Scott</i> ✓	City of Long Beach Fire Dept.	
<i>Knag, Tom</i>	West End /West Home Civic Association	
<i>McTiernan, Ryan</i>	City of Long Beach Community Development	
<i>Mirando, John</i> ✓	City of Long Beach Acting City Manager	
<i>Morrelli, Rocco</i>	City of Long Beach Zoning Board of Appeals	

✓ O'Toole, Edwin	O'Toole Insurance	
Rector, Anthony	Developer	
Reilly, Kevin	C.O.A.D	
Schuh, Rich	City of Long Beach Building Dept.	
✓ Steiner, Rebecca	City of Long Beach Economic Development	Rebecca Steiner
Subbio, Tony	Tetra Tech	
✓ Tepper, Gordon	City of Long Beach Public Relations	
✓ Tozer, Leah	Chamber of Commerce	
GALLINARO, Joseph JTG@GallinaroDesignStudios.com	GALLINARO DESIGN ARCHITECTURE ARCHITECT STUDIOS.COM	
S		
David Frase	CLB	

Lita Butler

DPW





MEETING NOTES

Meeting	City of Long Beach Floodplain Management Plan (FMP) Public Information Meeting		
Date	November 6, 2019	Time	5:00 – 6:30 p.m.
Location	Long Beach City Hall, 1 West Chester Street, Long Beach, New York		
Attendees	John Mirando, Acting City Manager, City of Long Beach		
	Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works		
	Chris Huch, Planner, Tetra Tech, Inc. (Tetra Tech)		
	Members of the public		

Discussion Points

This section summarizes each discussion point addressed during the Planning Committee Kickoff Meeting.

Introductions

Mr. Huch and Mr. Febrizio welcomed attendees to the meeting.

Community Rating System Program

Mr. Huch explained the Community Rating System (CRS), the National Flood Insurance Program (NFIP), and the City's current status in the CRS program as a Class 7 community. The CRS program rewards communities for going above and beyond the requirements of the NFIP. As a Class 7 community, eligible policy holders receive a 15% reduction in flood insurance premiums. Mr. Huch explained that the City is regularly scored on actions in the program which need to be maintained.

Floodplain Management Planning Process

Mr. Huch explained the City of Long Beach is starting the process of writing a Floodplain Management Plan to maintain points in the CRS program which were previously earned through the County's plan which has now expired.

Floodplain Management Planning Process

Mr. Huch explained the Floodplain Management Plan process includes a 10-step process. The Floodplain Management Plan Committee has had two meetings to start the process. The risk assessment is beginning to determine the sources of flooding, frequency and extent of flooding, and likely damages caused by flooding. Upon completion, the plan will identify various goals and objectives to be met through various types of actions including outreach, planning, mitigation actions, etc.

Stakeholder Participation and Community Engagement

Mr. Huch explained that the public and various stakeholder groups will be asked to provide input for the plan and review the draft of the plan when it is prepared. Public input will take place through a questionnaire, public meetings, and reviews of the draft.



MEETING NOTES

Schedule

Mr. Huch explained the City is aiming to have the Floodplain Management Plan completed by February 2020.

Flood Prone Locations

In order to support the risk assessment for the Floodplain Management Plan. The public was asked to help identify flood prone locations and note information about the cause of flooding, frequency of flooding, and impacts of flooding. The public noted the following:

- The bayfront on the northern side of the City is prone to flooding.
- The northern coast is vulnerable to high tide, storm surge, and rainfall events.
- Long Beach Road floods during storm surge events.
- States Street at Franklin and the Bay is prone to flooding.
- A member of the public noted that Long Island has seen heavier rainfall events in recent years which are overwhelming the stormwater system, causing flooding and a higher than normal water table.
- It was noted that the storm drain on Laurelton and West Bay Drive causes flooding. Backflow occurs during high tide events.

Next Steps

- Tetra Tech will continue to develop the risk assessment, taking into account information supplied by the Planning Committee and the public.
- Mr. Huch explained that the next public meeting will be announced via the City website, social media, and via the local newspaper.

Questions

- Mr. Febrizio answered several questions regarding upcoming stormwater projects.
- Mr. Febrizio answered several questions regarding maintenance of outfall pipes, stormwater catch basins, and roadways.

The meeting adjourned at 6:00 pm.



AGENDA

City of Long Beach Floodplain Management Plan Public Information Meeting

Wednesday, November 6, 2019 | 5:00 – 6:30 p.m.

1. **Welcome and Introductions**

2. **Community Rating System (CRS) Program**

3. **Floodplain Management Planning Process**

4. **Stakeholder Participation and Community Engagement**

5. **Schedule**

6. **Flood Prone Locations**
 - a. Coastal Flooding
 - b. Stormwater/Urban Flooding

7. **Next Steps**

8. **Questions**

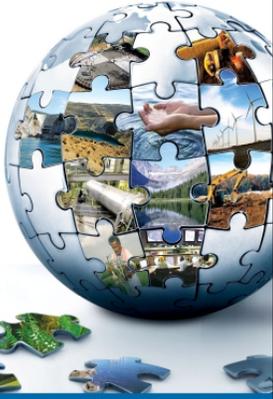




**Long Beach
Floodplain Management Plan**



**Public Information Meeting
November 6, 2019**



Today's Topics

- Welcome and Introductions
- Community Rating System (CRS) Program
- Floodplain Management Planning Process
- Stakeholder Participation and Community Engagement
- Schedule
- Flood Prone Locations
 - Coastal Flooding
 - Stormwater/Urban Flooding
- Next Steps
- Questions




The Community Rating System

- The CRS is a part of the NFIP
- Provides incentive to participating communities to exceed the minimum NFIP criteria
- Incentive is a reduction in the cost of flood insurance in participating communities
- Can reduce the cost of flood insurance from 5% up to 45%
- Participation is voluntary
- Improve ability to lower flood damages
 - (higher regulatory standards, enforcement of regulations, increased knowledge of floodplain issues)




The Community Rating System

- Long Beach is a Class 7 community in CRS, resulting in a 15% reduction in flood insurance premiums for eligible policy holders.
- In 2017, the CRS manual, which designates how points are earned in the program, was updated.
- Long Beach is due for a re-examination at the end of this year and is striving to maintain or improve the City's class ranking.
- The County Floodplain Management Plan has expired.




What is a Floodplain Management Plan?

- *"A Local Floodplain Management Plan demonstrates a commitment to reducing risks from flooding and serves as a guide for decision makers as they commit resources to minimize the effects of flood hazards."*




What is a Floodplain Management Plan?

- The City of Long Beach wishes to:
 - Examine its vulnerability to the flood hazard, create more detailed flood hazard analyses
 - Add new mitigation actions/projects/initiatives so that it can continue to lower its flood hazard risk
 - Garner points in the National Flood Insurance Program (NFIP) Community Rating System (CRS)




Benefits of a Floodplain Management Plan

- Identify existing and future flood-related hazards and their causes;
- Ensure that a comprehensive review of all possible activities and mitigation measures is conducted so that the most appropriate solutions will be implemented to address the hazard;




Benefits of a Floodplain Management Plan

- Ensure that the recommended activities meet the goals and objectives of the community, are in coordination with land use and comprehensive planning, do not create conflicts with other activities, and are coordinated so that the costs of implementing individual activities are reduced;
- Ensure that the criteria used in community land use and development programs account for the hazards faced by existing and new development;




Benefits of a Floodplain Management Plan

- Educate residents and property owners about the hazards, loss reduction measures, and the natural and beneficial functions of floodplains;
- Build public and political support for activities and projects that prevent new problems, reduce losses, and protect the natural and beneficial functions of floodplains; and
- Build a constituency that wants to see the plan's recommendations implemented.




10 Step Planning Process

- 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




10 Step Planning Process

- Step 1: Organize
- **Step 2: Involve the public**
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- Step 10: Implement, evaluate, revise




Stakeholder Participation and Community Engagement

- Notices and news releases on planning effort
- FMP Webpage detailing effort, providing downloadable drafts of the plan, and providing a way for public input (local contact information and email link)
- Public presentations and meetings
- Public access to draft and final plan documents
- Questionnaire (on-line)




10 Step Planning Process

- 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




Goals and Objectives

- Goals:
 - General guidelines that state what we want to achieve.
 - Example: "Protect existing properties."
- Objectives:
 - Define strategies or implementation steps to attain a stated goal.
 - Example: "Enact or enforce regulatory measures that ensure new development will not increase flood threats to existing properties."
- Actions:
 - Specific activities that will achieve our goals and objectives and manage natural hazard risk.




Types of Actions

- **Prevention.** Measures such as planning and zoning, open space preservation, land development regulations, building codes, stormwater management.
- **Property Protection.** Measures such as acquisition, relocation, storm shutters, rebuilding, barriers, flood-proofing, insurance, and structural retrofits
- **Public Education and Awareness.** Measures such as outreach projects, real estate disclosure, hazard information centers, technical assistance.
- **Natural Resource Protection.** Measures such as erosion and sediment control, stream corridor protection, vegetative management, and wetlands preservation.
- **Emergency Services.** Measures such as hazard threat recognition, hazard warning systems, emergency response, protection of critical facilities, and health and safety maintenance.
- **Structural Projects.** Measures such as levees, seawalls, bulkheads, retaining walls, channel modifications, storm sewers, and retrofitted buildings and elevated roadways.




Schedule

- Expedited schedule
- Expected completion of plan in February 2020




10 Step Planning Process

- 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




Risk Assessment

- The foundation of a risk assessment includes the following:
 - Assess Hazard
 - Past events
 - Areas most affected
 - Frequency
 - Severity
 - Warning time for response
 - Determine Exposure
 - Assess Vulnerability
 - Loss Estimation




Flood prone locations?

- Coastal flooding
 - High tides and storm surges
- Stormwater/urban flooding
 - Rainfall driven
- Areas where both flood sources contribute to flooding
 - Rainfall on top of high tides/storm surges



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Thank you for your time!

Joe Febrizio
jfebrizio@longbeachny.gov

Chris Huch
chris.huch@tetrattech.com

Tony Subbio
tony.Subbio@tetrattech.com



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Any Questions?



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CITY OF LONG BEACH
 Floodplain Management Plan Public Information Meeting

SIGN-IN

Wednesday, November 6, 2019 | 5:00 – 6:30 p.m.

NAME	RESIDENT or AGENCY/ORGANIZATION	E-MAIL ADDRESS	TELEPHONE
Aaron Miner	SEN. TODD COMINSKI'S OFFICE	miner@ny.senate.gov	
NANCY GOLDEN	Resident	n.golden12@gmail.com	516 695 8171
Jim Hingley	resident	cmhreston@gmail.com	301 6452
James Hingley		James.Hingley@... (John)	564 659 -
			9493
BILL TANSEY	RESIDENT & PRESIDENT WESTERN MICHIGAN'S CIVIC	WTANSEY@GMAIL.COM	516 249 2245





MEETING NOTES

Meeting	City of Long Beach Floodplain Management Plan (FMP) Planning Committee Assess the Problem Meeting		
Date	December 4, 2019	Time	3:00 – 4:30 p.m.
Location	Long Beach City Hall, 1 West Chester Street, Long Beach, New York		
Attendees	John Mirando, Acting City Manager, City of Long Beach		
	Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works		
	Scott Bochner, Environmental Advisory Board		
	Patricia Bourne, Director, City of Long Beach Department of Economic Development and Planning		
	Joe Brand, Director, City of Long Beach Department of Parks and Recreation		
	Rita Butler, City of Long Beach Department of Public Works		
	Richard Corbett, City of Long Beach Police Department		
	David Fraser, City of Long Beach		
	Joseph Gallinaro, Architect (non-governmental)		
	Tyler Huffman, Environmental Coordinator, City of Long Beach		
	Scott Kemis, City of Long Beach Fire Department		
	Tom Knag, Westholme and Walks Civic Association		
	Ryan McTiernan, City of Long Beach Department of Community Development and Sustainability		
	Edwin O’Toole, Insurance Agent		
	Rebecca Steiner, Planner, City of Long Beach Department of Economic Development and Planning		
	Gordon Tepper, City of Long Beach Public Relations		
Leah Tozer, Real Estate Agent, Engel and Völkers			
Chris Huch, Planner, Tetra Tech, Inc. (Tetra Tech)			

Discussion Points

This section summarizes each discussion point addressed during the Planning Committee Meeting.

Project Updates

Mr. Huch welcomed attendees to the meeting.

- Mr. Huch explained that the City is scheduled to have their CRS visit from Garrett Byma, ISO representative, on December 17.
- Mr. Huch noted that Tetra Tech would like to have the next public meeting take place on the same day as the CRS visit, if possible. After reviewing availability of the facility, the committee agreed to have the meeting take place on December 18. The meeting time will



MEETING NOTES

be 6:30 pm. This is slightly later than the previous public meeting based on public feedback that later meetings are better.

- Mr. Huch explained that Tetra Tech is continuing to prepare materials for the CRS visit and develop data and information for the Floodplain Management Plan

Planning Committee Charter Draft Review

The Planning Committee voted to adopt the Committee Charter. The Charter is designed to designate non-voting members, define a quorum, and establish procedures for the public to be heard during Committee meetings. All members voted in favor of adoption.

Assess the Flood Hazard

Mr. Huch presented draft mapping from the Risk Assessment:

- Flood Insurance Rate Map
 - Mr. Huch explained the difference between flood zones and how the presence of wave action is designated by the VE zone and the Limit of Moderate Wave Action (LimWA) line. The committee discussed how the City is protected on the oceanfront from wave action by the beaches, dune system, boardwalk, and bulkhead.
 - It was noted that base flood elevations are highest on the oceanfront but decrease back toward the channel, yet the areas that experience the most flooding are along the channel. This is attributed to the greater wave action that would be focused on the oceanfront during large storms.
 - The Committee discussed grandfathering of flood insurance policies and how past updates to the Flood Insurance Rate Maps have resulted in reductions of the X Zone to the point that there are very few small pockets of X Zone remaining within the City.
- Storm Surge
 - Mr. Huch presented SLOSH model maps to represent storm surge risk for Category 1, 2, 3, and 4 hurricanes.
 - Mr. Huch explained that SLOSH is an acronym for Sea, Lake, and Overland Surges from Hurricanes and is a model that takes into account various storm characteristics such as wind speed, direction of storm attack, forward motion of the storm, and tidal cycle. The maps displayed for each category of hurricane are meant to represent the worst-case scenario for each category.
 - Mr. Huch noted that the category of a hurricane is not fully indicative of storm surge and that high category hurricanes can have lower surge values than lower category hurricanes due to various factors.



MEETING NOTES

- It was noted that Long Island has been impacted by major hurricanes in the past. The Long Island Express hurricane of 1938 was a Category 3 hurricane that made landfall on Long Island.
- Sea Level Rise
 - Mr. Huch explained that the FMP process will look not only at currently flooding impacts but also at future flooding impacts.
 - Mr. Huch explained that in the past hundred years, New York has experienced about one foot of sea level rise. Mr. Huch noted that forecasts for sea level rise for the next hundred years are dependent on rates of atmospheric warming and land ice melt.
 - Mr. Huch presented maps for sea level rise at 1, 2, 3, 4, and 5 feet.
 - Mr. Huch noted that these maps could also be used to examine minor storm surge event impacts.
 - The Committee asked if the maps took into account flooding protections such as bulkheading and flood pumps. Mr. Huch explained that they did not but noted that sea level rise may result in many of these protections not being adequate. During development of actions, the ability of mitigation projects to respond to long-term sea-level rise should be considered.
- Rainfall
 - Mr. Huch explained that average annual precipitation has increased across New York State since 1900, with year-to-year (and multiyear) variability becoming more pronounced. New York is getting more precipitation in the winter and less precipitation in the summer. Between 1958 and 2010, the amount of precipitation falling in very heavy events (downpours) increased more than 70% across the northeastern United States.

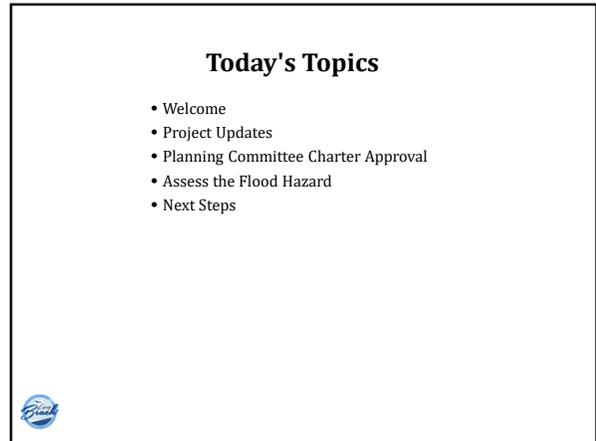
Next Steps

Mr. Huch confirmed that the next Public Information Meeting would take place following the CRS visit. Mr. Huch noted that Tetra Tech is working to complete the Risk Assessment and will work with the City to schedule the next Planning Committee.

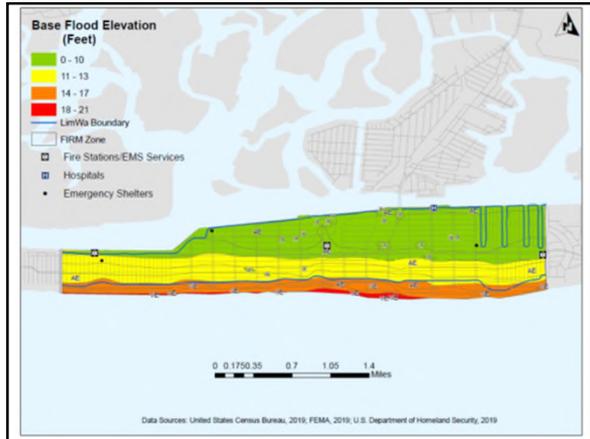
The meeting adjourned at 4:25 pm.



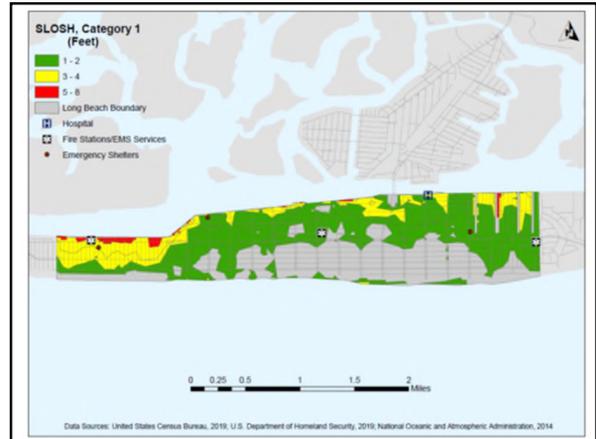
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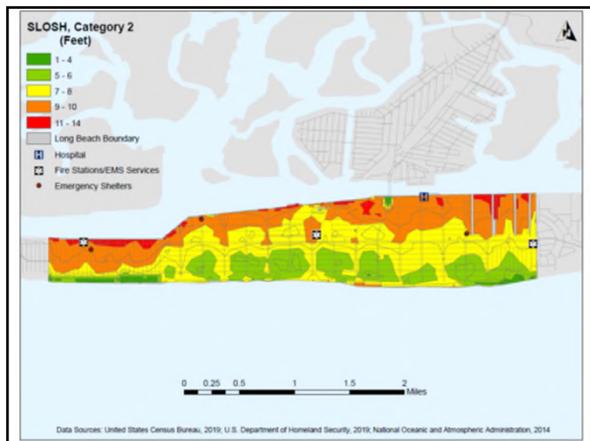
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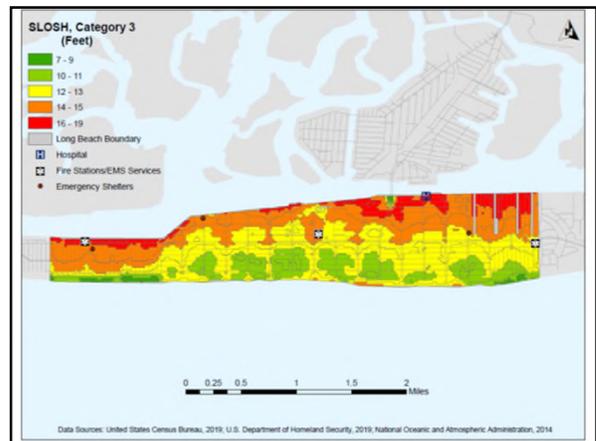
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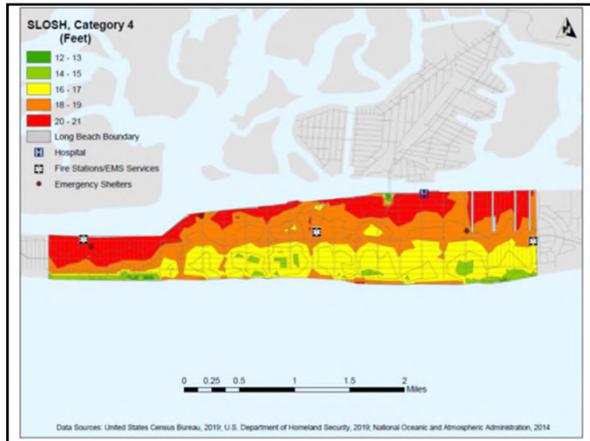
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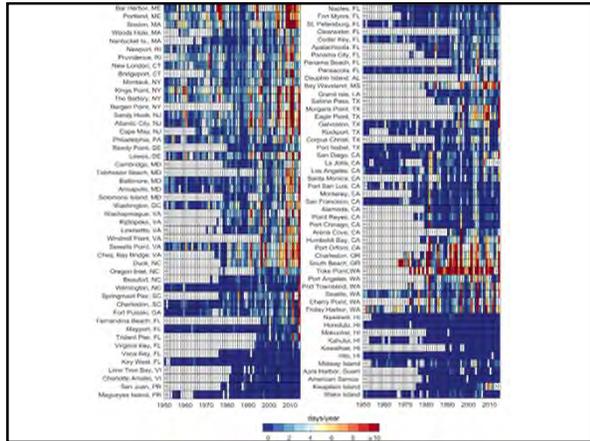
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Sea Level Rise in New York

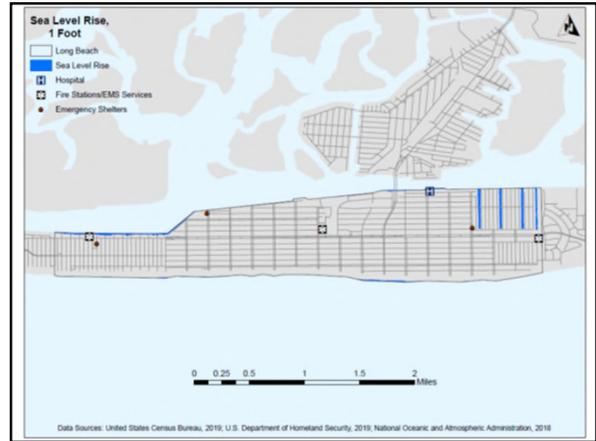
- Sea levels along New York's coast have already risen more than a foot since 1900.
- New York's rate of rise (about 1.2 in per decade) is almost twice the observed global rate (0.7 inches per decade) over the same period.

Baseline (2000-2004) 0 inches	Low Estimate (10th Percentile)	Middle Range (25th to 75th Percentile)	High Estimate (90th Percentile)
2020s	2 in	4 to 8 in	10 in
2050s	8 in	11 to 21 in	30 in
2080s	13 in	18 to 39 in	58 in
2100	15 in	22 to 50 in	75 in

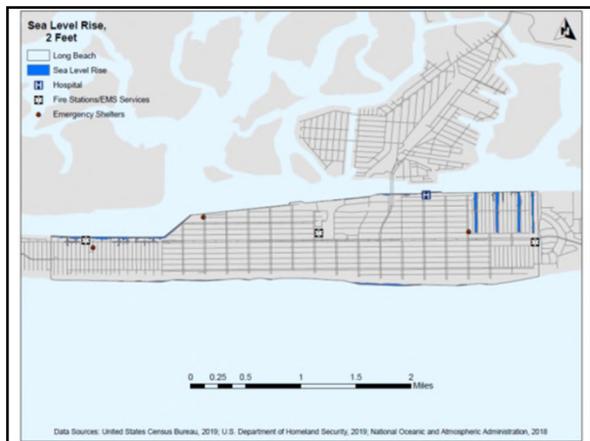
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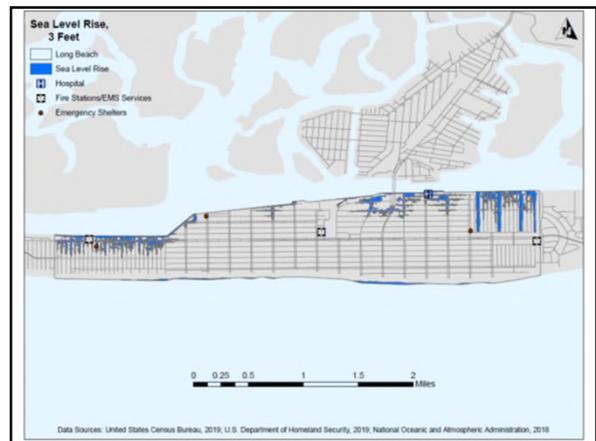
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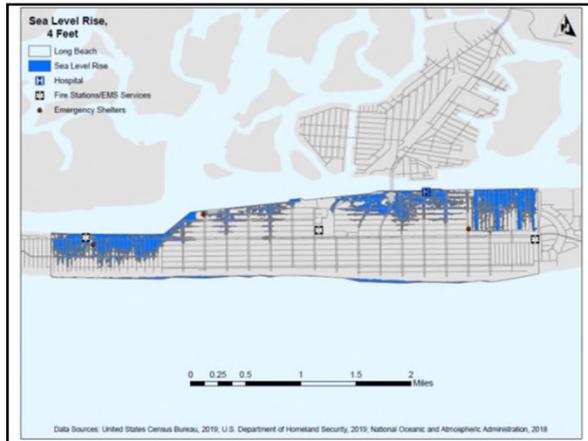
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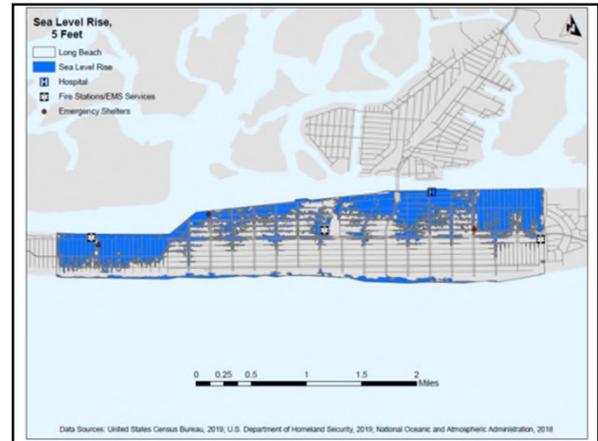
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Precipitation Changes in New York

- Overall, average annual precipitation has increased across New York State since 1900, with year-to-year (and multiyear) variability becoming more pronounced.
- New York is getting more precipitation in the winter and less precipitation in the summer.
- Between 1958 and 2010, the amount of precipitation falling in very heavy events (downpours) increased more than 70% across the northeastern United States.



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AGENDA

City of Long Beach Community Rating System (CRS) Support Planning Committee Assess the Problem Meeting

Wednesday, December 4, 2019 | 3:00 – 4:30 p.m.

1. Project Updates

- a. Schedule
 - b. Public engagement
-

2. Planning Committee Charter Approval

3. Assess the Flood Hazard

- a. Identify and confirm the best available information
 - i. Critical facilities and assets
 - ii. Flood Insurance Rate Maps
 - iii. Storm surge
 - 1. SLOSH model mapping
 - 2. Sandy Surge extent
 - iv. Sea level rise
 - 1. Projections
 - 2. Mapping
 - v. Heavy precipitation
 - 1. Projections
-

4. Next Steps

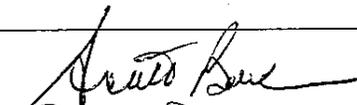
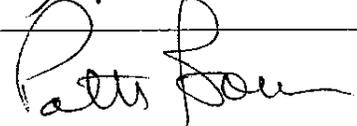
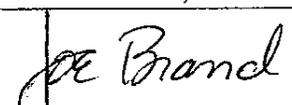
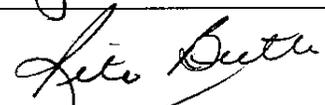
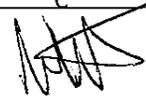
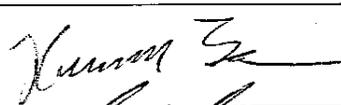
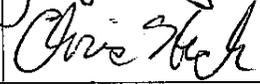
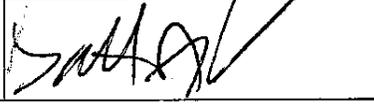
- a. Setting Goals
 - b. Possible Actions
-

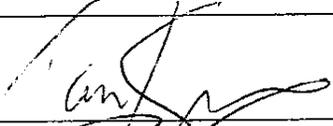
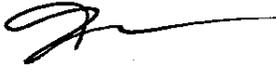
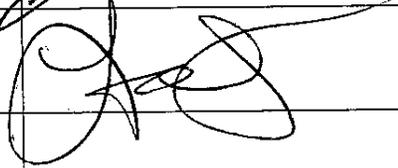
5. Questions

6. Next Meeting

7. Adjournment



DAY: Wednesday	DATE: December 4, 2019	
NAME	REPRESENTATIVE OF	SIGNATURE
Beck, Philip	Chamber of Commerce	
Bochner, Scott	Environmental Association	
Bourne, Patricia	City of Long Beach Economic Development	
Brand, Joe	City of Long Beach Park & Recreation	
Butler, Rita	City of Long Beach Dept. of Public Works	
Corbett, Richard	City of Long Beach OEM/Police	
Danby, Ian	Chamber of Commerce	
Fraser, David	City of Long Beach City Clerk	
Febrizio, Joe	City of Long Beach Dept. of Public Works	
Gallagher, Jennifer Dr.	Superintendent of Long Beach Schools	
Gallinaro, Joseph	Gallinaro Design Architecture Architect	
Huch, Chris	Tetra Tech	
Huffman, Tyler	City of Long Beach Community Development	
Kemins, Scott	City of Long Beach Fire Dept.	

Knag, Tom	West End /West Home Civic Association	
McTiernan, Ryan	City of Long Beach Community Development	
Mirando, John	City of Long Beach Acting City Manager	
Morrelli, Rocco	City of Long Beach Zoning Board of Appeals	
O'Toole, Edwin	O'Toole Insurance	
Rector, Anthony	Developer	
Reilly, Kevin	C.O.A.D	
Schuh, Rich	City of Long Beach Building Dept.	
Steiner, Rebecca	City of Long Beach Economic Development	
Subbio, Tony	Tetra Tech	
Tepper, Gordon	City of Long Beach Public Relations	
Tozer, Leah	Chamber of Commerce	



MEETING NOTES

Meeting	City of Long Beach Floodplain Management Plan (FMP) Planning Committee Goals and Objectives Meeting		
Date	December 18, 2019	Time	3:10 – 4:30 p.m.
Location	Long Beach City Hall, 1 West Chester Street, Long Beach, New York		
Attendees	John Mirando, Acting City Manager, City of Long Beach		
	Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works		
	Scott Bochner, Environmental Advisory Board		
	Patricia Bourne, Director, City of Long Beach Department of Economic Development and Planning		
	Rita Butler, City of Long Beach Department of Public Works		
	Richard Corbett, City of Long Beach Police Department		
	Ian Danby, Long Beach Chamber of Commerce		
	Joseph Gallinaro, Architect		
	Tyler Huffman, Environmental Coordinator, City of Long Beach		
	Ryan McTiernan, City of Long Beach Department of Community Development and Sustainability		
	Edwin O’Toole, Insurance Agent		
	Anthony Rector, Developer		
	Kevin Reilly, North East Bay and Canal Civic Association, and City Community Organizations Active in Disaster (COAD)		
	Rich Schuh, City of Long Beach Building Department		
	Rebecca Steiner, Planner, City of Long Beach Department of Economic Development and Planning		
	Gordon Tepper, City of Long Beach Public Relations		
Chris Huch, Planner, Tetra Tech, Inc. (Tetra Tech)			
Tony Subbio, Project Manager, Tetra Tech			

Discussion Points

This section summarizes each discussion point addressed during the Planning Committee Meeting.

Project Updates

Mr. Mirando welcomed attendees to the meeting. No members of the general public were present. Mr. Subbio described the purpose of this meeting is to review the planning process thus far and discuss the goals and objectives for inclusion in the FMP. There will be a public meeting to review the results of the risk assessment following the Planning Committee meeting.



MEETING NOTES

CRS Visit Results

Mr. Subbio explained CRS verification visit took place with ISO the day before the meeting on December 17, 2019. Mr. Subbio and Mr. Febrizio described the meeting and follow-up items. ISO will be sending a 30-day list of requests to the City early next week. Scoring from ISO is not available yet but should come as ISO reviews materials over the course of the next few months.

ISO requested to see additional elevation certificates for the last 5 years. Rich will be reviewing the certificates to ensure they are complete and correct over the next month.

Scoring for the Floodplain Management Plan will not be available until the plan is reviewed. Tetra Tech has worked to ensure that the planning process will result in the maximum amount of points possible. These steps have been documented and shared with ISO. The schedule remains for the Plan to be completed and submitted in mid-February.

After a review of the City's CRS program, Tetra Tech feels that Class 7 ranking will be preserved. Class 6 is likely out of reach due to changes in the CRS Coordinator's Manual rules, which have made it more difficult for barrier island communities to score points in several areas. This results in a reduction in the points that the City has previously earned.

According to the latest FEMA data, the City is currently saving policy holders around \$1.5 million annually. As flood insurance policies are no longer grandfathered due to home sales, etc., the savings should increase due to change from Zone X rating to Zone A rating. Total savings will also increase as flood insurance gradually becomes more expensive.

Review Problems and Problem Areas

Mr. Huch reviewed a list of the problems and problem areas collected from past committee and public meetings. The committee provided additional comments on the following problems/problem areas:

- Lack of erosional monitoring
 - The USACE will be doing a beach profile survey each year for 5 years to check the groins. USACE has shared a draft operations manual.
- Tide flex valves sometimes are clogged.
 - Tide flex valves seem to be most effective as internal systems.
 - The City has budgeted \$1.5 million to replace tide valves.
 - The Flood Awareness Bulletin mentions tide flex valves as part of outreach. This outreach must be done on an annual basis to earn CRS points.
- Jones Inlet shoaling issues.
 - Jones Inlet is scheduled to be dredged in the next few months
- Flooding is common in the West End
 - Some waterfront areas on the West End lack bulkhead.



MEETING NOTES

- Standards for bulkhead replacement (required height) are needed. There are currently no standards for bulkheads on private property. Permits for bulkheads do not require returns.
- The north side of the City experiences more damage. Flood velocity is higher from Reynolds Channel.

Mr. Corbett stated that the Office of Emergency Management will be putting together template warning messages at a meeting in January 2020.

Review Flood Related Goals of 2014 Nassau County HMP

Mr. Subbio presented the 2014 Nassau County HMP goals that were flood-related:

- Promote disaster-resistant development.
- Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
- Reduce the possibility of damage and losses due to flooding caused by floods and coastal storms.
- Reduce the possibility of damages to emergency facilities from flooding and wind damage.

Mr. Subbio noted that these goals were very general but could be used as a starting point for discussion for the development of the goals of the Long Beach FMP.

Set Goals and Objectives of Floodplain Management Plan

Mr. Subbio led a discussion with the committee to develop potential goals and objectives for the Floodplain Management Plan.

Mr. Subbio explained that goals for the FMP can be more specific but could cover the following topic areas:

- Property protection
- Protect people
- Natural resources protection
- Structural protection projects
- Education and Awareness programs

The committee discussed the following potential goals and objectives:

- To sustain the community long term in the face of flooding.
- Pass the Comprehensive Plan to provide better guidance for long term resiliency. Adopting a new Comprehensive Plan would also allow the City to update its zoning regulations.
- Increase building standards.



MEETING NOTES

- Public Information, awareness, and education.
- Protect critical facilities to ensure they continue to operate during and after a flood.
- Increase the resiliency of the City's economy/protect local businesses and help businesses stay open and recover from the flood.
- Increase flood insurance coverage.
- Increase flood insurance coverage for contents, particularly in businesses. Also ensure that renters are purchasing flood insurance for their contents.

Next Steps

- Tetra Tech will develop a draft set of goals and objectives to be shared with the committee.
- The next meeting of the Planning Committee will be on January 8, 2020, to discuss developing actions for inclusion in the FMP.
- Members will bring ideas for actions to include in the FMP to the January 8 meeting.

The meeting adjourned at 4:30 p.m.



AGENDA

City of Long Beach Community Rating System (CRS) Support Planning Committee Goals Meeting

Wednesday, December 18, 2019 | 3:00 – 4:30 p.m.

1. Project Updates

2. CRS Visit Results

3. Review Problems and Problem Areas

4. Review Flood Related Goals of 2014 Nassau County HMP

- a. Promote disaster-resistant development.
- b. Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
- c. Reduce the possibility of damage and losses due to flooding caused by floods and coastal storms.
- d. Reduce the possibility of damages to emergency facilities from flooding and wind damage.

4. Set Goals and Objectives of Floodplain Management Plan

5. Next Steps

- a. Public Information Meeting
- b. Next Planning Committee Meeting

6. Questions



Problem Areas

The following items are the City of Long Beach's problem areas and flood-prone locations as discussed during Floodplain Management Plan meetings or determined during the City's CRS Impact Analysis.

- Erosion rates on the oceanfront are not well documented year to year
 - Work with local universities or schools to develop erosion documentation program
- The City has 98 outfalls. Only half have tide flex valves to prevent backflow.
 - Install additional tide flex valves
- Backflow devices get clogged and increase flooding from rain events
 - Outreach to residents to ask for them to alert Public Works of clogs and education on how the valves work and how to help keep storm drains free of trash and debris which can clog the valves.
- Backflow devices stop functioning and allow unrestricted backflow
 - Outreach to residents to ask for them to alert Public Works
- Outreach efforts are not currently well organized.
 - Develop Program for Public Information
- The City's flood information is dispersed throughout the website and is difficult to reach at times.
 - Develop a flood information page for the City's website that is better organized and capable of being easily updated.
- The City does not have a Pre-Flood Plan for messaging to be released prior to, during, and after a flood event.
 - The City could develop a plan and outreach pre-populated outreach.
- The City does not have a flood warning system or a Flood Warning and Response Plan.
 - The City could develop a warning system utilizing the Stevens flood modeling system and develop a Flood Warning and Response Plan.
- Deposition of sand in Jones Inlet is an issue for navigation and can lead to "wind against tide/tidal stacking".
 - Work with USACE, NYS, Coast Guard to ensure channels are properly marked and dredged.

Flood Prone Locations:

- West Park Avenue is prone to high tide flooding and flooding from heavy rainfall.
- The Canals through Neptune and Franklin at Hudson flood from a combination of coastal flooding and heavy rainfall.
 - North of Park Avenue was noted as highly prone.
- Riverside and Pine Street:
- National Blvd and Park avenue intersection floods due to heavy rainfall.
- Laurelton and the bay floods during coastal flood events
- Park Avenue between New York and Nevada often experiences flooding.
 - The city is installing a pump station on Tennessee Avenue.
- The Committee noted that the worst damage from Sandy took place at the West End.

- Committee members noted that sea level rise has been noticeable in the city, especially in the Canals section.
- The Canals and North Shore lack protection and erosion is taking place. Bids are due to build bulkhead and put in pump station (3,000 feet)
- The bayfront on the northern side of the City is prone to flooding.
- The northern coast is vulnerable to high tide, storm surge, and rainfall events.
- Long Beach Road floods during storm surge events.
- States Street at Franklin and the Bay is prone to flooding.
- A member of the public noted that Long Island has seen heavier rainfall events in recent years which are overwhelming the stormwater system, causing flooding and a higher than normal water table.
- It was noted that the storm drain on Laurelton and West Bay Drive causes flooding. Backflow occurs during high tide events.



**CITY OF LONG BEACH COMMUNITY RATING SYSTEM (CRS) SUPPORT
Planning Committee Meeting
Set Goals and Objectives**

SIGN-IN

Wednesday, December 18, 2019 | 3:00 – 4:30 p.m.

Name	Organization	Initials
City of Long Beach Government Representatives		
Bourne, Patricia	Economic Development and Planning	<i>Pat Bourne</i>
Brand, Joe	Parks & Recreation	
Corbett, Richard	Police Department/Office of Emergency Management	<i>Richard Corbett</i>
Febrizio, Joe	Department of Public Works	<i>Joe Febrizio</i>
Huffman, Tyler	Community Development	<i>Tyler Huffman</i>
McTiernan, Ryan	Department of Community Development and Sustainability	<i>Ryan McTiernan</i>
Morrelli, Rocco	Zoning Board of Appeals	
Schuh, Rich	Building Department	<i>Rich Schuh</i>
Steiner, Rebecca	Economic Development and Planning	<i>Rebecca Steiner</i>
Tepper, Gordon	Manager's Office	<i>Gordon Tepper</i>
Non-Voting City of Long Beach Government Representative		
Butler, Rita	Department of Public Works	<i>Rita Butler</i>
Mirando, John	Acting City Manager	<i>John Mirando</i>
Non-government Representatives		
Bochner, Scott	Environmental Advisory Board	<i>Scott Bochner</i>
Danby, Ian	Long Beach Chamber of Commerce	<i>Ian Danby</i>
Gallagher, Dr. Jennifer	Superintendent of Long Beach Schools	<i>Jennifer Gallagher</i>
Kemins, Scott	City of Long Beach Volunteer Fire Department	
Knag, Tom	Westholme and Walks Civic Association	
O'Toole, Edwin	O'Toole Insurance	<i>Edwin O'Toole</i>
Rector, Anthony	Developer	<i>Anthony Rector</i>
Reilly, Kevin	North East Bay and Canal Civic Association, also representing the City Community Organizations Active in Disaster (COAD)	<i>Kevin Reilly</i>
Tozer, Leah	Engel and Völkers	<i>Leah Tozer</i>

Gallinabo, Joseph ARCHITECT

Joe [Signature]





MEETING NOTES

Meeting	City of Long Beach Floodplain Management Plan (FMP) Public Meeting to Review the Risk Assessment		
Date	December 18, 2019	Time	6:30 – 7:20 p.m.
Location	Long Beach City Hall, 1 West Chester Street, Long Beach, New York		
Attendees	Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works		
	Kathy Levine, City of Long Beach Resident		
	Joe Pontj, City of Long Beach Resident		
	Aaron Miner, Office of Senator Todd Kaminsky		
	Rebecca Steiner, Planner, City of Long Beach Department of Economic Development and Planning		
	Chris Huch, Planner, Tetra Tech, Inc. (Tetra Tech)		
	Tony Subbio, Project Manager, Tetra Tech		

Discussion Points

This section summarizes each discussion point addressed during the public meeting.

Project Update

Mr. Huch provided background information on the CRS Program and Floodplain Management Plan effort. He stated that this meeting was an opportunity for members of the public to provide feedback and input on the planning process. Mr. Huch described the FMP planning process as similar to the traditional hazard mitigation planning process. Attendees pointed out that the National Weather Service alert regarding snow squalls, which was sent one hour before the meeting, probably limited attendance at the meeting.

Review the Risk Assessment

Mr. Huch described the sources of flooding in the City being coastal storms and heavy rainfalls causing stormwater management issues. There were no questions on the sources of flooding.

Mr. Huch described past flood events. The top 10 events were mostly Nor'Easters.

In the description of the vulnerable areas, Mr. Huch pointed out that areas shown on the Flood Insurance Rate Maps (FIRM) as Zone X are not necessarily safe from flooding. Almost the entire City is in a special flood hazard area (SFHA).

Mr. Huch described the impacts of sea-level rise on flooding in the City. Sea level along the New York coast has risen over 1 foot since 1900. New York experiences a rate of rise higher than the global rate of sea level rise because the tectonic plate on which New York is located is also slumping.



MEETING NOTES

Of the total rainfall in the City, more of the rain is occurring during major rain events than is occurring in all of the smaller rain events combined. The City's stormwater management system needs to be examined and upgraded to have the capacity to manage larger rain events.

Mr. Ponti stated that he thinks a flood gate on the north side of the City would provide protection. The study by the U.S. Army Corps of Engineers conducted a study of the back bay, and the study includes the possibility of installing flood gates.

Next Steps

- The City will continue to develop the FMP.
- Upon completion, the draft will be posted for public review, and the City will conduct a final public meeting to receive comments on the FMP.

The meeting adjourned at 7:20 p.m.

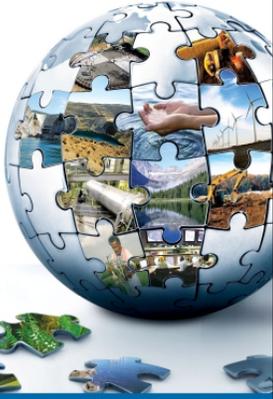


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Long Beach Floodplain Management Plan



Risk Assessment Review
Public Meeting
Wednesday, December 18, 2019



Today's Topics

- Welcome
- Project Updates
- Review the Risk Assessment
 - Nature of flooding
 - Historic impacts
 - Vulnerable areas
 - Expected losses
- Next Steps
- Questions




Risk Assessment

- The foundation of a risk assessment includes the following:
 - Assess Hazard
 - Past events
 - Areas most affected
 - Frequency
 - Severity
 - Warning time for response
 - Determine Exposure
 - Assess Vulnerability
 - Loss Estimation




Nature of Flooding

- Coastal flooding
 - High tides, storm surges, sea level rise
- Stormwater/urban flooding
 - Rainfall driven
- Areas where both flood sources contribute to flooding
 - Rainfall on top of high tides/storm surges




Historic Impacts

- August 1635
 - First recorded hurricane in NY. Storm surge 14' above high tide.
 - Not part of the historical flood record
- Norfolk Long Island Hurricane, September 1821
 - 21 people killed
 - Not part of the historical flood record
- Superstorm Sandy
 - The storm tide levels along the Southern Nassau County shore resulted from a peak storm surge of about 8 to 9 feet that coincided with normal high tides.

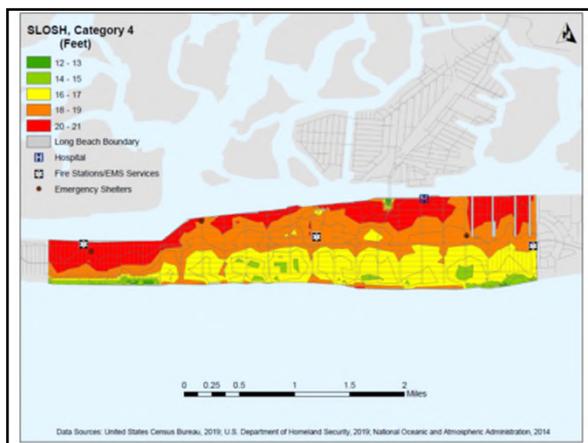
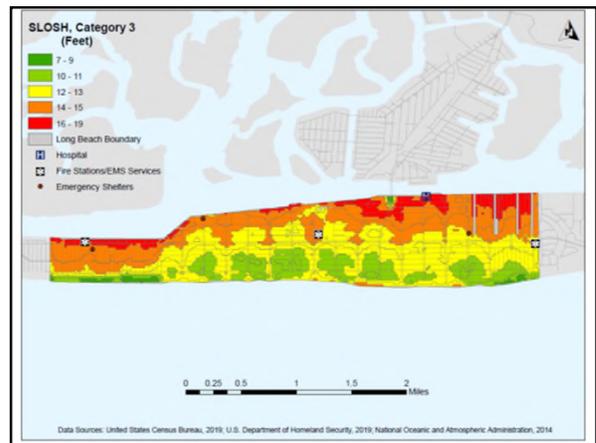
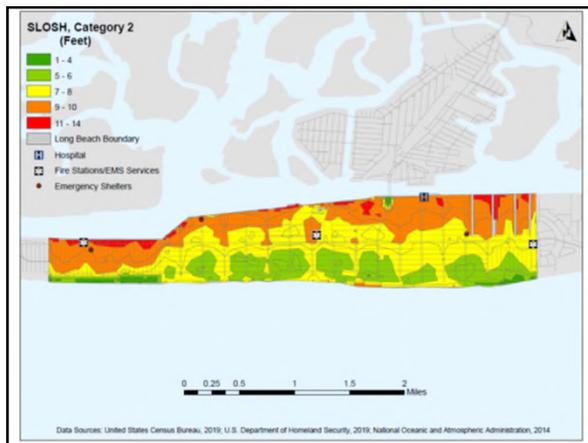
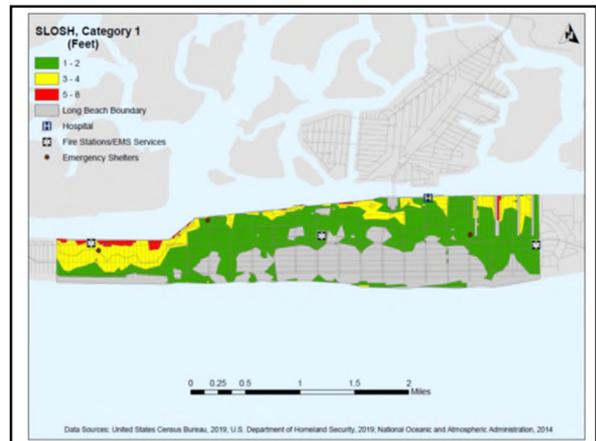
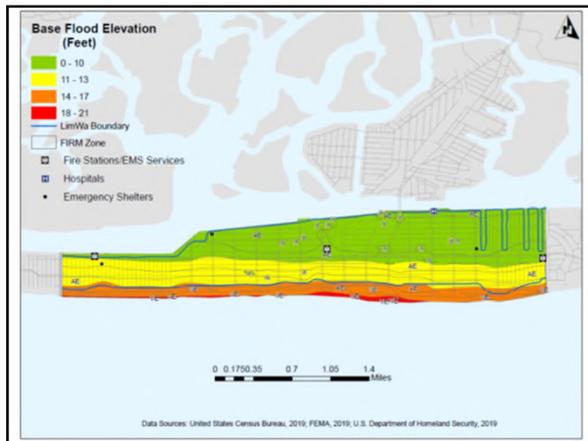



Top 10 flood events at the NYC Battery*

Event	Elevation (in feet above MHHW)
Superstorm Sandy, 10/30/2012	8.99
Hurricane Donna, 9/12/1960	4.96
12/11/1992	4.65
11/7/1953	4.46
Hurricane Irene, 8/28/2011	4.45
11/25/1950	4.06
Ash Wednesday Storm, 3/6/1962	3.86
3/13/2010	3.75
10/31/1991	3.67
3/29/1984	3.47

*As of 4/2018; period of record dates back to 1840. The Battery is the closest complete record NOAA operated tidal gauge.



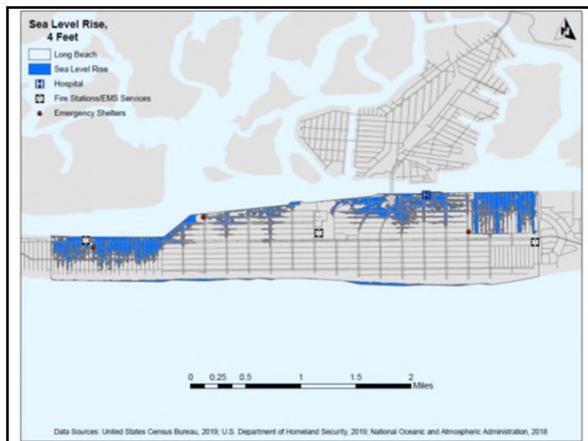
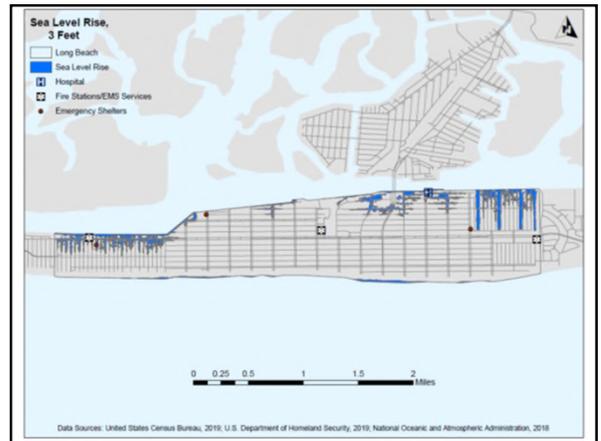
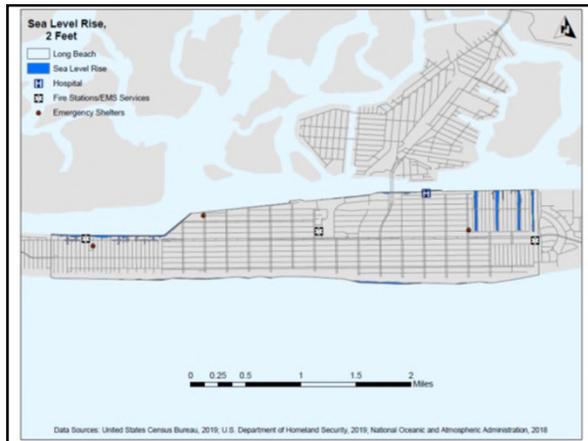
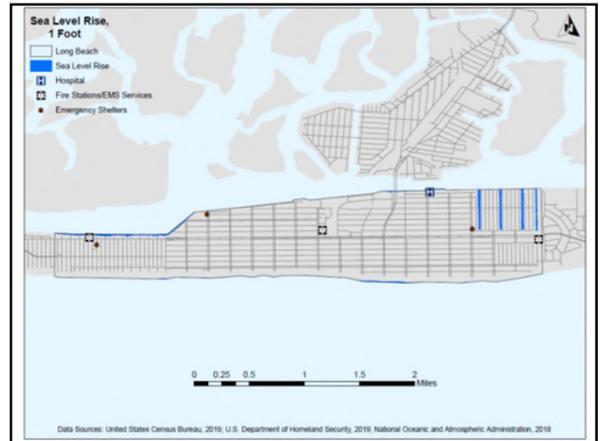
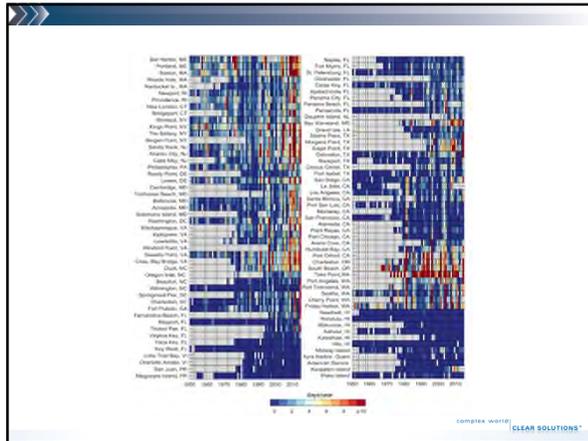



Sea Level Rise in New York

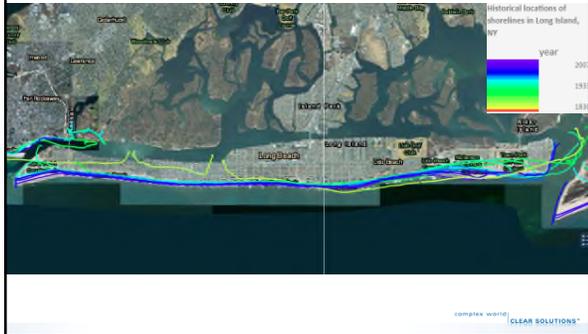
- Sea levels along New York's coast have already risen more than a foot since 1900.
- New York's rate of rise (about 1.2 in per decade) is almost twice the observed global rate (0.7 inches per decade) over the same period.

Baseline (2000-2004)	Low Estimate (10th Percentile)	Middle Range (25th to 75th Percentile)	High Estimate (90th Percentile)
0 inches	2 in	4 to 8 in	10 in
2020s			
2050s	8 in	11 to 21 in	30 in
2080s	13 in	18 to 39 in	58 in
2100	15 in	22 to 50 in	75 in

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Historical Shoreline Positions



Precipitation Changes in New York

- Overall, average annual precipitation has increased across New York State since 1900, with year-to-year (and multiyear) variability becoming more pronounced.
- New York is getting more precipitation in the winter and less precipitation in the summer.
- Between 1958 and 2010, the amount of precipitation falling in very heavy events (downpours) increased more than 70% across the northeastern United States.



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Any Questions?



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Thank you for your time!

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Chris Huch
chris.huch@tetrattech.com

Tony Subbio
tony.subbio@tetrattech.com



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AGENDA

**City of Long Beach
Floodplain Management Plan
Risk Assessment Review Public Meeting**

Wednesday, December 18, 2019 | 6:30 – 8:00 p.m.

1. Project Update

2. Review the Risk Assessment

1. Nature of flooding
 2. Historic impacts
 3. Vulnerable areas
 4. Expected losses
-

3. Next Steps

4. Questions





CITY OF LONG BEACH
Floodplain Management Plan
Risk Assessment Review Public Meeting

SIGN-IN

Wednesday, December 18, 2019 | 6:30 – 8:00 p.m.

NAME	RESIDENT or AGENCY/ORGANIZATION	E-MAIL ADDRESS	TELEPHONE
Chris Huck	Tetra Tech	chris.huck@tetratech.com	609-661-5077
Aaron Miner	SEN. Todd Kaminsky	MINER@NYSenate.gov	516-766-8357
Joe Pandic	-		516-411-0787
JOE FABRIZIO	COLB	jfabrizio@longbeachny.gov	516-431-1000
Rebecca Steiner	COLB Econ.Dev.	rsteiner@longbeachny.gov	516-431-1000
KATHY LEVINE	RESIDENT	KATHY.LEVINE1@OPTONLINE.NET	516-431-2361
Tony Subbio	Tetra Tech	tony.subbio@tetratech.com	717-545-3580





MEETING NOTES

Meeting	City of Long Beach Floodplain Management Plan (FMP) Planning Committee Review Possible Activities Meeting		
Date	January 8, 2020	Time	3:05 – 4:30 p.m.
Location	Long Beach City Hall, 1 West Chester Street, Long Beach, New York		
Attendees	John Mirando, Acting City Manager, City of Long Beach		
	Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works		
	Patricia Bourne, Director, City of Long Beach Department of Economic Development and Planning		
	Richard Corbett, City of Long Beach Police Department		
	Ian Danby, Long Beach Chamber of Commerce		
	Michael DeVito, Assistant Superintendent, Long Beach Public Schools (on behalf of Dr. Jennifer Gallagher)		
	David Fraser, City of Long Beach City Clerk		
	Joseph Gallinaro, Architect		
	Nancy Golden, Resident, City of Long Beach		
	Ellen Hession, Resident, City of Long Beach		
	Tyler Huffman, Environmental Coordinator, City of Long Beach		
	Scott Kemins, City of Long Beach Volunteer Fire Department		
	Edwin O’Toole, Insurance Agent		
	Brian Oper, Financial Analyst, Long Beach Public Schools		
	Anthony Rector, Developer		
	Kevin Reilly, North East Bay and Canal Civic Association, and City Community Organizations Active in Disaster (COAD)		
	Rich Schuh, City of Long Beach Building Department		
	Rebecca Steiner, Planner, City of Long Beach Department of Economic Development and Planning		
	Gordon Tepper, City of Long Beach Public Relations		
	Leah Tozer, Real Estate Agent, Engel and Völkers		
	Liz Treston, Councilwoman-Elect and Resident, City of Long Beach		
	Chris Huch, Planner, Tetra Tech, Inc. (Tetra Tech)		
Tony Subbio, Project Manager, Tetra Tech			

Discussion Points

This section summarizes each discussion point addressed during the Planning Committee Meeting.



MEETING NOTES

Public Input

Ms. Golden stated that she is getting flood vents this year to lower her flood insurance costs. Her neighbors have improved their homes on their own, including raising their houses. Mr. Schuh offered assistance from the Building Department to assist her in making proper improvements to her house.

Project Updates

Mr. Subbio stated that the purpose of this meeting is to review the planning process thus far and discuss the types of activities that can be included in the FMP.

Mr. Subbio briefly reviewed the problems and problem areas identified throughout the planning process. Ms. Golden stated that the City of Long Beach does not connect into the county's drainage system, which contributes to flooding on Long Beach Boulevard (Objective 1.11).

The bulkhead at the high school is being reconstructed. The work has been put out to bid twice, and bids have been coming in too high. Mr. Schuh discussed plans for the bulkhead.

Ms. Hession stated that she believes flooding will get worse near State Street and Franklin Boulevard if Mt. Sinai builds on fill.

Mr. Rector stated that there should be a standard for bulkheading throughout the city. Mr. Schuh responded that the Building Department has permit requirements for bulkheading.

Draft Goals and Objectives

Mr. Subbio reviewed the set of draft goals and objectives. Tetra Tech developed the set based on discussions at the December 18, 2019 Planning Committee Meeting. Members of the Planning Committee concurred with the draft set and will consider them until the next Planning Committee Meeting.

Possible Activities

Mr. Subbio reviewed the set of possible activities for consideration to address each objective in the FMP. He reviewed a handout on which each member of the Planning Committee can provide input as to which activities should be considered for each objective. Possible activities include the following:

- Enhancing the flood damage prevention ordinance
- Enhancing other community plans and regulations
- Elevation
- Retrofit
- Flood insurance
- Protecting the natural functions of the floodplain
- Enhancing emergency services



MEETING NOTES

- Implementing structural projects
- Conducting public information activities

At the Planning Committee's request at the December 18, 2019 meeting, Mr. Huch reviewed the draft City of Long Beach Comprehensive Plan to identify actions in the plan that should be included in the FMP as well. Mr. Huch reviewed a handout that shows the relevant actions in the Comprehensive Plan and the FMP objectives to which they would apply.

Next Steps

- Committee members will consider the draft goals and objectives for approval at the next meeting of the Planning Committee.
- Tetra Tech will develop actions for inclusion in the FMP based on the members' input as to which activities should be used to address each objective.
- The next Planning Committee Meeting to discuss the draft action plan will be conducted on January 29, 2020.
- Tetra Tech will complete the draft FMP and submit it to the Insurance Services Office, Inc. (ISO) for review in mid-February.

The meeting adjourned at 4:45 p.m.



AGENDA

City of Long Beach, New York, Community Rating System (CRS) Support Planning Committee Meeting Review Possible Activities

Wednesday, January 8, 2020 | 3:00 – 5:00 p.m.

1. Welcome

2. Public Input

3. Project Updates

4. Draft Goals and Objectives

5. Possible Activities

- a. Enhancing the flood damage prevention ordinance
- b. Enhancing other community plans and regulations
- c. Protecting property
 - i. Elevation
 - ii. Retrofit
 - iii. Flood Insurance
- d. Protecting the natural functions of the floodplain
- e. Enhancing emergency services
- f. Implementing structural projects
- g. Conducting public information activities

6. Next Steps

- a. Draft the action plan
- b. Conduct the next Planning Committee Meeting – January 29, 2020
- c. Complete the draft FMP
- d. Submit the draft flood management plan (FMP) to the Insurance Services Office (ISO) for review

7. Questions



Problem Areas

The items listed below describe the City of Long Beach’s problem areas and flood-prone locations, as discussed during Floodplain Management Plan meetings or determined during the City’s CRS Impact Analysis.

- Erosion rates on the oceanfront are not well documented from year to year.
 - Work with local universities or schools to develop an erosion documentation program.
- The City has 98 outfalls. Only half have tide flex valves to prevent backflow.
 - Install additional tide flex valves.
- Backflow devices get clogged and increase flooding from rain events.
 - Provide outreach to residents to ask them to alert Public Works of clogs and to educate them on how the valves work and how to help keep storm drains free of trash and debris that can clog the valves.
- Backflow devices stop functioning and allow unrestricted backflow.
 - Provide outreach to residents to ask them to alert Public Works.
- Outreach efforts are not currently well organized.
 - Develop program for public information.
- The City’s flood information is dispersed throughout the website and is difficult to find.
 - Develop a flood information page for the City’s website that is better organized and easily updated.
- The City does not have a Pre-Flood Plan for messaging to be released prior to, during, and after a flood event.
 - The City could develop a plan and outreach pre-populated outreach.
- The City does not have a flood warning system or a Flood Warning and Response Plan.
 - The City could develop a warning system, utilizing the Stevens flood modeling system, and could also develop a Flood Warning and Response Plan.
- Deposition of sand in Jones Inlet is an issue for navigation and can lead to “wind against tide/tidal stacking”.
 - Work with USACE, NYS, and the Coast Guard to ensure channels are properly marked and dredged.

Flood-Prone Locations:

- West Park Avenue is prone to high tide flooding and flooding from heavy rainfall.
- The Canals through Neptune and Franklin Boulevard (at Hudson) flood from a combination of coastal flooding and heavy rainfall.
 - North of Park Avenue was noted as highly prone.
- Riverside Boulevard and Pine Street are prone to flooding.
- National Boulevard and Park Avenue intersection floods during heavy rainfall.
- Laurelton and the bay floods during coastal flood events
- Park Avenue, between New York Avenue and Nevada Avenue, often experiences flooding.
 - The city is installing a pump station on Tennessee Avenue.



- The Committee noted that the worst damage from Superstorm Sandy took place at the West End.
- Committee members noted that sea level rise has been noticeable in the City, especially in the Canals section.
- The Canals and North Shore lack protection and erosion is taking place. Bids are due to build a 3,000-foot bulkhead and put in a pump station.
- The bayfront on the northern side of the City is prone to flooding.
- The northern coast is vulnerable to high tide, storm surge, and rainfall events.
- Long Beach Road floods during storm surge events.
- State Street at Franklin and the bay is prone to flooding.
- A member of the public noted that Long Island has seen heavier rainfall events in recent years which are overwhelming the stormwater system, causing flooding and a higher than normal water table.
- It was noted that backflow occurs in the storm drain on Laurelton and West Bay Drive, causing flooding during high tide events.

Goals and Objectives

Goal 1: Protect the City of Long Beach’s built environment from flooding and sea level rise.

- Objective 1.1 Prevent backflow from all outfalls.
- Objective 2.2 Prevent backflow flooding of the storm drain on Laurelton and West Bay Drive.
- Objective 1.3 Protect West Park Avenue from flooding due to high tide and/or heavy rainfall.
- Objective 1.4 Protect the area at Riverside Boulevard and Pine Street from flooding.
- Objective 1.5 Protect the intersection of National Boulevard and Park Avenue from stormwater flooding due to heavy rainfall.
- Objective 1.6 Protect Park Avenue, between New York Avenue and Nevada Avenue, from flooding.
- Objective 1.7 Stabilize and protect the bayfront on the northern side of the City from high tides, storm surge, and stormwater flooding from heavy rainfall events.
- Objective 1.8 Enhance the City’s stormwater management system to protect against the 100-year storm event.
- Objective 1.9 Protect critical City facilities from flooding to ensure they continue to operate during a flood event.
- Objective 1.10 Protect the West End from storm and flood damage similar to the effects of Superstorm Sandy.
- Objective 1.11 Protect Long Beach Boulevard from storm surge.
- Objective 1.12 Protect the area near State Street and Franklin Boulevard from flooding.
- Objective 1.13 Protect the area near Laurelton Boulevard and West Bay Drive from flooding.
- Objective 1.14 Protect the area from the canals to Franklin Boulevard and from East Park Avenue to East Hudson Street from flooding.

Goal 2: Make the City of Long Beach more resilient to flooding and sea level rise.

- Objective 2.1 Update the City’s strategy for maintaining a resilient community.
- Objective 2.2 Update City regulations to foster additional resilience.
- Objective 2.3 Ensure that the City’s businesses can continue to operate after a flood event.

Goal 3: Protect the natural environment from the impacts of flooding.

- Objective 3.1 Protect the City from erosive processes.
- Objective 3.2 Maintain Jones Inlet to prevent wind against tide/tidal stacking.
- Objective 3.3 Maximize open space throughout the City.
- Objective 3.4 Stabilize and protect the dune system on the oceanfront to provide storm protection and natural habitat.



Goal 4: Educate the public, officials, and other stakeholders about the flood hazard and what can be done to mitigate its impacts.

- Objective 4.1 Ensure that local officials attend current training on regulatory issues and best practices.
- Objective 4.2 Ensure that public information efforts are coordinated among City department and stakeholder groups.
- Objective 4.3 Provide information to individuals throughout the City on the flood hazard and property protection measures they can take.
- Objective 4.4 Increase flood insurance coverage held by individuals and businesses.

Goal 5: Ensure effective response to flood events to save lives and protect property.

- Objective 5.1 Ensure that an effective warning system is in place in the City.
- Objective 5.2 Enhance the public's capabilities of responding to flood events.
- Objective 5.3 Enhance the emergency response and emergency management community's capabilities to respond to flood events.

	Enhancing the flood damage prevention ordinance	Enhancing other community plans and regulations	Elevation	Retrofit	Flood insurance	Protecting the natural functions of the floodplain	Enhancing emergency services	Implementing structural projects	Conducting public information activities	Comments/Rationale
Prevent backflow from all outfalls.										
Prevent backflow flooding of the storm drain on Laurelton and West Bay Drive.										
Protect West Park Avenue from flooding due to high tide and/or heavy rainfall.										
Protect the area at Riverside Boulevard and Pine Street from flooding.										
Protect the intersection of National Boulevard and Park Avenue from stormwater flooding due to heavy rainfall.										
Protect Park Avenue, between New York Avenue and Nevada Avenue, from flooding.										
Stabilize and protect the bayfront on the northern side of the City from high tides, storm surge, and stormwater flooding from heavy rainfall events.										



	Enhancing the flood damage prevention ordinance	Enhancing other community plans and regulations	Elevation	Retrofit	Flood insurance	Protecting the natural functions of the floodplain	Enhancing emergency services	Implementing structural projects	Conducting public information activities	Comments/Rationale
Enhance the City’s stormwater management system to protect against the 100-year storm event.										
Protect critical facilities in the City from flooding to ensure they continue to operate during a flood event.										
Protect the West End from storm and flood damage similar to the effects of Superstorm Sandy.										
Protect Long Beach Boulevard from storm surge.										
Protect the area near State Street and Franklin Boulevard from flooding.										
Protect the area near Laurelton Boulevard and West Bay Drive from flooding.										
Protect the area from the canals to Franklin Boulevard and from East Park Avenue to East Hudson Street from flooding.										



	Enhancing the flood damage prevention ordinance	Enhancing other community plans and regulations	Elevation	Retrofit	Flood insurance	Protecting the natural functions of the floodplain	Enhancing emergency services	Implementing structural projects	Conducting public information activities	Comments/Rationale
Update the City's strategy for maintaining a resilient community.										
Update City regulations to foster additional resilience.										
Ensure that the City's businesses can continue to operate after a flood event.										
Protect the City from erosive processes.										
Maintain Jones Inlet to prevent wind against tide/tidal stacking.										
Maximize open space throughout the City.										
Stabilize and protect the dune system on the oceanfront to provide storm protection and natural habitat.										



	Enhancing the flood damage prevention ordinance	Enhancing other community plans and regulations	Elevation	Retrofit	Flood insurance	Protecting the natural functions of the floodplain	Enhancing emergency services	Implementing structural projects	Conducting public information activities	Comments/Rationale
Ensure that local officials attend current training on regulatory issues and best practices.										
Ensure that public information efforts are coordinated among City department and stakeholder groups.										
Provide information to individuals throughout the City on the flood hazard and what property protection measures they can take.										
Increase flood insurance coverage held by individuals and businesses.										
Ensure that an effective warning system is in place in the City.										
Enhance the public’s capabilities of responding to flood events.										
Enhance the emergency response and emergency management community’s capabilities to respond to flood events.										



Goals and Objectives

Goal 1: Protect the City of Long Beach's built environment from flooding and sea level rise.

Objective 1.1 Prevent backflow from all outfalls.

- Continue to explore and apply for grant funding for resiliency measures along the bayfront (such as the continued installation of tide-flex valves).
- Continue to explore and apply for grant funding for resiliency measures along the bayfront (such as the continued installation of tide-flex valves).

Objective 1.2 Prevent backflow flooding on the storm drain on Laurelton and West Bay Drive.

Objective 1.3 Protect West Park Avenue from flooding due to high tide and/or heavy rainfall.

Objective 1.4 Protect the area at Riverside and Pine Street from flooding.

Objective 1.5 Protect the intersection of National Boulevard and Park Avenue from stormwater flooding due to heavy rainfall.

Objective 1.6 Protect Park Avenue between New York Avenue and Nevada Avenue from flooding.

Objective 1.7 Stabilize and protect the bayfront on the northern side of the City from high tides, storm surge, and stormwater flooding from heavy rainfall events.

- Prioritize conveyance to the bay. This low-lying part of Long Beach is subject to chronic ponding and occasional flooding in intense rain events due to bay-side and ocean-side pressure on the groundwater lens.
- Create a Bay Mile that integrates the current flood protection barrier work with other real estate and landscape-based strategies. The Bay Mile, through the NYCRP and FEMA funding projects will reduce flood and surge impacts to public and private properties and allow the provision of recreational amenities and pedestrian and bicycle connectivity.
 - Landscape strategies are proposed to supplement the existing and planned bulkheading along the Bay Mile: opportunistic structures attached to the seawall support habitat for oysters and mussels, while an esplanade inland of the seawall activates the Bay Mile as an amenity for passive recreation. Redevelopment between the bay and Pine Street is proposed atop a plinth of landfill that serves as an additional barrier to surges and a benchmark well above the forecasted sea level rise and its attendant disturbances. Running through this new elevated mixed-use area of the neighborhood is a north-south linear park, extending from Sherman Brown Park at Riverside Boulevard. This park would be programmed with pedestrian and bike paths, as well as active recreation and passive recreation, including a kayak launch and new open space areas along the Bayfront. This additional open space would also assist in stormwater management in the area of the new redevelopment as well as the existing North Park neighborhood. Additional protection would be provided to the North Park community from the City's planned North Shore Critical Infrastructure Bulkheading/Shoreline redesign project. This project will span from the City's Water Pollution Control Plant to the City-owned property located on the east side of the Long Beach Boulevard Bridge (currently home

to the Long Beach Tennis Center). The project is designed to provide flood protection and shoreline stabilization for both critical infrastructure facilities and the residential neighborhoods located just south of the utility properties.

- Ultimately, however, the long-term Bayfront plan would depend on utility and infrastructure relocations. This plan for the long-term Bayfront redevelopment relies on several utility and infrastructure parcels becoming available for redevelopment over the twenty year period which includes completing the elevated residential and retail redevelopment of the blocks north of Pine Street and connecting the low-lying north-south corridor from Pine Street to the bay. It is anticipated that the twenty year plan would be constructed in stages as parcels became available for redevelopment

Objective 1.8 Enhance the City’s stormwater management system to protect against the 100-year storm event.

- Continue to upgrade underground utilities including water, sewer, drainage, gas and electric as major sections of streets are reconstructed.
- Continue to install stormwater infiltration and retention chambers as street restoration projects move forward throughout the City.
- Establish pilot programs to study the efficacy of landscape-based stormwater infrastructure for both infiltration and conveyance in the City of Long Beach that will lead to the adoption of the most effective program as common practice.
 - Green infiltration zones are landscape-based infrastructure visible at the ground level and appearing as plant beds. These can be incorporated into street right-of-ways as well as on open parcels. Green infiltration zones are proposed primarily in areas at the center and south of the city, where there is enough depth for storage and infiltration. Along the East-West street corridors, where rainwater can collect during high-intensity events, preventing flooding. This stored rainwater can then slowly be absorbed into the groundwater, passing through plant roots and filtration beds on its way and thereby returning to the aquifer at a slower rate, with a cooler temperature, and with many deleterious elements removed.
 - Blue conveyance zones are also pervious, planted areas that are very similar in appearance at the surface to green infiltration zones. The key difference is that the primary purpose of blue zones is conveyance, rather than storage and infiltration. Blue zones are proposed mainly at the street ends and along North-South corridors in Long Beach with poor drainage and high risk of flooding during rainwater events. Rather than creating green zones or other means of absorbing flood water in these already overburdened areas, blue zones are proposed to convey the excess water to locations where there is enough storage capacity for it to be absorbed into the groundwater over time. The proposed blue zones follow the existing topography of the bayside street grid, which alternates elevated (Lindell, Lafayette, Magnolia) and sunken (Washington, Laurelton, National) north-south corridors. The elevated streets form the edges of blue street rainwater catchment zones, while the sunken streets will be transformed to blue streets to collect and convey the rainwater from the surrounding blocks.

- A fundamental strategy for creating resiliency is investment in systems with multiple benefits that protect against multiple hazards. The proposed blue and green infrastructure work together not only to ameliorate rainwater flood risk and improve groundwater quality, but also to create continuous network of planted spaces along the existing street corridors that is a visual amenity for the community and is much easier to assess, expand and repair than a traditional system of underground pipes.
- Prioritize conveyance to the bay. This low-lying part of Long Beach is subject to chronic ponding and occasional flooding in intense rain events due to bay-side and ocean-side pressure on the groundwater lens.
- The City is establishing a pilot program for pervious infiltration zones at street ends within the West End. Many of these locations are extremely vulnerable to flooding and the location of many of the City's repetitive loss properties.
- Install a stormwater pumping system to discharge stormwater during extreme flood events. (Originally proposed in 2014 NYRCR Plan)
- Seek opportunities to upgrade underground, piped utilities with the addition of surface, green-infrastructure-based utilities wherever possible. Such systems have multiple benefits; primary among them is the benefit of resiliency as they are far less vulnerable to collapse and contamination issues.
- As part of the pervious pavement and green and blue zone pilot programs, a comprehensive stormwater flood management study is being established, with an emphasis on repetitive flooding areas. The study includes the use of green infrastructure such as retention and infiltration zones (planted, sloped areas for water conveyance and storage), porous paving, rain gardens and underground storage.
- The green malls located on Park Avenue, Hudson Street, Grand Boulevard, Lindell Boulevard, Washington Boulevard, Lafayette Boulevard, Laurelton Boulevard, Magnolia Boulevard, Monroe Boulevard, Lincoln Boulevard, Franklin Boulevard, Neptune Boulevard, Roosevelt Boulevard, and Pacific Boulevard give a sense of open space along this boulevard style roadway. The green malls are used for memorial gardens which are individually constructed and maintained. These areas have the potential to provide a greater resource for the community, in that memorial gardens could be implemented as rain gardens which are both aesthetically pleasing and provide a benefit for stormwater management.
- Green infrastructure can be combined with passive recreation spaces including walkways, linear parks, and pocket parks established in underutilized open spaces. All bay and ocean access points create opportunities for recreation, sustainability education, and orientation at street ends in the north and south of the city. Currently, recreation spaces do not incorporate green infrastructure (water conveyance, permeable surfaces, active landscapes), but they create an important opportunity for infiltration zone expansion given the City's extremely limited open spaces. Where possible, underutilized land could be reclaimed for pocket parks, providing active and passive recreation in floodable open spaces that double as infiltration zones.

Objective 1.9 Protect critical facilities in the City from flooding to ensure they continue to operate during a flood event.

- Continue to harden and elevate components of wells and sewer lift stations. Although submersible pumps and other resiliency improvements have been installed in the stations to provide some protection from flooding, additional flood mitigation measures at the stations would be beneficial.
- Continue to pursue the consolidation and/or relocation of bayfront infrastructure and utilities.
- The NYRCR Plan includes several resiliency projects which the City plans to pursue with funding from New York Rising. Where New York Rising funding is not available, the City will continue to seek grant funds to accomplish these resiliency projects. The NYRCR projects include:
 - Long Beach Fire Stations - raise electrical panels and conduit; floodproof and wind protect all doors including Bay doors, window protection from wind, and fixed/stationary generator where needed.
 - Ice Arena/Recreation Center – Raise electrical panels and conduit, glass door replacement and flood shield, window protection from wind, and fixed/stationary generator.
 - Community Centers – Flood protect and wind retrofit community center buildings, including louvre floodshield, door floodproofing, and window and door wind protection, raise electrical panels, conduit, and telecommunications equipment, provide emergency power and other necessary fixed equipment needed for disaster recovery, and repurpose centers with second floors as community assistance centers.
- Continue to pursue the consolidation and/or relocation of bayfront infrastructure and utilities. While properties such as the Water Purification Plant have been recently updated and will not be relocated, nearly all of the other infrastructure and utility properties could potentially be moved or reconfigured. This would greatly reduce vulnerability to critical infrastructure, which is a vital component in protecting not only the bayfront but the entire City.

Objective 1.10 Protect the West End from storm and flood damage similar to the effects of Superstorm Sandy.

Objective 1.11 Protect Long Beach Boulevard from storm surge.

Objective 1.12 Protect the area near State Street and Franklin Boulevard from flooding.

Objective 1.13 Protect the area near Laurelton Boulevard and West Bay Drive from flooding.

Objective 1.14 Protect the area from the canals to Franklin Boulevard and from East Park Avenue to East Hudson Street from flooding.

- Continue to explore and apply for grant funding for resiliency measures along the bayfront (such as the continued installation of tide-flex valves).
- Continue to explore various defense solutions for the Canals neighborhood, including removable dams or collapsible gates.

Goal 2: Make the City of Long Beach more resilient to flooding and sea level rise.

Objective 2.1 Update the City's strategy for maintaining a resilient community.

- Continue to consider coastal resiliency in all policy and development decisions
- Establish specific policies within the City Code of Ordinances to allow for rooftop gardens/green roofs. Roof space is generally underutilized throughout Long Beach and rooftop gardens/green roofs could improve stormwater management by retaining water and improving the quality of runoff coming from the roof. Rooftop gardens/green roofs can also reduce a building's heat island profile and improve insulation during cooler months. And for a relatively dense community like Long Beach, rooftop gardens/green roofs could provide additional space and allow residents to take advantage of the barrier island's numerous view sheds.
- Develop a performance-based green infrastructure rating system that would set clear goals for new development and provide sustainability incentives for existing properties. Key performance indicators could include: energy efficiency, green infrastructure/stormwater management, emissions reductions, and overall flood resilience. A performance-based rating system also provides a mechanism for homeowners and business owners to learn about new technologies and see locally-based case studies. Incentives for this type of development will go a long way towards making the community more resilient and more environmentally friendly.
- Designate certain critical waterfront areas, such as the West End and the Canals, with special zoning characteristics to account for erosion and compliance with FEMA regulations – particularly as these areas contain nearly all of the repetitive loss properties in the City. Such special districts could also require new development to provide waterfront public access areas. Given the amount of property along the bayfront that could be developed in the near future, such a provision for public access would help to create dedicated waterfront easement that could be used to enhance flood protection measures and enhance local recreational opportunities. The City's updated site plan review process would outline special procedures for development within these waterfront districts, ensuring that the waterfront remains accessible and development adheres to the specified resiliency requirements.

Objective 2.2 Update City regulations to foster additional resilience.

- Continue to consider coastal resiliency in all policy and development decisions
- Remove restrictions on the use of green infrastructure, particularly for stormwater management, from the current Code of Ordinances.
- Update water conservation and building codes that regulate watering practices and modernize building technologies; explore the feasibility of municipal, commercial, and residential building incentives and/or mandates, such as the installation of low-flow water fixtures, grey water systems, smart water meters, and/or rainwater catchment systems.
- Amend the City Zoning Ordinance to designate a bayfront overlay zone to guide development in this critical area. In general, the bayfront overlay zone would expand allowable uses along the industrially-zoned and underutilized bayfront. Give special consideration to the preservation and enhancement of public access. In addition to increasing access and use of the waterfront, such a policy would also provide flood mitigation and help to reduce impacts to private properties. Increase allowable height but make sure it fits within the context of community. As was compromised on during public outreach, maximum height along the bayfront is recommended to be eight stories.

- Amend the City Zoning Ordinance to permit housing or live/work lofts above commercial operations within the Central Business District and West End.
- Align the City Code of Ordinances more closely with Federal, State and Local regulations. This will help to clarify and/or remove certain sections of the Code that overlap or conflict with Federal or State regulations, including FEMA and SEQRA requirements. In addition, recognize local factors influencing zoning and development decisions, such as the Town of Hempstead's ownership of underwater lands in Reynolds Channel. Since there are no clearly defined procedural requirements for the City/Town relationship within the Code, the Future Bayfront will require careful coordination with the Town on these issues. It is also important to align local regulations with Federal and State requirements to ensure that the City is eligible for incentives including tax breaks and grant opportunities.
- Include a significant amount of community outreach concerning the proposed code changes, focusing on homeowners, business owners and interested developers.
- Update the zoning and building codes to apply sustainable housing methods (for example, utilizing low-flush toilets or solar panels) and expand practices to retain water on site to mitigate flooding, such as rain gardens and green roofs.

Objective 2.3 Ensure that the City's businesses can continue to operate after a flood event.

- It is noted that there are other important community facilities which are not City owned and operated, including the public libraries, schools, post office, railroad station and others. The City encourages these facilities to develop and implement the appropriate resiliency measures.

Goal 3: Protect the natural environment from the impacts of flooding.

Objective 3.1 Protect the City from erosive processes.

- Continue to support the ACOE dune reconstruction project that will help provide a storm barrier on the oceanfront.
- Introduce tree plantings for vulnerable oceanfront blocks. A recommended approach south of the boardwalk is to create clusters of *Pinus rigida* (pitch pine) at the street ends, to preserve key view corridors. Within the view corridors, recommendations for low woody plants include *Prunus maritima* (beach plum), *Myrica pennsylvanica* (bayberry), *Rhus coppalina* (dwarf sumac), and *Arctostaphylos uva-ursi* (bearberry). North of the boardwalk, street tree plantings will be planted at much tighter intervals than customary in the urban context, because of the dwarfing effects of wind-borne sea salt. Planting street trees at 12-15' spacing in staggered (rather than linear) formation also improves the ability of the planted mass to deflect wave energy by increasing the coefficient of friction as waves hit the scattered field of dense tree trunks. Suggested species for the beachfront blocks include *Prunus virginiana* (chokecherry), *Prunus serotina* (black cherry) and *Amalanchier spp.* (serviceberry or shadbush).
- Designate certain critical waterfront areas, such as the West End and the Canals, with special zoning characteristics to account for erosion and compliance with FEMA regulations – particularly as these areas contain nearly all of the repetitive loss properties in the City. Such special districts could also require new development to provide waterfront public access areas. Given the amount of property along the bayfront that could be developed in the near future,

such a provision for public access would help to create dedicated waterfront easement that could be used to enhance flood protection measures and enhance local recreational opportunities. The City's updated site plan review process would outline special procedures for development within these waterfront districts, ensuring that the waterfront remains accessible and development adheres to the specified resiliency requirements.

Objective 3.2 Maintain Jones Inlet to prevent wind against tide/tidal stacking.

Objective 3.3 Maximize open space throughout the City.

- Establish specific policies within the City Code of Ordinances to allow for rooftop gardens/green roofs. Roof space is generally underutilized throughout Long Beach and rooftop gardens/green roofs could improve stormwater management by retaining water and improving the quality of runoff coming from the roof. Rooftop gardens/green roofs can also reduce a building's heat island profile and improve insulation during cooler months. And for a relatively dense community like Long Beach, rooftop gardens/green roofs could provide additional space and allow residents to take advantage of the barrier island's numerous view sheds.
- The green malls located on Park Avenue, Hudson Street, Grand Boulevard, Lindell Boulevard, Washington Boulevard, Lafayette Boulevard, Laurelton Boulevard, Magnolia Boulevard, Monroe Boulevard, Lincoln Boulevard, Franklin Boulevard, Neptune Boulevard, Roosevelt Boulevard, and Pacific Boulevard give a sense of open space along this boulevard style roadway. The green malls are used for memorial gardens which are individually constructed and maintained. These areas have the potential to provide a greater resource for the community, in that memorial gardens could be implemented as rain gardens which are both aesthetically pleasing and provide a benefit for stormwater management.
- Green infrastructure can be combined with passive recreation spaces including walkways, linear parks, and pocket parks established in underutilized open spaces. All bay and ocean access points create opportunities for recreation, sustainability education, and orientation at street ends in the north and south of the city. Currently, recreation spaces do not incorporate green infrastructure (water conveyance, permeable surfaces, active landscapes), but they create an important opportunity for infiltration zone expansion given the City's extremely limited open spaces. Where possible, underutilized land could be reclaimed for pocket parks, providing active and passive recreation in floodable open spaces that double as infiltration zones.
- Preserve and expand existing dunes and plantings, which provided critical protection during Superstorm Sandy by continuing the recent efforts to replenish beach sand, build a dune and berm system, and install additional dune plantings.
- Continue to support the ACOE dune reconstruction project that will help provide a storm barrier on the oceanfront.
- Introduce tree plantings for vulnerable oceanfront blocks. A recommended approach south of the boardwalk is to create clusters of *Pinus rigida* (pitch pine) at the street ends, to preserve key view corridors. Within the view corridors, recommendations for low woody plants include *Prunus maritima* (beach plum), *Myrica pennsylvanica* (bayberry), *Rhus coppalina* (dwarf sumac), and *Arctostaphylos uva-ursi* (bearberry). North of the boardwalk, street tree plantings will be planted at much tighter intervals than customary in the urban context, because of the dwarfing

effects of wind-borne sea salt. Planting street trees at 12-15' spacing in staggered (rather than linear) formation also improves the ability of the planted mass to deflect wave energy by increasing the coefficient of friction as waves hit the scattered field of dense tree trunks. Suggested species for the beachfront blocks include *Prunus virginiana* (chokecherry), *Prunus serotina* (black cherry) and *Amalanchier spp.* (serviceberry or shadbush).

- Oceanfront Cultural Park: Not all coastal storms and disturbances can be predicted in advance. For this reason, the CP proposes an Oceanfront Cultural Park as a high point of refuge to provide immediate evacuation of the beach. The park and its underlying structure offer multiple benefits. The pristine Boardwalk and Ocean Beach Park are Long Beach's greatest assets. Yet, while the beach draws many visitors, it does not generate much revenue for the City beyond the sale of beach passes. Economic activity along the Boardwalk would provide a boost to the City's overall economy and tax base. With sizable residential, commercial, and parking space, the proposal provides multiple revenue streams and serves the demand for these functions at the beachfront. Above the parking structure, overlooking the Atlantic Ocean, the City of Long Beach has the rare opportunity to create a major recreation and gathering space right next to the boardwalk at little or no cost to the government.

Objective 3.4 Stabilize and protect the dune system on the oceanfront to provide storm protection and natural habitat.

- Preserve and expand existing dunes and plantings, which provided critical protection during Superstorm Sandy by continuing the recent efforts to replenish beach sand, build a dune and berm system, and install additional dune plantings.
- Continue to support the ACOE dune reconstruction project that will help provide a storm barrier on the oceanfront.
- Introduce tree plantings for vulnerable oceanfront blocks. A recommended approach south of the boardwalk is to create clusters of *Pinus rigida* (pitch pine) at the street ends, to preserve key view corridors. Within the view corridors, recommendations for low woody plants include *Prunus maritima* (beach plum), *Myrica pennsylvanica* (bayberry), *Rhus coppalina* (dwarf sumac), and *Arctostaphylos uva-ursi* (bearberry). North of the boardwalk, street tree plantings will be planted at much tighter intervals than customary in the urban context, because of the dwarfing effects of wind-borne sea salt. Planting street trees at 12-15' spacing in staggered (rather than linear) formation also improves the ability of the planted mass to deflect wave energy by increasing the coefficient of friction as waves hit the scattered field of dense tree trunks. Suggested species for the beachfront blocks include *Prunus virginiana* (chokecherry), *Prunus serotina* (black cherry) and *Amalanchier spp.* (serviceberry or shadbush).

Goal 4: Educate the public, officials, and other stakeholders about the flood hazard and what can be done to mitigate its impacts.

Objective 4.1 Ensure that local officials attend current training on regulatory issues and best practices.

- Continue to consider coastal resiliency in all policy and development decisions

- Remove restrictions on the use of green infrastructure, particularly for stormwater management, from the current Code of Ordinances.
- Update water conservation and building codes that regulate watering practices and modernize building technologies; explore the feasibility of municipal, commercial, and residential building incentives and/or mandates, such as the installation of low-flow water fixtures, grey water systems, smart water meters, and/or rainwater catchment systems.
- Amend the City Zoning Ordinance to designate a bayfront overlay zone to guide development in this critical area. In general, the bayfront overlay zone would expand allowable uses along the industrially-zoned and underutilized bayfront. Give special consideration to the preservation and enhancement of public access. In addition to increasing access and use of the waterfront, such a policy would also provide flood mitigation and help to reduce impacts to private properties. Increase allowable height but make sure it fits within the context of community. As was compromised on during public outreach, maximum height along the bayfront is recommended to be eight stories.
- Amend the City Zoning Ordinance to permit housing or live/work lofts above commercial operations within the Central Business District and West End.
- Update the zoning and building codes to apply sustainable housing methods (for example, utilizing low-flush toilets or solar panels) and expand practices to retain water on site to mitigate flooding, such as rain gardens and green roofs.

Objective 4.2 Ensure that public information efforts are coordinated among City department and stakeholder groups.

- Include a significant amount of community outreach concerning the proposed code changes, focusing on homeowners, business owners and interested developers.

Objective 4.3 Provide information to individuals throughout the City on the flood hazard and what property protection measures they can take.

- It is noted that there are other important community facilities which are not City owned and operated, including the public libraries, schools, post office, railroad station and others. The City encourages these facilities to develop and implement the appropriate resiliency measures.
- Establish specific policies within the City Code of Ordinances to allow for rooftop gardens/green roofs. Roof space is generally underutilized throughout Long Beach and rooftop gardens/green roofs could improve stormwater management by retaining water and improving the quality of runoff coming from the roof. Rooftop gardens/green roofs can also reduce a building's heat island profile and improve insulation during cooler months. And for a relatively dense community like Long Beach, rooftop gardens/green roofs could provide additional space and allow residents to take advantage of the barrier island's numerous view sheds.
- Remove restrictions on the use of green infrastructure, particularly for stormwater management, from the current Code of Ordinances.
- Update water conservation and building codes that regulate watering practices and modernize building technologies; explore the feasibility of municipal, commercial, and residential building

incentives and/or mandates, such as the installation of low-flow water fixtures, grey water systems, smart water meters, and/or rainwater catchment systems.

Objective 4.4 Increase flood insurance coverage held by individuals and businesses.

- Continue to participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS) to secure flood insurance premium discounts for residents. The City of Long Beach has been continually working to lower its CRS score by enhancing flood protection and preparedness measures throughout the City. These measures are divided into groups of actions, including public outreach (e.g., publicly-accessible flood insurance/protection information), mapping and regulatory updates (e.g., floodplain mapping and flood data maintenance), flood preparedness (e.g., higher freeboard requirements), and flood damage reduction (e.g., floodproofing of structures, drainage system improvements). In turn, the CRS program provides flood insurance discounts to all premium holders in the City. Having recently lowered the City's rating to a 7, City residents now receive a 15% discount on flood insurance. The City is continuing to pursue additional actions to lower the CRS rating with the ultimate goal of reaching Level 5 within five years.

Goal 5: Ensure effective response to flood events to save lives and protect property.

Objective 5.1 Ensure that an effective warning system is in place in the City.

Objective 5.2 Enhance the public's capabilities of responding to flood events.

Objective 5.3 Enhance the emergency response and emergency management community's capabilities to respond to flood events.

- Oceanfront Cultural Park: Not all coastal storms and disturbances can be predicted in advance. For this reason, the CP proposes an Oceanfront Cultural Park as a high point of refuge to provide immediate evacuation of the beach. The park and its underlying structure offer multiple benefits. The pristine Boardwalk and Ocean Beach Park are Long Beach's greatest assets. Yet, while the beach draws many visitors, it does not generate much revenue for the City beyond the sale of beach passes. Economic activity along the Boardwalk would provide a boost to the City's overall economy and tax base. With sizable residential, commercial, and parking space, the proposal provides multiple revenue streams and serves the demand for these functions at the beachfront. Above the parking structure, overlooking the Atlantic Ocean, the City of Long Beach has the rare opportunity to create a major recreation and gathering space right next to the boardwalk at little or no cost to the government.
- Solar PV panels for lighting along the City's emergency evacuation routes, to reduce system vulnerability during emergency situations. One of the main benefits of solar PV is a lack of underground wiring, thereby eliminating risks from flooding and ensuring safety along such critical routes.

Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build local capacity to respond to or be prepared for the hazard
Personal Scale			
<ul style="list-style-type: none"> • Clear storm drains and culverts 	<ul style="list-style-type: none"> • Relocate homes outside of the flood hazard area 	<ul style="list-style-type: none"> • Retrofit structures (e.g. elevate structures above the regulatory flood elevation) 	<ul style="list-style-type: none"> • Buy flood insurance
<ul style="list-style-type: none"> • Install local stormwater capture systems 	<ul style="list-style-type: none"> • Elevate utilities and/or other mechanicals above the regulatory flood elevation 	<ul style="list-style-type: none"> • Elevate items within homes above the regulatory flood elevation 	<ul style="list-style-type: none"> • Develop household mitigation plans, such as retrofit savings, communication capability with outside sources, and 72-hour self-sufficiency during and after an event
<ul style="list-style-type: none"> • Use low-impact development techniques 	<ul style="list-style-type: none"> • Use low-impact development technique 	<ul style="list-style-type: none"> • Construct new homes above the regulatory flood elevation 	<ul style="list-style-type: none"> • Understand the location of evacuation routes in the community
	<ul style="list-style-type: none"> • Assess projects to determine if they may inadvertently increase flood risk 	<ul style="list-style-type: none"> • Floodproof existing structures 	<ul style="list-style-type: none"> • Educate self on flood risk from related hazards such as coastal storms and severe rain events
			<ul style="list-style-type: none"> • Participate in CERT training



Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build local capacity to respond to or be prepared for the hazard
Corporate Scale			
<ul style="list-style-type: none"> • Clear stormwater drains and culverts 	<ul style="list-style-type: none"> • Relocate critical facilities or functions outside of flood area 	<ul style="list-style-type: none"> • Build redundancy for critical functions or retrofit critical buildings 	<ul style="list-style-type: none"> • Support and implement hazard disclosure for the sale/re-sale of property in identified flood areas
<ul style="list-style-type: none"> • Install local stormwater capture systems 	<ul style="list-style-type: none"> • Institute low-impact development techniques on property 	<ul style="list-style-type: none"> • Provide flood-proofing measures when new critical infrastructure must be located in floodplains 	<ul style="list-style-type: none"> • Solicit cost-sharing through partnerships with private-sector stakeholders on projects with multiple benefits
<ul style="list-style-type: none"> • Use low-impact development techniques 	<ul style="list-style-type: none"> • Assess projects to determine if they may inadvertently increase flood risk 		<ul style="list-style-type: none"> • Increase capability by having cash reserves for reconstruction
	<ul style="list-style-type: none"> • Use porous pavement, vegetative buffers, and islands in large parking areas 		<ul style="list-style-type: none"> • Buy flood insurance
	<ul style="list-style-type: none"> • Raise utilities or other mechanical devices above regulatory flood elevation 		



Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build local capacity to respond to or be prepared for the hazard
Government Scale			
<ul style="list-style-type: none"> • Work with USACE, NYS, and the U.S. Coast Guard to ensure channels of the Jones Inlet are properly marked and dredged 	<ul style="list-style-type: none"> • Promote open space uses in identified high-hazard areas via techniques such as: planned unit developments, easements, setbacks, greenways, and sensitive area tracks 	<ul style="list-style-type: none"> • Increase floodplain standards within municipal ordinances, and include provisions for enforcing best practice standards within floodplains and using FEMA flood maps 	<ul style="list-style-type: none"> • Utilize the City’s status as a Climate Smart Community to apply for grant funding (e.g. Climate Smart Communities Grant Program)
<ul style="list-style-type: none"> • Enhance stormwater management regulations and master planning 	<ul style="list-style-type: none"> • Install additional tide flex valves to prevent backflow 	<ul style="list-style-type: none"> • Increase size of undersized bridges and culverts 	<ul style="list-style-type: none"> • Develop and implement a public information strategy
<ul style="list-style-type: none"> • Clear stormwater drains and culverts 	<ul style="list-style-type: none"> • Locate or relocate critical facilities outside of flood hazard area 	<ul style="list-style-type: none"> • Implement higher regulatory standards such as higher freeboard and lower substantial damage threshold 	<ul style="list-style-type: none"> • Develop a flood information page on the City’s website
	<ul style="list-style-type: none"> • Acquire or relocate identified repetitive loss properties 	<ul style="list-style-type: none"> • Identify critical infrastructure such as those on single-entry roads and prioritize for replacement or resizing 	<ul style="list-style-type: none"> • Provide outreach to residents to inform them on how to notify Public Works of backflow device clogs
	<ul style="list-style-type: none"> • Work with local universities and schools to develop erosion documentation program 	<ul style="list-style-type: none"> • Provide redundancy for critical functions and infrastructure 	<ul style="list-style-type: none"> • Educate residents on how backflow valves work and how to help keep storm drains free of trash and debris
	<ul style="list-style-type: none"> • Institute low-impact development techniques on property 	<ul style="list-style-type: none"> • Review stormwater management regulations and master planning 	<ul style="list-style-type: none"> • Develop a flood warning system using the Stevens flood modeling system
	<ul style="list-style-type: none"> • Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff 	<ul style="list-style-type: none"> • Adopt "no-adverse impact" floodplain management policies that strive to not increase the flood risk on downstream communities 	<ul style="list-style-type: none"> • Develop a Flood Warning and Response Plan



Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build local capacity to respond to or be prepared for the hazard
Government Scale			
	<ul style="list-style-type: none"> Enforce more stringent parking standards to ensure vehicles are not being parked in floodprone areas or acquired properties 	<ul style="list-style-type: none"> Require accounting for sea level rise in all applications for new development in shoreline areas 	<ul style="list-style-type: none"> Provide better communication systems and back-up communication systems to inform public of hazards and to communicate during the hazard event
	<ul style="list-style-type: none"> Preserve undeveloped and vulnerable shoreline 	<ul style="list-style-type: none"> Implement standards for bulkhead replacement (required height) 	<ul style="list-style-type: none"> Develop an adaptive management plan to address long-term impacts of sea level rise
	<ul style="list-style-type: none"> Restore existing flood control and riparian corridors 		<ul style="list-style-type: none"> Consider the probable impacts of climate change on the risk associated with the flood hazard
	<ul style="list-style-type: none"> Utilize alternative funding sources for property buyouts that do not have the same restrictions as FEMA buyout programs 		<ul style="list-style-type: none"> Work with insurance agencies and real estate agents to provide workshops on tools and resources to get more information on flood hazard zones and FIRMs
			<ul style="list-style-type: none"> Enact tools to help manage development in hazard areas (stronger controls, tax incentives, information)
			<ul style="list-style-type: none"> Incorporate retrofitting/replacement of critical system elements in capital improvement plan
			<ul style="list-style-type: none"> Develop strategy to take advantage of post-disaster opportunities
			<ul style="list-style-type: none"> Warehouse critical infrastructure components
			<ul style="list-style-type: none"> Maintain existing data and gather new data needed to define risks and vulnerability



Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build local capacity to respond to or be prepared for the hazard
Government Scale			
			<ul style="list-style-type: none"> • Enforce NFIP requirements
			<ul style="list-style-type: none"> • Create an elevation inventory of structures in the floodplain
			<ul style="list-style-type: none"> • Charge a hazard mitigation fee on all new permits to create a hazard mitigation funding source for grant cost-share requirements
			<ul style="list-style-type: none"> • Integrate floodplain management policies into other planning mechanisms within the community
			<ul style="list-style-type: none"> • Be proactive in buy-outs for contiguous open space
			<ul style="list-style-type: none"> • Establish incentives to promote flood hazard mitigation of private property
			<ul style="list-style-type: none"> • Join NWS "Storm Ready" Program
			<ul style="list-style-type: none"> • Disseminate evacuation procedures
			<ul style="list-style-type: none"> • Ensure public safety personnel and ambulance drivers know safe evacuation routes • Install rain gage/flood warning system
			<ul style="list-style-type: none"> • Capture/survey high-water marks during flood events
			<ul style="list-style-type: none"> • Produce municipal post-disaster manuals to provide efficient recovery procedures and reimbursement of funds
			<ul style="list-style-type: none"> • Develop better education and outreach regarding flood insurance and NFIP programs
			<ul style="list-style-type: none"> • Floodproof/harden critical infrastructure



Manipulate the Hazard	Reduce Exposure to the Hazard	Reduce Vulnerability to the Hazard	Build local capacity to respond to or be prepared for the hazard
Government Scale			
			<ul style="list-style-type: none"> • Provide mitigation outreach campaign for businesses
			<ul style="list-style-type: none"> • Promote available mitigation-related training in the area
			<ul style="list-style-type: none"> • Where applicable, have municipal officials attend FEMA flood training and provide incentive for officials to get training
			<ul style="list-style-type: none"> • Work on engaging the public with progress on flood mitigation projects to demonstrate progress
			<ul style="list-style-type: none"> • Conduct proactive planning for buyouts to ensure more comprehensive buyout programs





**CITY OF LONG BEACH, NEW YORK,
COMMUNITY RATING SYSTEM (CRS)
SUPPORT**

SIGN-IN

**Planning Committee Meeting
Review Possible Activities**

Wednesday, January 8, 2020 | 3:00 – 5:00 p.m.

Name	Organization	Initials
City of Long Beach Government Representatives		
Bourne, Patricia	Economic Development and Planning	PB
Brand, Joe	Parks & Recreation	
Corbett, Richard	Police Department/Office of Emergency Management	
Febrizio, Joe	Department of Public Works	
Huffman, Tyler	Community Development	
McTiernan, Ryan	Department of Community Development and Sustainability	
Morrelli, Rocco	Zoning Board of Appeals	
Schuh, Rich	Building Department	
Steiner, Rebecca	Economic Development and Planning	
Tepper, Gordon	Manager's Office	
Fryer, David	City Clerk	
Non-Voting City of Long Beach Government Representative		
Butler, Rita	Department of Public Works	
Mirando, John	Acting City Manager	
Non-government Representatives		
Bochner, Scott	Environmental Advisory Board	
Danby, Ian	Long Beach Chamber of Commerce	
Gallagher, Dr. Jennifer	Superintendent of Long Beach Schools	
Gallinaro, Joseph	Gallinaro Design Architecture	
Kemins, Scott	City of Long Beach Volunteer Fire Department	
Knag, Tom	Westholme and Walks Civic Association	
O'Toole, Edwin	O'Toole Insurance	
Rector, Anthony	Developer	
Reilly, Kevin	North East Bay and Canal Civic Association, also representing the City Community Organizations Active in Disaster (COAD)	
Tozer, Leah	Engel and Völkers	

Brian O'Keefe *LB Schools*

Michael DeVito





**CITY OF LONG BEACH, NEW YORK,
COMMUNITY RATING SYSTEM (CRS)
SUPPORT**

SIGN-IN

**Planning Committee Meeting
Review Possible Activities**

Wednesday, January 8, 2020 | 3:00 – 5:00 p.m.

Name	Organization	Initials
Other Attendees		
Huch, Chris	Tetra Tech, Inc.	CH
Subbio, Tony	Tetra Tech, Inc.	TS
Eileen Hession		
Nancy Golden		
Liz Treston - Councilwoman Elect		





MEETING NOTES

Meeting	City of Long Beach Floodplain Management Plan (FMP) Planning Committee Meeting: Draft An Action Plan		
Date	January 29, 2020	Time	3:00 – 5:00 p.m.
Location	Long Beach City Hall, 1 West Chester Street, Long Beach, New York		
Attendees	Patricia Bourne, Economic Development and Planning		
	Richard Corbett, Police Department/Office of Emergency Management		
	Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works		
	David Fraser, City Clerk		
	Tyler Huffman, Community Development		
	Scott Kemins, City of Long Beach Volunteer Fire Department		
	Tom Knag, Westholme and Walks Civic Organization		
	John Mirando, Acting City Manager		
	Anthony Rector, Developer		
	Rich Schuh, Building Department		
	Rebecca Steiner, Planner, City of Long Beach Department of Economic Development and Planning		
	Liz Treston, City of Long Beach City Council		
	Chris Huch, Planner, Tetra Tech, Inc. (Tetra Tech)		

Discussion Points

This section summarizes each discussion point addressed during the meeting.

Public Input

Ms. Treston noted that additional publicity and a Spanish-translated survey are necessary for the public survey to be successful. City staff noted they would work on these improvements.

Project Updates

Mr. Huch provided status updates on the CRS Program and FMP planning effort. The CRS 30-day assignments were due the same day as the meeting. The FMP is nearing completion and will be finished in time to meet ISO requirements in February. A public meeting will be scheduled for the public to comment on the draft.

Review of Draft Actions

Mr. Huch described the draft actions table, noting that each action includes a description, lead and supporting departments, possible funding sources or resources, timeline, objectives met, project category, and priority.



MEETING NOTES

The Committee reviewed each identified action and provided input on changes to be made for language, lead departments, and more. Several general actions were divided into multiple, more-specific actions.

The Committee suggested reordering the actions so that similar actions are grouped together.

Additional Actions for Inclusion

The following additional actions were suggested:

- Educating residents on green infrastructure actions that could be taken to improve their properties.
- Adding flood-related information and outreach to the City's Welcome Package for new residents.
- Developing a CRS User Group for Nassau County South Shore communities.
- Implementing the North Shore Critical Infrastructure Project.

Next Steps

- Tetra Tech will submit the files requested by ISO in the 30-day letter.
- Tetra Tech will update the actions in the FMP and complete the draft.
- Upon recommendation by the FMP committee, the FMP will acknowledge the efforts of Rita Butler and Chandra Akins to support the FMP.
- A public meeting will be scheduled for February 11, 2020.
- Tetra Tech will share the meeting details and the link to the public survey with the full committee.

The meeting adjourned at 5:00 p.m.



AGENDA

**City of Long Beach, New York, Community Rating System (CRS) Support
Planning Committee Meeting
Draft an Action Plan**

Wednesday, January 29, 2020 | 3:00 – 5:00 p.m.

1. Welcome

2. Public Input

3. Project Updates

4. Review of Draft Actions

5. Additional Actions for Inclusion

6. Next Steps

- a. Complete the draft floodplain management plan (FMP)
- b. Submit the draft FMP to the Insurance Services Office (ISO) for review
- c. Address ISO comments
- d. Post the draft FMP for public review
- e. Conduct Public Review Meeting
- f. Finalize the FMP
- g. Facilitate adoption by City Council

7. Questions



Flood Mitigation Initiatives

Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives Met	Project Category	Priority (High, Med., Low)
1	<p>Adopt appropriate enhanced regulatory standards, specifically those that account for future flood conditions and climate change, such as:</p> <ul style="list-style-type: none"> • Increase freeboard requirement to 3 feet. • Establish cumulative substantial improvements. • Establish threshold lower than 50% for substantial damages. • Establish limitations on enclosures beneath elevated structures. • Increase bulkhead elevation requirements. • Require raising of lots on new development or substantial improvements. • “Green Zoning” focusing on coastal resiliency and green infrastructure enhancements. • Establish a bayfront overlay zone to guide development in critical waterfront areas. • Remove restrictions on green infrastructure currently in place in the City Code of Ordinances. 	City Code Official/Engineer, Planning	City budget	Short	1.8, 2.2	PR and PP	High
2	<p>Install backflow prevention flaps or valves where appropriate. Upgrade existing flaps and valves in problem areas. Identified areas for backflow prevention upgrades include Laurelton and West Bay Drive, West Park Avenue, Riverside Boulevard and Pine Street, Park Avenue between New York Avenue and Nevada Avenue, Long Beach Boulevard, State Street and Franklin Boulevard, Laurelton Boulevard and West Bay Avenue, Franklin Boulevard and East Park Avenue to East Hudson Street.</p>	City of Long Beach Engineering	City budget, Capital Improvements, HMGP, PDM	Short	1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14	SP	High
3	<p>Maintain stormwater system through regular/emergency cleaning and provide outreach to residents to ask them to alert Public Works of clogs and to educate them on how the valves work and how to help keep storm drains free of trash and debris that can clog the valves.</p>	Public Relations, Public Works	City budget	Ongoing	1.1	PI	High
4	<p>Install drain covers to prevent litter from entering stormwater system.</p>	Public Works	City budget, Clean Water Act Water Quality Grants, WQIP	Short	1.1	SP	Medium

Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives Met	Project Category	Priority (High, Med., Low)
5	Regrade the urban flooding prone roadways to increase runoff and increase water retention, including West Park Avenue, Riverside Boulevard, Pine Street, National Boulevard, Park Avenue, New York Avenue, and Nevada Avenue.	City of Long Beach Engineering	City budget, Work with utilities to cover costs when utilities require roadwork	Long	1.3, 1.4, 1.5, 1.6	SP	Medium
6	Install pump stations (including backup generators) at appropriate locations to decrease urban flooding. Complete pump station construction on Tennessee Avenue.	City of Long Beach Engineering	HMGP, PDM, FMA	Short	1.6	SP	High
7	Work with utility providers (PSEG, National Grid, Verizon, etc.) to protect utilities. Upgrade underground utilities (water, sewer, drainage, gas, and electric) as major sections of streets are reconstructed.	City Manager	City budget, EPG, utility providers	Ongoing	1.7	PP and SP	Medium
8	Explore installation of a sea wall along North Shore. Consider modified sea wall with green infrastructure components such as pocket wetlands, oyster reef habitat, etc. to strengthen the system with natural features and allow for natural protection from future flood conditions. Consider greenway features adjacent to sea wall, including vegetation capable of absorbing stormwater that is capable of surviving saltwater intrusion.	City of Long Beach Engineering	City budget, HMGP, PDM, FMA, LWRP	Long	1.7	SP	Low
9	Locate new or retrofit existing critical facilities, including lifeline facilities such as fire stations, wells, stormwater pumps, and sewer lift stations, above the 500-year flood level, where possible, to allow for continuity of operations under current and future flood conditions.	City of Long Beach Planning	HMGP, PDM, FMA, EPG	Ongoing	1.9, 2.1	SP, ES, PP	High
10	Identify critical facilities/infrastructure that require early notification during flood responses.	City of Long Beach OEM	City budget	Ongoing	1.9, 5.1	PP, ES	High
11	Purchase temporary storm surge barriers to be deployed around critical facilities which cannot be raised or retrofit to protect from flooding.	City of Long Beach OEM	EMPG, City budget	Short	1.9, 5.3	ES	Medium
12	Support funding for acquisition or elevation of Repetitive Loss properties. This may be addressed by submitting a City or joint municipal HMA grant application	City of Long Beach Planning	HMA/FMA	Short	1.10, 1.14, 4.3	SP, PP	High
13	Promote flood insurance for commercial properties, including contents coverage. Work with realtors and civic organizations to increase delivery of messaging.	Public Relations, Floodplain Administrator, Realtors	City budget, Realty agencies, Civic organizations	Ongoing	2.3	PI	High

Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives Met	Project Category	Priority (High, Med., Low)
14	Promote flood insurance for rental properties, including contents coverage for renters. Work with realtors and civic organizations to increase delivery of messaging.	Public Relations, Floodplain Administrator, Realtors	City budget, Realty agencies, Civic organizations	Ongoing	1.10, 4.4	PI	High
15	Promote flood insurance for homeowners, including contents. Work with realtors and civic organizations to increase delivery of messaging.	Public Relations, Floodplain Administrator, Realtors	City budget, Realty agencies, organizations	Ongoing	4.4	PI	High
16	Elevate/protect critical roadways, particularly evacuation routes such as Long Beach Boulevard, to account for current and future flooding conditions.	City of Long Beach Engineering, Nassau County	HMGP, PDM, FMA, TIGER	Long	1.11, 1.12, 1.13	ES, SP	Low
17	Explore the use of green infrastructure to reduce urban flooding near Laurelton Boulevard and West Bay Avenue.	City of Long Beach Engineering, City of Long Beach Office of Sustainability	Clean Water Act Water Quality Grants, WQIP, Climate Smart	Short	1.13	SP, NB	Medium
18	Adopt an updated comprehensive plan which integrates hazard mitigation, embraces resiliency, and updates zoning, including a Local Waterfront Revitalization Program and comprehensive stormwater flood management study.	City of Long Beach Planning	City budget	Short	1.8, 2.1, 2.2	PR	High
19	Support the USACE beach repair, restoration, and replenishment projects. This also includes oceanfront groin/jetty repairs and modifications.	City of Long Beach Engineering, City Manager	HMGP, PDM, FMA	Ongoing	3.1	NB, SP	High
20	Repair and install bulkheads on public waterfront to protect from coastal erosion. This includes new public bulkheads connecting existing private bulkheads in the West End from Ohio Avenue and California Street as well as one street end on Lindell Boulevard, a bulkhead extending from Washington Boulevard to Magnolia Boulevard, and two bulkheads along the eastern border of the two western canals.	City of Long Beach Engineering	HMGP, PDM, FMA, GOSR	Ongoing	3.1	NB, SP	Medium
21	Provide dredging, revetments, or channelization where appropriate.	City of Long Beach Engineering	HMGP, PDM, FMA, USACE	Ongoing	3.1, 3.2	SP	Medium
22	Work with USACE, local education institutions, and civic organizations to develop an erosion monitoring program.	City Manager, City of Long Beach Engineering	City budget, USACE, Private organization budgets	Ongoing	3.1	PI	Medium

Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives Met	Project Category	Priority (High, Med., Low)
23	Work with USACE, NYS, and the Coast Guard to ensure channels and local inlets are properly marked and dredged.	City Manager, City of Long Beach Engineering	USACE, NYS, Coast Guard	Ongoing	3.2	NB, PI	Low
24	Participate in regional watershed management and develop a Watershed Management Plan	City of Long Beach Engineering, City of Long Beach Planning, CRS Coordinator	City budget, NYS DEC	Ongoing	3.3	NB	Low
25	Promote open space or flood-compatible land uses in identified flood hazard areas via techniques such as: easements, setbacks, sensitive area tracts, community education, natural resource inventory; comprehensive planning; zoning provisions; floodplain protection ordinance; and the environmental review process.	City of Long Beach Planning, City of Long Beach Public Works	City budget, HMGP, PDM, FMA, Clean Water Act Water Quality Grants, WQIP, Climate Smart, EPF	Ongoing	3.3	NB, SP, PR, PI	High
26	Construct stormwater wetlands to maximize removal of pollutants from stormwater runoff.	City of Long Beach Planning, BTMUA	HMGP, PDM, FMA, Clean Water Act Water Quality Grants, WQIP, EPF	Short	3.3	NB	Low
27	Install a bio retention system in lawns, median strips, parking lot islands, unused lot areas, certain easements, or other areas that would benefit from stormwater mitigation.	City of Long Beach Planning, BTMUA	HMGP, PDM, FMA, Clean Water Act Water Quality Grants, WQIP, EPF	Short	3.3	NB	Medium
28	Remove un-utilized or under-utilized impervious surfaces, such as extra parking, with native or maintained vegetation. Where possible redirect runoff to these new pervious surfaces.	City of Long Beach Planning, BTMUA	HMGP, PDM, FMA, Clean Water Act Water Quality Grants, WQIP, EPF	Short	3.3	SP, NB	Low
29	Maintain and improve dunes and natural beach habitat through diverse native plantings (including tree plantings on the backside of the dune) to protect critical habitat of endangered and threatened species, strengthen the integrity of the dune, and encourage beach and dune growth for storm protection.	City of Long Beach Engineering	City budget, Environmental non-profits, HMGP, PDM, FMA, EPF	Ongoing	3.4	NB, SP	High
30	Increase the capabilities of City staff by having staff undergo training, including EMI training and CFM certification.	Long Beach Administration	City budget, FEMA EMI	Ongoing	4.1	NB	High

Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives Met	Project Category	Priority (High, Med., Low)
31	Develop and maintain a CRS-credited Program for Public Information.	Public Relations, CRS Coordinator	City budget	Ongoing	4.2, 2.3, 5.2	PI	High
32	Develop and maintain a CRS-credited Pre-Flood Plan. Include actions within the plan that discuss post-flooding disaster building requirements.	City of Long Beach OEM, Neighborhood Emergency Team (NET), CRS Coordinator	City budget	Ongoing	4.2, 2.3, 5.2	PI	High
33	Expand outreach programs in schools to include children in outreach and to improve families' disaster response capabilities. Schools include: <ul style="list-style-type: none"> • Long Beach Public Schools • Long Beach Catholic Regional School • Montessori School of Long Beach • Torah High School • Harriet Eisman Community School 	Public Relations, Boards of Education, City Police	City budget, Long Beach Boards of Education	Ongoing	4.2, 4.3, 5.2	PI, ES	High
34	Expand outreach through designed outreach videos and social media posts on flooding. Identify and complete targeted outreach efforts.	Public Relations	City budget	Ongoing	4.2, 5.2	PI	High
35	Work with civic organizations and realtors to expand stakeholder-delivered outreach.	Public Relations	City budget, Civic organizations realtors	Ongoing	4.2, 5.2	PI	High
36	Provide information on residential, business, and natural resource grant programs to residents.	City Planning, Building Department	City budget	Ongoing	4.3, 5.2	PI	High
37	Enhance City website for pre-storm information dissemination, including shelter locations.	Public Relations	City budget	Short	4.3, 5.2	PI, ES	High
38	Develop CRS-credited Flood Warning and Response Plan and incorporate Stevens Flood Advisory System into emergency operations, outreach, and City website. Explore automated flood warning system using the following tide gage locations for forecasting: <ul style="list-style-type: none"> • East Rockaway Inlet: http://hudson.dl.stevens-tech.edu/sfas/d/index.shtml?station=U207 • Reynolds Channel at Point Lookout: http://hudson.dl.stevens-tech.edu/sfas/d/index.shtml?station=U206 	City of Long Beach OEM, CRS Coordinator	City budget, USGS Silver Jackets	Short	5.1	PI, ES	High

Initiative Number	Initiative	Lead Dept.	Possible Funding Sources or Resources	Timeline	Objectives Met	Project Category	Priority (High, Med., Low)
39	Implement/participate in regional precipitation monitoring networks and other programs that enhance flood threat recognition capability.	City of Long Beach Engineering, OEM, City Manager	City budget, NYS DEC, USGS	Long	5.1	ES, PI	Low
40	Conduct regular Citywide tests of emergency warning system and include the public in tests whenever possible.	City of Long Beach OEM, Public Relations, Neighborhood Emergency Team (NET)	City budget, EMPG	Ongoing	5.1	ES	High
41	Maintain the all-hazards Emergency Operations Plan	City of Long Beach OEM	City budget	Ongoing	5.3	PR, ES	High
42	Support the USACE Nassau County Back Bays Coastal Storm Risk Management Feasibility Study and work with USACE to implement identified projects. Specifically, support projects that will provide adequate protection from future flooding conditions.	USACE, City Manager	USACE, City budget, HMGP, PDM, FMA	Long	Potential for all objectives exists.	SP, PP, NB	Low
43	Support updates to the Nassau County Hazard Mitigation Plan and incorporate Floodplain Management Plan actions into the City of Long Beach’s annex within the plan.	City Manager, OEM	City budget	Ongoing	2.1	PR, PP, NB, SP, PI	High
44	Reestablish signage of coastal evacuation routes.	OEM, Public Works	City budget, NWS	Short	5.2	PI, ES	High

Notes:

- EPF Environmental Protection Fund
- EPG New York State DEC/EFC Wastewater Infrastructure Engineering Planning Grant
- FMA Flood Mitigation Assistance Program
- HMPG Hazard Mitigation Grant Program
- LWRP Local Waterfront Revitalization Program
- PDM Pre-Disaster Mitigation Program
- WQIP Water Quality Improvement Project Program

Timeframe

- Short 1-5 years
- Long 5 years or greater
- Ongoing Ongoing or annual project

Project Category

- Prevention – PR
- Property Protection – PP
- Natural and beneficial floodplain functions – NB
- Emergency Services - ES
- Structural Projects - SP
- Public Information/Outreach - PI

Priority

- High A project that meets multiple plan objectives, benefits exceed cost, has funding secured under existing programs or authorizations, or is grant eligible, and can be completed in 1 to 5 years (i.e., short term project) once project is funded.
- Medium A project that meets at least 1 plan objective, benefits exceeds costs, funding has not been secured and would require a special funding authorization under existing programs, grant eligibility is questionable, and can be completed in 1 to 5 years once project is funded.
- Low Any project that will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, project is not grant eligible, and timeline for completion is considered long term (5 to 10 years).



Table 6-14. Prioritization of Mitigation Initiatives

Initiative Number	Objectives Met (specific objective numbers in parentheses)	Benefits	Costs	Do benefits equal or exceed costs? (Y or N)	Is project grant eligible? (Y or N)	Can project be funded under existing programs/budgets? (Y or N)	Priority (High, Med., Low)
1	(2) 1.8, 2.2	Medium	Low	Y	N	Y	High
2	13 (1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14)	High	Medium	Y	Y	N	High
3	1 (1.1)	Medium	Low	Y	N	Y	High
4	1 (1.1)	High	Medium	Y	Y	N	Medium
5	4 (1.3, 1.4, 1.5, 1.6)	High	High	Y	Y	N	Medium
6	1 (1.6)	High	High	Y	Y	Y	High
7	1 (1.7)	Medium	Low	Y	N	Y	Medium
8	1 (1.7)	High	High	Y	Y	N	Low
9	2 (1.9, 2.1)	High	Medium	Y	Y	Y	High
10	2 (1.9, 5.1)	High	Low	Y	N	Y	High
11	2 (1.9, 5.3)	High	Medium	Y	Y	N	Medium
12	3 (1.10, 1.14, 4.3)	High	High	Y	Y	N	High
13	1 (2.3)	Medium	Low	Y	N	Y	High
14	2 (1.10, 4.4)	Medium	Low	Y	N	Y	High
15	1 (4.4)	Medium	Low	Y	N	Y	High
16	3 (1.11, 1.12, 1.13)	High	High	Y	Y	N	Low
17	1 (1.13)	Medium	Low	Y	Y	N	Medium
18	3 (1.8, 2.1, 2.2)	Medium	Low	Y	N	Y	High
19	1 (3.1)	High	Low	Y	Y	Y	High
20	1 (3.1)	High	High	Y	Y	Y	Medium
21	2 (3.1, 3.2)	High	High	Y	Y	N	Medium
22	1 (3.1)	Medium	Low	Y	Y	N	Medium
23	1 (3.2)	Medium	Low	Y	Y	N	Low
24	1 (3.3)	Low	Low	Y	Y	N	Low
25	1 (3.3)	Medium	Low	Y	Y	Y	High
26	1 (3.3)	Medium	Medium	Y	Y	N	Low
27	1 (3.3)	Medium	Medium	Y	Y	N	Medium
28	1 (3.3)	Medium	Medium	Y	Y	N	Low
29	1 (3.4)	Medium	Low	Y	Y	Y	High
30	1 (4.1)	Medium	Low	Y	Y	Y	High
31	3 (4.2, 2.3, 5.2)	Medium	Low	Y	N	Y	High
32	3 (4.2, 2.3, 5.2)	Medium	Low	Y	N	Y	High
33	3 (4.2, 4.3, 5.2)	Medium	Low	Y	Y	Y	High
34	2 (4.2, 5.2)	Medium	Low	Y	N	Y	High
35	2 (4.2, 5.2)	Medium	Low	Y	Y	Y	High
36	2 (4.3, 5.2)	Medium	Low	Y	Y	Y	High
37	2 (4.3, 5.2)	Medium	Low	Y	N	Y	High
38	1 (5.1)	High	Low	Y	N	Y	High
39	1 (5.1)	Low	Low	Y	Y	Y	Low
40	1 (5.1)	Medium	Low	Y	N	Y	High
41	1 (5.3)	High	Low	Y	Y	Y	High
42	Potential for all objectives exists.	Low	Low	Y	Y	N	Low
43	1 (2.1)	Medium	Low	Y	Y	Y	High
44	1 (5.2)	Medium	Low	Y	Y	Y	High

Notes:

**"Yes" indicates the strategy is likely to fall within the objectives of the City budget or grant program. Does not indicate a project will automatically be funded.*

Benefits

High Project will have an immediate impact on the reduction of risk exposure to life and property.

Medium Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.

Low Long-term benefits of the project are difficult to quantify in the short term.

Cost

High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Medium Could budget under existing work plan but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.

Low Possible to fund under existing budget. Project is part of or can be part of an existing ongoing program.

Timeframe

Short 1-5 years

Long 5 years or greater

Ongoing Ongoing or annual project

Priority

High A project that meets multiple plan objectives, benefits exceed costs, has funding secured under existing programs or authorizations, or is grant eligible, and can be completed in 1 to 5 years (i.e., short term project) once project is funded.

Medium A project that meets at least 1 plan objective, benefits exceed costs, funding has not been secured and would require a special funding authorization under existing programs, grant eligibility is questionable, and can be completed in 1 to 5 years once project is funded.

Low Any project that will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, project is not grant eligible, and time line for completion is considered long-term (5 to 10 years).



**CITY OF LONG BEACH, NEW YORK,
COMMUNITY RATING SYSTEM (CRS)
SUPPORT**

SIGN-IN

**Planning Committee Meeting
Draft an Action Plan**

Wednesday, January 29, 2020 | 3:00 – 5:00 p.m.

Name	Organization	Initials
City of Long Beach Government Representatives		
Bourne, Patricia	Economic Development and Planning	<i>[Signature]</i>
Brand, Joe	Parks & Recreation	<i>[Signature]</i>
Corbett, Richard	Police Department/Office of Emergency Management	<i>[Signature]</i>
Febrizio, Joe	Department of Public Works	<i>[Signature]</i>
Huffman, Tyler	Community Development	<i>[Signature]</i>
McTiernan, Ryan	Department of Community Development and Sustainability	<i>[Signature]</i>
Morrelli, Rocco	Zoning Board of Appeals	<i>[Signature]</i>
Schuh, Rich	Building Department	<i>[Signature]</i>
Steiner, Rebecca	Economic Development and Planning	<i>[Signature]</i>
Tepper, Gordon	Manager's Office	<i>[Signature]</i>
<i>Fraser, David</i>	<i>City Clerk</i>	<i>[Signature]</i>
Non-Voting City of Long Beach Government Representative		
Butler, Rita	Department of Public Works	<i>[Signature]</i>
Mirando, John	Acting City Manager	<i>[Signature]</i>
Non-government Representatives		
Bochner, Scott	Environmental Advisory Board	<i>[Signature]</i>
Danby, Ian	Long Beach Chamber of Commerce	<i>[Signature]</i>
Gallagher, Dr. Jennifer	Superintendent of Long Beach Schools	<i>[Signature]</i>
Gallinaro, Joseph	Gallinaro Design Architecture	<i>[Signature]</i>
Kemins, Scott	City of Long Beach Volunteer Fire Department	<i>[Signature]</i>
Knag, Tom	Westholme and Walks Civic Association	<i>[Signature]</i>
O'Toole, Edwin	O'Toole Insurance	<i>[Signature]</i>
Rector, Anthony	Developer	<i>[Signature]</i>
Reilly, Kevin	North East Bay and Canal Civic Association, also representing the City Community Organizations Active in Disaster (COAD)	<i>[Signature]</i>
Tozer, Leah	Engel and Völkers	<i>[Signature]</i>

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CITY OF LONG BEACH, NEW YORK,
COMMUNITY RATING SYSTEM (CRS)
SUPPORT

SIGN-IN

Planning Committee Meeting
Draft an Action Plan

Wednesday, January 29, 2020 | 3:00 – 5:00 p.m.

Name	Organization	Initials
Other Attendees		
Huch, Chris	Tetra Tech, Inc.	CH
Boston, Liz	City of LB NY	ET
Rebecca Steiner	City of LB, Dept. Eco Dev & Planning	RS



Stuyvesant HS
CRS

MEMBER SIGN IN SHEET DATE: 10/21/19

NAME

COMPANY

PHONE NO.

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CHIAZZIMEDIA

CRS
Theologian East

MEMBER SIGN IN SHEET DATE: 10/21/19

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City of Long Beach Information Bulletin #1

Community Rating System (CRS) Program

What is the Community Rating System Program?

- ◆ The CRS Program is a voluntary incentive program that recognizes and encourages proactive community floodplain management that exceeds the minimum requirements of the National Flood Insurance Program (NFIP). As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.
- ◆ Communities are classified within 10 rate classes with potential CRS discounts ranging from 5% up to 45%.
- ◆ A community's CRS class is determined by assessing its programs and assigning CRS points. For every 500 points that a community earns, it reaches the next class rating.

What activities earn CRS points?

- ◆ There are 19 categories of CRS activities, including the following:
 - Elevation Certificates
 - Map Information Service
 - Outreach Projects
 - Hazard Disclosure
 - Flood Protection Information
 - Flood Protection Assistance
 - Flood Insurance Promotion
 - Flood Hazard Mapping
 - Open Space Preservation
 - Higher Regulatory Standards
 - Flood Data Maintenance
 - Stormwater Management
 - Floodplain Management Planning
 - Acquisition and Relocation
 - Flood Protection
 - Drainage System Maintenance
 - Flood Warning and Response
 - Levees
 - Dams

The City of Long Beach participates in the CRS Program as a Class 7 community, so our policyholders in the Special Flood Hazard Area (SFHA) (i.e., the floodplain) receive a 15% discount on their flood insurance premiums.

For more information about the City's participation in the CRS Program, please contact:

Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works,
(516) 431-1011 or jfebrizio@longbeachny.gov

The City of Long Beach has participated in the CRS Program since October 2009.

Activities for which the City earns CRS points include the following:

- Elevation Certificates
- Map Information
- Outreach Projects
- Hazard Disclosure
- Flood Protection Information
- Flood Protection Assistance
- Flood Insurance Promotion
- Additional Flood Data
- Open Space Preservation
- Higher Regulatory Standards
- Flood Data Maintenance
- Stormwater Management
- Floodplain Management Planning
- Drainage System Maintenance
- Flood Warning
- Dams





City of Long Beach Information Bulletin #1

Floodplain Management Plan (FMP)

What are the objectives of this project?

The City of Long Beach has begun the process of developing a Floodplain Management Plan (FMP). The FMP will analyze the hazard posed by flooding in the City, and identify a strategy for minimizing vulnerability to flooding.

The planning process to develop the FMP will be conducted in accordance with the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS) Program, which will help the City maintain its discount on flood insurance for policyholders throughout the City.

The City of Long Beach and its partner agencies, residents, visitors, and business owners are vulnerable to the impacts of flooding. The flood hazard threatens lives, damages property, and interrupts operations. By maintaining a current FMP and implementing the projects described within it, the City and its stakeholders minimize the likelihood of flood impacts and reduce our vulnerability to those impacts. The FMP will satisfy one of the CRS Program requirements that we work to mitigate the flood hazard in the City, and will earn CRS points for the City, which translates into discounts on flood insurance for our policyholders.

What is the general process to be used by the City to develop the FMP?

The City has established a Planning Committee consisting of representatives from City and stakeholder organizations. While Tetra Tech will conduct the required analysis and modeling and will develop the FMP document, the Planning Committee will meet regularly to provide input and review results. Planning Committee meetings will be open to the public. There will also be public meetings held to review the risk assessment and the draft document.

Tetra Tech will meet with the Planning Committee and others to collect information and solicit participation in the planning process, and will compile the FMP document itself.

How can residents, businesses, and other stakeholder agencies participate?

Individuals and stakeholder agencies can participate in the planning process by:

- ◆ Providing information (and/or access to information) to City and authorized Tetra Tech personnel by the requested deadlines
- ◆ Attending and actively participating in meetings and workshops to which you are invited
- ◆ Acting as spokespersons for the City of Long Beach FMP development project, and reaching out to other stakeholders to share and solicit additional information
- ◆ Identifying any mitigation projects that you would like to have included in the FMP

For more information about this initiative, please contact:

- ◆ Joe Febrizio, Acting Commissioner, City of Long Beach Department of Public Works, (516) 431-1011 or jfebrizio@longbeachny.gov
- ◆ Tony Subbio, Tetra Tech Project Manager, (717) 545-3580 or tony.subbio@tetrattech.com





CITY OF LONG BEACH

DEPARTMENT OF PUBLIC WORKS
1 WEST CHESTER STREET
LONG BEACH, NY 11561

TEL: (516) 431-1011
FAX: (516) 431-5008

Joseph Febrizio

DEPUTY COMMISSIONER OF PUBLIC WORKS

November 27, 2019

Corrina Cavallo
NYS Division of Homeland Security & Emergency Services
1220 Washington Avenue
Bldg 7A – 4th Floor
Albany, NY, 12242

Subject: Request for Information Regarding the City of Long Beach, New York's Vulnerability to Flooding

Dear Ms. Cavallo:

Greetings! The City of Long Beach, New York (the City) is in the process of developing a Floodplain Management Plan (FMP). The FMP will analyze the flood hazard in the City, and identify a strategy for minimizing the City's vulnerability to flooding.

I am writing to request your assistance in the planning process. If you have any data sets, plans, reports, or other information about flooding, hydrology, hydraulics, watershed management, etc., please share it with us. Likewise, if your organization is doing anything that may affect the nature of flooding and or the ways in which flooding may impact the City of Long Beach and its properties, we would like to know about that as well. Flooding from the Atlantic Ocean and Reynolds Channel are being analyzed.

I would be happy to discuss the planning process with you if you have any questions. You can reach me at (516) 431-1011 or via e-mail at jfebrizio@longbeachny.gov. You can also reach the City's planning contractor's project manager, Tony Subbio, at (717) 545-3580 or via e-mail at tony.subbio@tetrattech.com.

Finally, I would like to invite you to participate in the floodplain management planning process. You can find information about the planning process by visiting <https://www.longbeachny.gov/>. Planning committee meetings are listed on the Calendar of Events. Meetings are open to the public, and you are welcome to attend.

Thank you for your time and attention.

Sincerely,

Joseph Febrizio
Acting Commissioner



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1 WEST CHESTER STREET
LONG BEACH, NY 11561

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FAX: (516) 431-5008

Joseph Febrizio
DEPUTY COMMISSIONER OF PUBLIC
WORKS

November 27, 2019

Daniel T. Falt
U.S. Army Corps of Engineers New York District
Jacobs K. Javits Federal Building
26 Federal Plaza Room #17-302
New York NY 10278

Subject: Request for Information Regarding the City of Long Beach, New York's Vulnerability to Flooding

Dear Mr. Falt:

Greetings! The City of Long Beach, New York (the City) is in the process of developing a Floodplain Management Plan (FMP). The FMP will analyze the flood hazard in the City, and identify a strategy for minimizing the City's vulnerability to flooding.

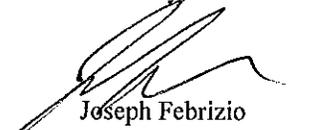
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Sincerely,



Joseph Febrizio
Acting Commissioner



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1 WEST CHESTER STREET
LONG BEACH, NY 11561

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FAX: (516) 431-5008

Joseph Febrizio
DEPUTY COMMISSIONER OF PUBLIC
WORKS

November 27, 2019

Eric Star
New York State Department of Environmental Conservation
Region 1
SUNY at Stony Brook
50 Circle Road
Stony Brook, NY, 11790

Subject: Request for Information Regarding the City of Long Beach, New York's Vulnerability to Flooding

Dear Mr. Star:

Greetings! The City of Long Beach, New York (the City) is in the process of developing a Floodplain Management Plan (FMP). The FMP will analyze the flood hazard in the City, and identify a strategy for minimizing the City's vulnerability to flooding.

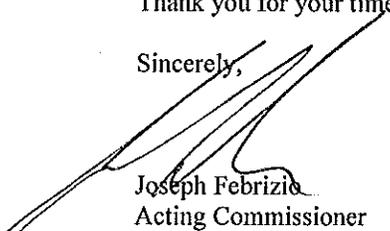
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Sincerely,


Joseph Febrizio
Acting Commissioner



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Joseph Febrizio
DEPUTY COMMISSIONER OF PUBLIC
WORKS

November 27, 2019

John Rocco
Village of Island Park
127 Long Beach Road
Island Park, NY, 11558

Subject: Request for Information Regarding the City of Long Beach, New York's Vulnerability to Flooding

Dear Mr. Rocco:

Greetings! The City of Long Beach, New York (the City) is in the process of developing a Floodplain Management Plan (FMP). The FMP will analyze the flood hazard in the City, and identify a strategy for minimizing the City's vulnerability to flooding.

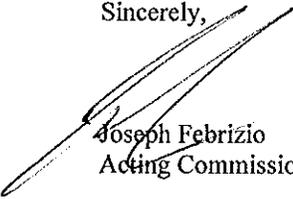
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Thank you for your time and attention.

Sincerely,


Joseph Febrizio
Acting Commissioner



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1 WEST CHESTER STREET
LONG BEACH, NY 11561

TEL: (516) 431-1011
FAX: (516) 431-5008

Joseph Febrizio
DEPUTY COMMISSIONER OF PUBLIC WORKS

November 27, 2019

John Rottkamp
Town of Hempstead
One Washington Street
2nd Floor
Hempstead, NY, 11550

Subject: Request for Information Regarding the City of Long Beach, New York's Vulnerability to Flooding

Dear Mr. Rottkamp:

Greetings! The City of Long Beach, New York (the City) is in the process of developing a Floodplain Management Plan (FMP). The FMP will analyze the flood hazard in the City, and identify a strategy for minimizing the City's vulnerability to flooding.

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Sincerely,



Joseph Febrizio
Acting Commissioner



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LONG BEACH, NY 11561

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FAX: (516) 431-5008

Joseph Febrizio
DEPUTY COMMISSIONER OF PUBLIC
WORKS

November 27, 2019

Joseph Trimarchi
Nassau County Office of Emergency Management
510 Grumman Road W.
Bethpage, NY, 11714

Subject: Request for Information Regarding the City of Long Beach, New York's Vulnerability to Flooding

Dear Mr. Trimarchi:

Greetings! The City of Long Beach, New York (the City) is in the process of developing a Floodplain Management Plan (FMP). The FMP will analyze the flood hazard in the City, and identify a strategy for minimizing the City's vulnerability to flooding.

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Joseph Febrizio
Acting Commissioner



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LONG BEACH, NY 11561

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Joseph Febrizio
DEPUTY COMMISSIONER OF PUBLIC
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November 27, 2019

Paul Hoole
Federal Emergency Management Agency
FEMA Region II
26 Federal Plaza
Suite 1307
New York, NY, 10278

Subject: Request for Information Regarding the City of Long Beach, New York's Vulnerability to Flooding

Dear Mr. Hoole:

Greetings! The City of Long Beach, New York (the City) is in the process of developing a Floodplain Management Plan (FMP). The FMP will analyze the flood hazard in the City, and identify a strategy for minimizing the City's vulnerability to flooding.

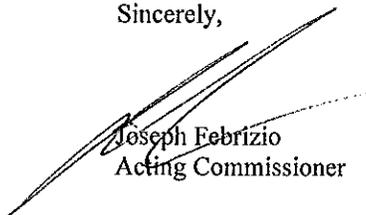
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Joseph Febrizio

DEPUTY COMMISSIONER OF PUBLIC WORKS

November 27, 2019

Ryan Porciello
New York State Department of Environmental Conservation
Region 1
SUNY at Stony Brook
50 Circle Road
Stony Brook, NY, 11790

Subject: Request for Information Regarding the City of Long Beach, New York's Vulnerability to Flooding

Dear Mr. Porciello:

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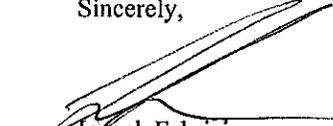
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Sincerely,



Joseph Febrizio
Acting Commissioner

**The Long Beach Chamber of Commerce
General Meeting Agenda December 16th 2019**

JR Fusion -896 West Beech Street
6.30 networking
7pm Pledge Allegiance + Mission

City Update

- ✓ Patti
- ✓ CRS Update

Chamber Update

- ✓ Light Parade Recap -
 - ✓ Board Nominations -
 - ✓ Chamber Volunteers sign up -
- CRS

Speakers

- ✓ Bernadette Martin Bobs natural foods
 - ✓ Lou Penello Execpro Enterprises
- ✓ Blake Malizia
Industry Advisory Board
Long Beach School District

Member Introductions and New member businesses this month

ExecPro Enterprises, Inc - Lou Penello
Bob's Naturel Foods - Bernadette Martin
All Island Media Inc - Pennysaver Got it Local - Renee Giordini
Sherwin Williams Paints - Jared Kaplan

Announcements - Amado Johano

Any other new members who have not had the chance to introduce themselves at other meetings?

- Gretchen Row
- Goh

Upcoming events

Nov 21 Nov 30th - Dec 26th Window Decorating Contest
Sip and Savor January February

Thank you to JR Fusion for sponsoring the evening.

Chamber meeting

GUEST SIGN IN SHEET

DATE: 12/16/19

CES Announcements

NAME

COMPANY

PHONE NO.

EMAIL ADDRESS:

Amanda Moore Wolf, Wing Interior Design 9178876765 amanda@wolfandwing.com

Bernadette Mastri 455 E Park Ave CANY 11631785227 Bernadette@foods.com

Joseph T Lee RES E Hochst LN NY 11561 CIE4328229 JTL622@optonline.net

Dele Bolton Mount Sinai South Nassau 516-944-8909 delebolton@optonline.net

Jack Zanzhoff Temple Emanu-El 918-765-7287 Rabbi Jack Zanzhoff@gmail.com

Dana Sanneman Mount Sinai South Nassau 377 5305 dana.sanneman@southnassau.org

Ellen Frisch Richer Communications 516-314-0236 efrisch@liberalarts.org

Jessica Janovsky Planet Pupils Inc. 516-974-4296 jessjan115@gmail.com

Casuy Jansen Planet Pupils Inc 516 474-0354 JansenCasuy95@aol.com

Lori Rinaldi Carch Reactors 917-440-2232 lrinaldi@carchreactors.com

LIZ NACHMAN BRANDABLE MKTS 516-729 5219 112@brandablemarketing.com

Michael Lehey Cutting Edge Science, LLC 631-291-1213 Mike@CEdgeScience.com

Johanna Matheson Artists in Partnership Inc. (561) 456-9902 aip4arts@gmail.com

Grethchen Grothwendler Emer-G HR + Coaching 917-743-0290 ggrothwendler@aol.com

Alison Laplita Run & Laps 92-679-0833 alison@plumandupper.com

MEMBER SIGN IN SHEET

DATE: 12/16/19

CPA Announcements

NAME

J. GUEST

COMPANY

PHONE NO.

EMAIL ADDRESS:

ALAN BRENNAN SERVED

(516) 536-1801

servpro9999@gmail.com

Robert Post PAP AIR

516-261-1200

RobertPost@aol.com

Blake Malicic LBSD

516-510-1955

Bmalic@aibeach.org

John Torat ENGROSTOCKS

516-820-5784

theleahkane@gmail.com

PAUL FETSCHER GREAT AMERICAN

516-889-7200

Paul@RestaurantExpert.ca

Eileen Hession New Deans

516-889-2197

Eileen104516@hotmail.com

Brian Berkeley Create the

516-432-5001

Brian@libofl.com

LENNY PETERS

HARVEST POWER

516-729-5526

lennyp@harvestpower.net

Justina Peters

Belmont Federal Credit Union

516-960-0367

cpasand@bethpage.com

Kathryn Winley Bethpage Federal Credit Union 516 960 0367 kathryn@bethpage.com

Louie Penello ExecPro Enterprises

516-600-0309

penello@execpro.com

Tom Dando Cybernet LLC

516-432-6000

tdando@cygnus.com

News In Our City

[City of Long Beach to Install Energy - Efficient Streetlights Funded by State Grants](#)

[AN IMPORTANT MESSAGE FROM THE NATIONAL WEATHER SERVICE - SNOW SQUALL WARNING](#)

Wednesday, December 18, 2019 at 4:10 PM

[2020 Resident Parking Permits On Sale Now! Extra Hours Available!](#)

[City of Long Beach Floodplain Management Meeting - December 18, 2019](#)

[A Winter Weather Message from the City of Long Beach...](#)
Monday, December 2, 2019 at 3:15 PM

[2019 Community Food Drive & Giveaway - 11/26/19](#)

[MEET WITH THE MANAGER OFFERS RESIDENTS DIRECT LINE TO THE CITY'S CHIEF EXECUTIVE OFFICER](#)

[Property Tax Exemption Deadline](#)

Wednesday, November 20, 2019 at 2:50 PM

[Office of the City Clerk Collecting Presents for Toys for Tots](#)

[An important update from the City of Long Beach...](#)

Tuesday, November 19, 2019 at 3:50 PM

["Mondays with the Manager" is now "Meet with the Manager!"](#)

Calendar of Events

[Christmas Eve](#)

Tuesday, December 24, 2019

[Menorah Lighting 2019](#)

Tuesday, December 24, 2019

[Christmas Day](#)

Wednesday, December 25, 2019

[Menorah Lighting 2019](#)

Wednesday, December 25, 2019

[City Of Long Beach Winter Blood Drive](#)

Thursday, December 26, 2019

[Menorah Lighting 2019](#)

Thursday, December 26, 2019

[Menorah Lighting 2019](#)

Friday, December 27, 2019

[Menorah Lighting 2019](#)

Saturday, December 28, 2019

[Chanukah on Ice](#)

Sunday, December 29, 2019

[Menorah Lighting 2019](#)

Sunday, December 29, 2019

Connect With Us



City of Long Beach, New York (OFFICIAL)

Like Page 23K likes



City of Long Beach, New York (OFFICIAL)



News In Our City

[City Council Work Session Scheduled](#)

[Floodplain Management Meeting - Resident Survey](#)

Monday, February 3, 2020 at 11:30 AM

[Food Drive @ City Clerk's Office](#)

[Long Beach Bridge Incident - Bridge has Reopened](#)

Friday, January 24, 2020 at 11:10 AM

[City of Long Beach Floodplain Management Program Meeting - January 29, 2020](#)

[2020 City of Long Beach High School Summer Internship Program](#)

[City Council Work Session Scheduled](#)

[Christmas Tree Recycling Information](#)

[Council Members Take Office](#)

Thursday, January 2, 2020

[City of Long Beach to Install Energy - Efficient Streetlights Funded by State Grants](#)

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Monday, December 2, 2019 at 3:15 PM

[Read All](#)

Calendar of Events

[Presidents' Day](#)

Monday, February 17, 2020

[Meet with the Manager](#)

Tuesday, February 18, 2020 at 4:30 PM

[City Council Meeting](#)

Tuesday, February 18, 2020 at 7:00 PM

[Meet with the Manager](#)

Monday, February 24, 2020 at 2:00 PM

[Zoning Board Meets](#)

Thursday, February 27, 2020 at 7:00 PM

[Meet with the Manager](#)

Monday, March 2, 2020 at 2:00 PM

[City Council Meeting](#)

Tuesday, March 3, 2020 at 7:00 PM

[8th Annual Kickin' Country Music Festival](#)

Friday, March 6, 2020

[8th Annual Kickin' Country Music Festival](#)

Saturday, March 7, 2020

[Daylight Saving Time Begins](#)

Sunday, March 8, 2020

[8th Annual Kickin' Country Music Festival](#)

Sunday, March 8, 2020

[Meet with the Manager](#)

Monday, March 9, 2020 at 2:00 PM

[Read All](#)

Connect With Us

City of Long Beach, New York (OFFICIAL)
Like Page 23K likes

Happy
PRESIDENTS DAY
February 17, 2020
City Hall and Magnolia Senior





City of Long Beach Flood Mitigation Plan Update - Citizen Survey

City of Long Beach Residents,

The City is developing a Floodplain Management Plan (FMP) for the City of Long Beach. This plan will allow us to identify and reduce the City's vulnerability to floods and allow us to implement actions to reduce the risk of floods to our residents and businesses. An FMP is a step towards addressing flooding, its effects on businesses and population, and ways to reduce future damages due to flood events.

An FMP is a living document that can be used to reduce the City's vulnerability to flooding. An FMP can form the foundation for a community's long-term strategy to reduce losses and break the cycle of disaster damage, reconstruction, and repeated damage. It can create a framework for risk-based decision making to reduce damages to lives, property, and the economy from future disasters.

This survey aims to gather feedback from local citizens about flooding in the City of Long Beach and to gather information about areas vulnerable to floods. The information you provide will help us coordinate activities to reduce risk of future injury or property damage for you and others.

This survey consists of 36 questions and will take less than 15 minutes to complete.

Thank you for your time in this effort!



City of Long Beach Flood Mitigation Plan Update - Citizen Survey

Flood Information

In this section, we are looking for your input on flood hazards that impact the City of Long Beach and its residents. Please answer the following questions to help us understand the concerns throughout the City.

1. In the past 10 years, which of the following natural hazard events have you experienced in the City of Long Beach? Check all that apply.

- | | |
|---|---|
| <input type="checkbox"/> Climate Change (sea level rise or other) | <input type="checkbox"/> Flooding - 1st floor or above |
| <input type="checkbox"/> Coastal Erosion | <input type="checkbox"/> Hurricane / Tropical Storm |
| <input type="checkbox"/> Coastal Storm (wind, storm surge) | <input type="checkbox"/> Nor'Easter |
| <input type="checkbox"/> Flooding - Street/Property | <input type="checkbox"/> Severe Weather (tornado, thunderstorm, hail) |
| <input type="checkbox"/> Flooding - Stormwater | <input type="checkbox"/> None |
| <input type="checkbox"/> Flooding - Basement | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> Other (please specify) | |

2. How concerned are you about the following natural hazards in the City of Long Beach? Please check one for each hazard.

	Not Concerned	Somewhat Concerned	Concerned	Very Concerned	Extremely Concerned
Climate Change (sea level rise or other)	<input type="checkbox"/>				
Coastal Erosion	<input type="checkbox"/>				
Coastal Storm (wind, storm surge)	<input type="checkbox"/>				
Flooding - Street/Property	<input type="checkbox"/>				
Flooding - Stormwater	<input type="checkbox"/>				
Flooding - Basement	<input type="checkbox"/>				
Flooding - 1st floor or above	<input type="checkbox"/>				
Hurricane / Tropical Storm	<input type="checkbox"/>				
Nor'Easter	<input type="checkbox"/>				
Severe Weather (tornado, thunderstorm, hail)	<input type="checkbox"/>				
None	<input type="checkbox"/>				

Other (please specify)

3. In the last 10 years, were you evacuated from your home as a result of a flood? If so, how long were you displaced? Did you go to a shelter?

8. Which of the following steps has your household taken to prepare for a local flood event? Check all that apply.

- | | |
|--|--|
| <input type="checkbox"/> Received first aid/CPR training | <input type="checkbox"/> Stored a battery-operated radio |
| <input type="checkbox"/> Made an emergency plan | <input type="checkbox"/> Stored a fire extinguisher |
| <input type="checkbox"/> Designated a meeting place | <input type="checkbox"/> Stored medical supplies (first aid kit, medications) |
| <input type="checkbox"/> Identified utility shutoffs | <input type="checkbox"/> Registered to receive emergency alerts (e.g. NY Alert or Everbridge) |
| <input type="checkbox"/> Prepared a disaster supply kit | <input type="checkbox"/> Purchased additional insurance to cover losses (e.g. flood insurance) |
| <input type="checkbox"/> Installed smoke detectors on each level of home | <input type="checkbox"/> Identified the location of the nearest emergency shelter |
| <input type="checkbox"/> Stored food and water | <input type="checkbox"/> Received emergency preparedness information from a government source |
| <input type="checkbox"/> Stored flashlights and batteries | |
| <input type="checkbox"/> Other (please specify) | |

9. In the past, has your home been damaged by a flood event? For example, the basement of your home flooded and damaged the hot water heater.

- Yes
- No
- Other (please specify)

10. If you answered "yes" to question #9, did you report the damages to your local police or fire department or to an emergency management agency?

- Yes
- No
- Other (please specify)

11. If you answered "no" to question #10, why did you not report the damages?

12. Please explain the flood damage your structure sustained and when it occurred.



City of Long Beach Flood Mitigation Plan Update - Citizen Survey

Property Protection

As defined by FEMA, mitigation is the effort to reduce loss of life and property by lessening the impact of disasters, such as floods. In order for mitigation to be effective, we need to take action now - before the next disaster - to reduce human and financial consequences later.

Effective mitigation requires that we all understand local risks, address the hard choices, and invest in long-term community well-being. Without mitigation actions, we jeopardize our safety, financial security and self-reliance.

In this section of the survey, we want to hear from you how the City of Long Beach can help protect the City and become more resilient before the next flood strikes.

13. To the best of your knowledge, is your property located in a designated floodplain? If you do not know, [click here](#) to find out.

- Yes
- No
- Unsure / Don't Know

14. If your property is in the floodplain, do you have flood insurance?

- Yes
- No

15. Did you consider the impact a flood could have on your home before you purchased/moved into the home?

- Yes
- No

**16. If you do NOT have flood insurance, what is the primary reason?
Check all that apply.**

- I don't need it
- My property has never flooded
- My property is located on high ground
- It is too expensive
- Not familiar with it/don't know about it
- Insurance company will not provide
- I believe my homeowners insurance will cover me
- Other (please specify)

17. Do you or did you have problems getting homeowners/renters insurance due to risk from flooding?

- Yes
- No

18. If you answered "Yes" to the previous question, please identify the natural hazard risk that caused you to have problems obtaining homeowners/renters insurance.

19. Was the presence of a natural hazard risk zone (e.g. flood zone) disclosed to you by a real estate agent, seller, or landlord before you purchased/moved into the home?

- Yes
- No

20. Would the disclosure of this type of information influence your decision to purchase/move into a home?

- Yes
- No

21. If your property were located in a designated high-hazard area (for example, NFIP flood zone) or had received repeated damages from a natural disaster event, would you consider any of the following options?

If your response is dependent on certain factors, such as the funding source, please indicate those factors in the following question.

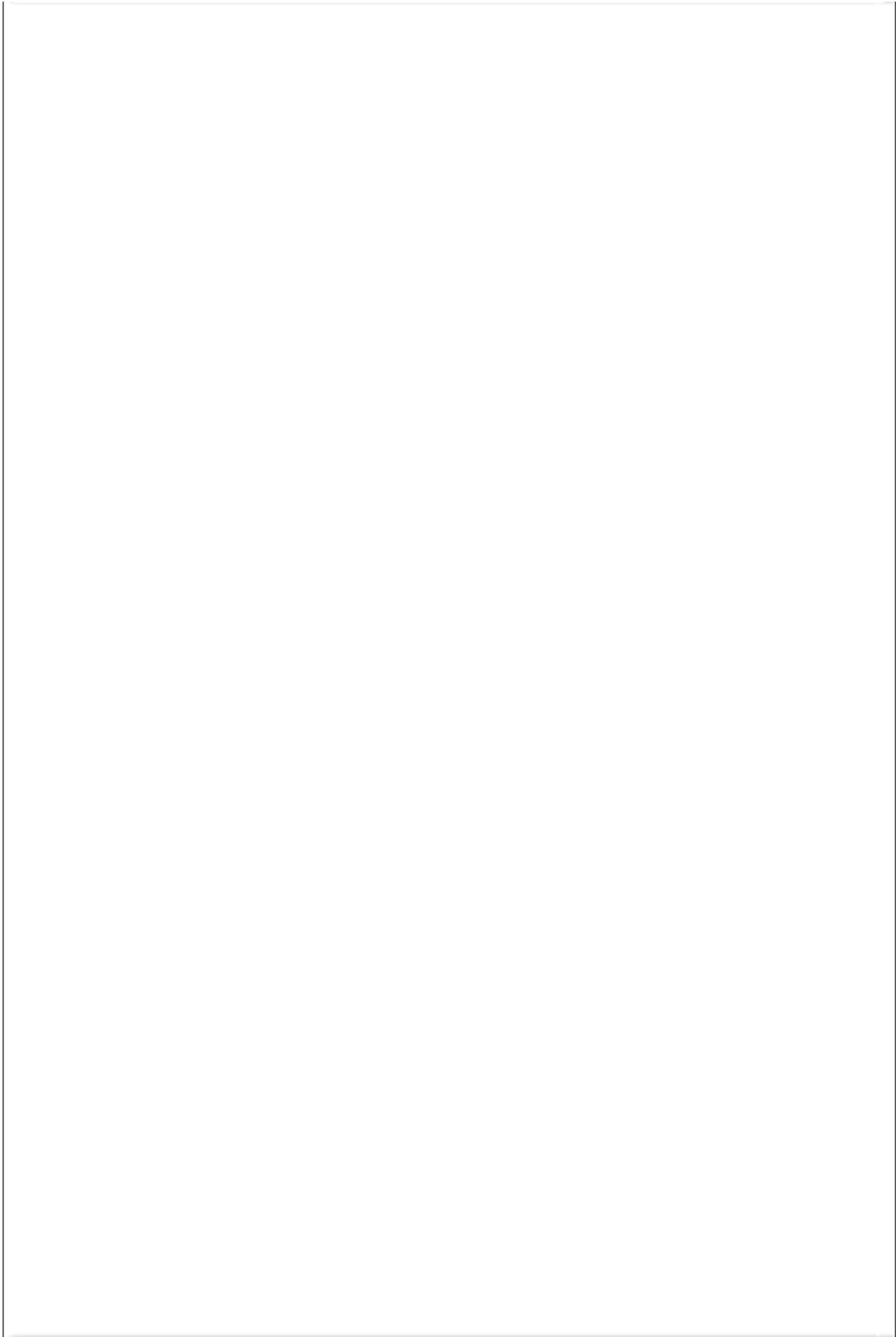
	Yes	No	Unsure
Having your property bought out	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Moving your structure to another property or a less risky part of your property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elevating your structure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Floodproofing your structure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Look into other ways to mitigate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Please select the factor(s) that would influence your decision on the options listed above (buyout/acquisition, relocation, or elevation).

- Cost Unaware of available programs
 Do not have the means to move/relocate Length of process
 Other (please specify)

23. If you have already had to spend money to mitigate your property, how much have you spent and on what measures?

24. Which (if any) incentives would motivate you to spend money on protecting your home from the possible impacts of a disaster? Such as lower interest rates, grant funding, waivers, etc.





City of Long Beach Flood Mitigation Plan Update - Citizen Survey

Hazard Mitigation

As defined by FEMA, mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. In order for mitigation to be effective, we need to take action now - before the next disaster - to reduce human and financial consequences later.

Effective mitigation requires that we all understand local risks, address the hard choices, and invest in long-term community well-being. Without mitigation actions, we jeopardize our safety, financial security and self-reliance.

In this section of the survey, we want to hear from you how the City of Long Beach can help protect the City and become more resilient before the next flood strikes.

**25. What areas in the City of Long Beach are most likely to flood?
Please list street names and other specific identifiers, if possible.**

26. What types of projects do you believe Local, County, State, or Federal Government agencies could be doing to reduce the damage and disruption of disasters in the City of Long Beach? Select your top three choices.

- Retrofit and strengthen critical facilities such as police, schools, and hospitals
- Buy out flood prone properties and maintain as open space
- Retrofit infrastructure, such as elevating roadways and improving drainage systems
- Inform property owners of ways they can mitigate damage to their properties
- Install or improve protective structures, such as floodwalls, levees and bulkheads
- Improve access to information about hazard risks and high-hazard areas
- Enhance stream maintenance programs/projects
- Assist vulnerable property owners with securing funding to mitigate their properties
- Replace inadequate or vulnerable bridges
- Create a stream gage and weather monitoring program to provide more accurate data and warnings
- Strengthen codes, ordinances and plans to require higher hazard risk management standards and/or provide greater control over development in high hazard areas
- Other (please specify)

27. Do you feel that the City of Long Beach is doing enough towards flood prevention and mitigation?

- Yes No

Please provide details for your answer.

28. Please list any additional types of projects you believe local, county, state or federal government agencies could be doing to reduce the damage and disruption in the City of Long Beach.

29. Do you have any other comments, questions, or concerns regarding flood mitigation in the City of Long Beach?



City of Long Beach Flood Mitigation Plan Update - Citizen Survey

General Household Information

The answers provided in this section will be treated as CONFIDENTIAL and will be used solely for the purpose of preparing this plan. Please note that individual answers will not be published in the plan.

30. Are you a resident of Long Beach?

- Yes
- No
- Other (please specify)

31. How long have you lived here?

- Less than 1 year
- 1 to 5 years
- 6 to 9 years
- 10 to 19 years
- 20 years or more

32. Do you own or rent your place of residence?

- Own
- Rent

33. What is your street address? (optional, will be kept confidential - only used to identify hazard areas such as flooding)

34. What is your type of residence?

- Single-family detached
- Multi-family detached
- Town Home
- Other (please specify)
- Condominium
- Apartment Complex
- Commercial

35. Is this your primary home or your second home?

Primary Home

Second Home

36. Please indicate your age range:

18 to 30

51 to 60

31 to 40

60 or over

41 to 50



City of Long Beach Flood Mitigation Plan - Business and Commerce Survey

The City is developing a Floodplain Management Plan (FMP) for the City of Long Beach. This plan will allow us to identify and reduce the City's vulnerability to floods and allow us to implement actions to reduce the risk of floods to our residents and businesses. An FMP is a step towards addressing flooding, its effects on businesses and population, and ways to reduce future damages due to flood events.

An FMP is a living document that can be used to reduce the City's vulnerability to flooding. An FMP can form the foundation for a community's long-term strategy to reduce losses and break the cycle of flood-related damage, reconstruction, and repeated damage. It can create a framework for risk-based decision making to reduce damages to lives, property, and the economy from future flooding events.

The following survey is designed to help identify general needs for flood mitigation within the City pertaining to your organization or industry, and identify projects that may be helpful to address those needs.

This survey consists of 18 questions and will take approximately 15 minutes to complete.

Thank you for your time in this effort!



City of Long Beach Flood Mitigation Plan - Business and Commerce Survey

Please answer the following questions about flooding and how they affect businesses in the City of Long Beach. Please provide as much information as possible. Where possible, identify specific areas (locations, facilities, programs, etc.) that need to be improved in the City and provide suggestions for improvements. Please note that individual answers will not be published.

If there are other important issues that you feel are not covered by this survey, please let us know.

1. Has your business been impacted by a flood (damaged, closed for extended periods, etc.)?

Yes

No

2. If you answered "YES," please identify the events and provide a brief description of the damages or loss of service.

3. Do you believe that your facility is disaster resistant or capable of withstanding a flood (e.g. properly located outside of the floodplain, constructed to be elevated above the base flood elevation)?

Yes

No

Don't Know

Please explain

4. Do you think that the transportation infrastructure (e.g. roads and bridges) are properly designed to withstand closures and/or damage due to flooding, and thus provides long term support for your community's response and recovery needs?

- Yes
- No
- Don't Know

Please explain

5. Do you think that the utility infrastructure (specifically electricity and communications) is sufficiently flood-resistant to support your business's ability to maintain operations and support response or recovery efforts?

- Yes
- No
- Don't Know

Please explain

6. Do you believe that flood risk (e.g. flood zones) are considered when local authorities consider land development and land use planning?

- Yes
- No
- Don't Know

Please explain

7. Do you believe that business organizations/associations, chambers of commerce, etc., are a valuable resource in helping business owners protect themselves pre-disaster, and/or help in recovery post disaster?

- Yes
- No
- Don't Know

Please explain

8. Do you believe that businesses are aware and take appropriate advantage of flood insurance resources and programs to help protect them from losses, as well as to support recovery from floods?

- Yes
- No
- Don't Know

Please explain

9. Do you believe that emergency planning, services, and equipment are adequate to manage and respond properly to flooding events that may impact your business or commercial interests?

- Yes
- No
- Don't Know

Please explain



City of Long Beach Flood Mitigation Plan - Business and Commerce Survey

10. Do you think the local government understands, supports, and possess the resources for flood risk reduction efforts in the community?

- Yes
- No
- Don't Know

Please explain

11. Does your business have a business continuity plan?

- Yes
- No
- Don't Know
- Other (please specify)

12. Can you identify projects or programs that you have implemented to reduce your business's vulnerability to damages and losses, including loss of operation/service, to flooding events?

13. Can you identify projects or programs that you would like or plan to implement to reduce your business's vulnerability to damages and losses, including loss of operation/service, to flooding events?

14. Do you have any other comments, questions, or concerns?



City of Long Beach Flood Mitigation Plan - Business and Commerce Survey

15. Name of Business

16. Type of Business

17. Where is your business located?

18. Name of Respondent

19. Contact information (email address or phone number) optional



City of Long Beach Flood Mitigation Plan - Emergency Services Survey

The City is developing a Floodplain Management Plan (FMP) for the City of Long Beach. This plan will allow us to identify and reduce the City's vulnerability to floods and allow us to implement actions to reduce the risk of floods to our residents and businesses. An FMP is a step towards addressing flooding, its effects on businesses and population, and ways to reduce future damages due to flood events.

An FMP is a living document that can be used to reduce the City's vulnerability to flooding. An FMP can form the foundation for a community's long-term strategy to reduce losses and break the cycle of flood-related damage, reconstruction, and repeated damage. It can create a framework for risk-based decision making to reduce damages to lives, property, and the economy from future flooding events.

The following survey is designed to help identify general needs for flood mitigation within the City pertaining to your organization or industry, and identify projects that may be helpful to address those needs.

This survey consists of 19 questions and will take approximately 15 minutes to complete.

Thank you for your time in this effort!



City of Long Beach Flood Mitigation Plan - Emergency Services Survey

Please answer the following questions about flood events and how they affect emergency services (police, fire, and EMS) in the City of Long Beach. Please provide as much information as possible. Where possible, identify specific areas (locations, facilities, programs, etc.) that need to be improved in the City and provide suggestions for improvements. Please note that individual answers will not be published.

If there are other important issues that you feel are not covered by this survey, please let us know.

1. Type of services your department provides:

- Police
- Fire
- EMS
- Other (please specify)

2. Please identify the location of your facility(ies) and/or primary service area.

3. Has your department been impacted by natural hazard events (damaged, closed for extended periods, etc.)?

- Yes
- No

If you answered "YES", please identify the events and provide a brief description of the damages or loss of service

4. Do you think that critical and essential facilities (incl. fire departments, police stations, EMS, hospitals and medical centers) are disaster-resistant (e.g. properly located and constructed, mitigated against flood damage)?

- Yes
- No
- I don't know

Please explain

5. Do you think that the transportation infrastructure serving your facilities (e.g. roads and bridges) are properly designed to withstand closures and/or damage due to flooding?

- Yes
- No
- I don't know

Please explain



City of Long Beach Flood Mitigation Plan - Emergency Services Survey

6. Do you think that the utility infrastructure in the City (specifically electricity and communications) is sufficiently flood-resistant to support emergency services (police, fire, and EMS) after flooding events?

- Yes
- No
- I don't know

Please explain

7. Do you think that local public education and outreach programs are effective at informing residents on how to prepare for and reduce their risk to flooding and other natural hazards, so as not to increase the need for emergency services during events?

- Yes
- No
- I don't know

Please explain

8. Do you think that road closure and pending road closure announcements are sufficiently accurate and available to support your department's functions during flooding events?

- Yes
- No
- I don't know

Please explain

9. Do you think that the public knows about, understands, and/or takes advantage of the City's emergency warning and notification systems (reverse 911, NY-Alert, audible alerts, call and text services)?

- Yes
- No
- I don't know

Please explain

10. Do you think that your department/district works to inform your constituents of how they can better manage their risk to flooding?

- Yes
- No
- I don't know

Please explain

11. Do you feel that your department's emergency response planning, services, and equipment are adequate to manage and respond properly to flooding in your community?

- Yes
- No
- I don't know

Please explain

12. Do you think that local government understands, supports, and possess the resources for flood risk reduction efforts in the community?

- Yes
- No
- I don't know

Please explain

13. Is your organization covered by a Continuity of Operations (COOP) plan? COOP plans examine an organization's ability to perform minimum essential functions during any situation, and support the continuance of your organization's functions.

- Yes
- No
- I don't know

If "Yes", please explain.



City of Long Beach Flood Mitigation Plan - Emergency Services Survey

14. Can you identify projects or programs that you have implemented to reduce your department's vulnerability to damages and losses, including loss of operation/service, to flood events?

15. Can you identify projects or programs that will reduce your department's vulnerability to damages and losses, including loss of operation/service, to hazard events?

16. Do you have any other comments, questions, or concerns?

17. Name of your department, district, or agency:

18. Name of respondent:

19. Contact information (email address or phone number) - optional:

City Council

Anthony Eramo, *President*
Chumi R. Diamond, *Vice President*
John Bendo
Scott J. Mandel
Anissa D. Moore



Acting City Manager

Michael Tangney

City of Long Beach Official Community Update

Winter 2018/2019

"The City by the Sea"

www.longbeachny.gov

FLOOD AWARENESS BULLETIN

Dear Neighbors,

In 2009, the Federal Emergency Management Association (FEMA) issued new preliminary floodplain maps to the City of Long Beach that reflect the current flood risks to homeowners. These Flood Insurance Rate Maps (FIRMs) represent flood zone boundaries of a community, and, because we are a barrier island, virtually all of Long Beach is considered a Special Flood Hazard Area (SFHA).



Anthony Eramo
City Council President

FEMA set up the Community Rating System (CRS), a point system that helps to reduce flood insurance premiums and rewards communities that undertake floodplain activities beyond the requirements of the National Flood Insurance Program (NFIP). Because of the innovative measures taken by City leadership, such as significant investment in capital infrastructure, the planting of new trees, the construction of comprehensive flood defenses along both the ocean and bay, along with significant flood and disaster preparedness outreach programs to residents, **Long Beach is rated as a Class 7 community, resulting in a 15% premium discount automatically applied to eligible flood insurance premiums within the City of Long Beach.**

This newsletter provides information that can protect your home and your family in the event of a flood. We kindly ask that you read through the material. It provides tips on emergency planning, flood proofing, and other safety measures you can take now so that you are prepared in advance of a flood event.

Sincerely,

Anthony Eramo
President, Long Beach City Council



The Army Corps project improves beachfront flood protection

SPECIAL TIPS FOR THOSE LIVING IN THE SPECIAL FLOOD HAZARD AREA

1. Sign up for the City of Long Beach Community Notification Program. The Long Beach Community Notification Program, powered by Everbridge, transmits a message to every home and business within a targeted area to warn of an impending storm, flood, evacuation, or other emergency situation. Call 431-1000 x 7217 and leave your name, street address, and telephone number. A staff person will return your call to confirm your information. In addition, you can sign up on our Official website at www.longbeachny.gov/lbready. We also encourage you to download the "Long Beach Response" mobile app, the fastest way to find information about Long Beach, interact with City Government, or just locate the nearest restaurant or shop; available for both iOS and Android.

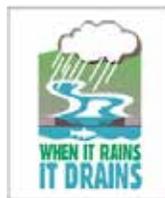
2. If you do not have flood insurance, talk to your insurance agent. Your regular homeowner's insurance policy doesn't cover damage from floods. However, because the City of Long Beach participates in the National Flood Insurance Program, you can purchase a separate flood insurance policy. This insurance is backed by the Federal Government and is available to everyone. If you have a mortgage, you must have this insurance. For map information contact the Building Department at 431-1005.

3. Flood protection assistance is available from the Building Department. They can help you with permit requirements, map determinations, lowest level requirements, site visits, and plan reviews in order for you to decrease the potential flood damage to your property. Additionally, flyers on retrofitting and how to reduce wind and flood damage are available at the Building Department.

4. The Long Beach Public Library has FEMA publications at the reference desk.

DRAINAGE SYSTEM MANAGEMENT

The drainage system is maintained by the City of Long Beach Sewer Maintenance Department. If your property is located near a storm drain, make sure that it is not clogged with leaves and other debris as streets cannot drain properly when drains are clogged. It is important that you report any kind of dumping or other conditions which are interfering with the proper functioning of this system. Report all incidents to the LBPD, Department of Public Works and the Building Department. Violators will be subject to fines.



STORM TIPS

1. Visit www.longbeachny.gov/lbready for preparedness information and to sign up for the City of Long Beach Community Notification Program
2. Establish a personal emergency plan. Make sure all members of your household are familiar with it, including your children. With the exception of guide dogs and other certified companion animals, Red Cross shelters will not allow pets. Call the American Red Cross at (516) 747-3500 or visit www.redcross.org to learn about the PetSafe Program. Monitor flooding patterns in your neighborhood in order to plan the best evacuation route.
3. Be ready to evacuate at least 18 hours before the storm is expected to hit. Pre-storm tides and flooding can cut off routes of escape.
4. Make sure your vehicle has a full tank of gas.
5. Prepare an emergency supply kit; this should include an adequate supply of water since local water systems may be damaged. Have a supply of non-perishable foods such as canned meat or fish, crackers, cheese, peanut butter, special diet foods, juice, a manual can opener, battery operated radio, flashlights, and a fresh supply of batteries.
6. Prepare a first aid kit which includes a 1-2 week supply of your prescription medication.
7. Prepare your property. If you have to evacuate, cut off all electrical circuits at the main. Shut off the water service and gas valves at each appliance. If possible, move appliances and furniture to a higher level. Secure outdoor furniture and structures so that they don't become deadly missiles in hurricane winds. Secure boats and floats with additional lines. Lock the doors to your home or business.
8. Evaluate what important papers you should take with you such as medical records, ID, etc. If you have been evacuated, you may need ID in order to return to your property.
9. Businesses must also establish a plan and fully train their employees. Those with special conditions or hazards must be fully advised of potential problems so that we can safeguard lives, protect businesses, and protect the community at large. Evaluate your plan yearly and update accordingly.
10. After the storm has past, many dangers may be left behind. The most important thing is to be alert and follow any instructions that are given to you by emergency personnel.
11. Since drowning is the number one cause of deaths during a flood, you should be very careful walking through flooded areas. Six inches of flowing water can knock you off your feet. If you are in standing water, use a stick to help you keep your footing. Also, keep an axe in your attic in the event rising waters force you to need escape onto your roof. Additionally, the danger of electrocution by downed wires is always present.
12. Do not drive through flooded areas. More people drown in their cars than anywhere else. Don't drive around barriers; they are there for a reason. It might look safe but it wouldn't be there unless some hazard is present.
13. Stay away from power lines and electrical wires. The number two flood killer after drownings is electrocution. Electrical currents can travel through water. Report any downed wires to the power authority.
14. Look before you step. After a flood, the ground and floor are covered with debris including broken glass, nails, etc. Use caution. Muddy floors and stairs can be slippery.
15. Be alert for gas leaks. Don't smoke or use candles, lanterns or open flame, especially in areas which have not been well ventilated.
16. If your building or home has been declared unsafe or if you have been advised not to enter it for any reason you must comply.
17. Most people who live in flood prone areas are aware of the threat of flooding since it often occurs during some moon tides. If you live in the flood zone but have never experienced flooding, don't feel that these warnings are not for you. Computer predictions have shown that the storm surge during a major storm could bring the floodwater above Sunrise Highway. We can save lives and properties by being prepared. Even if your property doesn't flood you still might have to evacuate if public services such as water, electric, gas etc. cannot be provided. 

PROPERTY PROTECTION METHODS

1. Most houses can be raised so that the lowest floor is above the flood protection level. The building department can show you examples of homes (large and small) which have been raised.
2. Install floodwalls which are properly designed to resist water pressure and are of sufficient height. This application works best where floodwaters do not exceed 3 feet.
3. Dry floodproofing means sealing a building to keep floodwaters out. Walls are coated, openings (e.g., windows, doors) are closed permanently or they are temporarily sealed with a removable shield or sandbags.
4. Wet floodproofing means modifying a building so that the floodwaters will cause only minimum damage to the building and contents. Building materials below base flood level are removed and are replaced to allow floodwaters into the building to counter the pressure on the outside walls.
5. Make sure that the professional you hire to do your retrofitting project has demonstrated an expertise in this type of work. Building permits must be obtained prior to all work. Be further advised the National Flood Insurance Program (NFIP) requires that if the cost of reconstruction, rehabilitation, addition or other improvements to a building equals or exceeds 50% of the building's market value, then the building must meet the same construction requirements as a new building. Substantially damaged buildings must also be brought up to the same standards (e.g., a residence damaged so that the cost of repairs equals or exceeds 50% of the building's value before it was damaged, must be elevated above the base flood elevation). 

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January 2020

S	M	T	W	Th	F	S
29	City of Long Beach Floodplain Management Program Meeting Wednesday, January 8, 2020 at 3:00 PM					4
5		★	★			11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
	★ ★	★		★		
26	27	28	29	30	31	1
						★

[< December](#)[February >](#)[See All Items](#)

Official Website of Long Beach, New



News In Our City

[Christmas Tree Recycling Information](#)

[City of Long Beach Floodplain Management Program Meeting - January 8, 2019](#)

[Council Members Take Office](#)

Thursday, January 2, 2020

[City of Long Beach to Install Energy - Efficient Streetlights Funded by State Grants](#)

[AN IMPORTANT MESSAGE FROM THE NATIONAL WEATHER SERVICE - SNOW SQUALL WARNING](#)

Wednesday, December 18, 2019 at 4:10 PM

[2020 Resident Parking Permits On Sale Now! Extra Hours Available!](#)

[City of Long Beach Floodplain Management Meeting - December 18, 2019](#)

[A Winter Weather Message from the City of Long Beach...](#)

Monday, December 2, 2019 at 3:15 PM

[2019 Community Food Drive & Giveaway - 11/26/19](#)

[MEET WITH THE MANAGER OFFERS RESIDENTS DIRECT LINE TO THE CITY'S CHIEF EXECUTIVE OFFICER](#)

[Property Tax Exemption Deadline](#)

Wednesday, November 20, 2019 at 2:50 PM

[Office of the City Clerk Collecting Presents for Toys for Tots](#)

[An important update from the City of Long Beach...](#)

Tuesday, November 19, 2019 at 3:50 PM

["Mondays with the Manager" is now "Meet with the Manager!"](#)

[Read All](#)

Calendar of Events

[City Council Meeting](#)

Tuesday, January 7, 2020 at 7:00 PM

[MLK Day Closings](#)

Monday, January 20, 2020

[Martin Luther King Jr Commemorative March](#)

Monday, January 20, 2020 at 11:30 AM

[City Council Meeting](#)

Tuesday, January 21, 2020 at 7:00 PM

[Zoning Board Meets](#)

Thursday, January 23, 2020 at 7:00 PM

[Snowflake 4-Mile Race](#)

Saturday, February 1, 2020 at 6:30 AM

[Polar Bear Splash](#)

Sunday, February 2, 2020 at 10:00 AM

[City Council Meeting](#)

Tuesday, February 4, 2020 at 7:00 PM

[Lincoln's Birthday](#)

Wednesday, February 12, 2020

[Presidents' Day](#)

Monday, February 17, 2020

[City Council Meeting](#)

Tuesday, February 18, 2020 at 7:00 PM

[Zoning Board Meets](#)

Thursday, February 27, 2020 at 7:00 PM

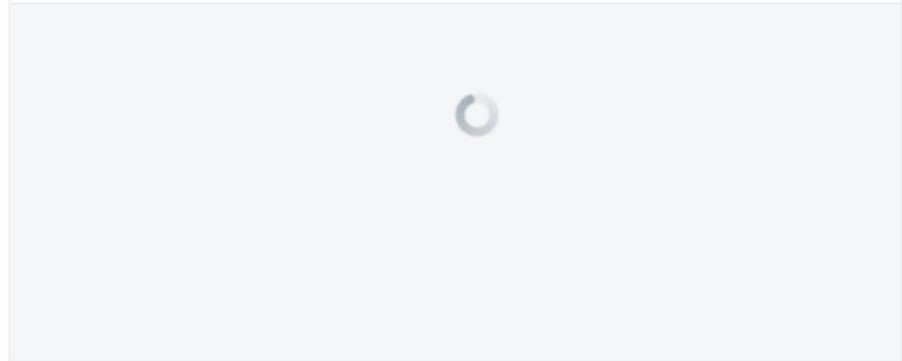
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Floodplain Management Meeting

Wednesday, January 29, 2020 at 3:00 PM

The City of Long Beach is currently developing a Floodplain Management Plan (FMP). The FMP documents the City's vulnerability to the flood hazard, and the City's strategy to reduce that vulnerability.

There will be a meeting of the FMP Planning Committee to discuss actions to include in the plan to reduce our vulnerability to flooding. The meeting will be held on January 29, 2020, from 3:00 to 5:00 p.m., at the Long Beach City Hall, 1 West Chester Street, Long Beach, NY, on the 6th floor. The meeting is open to the public, and all interested residents, businesses, and other stakeholders are invited to attend.

For more information on the Community Rating System, please visit <http://www.longbeachny.gov/crs>



LONG BEACH *New York*

THE CITY BY THE SEA

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- [Public Notices](#)
- [Services ▼](#)

January 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
	Meet with the Manager		Floodplain Management Meeting Wednesday, January 29, 2020 at 3:00 PM	Zoning Board Meets		
			Floodplain Management Meeting	First Time Homeowner Workshop		Snowflake 4-Mile Race

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LONG BEACH *New York*

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City of LB Floodplain Management Meeting - February 19, 2020

The City of Long Beach is in the final stages of developing its Floodplain Management Plan (FMP). The FMP documents the City's vulnerability to the flood hazard, and the City's strategy to reduce that vulnerability. There will be a public meeting to discuss the FMP on February 19, 2020 from 7:00-8:30 p.m. The meeting will be held at Long Beach City Hall, 1 West Chester Street, Long Beach, NY. All interested residents, businesses, and other stakeholders are invited to attend.

To get as much public input into the plan as possible, we would appreciate you taking the time to fill out a short survey about our community and the flood risk we face. Please visit the survey here: <https://www.surveymonkey.com/r/LongBeachCitizen>. Thank you for your participation in this planning effort!

For more information on flooding and emergency preparedness in Long Beach please visit <https://www.longbeachny.gov/flood>

Official Website of Long Beach, New York © 2019

1 West Chester Street, Long Beach, NY 11561 (516) 431-1000

Office Hours: 9:00am to 5:00pm

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City of Long Beach, New York Floodplain Management Plan Annual Progress Report

Reporting Period: *(Insert reporting period)*

Background: The City of Long Beach developed a floodplain management plan (FMP) to reduce risk from flooding by identifying resources, information, and strategies for risk reduction. To prepare the plan, the City of Long Beach organized resources, assessed risks from flooding, developed planning goals and objectives, reviewed mitigation alternatives, and developed an action plan to address probable impacts from floods. The plan can be viewed on-line at:

[Insert website]

Summary Overview of the Plan’s Progress: The performance period for the FMP became effective on *[]*, 2020, with the final approval of the plan by City Council. The initial performance period for this plan will be 5 years, with an anticipated update to the plan to occur before *[]*, 2025. As of this reporting period, the performance period for this plan is considered to be *[]*% complete. The FMP has targeted *[]* flood hazard mitigation initiatives to be pursued during the 5-year performance period. As of the reporting period, the following overall progress can be reported:

- []* out of *[]* initiatives (*[]*%) reported ongoing action toward completion.
- []* out of *[]* initiatives (*[]*%) were reported as being complete.
- []* out of *[]* initiatives (*[]*%) reported no action taken.

Purpose: The purpose of this report is to provide an annual update on the implementation of the action plan identified in the City of Long Beach FMP. The objective is to ensure that there is a continuing and responsive planning process that will keep the FMP dynamic and responsive to the needs and capabilities of the City of Long Beach and stakeholders. This report discusses the following:

- Flood events that have occurred within the last year
- Changes in risk exposure within the planning area
- Mitigation success stories
- Review of the action plan
- Changes in capabilities that could impact plan implementation
- Recommendations for changes/enhancement.

The FMP Planning Committee: The Planning Committee, made up of stakeholders within the city, reviewed and approved this progress report at its meeting held on *[]*, 202*[]*. It was determined through the plan’s development process that the Planning Committee would remain in service to oversee maintenance of the plan. At a minimum, the Planning Committee will provide technical review and oversight on the development of the annual progress report. It is anticipated that there will be turnover in the membership annually, which will be documented in the progress reports. For this reporting period, Planning Committee membership is as indicated in Table 1.

Table 1. Planning Committee Members

Name	Organization	Alternate
<i>City of Long Beach Government Representatives</i>		





Name	Organization	Alternate
<i>Non-Voting City of Long Beach Government Representatives</i>		
<i>Non-Government Representatives</i>		

Flood Events within the city: During the reporting period, there were [redacted] flood events in the city that had a measurable impact on people or property. A summary of these events is as follows:

- [redacted]
- [redacted]

Changes in Risk Exposure in the Planning Area: *(Insert brief overview of any flood event in the city that changed the probability of occurrence of flooding as presented in the FMP)*

Mitigation Success Stories: *(Insert brief overview of mitigation accomplishments during the reporting period)*

Review of the Action Plan: Table 2 reviews the action plan, reporting the status of each initiative. Reviewers of this report should refer to the FMP for more detailed descriptions of each initiative and the prioritization process.

Address the following in the “status” column of the following table:

Was any element of the initiative carried out during the reporting period?

If no action was completed, why?

Is the timeline for implementation for the initiative still appropriate?

If the initiative was completed, does it need to be changed or removed from the action plan?





DATE

Item No.
Resolution No.

The following Resolution was moved by
and seconded by :

Resolution Adopting the City of Long Beach Floodplain Management Plan (FMP).

WHEREAS, the City of Long Beach participates in the National Flood Insurance Program and the Community Rating System (CRS); and

WHEREAS, the City of Long Beach qualifies for a Class 7 rating, which provides a 15% reduction in flood insurance premiums, but is unable to maintain it without developing a Floodplain Management Plan; and

WHEREAS, the Floodplain Management Plan is intended to reduce private and public property damages due to future floods; and

WHEREAS, a Planning Committee to develop the Floodplain Management Plan was authorized by Resolution Number 72/19 on September 3, 2019; and

WHEREAS, the public and City Council has had an opportunity to review the Floodplain Management Plan, and finds that it is in the best interest of the City of Long Beach to adopt the Floodplain Management Plan;

NOW, THEREFORE, be it

RESOLVED, by the City Council of the City of Long Beach, New York that the 2020 City of Long Beach, New York Floodplain Management Plan is hereby adopted as the official Floodplain Management Plan of the City of Long Beach; and be it further

RESOLVED, that the Floodplain Management Plan Planning Committee shall continue to exist on an ongoing basis to maintain and update the Floodplain Management Plan as appropriate; and be it further

RESOLVED, that the respective officials and agencies identified in the implementation plan of the 2020 City of Long Beach Floodplain Management Plan are hereby directed to implement the recommended actions assigned to them, subject to resource availability.



APPROVED:

Commissioner of Public Works

APPROVED AS TO ADMINISTRATION:

Acting City Manager

APPROVED AS TO FUNDS:

City Comptroller

APPROVED AS TO FORM & LEGALITY:

Assistant Corporation Counsel

VOTING:

Council Member Delury –

Council Member Mandel –

Council Member Treston –

Vice President McInnis –

President Bendo –

DRAFT

510 FLOODPLAIN MANAGEMENT PLANNING**512.a Floodplain Management Planning (FMP)**

Credit Points: Enter the section or page number in the plan where each credited item can be found. Add notes on AW-510-4.

CRS Step	Section/Page	Item Score	Step Total
1. Organize to prepare the plan. (15 Max)	Table 3-1 on page 3-1 and text immediately following it on page 3-2	4	
a. Involvement of Office Responsible for Community Planning (4)	Table 3-1 and Table 3-2 on pages 3-1 and 3-2	9	
b. Planning committee of department staff (9)	Section 3.1 on page 3-1; Appendix C	2	15
c. Process formally created by the community's governing board (2)			
2. Involve the public. (120 Max)	Sections 3.1 and 3.2, pages 3-1 through 3-3	60	
a. Planning process conducted through a planning committee (60)	Section 3.2, page 3-2; Appendix D	15	
b. Public meetings held at the beginning of the planning process (15)	Section 3.2, page 3-2; Appendix D	15	
c. Public meeting held on draft plan (15)	Section 3.2, page 3-2; Appendix E	20	110
d. Other public information activities to encourage input (Up to 30)			
3. Coordinate with other agencies. (35 Max)	Section 3.3, pages 3-3 and 3-4; existing studies and plans listed in Appendix A are cited throughout the FMP	5	
a. Review of existing studies and plans (required) (5)	Section 3.3, pages 3-3 and 3-4; Appendix E	7	12
b. Coordinating with communities and other agencies (Up to 30)			
4. Assess the hazard. (Max 35)	Section 5.2, pages 5-28 through 5-67	5	
a. Plan includes an assessment of the flood hazard (REQUIRED) with:	Section 5.1, pages 5-1 through 5-35	5	
(1) A map of known flood hazards (5)	Section 5.1, pages 5-35 through 5-49	5	
(2) A description of known flood hazard (5)	LiMWA shown in map on page 5-2	2	
(3) A discussion of past floods (5)	Section 5.2, pages 5-56 through 5-66	5	
b. Plan includes assessment of less frequent floods (10)			22
c. Plan includes assessment of areas likely to flood (5)			
d. The plan describes other natural hazards (REQUIRED FOR DMA) (5)			

CRS Step	Section/Page	Score	Total
5. Assess the problem. (Max 52)			
a. Summary of each hazard identified in the hazard assessment and their community impact (REQUIRED) (2)	Section 5.2, pages 5-56 through 5-85	2	
b. Description of the impact of the hazards on: (Max 25)			
(1) Life, safety, health, procedures for warning and evacuation (5)	Section 5.2, pages 5-68 through 5-70	5	
(2) Public health including health hazards to floodwaters/mold (5)	Section 5.2, pages 5-68 through 5-70	5	
(3) Critical facilities and infrastructure (5)	Section 5.2, page 5-83	5	
(4) The community's economy and tax base (5)	Section 5.2, pages 5-83 through 5-85	5	
(5) Number and type of affected buildings (5)	Section 5.2, pages 5-71 through 5-81	5	
**c. Category C - Review of all damaged buildings/flood insurance claims (5)	Section 5.2, pages 5-81 and 5-82. Data not available due to FEMA system migration.	5	
d. Areas that provide natural floodplain functions (5)	Section 5.2, page 5-68; Section 5.1, pages 5-13 to 5-14	5	
e. Development/redevelopment/Population Trends (7)	Section 5.1, page 5-54 to 5-55; Section 5.2, page 5-85	7	
f. Impact of future flooding conditions outlined in Step 4, item c (8)	Future condition - Sea Level Rise: Section 5.2, pages 5-63 to 5-66, pages 5-68 through 5-85	5	49
** RL Category: (Insert A, B or C)			
6. Set goals. (required) (2)	Section 6.3, pages 6-3 to 6-4.	2	2
7. Review possible activities. (Max 35)			
a. Preventive activities (5)	Section 3.6, page 3-5; Section 6.5, page 6-35; Appendix D	5	
b. Floodplain Management Regulatory/current & future conditions (5)	Section 3.6, page 3-5; Section 6.5, page 6-35; Appendix D	5	
c. Property protection activities (5)	Section 3.6, page 3-5; Section 6.5, page 6-35; Appendix D	5	
d. Natural resource protection activities (5)	Section 3.6, page 3-5; Section 6.5, page 6-35; Appendix D	5	
e. Emergency services activities (5)	Section 3.6, page 3-5; Section 6.5, page 6-35; Appendix D	5	
f. Structural projects (5)	Section 3.6, page 3-5; Section 6.5, page 6-35; Appendix D	5	
g. Public information activities (5)	Section 3.6, page 3-5; Section 6.5, page 6-35; Appendix D	5	35

CRS Step

Section/Page Score Total

- 8. Draft an action plan. (Max 60)
 - a. Actions must be prioritized (required)
 - 1. Recommendations for activities from two of the six categories (10)
 - 2. Recommendations for activities from three of the six categories (20)
 - 3. Recommendations for activities from four of the six categories (30)
 - 4. Recommendations for activities from five of the six categories (45)
 - b. Post-disaster mitigation policies and procedures (10)
 - c. Action items for mitigation of other hazards (5)

Section 6.5, pages 6-36 through 6-42	45	
		45

- 9. Adopt the plan. (2)

To be done after ISO review. Will be documented in Section 3.8, page 3-6 and Appendix G.	2	2
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- 10. Implement, evaluate and revise.(Max 26)
 - a. Procedures to monitor and recommend revisions (required) (2)
 - b. Same planning committee or successor committee that qualifies
 - under Section 511.a.2 (a) does the evaluation (24)

Section 7.1.2, page 7-2	2	
Planning Committee meets quarterly: Section 7.1.1, page 7-1	24	26

FMP= 318

Notes/Comments: Note if step 5c is missed, or if score is capped at 50 points, reference FEMA approval