

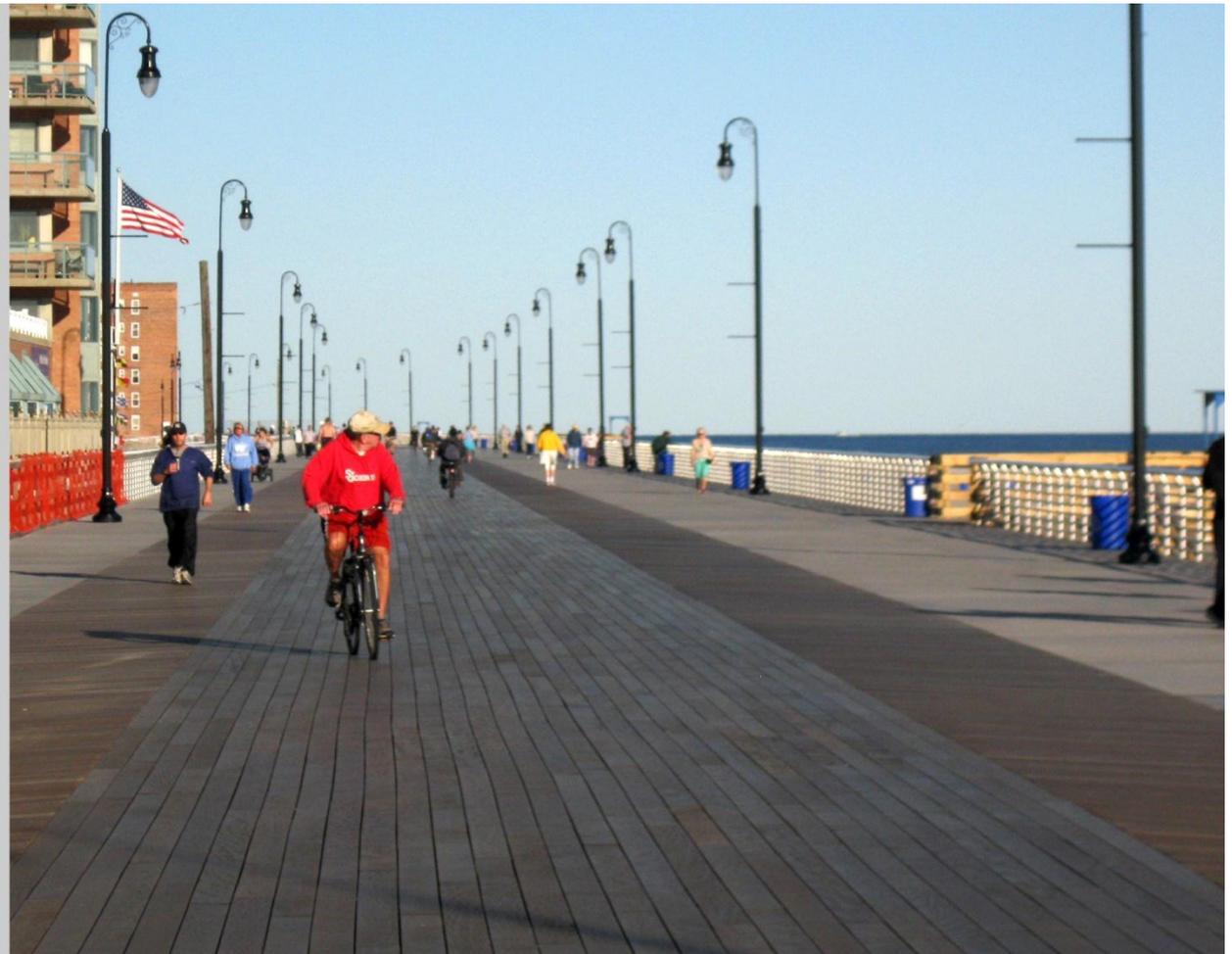
Long Beach

NY Rising Community Reconstruction Plan



NY Rising Community Reconstruction Program

March 2014



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The document was prepared by the following consulting firms:

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Two Twelve

Cover photographs of the Boardwalk with damage from Superstorm Sandy (left – from the NYRCR Long Beach Planning Committee) and the rebuilt Boardwalk (right – from Sustainable Long Island).

Foreword

Introduction

In the span of approximately one year, beginning in August 2011, the State of New York experienced three extreme weather events. Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy wreaked havoc on the lives of New Yorkers and their communities. These tragic disasters signaled that New Yorkers are living in a new reality defined by rising sea levels and extreme weather events that will occur with increased frequency and power. They also signaled that we need to rebuild our communities in a way that will mitigate against future risks and build increased resilience.

To meet these pressing needs, Governor Andrew M. Cuomo led the charge to develop an innovative, community-driven planning program on a scale unprecedented and with resources unparalleled. The NY Rising Community Reconstruction (NYRCR) Program empowers the State's most impacted communities with the technical expertise needed to develop thorough and implementable reconstruction plans to build physically, socially, and economically resilient and sustainable communities.

Program Overview

The NYRCR Program, announced by Governor Cuomo in April of 2013, is a more than \$650 million planning and implementation process established to provide rebuilding and resiliency assistance to communities severely damaged by Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy. Drawing on lessons learned from past recovery efforts, the NYRCR Program is a unique combination of bottom-up community participation and State-provided technical expertise. This powerful combination recognizes not only that community members are best positioned to assess the needs and opportunities of the places where they live and work, but also that decisions are best made when they are grounded in rigorous analysis and informed by the latest innovative solutions.

One hundred and two storm-affected localities across the State were originally designated to participate in the NYRCR Program. The State has allocated each locality between \$3 million and \$25 million to implement eligible projects identified in the NYRCR Plan. The funding for these projects is provided through the U.S. Department of Housing and Urban Development

(HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program.¹

Forty-five NYRCR Communities, each comprising one or more of the 102 localities, were created and led by a NYRCR Planning Committee composed of local residents, business owners, and civic leaders. Members of the Planning Committees were identified in consultation with established local leaders, community organizations, and in some cases municipalities. The NYRCR Program sets a new standard for community participation in recovery and resiliency planning, with community members leading the planning process. Across the State, more than 500 New Yorkers represent their communities by serving on Planning Committees. More than 400 Planning Committee Meetings have been held, during which Planning Committee members worked with the State's NYRCR Program team to develop community reconstruction plans and identify opportunities to make their communities more resilient. All meetings were open to the public. An additional 125-plus Public Engagement Events attracted thousands of community members, who provided feedback on the NYRCR planning process and proposals. The NYRCR Program's outreach has included communities that are traditionally underrepresented, such as immigrant populations and students. All planning materials are posted on the NYRCR Program's website (www.stormrecovery.ny.gov/nyrcr), providing several ways for community members and the public to submit feedback on materials in progress.

Throughout the planning process, Planning Committees were supported by staff from the Governor's Office of Storm Recovery (GOSR), planners from New York State (NYS) Department of State (DOS) and NYS Department of Transportation (DOT), and consultants from world-class planning firms that specialize in engineering, flood mitigation solutions, green infrastructure, and more.

With the January 2014 announcement of the NYRCR Program's expansion to include 22 new localities, the program comprises over 2.7 million New

¹ Five of the 102 localities in the program—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.



Yorkers and covers nearly 6,500 square miles, which is equivalent to 14% of the overall State population and 12% of the State's overall geography.

The NYRCR Program does not end with this NYRCR Plan. Governor Cuomo has allocated over \$650 million of funding to the program for implementing projects identified in the NYRCR Plans. NYRCR Communities are also eligible for additional funds through the program's NY Rising to the Top Competition, which evaluates NYRCR Communities across eight categories, including best use of technology in the planning process, best approach to resilient economic growth, and best use of green infrastructure to bolster resilience. The winning NYRCR Community in each category will be allocated an additional \$3 million of implementation funding. The NYRCR Program is also working with both private and public institutions to identify existing funding sources and create new funding opportunities where none existed before.

The NYRCR Program has successfully coordinated with State and Federal agencies to help guide the development of feasible projects. The program has leveraged the Regional Economic Development Council's State Agency Review Teams (SARTs), comprised of representatives from dozens of State agencies and authorities, for feedback on projects proposed by NYRCR Communities. The SARTs review projects with an eye toward regulatory and permitting needs, policy objectives, and preexisting agency funding sources. The NYRCR Program is continuing to work with the SARTs to streamline the permitting process and ensure shovels are in the ground as quickly as possible.

On the pages that follow, you will see the results of months of thoughtful, diligent work by the NYRCR Planning Committee, passionately committed to realizing brighter, more resilient futures for their Community.

The NYRCR Plan

This NYRCR Plan is an important step toward rebuilding a more resilient community. Each NYRCR Planning Committee began the planning process by defining the scope of its planning area, assessing storm damage, and identifying critical issues. Next, the Planning Committee inventoried critical assets in the community and assessed the assets' exposure to risk. On the basis of this work, the Planning Committee described recovery and resiliency needs and identified opportunities. The Planning Committee then developed a series of comprehensive reconstruction and resiliency strategies, and identified projects and implementation actions to help fulfill those strategies.

The projects and actions set forth in this NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in this NYRCR Plan does not necessarily indicate the NYRCR Community's prioritization of these projects and actions. Proposed Projects are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding. Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. Additional Resiliency Recommendations are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects. The Proposed Projects and Featured Projects found in this NYRCR Plan were voted for inclusion by official voting members of the Planning Committee. Those voting members with conflicts of interest recused themselves from voting on any affected projects, as required by the NYRCR Ethics Handbook and Code of Conduct.

NYRCR Long Beach is eligible for up to \$25 million in CDBG-DR implementation funds.

While developing projects for inclusion in this NYRCR Plan, the Planning Committee took into account cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. The Planning Committee also considered the potential likelihood that a project or action would be eligible for CDBG-DR funding. Projects and actions implemented with this source of Federal funding must fall into a Federally-designated eligible activity category, fulfill a national objective (meeting an urgent need, removing slums and blight, or benefiting low to moderate income individuals), and have a tie to the natural disaster to which the funding is linked. These are among the factors that the Governor's Office of Storm Recovery will consider, in consultation with local municipalities and nonprofit organizations, when determining which projects and actions are best positioned for implementation.

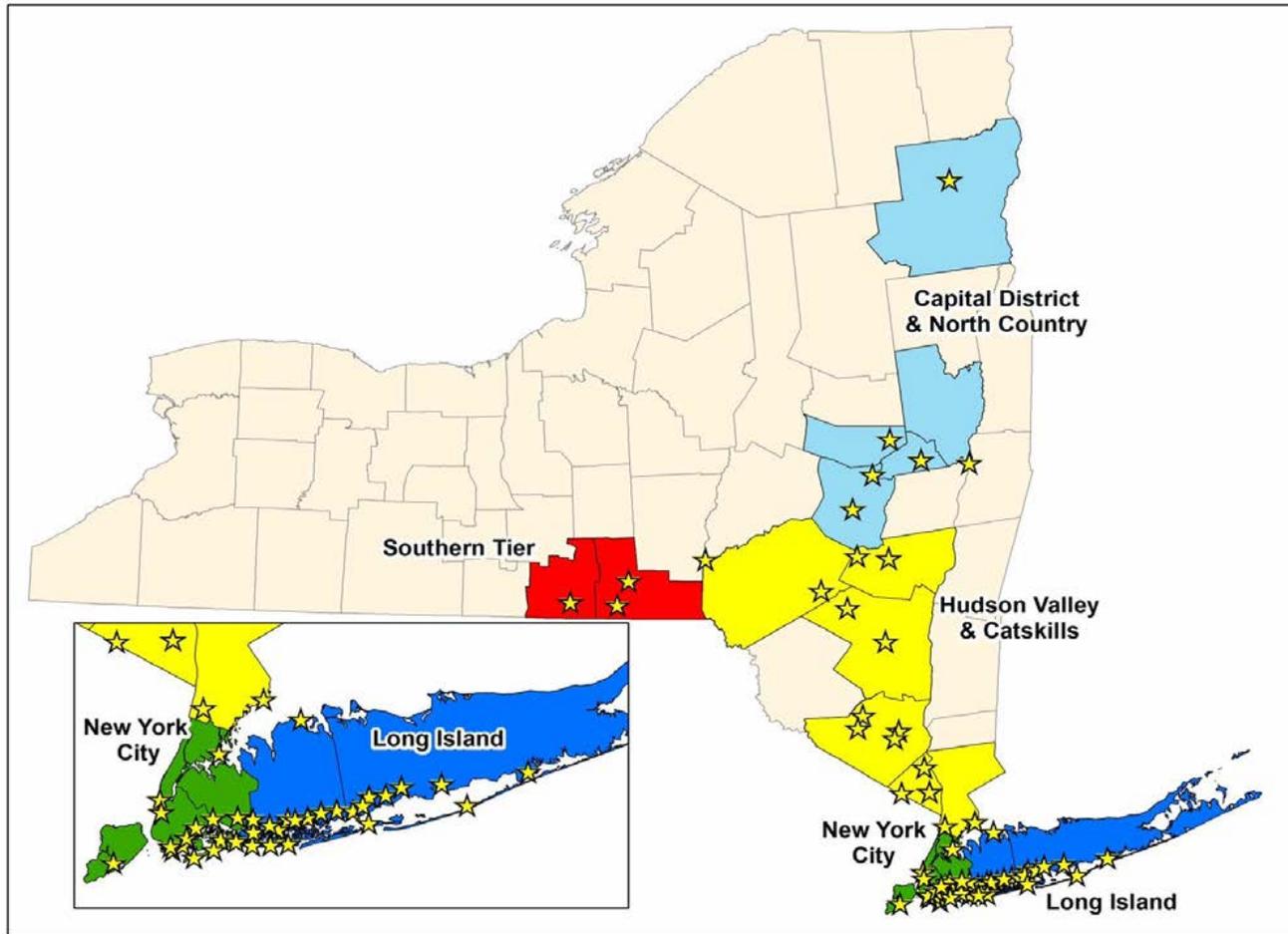
The total cost of Proposed Projects in this NYRCR Plan exceeds the NYRCR Community's CDBG-DR allocation to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in this NYRCR Plan are subject to applicable



Federal, State, and local laws and regulations, including the Americans with Disabilities Act (ADA). Inclusion of a project or action in this NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented. The Governor's Office of Storm Recovery will actively seek to match projects with funding sources.

In the months and years to follow, many of the projects and actions outlined in this NYRCR Plan will become a reality helping New York not only to rebuild, but also to build back better.

NYRCR Communities²



Find out more at:
<http://www.stormrecovery.ny.gov/nyrcr>

² Note: map includes those NYRCR Communities funded through the CDBG-DR program, including the NYRCR Communities announced in January 2014

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Executive Summary – NYRCR Long Beach Community

A. Overview

The City of Long Beach, NY, is located on the Barrier Island on Long Island's South Shore in Nassau County and is a 50-minute train ride from New York City. With approximately 33,275 residents year round and over 55,000 in the summer, the City shares the barrier island with the Village of Atlantic Beach and East Atlantic Beach to the west and Lido Beach and Point Lookout to the east.

The NY Rising Community Reconstruction (NYRCR) Long Beach Community was allocated up to \$25 million in Community Development Block Grant-Disaster Recovery (CDBG-DR) funding through the NYRCR Program. The NYRCR Planning Committee (Committee) identified the municipal boundary of the City of Long Beach as the geographic scope of the NYRCR Long Beach Plan (see Figure ES-1).

Storm impacts

Historically, the City of Long Beach has faced damaging winds, repetitive flooding, and storm surge. Superstorm Sandy (and to a lesser degree Hurricane Irene in 2011) brought a tremendous amount of destruction to Long Beach. Superstorm Sandy made landfall in New York on October 29, 2012, and was the largest storm in New York State's recorded history.

Superstorm Sandy devastated Long Beach, causing damage to homes, businesses, and key infrastructure, just as the economy was beginning to recover from the recession of 2008. The storm hit at a full moon high tide, with storm surge that rode on top of this extra high tide. The City was completely inundated by the storm. As water came from the Atlantic Ocean on one side of the barrier island, it was met by storm inundation from the bayfront. Residents were without electricity, drinking water, and sewer for more than two weeks, and approximately nine fires broke out across the City because of the storm. Many residents lost their vehicles, and City emergency apparatus and other vehicles were also destroyed.

Damages have been estimated at approximately \$200 million for City facilities and infrastructure, according to the City of Long Beach. In contrast, the damages from Hurricane Irene to the City of Long Beach were slightly

more than \$2 million. These numbers do not include damages to other sectors of the City (homes and businesses); total damages to all of Long Beach from Superstorm Sandy are likely over \$1 billion.

According to the United States Geological Survey (USGS), the City of Long Beach sustained a storm surge of 17.48 feet. Streets were flooded with 3 to 10 feet of water and covered by 4 to 6 feet of sand. The U.S. Army Corps of Engineers estimates that approximately 294,000 cubic yards of sand was lost from City beaches as a result of Superstorm Sandy.¹ The massive amount of debris collected after the storm in Long Beach was temporarily staged at Nickerson Beach in nearby Lido Beach prior to being removed to upstate landfills by barge.²

Sixty-eight percent of Long Beach's housing stock sustained heavy or strong damage related to Superstorm Sandy (10,554 housing units).³ Heavy damage is defined as more than 50% damage to the unit and strong damage is defined as 20% to 50% damage to the unit. In the City, 10,331 housing units were flooded: 1,337 units had greater than 4 feet of flooding, and 3,908 units had between 1 and 4 feet of flooding.⁴

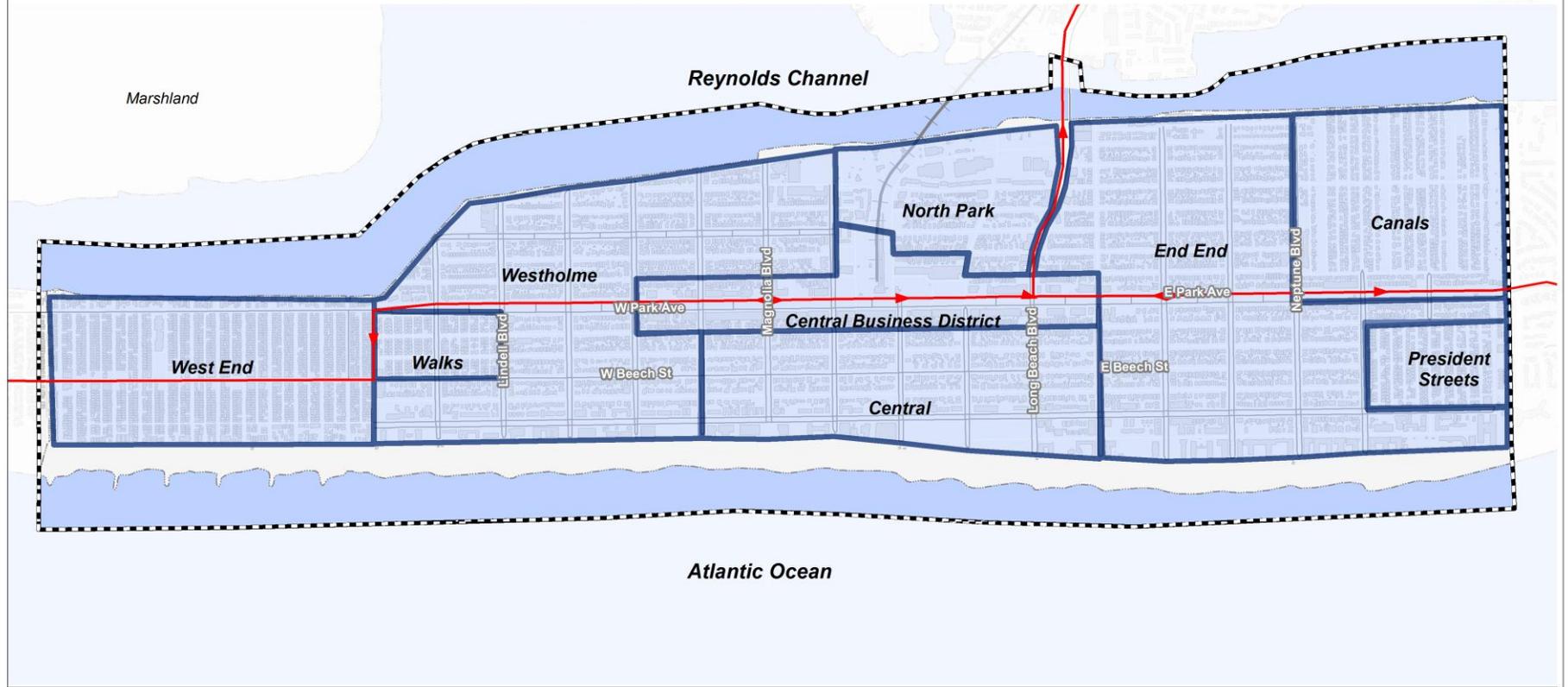
The storm damaged much of the City's infrastructure, including the sewer and water lines, wells, pump/lift stations, roads, parking lots, electrical systems, traffic signals, fire hydrants, sidewalks, and curbs. In the City's industrial area on the north shore, the Water Purification Plant and storage tower, Water Pollution Control Plant, electrical substations, and a major gas pipeline were damaged and required emergency repairs that took several weeks. The Water Pollution Control Plant was out of service for 7 days and the Water Purification Plant was shut down for about 2 weeks with periodic outages during repairs.

In addition, government facilities, bulkheads, dunes, pedestrian walkovers in the West End and East End, and the historic 2.2-mile Boardwalk, which was originally constructed in 1907, were also damaged. Beach pass booths and lifeguard stands were destroyed and the lifeguard headquarters was pulled out to sea. In total, 54 City-owned facilities (including the Water Purification Plant, playgrounds, wells, etc.) were damaged.

Figure ES-1: NYRCR Long Beach Community Geographic Scope

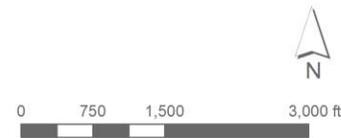
NY Rising Community Reconstruction Program

Source: Nassau County, USGS, NOAA, City of Long Beach



Legend

- Evacuation Routes
- Neighborhoods
- Community



Facing the reality of the storm’s devastation, Long Beachers did what they always do. They came together. At first light following the storm, residents were already checking in on neighbors, helping each other dig out cars and begin the weighty process of discarding all of their flood-drenched worldly possessions. Residents who were dealing with their own damaged homes and businesses found the time to help others—removing sand, debris, cooking on portable grills to provide meals, and going door to door to check on neighbors. Within hours, local establishments, that were devastated themselves, had morphed into gathering places, food pantries, and donation centers. Within days, well organized groups of local volunteers were helping to gut and muck out homes for anyone who needed it. The Ice Arena, the Martin Luther King, Jr. (MLK) Center, and other community gathering spaces became ad hoc places to receive needed information, hot meals, clothing, and supplies.



Rebuilt Boardwalk
Source: Sustainable Long Island



Boardwalk destruction by Superstorm Sandy
Source: NYRCR Long Beach Planning Committee

Critical issues

Although Long Beach has made tremendous progress in its recovery from Sandy, it still has a long way to go to regain its pre-storm condition and to protect against future storms. The City of Long Beach faces several critical issues, identified during the NYRCR planning process with key input from the Committee and the public, as it continues to recover from Superstorm Sandy.

One of the key challenges is that almost the entire City is located within the Federal Emergency Management Agency regulated floodplain, demonstrating a high degree of flood risk. Stormwater flooding is a frequent hazard as the City is relatively flat, has a high degree of impervious surface coverage, and has a high water table. While the oceanfront is being addressed through a massive U.S. Army Corps of Engineers project, the north shore (bayfront) of Long Beach has areas that repetitively flood and are not protected with uniform bulkheading or other similar protective measures.

Key health and social service assets are still in need of mitigation to prevent future flooding and to ensure that they remain operational during future hazard events. Some businesses and homeowners continue to struggle following Superstorm Sandy.

Access to power during and after an emergency was also identified as a critical Community issue. The City also has emergency operation and management needs. Designated community assistance centers, where residents can gather in emergency situations for help, news updates, and mutual support, are needed.

B. Working together to rebuild stronger, smarter, and safer

The ultimate vision for Long Beach (shown in Figure #ES-2), which is shared by the Committee and the Community, is to rebuild and redevelop in a manner that addresses resiliency, sustainability, and greater prosperity to ensure Long Beach's long-term success. This vision entails actions that protect homes, businesses, and facilities damaged by Superstorm Sandy, while providing a blueprint for enhanced economic development, recreation, and community services.

NYRCR Long Beach Vision Statement

Develop a vibrant, resilient, sustainable and green community that protects and enhances the safety, health, environment, diversity, culture and economy of current and future residents and guests of Long Beach.

Figure ES-2: NYRCR Long Beach Vision Statement

Public outreach

The NYRCR Long Beach public engagement process included 12 Planning Committee Meetings, 3 Public Engagement Events, and online surveys to provide an understanding of risk to community assets, to obtain feedback on the NYRCR Long Beach Plan, and to gather additional ideas for strategies, projects, and actions. Each Planning Committee Meeting was open to the public, and audience participation was encouraged. The Public Engagement Events took place at strategic intervals and varied locations, and were accompanied by online surveys for those not able to attend. The purpose of

these events was to obtain feedback from the public on the Committee's work to date.

The Public Engagement Events were advertised through traditional means (e.g., mainstream media, flyers, and lawn signs) and social media. The first Public Engagement Event, held in October 2013, was attended by more than 100 residents. The second Public Engagement Event, held in November 2013, organized participants into facilitated focus groups to further discuss the strategies that were included in the NYRCR Long Beach Conceptual Plan, which had been submitted in late October 2013. Over 50 residents attended this event. The third Public Engagement Event, held in February 2014 and attended by more than 100 residents, involved a review of the Projects under consideration for the NYRCR Plan. The event had an open house format with two short orientations. Project Evaluation Guides were provided for participants to indicate their input for each project. A fourth Public Engagement Event for the NYRCR Planning Program will be scheduled for the late spring of 2014.

C. Blueprint for implementation

Strategies, associated goals, projects, and actions were developed from the Planning Committee Meetings, the Public Engagement Events, review of the asset inventory and risk assessment, and response to the needs and opportunities assessment for Long Beach.

During the development of the NYRCR Plan, the Committee brainstormed many potential actions and strategies that would help Long Beach become more protected and resilient in the short term as well as longer-term actions and strategies to help in revitalization efforts. Because of the enormity of Superstorm Sandy's impact on Long Beach, the Committee focused mostly on resiliency measures needed for protection against storms.

Potential projects and actions were examined for feasibility as Proposed or Featured Projects in the NYRCR Plan.

The Proposed and Featured Projects include:

- Capital projects, such as perimeter structural defenses for coastal protection and resilient construction;

- Plan, policies, and programs that increase awareness and information; and
- Market-based methods, such as accruing points for the Community Rating System (National Flood Insurance Program), to reduce flood insurance premiums.

The projects in the NYRCR Plan are classified as Proposed Projects, Featured Projects, and Additional Resiliency Recommendations, which are defined as follows:

- **Proposed Projects:** Proposed Projects are designed to be fully funded through the NYRCR Program using the Community's allocation of CDBG-DR funding.
- **Featured Projects:** Featured Projects are innovative projects in which an initial study or discrete first phase of the project is proposed for CDBG-DR funding or other identified funding, and regulatory reforms and other programs that do not involve capital expenditures.
- **Additional Resiliency Recommendations:** Additional Resiliency Recommendations are projects and actions that the Committee would like to highlight, would be funded from sources other than CDBG-DR funding, and are not categorized as Proposed or Featured Projects.

Projects for NYRCR Long Beach are listed below in Table#ES-1 by strategy (some of the projects fit multiple strategies and are listed more than once). The order of appearance is not a reflection of project priority or ranking.



Table ES-1: Table of Projects

Strategy	Project Name	Project Category
Strategy #1 – Employ appropriate techniques to mitigate ocean and bay storm surge and stormwater flooding to protect Long Beach’s infrastructure, people, and assets while positioning for resilient redevelopment	Bulkheading – North Shore	Proposed Project
	Drainage Improvements	Proposed Project
	Critical Facility Resiliency	Proposed Project
	Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements	Proposed Project
	Parking Garage for Emergency Vehicles	Proposed Project
	Protection of Wells and Sewer Pump/Lift Stations	Proposed Project
	Park Avenue Complete Streets Phase 2	Featured Project
	Stormwater Project Phase 2/Stormwater Force Main Project	Featured Project
	North Shore Protection of Critical Utilities	Featured Project
	Canal Gates in East End	Featured Project
Strategy #2 – Protect critical Long Beach health and social services assets and increase the capacity to provide needed emergency and community services before, during, and after disasters	Critical Facility Resiliency	Proposed Project
	Protection of Community Centers	Proposed Project
	Protection of Public Housing Units	Proposed Project
	Protection of Senior Housing Units	Proposed Project
Strategy #3 – Implement measures to make Long Beach economic generators more resilient, while also facilitating enhancement of key commercial areas and the redevelopment of underutilized areas to stimulate economic growth	Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements	Proposed Project
	Park Avenue Complete Streets Phase 2	Featured Project
	Bayfront Revitalization Plan	Featured Project
Strategy #4 – Increase Long Beach’s capacity to facilitate and foster actions that lead to greater resiliency, emergency preparedness, and sustainability	Establish an Office of Emergency Management and Hire a Local Disaster Recovery Manager	Proposed Project
	Bayfront Revitalization Plan	Featured Project
Strategy #5 – Restore and enhance natural resources for both resiliency and recreation purposes while also protecting important cultural resources	Drainage Improvements	Proposed Project
	Stormwater Project Phase 2/Stormwater Force Main Project	Featured Project
Strategy #6 – Encourage and facilitate housing resiliency and sustainability measures while striving to maintain the character of Long Beach	Protection of Public Housing Units	Proposed Project
	Protection of Senior Housing Units	Proposed Project
	Revolving Loan Fund for Elevating Homes	Featured Project





Section I: Community overview

Photo: Ocean Beach Park in Long Beach
Source: Planning4Places, LLC

Section I: Community overview

The City of Long Beach, NY, is on a barrier island on Long Island's South Shore and a 50-minute train ride from New York City. With approximately 33,275 residents year round and over 55,000 in the summer, Long Beach has the feel of a seaside getaway and includes a dynamic mixture of long-time residents and tech-savvy relative newcomers. Residents are dedicated to sustainability and resiliency, interested in the arts and culture, and fitness oriented (e.g., surfing and jogging/bicycling on the Boardwalk). Long Beach is a diverse community that attracts young professionals and its economy is largely dependent on the summer visitor/guest season.

Long Beach has faced significant flooding over the past several years, first when Hurricane Irene crossed Long Island on August 28, 2011, and more significantly during Superstorm Sandy. Long Beach was devastated by Superstorm Sandy in October 2012. During Superstorm Sandy, the entire City was inundated with water when the ocean met the bay, and all of its residents and businesses were affected.



The Boardwalk in Long Beach, NY

Source: The LiRo Group

There's an old saying in Long Beach that goes something like, "Once you've got Long Beach sand in your shoes, you'll always have Long Beach sand in

your shoes." It's a saying that engenders not just the beauty and charm of the barrier island community, but that of the unique character of the people who inhabit it. Never has this strong and resilient character been more on full display than in the days, weeks, and months since Superstorm Sandy decimated the City.

On October 30, 2012, Long Beach woke up to what could only be described as a scene of devastation. The Boardwalk was in shambles. Thousands of water-soaked cars were strewn throughout the City. Entire sections of the City were buried in more than 6 feet of sand, as the beach side dune system had collapsed under the weight of Sandy's surge. The power was out. Sewage systems were down. There was no running water. Cell phones had no service. Save but a few, nearly every home and business in the City was impacted.

Facing this reality, Long Beachers did what they always do. They came together. At first light, residents were already checking in on neighbors, helping each other dig out cars and begin the weighty process of discarding all of their flood-drenched worldly possessions. Residents who were dealing with their own damaged homes and businesses found the time to help others—removing sand and debris, cooking on portable grills to provide meals, and going door to door to check on neighbors. Within hours, local establishments, that were also devastated, had morphed into gathering places, food pantries, and donation centers. Within days, well-organized groups of local volunteers were helping to gut and muck out homes for anyone who needed it. The Ice Arena, the Martin Luther King, Jr. (MLK) Center, and other community gathering spaces became ad hoc places to receive needed information, hot meals, clothing, and supplies.

Once cellular service was restored, things really took off. Facebook pages were formed that helped bring order to the chaos—a single posting would yield an army of volunteers ready to help. Needs were matched to resources. Fundraisers were launched. One such fundraiser, spearheaded by a local restaurant, resulted in a free community Thanksgiving dinner, shared by hundreds upon hundreds of Long Beachers. Hot meals were delivered to

elderly residents in high-rises. Residents were bruised, but certainly not broken. Every day since, they have been working to not just bring Long Beach back to what it was, but to help make it better than it's ever been. Residents continued to volunteer—holding holiday toy drives and fundraisers. Many of these volunteer efforts have launched non-profit organizations whose mission is to continue to rebuild the City of Long Beach.

The Long Beach community is still in the process of recovering and rebuilding; this NY Rising Community Reconstruction (NYRCR) Plan, a resident-driven, bottom-up process, complements these ongoing efforts.

In July 2013, the State of New York launched the NYRCR Program, an innovative post-disaster planning process. This program will help Long Beach to create a more resilient City as it continues to recover, rebuild, and protect vital City assets.

The NYRCR Long Beach Plan:

- Assesses the community's vulnerability to the adverse effects of future natural disasters and sea-level rise;
- Identifies strategies, projects, and actions that will increase the community's resilience, provide protection to vulnerable populations, and promote sound economic development by protecting the community's assets (see Section II.A);
- Identifies where funds should be used to repair or reconstruct essential public assets damaged or destroyed by Superstorm Sandy; and
- Assesses the need for economic development.

A. Geographic scope of the NYRCR Plan

The NYRCR Planning Committee (Committee) identified the municipal boundary of the City of Long Beach as the geographic scope of the NYRCR Plan. The maps in Figures I-1 and I-2 show the regional context of the City on the South Shore of Long Island and geographic scope of the NYRCR Plan, respectively. This section has three subsections—Community background, Existing development, and City operations—that provide context and detail about the community and development within the geographic scope of the NYRCR Plan.



Long Beach spirit after Superstorm Sandy
Source: NYRCR Long Beach Planning Committee

Community background

The City is in Nassau County, NY, south of Long Island. The City is on Long Beach Barrier Island, the westernmost of the outer barrier islands off Nassau County’s South Shore. Reynolds Channel borders the City on the north side of Long Beach Barrier Island, and the Atlantic Ocean is to the south. The City is less than 1.0 mile from north to south and approximately 3.5 miles from east to west and has a total area of approximately 2.0 square miles.

The City shares the barrier island with the Village of Atlantic Beach and East Atlantic Beach to the west and Lido Beach and Point Lookout to the east. Three drawbridges allow access on and off the barrier island. The Long Beach Bridge connects the City to the Village of Island Park on the mainland of Long Island via Long Beach Road/Austin Boulevard, a major evacuation route for the barrier island. To the west, the Atlantic Beach Bridge connects the island to Lawrence on the mainland of Long Island, en route to the John F. Kennedy International Airport and New York City. The Loop Parkway, to the east along the Lido Beach and Point Lookout borders, connects the island to Jones Beach, the Meadowbrook Parkway, and southern Long Island.

The City of Long Beach is one of the oldest communities on Long Island and was founded in 1880. The first Long Beach Hotel was built then and with the railroad arriving in 1882, Long Beach continued growing as a resort community.⁵ William Reynolds purchased Long Beach in 1907 to create a planned community and created the area known as Long Beach today by dredging Reynolds Channel, filling in the area, and constructing many of the City’s homes, the Boardwalk, the medians and street malls, and the sewer system.⁶ The City of Long Beach was incorporated in 1922, allowing greater control of government services. As a City, Long Beach has more autonomy than surrounding areas but also more responsibility for its own affairs and, therefore, must be somewhat self-reliant.

During the 1930s and 1940s, the City became more of a year-round community and during the post-World War II era, the City saw a decline of guests.⁷ In the 1970s, many of the old hotels were used as long-term stay facilities and, subsequently, much of the hotel sites were redeveloped for luxury market-rate multifamily housing.⁸ The City is a densely developed city and had a population of 33,275 in 2010⁹ (see demographic profile provided in Table I-1).

Table I-1: City of Long Beach Demographic Profile

Demographic	Number	Percentage
Population	33,275	—
Race/Ethnicity		
White	25,123	75.5%
African American	2,130	6.4%
American Indian/Alaskan Native	100	0.3%
Asian	898	2.7%
Hawaiian, Pacific Islander	0	0.0%
Two or more races	765	2.3%
Hispanic of any race	4,597	14.1%
Persons Per Square Mile	15,023	—
Income		
Median household Income	\$79,546	—
Poverty rate (persons)	—	10.0%
Housing Units	16,450	
Number of households	14,756	—
Homeownership rate		57.6%
Persons per household	2.18	
Median home value of owner-occupied units	\$517,000	—

Source: 2010 U.S. Census State and County Quick Facts



Figure I-1: Long Beach Regional Area

NY Rising Community Reconstruction Program

Source: Nassau County, USGS, NOAA



Legend

NYRCR Long Beach Community

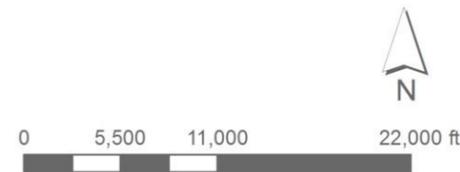
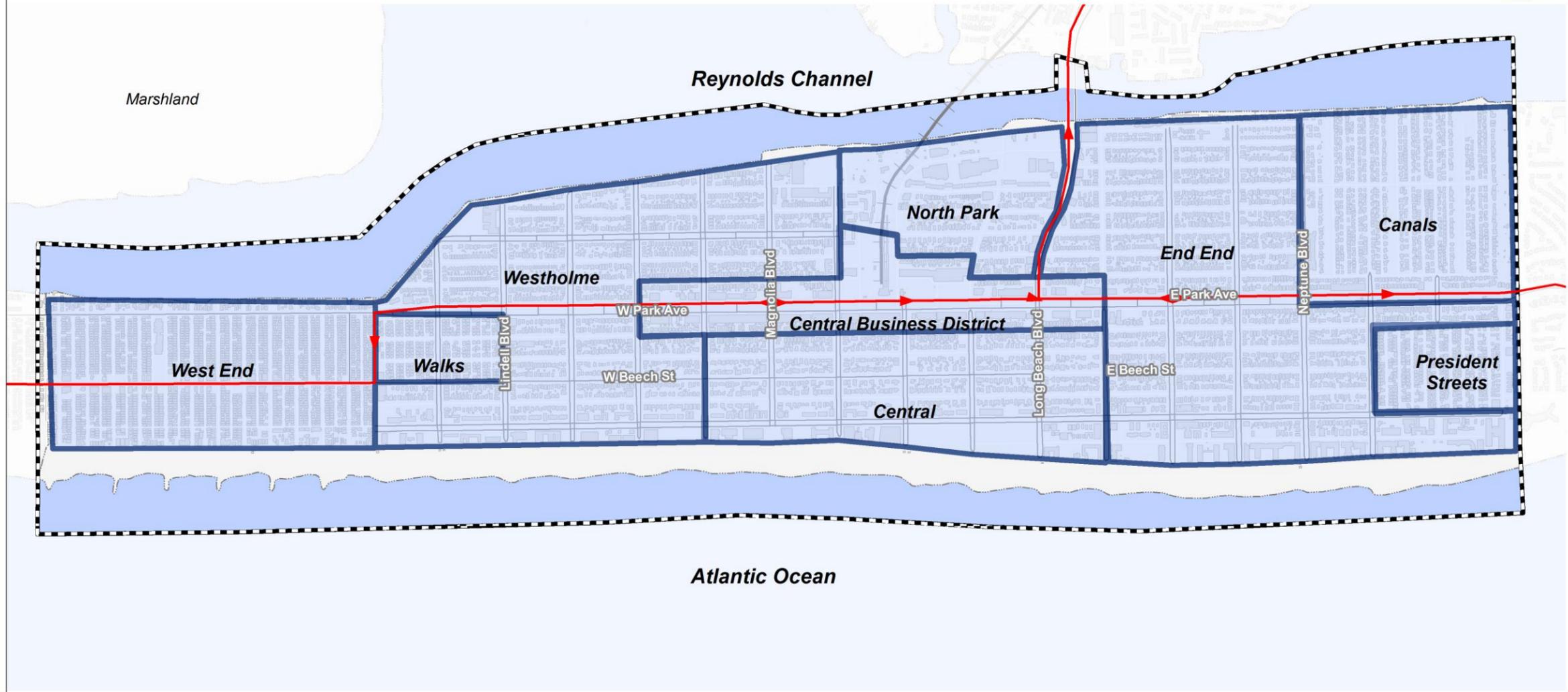


Figure I-2: NYRCR Long Beach Community Geographic Scope

NY Rising Community Reconstruction Program

Source: Nassau County, USGS, NOAA, City of Long Beach



Existing development

The City has three general geographic areas, the West End, the Central District, and the East End, and includes the following neighborhoods: the West End, Westholme, the Walks, the Central District, North Park, the East End, the Canals, and the President Streets. The City contains a mixture of densities, lot sizes, architectural styles, and types of housing. The West End is the narrowest part of the City. The City includes three main commercial areas: the central area along W. Park Avenue near City Hall, the West End, and the East End. The neighborhoods are described in more detail below and shown in Figure I-2:

- **West End** – This neighborhood is west of New York Avenue and extends to the western border of the City. The West End has many one-story bungalow homes on small, narrow streets named after U.S. States. One of the City’s three commercial corridors is along West Beech Street. Raised dunes at end of the blocks allowed residents access to the beach via wooden walkovers before Superstorm Sandy washed the dunes and walkovers away.
- **Westholme** – This neighborhood is bounded by New York Avenue to the west and Laurelton Boulevard to the east, and skirts around the West Park Avenue/City Hall commercial area to National Boulevard. It goes from the bayfront to the oceanfront at the Boardwalk. The Boardwalk ends at New York Avenue.
- **Walks** – This neighborhood is bounded by West Beech Street to the south, West Park Avenue to the north, New York Avenue to the west, and Lindell Boulevard to the east. This neighborhood has bungalows with very narrow sidewalks between them (each walk is named after a month).
- **Central District** – This neighborhood is south of Park Avenue and east of Laurelton Boulevard, and extends to Monroe Boulevard. A portion of the Boardwalk is in this neighborhood, as are the undeveloped Foundation Block, the Superblock, and some higher density residential buildings along East Broadway and Shore Road.
- **North Park** – This neighborhood is bounded by National Boulevard to the west, Long Beach Boulevard to the east, the bay to the north, and the City Hall/West Park Avenue business district to the south.

Most of Long Beach’s community facilities are in this neighborhood, as well as concentrations of industrial facilities on the north shore.

- **East End** – The East End neighborhood is east of Long Beach Boulevard/Monroe Boulevard. It extends to the Canals neighborhood and the City boundary at Curley Street on the east, the bayfront on the north, and the oceanfront to the south. One of the City’s commercial districts is located here on East Park Avenue. The Boardwalk ends at Neptune Boulevard within the neighborhood. Higher-density residential buildings are found along East Broadway and Shore Road.



Residential Apartments near the Boardwalk
Source: Planning4Places, LLC

- **Canals** – This neighborhood has four canals that run from the bayfront through the neighborhood, which is transected by bridges that run east-west. The neighborhood is bounded by Neptune Boulevard to the west, East Park Avenue to the south, the City boundary to the east, and the bay to the north.
- **President Streets** – This neighborhood is located south of East Walnut Street, north of East Broadway, and between Roosevelt and Maple Boulevards. The majority of the streets in the neighborhood are named after former U.S. Presidents.

- **Central Business District** – This area contains mostly businesses, the Long Island Rail Road (LIRR) Station, and government functions along with two senior housing facilities.



The Canals neighborhood
Source: Planning4Places, LLC

City operations – key public assets

The City's water supply is drawn from the Lloyd Aquifer through eight wells where it is pumped to the Water Purification Plant on the City's north shore for testing and chemical treatment, prior to being conveyed to homes throughout the City. A water tower helps provide adequate water pressure to the drinking water system.

The City owns and operates a sewage treatment plant (called the Water Pollution Control Plant), also located on the north shore near the Water Purification Plant, which takes in sanitary sewage flow from Long Beach and Lido Beach. Three wastewater pump stations, located on Park Avenue at Indiana Avenue, New York Avenue, and Roosevelt Boulevard, serve the Water Pollution Control Plant. Both the sewage treatment plant, constructed in 1951,¹⁰ and the water tower are aging facilities.

The City is unique on the barrier island in that it has its own police and fire departments. The Long Beach Fire Department is a combination department with 165 volunteers and a 25-member career uniformed force.¹¹ Its headquarters are at City Hall and the other two stations are located at Maple Boulevard and East Park Avenue, and Indiana Avenue and West Park Avenue. The fire department provides fire and emergency medical services protection for the City of Long Beach, the Village of Atlantic Beach, and East Atlantic Beach Fire Districts.

The Long Beach City School District serves the City of Long Beach, East Atlantic Beach, Point Lookout, and Lido Beach. The school district has seven schools serving approximately 4,300 students, including one pre-kindergarten school, four elementary schools, one middle school, one high school, as well as an alternative high school and an adult learning center.¹² Three of the elementary schools are in Long Beach: East Elementary School, Lindell Elementary School, and West Elementary School. Long Beach Middle School and the Long Beach High School are in Lido Beach. For more information on the City of Long Beach's assets, please see Section II: Description of Community Assets.

B. Description of storm damage

Historically, the City of Long Beach has faced damaging winds, repetitive flooding, and storm surge. Superstorm Sandy (and to a lesser degree Hurricane Irene the year before) brought a tremendous amount of destruction. This section includes both details on the destruction of Superstorm Sandy and the City of Long Beach's actions after the storm through March 2014. It also includes available information on the impact of Hurricane Irene, which made landfall in August 2011, on Long Beach.

Superstorm Sandy

Superstorm Sandy struck New York on October 29, 2012, bringing a storm surge of 9 to 12 feet above normal tide levels from Kings Point on the western end of Long Island Sound to the Battery on the southern tip of Manhattan.¹³ According to the United States Geological Survey (USGS), the peak storm surge during Superstorm Sandy occurred at the City of Long Beach where it reached 17.48 feet

Superstorm Sandy is the largest storm in New York's recorded history to make landfall. Superstorm Sandy's effect was devastating, causing widespread damage to lives, homes, businesses, core infrastructure, government property, and an economy just beginning to recover from a financial crisis. Overall, the storm caused 53 fatalities,¹⁴ destroyed an estimated 305,000 homes,¹⁵ affected more than 2,000 miles of roads, caused catastrophic flooding in subways and tunnels, and also damaged major power transmission systems.¹⁶ Fourteen counties in the State of New York, including Nassau County, were declared Federal disaster areas.¹⁷ Economic losses in New York as a result of Superstorm Sandy were estimated to be between \$30 and \$50 billion, with an estimated \$10 to \$20 billion in insured losses.¹⁸ New York Governor Andrew M. Cuomo stated that storm damage would cost New York State nearly \$42 billion, with the vast majority of damage centered on New York City and Long Island.¹⁹

Superstorm Sandy devastated Long Beach, causing damage to homes, businesses, and key infrastructure just as the economy was beginning to recover from the recession. The City was completely inundated by the storm (see Figure I-3). Damages were estimated at approximately \$200 million for City facilities and infrastructure according to the City of Long Beach. Total damages from Superstorm Sandy are likely over \$1 billion, including damages to homes and businesses.

As water came from the Atlantic Ocean on one side of the barrier island, it was met by storm inundation from the bayfront. Residents were without electricity, drinking water, and sewer for more than 2 weeks. Many residents lost their vehicles and many City of Long Beach vehicles were damaged or destroyed, including 4 lifeguard patrol emergency response vehicles, 4 fire pumps, 22 police vehicles, and 6 police motorcycles.

Approximately nine fires broke out across the City because of the storm (seven in the Canals area). Many residents lost their vehicles and City emergency apparatus and other vehicles were also destroyed. The City of Long Beach Fire Department started fighting fires in 4 to 5 feet of water and could not use their trucks until the water retreated.²⁰ The City of Long Beach Police Department with assistance from the National Guard, State and County Police protected the City and instituted a curfew to protect against looting.²¹

Streets were flooded with 3 to 10 feet of water and covered by 4 to 6 feet of sand. It is estimated that approximately 294,000 cubic yards of sand was lost from City beaches due to Superstorm Sandy.²² The massive amount of debris collected after the storm in Long Beach was temporarily staged at Nickerson Beach in Lido Beach prior to being removed to upstate landfills by barge.²³

Sixty-eight (68) % of Long Beach's housing stock sustained heavy or strong damage related to Superstorm Sandy (10,554 housing units).²⁴ Heavy damage is defined as more than 50% damage to the unit and strong damage is defined as 20 to 50% damage to the unit. In the City, 8,468 housing units sustained heavy damage.²⁵ Also, 10,331 housing units were flooded; 1,337 units had greater than 4 feet of flooding; and 3,908 units had between 1 and 4 feet of flooding.²⁶

Remarkably, there were no fatalities in the City, although 1,000 patients were treated for storm-related injuries and illnesses at the temporary hospital set up by the City of Long Beach and the Federal Emergency Management Agency (FEMA), when the Long Beach Medical Center was unusable.²⁷ The Long Beach Medical Center was damaged during the storm and the hospital has been closed since Superstorm Sandy. Approximately 700 employees are no longer employed at the Long Beach Medical Center as a result of Sandy.²⁸ In February 2014, the hospital filed for Chapter 11 bankruptcy protection.

Three elementary schools of the Long Beach School District that are in the City of Long Beach (West, East, and Lindell), along with Long Beach Middle and Lido Elementary in Lido Beach, sustained significant damage. The schools with less damage hosted the students from the more heavily damaged ones for long periods during the 2012–2013 school year.

The storm damaged much of the City's infrastructure, including the sewer and water lines, wells, pump/lift stations, roads, parking lots, electrical systems, traffic signals, fire hydrants, sidewalks, and curbs. City officials worked (and camped out in City Hall), trying to bring City infrastructure back online while removing massive piles of sand and garbage from City streets.²⁹ In the City's industrial area on the north shore, the Water Purification Plant and storage tower, Water Pollution Control Plant, electrical substations, and a major gas pipeline were damaged and required emergency repairs that took several weeks. The Water Pollution Control Plant was out of service for

7 days and the Water Purification Plant was shut down for about 2 weeks with periodic outages during repairs. Long Beach issued a boil-water advisory on October 30, 2012, that was rescinded on November 8, 2012.³⁰

In addition, government facilities, bulkheads, dunes, pedestrian walkovers in the West End and East End, and the historic 2.2-mile Boardwalk, which was originally constructed in 1907, were also damaged. Destruction of the Boardwalk devastated the City economy. Beach pass booths and lifeguard stands were also destroyed and the lifeguard headquarters was pulled out to sea. The lifeguard headquarters had been moved off its foundation during Hurricane Irene and had only recently been repaired and put in to service. In total, 54 City-owned facilities (including the Water Purification Plant, playgrounds, wells, etc.) had estimated damages of \$46,741,565 for demolition, disposal, and reconstruction of these assets.³¹

Some of the City facilities that were damaged include (see Figure II-1 for location of many of these facilities):³²

- Magnolia Senior Center/Community Center and Long Beach Recreation Center – damage to classrooms, offices, lobby, cardio room, locker rooms, indoor pool, pool filtration systems;
- Long Beach Ice Arena– damage to floor, ice surface, synthetic turf and hockey rink, locker rooms, mechanical equipment, lobby;
- City Hall Police and Fire Departments, Indian and Maple Fire Stations – damage to apparatus floors, equipment, staging areas, bathrooms;
- Police Auxiliary Building – flood damage to entire first floor;
- Animal Shelter – flood damage to entire building and its contents;
- Municipal Garage;
- LIRR Parking Garage;
- Long Beach Sanitation Department (150 West Pine Street);
- Martin Luther King, Jr. Community Center – flood damage to the entire first floor;
- West End Community Center – flood damage to entire first floor;

- Playgrounds – as an example, the Magnolia Street playground was severely damaged by Hurricane Irene and subsequently repaired, only to be destroyed by Sandy;
- Water Purification Plant, wells, and hydrants – damage to generators, electrical equipment;
- Water Pollution Control Plant;
- Roosevelt, New York, and Indiana Avenues pump stations; and
- Bricks on the historic roadway at 200, 300, and 600 block of West Penn.



**Damage from Superstorm Sandy
in Long Beach's West End, October 2012**
Source: NYRCR Long Beach Planning Committee



Damage from Superstorm Sandy in Long Beach, October 2012
Source: Kate Murray, Town of Hempstead Supervisor



Sand removal from Long Beach streets after Superstorm Sandy
Source: NYRCR Long Beach Planning Committee



Damage from Superstorm Sandy in Long Beach, October 2012
Source: Kate Murray, Town of Hempstead Supervisor



Armour St. in Canal Area looking north from E. Pine St. on October 29, 2012, at 9 am just before high tide (bayside)
Source: NYRCR Long Beach Planning Committee



Dune walkovers after dune erosion (dune was 15 feet high and 20 feet wide) between Neptune Blvd. and Roosevelt Blvd.
Source: NYRCR Long Beach Planning Committee

Hurricane Irene

The center of Hurricane Irene crossed Long Island on August 28, 2011, and also caused flooding to Long Beach, although not to nearly the same extent as Superstorm Sandy. A National Weather Service report states that a storm surge of 3 to 6 feet caused hundreds of millions of dollars in property damage in New York City and Long Island.³³ The City of Long Beach estimates its damage from Irene was \$2,117,884.95.

See Figure I-4 for approximate flood inundation extents of Hurricane Irene. The approximate inundation area was based on storm tide depths reported at the closest U.S. Geological Survey (USGS) storm tide gauge to the north shore of Long Beach, which was in Island Park (USGS site 01311143).³⁴ These data were originally in vertical control datum National Geodetic Vertical Datum of 1929 (NGVD29), used to estimate elevation heights, and were converted a newer datum (North American Vertical Datum of 1988 [NAVD88]) to be consistent with topography data used to estimate flood extent.

Other storms and hurricanes

Flooding from coastal storms and heavy precipitation is a recurring event in Long Beach. Stormwater flooding occurs multiple times a year. To illustrate the repetitive risk from larger coastal storms, the following larger storms that impacted affect Long Beach are listed for historical context:

- 1938 Hurricane
- 1960 Hurricane Donna
- 1962 Nor'easter
- 1971 Hurricane Doria
- 1976 Hurricane Belle
- 1979 Hurricane Davis
- 1983 Tropical Storm Dean
- 1985 Hurricane Gloria
- 1991 Hurricane Bob
- 1992 Nor'easter
- 1996 Hurricane Bertha

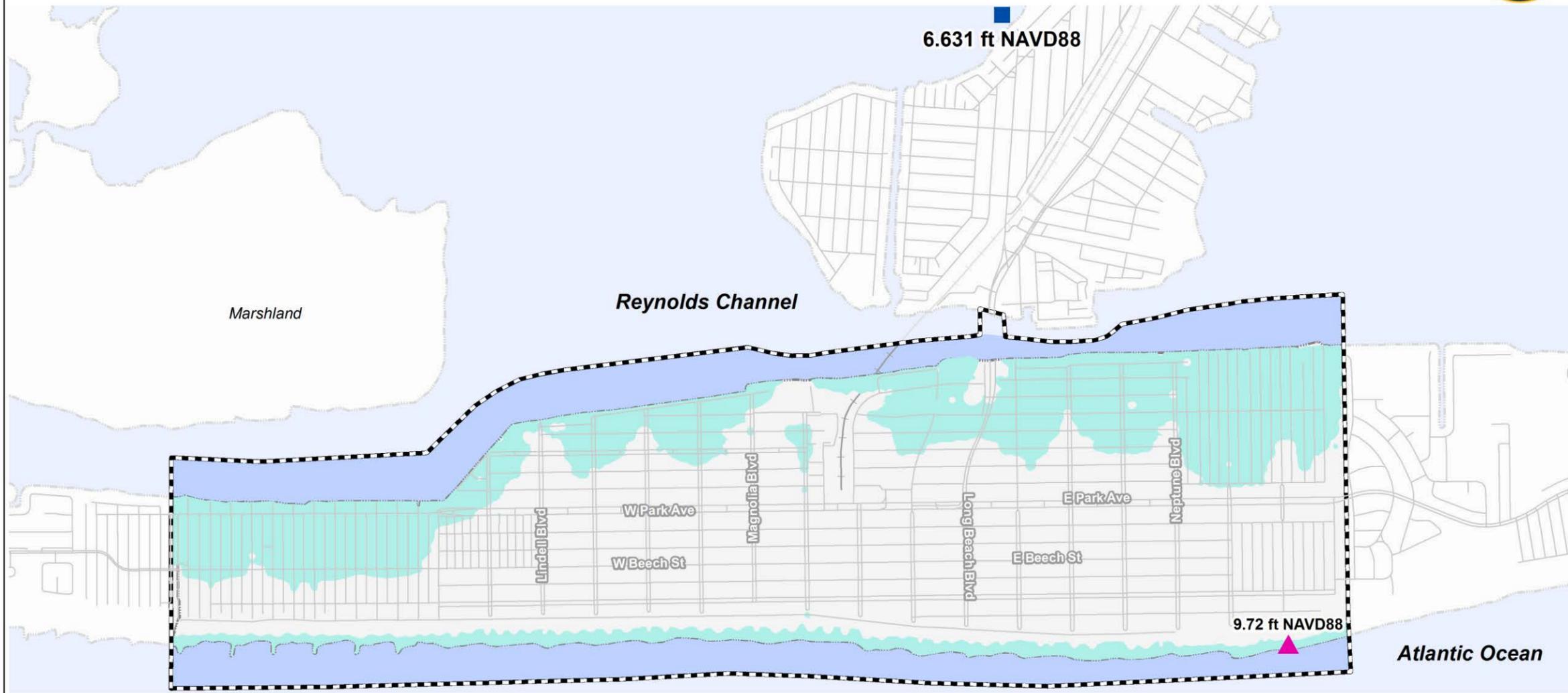


Flooding from Hurricane Irene in North Park neighborhood

Source: NYRCR Long Beach Planning Committee

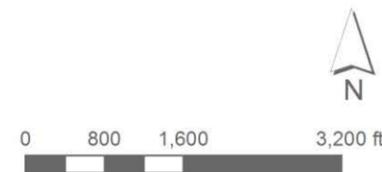
Figure I-4: Long Beach Hurricane Irene Peak Storm Tide Elevation (NAVD88, ft)
 NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, USGS, FEMA



Storm Tide Elevation (ft)

- ▲ Peak Storm Tide Elevation
- Real-Time Storm Gauge
- ▭ Community
- 0 ft - 6.31 ft



Actions since Superstorm Sandy

Since Superstorm Sandy, the City has undertaken the actions listed below to help recover and make the community more resilient following Superstorm Sandy. In addition, a number of announcements have been made that will help the City of Long Beach implement its recovery. Below is a synopsis of actions underway in chronologic order:

- The City completed the Boardwalk reconstruction project, which was funded by FEMA and the State of New York with Community Development Block Grant–Disaster Recovery (CDBG-DR) funds, ahead of schedule in October 2013 and held a grand reopening ceremony on October 25, 2013. Most of the Boardwalk was open by late July 2013. The reconstruction included a wave break wall installed beneath the Boardwalk to protect it. The redesign of the Boardwalk was a result of an extensive community visioning and public outreach process.
- In August 2013, the City completed a Bulkhead study for the north shore, the *Conditions Evaluation of Bulkheads & Outfall Structures in the City of Long Beach, New York*. This study was an exhaustive and detailed analysis of the entire bulkheading system and identifies areas that are inadequate. This study will be used to identify the critical areas in phasing the implementation of the Bulkheading – North Shore project (see Sections III and IV of this NYRCR Plan).
- The City improved three lift stations on Roosevelt Avenue, New York Avenue, and Indiana Avenue that now have submersible pumps.
- The City coordinated with the U.S. Army Corps of Engineers (USACE) on a fully federally funded project for reconstructing the dunes on the East End and West End. Dune grass planting events took place in late October and early November 2013. Community residents and the City of Long Beach volunteered to build back dunes to protect the City using 3,000 donated and discarded Christmas trees in the winter of 2013.³⁵ The rebuilding of the 19 dune walkovers was underway as of March 2014 with a scheduled completion by mid-July 2014. The remaining dunes for the central part of the City in front of the Boardwalk, beach berms, and rebuilt groins are part of a USACE plan entitled “Draft *Hurricane Sandy Limited Reevaluation Report*

(HSLRR) and Environmental Assessment (EA),” which was undergoing public review through March 31, 2014.³⁶ The Federal government has committed to paying for the entire expense for this project. The extensive work undertaken by the USACE was noted by the Committee and a reason that protection from north shore flooding became a priority of the NYRCR process.



Dune planting, Fall 2013
Source: Sustainable Long Island

- In November 2013, Governor Cuomo announced that funding in the amount of approximately \$12.9 million would be awarded to Long Beach to provide more than 6,000 feet of flood barrier protection for the north shore. This project includes about 2,300 feet of bulkheading to an elevation of 11 feet for Long Beach’s utility and industrial area. In addition, several flood barrier options including a 4,400-foot “Dutch dam,” a permanent subgrade flood barrier that can be deployed to a minimum height of 11 feet during a major storm, are being considered to protect the utilities. The utility flood

barrier will be placed along the north side of Park Place, to Long Beach Boulevard, and West Pine Street to the eastern edge of the Water Pollution Control Plant, which will meet up with the bulkheads in the area. This project is out for bid as of March 2014 with work slated to start later in 2014.

- The City received grants in December 2013 from the NYS Department of State (\$75,000) for updating the Local Waterfront Revitalization Plan and from the NYS Energy Research and Development Authority (NYSERDA) (\$187,500) for the Comprehensive Plan. The updates of these plans will help increase the City's resilience to climate change through incorporation of energy efficiency and environmentally sustainable practices.
- In January 2014, the Long Beach City Council voted to hire a firm to review its Community Rating System (CRS) program with the goal of lowering flood insurance premium rates for residents.³⁷
- In January 2014, it was announced that litigation had been resolved surrounding the Superblock. Subsequently, in February 2014, the Zoning Board of Appeals approved a plan for a mixed-use high-rise development that has two 15-story apartment towers.³⁸
- In February 2014, Governor Cuomo approved a \$12 million bond measure to help the City of Long Beach finance Superstorm Sandy-related costs that are not eligible for reimbursement.
- In March 2014, the City announced that it was conducting a comprehensive evaluation of its emergency response services, especially with the former Long Beach Medical Center's closure and bankruptcy filing (bankruptcy filing occurred in February 2014).
- The City took a pledge to become a Climate Smart Community. The City understands that flood risk is dynamic and the potential exists for future events like Sandy. By taking this pledge, the City will commit to sustainability and resiliency goals such as greenhouse gas reduction and climate adaptation to address climate change risks like sea-level rise and increased strength of coastal storms.
- In January 2014, it was announced that the City will receive smart growth technical assistance from Global Green USA which is funded by the Environmental Protection Agency Smart Growth Building

Blocks for Sustainable Communities Program. This program provides comprehensive recommendations for infrastructure and policy changes aimed at helping the communities build a future that is more resource-efficient, livable, healthy, and environmentally responsible. The program provides rapid, targeted technical assistance using different tools with proven results.



Breach in Pacific dune looking north, November 10, 2012

Source: NYRCR Long Beach Planning Committee

- The City Council established a program to provide assistance for bulkhead replacement on private property. Approximately \$500,000 has been set aside for the program. The City will bond the projects and will be repaid by property owners by adding to the tax bill or annual vouchers. Due to the high costs of residents' recovery, there has not been high participation in the program. As a result, the City is searching for additional grants to expand the program. This program will be complemented by the NYRCR Housing Recovery Program bulkhead replacement program.
- The City included \$125,000 to install some of the needed backflow prevention valves on stormwater outfall pipes in its capital budget

and scheduled the purchase of a sewer cleaning truck to continue cleaning the storm drain system.

- The City received CDBG-DR grant funding to increase the number of building code officials to assist with post-Sandy residential reconstruction needs and hired consultants to assist with disaster case management.
- The City initiated construction and redevelopment of Leroy Conyers Park, which will include new park facilities, equipment, and fencing. The park should reopen by Memorial Day of 2014. The Recreation Center, Ice Arena and Magnolia Park were also repaired and rebuilt.
- The City developed a \$400,000 capital plan for curb rehabilitation and replacement on the center mall area on Park Avenue.
- The City scheduled the purchase of four new sanitation trucks in October 2013. The acquisition of four new buses and two new paratransit vehicles was planned.
- The City made sewer line improvements that are normally made when road improvements are taking place. The City will continue making necessary improvements as road projects are initiated.
- The City passed a Complete Streets resolution to improve traffic congestion, traffic circulation, traffic calming, bicycle routes and parking, and to reduce vehicle-pedestrian conflicts. Funding was sought but not received from the U.S. Department of Transportation Investment Generating Economic Recovery (TIGER) grant and NYSERDA for the Complete Streets projects.

In addition to the City actions described above, the State in October 2013 also announced that elevation and flood protection would be provided for the two Long Island Power Authority (LIPA) Long Beach substations, operated by Public Service Electric and Gas Company (PSEG) power substations. These substations include: the Park Place substation on Water Street and the Long Beach substation on Riverside Boulevard). Temporary flood walls have been constructed around the site during construction while the key pieces of equipment are being raised or otherwise protected. In addition, LIPA/PSEG is upgrading electrical service and electrical capacity to the City of Long Beach from 4 kilovolts to 13.2 kilovolts, including installing a more protected, storm-resilient system.

Superstorm Sandy caused a 9-foot wall of water to wash over the Bay Park Sewage Treatment Plant (STP), which knocked out power and dumped more than 69 million gallons of raw sewage into waterways.³⁹ As Nassau County worked to repair damages, another 2.8 billion gallons of partially treated sewage was released into Reynolds Channel.⁴⁰ In January 2014, it was announced that Nassau County was working with the Federal government to assist Long Beach with converting its Water Pollution Control Plant into a pumping station so that sewage could be moved from there to Bay Park for treatment and then distributed with other effluent 2 to 3 miles offshore through an outfall pipe. This project, if funded and implemented, would help improve water quality in the bay and free up land for redevelopment.

It was announced in January 2014, that the State will receive \$810 million in Federal funds to repair and upgrade the STP.⁴¹ The project, which will be managed by Nassau County, includes:

- Building a system of dikes, levees, and movable flood walls around the entire plant to provide protection against the 500-year storm and account for anticipated sea-level rise;
- Elevating and hardening the Electrical Plant Distribution System and repairing existing generators to take the plant off temporary power;
- Elevating and/or hardening 57 pump stations that serve one million residents to protect from floods;
- Building a larger sewage collection line to accommodate increased flow levels during storm surges; and
- Hardening and replacing the sludge dewatering equipment and building damaged during Sandy.⁴²

The Long Beach School District is floodproofing its facilities including securing boilers and electric systems in watertight structures. Some of the schools have moved the mechanical room from the first to the second floor or modified classroom space into a raised mechanical room. All of the schools, except the High School, had already installed wind protection measures on windows. The District has applied for a FEMA grant to replace the weaker High School windows.⁴³

Governor Cuomo announced in January 2014 that New York State will fund the replacement of several bridges. Locally on the South Shore of Long

Island, scour retrofit improvements for large span bridges that will account for tidal conditions and flow will be undertaken in the following locations:

- Loop Parkway over Long Creek;
- Meadowbrook Parkway over False Channel, Fundy Channel, and Sloop Channel (3 bridges);
- Robert Moses Parkway over State Boat Channel (northbound and southbound) and over Fire Island Inlet (3 bridges); and
- Southern State Parkway over Hempstead Lake.

In February 2014, Nassau County hosted a training event for the State's Citizen Preparedness Corp program, a great resource for communities to help prepare their citizens for more frequent extreme weather. Citizens will be trained to help in emergencies (see www.prepare.ny.gov).

C. Critical issues

The City of Long Beach faces several critical issues, identified during the NYRCR planning process with key input from the Planning Committee and the public, as it continues to recover from Superstorm Sandy. See Section V for details on the NYRCR Public Engagement process.

One of the key challenges for the City of Long Beach is the topography of the barrier island. The City is very flat, with generally slightly higher elevations near the ocean beaches mostly between 8 and 10 feet above mean sea level. The land then gradually slopes down toward Reynolds Channel with grades mostly from 4 to 6 feet above mean sea level. The barrier island and its topography cause the island to be vulnerable to erosion and flooding during storm events, in particular along Reynolds Channel and the Canals during high tide and storm events.

Stormwater is slow to drain during heavy rainfall events. Figures I-5, I-6, and I-7 provide additional details that show the challenges of reducing the risk from flooding on a fully developed barrier island. As a result of intense development, the resulting impervious surfaces reduce ground absorption of stormwater, which then runs off (Figure I-5). The relative low elevations of the island allow coastal flooding, especially on the north shore, and reduce drainage times (Figure I-6). The water table is very close to the surface in

many parts of Long Beach, making subsurface activities, including stormwater infiltration and retention, a challenge (Figure I-7).

Superstorm Sandy revealed many critical issues for all the areas it impacted, including Long Beach. Flooding from the ocean was not listed as a critical issue because of the extensive USACE work on the oceanfront described earlier in this section. Long Beach is currently redeveloping in many areas and will look to incorporate resiliency in all redevelopment where opportunities exist. Implementing this resiliency vision will take time and Long Beach is positioning itself to rebuild stronger. Specific issues include:

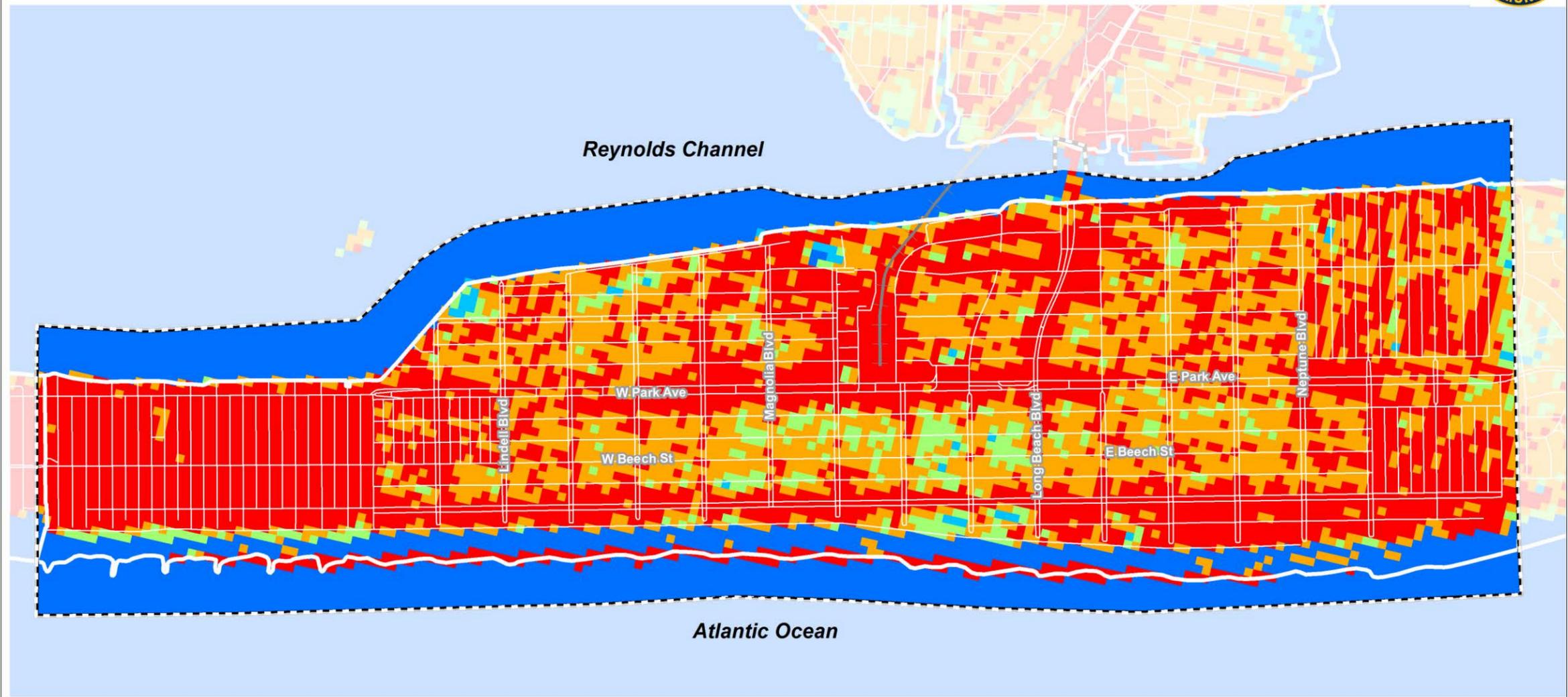
- The north shore of Long Beach has areas that repetitively flood even during moderate coastal storms and rainfall events. The north shore is not protected with bulkheading or other similar protective measures. New bulkheading, bulkhead improvement, canal gates, and other mitigation measures are needed throughout City on the north shore to protect against future flooding.
- Almost the entire City is within the FEMA Special Flood Hazard Area (SFHA), which indicates the repetitive nature of the flood risk and requires property owners with federally backed mortgages to purchase flood insurance. Only scattered small sites in different parts of the City are not in the SFHA (e.g., the northeast corner of Laurelton Boulevard and West Market Street is one site).⁴⁴
- Stormwater drainage is a challenge as the topography of the City is relatively flat and a majority of the City is covered by impervious surfaces (see Figure I-5). Tidal waters typically rise above stormwater outfall pipes during high tides. Green infrastructure techniques are needed to help transform the "grayscale" to "greenscape."
- Salt water intrusion has been a concern in the freshwater Lloyd Aquifer. A moratorium was enacted on granting new permits to drill water from the Lloyd Aquifer in 2010 to ensure that there is a safe level of withdrawal from the Aquifer⁴⁵. Enacting stormwater management measures will help to reduce the volume of stormwater runoff, control pollution, and encourage groundwater recharge which protects the drinking water supply.

- Power was out for more than 2 weeks, which resulted in no street lighting and unsafe conditions. To address unsafe conditions resulting from power outages, backup or alternative power lighting (e.g., solar-powered lighting) is needed.
 - The City does not have designated community assistance centers for residents where they can gather in emergency situations for help, news updates, and mutual support.
 - The City has an aging Water Pollution Control Plant and water tower that will need replacement.
 - The City has emergency operation and management needs, including needing a secure emergency operations center, a full-time Local Disaster Recovery Manager/Emergency Management Officer, emergency communications equipment, and a resiliency officer to help guide future redevelopment. Any efforts undertaken should be in close coordination with the Nassau County Office of Emergency Management (OEM).
 - Sections of the north shore, the Long Beach Boulevard gateway, and the Foundation Block remain vacant or underutilized. Sections II and III of this NYRCR Plan address this issue in more detail.
 - Additional waterfront-related and water-dependent uses are needed to capitalize on the City's oceanfront and bayfront assets.
 - Some businesses continue to struggle post-Sandy. The City reported that mercantile licenses, which are required for businesses to operate in Long Beach, numbered 300 in 2013, which is an approximately 10% decrease from 2012 (335) and 2011 (336).
 - Additional housing financial aid and reconstruction assistance are needed.
 - The City's Building Department estimates that approximately 20% of Long Beach residents impacted by Superstorm Sandy are still displaced and have not returned to Long Beach as of March 2014.
 - Balancing resiliency with neighborhood character is a challenge as some homes are rebuilt and elevated above the FEMA Base Flood Elevation. The new heights of these homes alter the traditional streetscape.
 - Key social service assets are still in need of further mitigation to prevent future flooding.
 - Emergency preparedness plans need to be updated to prepare for future events and coordinated with Nassau County OEM.
 - The former Long Beach Medical Center, the hospital on the barrier island, remains closed and filed for bankruptcy protection in February 2014, which means that residents seeking emergency care must travel off the barrier island to South Nassau Communities Hospital, Nassau University Medical Center, and other hospitals north of the barrier island.
 - Backup power generation sources are needed for many facilities.
 - Streetscape enhancements and implementation of a Complete Streets program is needed.
- Additional discussion of Long Beach's needs and opportunities can be found in Section II.

Figure I-5: Long Beach Percent of Impervious Surface

NY Rising Community Reconstruction Program

Source: USGS, NOAA, Nassau County
<http://www.csc.noaa.gov/digitalcoast/tools/isat>
http://www.mrlc.gov/nlcd06_data.php



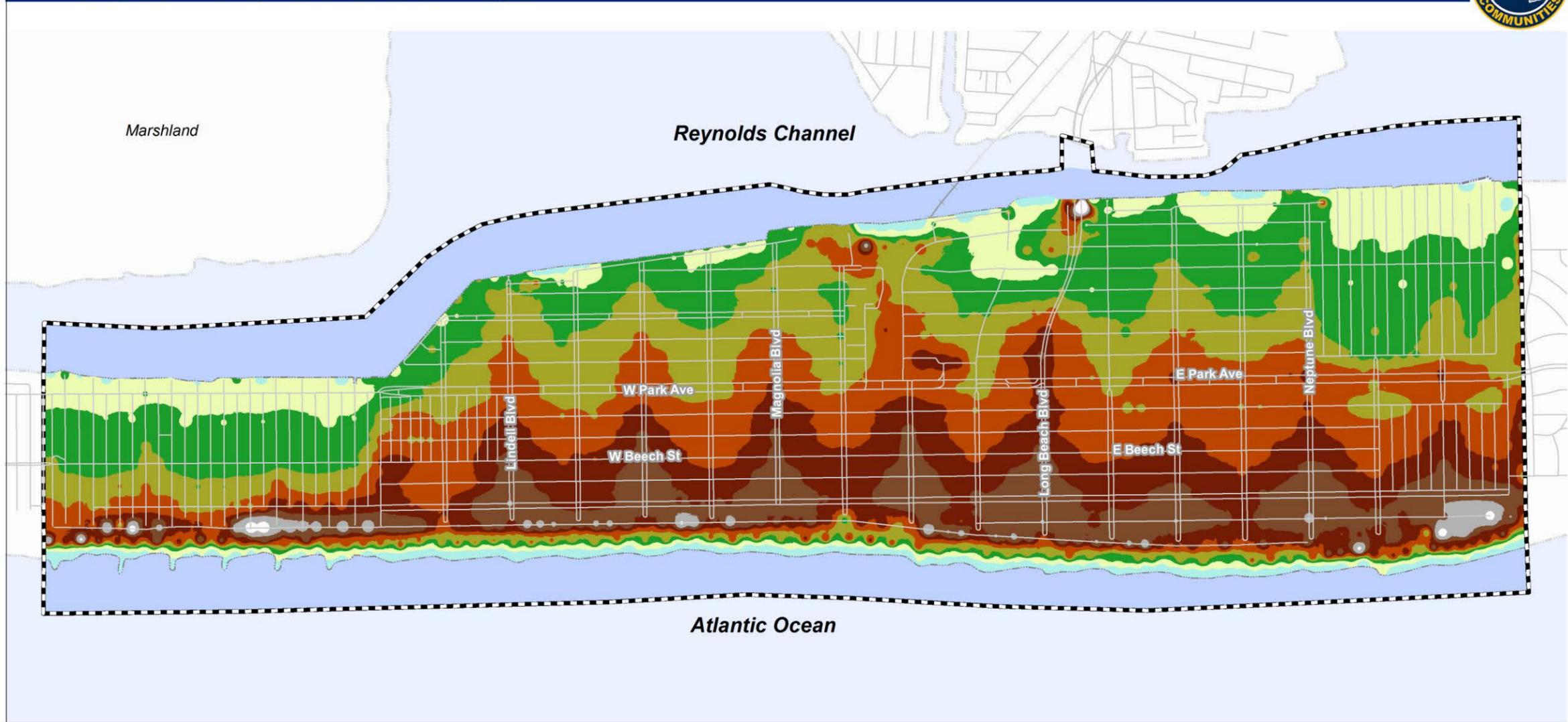
Impervious Surface, %

■ 62% - 100% ■ 44% - 61% ■ 25% - 43% ■ 8% - 25% ■ 0% - 7% Community



Figure I-6: Long Beach Topography (ft)
 NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, USGS, FEMA



Elevation (ft)

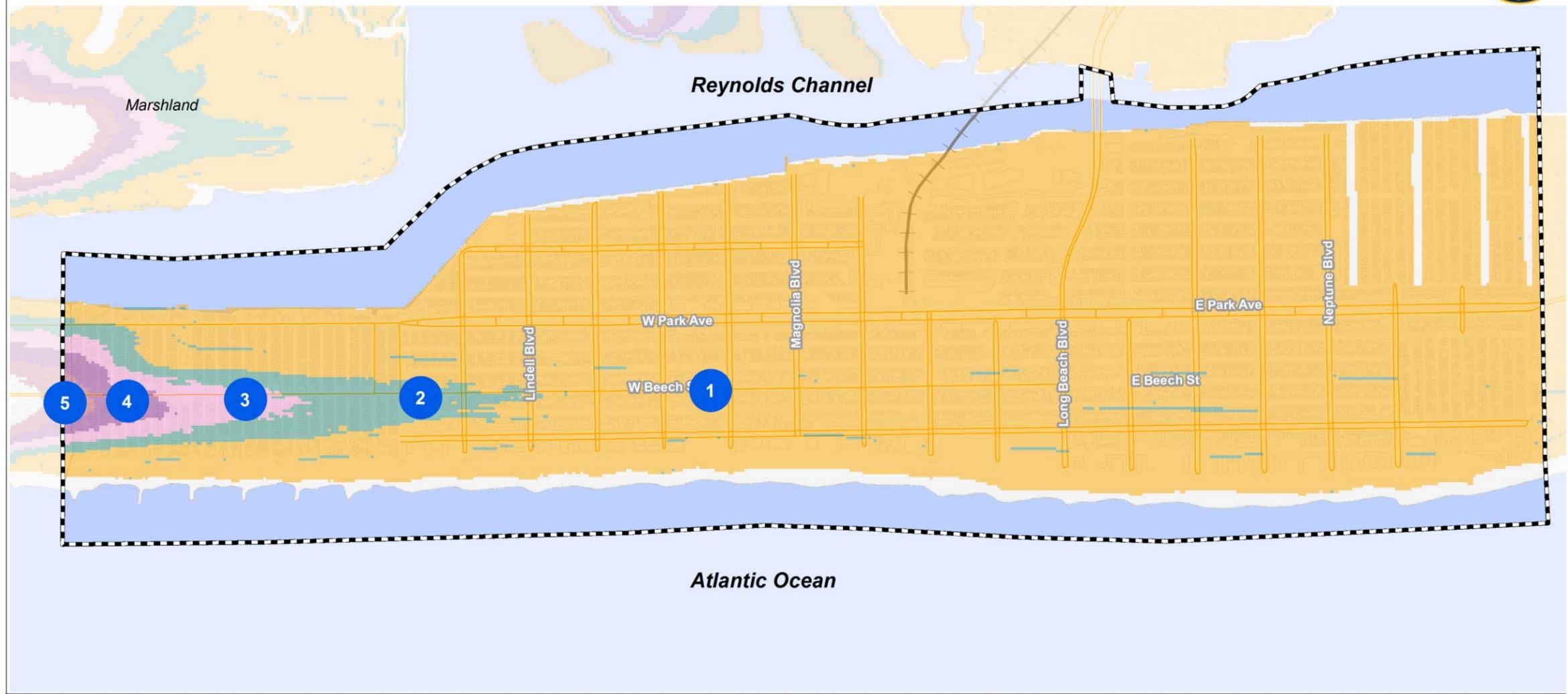
0 - 3.19	5.14 - 6.22	7.15 - 7.98	8.75 - 9.83	12.03 - 21.43
3.2 - 5.13	6.23 - 7.14	7.99 - 8.74	9.84 - 12.02	Community



Figure I-7: Long Beach Depth to Water Table (ft)

NY Rising Community Reconstruction Program

Source: USGS, ESRI, New York State
http://ny.water.usgs.gov/projects/gisunit/Long_Island_SIM3066.html



Depth (ft)





Figure I-8: Selected Key Words Used in the Development of the NYRCR Long Beach Vision Statement

D. Community vision

This section describes both the Committee’s vision statement for the NYRCR Plan and the City of Long Beach’s overall strategy to rebuild Long Beach stronger, smarter, and safer.

Long Beach has a long history of active resident participation in community meetings. More than 500 residents attended the Boardwalk visioning and redevelopment process meetings after Superstorm Sandy. Since Superstorm Sandy, residents have been particularly engaged in events related to recovery. During the NYRCR planning process, the Public Engagement Events had upwards of 100 people in attendance and members of the public also came to the Planning Committee meetings and participated in the discussion of priorities for the future. See Section V for more details on the public engagement process.

In September 2013, using a consensus-based approach, the Planning Committee selected the key words shown in the word cloud of Figure I-8 to develop the NYRCR Long Beach Vision Statement.

NYRCR Long Beach Vision Statement

Develop a vibrant, resilient, sustainable and green community that protects and enhances the safety, health, environment, diversity, culture and economy of current and future residents and guests of Long Beach.

Figure I-9: NYRCR Long Beach Vision Statement

The Vision Statement, shown in Figure I-9, was presented to the public for input and feedback at the October 10, 2013, Public Engagement Event at the Long Beach Public Library. The public reviewed the word cloud and vision statement as both “favorable” and the Vision Statement remained as drafted. The Vision Statement was subsequently presented in the NYRCR Long Beach Conceptual Plan (October 2013). More information on the public engagement process can be found in the Section V of this plan.

Rebuild stronger, smarter, and safer

The ultimate vision for Long Beach, which is shared by the Planning Committee and the City, is to rebuild and redevelop in a manner that addresses resiliency, sustainability, and greater prosperity to ensure Long Beach’s long-term success. This vision entails actions that protect homes, businesses, and facilities damaged by Sandy while providing a blueprint for enhanced economic development, recreation, and community services. Long Beach will use the momentum generated during the Long Beach Sandy recovery, including the NYRCR process, to continue addressing resiliency into the future. Long Beach will incorporate resiliency efforts in its redevelopment and development plans to continue addressing the risk posed by events like Superstorm Sandy as well as other more frequent coastal and stormwater flooding. As described in the National Disaster Recovery Framework (NDRF), recovery efforts should address other areas important to a community’s vitality, such as economic development, in addition to resiliency.



Overall, NYRCR Long Beach intends to help protect and then revitalize the Community. Specifically, the Community seeks to:

- Increase protection from both coastal and stormwater flooding.
- Increase housing resiliency. Long Beach’s most important assets are its residents. Opportunities remain to increase the resiliency of existing housing stock while also expanding housing options including affordable housing.
- Protect the north shore and then maximize the potential for land use by relocating some infrastructure, including the Water Pollution Control (sewage treatment) Plant, and downsizing the infrastructure footprint of other utilities in the area. Redevelopment of this area would take advantage of its bayfront setting and offer additional recreational opportunities, such as kayaking, to the residents of Long Beach.
- Connect the north shore area from the Recreation Center vicinity to the central business district along Park Avenue and then to the beach with more pedestrian and bike options as well as other transit options. Having other connections from the East and West Ends of the City and throughout the barrier island via a barrier island-wide trail system is also a long-term goal. In addition, connecting Long Beach to surrounding jurisdictions through implementation of Complete Streets principles, and addressing emergency ingress/egress routes, is a priority.
- Maximize waterfront usage, where possible, in a manner appropriate to Long Beach’s community while emphasizing recreational and cultural opportunities. Water-related and water-dependent uses that enhance the waterfront experience for both residents and guests through small-scale businesses, such as restaurants and kayak launches, will support this objective. Enhancing the waterfront will benefit both Long Beach residents and guests, as well as contribute to a larger regional identity with neighbors across the bay, such as the Village of Island Park and Barnum Island, and on the barrier island. Collectively, maximizing waterfront usage will help Long Beach connect with neighboring commercial activity centers and vice versa.

- Maximize the use of the land when large-scale redevelopment occurs in strategic areas. Rebuilding in a better, smarter manner means utilizing sustainable and resilient approaches. Developments should be geared toward supporting and accommodating existing residents and businesses while addressing affordable housing and growing desirable new businesses. Mixed-use transit-oriented development (TOD) in the vicinity of the LIRR Long Beach station, Waldbaum’s Shopping Center, and the City Hall vicinity would expand opportunities for residents to utilize transit along the LIRR Long Beach Branch.
- Expand Long Beach’s emergency preparedness operations.
- Develop dual-purpose facilities such as using community centers as community assistance centers and parking garages as elevated safe havens for emergency vehicles.
- Address multiple needs at once when replacing or redeveloping infrastructure, (e.g., combine modifications to underground utilities, including stormwater and sewer lines, during road construction). For example, streetscape improvements (including parking and bike lanes and pedestrian accommodations) can be implemented when sewer lines are replaced. Implementation of Complete Streets initiatives and stormwater drainage can be accomplished simultaneously, which will help ensure that emergency ingress/egress routes remain open and accessible to residents while encouraging economic revitalization through improvements to streetscapes.

As redevelopment occurs, it will be important to consider environmental justice concerns and simultaneously address affordable housing as increased economic activity will provide a revenue base to implement resiliency, sustainability, and affordable housing measures. Rebuilding and redevelopment opportunities are on the oceanfront, the downtown area, the bayfront, and along key corridors (connectors):

- **Oceanfront** – The City of Long Beach has a tremendous resource in its Boardwalk, Ocean Beach Park, and the natural dune system. Economic development opportunities exist for further enhancement of this area including the undeveloped Superblock (redevelopment proposal approved in February 2014) and Foundation Block parcels.

- **Bayfront** – The City has important recreational assets along the north shore including the Esplanade, municipal fishing pier, municipal boat launch, Veterans Memorial Park, and the Long Beach Recreation Center. Currently most of the bayfront has a concentration of industrial uses, which means much of this area is not as connected to the center of the City and the beach as it could be. As a discussion is underway to consolidate industrial uses on the north shore and transfer sewer treatment to the Bay Park STP, additional access for pedestrian and bicyclists could be made possible with redevelopment of the area. In addition, kayak access could also be installed to take advantage of access to Reynolds Channel.
- **Central Business District and commercial areas** – Implementing TOD and redevelopment around the LIRR station and the Waldbaum’s Shopping Center is a possibility for Long Beach. TOD is a higher-density mixed-use (commercial and residential) development design where access to mass transit is maximized to decrease dependency on automobiles. To explore this idea further, a feasibility study may be needed to evaluate and identify opportunities for resilient and sustainable mixed-use development that also includes affordable housing. Parking needs in both the Central Business District and the West End through structured parking will also need to be considered.
- **Connectors** – Long Beach has an opportunity to enhance its commercial corridors along Park Avenue and Beech Street (east to west) and connecting the City from the bayfront to the beach (north to south). Given Long Beach’s size and the availability of rail, bicycling could be a more viable mode of transportation if infrastructure was designed to better accommodate it. Implementing Complete Streets principles and creating bicycle and pedestrian connections throughout the City, and to neighboring communities, will enhance the area, provide further economic development possibilities, and expand transportation choices for pedestrians, bicyclists, and transit riders.

This NYRCR Plan is another step in the direction of realizing this vision. Investments considered today are in line with this larger-scale vision and will help bring Long Beach closer to rebuilding stronger, smarter, and safer.



Long Beach first Public Engagement Event, October 10, 2013

Source: NYRCR Long Beach Planning Committee

E. Relationship to regional plans

Table I-2 is a review of Long Beach and regional plans that contributed to an understanding of recurring and remaining needs and opportunities for historical context. Following the table are brief summaries of regional plans prepared after Superstorm Sandy that relate to issues and situations facing Long Beach. The table provides notations on whether the reviewed plans were developed prior to the recession of 2008 and Superstorm Sandy, as much has changed since those plans were developed.

Table I-2: Reviewed Plans and Studies Relevant to Long Beach

Reviewed Plan/Study	Date	Relevant Information
City of Long Beach Comprehensive Plan: Technical Memorandum – Existing Conditions Issues and Opportunities (Draft of Local Waterfront Revitalization Program [LWRP])	May 2005 ⁽¹⁾⁽²⁾	Community planning/capacity building, economic development, health and social services, housing, infrastructure, natural and cultural resources – <i>Plan not adopted</i>
Long Beach Comprehensive Plan	April 2007 ⁽¹⁾⁽²⁾	Community planning/capacity building, economic development, health and social services, housing, infrastructure, natural and cultural resources
Long Beach Comprehensive Plan Environmental Assessment	April 2007 ⁽¹⁾⁽²⁾	Economic development, health and social services, housing, infrastructure, natural and cultural resources
Nassau County Hazard Mitigation Plan	2007 ⁽¹⁾⁽²⁾	Infrastructure
Coastal Protection Study LB – Oceanside Shore Protection Plan	November 2009 ⁽²⁾	Community planning/capacity building, infrastructure, natural and cultural resources
Coastal Protection Study LB – Bayside Flood Protection Plan	November 2009 ⁽²⁾	Community planning/capacity building, infrastructure, natural and cultural resources
Conditions Evaluation of Bulkheads & Outfall Structures in the City of Long Beach, New York	August 2013	Infrastructure, natural and cultural resources
Long Beach Environmental Resources (LWRP Draft)	November 2007 ⁽¹⁾⁽²⁾	Infrastructure, natural and cultural resources
Long Beach Existing Land and Water Uses (LWRP Draft)	November 2007 ⁽¹⁾⁽²⁾	Community planning/capacity building, economic development, housing
Long Beach Brownfield Opportunity Areas Study	February 2009 ⁽²⁾	Community planning/capacity building, economic development, housing, infrastructure, natural and cultural resources
USACE, Draft Hurricane Sandy Limited Reevaluation Report (HSLRR) and Environmental Assessment (EA)	March 2014	Infrastructure, natural and cultural resources
USACE LB Jones Inlet to East Rockaway Inlet Hurricane and Storm Damage Reduction Reevaluation Report and summary review memo	February 2006 (MSC Approval Date: January 11, 2008); (Last Revised November 15, 2012) ⁽¹⁾⁽²⁾	Community planning/capacity building, economic development, housing, infrastructure, natural and cultural resources
USACE Jones Inlet to East Rockaway Inlet Feasibility Report	February 1995 ⁽¹⁾⁽²⁾	Community planning/capacity building, infrastructure, natural and cultural resources
USACE, North Atlantic Division. North Atlantic Coast Comprehensive Study (NACCS): Nassau County Back-bays Focus Area Analysis	September 20, 2013	Infrastructure, natural and cultural resources
Nassau County Infill Redevelopment Feasibility Report	May 2013	Community planning/capacity building, economic development, housing, infrastructure



Table I-2: Reviewed Plans and Studies Relevant to Long Beach (Continued)

Reviewed Plan/Study	Date	Relevant Information
Nassau County Stormwater Runoff Impact Analysis – Procedures Manual		Infrastructure
Long Island’s South Shore Bayway Strategic Implementation and Marketing Plan	April 2009 ⁽²⁾	Natural and cultural resources
Nassau County Drainage Requirements		Infrastructure
Long Island South Shore Estuary Reserve Comprehensive Management Plan	April 2001 ⁽¹⁾⁽²⁾	Infrastructure, natural and cultural resources
Long Island Comprehensive Economic Development Strategy: Supplementary Information	August 2012 ⁽²⁾	Infrastructure
Cleaner Greener Long Island Regional Sustainability Plan	May 2013	Community planning/capacity building, economic development, health and social services, housing, infrastructure, natural and cultural resources
Progress and Promise: The Strategic Economic Development Plan For Nassau and Suffolk Counties	2012 Update – Building a Foundation for Long Island’s Future ⁽²⁾	Infrastructure
Draft Long Beach Sewage Treatment Plant Alternatives Feasibility Study	2009 ⁽²⁾	Infrastructure
Long Beach Stormwater Management Plan	2012 ⁽²⁾	Infrastructure
Long Beach Capital Improvements Plan	2012 ⁽²⁾	Infrastructure, community planning/capacity building, economic development
City of Long Beach Zoning Ordinance	2009, with revisions as of 2011 ⁽²⁾	Community planning/capacity building
A New Vision for Long Island’s Economy: The Strategic Economic Development Plan for Nassau and Suffolk Counties	2011 ⁽²⁾	Community planning/capacity building, economic development, health and social services, housing, infrastructure, natural and cultural resources
Strong Island: The Story of a Region’s Recovery and Resurgence: Long Island Regional Economic Development Council	2013 Update	Community planning/capacity building, economic development, health and social services, housing, infrastructure, natural and cultural resources

(1) = **Pre-2008 Recession** – Important to note because the economic outlook, assumptions, and expectations have changed significantly since this time

(2) = **Pre-2012 Sandy** – Any information pre-Sandy likely does not anticipate the level of destruction, disruption, and change that has taken place from Superstorm Sandy despite the knowledge that a significant event could be devastating to the community



Below are highlights from recent key regional plans that address post-Superstorm Sandy conditions relevant to Long Beach:

Strong Island – The story of a region’s recovery and resurgence

The City of Long Beach is within the jurisdiction of the Long Island Regional Economic Development Council (LIREDC). The LIREDC recently prepared plans that address critical issues post-Superstorm Sandy, including their 2013 update entitled: *Strong Island – The Story of a Region’s Recovery and Resurgence*.

Key regional priorities from the LIREDC report relevant to the NYRCR Long Beach Plan include (Long Beach actions since the plan’s development are in *italics*):

- **Bay Park Sewage Treatment Plant** – Consolidation with Long Beach’s Water Pollution Control Plant is being considered in addition to other regional connections. The plant has been operating on temporary measures since its failure during Superstorm Sandy. Mitigation measures and additional changes, including creating an ocean outfall to prevent future contamination of Reynolds Channel, Hempstead Bay, etc., are being discussed. *The State has announced the commitment of \$810 million in Federal funds for the comprehensive rehabilitation and mitigation of the Bay Park STP, including the construction of a protective 500-year storm barrier around the plant (which will take into account sea-level rise), elevating and hardening the Electrical Plant Distribution System, repairing existing generators, elevating and/or hardening 57 pump stations that serve the plant, building a larger sewage collection line, and hardening and replacing sludge dewatering equipment and building.*⁴⁶
- **Reynolds Channel Shoreline Stabilization** – The regional plan discusses stabilizing the Reynolds Channel shoreline to provide a barrier to prevent tidal water from inundating the City. This effort is considered a priority in order to enable revitalization of the north shore. *As noted in "Actions since Superstorm Sandy," a project to install bulkheading along the north shore near the City’s major utilities will be funded, per an announcement by New York State.*

- **Infrastructure to support additional rental housing** – Historically, rental vacancies have been low on Long Island, and post-Sandy few rental properties are available. Construction of rental housing and associated infrastructure (sewer, wastewater treatment plants, roads, and transit lines) is encouraged. *Affordable housing is an issue that Long Beach will continue to address.*

Cleaner Greener Long Island Regional Sustainability Plan

The *Cleaner Greener Long Island Regional Sustainability Plan* from May 2013 also includes a number of goals that are relevant to the NYRCR planning process. Key regional priorities from this sustainability plan include:

- Advancing Superstorm Sandy recovery and rebuilding by providing incentives for greener and more resilient developments, encouraging relocation locally outside the floodplain, and encouraging rapid restoration of the electric grid. *Long Beach is considering several greener and more resilient redevelopment options.*
- Improving energy efficiency. *Long Beach is encouraging solar power as an alternative energy source.*
- Improving transportation options. *Long Beach has applied for Complete Streets grants to improve transportation.*
- Increasing the development of green infrastructure to control flooding and decrease pollution from stormwater runoff. *Long Beach has applied for grants to implement green infrastructure and improve stormwater drainage.*
- Encouraging regional coordination of sustainability planning and its implementation.

Additionally, the May 2013 plan includes recommended strategies to address climate change, such as updating comprehensive plans to address sea-level rise, flooding, and storm surges; updating building codes; adopting protection and mitigation measures to protect infrastructure; and updating emergency management plans. *Funding was recently approved for an update to Long Beach’s comprehensive plan. The City is considering mitigation measures to protect key facilities as part of the NYRCR process.*

Many of the recommendations found in this NYRCR Plan align with the strategies set forth in the previously mentioned regional plans. Reconstruction and resiliency strategies are detailed in Section III.

Regional Perspectives

In addition to considering the elements from the above plans, mitigating the risk of damage from future storms to increase resiliency will require regional as well as local actions. Although Long Beach is an incorporated city in Nassau County and has many of its own capabilities and authorities, it is still dependent on other entities, including utility companies (e.g., power and natural gas) and the LIRR, for services. In some cases, it is also in the City's best interest to collaborate with neighboring municipalities and jurisdictions to develop projects and coordinate resources. Some issues discussed in the NYRCR Plan cross political jurisdictions and need to be coordinated on a regional basis. For the NYRCR Long Beach community, the greater region to consider includes the entire barrier island, Nassau County, as well as greater Long Island.

Neighboring municipalities and communities on the barrier island include the Village of Atlantic Beach and the unincorporated areas of East Atlantic Beach, Lido Beach, and Point Lookout, which are part of the Town of Hempstead. Coordination with these communities and those across Reynolds Channel (e.g., Village of Island Park, Barnum Island) may help provide economies of scale to obtain needed resources for regional projects. Those projects include:

- Larger regional storm barrier projects;
- Improving established evacuation routes, transportation connectivity, a network of TODs, and Complete Streets and stormwater improvements;
- A shoreline improvement district to help deal with common issues, such as the need for bulkheading designed and built to a uniform height and for storm protection;
- Emergency services; and
- Microgrids and potential alternative power generation.

The large-scale USACE Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, NY Hurricane Sandy Limited

Reevaluation Report (HSLRR) for Coastal Storm Risk Management project is an example of a regional project already in process. Intergovernmental disaster response agreements with these communities may be beneficial to all.

Coordination with other communities to promote the development of green infrastructure including permeable pavement, bioswales, rain gardens, and gray water reclamation would be beneficial. In addition, the City, the Town of Hempstead, and Nassau County can coordinate on issues including sewage treatment, evacuation routes, and restoring marsh and wetland areas already affected by storms. Recreational opportunities such as bike trail along the entire barrier island, kayaking in the back bay, and a water taxi could be explored.

There is also an opportunity to partner regionally to develop and potentially implement small business revitalization programs to support the recovery of local businesses so they are able to contribute to the local economy.

Power and natural gas are supplied by substations and a pipeline that is located (and originated) outside of the Long Beach jurisdiction. Coordination with National Grid and LIPA/PSEG is necessary to secure backup power sources and protect transmission and distribution facilities that are still vulnerable. In addition, the City can work with LIPA/PSEG to install smart meters on homes and businesses to better monitor energy usage and to build a smart grid.

The LIRR is a vital link for residents from Long Beach to New York City and the rest of Long Island. Coordination with the LIRR to ensure that train service remains operational is important. In addition, there is an opportunity to protect the Long Beach LIRR Station and its track leading up to Long Beach. In October 2013, the State announced that contracts have been awarded to repair and elevate two of the three damaged electrical substations along the LIRR Long Beach Branch.

Continued coordination with the USACE, NYS Department of Environmental Conservation, the Town of Hempstead, Nassau County, and the City of Long Beach will continue for the HSLRR for Coastal Storm Risk Management project. The \$178 million dollar fully federally funded project is scheduled to begin in fall 2014. This project will maintain and enhance the oceanfront dunes and beaches, rehabilitate the groins, and install dune walkovers.

Continuing coordination with the Nassau County communities on the bayfront to develop a plan for resiliency is another important regional coordination effort underway. The USACE North Atlantic Division evaluated the back-bays area in the *North Atlantic Coast Comprehensive Study (NACCS): Nassau County Back-bays Focus Area Analysis* and determined that there is additional need for developing feasibility studies to evaluate coastal storm damage, risk reduction, and flood risk management.⁴⁷

Communication systems warrant regional coordination as well and could be coordinated with Nassau County OEM. The City could further discuss coordination with cell phone carriers on implementing a plan to ensure uninterrupted service and better response when signals are lost during a storm or emergency. The potential of developing a regional emergency radio broadcast or crowdsourcing system to facilitate communication with residents when telecommunications and traditional media outlets are unavailable should be explored in discussions with Nassau County Office of Emergency Management.



Long Beach LIRR Station
Source: Sustainable Long Island

On December 5, 2013, representatives from the NYRCR Village of Atlantic Beach/East Atlantic Beach, City of Long Beach, Lido Beach/Point Lookout, and Barnum Island/Harbor Isle/Village of Island Park/Oceanside

Communities gathered together to discuss issues of regional interest and concern. These issues included coastal protection (both for the bayfront and the oceanfront), stormwater management, green infrastructure, Complete Streets, water/wastewater, and microgrid systems. The purpose of the workshop was to provide an educational context for the NYRCR Communities to discuss the benefits and applicability of different resilient and protective measures and provide examples of models that have worked well in other areas.

In January and February 2014, the State and the Consultant Team participated in additional meetings and discussions with other Nassau County NYRCR communities to discuss potential projects of regional significance. The State and the Consultant Team also met twice with the Nassau County Office of Emergency Management (OEM). The first meeting was on February 25, 2014, and involved a general discussion about the relevant Emergency Relief projects for Nassau County OEM to review. The second meeting was on March 5, 2014, where each project was discussed in detail and decisions were made on specific formatting and level of responsibility.

The State and the Consultant Team also met with representatives from the Town of Hempstead (TOH) on February 25, 2014, so TOH could become familiar with the Long Beach potential project list. While TOH does not have jurisdiction in the City of Long Beach, it is involved in coastal permitting. TOH is also interested in how Long Beach potential projects will influence adjacent TOH areas such as East Atlantic Beach and Lido Beach. A second meeting occurred on March 6, 2014, with additional dialogue on the potential Long Beach projects, including ideas and suggestions to make the projects more feasible.

Later in Sections III and IV, projects of regional significance are identified. Regional significance can mean that a project protects an asset that is used by several communities (e.g., reduce flooding on an established evacuation route) or it is the community's part in a more global project that spans several communities (e.g., a community restores the dunes on its part of a barrier island). In addition, some Long Beach departments, such as the Fire Department, protect other communities on the barrier island, including the Atlantic and East Atlantic Beach fire districts. Any actions to protect the Long Beach Fire Department would take on regional significance.



Section II: Assessment of risk and needs

Photo: Flooding from Hurricane Irene in North Park
Source: NYRCR Long Beach Planning Committee

Section II:

Assessment of risk and needs

A. Description of community assets and assessment of risk

Description of community assets

Long Beach is a diverse community on a barrier island, and it has many resources and assets. Assets, in the context of this planning process, are individual structures, infrastructure, community facilities, and/or natural amenities that provide a level of service or offer an opportunity for the residents and guests of Long Beach. Many of Long Beach's assets are not only individual locations but also part of overall systems. Systems include stormwater drainage, road, sewer, and drinking water, as well as natural features, including the beach and Reynolds Channel.

New York State Department of State (NYS DOS) risk areas (shown in Figure II-1 and subsequent asset maps) were developed based on the information listed in Table II-1. Assets in extreme- or high-risk areas have a greater chance of flooding and damage compared to assets in moderate-risk areas. Extreme-risk areas are areas that are prone to coastal erosion and flooding and are within the Federal Emergency Management Agency (FEMA) Coastal V Zones. High-risk areas are subject to flooding from the 100-year storm and moderate-risk areas are subject to flooding from 500-year storms.

Many, if not all, of Long Beach's key assets, as identified through the NY Rising Community Reconstruction (NYRCR) Program planning process, were affected by Superstorm Sandy, and to a lesser degree by Hurricane Irene. Assets identified in the initial NYRCR Planning Committee Meetings and the first and second Public Engagement Events (in 2013) were included in the community asset inventory. Assets were grouped by the NYRCR community asset classes, which include: Economic; Health and Social Services; Housing; Infrastructure Systems; Natural and Cultural Resources; and Socially Vulnerable Populations. Some assets, because of their function and service base, fit more than one class and were listed in both asset class sections. An

example would be a senior housing asset that also serves a socially vulnerable population.

The focus of the asset inventory highlights the critical community assets that, if impaired by a storm event, would compromise the essential infrastructure, health and social (including public safety), economic, or environmental functions of Long Beach. The critical assets that are crucial to emergency response functions (e.g., police, fire) and basic daily services (e.g., water, power, communication, wastewater) for the whole community before, during, and after disaster events were given the highest community value.

The NYRCR Long Beach community assets are listed below with additional details provided throughout this section and in the full Community Asset Inventory in Section V, Additional Materials.

- Beachfront area and Boardwalk from New York Avenue to Neptune Boulevard;
- Cell towers;
- City Hall and other government facilities;
- City library;
- Existing bulkheading on the north shore;
- Georgia Street and Clark Street Splash Parks;
- Hess and Mobil gas stations and Williams/Transco high-pressure gas pipeline;
- Historic structures;
- Hotels;
- Houses of worship; and
- Kennedy Plaza and Veterans Memorial Park.

Table II-1: New York State Department of State Risk Areas

Extreme Risk Area	High Risk Area	Moderate Risk Area
<ul style="list-style-type: none"> • FEMA Coastal V Zones • NWS advisory thresholds for shallow coastal flooding • Areas within 3 feet of elevation of mean higher high water shoreline from the National Oceanic and Atmospheric Administration • Areas prone to erosion 	<ul style="list-style-type: none"> • FEMA 1% annual (100-year) flood risk (FEMA Zone V and Zone A) • Areas within 3 feet elevation of NWS advisory thresholds for shallow coastal flooding 	<ul style="list-style-type: none"> • FEMA 0.2% annual (500-year) flood risk • Areas within 3 feet of elevation of FEMA 1% annual flood risk (base flood elevations) • Area bounded by SLOSH Category 3 hurricane inundation zone

Source: New York State Department of State
 FEMA = Federal Emergency Management Agency
 NWS = National Weather Service
 SLOSH = Sea, Lake, and Overland Surge from Hurricanes





Identification of community assets at Planning Committee Meeting, September 27, 2013,

Source: URS

- Long Beach Boulevard Bridge
- Long Beach Boulevard Gateway area
- Long Beach Ice Arena, Long Beach Recreation Center, and bayfront Esplanade
- The former Long Beach Medical Center (hospital on the barrier island)
- Long Island Railroad Station
- Magnolia, Pacific Street, and Leroy Conyers Playgrounds
- Magnolia Senior/Community Center
- Major arterial roadways, including Beech, Broadway, and Park
- Major undeveloped parcels, such as the Foundation Block and Superblock (redevelopment proposal approved in February 2014)
- Martin Luther King, Jr. (MLK) Community Center

- North shore brownfield/former industrial area and other brownfield sites for economic redevelopment
- Post office
- Power supply infrastructure
- Reynolds Channel
- Sherman Brown basketball courts and tennis and handball courts
- Police and fire stations
- Schools - West, East, and Lindell Elementary
- Senior/affordable housing locations including Pine Town Homes, Channel Park Homes, and four senior public housing units
- Stormwater management systems and other drainage facilities
- Three key commercial districts: Park Avenue, the West End, and the East End
- Water Pollution Control (sewage treatment) Plant and pump/lift stations
- Water Purification (water treatment) Plant and wells

Figure II-1 identifies the locations of all of Long Beach's assets, including both public and private assets. Additional details on the City of Long Beach's important assets and accompanying maps are categorized in the following pages by the NYRCR asset classes. The assets in the Figure II-1 map each have a specific number that carries through to the maps that are specific to asset class.



West Elementary School
Source: The LiRo Group



Evacuation route sign on Park Avenue at National Boulevard
Source: The LiRo Group

Figure II-1: Long Beach Community Asset Map

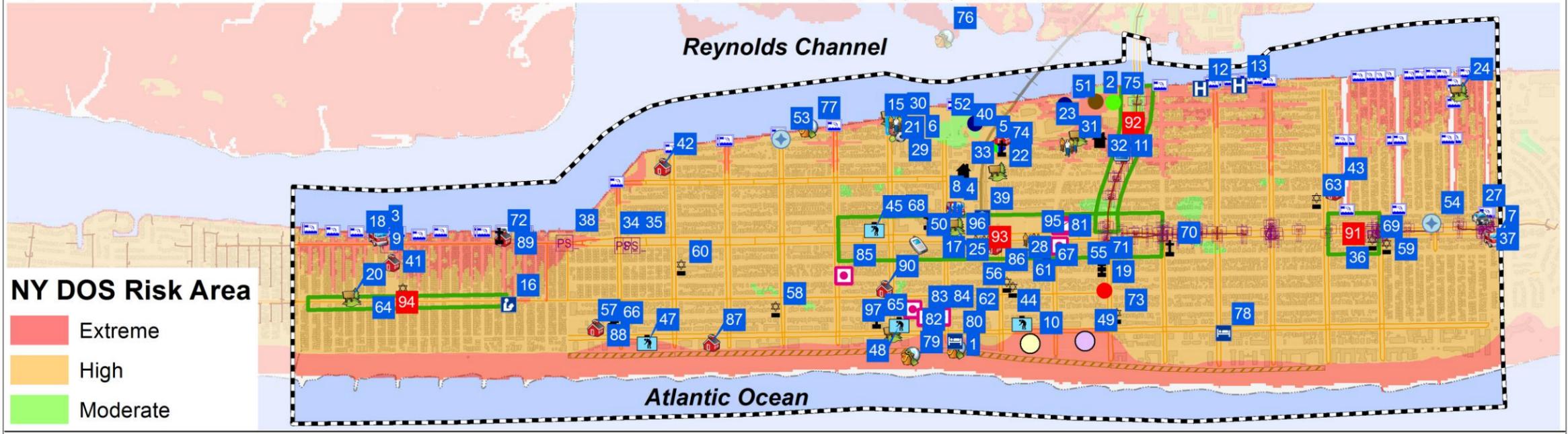
NY Rising Community Reconstruction Program

Source: Nassau County, ESRI, New York State, Community Input, FEMA



Community Assets

- | | | | | | | |
|-------------------------------------|------------------------------------|----------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|
| 01) Boardwalk | 15) Long Beach Ice Arena | 29) Long Beach Recreation Center | 43) East Elementary School | 57) Church of Saint Ignatius Martyr | 71) Cruzada Evangelica Misionera | 85) Alvarado/Barr Historical Site |
| 02) Brownfield | 16) West End Branch Library | 30) Magnolia Senior/Comm. Center | 44) Morton Cohen Apartments | 58) Sephardic Congregation | 72) Peoples Church | 86) Harriet Eisman Community School |
| 03) Cellular Tower | 17) Long Beach Main Library | 31) MLK Community Center | 45) Sol Scher Apartments | 59) East End Synagogue | 73) Young Israel Of Long Beach | 87) Hebrew Academy Of Long Beach |
| 04) Long Beach City Hall | 18) Lift Station | 32) Pine Town Homes | 46) Michael Valente Apts | 60) Temple Beth El | 74) Christian Light Baptist Church | 88) Long Beach Catholic School |
| 05) Head Start | 19) Natural Gas Pipeline | 33) Channel Park Homes | 47) Beach Terrace Care Center | 61) Temple Israel | 75) PSEG Substation | 89) Montessori Childrens School |
| 06) Department of Public Works | 20) Georgia Water Park | 34) Pump and Lift Station | 48) Sonny Duckman Sr Housing | 62) Temple Bachurei Chemed | 76) Reynolds Channel | 90) Torah High School |
| 07) Long Beach Fd Station 1 | 21) Veterans Memorial Park | 35) Pump and Lift Station | 49) Superblock | 63) Temple Emanuel | 77) Bayfront Esplanade | 91) Commercial Area-East End |
| 08) Long Beach Fire HQ | 22) Leroy Conyers Park | 36) Pump and Lift Station | 50) Verizon Substation | 64) Temple Zion | 78) Long Beach Hotel | 92) Commercial Area-Long Beach Blvd |
| 09) Long Beach Fd Station 2 | 23) Sherman Brown Sports Court | 37) Pump and Lift Station | 51) Water Purification Plant | 65) St James Church | 79) Beach | 93) Commercial Area-Park Ave |
| 10) Foundation Block | 24) Clark Street Park | 38) Pump Station | 52) Water Pollution Control Plant | 66) St Ignatius Martyr Church | 80) Allegria Hotel | 94) Commercial Area-West End/Beech St |
| 11) Long Beach Municipal Bus Garage | 25) Kennedy Plaza | 39) LIRR - Long Beach | 53) Well | 67) St Johns By The Sea Church | 81) Granada Towers | 95) Latino Civic Association |
| 12) Long Beach Hospital E C F Bldg | 26) Long Beach Police HQ | 40) Long Beach Head Start | 54) Well | 68) Church Of Christ | 82) Ross Residence Historic Site | 96) Circulo de la Hispanidad |
| 13) Long Beach Medical Center | 27) Long Beach Auxiliary Police HQ | 41) West Elementary School | 55) First Church of Christ Scientist | 69) Temple Beth Sholom | 83) Long Beach Historical Museum | 97) Magnolia Park |
| 14) Seaview Terrace Apartments | 28) U S Post Office Long Beach | 42) Lindell Elementary School | 56) Bachurei Chemed Synagogue | 70) St Mary Of The Isle Church | 84) St. James Church Historical Site | |



NY DOS Risk Area

- Extreme
- High
- Moderate

Legend

- | | | | | | | |
|------------------|--------------------|-------------------|-----------------|-------------------|-------------|------------------|
| Beach | Day Care Facility | Hospital | Gas Pipeline | Railroad | Super Block | Community |
| Brownfield | Dept. Public Works | Hotel | PSEG Substation | Recreation Center | Synagogue | Drainage Pipes |
| Cell Tower | Drainage Outfalls | Ice Skating Rink | Park | School | Wastewater | Boardwalk |
| Church | Fire | Landmark | Police | Senior Housing | Well | Commercial Areas |
| City Hall | Foundation Block | Library | Post Office | Stormwater | | |
| Community Center | Garage | Pump/Lift Station | Public Housing | | | |



Economic critical assets

Economic assets maintain or generate employment and have the potential to generate additional revenue through future development by attracting guests. Economic assets consist of neighborhood commercial and downtown commercial areas, industrial areas, shopping centers, and seasonal visitor destinations. Most of the small businesses in Long Beach were devastated by Superstorm Sandy. Protection of both current and future economic assets will assist in implementing Long Beach's economic recovery and achieving greater economic prosperity. Needed protective measures include shoreline defenses along the ocean and the bay, stormwater management, installation of flood barriers, and implementation of backup power.

Long Beach's economic assets include the following commercial districts: the West End, the Park Avenue commercial area around City Hall and the Long Island Rail Road (LIRR) Station (including the Waldbaum's Shopping Center), East Park Avenue in the East End, and the Long Beach Boulevard gateway area oriented toward industrial and auto-dependent uses. The Park Avenue commercial areas and the West Beech Street in the West End are predominantly made up of small businesses. The LIRR station area in the Park Avenue commercial area allows residents and businesses easy access to transit.

Seasonal destinations, including the Boardwalk, the beach, the recreation area near the bay, and the bayfront Esplanade, are critical economic drivers bringing in guests into the NYRCR Community (Community). Related assets include the Long Beach and Allegria Hotels. Additional key economic drivers include the former Long Beach Medical Center (which occupies a valuable site and was a former large employer that has remained closed as of March 2014), the City of Long Beach (a large employer), and the MLK Community Center, which provides youth and family programming (see Table II-2).

Opportunities for additional economic development include the undeveloped north shore brownfield site, the Superblock (redevelopment proposal approved in February 2014), and the Foundation Block. In addition, the Hebrew Academy of Long Beach (530 W. Broadway) is another parcel along the Boardwalk that may be for sale by March 2014 as a result of the relocation of the Academy's elementary school off the barrier island.⁴⁸ These parcels, along with the site of the current Water Pollution Control Plant next to the Recreation Center area, offer larger-scale redevelopment

opportunities. The LIRR Station area, including City Hall and the Waldbaum's Shopping Center, along with the West End, offer areas that could be transformed by redevelopment. Any redevelopment should factor in resiliency. Figure II-2 displays Long Beach's important economic assets.



Waldbaum's Shopping Center

Source: Planning4Places, LLC

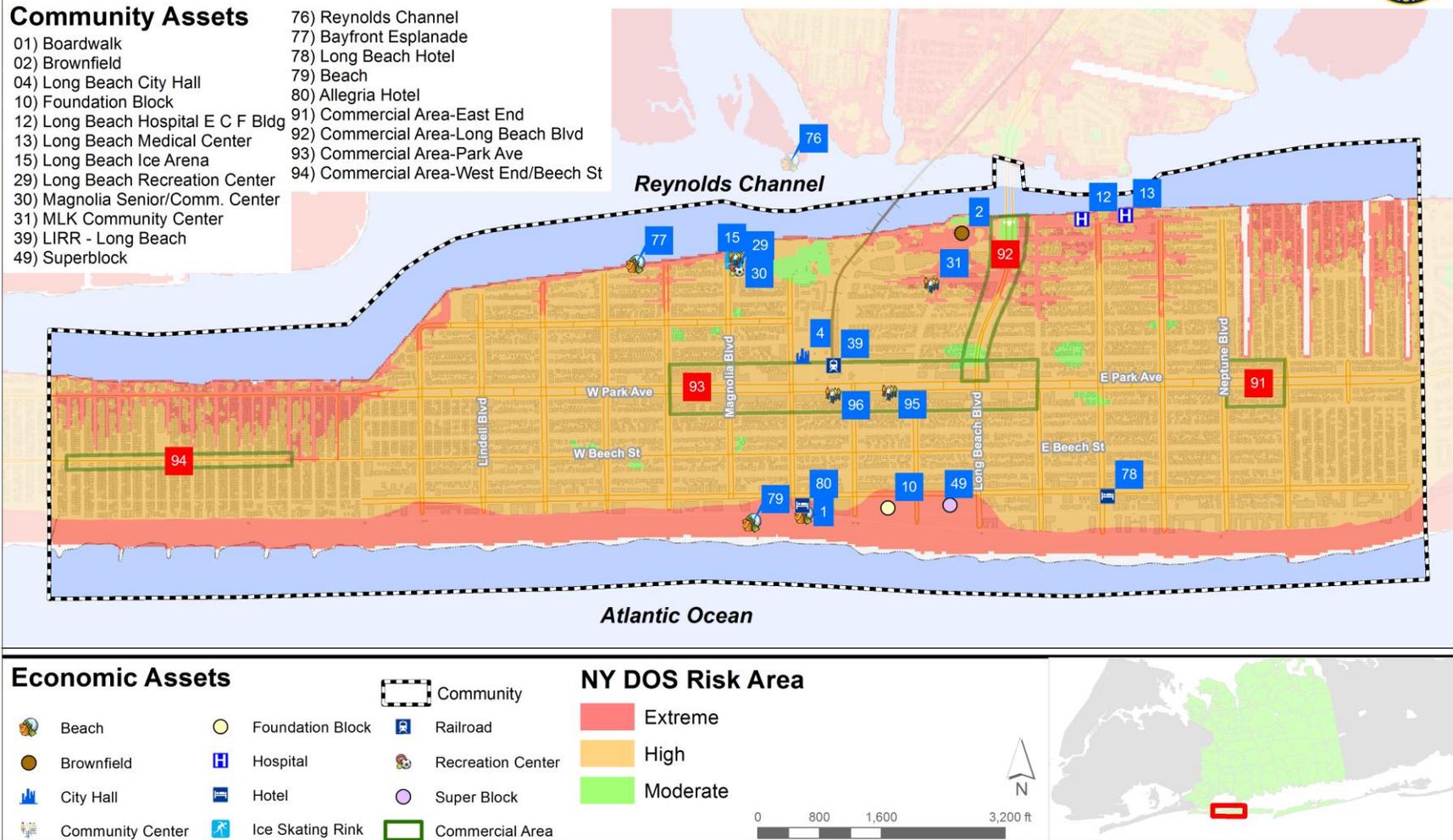
Table II-2: Economic Drivers

Name	Location	Description
Long Beach Boulevard "Gateway Area"	Long Beach Blvd. between Reynolds Channel and E. Park Ave.	Retail and service-oriented uses, including drug stores, fast food, banks, tire/oil/mechanic shops, gas, and convenience stores. Strip also has a few vacancies/underutilized lots.
East End Retail/Commercial	E. Park Ave. from Neptune Blvd. to Roosevelt Blvd.	Residential, doctor-type uses in former homes, grocery store, small retail, and small restaurant strip
Park Avenue Retail/Commercial	W. Park Ave. from Lafayette Blvd. to Long Beach Blvd. and E. Park Ave. to Monroe Blvd.	Waldbaum's Shopping Center, medical/office uses, gas, mechanic, CVS, small retail and service uses – some stand-alone some attached, chain and non-chain restaurants, and mid-rise residential
West End Retail/Commercial	W. Beech St. from Ohio Ave. to New York Ave.	Small retail; with some mixed-use residential on 2nd floor
Allegria Hotel	80 West Broadway	143-room hotel adjacent to the beach and Boardwalk
Long Beach Hotel	405 East Broadway	126-room hotel near the beach and Boardwalk
Ocean Beach Park & Boardwalk	New York Ave. to Neptune Blvd.	Beach and 2¼ mile Boardwalk serving multiple recreation and community uses
Long Beach Ice Arena	150 West Bay Dr.	Skating and hockey arena
Long Beach Recreation Center	660 Magnolia Blvd.	Large multi-purpose recreational center, which has a fitness center, pool, and other amenities
Former Long Beach Medical Center	455 East Bay Dr.	The barrier island's hospital was the largest employer in the City prior to Superstorm Sandy
MLK Center	615 Riverside Blvd.	Youth and family programming
City Hall/Auxiliary City Facilities	City Hall – 1 West Chester St. and other locations	A large employer with seasonal variation for some departments (such as lifeguards)



Figure II-2: Long Beach Economic Assets
 NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, Community Input, FEMA



Health and social services critical assets

Health and social services assets provide vital community services to residents, especially in emergencies. Ensuring that health and social services remain available before, during, and after storm events is very important to protecting the health and safety of Long Beach's residents. Health and social service assets house government functions such as the U.S. Post Office, City Hall, the Department of Public Works, and Police and Fire Department buildings. After a major storm, critical emergency responder services, including fire and police protection, must be maintained for public safety. While repairs were made to the emergency responder facilities, many were without power and key equipment and vehicles due to the severe damage caused by Superstorm Sandy. Additional resiliency measures are needed so the facilities remain operational during a storm and that important equipment remains usable and accessible.

Health and social services assets also include health facilities such as the former Long Beach Medical Center, which received significant damage from Superstorm Sandy and filed for Chapter 11 bankruptcy protection in February 2014. Long Beach residents now must depend on emergency transportation to South Nassau Communities Hospital in Oceanside for emergency care. Health and social services assets also include schools, day care, and nursing care facilities.

Both public and private schools (including the three public elementary schools) and the Headstart Facility are vital community assets. Quickly reopening schools after a disaster is important to maintaining a sense of normalcy during the difficult rebuilding process. Figure II-3 shows the City assets for health and social services.



City Hall and Kennedy Plaza

Source: The LiRo Group



Fire Station #1, 300 Maple Boulevard

Source: The LiRo Group

Figure II-3: Long Beach Health and Social Services Assets

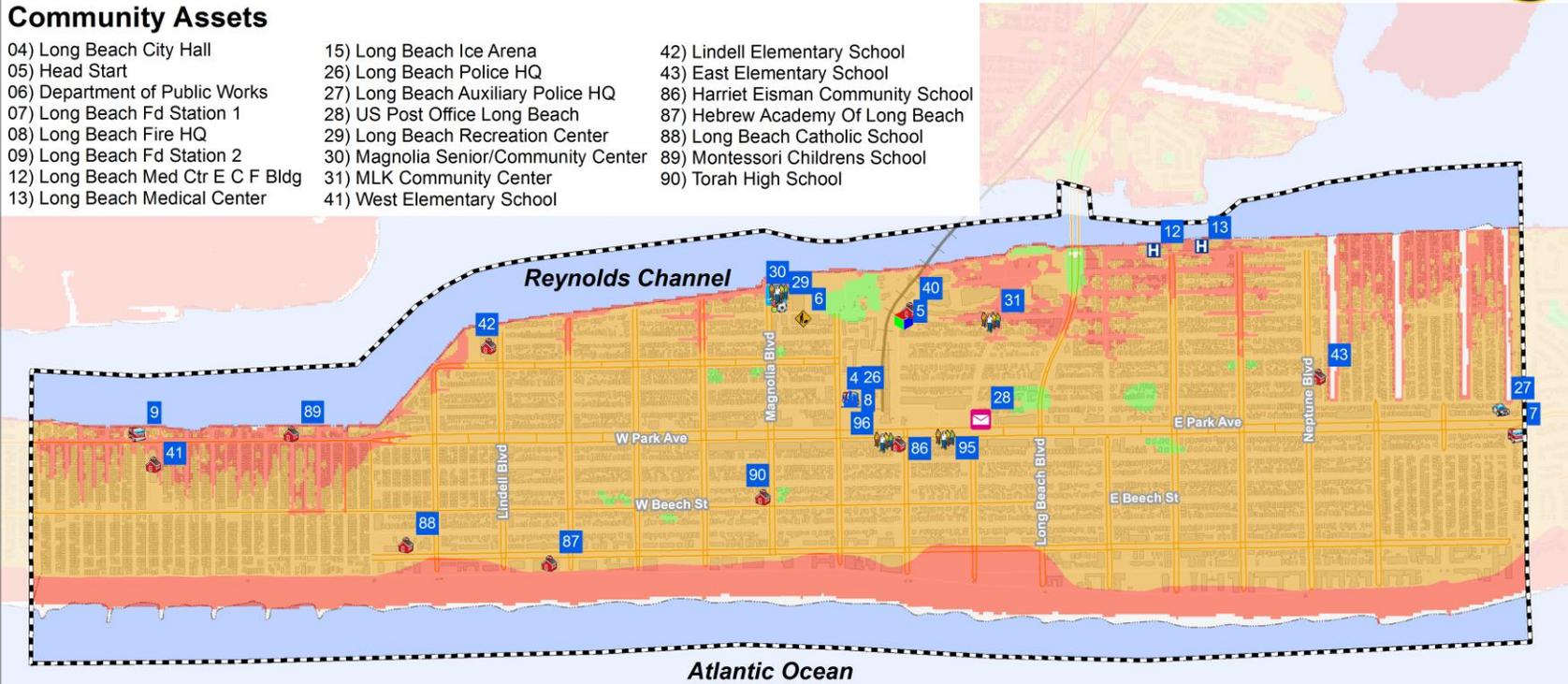
NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, Community Input, FEMA



Community Assets

- | | | |
|-----------------------------------|--------------------------------------|-------------------------------------|
| 04) Long Beach City Hall | 15) Long Beach Ice Arena | 42) Lindell Elementary School |
| 05) Head Start | 26) Long Beach Police HQ | 43) East Elementary School |
| 06) Department of Public Works | 27) Long Beach Auxiliary Police HQ | 86) Harriet Eisman Community School |
| 07) Long Beach Fd Station 1 | 28) US Post Office Long Beach | 87) Hebrew Academy Of Long Beach |
| 08) Long Beach Fire HQ | 29) Long Beach Recreation Center | 88) Long Beach Catholic School |
| 09) Long Beach Fd Station 2 | 30) Magnolia Senior/Community Center | 89) Montessori Childrens School |
| 12) Long Beach Med Ctr E C F Bldg | 31) MLK Community Center | 90) Torah High School |
| 13) Long Beach Medical Center | 41) West Elementary School | |

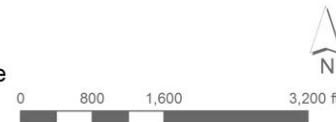


Health and Social Services Assets

NY DOS Risk Area

- | | | |
|-------------------|-------------------|-------------------|
| Community | Dept Public Works | Police |
| City Hall | Fire | Post Office |
| Community Center | Hospital | Recreation Center |
| Day Care Facility | Ice Skating Rink | School |

- | |
|----------|
| Extreme |
| High |
| Moderate |



Housing critical assets

Housing assets as identified by the NYRCR planning process include multifamily dwellings, and affordable and senior housing identified in Figure II-4. Although all residential structures on Long Beach are assets, the focus of the NYRCR Plan in regard to housing critical assets is on the City's multifamily public assets. This type of housing generally serves socially vulnerable populations that may require more assistance before, during, and after a storm event. Storm recovery and reconstruction issues relating to individual homes, including elevation programs, repair, rebuilding, and insurance, are generally addressed by FEMA and NY Rising Housing Recovery programs.

Nearly all of Long Beach's housing, including public and senior housing, was damaged by Superstorm Sandy. For Long Beach residents' homes and properties to remain resilient, flood protection, and wind retrofitting must be implemented, particularly for those housing assets that provide affordable housing.

Affordable housing units managed by the Long Beach Housing Authority include: the Channel Park Homes (family housing), Sol Scher Apartments (senior/disabled housing), Michael Valente Apartments (senior/disabled housing), Sonny Duckman Apartments (senior/disabled housing), and Morton Cohen Apartments (senior/disabled housing). Pine Town Homes also provides affordable housing for families and is managed by a private company. Additional details about affordable housing and senior housing developments in Long Beach are provided in the Assessment of Needs and Opportunities subsection found later in this section.



Pine Town Homes
Source: The LiRo Group



Sonny Duckman Senior Apartments
Source: The LiRo Group

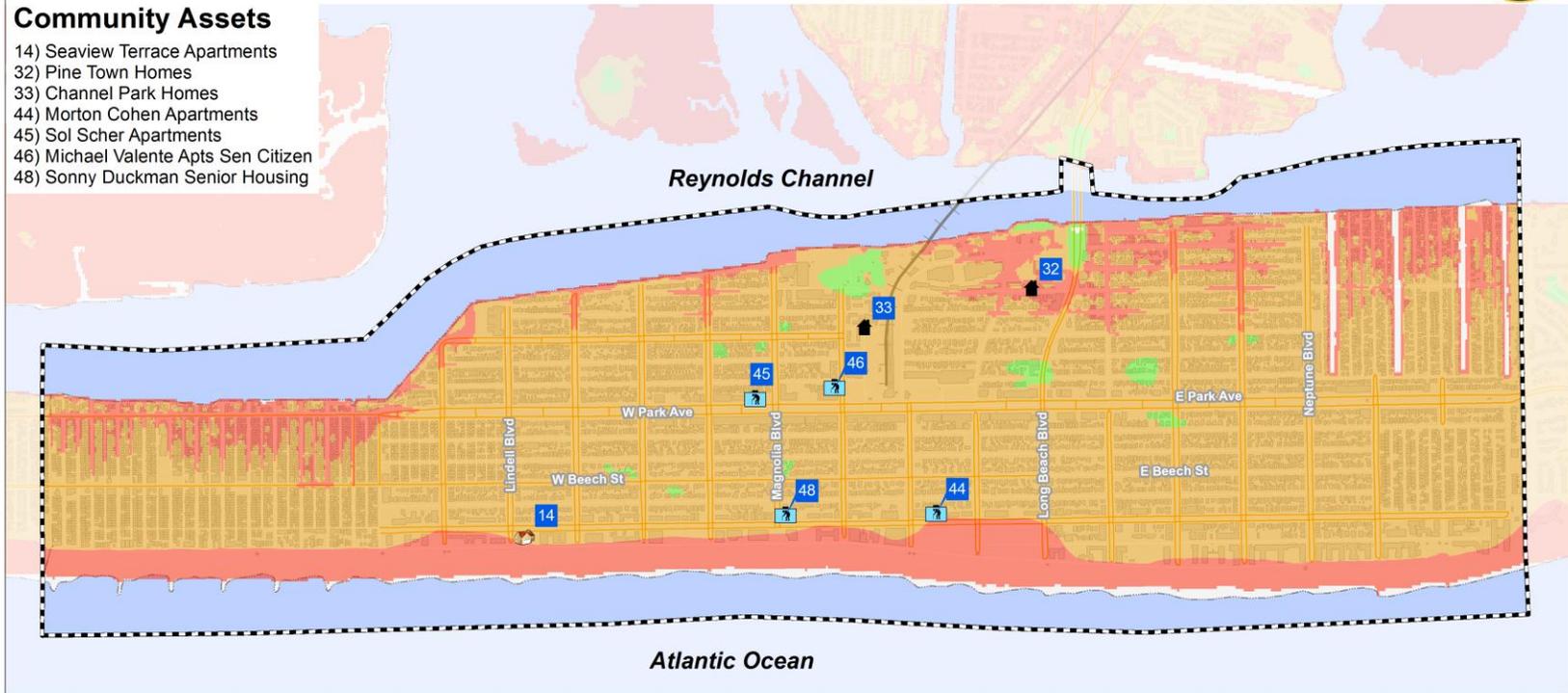
Figure II-4: Long Beach Housing Assets
 NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, Community Input, FEMA



Community Assets

- 14) Seaview Terrace Apartments
- 32) Pine Town Homes
- 33) Channel Park Homes
- 44) Morton Cohen Apartments
- 45) Sol Scher Apartments
- 46) Michael Valente Apts Sen Citizen
- 48) Sonny Duckman Senior Housing



Housing Assets

- Community
- Housing
- Public Housing
- Senior Housing

NY DOS Risk Area

- Extreme
- High
- Moderate



Infrastructure systems critical assets

Infrastructure systems represent the critical lifelines in a community that form the backbone of basic and essential services that serve virtually every residence, business, non-profit, and government structure. Long Beach's infrastructure systems include transportation systems, water supply and sewage systems, electrical power systems including lighting, and communication systems. Important infrastructure assets include the LIRR, the water treatment and Water Pollution Control plants, the wells, pump and lift stations, the stormwater drainage system, and the LIPA/PSEG electrical substation and systems. The City's major arterials serve as evacuation routes during emergencies. Figure II-5 identifies the City's infrastructure assets.

Nearly all of the City's entire infrastructure systems were significantly damaged by Superstorm Sandy, including its utilities; these included the water and sewage systems, which are in vulnerable areas on the north shore. These vital services were out of service for several weeks and residents were unable to drink the water or flush toilets during these outages. Other utilities, for instance electrical substations and a major gas pipeline, were also significantly impacted by Sandy. Additional protective measures are necessary to ensure that these critical community services are protected during future hazard events.

The stormwater drainage system is critical to managing runoff from the more frequent storms and to maintain ingress/egress for emergency vehicles as well as access to established evacuation routes. This system is aging and over capacity, not having been originally designed to meet current conditions, which compounds the difficulty of draining stormwater on a relatively flat barrier island. Additional protective measures are needed for Long Beach's infrastructure systems to be more resilient, such as introducing retention areas, installing stormwater backflow prevention devices (which prevent tidal water from entering the stormwater drainage system through outfall pipes) and stormwater treatment devices (e.g., vortex chambers), creating barriers around key system components, and elevating equipment.



Pump/lift station at W. Park Avenue and Grand Boulevard
Source: The LiRo Group



Well at Farrell Street and E. Park Avenue
Source: The LiRo Group

Figure II-5: Long Beach Infrastructure Systems Assets

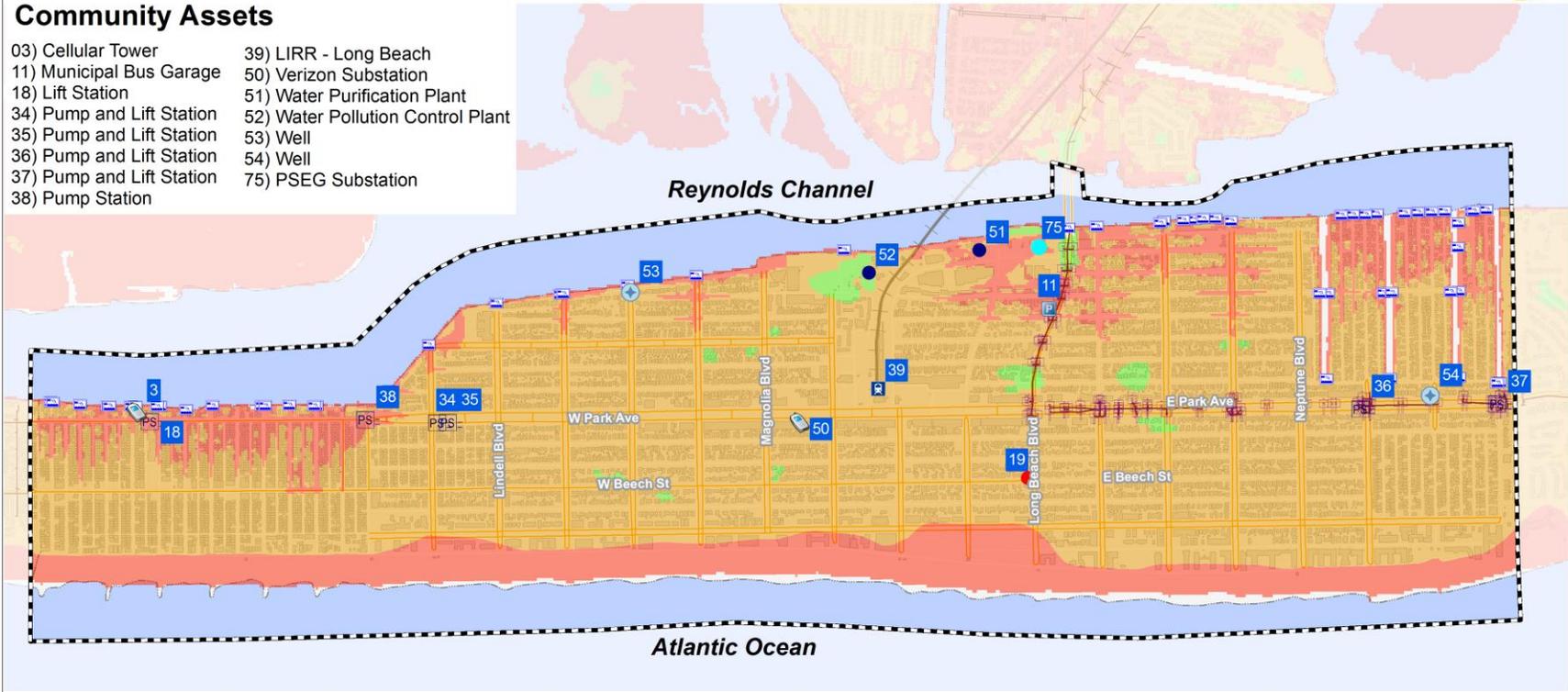
NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, Community Input, FEMA



Community Assets

- | | |
|---------------------------|-----------------------------------|
| 03) Cellular Tower | 39) LIIR - Long Beach |
| 11) Municipal Bus Garage | 50) Verizon Substation |
| 18) Lift Station | 51) Water Purification Plant |
| 34) Pump and Lift Station | 52) Water Pollution Control Plant |
| 35) Pump and Lift Station | 53) Well |
| 36) Pump and Lift Station | 54) Well |
| 37) Pump and Lift Station | 75) PSEG Substation |
| 38) Pump Station | |



Infrastructure Systems Assets

- | | | | |
|-------------------|-------------------|------------|----------------|
| Cell Tower | Pump/Lift Station | Railroad | Well |
| Drainage Outfalls | Gas Pipeline | Stormwater | Drainage Pipes |
| Garage | PSEG Substation | Wastewater | Community |

NY DOS Risk Area

- Extreme
- High
- Moderate

0 800 1,600 3,200 ft



Natural and cultural resources critical assets

As a barrier island with waterfront access on the bay and the ocean, Long Beach possesses natural resources that are some of its greatest assets for both residents and guests. The beach (Ocean Beach Park) and the Boardwalk, only a 40-minute train ride from Manhattan, are regional attractions that bring in thousands of people during the summer. The beach and ocean are the sites of summer family beach-goers; international, national, and local surfing contests; the annual Polar Bears Super Bowl Splash, which draws over 5,000 participants and viewers; arts and crafts shows; and other well-attended events. The Boardwalk was repaired in October 2013, dunes on the west and east ends of the Boardwalk were reconstructed, and additional work installing dune walkovers and replacing groins is forecast to occur soon after the preparation of this Plan.

The north shore of Long Beach is home to the bayfront Esplanade, fishing pier, and Reynolds Channel. The fishing pier, which is a major recreational asset used by anglers young and old, was destroyed by Superstorm Sandy. The north shore, with access to the marshes north of Reynolds Channel referred to as the back bay, in particular, holds future promise as the water quality in the bay improves. Future opportunities include consolidating industrial uses on the north shore to free up land for recreation and redevelopment and expanding the Esplanade and other recreational opportunities. Reynolds Channel can be a launching point for boating and kayaking and is a part of the planned South Shore Blueway Trail, a water trail in the western bays of the South Shore Estuary Reserve.⁴⁹ Other future activities might include water taxis connecting to other waterfront destinations, such as the Nautical Mile in Freeport.

Natural and cultural resources include natural and open space areas, recreational facilities, parks, playgrounds, splash parks, and historic landmarks. Further resilient measures can be undertaken to protect individual locations and ensure that the natural open space system is protected as a whole.



Leroy Conyers Park
Source: The LiRo Group

Libraries, community centers, and religious institutions are also important community gathering hubs. Additional cultural attractions include events, such as the Long Beach International Film Festival, the annual Arts and Crafts Festival on the Boardwalk, the Kennedy Plaza Fine Arts Show, and the Salsa in the Plaza. Kennedy Plaza is also home to the Farmers Market on Wednesdays and Saturdays from May through November. The City also has a number of historic landmarks that are identified in Figure II-6.



Long Beach Ice Arena (right) and Veterans Memorial Park (center)
Source: Planning4Places, LLC

Figure II-6: Long Beach Natural and Cultural Assets

NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, Community Input, FEMA



Community Assets

- | | | | | |
|--------------------------------|--------------------------------------|--------------------------------|------------------------------------|---|
| 01) Boardwalk | 24) Clark Street Park | 60) Temple Beth El | 68) Church Of Christ | 79) Beach |
| 15) Long Beach Ice Arena | 25) Kennedy Plaza | 61) Temple Israel | 69) Temple Beth Sholom | 81) Granada Towers |
| 16) West End Branch Library | 29) Long Beach Recreation Center | 62) Temple Bachurei Chemed | 70) St Mary Of The Isle Church | 82) Ross Residence Historic Site |
| 17) Long Beach Main Library | 55) First Church of Christ Scientist | 63) Temple Emanuel | 71) Cruzada Evangelica Misionera | 83) Long Beach Historical Museum |
| 20) Georgia Water Park | 56) Bachurei Chemed Synagogue | 64) Temple Zion | 72) Peoples Church | 84) St. James Church Historical Site |
| 21) Veterans Memorial Park | 57) Church of Saint Ignatius Martyr | 65) St James Church | 73) Young Israel Of Long Beach | 85) Alvarado/Barr Historical Site |
| 22) Leroy Conyers Park | 58) Sephardic Congregation | 66) St Ignatius Martyr Church | 74) Christian Light Baptist Church | 95) Long Beach Latino Civic Association |
| 23) Sherman Brown Sports Court | 59) East End Synagogue | 67) St Johns By The Sea Church | 76) Reynolds Channel | 96) Circulo de la Hispanidad |
| | | | 77) Bayfront Esplanade | 97) Magnolia Park |

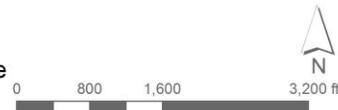


Natural and Cultural Assets

- | | | |
|------------------|------------------|-------------------|
| Community | Ice Skating Rink | Recreation Center |
| Beach | Landmark | Synagogue |
| Church | Library | |
| Community Center | Park | |

NY DOS Risk Area

- | |
|----------|
| Extreme |
| High |
| Moderate |



Socially vulnerable populations and their critical assets

The assets in this section are also discussed in other sections of the NYRCR Plan and are highlighted in this section because they provide important services for low and very-low income populations, the elderly, disabled, and young children. Generally, these populations may require more assistance and time to evacuate and return during major disasters. In addition to assets being protected, additional services need to be developed to help protect socially vulnerable populations.

Two important community centers in Long Beach are the Martin Luther King Center and the Magnolia Senior/Community Center. The Martin Luther King Center provides youth, family, and adult programming (including job training) and the Magnolia Senior/Community Center, provides senior programming. The Magnolia Child Care Center is located at the Magnolia Senior/Community Center. The Headstart Facility, in addition to public and senior housing units, and nursing homes are also key assets that provide important services for the City of Long Beach.

The senior and public housing units, Magnolia Senior/Community Center, Magnolia Child Care Center, and the Martin Luther King Center were severely damaged by Superstorm Sandy. The senior housing units, which are generally high-rise buildings providing subsidized housing for the elderly and the disabled and the public housing units, which provide subsidized housing for low-income families, need protection on the lower floors to protect electrical equipment and boilers for operating the buildings. Some protective measures, including elevating the boiler off the floor, have occurred in the Martin Luther King Center but more protective measures are needed. Figure II-7 indicates vital assets for socially vulnerable populations.



Headstart facility
Source: The LiRo Group

Figure II-7: Long Beach Socially Vulnerable Populations Assets

NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, Community Input, FEMA



Community Assets

- 05) Long Beach Head Start
- 14) Seaview Terrace Apartments
- 30) Magnolia Senior/Community Center
- 31) MLK Community Center
- 32) Pine Town Homes
- 33) Channel Park Homes
- 44) Morton Cohen Apartments
- 45) Sol Scher Apartments
- 46) Michael Valente Apts Sen Citizen
- 47) Beach Terrace Care Center
- 48) Sonny Duckman Senior Housing



Socially Vulnerable Populations

- Community Center
- Housing
- Senior Housing
- Headstart Facility
- Public Housing
- Community

NY DOS Risk Area

- Extreme
- High
- Moderate



Assessment of risk to assets and systems

The Risk Assessment Map in Figure II-8 shows that almost the entire City is in an extreme- or high-risk area for flooding and is subject to 100-year storm flooding risk with very few areas in the moderate-risk area. It also shows areas subject to frequent stormwater flooding. The extreme-risk areas are found along the beach/Boardwalk and Reynolds Channel with concentrations along the north shore (east and west of Long Beach Boulevard near the former Long Beach Medical Center and Water Purification Plant, respectively), in the West End, in the Canals, and in the Superblock and Foundation Block areas. Because the barrier island would be subject to sea-level rise, flooding during 100-year storm events will occur more often in the future. This is why evaluating the City's assets in relation to future risk is critical.

A risk assessment has been used to determine the potential impact of hazards on community assets. This risk assessment was conducted as a planning-level evaluation and does not constitute an engineering performance analysis. The risk assessment will help the Committee choose mitigation methods to reduce future risk. Input from the Planning Committee and the public on areas with the highest risk of flooding were used to supplement the Risk Assessment Map in evaluating which assets need to be protected.

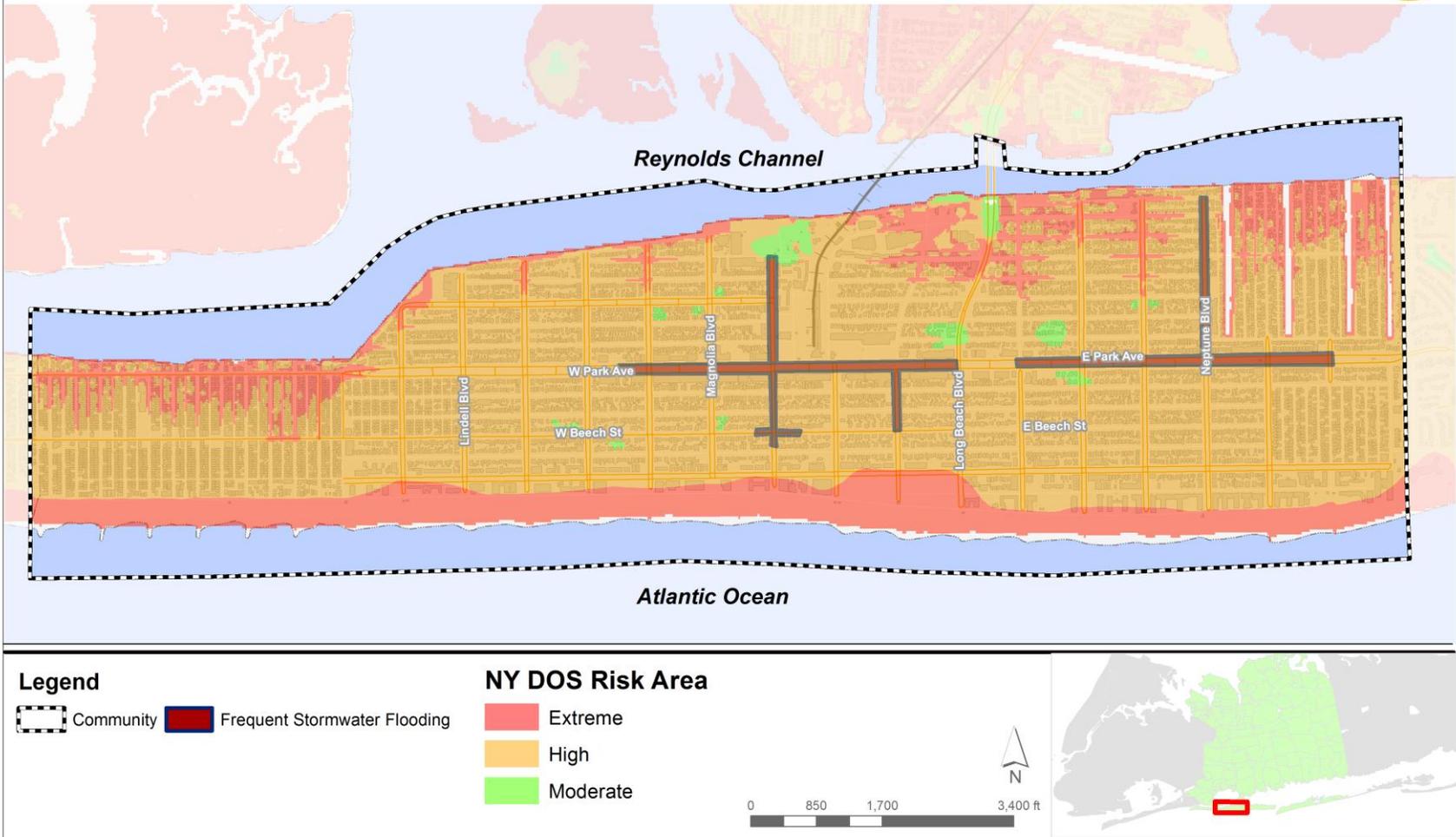
Detailed background information about the asset, landscape attributes in the vicinity of the asset, and vulnerability of the asset to flood damages was collected for the Community Asset Inventory. Assets were identified based on factors such as importance to the Community, probability of being affected by flooding, and restoration time. Asset background information includes asset address and geographic coordinates, NYS DOS risk area, asset class and subcategories, whether the asset represents a critical facility, and relative Community importance.



Long Island Rail Road Bridge leading to Long Beach and across Reynolds Channel
Source: The LIRO Group

Figure II-8: Long Beach Risk Assessment
 NY Rising Community Reconstruction Program

Source: Nassau County GIS, ESRI, New York State, Community Input, FEMA



Understanding risk scores

The risk assessment process starts with calculating a Risk Score based on the Risk Assessment Tool developed by the NYS DOS. The approach to calculate risk uses the following formula:

$$\text{Hazard} \times \text{Exposure} \times \text{Vulnerability} = \text{Risk}$$

In this equation, the Hazard represents the severity of the hazard event; the Exposure represents the risk area and local landscape where the asset is located; and the Vulnerability represents level of impairment or consequences that assets may experience from a hazard event and reflects the ability of the asset to resist damage from the hazard. Using data collected for each asset, the Risk Assessment Tool calculates scores for each of these three factors for current conditions.

Hazard

The analysis calculated hazard scores by considering typical storm events. Hazard scores for the risk assessment were calculated for the 100-year storm (1% annual chance) and the 500-year storm (0.2% annual chance), although for purposes of this NYRCR Plan, the more frequent 100-year storm was used for the analysis. In the Risk Assessment Tool, all assets in NYRCR Long Beach were given an automatic score of 3 based on the 100-year storm event because of location in the 100-year floodplain (Special Flood Hazard Area).

Exposure

Exposure was calculated based on local topographic and shoreline conditions that can affect how an asset will be impacted during a storm event. Landscape attributes related to exposure include factors related to shoreline and beach erosion rates, beach width, shore defenses, protective vegetation, and dune characteristics. Another factor in this analysis was the City's location on a coastal barrier island. In other words, direct exposure with frequent erosion, sparse vegetation, and inadequate shore defenses and dunes will increase flooding potential. For structural defenses, such as bulkheads, to work properly, they need to be built above the base flood elevation (BFE) and be continuously maintained. Wide, high, and vegetated dunes also help to minimize exposure from wave damage. The exposure

score is automatically generated based on the risk area in which the asset is located and landscape attribute scores.

Hazard: The likelihood and magnitude of future storm events.

Exposure: The moderating effect of topographic and shoreline features.

Vulnerability: The level of impairment or consequences that assets may experience from a storm event and their ability to resist damage from a storm.

Source: Guidance for New York Rising Community Reconstruction Plans:
A Planning Toolkit for CR Planning Committees

Vulnerability

Vulnerability represents both the effects that assets may experience from a storm event and the ability of the asset to return to normal service following an event. The quicker an asset can recover, the lower the vulnerability score. Assets that are above the BFE are less vulnerable than assets below the BFE. Because of the high risk of flooding in Long Beach, all the assets are vulnerable and almost all were damaged by Superstorm Sandy. To distinguish between assets that the whole community depends on to function, especially after a disaster, the assets receiving the highest vulnerability were those essential to all residents of Long Beach (e.g., water supply, sewage, emergency responders, such as police and fire). For these assets, there is little "tolerable" downtime as a fire could rage out of control and cause additional damage or the sewage system could back up and contaminate homes and businesses. Therefore, the assets that received the highest vulnerability scores were generally ones that the whole community depends on daily or weekly for essential services that may force relocation if the services are not continually provided. Scores for vulnerability are on a 1 to 5 scale (a score of 1 has insignificant vulnerability to major vulnerability with a score of 5).

Risk

Risk scores are used to help determine which assets have greater potential for storm damage. The resulting risk scores were calculated based upon the above-described formula and can be further categorized into severe, high, moderate, or residual risk levels. Higher scores denote greater risk levels. Table V-7 summarizes the Risk Assessment scoring for critical assets

alphabetically. The NYRCR risk assessment shows that the Long Beach's assets are predominately in the high-risk category with two assets in the severe-risk category (the Fire Station Headquarters and the Water Purification Plant).

Assessment of risk to systems

As discussed previously, many of Long Beach's assets are both individual locations and part of an overall system. Many of these systems go beyond Long Beach's borders and how these systems operate during storm events is a critical consideration in evaluating the overall risk to the system. Long Beach system assets are classified as individual assets for evaluation purposes and are listed in Table V-7.

- **Major utility systems:** Infrastructure assets in the Community include an electric power substation, the Water Pollution Control Plant and its sewer pump/lift stations, the Water Purification Plant and its wells, and a gas pipeline. The power substation, Water Pollution Control Plant, Water Purification Plant, and gas pipeline are in a particularly vulnerable location on the bayfront where the shoreline is not protected. The two plants suffered a high degree of damage from Superstorm Sandy flooding on the bayfront, as did the wells and lift stations. Maintaining power to these facilities and equipment during an emergency is critical to continuity of operation. The two cellular facilities are key communication links that are especially needed after a disaster. Providing backup power to street lights is critical to the Community to reduce unsafe conditions during power outages. All of Long Beach's infrastructure systems scored in the high category of the risk assessment analysis.
- **Stormwater management:** The stormwater management system suffered damage and disruption from Superstorm Sandy as sand infiltrated the system and had to be cleared out before the system was fully functional again.
- **Established evacuation routes:** Primary road systems, including Park Avenue and Beech Street, serve as established evacuation routes and are also susceptible to stormwater flooding. These frequent stormwater flooding areas are shown in Figure II-8 above. Once out of Long Beach, Park Avenue and Beech Street lead to other major evacuation routes. Those include Austin Boulevard in Island

Park and Lido Boulevard in Lido Beach, which are also susceptible to stormwater flooding.



Major utility systems along the north shore

Source: The LiRo Group

- **Emergency systems:** During Superstorm Sandy, the emergency responder facilities were all damaged, creating many challenges in responding to the needs in the aftermath of the disaster. The emergency responder facilities received some of the highest overall risk scores in the Community.
- **Health and social services delivery:** The former Long Beach Medical Center was rendered inoperable due to Superstorm Sandy flooding and social service facilities such as the Martin Luther King, Jr. Center were out for several months.
- **Visitor/guest networks:** Protection of the natural and cultural assets is critical to protecting the economic lifeblood and cultural heritage of the Community. During Superstorm Sandy, the Boardwalk was severely damaged and had to be reconstructed. In addition, commercial corridors generally frequented by guests were heavily damaged during Superstorm Sandy and are also vulnerable to stormwater inundation.

- **Coastal ecosystems:** The damage to the Water Pollution Control Plant created the need to bypass the plant and directly discharge into Reynolds Channel, which adversely impacted water quality in the bay. In addition, untreated stormwater runoff has a negative impact on water quality.

B. Assessment of needs and opportunities

This section describes the needs and opportunities identified throughout the NYRCR planning process. This analysis considers what is needed to help Long Beach's assets become more resilient in the future and presents opportunities for further economic rebuilding and expansion.

The needs and opportunities assessment was developed based on housing and economic assessments, research, discussions with the Planning Committee, review of applicable planning documents, input from the Public Engagement Events, and other public outreach efforts. Planning documents reviewed for historic context regarding needs and opportunities are found at the end of Section I in Table I-2.



First Public Engagement Event, October 10, 2013
Source: Sustainable Long Island

Public input (as of March 31, 2014) for the Community's needs and opportunities was captured during the 12 Planning Committee Meetings via

verbal comments made in the meeting or by comment cards, online surveys, and in the first two Public Engagement Events held in the fall of 2013. Additional discussion of the public engagement process can be found in Section V of this plan. This feedback was useful to the Planning Committee in considering the Community's needs and opportunities. It has been incorporated in the following needs and opportunities assessment categorized by Recovery Support Function.

There are six Recovery Support Functions established by President Barack Obama in 2011 through the National Disaster Recovery Framework (NDRF) and the NYRCR Plan addresses the needs, risks, and opportunities related to the Recovery Support Functions: Community Planning and Capacity Building, Economic Development, Health and Social Services, Housing, Infrastructure, and Natural and Cultural Resources. These functions represent the key subject areas that drive the well-being and prosperity of the whole community. As described in the NDRF, these six Recovery Support Functions are the "coordinating structure for key functional areas of assistance." The Needs and Opportunities identified here in Section II were further examined by the NYRCR Planning Committee (Committee) and Consultant Team within the context of the Recovery Support Functions, as defined by NYRCR Guidance:

Recovery Support Functions (RSFs)

Community Planning and Capacity Building: This Recovery Support Function addresses how the community will restore or enhance its ability to organize, plan, manage, and implement its recovery.

Economic Development: This Recovery Support Function addresses how the community will restore economic and business activities and develop new economic opportunities.

Health and Social Services: This Recovery Support Function addresses how the community will restore and improve essential health and social services, including for vulnerable populations.

Housing: This Recovery Support Function addresses how the community will meet the demand for affordable housing (and promotion of affordable housing), address post-disaster housing needs, and encourage disaster-resistant housing for all income groups.

Infrastructure: This Recovery Support Function addresses how the community will restore, repair, and manage essential infrastructure services.

Natural and Cultural Resources: This Recovery Support Function addresses how the community will approach natural and cultural resource management from a risk reduction and economic development context.

Source: Guidance for New York Rising Community Reconstruction Plans: A Planning Toolkit for CR Planning Committees

The NYRCR planning process examined key issues in these Recovery Support Functions to identify actions and projects to help Long Beach recover and rebuild stronger, smarter, and safer. These functions are organized to facilitate problem-solving, identify resources, and coordinate with stakeholder agencies.

Throughout the process, the Consultant Team and Committee were well integrated with the City of Long Beach officials. The City Manager and Commissioner of the Department of Public Works briefed the Committee and the community in both Planning Committee Meetings and Public Engagement Events on what actions they were taking to rebuild and increase resiliency. To follow up on discussions from Committee Meetings, the Consultant Team coordinated with City staff to obtain important materials and information that helped with the assessment of needs and opportunities.

The overarching needs identified at the beginning of the NYRCR Long Beach planning process was the need to protect the City from flooding on both the oceanfront and bayfront, as well as stormwater flooding. The U.S. Army Corps of Engineers' (USACE's) extensive work on the oceanfront allowed the Committee to primarily focus on the bayfront and stormwater concerns. The discussion below reflects short-term, intermediate, and long-term needs and opportunities for the Community. Actions to address these needs are discussed in Sections III and IV of this NYRCR Plan. In some cases, there will likely be unmet needs beyond the scope of the NYRCR Program and this NYRCR Plan will serve as a blueprint for future action.

Community planning and capacity building

Superstorm Sandy was the largest disaster Long Beach ever experienced. While the community came together in the aftermath of the storm, it also revealed additional needs to plan in a long-term, holistic manner that addresses all aspects of the recovery. Long Beach's community planning and capacity building needs and opportunities relate to implementing storm recovery activities, planning, and building greater internal capacity to address preparedness, response, and recovery from future storms. Community planning and capacity building activities under consideration include emergency preparedness operations and public education regarding disaster resiliency planning. Tools and techniques for considering energy efficiency options, addressing future risks such as sea-level rise, and planning for a sustainable future are also important in implementing Long Beach's long-term planning efforts.

Community planning and capacity building needs

- A February 2013 community survey identified storm protection as the primary concern of residents. Since Superstorm Sandy, there has been renewed support for a dune reconstruction project by the USACE.
- Superstorm Sandy demonstrated the need for designated neighborhood community centers to act as community assistance centers for residents in times of crisis.
- Given that most of the City is at risk from flooding and high winds, it would benefit from additional resources for emergency operations and management. Additional resources can help build on existing

City efforts so that residents have access to emergency preparedness information, assets are protected and then positioned to assist in the disaster operations, and response teams are established to check on socially vulnerable populations during power outages.

- An estimated 6,723 people in Long Beach speak a language other than English, primarily Spanish.⁵⁰ Emergency information should be available in both in English and Spanish.
- Continuous access to communications systems, such as cellular networks and a community-wide wireless network, are vital for Long Beach's residents during emergencies.
- Bayfront protection, revitalization, and waterfront usage is an important community planning issue to help Long Beach rebuild better and stronger. Some future efforts may require coordination with the Town of Hempstead, which owns the submerged land in the channel. The New York State Department of Environmental Conservation (DEC) has facilitated a process to expedite certain types of permits, including extending bulkheads by 18 inches in place. The City's ongoing beachfront and bayfront redevelopment initiatives will benefit from the adoption of a Local Waterfront Revitalization Program (LWRP) to update the information in the draft LWRP to reflect post-Sandy and post-recession conditions. In December 2013, the City announced that it had obtained a grant for an LWRP update which will provide additional coordination and potential funding opportunities for the City.
- As the City of Long Beach Comprehensive Plan dates from 2007 (prior to Superstorm Sandy and the economic recession), the City will be undertaking an update to the Plan. The City's upcoming update will address green/renewable energy, energy efficiency, sea-level rise, stormwater management, green infrastructure, and Complete Streets principles.



First Public Engagement Event, October 10, 2013

Source: Sustainable Long Island

- Following the Comprehensive Plan update, the zoning ordinance will be reviewed for consistency with the updated plan (and LWRP discussed above) and to determine what zoning changes are needed. Zoning and building codes updates are needed to reflect current priorities including: design, affordability, accessibility, sustainability, and mixed-use development.
- Design guidelines for addressing neighborhood character are needed to ensure that as homes are rebuilt above the FEMA BFE, are rebuilt using resiliency techniques where appropriate, and complement the surrounding neighborhood/streetscape. The Design Guidelines for assisting homeowners with elevation and sustainability techniques will be available in English and Spanish.

Community planning and capacity building opportunities

- The post-Sandy reconstruction period continues to offer an opportunity for increased public involvement in Long Beach. The City has helped bring the community together through its Boardwalk

visioning sessions, websites, and the Public Engagement Events as part of the NYRCR process. During the post-Sandy reconstruction period, the City has provided residents with multiple opportunities to learn about recovery and resiliency efforts and offer input. This process should continue in the future with emergency preparation and opportunities to make homes and businesses more sustainable and resilient, including design guidelines for elevating homes.

- Multiuse community centers can serve as social hubs and anchors for economic development and, in times of crisis, as disaster response centers for response, dissemination of news, and mutual support of residents. The MLK Center, the Main Library, Long Beach Recreation Center, and the Ice Arena are well suited for this purpose.
- An Office of Emergency Management with needed emergency equipment should be established to assist in emergency planning, hazard mitigation, emergency communications, and preparation of a list of disaster recovery services vendors. Development of Memoranda of Understanding (MOUs) with disaster recovery vendors and coordination with Nassau County OEM also represents potential opportunities.
- The City is a participant in the National Flood Insurance Program (NFIP) Community Rating System (CRS). CRS provides a reduction in flood insurance premiums for flood policyholders when a community accrues enough credit points for approved flood reduction activities. The City is currently Class 8, which provides a 10% discount in insurance premiums. For each additional accrual of 500 CRS credit points, there is an additional 5% discount. In January 2014, the City announced that it hired a firm to review its CRS program.
- A significant number of commuters in Long Beach bike, walk, or ride the Long Beach Bus to the LIRR train station. There is more potential for transit-oriented development (TOD) around the LIRR station, as well as opportunities to enhance pedestrian and bicycle accessibility and safety.

Economic development

In order to recover economically from Superstorm Sandy, the City is evaluating business recovery needs while also considering opportunities that

will ensure a strong, vibrant economy that can withstand future disasters. The Long Beach Chamber of Commerce is as an active entity that encourages new businesses and helps sustain established ones. Superstorm Sandy not only severely damaged most of the City's businesses but it also destroyed the City's Boardwalk, a huge draw for summer guests that supports the economy, and severely damaged the facility of its largest employer, the former Long Beach Medical Center. As part of the development of this effort, an economic development assessment was conducted to evaluate the City of Long Beach's greatest needs. This assessment looked at the key economic drivers of Long Beach's economy and what is needed to invigorate Long Beach's economy to ensure economic assets rebuild stronger and more resilient.

Opportunities exist for further development that will build on Long Beach's ocean and bayfront assets, including the Boardwalk and bayfront Esplanade, to further expand water-dependent and water-related uses and provide additional amenities for residents and guests. The north shore remains underutilized and the City's three business districts have opportunities for expansion. Because Long Beach is a built-out community, additional development will require redevelopment of existing properties and/or development of vacant land (e.g., the Superblock), underutilized land, or brownfield locations. The appropriate uses and scale of development will need to be carefully evaluated in addition to ensuring that any new development is built to withstand future hazard events. Any redevelopment efforts must also consider environmental justice concerns, affordable housing needs, and adopting resiliency and sustainability techniques.

Economic development trends

Key economic trends for the City are described below.

- The number of estimated households in Long Beach was 14,553 in 2012⁵¹. Between 2000 and 2012, the number of households with incomes over \$150,000 increased by 1,590, which contributed to an increase of \$28,478 in the median income to \$85,845 in 2012.⁵² However, the number of households in all other income categories, including low-, moderate-, and middle-income households declined between 2000 and 2012. This trend can have a number of implications to the Community, including the unavailability of a labor force for local small businesses that are rebuilding or expanding, or

any new start-up businesses or industries that Long Beach may want to attract.

- The City reported that mercantile licenses, which are required for businesses to operate in Long Beach, numbered 300 in 2013, which is an approximately 10% decrease from 2012 (335) and 2011 (336).



Park Avenue Commercial District
Source: Sustainable Long Island

- Major economic drivers in Long Beach shown in Table II-2 earlier in this section include recreational areas, the Beach and the Boardwalk, hotels, retail and commercial strips, and industrial areas.

For additional context on City economic trends and opportunities, Table II-3 shows land use by type and Figure II-9 shows a land use map to geo-reference the locations of the land use types. Based on maps generated with data from Nassau County Geographic Information System (GIS), current land use in Long Beach is primarily residential (66.1%), publically owned land (21.6%), commercial uses (5.1%), and industrial use (1.3%). Approximately 1.8% is vacant land. The vacant land and industrial uses are the areas within

the City that could best accommodate economic development and redevelopment.

Table II-3: Land Use

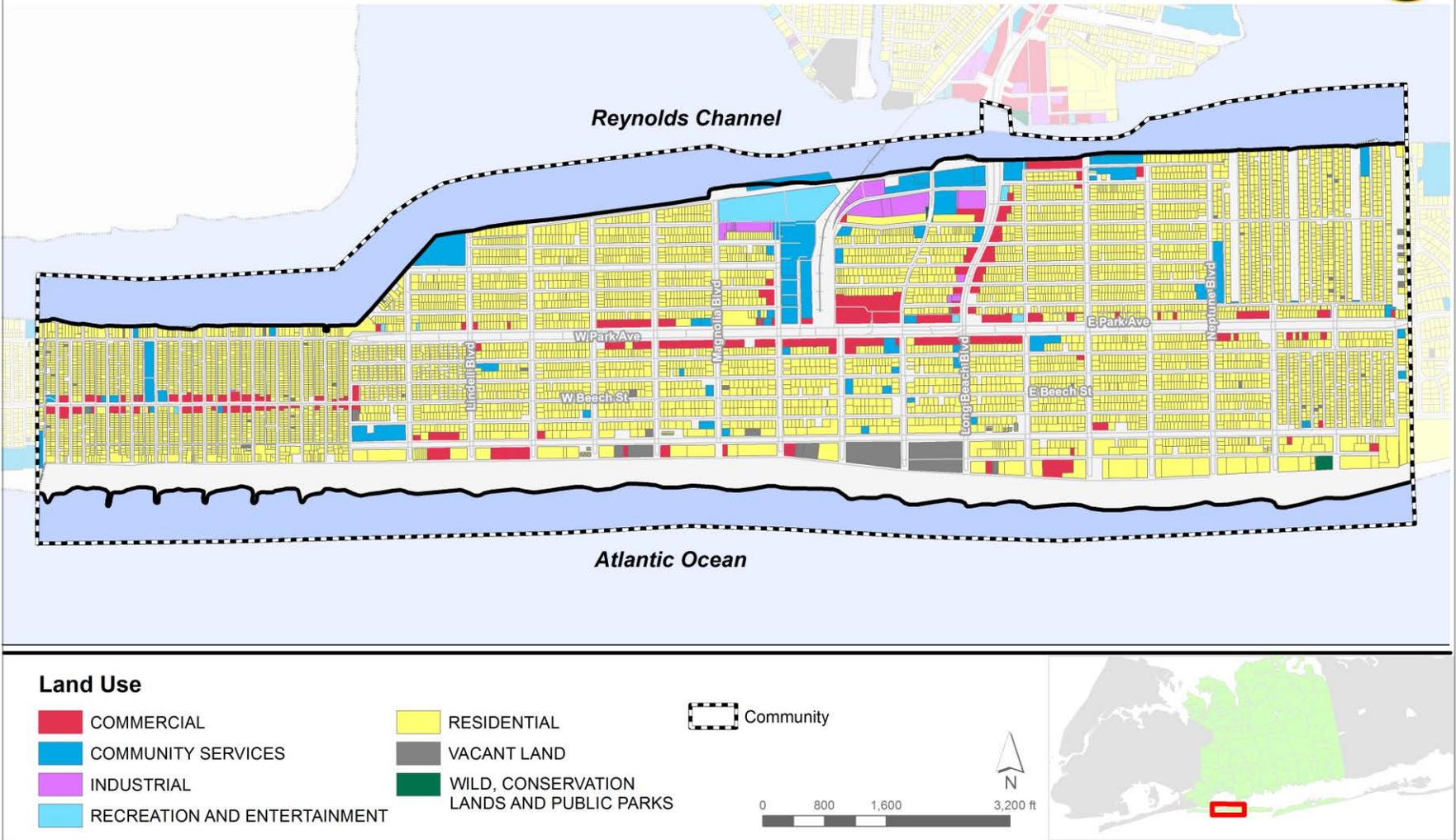
LAND USE	TOTAL SF*	PERCENT OF TOTAL
Commercial	2,266,379	5.2%
Community Service/Publically Owned	9,377,714	21.6%
Industrial	555,177	1.3%
Recreation And Entertainment	591,407	1.4%
Residential	28,748,961	66.1%
Vacant Land	789,632	1.8%
Wildlife Conservation And Public Parks	44,165	.1%
Other	1,120,227	2.6%
Total	43,493,661	100%

Source: Nassau County GIS January 2013.

*Square footage; data generated by URS based on existing usage. Note that overlapping of parcel data could result in an over count of total land area.

Figure II-9: Long Beach Land Use
 NY Rising Community Reconstruction Program

Source: Nassau County, USGS



Additional context on economic development trends in Long Beach:

- During the 2000 to 2012 period, there was a decrease of 6% in the total population from 34,462 to 33,356.⁵³ Most of the decline attributed to a reduction of 22% (1,232) in the population 15 years and under.⁵⁴ However, the large decline in individuals under 15 may indicate that low- and moderate-income households are moving out of the Community.
- Of the 876 establishments in the Community, 637 (73%) had 1 to 4 employees; 118 (13%) had 5 to 9 employees and 68 (8%) had 10 to 19 employees.⁵⁵ Small businesses are a critical component of the Long Beach Community and efforts should be made to support small business development and growth, specifically for businesses in the highest growth sectors.
- There was a major shift in the mode of transportation to work. The number of individuals walking to work increased significantly from 70 in 2000 to 1,116 in 2012. This change accounts for approximately 6.5% of all work commute trips in 2012 according to the American Community Survey.⁵⁶

Economic development needs

- A segment of the bayfront area is zoned for industrial use and is currently underutilized, with several vacant lots, a sewage treatment plant, and a metering station. The area also includes several brownfields and one demolished incinerator. Much of the waterfront is not being utilized to its full potential. Potential transfer of sewage treatment to the Bay Park Sewage Treatment Plant (STP) could free up as much as 5 acres of land for redevelopment. A plan to consider opportunities for reducing the industrial footprint and planning new resilient development is needed. The existing brownfield areas need additional study to determine the level of remediation required. Installation of protective measures, which is discussed further in the Infrastructure subsection, is needed prior to redevelopment.



East Park Avenue in the East End

Source: Sustainable Long Island

- Some small businesses continue to struggle during the “off” season and need financial assistance, mitigation options, and help rebuilding their customer base; especially as an estimated 20% of the City’s residents are not yet in their homes. The three main commercial areas of Long Beach were hit hard, especially restaurants, and they need help to rebuild and reach their full potential.
- Businesses also need to develop continuity of operation plans and backup power systems.
- In the long term, a Complete Streets project in the central business district could help connect the center part of the City to the beach and Boardwalk, as well as to the Recreation Center area on the bay. Ultimately, a network of pedestrian and bicycle networks are needed to enhance resident and guest access throughout the Community and the barrier island as a whole.
- The Long Beach Boulevard Gateway potential has not been realized and the Superblock and Foundation Block along the Boardwalk are underutilized real estate parcels. On January 22, 2014, the Long

Beach City Council voted to settle the Superblock lawsuit. In February 2014, a large-scale development was approved for the Superblock.

- Inadequate parking capacity in parts of the City could limit redevelopment and economic development efforts. Also, there is a need for improved traffic flow.
- The City lacks a diversity of uses, including non-food/beverage retail space and larger office space for innovative businesses.
- A significant number of commuters in Long Beach bike, walk, or take the bus to the train station. There is potential need for TOD around the LIRR station.



Long Beach Boulevard
Source: Planning4Places, LLC

Economic development opportunities

- Waterfront-related and water-dependent uses would capitalize on Long Beach's ocean and bayfront assets. Appropriate recreational opportunities on the bay (e.g., kayaking, water taxi) could lead to connections with other waterfront communities, such as Atlantic Beach, Point Lookout, Island Park, and Freeport.
- Opportunities for redevelopment in the bayfront area include the Long Beach Water Pollution Control Plant site, if the connection to Bay Park STP occurs, and brownfield sites. The Water Pollution Control Plant site is adjacent to many of the City's recreational facilities and is located by Reynolds Channel. Two studies including the next phase of the Brownfield Opportunities Area study and a Bayfront Revitalization Plan will assist in examining industrial

consolidation options for this area and exploring options for resilient redevelopment. The City will apply for a Phase 2 Brownfield Opportunities Area Study from New York State's Brownfield Opportunities Program to help revitalize properties. Redevelopment of this area could serve as the catalyst for relocation of other industrial uses away from the flood-prone bay.

- Additional economic development opportunities exist in the other vacant or underutilized parcels throughout the Community.
- Development opportunities should be encouraged along the Boardwalk area. The second part of the Boardwalk revision process, scheduled for 2014, and the development of the Superblock are key opportunities for further development. The second part of the Boardwalk revision process will explore topics such as expanding food and retail concessions on the Boardwalk, as well as the need for adequate public facilities (including restrooms/comfort stations) to accommodate guests. The Foundation Block is a key parcel next to the Boardwalk that should be considered for future development. The Committee identified a possible future land use opportunity with the announced relocation of the Hebrew Academy of Long Beach at the end of this planning process.



The former Long Beach Medical Center
Source: URS

- Long Beach's unique access to beaches and waterways make it an ideal outdoor getaway that area people flock to for exercise and leisure outdoor activity. A network of pedestrian and bicycle networks connecting the City from the bayfront to the ocean to the commercial districts and then throughout the barrier island would further enhance recreational opportunities and encourage economic development
- Efforts should be made to enhance gateways and streetscapes within the City, including Long Beach Boulevard, the West Park Avenue commercial corridor, the West Beech Street commercial corridor, and the East Park Avenue commercial area in the East End. Streetscape enhancements utilizing Complete Streets principles will enhance the area. Such improvements include wider sidewalks to facilitate pedestrian traffic and street retail opportunities. Long Beach Complete Streets efforts could connect with similar efforts in neighboring jurisdictions, such as East Atlantic Beach.
- The ongoing marketing initiated by the City to potential guests in the spring of 2013 should continue and expand to help rebuild the customer base and attract new customers. Marketing efforts to bring New York City residents to Long Beach for festivals and events should continue and expand to assist the City's ongoing initiative of becoming more of a year-round guest destination. Revenue-generating events should be brought to the beach and waterfront areas. A visitor/guest information booth should be set up at the LIRR station and promotional material should be provided at area airports for tourists visiting New York.
- Assistance should be provided to businesses with developing emergency preparedness plans/continuity of operation plans and backup systems so that there is less down time following storm events.
- Opportunities to install more public art work to further highlight Long Beach's arts community should be explored.
- Additional workforce training and green business training, especially for the populations that need additional resources and were particularly hard hit by Superstorm Sandy, should be provided.

- Business owners should be encouraged to seek opportunities to increase energy efficiencies and sustainability as businesses are rebuilt.

Health and social services

One of the critical issues in Long Beach's recovery is ensuring that essential health, mental health, and social services are restored. Basic care must be available, maintained, and protected during and after storm events. In particular, adequate access to care and services must be available for vulnerable populations. As of March 2014, the former Long Beach Medical Center (the barrier island's hospital) remains closed and access to medical care continues to be an important concern.

Health and social services needs

- The bayfront includes the former Long Beach Medical Center, a critical community asset that has filed for bankruptcy as of March 2014, because of financial struggles and Superstorm Sandy damage. Consequently, residents must travel at least 5 miles off the barrier island through a heavily trafficked road corridor to the next closest hospital, South Nassau Communities Hospital, which is a hardship for those needing emergency care. The Long Beach Fire Department estimates that it takes a 2-hour round trip for an ambulance to transport a patient to another hospital (compared with 15 minutes when the Long Beach Medical Center was operational), which strains available ambulance resources. Although the former Long Beach Medical Center may be opened in a limited capacity in 2014, full restoration is required to provide needed medical services.
- The Martin Luther King, Jr. Community Center was flooded and then reopened in early September 2013. Some mitigation measures for the facility have been completed, such as elevating the boiler, but more can be done to make it resilient. The Main Library, the Long Beach Recreation Center, and the Ice Arena also need additional mitigation measures. To use community centers as community assistance centers in the early stages of recovery, backup power generation will be required and electrical equipment must be raised.
- Resources are needed to continue relocating emergency generators to upper floors in key facilities such as emergency responder facilities

to maintain power and functionality during and immediately after future storm events.

- Superstorm Sandy rendered many emergency responder facilities inoperable. While emergency responders performed admirably given the loss of important facilities and equipment, it is clear that additional resiliency efforts are needed to maintain emergency response functions in future events. The three fire stations (including headquarters in City Hall, and the police department in City Hall need floodproofing and wind retrofit (hardening of openings and wind retrofitting of roof and walls). These needs include elevation of electrical equipment, backup generators, and critical IT equipment.
- Storage and/or relocation of equipment and apparatus above the level where flooding typically occurs, is needed so the fire department can use its equipment during emergency situations.
- Long Beach School District buildings were damaged by Superstorm Sandy and some of the City's children were unable to return to their school for months. In some cases, they were moved to other school locations while post-storm construction was underway. The School District has made modifications to protect critical components from flooding and should continue to examine further opportunities to protect its facilities.
- Adequate services and programming must be available for veterans and disabled and senior residents. Long Beach has over 1,500 veterans, and 2,908 disabled residents, most of whom are seniors.⁵⁷ The population aged 65 to 74 is projected to increase 30.8% by 2020.⁵⁸ Programming and information about services for these populations should be made available in both English and Spanish.

Health and social services opportunities

- Health facilities should identify ways to be more resilient than they were before Superstorm Sandy.
- Community centers should be floodproofed and protected from wind damage.

- The police station, the fires stations, and City Hall should be floodproofed and protected from wind damage to ensure that these facilities remain operational during emergencies.
- Emergency vehicles and fire apparatus need to be elevated during a flood event to avoid damage. One possibility is to design and construct a parking garage capable of allowing emergency response vehicles to be elevated during storm events. Neighborhood community centers that can serve as community assistance centers in times of emergency should be established. However, during any large-scale flooding events, residents and guests should be prepared to evacuate the barrier island.
- Special needs registrations should be established so that socially vulnerable populations (elderly, disabled, and low-income residents) can identify themselves and receive needed services during emergencies, including assistance with evacuation, transportation to inland hospitals if on a respirator, etc. Coordination with special needs registration efforts could be coordinated with Nassau County OEM.
- Create response teams to check on and assist populations on a continuous basis during power outages.
- Develop MOUs with food assistance groups (e.g., Island Harvest, Long Island Cares, Meals on Wheels) to arrange assistance for the elderly during power outages.
- A new Office of Emergency Management should take on the special needs registration, organizing response teams, establishing MOUs, and helping to organize the existing community emergency response groups, such as Neighborhood Emergency Team (NET) and other similarly purposed groups. The OEM should coordinate with Nassau County OEM, the State Citizen Preparedness Corp, and the Nassau County Community Emergency Response Team (CERT).

Housing

Long Beach's housing, both multi-family high-rise and individual residences, was devastated by Superstorm Sandy. A housing assessment was conducted as part of the NYRCR process to assist with the evaluation of the City of Long Beach's greatest needs in recovering from Superstorm Sandy. This



assessment looked at the City’s housing stock and housing conditions, including housing affordability, vacancy and homeownership rates, and socio-economic trends that would affect housing. The analysis also looks at the percentage of Long Beach’s population that has a housing cost burden (defined as paying more than 30% of household income for housing). This information provides a context for planning for housing post Sandy. Access to housing resources and information, especially as related to disaster planning and evacuation, is particularly challenging for vulnerable populations (such as the elderly and special needs populations) and will need to be addressed as the City plans for future hazard events.

Housing Trends

Key housing and socioeconomic trends are described below that relate to housing supply and demand.

- According to the American Community Survey, in 2012, the Long Beach Community had a total of 16,254 housing units. Of those, 57% were owner-occupied and 10.5% were vacant.⁵⁹ Table II-4 provides additional detail on housing occupancy.



Sol Scher Senior Apartments
Source: The LiRo Group

- Housing units are primarily single-family homes (40%) and multiple-story buildings with 20 or more units (32%). Most housing units were built between 1940 and 1969 (44.5%).⁶⁰ A significant percentage (32.5%) was built in 1939 or earlier. The average home value in the Community was \$505,225 in 2012.⁶¹ Table II-5 provides additional information on Long Beach’s types of housing.

Table II-4: Housing Occupancy 5-Year Estimates

HOUSING OCCUPANCY	TOTAL
Total Housing Units	16,254
Occupied Housing Units	14,553 (89.53%)
Vacant Housing Units	1,701 (10.47%)
Homeowner Vacancy Rate	1.65%
Rental Vacancy Rate	2.14%

Source: U.S. Census. American Community Survey 2008–2012

- According to the American Community Survey 2008–2012 estimate, of the 33,275 residents in the Long Beach Community, there are over 1,500 veterans, and 2,908 disabled residents, most of whom are seniors.⁶²
- An estimated 6,723 people in Long Beach speak a language other than English, primarily Spanish (4,149). Over half of these Spanish speakers reported that they spoke English “Less than Very Well.” Other languages spoken are “Other Indo-European Languages” (1,402), “Asian and Pacific Island Languages” (545), and “Other Languages” (627).⁶³
- The population in the Long Beach Community was 33,275 in 2010 according to the U.S. Census. A significant decline of almost 18% is projected by 2020 for individuals between 45 and 54 years old, and a 31% increase is projected by 2020 for individuals 65 to 74 years old.⁶⁴
- The median household income in Long Beach is \$85,845, which is above the Nassau County median income of \$81,300. However, close to 60% of households have incomes at or below \$74,999, including



2,480 (17% of all households) that have incomes of \$24,999 or less.⁶⁵

Table II-5: Units in Structure

UNITS IN STRUCTURE	TOTAL	PERCENTAGE
Total Housing Units	16,254	
1 Unit, Detached	6,050	37.22%
1 Unit, Attached	371	2.28%
2 Units	2,989	18.39%
3-4 Units	941	5.79%
5-9 Units	229	1.41%
10-19 Units	410	2.52%
20 or More Units	5,247	32.28%
Mobile Home	0	0.0%
Boat, RV, Van, etc.	17	0.10%

Source: American Community Survey 2008-2012 5 Year Estimates Table DP04 Selected Housing Characteristics in the United States <http://factfinder2.census.gov>

- Of the 8,253 owner-occupied units in the Community, close to 70% had mortgages in 2012. Approximately half (50%) of owners who occupy their units and have mortgages have housing costs above 30% of their incomes. (HUD defines individuals or families who pay over 30% of their income for housing to be cost burdened). Of owners who do not have mortgages, 28% pay more than 35% of household income for housing, indicating that these owners also have a housing cost burden.⁶⁶
- As of 2012 in the Community, there were 6,101 occupied units paying rent (approximately 43% of the housing units in Long Beach are occupied by renters). The median rent paid was \$1,434. However, over 58% of units have rents above \$1,500 and an estimated 39% of renters (2,326) have housing costs above 35% of their incomes.⁶⁷
- As of June 2013, there were close to 8,000 FEMA registrations for assistance by homeowners in the City of Long Beach with total damages of over \$92 million, including over 1,700 applicants with

incomes of less than \$30,000. There were also 8,000 FEMA registrations by renters in Long Beach. Of these, over 3,500 (44%) had incomes at or below \$30,000.⁶⁸

- The City of Long Beach has its own housing authority that oversees the administration of several affordable housing programs, including the Housing Choice Voucher Program (HCVP), which has 389 dedicated vouchers. The Long Beach Housing Authority oversees several affordable housing properties, which are listed in the table below. In addition, there are 26 rent-regulated, multiple-unit buildings (the majority co-ops and condos) in Long Beach, primarily along East and West Broadway and Shore Road.⁶⁹ Table II-6 details the City's affordable housing assets.
- There are four designated low- and moderate-income (LMI) census blocks in Long Beach. LMI census blocks are defined by the Department of Housing and Urban Development (HUD) as census blocks where at least 51% of persons are LMI individuals. Figure II-10 provides a map of the LMI census blocks and four where at least 51% are LMI families are shaded red or orange.



Channel Park Homes
Source: The LiRo Group

Table II-6: Affordable Housing Assets

DEVELOPMENT/ASSET NAME	DEVELOPMENT TYPE	ADDRESS	TENURE	TARGET POPULATION	NUMBER OF UNITS
Pine Town Homes	Section 236/Section 8 Loan Mgmt.	151 E. Pine Street	Rental	Family	130
Channel Park Homes	Housing Authority	500 Centre Street	Rental	Family	108
Sol Scher Apartments	Housing Authority	225 West Park Avenue	Rental	Low-income seniors and the disabled	71
Michael Valente Apartments	Housing Authority	415 National Boulevard	Rental	Low-income seniors and the disabled	65
Sonny Duckman Apartments	Housing Authority	175 West Broadway	Rental	Low-income seniors and the disabled	65
Morton Cohen Apartments	Housing Authority	35 East Broadway	Rental	Low-income seniors and the disabled	65

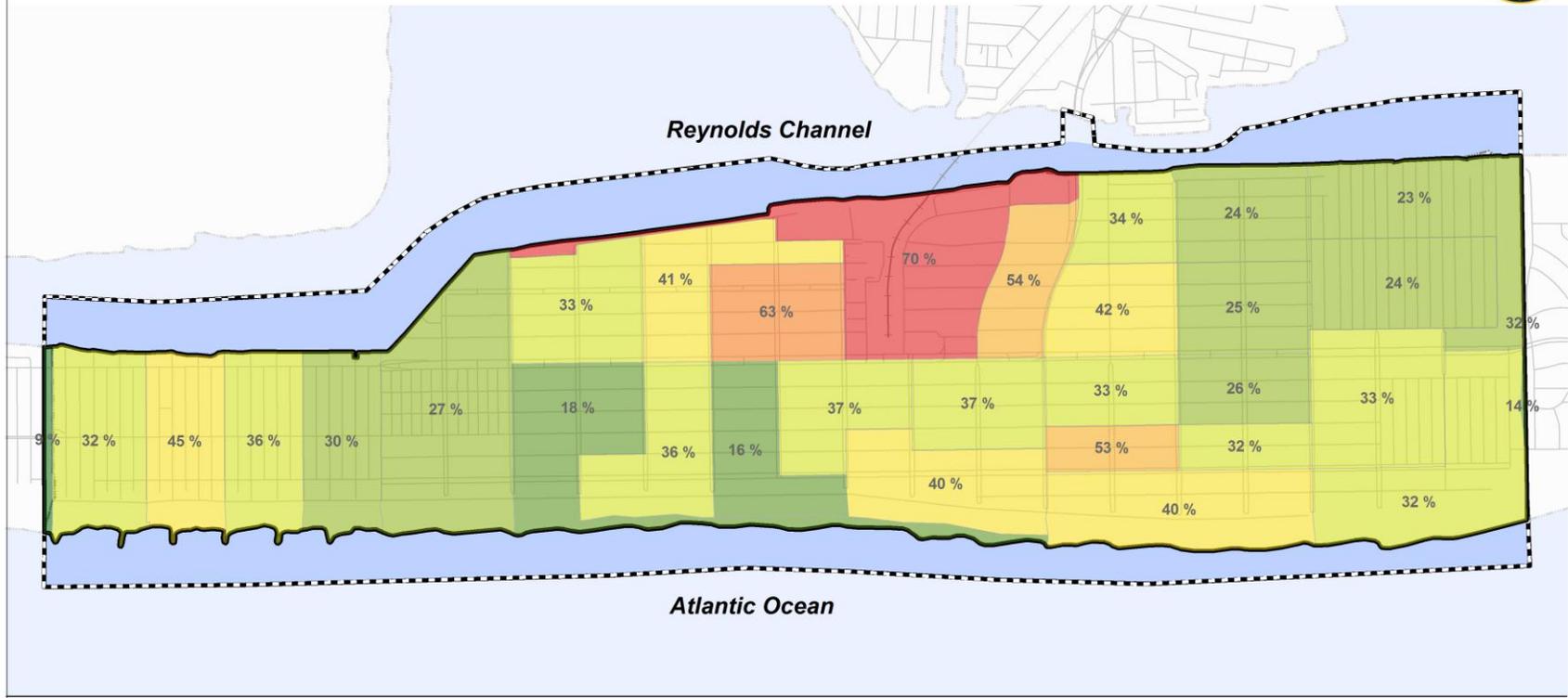
Source: Nassau Urban County Consortium Five Year (2010-2014) Consolidated Plan & Annual Action Report
http://www.nassaucountyny.gov/agencies/EconomicDevelopment/Docs/PDF/Five-YearConsolidatedPlanNarratives_002.pdf



Figure II-10: Long Beach Percentage of Low and Moderate Income Families

NY Rising Community Reconstruction Program

Source: Nassau County, US Census Bureau



Percentage of Low and Moderate Income Families by Block Group

- Under 10%
 20% - 30%
 40%-50%
 60%-70%
 Community
- 10% - 20%
 30% - 40%
 50%-60%
 70% +



Housing needs

Flooding on the oceanfront and bayfront affected almost every home in the City. Although some homes have been elevated, additional homeowner financial and reconstruction assistance is needed. Insurance and FEMA funding are insufficient to cover expenses for rebuilding and elevating homes, and some residents are struggling to rebuild. In some cases, rebuilding may be cost-prohibitive to residents who are seeking to return home. Resiliency requirements that require raising homes will be a particular challenge for low-income homeowners.



Elevation of homes in Long Beach

Source: URS

- More resilient rental and affordable housing is needed in the City. Rehabilitated houses could be used to fill this need.
- Where appropriate, additional housing should be evaluated to help increase the tax base and attract young professionals.
- Second-story additions and raised building elevations have altered the neighborhood scale of the City. For example, new two-story elevated homes are being built adjacent to one-story bungalow homes, creating an inconsistent streetscape.
- Public and senior housing in Long Beach was significantly impacted by Superstorm Sandy and is in need of flood protection measures. Many residents of public housing were displaced by the disaster

generally from 4 weeks to 7 months, delaying both their recovery and the City's. Long Beach residents were primarily housed at the following locations during Sandy: Nassau Community College, Levittown Memorial High School, the State University of New York (SUNY) Old Westbury campus, and Manhasset High School. The Housing Authority has applied for grants to protect its structures, but approval of the grants is uncertain.

- Additional flood protection is needed for the City's public housing units including protective measures for the ground floor areas, elevation of equipment, providing backup power, and wind protection of roofs, windows, and building exteriors. Protection of senior housing units is also needed to ensure that residents can quickly return to their homes once it is safe to return. Flood protection for ground floor areas is needed, as well as elevation of equipment, backup power systems, and demountable barriers. Emergency preparedness plans based on lessons learned during Superstorm Sandy should be considered.

Housing opportunities

- Identifying and creating access to as many housing-related financial resources as possible and distributing critical information to the public is an important goal. On December 15, 2013, the City participated in a Recovery Workshop sponsored by the Long Beach Interfaith Clergy Association and supported by Catholic Charities. Establishing an Office of Emergency Management, which Long Beach does not currently have, could help with this effort. The creation of a revolving loan fund that provides low-interest loans for home elevation would also help accomplish this goal.
- Coordination with State and Federal agencies could occur to simplify the grant application process by having a single application or a clearinghouse for all government grant programs.
- Building owners and homeowners should be encouraged to seek opportunities to increase energy efficiencies and sustainability as buildings and homes are rebuilt.
- The visual aspect of neighborhoods should be protected and balanced with the need to elevate homes to reduce flood risk.

Elevation of replacement buildings must be done thoughtfully with an eye toward maintaining the pedestrian-friendly character of the neighborhood. Homeowners who are considering elevation and sustainability measures need to be educated on the techniques that are technically appropriate and that will complement the surrounding neighborhood. Design guideline documents can help meet this need.

- Senior and public housing developments should have flood and wind protection so residents can return as quickly as possible to their homes when evacuations are needed.
- The City and the Long Beach Housing Authority could coordinate to identify opportunities to add additional affordable housing.
- Additional housing opportunities could be developed to ensure that Long Beach residents have ample opportunities to return back to the City.

Infrastructure

Superstorm Sandy devastated critical infrastructure, especially along the north shore, but also along the oceanfront. As described in Section I and earlier in Section II, key systems, such as water, power and wastewater were out of service for an extended period of time for such critical systems to the whole community. In addition, stormwater management assets were not designed to meet current and future risk needs and flooding occurs on key roads like Park Avenue and Beech Street that serve as evacuation routes prior to and during large storms.

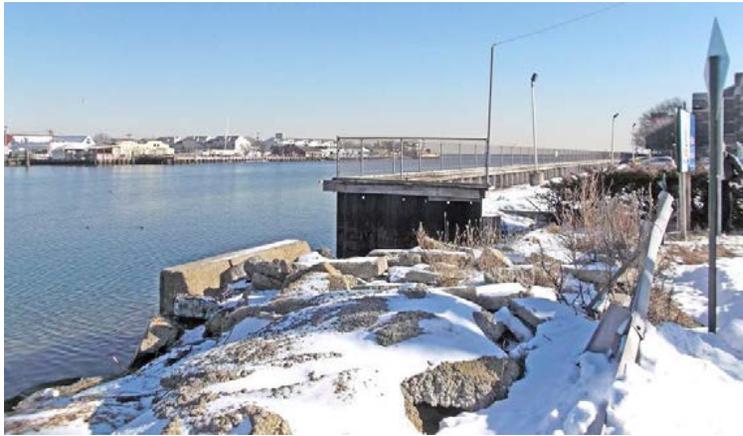
Key infrastructure assets must be protected in order to remain operational before, during, and after future storms. Layers of protection are needed to avoid interruption for significant lengths of time during a storm event. Critical infrastructure assets serving the whole community (e.g., water, wastewater, public safety) have the least amount of tolerable downtime. Providing redundancies in the system overall, will help mitigate different storm scenarios and help maintain critical services before, during, and after storm events. Addressing stormwater management concerns will also allow residents to evacuate safely.

Superstorm Sandy flooding and storm surge occurred on both the oceanfront and the bayfront, resulting in almost complete inundation of the City. At the date of this NYRCR Plan, the USACE will be initiating substantial work on the

oceanfront including dune restoration in the fall of 2014. Continuing efforts include replacing walkovers and rebuilding groins. Due to this progress, the Planning Committee focused attention on the bayfront (north shore).

Infrastructure needs

- The inadequate height and condition of the bulkheads, as well as the naturally low elevations, on the north shore to protect against flooding was demonstrated during Superstorm Sandy. Bulkheads along the bayfront are discontinuous and have variable elevations. In some areas, the bulkheads are non-existent. New bulkheads, bulkhead improvements, canal gates, and similar types of protection measures at a uniform height and designed for storm protection are needed on the hardened shoreline with the limited open land that is typical of the City's north shore. Particular areas of concern along the length of the north shore are on either side of the Long Beach Bridge from National Boulevard to Lincoln Boulevard, the West End, and in the Canals neighborhood.
- Although the flood damage from Superstorm Sandy was tremendous, flooding from stormwater occurs on a much more frequent basis and impacts several major roads. Stormwater management issues result from aging infrastructure, the amount of impervious surface in the City, the lack of topographic relief on the island, and tidal water entering stormwater outfall pipes. In order to prevent tidal water from entering stormwater outfall pipes, additional backflow prevention devices and centrifugal separation chambers are needed to help improve water quality.
- A comprehensive stormwater management study is also needed to evaluate the whole system and develop cost-effective solutions to stormwater issues, including use of green infrastructure and underground storage chambers. Areas subject to the highest level of repetitive flooding include W. Park Avenue from Virginia Avenue to Arizona Avenue, E. Chester Street from Neptune Boulevard to Curley Street, National Boulevard from W. Penn Street to W. Olive Street, E. Bay Drive from Neptune Boulevard to Lincoln Boulevard, and E. Pine Street from Park Place to Long Beach Boulevard.



Existing bulkhead conditions near the former Long Beach Medical Center

Source: The LiRo Group

- As a follow-up to the comprehensive study, a force-main stormwater pumping system is needed to provide greater capacity to discharge stormwater during flooding and high tides. Additional needs include converting sand gutter areas to positive drainage, replacing inadequate and undersized drainage inlet structures, installing control structures to filter out debris, and increasing stormwater storage to improve stormwater drainage.
- Aging water and sewer lines need to be replaced throughout the City.
- The Long Beach Water Pollution Control (sewage treatment) Plant is an aging facility that is in need of flood protection and updating. The sewage treatment plant was flooded and forced off line during Superstorm Sandy. In November 2013, the Governor announced a bulkheading and flood barrier project from National Boulevard to the Long Beach Bridge. Once implemented, this project will provide protection to much of the City's key infrastructure along the north shore. The potential future conversion of the treatment plant to a lift station would also reduce vulnerability.

- The Long Beach Water Purification Plant was flooded during Superstorm Sandy, resulting in boil-water advisories for approximately 1 week. The plant is in need of protection, which it should receive from the bulkheading and flood barrier project described above.
- Superstorm Sandy destroyed pumps in the wells and sewer lift stations when salt water went into the pump electrical components and water seals. Four pump stations and two wells need additional flood mitigation and elevated backup generators.
- Backup power systems located on ground floors in parts of the City were rendered inoperable by flooding and needed to be elevated or otherwise protected from flooding.
- Critical facilities, utilities, and infrastructure should plan for larger peak volumes during storms and should be elevated to mitigate flooding.



Water Purification Plant and North Shore Utilities

Source: URS

- Some roads, including established evacuation routes such as Park Avenue and Beech Street, are susceptible to flooding, even in heavy rain, which can limit evacuations. Additional drainage and stormwater management is needed along these roads so they are passable for emergency vehicles and during mandatory evacuations.
- Complete Streets enhancements are needed to address all modes of transportation infrastructure, including enhancing pedestrian and bicycle accessibility and safety. Identified areas for the first phase of

the proposed Complete Streets streetscape enhancements include Park Avenue in the Central Business District and Beech Street. A future phase of this project would be for Kennedy Plaza in front of City Hall which would include a large-scale underground stormwater storage chamber, rain gardens, and create a multi-purpose public space.

Infrastructure opportunities

- Due to the devastating flooding from Superstorm Sandy from the bay, developing a continuous line of perimeter defense along the north shore using bulkheading and canal gates is one of the Committee's priorities.
 - Continuing the City's efforts to install backflow prevention devices on all storm drain outfalls is an opportunity to prevent tidal backflow into the stormwater system. Installation of centrifugal separation chambers (e.g., vortex chambers) at strategic points in the stormwater system can help improve water quality at outfall points into the bay.
 - Preparation of a stormwater management feasibility study to address City-wide stormwater issues with a focus on areas that have repetitive flooding is a sensible first step to approach stormwater needs in the City. A byproduct of this study could be to study the replacement of aging water and sewer lines when stormwater projects are approved.
 - Repairs and reconstruction after Superstorm Sandy offer the opportunity for the City to implement stormwater best management practices and introduce green infrastructure, such as bioswales, porous paving, and rain gardens to assist with stormwater management. Retention areas are being designed as a part of the Neptune Boulevard road reconstruction, as well as for National Boulevard and W. Hudson Street.
 - Components of wells and sewer lift stations that need additional mitigation should be hardened and elevated. Although submersible pumps have been installed in the stations to provide some protection from flooding, barriers around the stations would be beneficial.
- Stormwater flood mitigation is needed in all of the business districts, including the Park Avenue and Beech Street corridors, which are also established evacuation routes. This project should also include bicycle, pedestrian, streetscape improvements, emergency signage, and solar powered lighting which will not only enhance resiliency of these important corridors but also provide opportunities for economic growth.
 - Opportunities to develop a plan and seek funding for backup power and telecommunications systems in local government-owned critical facilities should be explored.
 - Periodic inspection of storm drains/outfalls, bulkheads, and backflow prevention devices is an opportunity to make sure the system remains fully functional.



Pump/lift station at E. Park Avenue/Maple Boulevard

Source: The LiRo Group

- The USACE has an ongoing dune reconstruction project that will help provide a storm barrier on the oceanfront. This effort will continue into the near future with the replacement of dune walkovers and dunes in front of the Boardwalk. Additional enhancements should continue to be evaluated.
- Opportunities to implement a smart grid infrastructure and relocate utilities to enhance the resiliency of the power grid could be explored.
- As described in the Economic Development subsection above, comprehensive planning should include a detailed review of traffic congestion, traffic circulation, traffic calming, bicycle routes, pedestrian, and parking needs utilizing Complete Streets principles.
- Resources should be sought to conduct an in-depth study of large-scale future flood protection measures, such as a storm surge barrier system.

Natural and cultural resources

During Superstorm Sandy, the Boardwalk and dune system were destroyed. The barrier island and the surrounding waters as a coastal ecosystem must be considered. Issues such as improving water quality in Reynolds Channel are critical to environmental health and future opportunities. Long Beach's waterfront assets on both the ocean and the bay are significant and provide tremendous recreational opportunities for residents and guests. These assets should be evaluated for additional economic development opportunities. This subsection provides perspectives on how the overall natural system can be restored, protected, and used to boost economic development and storm protection for Long Beach.



Dune planting, fall 2013

Source: Sustainable Long Island

Natural and cultural resources needs

- Recent efforts to replenish beach sand, build a dune and berm system, and install additional dune plantings should be continued to make the beachfront area both a more effective storm barrier and a continual draw for guests. Replacing dune cuts with dune walkovers will help to make the dunes more effective as protection. Additional dune plantings will also help to ensure dune stability.
- Open space and natural areas, where green infrastructure techniques can be installed, are needed to reduce stormwater and improve water quality.
- Private properties encroach on the public greenways on the four canals and access to bulkheads along the canals will need to be evaluated for bulkhead repairs and improvements.
- Excessive nutrients from sewage treatment release and untreated stormwater outfall have deteriorated the water quality in the vicinity of the City. The habitat for fish, shellfish, fowl, and animals has

deteriorated, and shellfishing beds are deteriorated and no longer viable. The deteriorated water quality limits recreational use of Reynolds Channel. Improving water quality in Reynolds Channel is important to protect this natural resource.

- The City lacks sufficient artistic and performance space and venues to provide this type of facility are needed to provide residents additional cultural opportunities and to increase its draw to guests.
- Natural and cultural resources are not being used to their full potential as economic development generators. These resources are a tremendous asset that can be further highlighted and promoted to increase tourism.

Natural and cultural resources opportunities

- Two ways to improve the water quality of Reynolds Channel are the transfer of Long Beach's sewage to Bay Park STP and water quality treatment (e.g., debris separation chambers) of stormwater outfall. As described in the Economic Development section, the back bay area and Reynolds Channel are amenities that present an opportunity to partner with other communities to promote additional recreational activities, such as a kayak trail.
- The possibility of extending the bayfront Esplanade on the north shore is a way to expand recreational opportunities.
- Continued enhancements to the beach and dunes should be considered once the current efforts to restore walkovers, build dunes in front of the Boardwalk, and rehabilitate the groins have been completed.
- Long Island has an island-wide goal of attaining 10% open space buffer.⁷⁰ Although this goal may be difficult to attain in fully developed Long Beach, opportunities to incorporate green infrastructure will help improve Long Beach's resiliency while improving the streetscape through additional landscaping. Incorporating open space in new development or redevelopment projects for better resiliency should be considered.
- The City's efforts to restore the tree canopy with appropriate species during post-Sandy restoration should be supported to enhance

community character. The City has applied to be a "Tree City" with the Arbor Day Foundation and is actively pursuing funding to obtain additional trees and to create a tree maintenance program.

- The promotion of its beaches and waterways for festivals, competitions, and other events has been an effective way for the City to drive economic growth.
- Partnering with neighboring communities to market and promote regional natural and cultural attractions is a way to attract additional guests to Long Beach.



Ocean Beach Park
Source: Planning4Places, LLC



Section III: Reconstruction and resiliency strategies

Photo: Kerrigan Street and E. Pine Street

Source: Planning4Places, LLC

Section III: Reconstruction and resiliency strategies

Strategies, associated goals, projects, and actions were developed from the Planning Committee Meetings, the Public Engagement Events review of the asset inventory and risk assessment, and response to the needs and opportunities assessment for Long Beach. The City of Long Beach was a supportive partner during the NY Rising Community Reconstruction (NYRCR) process and provided information and assistance needed to first identify strategies and then develop projects and actions to support and fulfill the strategies. As described in Section II, the Consultant Team coordinated with the City many times during the process and also took site visits to evaluate important community assets.



First Public Engagement Event, October 10, 2013

Source: Sustainable Long Island

Overall, these strategies are part of Long Beach's larger vision described in Section I.D. to increase resiliency, sustainability, and prosperity citywide

through multi-objective projects and actions. Each NYRCR Long Beach reconstruction and resiliency strategy presented below is overarching and followed by more specific goals to achieve the strategy, and projects and actions to fulfill the goals. The strategies support the Recovery Support Functions defined in Section II and some projects address multiple strategies. All together, the strategies, goals, projects, and actions identified through the planning process are tailored approaches for a comprehensive recovery that positions Long Beach for greater future success.

The actions that ultimately became projects were the ones identified by the Committee that also received the greatest support during the Public Engagement Events. The Committee also took into consideration recovery actions already underway (e.g., the City or a Federal agency action) and looked to areas still in need of attention. For example, the extensive completed work and committed funding of the U.S. Army Corp of Engineers (USACE) on the oceanfront allowed the Committee to focus on the bayfront and stormwater management. See Section I for more detail on the USACE project.

During the development of the NYRCR Plan, the Committee brainstormed many potential actions and strategies that would help Long Beach become more protected and resilient in the short term. Based on community input, the risk assessment, and the history of frequent flooding, it was determined that solutions were needed for bayfront protection and stormwater drainage. The Committee also identified longer-term actions and strategies to help grow the economy, revitalize Long Beach, and/or enhance its appeal. Due to the enormity of Sandy's impact on Long Beach, the Committee focused mostly on resiliency measures needed for protection against storms.

The actions from the NYRCR Long Beach Plan were examined for feasibility as Proposed or Featured Projects. Some of the projects fit multiple strategies and are listed more than once to show how they address each one. Metrics such as cost, time frame, and technical feasibility, were used to evaluate the

strategies for potential as projects. The Proposed and Featured Projects include:

- Capital projects, such as perimeter structural defenses for coastal protection and resilient construction;
- Feasibility, planning studies, and land use regulations;
- Policies and programs that increase awareness and information;
- Market-based methods such as accruing points for the Community Rating System (CRS) (National Flood Insurance [NFIP]) to reduce flood insurance premiums; and
- Conservation, restoration, and enhancement of natural protective features at a local and regional level.

Detailed information on Long Beach’s Proposed and Featured Projects, including projects with cost-benefit analyses, is provided in Section IV. Proposed Projects are those projects proposed for funding through a community’s allocation of Community Development Block Grant Disaster Recovery (CDBG-DR) funding (up to \$25 million for Long Beach).

Featured Projects are innovative projects for which an initial study or discrete first phase of the project is proposed for CDBG-DR funding or other identified funding and regulatory reforms and other programs that do not involve capital expenditures.

Additional details on Proposed and Featured Projects are listed in the tables following each strategy. The regional significance of projects is noted in these tables. Regional significance can mean that a Proposed or Featured Project protects an asset that is used by several communities (e.g., reduce flooding on an established evacuation route) or it is the community’s part in a more global project that spans several communities (e.g., a community restores the dunes on its part of a barrier island). In addition, some Long Beach departments, including the Fire Department, protect other communities on the barrier island such as the Atlantic and East Atlantic Beach fire districts.

Additional Resiliency Recommendations are resiliency projects and actions the Committee would like to highlight and are not categorized as Proposed or Featured Projects. These projects are also listed in Section V.

Other actions not selected as a Proposed Project, Featured Project, or an Additional Resiliency Recommendation, because they were not formulated as project at this time, in the development of the NYRCR Plan, are listed in this section as “Ongoing and Future Actions.” These are important measures and some are currently being addressed by the City, while others are logical follow-up items to the projects outlined in the NYRCR Plan.

As projects are implemented, the protected assets and systems will still have some residual risk, which is typical of resiliency projects. Unless an asset is demolished and not replaced, it will be at some level of risk, particularly on a barrier island. The goal of the project is to lower the risk to an acceptable level in a cost-effective manner. More detail on how the Proposed and Featured Projects reduce risk is provided in Section IV. The costs are estimated based on the evolving nature of project development.



Strategy #1 – Employ appropriate techniques to mitigate ocean and bay storm surge and stormwater flooding to protect Long Beach’s infrastructure, people, and assets while positioning for resilient redevelopment.

The damage resulting from Superstorm Sandy prompted the Committee, in close connection with the City of Long Beach, to evaluate the infrastructure in the City to determine the greatest needs for future storm protection. As described earlier in the NYRCR Plan, the Committee followed the progress of the extensive USACE project work on the oceanfront, and focused on two other vulnerable areas: the bayfront and the stormwater system. The Committee looked for infrastructure options that would provide a beneficial level of protection in a cost-effective manner. The Long Beach Infrastructure reconstruction and resiliency goals to support Strategy #1 are as follows:

- Continue bulkheading at a uniform height along the entire north shore to provide coastal storm protection;
- Expand the capacity of the stormwater management system, including the use of green infrastructure, to reduce stormwater flooding to safeguard major access routes and established evacuation routes;
- Incorporate resiliency and sustainability into any proposed future infrastructure rebuilding and modification (also supports Strategy #3);
- Target strategic areas and programs to update infrastructure, redevelop in a resilient and sustainable manner, and increase economic growth (also supports Strategy #3);
- Implement the Complete Streets Program;
- Make system-wide improvements to protect critical facilities and major utilities from the flooding and high winds of coastal storms; and
- Maximize the dune and/or ocean barrier system along the entire Long Beach oceanfront.

Projects

Due to the importance of protecting enhancing the infrastructure to serve the whole community of Long Beach, the Committee and Consultant Team met with the City of Long Beach several times during the planning process to get updates on infrastructure projects and infrastructure needs. The Proposed Projects selected by the Committee to support Strategy #1 include the following:

Bulkheading – North Shore, a critical project because Superstorm Sandy devastated the north shore of Long Beach. The storm showed the inadequacy of the existing bulkheads to protect from major storms as there are many areas where the bulkheads are at inconsistent heights or non-existent. This project will provide phased installation of new bulkheads and replacement and improvement to existing bulkheads to an overall uniform height for storm protection on the north shore as required. The overall goal is a complete and uniform bulkhead running the entire length of the north shore. Phasing of the project is to be developed for critical areas as established by August 2013 *Conditions Evaluation of Bulkheads & Outfall Structures in the City of Long Beach, New York* study. This study was an exhaustive and detailed analysis of the entire bulkheading system and identifies areas that are inadequate. This project will connect north shore bulkheads with other funded and proposed bulkheading projects to form a continuous perimeter shoreline defense in Long Beach. The project includes a study to determine whether canal gates are feasible; if canal gates are feasible, the amount of bulkheading required for protection would likely be reduced.

A Featured Project that complements the Bulkheading of the North Shore is the **North Shore Protection of Critical Utilities** project which includes bulkheading along an unprotected part of the shoreline and flood barriers around the utilities. The storm surge of Superstorm Sandy severely damaged most major utilities, most of which are on the north shore along an unprotected shoreline. This project is to provide coordination with the approved project announced by Governor Cuomo in November 2013 to develop bulkheading from National Boulevard to the Long Beach Bridge and also includes flood barriers (e.g., a deployable barrier or Dutch dams) around major utilities. This project is out for bid as of March 2014, with work slated to start later in 2014.



Another complementary Featured Project is the **Canal Gates in the East End**, which will assess and provide phased installation of moveable canal gates to mitigate flooding of the canal area. This project would connect with the current and proposed bulkheading projects.



The Canals neighborhood in the East End
Source: The LiRo Group

To address the serious and repetitive stormwater flooding issue that is part of Strategy #1, the Committee identified a Proposed Project entitled **Drainage Improvements**. Superstorm Sandy caused serious flooding to major access streets and hindered movement of emergency vehicles. This project will address areas that are flooded with stormwater at least 10 times a year, which can be critical when flooding before a major storm like Sandy blocks access to evacuation routes. The first phase of this project will improve stormwater drainage in these areas that tie to evacuation routes. The second phase involves installing backflow prevention valves on stormwater outfall pipes and installing centrifugal separation chambers in strategic locations to improve water quality. The backflow prevention valves will help reduce the flooding of housing units from tidal water entering the stormwater drainage system.

A second phase of the effort to improve the stormwater system is the Featured Project entitled **Stormwater Project Phase 2/Stormwater**

Force Main Project. This project is a large-scale second-phase stormwater system improvement that includes a major stormwater conveyance component, the force main that will require a major investment. See Table III-1 for project details.

To complement these stormwater efforts, the Committee also selected two projects that combine infrastructure improvements, including stormwater drainage improvements, while also helping to meet economic development goals. The projects, **Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements**, a Proposed Project, and the **Park Avenue Complete Streets Phase 2**, a Featured Project. Both Park Avenue and Beech Street are established evacuation routes and reducing stormwater will help make these important routes more accessible and passable. This Proposed Project also includes solar-powered lighting to respond to power outage issues after Sandy, which created an unsafe environment with no street lighting.

A Proposed Project that will help improve community services is the **Critical Facility Resiliency** project. This project will protect critical facilities that are needed to provide essential services before, during, and after a disaster. The Community also had no pre-established facilities before Superstorm Sandy that could also serve as a post-evacuation staging center to receive and distribute important supplies and equipment post-disaster. All post-Superstorm Sandy actions were ad hoc. This project includes the retrofit of two facilities (the Ice Arena and Recreation Center) to serve as a post-disaster/post-evacuation staging center.

Due to the fact that Superstorm Sandy destroyed pumps for both water supply and sewage removal, the Committee looked at protection measures for these vital components of the water supply and sewage systems. Salt water destroyed the pumps' electrical components and water seals, rendering the pumps inoperable. The **Protection of Wells and Sewer Pump/Lift Stations** is a Proposed Project to study two methods of protection of these critical systems.

Long Beach is a flat barrier island that has no significant natural high ground. Therefore, Superstorm Sandy rendered emergency response vehicles and apparatus unusable because there was no nearby location where these vehicles could be relocated above flood levels. To address this issue, the Committee identified a Proposed Project, **Parking Garage for Emergency**

Vehicles, which involves constructing a parking garage to store emergency response vehicles and equipment at a second story level for major storm use. The garage can also be used as emergency distribution center; three locations will be considered. Long Beach also has a shortage of parking in its key commercial areas; the garage can help provide additional parking to help bring in more customers to these areas. It will also reduce overflow into neighborhoods.

Three Additional Resiliency Recommendations have been included for Strategy #1 because all involve technology or an approach that needs additional study and/or require a significant dollar investment for which resources are not yet secured. The first one helps address the power outages after Superstorm Sandy, which created an unsafe environment for residents, City officials, and emergency responders. The **Microgrid for Select Community Assets** is a project that involves using localized power generation to maintain power to specific assets if the utility grid becomes de-energized in a future storm event.

As described earlier, storm surge that enters the back bay of the Long Beach Barrier Island causes tremendous damage, as experienced in Superstorm Sandy. The second Additional Resiliency Recommendation is the **Bayside Flood Gates Feasibility Analysis**, which involves conducting a Flood Gates Feasibility Analysis at existing transportation structures, such as bridges. The third Additional Resiliency Recommendation addresses the issue that Long Beach has an outdated Water Pollution Control Plant for treating sewage that is in a vulnerable area. The outfall of this Plant is in Reynolds Channel. The project, the **Transfer of Sewage Treatment to Bay Park STP**, would transfer sewage treatment to the recently modified Bay Park STP. This project would benefit multiple communities with frontage on the bay.

Table III-1 at the end of this subsection provides additional detail on the NYRCR Long Beach's Proposed and Featured Projects.

Ongoing and future actions

- Continue implementing the Complete Streets program and, where feasible, connect to neighboring communities.
- Coordinate with NYRCR Housing Recovery Program to determine how to package these programs to address as much of the bulkheading needs as possible.

- Develop a public awareness campaign for the City's current bulkheading loan program for private property owners.
- Coordinate with the USACE to maximize the dune and/or ocean barrier system along the entire Long Beach oceanfront, including the Boardwalk.
- Continue implementing green infrastructure, such as bioswales in road medians, porous paving in parking areas, and rain gardens, to assist with stormwater management.
- Coordinate with the National Grid and LIPA/PSEG to secure backup power sources and protect transmission and distribution facilities that are still vulnerable. In addition, work with LIPA/PSEG to install smart meters on homes and businesses to better monitor energy usage and to build a smart grid.



Well at Lafayette Blvd and W. Bay Drive
Source: The LiRo Group

- Expand green energy generation ideas where feasible. The City has a program to fast track solar permitting and adopted the "Solar Energy System Fast Track Permit Application." This effort will be complemented by the Design Guidelines component of the OEM/LDRM Proposed Project.

- Explore regional coordination with barrier island communities and communities across Reynolds Channel for a shoreline improvement district to help deal with common issues, such as the need for bulkheading, emergency services, microgrids, and potential alternative power generation.
- Coordinate with LIRR to ensure that train service remains operational. Protect the Long Beach Station and its track leading up to Long Beach. In October 2013, the State of New York announced that contracts had been awarded to repair and elevate two of the three damaged substations along the LIRR’s Long Beach Branch.

Table III-1: Strategy #1 Proposed and Featured Projects

Strategy: <ul style="list-style-type: none"> • Employ appropriate techniques to mitigate ocean and bay storm surge and stormwater flooding to protect Long Beach’s infrastructure, people, and assets while positioning for resilient redevelopment. 				
Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional Project (Y/N)
Bulkheading – North Shore	This project will provide phased installation, replacement, and improvement to existing bulkheads along the north shore as required for storm protection. The phased approach will be based on the extensive analysis from the City’s August 2013 <i>Conditions Evaluation of Bulkheads & Outfall Structures in the City of Long Beach, New York</i> . This project includes all of the proposed bulkheading from this report. The project would include a feasibility study for both potential bulkheading locations and the use of canal gates (which would likely reduce the need for bulkheading in the Canals neighborhood).	\$12,450,000	Proposed Project	Y
Drainage Improvements	The first phase of the project includes a comprehensive stormwater study followed by improvements to stormwater drainage in the areas that tie to evacuation routes. These areas include: 1) W. Park Ave. to Virginia Ave. and Arizona Ave.; 2) E. Chester St. from Neptune Blvd. to Curley St.; 3) National Blvd. from W. Penn St. to W. Olive St.; 4) E. Bay Dr. from Neptune Blvd. to Lincoln Blvd.; and 5) E. Pine St. from Park Pl. to Long Beach Blvd. The second phase involves installing backflow prevention devices (city needs > 50) on stormwater outfall pipes and installing debris separation chambers in appropriate locations to improve water quality.	\$8,350,000	Proposed Project	Y



Table III-1: Strategy #1 Proposed and Featured Projects (Continued)

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional Project (Y/N)
Critical Facility Resiliency	This project includes the feasibility study and implementation of flood and wind protection to emergency responder facilities. It includes elevation of electrical systems, backup generators, and critical IT equipment so they will function throughout a severe storm, where needed, at the Central Police/Fire Station as well as the West End and East End Fire Stations. The project also includes providing wind protection for the roofs and walls of these critical buildings. It includes adding protective panels at the doorways of emergency responder facilities, as well as sealing the lower building walls to prevent water infiltration, and elevation of firehouse operations. The project includes creating a resilient OEM operations center in City Hall. The project also includes protection of the Recreation Center and the Ice Arena, which would serve as a post-disaster/post-evacuation staging center after a major storm event.	\$2,387,000	Proposed Project	Y
Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements	This project involves making stormwater retention and management improvements by installing retention structures, new drains, and piping; green infrastructure; introducing pervious landscaping; and increasing the amount of unpaved surfaces. Also included are bike, pedestrian, and streetscape improvements; emergency signage; and solar-powered lighting for emergency resiliency. The project involves two major streets that are the primary evacuation routes into and out of the community.	\$10,652,500	Proposed Project	Y
Parking Garage for Emergency Vehicles	This project involves constructing a parking garage to store emergency response vehicles and equipment at a second story level for major storm use. The garage will also serve as an emergency distribution center. One potential location is directly behind City Hall. This location is next to the primary police, fire, and OEM facilities. Other potential locations are a garage in the West End of the City or at the Waldbaum’s Shopping Center. The exact location is to be decided.	\$14,705,000	Proposed Project	N
Protection of Wells and Sewer Pump/Lift Stations	This project will study two methods of protection for these critical systems. The first is to construct flood barriers around the pump stations. The second is to raise the pumps and electrical systems above the flood height. There are four pump stations and two	\$2,480,000	Proposed Project	Y



Table III-1: Strategy #1 Proposed and Featured Projects (Continued)

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional Project (Y/N)
	wells. Both methods add backup generators elevated above the storm level.			
Stormwater Project Phase 2/Stormwater Force Main Project	As a continuation of the stormwater project, this project will improve stormwater drainage across the City through the following methods: converting areas served by sand gutters to a positive drainage system, installing pressurized pipes (force main), replacing inadequate and undersized drainage inlet structures, installing control structures such as swirl separators to prevent floatable materials from entering the drainage system, and increasing stormwater storage through subsurface storage chambers and bio-retention zones/rain gardens.	\$114,830,000	Featured Project	Y
Canal Gates in the East End	Assess and provide phased installation of moveable canal gates to mitigate flooding of the canal area. This project would connect with current and proposed bulkheading projects.	\$26,400,000	Featured Project	Y
Park Avenue Complete Streets Phase 2	This project involves the redevelopment of Kennedy Plaza in front of City Hall to improve the City’s stormwater system by providing large-scale underground stormwater storage chambers as well as strategically located green infrastructure, solar lighting for emergencies, and reconfigured use of the space. The project would augment the efforts of the Park Avenue Streetscape Drainage Study and Infrastructure Improvements by helping to control stormwater in the Park Avenue evacuation route corridor.	\$43,740,000	Featured Project	Y
North shore Protection of Critical Utilities – Bulkheading and Flood Barriers	Provide coordination with the project announced by Governor Cuomo in November 2013 to develop bulkheading from National Boulevard to the Long Beach Bridge. Includes flood barriers (e.g., Dutch dams) around major utilities. This project is out for bid as of March 2014 with work starting later in 2014.	\$12,900,000	Featured Project	Y



Strategy #2 – Protect critical Long Beach health and social services assets and increase the capacity to provide needed emergency and community services before, during, and after disasters.

All of Long Beach was flooded after Superstorm Sandy and providers of basic emergency services were operating with limited functionality due to damaged facilities and equipment. While the emergency responders performed admirably, they were functioning in extremely difficult conditions. In addition, community centers and other facilities were damaged and unable to function, some for several months, creating additional stress on the Community. Finally, vulnerable populations were displaced from public and senior housing, generally about 4 weeks and for some, up to 7 months. The Committee recognized the need to address these issues with Strategy #2. Specific goals to support this Strategy include:

- Protect facilities with critical government services, including emergency responders, to maintain continuity of operations after major storms;
- Repurpose public buildings to create community assistance centers during and after major storms;
- Increase the capacity of the City and local organizations to provide needed services to the residents of Long Beach, including vulnerable populations, before, during, and after disasters (supports Strategy #4);
- Enhance the resiliency of key social service facilities and medical and health care centers; and
- Restore and protect schools to allow them to be operable quickly after storms.

Projects

Protecting the emergency responders and other community facilities was a priority of the Committee and it developed into several projects to achieve Strategy #2. First, emergency responder facilities are vitally important as they protect the public safety of the whole Community and are particularly needed after a disaster when secondary impacts such as fires break out and looting can occur. The Committee identified the **Critical Facility Resiliency** as a Proposed Project and it involves increasing the resiliency of the

emergency responder facilities (police and fire stations) so they can be operable after a storm event. This project is described in greater detail in Strategy #1.

A second important Proposed Project is the **Protection of Community Centers**. The residents of Long Beach need a protected early recovery center, which did not exist after Superstorm Sandy, where they can gather for mutual support and to receive important information. These centers perform a distinct function from the post-disaster staging centers in the Critical Facility Resiliency project and would be set up to provide basic support services including recovery information dissemination and counseling during the early stages of recovery. While the facilities are not meant to be fully protected from a storm and therefore will not serve as a shelter, they are needed to be protected to avoid massive damages so they are available to serve the Community following a disaster. After Sandy, residents of other nearby communities gravitated toward community centers such as libraries for mutual support.

The final two Proposed Projects that help fulfill Strategy #2 are the **Protection of Public Housing Units** and the **Protection of Senior Housing Units**, which will help protect the facilities of vulnerable populations during and after a disaster. Superstorm Sandy displaced residents from public housing units for upwards of 7 months, forcing them into temporary housing (see Section II for locations of the public and senior housing units). Senior citizens of Long Beach are subject to additional stress when evacuating in a storm, which occurred during Superstorm Sandy, because of mobility issues and medical requirements. Both residents of public and senior housing generally cannot afford to remain away from their homes for any length of time. These two projects will enhance protection to two public housing and four senior housing units respectively to allow residents to return to the housing units more quickly after a storm evacuation and initial recovery.

Table III-2 at the end of this subsection provides additional detail on the NYRCR Long Beach's Proposed and Featured Projects.

Ongoing and future actions

- Relocate emergency generators to upper floors, and harden where necessary, in key facilities, such as schools, healthcare facilities, and

public buildings, to maintain power and functionality during future hazard events.

- Develop Memoranda of Understanding with food assistance groups (e.g., Island Harvest, Long Island Cares, Meals on Wheels) to arrange assistance for the elderly when the power is out. This action will be part of the OEM project and will be coordinated with Nassau County OEM.

Develop response teams to check on and assist (vulnerable) populations on a continuous basis until power is restored. This action will be part of the OEM project.



MLK Center
Source: The LiRo Group

Table III-2: Strategy #2 Proposed and Featured Projects

Strategy: <ul style="list-style-type: none"> Protect critical Long Beach health and social services assets and increase the capacity to provide needed emergency and community services before, during, and after disasters. 				
Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional Project (Y/N)
Critical Facility Resiliency	This project includes the feasibility study and implementation of flood and wind protection to emergency responder facilities. It includes elevation of electrical systems, backup generators, and critical IT equipment so they will function throughout a severe storm, where needed, at the Central Police/Fire Station as well as the West End and East End Fire Stations. The project also includes providing wind protection for the roofs and walls of these critical buildings. It includes adding protective panels at the doorways of emergency responder facilities, as well as sealing the lower building walls to prevent water infiltration, and elevation of firehouse operations. The project includes creating a resilient OEM operations center in City Hall. The project also includes protection of the Recreation Center and the Ice Arena, which would serve as a post-disaster/post-evacuation staging center after a major storm event.	\$2,387,000	Proposed Project	Y
Protection of Community Centers	This project involves improving the resiliency of existing community centers to be used in an emergency. The project involves providing flood protection for the buildings, raising existing electrical systems, and installing new electrical generation equipment to have the centers up and running soon after a storm. The community centers include the Main Library and the Martin Luther King Jr. Center. The centers would also serve as community assistance centers to assist residents with basic needs once the storm has passed and residents return to Long Beach.	\$1,335,000	Proposed Project	N
Protection of Public Housing Units	This project will enhance protection of vulnerable populations through the retrofit of two public housing units to allow residents to return to the units as soon as possible after a storm evacuation. The two public housing units are the Channel Park Homes and Pine Town Homes.	\$2,965,000	Proposed Project	N
Protection of Senior Housing Units	This project will enhance protection of vulnerable populations through the retrofit of public senior housing units, including the Sol Scher Apartments, Michael Valente Apartments, Sonny Duckman Apartments, and Morton Cohen Apartments.	\$1,925,000	Proposed Project	N



Strategy #3 – Implement measures to make Long Beach economic generators more resilient, while also facilitating enhancement of key commercial areas and the redevelopment of underutilized areas to stimulate economic growth.

Superstorm Sandy devastated the City’s business community and damaged many economic assets. The City of Long Beach made tremendous progress in getting one of its primary assets, the Boardwalk, rebuilt in time in 2013 before the typically busy summer season. The Committee recognized that there are additional efforts needed to protect the commercial areas in the City as well as opportunities to grow the economy so the Community is less dependent on summer guests. Several goals were identified to help fulfill the strategy of protecting existing economic generators, planning for better use of underutilized areas, and addressing resiliency and infrastructure improvements together with economic activities:

- Protect existing businesses and expand their economic opportunities;
- Protect and then redevelop underutilized areas to stimulate economic growth (also supports Strategy #1);
- Incorporate resiliency and sustainability into economic growth strategies and future planned developments (also supports Strategy #1);
- Expand Long Beach’s economy by providing additional guest opportunities; and
- Leverage economic investments to enhance resiliency and sustainability.

Projects

The Committee considered project ideas that could accomplish multiple objectives including redesigning infrastructure and amenities near existing commercial areas to make them more resilient and create wider economic appeal. A Proposed Project for this strategy, the **Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements**, is expected to improve stormwater drainage in the busy Park Avenue and Beech Street commercial corridors where frequent flooding can block access to these areas. This project, described in more detail in

Strategy #1, also includes streetscape improvements for pedestrian and bike traffic to enhance the commercial appeal of these two corridors.

As a second phase to the above project, the **Park Avenue Complete Streets Phase 2** is a Featured Project that builds on the first phase by creating additional stormwater storage areas to keep stormwater flooding off Park Avenue. The project includes the reconstruction of Kennedy Plaza, to include large-scale underground stormwater storage chambers and strategically located green infrastructure, solar lighting, and reconfigured use of the space. This project will enhance the City’s primary public space, enhancing its appeal to residents and guests as well as the attendees at the special events held at Kennedy Plaza.

The **Bayfront Revitalization Plan** is a Featured Project that includes an examination of the potential future use of the north shore utility area, which is underutilized and holds great economic potential. The plan will include a robust community visioning and public input process. Part of this effort will be addressing the brownfield site in the north shore utility area. The City of Long Beach was already awarded a Phase I study by NYS, and the City will apply for a Phase II study to investigate the old incinerator plant on the north shore. The Phase II study, entitled **Brownfield Remediation Studies** for the NYRCR Plan, is included as an Additional Resiliency Recommendation.

Table III-3 at the end of this subsection provides additional detail on the NYRCR Long Beach’s Proposed and Featured Projects.

Ongoing and future actions

- Establish a local green building program with zoning and tax incentives.
- Maximize use of the area around the Long Island Rail Road (LIRR) station/Waldbaum’s Shopping Center for transit-oriented development (TOD). Conduct a feasibility study of the downtown area to consider TOD.
- Expand guest marketing by increasing the number of events (e.g., triathlon, beach events) and festivals held in the City and appealing to a wide range of guests, including surfers, cyclists, and runners.



- Expand retail and food concessions to enhance the Boardwalk. The second part of the Boardwalk Visioning process will address future enhancements of the Boardwalk, including examining the appropriate type and amount of retail and food concessions.
- Encourage appropriate development along the Boardwalk, including the privately owned Foundation Block, the Hebrew Academy if it is put up for sale, and the Superblock. As of February 2014, the City zoning board approved an application for the Superblock to build two 15-story buildings with 522 one- and two-bedroom apartments. The application also includes 11,000 square feet of retail space along the Boardwalk and a 6,000-square-foot promenade to integrate public space into the project.
- Enhance gateways to Long Beach and install more public art on commercial streets.
- Encourage and assist small businesses and non-profits to obtain financial assistance, develop business continuity plans, and rebuild customer bases.
- Install a fiber-optic network to develop maximum bandwidth for a community-wide wireless network and encourage the growth of Internet-based businesses.
- Leverage Long Beach's setting and proximity to New York City to attract young technical entrepreneurs.
- Identify workforce needs and create job training, including training for green business opportunities, entrepreneur training, and job matchmaking programs to fill job needs.



W. Beech Street
Source: Sustainable Long Island

Table III-3: Strategy #3 Proposed and Featured Projects

Strategy: <ul style="list-style-type: none"> Implement measures to make Long Beach economic generators more resilient, while also facilitating enhancement of key commercial areas and the redevelopment of underutilized areas to stimulate economic growth. 				
Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional Project (Y/N)
Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements	This project involves making stormwater retention and management improvements; bike, pedestrian, and streetscape improvements; emergency signage; and solar-powered lighting for emergency resiliency. Investment in these areas will assist with economic development. This project adopts Complete Streets principles. See project description in Table III-1 for more details.	\$10,652,500	Proposed Project	Y
Park Avenue Complete Streets Phase 2	This project involves the redevelopment of Kennedy Plaza in front of City Hall to improve the City’s stormwater system. The redesign of Kennedy Plaza would also remake the area into a highly aesthetic, multi-purpose public space, respecting and honoring the memorials, with the flexibility to host many types of public activities from small gatherings to larger public events. See project description in Table III-1 for more details.	\$43,740,000	Featured Project	Y
Bayfront Revitalization Plan	Prepare a plan that examines opportunities to make bayfront critical infrastructure more resilient and potential options to consolidate industrial uses on the north shore. The plan will provide a blueprint to lead to resilient redevelopment to unite this area with the rest of the bayfront corridor and center of the City. This will include brownfield remediation, connections to downtown and ocean, housing options, and an economic opportunity feasibility study. The plan will include a robust visioning and public input process.	\$300,000	Featured Project	Y



Strategy #4 – Increase Long Beach’s capacity to facilitate and foster actions that lead to greater resiliency, emergency preparedness, and sustainability.

In order to make Long Beach more resilient and to redevelop in a smarter, stronger, and safer way, the Committee recognized that additional resources would be needed to assist in this effort. Continuous planning and action will be necessary for Long Beach to develop a multi-disciplinary disaster recovery approach to facilitate an effective recovery, coordinate with other disaster recovery entities, and include all residents affected by the storm.

The City of Long Beach has accomplished a great deal since Superstorm Sandy made landfall and is a key organization for implementing additional efforts going forward. The Committee also recognized the need for building partnerships with other organizations to expand capacity. The following goals support this strategy:

- Identify and implement greater resiliency and sustainability options into all actions;
- Increase local emergency management preparedness response and mitigation capability including pre-disaster planning for vulnerable populations;
- Increase community preparedness by developing community-based emergency response and communication strategies;
- Identify ways to offset the increasing cost of flood insurance including additional efforts in the CRS program;
- Update and enact planning documents and regulations to address post-Sandy conditions, climate adaptation, resiliency strategies, sustainability, and energy efficiency; and
- Educate residents about the NFIP, the CRS Program, and home mitigation techniques.

Projects

The Committee identified several projects that will help fulfill Strategy #4. To increase the City’s capacity to better plan and prepare for future events, it has identified establishing an Office of Emergency Management as a Proposed Project. This project, entitled **Establish Office of Emergency**

Management (OEM) through the Hire of Local Disaster Recovery Manager (LDRM), has several components. Long Beach needs a full-time LDRM to build on the lessons learned from Superstorm Sandy. The LDRM would continue disaster planning efforts to help enhance response and recovery from future storms. Lessons learned from Superstorm Sandy include a need for better emergency response resources, such as services to aid socially vulnerable populations during a disaster, pre-disaster agreements with vendors such as cellular service networks to provide post-disaster services, and design guidelines to educate homeowners, including Spanish-speaking populations, on resiliency techniques. An LDRM would better position Long Beach to receive future grants, including local Emergency Management Performance Grants. Emergency office setup and equipment that is program eligible are needed for better functioning in an emergency.

A second project, the **Bayfront Revitalization Plan**, is a Featured Project initially described in Strategy #3, is also included under Strategy #4 because of the importance of continued attention to the north shore area that includes many of the City’s critical facilities including utilities. This area is both highly vulnerable and holds promise for future redevelopment. This community plan, which will include a robust visioning and public input process, will build on the Local Waterfront Revitalization Plan (LWRP) and Comprehensive Plan update processes of the City’s Resilience-Planning Initiative.

Almost all of Long Beach is within a Federal Emergency Management Agency (FEMA) Special Flood Hazard Area (SFHA). Owners with property in the SFHA and a federally backed mortgage must purchase flood insurance. The costs of flood insurance for some homeowners will increase due to provisions of the Biggert-Waters Flood Insurance Reform Act of 2012, even with recent proposed changes to the Act in March 2014. The City already participates in the Community Rating System (CRS) Program, which provides a flood insurance discount for approved flood reduction activities. This project, **CRS Evaluation**, involves analyzing the City’s participation in the CRS Program with the goal of lowering flood insurance premiums for residents. In January 2014, the City announced that it had commissioned a firm to conduct a CRS evaluation, and this project has been included as an Additional Resiliency Recommendation to highlight its importance.

Table III-4 at the end of this subsection provides additional detail on the NYRCR Long Beach’s Proposed and Featured Projects.



Ongoing and future actions

- Increase residents' household readiness (e.g., evacuation plan, meeting point, go kits). This action could be added to the OEM project.
- Promote sign-up for the reverse-911 system and Long Beach Response, an always available emergency communications service, and promote quarterly tests of the system. This action could be added to the OEM project.
- Build on existing resident emergency teams, such as the City's Neighborhood Emergency Team (NET), to provide additional capacity to address emergencies. Connect NET with other similar neighborhood response teams and with the Nassau County Community Emergency Response Team. This action could be added to the OEM project.
- Update the City's Comprehensive Plan, which is a component of the City of Long Beach's Resilience-Planning Initiative effort. In December 2013, the City announced that it had received funding from the State to update the Comprehensive Plan.
- Update the LWRP, another component of the Resilience-Planning Initiative effort. The City also announced in December 2013 that it had received funding to update the LWRP.
- Prepare a Low Impact Development (LID) plan. As of February 2014, the City is working with New York University to prepare an LID plan.
- Continue revising the building code to make progress in flood mitigation and energy efficiency.
- Continue revising the zoning code to align land-use decisions with ongoing planning initiatives.



City of Long Beach Public Library

Source: The LiRo Group

- Prepare intergovernmental cooperative agreements with surrounding communities on the barrier island to coordinate disaster responses. This action could be added to the OEM project and should be coordinated with Nassau County OEM.
- Evaluate the feasibility of a regional emergency radio broadcast or crowdsourcing system to facilitate communication with residents when telecommunications and traditional media outlets are unavailable. This action could be added to the OEM project.

Table III-4: Strategy #4 Proposed and Featured Projects

Strategy: <ul style="list-style-type: none"> Increase Long Beach’s capacity to facilitate and foster actions that lead to greater resiliency, emergency preparedness, and sustainability. 				
Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional Project (Y/N)
Office of Emergency Management (OEM) through Hire of Local Disaster Recovery Manager (LDRM)	Establish office in City Hall including the hiring of a full time LDRM to lead disaster planning, disseminate upcoming storm actions, and coordinate emergency operations for larger hazard events such as floods. The LDRM would coordinate with Nassau County OEM, the State, and regional centers. The LDRM position would be funded for 2 years and then the City would seek funds for its continuance. The LDRM would be responsible for setting up post-disaster agreements with vendors to provide needed services, helping to establish a special needs registration, and setting up agreements with non-profit organizations to provide services to vulnerable populations before, during, and after disasters. Part of this project includes the creation of a design guidelines document for elevation and sustainability in both English and Spanish. The project will include office setup and any support equipment that is program eligible.	\$1,083,000	Proposed Project	Y
Bayfront Revitalization Plan	This project includes examination of consolidating industrial uses on the north shore and to unite it with the rest of the bayfront corridor and center of the City to reach its economic potential. Additional project detail is found in Table III-3.	\$300,000	Featured Project	Y



Strategy #5 – Encourage and facilitate housing resiliency and sustainability measures while striving to maintain the character of Long Beach.

As described earlier, Long Beach was completely inundated by Superstorm Sandy and almost every resident of Long Beach experienced damage to their home. The storm displaced many residents for months at a time and some have still not returned. Most of the homes are in FEMA SFHAs and subject to future risk from flooding. It is vital to manage long-term risk for Long Beach to protect its housing stock from flooding. In addition, providing sustainability options for homes is an important goal of the City and it complements the efforts to make homes more resilient. Goals that support Strategy #5 are as follows:

- Provide home elevation and floodproofing education and assistance to residents in high-risk areas;
- Protect and expand affordable housing options for Long Beach residents;
- Develop programs and partnerships to educate residents on resiliency and sustainability options; and
- Encourage residents to enact sustainable and energy efficient practices.

Projects

While housing needs after Superstorm Sandy are primarily being addressed by the NY Rising Housing Recovery Program, it was important for the Committee to identify projects that supported residents while paying close attention to housing for vulnerable populations. As described in the Strategy #2 subsection, the Committee has identified two projects to protect the housing for vulnerable populations through the Proposed Projects entitled **Protection of Public Housing Units** and **Protection of Senior Housing Units**. Funds for these projects have been sought from other programs but the grants have not been approved.

To provide assistance for homeowners who have incurred significant financial losses due to Superstorm Sandy and would have difficulty funding elevation, the Committee developed the **Revolving Loan Fund for Elevation**, which became a Featured Project for the NYRCR Plan. This project would make

low-interest loans available for residents who need to elevate their homes but cannot self-fund it, or meet loan or grant requirements to participate in other programs. As stated above, many homeowners were directly impacted by Superstorm Sandy and need to elevate their homes.

The City has created a program to assist homeowners to implement resiliency measures, including elevation, and has requested funding from another grant source. This project, entitled the **Residential Resilience Project**, is an Additional Resiliency Recommendation in this Plan⁷¹.

Table III-5 at the end of this subsection provides additional detail on the NYRCR Long Beach's Proposed and Featured Projects.

Ongoing and future actions

- Offer educational programs on retrofitting techniques for single- and multi-family residential units that achieve both risk reduction and energy techniques.
- Develop a partnership with a university or college that can provide technical resources to help homeowners conceive and implement appropriate green techniques for homes (education expos, workshops, and technical helpline).
- Implement rain barrel and rain garden programs for residents.
- Evaluate whether the existing housing stock is adequate to meet the demand or if more options for rental and affordable housing are needed.
- Provide assistance to the Long Beach Housing Authority to identify opportunities to add additional affordable housing.
- Publicize model home designs and/or build a demonstration home that features risk reduction and energy efficiency techniques.



Seaview Terrace
Source: The LiRo Group

Table III-5: Strategy #5 Proposed and Featured Projects

Strategy: <ul style="list-style-type: none"> Encourage and facilitate housing resiliency and sustainability measures while striving to maintain the character of Long Beach. 				
Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional Project (Y/N)
Protection of Public Housing Units	This project will enhance protection of two public housing units to allow residents to return to the units as soon as possible after a storm evacuation. The two public housing units are the Channel Park Homes and Pine Town Homes. Coordinate with other grant sources.	\$2,965,000	Proposed Project	N
Protection of Senior Housing Units	This project will provide flood protection to public senior housing units, including the Sol Scher Apartments, Michael Valente Apartments, Sonny Duckman Apartments, and Morton Cohen Apartments. Coordinate with other grant sources.	\$1,925,000	Proposed Project	N
Revolving Loan Fund for Elevation	This program would make low interest loans available for residents who need to elevate their homes and would be administered by an appropriate agency.	\$5,000,000	Featured Project	N



Strategy #6 – Restore and enhance natural resources for both resiliency and recreation purposes while also protecting important cultural resources.

Located on a barrier island, Long Beach had abundant natural resources, and due to its long, rich history as an early seaside resort close to New York City and diverse cultural heritage, it also has its share of cultural resources. The Committee recognized the importance of protecting these resources and developed the following goals to help fulfill Strategy #6:

- Protect beaches and build up dunes;
- Restore and protect water quality and marshes in Reynolds Channel and the bay; and
- Evaluate methods to protect important cultural resources including historic landmarks and religious organizations.

Projects

As described previously in the NYRCR Plan and detailed in Section I, the USACE *Draft Hurricane Sandy Limited Reevaluation Report (HSLRR) and Environmental Assessment (EA)* is a significant effort to rebuild the Long Beach dunes and better protect the beach with reconstructed groins. This project is a tremendous commitment of funding that will help fulfill Strategy #6. The Committee evaluated additional ways to protect natural and cultural resources and evaluated projects that could meet multiple objectives. The Committee identified projects that supported this strategy including the Proposed Project discussed in the Strategy #1 subsection, **Drainage Improvements**. This project also includes installation of debris separation chambers in appropriate locations to improve water quality to outfalls into Reynolds Channel. A second phase to this project, the **Stormwater Project Phase 2/Stormwater Force Main Project**, is a Featured Project and includes green infrastructure and treatment of stormwater outfall in additional areas, among other measures. Both of these projects are expected to help improve water quality in Reynolds Channel.

An Additional Resiliency Recommendation to help the iconic Boardwalk reach its full potential is the **Boardwalk Visioning Part 2**, which will build on the original Boardwalk visioning process and determine additional improvements needed for the Boardwalk to maximize its potential while maintaining the character desired by the Long Beach community. Table III-6 at the end of

this subsection provides additional detail on the NYRCR Long Beach's Proposed and Featured Projects.



Dunes in the West End
Source: Planning4Places, LLC

Ongoing and future actions

- Explore recreational opportunities, such as a bike trail along the entire barrier island, kayaking in the back bay, and a water taxi.
- Install dune fencing and eliminate dune cuts (as of March 2014, the City had released a bid for this work).
- Initiate a tree trimming program to reduce downed trees during high-wind events and coordinate a tree restoration program. In November 2013, the City announced the first phase of a multi-phase project to replace trees on public property that are dying as a result of Superstorm Sandy.
- Work with the USACE to maintain and enhance the beach and oceanfront dunes. Perform additional dune reconstruction in front of the Boardwalk and rebuild groins (current USACE project).
- Work with the USACE to develop a plan for resiliency on the bayfront.
- Coordinate with the Town of Hempstead and Nassau County on the restoration of marshes and wetlands off Long Beach to protect water quality and assist in the natural protection against storms.

Table III-6: Strategy #6 Proposed and Featured Projects

Strategy: <ul style="list-style-type: none"> Restore and enhance natural resources for both resiliency and recreation purposes while also protecting important cultural resources. 				
Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional Project (Y/N)
Drainage Improvements	This drainage improvement project, described in greater detail in Table III-1, is also included under Strategy #6 because it will include installation of debris separation chambers in appropriate locations to improve water quality for important natural resources such as Reynolds Channel.	\$8,350,000	Proposed Project	Y
Stormwater Project Phase 2/Stormwater Force Main Project	As a continuation of the stormwater project, this project will improve stormwater drainage across the City through the following methods: converting areas served by sand gutters to a positive drainage system, installing pressurized pipes (force main), replacing inadequate and undersized drainage inlet structures, installing control structures such as swirl separators to prevent floatable materials from entering the drainage system, and increasing stormwater storage through subsurface storage chambers and bio-retention zones/rain gardens.	\$114,830,000	Featured Project	Y





Section IV: Implementation – project profiles

Photo: The Canals neighborhood in the East End

Source: The LiRo Group

Section IV:

Implementation – project profiles

The NY Rising Community Reconstruction (NYRCR) Program has allocated to the NYRCR Long Beach Community up to \$25 million. The funding is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program. While developing projects and actions for inclusion in the NYRCR Plan, Planning Committees took into account cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. Planning Committees also considered the potential likelihood that a project or action would be eligible for CDBG-DR funding.

The projects set forth in the NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in the NYRCR Plan does not necessarily indicate the Community's prioritization of these projects and actions. Proposed Projects are projects proposed for funding through the Community's allocation of CDBG-DR funding. Featured Projects are projects that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. Additional Resiliency Recommendations (see Section V) are projects that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects.

The total cost of Proposed Projects in the NYRCR Plan exceeds the NYRCR Community's CDBG-DR allocation to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in the NYRCR Plan are subject to applicable Federal, State, and local laws and regulations, including the Americans with Disabilities Act (ADA). Inclusion of a project or action in the NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented.

This section provides a complete project profile for each Proposed or Featured Project identified by the NYRCR Planning Committee (Committee) and community. The Proposed and Featured Projects were identified, selected, and advanced as a response to the risks, needs, and opportunities described in Section II of the Long Beach NY Rising Community Reconstruction Plan to address its goals of protection, resiliency, and revitalization. The selection and identification of the projects took into account all public input and the City's accomplishments post-Sandy. It bears repeating that the Committee coordinated closely with the City and once it knew that the risk from oceanfront was being addressed to the extent possible by the U.S. Army Corps of Engineers (USACE) through an extensive set of projects some of which were already complete in March 2014, a main priority was to help reduce flooding from the north shore.

The Consultant Team communicated with City staff and obtained technical materials to help assess and better define the potential projects to follow up on discussions from the Committee Meetings. The State and the Consultant team met with City of Long Beach Department of Public Works on February 11, 2014, to discuss specific projects including bulkheading, storm drainage, and protection of critical facilities, wells and pump stations. A detailed report entitled *Conditions Evaluation of Bulkheads & Outfall Structures in the City of Long Beach, New York*, a copy of recent bid information for a requirements contract for all bulkhead activities are examples of information provided by the City to the Consultant Team for review. The Consultant Team also evaluated several of the facilities and systems proposed for protection in the field.

The Proposed and Featured Projects are some of the implementation mechanisms for the Section III reconstruction and resiliency strategies. These projects represent actions that are expected to be implemented in the near future to build resiliency and fulfill other important community goals. The Consultant Team coordinated with City officials to obtain important information needed to identify, develop and assess potential project ideas.



The regional significance of projects is noted in the project profile. Regional significance can mean that a Proposed or Featured Project protects an asset that is used by several communities (e.g., reduce flooding on an established evacuation route) or it is the community's part in a more global project that spans several communities (e.g., a community restores the dunes on its part of a barrier island). As described earlier, some Long Beach departments, like the Fire Department, protect other communities on the barrier island, such as the Atlantic and East Atlantic Beach fire districts, and have regional significance.

Initially, the projects were categorized with a basic project description, Recovery Support Function, beneficiaries of the project (i.e., public/private, local/regional) were identified, and basic cost categories provided. As part of an initial feasibility and funding evaluation, various sources of funding for the projects were explored. The Committee used the input from the Public Engagement Events, including online surveys, to make decisions about which projects to select as Proposed or Featured. The results of Long Beach's Public Engagement Events are documented in more detail in Section V, and the overall results were generally consistent with the Committee's selection of projects.

In addition to providing a detailed description of each project, the profiles include information on two important elements used by the Committee to evaluate the value of each project: a cost-benefit analysis and a risk reduction analysis. The benefits were presented with qualitative descriptions that demonstrate how the projects assist the community in economic, environmental, and health and social services terms. Before initiating the projects, these two analytical elements of the project profiles must be understood.

Cost-benefit analysis

A cost-benefit analysis (CBA) is a tool used to calculate and compare the benefits and costs associated with a project. The CBA provides decision-makers with a framework for comparing different projects (i.e., anticipated cost of implementation against total expected benefits) and determining whether the benefits of a particular project outweigh the costs. More specifically, the value of the CBA is two-fold: (1) to inform the NYRCR

Planning Committees as they develop projects for implementation; and (2) to help municipalities prepare grant applications for funding.

Because NYRCR is a community-driven process, the CBA focuses on identifying project costs and benefits that easily relate to the communities that the NYRCR Planning Committees represent. Community and Committee input, informed by a true understanding of local conditions, needs and community values, plays a crucial role in the selection of projects that are implemented. The risk reduction benefits are described in terms of how much the Proposed or Featured Project would lower the vulnerability score. The additional benefits of the projects are provided in descriptive qualitative terms with relevant data, where available, that explain how these projects bring additional value to the community.

The costs and benefits used to evaluate projects through the CBA are explained further below. The costs are estimated based on the evolving nature of project development.

Project costs

Project profiles include an estimated cost for implementing the project. This cost estimate does not include overall life-cycle costs of the project (e.g., operations and maintenance costs). Factors contributing to overall life-cycle costs are described in general terms. To achieve the project's anticipated useful life, regular maintenance is necessary. Project design costs generally include architectural and engineering (A & E) components. The CBA cannot forecast costs or benefits with complete certainty. It does provide the community with a practical understanding of the potential estimated costs of project implementation and the potential benefits accrued to the community with the particular project in place.

The cost of implementing a project is just one aspect of the justification for funding these Proposed Projects. Conversely, another important variable is the future costs of not implementing these Proposed Projects. Not implementing the projects has the potential to negatively impact the long-term viability of both the City and its neighboring South Shore communities. Although these lost opportunity costs of not implementing the projects do not always lend themselves to quantification, they are no less important to the analysis and are, therefore, addressed qualitatively. These costs include:

- Economic loss to residents and to local and regional employers as a result of the inability to work;
- Hindrance in the provision of life safety and emergency services resulting in repeated inability to access vast areas of the community; and
- Extensive, repetitive damage to personal property (vehicles, residences) and public infrastructure resulting from frequent recurring flooding and future storm events.

Project benefits

The types of benefits considered in the CBA include:

- **Risk reduction:** The extent to which a project reduces the risk of damage to a community asset from a future storm event (discussed further below under "Risk Reduction Analysis").⁷²
- **Economic:** The project's potential to help minimize economic costs, secure jobs and reduce the time it takes for the local economy to rebound from a storm event and the net effect on local municipal expenditures.⁷³
- **Health and social services:** Qualitative information was provided on the overall population benefits of improved access to health and social service facilities, including public safety services and degree to which essential health and social service facilities are able to provide services to a community during a future storm event as a result of the project.
- **Environmental protection:** Benefits include the protection of crucial environmental assets or high-priority habitat, threatened and endangered species, migration, or habitat connectivity; any cleanup resulting from the action; and creation of open space or a new recreational asset.

Risk reduction analysis

A risk reduction analysis estimates the extent to which Proposed and Featured Projects will lower the flood risk to identified community critical assets and population when the project is in place. The risk reduction

analysis uses information from the risk assessment in Section II to determine the risk of an asset before the project implementation. It then estimates how the risk will be lowered by showing how much the Proposed or Featured Project would lower the vulnerability score.

Table IV-1 is a key to the symbols on the top right on the first page of each project profile which shows how projects address Recovery Support Functions. Some projects address multiple support functions. Figure IV-1 shows the locations of Proposed and Featured Projects.

Table IV-1: Key to Symbols

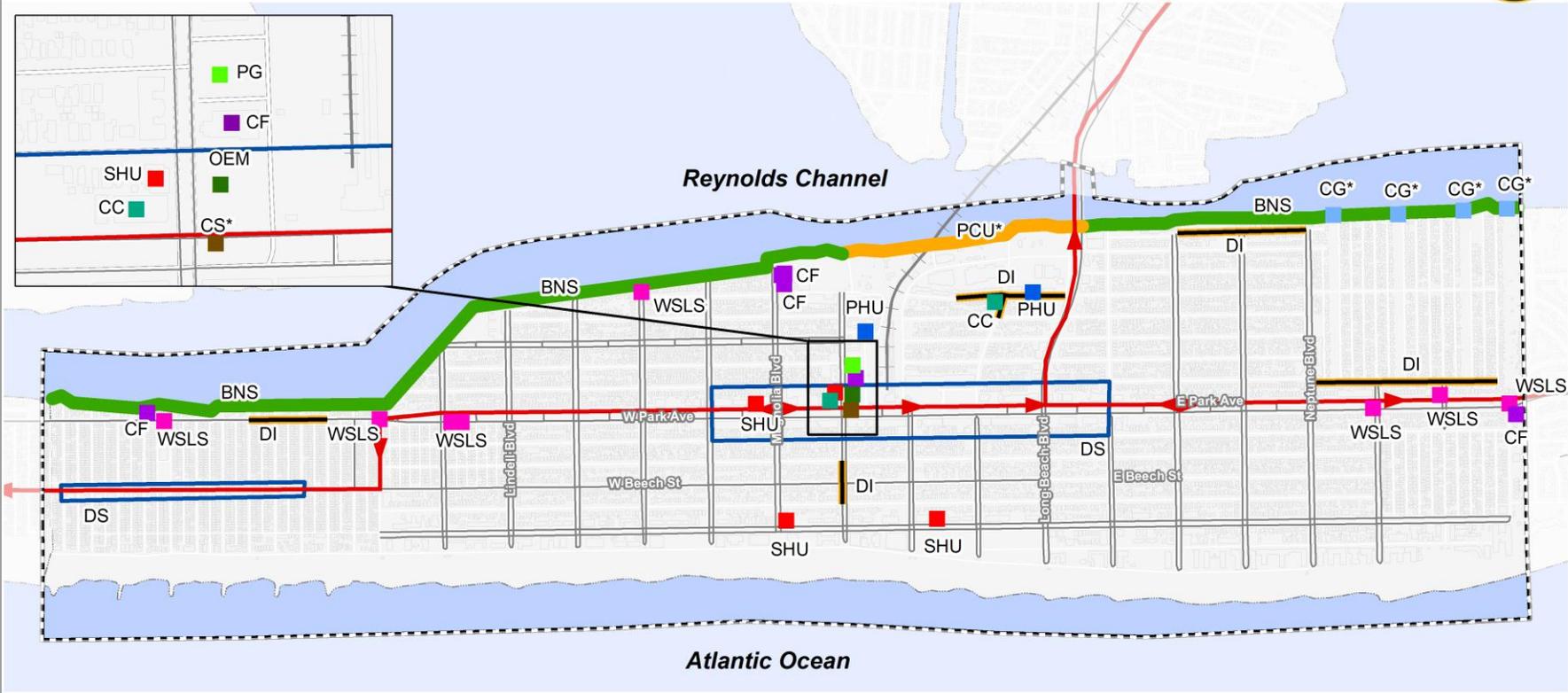
Symbol	Recovery Support Function
	Infrastructure
	Natural and Cultural Resources
	Health and Social Services
	Community Planning and Capacity Building
	Economic
	Housing



Figure IV-1: Long Beach Proposed and Featured Project Locations

NY Rising Community Reconstruction Program

Source: Nassau County, ESRI, New York State



Legend

* = Featured Project

- | | | | |
|--------------------------|---------------------------------------|--------------------------------|--------------------------|
| CG*-Canal Gates | CC-Community Centers | WSLs-Wells/Pumps/Lift Stations | PG-Emer. Vehicle Garage |
| CF-Critical Facilities | CS*-Complete Streets Ph 2 | OEM-Office of Emer. Mgmt | PHU-Public Housing Units |
| Evacuation Routes | BNS-Bulkheading, North Shore | DS-Drainage/Streetscape | SHU-Senior Housing Units |
| DI-Drainage Improvements | PCU*-Protection of Critical Utilities | Community | |



Bulkheading – North Shore



Picture of existing bulkheading (left) and rendering of potential improvement to bulkheading (right)

Source: URS

Description

Issue: Superstorm Sandy devastated the north shore of Long Beach with storm surge passing over the shoreline and damaging almost all homes, businesses and critical facilities inland. This part of the City has its lowest elevations and is extremely susceptible to storm surge flooding. The storm showed the inadequacy of the existing bulkheads, which are too low or non-existent, to provide protection from major storms. The City's coordination with the U.S. Army Corps of Engineers (USACE) has resulted in extensive work on the oceanfront leaving the north shore as the most vulnerable area. If nothing is done to protect the north shore, flooding will likely increase due to changes in flood risk caused by factors such as sea-level rise. The Committee, the City and the public have all recognized that this is a crucial component to the future resiliency of Long Beach.

This project would provide incremental, phased installation of new, and replacement and improvement (additional height) of existing substandard bulkheads on the north shore to a uniform height as required to protect the Community against coastal surge. Bulkheading would be designed to handle

soil backfill loading, with tie-backs and deadman anchors, and water height to storm level. The project will connect to other bulkheading projects. It would increase the shoreline defense from coastal flooding in areas with low elevations and would protect inland and shore properties, including private residences, commercial businesses on Park Avenue and Beech Street, the former Medical Center, and most City facilities.

The locations for the project will be identified through examination of the City's August 2013 bulkhead condition study, entitled *Conditions Evaluation of Bulkheads & Outfall Structures in the City of Long Beach, New York*, and consideration of which areas are most critical to address first. A study examining potential locations and the feasibility of canal gates, which would greatly reduce the need for bulkheading in the Canals neighborhood in the East End if proven feasible, will be included in the project. The project involves the following components:

- Removal of existing structures (existing steel sheetpiling to be replaced with straight faced heavy vinyl sheet bulkheads);
- Installation of pile supported headwall, cast-in-place headwall structure, and tie-backs; and
- Installation of new pipe bedding material, new concrete outfall pipe from existing manhole, and new tide valve.

This project should coordinate with NY Rising Housing Recovery Program for privately owned bulkheads. Related projects included the North Shore Protection of Critical Utilities and Canal Gates in the East End. This project aligns with a key strategy from the 2013 Long Island Regional Economic Development Council (LIREDC) *Strong Island: Strategic Economic Development Plan For Nassau and Suffolk Counties*, which is to "to harden our infrastructure, businesses and homes against the next major storm."



Cost estimate

\$12,450,000

Cost estimate components

- **Feasibility study and project design** – approximately \$1,217,000
- **Construction** – approximately \$10,297,000
- **Construction management** – approximately \$936,000

Benefits

Health and social

All residents of Long Beach, including socially vulnerable residents, are expected to benefit from the protection along the north shore of Long Beach. Bulkheading the north shore would protect several health and social service facilities and protect 10 census block groups that have between 26%-45% of the households at low/moderate income.

Economic

This project is generally expected to protect the main commercial corridors in Long Beach and would help reduce the disruption and downtime to these businesses, which were all severely impacted by Superstorm Sandy. The project is also expected to reduce local government expenditures by mitigating massive damage caused by storm surge across the north shore. An estimated 1,715 primary jobs on the Park Avenue commercial corridor and 422 on Beech Street commercial corridor would be protected⁷⁴.

Environmental

This project is expected to reduce some of the contamination associated with flooding of buildings including the reduction of floatable debris that polluted the waterways surrounding Long Beach after Superstorm Sandy.

Cost-benefit analysis

Long Beach is a fully developed community with a vulnerable shoreline. It has infrastructure such as bulkheads that were not originally designed to

address current and future flood risk. The City has experienced two major storm events, Irene and Sandy, since 2011 and storm surge over the north shore has been a major contributor to flooding in significant portions of the City from these events. The City recognizes improvements such as bulkheading are needed on the shoreline to protect both properties on the water and inland. The significant investment of \$12,450,000 is expected to yield high returns in protecting many homes, businesses, first responder facilities, and major employer/service providers from all but the largest storms.

Risk reduction

- The entire north shore bulkheading system would protect a large area from most coastal storms. It is generally expected to protect approximately 42 critical assets and to reduce the vulnerability score of these assets by 1 or 2.** This project addresses areas with the lowest elevations and highest risk in Long Beach, the north shore. In addition, it would provide protection from frequent coastal flooding of the residential and commercial areas on and to the north of Park Avenue and Beech Street in the West End which encompasses an area of approximately four census tracts, 6,361 housing units, 15,333 residents, and 1.7 miles of commercial business areas (1.1 miles on Park Avenue and 0.6 on Beech Street).
- The overall phased replacement and additional height to north shore bulkheading would help reduce the risk to a large number of physical assets and is generally expected to provide an increased level of protection to a majority of the population.**

Assets Benefitting: 42 critical assets for entire bulkheading project, mostly those north of Park Avenue and Beech Street in the West End including essential government facilities and major commercial corridors.

Population Benefitting: Approximately 65% of the City's population of 33,275 would benefit.

General time frame

Approximately 36 months





General time frame for implementation milestones

- **Prepare feasibility study and engineering and soil study** – approximately 3 months
- **Submit to regulatory agencies for review and permit approval** – approximately 6 months
- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 24 months

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances, New York State Department of Environmental Conservation permitting, USACE Section 10 and 404 permits, and Coastal Zone Management (CZM) consistency concurrence (New York State Department of State).

Jurisdiction

The project is in the City of Long Beach. See Figure IV-2 for project location.

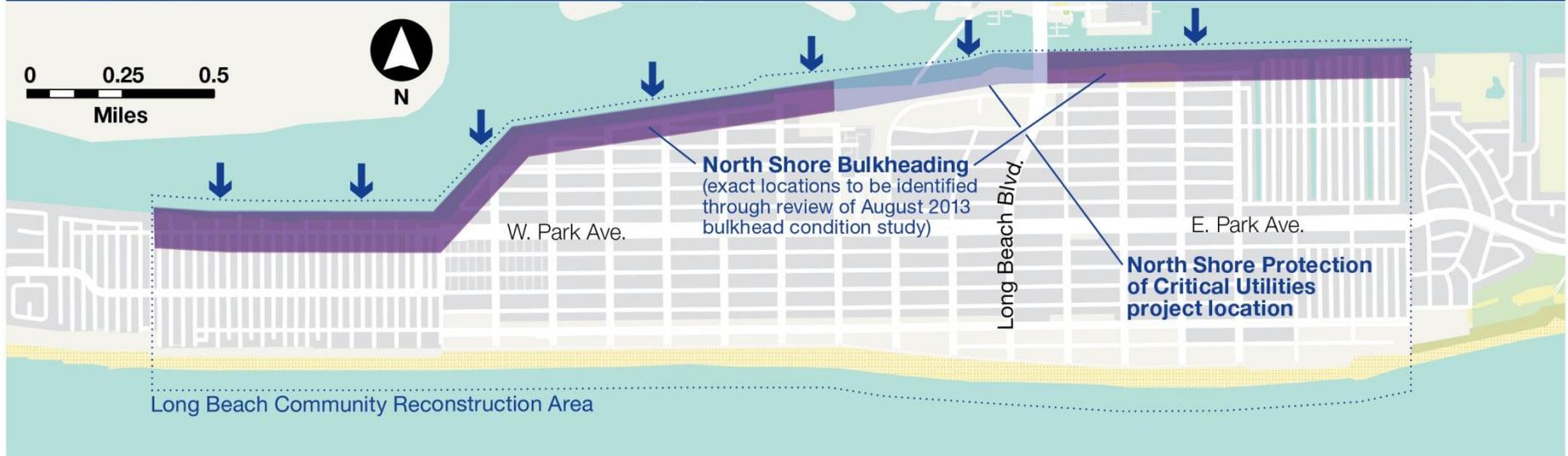




Figure IV-2: Project Locations for Bulkheading – North Shore

Showing goal of protection of entire north shore; tidal flow shown by arrows

Source: Two Twelve



Drainage Improvements



Backflow prevention devices

Source: URS

Description

Issue: Stormwater drainage is a persistent problem in Long Beach. The area has many systems that are over capacity and with an original design that cannot address current conditions. Some areas flood over 10 times a year from heavy rainfall or tidal events. Tidal water from Reynolds Channel coming up through stormwater drains was a primary cause of flooding of homes during Hurricane Irene. The inability to address the current stormwater flooding and prevent tidal water backflow can create costly re-routing of emergency vehicles and block access to commercial and residential areas. During and soon after a storm, as with Superstorm Sandy, the drainage problem can cause serious flooding to major access streets,

rendering them unusable to emergency vehicles and for residents trying to reach established evacuation routes.

This project would provide a comprehensive stormwater study followed by stormwater drainage improvements in several frequently flooded areas on major access streets. As a first implementation phase, the project would improve stormwater drainage in the areas that tie to evacuation routes and flood at least 10 times per year during heavy rainfall and nor'easter events. This part of the project involves

- Removal and replacement of the roadway in the flooded areas; and
- Increased drainage improvements with additional catch basins and manholes.

Key project locations for this part include: 1) W. Park Ave. to Virginia Ave. and Arizona Ave.; 2) E. Chester St. from Neptune Blvd. to Curley St.; 3) National Blvd. from W. Penn St. to W. Olive St.; 4) E. Bay Dr. from Neptune Blvd. to Lincoln Blvd.; 5) E. Pine St. from Park Pl. to Long Beach Blvd.

A second part of the project would install backflow prevention devices (approximately 50) on stormwater outfall pipes and debris separation chambers in appropriate locations to improve water quality. This project has the following benefits:

- Improves access to evacuation routes in case of emergency; and
- Helps start improvements to overall drainage system.

This project helps address an issue from the April 2013 *Cleaner Greener Long Island Plan Adaptation to Climate Change* plan: "inland, more frequent and intense rainfall events could also cause travel disruptions due to flooded intersections, roadways and rail lines." This project is also a response to the *Strong Island* report Goal 4 under the "Water" category to "Control flooding and surface water pollution from stormwater runoff." A related project is Stormwater Force Main (Phase 2 of this project).



Cost estimate

\$8,350,000

Cost estimate components

- **Prepare comprehensive drainage improvements study** – approximately \$900,000
- **Construction** – approximately \$6,898,200
- **Construction management** – approximately \$551,800

Benefits

Health and social

This project is expected to improve access for emergency vehicles and residents trying to reach established evacuation routes prior to major storms. It would also improve access to health/social service facilities during stormwater floods.

Economic

This project is expected to reduce flooding on important road corridors in Long Beach, including those near the East End Commercial District and in front of the former Long Beach Medical Center. By reducing flooding near these important economic assets, less disruption would occur. The City would also reduce staff costs to attend to these repetitively flooded areas. A report entitled *The Economic Impact and Financing of Infrastructure Spending* estimates that each dollar spent on infrastructure construction doubles the return on the dollar in ultimate economic output. Over 20 years, the return is \$3.21 in economic activity⁷⁵. The project is expected to protect the area in front of the former Long Beach Medical Center and protect access to 0.1 miles of commercial business area.

Environmental

Pollution to Reynolds Channel from stormwater runoff would be reduced.

Cost-benefit analysis

Long Beach is a fully developed community with infrastructure that, as with the stormwater system, was not originally designed to address current and future flood risk. This critical investment in upgrading and protecting the stormwater system is expected to reduce access problems for emergency response vehicles and blocked access for residents trying to get to established evacuation routes pre-storm. The project would reduce local government expenditures in responding to frequently occurring stormwater floods that occur at least 10 times per year during heavy rainfall events and nor'easters. The project would also protect flooding to housing units where backflow prevention devices are installed to prevent tidal water coming up through the stormwater drains.

Risk reduction

- This project is expected to reduce stormwater risk to six critical assets and reduce the vulnerability score by 1 for these assets.**
The project would also help improve stormwater drainage in the areas which flood at least 10 times per year and are tied to evacuation routes. The backflow prevention devices would help reduce impacts to coastal flooding that can penetrate the stormwater system during events like Superstorm Sandy, which left the system clogged with sand and debris. The approximately eight-block area to be protected (see "Key Project Locations") encompasses an area of a total of approximately 279 housing units and 667 people. This area will benefit from significantly reduced likelihood of flooding from heavy rainfall events.
- This project is expected to reduce stormwater risk to the population that uses these heavily traveled streets that frequently flood during rain storms.**

Assets Benefitting: Seven assets occupy an approximately eight-block area that will be protected from stormwater flooding. These assets are the Martin Luther King, Jr. (MLK) Center, Park Avenue, East End Commercial District, Fire Station #1, East Elementary School, a Pump/Lift Station, and the former Long Beach Medical Center.





Drainage Improvements

Population Benefitting: Protects residents who use these frequently travelled streets and emergency vehicles during storms. Also protects housing units flooded from tidal water entering stormwater system through unprotected outfall pipes.

General time frame

Approximately 30 months

General time frame for implementation milestones

- **Prepare comprehensive study** – approximately 9 months
- **Submit to regulatory agencies for review and permit approval** – approximately 3 months
- **Prepare bid documents and review responses** – approximately 3 months

- **Construct project** – approximately 15 months

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances; New York State Department of Environmental Conservation permitting, U.S. Army Corps of Engineers and Coastal Zone Management consistency concurrence (New York State Department of State), if applicable.

Jurisdiction

The project is located in the City of Long Beach. See Figure IV-3 for project locations.





Figure IV-3: Project Locations for Drainage Improvements

Source: Two Twelve



W. Park Ave. between Virginia Ave. and Arizona Ave.



National Blvd. between W. Penn St. and W. Olive St.



E. Pine St. between Park Pl. and Long Beach Blvd.



E. Bay Dr. between Neptune Blvd. and Lincoln Blvd.



E. Chester St. between Neptune Blvd. and Curley St.



Critical Facility Resiliency



Long Beach Fire Station in the East End
Source: The LiRo Group

Description

Issue: Superstorm Sandy rendered the police, fire, and emergency responder facilities inoperable. All of these facilities were heavily flood damaged and did not have power while trying to respond to post-storm emergencies. Nine fires broke out after Sandy. The City also did not have a pre-designated facility to receive and distribute emergency supplies and materials which hindered the post-disaster operation.

The project includes elevation of electrical systems, backup generators and critical IT equipment in the police and fire stations to function throughout a severe storm. Project also includes wind protection of the roofs and walls of these critical buildings. It includes adding protective panels at the doorways of emergency responder facilities as well as sealing the lower building walls to prevent water infiltration and elevation of firehouse operations. Specific

measures for the West End and East Fire Stations and the Central Fire and Police (Headquarters) include:

- Raise electrical panels and conduit;
- Floodproof and wind protect all doors including Bay doors;
- Window protection from wind; and
- Fixed/stationary generator where needed.

A second part is providing flood and wind protection for a post-disaster/post-evacuation staging area at the Ice Arena/Recreation Center, which will be used for distribution of emergency supplies and materials to residents. The staging area will be overseen by the OEM. Specific measures at these locations include:

- Raise electrical panels and conduit;
- Glass door replacement and flood shield;
- Window protection from wind; and
- Fixed/stationary generator.

Related projects include Parking Garage for Emergency Vehicles, Protection of Community Centers, and Establish Office of Emergency Management.

Cost estimate

\$2,387,000

Cost estimate components

- **Conduct retrofitting feasibility evaluation** – approximately \$50,000
- **Project design** – approximately \$260,000
- **Construction/retrofitting** – approximately \$1,904,000
- **Construction management** – approximately \$173,000



Benefits

Health and social

Having the Ice Arena/Recreation Center functioning as a community assistance center would provide a location for critical post-disaster supplies to be provided to the entire City population, including vulnerable populations. In addition, the project would help maintain police and fire protection functions to residents post-disaster.

Economic

Protection of emergency responder facilities during storm events is expected to reduce emergency and recovery costs post-disaster and preserves the capability to respond to emergencies. This project is expected to reduce post-disaster emergency and recovery costs by protecting the facilities. By protecting this functionality, emergency responders can perform their duties and help avoid adverse economic consequences. It can also help accelerate the recovery by providing a post-disaster staging center for securing and distributing vital supplies needed post-disaster. The project would help protect the jobs of approximately 25 career uniformed firefighter positions, 165 volunteer firefighters, and 78 sworn police officers. In addition, the protection of the Recreation Center and the Ice Arena is expected to reduce any service disruptions to these facilities associated with flooding and high wind, and therefore the project will help secure the positions of 321 employees (270 at Recreation Center and 51 at Ice Arena).

Environmental

This project would help reduce some contamination associated with flooding of buildings and release of chemicals into floodwaters including reduction of floatable debris that polluted the waterways surrounding Long Beach after Superstorm Sandy.

Cost-benefit analysis

Almost all of Long Beach is in either high- or extreme-risk areas, so the facilities cannot be relocated horizontally out of the floodplain as they are local emergency service providers that must remain in Long Beach. An investment in protecting these facilities is expected to lower local

government recovery expenditures from an event like Superstorm Sandy (the damages to these seven facilities from Sandy was over \$3 million) and would better ensure that the critical functions of these facilities are maintained during emergencies. Protecting post-storm designated staging centers would help expedite recovery and lower secondary impacts, such as temporary housing costs, by providing information and supplies to people to allow them to start the recovery process quicker. With these vital information and supply conduits located directly in the community, residents have less logistical challenges, and can coordinate more efficiently with non-profit recovery organizations, State and Federal recovery officials, the City, and neighbors. This efficiency reduces displacement time, which slows the recovery, and reduces the possibility of the impacted residents making the decision to relocate to another community.

Risk reduction

- a. **This project is expected to reduce the flood risk to six critical assets and reduce the vulnerability score by 1 to 3 for these assets.** The flood risk to these assets will be significantly reduced from all but the largest storms.
- b. **In a disaster event, the entire City population is expected to benefit from the risk reduction to these facilities, which would better enable emergency responders to provide services.** This project will help maintain emergency services after a large disaster event like Sandy where nine fires broke out immediately after the storm. The location of Long Beach on a barrier island with low elevation, surrounded by water and isolated from the mainland with limited access, magnifies the importance of protecting the City's emergency responder facilities.

Assets Benefitting: Seven – Three fire stations, police station, City Hall, Ice Arena and Recreation Center.

Population Benefitting: The entire City population is served by these emergency responder facilities.

General time frame

Approximately 24 months





General time frame for implementation milestones

- **Conduct retrofitting feasibility evaluation** – approximately 3 months
- **Prepare project design** – approximately 3 months
- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 15 months

Local, State, and Federal government regulatory requirements

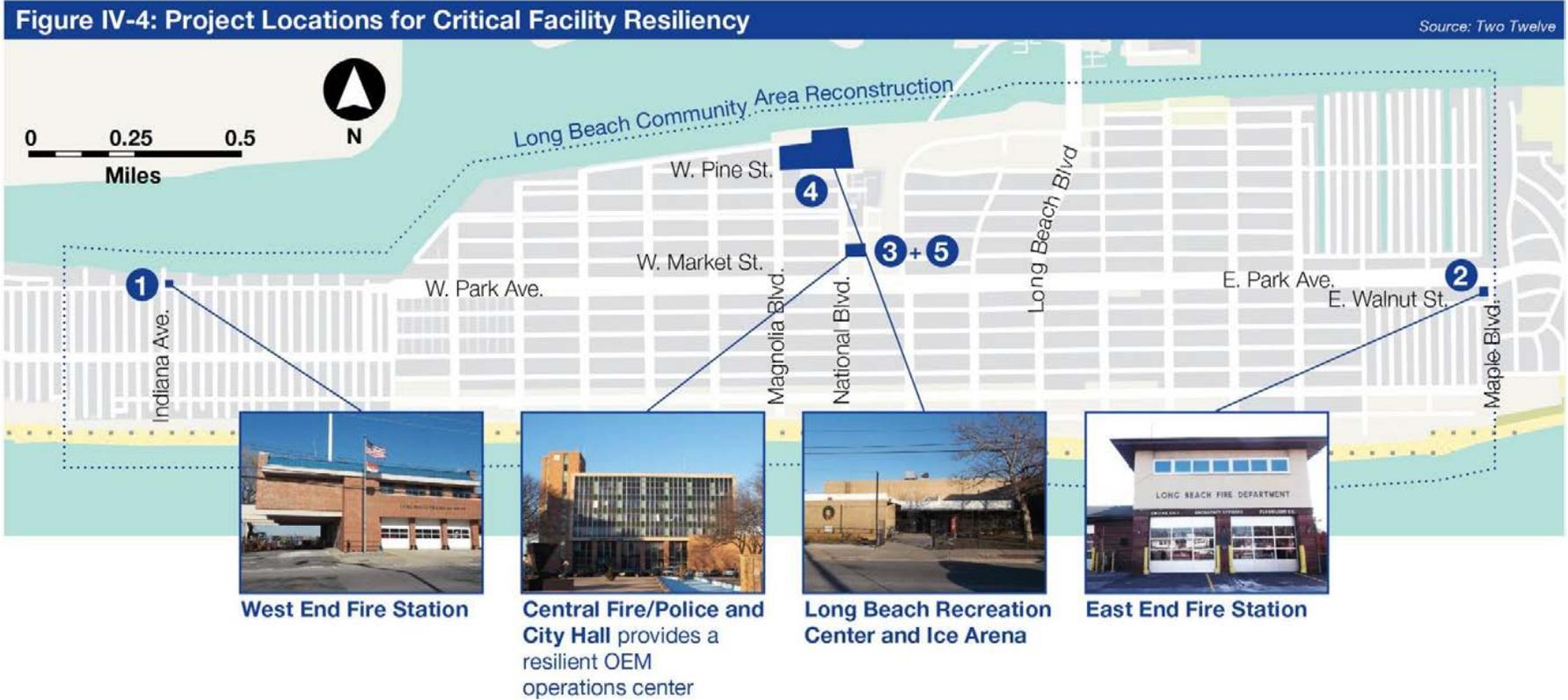
The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances; New York State Department of

Environmental Conservation permitting, U.S. Army Corps of Engineers (USACE) and Coastal Zone Management consistency concurrence (New York State Department of State), if applicable.

Jurisdiction

The project is in the City of Long Beach. See Figure IV-4 for project locations.





Establish Office of Emergency Management



Long Beach City Hall
Source: The LiRo Group

Description

Issue: Long Beach is at risk from flooding and high winds and would benefit from additional resources for emergency operations and management. Superstorm Sandy revealed additional emergency management and resiliency needs in Long Beach including the need for a secure Office of Emergency Management (OEM) command center. Additional resources and an experienced Local Disaster Recovery Manager (LDRM) can help build on existing City efforts so that residents have access to emergency preparedness information, assets are protected and then positioned to assist in the disaster operations, and response teams are established to check on socially vulnerable populations during power outages.

This project is intended to establish a full-time OEM with hiring of LDRM to lead disaster planning; disseminate upcoming storm actions; coordinate emergency operations for larger hazard events such as floods; 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. The project would fund the LDRM for 2 years. The LDRM would coordinate with Nassau County Government/OEM and tie to Regional disaster centers. The project includes the following components:

- Plan for disaster recovery and train applicable responders in disaster planning;
- Provide training on new critical emergency communications equipment such as satellite capability for weather and emergency communications;
- Establish Memoranda of Understanding for related organizations to provide post-disaster services. The LDRM would coordinate with the Long Island Voluntary Organizations Active in Disaster (LIVOAD) of Nassau County to streamline efforts and maximize coverage;
- Establish agreements with disaster recovery vendors;
- Coordinate fire, police, and emergency service personnel and equipment;
- Prepare Resiliency Design Guidelines, in English and Spanish, to educate homeowners on resiliency, elevation, and sustainability options in a neighborhood context; and
- Establish a protected and secure office in City Hall and outfit with emergency office equipment, including electrical panels tied to a generator, fixed emergency communication console, and hard wired telecommunication systems.

Related projects include Critical Facility Resiliency, Protection of Community Centers, and Parking Garage for Emergency Vehicles.



Establish Office of Emergency Management (OEM)

Cost estimate

\$1,083,000

Cost estimate components

- **LDRM staff position** (2 years) – approximately \$300,500
- **Secure OEM office** (construction) – approximately \$495,000
- **Secure OEM office** (project design/construction management) – approximately -\$112,500
- **Prepare Resiliency Design Guidelines** – approximately \$175,000

Benefits

Health and social

The LDRM, in coordination with LIVOAD, would develop agreements with non-profit organizations to provide services to vulnerable populations after storm events. Also included in the project is a special needs registration to identify the specific needs and locations of vulnerable populations.

Economic

A new position would be created for approximately 2 years, with the objective of ultimately making this job permanent. An apprenticeship to accompany this position would be explored. Hiring an LDRM and securing additional post-disaster support through agreements with service providers and non-profit organizations is expected to help reduce local government emergency and recovery costs in a disaster event.

Cost-benefit analysis

The City of Long Beach currently does not disaster recovery vendor agreements, Design Guidelines, a secure OEM, critical emergency communication equipment, a Local Disaster Recovery Manager, or an Office of Emergency Management. Nearly the entire City is at extreme or high risk from flooding. This project would provide the City necessary emergency management capacity in relation to its risk, which is an investment that is

expected to lower local government expenditures from storms like Superstorm Sandy and more frequent events.

Risk reduction

- It is assumed that the actions of the LDRM, enhanced disaster planning and training, establishing disaster recovery vendor agreements, and the use of any new equipment would yield risk reduction through better planning, preparedness, increased capacity, and better pre-storm positioning.** It is estimated that the actions of the LDRM would first determine enhanced protection of key emergency responder assets and facilities. Five critical assets related to emergency responder services would be better protected, which is expected to reduce the vulnerability score by 1 for these assets.
- Both socially vulnerable populations and the entire population, served through enhanced disaster planning and increased emergency capability, would benefit from this project.** The design guidelines portion of the project would also help provide educational materials to homeowners on elevating their homes, which would help reduce risk.

Assets Benefitting: Five – Three fire stations, police station, and City Hall.

Population Benefitting: Entire City population would benefit from enhanced emergency preparedness.

General time frame

Approximately 24 months

General time frame for implementation milestones

- **Prepare job announcement and hire LDRM** – approximately 3 months
- **Prepare design guidelines** – approximately 9 months
- **Establish Memorandum of Understandings (MOUs) and agreements** – approximately 9 months





Establish Office of Emergency Management (OEM)

- **Physical office setup** – approximately 12 months

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances.

Jurisdiction

The project is in the City of Long Beach. The project location is shown in Figure IV-5.





Protection of Community Centers



Long Beach Main Library
Source: The LiRo Group

Description

Issue: The residents of Long Beach need a protected community assistance center in the early recovery stage of a disaster where they can gather for emergency needs and recovery information after a storm. After Superstorm Sandy, residents were without many basic services and information about the recovery. Key community centers were damaged by Sandy and inoperable. This project would design and construct resiliency protection for existing community centers to be used as community assistance centers after a disaster.

The project involves flood protection of buildings, raising existing electrical systems, and installing new electrical generation equipment to have the

centers up and running soon after a storm. The project locations are the Long Beach Main Library and the Martin Luther King Jr. Center. The facilities are not meant to have full protection from a storm but if impacted by a storm, would be resilient enough to be operational quickly. Their function is to provide community assistance after storm evacuation and re-entry of the City population. These locations will serve as places where residents can come to receive personal assistance from agencies as well as recovery information. The centers will also be meeting places for residents to gather.

Key project information is as follows:

- 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.

Related projects include Critical Facility Resiliency and Establish Office of Emergency Management.

Cost estimate

\$1,335,000

Cost estimate components

- **Project design/feasibility** – approximately \$192,700
- **Construction/retrofitting** – approximately \$1,047,300
- **Construction management** – approximately \$95,000



Benefits

Health and social

The entire City population is expected to have better access to needed post-disaster supplies, services, and information that would be provided in the protected community assistance centers. The Martin Luther King, Jr. (MLK) Center also serves an area with a sizeable low/moderate-income (LMI) population (located in a census block group with 70% of the households LMI) while the main library serves the entire City, including all socially vulnerable populations.

Economic

Protection of these centers is expected to help them recover their functions quicker and would protect the jobs of employees. Establishing community assistance centers would help expedite the recovery of Long Beach by providing needed resources to residents and business owners. This project would help reduce local post-disaster emergency and recovery costs by protecting the facilities. In addition, the protection of the MLK Center and the Main Library is expected to reduce any service disruptions to these facilities associated with flooding and high wind, and therefore the project will help secure the positions of 49 employees (12 at MLK and 37 at library).

Environmental

This project is expected to help reduce some contamination associated with flooding of buildings and release of chemicals into floodwaters including reduction of floatable debris that polluted the waterways surrounding Long Beach after Superstorm Sandy.

Cost-benefit analysis

Long Beach recognizes the urgency of having a protected facility to serve as a community assistance center after Superstorm Sandy. This project is an investment that is expected to protect the Martin Luther King Center and Main Library, which were severely damaged by Superstorm Sandy (MLK Center had over \$440,000 worth of damages), and to provide a facility that could serve as community assistance center. Protecting post-storm community assistance centers would help expedite recovery and lower

secondary impacts, such as temporary housing costs, by providing information to people to allow them to start the recovery process quicker. With this vital information conduit located directly in the community, residents have less logistical challenges, and can coordinate more efficiently with non-profit recovery organizations, State and Federal recovery officials, the City, and neighbors. This efficiency reduces displacement time, which slows the recovery, and reduces the possibility of the impacted residents making the decision to relocate to another community.

Risk reduction

- a. **This project is expected to reduce flood risk to two critical assets and reduce the vulnerability score by 1 or 2 for these assets.** The additional benefit of this project is the repurposing into community assistance centers would provide information and supplies to assist residents and businesses. The community assistance center can help expedite the recovery process for the whole community as residents and business owners would be better positioned to start cleanup and repairs to their properties. The flood risk to these assets will be significantly reduced from all but the largest storms.
- b. **The population that uses these facilities as well as the population that may be impacted by future disasters would benefit from this project.** The location of Long Beach on a barrier island and its responsibilities as an incorporated City create the need for greater self-sufficiency during a disaster recovery.

Assets Benefitting: Two – Main Library and MLK Center.

Population Benefitting: These two community centers serve a majority of the Long Beach residents and could assist the entire population as a community assistance center.

General time frame

Approximately 24 months

General time frame for implementation milestones

- **Prepare project design** – approximately 3 months





Protection of Community Centers

- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 18 months

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances.

Jurisdiction

The project is in the City of Long Beach. See Figure IV-6 for project locations.





Figure IV-6: Project Locations for Protection of Community Centers

Source: Two Twelve



Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements

Proposed  

Long Beach



Proposed improvements along Park Avenue

Source: City of Long Beach

Description

Issue: The pre-storm surge flooding from Superstorm Sandy made Park Avenue, Beech Street, and the other established evacuation routes inoperable for periods of time. Electric power substations were damaged and the City had no power for over a week. Unsafe conditions for emergency responders and residents resulted without adequate street lighting.

The project combines needed infrastructure improvements in two of the principal commercial corridors on Long Beach with solar powered lighting in these areas for emergency resiliency. The project includes stormwater retention and management improvements through the use of rain gardens, retention structures, new drainage piping and catch basins, introducing pervious landscape, and decreasing paved surfaces on Park Avenue (Monroe Blvd. to Lafayette Blvd.) and Beech Street (Ohio Ave. to New York Ave.). The

project incorporates Complete Streets principles and includes bike, pedestrian and streetscape improvements to increase pedestrian safety and improve guest and resident access to key commercial areas. This project is expected to improve stormwater drainage on these two primary evacuation routes out of the community. Other elements include:

- Design retention structures under roads, parking and sidewalks; and
- Add emergency lighting (LED Solar Powered Street Lights on individual concrete foundations) in various locations on Park Avenue and Beech Street (per coordination with City and Long Island Power Authority [LIPA]/Public Service Electric and Gas Company [PSEG]) and needed signage for evacuation routes.

This project supports the April 2013 *Cleaner Greener Long Island Plan (CGLI)* Transportation Strategy 1.3, which reads: "Improve safety of streets for pedestrians and cyclists through implementation of Complete Streets, signal optimization, and a comprehensive bike plan." This plan also notes that "inland, more frequent and intense rainfall events could also cause travel disruptions due to flooded intersections, roadways and rail lines" and this project would help reduce those impacts. Related projects include Park Avenue Complete Streets Phase 2 (Kennedy Plaza Revitalization), Bayfront Revitalization Plan, and Drainage Improvements.

Cost estimate

\$10,652,500

Cost estimate components

- **Conduct drainage study** – approximately \$250,000
- **Park Ave./Beech St. drainage/streetscape project design** – approximately \$922,500





- **Park Ave./Beech St. drainage/streetscape construction** – approximately \$7,380,000
- **Solar-powered lighting design** – approximately \$165,000
- **Solar-powered lighting construction** – approximately \$1,210,000
- **Construction management** – approximately \$725,000

Benefits

Health and social

Reducing stormwater on Park Avenue and Beech Street is expected to assist with a more orderly evacuation prior to an event and improve access for emergency vehicles on established evacuation routes prior to major storms. Solar-powered lights provide more safety when power is out after an emergency.

Economic

Complete Streets projects have a proven track record of increasing retail sales and sales tax, and decreasing vacancies, among businesses in the project area. Projects from California to New York City incorporating Complete Streets concepts have improved pedestrian and transit access to stores in key commercial areas, resulting in greater economic activity and increased jobs.⁷⁶

Environmental

Creation of more pervious surface through landscaping is expected to help improve water quality.

Cost-benefit analysis

Long Beach is a fully developed community with infrastructure such as the stormwater system that was not originally designed to address current and future flood risk. This critical investment in upgrading and protecting the stormwater system is expected to help improve access on established evacuation routes pre-storm. The project would also provide safety measures such as emergency lighting that would help City officials and residents in future storms.

Risk reduction

- a. **The Park Avenue section of the project is expected to reduce the stormwater flood risk to six critical assets, while the Beech Street section is expected to reduce the risk to two critical assets.** Both reduce the vulnerability score by 1 for these assets. Both of these streets are established evacuation routes and the project would reduce stormwater flood risk on these routes. This approximately 1.7 mile stretch of commercial business area will be protected (1.1 miles on Park Avenue and 0.6 miles on Beech Street) and an estimated 1,715 primary jobs on Park Avenue and 422 on Beech Street associated with these commercial areas would be protected. This area will benefit from significantly reduced likelihood of flooding from heavy rainfall events.
- b. **The population that resides, works, and shops in the Park Avenue and Beech Street commercial corridors, including guests, would benefit from this project.**

Assets Benefitting: Eight –Park Avenue Commercial District, Park Avenue, LIRR Station, Central Fire Station, City Hall, West End Commercial Area, Police Station, and Beech Street.

Population Benefitting: A majority of Long Beach residents would use Park Avenue and Beech Street as evacuation routes and frequent commercial areas on these streets.

General time frame

Approximately 48 months

General time frame for implementation milestones

- **Conduct drainage study** – approximately 6 months
- **Prepare project design** – approximately 6 months
- **Submit to regulatory agencies for review and permit approval** – approximately 3 months
- **Prepare bid documents and review responses** – approximately 3 months





- **Construct project** – approximately 30 months

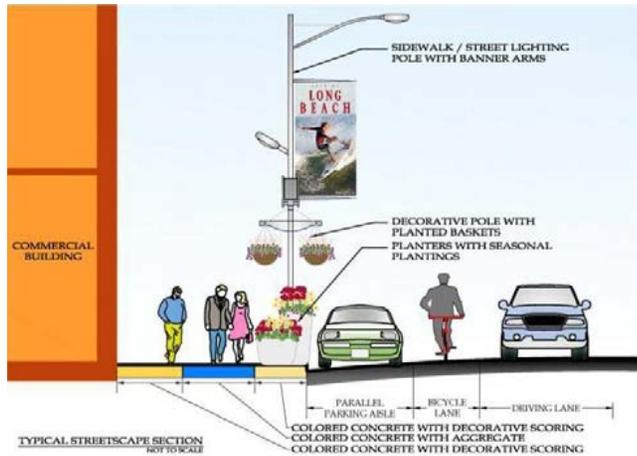
Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances; New York State Department of Environmental Conservation permitting, U.S. Army Corps of Engineers (USACE) and Coastal Zone Management consistency concurrence (New York State Department of State), if applicable.

Jurisdiction

The project is in the City of Long Beach. See Figure IV-7 for the project locations.





Typical streetscape section

Source: City of Long Beach

Figure IV-7: Project Locations for Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements Source: Two Twelve



Parking Garage for Emergency Vehicles



Typical fire department apparatus

Source: Peter Stehlik PS-2507 via Wikimedia Commons

Description

Issue: Superstorm Sandy rendered emergency response vehicles and apparatus unusable. This issue was caused by a lack of high ground in Long Beach which inhibits a safe placement of these vehicles and apparatus, and the flooding from Sandy destroyed them. To address this issue, a safe and elevated location within City limits needs to be identified and/or constructed.

This project is to construct a parking garage (approximately 300 spaces) that is structured to hold emergency response vehicles and equipment at a second-story level which would also act as an emergency distribution center. The first potential location is directly behind City Hall which is next to primary emergency responder facilities. Other potential locations include the

West End, site to be determined, or in the Waldbaum's Shopping Center. The design of the structure should incorporate measures to protect the apparatus and equipment from wind and debris to the extent possible. The project would:

- Provide a secure holding and staging area for emergency vehicles and emergency responder apparatus;
- Allow for easy access and egress of emergency vehicles; and
- Allow for improved logistics and positioning during emergencies.

Related projects include Critical Facility Resiliency and Establish Office of Emergency Management.

Cost estimate

\$14,705,000

Cost estimate components

- **Feasibility study on sites** – approximately \$125,000
- **Project design** – approximately \$1,620,000
- **Construction** – approximately \$11,880,000
- **Construction management** – approximately \$1,080,000

Benefits

Health and social

Providing for a safe location to store emergency vehicles during a storm generally allows for emergency response activities to resume in a quicker manner after a storm or disaster for the entire population, including socially vulnerable populations.



Parking Garage for Emergency Vehicles

Economic

During Superstorm Sandy, fire apparatus and emergency vehicles were damaged and two sets of apparatus had to be leased. Other City vehicles were also damaged or destroyed. Having emergency vehicles protected during storm events is expected to reduce emergency and recovery costs post-disaster as well as preserving the capability to respond to emergencies. During non-storm/emergency periods, the parking spaces in the garage can be used by shoppers, beach goers, and train riders. It will help increase business in the Long Beach commercial districts where parking is limited.

Environmental

This project is expected to help reduce some contamination associated with flooding of vehicles and release of chemicals into floodwaters.

Cost-benefit analysis

Long Beach is located on a barrier island with no natural high ground and its emergency vehicles were destroyed by Superstorm Sandy. This project provides an innovative way to protect emergency vehicles from future events while providing an emergency distribution center. Replacing destroyed fire apparatus can range from \$500,000 to over \$1,000,000 and this project will help avoid these type damages while maintaining critical emergency services. The project also provides an economic benefit with increased parking.

Risk reduction

- a. **This project is generally expected to reduce the flood risk to essential functional equipment of five critical assets (apparatus and emergency vehicles used by emergency responders) and to reduce the vulnerability score of these assets by 1 to 2.** In addition, this project helps maintain emergency responder services, which can help reduce the secondary impacts of a storm (e.g., fight fires that break out, rescue people in harm's way). The flood risk to these assets will be significantly reduced from all but the largest storms.
- b. **The assets protected by this project, which affect public safety, potentially impact the entire City population including socially vulnerable populations.** This project will help maintain emergency

services after a large disaster event like Sandy where nine fires broke out immediately after the storm.

Assets Benefitting: Five Emergency vehicles that are critical parts of emergency responder facilities (police and fire stations) and City vehicles from the City Garage.

Population Benefitting: The entire City population depends on these emergency vehicles for protection from during emergencies like fires.

General time frame

Approximately 36 months

General time frame for implementation milestones

- **Prepare feasibility study of parking garage sites** – approximately 6 months
- **Prepare project design** – approximately 6 months
- **Submit to regulatory agencies for review and permit approval** – approximately 3 months
- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 18 months

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances; New York State Department of Environmental Conservation permitting, if applicable. The project would comply with the U.S. Department of Housing and Urban Development Community Development Block Grant–Disaster Recovery program income requirements as defined in the April 2013 *State of New York Action Plan for Community Development Block Grant Program Disaster Recovery*.





Jurisdiction

The project is in the City of Long Beach. See Figure IV-8 for project locations.



Parking garage example
Source: Steve Morgan





Protection of Wells and Sewer Pump/Lift Stations



Pump/Lift Station, W. Park Avenue and Grand Boulevard
Source: The LiRo Group

Description

Issue: Superstorm Sandy destroyed pumps for both water supply and sewage removal. The saltwater destroyed the pump electrical components and water seals, making the pumps inoperable. As a result of this and the damage to the Water Pollution Control Plant and Water Purification Plant, the residents and businesses of Long Beach were without water and sewage treatment for more than 2 weeks. In addition, due to the sewage treatment system damages, raw sewage had to be discharged into Reynolds Channel.

This project would study two methods of protection of these critical systems. The first is to construct flood barriers around the pump stations. The second method is to raise the pumps and electrical systems above the flood height. There are three pump stations and two wells. Both methods add backup generators elevated above the storm level. Protection of the wells and pump/lift stations is vital in maintaining two services that each business and

resident (the local customer base) needs to function – drinking water and sewage. Key project elements include:

- Design flood protection/elevation of pumps and electrical equipment from saltwater;
- Allows for upgraded pumps and electrical supply and controls;
- Protects residents from disease and preserves ability to use City systems; and
- Allows emergency responders/medical personnel adequate supply of water/sewer.

Key project locations for the project include:

- W. Park Ave. and New York Ave.;
- Lafayette Blvd. and W. Bay Drive;
- E. Park Ave. and Roosevelt Blvd.;
- Farrell St. and E. Park Ave.; and
- E. Park Ave. and Maple Blvd.

Specific measures at each well and pump station include:

- Raise electrical panels and wiring;
- Elevate fixed emergency generator; and
- Provide deployable dyke around building.

Related projects include Critical Facility Resiliency and North Shore Protection of Critical Utilities (which includes protection of the Water Pollution Control Plant and Water Purification Plant). The project should coordinate with the City Capital Program.



Cost estimate

\$2,480,000

Cost estimate components

- **Project design** – approximately \$320,000
- **Construction** – approximately \$1,980,000
- **Construction management** – approximately \$180,000

Benefits

Health and social

The protection of wells and pump/lift stations is expected to benefit all residents of Long Beach, including socially vulnerable populations.

Economic

Without water and sewage, businesses could not operate, which would result in a potential loss of jobs. In addition, residents would not be able to occupy their homes, which would result in a loss to the customer base. Protection of these assets facilitates a more rapid recovery and is expected to reduce the chance of long-term displacement of residents and business that would result in reduced economic activity and potential job losses. This project is expected to help reduce post-disaster emergency and recovery costs by protecting these facilities and all the residences and businesses they serve.

Environmental

This project is expected to reduce contamination associated with damage to the sewage system and resulting bypass with direct discharge into the bay.

Cost-benefit analysis

Superstorm Sandy severely damaged the water and wastewater system of Long Beach, including the wells and pump/lift stations (over \$5 million damages and costs to system). This project is expected to reduce the cost

from damages to wells and pump/lift stations, which were damaged and inoperable after Superstorm Sandy, and to help avoid environmental contamination of the community and Reynolds Channel.

Risk reduction

- This project is generally expected to reduce the flood risk to five critical assets and to reduce the vulnerability score of these assets by 2 to 3.** In addition, this project helps maintain operation of the overall water and wastewater systems, which are needed for all businesses and residents, and helps reduce the chance of sewage contamination that occurs due to sewage backup and bypasses. The flood risk to these assets will be reduced from all but the largest storms.
- The well and stations are critical components of the overall water supply/wastewater system and protecting them is expected to maintain these critical services to the entire City population while reducing risk from sewage contamination in structures, streets and Reynolds Channel.**

Assets Benefitting: Five – Three pump/lift stations and two wells.

Population Benefitting: Entire City population is served by the water and wastewater systems.

General time frame

Approximately 24 months

General time frame for implementation milestones

- **Prepare project design** – approximately 3 months
- **Submit to regulatory agencies for review and permit approval** – approximately 3 months
- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 15 months





Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances; New York State Department of Environmental Conservation permitting, U.S. Army Corps of Engineers (USACE) and Coastal Zone Management consistency concurrence (New York State Department of State), if applicable.

Jurisdiction

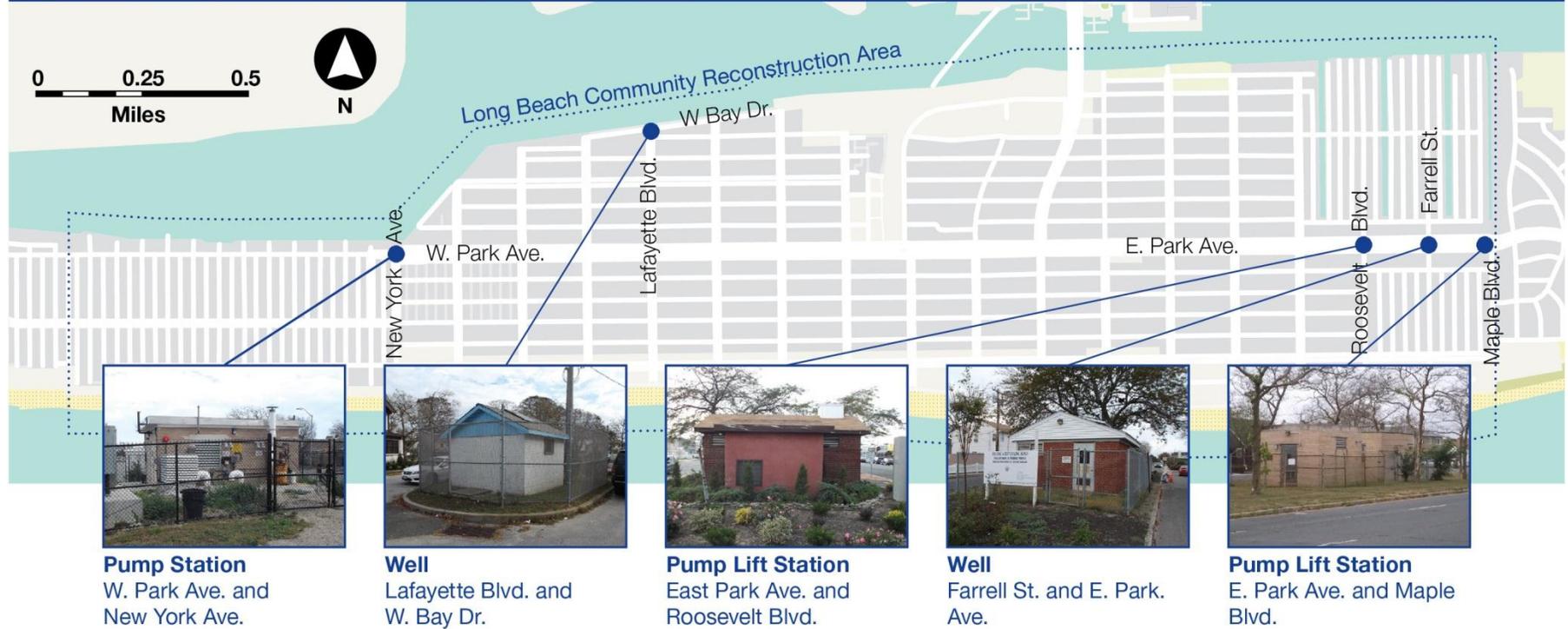
The project is in the City of Long Beach. See Figure IV-9 for project locations.





Figure IV-9: Project Locations for Protection of Wells and Sewer Pump/Lift Stations

Source: Two Twelve



Pump Station
W. Park Ave. and
New York Ave.



Well
Lafayette Blvd. and
W. Bay Dr.



Pump Lift Station
East Park Ave. and
Roosevelt Blvd.



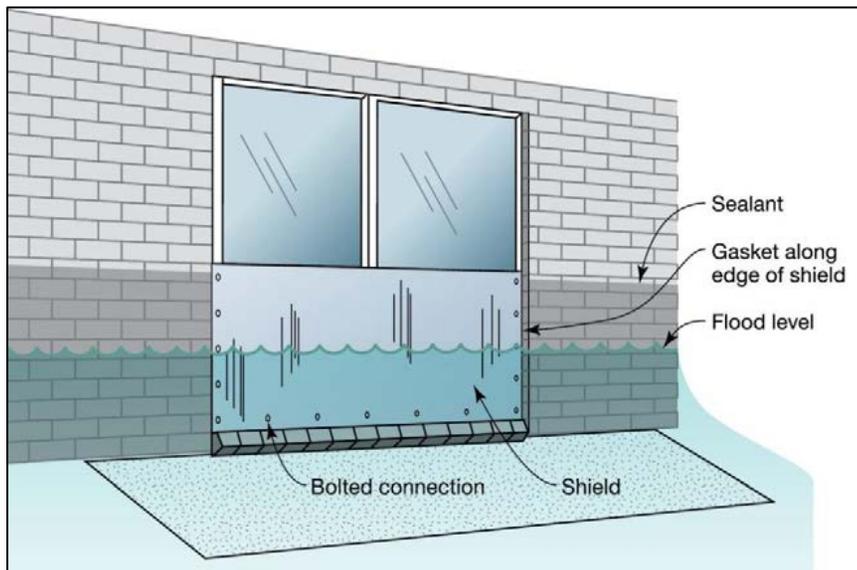
Well
Farrell St. and E. Park
Ave.



Pump Lift Station
E. Park Ave. and Maple
Blvd.



Protection of Public Housing Units



Bolted flood shield
Source: FEMA

- Flood protective measures to the ground floor areas include louvre floodshields;
- Elevation of electrical, power supply conduit, and telecommunications equipment; and
- Wind protection of windows.

Related projects include Establish Office of Emergency Management, Critical Facility Resiliency, Protection of Senior Housing Units, and Drainage Improvements. The project should coordinate with alternate funding sources, both State and Federal.

Cost estimate

\$2,965,000

Cost estimate components

- **Project design** – approximately \$347,000
- **Construction** – approximately \$2,400,000
- **Construction management** – approximately \$218,000

Description

Issue: Superstorm Sandy kept residents out of public housing for months. Most residents were displaced for 3 to 4 weeks by Superstorm Sandy and some residents were out of their homes for up to 7 months. Many public housing residents cannot afford to remain away from their homes for any length of time.

This project is to enhance protection of two public housing units (Channel Park Homes and Pine Town Homes) to allow residents to return to the units as soon as possible after a storm evacuation. The project includes:

Benefits

Health and social

This project is generally expected to protect the approximately 600 residents served by these facilities, most of whom are members of a socially vulnerable population.

Protection of Public Housing Units

Economic

Protection of these housing units is expected to help them recover their functions faster after a storm and help residents return to work sooner. If occupants of these public housing units are able to return to their homes sooner, the burden on government for providing temporary housing is reduced.

Environmental

This project is expected to help reduce some contamination associated with flooding of buildings and release of chemicals into floodwaters including reduction of floatable debris that polluted the waterways surrounding Long Beach after Superstorm Sandy.

Cost-benefit analysis

If this project is not built, Long Beach is likely to incur significant financial costs on a recurring basis related to repair of assets like these two housing units, which were severely damaged by Superstorm Sandy. In addition, severe damage to these housing units by Sandy resulted in disruption to the residents who lived in the units and high temporary housing costs to the government, which can be avoided with the construction of this project.

Risk reduction

- a. **This project is generally expected to reduce the flood risk to two critical assets and reduce the vulnerability score of these assets by 1.** The flood risk to these assets will be reduced from all but the largest storms.
- b. **The housing facility operated by the Long Beach Housing Authority serves approximately 600 people.**

Assets Benefitting: Two – Channel Park Homes and Pine Town Homes.

Population Benefitting: Approximately 600 residents live in these units.

General time frame

Approximately 24 months

General time frame for implementation milestones

- **Prepare project design** – approximately 6 months
- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 15 months

Local, State, and Federal government regulatory requirements

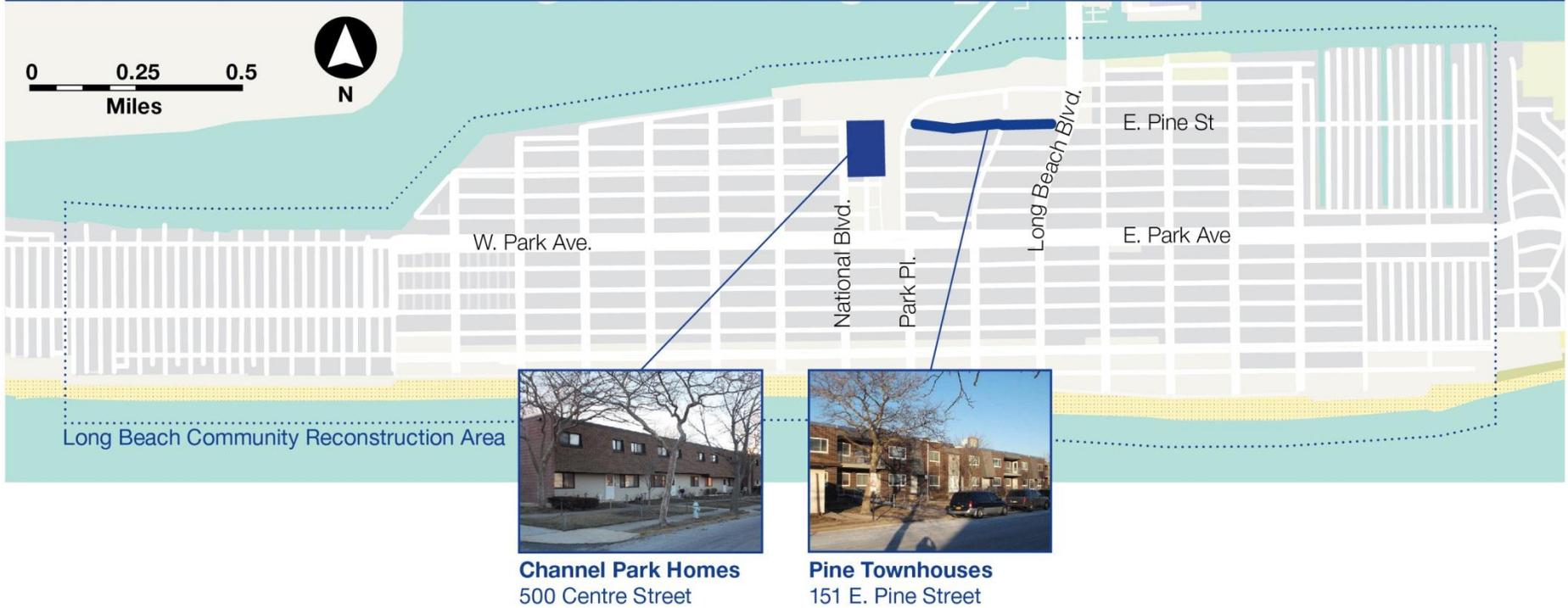
The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances.

Jurisdiction

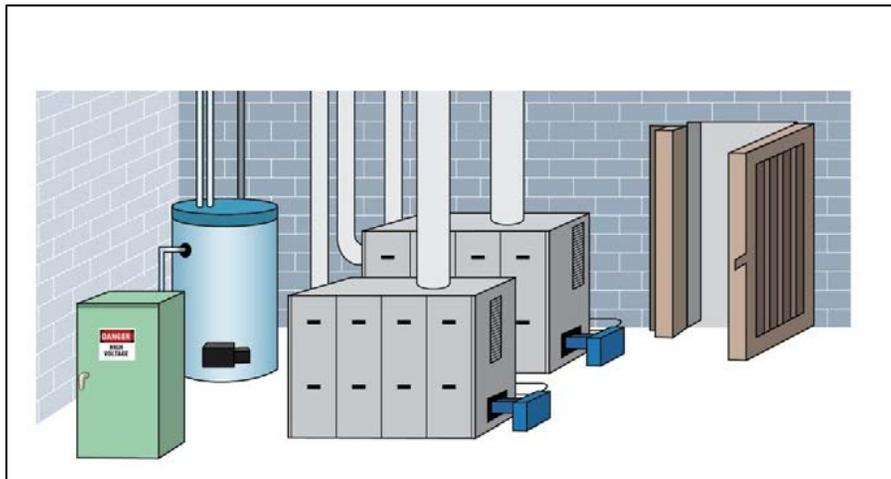
The project is in the City of Long Beach and Channel Park Homes is administered by the Long Beach Housing Authority. See Figure IV-10 for the project locations.

Figure IV-10: Project Locations for Protection of Public Housing Units

Source: Two Twelve



Protection of Senior Housing Units



Flood protected room with utilities in apartment basement
Source: URS

Description

Issue: Senior citizens of Long Beach, especially those with mobility and medical requirements, are subject to additional stress from evacuation and being displaced in a storm. Most residents were displaced for 3 to 4 weeks by Superstorm Sandy and some residents were out of their homes for up to 7 months.

This project is to provide flood and wind protection to four public senior housing units (Sol Scher Apartments, Michael Valente Apartments, Sonny Duckman Apartments, and Morton Cohen Apartments). This would allow the housing units to be more quickly available for senior resident return. Key project elements include:

- Flood protective measures to the ground floor areas include louvre floodshields;
- Elevation of or other type of flood protection (e.g., flood protected room) to electrical, power supply conduit, and telecommunications equipment; and
- Wind protection of windows and roof replacement for high wind protection.

Related projects include Establish Office of Emergency Management, Critical Facility Resiliency, Protection of Public Housing Units, and Drainage Improvements. The project should coordinate with alternate funding sources, both State and Federal.

Cost estimate

\$1,925,000

Cost estimate components

- **Project design** – approximately \$221,000
- **Construction** – approximately \$1,563,000
- **Construction management** – approximately \$141,000

Benefits

Health and social

This project is generally expected to protect the approximately 300 residents served by these facilities, most of whom are members of a socially vulnerable population.



Economic

Protection of these housing units is expected to help them recover their functions faster after a storm and get employees back to work. This more rapid recovery reduces the chance that these units would reduce services, leading to employees seeking other work and resulting job losses. If occupants of these senior public housing units are able to move quickly back to their homes, the burden on government to provide temporary housing is reduced.

Environmental

This project would help reduce some contamination associated with flooding of buildings and release of chemicals into floodwaters including reduction of floatable debris that polluted the waterways surrounding Long Beach after Superstorm Sandy.

Cost-benefit analysis

If the protection of the senior housing units project is not built, Long Beach is likely to incur significant financial costs on a recurring basis related to repair of assets like these four housing units, which were severely damaged by Superstorm Sandy. In addition, severe damage to these housing units by Sandy resulted in disruption to the residents who lived in the units and high temporary housing costs to the government, which can be avoided with the construction of this project.

Risk reduction

- a. **This project is generally expected to reduce the flood risk to four critical assets and reduce the vulnerability score of these assets by 1.** The flood risk to these assets will be reduced from all but the largest storms.
- b. **These housing facilities operated by the Long Beach Housing Authority serve approximately 300 people.**

Assets Benefitting: Four – Sol Scher Apartments, Michael Valente Apartments, Sonny Duckman Apartments, and Morton Cohen Apartments.

Population Benefitting: Approximately 300 residents live in these units.

General time frame

Approximately 24 months

General time frame for implementation milestones

- **Prepare project design** – approximately 6 months
- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 15 months

Local, State, and Federal government regulatory requirements

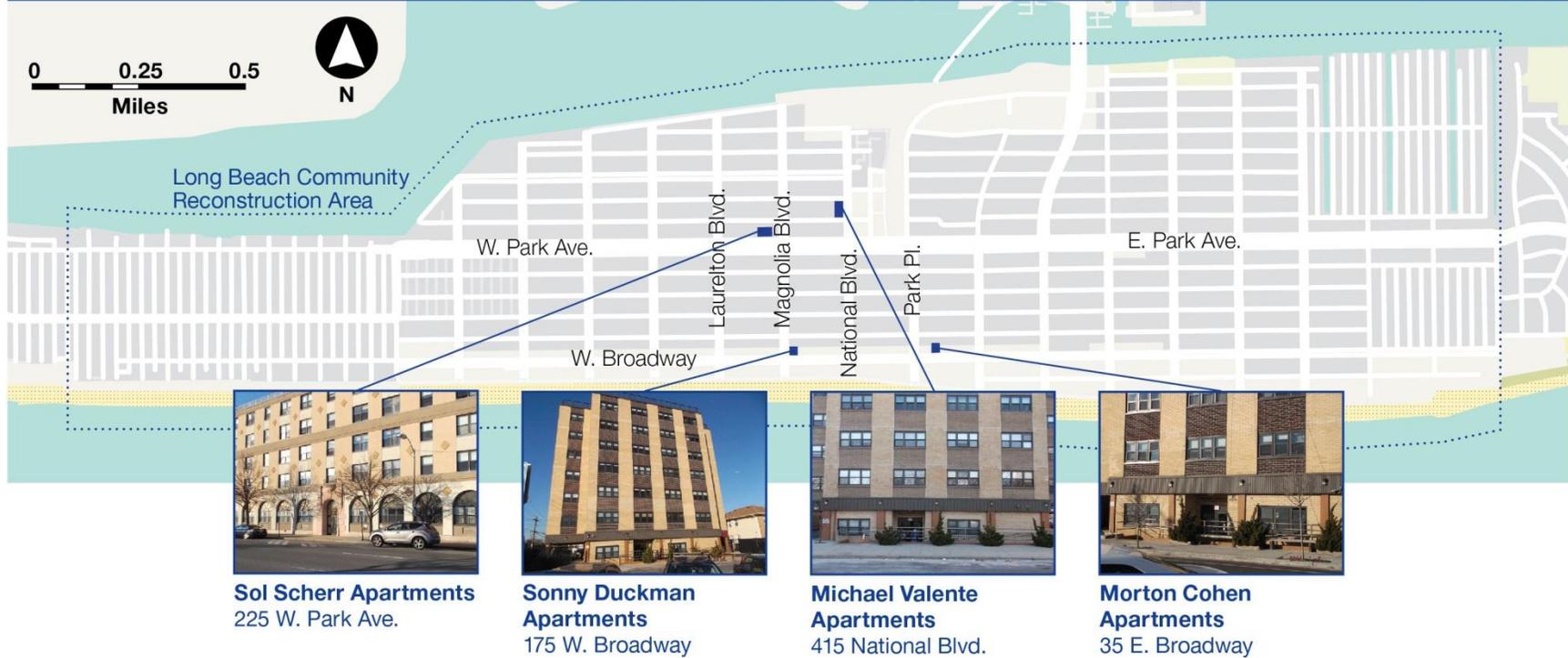
The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances.

Jurisdiction

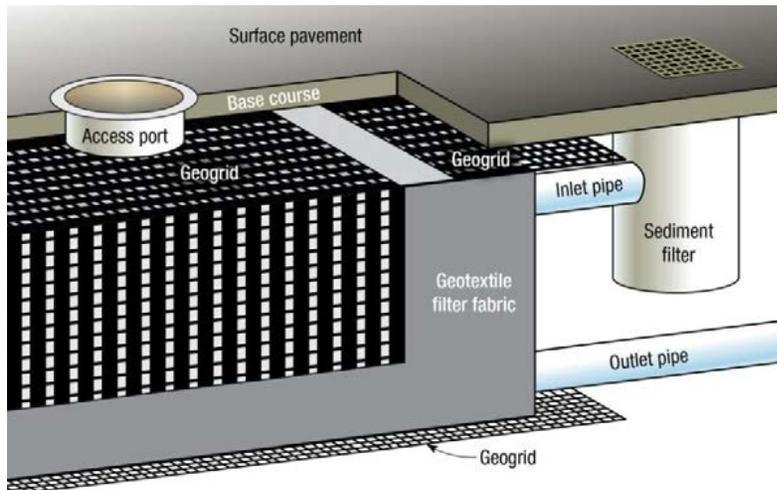
The project is in the City of Long Beach and administered by the City of Long Beach Housing Authority. See Figure IV-11 for the project locations.



Figure IV-11: Project Locations for Protection of Senior Housing Units Source: Two Twelve



Stormwater Project Phase 2/ Stormwater Force Main Project



Underground stormwater retention
Source: URS

Exact project locations are to be determined. This project supports solving an issue raised in the April 2013 *Cleaner Greener Long Island Plan*, Adaptation to Climate Change section, "inland, more frequent and intense rainfall events could also cause travel disruptions due to flooded intersections, roadways and rail lines." Related projects include Drainage Improvements (Phase 1) and Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements.

Cost estimate

\$114,830,000

Cost estimate components

- **Prepare data collection and study report** – approximately \$1,030,000
- **Project construction** – approximately \$113,800,000 (based on City grant application plus two additional pump stations)

Description

Issue: Superstorm Sandy caused serious flooding to major access streets, rendering them unusable to emergency vehicles.

As a second implementation phase, this project would continue stormwater drainage upgrades by:

- Installing pressurized system of pipes (force main);
- Replacing inadequate and undersized drainage inlet structures;
- Installing control structures to filter out debris; and
- Increasing stormwater storage through subsurface storage chambers and bio-retention.

Benefits

Health and social

This project is expected to help improve access for emergency vehicles and residents trying to reach established evacuation routes prior to major storms. It would improve access to health and social service facilities in stormwater flooding.

Economic

This project is expected to help the City increase its capacity to reduce the disruptions and damage to stormwater flooding, which can occur in all the main commercial areas. By reducing flooding near these important economic assets, less disruption of services would occur.



Environmental

Pollution to Reynolds Channel from stormwater runoff would be reduced.

Cost-benefit analysis

Long Beach is a fully developed community with flat terrain, a high water table, and undersized infrastructure. If this project is not built, Long Beach is likely to have continued access problems for emergency response vehicles and blocked access for residents trying to get to established evacuation routes due to stormwater flooding from heavy rainfall associated with the onset of large storm events like Superstorm Sandy. The construction of this project is expected to lower frequently recurring financial costs for road repairs.

Risk reduction

- a. **This project is generally expected to reduce the stormwater flooding risk to 29 critical assets and to reduce the vulnerability score of these assets by 1.** The project is expected to also improve stormwater drainage in the areas that tie to evacuation routes.
- b. **Most of the City’s residents and guests would receive positive risk reduction benefits from this project. Emergency vehicles need streets clear of stormwater flooding, especially prior to a large event like Superstorm Sandy, so this project is expected to help maintain ingress and egress for emergency vehicles.** In addition, this project is expected help reduce stormwater flooding on streets that tie into established evacuation routes and is expected to help many Long Beach residents evacuate with less delay prior to a large storm like Superstorm Sandy.

Assets Benefitting: 29 including the major commercial corridors, government facilities, schools, and major arterials.

Population Benefitting: A majority of the Long Beach population would benefit from this project.

General time frame

Approximately 36 months

General time frame for implementation milestones

- **Prepare stormwater data collection/study report** – approximately 9 months
- **Submit to regulatory agencies for review and permit approval** – approximately 3 months
- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 21 months

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances; New York State Department of Environmental Conservation permitting, U.S. Army Corps of Engineers and Coastal Zone Management consistency concurrence (New York State Department of State).

Jurisdiction

The project is in the City of Long Beach.



North Shore Protection of Critical Utilities



Picture of existing shoreline with no bulkheading (left) and rendering of potential bulkheading in this area west of Long Beach Bridge (right)

Source: URS

Description

Issue: Superstorm Sandy devastated the north shore of Long Beach. The storm showed the inadequacy of the existing bulkheads to protect from major storms. All the major utilities of Long Beach are located on the north shore adjacent to an unprotected shoreline. All these utilities were severely damaged by Sandy, resulting in a lack of power, water, and sewage for more than 2 weeks.

This project is to provide coordination with the \$12.9 million north shore bulkheading project from National Boulevard to the Long Beach Bridge, which currently has no bulkheading, announced by Governor Cuomo in November 2013. The project also includes flood barriers (i.e., either deployable or Dutch dams) around major utilities, including the Water Pollution Control Plant and the Water Purification Plant, to protect these critical facilities. The project would ultimately connect to additional current and proposed bulkheading projects including Bulkheading - North Shore and Canal Gates in the East End. This project is out for bid as of March 2014, with work starting later in 2014.

The project is the implementation of a key strategy from the "Strong Island 2013 Update," the Reynolds Channel Shoreline Stabilization Project, which identifies that shoreline protection is needed in this vulnerable area.

Cost estimate

\$12,900,000

Cost estimate components

- **Prepare engineering and soil study** – refer to City grant
- **Project construction** – refer to City grant
- **Construction management** – refer to City grant

Benefits

Health and social

Bulkheading is expected to protect a majority of the City from coastal surge and is expected to provide some level of protection to essential health and social services facilities to help quickly recover function after a storm.

Economic

This project is expected to reduce flooding in the critical north shore utility area, including the Water Purification Plant and the Water Pollution Control Plant. This project is also generally expected to protect the main commercial corridors in Long Beach and would help reduce the disruption and downtime to these businesses, which were all severely impacted by Superstorm Sandy.

Environmental

The project is expected to reduce contamination associated with flooding of buildings including reduction of floatable debris that polluted the waterways surrounding Long Beach after Superstorm Sandy.



Cost-benefit analysis

Long Beach is a fully developed community with a vulnerable shoreline. It has infrastructure such as bulkheads that were not originally designed to address current and future flood risk. The City recognizes that improvements like bulkheading are needed on the shoreline to protect properties both on the water and inland and especially the critical utilities on the north shore. This innovative project is expected to reduce local government expenditures from repairs to the major utilities, which were heavily damaged by Superstorm Sandy.

Risk reduction

- a. **The whole phased replacement and adding height to the entire north shore bulkheading system is generally expected to protect approximately 42 critical assets and to reduce the vulnerability score of these assets by 1 or 2.** In addition, it is generally expected to provide protection from frequent coastal flooding of the residential and commercial areas on and to the north of Park Avenue and Beech Street in the West End which encompasses an area of approximately four census tracts, 6,361 housing units, 15,333 residents, and 1.7 miles of commercial business areas (1.1 miles on Park Avenue and 0.6 miles on Beech Street).
- b. **The overall phased replacement and adding height to north shore bulkheading is expected to reduce flood risk to a large number of physical assets and is generally expected to provide an increased level of protection to a majority of the population.**

Assets Benefitting: Entire north shore bulkheading system – 42 critical assets including the Water Pollution Control Plant, the Water Purification Plant, electric power substation, and assets located north of Park Avenue and Beech Street in the West End including essential government facilities and major commercial corridors.

Population Benefitting: A majority of the population would be protected by the entire system.

General time frame

Approximately 30 months

General time frame for implementation milestones

- **Prepare engineering and soil study** – refer to City grant
- **Submit to regulatory agencies for review and permit approval** – refer to City grant
- **Prepare bid documents and review responses** – refer to City grant
- **Construct project** – refer to City grant

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances, New York State Department of Environmental Conservation permitting, U.S. Army Corps of Engineers Section 10 and 404 permits, and Coastal Zone Management consistency concurrence (New York State Department of State).

Jurisdiction

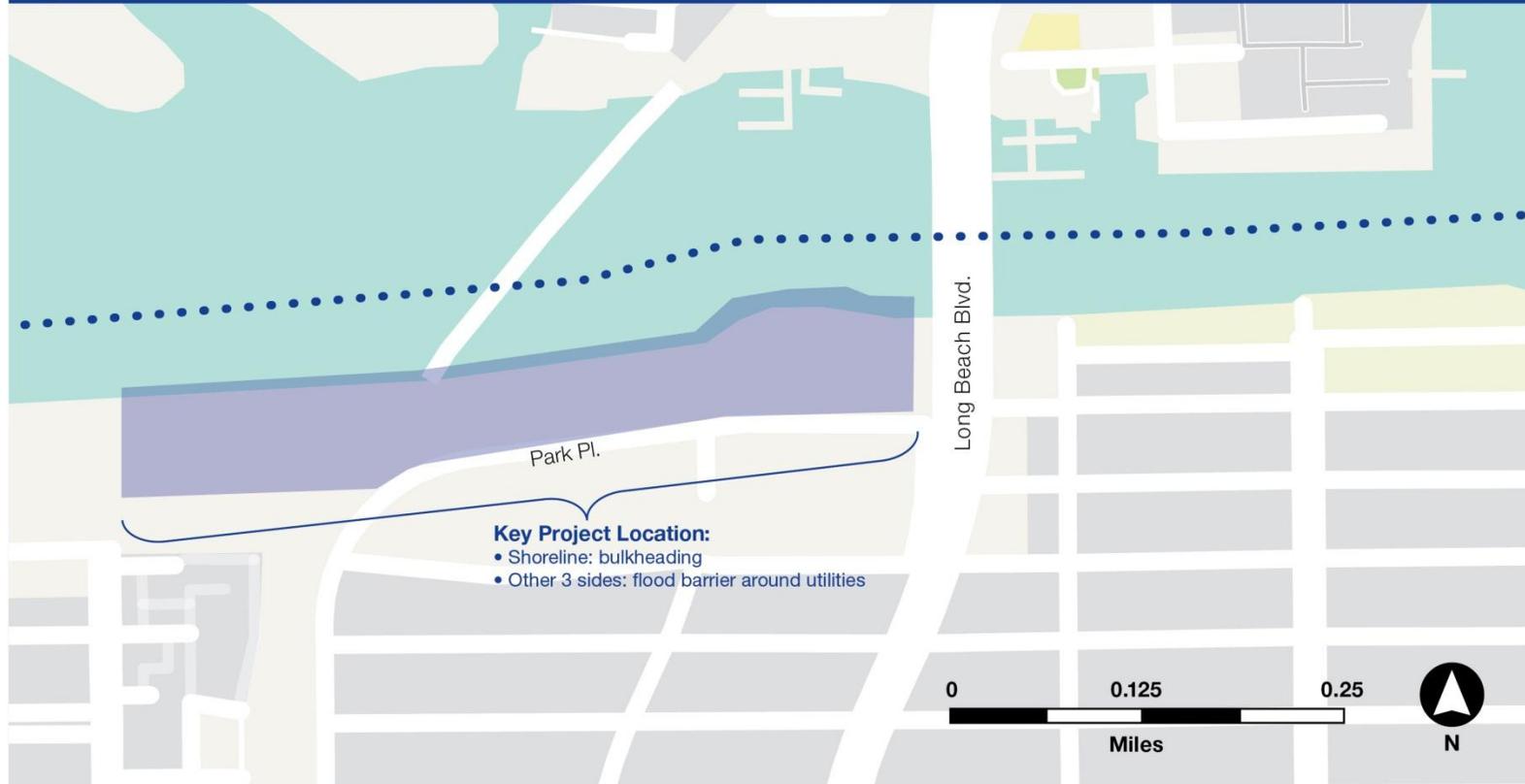
The project is in the City of Long Beach. See Figure IV-12 for project location.



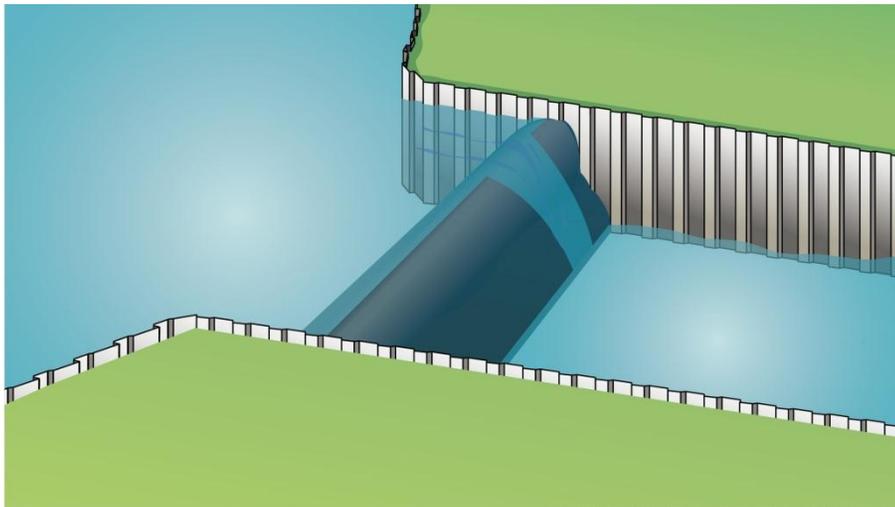


Figure IV-12: Project Location for North Shore Protection of Critical Utilities

Source: Two Twelve



Canal Gates in the East End



Flood protective measure (rubber dam) at bay end of canal
Source: URS

Description

Issue: Superstorm Sandy devastated the north shore of Long Beach. The storm showed the inadequacy of the existing bulkheads to protect the area from major storms.

This project is to explore the feasibility of canal gates, or a similar type protective device, at the bay ends of the 4 canals located in the East End (Neptune Blvd. to Curley St.). The project also involves the potential phased installation of the gates. This project would ultimately connect to additional current and proposed bulkheading projects (the North Shore Protection of Critical Utilities and North Shore –Bulkheading projects). The project is part of the larger north shore shoreline defense system.

Cost estimate

\$26,400,000

Cost estimate components

- **Prepare engineering and soil study** –approximately \$4,400,000
- **Project construction** – approximately \$20,000,000
- **Construction management** –approximately \$2,000,000

Benefits

Health and social

Bulkheading is expected protect a majority of the City from coastal surge, and to help provide some level of protection to essential health and social services facilities to help quickly recover functions after a storm.

Economic

This project is expected to help reduce flooding in the Canals neighborhood in the East End. This project is also generally expected to provide another layer of shoreline defense, which is needed to protect the main commercial corridors in Long Beach and would help reduce the disruption and downtime to those businesses, which were all severely impacted by Superstorm Sandy.

Environmental

The project is generally expected to help reduce contamination associated with buildings being flooded including reduction of floatable debris that polluted the waterways surrounding Long Beach after Superstorm Sandy.



Cost-benefit analysis

Long Beach is a fully developed community with a vulnerable shoreline. It has infrastructure like bulkheads that was not originally designed to address current and future flood risk. The City recognizes that shoreline improvements like canal gates are needed to protect properties both on the water and inland. This significant investment is expected to yield high returns in protecting homes, businesses, first responder facilities, and major employer/service providers damaged or destroyed by Superstorm Sandy.

Risk reduction

- a. **The entire effort to protect the north shore, including canal gates and bulkheading, is generally expected to protect approximately 42 critical assets, and to reduce the vulnerability score of these assets by 1 or 2.** In addition, it is generally expected to provide protection from frequent coastal flooding of the residential and commercial areas on and to the north of Park Avenue and Beech Street in the West End which encompasses an area of approximately four census tracts, 6,361 housing units, 15,333 residents, and 1.7 miles of commercial business areas (1.1 miles on Park Avenue and 0.6 miles on Beech Street).
- b. **The overall canal gates/bulkheading of the north shore is expected to reduce risk to a large number of physical assets and provide an increased level of protection to a majority of the population.**

Assets Benefitting: Entire north shore protection system including canal gates – 42 critical assets, which includes mostly those north of Park Avenue and Beech Street in the West End, including essential government facilities and major commercial corridors such as E. Park Avenue in the East End.

Population Benefitting: A majority of the population would benefit from the entire system.

General time frame

Approximately 36 months

General time frame for implementation milestones

- **Prepare engineering/feasibility study** – approximately 9 months
- **Regulatory agency review/permit approval and prepare bid documents and review responses** – approximately 6 months
- **Construct project** – approximately 21 months

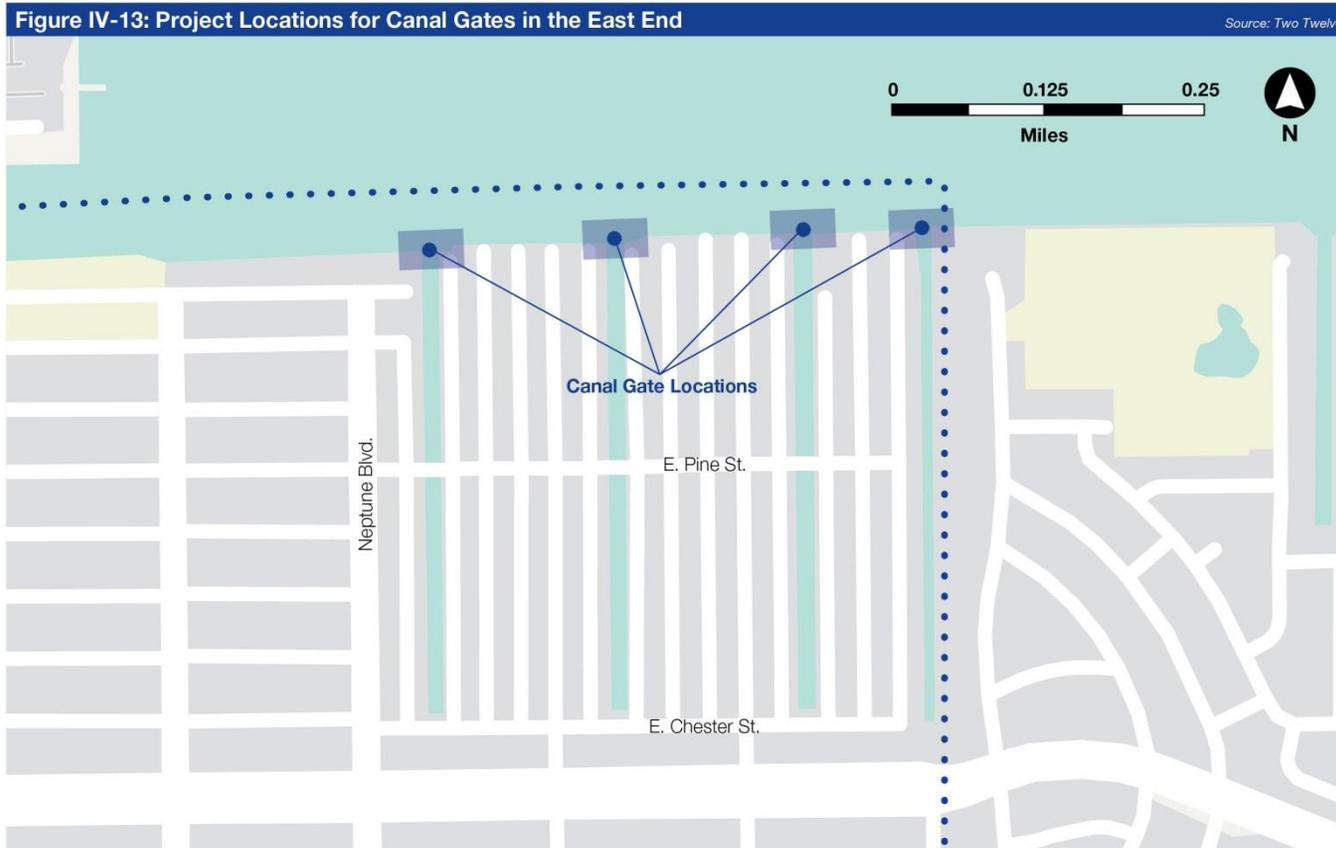
Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances, New York State Department of Environmental Conservation permitting, U.S. Army Corps of Engineers Section 10 and 404 permits, and Coastal Zone Management consistency concurrence (New York State Department of State).

Jurisdiction

The project is in the City of Long Beach. See Figure IV-13 for project locations.





Park Avenue Complete Streets Phase 2

Description

Issue: The pre-storm surge flooding from Superstorm Sandy made the established evacuation routes inoperable for periods of time.

This project involves a second phase to the Park Avenue Streetscape and Drainage Infrastructure Improvement project. This phase includes the redevelopment of Kennedy Plaza in front of City Hall to improve the City's stormwater system by providing large-scale underground stormwater storage chambers as well as strategically located green infrastructure and solar powered lighting. The re-design of Kennedy Plaza would remake it into an aesthetically pleasing multipurpose public space that respects and honors the memorials while having the flexibility of hosting many types of public activities, from small gatherings to larger public events.

This project supports the April 2013 *Cleaner Greener Long Island Plan (CGLI)* Transportation Strategy 1.3, which reads: "Improve safety of streets for pedestrians and cyclists through implementation of Complete Streets, signal optimization, and a comprehensive bike plan." This plan also notes that "inland, more frequent and intense rainfall events could also cause travel disruptions due to flooded intersections, roadways and rail lines" and this project would help reduce those impacts. Related projects include Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements, Drainage Improvements, and Stormwater Project Phase 2/Stormwater Force Main Project. See Figure IV-14 for rendering of potential re-design of Kennedy Plaza.

Cost estimate

\$43,740,000

Cost estimate components

- **Prepare project design including drainage study** – approximately \$4,860,000
- **Project construction** – approximately \$35,640,000
- **Construction management** – approximately \$3,240,000

Benefits

Health and social

Reducing stormwater on Park Avenue and Beech Street is expected to assist with a more orderly evacuation prior to an event and improve access for emergency vehicles on established evacuation routes prior to major storms.

Economic

Complete Streets projects have a proven track record of increasing retail sales and sales tax among businesses, and decreasing vacancies, in the project area. Projects from California to New York City incorporating Complete Streets concepts have improved pedestrian and transit access to stores in key commercial areas, resulting in greater economic activity and increased jobs.

Environmental

Creation of more pervious landscape would help improve water quality.

Cost-benefit analysis

Long Beach is a fully developed community with infrastructure like the stormwater system that was not originally designed to address current and future flood risk. This critical investment in upgrading and protecting the stormwater system is generally expected to help improve access on established evacuation routes pre-storm.



Risk reduction

- a. **The Park Avenue section of the project is expected to reduce the stormwater flood risk to six critical assets and reduce the vulnerability score by 1 for these assets. In addition, this project would help reduce stormwater on a major evacuation route.** The approximately 1.1-mile commercial area on Park Avenue will receive additional protection which helps protect an estimated 1,715 primary jobs on Park Avenue. This area will benefit from significantly reduced likelihood of flooding from heavy rainfall events.
- b. **The population that resides, works, and shops in the Park Avenue and Beech Street commercial corridors, including guests, would benefit from this project.**

Assets Benefitting: Six critical assets, including LIRR Station, Police Station, City Hall, Fire Station, and established evacuation route.

Population Benefitting: A large number of Long Beach residents would use Park Avenue as an evacuation route and frequent the commercial area on this street.

General time frame

Approximately 30 months

General time frame for implementation milestones

- **Prepare project design** – approximately 6 months
- **Submit to regulatory agencies for review and permit approval** – approximately 3 months
- **Prepare bid documents and review responses** – approximately 3 months
- **Construct project** – approximately 18 months

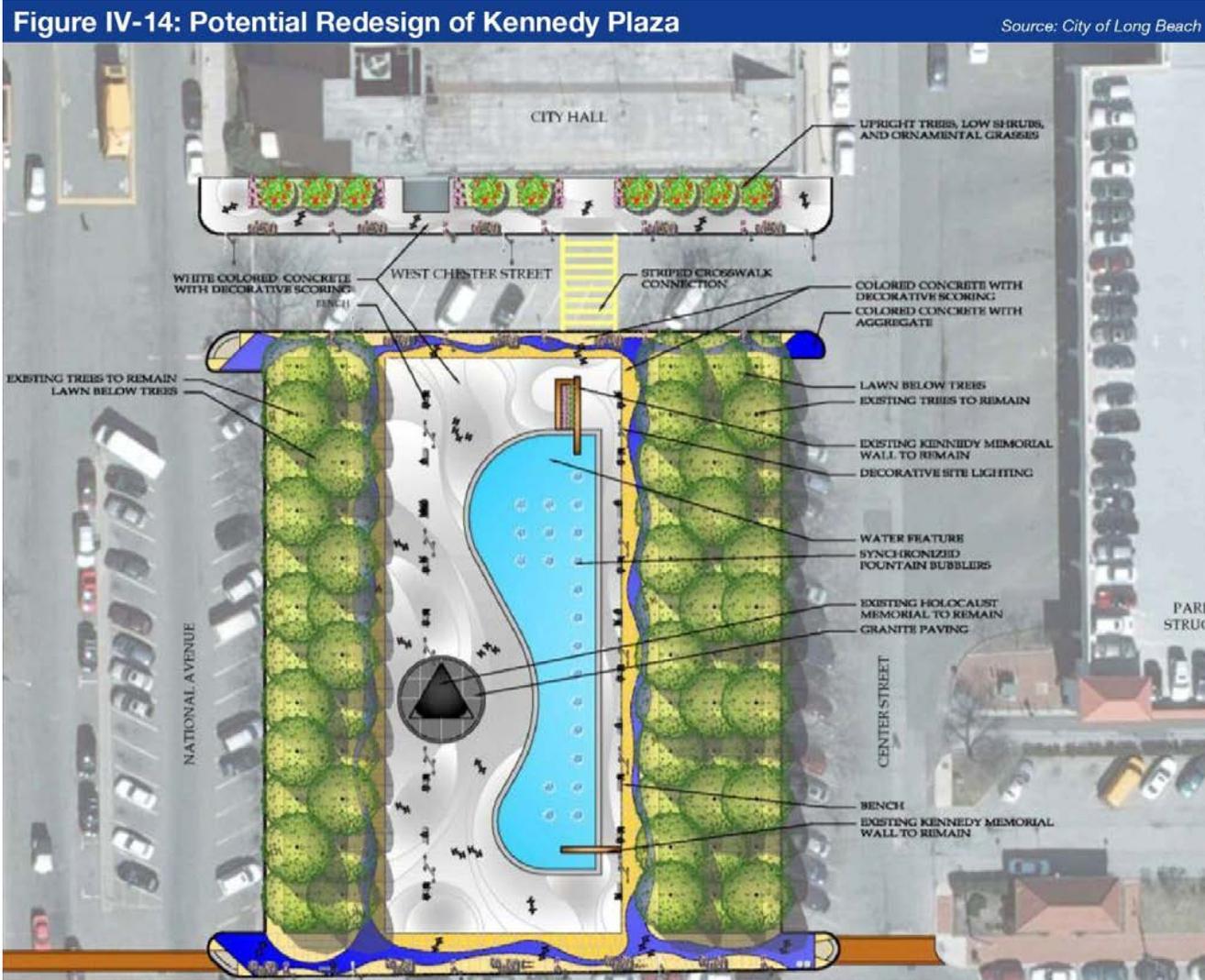
Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances; New York State Department of Environmental Conservation permitting, U.S. Army Corps of Engineers (USACE) and Coastal Zone Management consistency concurrence (New York State Department of State), if applicable.

Jurisdiction

The project is in the City of Long Beach. See Figure IV-14 for potential re-design of Kennedy Plaza.





Bayfront Revitalization Plan



Long Beach bayfront industrial area
Source: URS

Description

Issue: The north shore of Long Beach from approximately National Boulevard to the Long Beach Bridge is where most of the City’s primary utilities are, including the Water Pollution Control Plant and the Water Purification Plant. There is a need to build on previous resiliency efforts in this area and examine ways to advance protection before redevelopment can be considered.

This project builds on the City’s current “Creating Resilience: A Planning Initiative” efforts, which include updating its comprehensive plan and the Local Waterfront Revitalization Plan (LWRP). This project involves the preparation of a plan that examines opportunities to make bayfront critical infrastructure more resilient and potential options to consolidate industrial uses on the north shore to lead to resilient redevelopment. This will include brownfield remediation, connections to downtown and the ocean, and an economic opportunity feasibility study. This plan will include a robust community visioning and public input process. The approximate location of the project is the north shore from National Boulevard to Long Beach Bridge but this may be modified as the project is developed. Related projects

include the North Shore Protection of Critical Utilities and Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements, Drainage Improvements.

Cost estimate

\$300,000

Cost estimate components

- **Prepare plan** – approximately \$300,000

Benefits

Health and social

This project is expected to identify additional resiliency measures for an area that includes or is adjacent to two census block groups where a majority of households are at low/moderate income levels. This project would examine measures to make the entire area more resilient and lower its flood risk.

Economic

This plan is expected to lay the groundwork for additional resiliency and redevelopment in the north shore area, which could boost future economic activity. Additional resiliency efforts in the bayfront can increase the resiliency of the area and is expected to reduce future City emergency and recovery costs.

Environmental

Reducing industrial uses on the bayfront is expected to help protect Reynolds Channel from stormwater pollution. Part of the plan would address the brownfield on the north shore; redevelopment should take into consideration environmental justice concerns.



Cost-benefit analysis

Long Beach has a significant number of critical utilities located in one of the most vulnerable locations in the City. This plan is a sound approach to evaluate how assets in the bayfront area of Long Beach could be further protected and lower damages from events like Superstorm Sandy.

Risk reduction

- a. **The assets in the bayfront area are currently some of the most vulnerable in Long Beach. Other efforts, like the bulkheading and Dutch dams, are expected to help reduce vulnerability and this plan can help identify additional risk reduction measures.**
- b. **The actual risk reduction of this project is difficult to estimate but part of the plan would identify additional resiliency measures for critical assets that affect a majority of the Long Beach population.**

Assets Benefitting: Not applicable.

Population Benefitting: Plan identifies additional resiliency for critical assets needed by entire City population.

General time frame

Approximately 18 months

General time frame for implementation milestones

- **Prepare bid documents and review responses** – approximately 3 months
- **Prepare plan** – approximately 15 months

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances.

Jurisdiction

The project is in the City of Long Beach.



Revolving Loan Fund for Elevating Homes



House elevation: Long Beach, NY,
March 2013 (top); June 2013 (bottom)
Source: FEMA News Photo

Description

Issue: Thousands of homes in Long Beach were severely flooded by Superstorm Sandy. Elevation is a resiliency method well suited to protecting homes against floods but can be costly.

This project is a program for residents who need to elevate their homes to obtain low-interest loans administered by an appropriate agency. The exact locations of homes to be elevated are to be determined. A related project is Establish an Office of Emergency Management.

Cost estimate

\$5,000,000

Cost estimate components

- **Conduct feasibility analyses of elevating homes** – approximately \$100,000
- **Elevate homes** – approximately \$4,500,000
- **Project management** – approximately \$400,000

Benefits

Health and social

Availability of low-interest loans is expected to help make elevation more affordable for all populations, including socially vulnerable ones.

Economic

This project is expected to help increase resilient residential construction and make elevation more affordable, which would help maintain the customer base for small businesses in Long Beach. Local government expenditures



Revolving Loan Fund for Elevating Homes

associated with debris removal and emergency management costs are expected to be reduced in proportion to the number of homes elevated, which this project would help make elevations more affordable.

Environmental

This project should reduce some contamination associated with buildings being flooded including reduction of floatable debris that polluted the waterways surrounding Long Beach after Superstorm Sandy.

Cost-benefit analysis

Long Beach has hundreds to thousands of homes that should be elevated. If this revolving loan fund project is not funded, residential structures in Long Beach are likely to continue to be damaged by events like Superstorm Sandy.

Risk reduction

- a. **For the property owners who participate in this program, the risk to their individual homes and structures is expected to be greatly reduced.** Sixty-eight % of Long Beach’s housing stock sustained heavy or strong damage related to Superstorm Sandy (10,554 housing units) and many owners would need to elevate their homes.
- b. **This project is expected to help make elevation, a proven mitigation technique, more affordable for Long Beach residents.**

Assets Benefitting: Residential structures to be identified.

Population Benefitting: To be determined.

General time frame

Approximately 48 months

General time frame for implementation milestones

- **Identify organization to lead process** – approximately 3 months
- **Identify interested participants** – approximately 3 months

- **Conduct feasibility analyses of elevating homes** – approximately 6 months
- **Elevate homes** – approximately 36 months

Local, State, and Federal government regulatory requirements

The following is a non-exhaustive list of applicable requirements: The City of Long Beach Code of Ordinances; New York State Department of Environmental Conservation permitting.

Jurisdiction

The project is in the City of Long Beach.





Section V: Additional materials

Photo: Second Public Engagement Event, November 7, 2013
Source: Sustainable Long Island

Section V:

Additional materials

A. Additional Resiliency Recommendations

The Additional Resiliency Recommendations listed in Table V-1 are projects that the NYRCR Planning Committee would like to highlight because they help fulfill the reconstruction and resiliency strategies in Section III but are not categorized as Proposed or Featured Projects. These recommendations are generally additional ongoing projects or demonstrate further progress toward the overall NYRCR goals. These recommendations are categorized by strategy. A short project description is included in addition to a rough estimated cost and whether the project is a regional project. The costs are estimated based on the evolving nature of project development. Identifying these projects in the NYRCR Long Beach Plan will aid Long Beach in potential future implementation.



Table V-1: Additional Resiliency Recommendations

Strategy	Project Name	Short Description	Estimated Cost	Regional Project (Y/N)
Strategy 1 – Employ appropriate techniques to mitigate ocean and bay storm surge and stormwater flooding to protect Long Beach’s infrastructure, people, and assets while positioning for resilient redevelopment	Microgrid for Select Community Assets	Use localized power generation to maintain power to specific assets if the utility grid becomes de-energized in the next storm event. The project proposes to use natural gas and hydrogen fuel cells to power key community assets with local generators. This project could construct a microgrid of reliable power sources with low emissions to power selected assets (East and West Elementary School, City Hall, Fire and Police Stations at City Hall).	\$9,000,000	Y
	Bayside Flood Gates Feasibility Analysis	Conduct Bayside Flood Gates Feasibility Analysis – at existing transportation structures for storm surge barrier protection.	\$1,000,000 to \$2,000,000	Y
	Transfer of Sewage Treatment to Bay Park STP	Transfer sewage treatment to Bay Park STP via sewer lift station and current sewage treatment plant location. Current sewage treatment plant decommissioning and pipeline from Bay Park STP to 2 miles out into Atlantic Ocean.	\$35,000,000 to transfer from Long Beach to Bay Park STP; \$700,000,000 for Ocean outfall	Y
Strategy 3 – Implement measures to make Long Beach economic generators more resilient, while also facilitating enhancement of key commercial areas and the redevelopment of underutilized areas to stimulate economic growth	Brownfield Remediation Studies	The City has been awarded a Phase I study and will apply for a Phase II study. The identified area is the old incinerator plant on the north shore.	Less than \$1,000,000 for Phase II study	N
Strategy 4 – Increase Long Beach’s capacity to facilitate and foster actions that lead to greater resiliency, emergency preparedness, and sustainability	Community Rating System Evaluation	The City hired a firm to review the City’s floodplain management system with the goal of lowering flood insurance premiums for residents. The review is expected to include a scoring evaluation with the National Flood Insurance Program’s Community Rating System.	\$35,000	N
Strategy 5 – Encourage and facilitate housing resiliency and sustainability measures while striving to maintain the character of Long Beach	Residential Resilience Project	The City has created a program to assist homeowners in implementing resiliency measures and requested.	\$25,000,000	N
Strategy 6 – Restore and enhance natural resources for both resiliency and recreation purposes while also protecting important cultural resources	Boardwalk Visioning Phase 2	Build on the original Boardwalk visioning process and determine additional improvements needed for the Boardwalk to maximize its potential while maintaining the character desired by Long Beach.	Less than \$1,000,000	N



B. Master table of projects

The Proposed Projects, Featured Projects, and Additional Resiliency Recommendations (ARR) identified throughout the Long Beach NY Rising Community Reconstruction Plan are reflected in Table V-2 below. These projects and recommendations are categorized by Reconstruction and Resiliency Strategy and project category. The table also provides short project descriptions, estimated costs, and whether the project/recommendation is a regional project. The costs are estimated based on the evolving nature of project development. In some cases, projects and recommendations may address more than one Reconstruction and Resiliency Strategy.



Table V-2: Master Table of Projects

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional Project (Y/N)
Strategy 1 – Employ appropriate techniques to mitigate ocean and bay storm surge and stormwater flooding to protect Long Beach’s infrastructure, people, and assets while positioning for resilient redevelopment	Bulkheading – North Shore	The entire north shore of Long Beach needs major storm protection. This project is to provide phased installation, replacement, and improvement to bulkheads for the north shore for storm protection. Phasing to be developed for critical areas as established by August 2013 Long Beach Bulkhead study.	Proposed Project	\$12,450,000	Y
	Drainage Improvements	Stormwater drainage in critical areas, including those that tie to evacuation routes and adjacent hot spots. Includes comprehensive stormwater study and addition of backflow prevention valves on stormwater outfalls and green infrastructure for retention.	Proposed Project	\$8,350,000	Y
	Critical Facility Resiliency	Feasibility study and implementation for flood and wind protection, and backup power at critical emergency responder facilities; include support equipment. Create a community assistance center at the Ice Arena/Recreation Center.	Proposed Project	\$2,387,000	Y
	Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements	Comprehensive stormwater study that leads to stormwater drainage improvements, green infrastructure, streetscape improvements, emergency signage, and solar-powered lighting.	Proposed Project	\$10,625,500	Y
	Parking Garage for Emergency Vehicles	Study locations for and construct a parking garage structured to hold emergency response vehicles and equipment at a second-story level which will also act as an emergency distribution center.	Proposed Project	\$14,705,000	N
	Protection of Wells and Sewer Pump/Lift Stations	Protection for three pump stations and two wells, and backup generators elevated above the storm level.	Proposed Project	\$2,480,000	Y
	Park Avenue Complete Streets Phase 2	Improve the City’s stormwater system via redevelopment of Kennedy Plaza in front of City Hall to provide large-scale underground stormwater storage chambers and strategically located green infrastructure, solar lighting and reconfigured use of the space.	Featured Project	\$43,740,000	Y



Table V-2: Master Table of Projects (Continued)

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional Project (Y/N)
Strategy 1 (cont.)	Stormwater Project Phase 2/Stormwater Force Main Project	Improve stormwater drainage, including installing pressurized pipes (force main), replacing drainage inlet structures, and increasing stormwater storage.	Featured Project	\$114,830,000	Y
	North Shore Protection of Critical Utilities	Provide coordination with the \$12.9 million north shore bulkheading project, announced by Governor Cuomo in November 2013, which will develop bulkheading from National Boulevard to the Long Beach Bridge. Includes flood barriers (i.e., deployable barriers or Dutch dams) around major utilities.	Featured Project	\$12,900,000	Y
	Canal Gates at the East End	Assess and provide phased installation of moveable canal gates to mitigate flooding of the canal area. Coordinate with north shore bulkheading project.	Featured Project	\$26,400,000	Y
	Microgrid for Select Community Assets	Use localized power generation to maintain power to specific assets if the utility grid becomes de-energized in the next storm event. The project proposes to use natural gas and hydrogen fuel cells to power key community assets with local generators. This project could construct a microgrid of reliable power sources with low emissions to power selected assets (East and West Elementary School, City Hall, Fire and Police Stations at City Hall).	ARR	\$9,000,000	
	Bayside Flood Gates Feasibility Analysis	Conduct Bayside Flood Gates Feasibility Analysis at existing transportation structures.	ARR	\$1,000,000 to \$2,000,000	Y
	Transfer of Sewage Treatment to Bay Park STP	Transfer sewage treatment to Bay Park STP via sewer lift station and current sewage treatment plant location. Current sewage treatment plant decommissioning and pipeline from Bay Park STP to 2 miles out into Atlantic Ocean.	ARR	\$35,000,000 to transfer from Long Beach to Bay Park STP; \$700,000,000 for pipe to Ocean outfall	Y



Table V-2: Master Table of Projects (Continued)

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional Project (Y/N)
Strategy 2 – Protect critical Long Beach health and social services assets and increase the capacity to provide needed emergency and community services before, during, and after disasters	Critical Facility Resiliency	Feasibility study and implementation for flood and wind protection, and backup power at critical emergency responder facilities; include support equipment. Create a community assistance center at the Ice Arena/Recreation Center.	Proposed Project	\$2,387,000	Y
	Protection of Community Centers	Feasibility study, design and construct resiliency protection for existing community centers to be used in an emergency.	Proposed Project	\$1,335,000	N
	Protection of Public Housing Units	Enhance protection of two public housing units to allow residents to return to the units as soon as possible after a storm evacuation. The two public housing units are the Channel Park Homes and Pine Town Homes. Coordinate with other funding sources.	Proposed Project	\$2,965,000	N
	Protection of Senior Housing Units	Provide flood protection to public senior housing units, including the Sol Scher Apartments, Michael Valente Apartments, Sonny Duckman Apartments, and Morton Cohen Apartments. Coordinate with other funding sources.	Proposed Project	\$1,925,000	N
Strategy 3 – Implement measures to make Long Beach economic generators more resilient, while also facilitating enhancement of key commercial areas and the redevelopment of underutilized areas to stimulate economic growth	Park Avenue/Beech Street Streetscape Drainage Study and Infrastructure Improvements	Comprehensive stormwater study that leads to stormwater drainage improvements, green infrastructure, streetscape improvements, emergency signage, and solar-powered lighting.	Proposed Project	\$10,652,500	Y
	Park Avenue Complete Streets Phase 2	Improve the City’s stormwater system via redevelopment of Kennedy Plaza in front of City Hall to provide large-scale underground stormwater storage chambers and strategically located green infrastructure, solar lighting and reconfigured use of the space.	Featured Project	\$43,740,000	Y
	Bayfront Revitalization Plan	Prepare a plan to examine resiliency and consolidation options for north shore critical infrastructure for resiliency and redevelopment to unite the bayfront with the rest of the corridor and center of the City. This will include brownfield remediation, connections to downtown and ocean, housing options, and an economic opportunity feasibility study.	Featured Project	\$300,000	Y



Table V-2: Master Table of Projects (Continued)

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional Project (Y/N)
	Brownfield Remediation Studies	The City has been awarded a Phase I study and will apply for a Phase II study. The identified area is the old incinerator plant on the north shore.	ARR	Less than \$1,000,000 for Phase II study	N
Strategy 4 – Increase Long Beach’s capacity to facilitate and foster actions that lead to greater resiliency, emergency preparedness, and sustainability	Establish an Office of Emergency Management (OEM) and Hire a Local Disaster Recovery Manager (LDRM)	Establish office in City Hall including hiring an LDRM to lead the OEM to conduct disaster planning, disseminate upcoming storm actions, coordinate larger hazard events like floods, and work with a community education plan. Includes office setup in City Hall to be operational post-disaster.	Proposed Project	\$1,083,000	Y
	Bayfront Revitalization Plan	Prepare a plan to examine resiliency and consolidation options for north shore critical infrastructure for resiliency and redevelopment to unite the bayfront with the rest of the corridor and center of the City. This will include brownfield remediation, connections to downtown and ocean, housing options, and an economic opportunity feasibility study.	Featured Project	\$300,000	Y
	Community Rating System Evaluation	The City hired a firm to review the City’s floodplain management system with the goal of lowering flood insurance premiums for residents. The review is expected to include a scoring evaluation with the National Flood Insurance Program’s Community Rating System.	ARR	\$35,000	N
Strategy 5 – Encourage and facilitate housing resiliency and sustainability measures while striving to maintain the character of Long Beach	Protection of Public Housing Units	Enhance protection of two public housing units to allow residents to return to the units as soon as possible after a storm evacuation. The two public housing units are the Channel Park Homes and Pine Town Homes. Coordinate with other funding sources.	Proposed Project	\$2,965,000	N
	Protection of Senior Housing Units	Provide flood protection to public senior housing units, including the Sol Scher Apartments, Michael Valente Apartments, Sonny Duckman Apartments, and Morton Cohen Apartments. Coordinate with other funding sources.	Proposed Project	\$1,925,000	N



Table V-2: Master Table of Projects (Continued)

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional Project (Y/N)
	Revolving Loan Fund for Elevating Homes	Make low-interest loans available for residents who need to elevate their homes; would be administered by an appropriate agency.	Featured Project	\$5,000,000	N
	Residential Resilience Project	The City has created a program to assist homeowners in implementing resiliency measures and requested funding.	ARR	\$25,000,000	N
Strategy 6 – Restore and enhance natural resources for both resiliency and recreation purposes while also protecting important cultural resources	Drainage Improvements	Stormwater drainage in critical areas, including those that tie to evacuation routes and adjacent hot spots. Includes comprehensive stormwater study and addition of backflow prevention valves on stormwater outfalls and green infrastructure for retention.	Proposed	\$8,350,000	Y
	Stormwater Project Phase 2/Stormwater Force Main Project	Improve stormwater drainage, including installing pressurized pipes (force main), replacing drainage inlet structures, and increasing stormwater storage.	Featured Project	\$114,830,000	Y
	Boardwalk Visioning Phase 2	Build on the original Boardwalk visioning process and determine additional improvements needed for the Boardwalk to maximize its potential while maintaining the character desired by Long Beach.	ARR	Less than \$1,000,000	N



C. Public engagement process

The NYRCR Long Beach public engagement process included 12 Planning Committee meetings, three Public Engagement Events, and online surveys (as of March 31, 2014). Each Planning Committee Meeting was open to the public and audience participation was encouraged through questions at the end of the meeting and public comment cards. The meetings occurred on the following dates:

- September 18 and 26, 2013
- October 3, 14 and 24, 2013
- November 16, 2013
- December 5, 2013
- January 9 and 23, 2014
- February 6, 2014
- March 11 and 27, 2014

The Public Engagement Events took place at strategic intervals and were accompanied with online surveys for those not able to attend. Further discussion of the meetings and methods for public outreach are provided in the following subsections.

Public Outreach for Engagement Events

The methods used to notify the public of the Public Engagement Events and the NYRCR planning process were as follows:

- The New York State and Long Beach NYRCR Facebook pages provided information, documents, meeting dates, and answers to questions that were posted. The Facebook page was shared with local groups that are also on Facebook.
 - Website: <http://stormrecovery.ny.gov/nyrcr/community/city-long-beach>
 - Facebook: <https://www.facebook.com/LBCRP> (531 members)

- An official press release describing the work before and after the Public Engagement Event was distributed to local papers.
- Information and flyers were distributed electronically and in person to the following entities:
 - LongBeachListens.com listserv (900 people);
 - Long Beach Community Organizations Active in Disasters (23 member organizations);
 - What Long Beach Can Be!! (1,229 members);
 - Imagine Long Beach (2,568 members);
 - City of Long Beach official website ;
 - City of Long Beach’s Facebook page (9,775 members);
 - Long Beach Chamber of Commerce, Public Library, Public School Board, and the Parent-Teacher Association ;
 - Media outlets such as the Long Beach Herald, Patch, News 12, Fios, and Newsday (articles published in the Long Beach Herald and Newsday);
 - Local civic associations;
 - Houses of worship;
 - Long Beach Latino Civic Association and Circulo de la Hispanidad (translated into Spanish);
 - Martin Luther King, Jr. Community Center and Magnolia Senior /Community Center;
 - Long Beach Reach, Federation Employment and Guidance Services, Inc. Health and Human Services, and Project Hope;
 - Individuals who are active in their community;
 - Farmers’ Market;
 - Long Beach High School/Nike alternative school program; and
 - Long Beach bus depot/shelters.

- Additionally, flyers were distributed at the following locations for the November 7, 2013, event:
 - 500 flyers were distributed at the Waldbaum’s shopping center in early November.
 - 500 flyers were distributed throughout the West End during the Dune Grass Planting event on Saturday, November 2, 2013.
 - 1,000 flyers were distributed throughout the East End and Central District stores in late October and early November, including at the Long Island Rail Road (LIRR) station.
- Lawn signs – 40 distributed citywide for February 27, 2014, event.
- Additionally, flyers were distributed at the following locations for February 27, 2014, event:
 - 1,500 at the Long Beach Polar Bear Plunge Event on February 2;
 - 250 at the Winter Farmers’ Market on February 5;
 - 500 at the Lindell Elementary School on February 24;
 - 50 to Key Food Supermarket on February 20;
 - 250 to the City of Long Beach Community Development Office for additional distribution to the West End on February 20;
 - 100 to Circulo de la Hispanidad organization for distribution to its members on February 20; and
 - 100 to the Long Beach Latino Civic Association for distribution to its membership on February 20.
- The first Public Engagement Event was publicized at the LIRR Long Beach station and bus shelters via Street Teams.



First Public Engagement Event, October 10, 2013

Source: Sustainable Long Island

The event opened with an overview of the NYRCR planning process and the City’s progress in implementing projects. The overview was presented by the Committee Co-Chairs, the City, and the Consultant Team. Most of the meeting involved a facilitated breakout session during which participants were asked for feedback on the Vision Statement, needs and opportunities, key strategies, and community assets. Spanish-speaking interpreters were made available. Residents discussed their particular concerns during the aftermath of Superstorm Sandy and emphasized that they were impacted the most by flooding and loss of heat, sewers, and access to food and fuel. Residents added they were also impacted by lack of communication, lack of cell towers/internet, debris taking weeks to be removed, and lack of drinking water.

During the event, participants were also asked to identify their preferred mitigation strategies to lessen flood impacts shown in Table V-3. The perceived effectiveness of mitigation strategies, as identified by participants, is shown in Table V-3.

First Public Engagement Event

The first Public Engagement Event was held on October 10, 2013, and was attended by more than 100 residents. An online survey was developed to obtain feedback on resiliency planning from residents unable to attend meetings.

Table V-3: Perceived Effectiveness of Mitigation Strategies

Effectiveness of four types of mitigation strategies to lessen the impact of flood events:	
Four types of mitigation strategies	Community Value
Hard Infrastructure (bulkheads, cement walls)	High
Resiliency Techniques (elevate homes)	High
Soft Infrastructure (dunes, wetlands)	High
Stormwater Management (bioswales)	High
Strategies to achieve resiliency on the oceanfront:	
Resiliency strategies on the oceanfront	Community Value
Build dunes, bulkheads, and/or flood gates to protect homes and infrastructure	High
Harden critical infrastructure	Medium
Convert abandoned areas to open space	Low
Do not rebuild on areas with high rebuilding costs	Low
Relocate homes and infrastructure further from shorelines	Low
Strategies to achieve resiliency on the bayfront:	
Resiliency strategies on the bayfront	Community Value
Build dunes, bulkheads, and/or flood gates to protect homes and infrastructure	High
Harden critical infrastructure	Medium
Convert abandoned areas to open space	Low
Do not rebuild on areas with high rebuilding costs	Low
Relocate homes and infrastructure further from shorelines	Low



Second Public Engagement Event

The second Public Engagement Event, held on November 7, 2013, included a review of strategies presented in the NYRCR Long Beach Conceptual Plan. Over 50 residents attended the meeting. This Public Engagement Event included a presentation on the status of the project and participants were organized into facilitated focus groups to further discuss the strategies that were included in the NYRCR Long Beach Conceptual Plan. Three hardcopies of the Conceptual Plan were placed in the library for review, and it was available online on the NYRCR website. Participants were asked to identify strategies to achieve resiliency, identify ideas for new projects by Reconstruction Strategy, provide input on economic development strategies to achieve resiliency, and discuss projects identified as “ready to go.”

Community value of the preferred strategies to achieve resiliency are shown in Table V-4.



Second Public Engagement Event, November 7, 2013

Source: Sustainable Long Island

Table V-4: Second Public Engagement Event Activity Results

Strategies to achieve resiliency	
Strategies	Community Value
Establish a Memorandum of Understanding (MOU) with local cellular carriers to ensure better response after storms (e.g., expanded and faster access to mobile cell phone towers after a storm).	High
Install flood barriers at canal entrances.	High
Introduce green infrastructure, such as bioswales in road medians, porous paving in parking areas, and rain gardens, to assist with stormwater management.	High
Protect critical facilities and major utilities by making system-wide improvements, including elevating critical mechanical systems, hardening outer structures, constructing ring walls or berms, elevating vulnerable key components, providing backup power, and updating sewage treatment plants to improve water quality.	High
Develop response teams to check on and assist populations on a continuous basis until power is restored.	Medium
Enhance the Complete Streets Program to reduce traffic congestion; improve traffic circulation, traffic calming, and bicycle routes; reduce vehicle-pedestrian conflicts; and improve parking. It will also provide a means to reduce flooding with rain gardens, and holding basins for the water.	Medium
Relocate emergency generators to upper floors, and harden where necessary, to maintain power and functionality during future hazard events.	Medium
Repurpose public buildings to create refuge centers during and after major storms.	Medium
Update post-Sandy and complete the Local Waterfront Revitalization Plan.	Medium
Balance future redevelopment needs with Environmental Justice concerns.	Low
Continue accruing Community Rating System points (a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum requirements) from the National Flood Insurance Program to reduce flood insurance premiums.	Low
Develop MOUs with food assistance groups (e.g., Island Harvest, Long Island Cares, Meals on Wheels) to arrange for assistance for the elderly in walk-up buildings when the power is out.	Low
Enhance the resiliency of key social service facilities, including the Martin Luther King, Jr. Community Center.	Low
Establish a local Office of Emergency Management.	Low
Facilitate the bulkheading of medical and health care centers.	Low



Table V-4: Second Public Engagement Event Activity Results (Continued)

Strategies to achieve resiliency	
Strategies	Community Value
Prepare a list of disaster recovery services vendors for the City and enter into MOUs.	Low
Promote sign-up for the Reverse 911 System and Long Beach Response, an always-available emergency communications service, and promote quarterly tests of the system.	Low
Protect facilities with critical government services to maintain continuity of operations after major storms.	Low
Protect senior housing/centers and housing for other vulnerable populations.	Low
Restore and protect fire, ambulance, and police facilities.	Low
Restore and protect schools and daycare facilities to allow schools to be operable quickly after storms.	Low
Set up special needs registration so that vulnerable people (elderly, bilingual, disabled, low income) can identify themselves and receive needed services during emergencies (e.g., assistance with evacuation, transportation to inland hospitals if on a respirator).	Low



Survey results

A survey soliciting input from Long Beach residents on key topics related to Superstorm Sandy was conducted (available on the NYRCR Long Beach website) from October 2013 through February 2014. The survey asked questions on how Superstorm Sandy affected residents, what issues are still concerns during flood events, priorities for the future, and comments on the types of strategies that would lessen flooding during storm events. 204 people who identified themselves as Long Beach residents responded to the survey and the results are found on the following pages.



Second Public Engagement Event, November 7, 2013

Source: Sustainable Long Island

Table V-5: Survey Results

How severely Sandy affected residents' lives	
Affected	Community Value
Communication access (phone, email)	High
Displaced from home	High
Drinking water (shower, etc.)	High
Power/electricity	High
Sewer & stormwater drainage	High
Fuel for cars/automobiles	Medium
Gas (heat/cooking)	Medium
Public safety concerns	Medium
Transportation access	Medium
Access to food	Low
Displaced from school	Low
Displaced from work	Low
Medical attention	Low
Other (please specify)	Low

Table V-5: Survey results (Continued)

Remaining concerns during flood events	
Issues	Community Value
Electricity (loss of power)	High
Home flooding	High
Roads (flooding)	High
Sewer or wastewater	High
Waterfront erosion	High
Access to food/replace lost food	Medium
Access to fuel for evacuation, getting to work or personal emergencies	Medium
Gas (cooking, heat – loss of power)	Medium
Reliable, effective, real-time communication	Medium
Access to emergency supplies, clothes and goods	Low
Businesses or place of employment closed or shut down	Low
Other (please specify)	Low
Private transportation	Low
Public transportation	Low

Table V-5: Survey results (Continued)

Importance for the future	
Importance	Community Value
Improved communication systems	High
Improved emergency preparedness, management, or response	High
Improved infrastructure to serve commercial and/or industrial areas	High
Physical barriers to block or divert flood waters	High
Restored, repaired, or expanded marshes and wetlands to absorb stormwater, tides, and flooding	High
Green infrastructure to reduce runoff and improved maintenance of stormwater retention facilities	Medium
Improved drainage and capacity of storm sewer system	Medium
Reduced flooding in commercial areas to protect business investments	Medium
Restored, repaired, or expanded dunes	Medium
Restored access to medical care	Medium
Strengthen infrastructure to better withstand future storms	Medium
Homes elevated above 100-year floodplain	Low
Improved homeowner understanding of reconstruction options/practices	Low
Other (please specify)	Low
Public education about possible longer-term effects from storm damage	Low
Voluntary relocation or buy-outs where appropriate	Low



Table V-5: Survey results (Continued)

Perceived effectiveness of strategies for achieving resiliency	
Strategies	Community Value
Hard infrastructure (i.e. bulkheads, expanded sewers, cement walls, storm drains, fortified structures, etc.)	High
Resiliency techniques (i.e. elevation of homes, renewable energy sources, water retention areas; resiliency and response plan for schools.)	High
Communication (i.e. central location or points of contact, evacuation and communication plan that connects with existing plans as appropriate, volunteer street sweep teams, system for providing first responders and residents with real-time information)	Medium
Emergency management & response (Improve coordination; harden emergency services buildings such as police and fire departments where necessary; create community assistance center, "safe zones," etc.)	Medium
Soft infrastructure (i.e. dunes, wetlands, vegetation, bioswales, French drains, open space, etc.)	Medium
Natural water capture and filtration (i.e. bioswales, new/expanded tree pits, green and roofs, etc.)	Low
Other (please specify)	Low



Third Public Engagement Event

The third Public Engagement Event was held on February 27, 2014, at the Lindell Elementary School. It involved a review of the Proposed Projects and Featured Projects in consideration for the NYRCR Plan. The event was set up as an open house format with two short orientations throughout the meeting. Project boards were set up so that specific projects could be viewed and discussed in more detail with the Committee Members and the Consultant Team. Project Evaluation Guides were also made available so that participants could indicate their support for each project, the reasons why they felt that the projects were important and how they addressed community needs, and any other comments on the projects presented.

Over 100 residents attended the meeting. A survey (which was available on-line and a link provided on the NYRCR Long Beach website) was also circulated to ascertain residents' opinions on suggested Proposed and Featured Projects for those residents who could not attend the Public Engagement Event. Overall results from public input on the projects indicated that 76% of respondents rated overall support for the projects between "Moderate" and "High." Table V-6 provides details on the level of community support by specific project.

The participants provided information on how long they have lived in Long Beach:

- 28% have lived in Long Beach for 20 or more years;
- 25% for 11-20 years;
- 17% for 6-10 years;
- 12% for 1-5 years;
- 5% for less than 1 year; and
- 13% did not respond to this question.



**Third Public Engagement Event,
February 27, 2014**

Source: Sustainable Long Island

*The City of
Long Beach
invites
you...*



**NEW YORK RISING COMMUNITY
RECONSTRUCTION PROGRAM
(NYRCR) 3RD PUBLIC MEETING**

LEARN MORE ABOUT SPECIFIC PROPOSED PROJECTS!
Take the online survey at:
https://www.surveymonkey.com/s/LBCRprojects_Eng

THURSDAY, FEBRUARY 27, 2014
6:00PM - 9:00PM
LINDELL ELEMENTARY SCHOOL
601 LINDELL BLVD.
LONG BEACH, NY
www.stormrecovery.ny.gov/nyrcr



*La Ciudad
de Long
Beach le
invita...*



**NEW YORK RISING—PROGRAMA DE
RECONSTRUCCIÓN DE LA
COMUNIDAD, 3^{RA} REUNIÓN PÚBLICA**

¡CONOZCA MÁS ACERCA DE LOS PROYECTOS
PROPUESTOS PARTICULARES!
Tome la encuesta en el Internet en:
https://es.surveymonkey.com/s/LBCRprojects_Span

JUEVES, 27 DE FEBRERO 2014
6:00PM - 9:00PM
LINDELL ELEMENTARY SCHOOL
601 LINDELL BLVD.
LONG BEACH, NY
www.stormrecovery.ny.gov/nyrcr



Flyers for Third Engagement Meeting in English and Spanish

Source: Sustainable Long Island

Table V-6: Community Support by Project

Based upon February 27, 2014, Public Engagement Event		
Project Name	Project Category	Community Support
Bulkheading – North Shore	Proposed Project	High
Canal Gates in the East End	Featured Project	High
Drainage Improvements	Proposed Project	High
North Shore Critical Facilities Bulkheading (funding announced by Governor Cuomo in November 2013)	Featured Project	High
North Shore Bulkheading Final Phase (since the 2/27/14 meeting, this has been combined with Bulkheading–North Shore project)	Featured Project	High
Protection of Wells and Pump/Lift Stations	Proposed Project	High
Stormwater Project Phase II	Featured Project	High
Bayfront Revitalization Plan	Featured Project	Medium
Critical Facility Resiliency	Proposed Project	Medium
Protection of Community Centers	Proposed Project	Medium
Revolving Loan Fund for Elevating Homes	Featured Project	Medium
Streetscape Drainage Infrastructure	Proposed Project	Medium
Establish Office of Emergency Management	Proposed Project	Low
Park Ave Complete Streets II	Featured Project	Low
Parking Garage for Emergency Vehicles	Proposed Project	Low
Protection of Public Housing Units	Proposed Project	Low
Protection of Senior Housing Units	Proposed Project	Low



D. Community asset inventory

In Table V-7, risk scores are defined as follows:

>53 = severe risk (shown in red)

24 – 53 = high risk (shown in orange)

6 – 23 = moderate risk category (shown in green)

<6 = residual risk

Table V-7: Risk Assessment Scores for Critical Assets

Asset	Risk Assessment			
	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Bayfront Esplanade	3	4	1	12
Beachfront Boardwalk	3	4	3	36
Beach Terrace Care Center	3	4	3	36
Channel Park Homes	3	3	3	27
Cingular Wireless Cellular Tower	3	4	4	48
City Hall	3	3	5	45
City Library	3	3	3	27
Clark Street Splash Park	3	4	1	12
Commercial District – East End	3	3	3	27
Commercial District – Park Avenue	3	3	3	27
Commercial District – West End	3	3	3	27
East Elementary School	3	3	4	36
Fire Station #1	3	3	5	45
Fire Station #2	3	3	5	45
Fire Station #3 (Headquarters)	3	4	5	60



Table V-7: Risk assessment scores for critical assets (Continued)

Asset	Risk Assessment			
	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Foundation Block	3	4	2	24
Georgia Street Splash Park	3	3	1	9
Haas Pavilion	3	4	3	36
Headstart Facility	3	3	3	27
Kennedy Plaza	3	3	1	9
Komanoff Pavilion	3	4	3	36
Leroy Conyers Park	3	3	1	9
Lindell Elementary School	3	3	4	36
Long Beach Auxiliary Police	3	3	3	27
Long Beach Boulevard Bridge	3	4	4	48
Long Beach Boulevard Gateway Area	3	4	3	36
Long Beach Bus Garage/Vehicle Maintenance	3	4	3	36
Long Beach Ice Arena	3	4	2	24
Long Beach Medical Center (former)	3	4	4	48
Long Beach Recreation Center	3	4	3	36
Long Island Rail Road Station	3	3	4	36
Magnolia Senior Community Center	3	3	3	27
Major Arterial – Beech Street	3	3	4	36
Major Arterial – Broadway	3	3	4	36



Table V-7: Risk assessment scores for critical assets (Continued)

Asset	Risk Assessment			
	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Major Arterial – Park Avenue	3	3	4	36
Martin Luther King, Jr. Community Center	3	4	3	36
Michael Valente Senior Apartments	3	3	3	27
Morgan Stern Pavilion	3	4	3	36
Morton Cohen Senior Apartments	3	3	3	27
North Shore Brownfield	3	4	2	24
Pine Townhouses	3	4	3	36
Police Station	3	3	5	45
Power Supply Infrastructure	3	3	5	45
Public Works Facility	3	3	3	27
Pump/Lift Station	3	4	4	48
Pump/Lift Station	3	4	4	48
Pump/Lift Station	3	3	4	36
Pump/Lift Station	3	3	4	36
Pump/Lift Station	3	3	4	36
Seaview Terrace	3	3	3	27
Sherman Brown Sports Courts	3	4	1	12
Sol Scher Senior Apartments	3	3	3	27
Sonny Duckman Senior Apartments	3	3	3	27
Stormwater Management System	3	4	4	48



Table V-7: Risk assessment scores for critical assets (Continued)

Asset	Risk Assessment			
	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Superblock	3	4	2	24
U.S. Post Office	3	3	2	18
Verizon Substation	3	3	4	36
Veterans Memorial Park	3	3	1	9
Water Pollution Control Plant	3	3	5	45
Water Purification Plant	3	4	5	60
Well	3	3	4	36
Well	3	3	4	36
West Elementary School	3	3	4	36
West End Library	3	3	3	27
Williams/Transco High Pressure Gas Pipeline	3	3	4	36



Community asset, landscape attributes, and risk assessment information

In Table V-8, assets with risk scores over 53 are in the severe risk category. Assets with scores between 24 and 53 are in the high-risk category. Assets with scores between 6 and 23 are in the moderate-risk category. And lastly, assets with scores less than 6 means are in the residual risk category.

Table V-8: Community Asset Inventory - Long Beach Assets, Landscape Attributes, and Risk Assessment Scores

ASSET INFORMATION						LANDSCAPE ATTRIBUTES							RISK ASSESSMENT			
Asset	Risk Area	Asset Class	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate ⁽¹⁾	Beach Width ⁽²⁾	Shore Defenses ⁽³⁾	Protective Vegetation ⁽⁴⁾	Dunes or Bluffs ⁽⁵⁾	Soils ⁽⁶⁾	Landscape Attribute Score ⁽⁷⁾	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Bayfront Esplanade	Extreme	Natural and Cultural Resources	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	4	1	12
Beachfront Boardwalk	Extreme	Natural and Cultural Resources	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Clark Street Splash Park	Extreme	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	3	4	1	12
Georgia Street Splash Park	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	3	3	1	9
Kennedy Plaza	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	3	3	1	9
Leroy Conyers Park	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	3	3	1	9
Sherman Brown Sports Courts	Extreme	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	3	4	1	12
Veterans Memorial Park	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	3	3	1	9
Long Beach Ice Arena	Extreme	Natural and Cultural Resources	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	2	24
Long Beach Recreation Center	Extreme	Natural and Cultural Resources	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Magnolia Senior/Community Center	High	Health and Social Services	Yes	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Martin Luther King, Jr. Community Center	Extreme	Natural and Cultural Resources	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Channel Park Homes	High	Housing	Yes	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Pine Town Homes	Extreme	Housing	Yes	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Senior Housing	High	Housing	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Senior Housing	High	Housing	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Senior Housing	High	Housing	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Senior Housing	High	Housing	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Beach Terrace Care Center	Extreme	Housing	Yes	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Cingular Wireless Cellular Tower	Extreme	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	4	4	48
Verizon Substation	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
City Hall	High	Health and Social Services	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	3	3	5	45



Table V-8: Community Asset Inventory - Long Beach Assets, Landscape Attributes, and Risk Assessment Scores (Continued)

ASSET INFORMATION						LANDSCAPE ATTRIBUTES							RISK ASSESSMENT			
Asset	Risk Area	Asset Class	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate ⁽¹⁾	Beach Width ⁽²⁾	Shore Defenses ⁽³⁾	Protective Vegetation ⁽⁴⁾	Dunes or Bluffs ⁽⁵⁾	Soils ⁽⁶⁾	Landscape Attribute Score ⁽⁷⁾	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
City Library	High	Natural and Cultural Resources	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
West End Library	High	Natural and Cultural Resources	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
East Elementary School	High	Health and Social Services	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Lindell Elementary School	High	Health and Social Services	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
West Elementary School	High	Health and Social Services	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Headstart Facility	High	Health and Social Services	Yes	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Fire Station #1	High	Health and Social Services	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	5	45
Fire Station #2	High	Health and Social Services	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	5	45
Fire Station #3	Extreme	Health and Social Services	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	4	5	60
Long Beach Auxiliary Police	High	Health and Social Services	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Police Station	High	Health and Social Services	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	3	3	5	45
Post Office	High	Health and Social Services	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	3	2	18
Commercial District – East End	High	Economic	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Commercial District – Park Avenue	High	Economic	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Commercial District – West End	High	Economic	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Long Beach Boulevard Gateway Area	Extreme	Economic	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Haas Pavilion	Extreme	Health and Social Services	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Hannah and Isidore Komanoff Pavilion	Extreme	Health and Social Services	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Long Beach Medical Center	Extreme	Health and Social Services	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	3	4	4	48
Morgan Stern Pavilion	Extreme	Health and Social Services	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36



Table V-8: Community Asset Inventory - Long Beach Assets, Landscape Attributes, and Risk Assessment Scores (Continued)

ASSET INFORMATION						LANDSCAPE ATTRIBUTES							RISK ASSESSMENT			
Asset	Risk Area	Asset Class	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate ⁽¹⁾	Beach Width ⁽²⁾	Shore Defenses ⁽³⁾	Protective Vegetation ⁽⁴⁾	Dunes or Bluffs ⁽⁵⁾	Soils ⁽⁶⁾	Landscape Attribute Score ⁽⁷⁾	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Long Beach Bus Garage/Vehicle Maintenance	Extreme	Infrastructure Systems	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36
Public Works Facility	High	Health and Social Services	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	3	3	27
Long Beach Boulevard Bridge	Extreme	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	4	4	48
Long Island Railroad Station	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Major Arterial - Beech Street	High	Infrastructure Systems	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Major Arterial - Broadway	High	Infrastructure Systems	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Major Arterial - Park Avenue	High	Infrastructure Systems	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Water Pollution Control Plant	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	5	45
Water Purification Plant	Extreme	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	4	5	60
Pump/Lift Station	Extreme	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	4	4	48
Pump/Lift Station	Extreme	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	4	4	48
Pump/Lift Station	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Pump/Lift Station	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Pump/Lift Station	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Well	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Well	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Power Supply Infrastructure	High	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	3	5	45
Stormwater Management System	Extreme	Infrastructure Systems	No	No, locally significant	High	No	No	Yes	Yes	Yes	Yes	2	3	4	4	48
Williams/Transco High Pressure Gas Pipeline	High	Infrastructure Systems	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	3	4	36
Foundation Block	Extreme	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	3	4	2	24
Superblock	Extreme	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	3	4	2	24



Table V-8: Community Asset Inventory - Long Beach Assets, Landscape Attributes, and Risk Assessment Scores (Continued)

ASSET INFORMATION						LANDSCAPE ATTRIBUTES							RISK ASSESSMENT			
Asset	Risk Area	Asset Class	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate ⁽¹⁾	Beach Width ⁽²⁾	Shore Defenses ⁽³⁾	Protective Vegetation ⁽⁴⁾	Dunes or Bluffs ⁽⁵⁾	Soils ⁽⁶⁾	Landscape Attribute Score ⁽⁷⁾	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
North Shore Brownfield Site	Extreme	Economic	No	No	High	No	No	Yes	Yes	Yes	Yes	2	3	4	2	24
Reynolds Channel	Extreme	Natural and Cultural Resources	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	3	4	3	36

(1) Erosion rate: Long-term average erosion rate ≥1 foot per year or unknown

(2) Beach width: Waterline frequently at shore defense or upland vegetation

(3) Shore defenses: Absent, not constructed to anticipated conditions, or deteriorating

(4) Protective vegetation: Dense, healthy vegetation, wetlands between asset and flood source absent

(5) Dunes or bluffs: Dunes absent, below BFE, discontinuous, eroding; Bluff slope unstable, little vegetation

(6) Soils: Asset on coastal barrier island or filled wetland

(7) Landscape attribute score: "Yes" = +0.5



Risk Score Interpretation

		100-year event (Hazard score = 3)				
Exposure	5	15	30	45	60	75
	4.5	13	27	40.5	54	67.5
	4	12	24	36	48	60
	3.5	10.5	21	31.5	42	52.5
	3	9	18	27	36	45
	2.5	7.5	15	22.5	30	37.5
	2	6	12	18	24	30
	1.5	4.5	9	13.5	18	22.5
	1	3	6	9	12	15
	0.5	1.5	3	4.5	6	7.5
		1	2	3	4	5
Vulnerability						

Risk Category	100-year Event Risk Score	500-year Event Risk Score	Comment
Severe	>53	>70	Risk scores in this category occur only if one of the two factors, exposure or vulnerability, is rated 5, and the other is 4 or higher; this could represent that the asset is in a dangerous situation. Both exposure and vulnerability should be reduced, if possible. Consider relocation a priority option for these assets.
High	24 – 53	32 – 70	Risk scores in this category are indicative of conditions that could lead to significant negative outcomes from a storm. Using the risk scoring system, a total of 24 (or 32 for the 500-year event) can only be achieved if the vulnerability is 4 and exposure is 2, or vice versa. A vulnerability of 4 indicates the likely loss of service of an asset for an extended period of time. For many assets this may be unacceptable. Actions should be taken to reduce vulnerability, such as elevating or floodproofing the asset, to help avoid a long-term loss of function. A score of 4 for exposure indicates most of the local landscape attributes that help reduce storm damages are absent. Actions to restore landscape attributes may be appropriate. All other risk scores higher than 24 (or 32 for the 500-year event) indicate either the exposure or the vulnerability, or both, are higher than the conditions discussed above, lending more weight to the need to take actions that reduce risk. Relocation may be necessary in the future if other means of adaptation or management actions are not effective.
Moderate	6 – 23	8 – 31	Risk scores in this category pose moderate to serious consequences, but adaptation may be of lower priority due to one factor, exposure or vulnerability, remaining relatively low. Use a combination of measures to reduce exposure and/or vulnerability.
Residual	<6	<8	Risk scores in this category occur when both exposure and vulnerability are relatively low. This situation suggests floods would pose minor or infrequent consequences. However, a vulnerability score of 3 may not be acceptable for critical facilities or high community value assets, because the community cannot afford to be without these services, event on an infrequent basis. Note that risk is never completely eliminated. Some residual risk still remains even after management measures have been implemented. Monitor conditions and adapt as necessary.



E. Endnotes

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F. Glossary

A & E – Architectural & Engineering

BFE – Base flood elevation

CBA – Cost-benefit analysis

CDBG-DR – Community Development Block Grant – Disaster Recovery

CRS – Community Rating System

DOS – Department of State

DOT – Department of Transportation

FEMA – Federal Emergency Management Agency

GIS – Geographic Information System

HUD – Department of Housing and Urban Development

HCVP – Housing Choice Voucher Program

IT – Information Technology

LIREDC – Long Island Regional Economic Development Council

LMI – Low- and moderate-income

LID – Low Impact Development Plan

LIPA – Long Island Power Authority

LIVOAD – Long Island Voluntary Organizations Active in Disaster

LWRP – Local Waterfront Revitalization Program

MLK – Martin Luther King, Jr.

MOU – Memorandum of Understanding

NDRF – National Disaster Recovery Framework

NET – Neighborhood Emergency Team

NFIP – National Flood Insurance Program

NYRCR – NY Rising Community Reconstruction Program

NYS – New York State

NYSERDA – New York State Energy Research and Development Authority

NYS DOS – New York State Department of State

OEM – Office of Emergency Management

PSEG – Public Service Electric and Gas Company

SFHA – Special Flood Hazard Area

STP – Sewage Treatment Plant

TIGER – U.S. DOT Transportation Investment Generating Economic Recovery

TOD – transit-oriented development

TOH – Town of Hempstead

USACE – U.S. Army Corps of Engineers

USGS – U.S. Geological Survey





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