

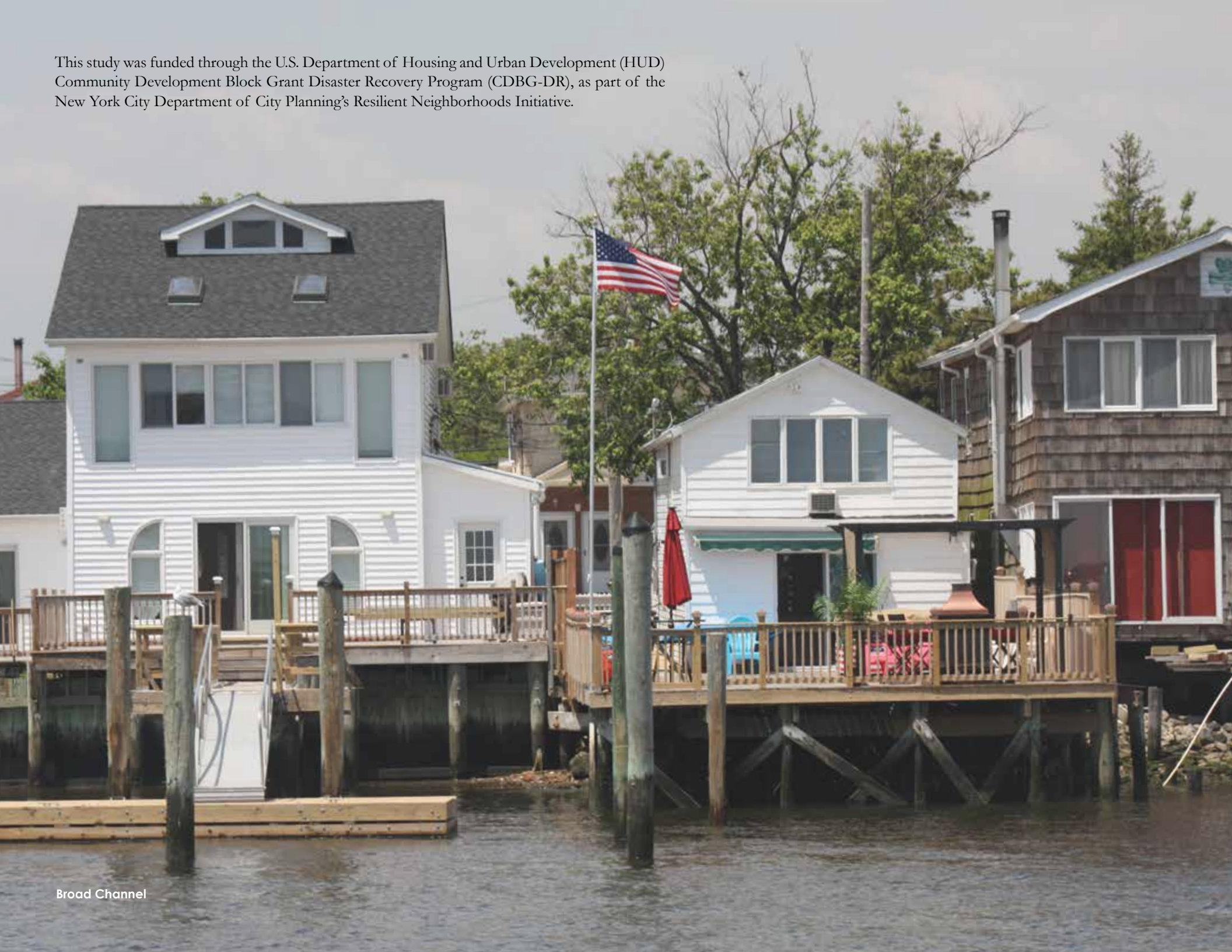
Resilient Neighborhoods

# Old Howard Beach Hamilton Beach Broad Channel





This study was funded through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant Disaster Recovery Program (CDBG-DR), as part of the New York City Department of City Planning's Resilient Neighborhoods Initiative.



Broad Channel

Resilient Neighborhoods

# Old Howard Beach Hamilton Beach Broad Channel

THE CITY OF NEW YORK  
MAYOR BILL DE BLASIO

DEPARTMENT OF CITY PLANNING  
CARL WEISBROD, DIRECTOR

DECEMBER 2016  
[www.nyc.gov/resilientneighborhoods](http://www.nyc.gov/resilientneighborhoods)

# FOREWORD

Old Howard Beach, Hamilton Beach, and Broad Channel are waterfront communities on the shorelines of Jamaica Bay in southern Queens. This waterfront setting is one of the main reasons generations of families choose to live in these neighborhoods, but it is also what makes them vulnerable to flooding, a vulnerability likely to increase in the future due to climate change.

Hurricane Sandy starkly demonstrated the hazards facing New York City's coastal neighborhoods, like Old Howard Beach, Hamilton Beach, and Broad Channel. The storm also highlighted these communities' resilience—their ability to bounce back from the storm and to strengthen themselves for the next one.

Since the storm, the New York City Department of City Planning (DCP) has been working at both citywide and local levels with communities and other agency partners to increase the resiliency of all five boroughs' coastal neighborhoods. Our work includes a citywide Flood Resilience Zoning Text Amendment that changes zoning in the floodplain to make it easier and more cost-effective for property owners to retrofit buildings. We have also produced guidelines, such as *Retrofitting Buildings for Flood Risk* and *Urban Waterfront Adaptive Strategies*, that help designers, planners, and residents plan for and adapt to the risks of flooding.

As a complement to these citywide efforts, DCP has been working with various communities in all five boroughs where there was particularly heavy damage from Sandy or where substantial flood risk still exists. DCP's Resilient Neighborhoods, an initiative funded by the U.S. Department of Housing and Urban Development, focuses on areas that present specific land use, zoning and resiliency issues that cannot be fully addressed by citywide zoning changes or guidelines.

This report marks the culmination of over two years of research, outreach, and hard work by DCP, working closely with the communities of Old Howard Beach, Hamilton Beach, and Broad Channel. The goal of this work is to reduce flood risk by planning for adaptation over time in the most vulnerable areas, and to encourage development in other areas that is both resilient and respectful of the neighborhood's built environment. Residents will find here recommendations for updating specific zoning and land use regulations, and for investment in coastal infrastructure and other programs.

These recommendations illustrate the importance and effectiveness of strengthening New York City's resiliency through place-based planning, alongside the other city, state, and federal agency projects. This plan is the beginning of a conversation and a commitment to work with Old Howard Beach, Hamilton Beach and Broad Channel to ensure their ongoing vibrancy and resiliency.



**Carl Weisbrod, Director**  
Department of City Planning



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# EXECUTIVE SUMMARY

Hurricane Sandy's devastating impacts on neighborhoods within New York City served as a vivid reminder of the city's vulnerability to coastal storms and flooding. With climate change, storms like Sandy are expected to increase in frequency and severity in the future, putting New Yorkers living and working near the waterfront at even greater risk. Yet, as Sandy also demonstrated, resilient building design can significantly reduce the damage caused by flooding and enable homes and businesses to be reoccupied sooner. By combining resilient building with thoughtful land use planning and strategic investment in infrastructure, the city can adapt to challenging environmental conditions over time and create neighborhoods that are both vibrant under ordinary conditions and able to withstand, and recover quickly from, future floods.

Resilient Neighborhoods is a place-based planning initiative, led by the NYC Department of City Planning in collaboration with communities and other agencies, to identify strategies to support the vitality and resiliency of ten neighborhoods in the city's floodplain. This report focuses on the southern Queens neighborhoods of Old Howard Beach, Hamilton Beach, and Broad Channel. These neighborhoods have a concentration of small houses on narrow lots, which pose challenges for elevating or floodproofing to federal standards for floodplain construction. In addition to facing hazards from storm surge, parts of these neighborhoods already experience periodic tidal flooding of streets, a condition likely to become more severe over time with projected sea level rise. This study makes recommendations for reducing the long-term vulnerabilities these neighborhoods will face. Recommendations include zoning changes to reduce density in the most vulnerable areas, coordinating with City capital agencies on potential infrastructure upgrades, and aligning resiliency, land use, and other policy goals to be responsive to long-term risks associated with tidal flooding.

This report's recommendations for Old Howard Beach, Hamilton Beach, and Broad Channel have been guided by three primary goals:

## Reducing flood risk

Provide zoning changes that enable property owners to invest in improvements to make residential and commercial buildings more resilient to flooding, particularly on narrow or shallow lots where efforts to elevate, retrofit, and rebuild are constrained by existing zoning. While post-Sandy zoning amendments have provided some flexibility on a temporary basis, a longer term solution is needed.

## Planning for adaptation over time

Ensure that land use regulations do not encourage growth in areas vulnerable to sea level rise through a special zoning designation. This designation would limit future development to low-density buildings that are consistent with each neighborhoods' flood risk and character.

## Creating resilient, vibrant neighborhoods

Advance coastal protection strategies and other investments to reduce impacts from flooding in targeted areas, bolster the resilience of businesses through preparedness outreach, and identify opportunities for alternative uses of vacant City-owned property in the most vulnerable areas.

In addition, this report provides a detailed description of the outreach, research, and analysis conducted, as well as an overview of the planning framework and regulatory context for these efforts. A glossary of key terms is provided on page 40.

The recommendations outlined in this report include specific actions to be undertaken in the near-term and mid-term, as well as ongoing strategies in response to evolving risks and changing conditions, in order to promote equity, livability, and safety.





Hawtree Basin



# INTRODUCTION

## Resiliency Planning in New York City

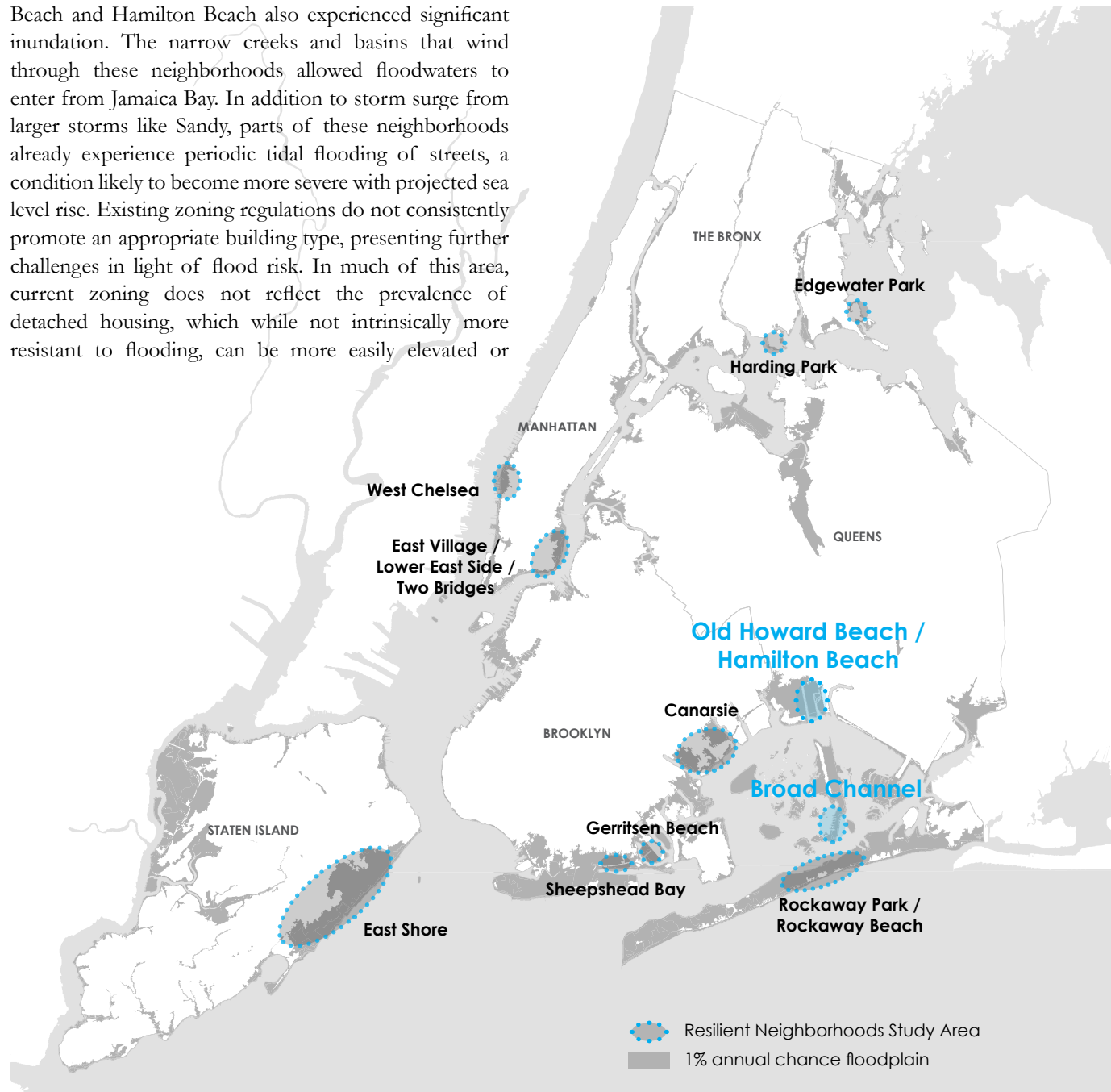
Following Hurricane Sandy in October 2012, the City developed *A Stronger, More Resilient New York*, which laid out a detailed action plan for rebuilding post-Sandy and making the city's coastal communities, buildings, and infrastructure more resilient in the long-term. The City has made significant progress implementing the plan, including funding a \$20 billion climate resiliency program, advancing housing recovery through the Build it Back program, and making long-term resiliency a reality by investing in infrastructure upgrades. Drawing on this work and earlier planning efforts, the City released in Spring 2015 *OneNYC: The Plan for a Strong and Just City*, a long-term strategy to address the city's most pressing challenges, including a rapidly growing population, rising inequality, aging infrastructure, and climate change.

## Resilient Neighborhoods

One of the projects described in *OneNYC* is Resilient Neighborhoods, a place-based planning initiative to identify tailored strategies, including zoning and land use changes, to support the vitality and resiliency of communities in New York City's floodplain. Based on collaboration with residents, stakeholders, elected officials, and other City agencies, the initiative focuses on ten study areas located in all five boroughs that represent a variety of demographic and built conditions. The NYC Department of City Planning (DCP) identified these study areas because they present specific land use, zoning, and other resiliency issues that cannot be fully addressed by citywide zoning changes.

In southern Queens, the Old Howard Beach, Hamilton Beach, and Broad Channel neighborhoods were chosen not only because they were among the city's hardest-hit neighborhoods during Hurricane Sandy, but also because of the unique challenges they face. Broad Channel, sitting at a low elevation in the middle of Jamaica Bay, suffered from Hurricane Sandy's surge, which spread large volumes of water throughout the neighborhood. Old Howard

Beach and Hamilton Beach also experienced significant inundation. The narrow creeks and basins that wind through these neighborhoods allowed floodwaters to enter from Jamaica Bay. In addition to storm surge from larger storms like Sandy, parts of these neighborhoods already experience periodic tidal flooding of streets, a condition likely to become more severe with projected sea level rise. Existing zoning regulations do not consistently promote an appropriate building type, presenting further challenges in light of flood risk. In much of this area, current zoning does not reflect the prevalence of detached housing, which while not intrinsically more resistant to flooding, can be more easily elevated or





otherwise retrofitted without the need for coordination and cooperation of multiple property owners. In the longer term, provisional zoning changes need to be made permanent to allow residences on small lots constrained by yard regulations to undertake retrofits.

The Old Howard Beach, Hamilton Beach, and Broad Channel study represents a collaboration between DCP, the Mayor's Office, and other City agencies, including the Mayor's Offices of Recovery and Resiliency and Housing Recovery Operations; the NYC Economic Development Corporation; and the Departments of Transportation, Environmental Protection, Citywide Administrative Services, and Parks and Recreation. In addition, the process built on public input previously generated through other initiatives, such as New York State's Community Reconstruction Program and the Queens Borough President's Hurricane Sandy Task Force.



Houses adjacent to the creek in Ramblersville, Hamilton Beach



Houses abutting Jamaica Bay in Broad Channel

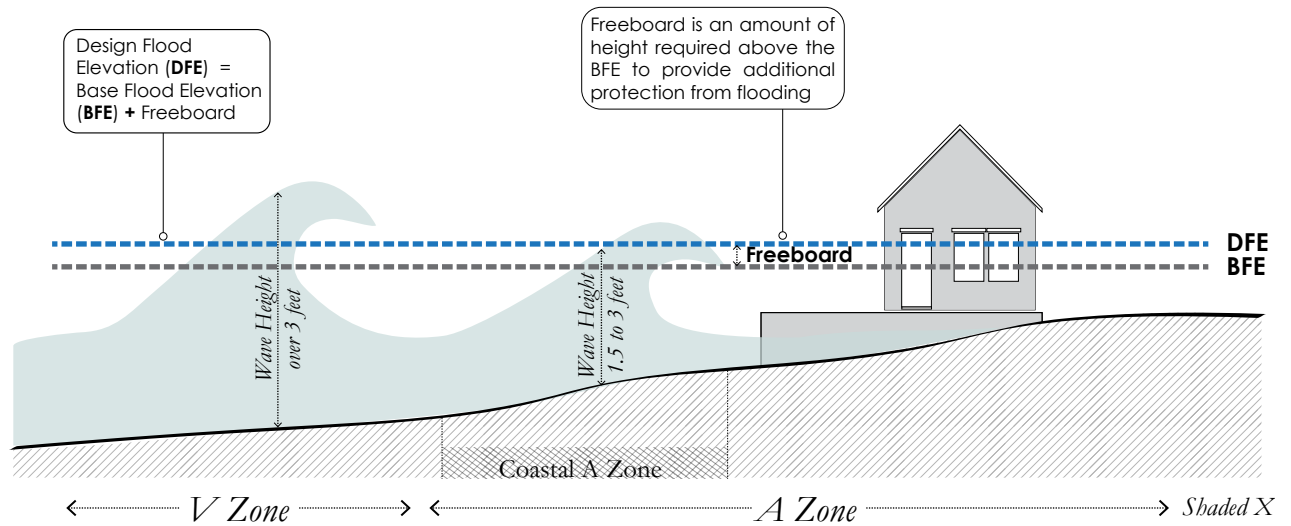
## Regulatory Context

A wide array of programs and regulations at various levels of government shape the City's approach to managing flood risk and promoting resilient development. In the United States, floodplain regulation begins with Flood Insurance Rate Maps (FIRMs), which the Federal Emergency Management Agency (FEMA) creates and maintains. The maps show the extent and elevation to which flood waters are expected to rise during a 100-year flood or a flood that has a 1% chance of occurring in any given year. The elevation of the expected 1% annual chance flood is called the Base Flood Elevation or BFE. FIRMs also show the 500-year or 0.2% annual chance floodplain, which is shown as the Shaded X Zone.

The 1% annual chance floodplain is divided into three areas—the V Zone, Coastal A Zone, and A Zone—each associated with a different degree of flood risk. The diagram to the right illustrates these zones and the types of flood risk in each.

The 1% annual chance floodplain is also the area where property owners with federally-regulated or federally-insured mortgages are required to carry flood insurance. For residential structures, flood insurance premiums under FEMA's National Flood Insurance Program (NFIP) are determined by the relationship between the lowest occupied floor of the structure and the BFE shown on the FIRMs at the structure's location, as well as other factors. Houses built before the FIRMs were established have historically been offered subsidized insurance rates. However, due to recent federal legislative changes, those subsidized rates are gradually increasing to come in line over time with actuarial rates more closely reflecting the flood risk a home faces.

For the past several years, FEMA has been in the process of updating the FIRMs for NYC, which were implemented in 1983 and most recently updated in 2007. As part of the mapping update, FEMA issued updated



	ELEVATE	WET FLOODPROOF	DRY FLOODPROOF
	Open structure Eg. Open lattice	Water to run in / run out Eg. Flood vents	Watertight structure Eg. Flood shields
Ground Floor Configuration	<p>Open Structure</p> <p>Bottom of <u>lowest horizontal structural member</u> to be at or above Design Flood Elevation</p>	<p>1 inch of net open area per 1 sq.ft of enclosed area</p> <p><u>Lowest occupiable floor</u> to be at or above Design Flood Elevation</p>	<p>Flood shields prevent water from entering</p> <p><u>Lowest occupiable floor</u> allowed to be excavated below grade. (Not permitted for residential buildings)</p>
Permitted Uses (BELOW DFE)	<input checked="" type="checkbox"/> Parking <input checked="" type="checkbox"/> Access <input checked="" type="checkbox"/> Storage <input checked="" type="checkbox"/> Non-Residential <input checked="" type="checkbox"/> Residential	<input checked="" type="checkbox"/> Parking <input checked="" type="checkbox"/> Access <input checked="" type="checkbox"/> Storage <input checked="" type="checkbox"/> Non-Residential <input checked="" type="checkbox"/> Residential	<input checked="" type="checkbox"/> Parking <input checked="" type="checkbox"/> Access <input checked="" type="checkbox"/> Storage <input checked="" type="checkbox"/> Non-Residential <input checked="" type="checkbox"/> Residential



Preliminary FIRMs (PFIRMs) in December 2013 with another revision in January 2015. In most places, the 2015 PFIRMs show an expanded 1% annual chance floodplain. The maps also increase BFEs for much of the city. The City found inaccuracies in FEMA's underlying analysis that resulted in overstating the size of the city's current 1% annual chance floodplain. Following a successful appeal of the PFIRMs, NYC is working with FEMA to create a set of new flood maps for the city. There will be one map for insurance purposes based on current flood risk, and another for planning purposes that incorporates climate change. In the meantime, the 2015 PFIRMs remain in use for building code, planning, and zoning, as described below, while flood insurance still refers to the 2007 FIRMs.

### **Flood Resilient Construction and Building Design**

The primary purpose of the FIRMs is to establish parameters for NFIP, based on present-day flood risk. However, the same maps also establish where federal minimum standards for flood resistant construction apply. These standards are enacted through the NYC Building Code's Appendix G on "Flood-Resistant Construction," which as of 2013 applies to the 1% annual chance floodplain shown on FEMA's 2015 PFIRMs or the 2007 FIRMs, whichever of the two is more restrictive. Appendix G includes different elevation and floodproofing requirements for each flood zone, as well as separate requirements for residential and non-residential structures. Appendix G also includes rules requiring that most residential and commercial developments be floodproofed an additional one or two feet of "freeboard" above the FEMA-designated BFE. The elevation of the BFE plus freeboard is called the Design Flood Elevation (DFE).

To fully comply with Appendix G requirements, residential buildings must elevate all living space to be at or above the DFE, and any enclosed space below the DFE must be

wet floodproofed. Non-residential buildings (any building that contains non-accessory, non-residential floor area) have the option of elevating and wet floodproofing, or dry floodproofing. Where there is a mix of residential and non-residential uses, dry floodproofing is allowed, but no dwelling units may be located below the DFE. Full compliance with Appendix G results in lower NFIP premiums.

Buildings that are neither new, "Substantially Damaged," nor "Substantially Improved" (see glossary of key terms on page 40) are not required to meet Appendix G requirements as long as any changes to the building do not increase the level of noncompliance, but owners may voluntarily choose to implement partial flood mitigation strategies including elevating or floodproofing a building's mechanical systems. These measures may not currently result in lower NFIP premiums, but will reduce a building's overall vulnerability to future floods and enable the building to be reoccupied more quickly after a flood.

### **Citywide Zoning for Flood Resiliency**

The City has instituted a series of zoning changes that remove impediments to retrofitting residential and commercial properties and accommodate many of the aforementioned building regulations. The first of these changes was an emergency Executive Order, issued in January 2013, which suspended height and other restrictions to the extent necessary for property owners to rebuild after Sandy. Many of these provisions, plus additional regulation, were included in a subsequent zoning text amendment to make the emergency order part of the City's legislation. The 2013 Flood Resilience Zoning Text Amendment amendment created allowances for measuring building height from the latest FEMA flood elevations (including freeboard required by building code), providing access from grade to elevated buildings, locating mechanical systems above flood levels, accommodating off-street parking requirements, and

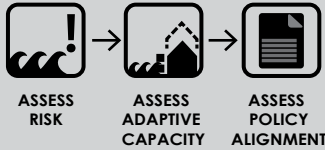
### **Regulatory Context Summary**

- The Federal Emergency Management Agency (FEMA) creates Flood Insurance Rate Maps (FIRMs) that show the extent and elevation of the 1% and 0.2% annual chance floodplains.
- FEMA also administers the National Flood Insurance Program (NFIP).
- The New York City Building Code's Appendix G on Flood-Resistant Construction applies within the 1% annual chance floodplain.
- The Department of City Planning works to create zoning, which controls the size and use of buildings, to accommodate flood resilient building regulations and remove impediments to flood resilient construction.

allowing reallocation of floor space that is abandoned and wet floodproofed. It also incorporated provisions to mitigate adverse streetscape impacts. The rules, now part of the Zoning Resolution, remain in effect and apply to all buildings in the PFIRM 1% annual chance floodplain.

The 2013 text amendment was conducted as an emergency measure to facilitate ongoing rebuilding and retrofitting following Sandy, and included a sunset provision, so, in absence of further action, will expire a year after new flood maps are adopted by the City. DCP anticipates advancing another amendment that will make permanent the basic provisions set forth in the 2013 text, and potentially address resiliency challenges identified since then, to make it easier for property owners to make

## RESILIENCY ASSESSMENT



The resiliency assessment evaluates coastal risks, the capacity of neighborhoods to adapt to these risks, and the potential to align adaptation options with other policy goals or community priorities. The objective is to determine which hazards and vulnerabilities are present within a neighborhood and evaluate the potential for adaptive strategies, such as retrofitting buildings or creating new coastal protection infrastructure, to reduce these vulnerabilities.

Ongoing community outreach

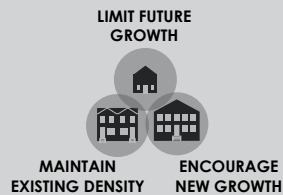
## ESTABLISH RESILIENCY FRAMEWORK



The resiliency framework uses the results of the resiliency assessment to envision the range of changes necessary to make the neighborhood more resilient, which might include coastal protection, infrastructure investments, changes to regulations, and community education, among other strategies.

Ongoing community outreach

## SELECT LOCAL RESILIENT LAND USE STRATEGIES



Across the city, there is a spectrum of potential land use strategies that can be used as appropriate to achieve the goals envisioned in the resiliency framework. In areas that are at significant risk from future frequent tidal flooding due to sea level rise, as well as more severe flooding from extreme events, it will often make sense to limit growth. In other areas where buildings are at risk of flood damage primarily from extreme events, there may be ways to alter regulations to promote retrofits. Where growth can be supported, increasing densities may promote investment in resilient buildings that will reduce risks of flood damage. More than one type of land use strategy may be appropriate in different parts of a neighborhood, based on flood risk and other planning considerations.

Ongoing community outreach

## IMPLEMENT RESILIENCY STRATEGIES



Resiliency strategies can be implemented through a range of tools, including but not limited to zoning changes, changes to other City, State, or Federal regulations, operational measures, education and outreach, financial assistance, construction or upgrades of infrastructure, and emergency preparedness training. A combination of tools enacted at different scales and amongst different stakeholders is likely to be necessary to fully implement a set of resiliency strategies.

existing and new buildings resilient to current and future flood risks, while supporting the vibrancy and character of neighborhoods.

## Coastal Zone Management

The Waterfront Revitalization Program (WRP) is the City's principal Coastal Zone Management tool. The WRP establishes the City's policies for development in the Coastal Zone, a geography defined by legislation that includes the floodplain, as well as other areas that have some relationship with the waterfront. City, State, or Federal discretionary actions within NYC's Coastal Zone must be reviewed for consistency with the WRP. This includes zoning changes, infrastructure projects, and funding. Revisions to the WRP approved in 2016 require that all projects take sea level rise projections into consideration.

## Planning Approach for Resiliency

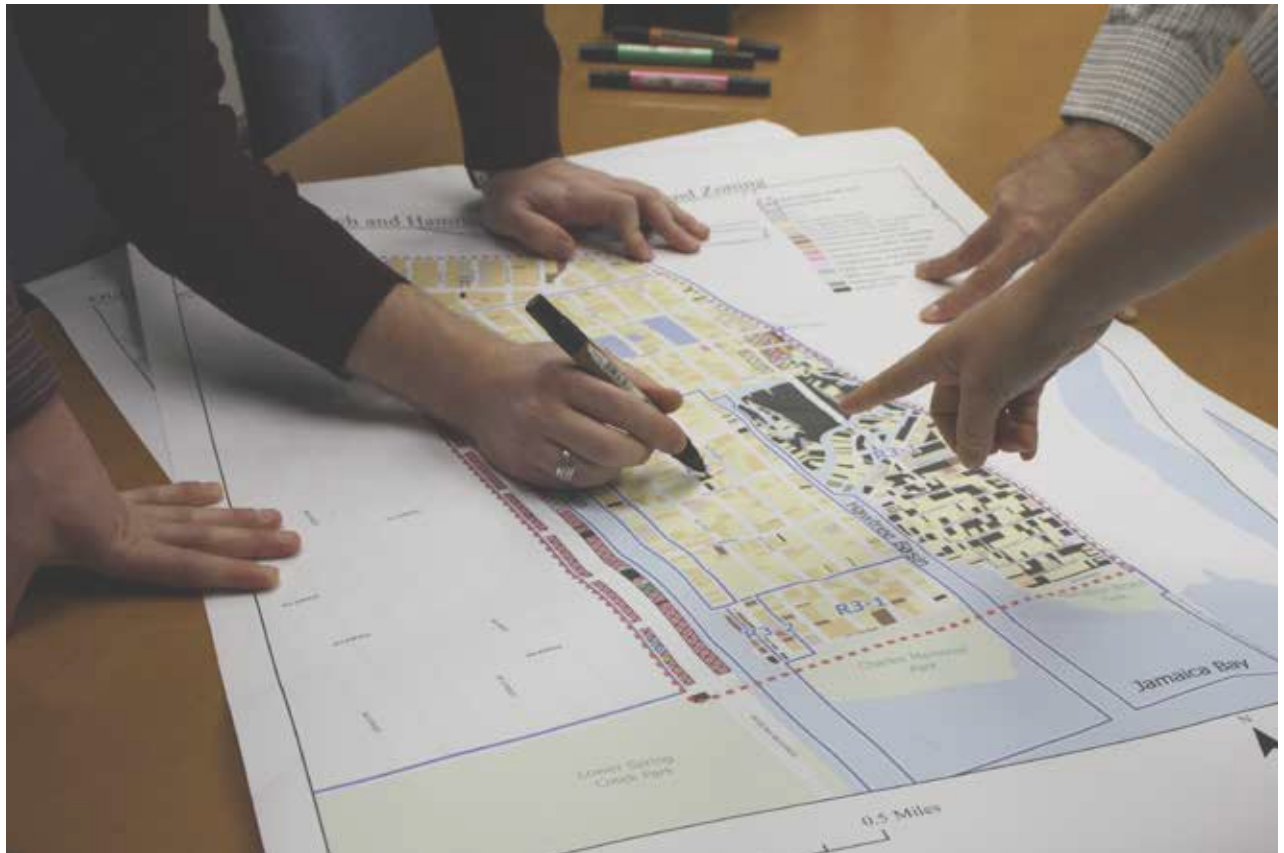
Each of the ten Resilient Neighborhoods study areas exhibits a variety of physical, environmental, social, and economic conditions and community perspectives, the combination of which creates a distinct set of resiliency challenges and different potential strategies for addressing them. To account for this diversity of contexts and to ensure that a consistent planning approach underpins the City's resilient land use goals, DCP developed a four-step process for coordinated analysis to guide risk-based decision-making, as shown in the diagram to the left. The latter half of this report details the strategies and recommendations generated using this process.

## Summary of Outreach Process

DCP worked closely with members of the community to analyze the flood risks and resiliency challenges that Old Howard Beach, Hamilton Beach, and Broad Channel face. The result of this outreach process was a series of recommendations for how to create a more resilient future for each neighborhood.

Stakeholders formed a community advisory committee that met five times from fall 2014 through spring 2016. The committee was comprised of representatives from Queens Community Boards 10 and 14, New Hamilton Beach Civic Association, Broad Channel Civic Association, Howard Beach-Lindenwood Civic Association, and area business owners selected in consultation with the New York City Councilmember for District 32, as well as other local elected officials and their staff.

The committee discussed issues involving zoning, infrastructure, and future tidal flooding. At one meeting, DCP presented its analysis of residential and commercial zoning constraints and potential solutions. At another meeting, the NYC Departments of Transportation, Environmental Protection, and Parks and Recreation discussed infrastructure challenges and opportunities in these neighborhoods. The Mayor's Office of Recovery and Resiliency described the vulnerability of these neighborhoods by presenting the NYC Panel on Climate Change (NPCC) sea level rise projections and how future tidal flooding may result in infrastructure retrofits that are more costly and difficult. Through these discussions, the committee helped shape the recommendations that are outlined in this report. In particular, they provided local knowledge and context on flood-related challenges in the study area, and gave input on land use strategies that they believed would be most appropriate in each neighborhood.



Community members review the existing zoning in Howard Beach during a stakeholder meeting

Additional input was gathered at presentations to Community Boards 10 and 14 as well as local civic groups, which were open to the public. DCP gave presentations at meetings hosted by the New Hamilton Beach Civic Association in September 2015 and January 2016 and also to the Broad Channel Civic Association in October 2015. At these meetings, DCP presented draft recommendations to the larger community and gathered feedback on the study.



# COMMUNITY RISK PROFILE

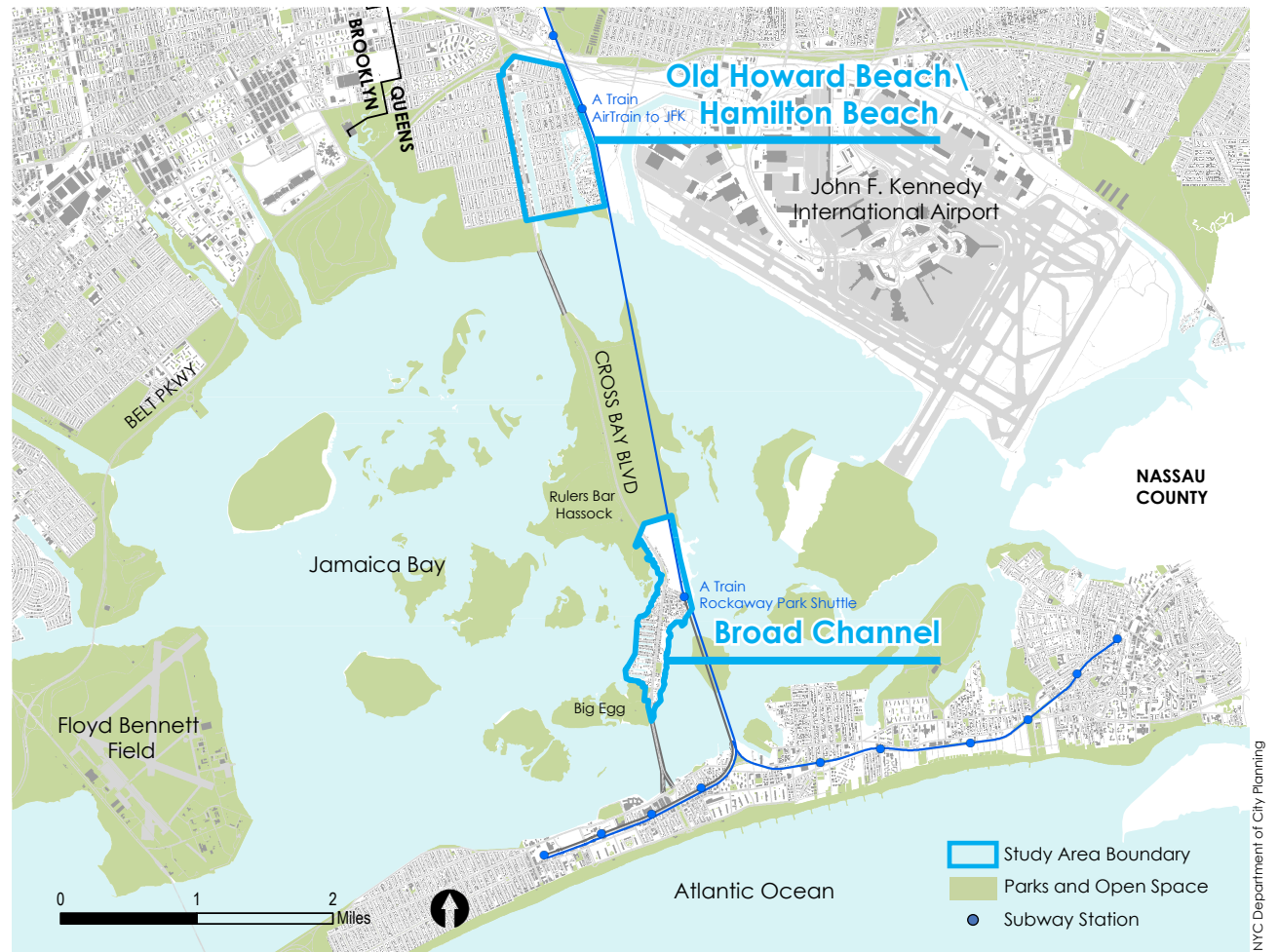
## Community Character and History

Old Howard Beach, Hamilton Beach, and Broad Channel are three waterfront neighborhoods in southern Queens that have long enjoyed the natural and recreational benefits that Jamaica Bay provides. However, with the proximity of these communities to the Bay comes a range of flood-related challenges that must be addressed in order to limit their vulnerabilities.

## Old Howard Beach and Hamilton Beach

Old Howard Beach and Hamilton Beach are located to the north of Jamaica Bay within Community District 10 in Queens. This portion of the study area is generally bounded by the Belt Parkway to the north, the Metropolitan Transit Authority (MTA) A-train tracks to the east, Jamaica Bay to the south, and the Cross Bay Boulevard commercial corridor to the west. These neighborhoods are physically divided from adjacent communities by two canals: Shellbank Basin and Hawtree Basin, which are lined with private docks for recreational boating. The MTA A train and AirTrain shuttle to John F. Kennedy International Airport share a station located at Coleman Square just north of Hamilton Beach. This portion of the study area is comprised of ninety-nine blocks, a population of approximately 7,300 residents, and 2,300 buildings, the majority of which are one- and two-family residences.

The history of these communities can be traced back to the 1880s when fishermen's shacks were built near Hawtree Creek and Jamaica Bay. The area was established as a year-round community with the introduction of the Long Island Rail Road line to Rockaway Beach. Hamilton Beach is located east of Hawtree Basin and includes Ramblersville, a small community located adjacent to the 102nd Street bridge. Ramblersville was originally comprised of shacks and residences connected by a wooden boardwalk that was known to flood at high tide. William J. Howard developed Howard Beach during



Study Area Context

the early 1900s between Hawtree and Shellbank Basins by dredging and filling in land, laying out streets, and installing gas and water mains. Sand dredged from the marsh to create Shellbank Basin was dumped to the west, raising the land that today keeps Cross Bay Boulevard from flooding during high tide. Cross Bay Boulevard continued to develop through the 1960s and 1970s until it became the regional commercial corridor it is today, with restaurants, health services, and other small businesses. The current mapped width of the right of way is 110 feet

and serves as an important connection to Broad Channel and the Rockaway Peninsula. A major difference between the two communities is infrastructure. While Old Howard Beach has had sanitary sewers since the 1960s and a partial storm sewer system since the 1970s, Hamilton Beach residents relied on private septic systems to store wastewater until 1995, when the City expanded its sewer system. The only storm sewer in the area today is under 164th Drive.

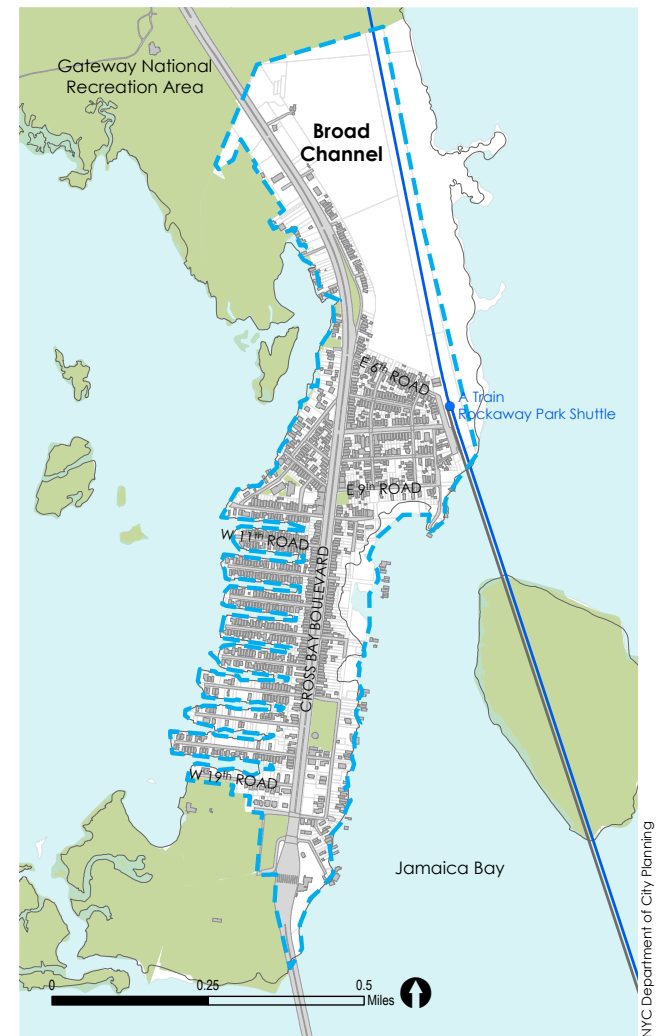


Old Howard Beach and Hamilton Beach Study Area




### Broad Channel

Broad Channel is an island located on Big Egg Marsh in the middle of Jamaica Bay, adjacent to the Gateway National Recreation Area, and accessible by only one through road, Cross Bay Boulevard. It also has a train station for the A train and the Rockaway Park shuttle. It is part of Community District 14 in Queens, which also includes the Rockaways. Broad Channel has a total population of nearly 2,500 residents, and it contains fifty-six blocks and approximately 1,000 buildings, the vast majority of which are single-family residences.

Broad Channel was originally a summer getaway in the late 1800s for New Yorkers who built small houses on stilts on two islands, Rulers Bar Hassock and Big Egg Marsh. The neighborhood was formally settled in 1914 by the Broad Channel Development Corporation, which built streets and boardwalks, filled in marshland, laid water mains, and installed fire hydrants. The neighborhood thrived, despite the collapse of the fishing industry due to pollution in the bay, and during Prohibition served as a remote location for speakeasies. In the 1930s, Broad Channel became a year-round community following the construction and widening of Cross Bay Boulevard. NYC became the official landowner in 1939 after the Broad Channel Development Corporation declared bankruptcy. Though the City initially made attempts to remove residents from the land when the City-owned leases were set to expire to make way for other plans—including a 1962 proposal for converting the area to recreational land uses—an agreement was reached in 1982 for residents to purchase the properties back from the City. The area, however, lacked complete infrastructure to support the year-round community, resulting in untreated sewage from cesspools flowing into Jamaica Bay, which the City’s Health Department declared a health nuisance. In addition, the area experienced difficulties accessing certain streets during flood events. Streets that had not been raised to legal grade allowed flood water onto properties,



Broad Channel Study Area

-  Study Area Boundary
-  Parks and Open Space
-  Subway Station

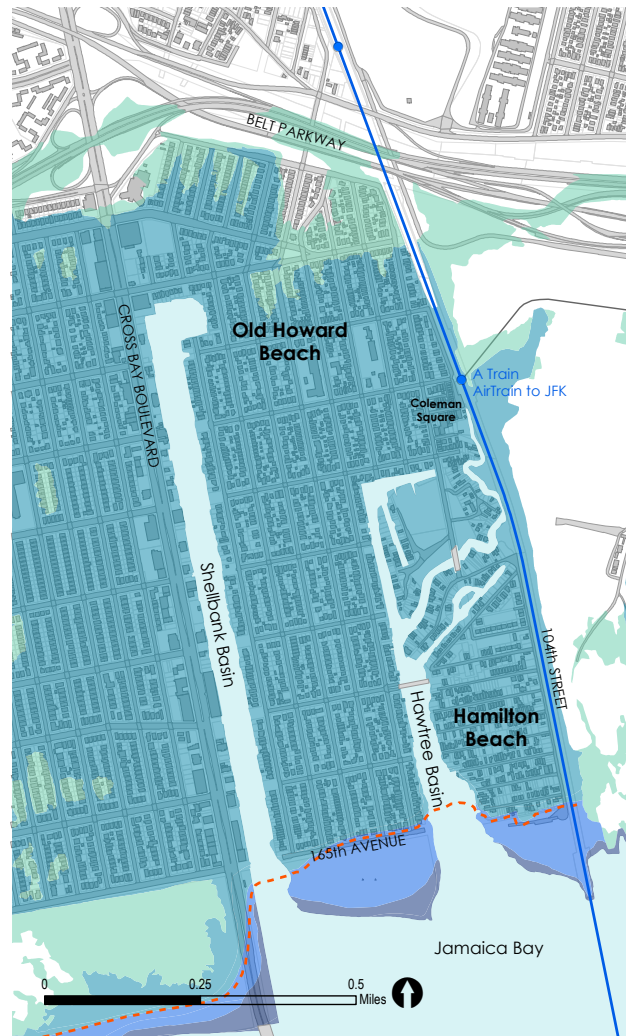
a condition that persists today. Sanitary sewers were installed between 1988 and 1998. Current capital plans for bulkheads and raised street reconstruction on West 11th through 19th Roads are expected to reduce the severity of current street flooding that occurs twice a month during spring high tide periods, but cannot address longer-term flood risks.



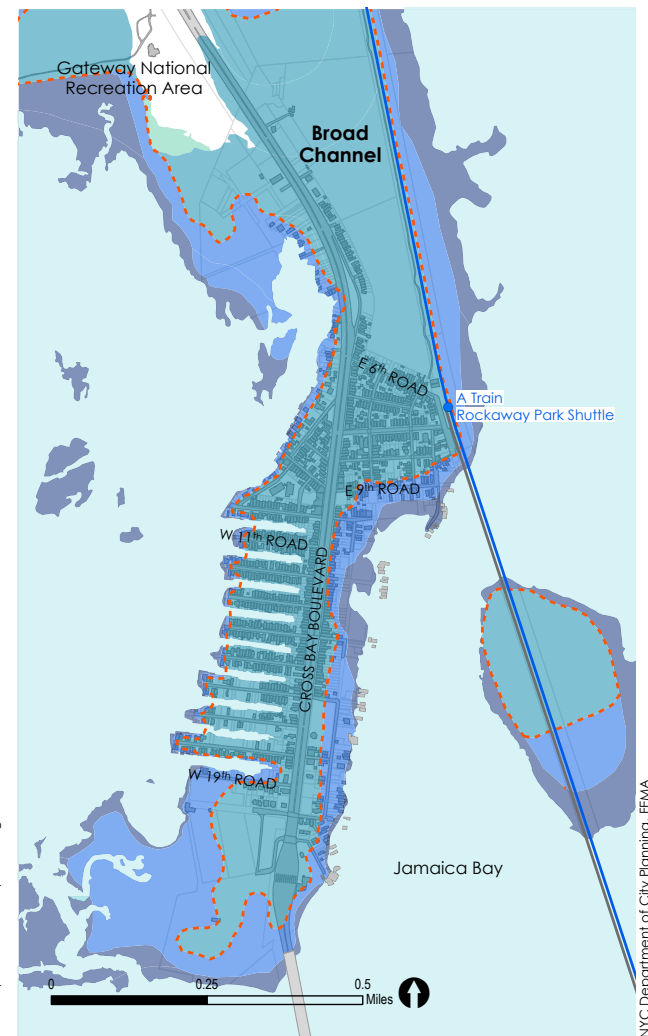
## Flood Risk Profile

Old Howard Beach, Hamilton Beach, and Broad Channel experienced significant inundation and damage from Hurricane Sandy, and are threatened by both regular tidal flooding and projected sea level rise. Old Howard Beach, Hamilton Beach, and Broad Channel are all vulnerable to flood hazards according to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRMs), and as reinforced by Hurricane Sandy. While most of Broad Channel and Hamilton Beach were already designated within the 1% annual chance floodplain in FEMA's 2007 FIRMs, the majority of Old Howard Beach has now been added to the floodplain as well, with the release of FEMA's 2015 Preliminary FIRMs (PFIRMs). In Old Howard Beach and Hamilton Beach, 1,517 residential units were added to the 1% annual chance floodplain under the 2015 PFIRMs, for a total of 2,706 residential units. In Broad Channel, fifty-seven residential units were added to the 1% annual chance floodplain, with the result that all residences in Broad Channel are incorporated in the floodplain of the 2015 PFIRMs. Furthermore, buildings on Broad Channel's eastern coast and some on the western coast are now designated in the Coastal A Zone and V Zone, as shown in the maps to the right, where building code requires open foundations or breakaway walls below the Base Flood Elevation (BFE). In addition to new areas being added to the 1% annual chance floodplain, as shown in the maps on page 13, the 2015 PFIRMs generally show higher BFEs, ranging from ten to eleven feet above sea level, or two to eight feet above grade. Building to these higher flood resistant construction standards will reduce vulnerability to future floods, as well as help property owners avoid higher flood insurance premiums, but there are physical and financial challenges in doing so.

While these neighborhoods are still recovering from the impacts of Hurricane Sandy, future flood risk further underscores the need for resilient buildings. Other hurricanes, nor'easters, and tropical storms are expected



Extent of flooding based on 2015 FEMA Preliminary Flood Insurance Rate Maps

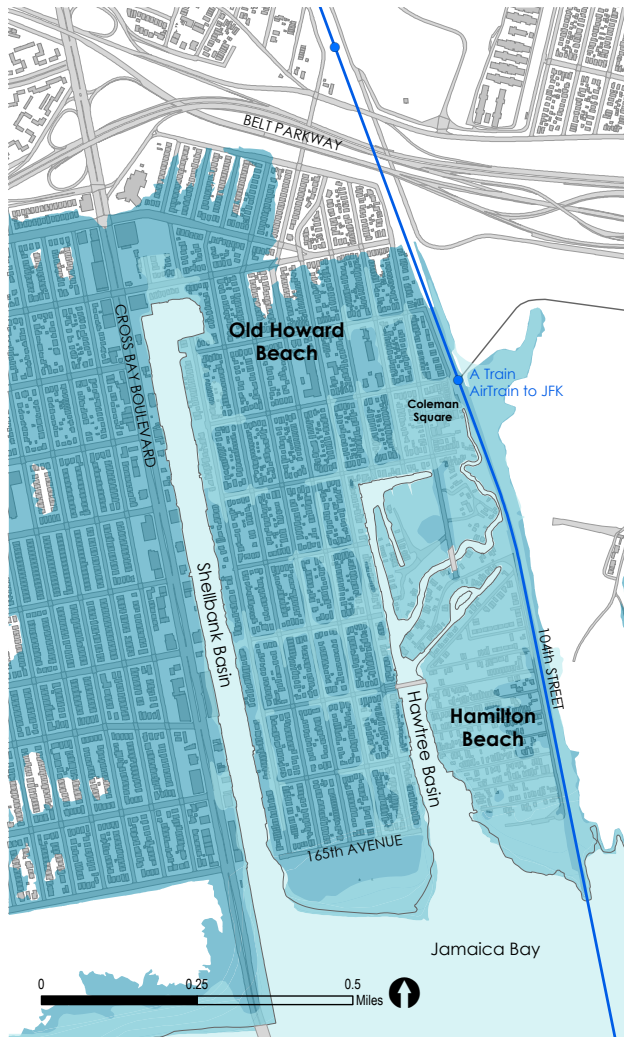


Extent of flooding based on 2015 FEMA Preliminary Flood Insurance Rate Maps

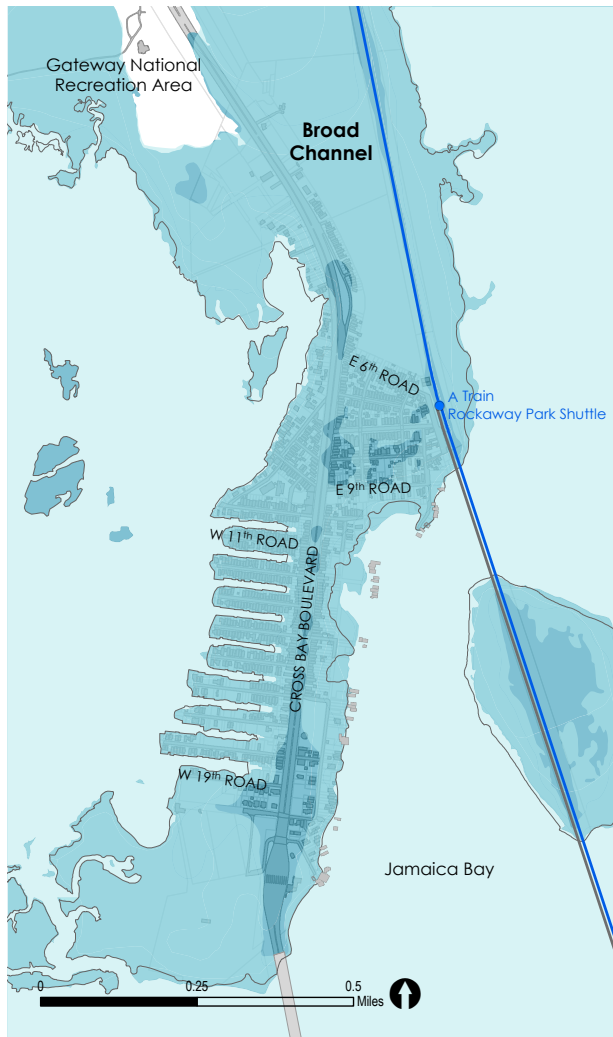
### PFIRM Flood Zones

- V Zone
- Coastal A Zone
- A Zone
- Shaded X Zone
- Subject to Wave Risk (LiMWA)





2007 FEMA Flood Insurance Rate Maps vs. 2015 Preliminary FIRMs



2007 FEMA Flood Insurance Rate Maps vs. 2015 Preliminary FIRMs

**1% Annual Chance Floodplain -  
2015 PFIRMs vs. 2007 FIRMs**

- PFIRM (2015) 1% Annual Chance Floodplain
- FIRM (2007) 1% Annual Chance Floodplain

to cause coastal flooding and erosion in the coming years, and flooding from spring high tides affects Hamilton Beach and Broad Channel today. As sea levels rise, Old Howard Beach, Hamilton Beach, and Broad Channel are projected to see a gradual increase in vulnerability to flooding from daily and monthly spring high tides (see the inset box on page 14 for an explanation on types of tides). Sea levels have risen by roughly a foot in the last century, and according to the NYC Panel on Climate Change (NPCC), a group of leading scientists and risk management experts, sea levels are likely to rise in the future at a higher rate. Middle range projections for sea level rise in NYC range from four to eight inches by the 2020s and eleven to twenty-four inches by the 2050s. High-end projections for those same periods are eleven inches and thirty inches, respectively.

When compared to the rest of the city, Hamilton Beach and Broad Channel are among the most vulnerable inhabited areas in terms of future risk for daily tidal flooding, and the extent and configuration of these shorelines makes flooding exceptionally difficult to prevent. As shown on the maps on page 15, a range of projections for high tide in the 2050s show inundation across areas closest to the water's edge and extending further inland.

In Old Howard Beach, with projected sea level rise, the low-lying street ends are likely to be the first areas affected by flooding, the extent of which could reach the neighborhood's residential blocks on a regular basis. The built conditions of these street ends vary considerably; four street ends have rubble or natural shorelines, while others are improved with riprap, partial bulkheads, or bulkheads in various states of repair.

Hamilton Beach already experiences street end flooding during rain events and spring high tide, and will likely see increased flooding with sea level rise at high tide by the 2050s under high end projections (thirty inches). More



A flooded street in Broad Channel during a Super Moon high tide



Low-lying street end at Hawtree Basin in Hamilton Beach



Street end without a bulkhead in Old Howard Beach on the residential side of Shellbank Basin

## Types of Tides

- **Daily High Tide:** refers to the two highest tides each day
- **Spring High Tide:** strong high tides that occur twice a month during the full moon and new moon
- **Super Moon High Tide:** a Spring high tide that occurs while the Moon is closest to the Earth, resulting in an especially strong high tide

than 300 buildings and nearly two miles of streets could be flooded under this projection. A significant length of shoreline, approximately two-and-a-half miles, is exposed to floodwaters entering from Hawtree Basin, but a majority of the length of shoreline is owned by multiple private homeowners, making comprehensive coastal protection difficult and costly.

Broad Channel also experiences street end flooding during rain events and spring high tide, and is expected to see increased flooding with sea level rise at high tide by the 2050s under high end projections (thirty inches). More than 700 buildings and three miles of streets could be flooded under this projection. The entire shoreline is exposed to floodwaters entering from Jamaica Bay, and the streets along the western coast create an extremely long perimeter, the majority of which is privately owned. The waters outboard of the shoreline are protected as a part of the Gateway National Recreation Area, a unit of the National Park Service. These factors together make protection difficult and costly.

The commercial areas in these neighborhoods also experience impacts during flood events. Cross Bay Boulevard is in the flood zone, though it has a higher elevation than the neighboring residential communities.

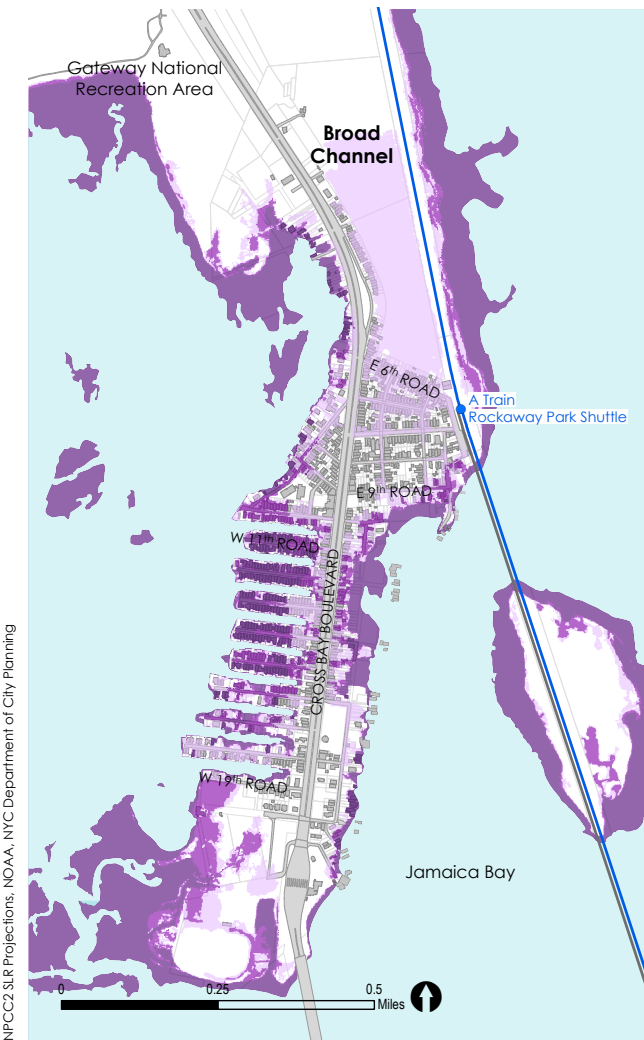
Two local commercial nodes—Coleman Square, just north of Hamilton Beach, and a small section of Cross Bay Boulevard at East 9th Road in Broad Channel—are in the flood zone and also at risk of tidal flooding in the future.

Opportunities to deploy infrastructure to reduce vulnerability to future daily tidal flooding in Hamilton Beach and Broad Channel are limited. However, there are efforts underway to protect against storm surge and mitigate some impacts of flood risk. In particular, the U.S. Army Corps of Engineers (USACE) East Rockaway Inlet and Jamaica Bay Reformulation Study is assessing strategies for controlling erosion and reducing risks from coastal storms along the Atlantic shorefront, including groins, dunes, berms, and reinforced dunes. To reduce risks from flooding in the Bay, USACE has identified several potential alternatives, including a series of shoreline protections along the edge of Jamaica Bay and the bayside of Rockaway Peninsula, as well as a hurricane barrier at the inlet of Jamaica Bay at one of several different locations. In addition, related measures in Coney Island are being explored. (See page 36 for additional information and a map of these projects.) The NYC Economic Development Corporation and the Mayor's Office of Recovery and Resiliency are currently studying raised shorelines in this area as a potential priority for federal Community Development Block Grant Disaster Recovery funding. Additionally, improvements to raise the street grades and reconstruct bulkheads in Broad Channel on West 11th through 19th Roads will help mitigate the effects of current high tide levels. None of these projects would fully address future risk from tidal flooding in these Jamaica Bay communities, making other strategies described in this report important.





Extent of future daily tidal flooding based on sea level rise projections for 2050



Extent of future daily tidal flooding based on sea level rise projections for 2050

## Flood Risk Summary

- The majority of Old Howard Beach and all of Hamilton Beach is now included in the expanded 1% annual chance flood zone.
- Some areas in Broad Channel closest to the water now fall into the Coastal A and V Zones, which have higher risk and stricter building standards.
- Regular tidal flooding occurs today and is expected to worsen with projected sea level rise, leaving more than 1,000 buildings at risk.
- Infrastructure projects that protect against storm surge will not fully address future flood risk from tidal flooding with projected sea level rise.

### Future Extent of Daily Tidal Flooding (2050s High Tide)

- Low-Mid Range Estimate (+11")
- Mid-High Range Estimate (+21")
- High Estimate (+30")

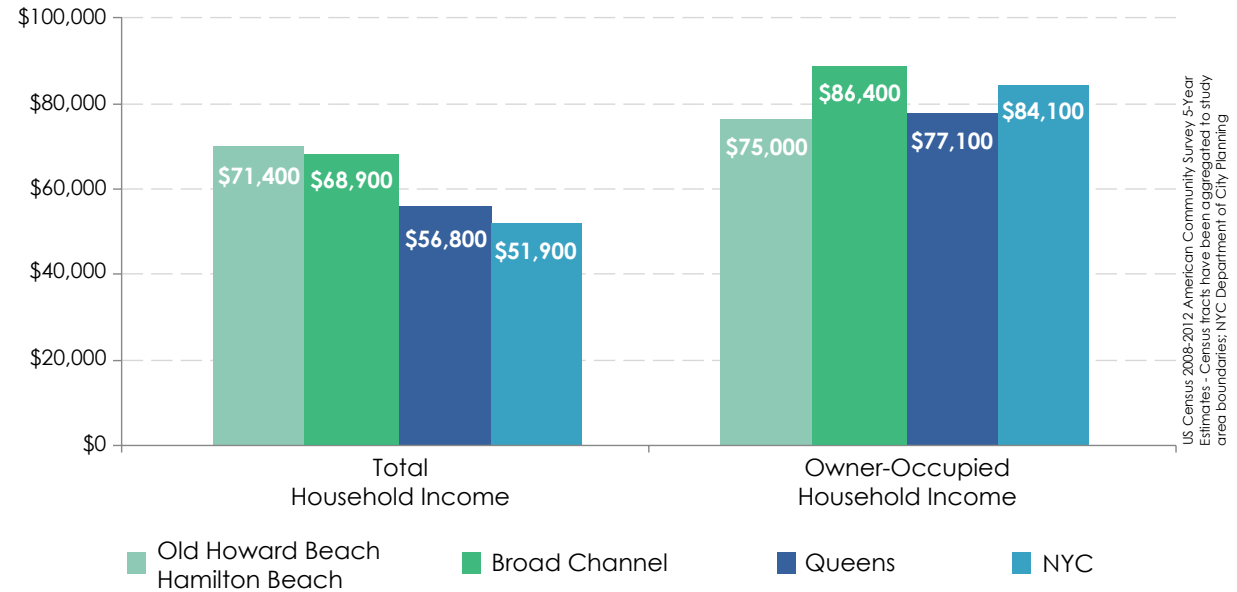
## Household Financial Vulnerabilities

Old Howard Beach, Hamilton Beach and Broad Channel are middle income communities, with median household incomes somewhat higher than Queens and New York City averages. Median household income is roughly the same across the study area at approximately \$70,000, but owner-occupied household incomes are higher in Broad Channel, at \$86,400, than in Old Howard Beach and Hamilton Beach (which are within the same Census tract), at \$75,000, as shown in the charts to the top right.

In Old Howard Beach and Hamilton Beach, there are a combined 3,020 housing units, of which approximately seventy-five percent are owner-occupied, as shown in the chart to the bottom right; this likely includes a small portion of two-family homes in these neighborhoods. This rate is significantly higher than the average homeownership rate for both Queens and NYC, though mortgage holding rates are considerably lower in these neighborhoods than Queens and NYC averages at fifty percent of owner-occupied homes, suggesting more residents own their homes outright. This could indicate that homeowners have paid off their mortgages, or that access to mortgage lending is limited.

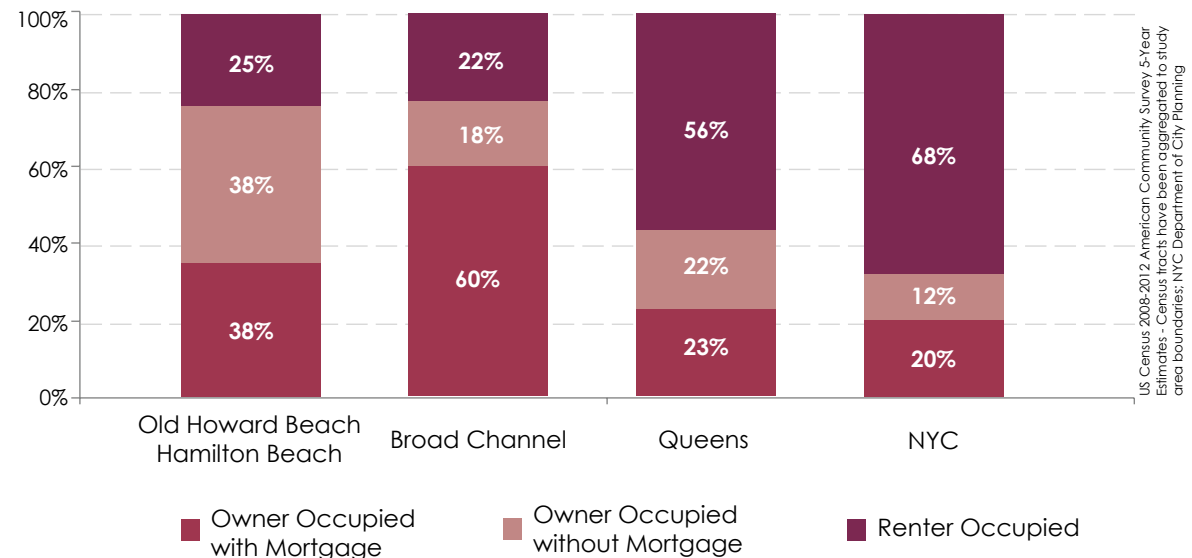
Broad Channel is home to 1,050 housing units, of which seventy-eight percent are owner occupied, a rate that is more than twice the average for the city overall, as shown in the chart to the bottom right. This rate likely reflects a small portion of two-family homes in the neighborhoods. Two out of every three Broad Channel houses have active mortgages, a rate significantly higher than Old Howard Beach and Hamilton Beach as well as the Queens and NYC averages. Homeowners with outstanding mortgages may in some cases be vulnerable to default in the event of a flood. They may also have limited home equity available to finance storm recovery or invest in resilient retrofits for any future storm or flood events.

### Median Household Income



US Census 2008-2012 American Community Survey 5-Year Estimates - Census tracts have been aggregated to study area boundaries; NYC Department of City Planning

### Percentage of Owner-Occupied Homes with Mortgages



US Census 2008-2012 American Community Survey 5-Year Estimates - Census tracts have been aggregated to study area boundaries; NYC Department of City Planning

Since 2012, these three neighborhoods have seen an increase in the number of National Flood Insurance Program (NFIP) policyholders. In Old Howard Beach and Hamilton Beach the number has increased from 581 in 2012 to 1,319 in 2015, an increase of 127 percent, yet still only covering less than half of all households. Broad Channel saw a more modest twenty-one percent increase, from 547 policies in 2012 to 664 policies in 2015, representing sixty one percent of households in the neighborhood. The average annual premium for these policies is \$1,054 in Old Howard Beach and Hamilton Beach and \$1,807 in Broad Channel (FEMA NFIP). These numbers include both residential and non-residential policies. The cost of these flood insurance policies is expected to substantially increase in the future due to reforms to federal legislation.

Households in the study area may be cost burdened by factors other than flood insurance. A household is commonly referred to as cost burdened when its housing costs exceed thirty percent of monthly gross household income. In Old Howard Beach and Hamilton Beach, two-thirds of owner occupied houses with mortgages are cost burdened. In Broad Channel, fifty-four percent of owner occupied houses with mortgages are cost burdened, which is closer to the NYC average of approximately fifty percent. When homeowners are cost burdened, they may be vulnerable to default in the event of flood damage, and have limited equity to make resiliency investments.

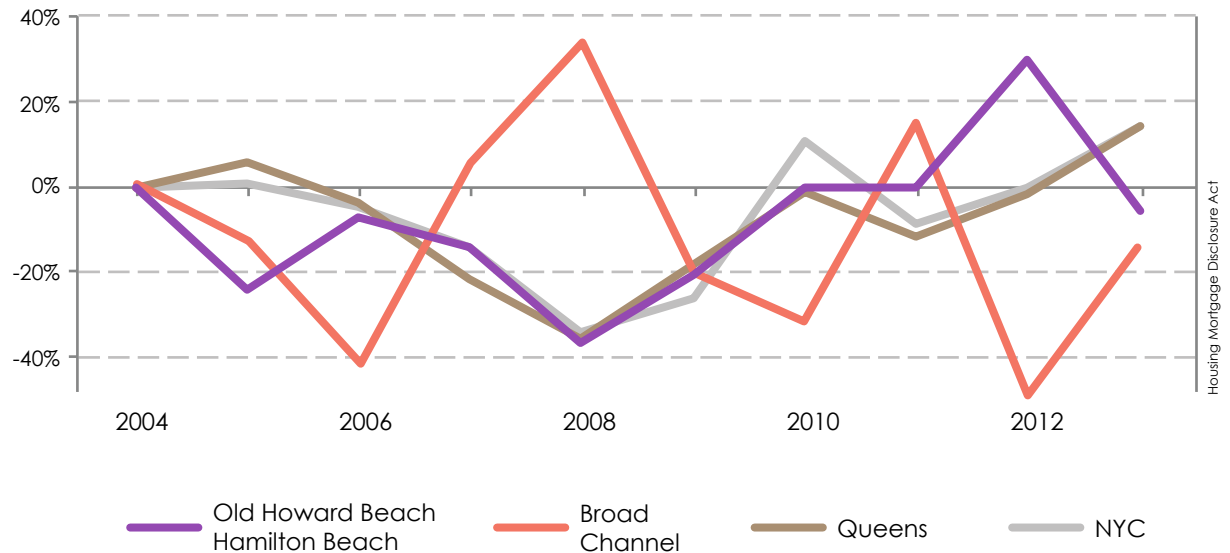
Changes in mortgage lending patterns may also suggest housing distress. According to data provided through the Housing Mortgage Disclosure Act (HMDA), the number of home purchase mortgage loans issued for one- to four-unit houses in Old Howard Beach, Hamilton Beach, and Broad Channel has not recovered in the last several years, as is shown in the chart to the right. However, it is unclear whether this is due to the recession or damages from Sandy, as the data only spans through 2013. Additionally, Broad

Channel has seen a small uptick in the rate of foreclosure proceedings initiated between 2011 and 2013. Prior to the storm, each of these communities had higher rates of mortgages issued than the Queens average. Financial distress among homeowners may be exacerbated when new, higher flood insurance premiums are factored into the cost of home ownership for prospective home buyers.

### Financial Vulnerability Summary

- All three neighborhoods have high rates of home ownership, which is consistent with prevailing building types. However, households may be financially strained due to flood insurance premium rates and mortgage burdens.
- When homeowners are financially burdened and lack home equity, they may also be unable to pay increases in flood insurance rates and/or unable to implement retrofits to make their homes safer and more resilient.

**Annual Change in 1-4 Family Home Purchase Mortgage Loans Issued**





## Sandy Storm Damage and Recovery

Hurricane Sandy brought a significant storm surge through Jamaica Bay and up through the basins, inundating Old Howard Beach, Hamilton Beach, and Broad Channel. The impacts were devastating, with seventy-five percent of households in Old Howard Beach and Hamilton Beach and ninety-seven percent of households in Broad Channel reporting damages during FEMA inspections (FEMA, HUD 2013). In Old Howard Beach and Hamilton Beach the most common flood level was at the basement level, where flood heights reached over two feet above basement slab. Basements are less common in Broad Channel and the depth of flooding was greater, so the most common flood depth was between one and four feet high in the first floor of the house, and many had flooding above four feet. After the floodwater retreated, damages reported and NFIP claims made were significant. In Old Howard Beach, the average NFIP claims paid for one- to four-family houses ranged from \$30,306 near the Belt Parkway, to \$71,514 near Jamaica Bay. In Hamilton Beach, the average NFIP claims paid for one- to four-family houses was \$52,746, and in Broad Channel the average was \$76,717 (FEMA NFIP).

Many homeowners are enrolled in the City's Sandy recovery program, Build it Back—managed by the Mayor's Office of Housing Recovery (HRO) in partnership with the Department of Housing Preservation and



Houses damaged by Hurricane Sandy in Ramblersville, Hamilton Beach

Development (HPD) and the Department of Design and Construction—though some homeowners chose to finance their own repairs. Through Build it Back, owners of properties affected by the hurricane are offered one or more pathways for making improvements, depending on the level of damage and other factors: repair, repair with elevation, rebuild with elevation, reimbursement, or acquisition. As of October 2016, the most common pathways selected by applicants were as follows:

- Rehabilitation in Old Howard Beach (fifty-six percent of applicants)
- Rehabilitation with elevation in Hamilton Beach (thirty-eight percent of applicants)
- Rehabilitation with elevation in Broad Channel (fifty percent of applicants)

Both private and City-sponsored retrofits experienced technical challenges that hindered the recovery process. These issues, mainly affecting houses built prior to 1938, existed because of the difficulty in locating documentation of approved building plans describing pre-storm condition, which are necessary to determine whether a given home is considered “non-conforming” or “non-complying”—legal statuses defined in the Zoning Resolution.



Elevated house in Broad Channel

In March 2015, the Department of City Planning (DCP), together with HRO and the HPD, proposed a zoning text amendment, “Special Regulations for Neighborhood Recovery,” (SRNR) to accelerate post-Hurricane Sandy recovery and enable flood-resilient building construction within designated “neighborhood recovery areas” in Staten Island, Queens, and Brooklyn. These recovery areas include Old Howard Beach, Hamilton Beach, and Broad Channel. SRNR was adopted by the City Planning Commission in May, and by the City Council in June 2015.

SRNR provides exceptional, one-time procedural zoning relief to facilitate the elevation of existing houses, and replacement of substantially damaged houses with more resilient ones, by:

- simplifying the process for documenting non-compliances;
- removing disincentives for property owners to make resilient investments; and
- establishing a new zoning envelope for narrow and shallow lots that better reflects the existing neighborhood character.

Given the specific goal of accelerating recovery in Sandy-impacted neighborhoods, this zoning relief is set to expire in 2021. Together, these zoning changes will speed up the process for owners of Sandy-damaged houses to obtain building permits for elevation and reconstruction, reducing the community's vulnerability to future floods, enabling homeowners to avoid higher flood insurance premiums.

While the 2013 Flood Resilience Zoning Text Amendment and 2015 SRNR targeted specific needs of homeowners affected by Hurricane Sandy, and lessons learned after adoption of these regulations will be considered for permanent adoption, this study examined the suitability of current zoning in these neighborhoods.

## Existing Zoning

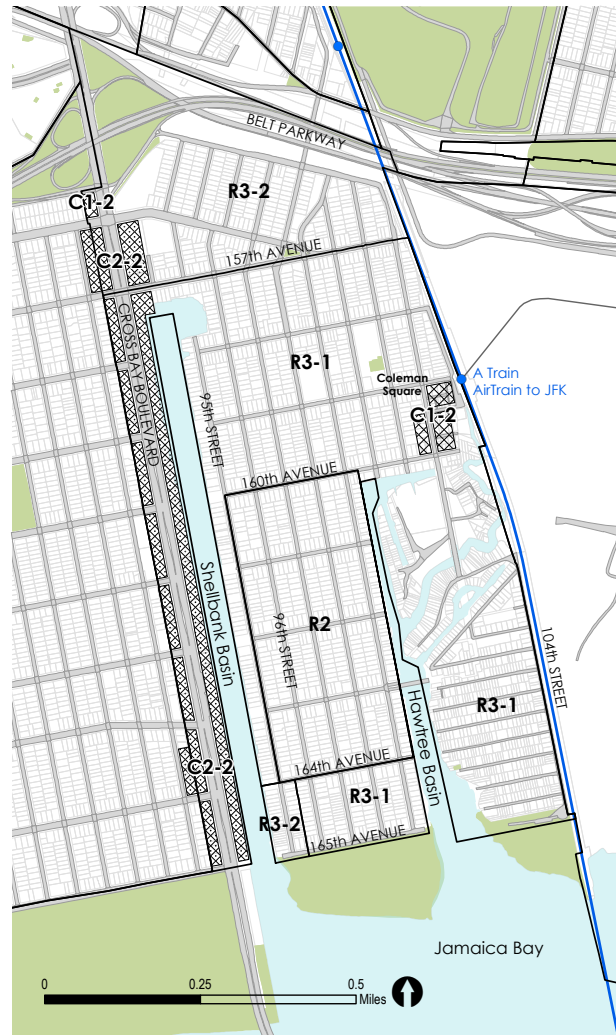
Old Howard Beach, Hamilton Beach, and Broad Channel are zoned for low-density residential uses with commercial uses permitted in overlay districts located on major corridors and at transit nodes. Community facilities, including schools, houses of worship, and medical offices, are permitted in most districts. Zoning designations for the study area have largely been in place since the Zoning Resolution was adopted in 1961. The residential parking requirement throughout the study area is one space per dwelling unit. A description of area zoning districts follows.



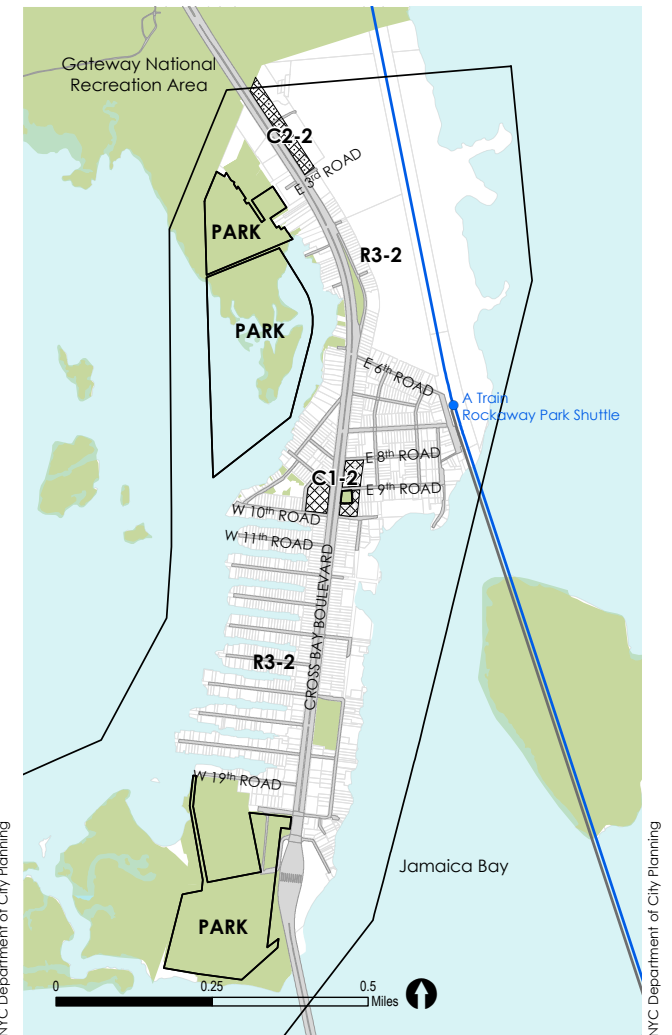
Detached house in R2 district in Old Howard Beach

### R2

An R2 district is located in the portion of Old Howard Beach generally bounded by 160th Avenue, Hawtree Basin, 164th Avenue, and 95th Street. The R2 district allows for single-family detached residences with a maximum floor area ratio (FAR) of 0.5. The minimum required lot area is 3,800 square feet, and the minimum lot width is 40 feet. Some community facilities are allowed at a maximum FAR of 0.5. Within this area the R2 matches the existing built character of single-family detached residences.



Current zoning in Old Howard Beach and Hamilton Beach



Current zoning in Broad Channel





Semi-detached houses in R3-1 district in Hamilton Beach



Attached housing in R3-2 district in Old Howard Beach



C2-2 commercial overlay on Cross Bay Boulevard in Howard Beach

### R3-1

The entirety of Hamilton Beach and two areas in Old Howard Beach are zoned R3-1: the first between 157th Avenue, the A-Train right-of-way, Hawtree Creek, 160th Avenue, 95th Street, 164th Avenue, and Shellbank Basin; and the second between 164th Avenue, Hawtree Basin, 165th Avenue, and 96th Street. R3-1 is the lowest density district that allows semi-detached one- and two-family residences. Detached residences are also allowed. The maximum FAR is 0.6, which includes a 0.1 FAR attic allowance. The minimum required lot area is 3,800 square feet for detached residences and 1,700 square feet for other residences. The minimum lot width for a detached house is forty feet, or eighteen feet for other residences. Community facilities are allowed at a maximum FAR of 1.0. The predominant built form in both areas is detached residences, but lot sizes differ in Hamilton Beach, as explained on page 22. Recent new construction in Hamilton Beach has generally consisted of semi-detached residential buildings, which differs from most older buildings.

### R3-2

Broad Channel and two areas of Old Howard Beach are zoned R3-2. In Old Howard Beach, R3-2 is zoned between Belt Parkway, the A-Train right-of-way, 157th Avenue, and Cross Bay Boulevard; and also on one block on 95th Street between 164th and 165th Avenues. R3-2 allows all residential building types, including detached, semi-detached, and attached residences, as well as low-rise multi-family apartments. In R3-2 districts, residences are allowed at a maximum FAR of 0.6, which includes a 0.1 attic allowance. The minimum required lot area is 3,800 square feet for detached residences and 1,700 square feet for other residences. The minimum lot width for a detached house is forty feet, or eighteen feet for other residences. Community facilities are allowed at a maximum FAR of 1.0. While the zoning matches the

existing built conditions on 95th Street in Old Howard Beach, it does not match the neighborhood character in northern Old Howard Beach or Broad Channel.

### Commercial Overlays

C1-2 and C2-2 commercial overlay districts are mapped on Cross Bay Boulevard in Howard Beach, in Coleman Square in Old Howard Beach, and on Cross Bay Boulevard in Broad Channel between East 1st and East 3rd Roads and between East 8th and West 10th Roads. C1 and C2 overlays are mapped within residential districts to allow a range of local retail and service establishments.

When C1 and C2 overlay districts are mapped within R1 through R5 residential districts the maximum commercial FAR is 1.0, with commercial uses limited to the first floor in mixed-use buildings. Off-street parking requirements vary with the use. In C1-2 and C2-2 overlays, most retail uses require one accessory parking space per 300 square feet of commercial floor space, although the requirements can range between one space per 200 square feet and one space per 800 square feet, depending on the use.

Cross Bay Boulevard in Howard Beach is characterized primarily by one- and two-story non-residential buildings and occupied either by businesses—such as restaurants, grocery stores, and retail stores—or community facilities. Coleman Square is a small commercial node adjacent to the A train station in Old Howard Beach where most buildings are two stories and businesses include offices, salons, and restaurants. Between East 1st and 3rd Roads on Cross Bay Boulevard in Broad Channel, a portable toilet rental company is the only commercial land use. Between East 8th and East 10th Roads further south in Broad Channel, one- and two-story attached buildings are most common and uses include restaurants, a deli, a salon, and offices.

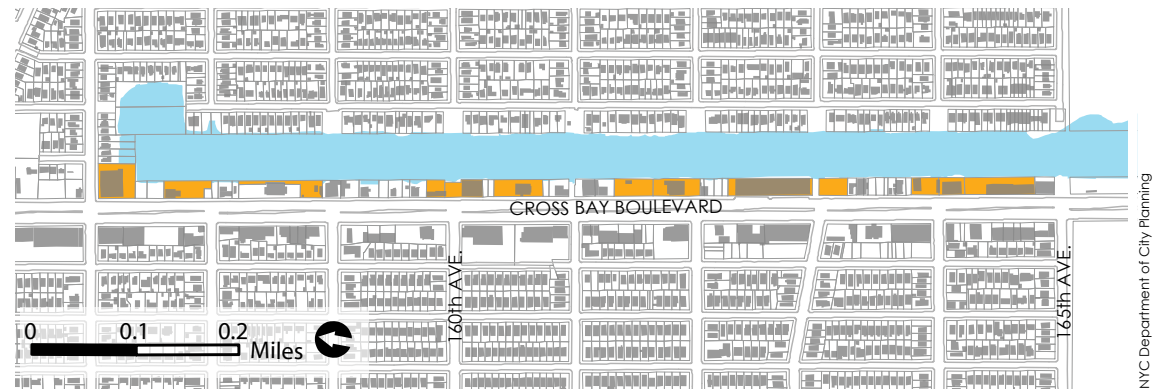


### Special Regulations Applying to the Waterfront Area

New commercial or multi-family developments on certain waterfront zoning lots on Cross Bay Boulevard are required to provide and maintain public open space at the water's edge with pedestrian links to upland streets. Parcels that border Shellbank Basin that are greater than 10,000 square feet and have at least 100 feet of shoreline must meet Waterfront Public Access (WPA) requirements when developed. Currently thirteen sites could trigger this requirement.

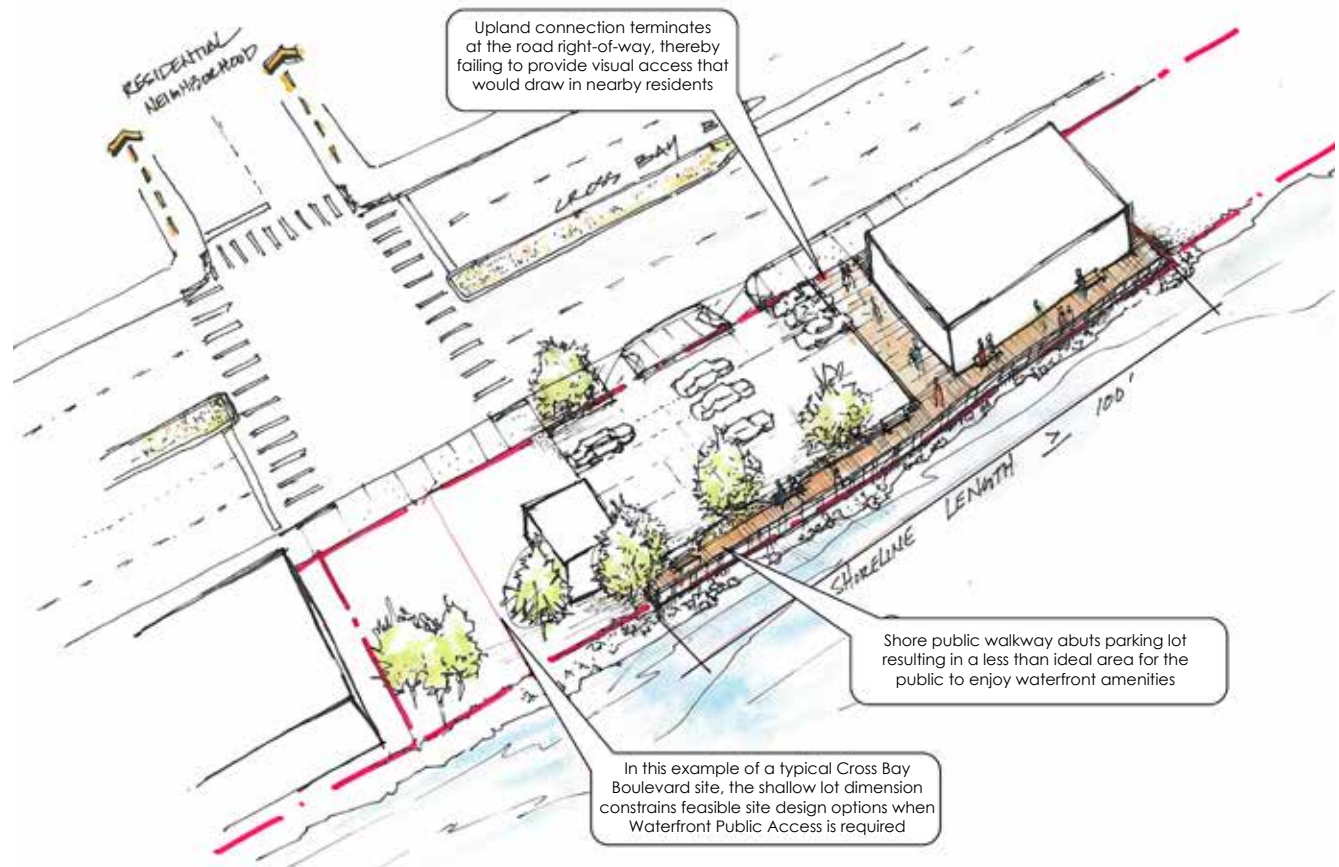
WPA includes a requirement to build and maintain shore public walkways, upland connections, and supplemental public access areas as needed to fulfill the minimum requirement for public access. The waterfront zoning regulations include certain design requirements related to seating, planting, signage and other design elements. Waterfront zoning also requires visual corridors, which are open areas that provide an unobstructed view from upland streets through a waterfront zoning lot to the shoreline. For most developments on waterfront lots, the Chairperson of the City Planning Commission must certify that the proposed development complies with requirements for public access and visual corridors. Once certified, a maintenance and operation agreement with the Department of Parks and Recreation must be filed and recorded before a building permit can be issued by the Department of Buildings.

WPA zoning regulations require new developments in low-density areas to provide a shore public walkway adjacent to the shoreline with a minimum width of thirty feet, which can be reduced to as little as ten feet for shallow lots. Developments must also include a minimum twenty-foot wide upland connection, which can be reduced to as little as twelve feet for lots less than 150 feet wide. Only one site has triggered these requirements along the corridor to date, and it has met the minimum standards for WPA.



Thirteen lots trigger Waterfront Public Access requirements on Cross Bay Boulevard

 Lots triggering requirements

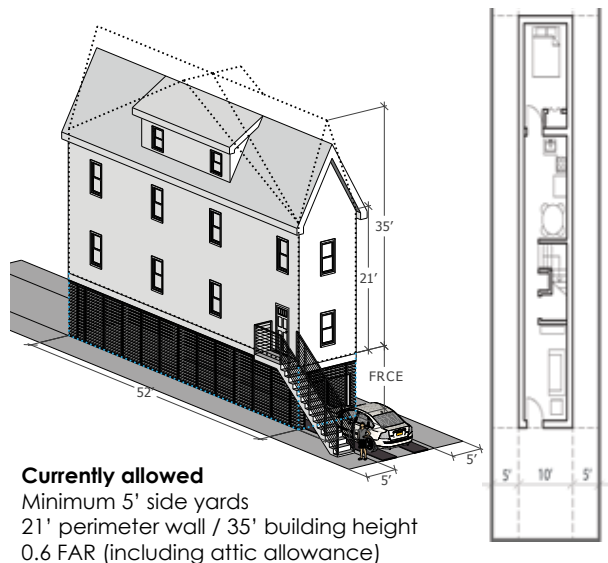


## Building and Lot Typology

### Residential

Old Howard Beach and Hamilton Beach are characterized by detached residences, which make up seventy-seven percent of the buildings in this portion of the study area. Ninety percent of houses in the two neighborhoods were built prior to 1983, when national flood protection standards were first applied to NYC. As a result, many houses are below the 2015 PFIRM BFE and have basements.

Old Howard Beach is characterized by standard lot widths for detached residences; seventy-four percent of lots comply with the zoning districts' minimum lot width requirements of forty feet. The width generally does not impede resilient retrofits and new construction elevated to FEMA standards because these lots have sufficient space to accommodate yard requirements. The neighborhood is also at a higher elevation with lower BFEs than Hamilton Beach and Broad Channel. As a result, the current zoning district designations do not pose specific challenges to resiliency.



Hamilton Beach is primarily comprised of detached residences: seventy-nine percent are one-family and six percent are two-family. Since the early 2000s the neighborhood has seen an increase in the number of semi-detached houses, which are permitted under the existing zoning. These buildings are more difficult to elevate than detached houses because of the shared wall.

Furthermore, a range of substandard lot sizes and current side yard requirements under zoning can make new, resilient development and retrofitting more difficult in Hamilton Beach. Only twenty-eight percent of lots are forty feet or more in width, the current minimum lot width. Fifty-five percent of lots are less than thirty feet wide, and these lots are challenged because of side yard requirements in R3-1 districts: side yards cannot be less than five feet wide each, for a total of ten feet. As an example, and shown in the graphic to the left, a new detached house on a twenty foot wide lot could only be ten feet wide after side yards are accounted for, resulting in a poor interior layout and awkward appearance. The mismatch between lot configurations and zoning requirements can discourage property owners from making resiliency investments.

Broad Channel is characterized primarily by single-family detached residences, which make up ninety percent of all residential lots. In addition, a majority of residences (ninety-four percent) were built prior to 1983. All houses are within close proximity to the water, but most are not elevated to the new, higher BFEs, leaving many residents at risk in storm events. Narrow lots in Broad Channel face challenges retrofitting under existing zoning. The most common lot size is twenty-five feet wide by 100 feet deep, and three quarters of lots are less than forty feet wide, the current minimum lot width. For waterfront lots, a waterfront rear yard of thirty feet is required, though this can be reduced for shallow lots. For most lots in Broad Channel, meeting these yard requirement scan be

difficult. While the 2013 Flood Resilience Zoning Text Amendment removed some zoning barriers to retrofits on these narrow, non-complying lots, challenges remain for retrofits and new, more resilient housing.

### Commercial

The Cross Bay Boulevard commercial corridor is constrained by shallow lot depths along Shellbank Basin and the relatively high parking requirements for commercial uses. With one exception, all waterfront lots are less than eighty-five feet deep. Zoning requires that all qualifying lots (of which there are thirteen on Cross Bay Boulevard) provide a minimum ten foot wide shore public walkway, which effectively reduces the lot depth to seventy-two feet. Furthermore, buildable lot areas are reduced by a required twenty foot wide upland connection to the shore public walkway—with a minimum of twelve feet for lots less than 150 feet wide. The shallow lot depths on the east side of Cross Bay Boulevard not only pose a challenge for accommodating WPA requirements, but also for fitting required parking on the site. Parking requirements under existing zoning are generally high at one space per 300 square feet of floor area, depending on the use. At present, nineteen buildings on both sides of Cross Bay Boulevard, or one out of every three, would not meet the off-street parking requirement and very few properties meet the perimeter landscape requirement for parking lots since they were developed prior to the establishment of these requirements.

In the smaller commercial nodes in Hamilton Beach and Broad Channel, buildings on small lots cannot meet parking requirements, which may be triggered if sites are redeveloped to a more resilient form.

# Summary of Resiliency Challenges

## 1 Portions of these neighborhoods are uniquely vulnerable to tidal flooding

There is a need for a land use and infrastructure framework that will guide neighborhood recovery and safety today, where monthly tidal flooding is a risk, and reflects long-term vulnerability to projected sea level rise. To address long-term risks, zoning should permit resiliency investments in existing residential areas but limit future growth.

## 2 Existing residential zoning creates retrofitting challenges and does not always match the neighborhood character

Hamilton Beach and Broad Channel are characterized by unusual conditions—detached houses on substandard lots—that would benefit from special zoning regulations that make it easier for property owners to make resiliency investments. Residences in Old Howard Beach, which are less likely to be affected by sea level rise, would benefit from updated zoning that reflects the established residential character.

## 3 Current zoning makes commercial resiliency unnecessarily difficult and costly

Commercial property owners on Cross Bay Boulevard may face difficulty making necessary resilient retrofits on the more constrained sites along the waterfront, and would benefit from updated waterfront zoning regulations to provide additional flexibility. Businesses in Coleman Square and Broad Channel with limited retrofitting options would benefit from a rezoning to alleviate constraints posed by parking requirements, and from an outreach effort focused on storm preparedness.



# **BROAD CHANNEL: RESILIENCY FRAMEWORK**

The resiliency framework for Broad Channel identifies recommendations for residential and commercial zoning changes to respond to the immediate need to limit future density due to vulnerability from sea level rise. The framework also outlines longer term zoning recommendations for future adoption, as well as ongoing strategies for storm preparedness and the adaptive use of vacant City-owned properties.

## **Zoning to Limit Vulnerability and Growth and Promote Resilient Buildings**

Zoning changes should better enable new construction and retrofits of existing buildings to meet floodplain construction requirements, and ensure that buildings will be contextually appropriate and limited in density.

## **Map Water-Dependent Use District**

A rezoning of Broad Channel should reflect existing water-dependent uses.

## **Promote Commercial Resiliency**

Enable resiliency in commercial areas through providing zoning flexibility and technical resources on storm preparedness to existing businesses.

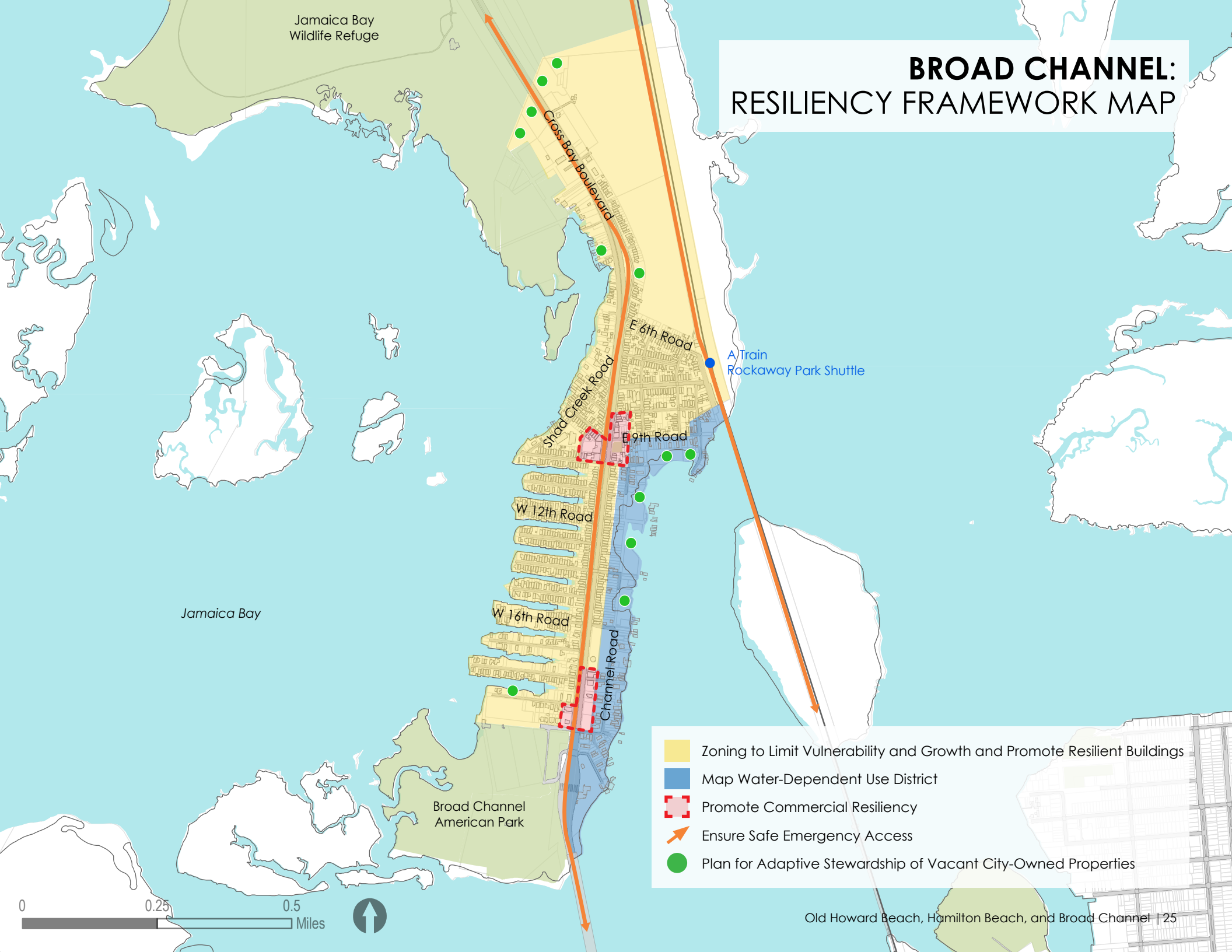
## **Ensure Safe Emergency Access**

Support the ability of emergency responders to safely access the neighborhood in all conditions.

## **Plan for Adaptive Stewardship of Vacant City-Owned Properties**

Explore opportunities to make more appropriate use of vacant City-owned properties.

# BROAD CHANNEL: RESILIENCY FRAMEWORK MAP



Jamaica Bay  
Wildlife Refuge

Cross Bay Boulevard

E 6th Road

A Train  
Rockaway Park Shuttle

Shad Creek Road

E 9th Road

W 12th Road

W 16th Road

Channel Road

Jamaica Bay

Broad Channel  
American Park

-  Zoning to Limit Vulnerability and Growth and Promote Resilient Buildings
-  Map Water-Dependent Use District
-  Promote Commercial Resiliency
-  Ensure Safe Emergency Access
-  Plan for Adaptive Stewardship of Vacant City-Owned Properties

0 0.25 0.5 Miles



## Broad Channel:

### Recommended Zoning Changes

#### Zoning to Limit Vulnerability and Growth and Promote Resilient Buildings

Zoning changes are needed in Broad Channel to address the area's unique vulnerability to sea level rise. The primary zoning proposed is R3A, with a modification by special zoning regulations to limit future residential development to single-family detached houses. Under R3A, the maximum Floor Area Ratio (FAR) is 0.6, which includes a 0.1 FAR attic allowance. The minimum required lot area is 2,375 square feet and the minimum lot width is twenty-five feet. One off-street parking space is required for each dwelling unit. These regulations would not be changed. Community facilities are permitted at an FAR of 1.0, but any community facilities that include sleeping or overnight accommodations would be prohibited under the special zoning regulations.

This recommendation reflects the neighborhood character of single-family detached residences on narrow lots and would achieve the goal of avoiding inappropriate new residential development in an area projected to experience daily tidal inundation with sea level rise. In Broad Channel, there are few viable options for infrastructure

investments to mitigate this flood risk. For this reason, it is recommended that this part of the proposal move forward in advance of other zoning changes.

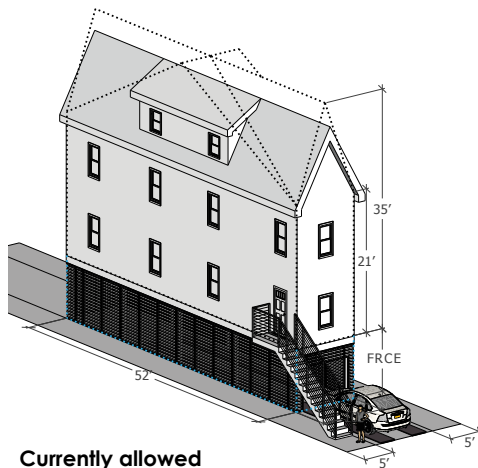
In addition to this local rezoning, flexibility to facilitate rebuilding on small lots is needed, such as through the envelope that was provided through Special Regulations for Neighborhood Recovery. This should be addressed as part of a future update to the Flood Resilience Zoning Text Amendment. These changes would alleviate the difficulties faced in rebuilding residences on narrow, substandard lots and would result in a more usable layout than can be achieved under existing zoning. As described in the Building and Lot Typology section on page 22, the most common lot size in Broad Channel is twenty-five feet wide by 100 feet deep. These lots can be limited under existing zoning that results in narrow houses and poor interior layouts, as shown in the lower left graphic. Modifications should include new building height and setbacks that are representative of the small-scale residences found in Broad Channel. Specifically, the text should introduce a new zoning envelope to allow for a reduction of side yard requirements, with a minimum

required side yard of three feet on the most constrained sites. Residences constructed pursuant to the side yard reduction should be required to use new height and setback requirements, resulting in a zoning envelope that is shorter but wider than the existing as-of-right envelopes in these low-density residential districts, as shown in the lower right graphic, while avoiding disproportionately tall, skinny buildings. These changes would better enable property owners to make resilient retrofits and rebuild appropriately, if necessary, and would help buildings lacking complete documentation of the existing footprint. In addition, new buildings would also better match the existing context.

#### Map Water-Dependent Use District

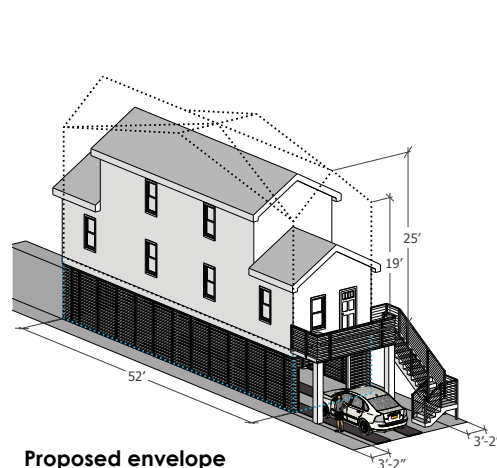
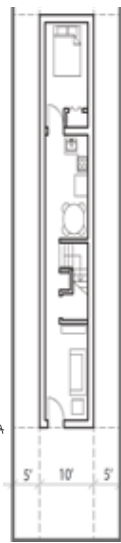
As part of the proposed change to local zoning, a C3A district is proposed on Broad Channel's southeast shore, where existing uses include marinas, boat parking, and waterfront restaurants alongside residences. The proposed district is generally bounded by East 9th Road, Lanark Road, Jamaica Bay, Van Brunt Road, Cross Bay Boulevard, and Channel Road. C3A districts permit waterfront recreational activities, primarily boating and fishing, in areas along the waterfront that are usually adjacent to residential docks. Permitted activities include facilities for docking, renting, services and storing fishing and pleasure boats, among other activities. The FAR is 0.6, which includes a 0.1 FAR attic allowance. The residential equivalent is R3A, and the area would also be modified by the special zoning regulations to limit future residential development to single-family detached.

This proposed rezoning would bring existing water-related uses, such as boat storage sites, into compliance. Under C3A, properties could be developed with a water-dependent use, or be rebuilt following a storm, whereas only residential or community facility uses are allowed under current zoning. Water-dependent commercial uses are an appropriate use here due to the proximity to the water.



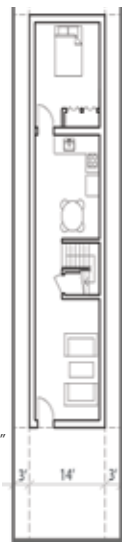
#### Currently allowed

Minimum 5' side yards  
21' perimeter wall / 35' building height  
0.6 FAR (including attic allowance)



#### Proposed envelope

Minimum 3' side yards  
19' perimeter wall / 25' building height  
0.6 FAR (including attic allowance)





## **Broad Channel: Infrastructure and Coastal Preparedness Strategies**

### **Promote Commercial Resiliency**

An update of the existing commercial overlay from C1-2 to C1-3 is proposed in the area generally bounded by East 8th Road, Church Road, East 10th Road, West 10th Road, Power Road, West 9th Road, and Cross Bay Boulevard. In addition, as part of a future rezoning, a new C1-3 commercial overlay is proposed on the southernmost portion of Cross Bay Boulevard in Broad Channel (currently zoned R3-2), generally bounded by East 18th Road, Channel Road, Van Brunt Road, West 20th Road, Cross Bay Boulevard, and West 19th Road. This proposal reflects existing development patterns. C1-3 allows for development that serves the local shopping needs of the communities and has an FAR of 1.0. However, parking requirements are lower, at a minimum of one per 400 square feet of floor area for general retail uses, compared to one per 300 under current zoning in the existing commercial node.

Under C1-3, there would be greater latitude for small developments to be exempted from parking requirements, compared to what would be exempted under existing zoning. This designation is appropriate because it would remove impractically high parking requirements that may deter resiliency upgrades to their buildings. It would also more closely reflect the commercial properties and amount of parking that is provided today.

### **Ensure Safe Emergency Access**

Residents and emergency responders may face increasingly challenging conditions if roadways are inundated during flooding and storm events, and costs are likely to increase with projections of more flooding. In the future, increased funding may be necessary to maintain emergency services. Cross Bay Boulevard and the A train and Rockaway shuttle are the only points of access to and from Broad Channel. Standard emergency vehicles, which already have trouble navigating the narrow streets, may have difficulty reaching residents during a flood event. The Fire Department utilizes high axle vehicles and flat bottom boats during stillwater flooding events, and relies on inflatable response boats during larger storm events. However, residents may experience slower response times in these situations because of the need to transport special equipment. Some local fire stations may not have the capacity to store all equipment on-site and may need to deploy resources from storage sites. Furthermore, maintenance of, and training for, these special resources is dependent upon the availability of state and federal funding in any given year. Given the high vulnerability of this area to projected sea level rise, there may be a need for storage of additional special equipment closer to the neighborhood. Future funding for emergency access measures for Broad Channel could include the need for additional special access vehicles and storage facilities, as well as specialized training for personnel. In addition, residents and community groups should continue to work closely with NYC Emergency Management to partner with the ReadyNY program and NYC Citizen Corps to build their own inclusive emergency plan. These efforts would address individual and community emergency preparedness.

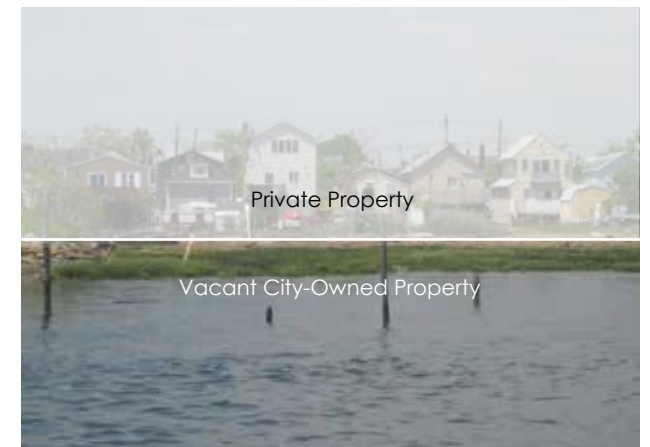
### **Promote Commercial Resiliency**

Existing businesses in Broad Channel may be limited in their ability to make resilient retrofits today and rebuild after a major storm or flood in the future. Businesses

should take advantage of the Business Preparedness and Resiliency Program (Business PREP), a program run by the Department of Small Business Services, is offering workshops to assist with the creation of a basic business continuity plan. As of Fall 2016, the program will also provide on-site resiliency assessments for small businesses and micro-grants to implement specific recommendations. Going forward, the program will launch an online tool for businesses to learn about resiliency planning.

### **Plan for Adaptive Stewardship of Vacant City-Owned Properties**

There are approximately twenty vacant City-owned lots in Broad Channel. At least five of these properties will be maintained as wetlands by the Department of Parks and Recreation, following recommendations made in a 2007 report by the Wetlands Transfer Task Force. To ensure that future growth in this vulnerable area is limited, the City is planning to identify the most appropriate uses for these vacant lots. Uses may include wetlands and native landscape restoration. Native coastal species should be selected in order to thrive during inundation from high tide, provide wave attenuation, and tolerate salt spray.



Vacant City-owned waterfront property on Broad Channel's eastern edge is mostly land under water

# HAMILTON BEACH: RESILIENCY FRAMEWORK

The resiliency framework for Hamilton Beach identifies recommendations for residential zoning changes to respond to the immediate need to limit future density due to vulnerability from sea level rise. The framework also outlines longer term zoning recommendations for future adoption, as well as ongoing strategies for storm preparedness and the adaptive use of vacant City-owned properties.

## **Zoning to Limit Vulnerability and Growth and Promote Resilient Buildings**

Zoning changes should better enable new construction and retrofits of existing buildings to meet floodplain construction requirements, and ensure that buildings will be contextually appropriate and limited in density.

## **Ensure Safe Emergency Access**

Support the ability of emergency responders to safely access the neighborhood in all conditions.

## **Plan for Adaptive Stewardship of Vacant City-Owned Properties**

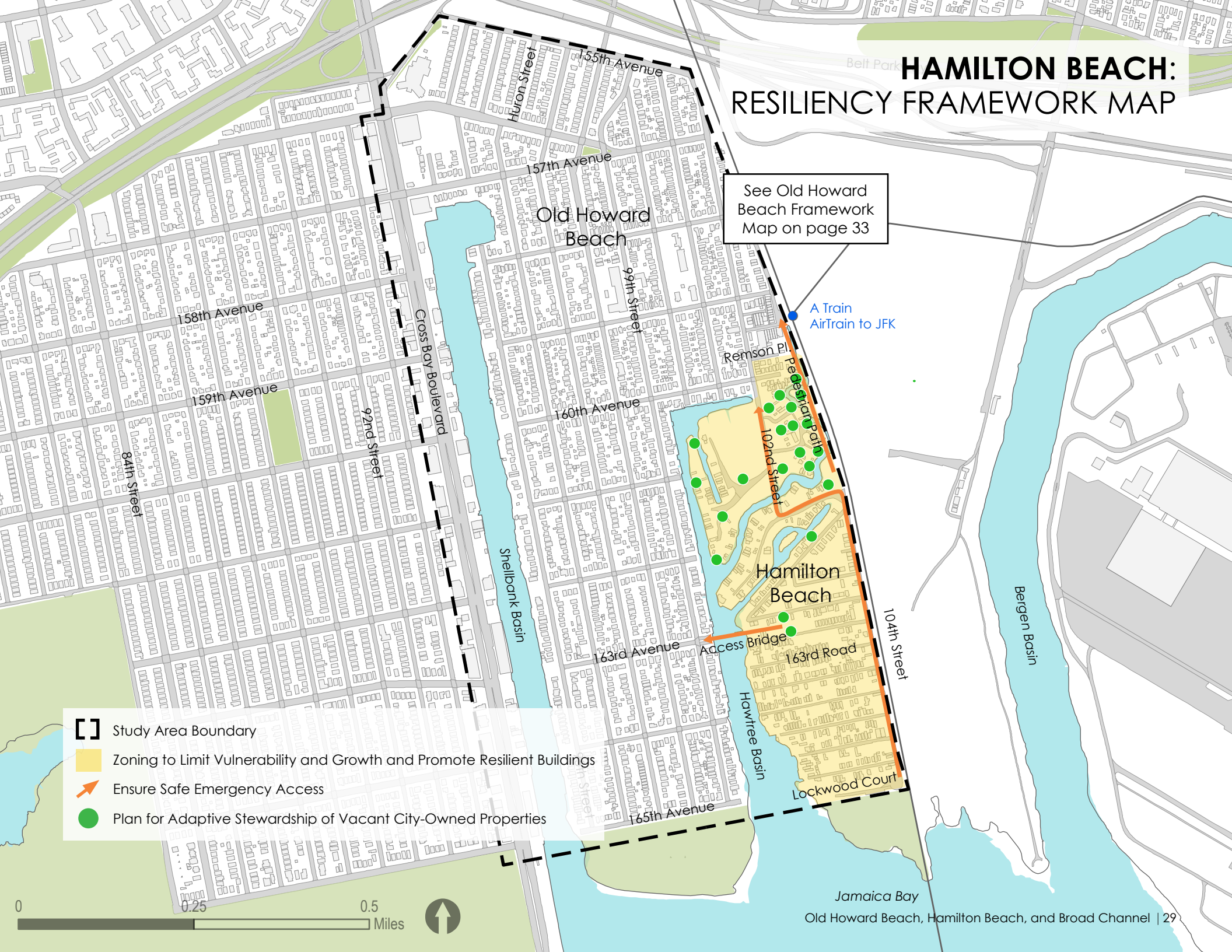
Explore opportunities to make more appropriate use of vacant City-owned properties.

# HAMILTON BEACH: RESILIENCY FRAMEWORK MAP

See Old Howard Beach Framework Map on page 33

A Train  
AirTrain to JFK

-  Study Area Boundary
-  Zoning to Limit Vulnerability and Growth and Promote Resilient Buildings
-  Ensure Safe Emergency Access
-  Plan for Adaptive Stewardship of Vacant City-Owned Properties





## Hamilton Beach: Recommended Zoning Changes

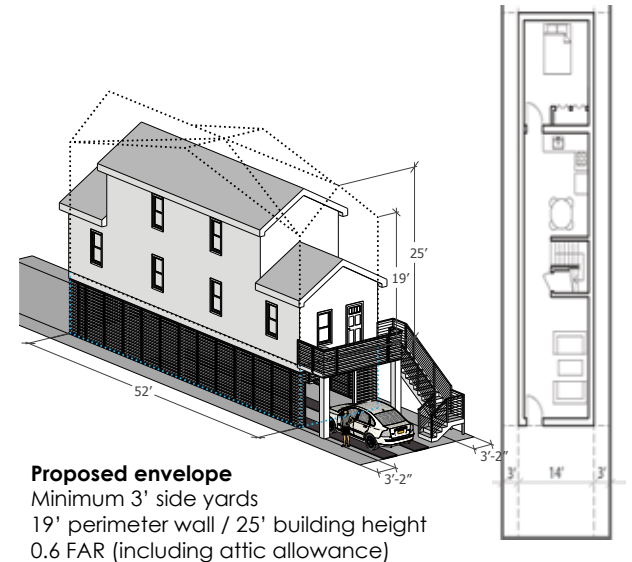
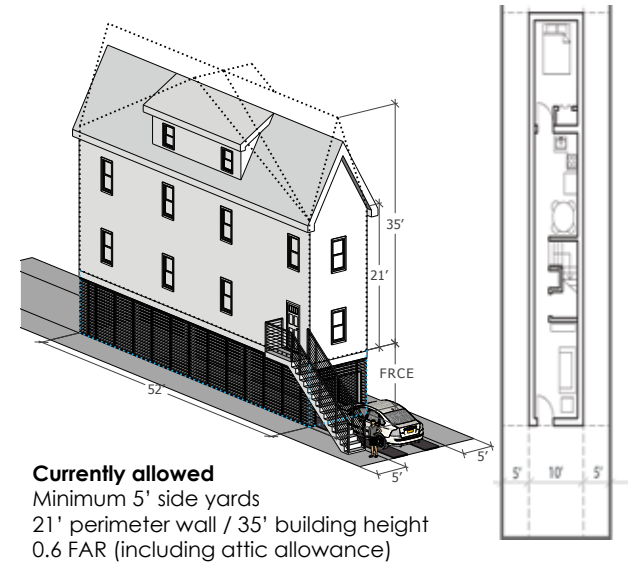
### Zoning to Limit Vulnerability and Growth and Promote Resilient Buildings

Like Broad Channel, Hamilton Beach is also likely to face regular flooding from high tides in the future. Changes to zoning can help limit this vulnerability and promote resilient buildings in Hamilton Beach—generally bounded by Coleman Square, the A-Train right-of-way, and Hawtree Basin. The primary zoning proposed is R3A, with a modification by special zoning regulations to limit future residential development to detached houses, with one-family houses allowed on all lots, and two-family houses allowed on lots at least forty feet wide. Under R3A, the maximum Floor Area Ratio (FAR) is 0.6, which includes a 0.1 attic allowance. The minimum required lot area is 2,375 square feet and the minimum lot width is twenty-five feet. One off-street parking space is required for each dwelling unit. These regulations would not be changed. Community facilities are permitted at an FAR of 1.0, but any community facilities that include sleeping or overnight accommodations would be prohibited.

This recommendation reflects the neighborhood character of detached residences on narrow lots. More importantly, however, it would achieve the goal of avoiding inappropriate new residential development in an area projected to experience daily tidal inundation due to sea level rise. In this neighborhood, there are also few viable options for infrastructure investments to mitigate this flood risk. For this reason, it is recommended that this part of the proposal move forward in advance of other zoning changes.

In addition to this local rezoning, flexibility to facilitate rebuilding on small lots is needed, such as through the envelope that was provided through Special Regulations for Neighborhood Recovery. This should be addressed as part of a future update to the Flood Resilience Zoning Text Amendment. These changes would alleviate the difficulties faced in rebuilding residences on narrow, substandard

lots and would result in a more usable layout than can be achieved under existing zoning. As described in the Building and Lot Typology section on page 22, fifty-five percent of lots are less than thirty feet wide and are limited by existing five-foot side yard requirements that result in narrow houses and poor interior layouts (see upper right graphic). Modifications to the text amendment should include new building height and setback requirements that are representative of the small-scale residences found in Hamilton Beach. Specifically, the text should allow for a reduction of side and rear yard requirements and require that any development taking advantage of these reductions conform to a new, cottage-style zoning envelope. Minimum required side yards should be three feet on the most constrained sites and the rear yard reduction allowance should be expanded from the current depth of lots less than eighty feet deep to any lots less than ninety-five feet deep, while still requiring a minimum rear yard depth of ten feet. Residences constructed pursuant to these yard reductions would be required to use new height and setback requirements, with a zoning envelope that is shorter but wider than the existing as-of-right envelopes in these low-density residential districts. This would yield a more rational and usable floor plan, as shown in the lower right graphic, while preventing disproportionately tall and skinny houses. These changes would better enable property owners to make resilient retrofits and rebuild appropriately, if necessary, and would help buildings lacking complete documentation of the existing footprint. In addition, new buildings would also better match the existing context.



## Hamilton Beach: Infrastructure and Coastal Preparedness Strategies

### Ensure Safe Emergency Access

Residents and emergency responders may face increasingly challenging conditions if roadways are inundated during flooding and storm events, and costs are likely to increase with projections of more flooding. Future funding may be necessary to provide additional emergency services. Currently there are only three options for egress in Hamilton Beach: vehicular and pedestrian access on 104th Street (a narrow street), pedestrian and vehicular access (as needed) on the Rau Court Pedestrian Bridge, and pedestrian access on the path adjacent to the A-train. Standard emergency vehicles, which already have trouble navigating the narrow streets, may have difficulty reaching residents during a flood event. The Fire Department utilizes high axle vehicles and flat bottom boats during stillwater flooding events, and relies on inflatable response boats during larger storm events. However, residents may experience slower response times in these situations because of the need to deploy special equipment. Some local fire stations may not have the capacity to store all equipment on-site and may need to transport resources



The pedestrian path adjacent to the A train connects Hamilton Beach to Coleman Square and the AirTrain to JFK Airport

from storage sites. Furthermore, maintenance for, and training to utilize, these special resources is dependent upon the availability of state and federal funding in any given year. Given the high vulnerability of this area to projected sea level rise, there may be a need for storage of additional special equipment closer to the neighborhood. Future funding for emergency access measures for Hamilton Beach should include the need for additional special access vehicles and storage facilities, as well as specialized training for personnel. In addition, residents and community groups should continue to work closely with NYC Emergency Management to partner with the ReadyNY program, NYC Citizen Corps, and build their own inclusive emergency plan. These efforts would address individual and community emergency preparedness.

### Plan for Adaptive Stewardship of Vacant City-Owned Properties

There are more than seventy-five vacant City-owned lots in Hamilton Beach. Most of these properties were acquired by the City through the *in rem* process. To ensure that future growth in this vulnerable area is limited, the City is planning to identify the most appropriate uses for these City-owned vacant lots. Some of these uses might include turn-around areas for emergency vehicles that have difficulty navigating narrow streets, community gardens, or green infrastructure utilizing a sustainable native landscape that is more resistant to flood waters.



Vacant City-owned property between Rau and Davenport Courts in Hamilton Beach

# OLD HOWARD BEACH: RESILIENCY FRAMEWORK

The resiliency framework for Old Howard Beach identifies recommendations for zoning, as well as infrastructure investments and storm preparedness plans. While this neighborhood does not face the same degree of risk to tidal flooding with sea level rise, future zoning changes should provide flexibility to encourage property owners to make resiliency investments.

## **Contextual Rezoning**

Promote resilient development by changing zoning to be consistent with existing residential context.

## **Promote Commercial Resiliency**

Enable resiliency in commercial areas through providing zoning flexibility and technical resources on storm preparedness to existing businesses.

## **Flexibility for Waterfront Access**

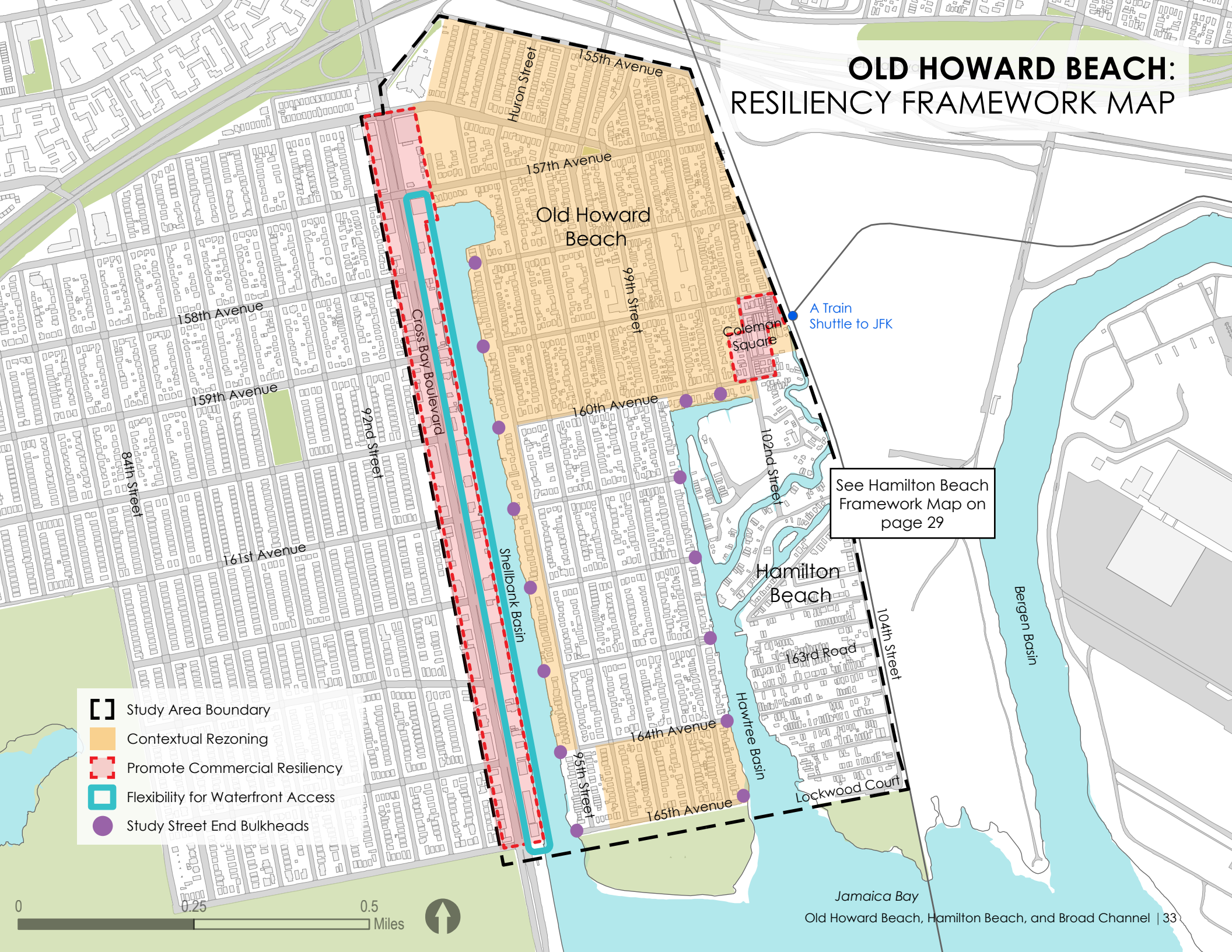
Modify waterfront zoning to remove barriers to resilient design while creating new opportunities for public access.

## **Study Street End Bulkheads**

Identify opportunities for street end bulkhead improvements.



# OLD HOWARD BEACH: RESILIENCY FRAMEWORK MAP



-  Study Area Boundary
-  Contextual Rezoning
-  Promote Commercial Resiliency
-  Flexibility for Waterfront Access
-  Study Street End Bulkheads

See Hamilton Beach Framework Map on page 29



## Old Howard Beach: Recommended Zoning Changes

### Contextual Rezoning

Rezoning portions of Old Howard Beach would align zoning with established neighborhood character.

#### Recommended R3X (from R3-1 and R3-2)

An R3X contextual rezoning is recommended in the future in two areas that together comprise forty blocks in Old Howard Beach: the first generally bounded by the Belt Parkway, the A Train right-of-way, 160th Avenue, 95th Street, Shellbank Basin, Cross Bay Boulevard, 156th Avenue, and Killarney Street (but excluding Huron Street); and the second generally bounded by 164th Avenue, Hawtree Basin, 165th Avenue, and 96th Street. R3X allows one- or two-family detached residences with a maximum Floor Area Ratio (FAR) of 0.6, which includes a 0.1 FAR attic allowance. The maximum perimeter wall height is twenty-one feet and the maximum building height is thirty-five feet. The minimum required lot area is 3,325 square feet, and the minimum lot width is thirty-five feet. The front yard of a new residence must be at least as deep as an adjacent front yard, with a minimum depth of ten feet and a maximum depth of twenty feet. One off-street parking space is required for each dwelling unit. Community facilities are permitted at an FAR of 1.0.

This contextual rezoning would more closely reflect the existing residences in terms of lot width and reinforce the one- and two-family detached character in these two areas. Detached residences have more flexibility to be retrofitted and, as may be necessary, raised to the DFE.

#### Recommended R3-1 (from R3-2)

A future rezoning of Huron Street—between the Belt Parkway and 156th Avenue—from R3-2 to R3-1 is recommended to reflect the existing semi-detached character. R3-1 is the lowest density district to allow semi-detached one- and two-family, in addition to detached one- and two-family, residences. The maximum FAR is 0.6, which includes a 0.1 FAR attic allowance.

The minimum required lot area is 3,800 square feet for detached residences and 1,700 square feet for other residences. The minimum lot width for a detached house is forty feet, or eighteen feet for other residences. One off-street parking space is required for each dwelling unit. Community facilities are permitted at an FAR of 1.0.

This rezoning would more closely reflect the semi-detached character on this block, which differs from the detached buildings elsewhere in Old Howard Beach. Huron Street is partially outside the 1% annual chance floodplain and is less likely to be flooded.

### Promote Commercial Resiliency

While the 2013 Flood Resilience Zoning Text Amendment provided some flexibility for resiliency standards, commercial properties here are still likely to face barriers to redevelopment.

#### Update Citywide Zoning

As part of a future update to the text amendment, additional measures should be considered to accommodate dry floodproofing of commercial buildings, which would benefit properties on Cross Bay Boulevard in particular. Such provisions could include additional latitude to provide sufficient room for parking underneath the first floor of commercial use.

#### Update Commercial Overlay in Coleman Square

A rezoning of Coleman Square from C1-2 to C1-3 is recommended in the near term to reflect existing development patterns and reduce parking requirements. This area is generally bounded by 159th Avenue, the A train right-of-way, 159th Road, Hawtree Creek, 160th Ave, 101st Street, 159th Road, and 102nd Street. C1-3, like C1-2, serves the local shopping needs of the communities and has an FAR of 1.0. However, parking requirements are somewhat lower at generally one per 400 square feet of floor area for general retail uses, compared to one

per 300 under existing zoning. Additionally, there would be greater ability for small developments to be exempt from parking requirements. This change would reduce a zoning impediment that may deter resiliency upgrades for buildings on small lots. It would also more closely reflect the commercial properties and amount of parking that is provided today.



Businesses on Cross Bay Boulevard



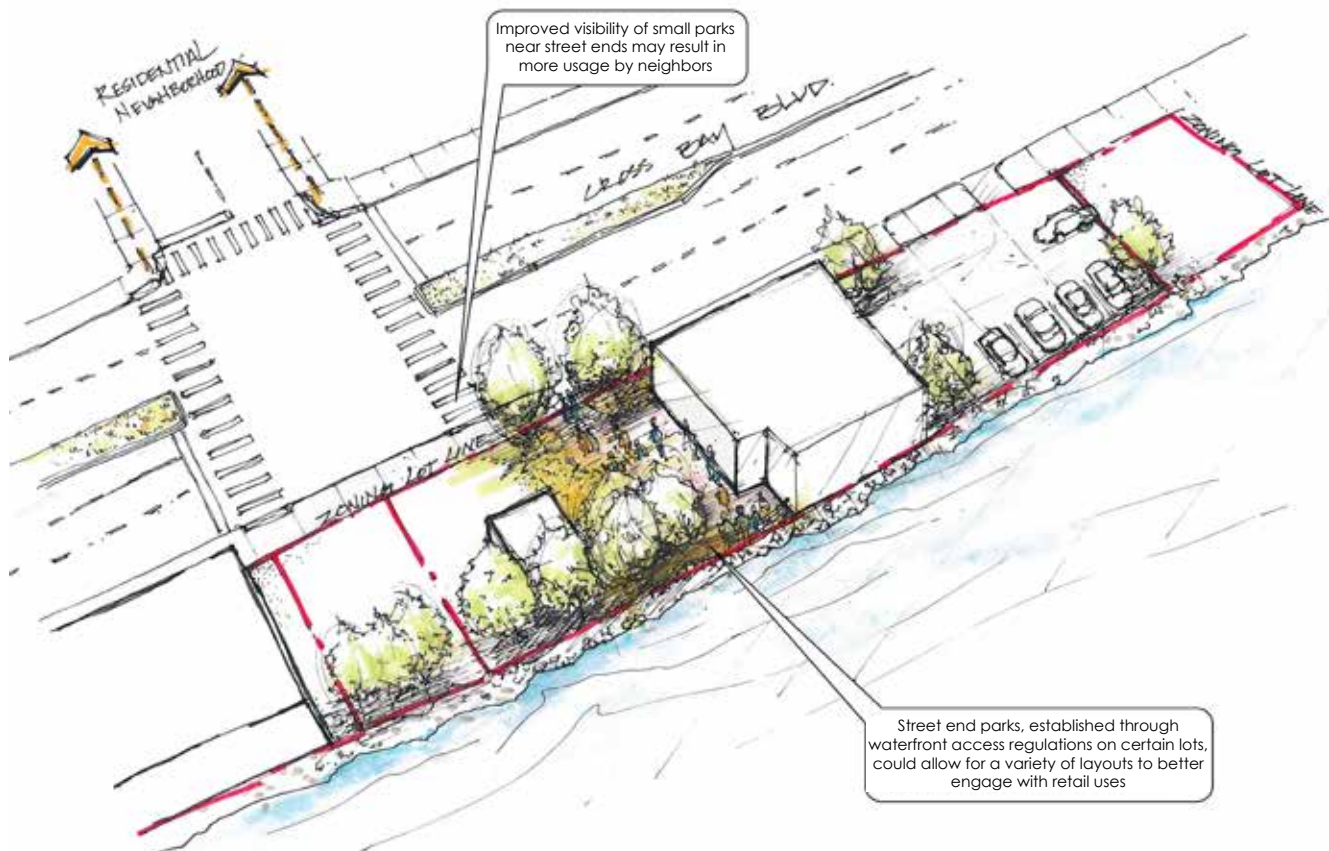
Businesses in Coleman Square



### Flexibility for Waterfront Access

Current waterfront zoning requires linear access along the shoreline. These requirements provide limited public value and create difficulties for the narrow sites along Cross Bay between 157th and 165th Avenues to redevelop or make improvements. To facilitate greater shoreline access, required access could be located closer to a street end for improved visibility from the nearby neighborhood, rather than as currently required along the length of the shoreline, which is more difficult to see and access. By allowing shoreline access to relocate on a site, property owners would have flexibility in site planning options when making resiliency investments on these shallow, constrained sites. Waterfront access could

be relocated on the lot in the form of a street end park to provide a street end upland connection. These changes could be enacted through a private developer's proposal, or through a City-sponsored text amendment that would require future developers to build and maintain this access. In addition to reconfigured waterfront public space, the regulations should require enhanced landscaping for parking lots adjacent to Shellbank Basin to decrease impervious surface area and improve drainage during floods. The regulations should also modify the waterfront rear yard requirements to complement these changes. The result would be greater site flexibility for businesses making resilient retrofits while providing public access to the waterfront at appropriate locations.



## Old Howard Beach: Infrastructure and Coastal Preparedness Strategies

### Study Street End Bulkheads

Flood waters often enter Old Howard Beach through low-lying street ends. Targeted investments in bulkheads will be necessary to reduce street end flooding, as well as tidal flooding that is projected with sea level rise.

Bulkheads prevent shoreline erosion and provide protection against minor but more frequent storms. Some street ends in Old Howard Beach have bulkheads, but those bulkheads are often in need of repair. Some street ends lack shoreline protection entirely. The NYC Economic Development Corporation and the Mayor's Office of Recovery and Resiliency have identified this area as a priority for bulkhead improvements. Design and permitting for several street ends with deteriorated bulkheads will be undertaken using federal Community Development Block Grant Disaster Recovery funding. Coordination with the adjacent property owners regarding potential impacts to their property will be undertaken during design phase.

### Promote Commercial Resiliency

Existing businesses in Coleman Square are small and serve a limited, local market, so they may face challenges when incorporating resilient retrofits today, or rebuilding after a major storm or flooding in the future. The Business Preparedness and Resiliency Program (Business PREP), run by the Department of Small Business Services, is offering workshops to assist with the creation of a basic business continuity plan. In fall 2016, the program began to provide on-site resiliency assessments for small businesses and micro-grants to implement specific recommendations. Going forward, the program will launch an online tool for businesses to learn about resiliency planning.



# ADDITIONAL AREA-WIDE STRATEGIES

In addition to the zoning, infrastructure, and coastal preparedness strategies described in this report, other actions can further support the resiliency of Old Howard Beach, Hamilton Beach, and Broad Channel. Federal, State, and City government agencies are exploring different potential capital projects that would help address coastal flooding vulnerabilities within the study area. All future public investments in these areas should consider the effects of sea level rise over the lifespan of each project, as required by the NYC Waterfront Revitalization Program. Sea level rise impacts should also be assessed and considered when evaluating the costs and benefits of pursuing a project.

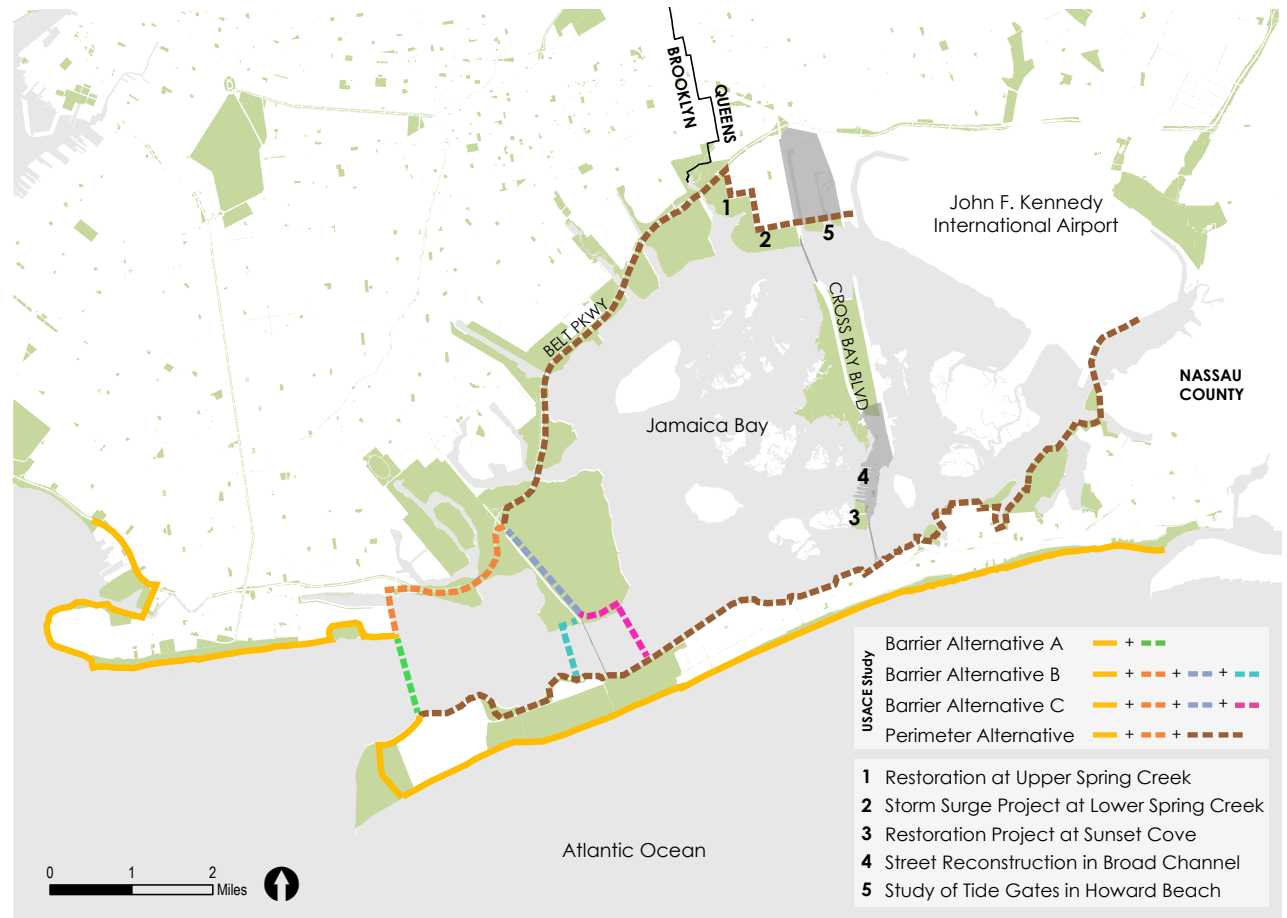
The City is working with the State and Federal governments and non-profit partners on developing outreach programs for property owners in the floodplain to help them better understand risks, insurance requirements, and mitigation options. The New York State Governor’s Office of Storm Recovery (GOSR) is partnering with the Center for NYC Neighborhoods on a \$7.5 million pilot program for homeowners in the floodplain in certain neighborhoods, including Howard Beach, that will combine an online platform with one-on-one, in-person resiliency audits and counseling. Users of the web tool can get personalized calculations of expected insurance premiums, along with design and cost estimates for flood mitigation strategies. Homeowners in the pilot neighborhoods will also have the opportunity to receive resiliency audits of their homes from an engineer, including an Elevation Certificate, as well as one-on-one counseling on flood insurance and how their homes may be affected in the future by extreme weather and climate change. While counseling will be available only in certain neighborhoods, the online tool will also be available to all communities and homeowners in the five boroughs. The initiative is being federally funded through the New

York Rising Community Reconstruction Program. More information can be found on the project website, [www.FloodHelpNY.org](http://www.FloodHelpNY.org).

In addition, the City is continuing to explore the creation of a loan program for low-, moderate-, and middle-income property owners to fund resiliency improvements. To complement these efforts, the City will continue to advocate for FEMA recognition of a wider range of mitigation strategies, including wet

floodproofing, temporary flood barriers (for businesses), and other alternatives for full or partial reduction in NFIP premiums.

The United States Army Corps of Engineers (USACE) is undertaking the East Rockaway Inlet to Rockaway Inlet and Jamaica Bay Reformulation Study to assess strategies for controlling erosion and reducing risks from coastal storms along the Atlantic shorefront. Measures being explored include groins, dunes, berms, and



reinforced dunes. To reduce risks from flooding in the Bay, four alternatives are being analyzed: three hurricane barrier alternatives and a shoreline protection perimeter alternative. All alternatives also include the exploration of strategies for Coney Island. The USACE has thus far determined that the hurricane barrier option is more cost-effective and will have less environmental impacts. They have tentatively selected Barrier Alternative C as the preferred alternative, but implementation of the project will require several more years of permitting and design. The alignment is still being analyzed to ensure, among other things, that water quality and coastal habitats in the Bay are not compromised. In the interim, the City recommends that the USACE advance the Atlantic oceanfront element of the project, which includes beach restoration and a reinforced seawall, as well as smaller-scale projects within the Bay to protect low-lying areas from sea level rise and improve coastal habitats. Importantly, this study is not currently funded and requires approval and appropriation from Congress.

Though the USACE study is ongoing, several projects are currently underway to either assess or implement measures to protect communities in Jamaica Bay against storm surge. The New York Rising Community Reconstruction Plans led by GOSR funded feasibility study of tide gates at Hawtree and Shellbank Basin, which is being conducted as part of the USACE study. The USACE, in collaboration with NYC Department of Parks and Recreation (DPR), is leading an ecosystem restoration effort at Upper Spring Creek, and DPR is spearheading a restoration project at Sunset Cove. Both of these projects will help reduce coastal storm risk. An additional effort to protect against storm surge while simultaneously promoting ecological restoration is being led by the New York State Department of Environmental Conservation in Lower Spring Creek. The City supports

the continued investment in green shoreline projects that provides modest wave attenuation, storm surge reduction, and benefits to Jamaica Bay's wetlands.

Street and sewer infrastructure projects currently under construction or in the planning phases will lessen flooding during high tide today and reduce impacts during storm events. However, none of these projects will address tidal flooding under future conditions projected with sea level rise. The Broad Channel Flood Mitigation Project is a multi-year City capital project that involves reconstructing bulkheads, elevating roadbeds by three to four feet (the highest these streets can be raised), and installing storm sewers on nine streets. Though these projects have a limited anticipated life span given the sea level rise projections, they will provide short- to mid-term quality of life benefits.

# CONCLUSION

Old Howard Beach, Hamilton Beach, and Broad Channel were included in the Resilient Neighborhoods initiative because of their unique built character and high vulnerability to coastal flooding. The resiliency frameworks and recommendations outlined in this report are intended to guide land use and infrastructure investment to support neighborhood recovery and vitality. The recommendations will inform the Department of City Planning's work in 2017 and beyond, and will inform inter-agency coordination on resiliency issues. In summary, the recommendations are to:

## **Enact targeted zoning changes to reflect the unique character and long-term vulnerability of Hamilton Beach and Broad Channel**

Timeline: Near-Term | Lead Agency: DCP

Zoning changes are needed to reflect that these areas face risks from flooding, for which there are no simple infrastructure solutions. Inappropriate and inflexible new development can be avoided in Hamilton Beach by allowing only detached residences and only single-family detached residences in Broad Channel. In both areas, zoning currently allows residential development ranging from semi-detached houses to small multi-family apartment buildings. DCP proposes advancing these anticipated actions expeditiously to prevent additional density in these vulnerable neighborhoods. Additional zoning challenges faced in these neighborhoods should be addressed as part of a citywide zoning update process.

## **Update zoning to make it easier for property owners to make resiliency investments to their buildings**

Timeline: Mid-Term | Lead Agency: DCP

Additional citywide zoning changes are necessary to address the challenges faced when building on narrow, substandard lots in Hamilton Beach and Broad Channel. This is an issue faced throughout New York City's floodplain, and should be addressed on a citywide basis. These changes would also enable buildings to achieve better floor plans than possible under current zoning. DCP will be working with communities throughout the floodplain over the next several years on updating the flood resilience provisions of zoning to address this issue, as well as others. In addition, in Old Howard Beach, a future neighborhood rezoning is necessary to ensure zoning that reflects the existing conditions.

## **Advance coordinated infrastructure and coastal protection strategies**

Timeline: Ongoing | Involved Agencies: Multiple City Agencies

Within the study area, there are a variety of cost-effective investments to address life safety issues and reduce property risks from flooding. Recommended strategies include studying the viability of new bulkheads on street ends in Old Howard Beach, offering business continuity support to commercial property owners, ensuring safe access in Hamilton Beach and Broad Channel, considering long-term sea level rise in capital investments, and identifying alternative uses for vacant City-owned property in Hamilton Beach and Broad Channel.

The Resilient Neighborhoods recommendations for Old Howard Beach, Hamilton Beach, and Broad Channel were shaped by input from the community and cooperation among other City agencies. The City remains committed to working with these neighborhoods as they adapt to changing conditions by continuing to address resiliency needs through zoning, infrastructure, and coastal flood preparedness strategies.





Elevated cottage-style house common to Hamilton Beach and Broad Channel

# GLOSSARY OF KEY TERMS

## **Base Flood Elevation (BFE)**

The computed elevation in feet to which floodwater is anticipated to rise during the 1% annual chance storm shown on the Flood Insurance Rate Maps (FIRMs) issued by the Federal Emergency Management Agency (FEMA). A building's flood insurance premium is determined by the relationship between the BFE and the level of the lowest floor of a structure.

## **1% Annual Chance Floodplain (100 Year Floodplain)**

The area that has a 1% chance of flooding in any given year. It is indicated on FEMA's Flood Insurance Rate Maps (FIRMs). See "Special Flood Hazard Areas," below.

## **Design Flood Elevation (DFE)**

As defined by the New York City Building Code, the Design Flood Elevation (DFE) is the minimum elevation to which a structure must be elevated or floodproofed. It is the sum of the BFE and a specified amount of freeboard (see definition below) based on the building's structural category.

## **Flood Insurance Rate Maps (FIRMs)**

The official flood map, on which FEMA has delineated the Special Flood Hazard Area (SFHA), 0.2% annual floodplain (Shaded X Zone), Base Flood Elevations (BFEs), and floodways.

## **Preliminary Flood Insurance Rate Maps (PFIRMs)\***

The PFIRMs are the best available flood hazard data. FEMA is in the process of updating the Flood Insurance Rate Maps (FIRMs) for New York City and issued PFIRMs in December 2013 and again in 2015 as part of this process. The New York City Building Code requires new and substantially improved buildings to use the PFIRMs (unless the effective FIRMs are more restrictive) until the maps become effective. The PFIRMs, however, are not used to guide the requirements of the National Flood Insurance Program.

## **Floodproofing, Dry**

For non-residential buildings, a flood mitigation technique that results in the building resisting penetration of flood water up to the DFE, with walls substantially impermeable to the passage of water and structural components having the capacity to resist specified loads.

## **Floodproofing, Wet**

A flood mitigation technique designed to permit parts of the structure below the DFE to intentionally flood, by equalizing hydrostatic pressures and by relying on the use of flood damage-resistant materials. With this technique, parts of the building below the DFE are only to be used for parking, storage, building access, or crawl space.

## **Freeboard**

An additional amount of height above the BFE to provide a factor of safety to address the modeling and mapping uncertainties associated with FIRMs, as well as a degree of anticipated future sea level rise. It is a risk reduction requirement found in Appendix G of the Building Code and recognized by NFIP as an insurance premium reduction factor. In New York City, one foot of freeboard is required for commercial and multi-family buildings, and two feet for single- and two-family buildings.

\* The City found inaccuracies in FEMA's underlying analysis that resulted in overstating the size of the city's current 1% annual chance floodplain. Following a successful appeal of the PFIRMs, New York City is working with FEMA to create a set of new flood maps for the city. There will be one map for insurance purposes based on current flood risk, and another for planning purposes that incorporates climate change. In the meantime, the PFIRMs remain in use for building code, planning, and zoning, while flood insurance still refers to the 2007 Effective FIRMs.

**National Flood Insurance Program (NFIP)**

Federal program that makes flood insurance available to municipalities that enact and enforce floodplain management regulations that meet or exceed the criteria established by FEMA. Under this program, properties within the SFHA with a federally-backed or -regulated mortgage are required to buy flood insurance. Communities participating in the NFIP must incorporate flood-resistant construction standards into building codes.

**Special Flood Hazard Areas (SFHA)**

Area of the floodplain that has a 1% chance, or greater, of flooding in any given year. Also referred to as the 100-year floodplain or the 1% annual chance floodplain. The SFHA is separated into zones depending on the level of hazard:

*V Zone*

The area of the SFHA subject to high-velocity wave action that can exceed three feet in height.

*Coastal A Zone*

A sub-area of the A Zone that is subject to moderate wave action between one-and-a-half and three feet in height.

*A Zone*

The area of the SFHA that is subject to still-water inundation by the base flood.

**Substantial Damage**

Damage sustained by a building whereby the cost of restoring the structure to its pre-damaged condition would equal or exceed fifty percent of the market value before the damage occurred. When a building is substantially damaged or substantially improved (see below), it is required to comply with Appendix G of the Building Code as if it was a post-FIRM structure.

**Substantial Improvement**

Any repair, reconstruction, rehabilitation, addition or improvement of a building with cost equaling or exceeding fifty-percent of the current market value of the building. When a building is substantially improved, it is required to comply with the flood-resistant construction requirements of Appendix G of the Building Code.



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## **Data Sources**

Federal Emergency Management Agency  
Mayor's Housing Recovery Office  
National Oceanic and Atmospheric Administration  
NYC Panel on Climate Change  
U. S. Department of Housing and Urban Development  
U. S. Census - American Community Survey

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# RESOURCES

## TECHNICAL GUIDANCE

### New York City Department of City Planning

#### Retrofitting Buildings for Flood Risk

[nyc.gov/retrofittingforfloordrisk](https://nyc.gov/retrofittingforfloordrisk)

#### Designing for Flood Risk

[nyc.gov/designingforfloordrisk](https://nyc.gov/designingforfloordrisk)

#### Urban Waterfront Adaptive Strategies

[nyc.gov/uwas](https://nyc.gov/uwas)

#### Flood Resilience Zoning Text Amendment

[nyc.gov/assets/planning/download/pdf/plans/flood-resiliency/flood-resiliency.pdf](https://nyc.gov/assets/planning/download/pdf/plans/flood-resiliency/flood-resiliency.pdf)

#### Special Regulations for Neighborhood Recovery

[nyc.gov/site/planning/plans/special-regulations-neighborhood/special-regulations-neighborhood.page](https://nyc.gov/site/planning/plans/special-regulations-neighborhood/special-regulations-neighborhood.page)

### New York City Department of Buildings

#### Building Code Appendix G Flood-Resistant Construction

[nyc.gov/site/buildings/codes/2014-construction-codes.page](https://nyc.gov/site/buildings/codes/2014-construction-codes.page)

### Federal Emergency Management Agency

#### Flood Insurance Rate Maps

[region2coastal.com](https://region2coastal.com)

#### National Flood Insurance Program

[floodsmart.gov](https://floodsmart.gov)

## INFORMATIONAL RESOURCES

### OneNYC

[nyc.gov/onenyc](https://nyc.gov/onenyc)

### Mayor's Office of Recovery and Resiliency

[www.nyc.gov/html/planyc/html/resiliency/resiliency.shtml](https://www.nyc.gov/html/planyc/html/resiliency/resiliency.shtml)

### New York City Panel on Climate Change

[onlinelibrary.wiley.com/doi/10.1111/nyas.2015.1336.issue-1/issuetoc](https://onlinelibrary.wiley.com/doi/10.1111/nyas.2015.1336.issue-1/issuetoc)

