Resilient Neighborhoods

East Shore, Staten Island

NYC PLANNING

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.

Privately-funded home elevation in New Dorp Beach

Resilient Neighborhoods

East Shore, Staten Island

THE CITY OF NEW YORK
MAYOR BILL DE BLASIO

DEPARTMENT OF CITY PLANNING
MARISA LAGO, DIRECTOR

April 2017
www.nyc.gov/resilientneighborhoods

FOREWORD

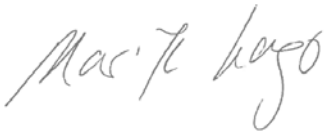
South Beach, Midland Beach, New Dorp Beach, and Oakwood Beach are waterfront communities on the shoreline of the Lower Bay that collectively make up the East Shore of Staten Island. This waterfront setting has drawn generations of families to live in these neighborhoods, but it is also what makes them vulnerable to flooding. While previous storms affected these neighborhoods, the impact of Hurricane Sandy in 2012 was severe. The storm's surge overtopped Father Capodonna Boulevard and flood waters rose quickly throughout these low-lying neighborhoods, causing extensive damage and even deaths.

Today, nearly four years after the storm, much has changed. Homes are being elevated and shuttered stores have reopened. Planned investments in coastal protection, drainage, relocation, and parkland will make these neighborhoods better prepared for future floods, and will provide new amenities and vibrancy. But much work remains to be done as well.

The Resilient Neighborhoods initiative was launched by the Department of City Planning (DCP) shortly after Hurricane Sandy. This report is the culmination of over three years of research, outreach, and hard work by DCP, working closely with communities in South Beach, Midland Beach, New Dorp Beach, and Oakwood Beach, to develop a long-term plan for shaping land use and development in ways that reduce flood risks and complements other resiliency programs and investments.

Here, residents will find recommendations for updating specific zoning and land use regulations, and for investments in coastal infrastructure and other programs. The conclusions of this report will guide a series of future zoning actions that DCP will pursue. These include a proposal, which will be advanced immediately, to limit density in the most vulnerable areas, as well as longer term local and citywide proposals.

This report is the beginning of a commitment to work with communities to ensure the ongoing vibrancy and resiliency of the East Shore of Staten Island.



Marisa Lago, Director
Department of City Planning

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Resilient Neighborhoods is a place-based planning initiative, led by the NYC Department of City Planning (DCP) 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 East Shore of Staten Island. DCP has been working with residents in the East Shore communities of South Beach, Midland Beach, New Dorp Beach, and Oakwood Beach since Hurricane Sandy devastated the area in October 2012. This work has included reviewing the regulatory context and performing detailed neighborhood assessments to develop tailored land use strategies and recommendations in partnership with agencies, community members, and other stakeholders.

The East Shore is a coastal, low-lying area that is primarily residential and has a long history as a tight-knit community and beach destination. As demonstrated by Sandy, the area has significant exposure to flooding, which poses risks to human safety and can cause damage and disruption to homes and businesses. In addition to flood risk, other barriers inhibit the ability of the East Shore to thrive. These include zoning that makes resilient residential building and retrofitting on small lots challenging, widespread commercial disinvestment, a disjointed street grid, and limited transportation infrastructure for cyclists and pedestrians to make safe connections to beaches and parks.

There are also many ongoing and planned investments in new flood control projects, and ongoing Sandy recovery programs that present an opportunity for significant improvements in safety and neighborhood vitality.

The City's work in the East Shore to address these concerns has been guided by three primary goals, each with additional strategies to support their implementation:

Reducing flood risk

DCP aims to facilitate resilient residential investment that aligns with neighborhood character. This would be accomplished by adjusting zoning regulations to make a broader range of solutions for rebuilding and retrofitting existing buildings feasible. It also entails mapping a contextual district in the New Dorp Beach Bungalow Colony and amending zoning provisions near freshwater wetlands to better balance ecological protection and development while promoting recreational opportunities. While changing zoning rules to address the needs of individual property owners is a necessary step for reducing flood risk on the East Shore, rebuilding resilient neighborhoods to address the long-term challenges of living near the waterfront will be an ongoing process lasting many years and requiring continued investment from homeowners and support from government.

Planning for adaptation over time

DCP is working to support and advance programs and capital projects at the Federal, State, and City level to address flooding, including the proposed U.S. Army Corps of Engineers Line of Protection, New York City Department of Environmental Protection's Mid-Island Bluebelt, and New York State Enhanced Buyout Areas in Oakwood Beach, Ocean Breeze, and Graham Beach. This will require an on-going coordinated planning effort to reduce flood risk and create an enhanced open space network that can redefine the quality of life for the East Shore's waterfront neighborhoods.

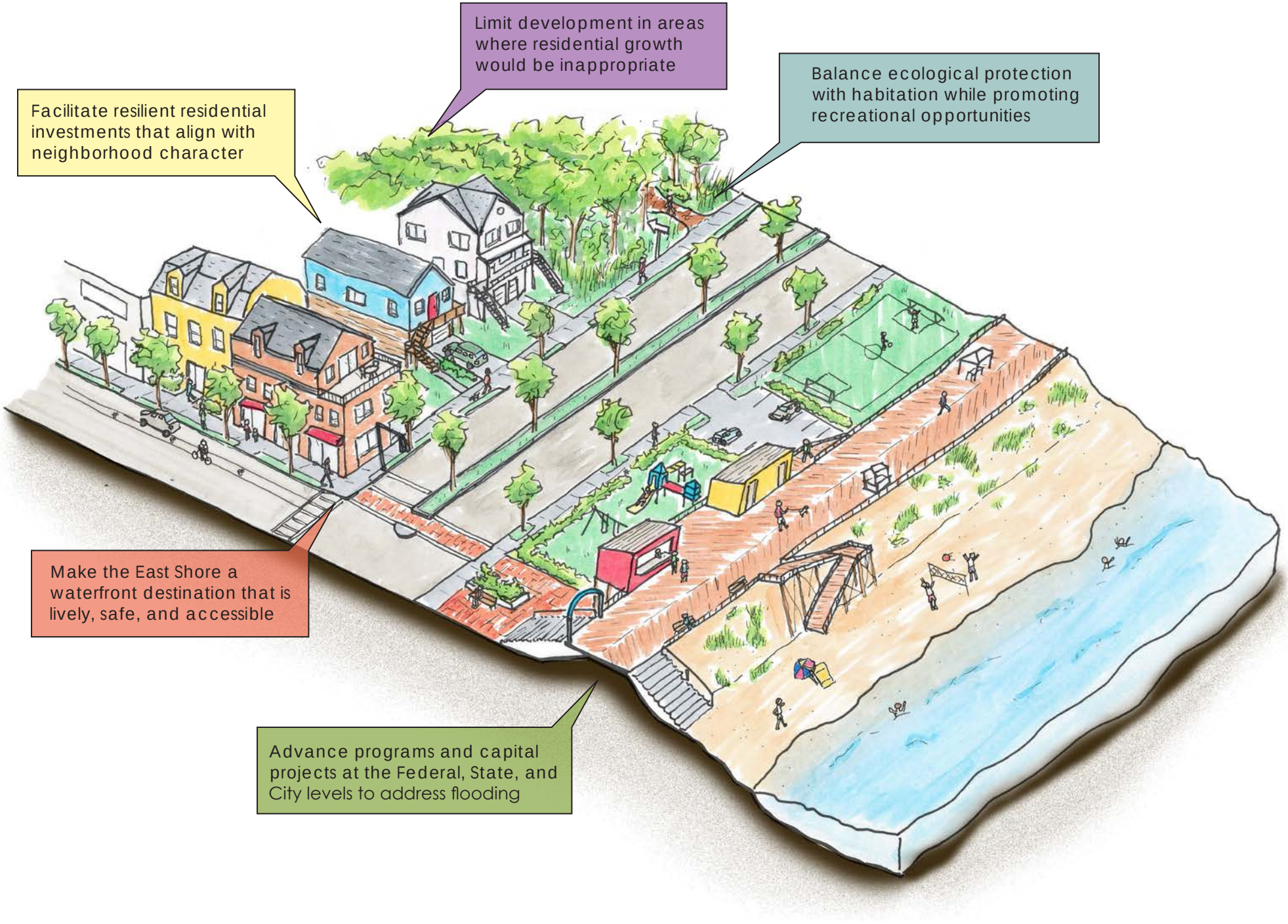
Creating resilient, vibrant neighborhoods

Many community members have articulated a desire for the East Shore to again become a waterfront destination that is lively, safe, and accessible. Together with planned capital investments, changes to zoning can support resilient residential and mixed-use development that builds upon the community's character and recreational assets.

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 74.

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

SUMMARY OF GOALS AND RECOMMENDATIONS



INTRODUCTION

Resiliency Planning in New York City

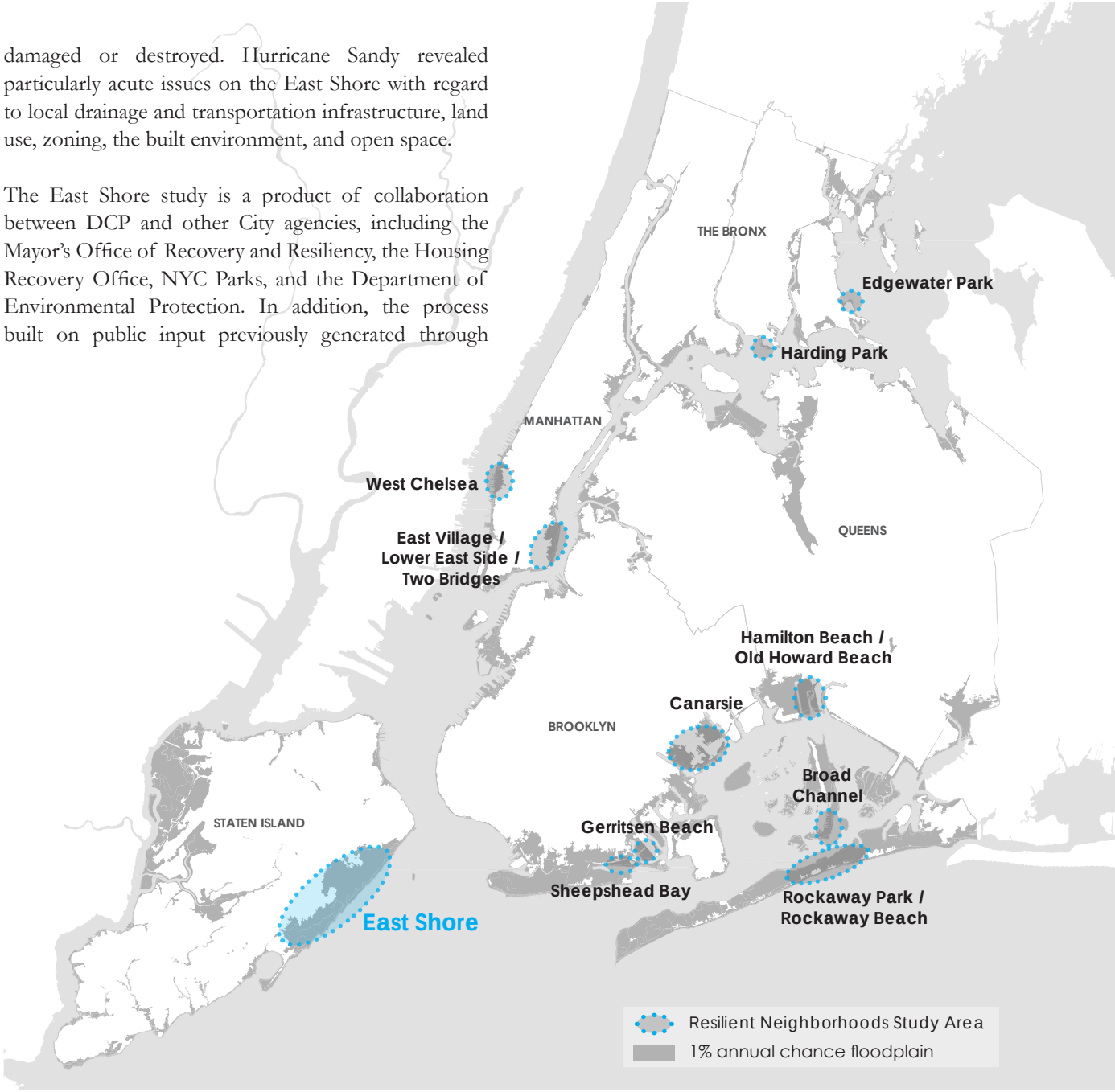
Following Hurricane Sandy in October 2012, the City developed *A Stronger, More Resilient New York*, which laid out a detailed action plan for rebuilding post-Sandy and making the city's coastal communities, buildings, and infrastructure more resilient in the long-term. The City has made significant 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 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.

The East Shore Study Area is a low-lying geography of roughly four square miles that was hit particularly hard by coastal inundation during Hurricane Sandy. Thousands of homes in Oakwood Beach, New Dorp Beach, Midland Beach, and South Beach were severely damaged or destroyed. Hurricane Sandy revealed particularly acute issues on the East Shore with regard to local drainage and transportation infrastructure, land use, zoning, the built environment, and open space.

The East Shore study is a product of collaboration between DCP and other City agencies, including the Mayor's Office of Recovery and Resiliency, the Housing Recovery Office, NYC Parks, and the Department of Environmental Protection. In addition, the process built on public input previously generated through



other initiatives, such as New York State's Community Reconstruction Program and the U.S. Department of Housing and Urban Development's Rebuild by Design. Recommendations made through Resilient Neighborhoods also draw on previous work by DCP and other City agencies.

The Department's Flood Resilience Zoning Text Amendment, adopted in October 2013, changed zoning regulations to enable new and existing buildings to incorporate flood protection measures more easily. This text amendment, adopted as a temporary measure immediately after Sandy, is currently in the process of being revised and updated before its permanent adoption. In addition, *Retrofitting Buildings for Flood Risk*, a report released by DCP in 2014, provided a comprehensive guide to retrofitting buildings in the floodplain. This study also builds on DCP's *Resilient Retail* report, released in 2016, and other ongoing studies of resiliency issues related to transportation on the East Shore and industrial land uses citywide.

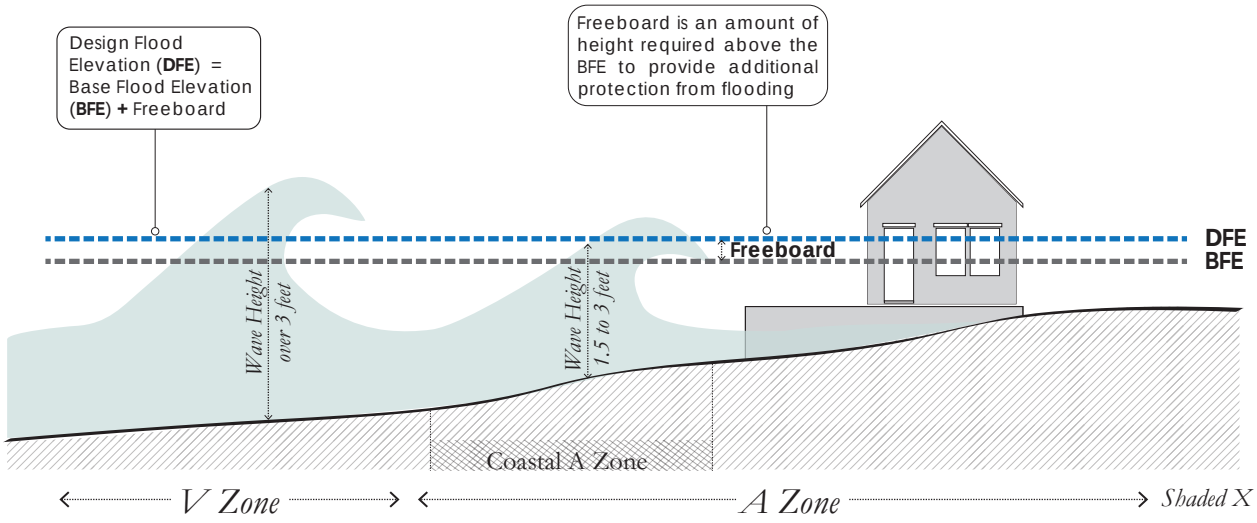
Regulatory Context

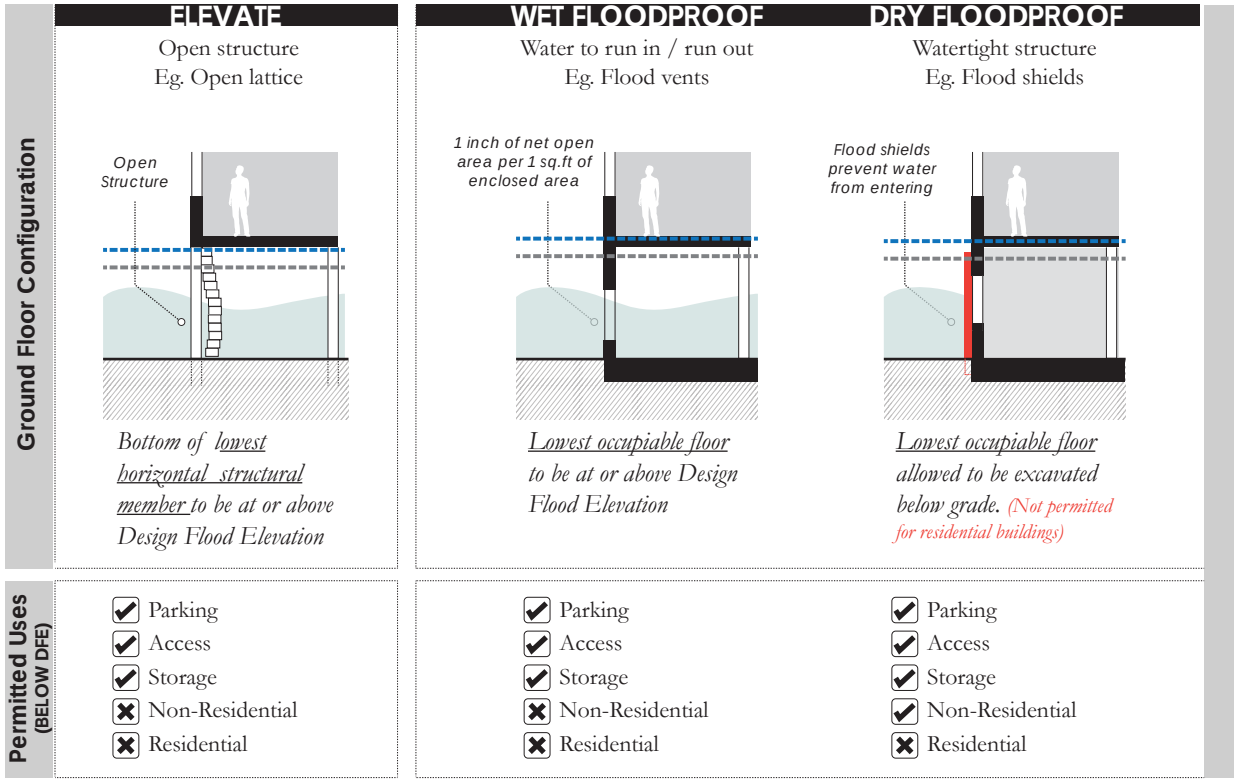
A wide array of programs and regulations at various levels of government shape the City's approach to managing flood risk and promoting resilient development. In the United States, floodplain regulation begins with Flood Insurance Rate Maps (FIRMs), which the Federal Emergency Management Agency (FEMA) 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. Homes 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 New York City, which were implemented in 1983 and most recently updated in 2007. As part of the mapping update,





FEMA issued updated Preliminary FIRMs (PFIRMs) in December 2013 with another revision in January 2015. In most places, these PFIRMs show an expanded 1% annual chance floodplain. The maps also increase Base Flood Elevations 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, 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, as described below, while flood insurance still refers to the 2007 effective 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 New York City Building Code's Appendix G on "Flood-Resistant Construction," which as of 2013 applies to the 1% annual chance floodplain shown on FEMA's PFIRMs or the 2007 effective 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.

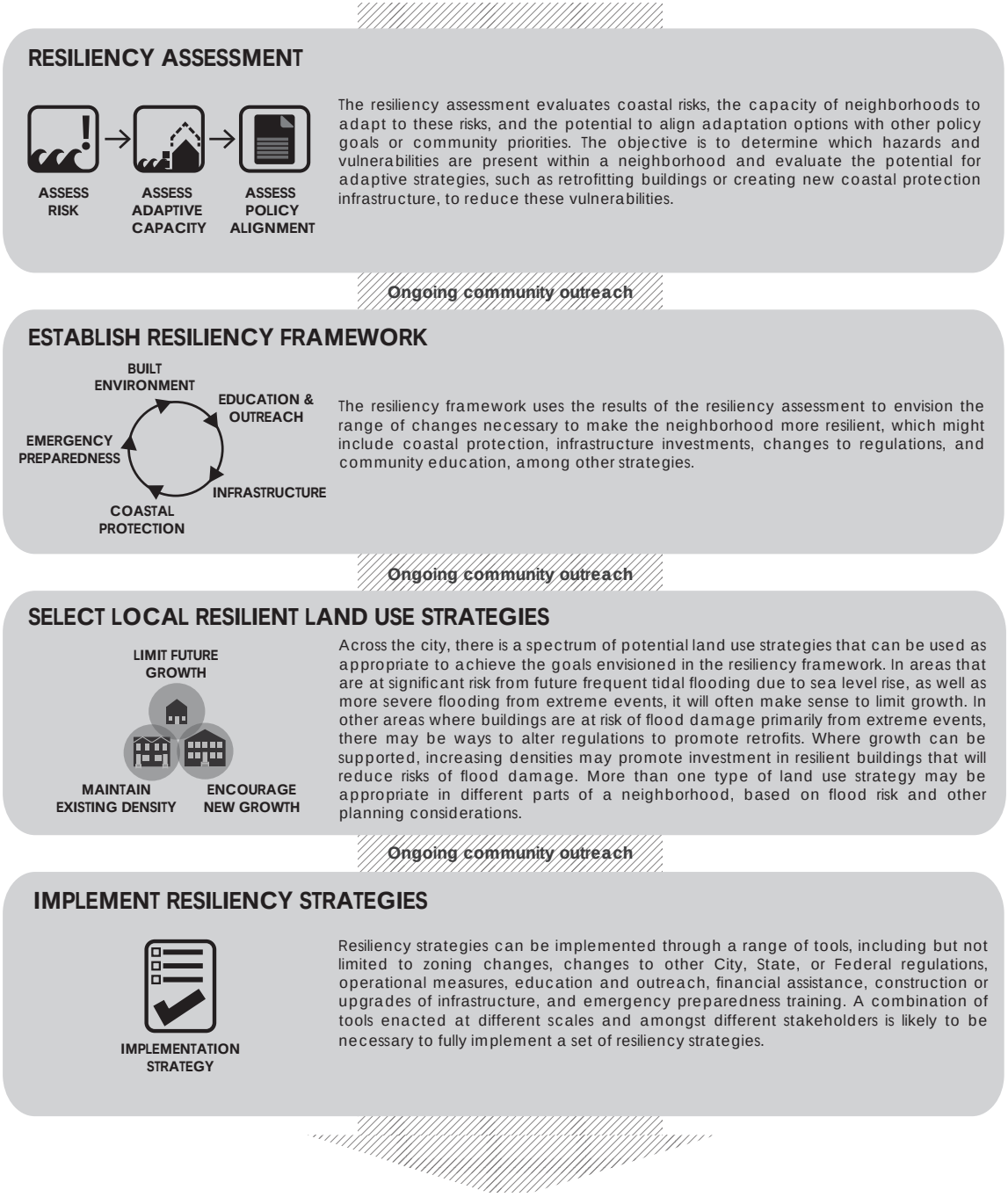
Buildings that are neither new, "Substantially Damaged," nor "Substantially Improved" (see glossary) are not required to meet Appendix G requirements as long as any changes to the building do not increase the level of noncompliance, but owners may voluntarily choose to implement partial flood mitigation 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. This text 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

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.



parking requirements, and 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 Flood Resilience Zoning Text Amendment was conducted as an emergency measure to facilitate ongoing rebuilding and retrofitting following Sandy, and included a sunset provision, so will expire one 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 existing and new buildings resilient to current and future flood risks, while supporting the vibrancy and character of neighborhoods.

Planning Approach for Resiliency

The ten Resilient Neighborhood study areas each exhibit a variety of physical, environmental, social, and economic conditions, 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. The diagram shown to the left explains this approach and the latter half of this report details the strategies and recommendations generated for the East Shore using this process.

East Shore Community Advisory Committee members discussing residential zoning

East Shore business owners gather to discuss commercial areas

Community Outreach

Throughout this study, DCP engaged a wide array of stakeholders in order to better understand resiliency challenges facing residents and business owners. DCP also incorporated the recommendations and planning efforts of Federal, State, and other City agencies to help address issues requiring comprehensive planning.

Following Sandy, the City and State worked with residents and community organizations in an effort to address both short-term recovery and long-term community resiliency issues. One of these efforts was NY Rising Community Reconstruction, led by the State, which helped to identify and fund a number of local strategic investments to kick-start rebuilding and increase resilience. Others efforts paved the way for DCP's outreach including HUD's Rebuild by Design and Staten Island Imagines, an initiative of the Staten Island chapter of the American Institute of Architects.

Community Advisory Committee

In order to best inform and develop recommendations for the East Shore, DCP convened a Community Advisory Committee (CAC) comprised of thirteen community stakeholders from local civic, professional, environmental, and post-Sandy recovery organizations. Local elected officials were invited to participate as observers in the CAC process. DCP elected to carry over many committee members from the highly successful New York Rising Committee to preserve institutional knowledge and build on previous planning efforts.

Six East Shore CAC meetings were held between March and September 2015. Each meeting featured a different topic related to addressing the long-term needs of the East Shore community including resilient residential development, viable commercial centers, parks and open space, and transportation.

Feedback from committee members provided a diversity of viewpoints. Participants commented on issues including zoning changes to support residential flood resilience, long term commercial viability for businesses located in the floodplain, the future of local parks and open spaces, major transportation issues on the East Shore, and protection of freshwater wetlands.

Borough President's Staten Island Sandy Task Force

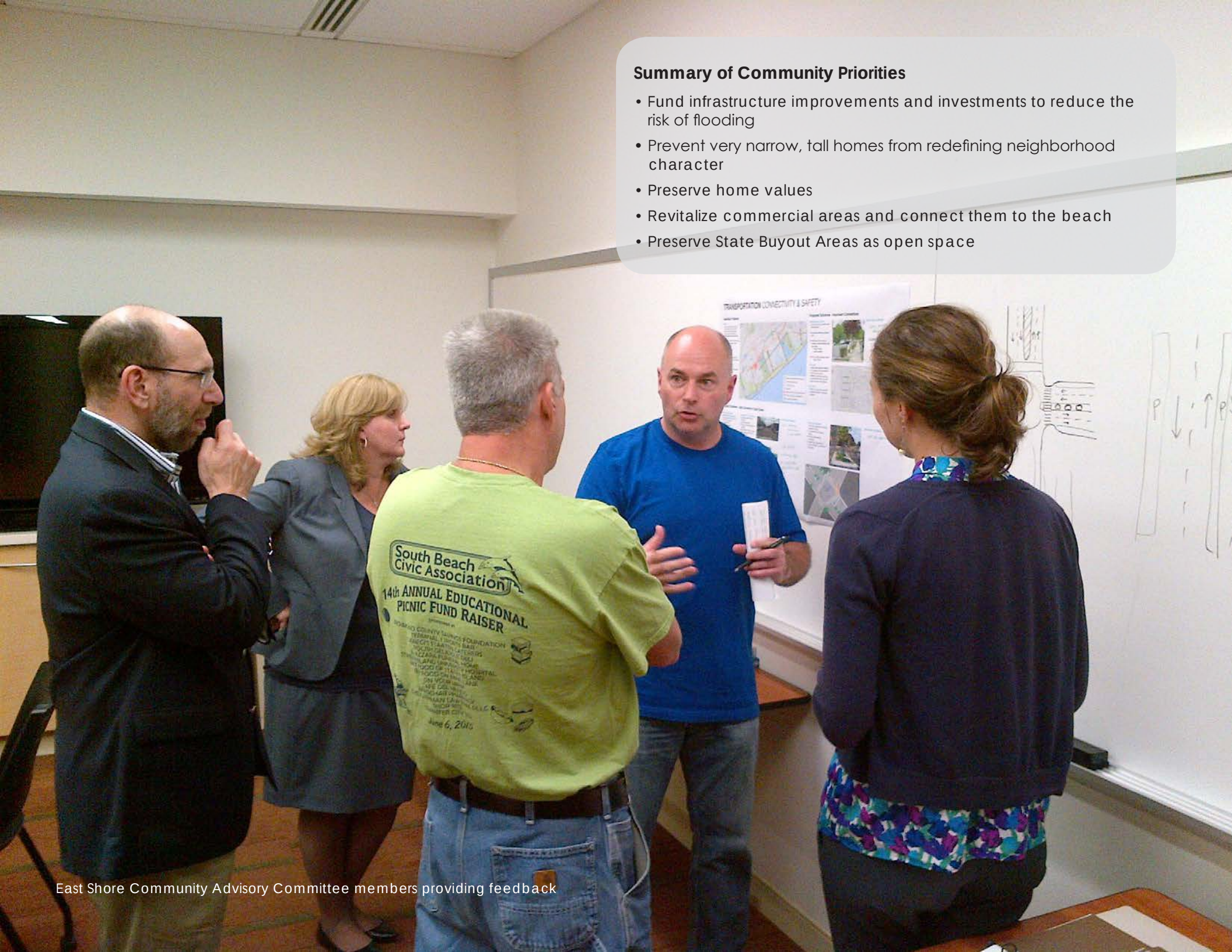
To respond to the immediate needs and questions of the residents and business owners in Staten Island that were impacted by Hurricane Sandy, Borough President James Oddo convened the Staten Island Sandy Task Force to allow for public agencies at all levels of government to provide routine updates on projects, report progress, and identify coordination opportunities. Staff from the Resilient Neighborhoods East Shore study participated to ensure that City and State agencies responses were coordinated with the long-term planning goals for the East Shore.

Public Engagement

DCP conducted additional informal outreach throughout the planning process. Outreach included a routinely updated web page on the DCP's website with current information about the East Shore Neighborhood Study; briefings with Community Boards and elected officials; discussions with community members during field surveys; participation and attendance at Hurricane Sandy-related public meetings; and stakeholder meetings with local businesses owners, Local Development Corporations, Civic Associations, developers, and architects.

Borough President's Staten Island Sandy Task Force meeting

East Shore Community Advisory Committee meet to discuss Parks and Open Space



East Shore Community Advisory Committee members providing feedback

Summary of Community Priorities

- Fund infrastructure improvements and investments to reduce the risk of flooding
- Prevent very narrow, tall homes from redefining neighborhood character
- Preserve home values
- Revitalize commercial areas and connect them to the beach
- Preserve State Buyout Areas as open space

STUDY AREA CONTEXT & BACKGROUND

The East Shore is a coastal, low-lying, primarily residential area spanning four miles between Great Kills Park and the Verrazano Bridge. The study area is rich in open space, with abundant parks, wetlands, and other natural areas.

Flooding from Hurricane Sandy caused widespread damage and destruction on the East Shore. The total number of lives lost in New York City due to the storm was forty-three; of those twenty-three were Staten Island residents, almost all from the East Shore. The event continues to have lasting economic, social, and personal effects. The breadth and severity of damage was due to several compounding factors, including the timing of the peak storm surge, the unique coastal position of the East Shore within New York Harbor, low-lying elevations considerably far inland, and the proximity of residences to the waterfront.

Flooding from Sandy extended almost a mile inland and the impacts were compounded by topography which prohibited proper drainage. The slightly higher elevation of Father Capodanno Boulevard, combined with limited stormwater infrastructure, resulted in a "bowl" effect, allowing several feet of water to collect and remain within East Shore neighborhoods for days and weeks following the storm. These conditions also frequently lead to flooding from heavy rain storms, which while not causing the same degree of damage as a hurricane, can disrupt life for residents.

Study Area Overview, Pre-Sandy

- **40,000** residents
- **12,900** residential units
- Nearly **4** square miles
- **590** businesses
- **9,336** jobs

EAST SHORE STUDY AREA

- Study Area Boundary
- NYS Designated Freshwater Wetlands
- NYC Parks
- National Parks
- Sandy Surge Extents
- Waterways

0 .5 1 Miles

Development History

The East Shore was first occupied by American Indians over 10,000 years ago, with the first European settlement beginning in 1671. Today's East Shore is a product of several distinct eras of development beginning in the late 19th century. The unique history of development on the East Shore helps to explain some of the factors that make it particularly vulnerable today.

Summer Beach Destination

Prior to its development, much of the East Shore was a series of freshwater and tidal wetlands which regularly emptied directly into Lower New York Bay. The mid-19th century saw the construction of what would later become the Staten Island Railway which spurred inland development in New Dorp and Grant City. The construction of a trolley line along Midland Avenue in 1897 helped to grow Midland Beach into a summer resort destination which would attract tens of thousands of visitors from Staten Island and the wider metropolitan region in the spring and summer months. Development continued through the early years of the 20th century with the addition of piers, Victorian-era hotels, roller coasters, restaurants, and other common beachfront attractions. South Beach hosted similar attractions such as Happyland, a resort that opened in 1906. In the summer of 1921, the B&O train line connecting St. George with Sand Lane on South Beach carried roughly 40,000 passengers daily on Sundays and holidays. During this booming era, a significant amount of land adjacent to the beach was developed for commercial uses and summer beach bungalow colonies.

Beginning in the 1920s, the Great Depression, fires, and water pollution resulted in wide spread disinvestment along the East Shore. The boardwalk was largely overlooked until 1938 when master builder Robert Moses transferred ownership to the Parks department, promoting the area as a swimming beach while removing amusements.

Postcard of summer bungalows at Midland Beach

New York Public Library Archive

The existing stock of bungalow housing generally dates to this period. Retrofitted for year-round habitation, bungalows are one of the predominant styles of single-family detached housing within East Shore neighborhoods, and are a source of unsubsidized affordable homeownership opportunities.

Father Capodanno Boulevard

In the early 1960s, to prepare for the anticipated population boom upon completion of the Verrazano-Narrows Bridge and to provide a direct route to connect with the Outerbridge Crossing, Robert Moses envisioned a scenic shorefront parkway that enhanced connectivity and provided beach access on what was then Seaside Boulevard. The proposed Shore Front Drive was authorized by Governor Rockefeller as a state-sponsored measure to improve the current road in an effort to control beach erosion and promote orderly development of adjacent properties. The proposed thoroughfare would run along the now existing street alignment, and through US National Parks at Miller Field and Great Kills Park. However, by the late 1960s, Moses was no longer head of the agencies necessary for its completion, and the proposal lost support. The existing Seaside Boulevard remained in its existing state and was renamed in 1975 to honor Father Vincent Robert Capodanno, a Roman Catholic chaplain who was killed in combat in the Vietnam War.

New York Public Library Archive

Postcard of Midland Beach boardwalk circa 1920s

Opening of the Verrazano Bridge

The Verrazano-Narrows Bridge opened on November 21, 1964, creating the first direct vehicular connection between Staten Island and the rest of the city. Following the bridge's construction, Staten Island's population began to increase at an average rate of 1,700 people per month, which continued steadily until the 1980s. Population growth associated with development made possible by the bridge created an unprecedented real estate and housing development boom. The East Shore saw a significant increase in residential development from the 1960s through the early 1980s, due in large part to the area's proximity to the bridge and the availability of hundreds of acres of lightly regulated wetlands.

Over time, as land became scarcer, residential construction shifted toward the redevelopment of adjacent bungalow homes into semi-detached and attached homes. Bungalow lots were particularly suited to this development as zoning permits semi-detached and attached homes on relatively small lots.

LDGMA and 2003 Rezonings

After decades of high housing demand on Staten Island and resulting issues related to design and construction characterized by the community as "inappropriate and haphazard," the City created a Staten Island Growth Management Task Force led by DCP. The resulting Lower Density Growth Management Area (LDGMA) was adopted Island-wide in 2003 to address issues of private roads, density, parking, and driveway pitch. As a result of the stricter requirements, which increased minimum lot sizes for development, fewer homes could be built on the remaining vacant lots. Additionally, the City, working with local elected officials, rezoned many neighborhoods across the Borough, including the East Shore, which reduced the allowable density of future development. Since then, most new buildings in the area have been constructed by combining multiple smaller lots.

New York Public Library Archive

Verrazano-Narrows Bridge circa 1964

Pre-LDGMA private road development

NYC Build It Back construction in Midland Beach

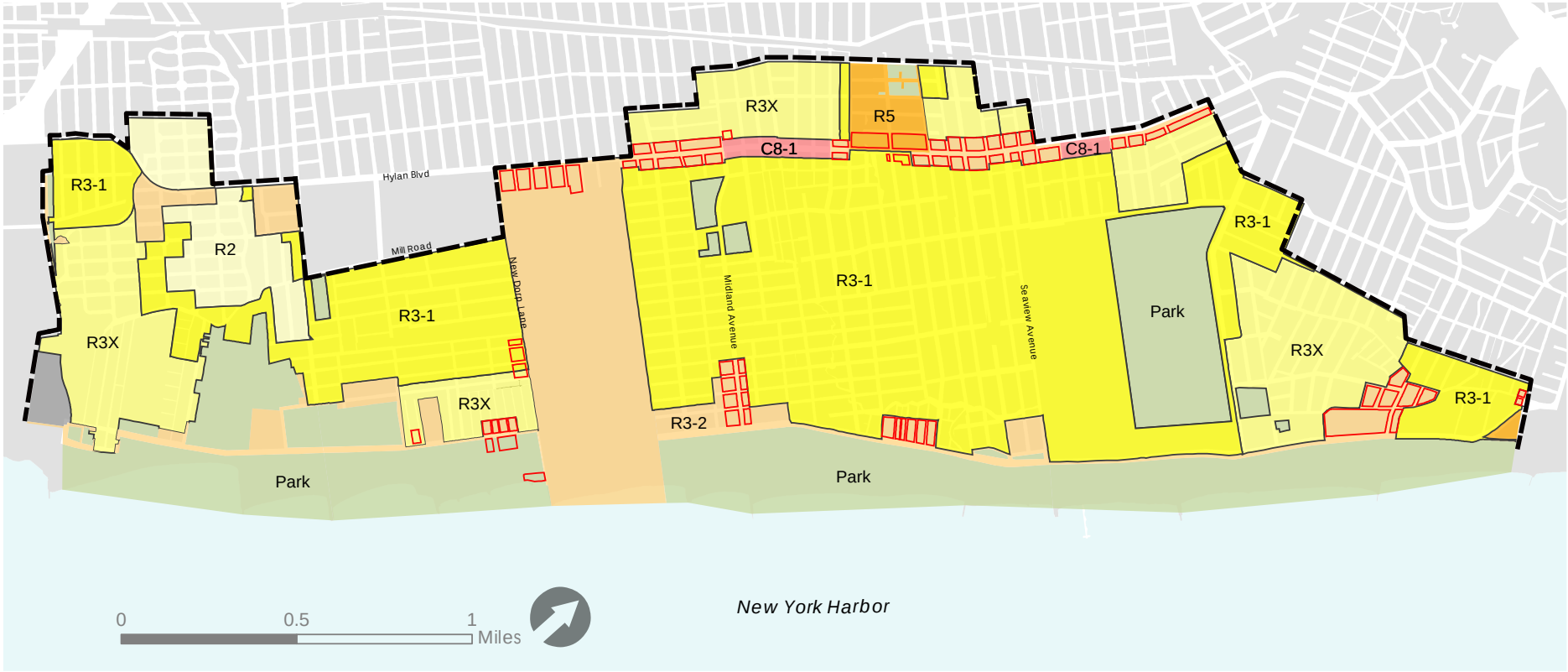
Elevated home in Midland Beach

Sandy Recovery

Hundreds of homes on the East Shore were significantly damaged or destroyed as a result of Sandy. Recently built homes generally fared better compared with older homes that predated flood elevation requirements. The proposed new boundaries of the 1% annual chance floodplain will increase the number of homes required to meet FEMA floodproofing standards in order to obtain building permits. In addition, those homes with a federally-backed mortgage must make the tough choice to raise their home, whether it was severely damaged or not, in order to avoid paying much higher flood insurance premiums in the future. Homeowners without mortgages, or with mortgages from non federally-regulated lenders, are not required to carry flood insurance, but are at greater financial risk in the event of future flooding if they do not.

The repair and redevelopment of housing to meet updated FEMA standards and local building codes is contributing to a new neighborhood character for the East Shore. Homes are either elevated or newly constructed above the Design Flood Elevation (DFE), a noticeable increase from the FEMA flood elevations in effect prior to Sandy. This means that as an inevitable consequence of making buildings more resilient, it is likely that the East Shore will look and feel different.

After Sandy, the NYC Mayor's Office of Housing Recovery Operations developed a program to assist homeowners with Sandy-related damages called Build it Back. The goal is to assist homeowners in repairing or rebuilding their homes. Within the East Shore study area there were 2,804 eligible applications requesting assistance.

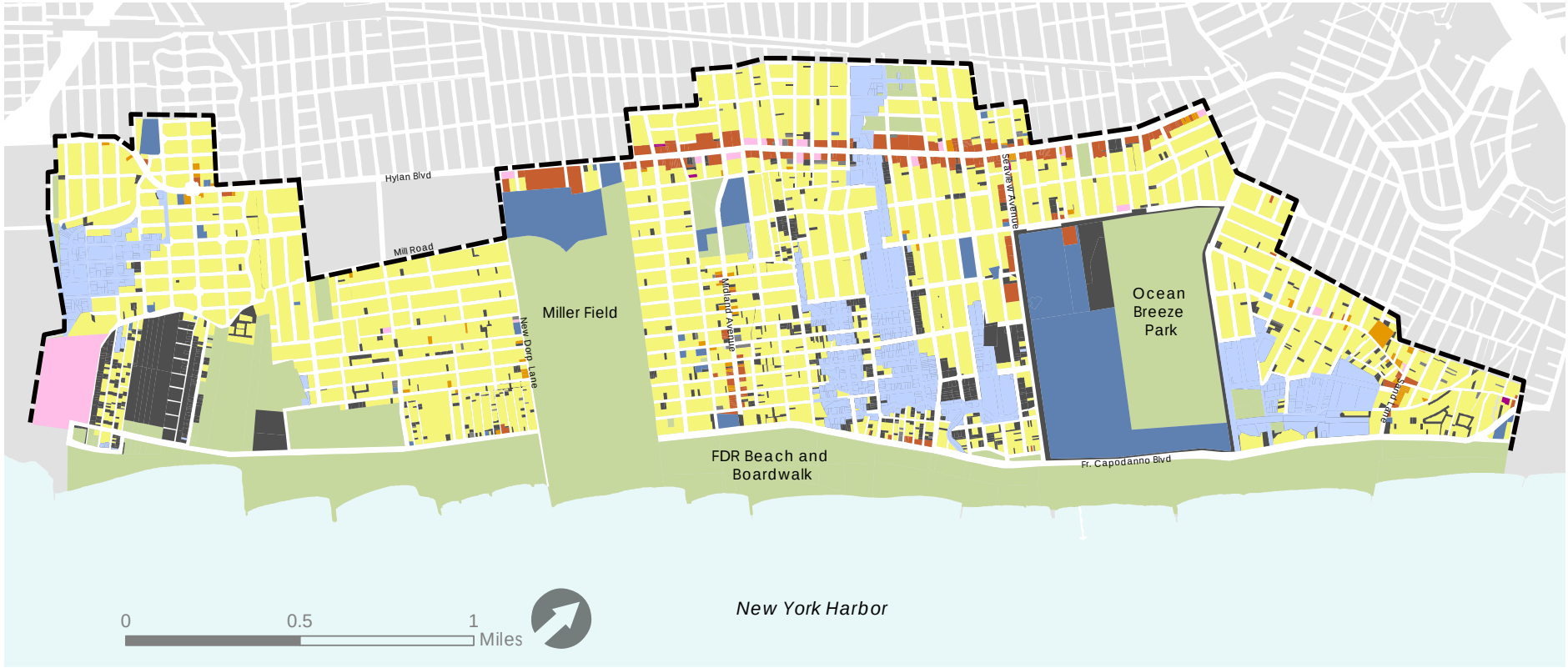


East Shore Zoning Districts & Commercial Overlays

Zoning

Zoning determines what types of new land uses are permitted and which building forms are permitted to be built. Much of the study area is zoned R3-1, a low density district that allows for one- and two-family detached and semi-detached homes. Some areas are zoned R3-2, which is the lowest-density zoning district in which multiple dwelling buildings are permitted. There are also areas zoned R3X, a lower-density contextual district that allows for one- and-two family detached homes. Limited areas are mapped as R2, allowing only single-family detached homes. Many community facilities are permitted as-of-right in residential districts. Low-density commercial overlays throughout the East Shore allow for retail and mixed use buildings that serve the needs of the surrounding neighborhoods. C1-1, C1-2 and C2-1 overlays in residential neighborhoods allow for small-scale local retail such as grocery stores, restaurants, and beauty parlors, with additional residential uses located above retail uses. C8-1 zoning districts mapped along Hylan Boulevard permit automotive and other heavy commercial services and prohibit residential use. A small M3-1 manufacturing district is zoned for the waste water treatment plant in Oakwood Beach.

As outlined in the Regulatory Context section, in 2013 DCP adopted an emergency citywide zoning text amendment intended to support a range of flood-resilient construction measures, including elevating and flood-proofing buildings. In addition, this amendment includes regulations that mitigate potential negative effects of flood-resilient construction on the public realm. The mitigation measures include streetscape enhancements like plantings and requirements for a differentiated façade.



East Shore Land Use

Land Use

Within the study area, the primary land use is low-density residential, with limited areas permitting multi-family buildings. There are also large areas of vacant land throughout the study area, much of which comprises the future Mid-Island Bluebelt. Along Hylan Boulevard, the main commercial corridor in the area, the major land uses are retail and offices, with additional neighborhood retail clusters located along Midland Avenue, Seaview Avenue and Sand Lane. There are also public facilities throughout the study area including the Staten Island University Hospital and the South Beach Psychiatric Center on Seaview Avenue, and New Dorp High School on New Dorp Lane. In addition, the study area has a large amount of both park and open space including National Parks at Great Kills Park, Miller Field, Fort Wadsworth, and City parks at Ocean Breeze Park and local beaches. Due to the primarily residential nature of the East Shore and its relatively few local commercial corridors with few services located within walking distance, residents often rely on automobiles to meet daily needs.

- Residential
- Mixed Use
- Commercial/Office
- Industrial
- Transportation/Utility
- Public Facility/Institution
- Public Open Space
- Parking Facilities
- Vacant Land
- Properties Acquired or to be Acquired for Future Bluebelt Use

Parks and Open Space

Parks and open space are abundant throughout much of the East Shore and include the beach and coastal areas, a network of large, regional parks, and freshwater wetlands. These areas initially attracted development in the 19th century and remain popular destinations today, beloved by local residents. However, it is now more widely understood that a delicate balance is necessary to preserve their ecological integrity. It is also important to recognize the function these areas provide for floodplain management, serving natural drainage functions, acting as buffers, and, in the wake of natural disasters, allowing for staging of medical services, supplies, and communications centers.

City Parks

In 1935, the City acquired East Shore beachfront property and soon began improvements under President Franklin Delano Roosevelt's Works Progress Administration. While providing jobs for Depression-era workers, the project also helped to revive the community of South Beach. Workers removed the deteriorating music halls, carousels, and shooting galleries and built the two-and-a-half mile long boardwalk. In 1939, the boardwalk was dedicated to President Roosevelt and has since continued to undergo periodic renovations and neighborhood improvements.

Throughout the 1970s, 1980s, and parts of the 1990s, portions of the nearly two mile stretch of the FDR Boardwalk in Ocean Breeze and South Beach were regularly damaged by fire. This damage-and-repair cycle repeated itself until elected officials and City agencies dedicated resources to improve the Boardwalk with the goal of turning it into an attractive destination.

The FDR boardwalk and beach area is a vital community asset within the East Shore. Extending southeast from Fort Wadsworth to Miller Field, this stretch provides access for walking and biking along a continuous shoreline park that hosts baseball fields, basketball, bocce, and volleyball courts, playgrounds, barbecue areas, a fishing pier, skateboard park, children's amusements, concessions, and comfort stations. The FDR boardwalk is also a popular venue for spring and summer beachfront concerts and events like Back to the Beach.

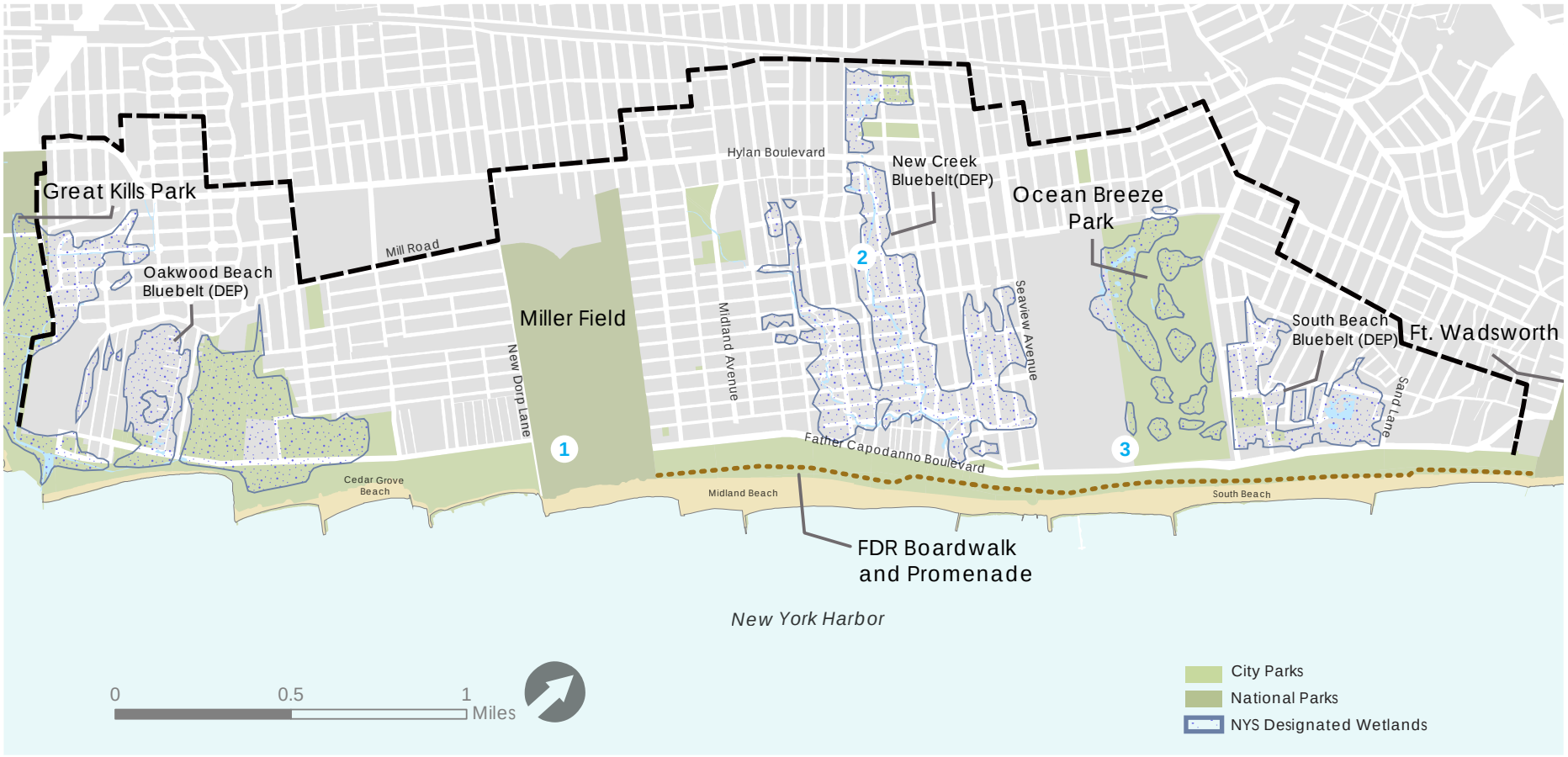
Kivlehan Park in New Dorp Beach

Ocean Breeze Park spans more than 110 acres and is the site of the new Ocean Breeze Track and Field facility which opened November 2, 2015. This 135,000 square-foot athletic complex will draw competitors from all over the region. Construction has been recently completed on the new $5.8 million therapeutic horse riding arena in the Park, the first of its kind on Staten Island. The arena will provide year-round support for physical and

Historic Air Field Hangers at Miller Field

Wetland Area in Midland Beach

Track and Field Facility at Ocean Breeze Park



occupational therapy programs and will include a nearly 5,800-square-foot riding arena, stables, areas for feeding and grooming horses, and an observation room for visitors. The remainder of the park provides passive recreational opportunities throughout the abundant natural area.

In New Dorp Beach, Kivlehan Park is a popular playground and recreational area, with meandering footpaths leading through natural areas to the beach.

National Parks

In 1972, The Gateway National Recreation Area was created to preserve and protect scarce recreational resources in New York and New Jersey. Three parks were identified on Staten Island - Fort Wadsworth, Miller Field, and Great Kills Park - as well as Hoffman and Swinburne Islands in the Lower Bay. These sites continue to be managed by the National Parks Service.

Cyclists using protected bike lane through park at New Dorp Beach

Fort Wadsworth, situated on The Narrows, is the northernmost boundary of the East Shore Study Area and the headquarters for the Gateway National Recreation Area. It is a site of major historical significance, serving as a military installation protecting the Upper Bay and Manhattan since the mid-seventeenth century until its closing in 1994. Today, ranger-led tours, passive recreation, camping, and a scenic overlook of New York Harbor, the Verrazano Bridge, and the Raritan Bay are the primary attractions. In addition to daily use by visitors and locals, Fort Wadsworth is a crucial staging area for both the New York City Marathon and Five Boro Bike Tour, each attracting tens of thousands of visitors annually.

Miller Field, a 144-acre park, borders the neighborhoods of New Dorp Beach and Midland Beach and today is home to baseball, football, and soccer fields. Originally the site of the William Vanderbilt Farm, it was later a coastal defense station with a grass runway, ramps for seaplanes, and four airplane hangers. In 1980, the Miller Army Air Field Historic District was listed on the National Register of Historic Places.

Great Kills Park is roughly 580-acres and is located at the southernmost portion of the East Shore Study Area. It is a major connection point between inland communities and Great Kills Harbor. The area was created by Robert Moses through landfill and is now a vast park largely used for walking, jogging, cycling, fishing, boating, and as one of the primary beach access points on Staten Island.

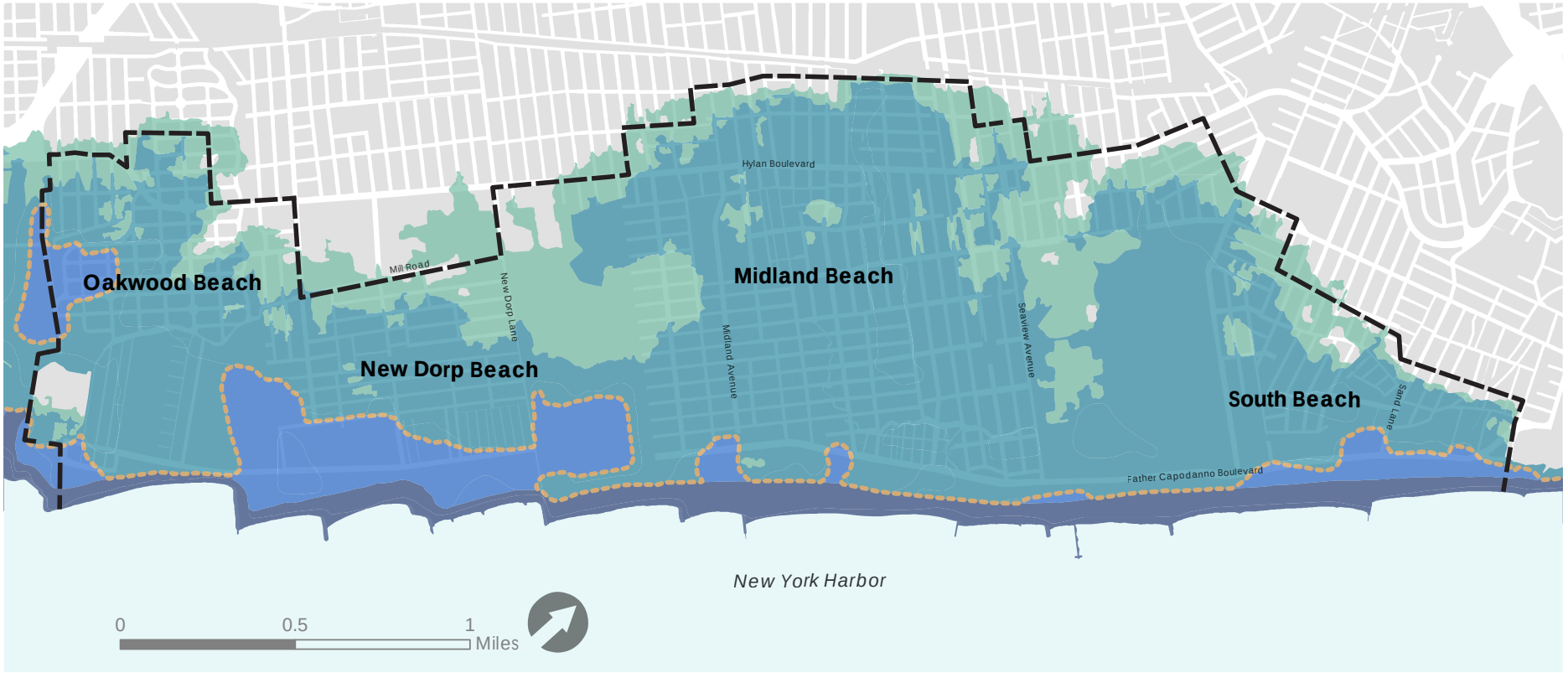
State Designated Freshwater Wetlands

Freshwater wetlands provide a natural transition between upland areas and aquatic habitats. They serve vital ecological functions, including surface and groundwater protection, erosion control, and pollutant treatment as well as providing fish and wildlife habitat. Prior to development and road construction, the East Shore contained both freshwater and tidal wetlands, as well as streams that fed directly into the Lower Bay.

In 1987, the New York State Department of Environmental Conservation (DEC) conducted field studies which designated twenty-nine percent of the total land area on the East Shore as freshwater wetlands. DEC continues to regulate these areas although there is some evidence that their boundaries have shifted over time, as is inherent with wetlands. Many of these wetlands have been incorporated into the New York City Department of Environmental Protection's proposed Mid-Island Bluebelts, a system of natural and man-made areas to collect and control stormwater runoff.

FDR Boardwalk in South Beach

COMMUNITY RISK PROFILE



Data: FEMA PFIRMS (2015), NYC Department of City Planning

Preliminary Flood Insurance Rate Maps

The East Shore has high vulnerability to flooding. The dense and varied development in the area, along with the extent of the 1% annual chance floodplain, means that over 10,000 residential units are within the Preliminary Flood Insurance Rate Maps (PFIRMs) issued by FEMA in 2015.

The PFIRMS show the extent of the 1% annual chance floodplain, also known as the 100-year floodplain or Special Flood Hazard Area, as well as the 0.2% annual chance floodplain, also known as the 500-year floodplain. The floodplain is divided into four zones. The V and Coastal A zones are subject to risk from wave action of varying heights, and together with the A zone, comprise the 1% annual chance floodplain. The Shaded X zone is the extent of flooding expected from a 0.2% annual chance storm.

In addition to showing floodplain extents, the PFIRMS also provide Base Flood Elevations (BFE). The BFE is the elevation in feet to which floodwater is anticipated to rise during the 1% annual chance storm. A building's flood insurance premium is determined in part by the relationship between the BFE and the level of the lowest occupied floor of a structure. Determining how high the lowest occupied floor of a structure must be elevated or flood-proofed requires measuring the height of the BFE above ground elevation at the building's

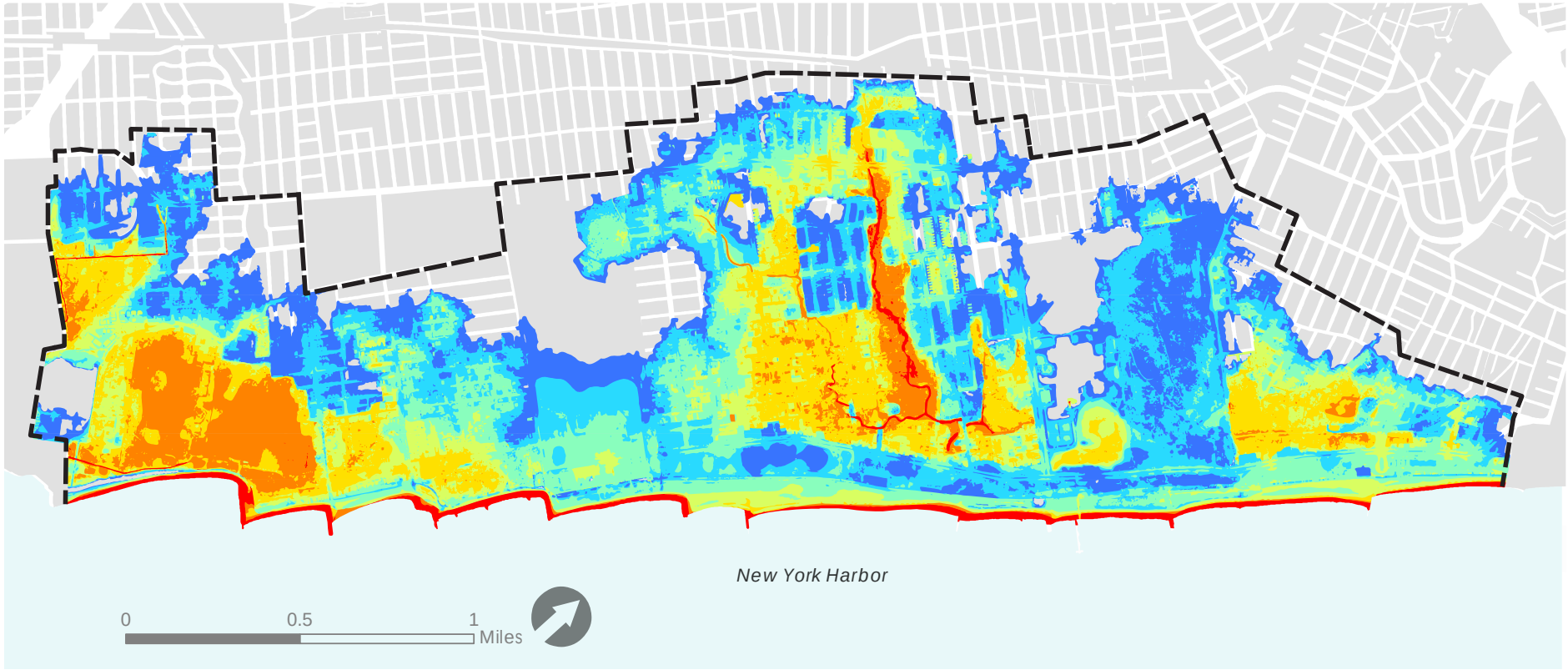
2015 Preliminary Flood Insurance Rate Maps

- V Zone
- Coastal A Zone
- A Zone

(1% annual chance floodplain)

- Shaded X Zone (0.2% annual chance floodplain)
- Limit of Moderate Wave Action (LiMWA)
- Study Area Boundary

Total Number of Buildings by Flood Zone



Data: FEMA PFIRMS (2015), NYC Department of City Planning

location. The map above shows the PFIRM BFEs in feet as calculated above grade within the 1% annual chance floodplain. On the East Shore, BFEs can be quite high, ranging between four and twelve feet across large swaths of the study area. Even low BFEs can pose challenges for existing buildings that currently have dwelling space at or below the flood elevation. These spaces may need to be elevated to avoid paying higher flood insurance premiums.

As outlined in the Regulatory Context section, 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.

It is anticipated that the FIRMs within the East Shore study area will also be updated following substantial completion of the U.S. Army Corps of Engineers coastal protection. With this project, some areas will have a lower risk of flooding but will still remain within the 0.2% annual chance floodplain. Other areas will remain within the 1% annual chance floodplain due to flooding from intense rain storms.

Household Financial Vulnerability

In addition to the safety risks of living in the floodplain, East Shore communities also encounter financial and economic challenges in adapting homes for long-term flood resilience. While residents here generally have higher incomes compared to the city overall, they still suffered significant hardships during storm recovery and face many financial obstacles, such as the high cost of building retrofits. In addition, increased flood risk may have reduced property values and many households remain vulnerable to increasing costs of flood insurance and potential future storm damages.

The housing stock of primarily one- and two- family homes has provided affordable homeownership opportunities that are often scarce elsewhere in the city, including for many first-time home buyers. In addition, rental units within these homes, provide a critical source of housing. Three-quarters of homeowners hold a mortgage, and many of these households may be constrained when trying to access money needed to fund flood mitigation measures that can help reduce future flood insurance premiums.

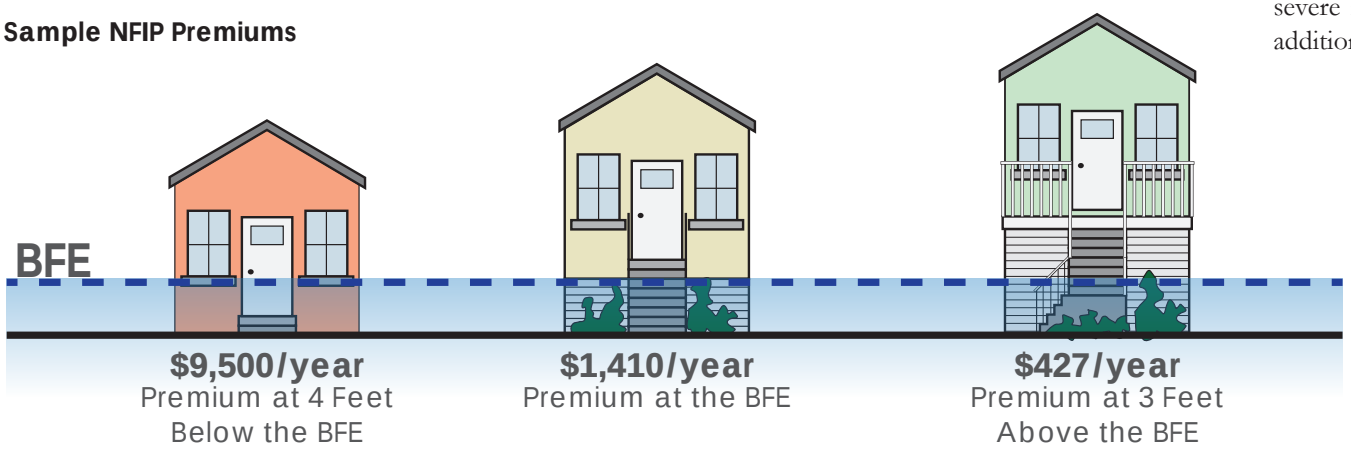
The economic impact of Sandy in these neighborhoods was widespread and significant. Over seventy percent of households in Midland Beach and New Dorp Beach suffered Sandy-related damage according to post-Sandy FEMA Individual Assistance data. The entire East Shore region saw $149 million in NFIP claims on one-to-four unit homes alone, with another $9 million to commercial, multifamily, and other properties. Though NFIP reimbursement has somewhat offset storm damages, the costs of home repair, retrofitting, elevation, and relocation have exceeded the funding received through insurance payouts and federal support. Many homeowners used credit, savings or retirement accounts, or took out costly loans on homes and businesses to supplement any insurance payouts or federal assistance in order to make needed repairs or pay for temporary housing costs.

Flood insurance presents yet another future expense for households. Federal legislative changes to NFIP have begun phasing out subsidized rates for older homes. Current average annual flood insurance premiums for owner occupied homes range from $1,000 in South Beach to over $1,300 in New Dorp Beach. With the majority of homes currently receiving subsidized pre-FIRM rates, those averages are expected to rise. Additionally, with the potential future expansion of the floodplain, even more homeowners may be required to purchase flood insurance. These added costs may pressure some residents to sell their homes if they find they can no longer support these expenses. The increased expenses will also tend to reduce the value of these homes on the market.

Recent demographic shifts on the East Shore have pointed toward an aging and ethnically diversifying population, reflecting the mix of long-time and newly arriving residents. In addition to the mobility issues aging residents face, the sudden demands of flood-related repairs, home elevation, or the cost of flood insurance may be prohibitively expensive for residents on fixed incomes. Similar challenges may confront other homeowners with lower incomes.

Many of these residents may have difficulty securing financial assistance, may face language barriers, and may not have the sort of social support network that longtime residents may benefit from. While the seven percent poverty rate for East Shore residents is low compared with the rest of the city, those residents in severe financial distress are likely subject to significant additional burdens following Sandy.

Sample NFIP Premiums

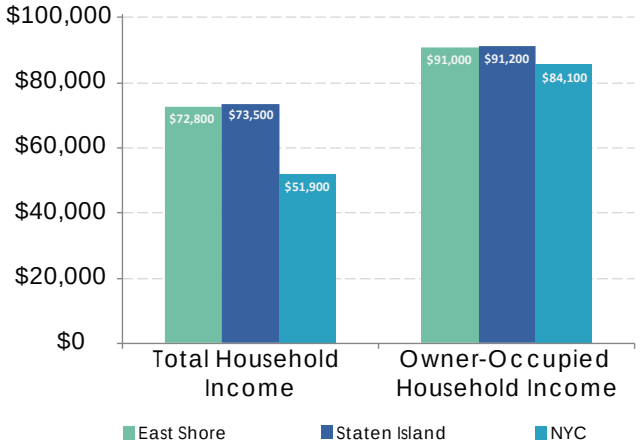


The NFIP premiums shown here are examples of a single-family one-story detached home with $250,000 building coverage only (does not include household contents) located in the A zone of the floodplain. Source: FEMA

Sandy Damage and NFIP Claims by Neighborhood

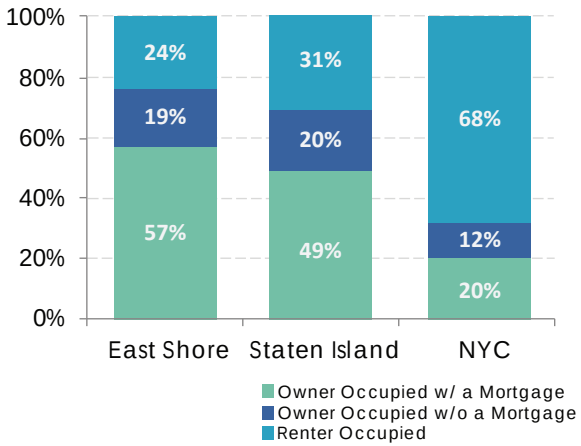
	Oakwood Beach	New Dorp Beach	Midland Beach	South Beach
Inspected Damage Following Sandy *Source: FEMA Individual Assistance Program, HUD, US Census, Through January 31, 2013*				
Households with Inspected Damaged	**64.5%**	**77%**	**70.6%**	**29.8%**
Total Sandy Damage Claim *Source: National Flood Insurance Program, Claims related to Sandy, Through May 31, 2015*				
1 Family Residence	**$22,566,145**	**$29,470,462**	**$66,755,714**	**$15,267,453**
2-4 Family Residence	**$1,896,926**	**$4,747,794**	**$14,185,233**	**$4,643,893**
Average Sandy Damage Claim *Source: National Flood Insurance Program, Claims related to Sandy, Through May 31, 2015*				
1 Family Residence	**$43,903**	**$52,067**	**$45,105**	**$35,341**
2-4 Family Residence	**$40,360**	**$61,659**	**$54,981**	**$51,598**
Average Current NFIP Annual Premium *Source: National Flood Insurance Program, Active Policies, Through June 30, 2015*				
1 Family Residence	**$955**	**$1,321**	**$1,202**	**$916**
2-4 Family Residence	**$944**	**$1,238**	**$1,539**	**$1,079**

Median Household Income

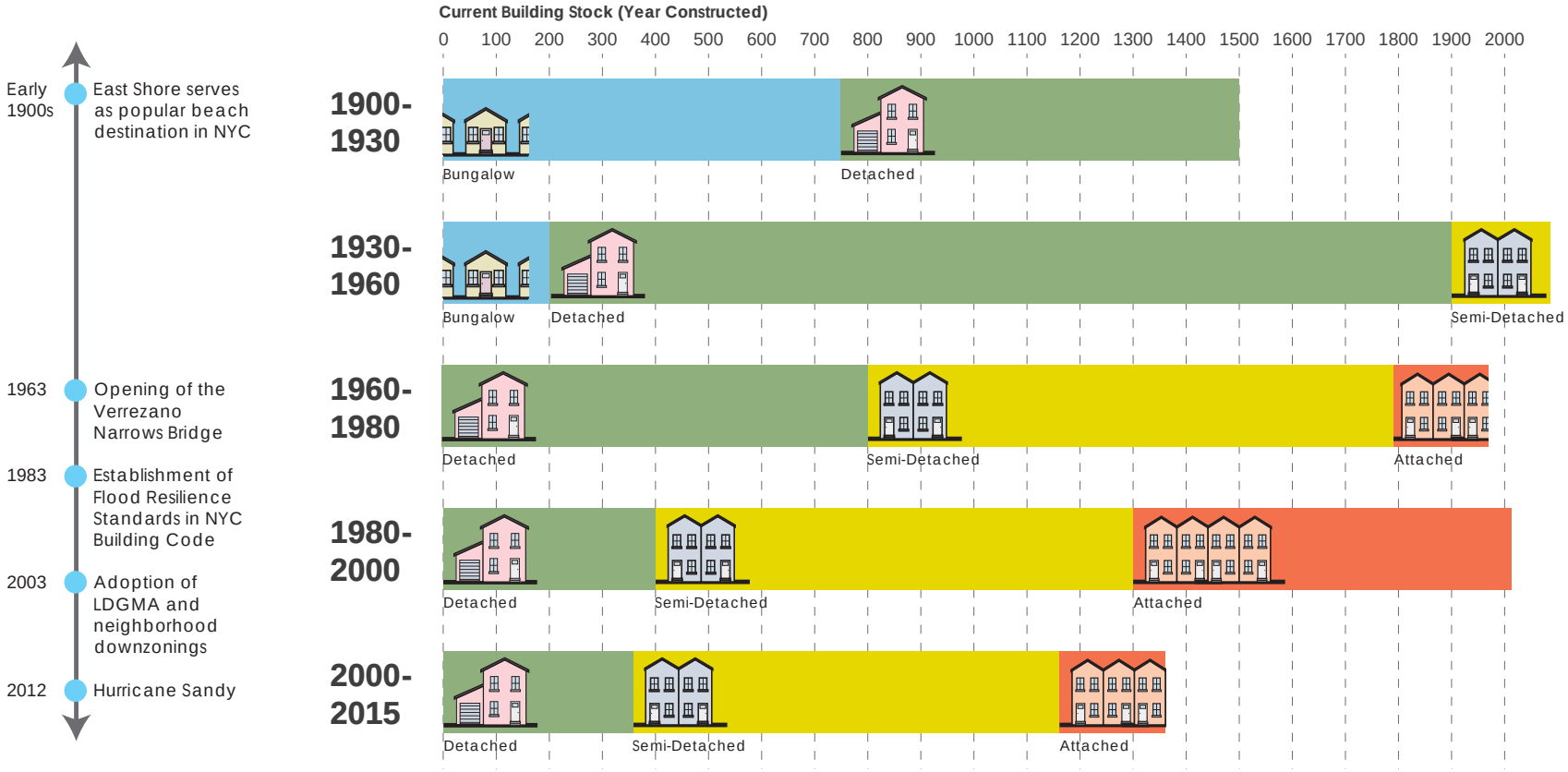


Source: US Census American Community Survey, 2012 5-Year

Ownership Status and Renters



Source: US Census American Community Survey, 2012 5-Year



Building and Lot Scale Resiliency Challenges

Building age often correlates with how well a structure may fare during a flood. Homes built many decades ago were generally built under less stringent codes and standards, and structurally may be more vulnerable than more recent development. Homes built prior to 1983, when the building code first adopted flood resistant construction standards, were not required to elevate above flood elevations and many are built at grade, increasing their vulnerability when flooding occurs. In addition, many older homes on the East Shore were in some degree of disrepair prior to Sandy.

Overall, more recent construction fared better during Sandy than older homes built to earlier standards. One in five homes in this area was built over seventy-five years ago. Those homes, given their current condition and present value, are less likely to be retrofitted and more likely to be demolished and redeveloped, which may often be a challenge within the constraints of the current zoning.

Narrow and Shallow Lots

In the study area, a single-family detached home generally requires at least thirty-five feet in lot width to accommodate both required yards and sufficient space for a typical full-sized dwelling unit with required parking. Zoning allows construction of single-family homes on narrower lots but the ability to provide quality living space that also meets zoning standards is constrained on smaller lots. On the East Shore, mainly due to the historic development of small seasonal beach bungalows, lots commonly do not meet this standard. This makes it particularly difficult when constructing or retrofitting an elevated home to the Design Flood Elevation.

Only thirty-eight percent of residential homes built today on the East Shore are on lots at least forty feet in width (the minimum width to accommodate a two-family detached home). The remaining sixty-two percent vary in terms of width, but are generally between twenty to thirty feet wide, a condition making redevelopment more challenging. The vast majority of homes, seventy-nine percent, are on lots at least ninety feet deep, which enables front and rear yards to be provided while

maintaining adequate interior space. The remaining homes are on lots between seventy and ninety feet deep and are concentrated in former beach bungalow colonies.

Zoning Requirements

Zoning requires homes to be built within a certain footprint on a lot in order to form appropriate yards for open space and parking. For instance, R3-1 zoning requires buildings to be set back at least fifteen feet from the street line and thirty feet from the rear yard line to provide front and rear yard spaces. Additionally, new detached houses are required to provide two side yards for a total combined width of thirteen feet. These requirements are crafted to produce adequate yard space on standard sized lots but result in small and awkwardly shaped houses when applied to the lot sizes commonly found on the East Shore. Currently, zoning does provide some side and rear yard relief for narrow and shallow lots, but these regulations are not designed to address the specific conditions found in East Shore beach bungalow colonies. Even with these permitted reductions, the zoning requirements result in a small buildable area on the already small lot, potentially leading to an inefficient floorplan and odd building proportions.

While zoning rules put in place in 2015 have addressed this issue in some areas for Sandy rebuilding, these rules are temporary and only apply to Sandy-damaged buildings.

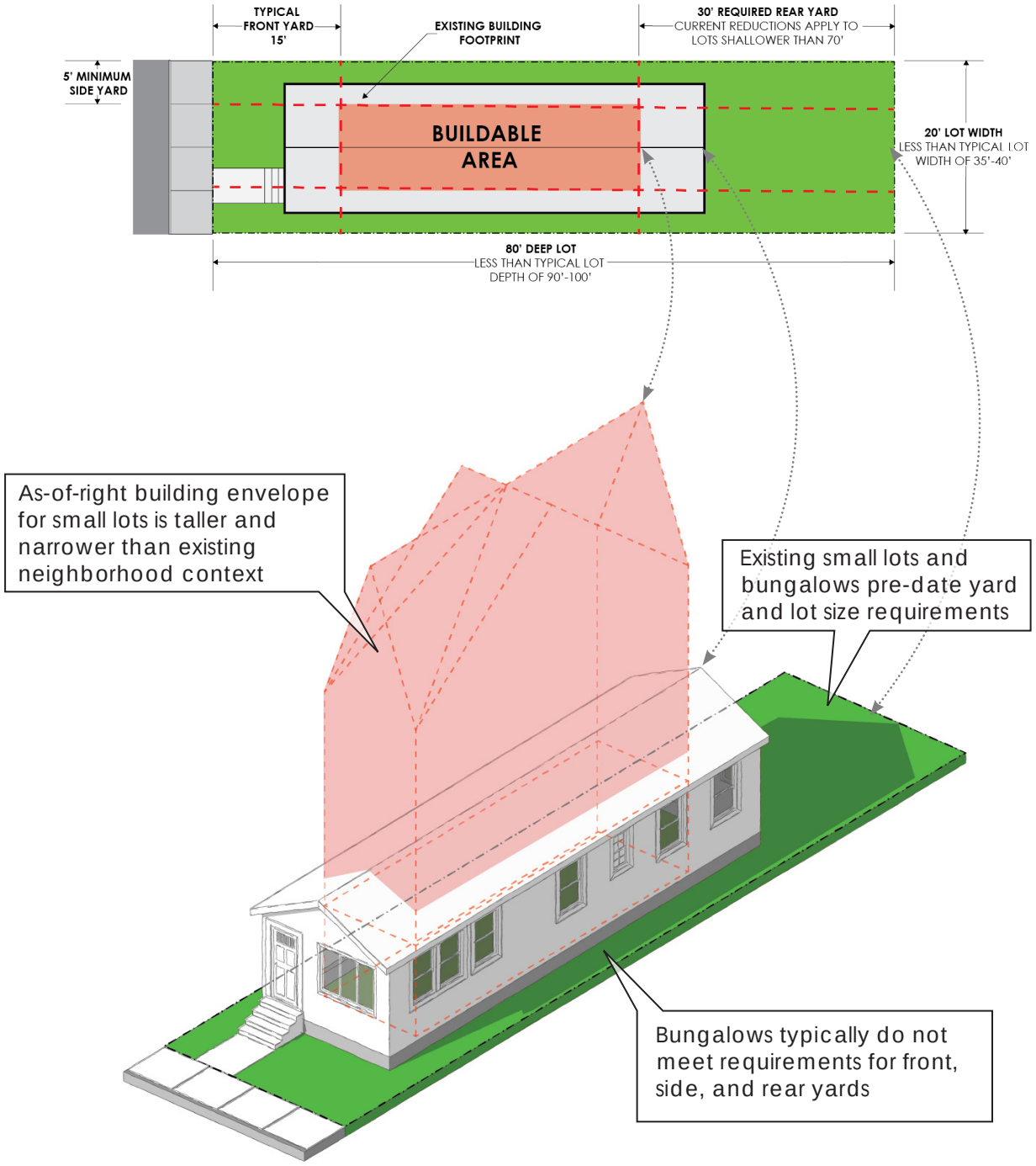


Illustration of high Design Flood Elevations along the Midland Avenue Commercial Corridor

Barriers to Commercial Investment

Within the study area, there are three primary commercial corridors: Midland Avenue, Sand Lane, and Hylan Boulevard. With the exception of Hylan Boulevard, the commercial areas are neighborhood-scale and mostly provide services to the immediate community. These small businesses located close to residential neighborhoods can provide convenient access to goods and services and support walkable communities that are accessible for a wide variety of residents, including those with limited mobility. However, these businesses face a multitude of challenges when located in the floodplain, making it more difficult to sustain healthy commercial corridors.

High Cost of Retrofitting

Flooding poses a significant challenge to commercial properties, particularly local retail uses, which rely on a visual ground floor presence and direct connection to the street in order to attract customers and comply with access regulations such as ADA. Unlike residential properties, which can elevate and wet floodproof at-grade spaces to be used for parking, access, and storage, this type of commercial development thrives when directly accessible and visible from the street. In order to achieve this within the floodplain under current federal standards, buildings must be dry floodproofed, a costly process requiring a strong foundation and space that is watertight below the flood elevation through the fitting of waterproof membranes or sealants and installation of watertight shields over windows and doors. For areas with Design Flood Elevations approaching twelve feet above grade, such as Midland Avenue, this can be prohibitively costly.

Commercial buildings are required to dry floodproof only when built anew or substantially improved. While floodproofing can significantly lower flood insurance premiums, many property owners without a federally-backed mortgage or loan choose not to make retrofits because the additional cost of construction often exceeds

Pedestrian Friendly Commercial Area on Sand Lane

Midland Avenue Commercial Area

the benefit, or they cannot access the necessary capital altogether. For other areas with higher density or real estate values, the cost of dry floodproofing can be better supported by the revenues generated by the property. On the East Shore, because of the lower density zoning and relative weakness of the market, commercial properties cannot offset the cost of dry floodproofing by building additional stories of commercial or residential space.

Absence of a Cohesive Walkable Character

Among the more significant and overarching challenges facing the future of commercial areas within the East Shore is the lack of an established retail or beachfront character. Local character is often heavily influenced by historic development, and should reflect an area's unique assets. However, the various eras of development on the East Shore and changes in land use and building requirements over time have hindered the area's ability to establish a cohesive neighborhood character.

Challenges to creating a sense of place along commercial corridors on the East Shore include: significant numbers of residential properties within commercial overlays, erratic setbacks, widely varying building elevation, location of parking, and inconsistent building design.

Separation from Beach Amenities

The heyday of the East Shore as a thriving beach destination in the early 1900s established a strong connection between the beach, boardwalk, and surrounding businesses and upland neighborhoods. However, as beach and boardwalk amenities have declined, and other beach destinations have become comparatively more accessible, this pedestrian connection between the beaches and neighborhoods has broken down over time. The shoreline park entrance from Sand Lane provides a concentration of active uses but is visually disconnected from the upland businesses just a block away. Midland Avenue is both visually and

physically disconnected from the shoreline park and FDR Boardwalk. Additionally, this section of the boardwalk lacks gateway treatments such as inviting signage and landscaping, safe pedestrian crossings, and active beach uses that could recreate the historic development pattern in a new fashion that reconnects the beaches to upland neighborhoods and nearby businesses.

Existing Parking Requirements

Another barrier to local reinvestment is the high number of required parking spaces for commercial uses. This makes improvements or redevelopment difficult, since there is little space remaining on a lot to build after required parking is provided. Additionally, the number of parking spaces required is not consistent with the needs of local retail. The result is that property owners cannot invest in their property to make it desirable and attract businesses. This contributes to the high number of vacancies in these local retail corridors.

These challenges to fostering walkable retail corridors are compounded by the tendency to locate parking in front of the business. This creates strip mall-style shopping developments that result in an unwelcoming pedestrian environment. While the design of these is suitable in other contexts, it is not effective to build a stronger corridor in a beachfront community which aims to draw in visitors with attractive, walkable neighborhood commercial amenities along an inviting streetscape.

Residential buildings in commercial overlay portions of Midland Avenue

Transportation Network

Pedestrian Infrastructure and Walkability

The East Shore Transportation Study, which was conducted parallel to the Resilient Neighborhoods Study, identified a number of significant impediments to a resilient transportation network. A transportation network that is resilient accommodates a wide range of modes, including vehicles, bicycles, buses, and pedestrians, and allows for adaptation to uncertain future conditions.

Lack of sidewalks along Bluebelt on Olympia Boulevard at Graham Avenue

Observed mid-block crossings on Seaview Avenue at Mason Avenue

Patterns of development, natural areas such as wetlands and parks, and changes in elevation have created a disjointed street grid along the East Shore. For pedestrians, this limits opportunities for accessible walking routes within and between neighborhoods and makes walking a less attractive mode than driving for even short trips. A lack of sidewalks, few street markings, speeding vehicles, wide thoroughfares, and inadequate pedestrian crossings prioritize vehicular traffic and may make pedestrians feel unsafe.

Commercial Streetscape

The character of the streetscape in commercial areas can be a visual aid to help visitors determine whether it is a place to visit, for what purpose, and for how long. A streetscape with measures to increase safety for pedestrians crossing, trees to provide shade on a hot summer day, and benches to sit and eat are all signals of vitality and the presence of a vibrant and successful commercial area. These are currently absent in a consistent and meaningful way within the designated commercial areas adjacent to the beach.

Disjointed Vehicular Network

The fragmented street network also has negative implications for vehicular travel. This presents a vulnerability during storms in the event a street or street segment is unusable due to flooding or debris, in which case there may not be another viable access or evacuation route. On a day-to-day basis, the lack of through streets within neighborhoods causes drivers to make more vehicle trips, take circuitous routes, and diverts almost all local traffic onto the main arterials: Hylan Boulevard and Father Capodanno Boulevard. Hylan Boulevard and Father Capodanno Boulevard are important through routes and regional connections for motorists accessing the Staten Island Expressway and Verrazano-Narrows Bridge to the north. The addition of local to regional traffic on these main corridors contributes to congestion and safety issues.

Dead-end street at Nugent Ave and Greeley Ave near Miller Field

Street end limiting connections to adjacent areas

Wetland adjacent development and dead-end streets in Midland Beach

Dead end at Quincy Ave

Summary of East Shore Resiliency Challenges

1 Flood Risk

Due to the topography and proximity to the ocean, there is substantial risk of flooding both from rain and coastal storms.

2 Encroachment of Development on Freshwater Wetlands

Development in and around wetlands places residents at increased risk, diminishes wetlands' ability to aid the natural drainage network, and degrades these ecologically sensitive areas.

3 Resiliency Challenges for Homes on Small Lots

Current zoning was intended to encourage building on larger lots, and makes retrofitting of existing homes and rebuilding of new homes on small lots difficult, resulting in awkwardly configured living spaces. This makes it difficult for residents to make investments to keep themselves, their homes, and neighborhoods safe during storms.

4 Commercial Disinvestment

Limited building envelopes and costly floodproofing requirements are barriers to realizing the full potential of key beachfront destinations that could become thriving commercial corridors.

5 Limitations of the Transportation Network

The lack of functional redundancy and support for a range of transportation modes constrains options for residents and visitors on an everyday basis, as well as in the event of a network disruption such as street flooding.

RESILIENCY FRAMEWORK

While the East Shore faces challenges related to flooding, increasing insurance costs, home retrofitting, transportation, and local economic development, it also enjoys a commitment from residents and business owners who understand its unique assets. These stakeholders envision a future that is thriving and neighborhoods defined by their relationship to the beachfront and surrounding natural areas. The Framework Map illustrates a shared overarching vision and recommendations, developed by the City in partnership with the community, to address the most pressing land use issues within the study area.

With these guiding principles, the Framework Map identifies localized land use recommendations and complementary capital projects, as well as issues and policies that require further study and inter-agency collaboration.

Invest to Reduce Flood Risk

Proposed Line of Protection
Pursue the timely construction of the Army Corps of Engineers system of proposed buried seawalls and armored levees.

Mid-Island Bluebelt
Advance the expansion of DEP's Mid-Island Bluebelt to reduce flooding from rain and provide stormwater storage behind the Line of Protection.

Advance Resilient Building

Low Density Residential Areas
Provide avenues for homeowners to make resilient investment by removing zoning impediments. Support new construction without increasing overall density by removing zoning constraints for homes that are built on smaller lots.

New Dorp Beach Bungalow Colony
Limit residential growth and encourage resilient investment consistent with the existing neighborhood character and infrastructure.

Strengthen Key Waterfront Destinations

Midland Avenue and Sand Lane
Activate beachfront commercial areas on existing corridors by strengthening visitor connections between historic retail areas and beachfront improvements. Remove zoning impediments to resilient investment and help incentivize mixed-use development. Promote development that is contextual, consistent, and attractive. Additional opportunities for housing should be encouraged to support local retail, replace lost housing supply in State Buyout Areas, help offset floodproofing costs, and encourage investment in abandoned properties.

Preserve Natural Environments and Open Space

Enhance Open Space Network
Create opportunities for education and improved connections between neighborhoods and the beachfront by including discrete projects and elements, such as the State Buyout Areas, Line of Protection, Bluebelt, and other natural features, as part of a larger open space network.

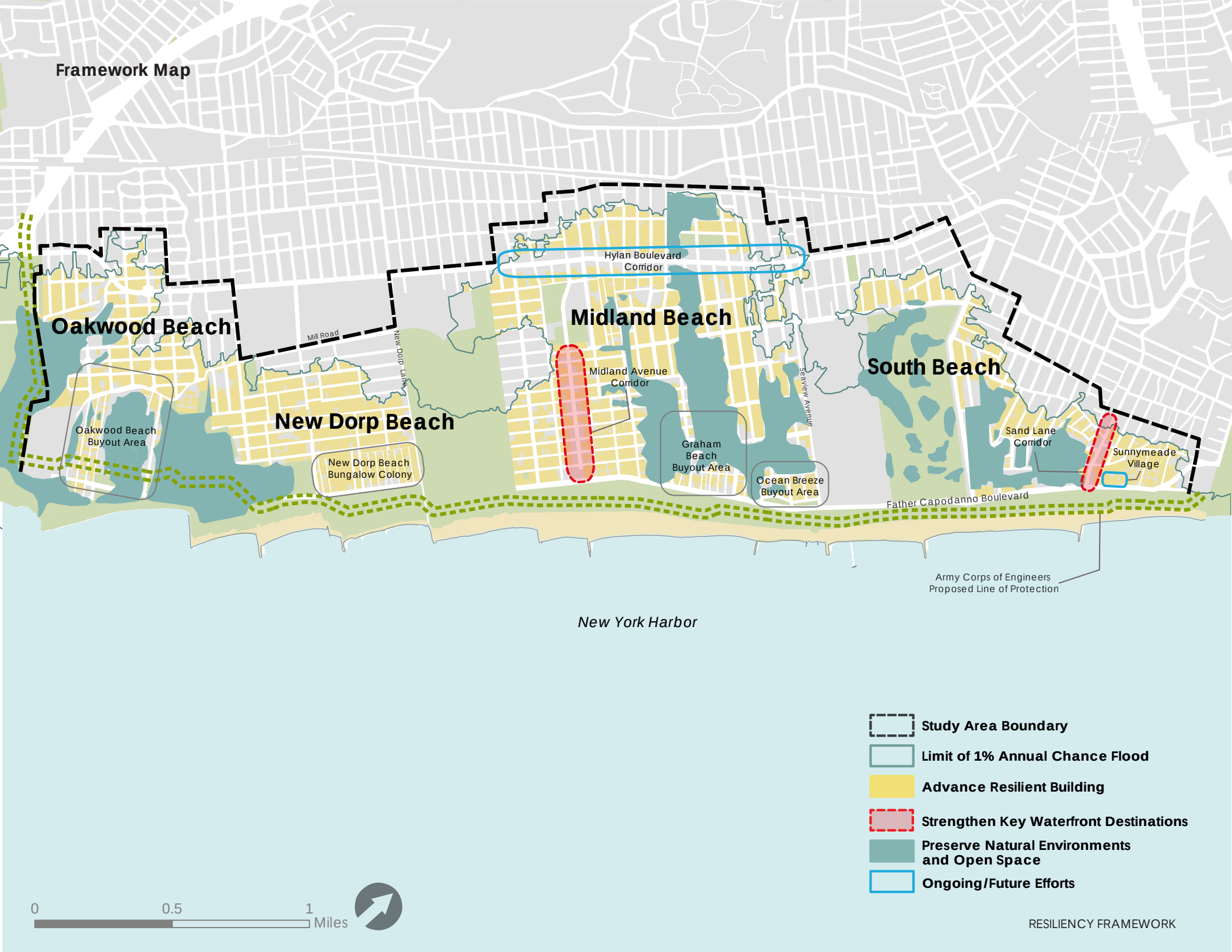
Limit Density in New York State Buyout Areas
Limit future growth and support the return of land to natural functions in the New York State Buyout Areas by applying appropriate zoning in these sensitive areas. Support long-term open space planning efforts to ensure that Buyout Areas function as both a buffer to future storms and as a valued community resource.

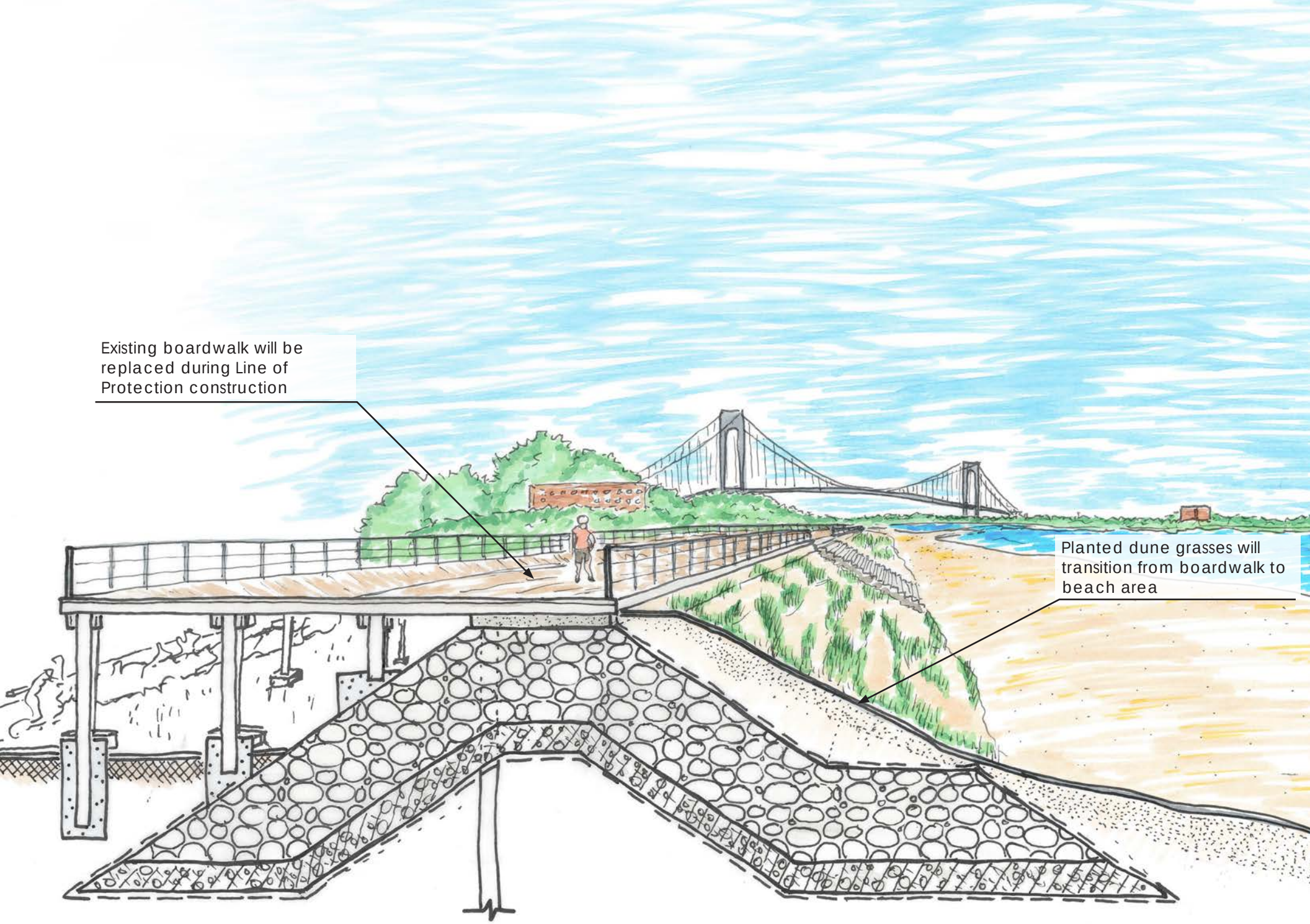
Freshwater Wetlands and Inland Drainage
Preserve and enhance existing wetlands by developing zoning tools to limit and improve the quality of wetland-adjacent development. Develop site-specific techniques to preserve wetland buffers and ensure the long-term integrity and ecological diversity of areas vital to interior drainage.

Ongoing/Future Efforts

Sunnymeade Village
Support long term planning efforts by the City and State and promote contextually appropriate and resilient development adjacent to a thriving commercial corridor and beachfront location at Sand Lane and Father Capodanno Boulevard.

Hylan Boulevard
The Hylan Boulevard corridor raises a number of issues that are beyond the scope of this study. Further study in coordination with DOT is needed to examine and develop recommendations for addressing these issues.


Framework Map
Oakwood Beach
Midland Beach
South Beach
New Dorp Beach
Mill Road
New Dorp Lane
Hylan Boulevard Corridor
Midland Avenue Corridor
Seaview Avenue
Oakwood Beach Buyout Area
New Dorp Beach Bungalow Colony
Graham Beach Buyout Area
Ocean Breeze Buyout Area
Sand Lane Corridor
Sunnymeade Village
Father Capodanno Boulevard
Army Corps of Engineers Proposed Line of Protection
New York Harbor
Study Area Boundary
Limit of 1% Annual Chance Flood
Advance Resilient Building
Strengthen Key Waterfront Destinations
Preserve Natural Environments and Open Space
Ongoing/Future Efforts
0
0.5
1
Miles
RESILIENCY FRAMEWORK



Section through Line of Protection and Boardwalk (USACE FEIS 2016)

INVEST TO REDUCE FLOOD RISK

Advance programs and capital projects at the Federal, State, and local level to address flooding

The New York City Panel on Climate Change projects that sea levels may rise as much as thirty inches by the 2050s. Without major investments in infrastructure to reduce flood risk, coastal inundation on the East Shore will not only continue, but increase as the result of sea level rise. Flooding may also be caused by heavy rain storms and poor upland drainage. The result would be extensive property damage and risk to safety for residents and first responders.

Flooding on the East Shore may be caused by different factors, either storm surge from the Lower Bay during major storm events, or localized rainwater flooding as a result of more frequent storms. Low ground elevations throughout the study area and the lack of stormwater infrastructure contribute to flooding. Given the substantial and growing flood risk, there has been a coordinated Federal, State, and City response to implement planned infrastructure projects that alleviate or greatly reduce the risk of both coastal inundation and local stormwater flooding.

At the Federal level, the U.S. Army Corps of Engineers has proposed a buried seawall, armored levee and interior drainage system that will reduce the threat of coastal inundation dramatically. Additionally, the plan calls for large inland drainage areas that are necessary to contain interior runoff when outfalls are closed during high tide or coastal surge. These ponding areas will be implemented through the construction of the City's Mid-Island Bluebelt, a project to reduce flooding caused by frequent rain storms and greatly aid local drainage on the East Shore. Bluebelts are a hybrid stormwater management system that combine restored wetlands with engineered infrastructure. Lastly, the State has identified three neighborhoods highly susceptible to flooding and other natural hazards and is currently working to acquire private properties and return the land to a natural state. These three major capital investments will work in concert to substantially reduce flood risk and its consequences on the East Shore.

Investments in Flood Risk Reduction

Coastal Protection

Following a devastating nor'easter in 1993, the US Army Corps of Engineers (USACE) was first authorized to study the feasibility of coastal protection along the east and south shores of Staten Island. With funding from the Disaster Relief Appropriations Act of 2013, a comprehensive South Shore of Staten Island Coastal Storm Risk Management Feasibility Study was conducted. In December 2016, the USACE released the Final Environmental Impact Statement and South Shore of Staten Island Coastal Storm Risk Management Feasibility Report. The goal of Phase 1 is to reduce flood risk for the area stretching from Fort Wadsworth to Oakwood Beach. Phase 2 is included in a separate action and could potentially stretch from Great Kills to Tottenville.

Upon planned completion in 2023, the hybrid system of armored levees and buried seawalls, called the Line of Protection (LOP), will reduce flood risk. The plan also involves a complementary Interior Drainage Plan, which calls for tidal gates, road elevations, and pond excavation. These coastal protection measures will be designed to withstand a 300-year storm surge and will dramatically reduce the risk of coastal flooding within the study area. The total project cost is $615 million with sixty-five percent funded by the Federal government and thirty-five percent from the State and City.

Given the scale of the project and its vital importance to the safety of East Shore communities, DCP is working to support expedited LOP construction by coordinating with all involved agencies on the resulting Uniform Land Use Review Process (ULURP) applications. In addition, because the LOP will affect shoreline parks on the East Shore, the City will continue working with the USACE through the Shoreline Parks Plan to ensure good connections and access are maintained after the project is complete.

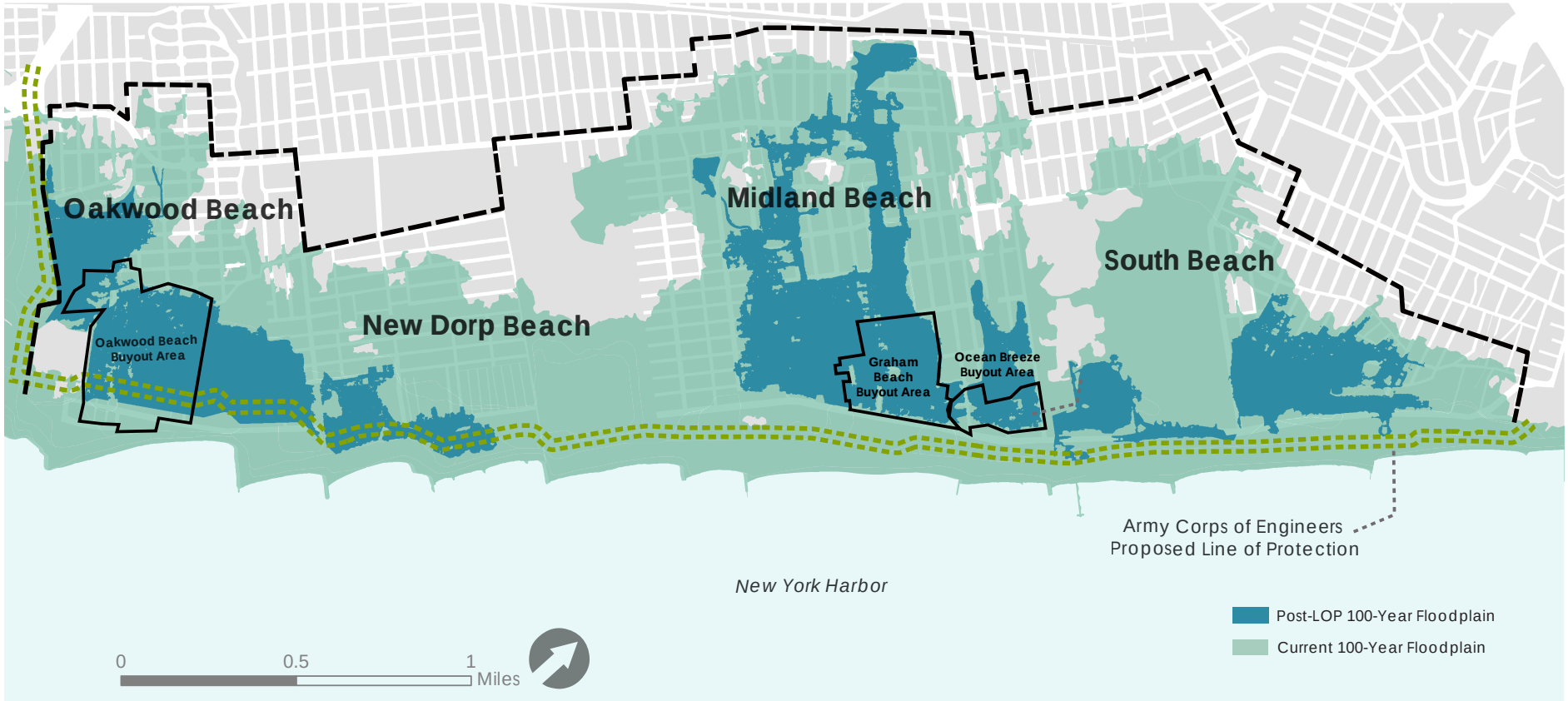
The flood risk reduction as a result of this substantial investment will be advantageous to residents and other property owners on the East Shore. However, this project will not entirely eliminate the possibility of major flooding in the study area. While it is anticipated that the federal flood maps will be updated following substantial completion of the project, and a large number of homes may no longer be subject to insurance requirements due to decreased risk, over 400 homes will likely remain in the 1% annual chance floodplain. In addition, homes and property outside the potential future 1% annual chance floodplain will still likely remain in the 0.2% annual chance floodplain and would be at risk should the Line of Protection be over-topped. Over the life of a home, this risk is considerable. The existing New York City Building Code references the PFIRMs and FIRMs to designate areas required to meet flood resilient construction standards. If these maps change as a result of the Line of Protection, homes could be built to less precautionary standards, placing residents at risk over the lifetime of a home. Therefore flood resistant construction requirements are recommended to be established for residential buildings behind coastal protection and within the 0.2% annual chance floodplain.

Drainage Infrastructure

The Line of Protection will provide the first line of defense against coastal surge and wave action, but also includes significant improvements to interior drainage. The proposed plan will aid in the controlled storage and discharge of interior floodwaters during heavy rain through excavated ponding areas. This ensures that the coastal barrier will not induce flooding during storms below a 10-year rain event.

The proposed ponding areas build upon New York City Department of Environmental Protection's (DEP) efforts to improve stormwater drainage through a system of natural and man-made infrastructure, or "Bluebelts." The Staten Island Bluebelt system provides award-winning, ecologically sound, and cost-effective stormwater management infrastructure for approximately one third of Staten Island's land area.

The Mid-Island Bluebelt, currently under construction, covers Oakwood Beach, New Creek, and South Beach watersheds, an area approximately 5,000 acres in size. The primary objective of the project is to provide comprehensive stormwater management and address chronic flooding of streets and properties while preserving and enhancing existing wetlands. This is achieved through approximately 137 miles of new storm sewers, five Best Managment Practices (BMPs), and five enlarged outfalls. Previous plans were amended to align with the excavation of ponding areas for the Line of Protection, with the tributary sewer system built out as funding is allocated, likely over the next 30 years. The Bluebelt is designed to resolve flooding for the most frequent rain events (up to a five-year storm) providing much needed relief for residents. By advancing the project expeditiously, the area's vulnerability to flooding from heavy rain will be significantly reduced. However, upon completion, Bluebelts alone would not address more severe rain storms which could cause flooding issues in inhabited areas, especially those that are very low lying and naturally collect rainwater.



Pre- and Post-Line of Protection Floodplain

10,446 Buildings

Current 100 Year

400 Buildings*

Post-LOP 100 Year*

*Assumes full participation in New York State Enhanced Buyout Program

*Estimate based on USACE post-LOP floodplain modeling

Line of Protection Key Facts

- **December 2016** USACE release of Final South Shore of Staten Island Coastal Storm Risk Management Feasibility Study the Final Environmental Impact Statement
- Projected costs total **$615,000,000**
- Designed to withstand a **300**-year storm
- Planned completion in **2023**

Return to Nature

While the entire East Shore study area is at risk of flooding from both coastal storms and heavy rain, there are particular areas that are especially vulnerable, including Graham Beach, Ocean Breeze, and Oakwood Beach (see map on page 41). These areas are more susceptible to flooding due to their proximity to the coast, low elevations, and drainage issues. Even with infrastructure investment, such as the Line of Protection and Bluebelts, these areas will continue to be at risk and require a long-term approach to prevent increased exposure to flooding. Additionally, these areas are conducive to the rapid growth of phragmites, an invasive species of tall grass that creates a wildfire hazard to the surrounding neighborhood and puts residents and firefighters at risk seasonally.

In light of these ongoing concerns, following Hurricane Sandy the New York State Office of Storm Recovery designated the three neighborhoods as Enhanced Buyout Areas. Within these defined boundaries the State offered to buy homes at pre-storm value that sustained substantial damage from Sandy, Tropical Storm Lee, or Hurricane Irene. The program has also extended purchase offers to vacant properties in these areas which would result in more contiguous acquisitions. The stated long-term goal of the program is convert the land to open space to serve as buffers to future storms. However, because participation in the program is voluntary, some residents will continue to be at risk from flooding and other hazards if they choose to stay.

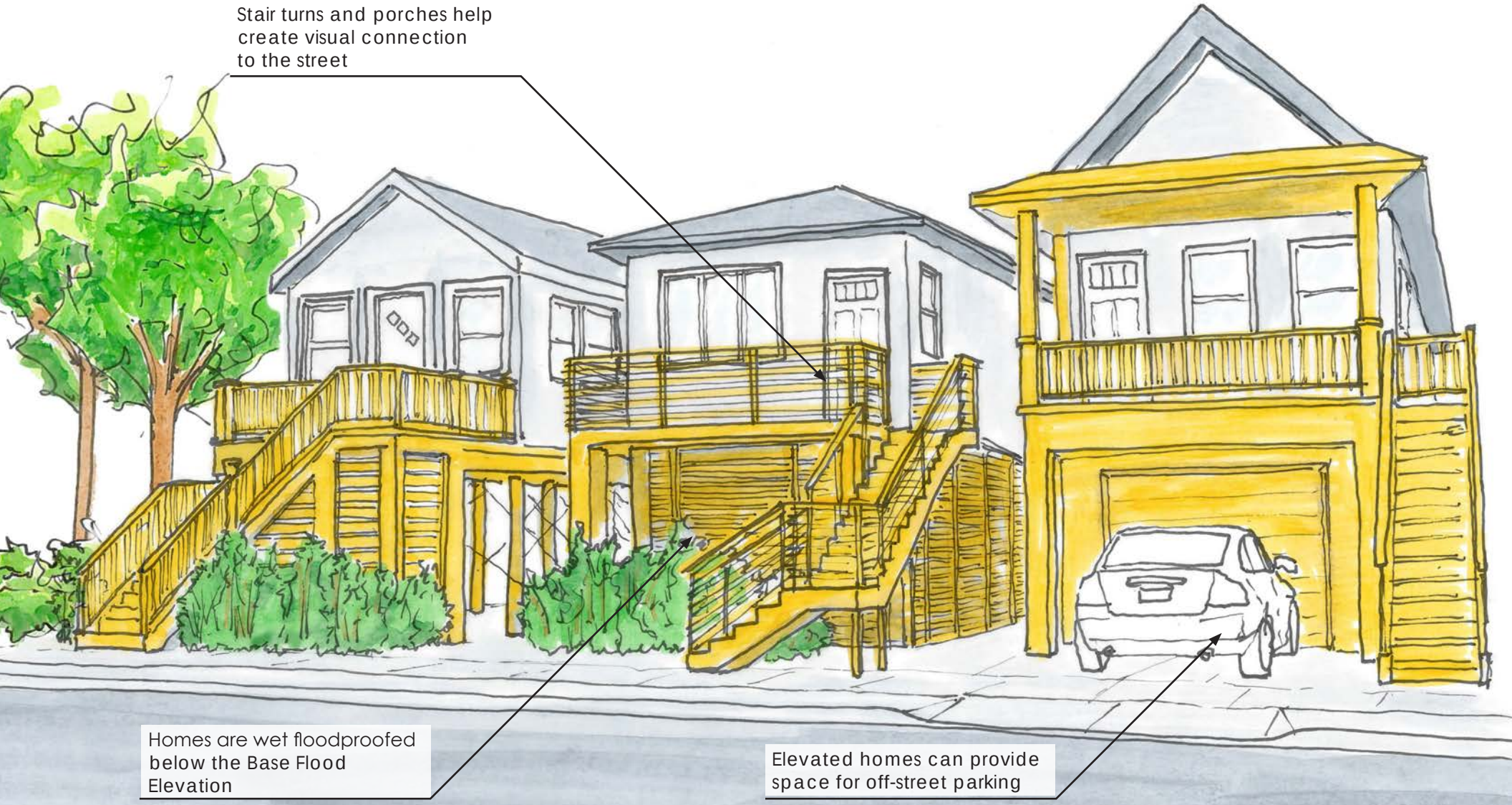
Creating an open space network within the Buyout Areas benefits from local land use regulation that is aligned with this long-term goal. Thus, DCP recommends zoning for the Buyout Areas that restricts future residential density, but ensures remaining residents are able to maintain and invest in their existing homes. This recommendation is further discussed on pages 68-69 of this report.

Example of DEP Bluebelt on the South Shore of Staten Island

Recommendations

- Work to expedite Line of Protection-related ULURP actions
- Maintain flood resistant construction standards in areas behind coastal protection
- Advance construction of the Mid-Island Bluebelt
- Align zoning to limit future density in State Buyout Areas

Demolition of home in Oakwood Beach Enhanced Buyout Area



Resilient Bungalows in Midland Beach

ADVANCE RESILIENT BUILDING

Facilitate resilient residential investment and reconcile flood protection with neighborhood character

For East Shore neighborhoods to thrive in the years to come, it is imperative to ensure that new and existing homes can be elevated above the height of floodwaters. Elevation protects the safety of residents and significantly limits the extent, cost, and severity of flood damage to property.

Homes built below the local Base Flood Elevation are at much higher risk of flood damage than elevated homes. Additionally, these homes are much more likely to face significant increases in flood insurance costs as Flood Insurance Rate Maps are updated. The cost of flood insurance is greatly reduced when homes meet or exceed NFIP standards. Homes that do not meet NFIP standards are also much more likely to suffer from decreasing value, especially as elevation becomes more common within a given housing market.

To provide relief to homeowners making resilient investments, the City adopted the Flood Resilience Zoning Text Amendment on October 9, 2013. This was intended to encourage flood-resilient building construction throughout designated flood zones. The changes removed regulatory barriers that hindered or prevented the reconstruction or retrofitting of storm-damaged properties. The amendment enabled many new and existing buildings to comply with higher flood elevations issued by FEMA and with new requirements in the New York City Building Code.

There are two general strategies homeowners and other property owners can utilize when determining the appropriate path forward: retrofitting and rebuilding. While new construction will replace older buildings over time, wholesale replacement of the existing building stock would take decades, and would be prohibitively expensive and highly disruptive. Therefore it is critically important to provide owners with guidance on how they can retrofit buildings in ways that are economically viable and successfully reduce the risk of damage and disruption from flooding.

In October 2014, DCP released *Retrofitting Buildings for Flood Risk,* the most comprehensive analysis of retrofit options available for buildings in the New York City floodplain. This report provides a step-by-step methodology for architects, developers, and property owners to approach decisions about retrofits for many common types of buildings. The following pages are excerpts from this report applicable to the East Shore.

Enable Buildings to Retrofit

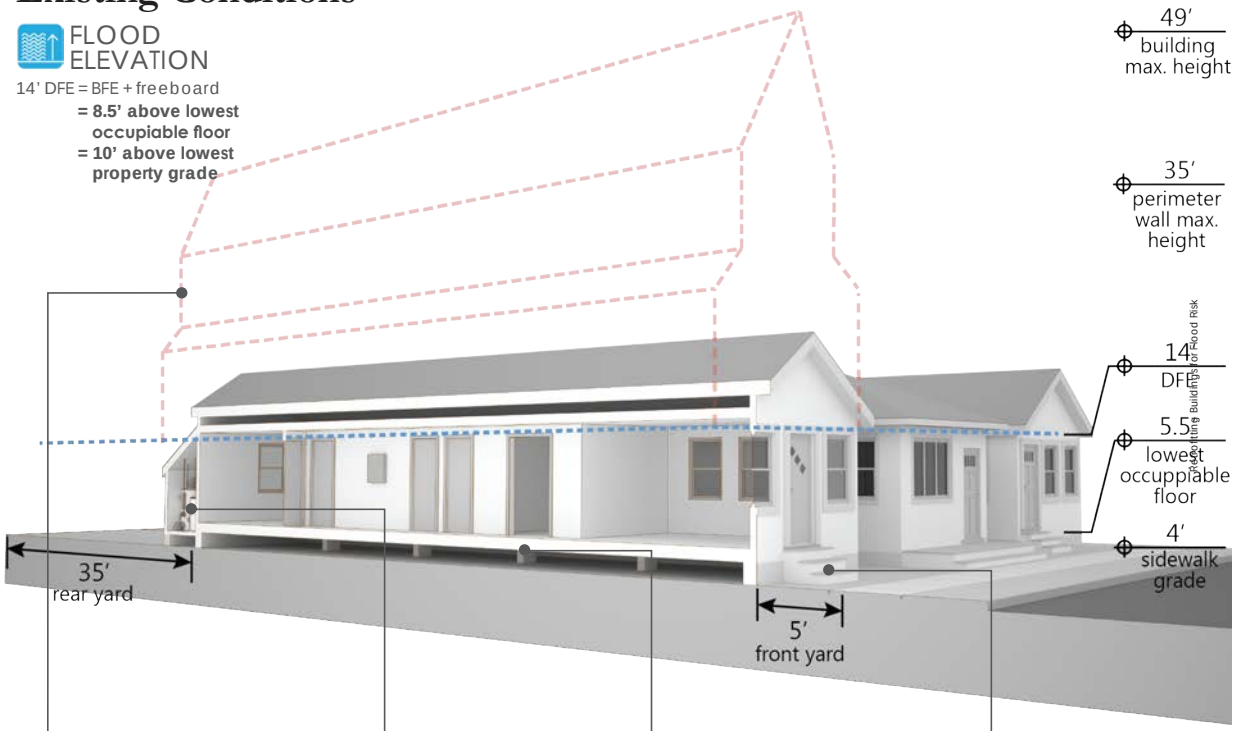
Bungalow Case Study

The bungalow example described here is a structural type that is not entirely dissimilar to the structures anticipated by NFIP standards, a lightweight wood-frame building without a sub-grade foundation. The building type is often located in neighborhoods where site conditions are highly constrained, making retrofitting (as well as reconstruction) difficult and costly.

Retrofit strategies that will result in full NFIP reduction in flood insurance premiums include elevating the structure and shifting it to the rear yard to make room for new stair access in the front yard. The area below the elevated structure can be left open or enclosed and wet floodproofed. Critical systems are elevated within an enclosure at the rear of the building or simply within the building. The costs associated with elevation are high considering the small size of the resulting building.

Even though the light structure is conducive to elevation, the proximity of neighboring buildings may make it difficult to stage construction. Successful elevation requires assessment of the building's structural integrity and any implications of site excavation for the neighboring buildings.

Existing Conditions



ZONING ENVELOPE

The allowable building height is measured from the DFE.

The existing building has non-compliant front and side yards, and does not provide required parking. These non-compliances must be considered when retrofitting.

The floor area is not maximized. 200 square feet can be added pursuant to underlying floor area ratio and within the adjusted bulk envelope.

CRITICAL SYSTEMS

All systems are located in a rear enclosure below the DFE.

STRUCTURAL SYSTEMS

Single story wood frame combustible construction type on shallow unreinforced masonry foundation. The wood structure is not sufficiently tied to the foundation.

ACCESS

Building access is provided at the front and rear entrances 1.5' above the sidewalk grade.

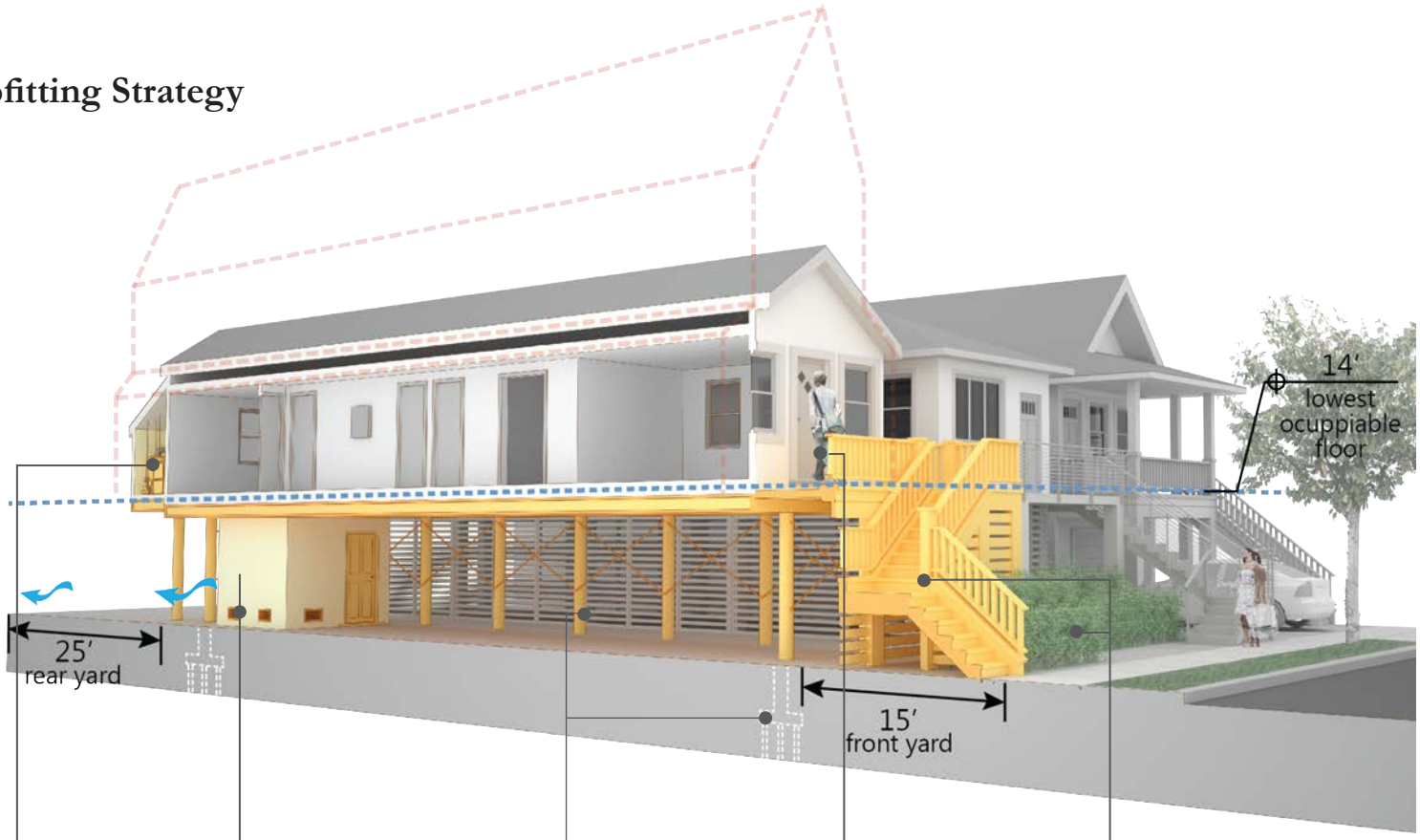
NFIP Compliant Retrofitting Strategy

ELEVATE & WET FLOODPROOF

Elevate the existing structure on a new foundation system to bring the lowest occupiable floor above the DFE. To accommodate access to the elevated structure, shift the existing building footprint back from the front property line into the rear yard.

Elevate critical systems above the DFE.

Wet floodproof the storage enclosure below the DFE.



CRITICAL SYSTEMS

Elevate systems above the DFE within a fireproofed and vented accessory structure at the rear.

USE

There is no loss of usable space because the existing home is elevated in place.

If loss of usable space occurs by relocation of access or critical systems within habitable space, that loss of usable floor area can be recaptured as an addition within the permitted bulk envelope.

The non-compliant yards remain.

The wet floodproofed area below the structure may only be used for vehicular parking, crawl space, storage or access.

STRUCTURAL SYSTEMS

Elevate the structure on columns with a spread footing foundation system. Piles may be required depending on soil conditions or by the flood hazard area designation.

Elevate the accessory structure containing the critical systems on structural columns or piles.

Insulate and fireproof underside of lowest floor to enclose building envelope.

ACCESS

The building entrance is relocated to 10' above sidewalk grade. The stairs may be located underneath or adjacent to the structure depending on available yard space and clearance underneath the structure. Here the building is shifted towards the rear property line to accommodate the stair run and porch depth.

STREETSCAPE

As per the Zoning Resolution, homes elevated over 5' above the sidewalk grade require one streetscape mitigation, and over 9' require two. These enhancements can be selected from a list of options specified in the Zoning Resolution, such as: plantings, covered and uncovered porches, stairs with 90-degree turns, or elevated front yards. Here, plantings and the stair turn are counted toward streetscape mitigations.

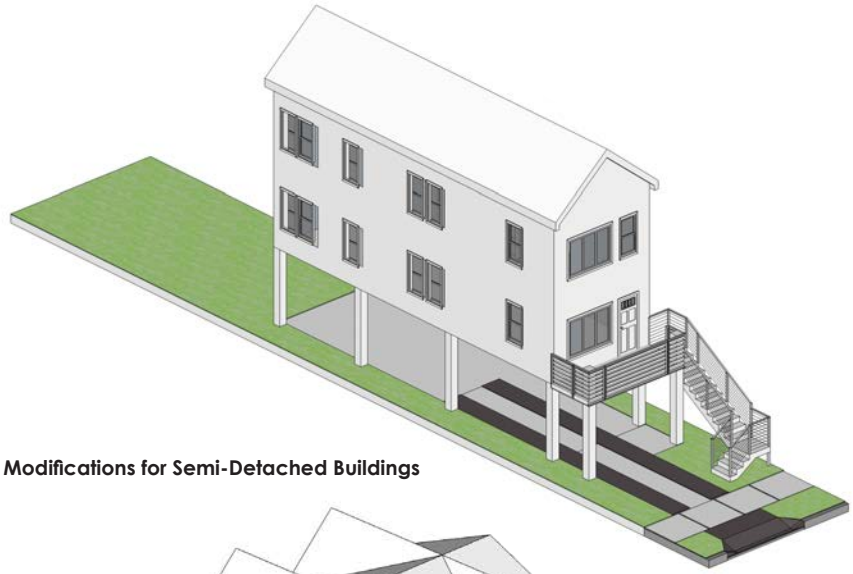
Support Appropriate New Construction

This study has focused on addressing lot conditions and zoning impediments that create challenges for the construction of new resilient homes. Zoning currently has requirements that make resilient redevelopment difficult, particularly on narrow and shallow lots. Homes recently rebuilt according to current zoning rules are frequently cited as awkwardly proportioned, misaligned with neighborhood character, and as having inefficient interior layouts. The resulting building, known locally as a "candlestick home," is a very narrow and tall detached home.

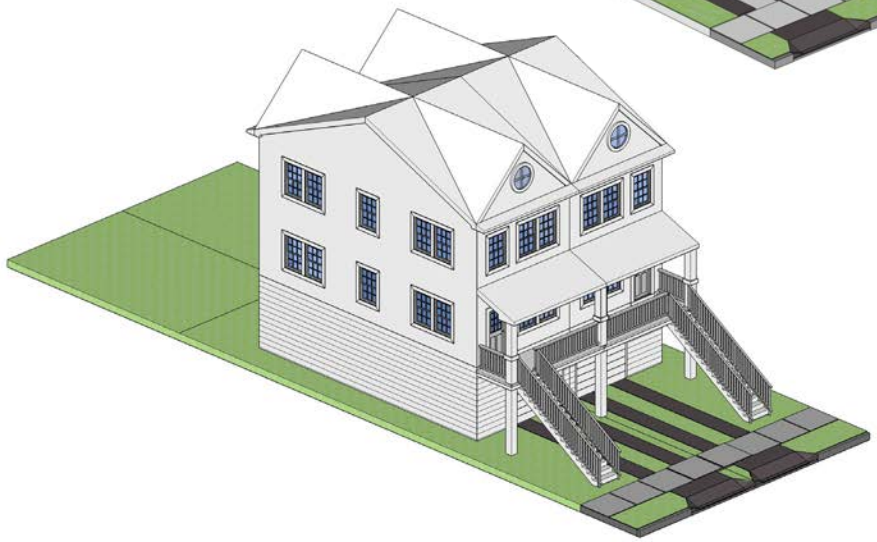
This form is the result of applying current zoning standards to a particularly narrow lot. In most areas of the East Shore, current zoning rules require detached homes to have two side yards of at least five feet each, which amounts to half of the width for a twenty foot wide lot. The remaining building footprint is ten feet wide, which is too narrow for an interior hallway, creating a "shotgun" floorplan and ground floor consisting entirely of a garage. Additionally, homes in low-lying areas have very high flood elevations and must be elevated considerably to meet flood standards. Similar issues face semi-detached homes built on narrow lots. The resulting building can rise to the full height permitted for a standard width lot, but be very narrow. If this trend continues, the shift in neighborhood character will be dramatic and described by current residents as unattractive.

To enable elevation and resilient construction on existing narrow lots while supporting better proportioned buildings that better suit the existing built character, DCP, with local stakeholders, recommends making new rules for future development that link reduced yards requirements with lower height limits to permit homes that better fit with the existing neighborhood character of small bungalows and cottages.

Proposed Modifications for Detached Buildings



Proposed Modifications for Semi-Detached Buildings



Recommendations

- For narrow lots, decrease the minimum required side yards
- For shallow lots, decrease the minimum required rear yard
- With reduced yards, impose height restrictions to maintain appropriate building proportions, keeping with neighborhood character

Recommended Modifications Applied to a Detached Building

Recommended Modifications Applied to a Semi-Detached Building

Guide Appropriate New Development in New Dorp Beach

New Dorp Beach Bungalow Area

The New Dorp Beach bungalow colony faces major infrastructure deficits such as extraordinarily narrow one-way streets, a high concentration of narrow and shallow lots, poor drainage, and a limited number of storm sewers or locations where they could be provided. These conditions make it impossible to improve public infrastructure to create satisfactory road and sidewalk widths. Property ownership patterns and residents' stated desire to remain in place preclude any street widening to construct stormwater improvements on these very narrow residential streets.

The current zoning in New Dorp Beach permits new two-family homes and, in some areas, attached homes, which are not appropriate building types on these very small lots located on substandard streets without stormwater drainage systems. It is recommended that future construction of two-family homes require larger lots, and building heights be restricted to twenty-five feet above the Design Flood Elevation because of the extremely narrow streets. This will enable the cohesive neighborhood character to be maintained but prevent further stress on already strained infrastructure.

New Dorp Beach

Location:	Located adjacent to both New Dorp Lane and Cedar Grove Avenue. Bound by the coast to the east.
Current Zoning:	Primarily R3X with a some R3-2
Land Use:	Primarily 1 and 2 Family Detached Residential
Residential Units:	322 Residential Units
Total Area:	28 Acres
Notable Features:	Beach bungalow housing typology. Street widths are extraordinarily narrow. Suffered severe damage from Sandy coastal inundation.

Zoning Recommendations

- Limit two-family development on small lots.
- Restrict building heights because of extremely narrow streets to 25 feet above the DFE

Bungalows in New Dorp Beach

Conceptual view from boardwalk to commercial areas

STRENGTHEN KEY WATERFRONT DESTINATIONS

Make the East Shore a waterfront destination that is lively, safe, and accessible

The Midland Avenue and Sand Lane corridors are vital neighborhood anchors for East Shore residents. The commercial corridors are home to dozens of locally-owned businesses that provide goods and services to residents and visitors. However, these areas also face numerous challenges. The high cost of floodproofing commercial spaces, rising insurance premiums, increasing business vacancy, and the ever-present threat of flooding are all considerable challenges that threaten the corridors' future viability.

Even so, proximity to the coast has also allowed for the growth and success of these business districts and their surrounding neighborhoods. The expansive beach and boardwalk, considerable natural resources, abundant parks, rich cultural diversity, and the relative affordability of housing have attracted residents to the area. Maintaining this vibrancy, while increasing the area's resiliency to flooding, entails capitalizing on neighborhood assets to help create vibrant, livable areas that attract and retain residents, while reconnecting retail corridors to the beachfronts that have historically defined them.

Thriving commercial areas support economically resilient neighborhoods. Well-planned commercial corridors not only provide everyday services to residents, but in the event of a storm supply necessary goods in locations easy to reach on foot. Unfortunately, existing zoning and land uses along both Midland Avenue and Sand Lane are not conducive to vibrant flood resilient development. The prevailing zoning in both areas permits strip mall style, single-story commercial buildings set back behind parking lots and semi-detached residential development, while prohibiting the older, street-fronting, mixed-use buildings with limited parking that define the existing neighborhood character. This results in a disjointed and unattractive streetscape. High parking requirements discourage mixed-use buildings, which also makes offsetting the cost of dry floodproofing commercial sites difficult. Combined with relatively weak demand for commercial space, these factors all contribute to high vacancy rates. Mixed-use buildings with residential units located above retail businesses are not supported by the current zoning.

Improved zoning could encourage revitalization and redevelopment along Midland Avenue and Sand Lane. Increases in permitted floor area would allow for additional or larger residential units on the second and third floors of commercial buildings, and permit small multifamily developments in residentially zoned areas along the corridor. This would enable the corridors to increase their local customer base and offset some of the housing lost following Sandy. Additionally, zoning controls can encourage, or at least not prohibit, building design features that create a more pedestrian-friendly streetscape experience such as ground floor transparency requirements to encourage public safety and vitality at the sidewalk, requiring façade articulation or upper story setbacks to allow more design options, or limiting curb cuts and requiring parking lot screening to reduce pedestrian/shopper conflicts. The use and design of commercial sites is influenced by parking requirements, which can be crafted to support a beachfront neighborhood character. Parking is necessary to support the retail corridors, but the location and amount of parking can either enhance or detract from the desired goal of attractive retail gateways to the beach and boardwalk. Reductions in required parking to a more market appropriate range will ease a major development hurdle that would otherwise result in very large surface parking lots with limited retail space. Zoning changes can also require parking to be located behind buildings so that a continuous retail frontage is presented. Retail parking needs can be supplemented with additional on-street parking by providing angled parking spaces that will accommodate shoppers and beach-goers, as well as residents.

New York City Parks' Shoreline Parks Plan sets out a vision for the adaptation of shoreline parks to the U.S. Army Corps' protective seawall, re-imagining the use and design of parkland to reflect the community's needs after completion of the Line of Protection. Coordinated public streetscape improvements such as enhanced lighting, benches, medians, inviting pedestrian and bike crosswalks, and additional on-street parking can create a more welcoming environment and contribute to defining the unique beachfront character of the neighborhood while reconnecting and concentrating activities at Midland Avenue and Sand Lane. Together, these proposals will help ensure that both Midland Avenue and Sand Lane are hubs of activity and resilient well into the future.

Promote Corridor Reinvestment

Midland Avenue

Midland Avenue has historically connected the beach to Hylan Boulevard. Today, however, the corridor faces many challenges including significant flood elevations, a high commercial vacancy rate, perceptions of crime, and growing home abandonment due to damage from Sandy. Despite all of this, the community has expressed a strong interest in revitalizing this commercial area, as illustrated through the recently formed Midland Beach Merchants Association and grant-funded East Shore Local Development Corporation.

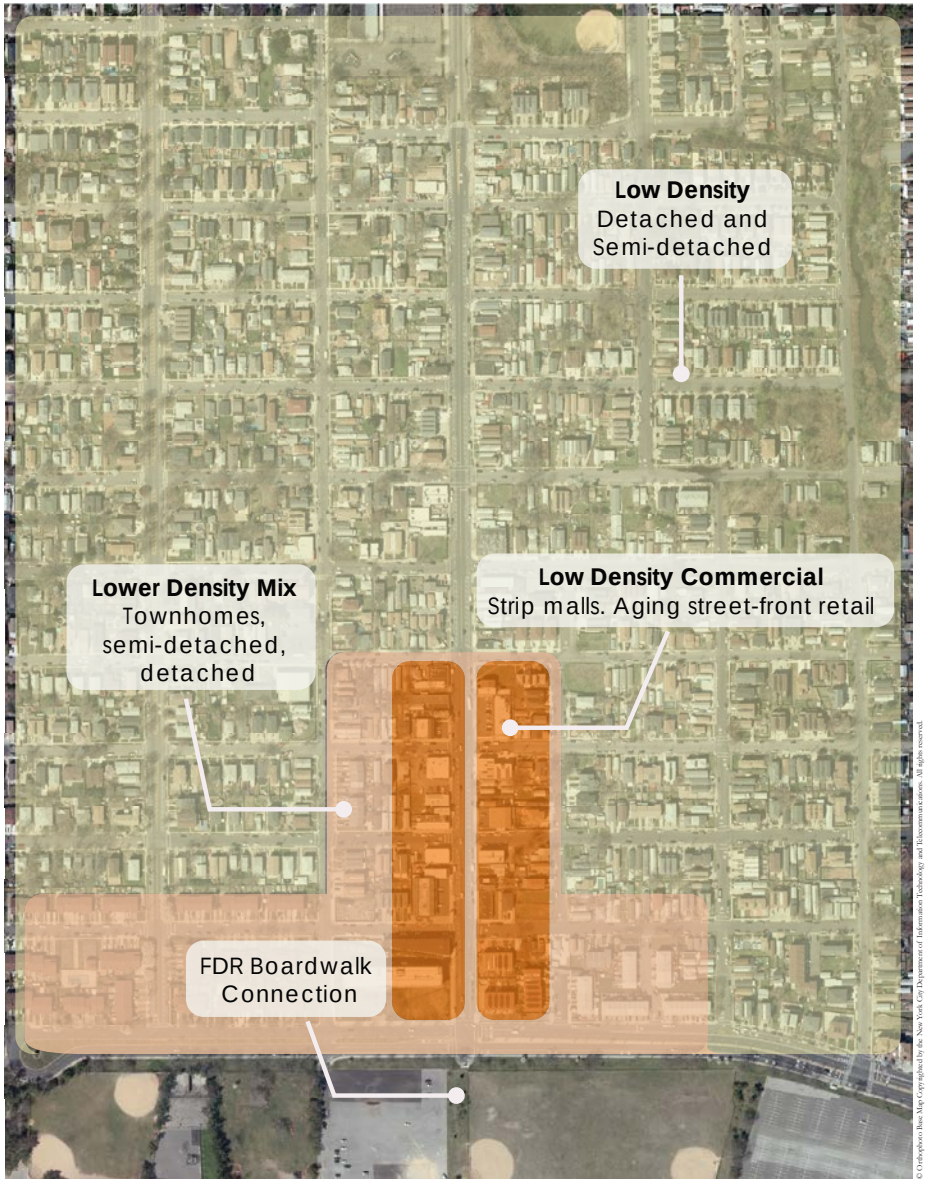
Lower Density Growth Management Area zoning rules require non-residential ground floor uses within the commercial overlay. However, in some locations these overlays are currently mapped over residential side streets which are not ideal for commercial uses. The requirement also makes it difficult for existing homes within the commercial overlay to make resilient investments in their property. This rule was generally intended to prevent residential redevelopment along arterials where commercial uses are ideal. But the existing C1-1 commercial zoning along Midland Avenue acts as a disincentive to commercial investment and redevelopment. While it allows contextually appropriate uses, such as local retail and restaurants, it also carries with it a high parking requirement that cannot be reasonably met within the lot sizes and building typologies common in these beachfront communities.

Modifications to the commercial zoning could better align boundaries to focus commercial uses along arterial streets, provide relief for homeowners on residential side streets, and more closely align parking requirements with lot conditions and market demand. This would also support resilient redevelopment, which would make the neighborhood safer from flood risks.

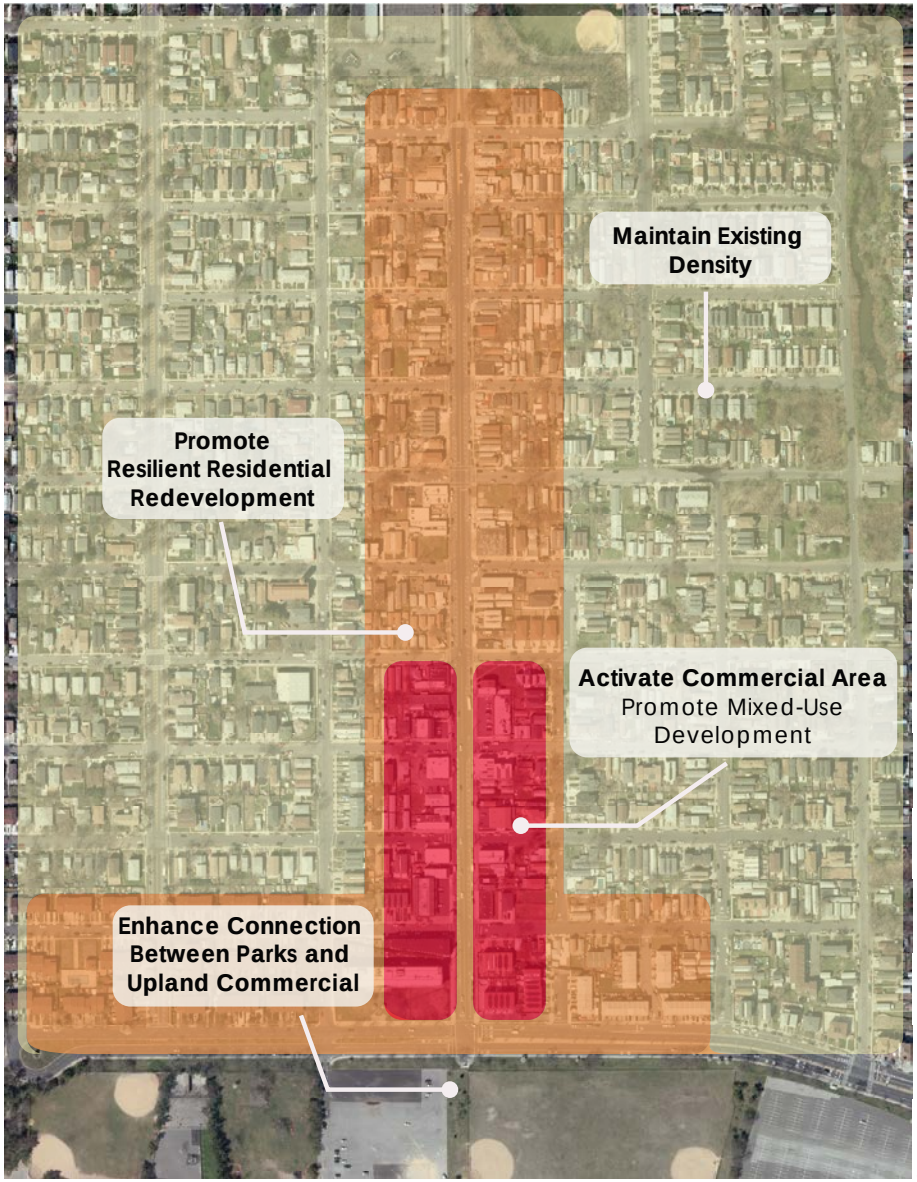
In addition to changes to the commercial overlay, there are opportunities to improve the residential zoning to promote resiliency. Currently, Midland Avenue hosts a variety of housing types, including small bungalows, semi-detached buildings, townhomes, and small mixed-use buildings. These housing types are scattered along the corridor with little continuity. Setbacks, yards, and curb cuts vary widely. The underlying residential zoning is all low density and includes both R3-1 and R3-2 districts. This zoning is found across Staten Island, though is not conducive to the type of mixed-use and small multifamily development associated with vibrant mixed-use corridors often found in beachfront communities.

As illustrated in the map to the right, no changes are recommended to the existing zoned density in the vast majority of the neighborhood. The focus for revitalization and long-term redevelopment would be Midland Avenue, where wide streets would support new buildings and increased on-street parking. An increase in residential floor area would promote resilient residential and mixed-use development. Permitting somewhat larger residential typologies along Midland Avenue, including townhomes and even small apartment buildings, allows greater flexibility to meet neighborhood goals of allowing residents to age in place, provides a wider range of housing types closer to the waterfront, and supports a more active business corridor. Future commercial development would be limited to the four blocks of Midland Avenue nearest Father Capodanno Boulevard. Eventually, bungalows within the commercial area may redevelop as conforming mixed-use buildings that comply with flood standards. Future parkland enhancements at the main entrance to the beach at Midland Avenue could help enable a more continuous connection with the business district, resulting in increased foot traffic along Midland Avenue and a seamless and inviting gateway between the neighborhood and the beach.

Midland Avenue Existing Conditions



Midland Avenue Recommendations

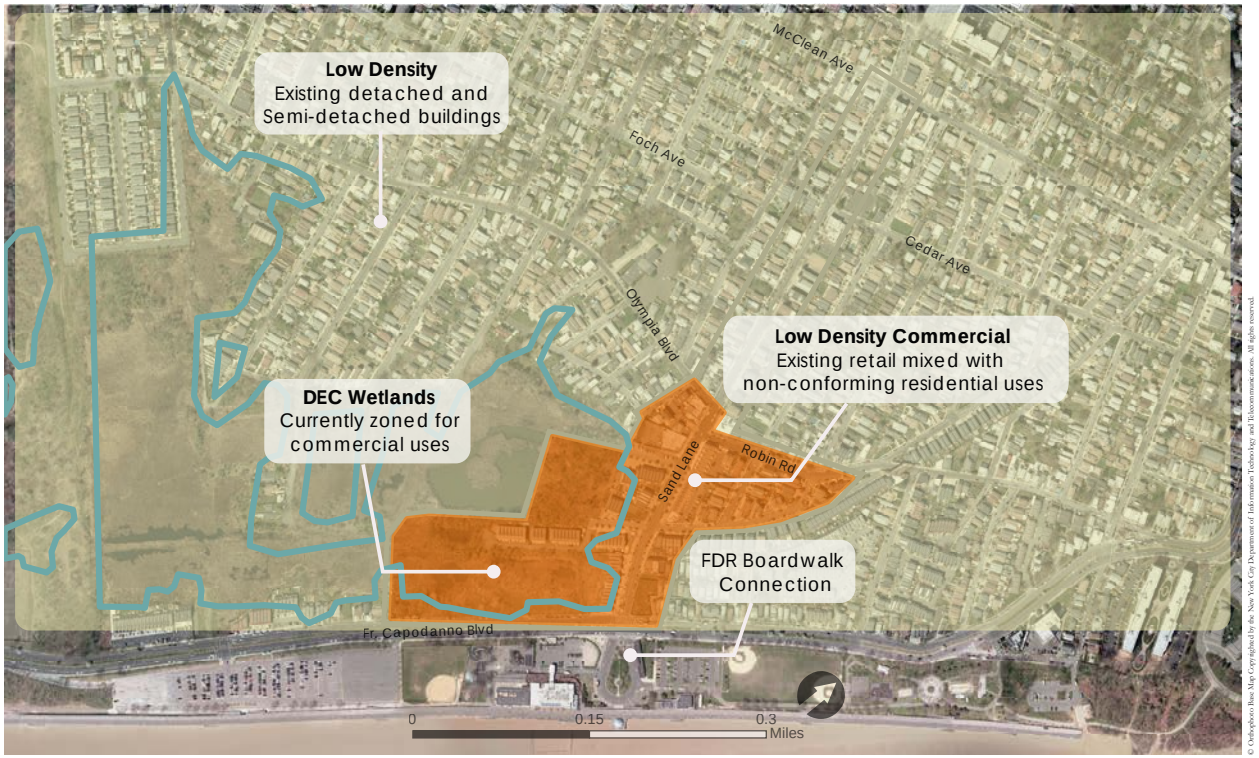


Sand Lane

The Sand Lane corridor is a commercial area between South Beach and upland neighborhoods. It is also a main entrance to the FDR Beach and Boardwalk. Historically, it was the last stop on the former train line from the North Shore bringing residents to summer beachfront retreats. The rail line no longer exists but the business district maintains a welcoming streetscape with a grocery store and relatively new mixed-use buildings erected prior to the release of the PFIRMs.

The corridor recovered quickly following Sandy and retail vacancy is low. However, the current C1-1 commercial overlay extends over blocks of residential properties and a large State-designated wetland area. Since Sandy there has been little additional commercial investment along the corridor, and prime commercial locations at the beach remain vacant or developed with nonconforming residential uses. Some of the same issues with the commercial and residential zoning on Midland Avenue exist on Sand Lane: a high parking requirement unsuitable for mixed-use development and the small lot conditions common along the corridor.

Modifying the current commercial overlay zoning boundaries and parking requirements to concentrate commercial uses on Sand Lane would not only support the creation of a continuous, thriving retail corridor, but would also provide relief to the many homeowners with properties fronting side streets where required commercial uses would not be practical or suitable. In addition, current zoning requires a significant portion of a site to be devoted to parking. This can make it nearly impossible to develop some of the smaller sites along the corridor. By adjusting the parking requirements to accommodate site constraints, sites that are impractical for building today can be revitalized.

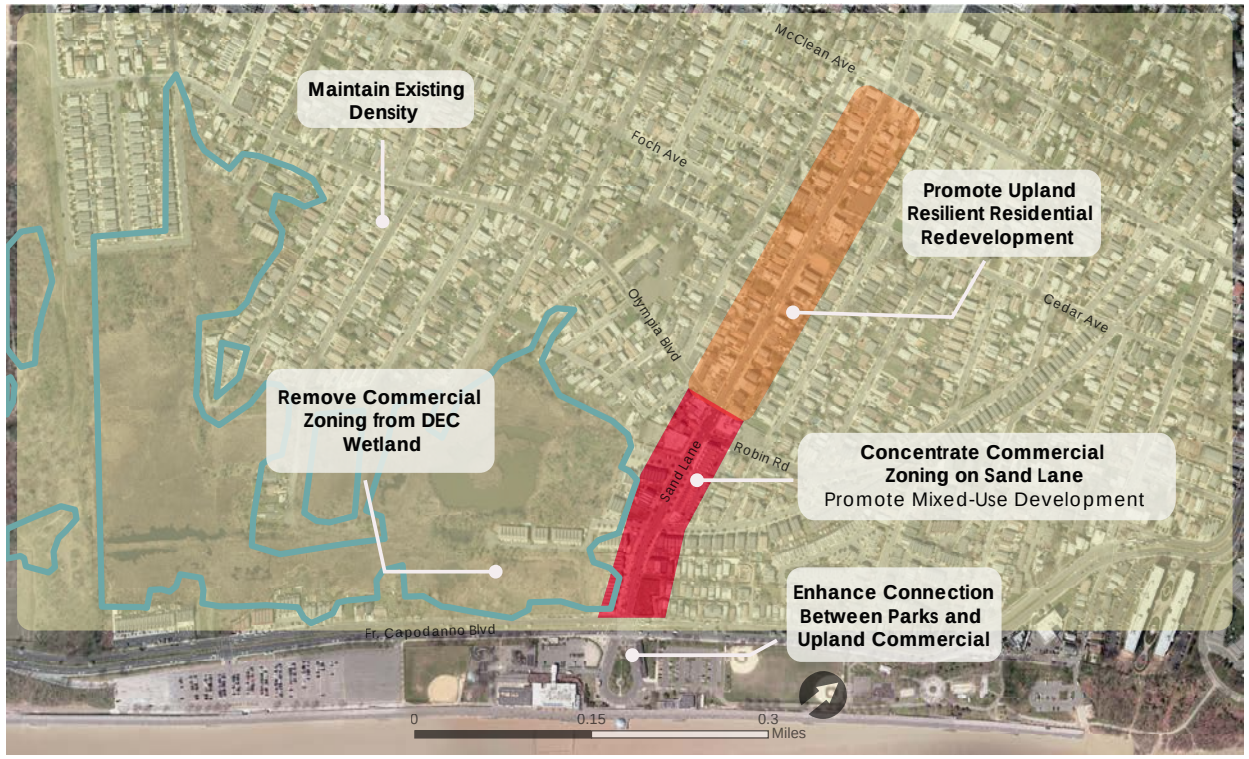


Sand Lane Existing Conditions

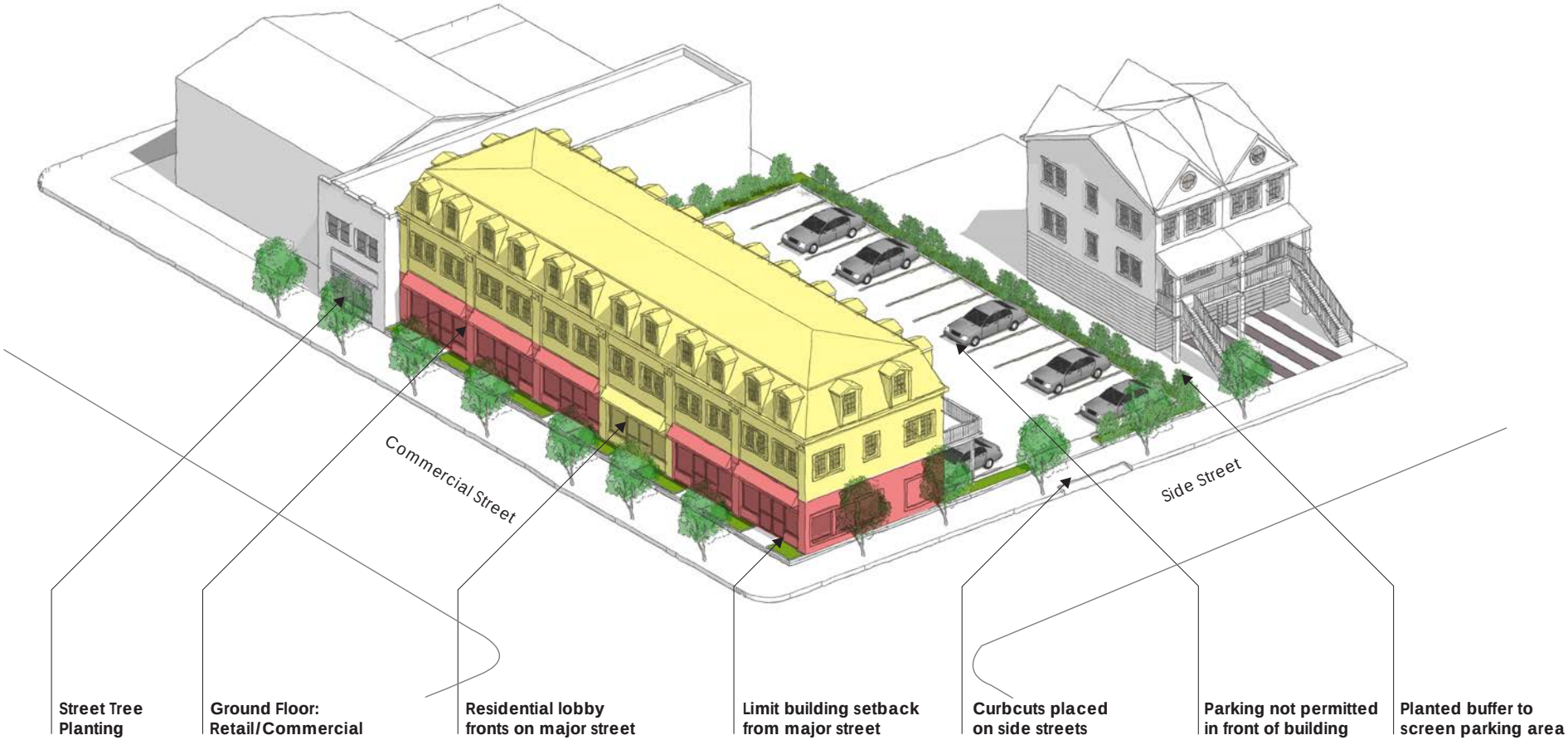
Currently, townhomes, small apartment buildings, and mixed-use developments are the most common residential building typologies on Sand Lane. The current zoning districts of R3X and R3-2, relatively common on Staten Island, are not well suited to the sites within the floodplain, particularly within the commercial overlay. The small amount of residential floor area currently permitted discourages development of vacant and declining commercial sites into new, resilient mixed-use buildings.

As illustrated in the map to the right, an increase in residential capacity could help to accomplish many community goals: replacing lost housing supply from the nearby State Buyouts Areas, spurring resilient residential reinvestment in contextually appropriate development, allowing for a more cohesive and consistent corridor, and providing alternative housing typologies. Additionally, permitting the development of small apartment buildings along Sand Lane outside the commercial overlay and mixed-use buildings within the overlay could help to revitalize the corridor and provide a critical mass of customers to support a successful local commercial corridor. Shifting the commercial overlay away from the protected wetland and onto the corridor itself will prevent paving of areas important for drainage, and further help to incentivize and prioritize commercial development where it is appropriate.

These zoning changes, in coordination with improvements to the entrance to the beach and park at Sand Lane discussed later, could update the historic beachfront gateway that once existed.



Sand Lane Recommendations



Zoning Provisions to Promote Good Design and Consistent Character

A consistent character can support the long term resilience and vitality of the commercial corridors along Midland Avenue and Sand Lane. This does not mean all buildings have to be the same color or architectural style. In fact, a diversity of aesthetics can offer visual interest. What is meant by consistency in this case is that the commercial area should have, for example, limited variation in setbacks, suitably located curb cuts, similar placement of buildings on lots, and a generally continuous street wall, similar to what is commonly found in historic beachfront communities. The prevailing character promoted by current zoning results in a patchwork of buildings and building types, and a wide variation in siting, parking location, and setback from the street. New rules to provide predictability for property owners can, over time, lead to a more consistent character. They also provide a welcoming environment and visual cues that create a unique destination that encourages customers to meander to other nearby businesses. In addition to zoning provisions that promote consistent character, buildings can be encouraged to provide amenities, such as plantings and outdoor seating, that can help create an inviting streetscape for both residents and shoppers.


Upper Story Setback:
Allows Upper Story to be
Concealed from Street-Level View
Facade Articulation
Relax Dormer
Regulations
Setback
Allow limited building setback
with planting requirement
Ground Floor Transparency
for Commercial Uses
Rear Parking Screening
Limit Curbcuts on Corridor

Promoting an Active Streetscape and Mitigating the Cost of Dry Floodproofing

The most challenging aspects of locating commercial businesses in the floodplain include the conflict between flood risk mitigations and maintaining an inviting public realm to attract and retain customers. If spaces are neither floodproofed nor elevated, business owners face considerable costs for flood insurance. When retrofits are costly or impractical for existing buildings, owners may decide to run the risk of not carrying flood insurance and instead shouldering the cost in the event of damage.

For new buildings, the New York City Building Code requires commercial spaces to either be located above the applicable Design Flood Elevation or be dry floodproofed below that elevation. Dry floodproofing adds considerable cost to construction. Elevating a commercial use can break the visual connection to the street, which is vital to the health of neighborhood commercial corridors. Together these challenges have the potential to encourage vacancy and limit investments in retail floodproofing.

As illustrated here, there are several options for commercial development that can maintain active streetscapes and strong commercial corridors while meeting resiliency standards.

Partial Elevation

Full Elevation with Arcade

Covered arcades can articulate the facade of an elevated building while creating valuable outdoor space

Provide full height windows to increase visibility to the street

Activate the ground floor through use of seating areas and planting

Elevate the commercial use above the DFE

Use front setback to provide stairs, ramps or lift systems to first floor

Wet floodproof residential lobbies

Full Elevation with Seating Area

Provide full height windows to increase visibility to the street

Activate the ground floor through use of seating areas and planting

Elevate the commercial use above the DFE

Use front setback to provide stairs and lifts the first floor commercial area

Wet floodproof residential lobbies

Create Activity Nodes and Gateways to the Beach at Key Intersections

Construction of coastal protection by the USACE offers an opportunity to rethink the beachfront, boardwalk, and parks in relation to surrounding neighborhoods and retail corridors. Through the Shoreline Parks Plan, NYC Parks is addressing several challenges, including the impending elevation of the boardwalk, the lack of safe pedestrian and bicycle connections, and the investment in parks amenities along the four miles stretch of shoreline. Several recommendations are proposed to enhance the quality of life along the East Shore beachfront.

Create Select Gateways to Access the Waterfront

The Shoreline Parks Plan identifies several points along the proposed Line of Protection to provide enhanced access to the waterfront such as Sand Lane, Seaview Avenue, and Midland Avenue. Since these provide critical access to the East Shore retail corridors, it is recommended that these be treated as inviting and safe gateways to the beach with enhanced design features such as seating, landscaping, lighting, and pedestrian-oriented infrastructure, and safer pedestrian and bicycle crossings.

Concentrate Active Parks Uses

Concentrating active park uses at key points, aligning with adjacent commercial corridors can increase functionality, create critical mass for the area as a destination, and provide potential opportunities for concessions that create park revenue.

Signage and Wayfinding

To support economic development of adjacent retail corridors and provide information about the East Shore's beachfront history, signage and wayfinding should be designed and installed. Signage will provide useful information to beach-goers and help to bolster and raise awareness of nearby retail corridors.

Improve Intersections for Pedestrian and Cyclists

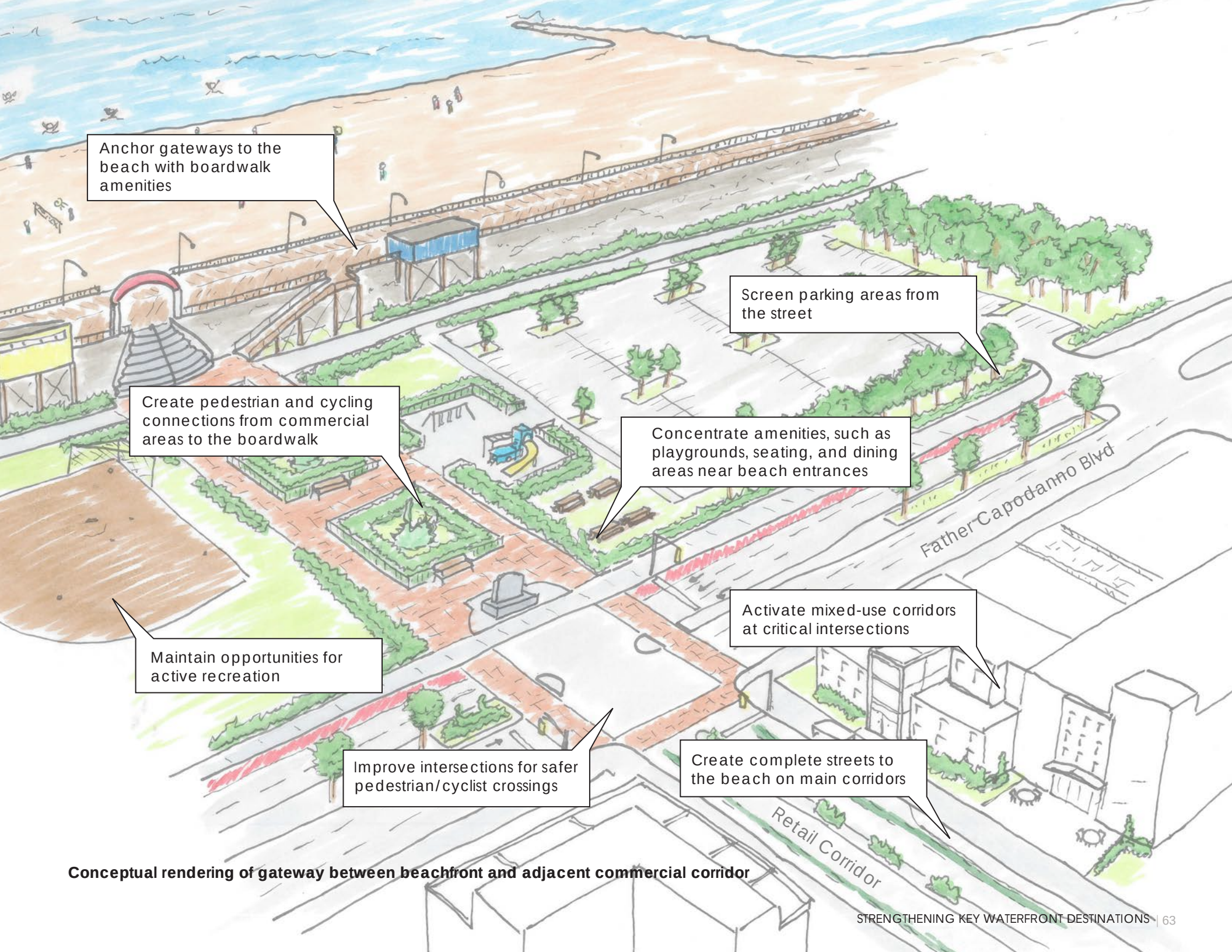
DCP's study of transportation issues on the East Shore outlined a series of recommendations for transportation network upgrades that could help support a thriving and lively beachfront neighborhood. These recommendations include exploring opportunities to provide safe pedestrian and bike connections that will help achieve Vision Zero—the City's goal to eliminate all traffic fatalities. For example, traffic calming interventions and improved pedestrian infrastructure (illustrated to the right) at key gateways along the waterfront, particularly at Midland Avenue, Seaview Avenue, and Sand Lane, could help to improve connections between the beach and boardwalk and encourage more residents and visitors to cross Father Capodanno Boulevard on foot.

Create Complete Streets to the Beach

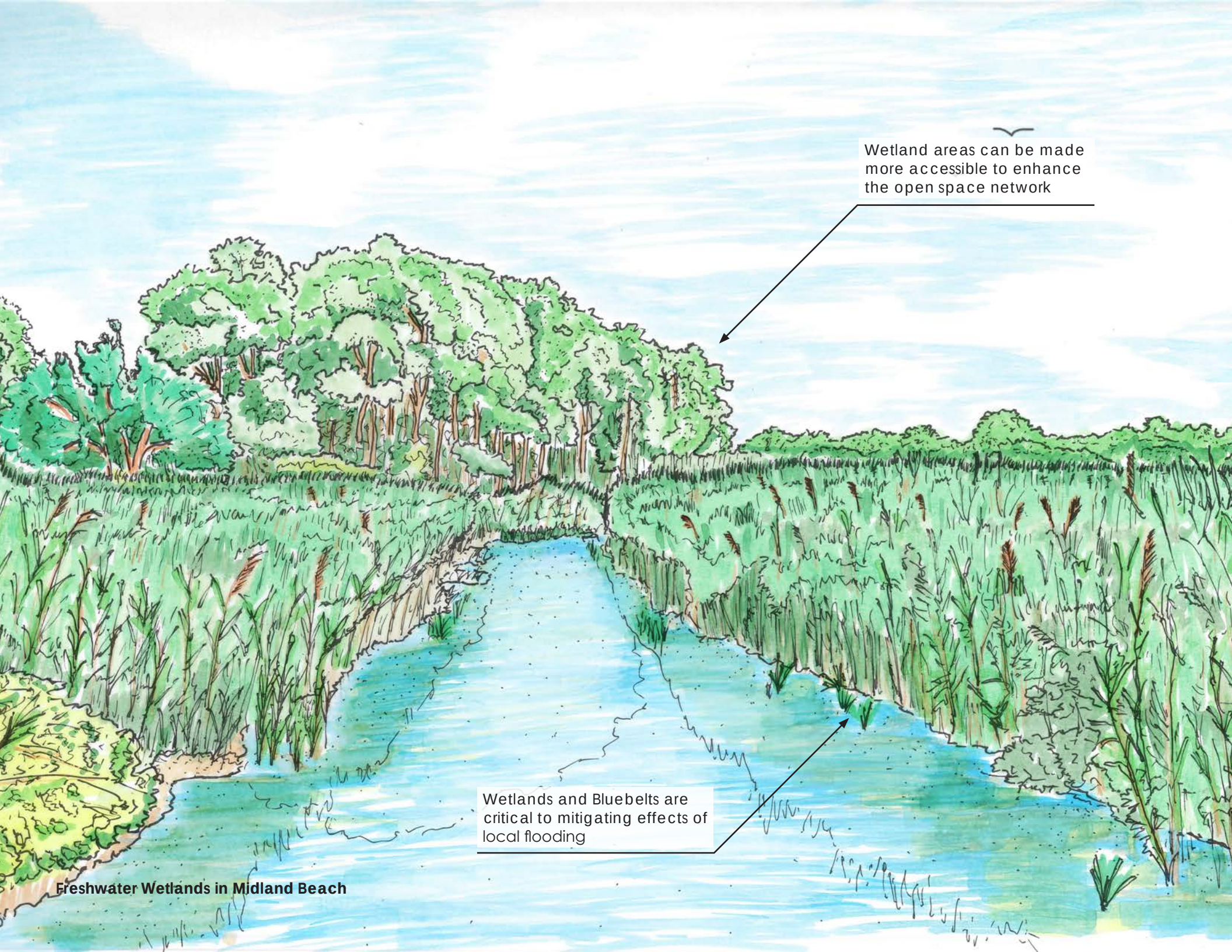
Establishing multi-modal connections to the waterfront would foster increased attendance at the beaches and help support local retail corridors by increasing foot traffic. The prevalence of local bus stops, proximity to the shoreline parks, and commercial and/or community facilities all help generate pedestrian and bicycle traffic on Sand Lane, Seaview Avenue and Midland Avenue.

Additionally, these streets have excess road capacity given current traffic volumes. Additional on-street parking, particularly on Midland Avenue and Seaview Avenue, could calm traffic and discourage speeding, allowing drivers to better react to other street users. The current intersection has room to construct facilities for pedestrians and cyclists while maintaining existing capacity. These facilities may include: bike lanes or shared lanes ("sharrows"), pedestrian refuge islands, or bus bulbs at intersections. These interventions would improve safety and functionality, and create streets that are more inviting for all users.

Signage on the boardwalk



Conceptual rendering of gateway between beachfront and adjacent commercial corridor



Freshwater Wetlands in Midland Beach

PRESERVE NATURAL ENVIRONMENTS AND OPEN SPACE

Balance ecological protection with appropriate development and recreation

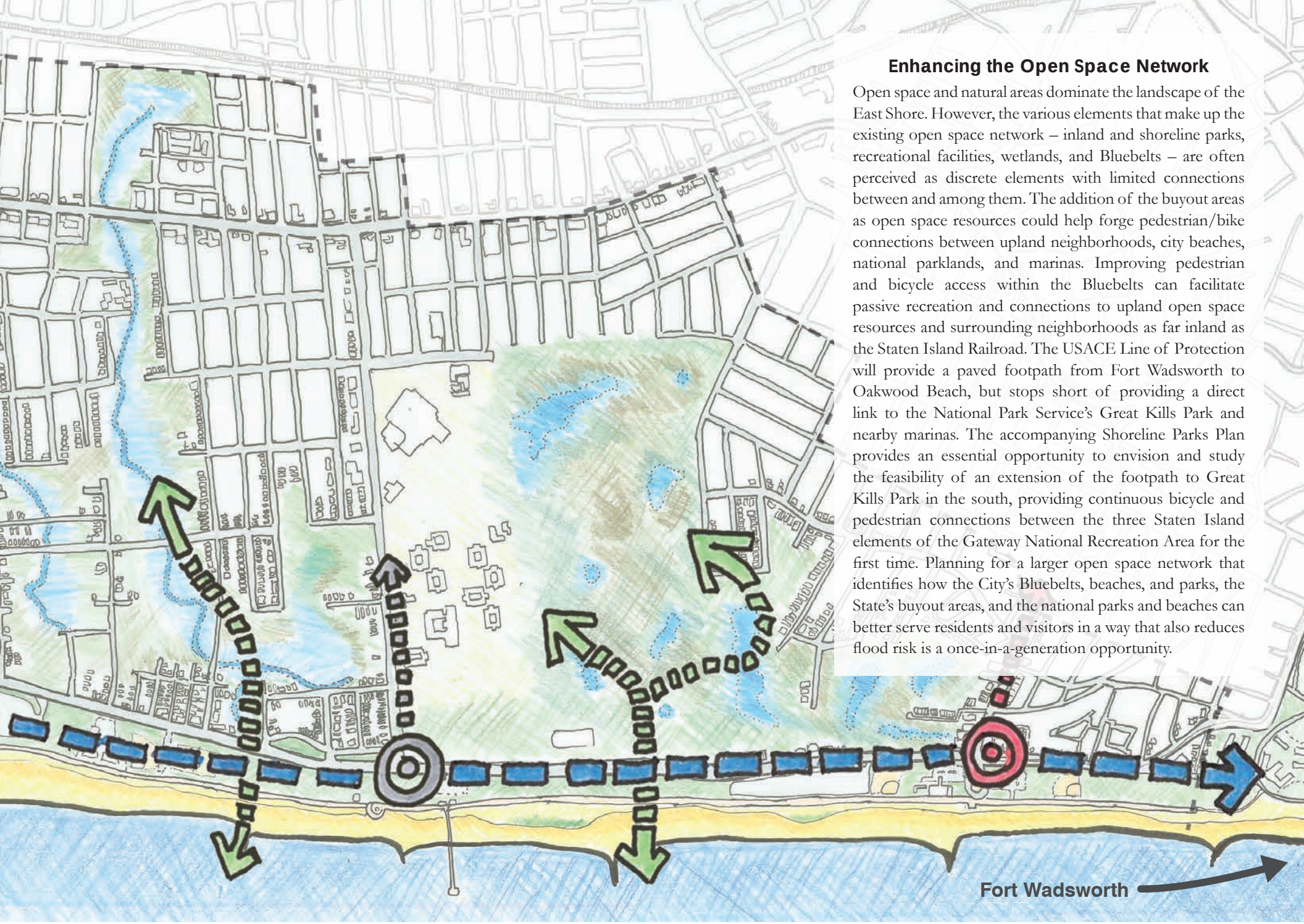
Abundant and extensive natural resources are among the most striking and unique features of the East Shore. The shoreline along the Lower Bay supports the quality of life of residents, and the network of freshwater wetlands located there is essential to the long term ecological health of the neighborhoods on the East Shore. However, while these areas provide significant recreational and environmental benefits, the relative proximity of residences also increases the risk to public safety from natural hazards.

Recurring floods and wildfires in some East Shore neighborhoods have led to questions about their suitability for continued residential development and long-term habitation. The devastating impact of coastal inundation during Hurricane Sandy on Oakwood Beach, Graham Beach, and Ocean Breeze, prompted their designation as Enhanced State Buyout Areas. With this designation came the opportunity to re-purpose these areas as contiguous natural buffers to future storms and essential pieces of a future ecological network on the East Shore.

In addition, watershed-wide drainage and wetland revitalization underway in the Mid-Island Bluebelt will greatly enhance and expand the network of natural open space on the East Shore. Beyond the extraordinary ecological benefit of the Bluebelt system, there is a further opportunity to re-envision these areas as serving multiple purposes, perhaps most notably, passive recreation and education corridors that reconnect neighborhoods to the beach.

When considering land use in coastal and wetland areas with a history of inundation, it is desirable to achieve a balance with nature that enables education and recreation, while also preserving and protecting these assets from inappropriate development, overuse, and pollution. Enhancing the open space network through the State Buyout Program not only protects the residents who would otherwise reside in this risky low-lying area, but serves as a buffer to minimize the impacts of flooding on surrounding residential areas.


Great Kills Park



Enhancing the Open Space Network

Open space and natural areas dominate the landscape of the East Shore. However, the various elements that make up the existing open space network – inland and shoreline parks, recreational facilities, wetlands, and Bluebelts – are often perceived as discrete elements with limited connections between and among them. The addition of the buyout areas as open space resources could help forge pedestrian/bike connections between upland neighborhoods, city beaches, national parklands, and marinas. Improving pedestrian and bicycle access within the Bluebelts can facilitate passive recreation and connections to upland open space resources and surrounding neighborhoods as far inland as the Staten Island Railroad. The USACE Line of Protection will provide a paved footpath from Fort Wadsworth to Oakwood Beach, but stops short of providing a direct link to the National Park Service's Great Kills Park and nearby marinas. The accompanying Shoreline Parks Plan provides an essential opportunity to envision and study the feasibility of an extension of the footpath to Great Kills Park in the south, providing continuous bicycle and pedestrian connections between the three Staten Island elements of the Gateway National Recreation Area for the first time. Planning for a larger open space network that identifies how the City's Bluebelts, beaches, and parks, the State's buyout areas, and the national parks and beaches can better serve residents and visitors in a way that also reduces flood risk is a once-in-a-generation opportunity.

Recommendations for New York State Enhanced Buyout Areas

As outlined earlier, Oakwood Beach, Graham Beach, and Ocean Breeze were designated Enhanced Buyout Areas by the State after Sandy. The voluntary buyout program offers homeowners the option to sell their house and land at pre-storm values. Homes on the property would then be demolished and the land returned to nature.

While large numbers of owners have accepted buyout offers, because the program is voluntary some homeowners have opted to remain. In addition, some vacant land with development potential will remain. This creates challenges for resiliency and long-term planning. Most of these areas consist of primarily one- and some two-family homes and many sites contain wetlands or are otherwise difficult to develop. However, in select areas the zoning allows for denser development in the form of townhomes and small multi-family buildings. To reduce risks to safety and to enhance resiliency, it is prudent to impose suitable limitations on future development while also allowing property owners who choose to remain to make existing homes safer and more resilient.

This area contains one of the largest concentrations of privately-owned freshwater wetlands in the city. These environmentally sensitive areas should be identified and protected not only to preserve their ecological function, but also to ensure residents are sufficiently buffered from the dangers of flooding and wildfires that are associated with wetlands. Therefore, it is recommended that any new buildings in these areas be subject to sufficient review to ensure appropriate site planning and the protection of wetlands and natural areas. This recommendation should be advanced in the near term, to prevent developments that would impair local drainage, flood protection, and other open space functions.

Oakwood Beach State Buyout Area in Fall 2016

Oakwood Beach Buyout Area

Location:	Located near Great Kills Park and the Oakwood Beach Wastewater Treatment Plant. Bound by Mill Road to the West
Current Zoning:	Primarily R3X with a small pocket of R3-1
Land Use:	Primarily 1 and 2 Family Detached Residential
Residential Units:	300 Residential Units
Eligible Properties:	455 Privately-Owned Parcels
Total Area:	74 Acres
Notable Features:	Oakwood Beach contains abundant freshwater wetlands and tidal salt marshes. Residents report frequent flooding from ordinary rain storms. The area suffered widespread damage from Hurricane Sandy.

Graham Beach and Ocean Breeze Buyout Areas

Location:	Located immediately upland from Father Capodanno Blvd. and Seaview to the North
Current Zoning:	R3-1 and R3-2. Additional C1-1 commercial overlay
Land Use:	Primarily 1 and 2 Family Detached Residential
Residential Units:	464 (326 + 138) Residential Units
Eligible Properties:	583 (437 + 145) Privately Owned Parcels
Total Area:	53 (42 + 11) Acres
Notable Features:	Located between lowland wetlands and the elevated Father Capodanno Boulevard. Suffered extreme coastal inundation during Sandy. Feature very high flood elevations and are adjacent to planned Bluebelts.

Zoning Recommendations

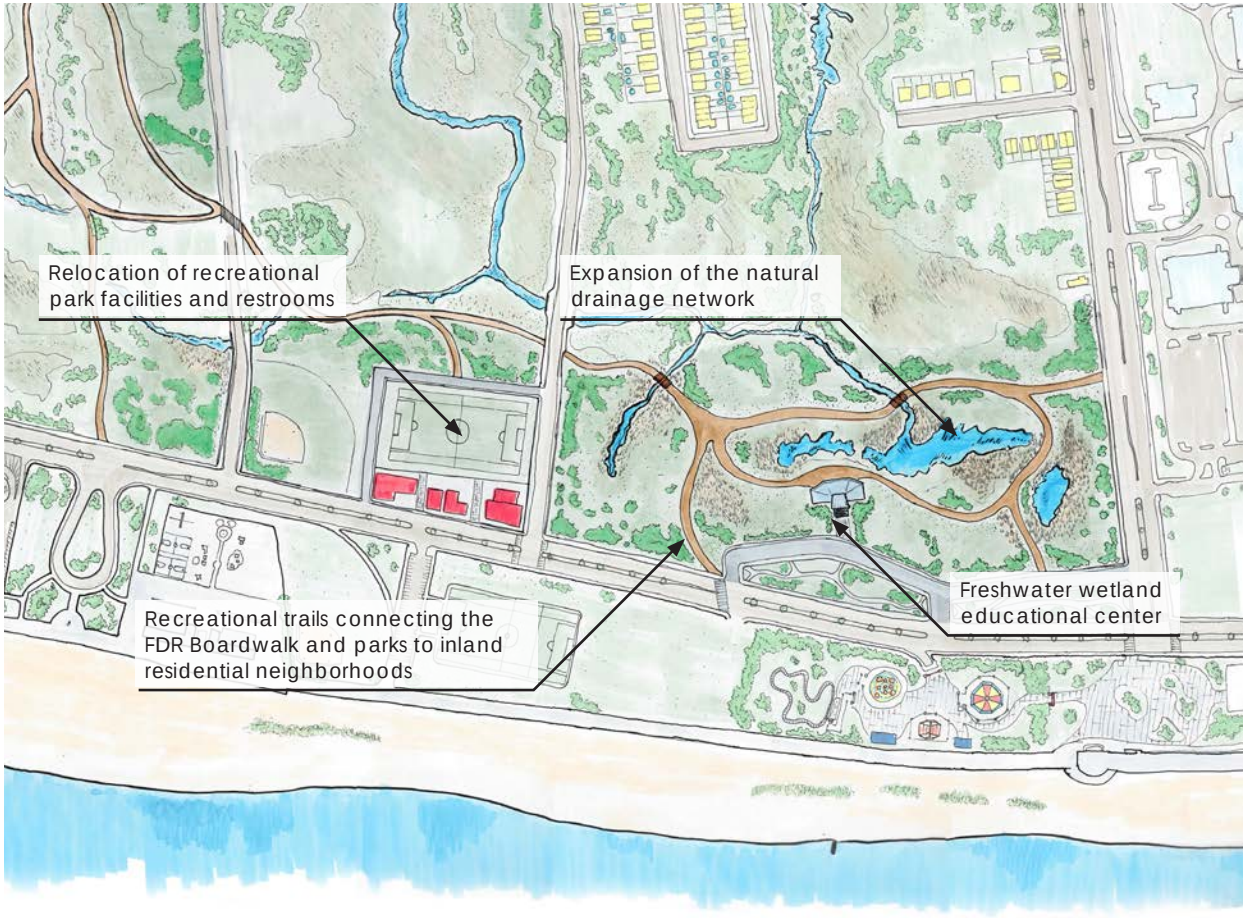
- Limit new development to single-family detached homes
- Ensure sufficient review of new developments to minimize adverse effects on local drainage, flood protection, and environmentally sensitive areas
- Allow modifications to bulk rules to provide for additional buffering from nearby freshwater wetlands

Visioning the Future of the Buyout Areas

The New York State Enhanced Buyout Areas present a unique long-term opportunity to connect and enhance the network of natural drainage and recreational systems. Although interim phases are necessary while residential uses remain, the ultimate goal outlined by the State for these areas is to serve as a natural expansion of the surrounding open space and drainage network. As the areas are vacated over time they provide an opportunity to create recreational areas, with educational facilities and active uses in suitable locations. Vehicles for funding necessary maintenance, including expansion of existing programs such as Adopt-a-Bluebelt or a parks conservancy, should be explored.

Create Connections through the Mid-Island Bluebelt

Providing opportunities for residents of the East Shore to enjoy the ecological resources in their neighborhoods will foster community and increase opportunities for recreation, enhancing healthy outcomes, and livability for residents. Currently, the Mid-Island Bluebelt serves key stormwater management and ecological preservation functions, but has not been integrated as a programmed or passive recreational resource into the community that it serves. While there are maintenance and liability issues that would need to be addressed, limited public access to the Bluebelt should be considered and balanced with the functionality of this valuable resource. The South Shore Bluebelt utilizes maintenance access ways as shared paths for pedestrians. This precedent provides a potential model for integrating pedestrian and bicycle access, along with other forms of recreation, into green infrastructure projects.



Illustrative rendering for the future of Graham Beach and Ocean Breeze

Preserve Freshwater Wetlands

The East Shore study area contains a significant amount of freshwater wetlands which are naturally located in low lying areas. The existing and future functionality of these valuable natural assets has been compromised by the historic filling of wetlands and construction of residential development that has increased stormwater runoff. In addition, homes in or around wetlands are at increased risk of flooding as well as the risk of fire in times of drought. Certain freshwater wetlands are currently regulated by the New York State Department of Environmental Conservation, yet there are opportunities to further support the protection of wetlands by harmonizing zoning with wetland regulations. In highly sensitive locations, such as within the State Buyout Areas, ensuring the provision of setbacks from delineated wetlands, increasing lot permeability, and reducing yard requirements can achieve ecologically-sensitive site designs. Better site design includes the potential for smaller building footprints located farther from the wetland designated areas, with more flexible requirements for front yards and side yards to allow homeowners to achieve a reasonably sized and configured building.

CONCLUSION

The recommendations presented in this report call for a multi-layered and nuanced approach to coastal resiliency on the East Shore.

Large-scale flood protection in the form of the USACE Line of Protection will help to prevent devastating coastal inundation of the type experienced during Hurricane Sandy. New zoning envelopes that consider flood elevations will help ensure that future development is resilient to coastal flooding, safe and accessible for residents, and in line with the character of the surrounding neighborhood. Regulations to limit residential uses in the most vulnerable areas will provide a buffer for inland areas and remove hundreds of residents from harm's way, while ensuring protection of environmentally sensitive natural areas. In those areas where growth is desirable, mixed-use residential and commercial development can help to bolster neighborhood commercial centers and grow waterfront destinations. Natural systems and the open space network should be enhanced through coordinated planning efforts to restore wetlands, complete Bluebelt construction, and provide stronger connections between neighborhoods, beaches, retail corridors, and the Staten Island Railway where possible.

DCP will be working closely with community and governmental partners over the coming years to advance these recommendations, refining timelines for specific projects based on agency resources. In the near-term, zoning recommendations for the State Buyout Areas will be advanced in 2017.

Invest to Reduce Flood Risk

Work with U.S. Army Corps of Engineers to implement Line of Protection and interior drainage plan, and provide resources and support for any accompanying ULURP applications.

Project Timeline: Long-term
Lead Agency: USACE
Involved Agencies: ORR, DCP, DOT, DEP, DPR, LAW

Additional Ongoing Steps

- Work with DEP to implement and construct Mid-Island Bluebelt network.
- Work with the New York State Buyout Program to acquire remaining private properties, return them to nature, and ensure they can serve as buffers to future storms.
- Coordinate with Parks to identify appropriate upland access points.

Advance Resilient Building

Create a new zoning envelope for detached and semi-detached homes within the 1% annual chance (100-year) floodplain through an update to the Citywide Flood Resiliency Text Amendment. Also amend zoning in the New Dorp Beach bungalow colony to discourage development of two-family homes and limit maximum building heights to 25 feet above the Design Flood Elevation.

Project Timeline: Mid-term
Lead Agency: DCP
Involved Agencies: DOB, ORR

Additional Ongoing Steps

- Explore new building code and zoning requirements for homes behind the future Line of Protection in coordination with the City's flood map update.

Strengthen Key Waterfront Destinations

Advance corridor rezoning for Midland Avenue and Sand Lane to encourage attractive mixed-use, commercial, and residential reinvestment.

Project Timeline: Mid-term
Lead Agency: DCP
Involved Agencies: DOT, Parks

Additional Ongoing Steps

- Work with Parks, EDC, and U.S. Army Corps of Engineers to create activity nodes and gateways to the shoreline parks in conjunction with the Shoreline Parks Plan.
- Work with DOT, Parks, and DEP to enhance bike and pedestrian amenities to create multi-modal corridors and a safe environment for all street users.

Preserve Natural Environments and Open Space

Implement zoning to limit future density and ensure sufficient review of new development near wetlands and other planned open space projects.

Project Timeline: Short-term
Lead Agency: DCP
Involved Agencies: DEP, Parks, GOSR, NYS DEC, DOT

Additional Ongoing Steps

- Work with Parks, DEP, DOT, DEC, and NPS to explore the creation of an Open Space Network on the East Shore that incorporates parks, Bluebelts, and State Buyout Areas.
- Work with Parks, DEP, DOT, DEC, and NPS to incorporate off-street trails that can provide safe, attractive, educational paths linking neighborhoods to each other, the beach, parks, and Staten Island Railway.

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.

* In October 2016 FEMA announced that the City of New York won its appeal of FEMA's 2015 Preliminary Flood Insurance Rate Maps and has agreed to revise New York City's flood maps. This will result in revised flood maps which will provide New York City residents with more precise flood risk data for current conditions, in addition to providing a new map product for future conditions that account for climate change. Until any new flood maps are issued, the city's building code will continue to reflect the 2015 Preliminary FIRMs to ensure that new buildings are better able to withstand flood risk.

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.

ACKNOWLEDGEMENTS

New York City Department of City Planning

Marisa Lago, Chairman of City Planning Commission
Purnima Kapur, Executive Director
Howard Slatkin, Deputy Executive Director for Strategic Planning

Staten Island Office Project Team
Len Garcia-Duran, Director
Nicole Campo, Deputy Director
Kadie Bell Sata, Team Leader
Joseph Helferty, Urban Designer
Joseph DeAngelis, Resiliency Planner
Aleena Farishta, City Planner
Stephanie Shellooe, Transportation Planner
Jocelyn Dupre, Intern
Mehak Sachdeva, Intern

Resilient Neighborhoods Program Team
Michael Marrella, Director of Waterfront and Open Space Planning
Mary Kimball, Program Manager
Nilus Klingel, Urban Designer
Ryan Jacobson, Urban Designer
Trevor Johnson, City Planner
Amritha Mahesh, Urban Designer
Allan Zaretsky, City Planner

Advisors and Contributors
Johane Clermont
Rachel Cohen
Danielle DeCerbo
Jessica Fain
Danny Fuchs
Janine Gaylard
Claudia Herasme
Christopher Holme
Samantha Kleinfield
Eric Kober
Cecilia Kushner
Anita Laremont
Beth Lebowitz
Jessie Levin
Stephany Lin
Joe Marvilli
Thaddeus Pawlowski
Manuela Powidayko
Racheale Raynoff
Will Rosenthal
Jack Schmidt
Jeffery Shumaker

Data Sources

Federal Emergency Management Agency
U. S. Department of Housing and Urban Development

Community Advisory Committee

David Sorkin – Staten Island Jewish Community Center
Debi Vadola –Midland Beach Civic Association
Debi Derrico – Community Board 2 District Manager
Dee Vandenburg – Staten Island Taxpayers Association
Jim Scarcella – Natural Resources Protective Association
Joe McCallister – South Beach Civic Association
Linda Barran – Staten Island Chamber of Commerce
Nicole Romano-Levine – New Dorp Beach Civic Association
Dan Clark – Staten Island Economic Development Corporation
Timothy Boyland – American Institute of Architects
Tom Barlotta – Community Board 3, Land Use Chair
Tom McDonough – Stephen Siller Tunnel to Towers Foundation
Yasmin Ammirato – Midland Beach Civic Association

External Contributers

Office of Recovery & Resiliency
Dan Zarrilli
Katherine Greig
Rebecca Fischman
Sam Hersh
Adam Zaranko

Department of Parks and Recreation
Steven Lenard
Fiona Akins

Housing Recovery Office
Amy Peterson
Wil Fisher
Dan Doyle

Department of Housing Preservation & Development
Deborah Morris
Evan Seiler

Department of Environmental Protection
Dana Gumb

Department of Transportation
Ed Pincar

RESOURCES

TECHNICAL GUIDANCE

New York City Department of City Planning

Retrofitting Buildings for Flood Risk
www1.nyc.gov/site/planning/plans/retrofitting-buildings/retrofitting-buildings.page

Designing for Flood Risk
www1.nyc.gov/site/planning/plans/sustainable-communities/climate-resilience.page

Urban Waterfront Adaptive Strategies
nyc.gov/uwas

Flood Resilience Zoning Text Amendment
www1.nyc.gov/site/planning/zoning/districts-tools/flood-text.page

Special Regulations for Neighborhood Recovery
www1.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
www1.nyc.gov/site/buildings/codes/2014-construction-codes.page

Federal Emergency Management Agency

Flood Insurance Rate Maps
region2coastal.com

National Flood Insurance Program
floodsmart.gov

INFORMATIONAL RESOURCES

OneNYC
www.nyc.gov/onenyc

Mayor's Office of Recovery and Resiliency
www.nyc.gov/resiliency

New York City Panel on Climate Change
onlinelibrary.wiley.com/doi/10.1111/nyas.2015.1336.issue-1/issuetoc

NYC PLANNING