

# Lower Manhattan

## NY Rising Community Reconstruction Plan

MARCH 2014



NY Rising  
Community Reconstruction Program



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The Committee would also like to acknowledge the several Community members who actively participated in the majority of Committee meetings and Public Engagement Events. Thank you for your passion and dedication. Our plan—and our community—are better because of your thoughtful contributions.

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# Foreword

## Introduction

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

To meet these pressing needs, Governor Andrew M. Cuomo led the charge to develop an innovative, community-driven planning program on a scale unprecedented and with resources unparalleled. The NY Rising Community Reconstruction (NYRCR) Program empowers the State's most impacted communities with the technical expertise needed to develop thorough and implementable reconstruction plans to build physically, socially, and economically resilient and sustainable communities.<sup>1</sup>

## Program overview

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

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

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

website ([www.stormrecovery.ny.gov/nyrcr](http://www.stormrecovery.ny.gov/nyrcr)), providing several ways for community members and the public to submit feedback on materials in progress.

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

With the January 2014 announcement of the NYRCR Program's expansion to include 22 new localities, the program comprises over 2.7 million New Yorkers and covers nearly 6,500 square miles, which is equivalent to 14% of the overall State population and 12% of the State's overall geography.

The NYRCR Program does not end with this NYRCR Plan. Governor Cuomo has allocated over \$650 million of funding to the program for implementing projects identified in the NYRCR Plans. NYRCR Communities are also eligible for additional funds through the program's NY Rising to the Top Competition, which evaluates NYRCR Communities across eight categories, including

best use of technology in the planning process, best approach to resilient economic growth, and best use of green infrastructure to bolster resilience. The winning NYRCR Community in each category will be allocated an additional \$3 million of implementation funding. The NYRCR Program is also working with both private and public institutions to identify existing funding sources and create new funding opportunities where none existed before.

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

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

communities.

## The NYRCR Plan

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

The projects and actions set forth in this NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in this NYRCR Plan does not necessarily indicate the NYRCR Community's prioritization of these projects and actions. Proposed Projects are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding. Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in

depth, but has not proposed for funding through the NYRCR Program. Additional Resiliency Recommendations are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects. The Proposed Projects and Featured Projects found in this NYRCR Plan were voted for inclusion by official voting members of the Planning Committee. Those voting members with conflicts of interest recused themselves from voting on any affected projects, as required by the NYRCR Ethics Handbook and Code of Conduct.

The NYRCR Lower Manhattan Community is eligible for up to \$25 million in CDBG-DR implementation funds.

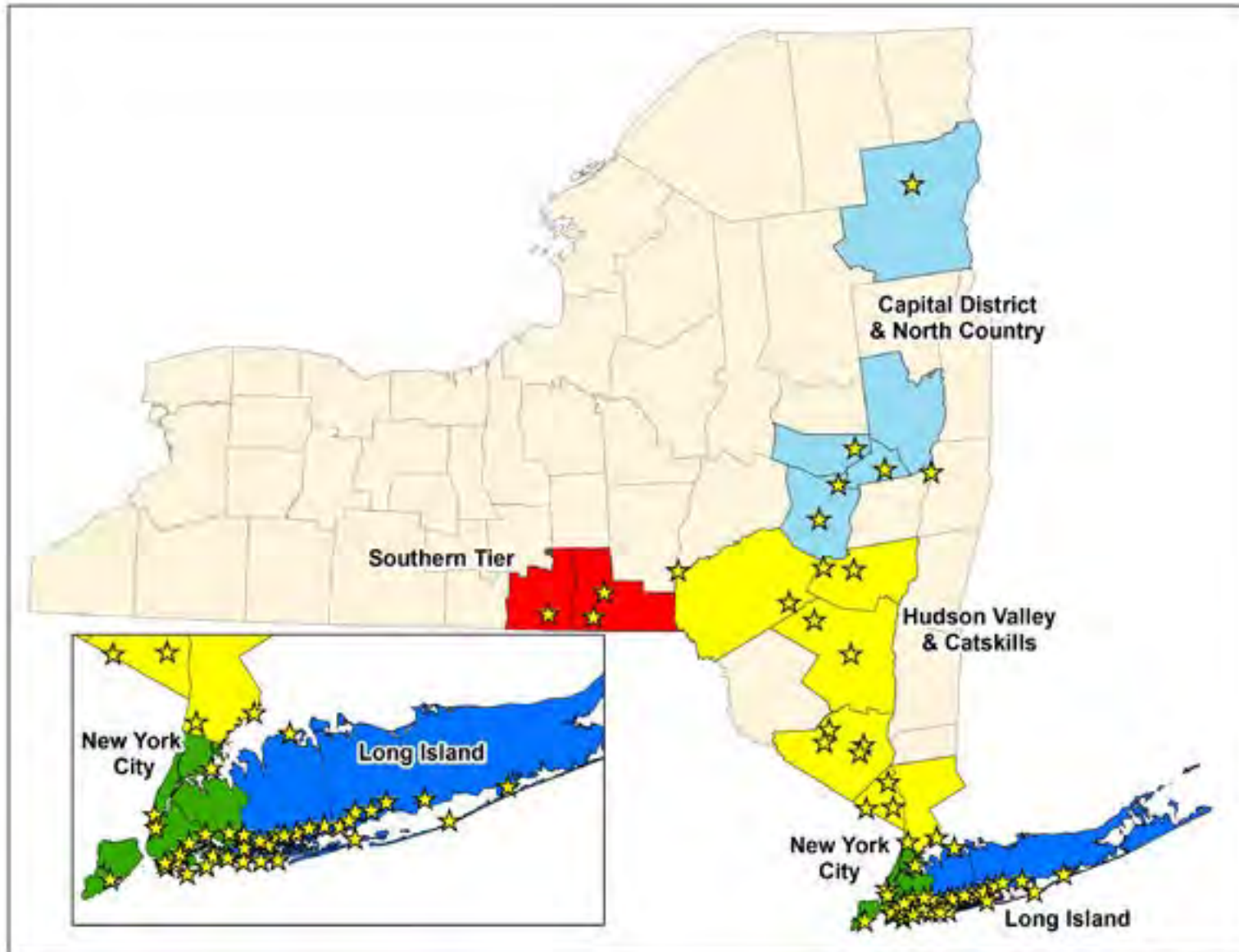
While developing projects for inclusion in this NYRCR Plan, Planning Committees took into account cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. Planning Committees also considered the potential likelihood that a project or action would be eligible for CDBG-DR funding. Projects and actions implemented with this source of Federal funding must fall into a Federally-designated eligible activity category, fulfill a national objective (meeting an urgent need, removing slums and blight, or benefiting low to moderate income individuals), and have

a tie to the natural disaster to which the funding is linked. These are among the factors that the Governor's Office of Storm Recovery will consider, in consultation with local municipalities and nonprofit organizations, when determining which projects and actions are best positioned for implementation.

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

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

## NYRCR Communities





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## Executive summary

**The NY Rising Community Reconstruction (NYRCR) Plan for Lower Manhattan is driven by the idea that community resiliency following an emergency depends on the ability of both physical and social structures to bounce back after such an event.** Superstorm Sandy unleashed devastating effects in Lower Manhattan, throughout New York City, and in the tri-State area – effects that persist even today, 17 months later. Visible impacts tell of the damage done to buildings and infrastructure: from temporary boilers that still heat some apartment buildings, to shuttered storefronts along Front Street in Lower Manhattan, to the lasting closure of the Montague subway tunnel. The resiliency of physical structures, however, is no more important than social resiliency and the strength of the ties that bind a community together.



Immediately after Superstorm Sandy, community organizations such as Good Old Lower East Side (GOLES) rallied volunteers for recovery efforts.

Source: Courtesy of GOLES.

### Lower Manhattan and the NY Rising Community Reconstruction Plan

**The Governor's Office of Storm Recovery has allocated up to \$25 million in Federal Community Development Block Grant-Disaster Recovery (CDBG-DR) dollars to fund eligible recovery and resiliency projects in the Lower Manhattan Planning Area, a mosaic of diverse neighborhoods in Manhattan south of 14<sup>th</sup> Street, from the Hudson River to the East River.**

The Lower Manhattan Planning Committee is made up of 17 members of the community, including members of all three Community Boards that fall within the Planning Area, community residents, business leaders, and representatives of local non-profit organizations. The Committee faced a daunting task in collectively assessing the needs and priorities of the Planning Area, which is the single largest NYRCR Planning Area by population and covers many neighborhoods with differing demographics, character, density, and building types. Across these divergent localities, there is one constant: the high price of physical interventions and infrastructure hardening, particularly given the dense urban environment here that dates back to New Amsterdam's beginnings.

Many efforts led by public agencies, utilities, and private building owners throughout Lower Manhattan are already underway. Identifying and considering these initiatives allowed the Planning Committee to pinpoint gaps that could be filled through the NYRCR Program.

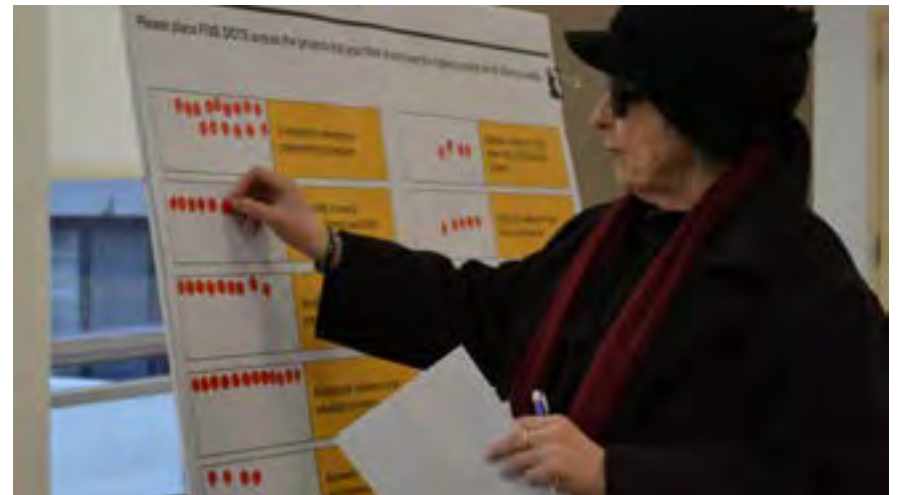
## Sandy's impact and the recovery

**The combination of high tide, a full moon, and Superstorm Sandy's size and wind dynamics created a massive surge of salt water, causing flooding and sewer backup.** Flooding primarily affected the areas with lowest elevation adjacent to the shoreline, and in some cases, water overtopped the bulkheads and infiltrated areas inland. In addition to direct damage caused by flooding, preventative transportation and utility shutdowns and major power failures led to the widespread loss of electrical power, steam, transit, and telecommunications systems, impacting the Community even in areas not reached by flood waters. Following Superstorm Sandy, local emergency response efforts based on pre-existing social infrastructures seemed to materialize overnight, with community groups jumping into action to augment public recovery and rebuilding efforts.

## A community-driven process

**This Plan showcases a community-based planning process that has integrated both social and physical resiliency to inform a plan for a more resilient Lower Manhattan for years to come.**

**This Plan is the product of a collaborative community-based process led by the Committee.** Input on needs and comments on projects were gathered through three Public Engagement Events, meetings of all three local Community Boards, and responses received from the public through the internet and in person. Based on this feedback, the Committee has developed an NYRCR Plan that seeks to address the specific and unique needs of the communities in the Lower Manhattan Planning Area. At early Public Engagement Events, public feedback contributed to the Community Vision Statement, which reflects these goals.



Lower Manhattan is located at the southern tip of the island of Manhattan (top). Community members voiced their feedback during Public Engagement Events (bottom).



Community-based organizations collected food and supplies to deliver to residents throughout Lower Manhattan. Source: Courtesy of GOLES.

## Community vision statement

Through the NY Rising Community Reconstruction Plan, the Lower Manhattan community aims to **improve the capacity and readiness of all community members** to prepare for, respond to, and quickly recover from severe weather-related events; to **address needs currently unmet** by existing rebuilding and resiliency efforts; and to **support the vital and diverse character and history** of Lower Manhattan.

**The Vision Statement reflects the Committee's focus on the strategic use of NYRCR funding to fill gaps in resiliency efforts already underway, with an emphasis on meeting the needs of the most vulnerable residents in Lower Manhattan.** Vulnerable populations are those individuals who have limited mobility due to physical or other disability, limited communication skills (e.g., due to limited English proficiency), and/or a limited ability to control their environment. They are the most at risk during emergency events, and their collective safety was compromised by the particular effects of Superstorm Sandy and the power failures and cold weather that followed soon thereafter.

## Critical issues and approaches

To address the needs of vulnerable populations during and following emergencies, the Committee focused on providing support to the community-based organizations (CBOs) that serve these residents on a daily basis.

In addition to the focus on vulnerable populations, the Planning Committee has prioritized strategic investments that are complementary to existing recovery and resiliency initiatives, by boosting emergency preparedness coordination, educating residents and small businesses about resiliency, and filling gaps in resiliency planning. The Committee also sought ways to leverage other efforts or investments by filling funding gaps for existing or planned government programs, and to create or expand scalable programs that could be replicated citywide. Finally, the Committee sought to identify projects that are highly feasible, able to be implemented on a short timeline, and whose benefits could thus be realized within the next few years.

Given this framework, the main areas of focus of the Committee were bolstering community emergency preparedness by investing in existing, unfunded initiatives; concentrating efforts and resources toward programs that benefit vulnerable populations; and developing replicable programs that seed further investment wherever possible.

## A blueprint for future resiliency

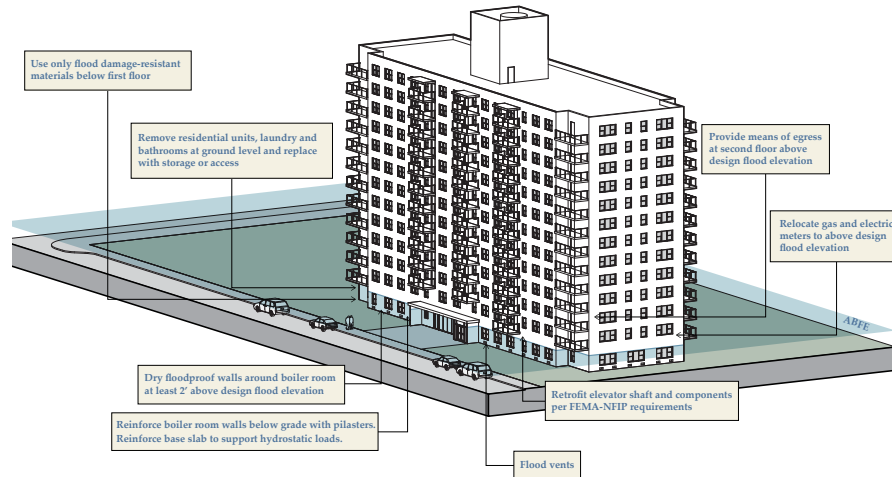
**The NYRCR Plan for Lower Manhattan offers a blueprint for the implementation of the goals of the Planning Committee, outlining concrete strategies for enhancing the Community's resiliency.**



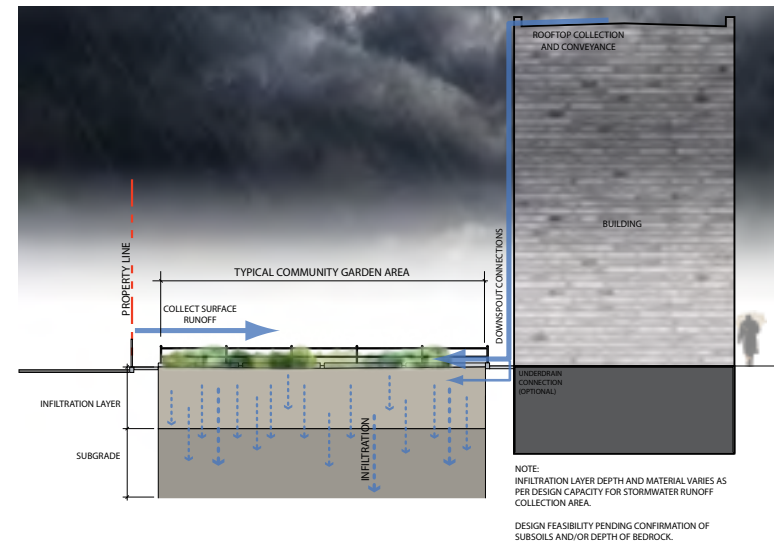
Community-based organizations quickly established supply distribution networks to deliver critical support to vulnerable populations in the wake of Superstorm Sandy. Source: Courtesy of GOLES.

## Recovery support functions

The NYRCR Plan is informed by six Recovery Support Functions, established by President Barack Obama in 2011 through the National Disaster Recovery Framework. These Recovery Support Functions were used when developing needs, opportunities, strategies, and projects to ensure that a comprehensive approach is reinforced throughout the effort to shape a holistic resiliency strategy for the Community.



To enhance residential building resiliency, one Proposed Project would fund the creation of information center, and the provision of technical and financial assistance, around making resiliency upgrades to residential buildings.



Another Proposed Project would allocate funding toward the study and implementation of stormwater capture measures in the Planning Area, potentially including drainage systems in community gardens, seen here.

## Strategies and projects

The NYRCR Plan contains six strategies and incorporates nine Proposed and Featured Projects to improve the resiliency of Lower Manhattan, as described below. Proposed Projects are projects that the Lower Manhattan Planning Committee has recommended to be fully funded through the NYRCR process. Featured Projects are innovative projects that may require additional funding sources for implementation, and for which the Committee has recommended funding an initial phase of implementation. The projects are not listed in any priority order.

### Improve emergency preparedness through enhanced coordination and planning

#### Community emergency preparedness program (Proposed Project).

This project would create: (a) one or more local community emergency preparedness coordinators and (b) local emergency preparedness programs and plans, throughout the Planning Area.

### Ensure CBO capacity to deliver key services to local populations during emergency events

**Community resource/recovery center and CBO grant program (Proposed Project).** This project would fund: (a) a network of hardened community resource/recovery centers, to be based out of existing community facilities and organizations; and (b) grants to provide technical and financial assistance programs to CBOs to implement the functions of the community emergency preparedness plans.

### Strengthen the resiliency of existing residential buildings

#### Residential resiliency and education program (Proposed Project).

This project would fund: (a) the creation of a resiliency information

assistance center for residential building owners, tenants' associations, and managers, as well as (b) technical assistance and individual counseling and (c) financial assistance for improving the resiliency of residential buildings.

### Empower small businesses to become more resilient

#### Small business resiliency and education program (Proposed Project).

This project would fund: (a) the creation of an information and assistance center to connect ground-floor and below-grade small business retailers with existing programs and resources, as well as offer technical assistance for improving the resiliency of operations and retail spaces, and (b) financial assistance to help small businesses pay for technical audits and recommended resiliency upgrades.

### Improve stormwater capture and retention

#### Stormwater capture and retention study (Proposed Project).

This project would fund: (a) a study to examine feasibility, costs and benefits, and potential sites for a high-impact implementation program of various stormwater capture and retention approaches in the Planning Area, followed by (b) the implementation of recommended scalable pilot projects.

#### Wetland creation at East River Park (Proposed Project).

This project would fund the construction of a one-acre artificial wetland on a currently unoccupied portion of land in East River Park near Corlears Hook.

### Protect edge neighborhoods from coastal flooding

#### Berms and deployable walls at Battery Park (Featured Project).

This project would support the implementation of a system of berms and adjoining deployable flood barriers at Battery Park, for protection

against a 500-year flood event, as well as conceptual design for future phase(s) of work to the east and west of the Phase 1 project site.

**Targeted flood protection strategy for Lower West Street (Featured Project).** This project would fund a feasibility study and conceptual design for a targeted strategy for protection of the lower West Street area against a 100-year flood event, proposing strategies at sites to the north and south of Battery Park City.

**Coastal protection study for west and east side (Proposed Project).** This project would fund a feasibility study and conceptual design for a series of multipurpose flood barriers for protection of the east and west sides of Lower Manhattan against a 100-year flood event, using measures such as a raised greenway, berming, and deployable walls.

## Outline of the Plan

The Plan begins with Section **I. Community Overview**, which provides an orientation to the Community, the critical issues laid bare by Superstorm Sandy, and the Planning Committee's work in the context of ongoing resiliency and recovery work.

The following Section, **II. Assessment of Risks and Needs**, describes the diverse assets at risk from future storms, and uses the Planning Committee and public feedback to catalog those risks. Using the risk assessment tool developed by the NYRCR Program, this section identified key opportunities for action that form the rationale for resiliency strategies and the related projects developed by the Planning Committee.

The next Section, **III. Reconstruction and Resiliency Strategies** describes strategies developed by the Committee to respond to needs, opportunities, and risks to assets measured through the risk assessment process.

The Proposed and Featured Projects, which are the path to implementing those strategies, are described in more detail in Section **IV. Implementation—Project Profiles**.

The final Section, **V. Additional Resiliency Recommendations**, describes additional resiliency recommendations strongly supported by the Community, as well as provides a list of the Proposed and Featured Projects described in Section IV. This Section also describes in more detail the public engagement process which informed this Plan, and provides additional information around existing local initiatives, the risk assessment process, and the assets identified by the Community in Section II.



A photograph of children playing in a park. In the foreground, three children are sitting on the ground, looking at a small object held by one of them. In the background, a boy in a red tracksuit is riding a scooter, and other children are walking around. The scene is outdoors on a paved area with trees and a building in the distance.

# I. Community overview

Lower Manhattan is home to many recreational and open space assets. Source: Flickr user Susan NYC, licensed under Creative Commons.

## Geographic scope of NYRCR Plan

The NY Rising Community Reconstruction (NYRCR) Program was established to provide additional rebuilding and revitalization assistance to communities severely damaged during Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. New York State has allocated up to \$25 million in Community Development Block Grant-Disaster Recovery (CDBG-DR) funding from the U.S. Department of Housing and Urban Development (HUD) to implement eligible projects identified in this Lower Manhattan NYRCR Plan. The Lower Manhattan Planning Committee (Committee), composed of volunteer members representing various constituencies of Lower Manhattan, has undertaken an extensive planning process to identify short- and long-term resiliency projects that may be funded with this allocation. The Committee has also identified a broader vision for the long-term future of the Community, as well as additional projects recommended for implementation with other funds.

**For the purposes of the NYRCR Program, the Planning Committee defined the Lower Manhattan Planning Area as the area south of 14<sup>th</sup> Street to the Battery, from the Hudson to the East River.** The Planning Area includes vibrant, culturally diverse, mixed-use neighborhoods; serves as an international



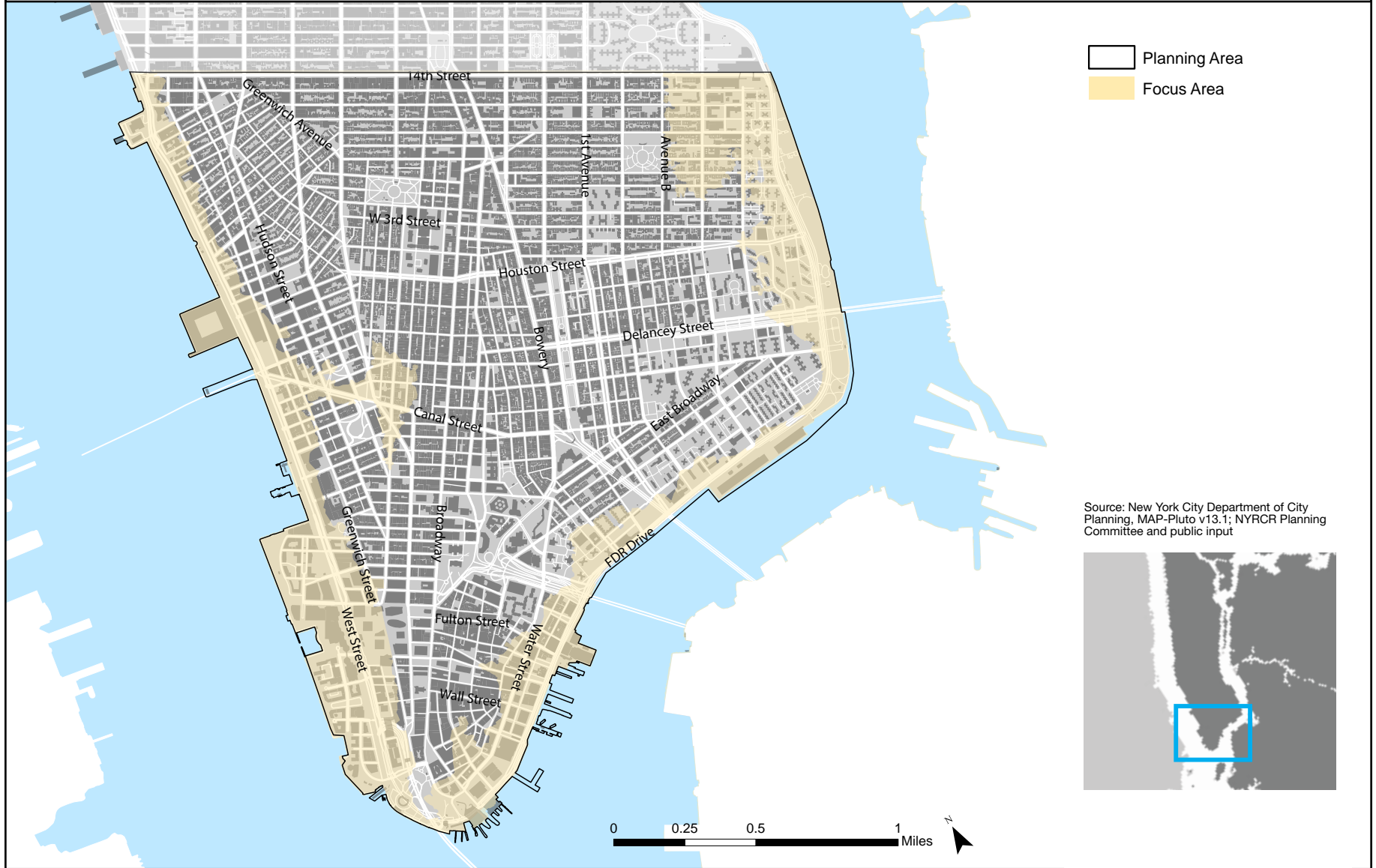
The Planning Area includes diverse, mixed-use neighborhoods south of 14<sup>th</sup> Street. Sources (clockwise from top left): Flickr user NYC [heart] NYC; Flickr user Ismo; Wikimedia Commons author chensiyuan; and Wikimedia Commons author Beyond My Ken. All are licensed under Creative Commons.

center for commerce; and is home to more than 300,000 residents.<sup>2</sup> Lower Manhattan sustained substantial economic damage from Superstorm

Sandy (Sandy) as well as significant lasting impacts to area residents. This area covers the entireties of Manhattan Community Districts 1, 2,

### I-1 Community overview

**Figure I-1: Lower Manhattan Planning Area and Focus Area**



and 3, including the downtown neighborhoods of the Financial District, Battery Park City, South Street Seaport Historic District, Civic Center, Tribeca, Two Bridges, the Lower East Side, Alphabet City, Washington Square, Little Italy, Nolita, Chinatown, East Village, Greenwich Village, West Village, Hudson Square, SoHo and the Meatpacking District. Figure I-1 indicates the Planning Area as designated by the Planning Committee.

**The Planning Committee also identified a Focus Area within the Planning Area along the Lower Manhattan coastal edge, defined by the zones that are at extreme and high risk of coastal flooding.** The coastal edge of Lower Manhattan, which is exposed to wave action, sustained the greatest damage from Sandy within the Planning Area and still continues to recover. These areas remain at the highest risk of future flooding. The Planning Committee devoted special attention to this area, while also recognizing that communities beyond this high-risk zone were also significantly impacted by Sandy and remain vulnerable.

**The Planning Area is surrounded by water on two of three sides.** On the east and west sides of the Planning Area are the East and Hudson Rivers, respectively. Beyond the southern tip of

Lower Manhattan is Upper New York Harbor, which leads to Lower New York Harbor and the Atlantic Ocean. The Planning Area tends to have a manmade—rather than natural—coastal edge, with a variety of piers, seawalls, and bulkheads lining and protecting the shoreline. Esplanades are also located along most of the waterfront.

Major landfill has taken place over the course of centuries, expanding the shoreline significantly from its original contours. Over the past century, as skyscrapers were built upward, Manhattan was built outward. The most recent major landfill involved the construction of Battery Park City using materials excavated from the construction of the original World Trade Center site.

Lower Manhattan is not directly exposed to the open ocean, but both the East River and Hudson River waterfronts are subject to tidal movement. Lower Manhattan is at risk of water from the Hudson River upstream, including increased flooding from intense rain and ice melt. Importantly, the East River is not truly a river, but rather a tidal strait, part of a tidal estuary, that is subject to tidal forces from both New York Harbor and Long Island Sound.

**The Planning Area encompasses much of the original settled area of Manhattan, prior**

**to the rapid growth that expanded to the north, following the street grid laid out by the Commissioner’s Plan of 1811.** As a result, one of the defining features of the Planning Area is that its street network is less regimented than that of other parts of Manhattan, with multiple intersecting sub-grids and a variety of complex junctions and intersections. The



The Lower Manhattan coastline has expanded due to landfill over the past few centuries. Source: with permission from NYC EDC, NYC DCP, Colton 1836 Map; 1609 Shoreline.

### I-3 Community overview

Planning Area is also a convergence point for almost all of the subway lines in New York City, and is additionally host to two regional highway, six ferry, and five bridge and tunnel connections. These transportation connections both serve Lower Manhattan and provide connections for regional travel, critical to the city's and the region's transportation network. Ferries are also a critical element of the transportation network, bringing commuters from Staten Island, New Jersey, Brooklyn, and Queens.

**Lower Manhattan's utility infrastructure is both old and diverse, with a complex mix of overlapping power, steam, telecommunications, and water wastewater lines located below the streets.** All of these utilities are central to the orderly functioning of the Planning Area, from the power required for almost all aspects of daily life, to the telecommunications that support both residences and commercial businesses, to the steam that provides heat (and in some cases, air conditioning) to many large buildings. The Planning Area is both home to certain critical facilities (including telephone switching "central offices" and telecom hotels) and dependent on external sources of power, gas, and steam. One of the most critical power facilities is Consolidated Edison's (ConEd's) 13th Street power substation, which is located along the East River at the

northeast corner of the Planning Area.

**In general, the Planning Area is relatively flat, without any particularly major changes in elevation or topographical features.** However, the portion of the area along the central spine of Manhattan is at a higher elevation, and therefore, more resilient to coastal flooding. In addition, there are specific topographic features within the Planning Area that are worth noting, and that make certain areas more susceptible to coastal flooding. Canal Street is located along the original route of a canal that used to drain to the Hudson River, and as a result, is located at a low point within the surrounding area. Alphabet City (the area located east of First Avenue between 14<sup>th</sup> Street and Houston Street) and the Lower East Side are generally flat and are located in close proximity to the East River.

Major portions of the coastal edges/shorelines of the Planning Area are lined with parks, including East River Park, Hudson River Park, and Battery Park, while other areas have bulkheads with esplanades, including the South Street Seaport area and Battery Park City.



Canal Street and Alphabet City are historic marshland areas located at low elevations, as seen in Egbert Viele's 1865 map of Manhattan. Source: Wikimedia Commons author Thesupermat.

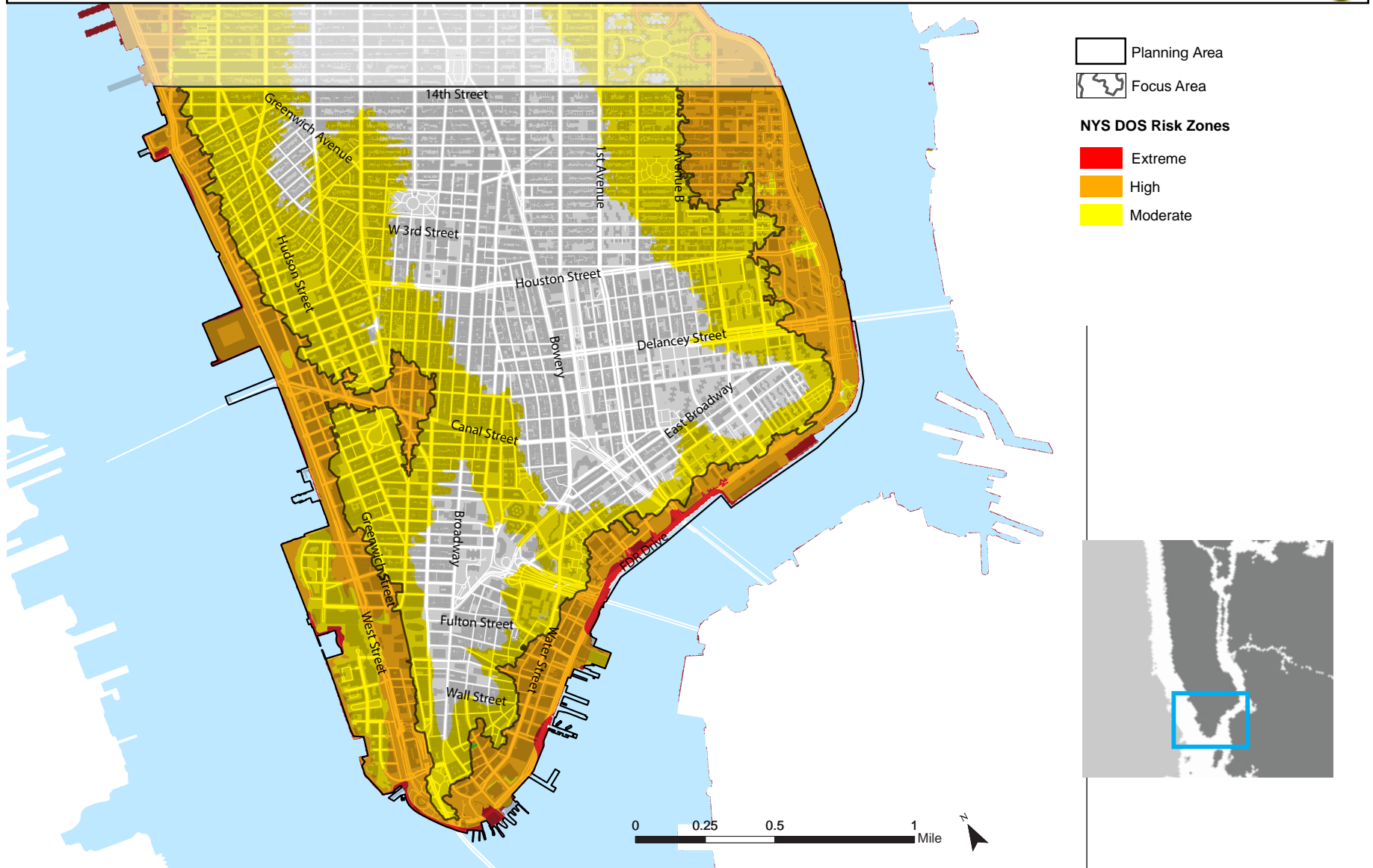
### What do the risk areas mean?

NY Department of State (DOS), with the assistance of the National Oceanic and Atmospheric Administration (NOAA), mapped geographic areas representing the likelihood for coastal flooding. They identified three risk areas:

- **Extreme:** Areas currently at risk of frequent inundation and vulnerable to erosion and wave action over three feet (FEMA V zone), subject to shallow coastal flooding (within the National Weather Service's shallow coastal flooding advisory threshold), or likely to be inundated in the future due to sea level rise (assumes three feet).
- **High:** Areas outside the extreme risk area that are currently at risk of infrequent inundation (FEMA A zone, meaning there is a 1% annual chance of flooding) or at future risk of shallow coastal flooding with sea level rise (assumes three feet).
- **Moderate:** Areas outside the extreme and high risk areas but currently at moderate risk of inundation from infrequent events (FEMA shaded X zone, meaning there is a 0.2% annual chance of flooding) or at risk of being in the 100 year floodplain with sea level rise (assumes of three feet), and any areas expected to be inundated by a category three hurricane.

A more detailed description of the NYS DOS Risk Assessment Area Mapping Methodology can be found on the NYRCR website, as can a link to an online viewer for the risk assessment area maps, at <http://stormrecovery.ny.gov/community-reconstruction-program>.

Figure I-2: NYS DOS Hazard Zones



## Community overview

**The Lower Manhattan Planning and Focus Areas are extremely diverse and include numerous neighborhoods such as: Alphabet City, Chinatown, East Village, Financial District, Greenwich Village, Hudson Square, Little Italy, Lower East Side, Meatpacking District, Nolita, South Street Seaport, SoHo, Tribeca, Two Bridges, and West Village.**

The Planning Area covers approximately 2,720 acres, with 58,600 feet of coastline, and is home to approximately 314,000 people, according to the 2010 Census.<sup>3</sup> The Focus Area covers approximately 728 acres, features the same amount of coastline and is home to approximately one-third of the Planning Area population, or about 102,000 people according to the 2010 Census.

**The Focus Area includes a broad mixture of land uses** (based on data from the NYC Department of City Planning’s MapPLUTO database). Residential uses comprise 23% of the total land area, predominantly consisting of high-rise buildings. Commercial uses cover 21% of the land area, the majority concentrated in the Financial District, one of the world’s most prominent financial capitals and the fourth-largest central business district in the nation. Public facilities cover 11% of the area, while parking, transportation, and utilities cover almost

a quarter of the area. In addition, there are more than 100 acres of open space in the Focus Area, comprising about 13% of land area, mostly along the waterfront, which includes 23,730 linear feet of public esplanade. The remaining 8% of land is composed of vacant and industrial uses. Ownership of land is split roughly evenly between public and private entities.<sup>4</sup>

**The Lower Manhattan Planning and Focus Areas are diverse with regard to income, ethnicity, and age, creating pockets of populations that are particularly vulnerable to catastrophic events.** The median household income of the Planning Area is roughly \$64,200, compared with Manhattan’s overall median income of \$66,800. However, median income varies greatly throughout the Planning Area, with the highest median incomes in Greenwich Village, Tribeca, and the Financial District, at approximately \$150,000, according to the 2007–2011 American Community Survey. The Lower East Side, Two Bridges, and Chinatown have some of the lowest median incomes, at approximately \$20,000.<sup>5</sup>

Within the Planning Area, approximately 60% of residents identify as White, 25% as Asian, 6% as Black, and 6% as American Indian/Pacific Islander/Other races. A further 16% identify as

being of Hispanic origin. The Focus Area has a similar distribution across racial and ethnic groups with slightly larger proportions of Black, American Indian/Pacific Islander/Other, and Hispanic populations.<sup>6</sup>

**The Lower Manhattan Planning and Focus Areas are home to large immigrant populations who may face particular challenges during emergency events due to language and cultural barriers.** According to the 2005–2009 American Community Survey, 13% of adults in the Planning Area report speaking English “not well” or “not at all” compared with 9% overall in Manhattan. This rate is slightly higher in the Focus Area at approximately 15%.<sup>7</sup>

**Many residents have noted the need for increased resources for elderly populations.** According to the 2005–2009 American Community Survey, approximately 13% of the population in the Planning Area and Focus Area is over 65 years old, similar to the distribution of this age cohort across Manhattan.<sup>8</sup> Building typology and quality play a large role in how elderly and vulnerable populations are impacted by severe weather events.

**The vast majority of residents in the Planning Area are renters living in medium-to-large**





Lower Manhattan is home to diverse communities with regards to age, income, and ethnicity. Sources (clockwise from top left): Flickr user Paul Lowry; Flickr user Susan NYC. Both licensed under Creative Commons.

**apartment buildings.** According to the 2005–2009 American Community Survey, in the Planning Area, 41% of units are in mid-sized apartment buildings of 10 to 50 units, and 44% are in buildings with more than 50 units.<sup>9</sup> The Focus Area, by comparison, has a significantly higher proportion of large apartment buildings, with almost 70% of housing units located in high-rise buildings of 50 or more units. These building typologies pose particular challenges for vulnerable populations during power outages, forcing many residents to rely on stairs to move up and down throughout the building, and persevere without heat, cooling, lighting, and/or water in many cases.

Ninety-percent of residents in the Focus Area are renters, suggesting limited control over resiliency improvements, as landlords are responsible for capital upgrades in their buildings.<sup>10</sup> Limited financial resources among landlords can often restrict their ability to invest in necessary resiliency upgrades, particularly in rent-controlled or rent-stabilized buildings.

There are also 32 New York City Housing Authority (NYCHA) public housing developments in the Planning Area and 15 in the Focus Area. When including Section 8, and other subsidized developments, this number is significantly larger.

These buildings often struggle to meet regular maintenance goals and may face particular challenges in making additional resiliency upgrades.

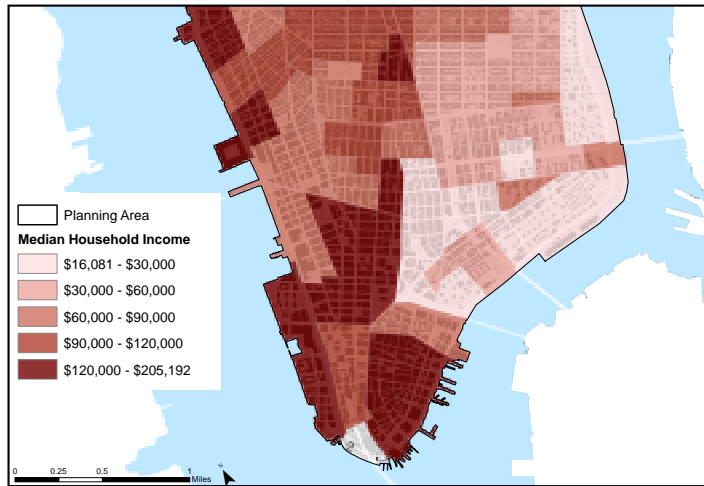
**The character of the commercial corridors within the Planning Area runs the spectrum.**

Historically, Lower Manhattan was a center of maritime trade, with a waterfront lined with docks, wharves, and warehouses. As the area transitioned to a more service- and tourism-based center, it also continued in its role as a center of government, with a large number of City, State, and Federal offices. At the same time, the historical waterfront areas have transitioned into a variety of new uses, including residential, office/retail, tourism destinations, and open spaces. Commercial buildings range from high-density office buildings in the Financial District to numerous low-scale, mixed-use corridors throughout the Planning Area, which offer ground floor retail with housing and office space above. The area continues to undergo transition, with traditional commercial areas adding new residential buildings, the redevelopment of the World Trade Center site, and the economic growth of areas such as the Lower East Side, Tribeca, and SoHo.



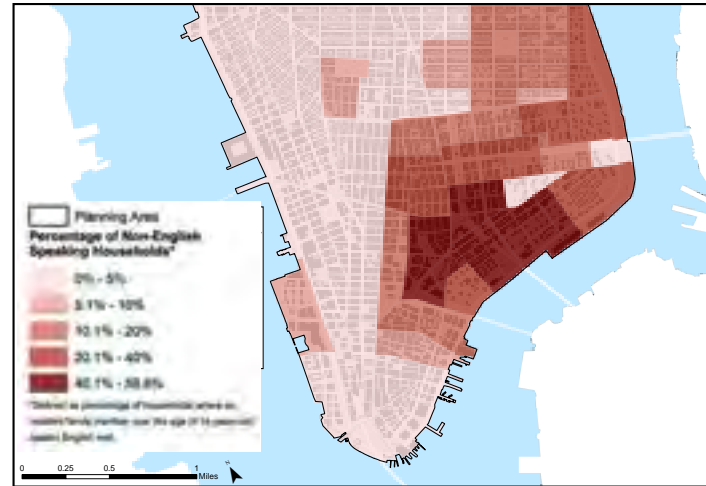
Walk-up residential buildings are found throughout the Planning Area (top). Governor Alfred E. Smith Houses is one of many NYCHA developments in the Focus Area (bottom). Source (bottom): Flickr user -TVL-, licensed under Creative Commons.

**Figure I-3: Median household income**



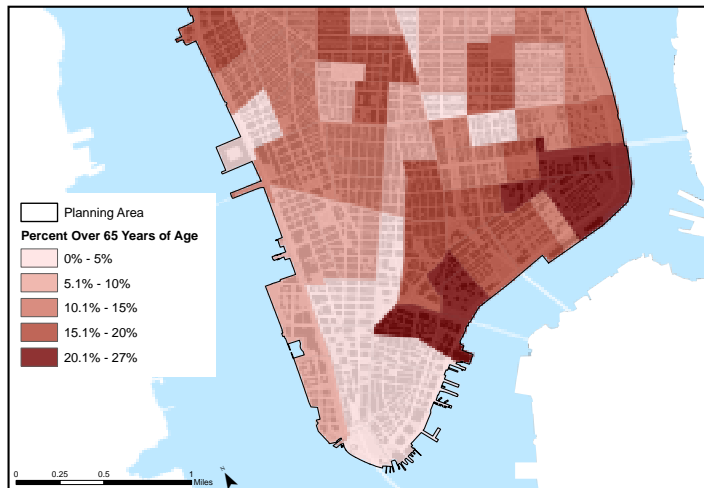
Source: U.S. Census Bureau, 2007–2011 American Community Survey.

**Figure I-4: Percent, non-English Speaking households**



Source: U.S. Census Bureau, 2005–2009 American Community Survey.

**Figure I-5: Percent over 65 years of age**



Source: U.S. Census Bureau, 2007–2011 American Community Survey.

## Description of storm damage

**The combination of high tide, a full moon, and Superstorm Sandy's size and wind dynamics created a massive surge of water that funneled up through the Narrows at the entrance to Upper New York Harbor.** The tide gauge at the Battery measured a flooding height of 14 feet above Mean Lower Low Water,<sup>11</sup> surpassing the previous high water mark (set by Hurricane Donna in 1960) by four feet.<sup>12</sup> This large influx of water led to still water (as opposed to wave-driven) flooding of many of the shoreline areas of Lower Manhattan, with significant salt water flooding and sewer backup of building first floors, basements, and underground infrastructure—including transportation, electrical power, and telecommunications equipment. The damage to physical assets was eclipsed by the impact on human life, including two lives lost in the Area and far more across the City and region.

**The flooding in Lower Manhattan was intensified by the fact that high tide at the Battery occurred at roughly the peak of the Superstorm Sandy storm surge, meaning that the surge was building on top of the highest base water levels.** Had the storm surge arrived six hours earlier or six hours later, flooding likely still would have occurred, but would have been significantly less extreme in this location.<sup>14</sup> In addition, the prevailing winds shifted

to a direction that pushed more water directly through the Narrows and into the Upper Harbor, increasing the volume of water entering into the constrained topography, leading to yet higher levels of storm surge coming over the various seawalls and bulkheads at the waterfront edge. Because the Upper Harbor is relatively sheltered and the shoreline is generally guarded by those seawalls, the buildings within Lower Manhattan experienced water flowing in and around them, but did not experience the direct wave action that severely impacted the waterfront neighborhoods of Queens, Brooklyn, and Staten Island that suffered the most structural damage to buildings.

**Flooding in the area principally affected the low-lying areas adjacent to the shoreline, typically within two to three blocks from the shore.** In certain cases, particularly in the lower-lying areas adjacent to Canal Street on the west side, flooding extended farther inland once water overtopped the bulkheads, covering adjacent areas based on local topography. Flooding in Battery Park City was more limited because the neighborhood was constructed at a higher elevation, but water entered from both the north and south of Battery Park City along West Street (Route 9A), which led to significant flooding of the World Trade Center site, including the Port Authority Trans-Hudson (PATH) tunnels into New



Superstorm Sandy rattled the west side, seen at top at Christopher Street Pier. Damage was extensive to retail businesses throughout the Focus Area, including in the South Street Seaport Historic District (bottom). Sources: courtesy of Robert Woodworth (top); courtesy of Pasanella & Son Vintners (bottom).

Jersey. Some other areas hit hardest by flooding include Alphabet City, portions of the Lower East Side, the South Street Seaport, Water Street, and high-density housing, including public and subsidized housing, adjacent to the East River between the Brooklyn Bridge and the Manhattan Bridge.

**In addition to the direct damage caused by flooding, which was concentrated at the shoreline, the entire area lost electrical power and steam, due to both preventative shutdowns of certain portions of the electrical grid and the failure of other portions of the grid, due to flooding of critical facilities.** One exception to this was Battery Park City, which, as noted above, was spared significant flooding due to its higher elevation and maintained power because it receives its electrical supply from an area transmission substation in Brooklyn that was not impacted by Sandy.

**In addition to impacts on electrical systems, Sandy led to major damage to, and shutdown of the area's steam system and telecommunications systems.** The shutdown of the steam system led to a loss of heat and hot water to many buildings, posing a danger to residents and business owners as cooler weather approached. The loss of steam required



Subway stations suffered serious damage from Sandy, including South Ferry station. A blackout engulfed Lower Manhattan (below). Sources: Flickr user MTAPhotos (Metropolitan Transportation Authority/Patrick Cashin) (top); Flickr user Dan Nguyen (bottom). Both licensed under Creative Commons.

many property owners to install portable boilers and generators mounted on trailers around Lower Manhattan as commercial and residential buildings were reoccupied leading to quality of life issues for residents. The loss of communications had varying impacts on both residential and commercial buildings, particularly as many businesses could not move back into their offices until they had phone and internet access, and critical community-based organizations (CBOs)



found it difficult to coordinate relief efforts without reliable communications.

**High-rise buildings lost water pressure, elevator service, and security systems, though this did not result in any major fires or other public safety hazards.** In high- and mid-rise buildings, many residents found themselves trapped during and after Sandy due to power outages that caused the failure of electrical and mechanical systems. This disproportionately affected vulnerable populations, including seniors and tenants of public housing, who were stranded with limited access to vital services. These outages also forced many people to leave their homes for extended periods of time after the storm.

**Damage to transportation infrastructure was great.** Estimates of damage to the City's overall transportation infrastructure exceed \$8 billion, with most of that damage concentrated in Lower Manhattan due to the density of transportation assets.

In advance of Sandy, the Metropolitan Transportation Authority (MTA) shut down the City subway system due to the risk of flooding and possible loss of electricity and damage to mechanicals. After Sandy made landfall,

salt water damaged important electrical and communications equipment, including signal relays that prevent train collisions. Among the most severely damaged subway assets was the South Ferry 1 train Station—a loss that will require multiple years to repair. Other damaged assets include the World Trade Center PATH station and the Montague Tunnel, which connects the R train to Brooklyn. The Holland Tunnel to New Jersey, the Battery Park Underpass of the Franklin D. Roosevelt (FDR) Drive, and the Hugh L. Carey Tunnel to Brooklyn were fully flooded, the latter taking over three weeks to fully reopen.

Sandy also resulted in temporary shutdowns of the Staten Island Ferry and private ferry services, and damaged the surface—and in certain cases, the underground structure—of many streets in the inundation area, including Water Street, West Street and the FDR Drive.

Storm damage from Superstorm Sandy was more pervasive and long-lasting in the Planning Area than during Hurricane Irene and Tropical Storm Lee. During Hurricane Irene, a mandatory evacuation order was issued for significant coastal portions of New York City, including portions of the Planning Area, and the entire MTA bus, subway, and commuter rail system was shut down preemptively. Hospitals and other medical

facilities were also evacuated and a state of emergency was declared. While portions of the Meatpacking District suffered flooding, most of the Planning Area experienced minimal damage, with the World Trade Center site escaping flooding damage due to efforts by construction workers to install temporary floodproofing structures. Because Tropical Storm Lee followed a path that brought it significantly to the west (inland) of New York City, the Planning Area was spared from any major impacts, as compared to locations such as Binghamton and the Susquehanna River Valley.

## Recovering from the storm

**Lower Manhattan required significant immediate and long-term recovery efforts, focused both on the physical assets in the area and the people who live there.** Approximately 950 residential buildings with more than 40,000 units were impacted by the flooding.<sup>13</sup> The most immediate need was to begin restoring power and heat, which enabled residents whose homes were otherwise undamaged to return. Given that Sandy occurred in late October, heat was a critical issue. Portable generators were introduced across the area to provide electrical power to apartment buildings, commercial high rises, medical facilities and government offices. While these generators helped many buildings to reopen once the flood damage was addressed, they created ongoing noise and pollution.

**In addition, much of the damaged infrastructure needed to be restored and repaired. Although the majority of the subway system was back in operation within a week or less, many of the long-term repairs took weeks and months, and some will stretch out over years.** Similarly, repairs to telecommunications systems took several months in certain cases. This was particularly the case as old copper telephone lines were replaced with fiber optic lines, which are more efficient, provide



Businesses, organizations, and governmental entities immediately got to work to repair streets and infrastructure in Sandy's wake. Source: Courtesy of the Alliance for Downtown New York.

greater bandwidth and will be more resilient to future storms. As Con Ed restored electrical power and steam supply, many buildings were able to return to normal service. In other cases, significant repairs were required to the internal electrical systems before the buildings could be reoccupied.

**Businesses in Lower Manhattan were also profoundly impacted by the storm.** Approximately 6,500 businesses were directly impacted by flooding, with over 10 times as many indirectly impacted by the resulting loss of power.<sup>14</sup> In particular, many ground floor small businesses were impacted by flooding—resulting

in loss of below and above ground inventory, equipment and fixtures, while many larger businesses were forced to evacuate their space due to lack of power, water and communications. In the case of smaller businesses, their limited capitalization made it challenging to recover from the damage, particularly since it took many weeks or months for these businesses to reopen, if they were able to reopen at all. Larger financial and commercial businesses were typically better positioned to survive the loss or suspension of operations, because they had the financial resources to resume operations quickly, relocate operations to another location, or weather suspended operations. However, due to the importance of many financial companies to the regional, national, and global economy, the temporary shutdown of those businesses had a significant impact. A number of major commercial corridors were impacted for significant periods of time—in many cases for weeks or months—including, but not limited to, Water Street, the South Street Seaport, and Avenue C in Alphabet City.

**In the midst of this recovery, a number of community-based organizations (CBOs) mobilized to help residents—including vulnerable populations such as seniors and public housing tenants—to recover in**



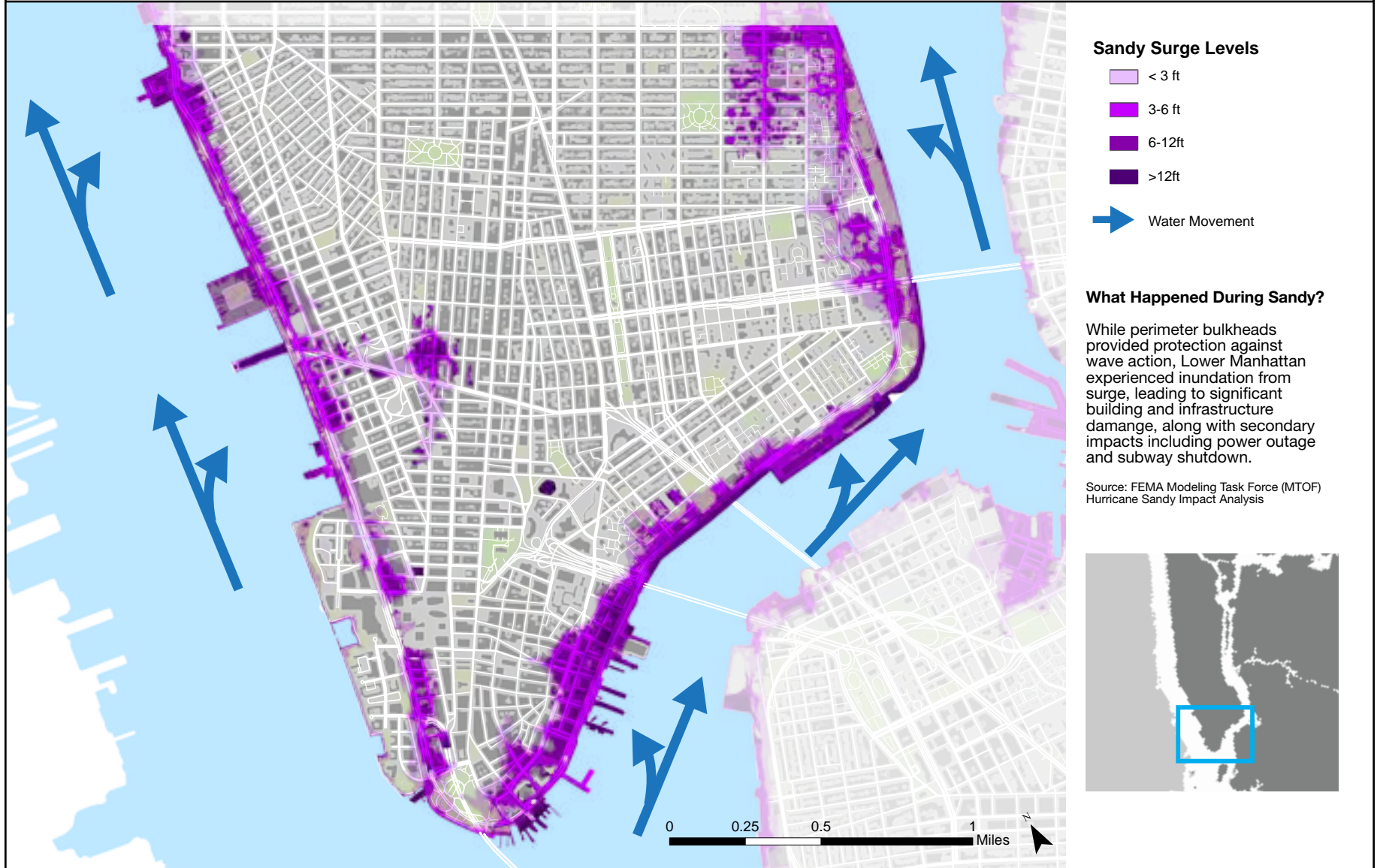
Sandy left many CBOs with extensive damage to office and community facilities. Source: Courtesy of Two Bridges Neighborhood Council, Inc.

**both the short and long terms.** CBOs were critical in helping residents, small businesses, and community facilities to recover by providing technical assistance, financial assistance, and supplies. These CBOs were among the first

organizations to assist victims of Sandy in Lower Manhattan. One key lesson learned from Sandy was the importance of these organizations in creating and sustaining community resiliency, especially for vulnerable populations.



**Figure I-6: Superstorm Sandy inundation map**



## Critical issues

**Many critical resiliency issues came to light in the wake of Sandy and its recovery, highlighting the need to assist those most at-risk.** Planning Committee members and Lower Manhattan residents echoed this focus, recognizing the opportunity for the NY Rising Community Reconstruction (NYRCR) Plan to fill gaps where critical issues could be better addressed.

**Addressing resiliency across Lower Manhattan requires a long-term focus, the collaboration of a large number of governmental and nongovernmental entities, and significant capital investment.** The challenge of creating a more resilient Lower Manhattan is a daunting one, given the scale, complexity and diversity of the Planning Area's neighborhoods, buildings and infrastructure. Recognizing this essential challenge, the Planning Committee sought to carve out a role for its Community Reconstruction Plan that was complementary to existing recovery and resiliency initiatives, and addressed critical needs for the Community, which were not being met.

**While considerable public and private recovery activities are underway, the long-term resiliency of many segments of the population still needs to be addressed.** Major

infrastructure providers and large private entities which operate in the area have a variety of well-funded initiatives underway to improve the resiliency of their assets in Lower Manhattan. However, there remains a need for support to local residents, small businesses and others to ensure that they are better protected when the next severe weather event or other emergency occurs.

**Specifically, vulnerable populations require better protection from the deleterious impacts of future disasters.** The elderly and disabled populations, as well as limited-English proficient speakers, among others, faced significant challenges in accessing basic essential resources during Superstorm Sandy —food and water, medications, heat, and power—as well as access to basic information about available services. Given that community-based organizations (CBOs) serve these populations on a daily basis, the Planning Committee and Community have recognized that the protection of these vulnerable populations is contingent upon ensuring that local CBOs are better prepared, staffed and resourced to respond during the next emergency and ensure continuity of service.

**In addition, a lack of awareness about available resources hampers the efforts of**



Community members with mobility challenges are particularly vulnerable during and after emergency events.

**residential owners and small businesses to recover from Sandy and strengthen the resiliency of their assets.** Many local community members, building owners/managers, tenant associations, and small businesses reported a lack of understanding about how to increase the long-term resiliency of their assets, as well as around existing technical and financial resources and programs. Outreach and educational

### Future Conditions: dealing with a changing climate

Climate change is a real and significant concern for New York’s coastal communities. Two impacts of climate change have the most bearing on the future risk to New York’s coastal communities from future storm events and flooding: (1) Sea Level Rise and (2) increased frequency and intensity of storm events. On March 31, 2014, the International Panel on Climate Change (IPCC) released *Climate Change 2014: Impacts, Adaptation and Vulnerability*, reiterating the risk to coastal communities across the globe and assigning a high confidence that risks from extreme weather events and of sea level rise will continue to increase in the future due to climate change. Closer to home, the New York Panel on Climate Change (NPCC) continues to look at the potential risks presented to New York City in light of climate change. In their *Climate Risk Information 2013*, ” the NPCC made the following projections for 2050:

- Sea Level will increase between 7 and 31 inches with a mid-range projection of 11 to 24 inches.
- The annual chance of today’s 100-year storm (which is a 1% chance) will increase to between 1.4 and 5.5% with a mid-range estimate of 1.7 to 3.2%.
- Flood heights associated with a 100-year storm event will increase between .6 and 2.6 feet with a mid-range projection of .9 to 2.0 feet.
- Precipitation (rain/snowfall) will increase by 1 to 15% with a mid-range projection of 5 to 10 %.

These projected changes all increase the extent and likelihood of flooding in New York’s coastal communities.

these parties “close the gap” in their efforts to pay for essential resiliency improvements.

**Residents and businesses along the coastal edge remain concerned about the future impacts of flooding.** The community consistently voiced considerable concern about how flooding could be prevented in the future, given the level of impacts sustained during Sandy. While the community understands the magnitude of the challenge, which requires comprehensive flood protection for extensive portions of the coastline, they believe that the Lower Manhattan NYRCR Plan should help support initial phases to build toward a more flood-protected edge. These critical issues frame some of the basic needs for ensuring a more resilient Lower Manhattan. The “Assessment of needs and opportunities” section of the following chapter delves into these issues, suggesting a series of key interventions under the Lower Manhattan NYRCR Plan.

activities are required to increase awareness of key resiliency issues, and assistance is required to guide building and business owners and others through the identification, selection, and implementation of resiliency improvements.

**Similarly, many building and business owners**

**suffer from a lack of financial resources to undertake operational and capital resiliency improvements.** Small businesses, cooperatives, and other ownership entities often lack the equity to invest in these improvements and/or may not be able to obtain financing to support capital plans. Additional financial assistance is required to help

# Community vision

**A first key objective of the NY Rising Community Reconstruction planning process was to establish overarching short-term and long-term resiliency and recovery goals for Lower Manhattan.** Setting targets and aspirations for the future helps to think beyond the current state and begins to paint the picture of a more resilient, sustainable Community. By looking at assets and needs, and then setting goals and a vision, the Community can then begin to devise strategies to reach those goals.

**Goals help define particular objectives that the Community hopes to achieve over the short- and long-term.** They can range from small, simple goals to much more complex multi-pronged ambitions. Overall, they are action-oriented and aspirational in nature. Over the course of the first few Planning Committee meetings and the first Public Engagement events, the Lower Manhattan community voiced a variety of short-term and long-term goals to enhance their resiliency, summarized in the adjacent table.

**These goals also informed a Community vision, an overarching umbrella statement that encapsulates a collective sense of purpose and direction and maximum potential for the future.** Like the goals on this page, the Lower Manhattan Community’s vision statement was established based on Planning Committee discussion and input at the first Public Engagement Event.

## Short-Term Goals (2-5 years)

- Meet the needs of vulnerable populations in the area
- Increase the capacity of CBOs to help residents prepare for, respond to, and recover from emergencies
- Increase the capacity of CBOs to meet the specific needs of vulnerable populations in the area
- Improve coordination and communication among CBOs and agencies involved in emergency preparedness, response, and recovery
- Develop a comprehensive network of resilient recovery and supply distribution centers
- Plan a pilot resilient neighborhood communications system for coordination among CBOs, government agencies, residents, and businesses
- Increase the resiliency of small businesses in the most flood-prone areas
- Incorporate stormwater management and wave attenuation strategies in the most flood-prone waterfront open spaces
- Increase access to local, resilient, and high-quality healthcare options and access to pharmacies

## Long-Term Goals (5-10 years)

- Ensure effective coordination and communication systems in emergency preparedness, response, and recovery are in place
- Sustain the mixed-use, live/work character of Lower Manhattan
- Ensure the resiliency of small businesses throughout the Planning Area
- Ensure the resiliency of high-rise subsidized housing developments throughout the Planning Area
- Expand affordable housing stock and increase resiliency
- Provide redundant, resilient transportation, energy, and telecommunications infrastructure options
- Strengthen coastal flood protection, particularly for East River neighborhoods
- Expand the open space and recreation facilities in the area

## Vision statement

Through the **NY Rising Community Reconstruction Plan**, the Lower Manhattan Community aims to **improve the capacity and readiness of all community members** to prepare for, respond to, and **quickly recover** from severe weather-related events; to address needs currently unmet by existing rebuilding and resiliency efforts; and to **support the vital and diverse character** and history of Lower Manhattan.



Community members brainstormed a community vision at Public Engagement Event #1.

## Relationship to regional plans

### Regional perspectives

#### Lower Manhattan infrastructure

**Lower Manhattan plays a critical role in the region's infrastructure, particularly in terms of transportation, so the failure of infrastructure systems in this area has a regional impact on mobility and economic activity.** Transportation infrastructure in Lower Manhattan creates important connections between the boroughs and New Jersey. Transit assets in the area include 19 of the City's 22 subway lines, the PATH Train to New Jersey, and ferry service to Queens, Brooklyn, Staten Island, New Jersey and Westchester. Major road infrastructure includes highways such as the West Side Highway (9A) and FDR Drive, and tunnels and bridges including the Hugh L. Carey Tunnel (formerly the Brooklyn Battery Tunnel), the Holland Tunnel, the Brooklyn Bridge, the Manhattan Bridge and the Williamsburg Bridge.

Because most of the City's subway lines travel through Lower Manhattan, the flooding and loss of electricity that led to the shutdown of the subway system after Sandy had major impacts on mobility throughout the region. In particular, residents in and out of Manhattan were unable to reach employment centers in Lower and Midtown Manhattan, as well as other key destinations. This led to the deployment of the "bus bridges,"

with dedicated, non-stop routes connecting Downtown Brooklyn and the Williamsburg Bridge Bus Plaza to Midtown Manhattan until subway service was restored. Similarly, the shutdown of the two tunnels connecting Lower Manhattan to New Jersey and Brooklyn inhibited the movement of people and goods, not only within this Planning Area, but also throughout the region. Ensuring a resilient, secure and dependable transportation network is essential to sustaining Lower Manhattan's ability to serve as an economic engine and hub for the region.

#### Global business hub

**As the home of the United States' financial industry and a highly diversified employment center, Lower Manhattan plays a critical role in the local, regional, national, and global economy.** In addition to the well-known financial services and banking firms that are headquartered in Lower Manhattan, there are myriad other business entities and employers in Lower Manhattan, including those that help support the global financial industry, municipal, state, and federal offices, and a diverse range of other businesses, not-for-profit organizations, and cultural institutions. More than half a million workers living throughout the Tri-State Region commute to Lower Manhattan,<sup>15</sup> which includes the Financial District, the fourth-largest central

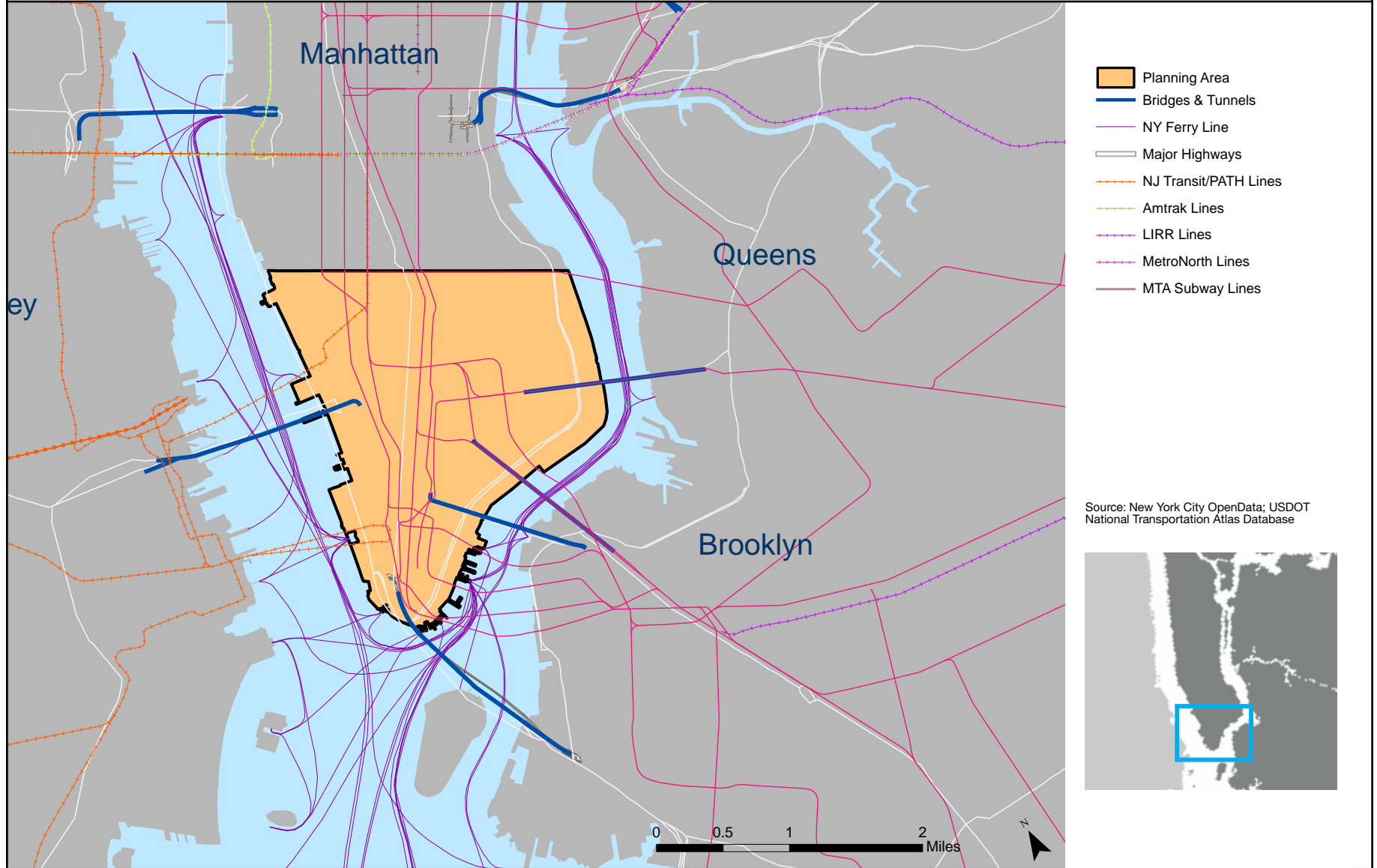


Lower Manhattan is home to Wall Street, the world's financial center. Source: Flickr user kosmolaut, licensed under Creative Commons.

business district in the country.<sup>16</sup>

**Planning for the resiliency of Lower Manhattan is therefore critical to not only the regional and global economy, but also for the local residents, small businesses, and community institutions that give the Planning Area so**

**Figure I-7: Lower Manhattan as a regional transportation hub**



**much of its character, culture and diversity.** As seen in the aftermath of both September 11th and Superstorm Sandy, the suspension of business operations in Lower Manhattan has substantial impacts on economic activity, as well as the sustained employment of residents in the region. Some Lower Manhattan businesses were able to reopen within a week of Sandy, once power and subway service were restored, but others took longer to reopen, due to more extensive building damage. After September 11th, some businesses had developed emergency plans and were in a better position to handle the impacts of Sandy through backup data centers and alternative employee reporting locations. Nonetheless, comprehensive resiliency planning for the area as a whole is critical to economic resiliency.

### Scalable solutions for the region

**The Planning Committee and public have emphasized a strong interest in pursuing projects and strategies through the NY Rising Community Reconstruction (NYRCR) Program that are scalable and applicable to surrounding areas.** The density and diversity of the Lower Manhattan Planning Area represent common conditions in other parts of New York City, in particular Manhattan. As such, resiliency challenges and solutions that are explored for the Lower Manhattan Planning Area have regional

relevance. There is great potential for Lower Manhattan resiliency strategies and lessons to be broadly replicable, which is an important point that will underlie much of the future discussion and analysis of needs and strategies. For instance, efforts to strengthen community emergency response coordination may serve as a model for densely-populated locations throughout urban centers.

### Existing plans, studies, and projects

**The Planning Committee expressed explicit interest in using the NYRCR Program process to fill gaps and address needs that are not being covered in existing recovery and planning work.** In order to avoid duplication of plans and to identify how the NYRCR Program may best fill existing gaps, the Committee reviewed past and ongoing plans, studies, projects and programs in Lower Manhattan and surrounding areas.

Numerous plans and studies were reviewed that have been undertaken or are underway in Lower Manhattan and New York City as a whole, with an emphasis on the Focus Area. Profiled plans include the New York City Regional Economic Development Council's Strategic Plan, Sandy

recovery plans, as well as other plans around waterfront access; corridor and neighborhood improvement, sustainability, and hazard mitigation.

The analyses and recommendations included in these plans can contribute valuable information and ideas to the NYRCR Program planning process.

**A key takeaway from review of existing plans, studies, and projects that specifically address Lower Manhattan is that major infrastructure providers and large private entities that operate in the area have a variety of well-funded initiatives underway to improve the resiliency of Lower Manhattan.**

More specific takeaways include:

- The public agencies and private companies responsible for the area's infrastructure are making significant investments to restore and upgrade their assets, including agencies like the Metropolitan Transportation Authority (MTA), and the Port Authority of New York and New Jersey (PANYNJ), and companies like Consolidated Edison (Con Ed), and Verizon. At the same time, capital projects underway continue to have service



impacts on the area, including short- and long-term shutdown of systems for upgrades (such as the ongoing suspension of R train service under the East River), increases in rates (as Con Ed amortizes the costs of system upgrades), and changes in service (e.g., loss of copper wire phone service due to fiber optic upgrades).

- Sophisticated owners of larger private buildings in Lower Manhattan have begun to make their buildings more resilient independent of any public planning efforts. Multiple buildings along the Water Street corridor have begun to install flood wall systems that can be deployed in the event of flood risk. In addition, many buildings have begun to move building mechanical systems out of basements and onto higher floors, or to waterproof systems currently in place particularly if they had to replace systems damaged by Sandy.
- The New York City Housing Authority (NYCHA) is actively planning to increase the resiliency of the numerous public housing developments in the area, particularly those that have apartments located on the first floor. These plans aim to better protect vulnerable populations from future damage and disruption. To this end, FEMA recently



The Financial District is a major regional transportation hub. Source: Flickr user The All-Nite Images, licensed under Creative Commons.

agreed to provide \$100 million in funding to NYCHA to cover the costs of both the temporary boilers that have been in use by 110 developments since Sandy, as well as the purchase of new boilers for these properties.<sup>17</sup>

- Many of the commercial districts in the Focus Area have Business Improvement Districts and other organized entities that are actively engaged in economic development and organizational activity in support of small businesses in these areas.

In addition, a number of key planning studies with direct linkages to resiliency have either been completed or are underway:

- Waterfront access and development of waterfront recreational trails along both the East and Hudson Rivers have been extensively studied with considerable resources currently going toward these efforts. These amenities contribute to the livability and character of the Planning Area, can serve as critical transportation routes after emergency events, and may present opportunities for increasing resiliency through green infrastructure.
- Numerous corridor plans and studies have been undertaken aiming to improve the streetscape, connectivity, and economic activity in key retail and commercial corridors in the Focus Area, and in the greater Planning Area.

**Based on a review of existing plans and initiatives, the Planning Committee recognized a significant gap for resiliency planning: supporting community-based emergency preparedness, with a specific focus on vulnerable populations throughout Lower Manhattan. The Committee chose to adopt this as a priority theme for the creation of the Lower Manhattan NYRCR Plan, filling a gap in existing regional plans.**

Specific areas of focus for the community include:

- Increasing community resiliency and supporting existing or new community organizations that could provide support in future emergencies.
- Providing additional support for small businesses that may not have the financial resources to weather even short-term shutdowns.
- Developing cohesive plans and initiatives for the northern portions of the Planning Area, such as Alphabet City, particularly those that fall outside the more traditionally-defined Lower Manhattan neighborhoods.
- Undertaking a comprehensive study of the vulnerability of affordable housing and the potential for increasing its resiliency.
- Promoting effective coordination among community organizations and government agencies in the identification and tracking of vulnerable populations.
- Crafting emergency response protocols for addressing the needs of vulnerable populations.
- Developing a means to deliver distributed backup power generation to residential buildings and small businesses, and provision of telecommunications redundancy in the event of an emergency.

## Lower Manhattan initiatives

Below is a list of relevant major planning initiatives and projects either planned or underway throughout the Lower Manhattan Planning Area.

**The Lower Manhattan Development Corporation (LMDC).** Formed in the immediate aftermath of September 11th, this organization has a number of redevelopment plans and initiatives underway:

- LMDC’s Plan for Lower Manhattan lays out a range of plans for improving the area following September 11th, including rebuilding the World Trade Center site, improving waterfront access and open spaces, and supporting businesses and cultural organizations within the area.
- LMDC has pursued improvements on various corridors and in various sub-areas of Lower Manhattan, including Fulton Street and the area surrounding the World Trade Center.
- LMDC also has incentive programs in place to support businesses in and around Lower Manhattan. One such program distributes the New York City Economic Development Corporation’s Job Creation and Retention Program funds, which the City of New York’s

Special Initiative for Rebuilding and Resiliency (SIRR) proposes to expand to 2017.

The **Alliance for Downtown New York (ADNY)**. This organization has various plans and policies in place to assist residents and businesses:

- ADNY has developed a vision plan for improvements on Water Street, focusing on privately-owned public spaces, which has led to initial improvements implemented by the New York City Department of Transportation and additional improvements being pursued by the New York City Economic Development Corporation.
- ADNY’s 2009 Greenwich Street South plan laid out key strategies for improving the 41 acres south of the World Trade Center, between Broadway and West Street.
- ADNY also has created programs around recovery after emergency events. Offering immediate assistance after Sandy, ADNY created a Back to Business small grant program for ground level retailers located in Flood Zone A. Through the Back to Business program, ADNY assigned nearly \$1.6 million in grants to 105 Lower Manhattan businesses.

Additional significant projects and plans in Lower Manhattan include:

- The Lower East Side Long-Term Recovery Group (LES Ready!), a coalition of community groups and institutions that are working together to enhance coordination and build capacity in emergency preparedness and response in Community Board 3 and the immediately adjacent neighborhoods.
- Rebuild by Design is a design competition sponsored by the Hurricane Sandy Rebuilding Task Force and HUD to develop resiliency proposals for the region impacted by Superstorm Sandy. With particular relevance to Lower Manhattan is the BIG U flood protection strategy. This proposal includes resiliency plans for the neighborhoods that line the “U” of Lower Manhattan—from West 54th Street on the west side, south to the Battery, and up to East 40th Street on the east side. The plan was developed with local community input and consists of a variety of integrated hard infrastructure and community planning strategies to increase resiliency. HUD is expected to announce winning design solutions in spring 2014.
- Regional economic development studies, including the New York City Regional Economic Development Council’s Strategic Plan, which identifies strategies for accelerating job growth and economic development in the region. Strategies suggested for encouraging economic growth in Lower Manhattan—an

Opportunity Zone—include expansion of commercial real estate and parks and open space.

- Hudson River Park improvements and expansion, including various recreational amenities, infrastructure improvements, and expansion and conversion of piers for mixed uses and open space.
- East River Waterfront improvements and expansion, providing waterfront access and recreational amenities for community residents.
- The East River Blueway Plan, a community-based waterfront initiative for the East River that plans for redevelopment of recreational amenities, connecting neighborhoods to the waterfront, and integration of storm surge resiliency measures into design.
- The Chinatown/Lower East Side Special Zoning District, a proposal by the Coalition to Protect Chinatown and the Lower East Side which, if approved, would establish a special zoning district to preserve the neighborhoods of Chinatown and the Lower East Side.

## Citywide resiliency initiatives

### Special Initiative for Rebuilding and Resiliency (SIRR)

On June 11, 2013, then-New York City Mayor Michael Bloomberg announced the release of “A Stronger, More Resilient New York,” which is the product of the Mayor’s Special Initiative for Rebuilding and Resiliency and SIRR Report. The SIRR Report detailed what transpired prior to, during, and after Sandy, what is the likely risk as the City faces climate change, and what the City can do to rebuild post-Sandy, ensuring resiliency into the future. The SIRR Report contains actionable recommendations both for rebuilding communities in the City that were impacted by Sandy and for increasing the resiliency of buildings and infrastructure citywide. Broadly, the SIRR Report lays out numerous citywide initiatives to improve the resiliency of systems, including coastal protection, buildings, insurance, utilities, liquid fuels, healthcare, telecommunications, transportation, parks, water and wastewater and other critical networks.

Specific proposed initiatives for Lower Manhattan include an integrated flood protection system along the coastal edge, with a first phase targeted for the Lower East Side and Chinatown.

The report and latest updates on implementation can be found on the SIRR website:

<http://www.nyc.gov/html/sirr/>.

### Future updates to the building and zoning code

The City’s Building Resiliency Task Force identified 33 recommendations to the City Council. Many of these recommendations are still in various stages of review by the Council, but 16 initiatives have been passed. In addition, the Department of City Planning’s Flood Resilience Zoning Text Amendment was approved by the City Council on October 9, 2013. This amendment applies to construction in the 100-year floodplain and modifies zoning to remove barriers to flood-resistant construction (e.g., increasing allowable building heights to enable the elevation of groundfloor uses and mechanical systems).

### NYC Recovery Program

The City has also launched several initiatives to help residents across the five boroughs recover from the damage caused by Superstorm Sandy. The City’s “Build it Back” program seeks to assist homeowners, landlords, and tenants, whose homes were damaged by Sandy. The NYC Recovery Program also offers business loans and grants to small business owners whose spaces were damaged by Sandy. Most of these recovery

programs support resiliency investments and will help improve homes and businesses in the communities within southern Manhattan. More information on the NYC Recovery program can be found here: <http://www.nyc.gov/html/recovery/>. (The State of New York manages both housing and small business recovery programs outside of New York City.)

### **Transportation improvements**

The NYC Department of Transportation (NYC DOT), the MTA, and the PANYNJ recently released updated and more detailed plans for upgrading the resiliency of their networks, including roads, subways, vehicular tunnels, and communications. Examples include retrofitting subway entrances and vent grates with closure mechanisms, installing flood gates and closures of tunnel entrances, and installing emergency generators designed to withstand flooding and other hazards. A number of major projects are already in design or construction, including the reconstruction of the new South Ferry Terminal on the 1 train, the complete rehabilitation of the Montague tube on the R train, and major retrofits to the four key vehicular tunnels that serve Lower Manhattan.

## FEMA Flood Maps and Flood Risk

The Federal Emergency Management Agency (FEMA) describes its assessment of flood risk through flood maps referred to as Flood Insurance Rate Maps (FIRMs). These maps are used by the National Flood Insurance Program (NFIP) to set flood insurance rates. Before Superstorm Sandy, FEMA had begun a coastal flood study to update FIRMs for portions of New York and New Jersey, using improved methods and data to better reflect coastal flood risk. When Superstorm Sandy hit New York City, the FIRMs in use were based on information from 1983 and inundation extended well beyond what these maps estimated would be the 100-year floodplain.

These final FIRMs will guide new flood insurance rates for homeowners and businesses in the floodplain. FEMA's flood maps do not take into account future conditions and thus do not factor in potential sea level rise.

## National Flood Insurance Program (NFIP)

FEMA developed the NFIP in the 1960s to provide homeowners with flood insurance, which was not readily available in the private market. Through NFIP, property owners in participating communities are able to buy subsidized, government-backed insurance to protect against flood losses. The Biggert-Waters Act of 2012 proposed the controversial repeal of subsidies and other restructuring in order to make the program more financially sound. Coupled with the previously mentioned FIRM map adjustments, this repeal

would result in substantial premium increases for many policyholders. In a move to bring flood insurance rate relief to coastal communities in the wake of Superstorm Sandy, in March 2014, Congress passed and President Obama signed the Homeowner Flood Insurance Affordability Act into law. The law caps average annual flood insurance premium increases at 15%-18%, and allows subsidies for insurance rates that are based on revised flood maps. It also designates a flood insurance advocate to educate homeowners and

policy holders on mitigation measures that can help reduce flood insurance rates, and recognizes among these measures methods for reducing flood risk that provide alternatives to building elevation for residential buildings such as attached homes whose structures cannot be elevated.

A photograph showing two individuals in a room, likely a warehouse or storage area, organizing stacks of cardboard boxes. One person is wearing a grey hoodie and the other a dark jacket. A red hand truck is in the foreground, also loaded with boxes. The background shows a door and a poster on the wall.

## II. Assessment of risk and needs

Community-based organizations need support to continue to provide critical services before, during, and after emergency events. Source: Courtesy of Two Bridges Neighborhood Council.

# Description of community assets and assessment of risk

## Description of community assets

To guide the planning process, the Planning Committee (Committee) developed a comprehensive inventory of the key assets located within the Lower Manhattan Planning Area. The Committee placed particular emphasis on those assets whose loss or impairment due to flood and storm events would compromise essential social, economic or environmental functions or critical facilities of the community. The inventory aims to include sufficient information to assess risk to the assets under current and future conditions.

Assets include a variety of places and resources valued by the community. They may facilitate economic and social activities, or may refer to critical infrastructure required to support those activities. Assets may also be part of the built or natural environment. Some assets are best described as systems. These are assets that may fall within or outside the community whose impairment would affect community assets or activities: for example, a wastewater system is made up of multiple components and much of the network may exist outside the community itself, but the function of all these parts is critical to regular community life. The asset inventory

was developed based on a combination of publicly-available data and community input. The inventory was organized by the six Asset Classes below (listed in alphabetical order):

- Economic
- Health and Social Services
- Housing
- Infrastructure Systems
- Natural and Cultural Resources
- Socially Vulnerable Populations

These Asset Classes closely mirror the six Recovery Support Functions, established by President Obama in 2011 as part of the National Disaster Recovery Framework, which is discussed in more detail later in this document. All assets inventoried as a part of this process are of high community value. The process drew from a series of Public Engagement Events, as well as an online interactive community asset map (located at <http://lowermanhattan.nyrisingmap.org/>), which allowed community members to comment on key assets and highlight the needs and issues associated with them. It also allowed them to add additional or corrected information about assets and to add missing assets.

Committee and public input determined a list

of key assets of highest community value, with particular attention to assets serving vulnerable populations and those most at risk for future flooding. Given the breadth and size of the Lower Manhattan Planning Area, risk assessment was focused on assets in areas of high or extreme risk of future flooding, defined as the coastal Focus Area portion of the Planning Area. In cases where assets were essential to emergency response and preparedness for serving vulnerable populations (e.g., hospitals, evacuation centers, etc.), or were schools or universities, the entirety of the Planning Area was profiled—that is, all of Lower Manhattan below 14th Street. While many of these assets are not at extreme or high risk of flooding, they nonetheless serve a critical role in the community, especially during the aftermath of a disaster. Other assets were categorized to aid risk assessment and the development of targeted strategies for improving resiliency to areas most in need. As Appendix C demonstrates, housing assets were grouped by Community District, and economic assets by those commercial corridors with the highest concentration of commercial uses. Health and social service and natural and cultural assets were grouped by location in high or extreme risk area. For asset categories for which no assets were located in extreme risk zones, those categories were omitted from the risk assessment asset inventory.



## Recovery support functions: a framework for a holistic resiliency plan

Throughout the remainder of the NYRCR Plan, six **Recovery Support Functions** are used to guide the identification of issues, assist in categorizing assets and assessing risk, frame needs and opportunities, and organize resiliency strategies. These functions are derived from FEMA's National Disaster Recovery Framework (NDRF) developed by President Obama in 2011 and will help coordinate this plan with state and federal programs. These recovery support functions are:



### Natural and Cultural Resources

Natural systems can play an important role in resiliency and recovery. The ability of natural features to withstand disruptive events as well as their ability to mitigate damage are addressed by this function. Cultural resources can play an important role in recovery through provision of spaces and forums for recovery.



### Community Planning and Capacity Building

This function addresses a community's ability to implement immediate storm recovery activities and organize long-term resiliency plans. Formal and informal community networks, dedicated emergency education and planning efforts, and experience recovering from past emergency events are characteristics that may enhance this function.



### Economic Development

This function addresses the ability for economic and business activities to return to normal. Developing new economic opportunities that result in a sustainable and economically strong community is a component of this function.



### Health and Social Services

This function addresses the ability of public health, healthcare facilities, and essential social services to be restored after a disruptive event.



### Housing

The resiliency of a community's housing stock is addressed by this function—including both physical resiliency and financial health and resources.



### Infrastructure Systems

This function relates to local and regional transportation, water management, utility systems, and the ability of these to withstand and recover from disruptive events. The economic development and job creation capacities of these systems are also critical to this function.



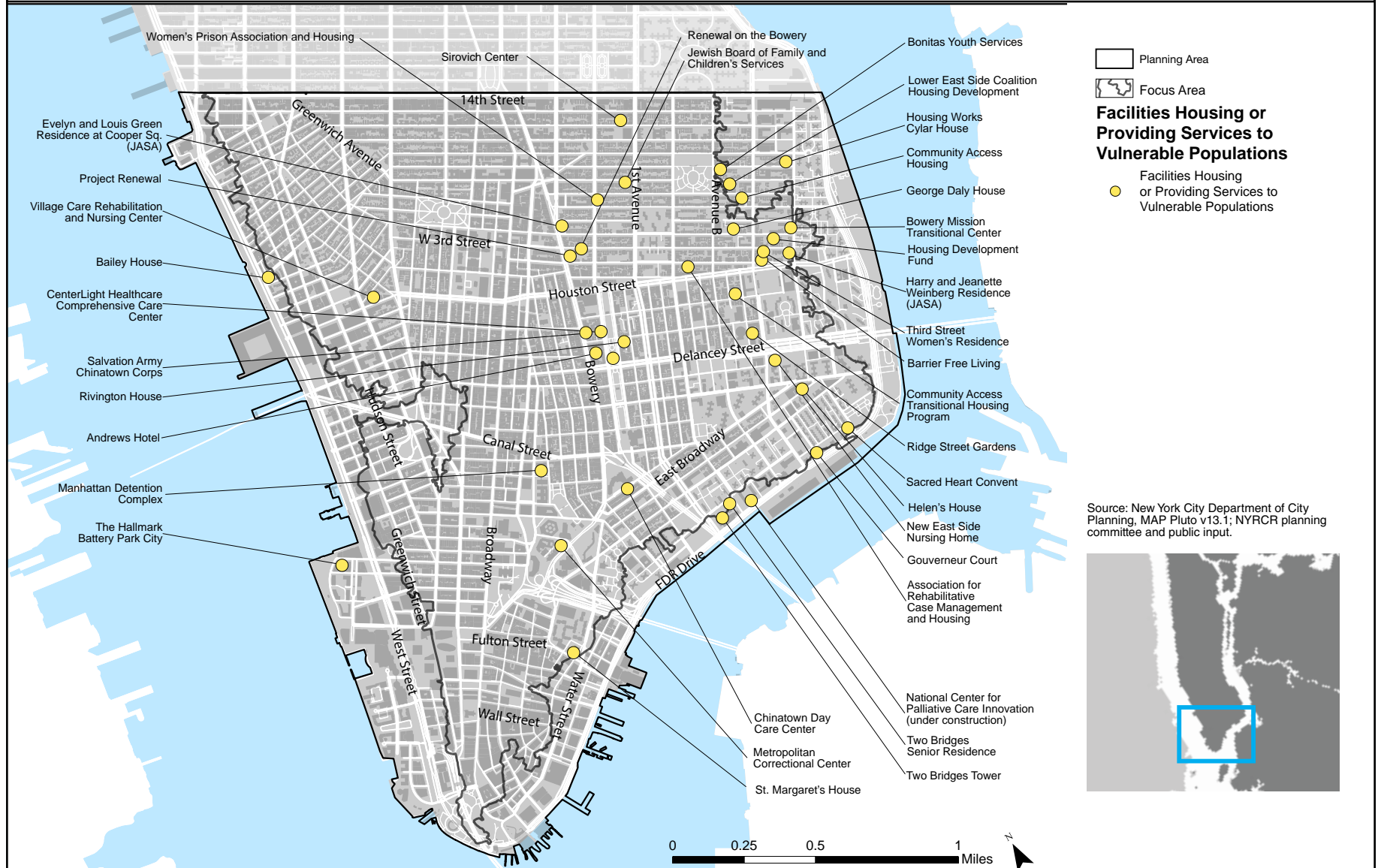
## Vulnerable populations

The Committee determined vulnerable populations to be the most important community asset category for consideration under the plan. Vulnerable populations are defined here as those individuals who have limited mobility, limited communication skills, and/or a limited ability to control their environment. Seniors, disabled or home-bound persons, and limited English proficient speakers were particularly affected by the impacts of Sandy, as many were unable to leave their homes or obtain critical support. While the Planning Committee recognized the need to address the resiliency of place-based assets and hard infrastructure, they advanced

the idea that community members themselves are Lower Manhattan's most critical asset and therefore prioritized vulnerable populations and the organizations and facilities that serve them.

Due to the size of the Planning Area and the diversity of its neighborhoods, the identification and tracking of vulnerable populations is challenging. The map on the following page provides an initial examination of the potential locations where vulnerable population reside, including the distribution of elderly populations and those living in nursing homes, prisons, and mental health facilities.

**Figure II-1: Facilities serving vulnerable populations**



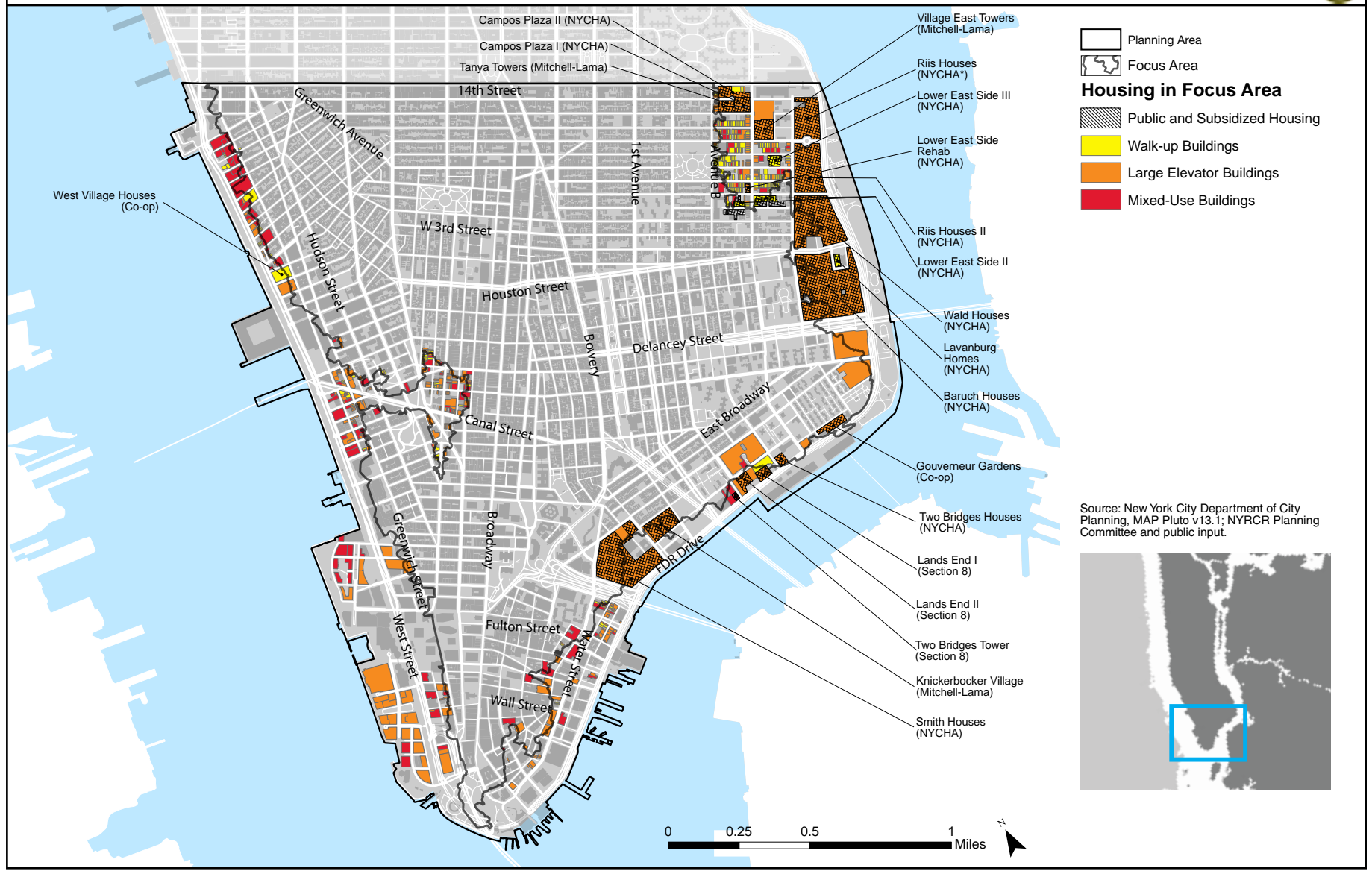


## Housing assets

All housing in the Focus Area was deemed critical for the NYRCR Plan as these buildings are at high risk from the effects of hurricanes and other extreme weather events. According to the 2005–2009 American Community Survey, there are over 46,000 housing units in the Focus Area, 69% of which are located in buildings with 50 or more units. Seventeen percent of the housing units in the Focus Area are further located in New York City Housing Authority (NYCHA) public housing developments, home to approximately

18,000 residents.<sup>17</sup> The public and subsidized housing along the east side of the Planning Area, in particular, experienced severe flooding during Sandy, leaving the residents in need of immediate assistance. The Planning Committee believes that protecting these vulnerable residents should be at the forefront of any resiliency strategy, while also respecting and responding to the needs of residents outside of the high and extreme risk flood-prone zones.

**Figure II-2: Housing assets (subsidized housing)**





## Health and social services assets

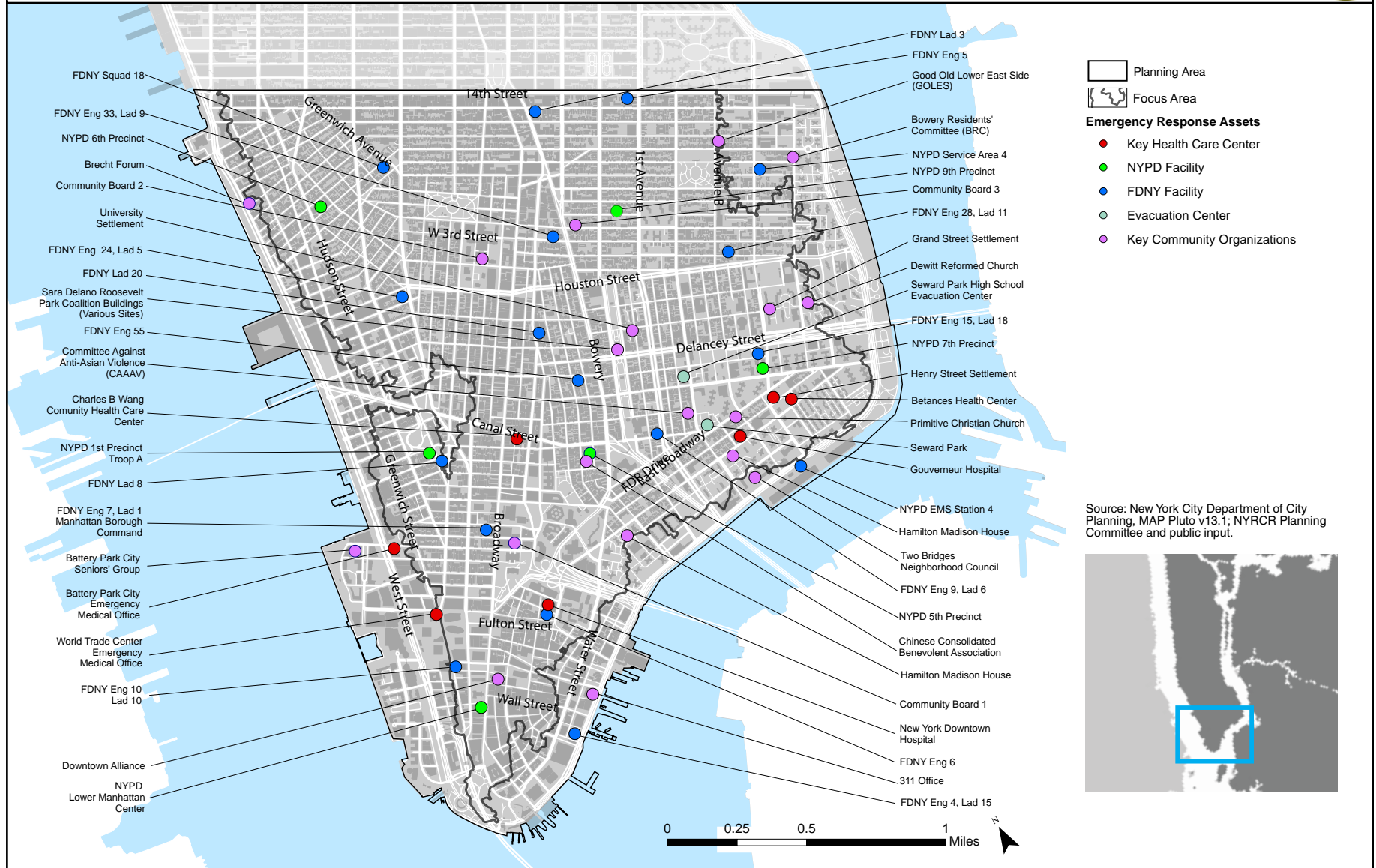
The Committee determined that health and social service assets supporting emergency response are a priority for Lower Manhattan resiliency planning. The Planning Committee recognizes the importance of these assets in helping the Lower Manhattan community recover from Superstorm Sandy and be more prepared for future such events. This is largely due to the significant role that community organizations, healthcare institutions and other emergency responders have played during past emergencies within Lower Manhattan, including Sandy. Due to

the importance of these assets, the Committee inventoried all critical healthcare and emergency response facilities and organizations throughout the Planning Area, extending beyond the Focus Area.

The Committee identified priority assets including New York City Fire Department (FDNY) and New York City Police Department (NYPD) facilities, key healthcare centers, the Seward Park High School evacuation center, and the offices of key community organizations that played a significant

role in organizing aid and relief services during the aftermath of Sandy. For instance, Dewitt Reformed Church served as a staging area for Sandy recovery, while the Lower Manhattan Construction Command Center (LMCCC) helped buildings in Community Board 1 to get their power restored by connecting building managers with City agency representatives.

**Figure II-3: Health and social service assets (Key emergency response assets)**





## Economic assets

Lower Manhattan is not only a global center for finance, with more than 100 million square feet of commercial office space,<sup>18</sup> but it is also a growing hub for the technology and creative sectors. The reconstructed World Trade Center will fully restore and expand upon a vital center for global business. While traditionally the seat of the New York Stock Exchange and some of the world's largest banking institutions, Lower Manhattan also has a rapidly diversifying economy driving leasing and job growth. Additionally, an increasing number of technology and creative companies have moved into the historic Financial District area in recent years. The zone south of Chambers Street is now home to 600 technology companies, up from 500 only a year ago.<sup>19</sup> Key commercial corridors such as Water Street, Fulton Street, and Canal Street house businesses both big and small. The largest commercial building in New

York City, 55 Water Street, is also located in the area. The area also boasts economic drivers in the form of tourist destinations, which include the National September 11 Memorial and Museum, Wall Street, the Brooklyn Bridge and a multitude of other assets.

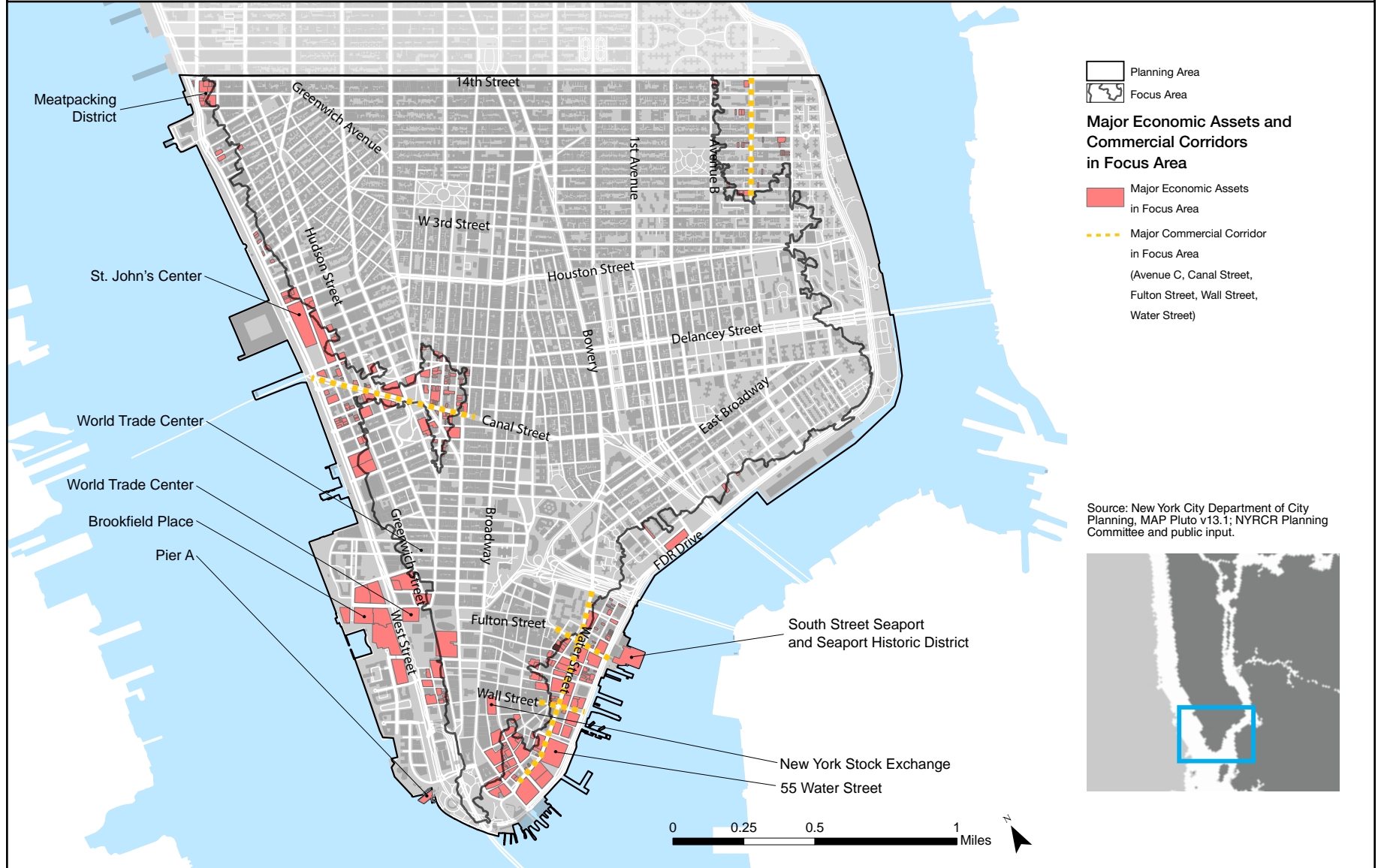
Lower Manhattan is also home to a wide variety of independently-owned small businesses, clustered in key commercial corridors and interspersed in the fabric of its neighborhoods. A number of these key commercial corridors in the Focus Area, particularly prone to flooding, include Water Street, Fulton Street, South Street Seaport and Historic District, Broadway, Canal Street, Greenwich Street, West Street, and shops along Avenues C and D. The Focus Area alone is home to 4,800 businesses and 3.5 million square feet of retail space.<sup>21</sup> In addition, some of these at-risk areas directly serve

vulnerable populations, such as those located adjacent to the large, regulated, and subsidized housing developments along the east side.

Many of the small businesses located near the key commercial corridors listed above still struggle to recover from the flooding and damage that Sandy visited on the area. The South Street Seaport Historic District and Alphabet City have been particularly challenged by Sandy's flooding. Some of the small businesses in these areas were forced to shutter their doors and have still not reopened. The Planning Committee has identified small businesses as a key asset to be addressed within the Community Reconstruction Plan, as many remain challenged to both recover and prepare for future potential severe weather events.



**Figure II-4: Key economic assets**





## Infrastructure systems assets

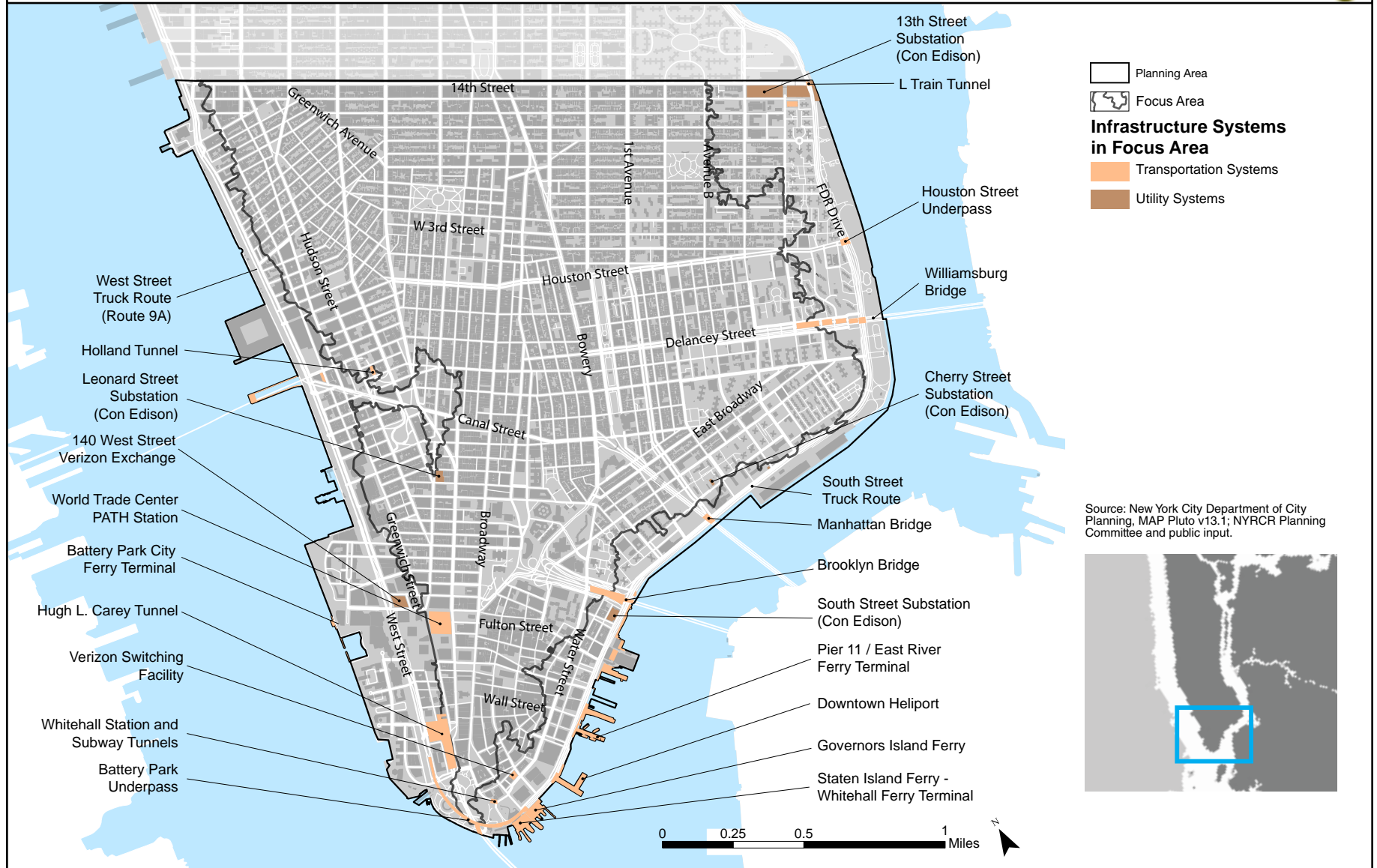
Lower Manhattan's critical infrastructure systems serve not only the residents and visitors of the community, but the New York City metropolitan region as a whole. With many systems located near bulkhead lines in the Focus Area, critical infrastructure assets at high or extreme risk to flooding are numerous. This risk is magnified when considering that these assets are either responsible for transporting people in and out of Manhattan or providing the Lower Manhattan community with running water and electrical power.

Key transportation assets include six passenger ferry terminals, five major subway interchanges, the Port Authority Trans-Hudson (PATH) train terminal, five regional bridges and tunnels, and two major regional highways. New York City's new bicycle sharing system, with stations throughout the Planning Area, is also a transportation asset.

Additionally, the Planning Area houses numerous Con Ed substations that are critical to providing power to the Lower Manhattan community. For example, the well-documented failure of the 13<sup>th</sup>

Street Substation during Superstorm Sandy gave way to power loss for the entire Planning Area, save Battery Park City. While the City of New York and its respective agencies and organizations have numerous plans and financial resources in place to protect these critical infrastructure systems assets, they are nonetheless recognized in this plan as key assets to the Lower Manhattan community.

**Figure II-5: Infrastructure systems assets**





## Natural and cultural assets

Lower Manhattan features a wealth of parks, open spaces, privately-owned public spaces, and cultural facilities, many of which are located in the Focus Area, home to over 100 acres of open space. Battery Park, in the Focus Area, served as a key staging ground for recovery services during the aftermath of Sandy, providing ample room for agencies such as FEMA and the National Guard to tend to, and provide services for, those in need. The various park spaces within Battery Park City are also a natural and cultural asset during post-emergency situations.

Other parks are essential community assets, providing open space, recreational activity, and light and air. These parks also provide a variety of environmental benefits, such as stormwater absorption, and can provide a protective border to mitigate flooding impacts on interior land. These include East River Park, Hudson River Park, the ball fields within Battery Park City, and the East River Esplanade, all of which were heavily affected by Superstorm Sandy. The quality of life in the community was directly impacted by the damage caused to these public spaces and the duration of their closures. Additionally, numerous

performing arts centers, museums, and other arts centers exist within the Focus Area. These facilities serve as assets not only for their public facilities (theaters, galleries, or studios) and their role within the community, but also for their potential capacity to serve as a gathering space or community hub in the event of an emergency.

**Figure II-6: Natural and cultural assets**



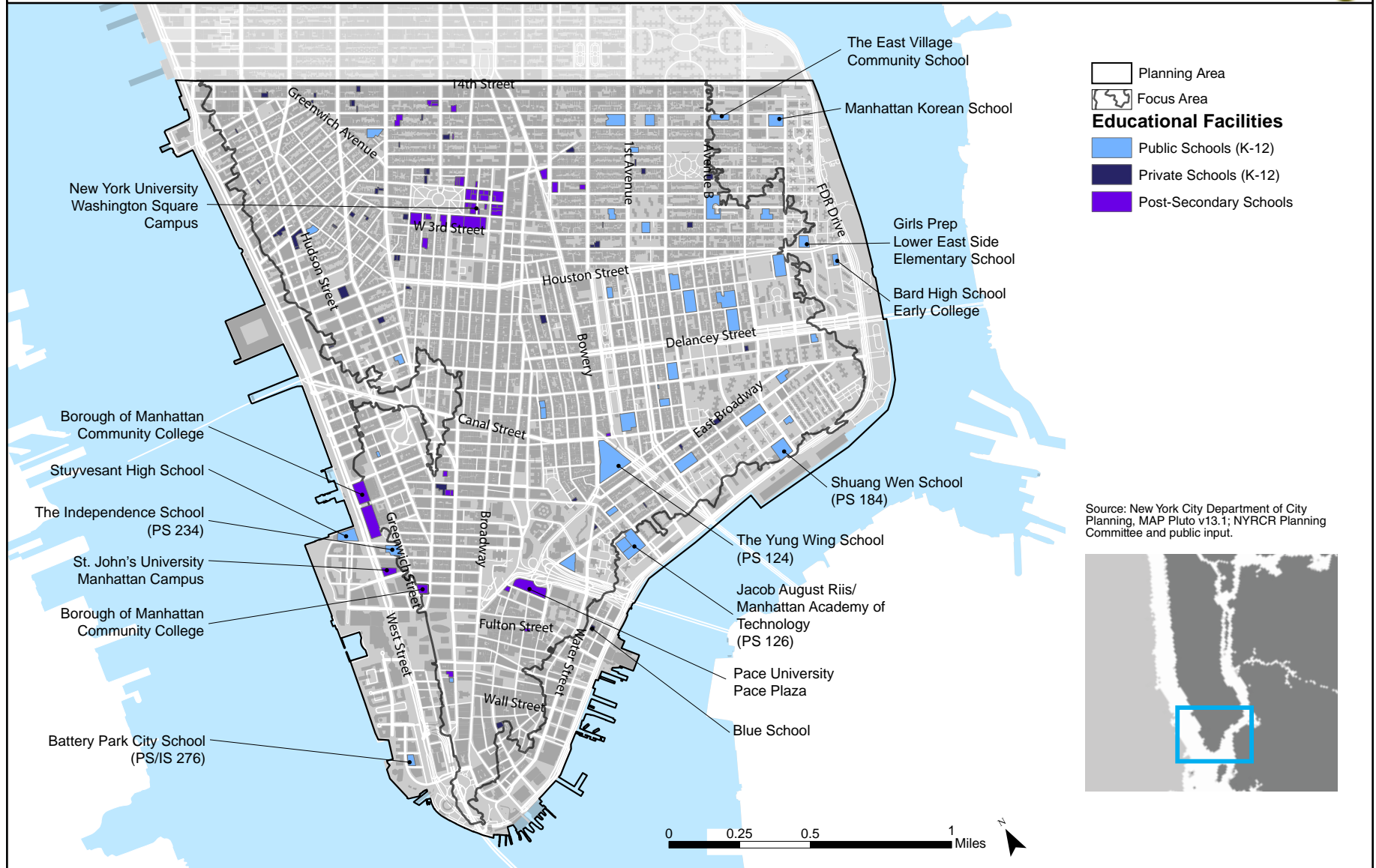


## Schools and universities

Lower Manhattan is home to a large number of pre-K, elementary, and secondary schools, both public and private, as well as universities and colleges, including New York University, Pace University, and Borough of Manhattan Community College. Recognizing that the thousands of school-aged children of Lower Manhattan neighborhoods spend the majority of their days within schools, the Committee determined these facilities to be one of the most important asset categories for this community. Local schools need to have effective emergency preparedness plans, clear lines of communications with emergency responders and parents, and viable evacuation protocols. The organized and orderly evacuation of these schools during the aftermath of a severe

weather event or other emergency is crucial for avoiding tragedy. Local schools and universities also serve as centers for the community, and their ability to recover following emergency events is paramount to the functioning of the community at large. Additionally, the dormitories of the larger universities house large numbers of undergraduate students who may need assistance in the aftermath of a storm. As an example, Pace University's Maria's Tower houses about 550 first-year students in a single building, a quarter of Pace's approximately 2,000 students living on campus.<sup>20</sup>

**Figure II-7: Schools and universities**



## Assessment of risk to assets and systems

### Future risk

**With its location in Upper New York Harbor, Lower Manhattan remains at risk from future coastal storms, although a number of factors—in particular, tide cycle and wind direction—must be aligned to result in damage and devastation on the order of what occurred during Sandy.** Along the east side, this risk is exacerbated by the fact that the East River is not truly a river, but rather a tidal strait, part of a tidal estuary, and subject to tidal surges from two waterways (Upper New York Bay or Long Island Sound). The risk of coastal flooding will continue to increase with rising sea levels. Significant portions of the Lower Manhattan Planning Area lie in high-risk zones, according to New York State Department of State (NYS DOS) risk analysis; the area that is at extreme risk is limited due to the general presence of bulkheads and seawalls that lessen the direct impact of wind-driven waves. Given its tall buildings, location at the “prow” of Manhattan, and large bridges crossing the East River, the area is also vulnerable to wind damage from storms.

The assessment of risk to specific assets or systems of assets in a community produced important information that helped guide the Planning Committee’s decisions about needs,

### Assessing risk

Risk, in this context, is the potential for an asset to be damaged or destroyed in a future storm event. The assessment of risk to assets or systems of assets in a community produced important information to evaluate needs and opportunities and help guide Committee decisions about resiliency strategies and projects. The NYS DOS developed a risk assessment tool that is aimed at understanding flood risk to community functions to support this process. The tool assigns each asset a risk score by evaluating three factors:

- **Hazard:** the likelihood and magnitude of future storm events
- **Exposure:** the local topographic and shoreline conditions that tend may increase or decrease the impact of coastal hazards
- **Vulnerability:** the capacity of an asset to return to service after a storm, taking into account its material strength relative to the coastal hazard as well as its regenerative capacity

Collectively, hazard, exposure, and vulnerability determine the risk that an asset could be damaged or destroyed by a coastal storm event. This analysis identifies which assets within the Community are most at risk from future storms in comparison to other assets. Further, it allows potential projects to be evaluated by their ability to reduce risk to assets. For access to the NYS DOS Risk Assessment Tool and additional information how to use it, see: <http://stormrecovery.ny.gov/resources-0>

opportunities, strategies, and projects.

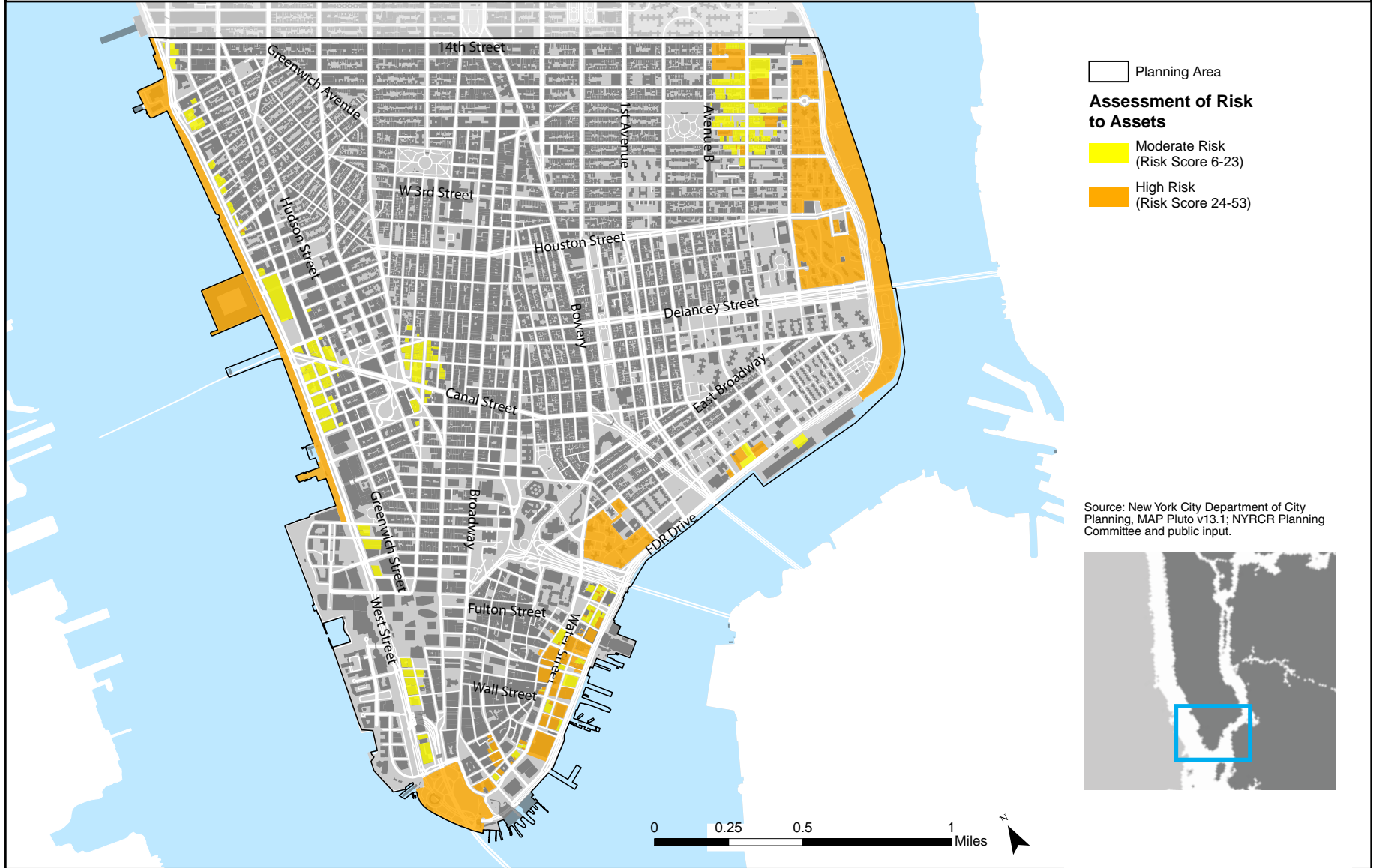
### Assets at risk

**The Lower Manhattan assets in the NYS DOS High and Extreme risk zones are classified as the Lower Manhattan Focus Area.** This includes affordable and public housing, other housing serving vulnerable populations, critical

infrastructure assets, several key commercial corridors, and emergency response facilities and headquarters of community organizations.. Many assets in the NYS DOS High and Extreme risk zones that were severely affected after Sandy are at risk from future disaster events. Sandy damaged hundreds of homes and small businesses, especially on Lower Manhattan’s



**Figure II-8: Assessment of risk to assets**



east side, and many have yet to be repaired and/or reopened. Those assets at greatest future risk include vulnerable populations and those living in subsidized and public housing, the majority of whom reside on the east side as well as Hudson River Park, Battery Park, and parks along the East River.

Lower Manhattan is also home to numerous large infrastructure, economic, and government assets, but because the owners of these assets are already developing and implementing specific resiliency measures for them, the Planning Committee has chosen to focus on assets and populations that have fewer internal resources.

### Risk

The assessment of risk to specific assets or systems of assets in a community produces important information to help guide Planning Committee decisions about projects and priorities. NYS DOS established a quantitative methodology for evaluating risk, which also takes into account storm and flood risk, shoreline conditions, and the innate vulnerability of each asset to damage and/or service disruptions. Specifically, the NYS DOS Risk Tool assigns a risk score to each asset by evaluating three factors:

- Hazard: the likelihood and magnitude of

future storm events

- Exposure: the local topographic and shoreline conditions that may increase or decrease coastal hazards
- Vulnerability: the capacity of an asset to return to service after a storm, taking into account its material strength relative to the coastal hazard as well as its regenerative capacity

Collectively, hazard, exposure, and vulnerability determine the chance that an asset could be damaged or destroyed by a storm event (i.e., “risk”). This risk assessment identifies which assets within the community are most at risk in comparison to other assets, as discussed in this section.

### Systems at risk

The following key systems are at risk in Lower Manhattan:

**Health Care and Social Services Delivery:** Sandy caused a health care and social services delivery crisis in Lower Manhattan. Many vulnerable populations and people in need of immediate healthcare were left unattended — due to a lack of resources, inability to travel to health/social services centers, or their needs being unknown to emergency workers. Lower Manhattan is home to many vulnerable populations, defined here as those individuals who have limited mobility,

limited communication skills, and/or a limited ability to control their environment. This includes senior citizens, those with limited mobility, children, and those people living in subsidized or public housing, making health care and social services a key system that needs to be protected from future risk.

### Emergency and other communication systems:

Emergency response coordination and resilient communication systems will be of critical importance to Lower Manhattan in the event of a future disaster. The ability for these facilities to maintain operations and coordination during and after future disasters is integral to the Lower Manhattan community’s resiliency during a storm. With dozens of New York City Fire Department (FDNY), New York City Police Department, (NYPD) and community organizations within the Planning Area—along with one major hospital—emergency and communications systems are at risk of ceasing operations in the event of another damaging storm. In addition, the inability of smaller community-based organizations and even individuals to communicate during and after the storm reduced the ability of the community to respond to critical needs, particularly among the most vulnerable populations.

**Infrastructure Systems:** Lower Manhattan is home to a large number of infrastructure systems, including transportation, electrical, steam, and

telecommunications. Failures in any of these systems can impair mobility, communications, public safety, and economic activity, while a failure of the electrical system can cause cascading failures in many of the systems. In certain cases, these systems serve not only Lower Manhattan, but other parts of the city as well, so failures in these systems can have impacts beyond the planning area. Protecting these assets from storm-related impacts lowers the risk of direct damage to these systems, but also of downstream impacts on other systems and populations.

This analysis of risk has been used to inform the definition and prioritization of projects, particularly those that protect assets from flooding. A subsequent section discusses how some of this Plan's Proposed and Featured Projects reduce the risk to assets identified here. A more detailed description of the Risk Assessment Methodology can be found on the NY Rising Community Reconstruction (NYRCR) Program website, and the output from the Risk Assessment Tool is included in this document as Appendix B.

## Assessment of needs and opportunities

**As part of the NYRCR Plan process, the Lower Manhattan Community identified key resiliency needs and opportunities.** Community members spoke about what they need to be safe and sustainable in the face of extreme events, emergencies and the impacts of climate change. The process also identified key opportunities to address the gaps in the community’s collective resiliency to such events, thereby making Lower Manhattan stronger for the future.

The needs and opportunities discussed here reflect the first-hand experiences of Planning Committee members and Lower Manhattan residents, along with their combined knowledge of risks, challenges, unmet demand and untapped potential across the neighborhoods of Lower Manhattan. At the first Public Engagement Event, the Community reported on the greatest resiliency needs facing Lower Manhattan.

Based on input from public outreach activities, the Planning Committee prioritized among the various resiliency needs and opportunities in Lower Manhattan, with a distinct focus on emergency preparedness to support vulnerable populations. This prioritization formed a framework for guiding the Planning Committee in the development of

the NYRCR Plan’s key strategies and the projects that will enact them.



### Protection for vulnerable populations

**A critical need cited repeatedly by the Planning Committee and the broader public is the protection of vulnerable populations throughout Lower Manhattan.** Vulnerable populations include individuals who have limited mobility, limited communication skills, and/or a limited ability to control their environment. Approximately 12.5% of the population in both the Planning Area and the Focus Area is over 65 years of age—a community that may face particular challenges during an emergency due to limited mobility and lack of access to information. Residents noted the importance of enhancing current efforts by state and city governments to develop an online registry of vulnerable individuals in order to target support to these populations first before an emergency event is anticipated to occur. Additionally, health facilities which serve vulnerable populations should have backup power to ensure continuity of care throughout emergency events.

**Limited-English proficient (LEP) speakers represent another vulnerable population who face significant barriers in access to information around preparedness, response, and recovery procedures and resources.** According to the 2005–2009 American Community Survey, 13% of adults in the Planning Area and 15% of adults in the Focus Area report speaking English “not well” or “not at all.” Community-based organizations (CBOs) present an opportunity for conducting outreach to these populations, capable of developing and disseminating culturally- sensitive information in multiple languages.

**Low-income residents of Lower Manhattan form another vulnerable population, with nearly 17% of residents across the Planning Area earning below the Federal poverty line.** These residents may face limited relocation options in the event of an emergency and additionally may not be able to afford neither repairs to businesses or homes, nor medical care in the event of injury. It is important that emergency preparedness-related information and services are free or very low-cost to be accessible to low-income residents, and that targeted outreach to these populations is conducted to ensure they are aware of these resources.

Given that local community-based organizations serve many of these vulnerable populations on a daily basis, the Planning Committee and public emphasized the opportunity to provide support to these populations by strengthening the coordination and continuity of CBO activity during emergency events.



### Improved coordination and communications during emergencies

**CBOs played a significant role in the Sandy recovery effort, despite often limited resources.** CBO services provided a necessary complement to much of the critical emergency response services provided by governmental agencies. Many of these organizations have a long and deep history in Lower Manhattan, particularly in Chinatown and the Lower East Side. With extensive, neighborhood-based service networks, many of these organizations provide vital outreach, educational programming, and health and social services to the community. Several organizations also provided critical food, water and medical aid.

**Community members emphasized a need**



CBOs need greater financial, technical, and labor resources to continue to offer the critical services they provided after Superstorm Sandy. Source: Courtesy of GOLES.

**for better upfront planning and coordination among these CBOs and local, State, and Federal emergency response entities.** Effective emergency response is dependent upon pre-planning among CBOs to establish and coordinate their operations, but also with governmental agencies to better define roles, protocols for information sharing, and ensure that critical systems are up and running during emergency events. The presence of a well-coordinated set

of CBOs provides the opportunity to identify and reach key populations, deliver essential supplies and services, and increase residents' overall emergency preparedness.

**Lower Manhattan residents also specified a need for improved communications options during and after emergency events.** Amid the power outage, which engulfed the majority of the Planning Area, residents described difficulties in

receiving information from emergency response agencies and organizations, and in tracking down relatives, friends, and pets. Community members identified a need for information hubs that have dedicated space for locating loved ones, and for such information to be easily accessible to those who may not have access to computers or cellphones. Community members also cited a need for greater access to comprehensive resiliency information, as well as improved outreach in advance by emergency response agencies and organizations on emergency preparedness, response, and recovery procedures. A range of existing facilities to serve as information and resources hubs – and CBOs ready to staff and operate those facilities – provide a significant opportunity to address these needs.



### Access to key support services during emergency events

**Lower Manhattan residents noted a need for CBOs to have access to sufficient funding, training and supplies to serve constituents both during and following emergency events.** In order to conduct vital door-to-door outreach to vulnerable populations, CBOs cited a need for greater funding to support staff and volunteer

recruitment and training, as well as improved communications systems. They described difficulties in coordinating relief operations with partner organizations, communicating with employees and volunteers, and accessing databases with information on constituents and vulnerable populations post-storm.

Many CBOs active in response to Sandy continue to provide resiliency programming to their constituents, but report that resources are stretched thin and, with additional support, they could be more effective in their response during the next emergency event. Continuity of service for a strengthened and better-coordinated set of CBOs could help to bring timely essential services to thousands more people during the next severe weather event.



### Physical support spaces and infrastructure to enhance community-based emergency response activities

**CBOs require improved facilities, backup power and communications systems to serve populations in need during emergency events.** After the storm, Lower Manhattan residents lacked

basic information about resources and services, such as where to find medical services, food, supplies, working ATMs, or cell phone charging stations. Without power, food, and hot water, community members sought a place where they could access these services and find temporary respite from flooded or powerless apartment buildings. CBOs coordinated these relief efforts despite often limited space, sometimes renting additional storage areas for supplies, and distributing food, water, and services from relief stations set up on sidewalks outside. These organizations not only helped distribute physical supplies, but also provided critical information to residents. On the Lower East Side, this included thousands of volunteers who deployed throughout the community.

Furthermore, flooding and power outages rendered many local CBOs unable to effectively serve their everyday populations. Local CBOs recognized the opportunity to continue being an effective resource for constituent populations during emergency events, by ensuring backup power, redundant communications systems and resilient computer data storage and access to CBOs so that they can remain operable during emergencies and bounce back more quickly.



Building owners need funding and technical assistance to enhance building resiliency. Source: Wikimedia Commons author Joel Raskin, licensed under Creative Commons.



## Access to information for capital and operational resiliency improvements

**Across residential, commercial and institutional sectors, private owners and stakeholders require clear, accessible information related to recovery and emergency preparedness.** Outreach and educational activities are required to increase awareness of key resiliency issues, and assistance is required to guide building owners, business owners and others through the

identification, selection and implementation of resiliency improvements.

**Within the residential sector, building owners, ownership entities, and tenant associations need information about how to access existing resources and plan for emergencies.** Facing a lack of information and support, small business retailers in Lower Manhattan need targeted education and technical assistance in order to improve both operational and physical resiliency. Since Sandy, many small business owners have attempted to apply for loan assistance but experienced difficulties in navigating the application process and providing necessary evidence of pre-storm business operations when much of that documentation was destroyed during Sandy. Additionally, small business retailers lack information about the types of measures they can undertake to mitigate future flood damage. It is particularly important that some of this information be delivered to small business retailers via door-to-door outreach, given that many operate sole proprietorships, maintain small staff sizes, work long hours on-site, and otherwise cannot easily leave their place of business to access services.



## Financial resources for residential building resiliency improvements

Housing stock along Lower Manhattan’s edge faces particular vulnerabilities to storm damage, and building owners need support to undertake upgrades in order to enhance the resiliency of residential buildings. A substantial proportion of the area’s housing is located in the extreme- and high-risk zones: according to NYC Department of City Planning PLUTO data, 27% of housing by built area (and 29% of housing by number of housing units, according to the 2005–2009 American Community Survey) is in areas of high flood risk.<sup>21</sup> This includes a large proportion of the public and subsidized housing in the community, putting its low-income, senior, and disabled residents at heightened risk of injury.

Throughout the entirety of the Planning Area, power outages plagued residents, especially those in high-rise buildings. Forty-four percent of the housing units in the Planning Area are located in high-rise buildings of 50 or more units.<sup>22</sup> Power outages resulted in the loss of stairwell lighting and elevator systems in these buildings, making

evacuation difficult and dangerous. In addition, water service to upper floors was interrupted, and many buildings suffered from sewer backflow. Lastly, given that many of the area's buildings are large elevator apartment buildings, mechanical systems can be costly to floodproof or elevate. Building owners and managers recognized that incentives and financing can help fill critical gaps to get key resiliency upgrades implemented and operational, keeping their buildings and tenants safer during the next severe weather event.



### Resources and guidance for small business resiliency improvements

Small businesses, especially ground-floor retailers, are vulnerable to storm damage. Lower Manhattan has a rich and varied assortment of small businesses that face the risk of significant impacts from severe weather-related events. Inundation during Sandy resulted in significant inventory losses for many local retailers, and power outages meant that business owners were unable to operate credit card machines and make transactions. With mold damage worsening significantly after the storm, retailers hurried to remediate the worst damage, but

many businesses nonetheless remained closed for weeks or months as they struggled to find funding to replace lost inventory and to clean flooded basements and commercial spaces. These impacts continued through the holiday season, preventing many small business owners from recouping major losses during the retail industry's busiest time of the year.

The needs of small business owners vary, depending on the type of business, whether the business owner is a tenant or owner of the space and location. The Planning Committee has prioritized addressing the needs of ground-floor small-business tenants, who are particularly vulnerable.

Increasing the resiliency of small businesses to operate during emergencies and bounce back sooner is not only an opportunity to keep the economy active but also to deliver key resources and services—food, medication, supplies—to Lower Manhattan residents during and following emergency events.



### Improvements to local stormwater management systems

Community members have described problems related to sewer backflow and stormwater flooding in locations throughout the Planning Area and indicated that improvements both in drainage infrastructure and stormwater capture were necessary. Sandy exacerbated the types of sewer backflow that occur even after regular rain events and are caused by high levels of stormwater entering and exceeding the capacity of the combined sewer system. Reducing the amount of water entering the sewer system through stormwater capture can ameliorate these issues during both extreme and normal rain events. Residents also cited a need for increased permeable surfaces throughout the Planning Area to absorb rainwater and mitigate flooding. For example, in Community Board 3 alone, 95% of the surface is impervious.<sup>23</sup> The public noted the opportunity for the NYRCR Program to study local stormwater issues and fund projects that serve as scalable models for stormwater mitigation.





There are high concentrations of impervious surfaces throughout the Planning Area, particularly in Community Board 3 (top). Redundant energy options are needed to avoid power disruptions (bottom). Source (bottom): Flickr user Timothy Krause, licensed under Creative Commons.



### Protection from coastal flooding

Community members highlighted the importance of improved coastal flood protection, particularly in highly flood-prone areas exposed to surge, such as the east side neighborhoods of Alphabet City and the South Street Seaport Historic District and the west side neighborhoods of the West Village and Tribeca. The community highlighted the need for protection strategies that are both comprehensive and strategic, and that protect the populations that are most vulnerable to impacts from these types of events. While comprehensive coastal flood mitigation requires significant capital and coordination among a variety of public and private entities, the public recognized the opportunity for the NYRCR Program to help fund design activities that serve to establish a vision for, and advocate on behalf of, potential flood protection improvements.



### Resilient, dependable transportation and utility systems

Residents highlighted the community's vital need to improve the resiliency of the telecommunications infrastructure and building infrastructure in Lower Manhattan. Community members' experiences during Sandy relayed the need for resilient power sources for wireless networks (WiFi and cell phone), as well as building infrastructure. Because many buildings lost heat during and after Sandy, residents also cited the importance of more resilient steam-heating systems in buildings that are vulnerable to flooding. Federal, state, and local government agencies, along with private utilities, are leading a number of ongoing initiatives to protect the infrastructure of Lower Manhattan; however, more localized networks would also support resilient communication in Lower Manhattan. There is also an additional need to provide redundant transportation options in the event of an emergency. For example, bus service should be extended if subway or ferry service is disrupted.

### How does identifying needs and opportunities help to define projects?

The projects in this plan were developed through the following Community-based process, starting with identifying assets and risks, as well as needs and opportunities:

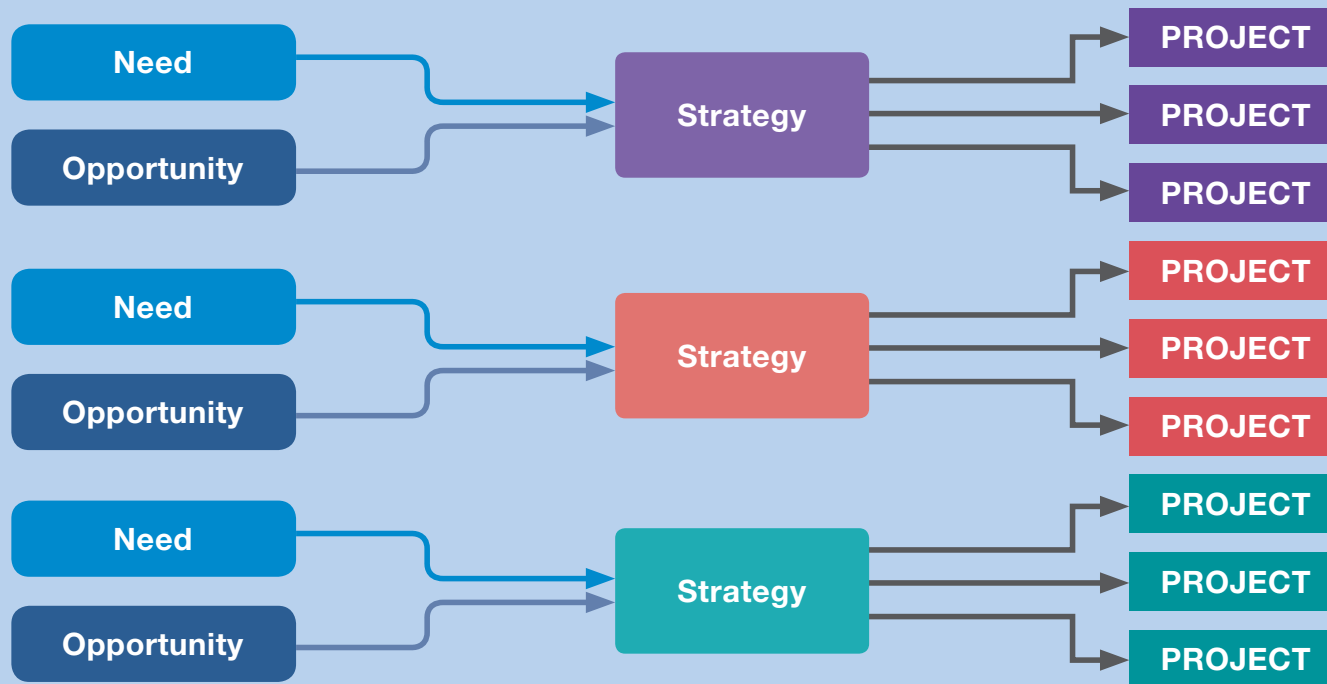
Resiliency needs and opportunities were brainstormed through extensive public engagement. **Needs** were discussed in the context of reducing short and long-term risk and increasing the resiliency of assets, systems, and people. **Opportunities** to build off of existing community strengths were also identified.

With a thorough, baseline understanding of the

Community’s resiliency needs and opportunities, the Committee identified overarching **strategies** to address the most critical needs in the community, and to take advantage of existing opportunities. Public input guided the refinement of these strategies.

In order to implement strategies, the Committee identified specific **projects**. These projects

directly address the needs and opportunities identified at the beginning of the process.





### **III. Reconstruction and resiliency strategies**

CBOs set up supply distribution networks in the wake of Superstorm Sandy. Source: Courtesy of GOLES.

# Reconstruction and resiliency strategies

**Lower Manhattan’s assets, needs, and opportunities inform a series of strategies for increasing both the social and physical resiliency of the community.** These strategies, developed by the Planning Committee and prioritized through community input, address the critical needs of Lower Manhattan communities to recover from the impacts of Superstorm Sandy (Sandy) and be better prepared for the next severe-weather event. The strategies provide a framework for the key Proposed Projects to be funded under the NY Rising Community Reconstruction (NYRCR) Plan, as well as the Featured Projects and Additional Resiliency Recommendations for which the plan advocates.

This section provides an overview of the overarching high-level strategies identified by the community as critical to its future. For each strategy, the report indicates the applicable Recovery Support Functions (see box on page II-2). The following chapter then describes the specific projects recommended by the Planning Committee in order to carry out these strategies.



## Improve emergency preparedness through enhanced coordination and planning

**Coordinated response during and after emergencies is a top priority in Lower Manhattan and relies on a robust organizational network.** In the wake of Superstorm Sandy, the community cited the critical need to bolster its emergency preparedness network, including improved coordination among emergency service providers and community-based organizations (CBOs), and increased access to information and communication options. These needs should be addressed twofold: (a) by supporting the capacity of CBOs to coordinate across communities, through the designation of a series of community-based emergency preparedness coordinators to aid in emergency preparedness education and emergency response, and (b) through the creation of comprehensive local community emergency preparedness plans to formalize support networks, information and service protocols, as well as allocate resources effectively within emergency response networks.

### Proposed and Featured Projects

**Proposed Projects** are projects that the Planning Committee has proposed for funding through their Community’s allocation of CDBG-DR dollars.

**Featured Projects** are innovative projects that may require additional funding sources for implementation, and for which the Committee has recommended funding an initial phase of implementation.

In addition, the Lower Manhattan Planning Committee recommends the continued support and investment in initiatives that increase citywide emergency preparedness capacity, including through the development of a vulnerable-populations database. Please see Section V-1, Additional Resiliency Recommendations, for more information.

**Table III-1: Improve emergency preparedness, coordination, and capacity (Proposed and featured projects)**

Project name	Short project description	Estimated cost	Proposed or Featured Project	Regional project(Y/N)
Community emergency preparedness program	This project would create: (a) one or more local community emergency preparedness coordinators and (b) local emergency preparedness programs and plans, throughout the Planning Area.	\$1.5 million to \$2 million	Proposed Project	N



### Ensure community-based organization (CBO) capacity to deliver key services to local populations during emergency events

**CBOs played a central role in Lower Manhattan in the aftermath of Sandy, but require additional human and capital resources to ensure their ability to respond effectively to future emergencies.** CBOs are vital assets to Lower Manhattan neighborhoods due to their deep knowledge and history of providing daily services to the communities in which they work. They benefit from having on-the-ground experience, locally-based volunteer networks for conducting door-to-door outreach, and familiarity with the location and needs of vulnerable populations.

**In many cases, responding CBOs distributed essential supplies to vulnerable populations in the Planning Area.** Many, however, did so without adequate facilities or clear coordination with other responders, and their communities lacked key basic resources such as power, heat, and food. These needs suggest a strategy of funding a network of brick-and-mortar establishments well-distributed throughout the Planning Area where community members may go to access essential emergency services. These “resource/recovery centers” would be hardened locations offering emergency support services

that were sorely lacking during Sandy: charging stations for cellphones and laptop computers, running water and showers, hot food, heating and cooling, and non-urgent medical care. Resource/recovery centers would also support community resiliency by offering educational and outreach programs to educate community members and, in particular, vulnerable populations, about using the resource/recovery center network in the event of an emergency. In addition, resource/recovery centers would coordinate with City agencies to augment their efforts both in preparation for, and during, a crisis. These activities would be

led by staff coordinators, hired and trained to conduct program development, outreach, and communication across the network.

**In addition, CBOs in Lower Manhattan vary in size, breadth of programs, and neighborhoods served, and thus their own respective resiliency needs may also differ.**

Based on this analysis of needs, the Committee has proposed to provide funding to CBOs and coalitions of CBOs to expand their capacity to respond to and recover from emergency events, resuming their normal operations quickly and with

limited negative impact on the communities they serve. Conversations with CBO staff, Planning Committee members, and the public suggest a strategy of funding to support the following:

- Leveraging and building capacity of existing CBO coalitions that are engaged in emergency preparedness
- Hiring and training of staff to conduct outreach, administer programming, coordinate with agencies, and develop and distribute materials
- Business continuity planning
- Resilient communications systems
- Backup power for offices and facilities

**Table III-2: Ensure CBO capacity to deliver key services to local populations during emergency events (Proposed and featured projects)**

Project name	Short project description	Estimated cost	Proposed or Featured Project	Regional project (Y/N)
Community resource/recovery center and CBO grant program	Community resource/recovery center and CBO grant program (Proposed). This project would fund: a) a network of hardened community resource/recovery centers, to be based out of existing community facilities and organizations; and b) grants to provide technical and financial assistance programs to CBOs to implement the functions of the community emergency preparedness plans.	\$10 million to \$12 million	Proposed Project	N



## Strengthen the resiliency of existing residential buildings

**Residential buildings, especially those situated in extreme and high-risk flood zones, are acutely vulnerable to damage and must be strengthened against flooding.** There exists a need to make residential building owners, managers and tenants aware of key resiliency resources, such as existing technical and financial assistance programs. This need can be addressed through the development of an information and assistance center which offers guidance to building owners, managers, and tenants' associations around applying for these programs. Such a center could additionally

offer design and technical services, such as audits of residential buildings, to address the lack of knowledge around appropriate resiliency measures and lay out a program of potential measures tailored to the particular building.

Since such measures are often capital-intensive, public input has indicated it is also important to offer financial assistance in the form of grants or incentives. The Planning Committee also has prioritized serving those buildings that house the most vulnerable; therefore, eligibility criteria for building owners who participate in these

programs would prioritize owners of subsidized housing for low-income populations, seniors, and/or the disabled.

**In addition, the Lower Manhattan Planning Committee recommends the continued investment in citywide initiatives that increase the resiliency of both residential buildings and residents.** Please see Table V-I, Additional resiliency recommendations, for more information.



**Table III-3: Strengthen the resiliency of existing residential buildings (Proposed and featured projects)**

Project name	Short project description	Estimated cost	Proposed or Featured Project	Regional project (Y/N)
<p>Lower Manhattan residential resiliency and education program</p>	<p>This project would fund: (a) the creation of a resiliency information assistance center for residential building owners, tenants’ associations, and managers, as well as (b) technical assistance and individual counseling and (c) financial assistance for improving the resiliency of residential buildings.</p>	<p>\$3.5 million to \$7 million</p>	<p>Proposed Project</p>	<p>N</p>



## Empower small businesses to become more resilient

**Small businesses face a particular set of operational and building related risks and often lack the technical and financial assistance necessary for mitigating these risks.** The Planning Committee has prioritized the needs of small business tenants, especially ground-floor retail tenants, who are most vulnerable to flood risk during storms. Outreach to retailers identified the need for advice on ways to protect inventory, proactively engage in business continuity planning, and migrate records to cloud-based data systems, which may help to mitigate a business's risk from flooding. Owners of commercial buildings also need

to better understand the measures they may undertake to improve tenant spaces, such as elevating mechanical systems, installing backup power, and flood-proofing basements. In order to improve access to information around resiliency measures, the Planning Committee has identified a proposed project to fund the creation of an information and assistance center, which would provide needed technical assistance. Additionally, the center could provide design and technical services, such as audits of commercial spaces, to assist business tenants in understanding the menu of measures they can undertake to enhance resiliency.

**In addition, the Lower Manhattan Planning Committee recommends the continued investment in citywide initiatives that increase the resiliency of small businesses, including expanding incentive programs, and by extending education and technical assistance to at-risk businesses.** Please see Table V-I, Additional resiliency recommendations, for more information.

**Table III-4: Empower small businesses to become more resilient (Proposed and featured projects)**

Project name	Short project description	Estimated cost	Proposed or Featured Project	Regional project (Y/N)
Lower Manhattan small business resiliency and education program	This project would fund: (a) the creation of an information and assistance center that would connect ground-floor and below-grade small business retailers with existing programs and resources, as well as offer technical assistance for improving the resiliency of operations and retail spaces, and (b) financial assistance to help small businesses pay for technical audits and recommended resiliency upgrades.	\$2.25 million to \$3.75 million	Proposed Project	N



## Improve stormwater capture and retention

During storm events, severe local flooding can occur due to the limited capacity of the combined sewer system within the Planning Area, leading to combined sewer overflows into New York Harbor. Rather than addressing this issue through cost-intensive infrastructure measures over the long-term, the Planning Committee has prioritized the potential implementation of short-term stormwater management strategies that will increase stormwater capture and reduce the volume of water entering the combined sewer system, which can reduce combined sewer overflows and the resulting impacts on water quality and the

environment. Stormwater capture measures may include efforts to increase the concentration of permeable surfaces in the Planning Area through increasing natural groundcover, permeable paving, and bioswales, and measures to increase the resiliency of community gardens. Bioswales are vegetated areas adjacent to the street right-of-way that allow water from the street to infiltrate into the soil, thereby reducing the volume of water entering the storm sewer system.

In addition, the Lower Manhattan Planning Committee recommends the adoption of green

infrastructure in the Planning Area. Green infrastructure generally refers to a variety of designs and approaches, such as bioswales, green and blue roofs,<sup>24</sup> permeable gutters, and rain gardens, which increase the volume of water that infiltrates into the ground, rather than entering the storm sewer system. Please see Table V-I, Additional resiliency recommendations, for more information.

**Table III-5: Improve stormwater capture and retention (Proposed and featured projects)**

Project name	Short project description	Estimated cost	Proposed or Featured Project	Regional project (Y/N)
Stormwater capture and retention study and pilot implementation	This project would fund: (a) a study to examine feasibility, costs and benefits, and potential sites for a high-impact implementation program of various stormwater capture and retention approaches in the Planning Area, followed by (b) the implementation of recommended scalable pilot projects.	\$2 million	Proposed Project	N
Wetland creation at East River Park	This project would fund the construction of a one-acre artificial wetland on a currently unoccupied portion of land in East River Park near Corlears Hook.	\$1 million	Proposed Project	N



## Protect edge neighborhoods from coastal flooding

**The Lower Manhattan coastline remains vulnerable to widespread flooding during storm events.** The majority of the East River bulkhead line, as well as areas just north of Battery Park City on the west side, remain at risk of flooding. During Superstorm Sandy, many of the upland neighborhoods also experienced flooding, impacting apartment buildings, commercial office buildings, retail shops, community gathering spaces such as community centers, gardens, and local parks. Housing for vulnerable populations was also significantly impacted, including, but not limited to, the West Village Houses, Independence Plaza, Jacob Riis Houses, and Knickerbocker Village. Strategies to provide flood protection include permanent and deployable walls, earthen and armored berms, and other measures to attenuate wave action and/or block the entry of floodwaters. Priority is placed on identifying particularly low-lying areas where floodwaters entered during Sandy, strategic interventions that can protect large areas with relatively limited construction, and sites where there is potential to protect the greatest area within limited budgetary constraints.

**In addition, the Lower Manhattan Planning Committee recommends that coastal protection measures relate to Lower Manhattan communities' respective needs and character.** Please see Table V-I, Additional resiliency recommendations, for more information.

### Advocate for the long-term resiliency and dependability of transportation and utility infrastructure.

**The resiliency of the Planning Area is inherently tied to the reliability of transportation and utility services during future emergency events.** During Sandy, the residents and businesses that experienced flooding were also subject to the added complication and difficulty arising from resultant power outages and compromised telecommunications networks. Furthermore, areas that escaped harm from flooding nonetheless suffered from risk due to inoperable fire-safety systems, elevators, heating, plumbing, and communications systems

that resulted from widespread power outages. The Lower Manhattan Planning Committee identified the need to better plan for resiliency and redundancy of transportation and utility services, but recognized that the costs of many of these investments are far in excess of funds available through the NYRCR Program planning process. In addition, there are already a series of governmental agencies and utilities addressing resiliency matters.

**The Lower Manhattan Planning Committee recommends that governmental entities continue to advocate for the short-, medium-, and long-term resiliency and dependability of transportation and utility infrastructure for the benefit of the entire City, including Lower Manhattan.** Please see Table V-I, Additional resiliency recommendations, on page V-3 for more information.

**Table III-6: Protect edge neighborhoods from coastal flooding (Proposed and featured projects)**

Project name	Short project description	Estimated cost	Proposed or Featured Project	Regional project (Y/N)
<p>Berming and deployable walls at Battery Park: Phase 1 construction</p>	<p>This project would support the first phase of implementation of a system of berms and adjoining deployable flood barriers at Battery Park, for protection against a 500-year flood event, as well as conceptual design for future phase(s) of work to the east and west of the Phase 1 project site.</p>	<p>\$2 million</p>	<p>Proposed Project</p>	<p>N</p>
<p>Berming and deployable walls at Battery Park: Phase 2 construction and future conceptual design</p>	<p>This project would entail the next phase of implementation as well as conceptual design for future phase(s) of work to the east/west of the berm. If part of a larger comprehensive group of projects to the west (at Battery Place) and east (Coast Guard land), this project would protect against a 500-year flood event.</p>	<p>\$1.8 million to \$3.4 million</p>	<p>Featured Project</p>	<p>N</p>
<p>Feasibility study and design of targeted flood protection strategy for lower West Street</p>	<p>This project would fund a feasibility study and conceptual design for a targeted strategy for protection of the lower West Street area against a 100-year flood event, proposing strategies at sites to the north and south of Battery Park City.</p>	<p>\$750,000</p>	<p>Proposed Project</p>	<p>N</p>

**Table III-7: Protect edge neighborhoods from coastal flooding (Proposed and featured projects)**

Project Name	Short project description	Estimated cost	Proposed or Featured Project	Regional project (Y/N)
Implementation of targeted flood protection strategy for lower West Street	This project would fund the implementation of a targeted strategy for protection of the lower West Street area against a 100-year flood event, proposing strategies at sites to the north and south of Battery Park City.	\$9 million	Proposed Project	N
Coastal protection study for west side and east side	This project would fund a feasibility study and conceptual design for a series of multipurpose flood barriers for protection of the east and west sides of Lower Manhattan against a 100-year flood event, using measures such as a raised greenway, berming, and deployable walls.	\$2 million	Proposed Project	N





## **IV. Implementation–Project profiles**

There are community gardens throughout Lower Manhattan.

## Implementation—Project profiles

The Proposed and Featured Projects in the following pages are those projects that the Committee, with input from the community, has prioritized for funding with its CDBG-DR allocation of up to \$25 million. This section describes each project and the potential costs and benefits that would result from each project if funded. In addition to preliminary cost estimates,<sup>25</sup> the project profiles discuss the projects' potential benefits:

- Health and social benefits
- Economic benefits, including potential job creation<sup>26</sup>
- Environmental benefits
- Ability to reduce future risk

Finally, the descriptions describe relevant implementation factors, including the likely timeline and the governmental jurisdiction for implementation of each project.

### Community emergency preparedness program IV-3



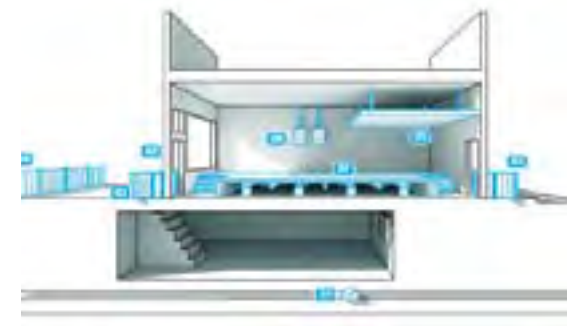
### Community resource/recovery centers and CBO grant program IV-9



### Residential resiliency and education program IV-19



### Small business resiliency and education program IV-27



### Stormwater capture and retention study

IV-33



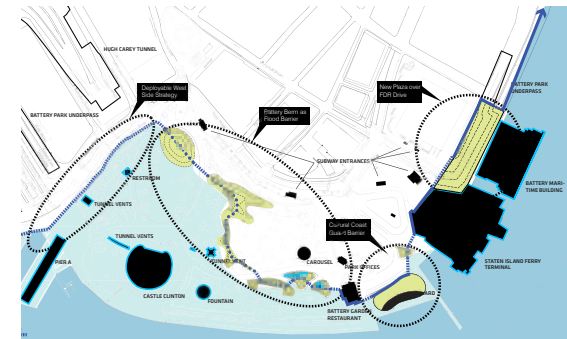
### Wetland creation at East River Park

IV-39



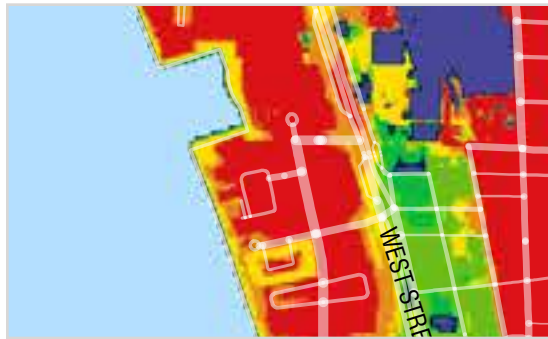
### Berming and deployable walls at Battery Park

IV-43



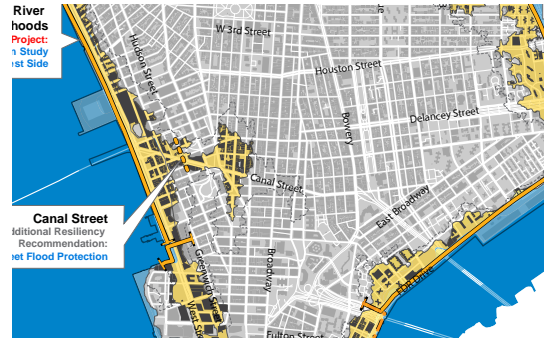
### Targeted flood protection strategy for lower West Street

IV-49



### Coastal protection study for east and west side

IV-59



## Project Overview

### Recovery Support Functions



Health & Social Services



Community Planning & Capacity Building

### Cost

**\$1.5–2M**

### Health & Social Benefits

HIGH

### Economic Benefits

MEDIUM

### Risk Reduction

MEDIUM

### Timeline (years)



STRATEGY: IMPROVE EMERGENCY PREPAREDNESS THROUGH ENHANCED COORDINATION AND PLANNING

# Community emergency preparedness program

## Proposed project

To improve local coordination in emergency preparedness, response, and recovery efforts, this project would establish a Lower Manhattan-wide community coordinator and staff to serve as a central coordinating entity among community-based organizations (CBOs) and governmental agencies in emergency preparedness planning and implementation.

## Local community emergency preparedness coordinators

The emergency preparedness coordinator would serve as a community-wide advocate, watchdog and coordinator for both publicly- and privately-led resiliency efforts in Lower Manhattan. The manager would track the allocations and expenditures for both publicly- and privately-led resiliency efforts, and as community advocate, report on those efforts to the community at large.

The manager and coordinators would be embedded within local organizations selected through a competitive process to administer the program. Organizations may either designate existing staff or recruit new staff to serve as the coordinators.

Acting as a resource for both government agencies and local residents, administrating organizations would act as



CBOs like Two Bridges Neighborhood Council hosted meetings with residents after Sandy to deliver important updates about neighborhood response and recovery efforts. Source: Courtesy of Two Bridges Neighborhood Council, Inc.

a central repository of resiliency information and resources, both by communicating with governmental emergency preparedness agencies including the New York Office of Emergency Management (NYC OEM), the New York State Division of Homeland Security and Emergency Services (NYS DHSES) and Federal Emergency Management Agency (FEMA), and by helping to disseminate that information to the community, using the hub-and-satellite network of resource/recovery centers throughout the area. Armed with this resiliency information, administrating organizations would develop educational and volunteer training programs.

Finally, these organizations would also seek private and public funding to increase the overall pool of funds supporting resiliency in Lower Manhattan, as well as bolster and sustain the coordinator positions beyond the initial two-year funding period.

### Community emergency preparedness plans

Coordinators would spearhead the creation and execution of community emergency preparedness plans, community-driven plans to buttress the efforts of NYC OEM and other public agencies during emergencies, using the following planning elements:

- Emergency protocols
- Chain of communication
- Established distribution networks, in coordination with the resource/recovery

- Vulnerable populations preparedness programs (e.g. voluntary registries, access to medications during emergency events)
- Best practices to fill preparedness gaps (e.g. creation of a “buddy system” for vulnerable community members)
- Potential expansion of NYC OEM’s Community Emergency Response Team (CERT) programs

### Cost estimate

**\$1.5–2 MILLION**

Project Component	Cost Estimate
Staffing	\$800,000 to \$1,300,000
Programming and Outreach	\$400,000
Technical assistance and planning services	\$300,000
<b>TOTAL</b>	<b>\$1,500,000 to \$2,000,000</b>

This project would allocate \$1.5 to \$2 million for this project over a two-year period. Of this amount, staffing for four positions (one program manager and three local coordinators) is expected to cost approximately \$800,000 to \$1,300,000 for the two years. Of the remaining amount,

\$400,000 would be allocated to programming, outreach, and program administration, and approximately \$300,000 would be allocated to outside technical assistance and planning services to support the program.

The conceptual-level cost estimate was developed based on assumptions for current staff salaries and benefits and programmatic costs. Cost estimates would continue to be refined as more information is developed about the project. Additional funds could be allocated to support any of the staffing, outreach and technical assistance activities described herein.

## Benefits

While this project in and of itself would not reduce flood risk, it would bolster the resiliency of community members, especially vulnerable populations.

### Health and social benefits

HIGH

By preparing community members, especially those most at risk among vulnerable populations, a community emergency preparedness plan would help Lower Manhattan community members find access to resources and information and better withstand extreme conditions during an emergency. Multilingual neighborhood-based coordinators would help deliver information to populations with limited English-speaking capacity.

For the entire community, creating a series of programs related to resiliency and an established set of protocols for

coordination during an emergency would reduce risks to health and safety following a disaster.

Vulnerable populations, such as seniors and physically-impaired residents, stand to benefit the most, given that they are most likely to need information and assistance in times of emergency, yet less likely to have reliable and convenient access to critical supplies and services.

### Economic benefits

MEDIUM

The community emergency preparedness program is likely to support a full-time program manager, as well as three local recovery coordinators, each embedded in a community organization or local Community Board office, over the course of two years. Additionally, one of the goals of the recovery coordinator and staff is to leverage other public and private funding sources to increase the overall pool of funds supporting resiliency efforts in Lower Manhattan, as well as extend the tenure of these positions beyond the two-year funding window.

## Cost-benefit analysis

There is substantial need for enhanced coordination among the wide number of CBOs, local neighborhood associations, government agencies, utilities, public and private planning agencies, and regulatory bodies that provide emergency services or information across the Planning Area. The \$1.5 to \$2 million cost of this project is modest when considering the potential to benefit the approximately 314,000 people who live in the Planning

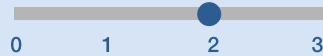
Area, and particularly, the nearly 39,000 people who are over 65 years of age.

## Risk reduction

MEDIUM

The community emergency preparedness program would reduce risk to Lower Manhattan residents by providing a coordinated set of widely-distributed educational and preparedness materials, and program staff who would ensure the execution of community-driven emergency preparedness plans in coordination with, and support of, relevant government agencies during emergencies.

## Timeframe for implementation



Once the project has been formally initiated, it would take approximately one to two years to implement. The length and format of the selection process are the key issues that could most dramatically affect the timeframe.

Project implementation would begin with a competitive bidding process, inviting local organizations meeting certain criteria—including those mentioned above—to apply to participate in this program. This process would take into account existing conditions, emergency planning efforts, organizational capacity, and other community characteristics. After selection, each organization would

need to identify an emergency preparedness coordinator within the organization, or as a new hire. It is estimated that this process—from initial analysis to the release of the solicitation—would take approximately three to six months. Implementation of the emergency preparedness program would be covered by Community Development Block Grant – Disaster Recovery (CDBG-DR) funding for two years. After this time, organizations would need to identify other sources of funding to maintain the plan and coordination networks, or absorb the costs into their existing budgets. However, the cost of maintenance is likely to be significantly less than the initial \$1.5 to \$2 million in startup costs allocated here.

## Regulatory requirements

It is anticipated that no regulatory review would be needed for the execution of this project. However, the New York City Office of Emergency Management (NYC OEM) and the New York State Division of Homeland Security and Emergency Services (NYS DHSES) must be consulted in implementing this project to ensure coordination with citywide and statewide emergency preparedness efforts.

## Jurisdiction

The project would be located in Lower Manhattan. While the development of community emergency preparedness plans would be a community-based initiative, NYC OEM could help direct the process.





## Project Overview

### Recovery Support Functions



Health & Social Services



Infrastructure



Community Planning & Capacity Building

### Cost

**\$10–12M**

### Health & Social Benefits

HIGH

### Economic Benefits

MEDIUM

### Risk Reduction

HIGH

### Timeline (years)



STRATEGY: ENSURE CBO CAPACITY TO DELIVER KEY SERVICES TO LOCAL POPULATIONS DURING EMERGENCY EVENTS

# Community resource/recovery centers and CBO grant program

## Proposed Project

This project would fund:

- (a) A network of hardened community resource/recovery centers, to be based out of existing community facilities and organizations; and
- (b) Grants to provide technical and financial assistance programs to community-based organizations (CBOs) to implement the functions of the community emergency preparedness plans.

## Community resource/recovery centers

This project would fund the creation of community resource/recovery centers, which would house the coordination of emergency services following a disaster and facilitate emergency preparedness coordination across community-based organizations (CBOs) in advance of an event. Funding would be used for the following:

- Installation of backup power
- On-site capital improvements
- Initial staffing costs

Community resource/recovery centers are similar to New York City Office of Emergency Management’s (NYC OEM) Disaster Assistance Service Centers (DASC), but would be smaller in scale and community-driven. Community resource/recovery centers are not evacuation centers or shelters, which NYC OEM already operates during



Community resource/recovery centers would offer non-urgent medical care and other essential services to community members. Source: Flickr user Billy Brown, licensed under Creative Commons.



Hub sites would ideally feature large, flexible spaces capable of providing a diverse array of services to large numbers of community members. Source: Flickr user San José Library, licensed under Creative Commons.

disasters to direct people to a safe, dry place to stay on a temporary basis.

The proposed resource/recovery center network would be a “hub” and “satellite” model. The hub would be a large community space where logistics, communications, and supplies can be managed and distributed. The hub would serve as the primary neighborhood contact for NYC OEM and would coordinate with smaller satellite locations throughout the community that would provide additional distribution of supplies and information.

The resource/recovery center network model provides built-in redundancies and cooperation across local CBOs. Under the guidance of the local Community Emergency Preparedness Plan, the resource/recovery center network would formalize collaboration among hub and satellite sites. This format also allows organizations with different expertise and resources to contribute important relief support. For example, a CBO that has strong relationships with a segment of the population within the community might serve as a satellite site, while a CBO with a large facility and staff might serve as the hub.

The hub and satellites would offer both physical and programmatic resources for communities after emergencies. The hub, as the central coordination, relief, and distribution site, would have back-up power and develop programming to support coordination across multiple satellite sites and with citywide response and recovery efforts. Physical resources and programming at satellites may vary by location, but generally, satellites would also have back-up power, in order to support the resource/recovery center network following acute events. The array of services to be provided at both hub and satellites would include:

- Access to food, water, heating and cooling, and basic supplies
- Access to power and charging stations for cellphones
- Information about both citywide emergency response activities and local efforts
- Non-urgent medical services (e.g., first aid, mental health services);

- Social services (e.g., legal or financial counseling, food stamp aid, childcare); and
- Translation services (based on community needs).

Resource/recovery centers would be housed within existing buildings and organizations that provide year-round community services. A competitive process could select eligible sites and participating organizations based on an analysis of existing efforts in the community, organizational capacity, facility capacity and proposed services. The building that houses the resource/recovery center hub should meet certain physical requirements, described below, developed from Lower Manhattan Planning Committee discussions and criteria for siting DASCs and Red Cross Hurricane Evacuation Shelters. One or more satellite sites could serve a supporting role to the hub and would not necessarily need to meet all of the criteria below, since they would not be providing the full set of services that a hub would provide.

- Capacity for reliable source of power and heat/cooling
- Capacity to be made Americans with Disabilities Act (ADA)-accessible
- Potable water system
- Restrooms with showers
- Large space on ground floor

There are also important geographic considerations when selecting a hub site. Resource/recovery center hubs would be located outside of the high and extreme flood risk zone, yet close enough to it in order to be able to serve the communities in areas with the highest risk. They should

be located in proximity to: (i) vulnerable populations; (ii) an evacuation route or a road with quick, reliable access to the route; and (iii) commercial centers and corridors. The hub and satellite sites should be easy to access from the street. A parking lot or outdoor space would also be preferable to act as a service or assemblage area.

Based on needs identified by the Lower Manhattan Planning Committee, the ideal resource/recovery center host organization for both hub and satellite sites would exhibit the following characteristics:

- Year-round service to local vulnerable populations impacted by Sandy
- Active in post-Sandy response effort
- A long history of community engagement and strong community ties
- Regular community programming and capacity to provide emergency programming
- Demonstrated ability to conduct outreach to vulnerable populations
- Capacity to provide social and/or health services
- A long-term occupancy agreement or ownership of the building
- A business continuity plan
- Financial stability
- Ability to fund the purchase of basic emergency supplies and equipment, such as radios or push-to-talk phones, or fuel for emergency generators

A program manager would be embedded within the hub



Grants would enable CBOs to continue to offer services to community members in emergency events, including hot meals. Sources: GOLES (top); Two Bridges Neighborhood Council, Inc.

host organization. To ensure rapid response and effective coordination during an emergency, the program manager would maintain regular contact and coordination with satellite sites, local CBOs, NYC OEM and other city agencies. The program manager could also oversee disaster preparedness-related programming, such as trainings and practice drills, “know your neighbor” events, and outreach to vulnerable populations. This capability would be supported initially with Community Development Block Grant Disaster Recovery (CDBG-DR) funds for a part-time program manager for two years to build capacity and coordinate activities across the network. After two years, the hub organization would be responsible for supporting the employee on an ongoing basis, although responsibilities after the two-year period could possibly change based on organizational need.

### **CBO capacity-building grants**

CBOs would play a key role in the resource/recovery center network, both as potential hub and satellite locations and as community-based partners for the network. To this end, this project would create a flexible grant program for CBOs to bolster existing or in-development resiliency-related programs and to participate as hubs or satellites within the community resource/recovery center network.

As CBOs’ needs, populations served, and missions vary throughout the Planning Area, the grant program would allocate funding to a wide array of eligible activities that enhance the resiliency of CBOs and their ability to serve the community during emergencies, ensuring their ability to communicate effectively with the resource/recovery center

network and public agencies, and maintain operations in order to continue serving the most vulnerable members of the community

**Grants would be allocated for both capital expenditures and operational expenses, including:**

- Resiliency staff and training, volunteer recruitment
- Multilingual outreach and education
- Vulnerable populations identification and tracking;
- Business continuity planning
- Professional consulting services to support disaster planning
- Building and systems hardening (e.g., fixed back-up generators)
- Redundant communication networks (e.g., WiFi networks, microgrid development) that provide back-up options to increase overall reliability
- Community-wide emergency communications networks within the Community Emergency Preparedness Plan
- Expansion of CBO geographic reach to meet needs of underserved areas
- Protocols for coordination with emergency response agencies and CBOs

**Cost estimate**  
**\$10–12 MILLION**

Project Component	Cost Estimate
Community resource/recovery centers	\$3,750,000 to \$7,625,000
CBO grants	\$2,375,000 to \$8,250,000
<b>TOTAL</b>	<b>\$10,000,000 to \$12,000,000</b>

The proposed project would allocate \$10 to \$12 million to the development of a resource/recovery center network and CBO grant program.

**Resource/recovery centers would require funding to cover two types of expenses: capital and operational.**

- Capital to provide redundant power supply, harden the physical structure, and make communications redundant. Costs include a fixed generator and fuel storage tank, building upgrades, storage areas for supplies.
- Operating support to build the host organization’s capacity to provide year-round emergency programming, conduct outreach, host a full-time program manager, and to deploy resources during an emergency.

While the costs for required capital improvements depend upon the specific selected sites, capital costs for a hub with 10,000 square feet of usable space could range from between approximately \$350,000 to \$1,000,000. Upgrades to a satellite site in a 2,000-square-foot facility could cost \$200,000. Key costs for facility improvements would likely include fixed back-up power and fixed communications infrastructure. The exact costs may vary widely, depending on how many facilities ultimately participate in the resource/recovery center network, the physical characteristics of those buildings and sites, and the programming offered at each site.

Costs for a program manager and emergency preparedness programming at the hub could also vary widely, depending on the availability of funds and the needs identified in the community. The annual cost of the program manager and emergency preparedness programming (plus overhead) could cost around \$275,000, for a total project costing \$625,000 to \$1,275,000 or more for both capital and operational costs over the course of two years. Funding to support programming and outreach at satellite sites could cost approximately \$40,000.

Estimates based on generic building types within the Planning Area suggest at least six hubs could receive funding for capital and operational costs, or two per community district. For six hubs, the total cost of the resource/recovery center network would range between \$3.8 million and \$7.6 million.

CBO grants could range in size, but each might cover installation of a fixed generator and fuel storage tank,

redundant communications infrastructure, salary and benefits for one additional full-time staff person dedicated to emergency preparedness programming and outreach, and business-continuity planning services. A CBO grant might allocate a little over \$400,000 to the organization for these activities. The balance of the project, with a total allocation of up to \$12 million, would provide approximately \$2.4 million to \$8.3 million in CBO grants, and could therefore provide 5 to 15 direct grants to CBOs, depending on size and scope.

CBOs could receive grants to support their role as a satellite site, or for stand-alone capacity-building not as part of the network. In addition, because a priority of the Lower Manhattan Planning Committee is flexibility in grant allocations, CBO grants could fund specific initiatives.

After two years, the organizations with new program managers or staff persons would be responsible for supporting the salary (with a potential decrease in time commitment after resource/recovery center ramp-up during the first two years), as well as programming and maintenance costs on an ongoing basis.

It should also be noted that the operation of resource/recovery centers would likely require identifying additional funding sources to purchase supplies, including emergency radios, batteries, and food.

The conceptual-level cost estimate was developed based on current unit pricing and typical soft cost assumptions. Cost estimates would continue to be refined as more information is developed about the project.



## Benefits

### Health and Social Benefits

#### HIGH

By bolstering a number of existing buildings to serve as resource/recovery centers, this project would improve the ability of community organizations to operate during an emergency. The network would coordinate and share information about the location and availability of social and health services and may also provide on-site medical, legal, counseling, and other services.

For the entire community, formalizing a network of locations to provide relief supplies and support services would reduce risks to health and safety following a disaster. Specifically, resource/recovery centers would reduce the risk of:

- Sickness, discomfort, or injury related to lack of access to non-urgent medical attention, food, water, heat, and other necessities
- Emotional or psychological distress
- Displacement of children, relatives, and friends who might need to relocate to receive services

Vulnerable populations such as seniors and physically-impaired residents stand to benefit the most, given that they are most likely to need assistance, yet less likely to have reliable and convenient access to critical supplies and services. Assuming the Lower Manhattan Planning Area boundary as the catchment area, the resource/recovery center network would specifically benefit the following vulnerable populations:

- Low-income residents: Approximately 24,070 households (16.8% of total in 2005-2009) live below the federal poverty line<sup>27</sup>
- Limited English Proficient (LEP) speakers: Approximately 57,244 residents (12.4% of the population in 2005-2009) speak English “not well” or “not at all”<sup>28</sup>
- Senior population: Approximately 38,943 residents (12.4% of the population in 2010) are over the age of 65<sup>29</sup>
- Additional vulnerable populations, including those who have limited mobility, limited communication skills, and/or a limited ability to control their environment.

When considering the Lower Manhattan Focus Area (high and extreme flood risk zone) as the catchment area, the resource/recovery center network would benefit the following vulnerable populations:

- Low-income residents: Approximately 9,261 households (21.8% of total) live below the federal poverty line<sup>30</sup>
- Limited-English proficient residents : Approximately 14,214 residents (15% of the population) speak English “not well” or “not at all”<sup>31</sup>
- Senior population: Approximately 12,759 residents (12.5% of the population) are over the age of 65<sup>32</sup>

The project would also increase the operational capacity of CBOs to provide services during emergency events. Emergency plans and back-up power would allow these organizations to continue to operate in the wake of

emergency events, thereby reducing business interruption. Further, the funding provided by this program would increase the capacity of CBOs to conduct emergency preparedness outreach and planning, and increase their ability to support their constituents overall.

### Economic Benefits

MEDIUM

The resource/recovery center network is likely to support a full-time employee embedded in a CBO to help plan and build organizational capacity at hubs and across satellites over the course of two years. Capital expenses associated with hardening community centers would also create a small number of temporary jobs for construction and installation of resiliency building improvements.

Additionally, by protecting vulnerable populations, an emergency resource/recovery center supports diverse and thriving neighborhoods, which helps improve quality of life.

The resource/recovery center network would likely have a net-neutral or potentially net-positive impact on local government spending. The network would require agencies to coordinate during emergency events. The network could incrementally reduce government costs of emergency response and recovery in the future.

### Cost-Benefit Analysis

This project would have broad public benefits and serve vulnerable populations—two key priorities of the Lower

Manhattan Planning Committee. A Lower Manhattan resource/recovery center network would reduce overall risk to the well-being of residents—especially vulnerable populations—and provide critical health and social services. In addition, the project would benefit the community year-round due to increased capacity and coordination among CBOs participating in the network. The reduced vulnerability of all Lower Manhattan residents justifies the relatively modest cost of implementing this project.

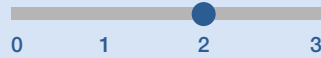
The benefits of the project would be sustainable beyond the two year CBDG-DR funding period so long as participating organizations dedicate modest resources to maintain emergency equipment, update emergency plans, and maintain communication with the other resource/recovery center network locations as well as the City. There are no apparent negative externalities associated with the proposed project.

### Risk Reduction

HIGH

A resource/recovery center network and CBO grant program would reduce the vulnerability of participating CBOs and help to ensure business continuity. More importantly, the network would reduce risk to Lower Manhattan residents by providing publicly-accessible back-up power, a centralized source for information, social and support services, and more secure emergency services due to the redundancy inherent in a network of resource/recovery centers.

## Timeframe for Implementation



Once the project has been formally initiated, it could take approximately one to two years to implement. The key issues that could most dramatically affect the timeframe are: (i) the length and format of the selection process, and (ii) physical challenges that may emerge with building resiliency improvements.

Project implementation would begin with a competitive bidding process, inviting local organizations meeting certain criteria—including those mentioned above—to apply to participate in this program. This process would take into account existing conditions, emergency planning efforts, organizational capacity, and other community characteristics. It is estimated that this process—from initial survey of existing conditions to the release of the solicitation—would take approximately four-to-six months. Subsequently, a program manager must be hired and implementation of capital improvements must begin. Depending on the scope of the work, this construction phase could take up to six months. Allocation of CBO grants may occur on a rolling basis, but would begin with the competitive bidding process described above.

## Regulatory Requirements

It is anticipated that no regulatory review would be needed for the execution of this project; however, NYC OEM and NYS Department of Homeland Security and Emergency Services (NYS DHSES) must be consulted in implementing

this project to ensure coordination with citywide emergency preparedness efforts. Should alterations to a building be proposed, permits and approvals could be required from NYC Department of Buildings (NYC DOB).

## Jurisdiction

The resource/recovery center network would be located in Lower Manhattan and the development of the network would fall under the jurisdiction of City agencies. Because the sites would provide relief, and not function as formal shelters or evacuation centers, they would not be subject to FEMA regulations.

## Project Overview

Recovery Support Functions



Housing

Cost

**\$3.5–7M**

Health & Social Benefits

HIGH

Economic Benefits

MEDIUM

Risk Reduction

HIGH

Timeline (years)



STRATEGY: STRENGTHEN THE RESILIENCY OF EXISTING RESIDENTIAL BUILDINGS

# Residential resiliency and education program

## Proposed Project

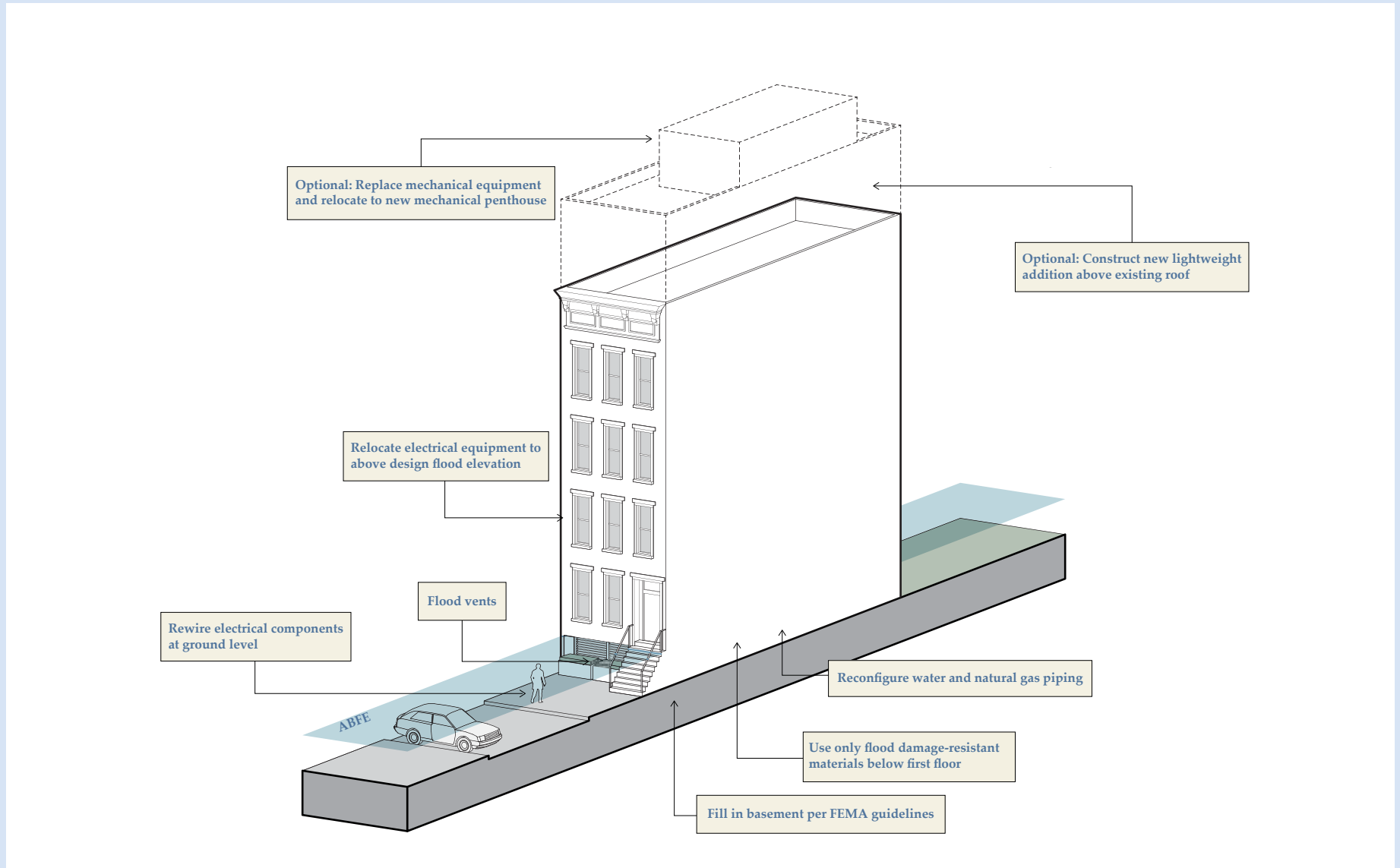
This project would fund: (a) the creation of a resiliency information assistance center for residential building owners, tenant associations, and building managers, as well as (b) technical assistance and individual counseling and (c) financial assistance for improving the resiliency of residential buildings.

The goal of this project would be to help property owners fully understand the physical and financial risks facing their buildings, to help them make more informed decisions about resiliency investments, and to provide financial support to make these investments.

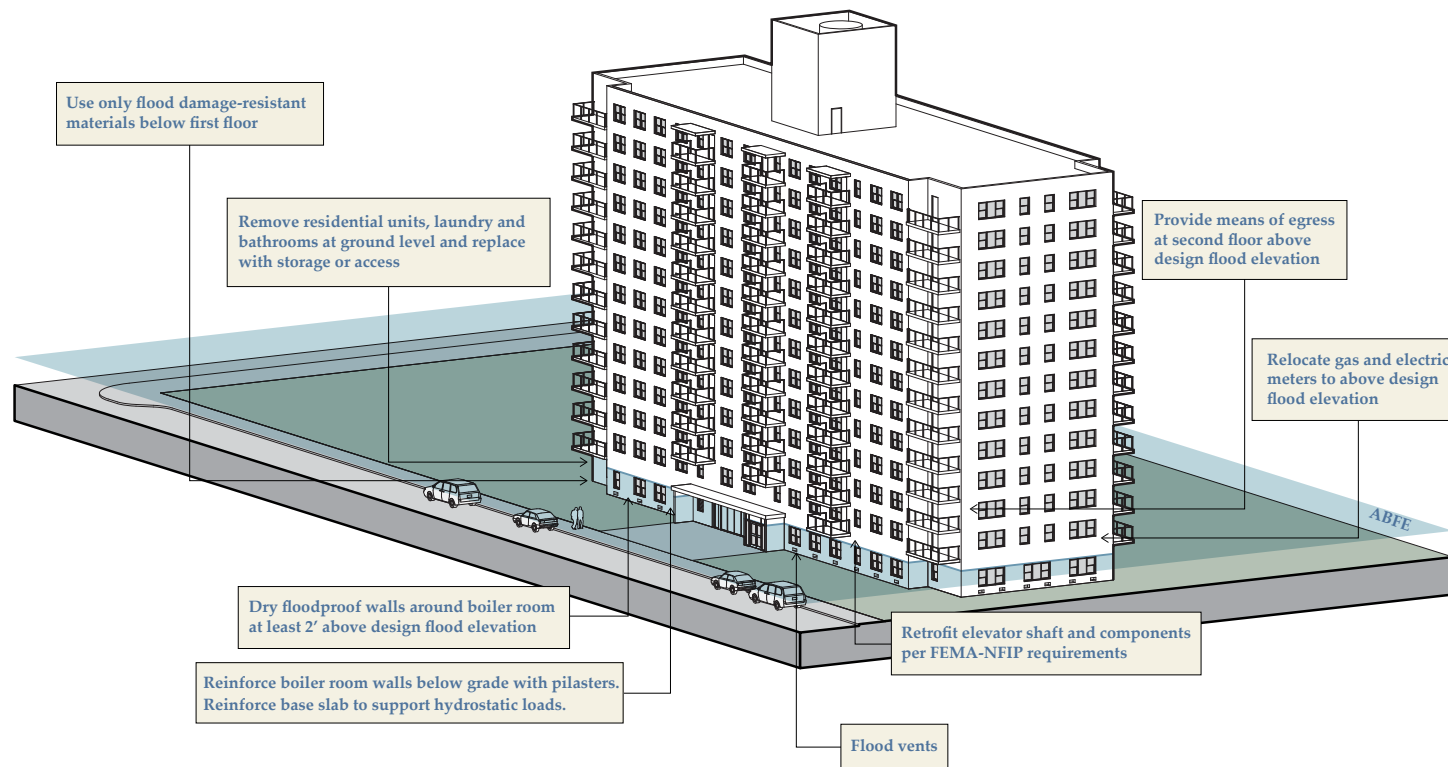
### Resiliency assistance information center

The education program would offer residential property owners information on resiliency best practices in a

publicly-accessible format. A resiliency information clearinghouse would be created in the form of a website, manual or physical information center to serve as a one-stop shop for all resiliency information. The clearinghouse would also provide resources for accessing the education and technical assistance programs. The resiliency information assistance center would be owned and maintained by a citywide agency or community-based organization (CBO) administrator, and would contain information developed by qualified counselors and auditors, including sample counseling documents



Measures to enhance resiliency for walk-up and large elevator buildings include floodproofing ground floors and elevating mechanicals to upper floors. Source: Arup and Architecture Research Office, as part of a report for FEMA and the NYC Housing Recovery Office.



Measures to enhance resiliency for walk-up and large elevator buildings include floodproofing ground floors and elevating mechanicals to upper floors. Source: Arup and Architecture Research Office, as part of a report for FEMA and the NYC Housing Recovery Office.

## IV-21 Implementation—Project profiles

(insurance claims, financial statements, etc.) and sample assessments and audits. This information would be made available to the general public.

General education would cover information on the following topics:

- Identifying common insurance pitfalls and loopholes
- Avoiding potential rebuilding, insurance or financial scams
- Obtaining and understanding flood insurance
- Financing for needed building repairs
- Remediating mold
- Understanding resiliency retrofits, including elevating and floodproofing building mechanicals, installing backflow prevention device, etc.
- Identifying products, providers and reasonable costs

Resiliency information could be delivered in the following forms:

- Print or online resiliency design guidelines, outlining general costs and benefits of retrofits
- Online courses
- Introductory, in-person courses
- Monthly speaker series covering different resiliency topics

Because of the broad nature of these educational materials, opportunities would be explored to partner

with other NY Rising Community Reconstruction (NYRCR) Program communities or organizations to create materials that could reach building owners throughout the City. If costs can be shared by multiple communities, the balance of Lower Manhattan’s budget for this program could be reallocated to counseling and technical and financial assistance.

The project would also include local multilingual outreach and education around building resiliency, including extensive door-to-door outreach in eligible housing developments throughout the Focus Area to assess needs, distribute educational materials on resiliency best practices, and advertise services offered by the center.

## Technical assistance and counseling services

The second component of this program, technical assistance, provides two types of services to residents: counseling and physical building audits. The technical assistance/individual counseling program would be offered as an individualized tool that is tailored to help high-need property owners. Qualified auditors and counselors would be responsible for carrying out this component.

Technical assistance includes the following services:

- Assessing storm damage to residential properties
- Identifying potential retrofits to mitigate against future storm damage, which for multifamily properties could include

- Installation of backup power source (e.g., on-site generator)
- Installation of check valve (e.g., sewer backflow preventer)
- Elevation and protection of mechanical systems
- Floodproofing of ground-floor spaces

Individual counseling includes the following services:

- Flood, homeowner and property insurance, financial management, and individually-tailored rebuilding and resiliency support for property owners
- Management of rebuilding, resiliency and recovery issues for building managers
- Legal support and representation when necessary

### Financial assistance

A financial assistance program would increase aid by offering grants and incentives to building owners and ownership entities to implement select building resiliency measures (or percentage thereof).

Priority would be given to multifamily buildings in high- and extreme-flood risk areas that house vulnerable populations. These include: limited-equity cooperative developments; subsidized rental housing for low-income populations; and/or residences for the elderly, disabled, and homeless. The Planning Committee also prioritized providing support to tenants’ associations, co-op boards, owners, and building managers.

### Cost estimate

**\$3.5–7M**

Project Component	Cost Estimate
Resiliency assistance information center	\$600,000
Audits and individual counseling	\$1,100,000
Financial assistance program	\$1,800,000 to \$5,300,000
<b>Total</b>	<b>\$3,500,000 to \$7,000,000</b>

This proposal would allocate \$3.5 million towards the three project elements. As previously mentioned, there are already citywide organizations administering similar programs and providing funding to local CBOs to provide housing education, counseling, and technical assistance in New York City neighborhoods. To leverage existing expertise and maximize the impact of available Community Development Block Grant (CDBG-DR) funding, this project should build off of existing programs. The funding could pass through a citywide organization involved in this work, but would ultimately be allocated to locally-based organizations that would administer education, technical assistance, and counseling within the Planning Area.

Of the \$3.5 million allocation, the general education program is expected to cost approximately \$600,000. Another \$1.1 million of the funds allocated for this project





This project may provide funding for measures such as the installation of fixed backup generators, to supply power in the event of an outage. Source: Flickr user Jemimus (Robert), licensed under Creative Commons.

would subsidize audits and individual counseling, with audit costs anticipated to range from \$5,000 to \$10,000 for a walk-up building and \$10,000 to \$15,000 for a large elevator building, or more, depending on the size of the building and scope of audit.

The remaining \$1.8 to \$5.3 million of the funds would support grants and financial incentives through the financial assistance program. Funding would go toward covering a portion of the costs (e.g., 10–20%) of a program of comprehensive or select measures. A sample

program of comprehensive building upgrades is expected to cost \$300,000–\$350,000 for a walk-up building (approximately six units on average for the purposes of this analysis) and \$950,000 to \$1,050,000 for a large elevator apartment building (approximately 150 units on average for the purposes of this analysis). A sample program of select measures (e.g., backup power) is expected to cost \$100,000 to \$150,000 for a walk-up building and \$600,000 to \$800,000 for a large elevator apartment building.

The conceptual-level cost estimate was developed based on current unit pricing and typical soft cost assumptions. Cost estimates would continue to be refined as more information is developed about the project.

## Benefits

### Health and social benefits

HIGH

Through reducing risk to their homes, this project would benefit low-income and/or senior and disabled populations who reside in housing developments in the extreme- and high-flood risk areas. Without improvements to these buildings, residents face risk of injury and inability to evacuate due to ground-floor flooding and power outages which impact hallway and stairway lighting as well as elevator banks. Efforts to address these concerns would reduce risk to vulnerable resident populations.

### Economic benefits

MEDIUM

The proposed program would give building owners the tools to protect economic assets, and avoid significant repair costs in the future. Additionally, repairs may potentially bring down insurance premiums, which could be passed along to tenants. The program could provide building owners and their tenants with financial security.

Enhanced resiliency of the residential building stock could additionally help to preserve or improve neighborhood economic conditions and prevent decline caused or exacerbated by worsening housing conditions. Helping the community achieve a more stable financial outlook can promote diverse and thriving neighborhoods and improve

residents' quality of life, which are both outcomes in line with the New York City Regional Economic Development Council's Strategic Plan, which seeks to increase the commercial growth and overall real estate value of Lower Manhattan.

## Cost-benefit analysis

The general education resources offered by this program could benefit any residential property owner in the Planning Area looking for resiliency information. Further, because this program could benefit property owners citywide, funding for this could be contributed from other sources or from other NYRCR Program communities. This portion of the project could reduce risk to properties in the Focus Area through enabling owners, ownership entities, and property managers to make resiliency improvements, and thereby would reduce risk to the residents living in these residential buildings.

The benefits of the project would be sustainable beyond the two-year CBDG-DR funding period so long as the implementing agency dedicates modest resources to extend staff positions and the technical and design services offered. There are no apparent negative externalities associated with the proposed project.

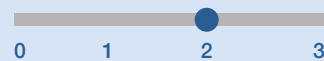
## Risk reduction

HIGH

This project would help property owners make more informed decisions about how to best protect their

properties from future flooding. If building owners choose to implement the suggested flood mitigation measures, the retrofits would help protect the community’s residential housing stock, from future damage and protect the residents of those buildings.

### Timeframe for implementation



Project implementation would begin with the identification of a non-profit organization to administer the project by awarding direct grants to local organizations to provide individual counseling and to contract with qualified auditors. Once the administering entity has been selected, it would take approximately six months to launch the program, which includes the selection process for identifying service providers and establishing program parameters.

The administering entity would begin a competitive bidding process that would invite neighborhood organizations such as Community Development Corporations (CDCs) and CBOs who meet certain criteria, to apply to participate as service providers in the program. The selection of service providers would take into account whether the organization has a history of providing similar services to the community, their proximity to the Focus Area, and overall organizational capacity. It is estimated that the selection process would take approximately four to six months or may be completed on a rolling basis by neighborhood.

In addition, the administering entity would begin a separate competitive bidding process for the services of engineering and technical-services firms who can provide resiliency audits to owners of eligible buildings. Alternatively, this bidding process could be undertaken concurrently with the selection of the administering entity to reduce the overall timeframe of the program ramp-up process.

Finally, the administering entity would, working with the selected provider organizations and firms, determine the parameters for eligibility of building owners in accessing free or subsidized audits and develop guidelines and materials for education and outreach.

### Regulatory requirements

It is anticipated that no regulatory review would be needed for the execution of this project. The New York City Department of Buildings (NYC DOB) may be involved on a discretionary basis to oversee or certify building resiliency audits. Certain elements of outreach and intake programming would require coordination with the New York City Department of Housing Preservation and Development (NYC HPD) and other public agencies that administer various residential resiliency financial assistance programs.

### Jurisdiction

The Proposed Project would be deployed in Lower Manhattan and would fall under the jurisdiction of New York City.

## Project Overview

Recovery Support Functions



Economic Development

Cost

**\$2.25-3.75M**

Economic Benefits

HIGH

Health & Social Benefits

MEDIUM

Risk Reduction

HIGH

Timeline (years)



STRATEGY: EMPOWER SMALL BUSINESSES TO BECOME MORE RESILIENT

# Small business resiliency and education program

## Proposed Project

This project would fund (a) the creation of an information and assistance center to connect ground-floor and below-grade small business retailers with existing programs and resources, as well as offer technical assistance for improving the resiliency of operations and retail spaces, and (b) financial assistance to help small businesses pay for technical audits and recommended resiliency upgrades.

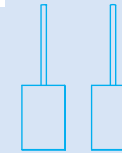
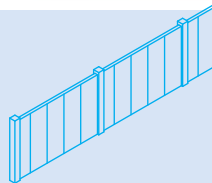
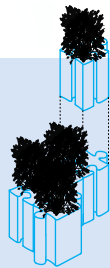
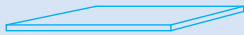
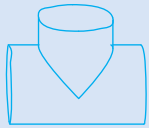
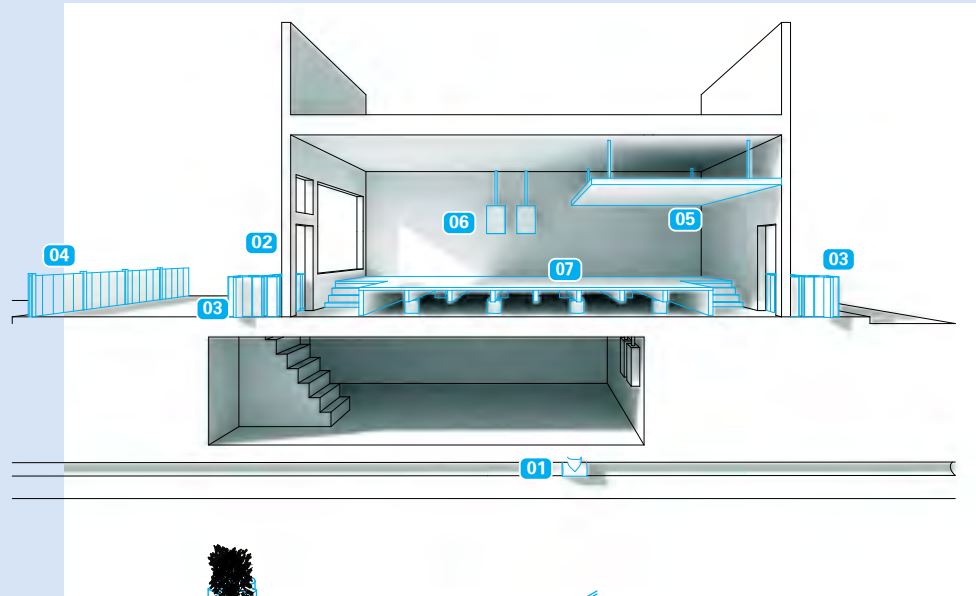
### Information and assistance center

The small business resiliency information and assistance center would provide an intake counseling service, “help desk” support, business resiliency and continuity planning technical assistance, multilingual outreach, and access to audits of businesses and buildings to identify and recommend resiliency improvements. The “help desk” would provide design and technical assistance to business owners, while the intake counseling services would help participants to navigate the application process for financial assistance programs, such as federal and city grant and loan programs. In order to attract small-business participants, the program would

also include extensive door-to-door outreach in multiple languages to eligible small businesses throughout the Focus Area to assess needs, distribute educational materials on resiliency best practices, and advertise services offered by the center.

### Technical audits and subsidized upgrades

The project would also offer free technical audits and subsidize recommended resiliency upgrades for eligible small-businesses in order to help to identify, recommend, and pay for the following types of measures:



<b>01 BACKWATER VALVE</b>	<b>02 BILCO ACRYLIC CAP</b>	<b>03 PUZZLE PLANTER</b>	<b>04 TEMPORARY BARRIER</b>	<b>05 SUSPENDED CEILING</b>	<b>06 RELOCATE UTILITIES</b>	<b>07 RAISED PLATFORM</b>
1 Unit ( _ diameter) = \$ __.00	1 unit ( _W x _D x _H) = \$ __.00	4 unit ( _W x _D x _H) = \$ __.00	1 unit ( _W x _D x _H) = \$ __.00	1 unit ( _W x _D x _H) = \$ __.00	# Of Units = \$ __.00	1 unit ( _W x _D x _H) = \$ __.00
Installation = \$ __.00	Installation = \$ __.00	Installation = \$ __.00	Material = Aluminum	Material = Wood	Installation = \$ __.00	Material = Wood
			Installation = \$ __.00	Installation = \$ __.00		Installation = \$ __.00
<b>TOTAL = \$ __.00</b>	<b>TOTAL = \$ __.00</b>	<b>TOTAL = \$ __.00</b>	<b>TOTAL = \$ __.00</b>	<b>TOTAL = \$ __.00</b>	<b>TOTAL = \$ __.00</b>	<b>TOTAL = \$ __.00</b>

Small business resiliency measures may include elevation of inventory and installation of a sewer backflow preventer. Source: Cooper, Robertson & Partners and HR&A Advisors.

- Business resiliency measures, including:
  - Business continuity planning and business disaster preparedness planning
  - Elevating or flood-protecting business equipment and inventory
  - Elevating or flood-protecting data systems
  - Data management solutions through the use of cloud-based storage
- Building resiliency measures, including:
  - Elevating mechanical systems
  - Installing backup power
  - Flood-proofing buildings
  - Structurally reinforcing wood-framed buildings
  - Backflow devices to prevent sewage backup
  - Additional improvements such as energy efficiency and health and safety measures

## Cost estimate

**\$2.25–3.75 MILLION**

Project Component	Cost Estimate
Information and assistance program	\$850,000
Technical audits and subsidized upgrades	\$1,400,000 to \$2,900,000
<b>TOTAL</b>	<b>\$2,250,000 to \$3,750,000</b>

This project would allocate \$2.25 to \$3.75 million to create an information and assistance center for small businesses, targeted at ground-floor small-business retailers. Of this amount, staffing, outreach, marketing, and administration of the information and assistance program are expected to cost approximately \$850,000. The remaining \$1.4 to \$2.9 million of the funds allocated for this project would subsidize audits, design services and recommended upgrades. Assuming that a sample audit of a commercial space may cost between \$2,000 and \$5,000, the funding allocation could support 280 to 700 audits, in addition to the amount that may be support resiliency upgrades.

Upgrades to commercial spaces for tenants are estimated to cost in the range of \$5,000-\$20,000 per commercial unit, including measures such as installing a backflow valve, relocating an electrical panel box, and applying water-resistant wall coating.

This conceptual-level cost estimate was developed based on current unit pricing and typical soft-cost assumptions. Cost estimates would continue to be refined as more information is developed about implementation of resiliency measures.

## Benefits

### Economic benefits

**HIGH**

This project would help prevent future business closures and job losses related to flooding, blackouts and other

severe-weather events, for the approximately 3.5 million square feet of retail space within the Focus Area.<sup>32</sup> Additionally, this project implies the creation of a modest number of temporary jobs to support the implementation of resiliency measures. Through reducing risk, the project would help to preserve the economic health of commercial corridors in flood-prone areas, aligning this project with the New York City Regional Economic Development Plan’s objectives for Lower Manhattan, which seeks to grown the commercial diversity and value of the area.

**Health and social benefits**



As discussed above, by promoting business continuity during and after an emergency, this project would ensure access to critical supplies that community residents rely on local retailers to provide. Improving the ability of small businesses to function during emergencies would result in increased local access to needed supplies like batteries and flashlights, drinking water, and food supplies, as well as providing continued access to key services such as ATMs.

**Cost-benefit analysis**

While not all small businesses in the Planning Area would receive technical audits under the program, the small business resiliency and information center can reach a very broad array of small businesses in the Planning Area. The information center has the potential to be replicated with additional funding throughout the Planning Area and elsewhere in New York City. The wide reach of the project

justifies the relatively modest cost of implementing this project.

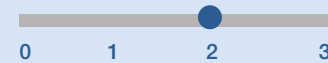
The benefits of the project would be sustainable beyond the two-year CBDG-DR funding period so long as the implementing agency dedicates modest resources to extend staff positions and the technical and design services offered. There are no apparent negative externalities associated with the proposed project.

**Risk reduction**



Small business retailers provide essential amenities, as well as employment opportunities to community members throughout the Planning Area and citywide. During and after emergency events, small business retailers further serve as a critical lifeline for supplies. Both in preparation for and in the aftermath of an emergency, it is important that residents be able to access ATMs, food, medicine and water, and other basic needs often provided by local small-business retailers. Promoting business continuity can help ensure continued access to these items during emergencies, thereby reducing risk to the local population.

**Timeframe for implementation**



Project implementation would begin with the identification of a public agency or creation of a non-profit organization

to administer the project on a citywide basis. To reduce overall administrative cost, the project may be established through a citywide entity—either a public agency or nonprofit organization—acting in multiple communities citywide with overall responsibility for the program. If a non-profit organization administers the program, it would be selected through a competitive bidding process.

Once identified, the program administrator would solicit proposals in order to award direct grants to local organizations to provide educational services and contract with engineering or technical-services firms to provide audits. The program administrator would begin a competitive bidding process that would invite local business assistance organizations, such as merchants' associations or business improvement districts, who meet certain criteria to apply to participate as service providers in the program. The selection of service providers would take into account whether the organization has a history of providing similar services to the community, their proximity to the Focus Area, and organizational capacity.

It is estimated that the selection process would take approximately four to six months to launch the program, which includes the selection processes for identifying service providers and establishing program parameters.

### **Regulatory requirements**

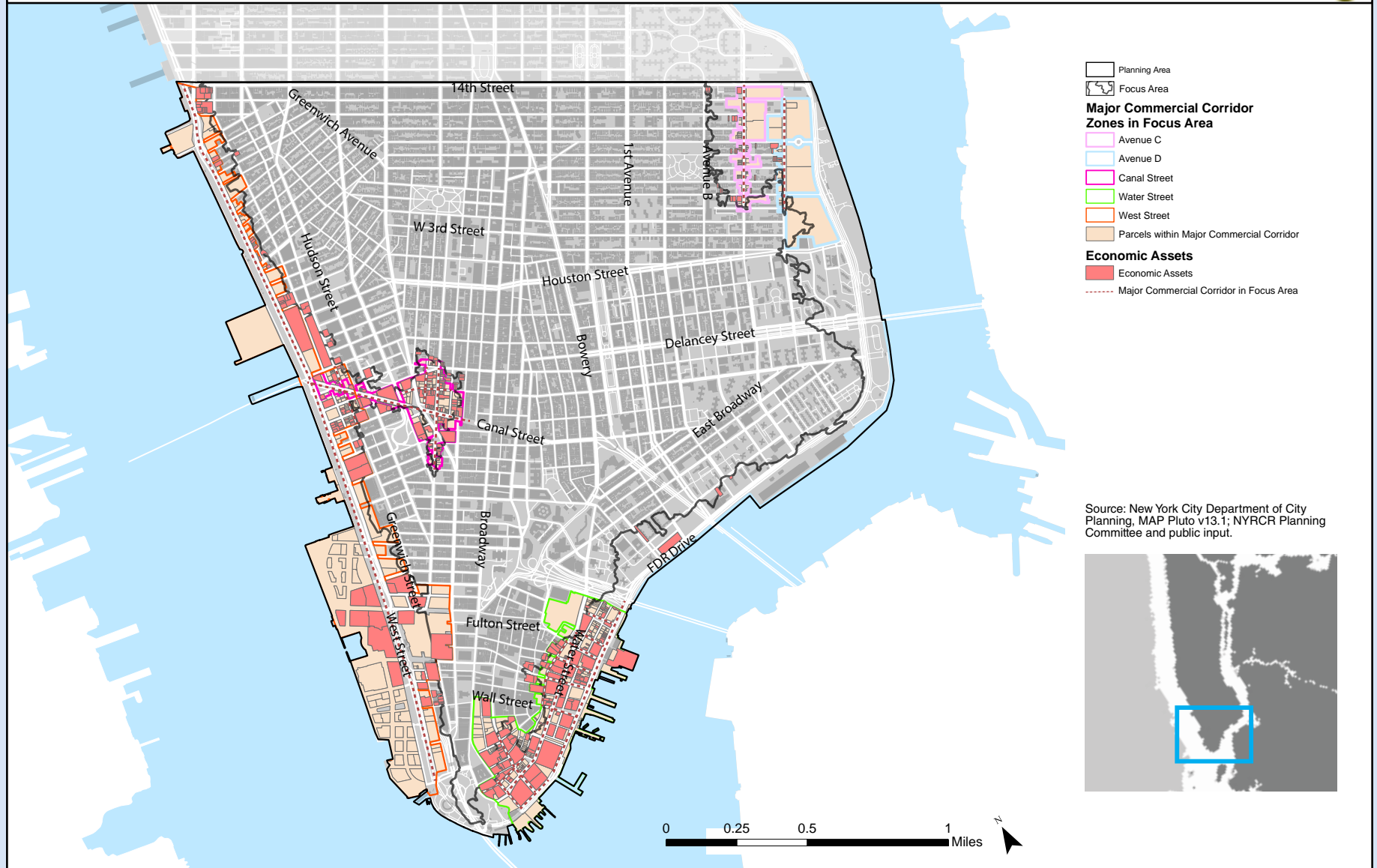
It is anticipated that no regulatory review would be needed for the execution of this project. The NYC Department of Buildings (NYC DOB) may be involved on a discretionary basis to oversee or certify building resiliency audits. Certain elements of outreach and intake programming would require coordination with New York City Economic Development Corporation (NYC EDC) and other public agencies that administer various financial assistance programs geared at small businesses.

### **Jurisdiction**

The program would be located in Lower Manhattan and under the jurisdiction of the City of New York.



**Figure IV-1: Economic assets and major commercial corridors**



## Project Overview

Recovery Support Functions



Natural & Cultural Resources



Infrastructure

Cost  
**\$2M**

Environmental Benefits

MEDIUM

Health & Social Benefits

MEDIUM

Economic Benefits

LOW

Risk Reduction

MEDIUM

Timeline (years)



STRATEGY: IMPROVE STORMWATER CAPTURE AND RETENTION

# Stormwater capture and retention study

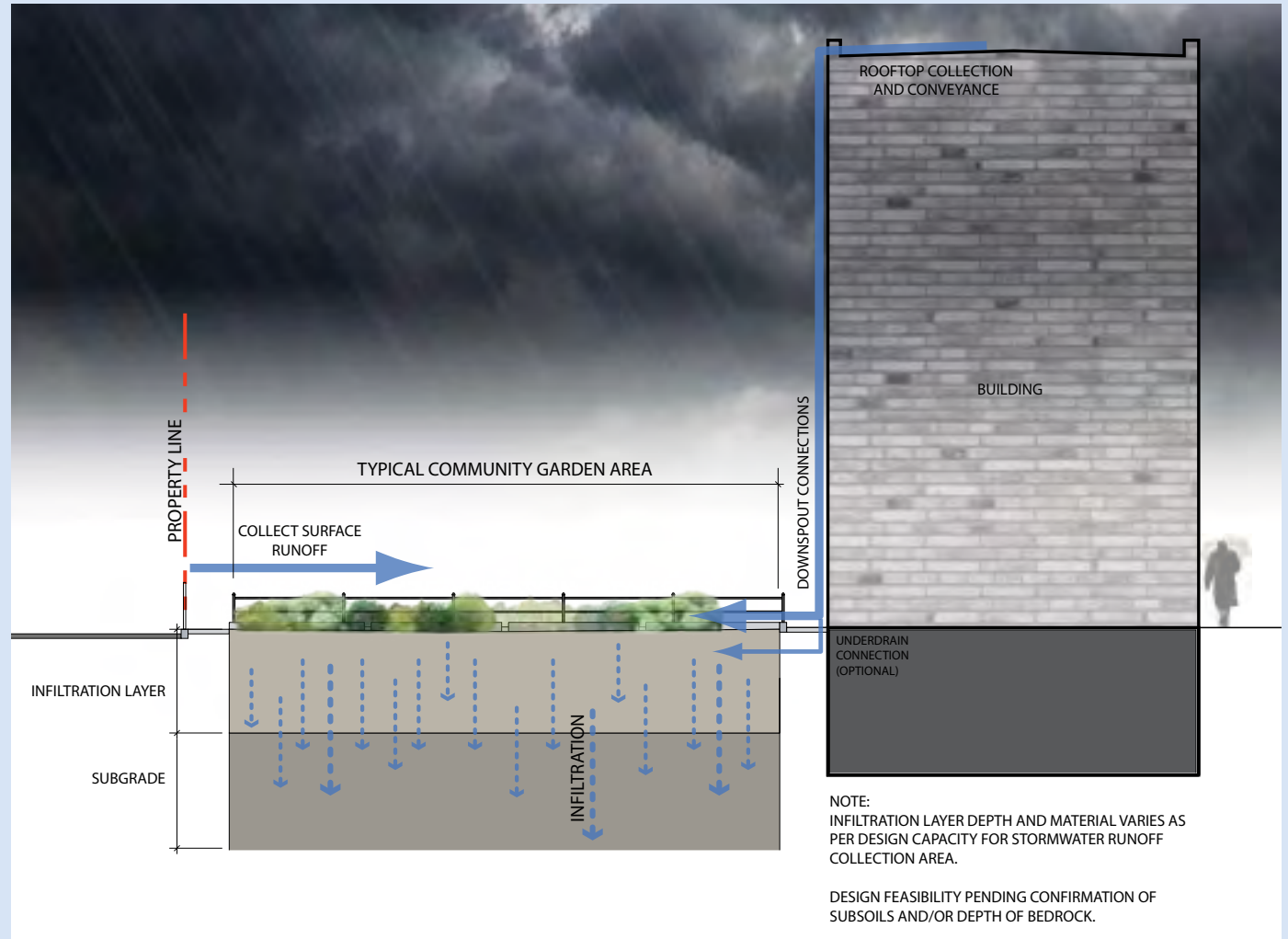
## Proposed Project

This project would fund (a) a study to examine the feasibility, costs and benefits for various high-impact stormwater capture and retention approaches in the Planning Area, followed by (b) the implementation of recommended scalable pilot projects.

### Phase 1: Stormwater mitigation study

Phase 1 of this project would perform a study of potential stormwater capture and retention strategies to be applied within the Lower Manhattan Planning Area. This would include identifying areas of highest need within the Planning Area, such as neighborhoods with a high concentration of impervious surfaces (e.g., Community District 3, at 95%<sup>33</sup>) and areas where there are community-reported chronic drainage issues. The study would examine feasibility, costs, benefits, and impacts of potential stormwater capture measures; develop proposals for governmental interventions to incentivize stormwater capture and retention; and suggest potential pilot projects.

The Lower Manhattan Planning Committee also identified the opportunity to partner with and leverage the existing community gardens located within the Planning Area. Many community gardens serve as centers for community gatherings, but were significantly damaged during Superstorm Sandy. The study, therefore, would identify ways to incorporate the network of community gardens into implementation projects, including through the construction and improvement of stormwater capture systems at these important community facilities, as well as the implementation of additional resiliency upgrades, such as solar power and improved physical facilities.



A stormwater collection system could increase the stormwater capture capacity of the large number of community gardens in Alphabet City. Other measures that may be examined by this project include bioswales. Sources: Flickr user edenpictures (top left); Flickr user NYC DEP (bottom left). Both licensed under Creative Commons.

## Phase 2: Stormwater mitigation pilot projects

Phase 2 would implement targeted piloting strategies that are identified in Phase 1 as having the highest feasibility and potential impact. This may include:

- Measures such as bioswales—landscaped elements to remove silt and pollution from surface runoff water—and permeable paving in areas with poor drainage and nonporous surfaces
- Improvements in and around community gardens and pocket parks to enhance area stormwater capture capacity and strengthen the resiliency of these community assets

## Implementation considerations

Potential implementation for the Phase 2 pilot strategies may additionally involve coordinating with large-scale municipal or private property owners in Lower Manhattan. For example, the New York City Housing Authority (NYCHA) owns and operates large-scale properties on Lower Manhattan’s east side, where there is a high percentage of impermeable surfaces. Single-owner properties may represent more feasible pilot implementation projects to mitigate the effects of flooding, as compared to the complexity of working with multiple private property owners.

Potential implementation of Phases 1 and 2 would begin with the identification of an administrating entity who would procure the feasibility study and oversee pilot project

development. Both phases would likely occur through a competitive grant program for which interested parties may apply. The program may also help to supplement the NYC Department of Environmental Protection (NYC DEP)’s existing Green Infrastructure Grant Program, which provides incentives to private property owners to incorporate green infrastructure onto their properties.

## Cost estimate

**\$2 MILLION**

Project Component	Cost Estimate
Phase 1: Stormwater mitigation study	\$500,000
Phase 2: Stormwater mitigation pilot projects	\$1,500,000
<b>Total</b>	<b>\$2,000,000</b>

The Phase 1 study is a contract cost estimated at approximately \$500,000, based on prior studies similar in scope and intent. This would fund a study of the range of feasibility and applicability issues noted earlier, to determine if and how stormwater capture and retention strategies would be applied within the Planning Area. The Planning Committee envisions more than one pilot project being implemented in the Focus Area in order to best evaluate effectiveness. A preliminary cost estimate for Phase 2 pilots is \$1.5 million, based on typical implementation costs, bringing the total project cost to approximately \$2 million.

The conceptual-level cost estimate was developed based

on current unit pricing and typical soft cost assumptions. Cost estimates would continue to be refined as more information is developed about the project.

## Benefits

### Environmental benefits

MEDIUM



While this project is expected to have modest environmental benefits in the short-term, it could pave the way for a more comprehensive strategy of addressing Lower Manhattan’s stormwater flooding issues, with resulting benefits to water quality and sustainability. The majority of surfaces in Lower Manhattan are impervious, causing serious environmental concerns, not only from a storm resiliency standpoint, but also from a long-term sustainability standpoint. This project would begin to address a serious environmental problem in the area.

### Health and social benefits

MEDIUM



This project would benefit residents, employees, and business owners. It would protect marine habitats and expand recreational opportunities throughout the Planning Area by mitigating combined sewer overflows, which pose significant public health and environmental risks when untreated sewage from waterways floods onto streets, into waterways, and into buildings and basements. Stormwater capture measures would likely provide particular benefit to residents and community members on the east side, where there is a particularly high concentration of impervious

surfaces and community gardens.

From a regional perspective, combined sewer overflows significantly impact the quality of New York City’s waterways, impacting dissolved oxygen content and marine habitat. A study and pilot implementation of effective stormwater management practices can help advance a scalable model for replication across the city and region, potentially leading to further improvements that contribute towards positive impacts on area water quality.

### Economic benefits

LOW



This project is expected to produce some modest economic benefits, mostly related to construction and operations jobs associated with the pilot implementation of protection measures in Phase 2.

## Cost-benefit analysis

Given the site-specific nature of pilot implementation, the greatest value of this project is not in the project itself, but in the long-term benefits that it may provide, as a model for a larger-scale stormwater capture and retention best-practice strategies for Lower Manhattan in the future. Given the \$2 million price tag of this study and associated pilot projects, and the level of near-term economic and health and social benefits, the costs are somewhat high as compared to the level of benefit provided in the short-term. Nonetheless, many stormwater improvements can help beautify the public realm, ranging from bioswales and

other greenery in residential areas to improved community gardens and key open spaces.

In the long-term, this project could serve as a catalyst to address Manhattan’s issues of impervious surfaces, with future benefits far outweighing the upfront costs of funding this Proposed Project. In addition, the short-term ancillary benefits of this project, including community landscaping, reduction in impacts from less intense storms, and improvements in public health and recreational opportunities, make this an important project within the Planning Area.

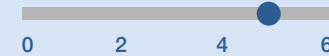
### Risk reduction

**MEDIUM**

As a study, Phase 1 may not lead to any direct risk reduction, though pilot projects implemented through Phase 2 are anticipated to provide some level of risk reduction associated with minimizing localized flooding. The degree to which these measures are able to mitigate localized flooding depends largely on the size of the catchment area, quantity of rainfall, and, in the case of bioswales, the functionality of existing sewage systems and soil types.

Should the pilot projects prove effective, this project could pave the way for a large-scale stormwater strategy in Lower Manhattan, creating pockets of “soft” surfaces to counteract what is now one of the most impervious areas of New York City.

### Timeframe for implementation



Once the subrecipient organization has been determined, Phase 1 of this project could begin within six months, while Phase 2 would take anywhere from three to five years, depending on the scope of the projects identified in Phase 1 and the identification and coordination of appropriate partners.

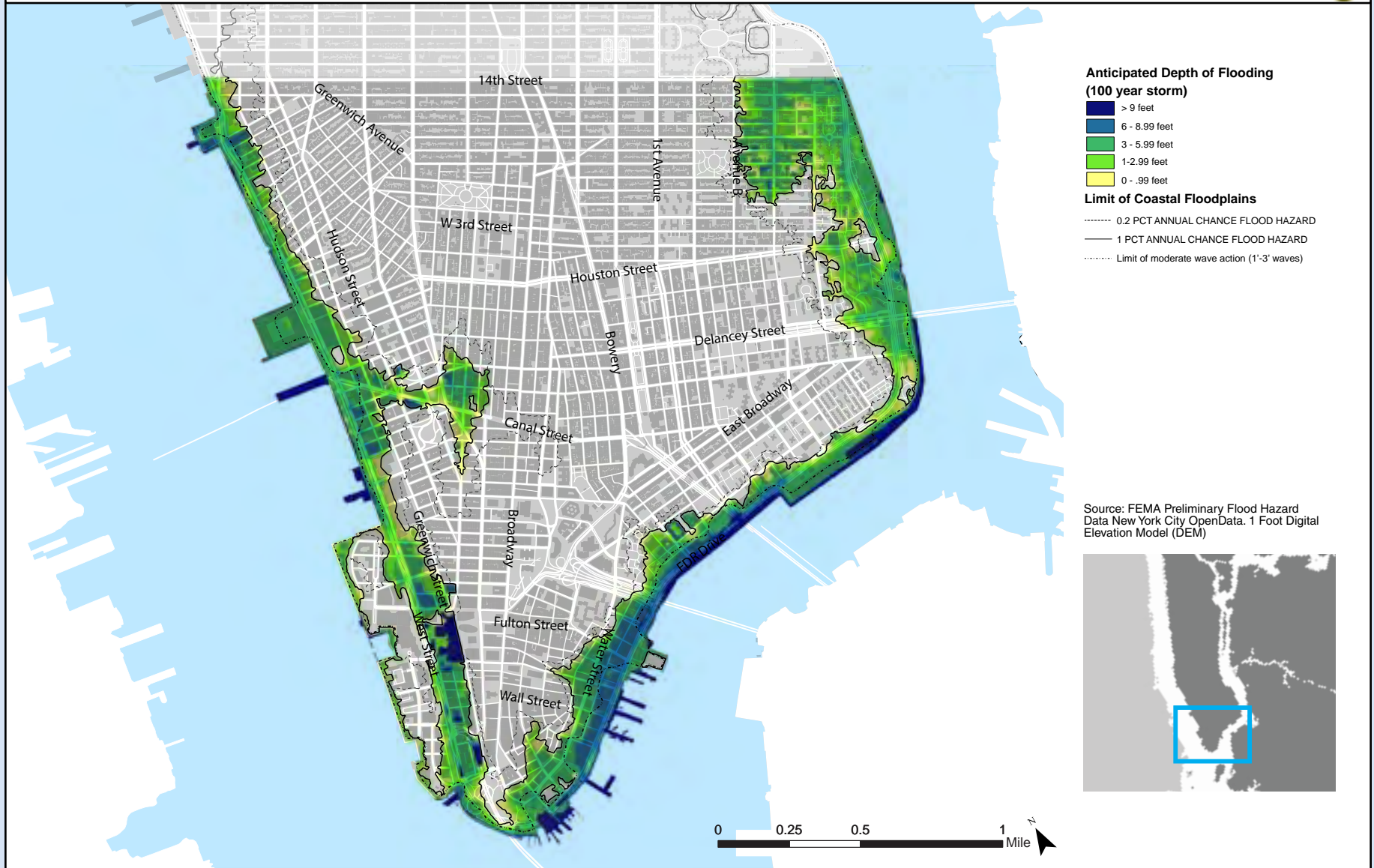
### Regulatory requirements

While the Phase 1 study would not have any regulatory requirements, the stormwater capture and retention projects identified for implementation during Phase 2 would require review and approval of agencies such as NYC DEP and NYC Department of Transportation (NYC DOT).

### Jurisdiction

Jurisdiction over this project’s proposed initiatives would depend on the types of initiatives implemented in Phase 2. If entailing improvements to street infrastructure and community gardens, agencies with jurisdictional authority would include NYC DEP, NYC DOT, and New York City Department of Parks and Recreation (NYC DPR). Any measures proposed for residential properties—either publicly owned by NYCHA or privately-owned—would also need to coordinate with those owners.

**Figure IV-2: Depth of flooding**



## Project Overview

### Recovery Support Functions



Natural & Cultural Resources



Infrastructure

### Cost

**\$1M**

### Environmental Benefits

MEDIUM

### Health and Social Benefits

LOW

### Risk Reduction

LOW

### Timeline (years)



STRATEGY: IMPROVE STORMWATER CAPTURE AND RETENTION

# Wetland creation at East River Park

## Proposed Project

This project would provide funding to create a constructed wetland in East River Park at a new composting facility.

This project would support the creation of a one-acre constructed wetland in East River Park, at a site where a local community group plans to construct a new composting facility in a currently-unoccupied portion of land near Corlears Hook. This project would also establish a precedent for softening Lower Manhattan’s bulkhead line with wetlands. The project includes the following components:

- Composting windrows,<sup>34</sup> which allows for large-volume composting;
- Artificial wetland, meadow, and pond; and
- Outdoor classroom and shade structure.

The composting facility is expected to produce 75 tons of finished compost per year, which can be returned as fertilizer for the urban landscape. Replacing an impervious surface with an absorptive one, this project would also

provide additional stormwater capture capacity for the immediate area.

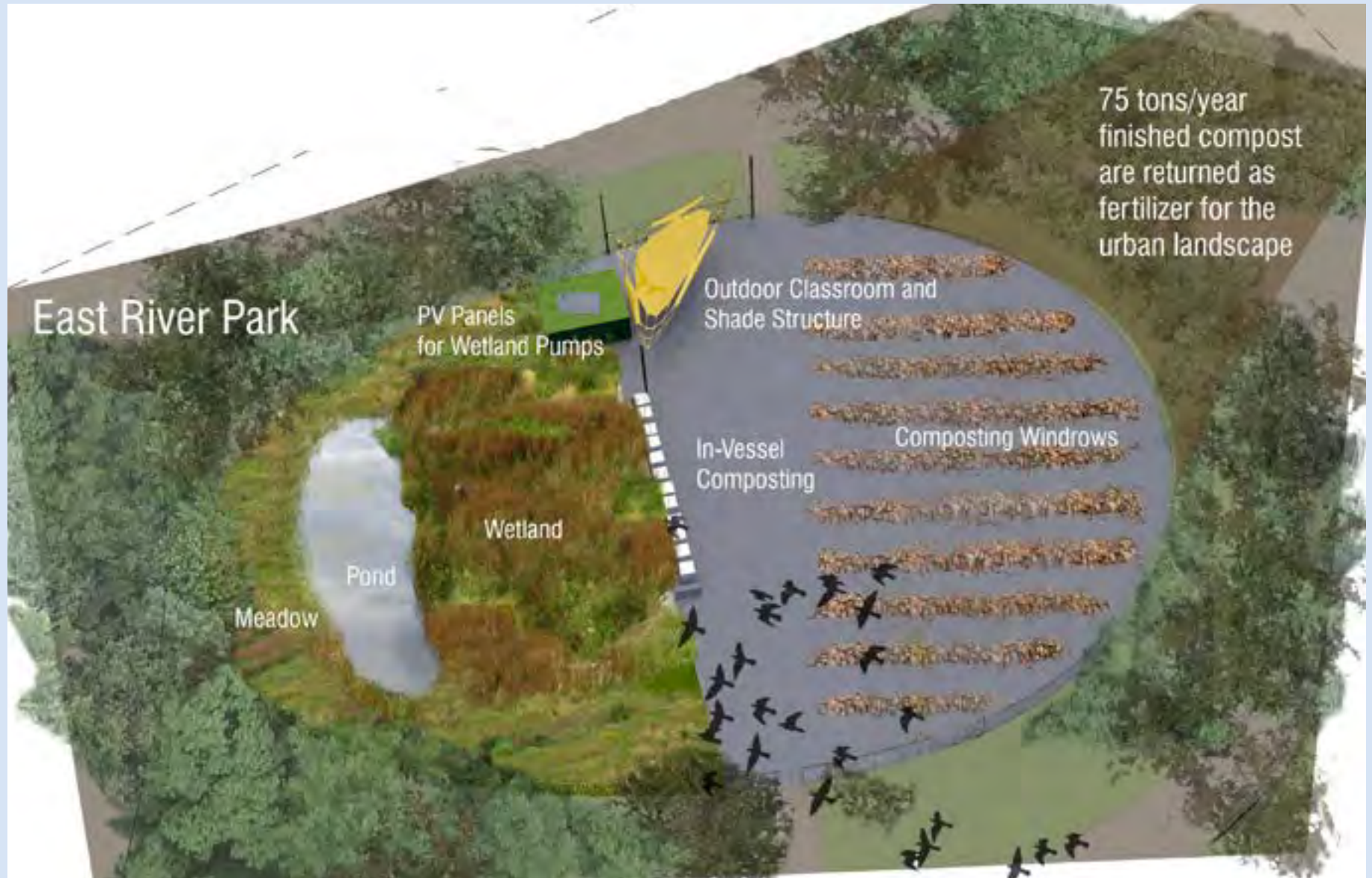
## Cost estimate

**\$1 MILLION**

This project would provide approximately \$1 million to cover the unfunded construction costs for the project.

Project component	Cost estimate
Unfunded programming costs	\$10,000
LES Ecology Center funding	\$350,000
NYRCR contribution: Unfunded construction costs	\$1,000,000
<b>TOTAL</b>	<b>\$1,360,000</b>





The project would entail composting windrows; a constructed wetland; and an outdoor classroom and shade structure. Source of conceptual rendering: Courtesy of LES Ecology Center.

## Benefits

### Environmental benefits

MEDIUM

This project would provide multiple environmental benefits: it would host the Lower East Side Ecology Center's composting operations and clean runoff from the composting system, as well as expand the Center's environmental educational offerings. The Lower East Side Ecology Center is a not-for-profit organization which runs community-based recycling and composting programs as well as environmental education programs. In addition to these benefits, the project would also capture a small amount of stormwater for the immediate area.

### Health and social benefits

LOW

This project would provide recreational benefits to community members through increasing the amount of public open space in the area. In addition, educational programming would provide an opportunity for community members to gather and learn about sustainability best practices.

### Cost-benefit analysis

The costs of this project are relatively low, when considering the substantial environmental and educational benefits it would provide for the community. Additionally, the wetlands could serve as a precedent for how to soften Lower



Current site conditions at East River Park. Source: Courtesy of LES Ecology Center.

Manhattan's bulkhead line while providing co-benefits to the community. As a potentially scalable project, the benefits of this project outweigh the cost.

### Risk reduction

LOW

The risk reduction of this project is negligible, given the site's relatively small size. However, future replication of this project along the Lower Manhattan bulkhead line could provide additional opportunities for stormwater absorption and wave attenuation, if appropriately scaled.



### Timeframe for implementation



The project is currently planned, and the conceptual design for this project is already underway (subject to input and approval from NYC Department of Parks and Recreation (NYC DPR)). Therefore, once funding and necessary approvals are secured, implementation could begin in the short term, within two to three years.

### Regulatory requirements

The project must obtain the approval of NYC DPR and the

New York State Department of Environmental Conservation (NYS DEC). This may also involve the USACE and Coastal Zone Management (CZM) consistency concurrence (NYS DOS). The project team should also coordinate with local community organizations.

### Jurisdiction

This project falls within the jurisdiction of NYC DPR, which controls East River Park, and input and approval from NYC DPR is required for the project to be implemented.

## Project Overview

### Recovery Support Functions



Natural & Cultural Resources



Infrastructure

### Cost

**\$2M**

### Economic Benefits

LOW

### Environmental Benefits

LOW

### Risk Reduction

HIGH

### Timeline (years)



STRATEGY: PROTECT EDGE NEIGHBORHOODS FROM COASTAL FLOODING

# Berming and deployable walls at Battery Park

**Proposed Project:** Funding toward the implementation of Phase 1

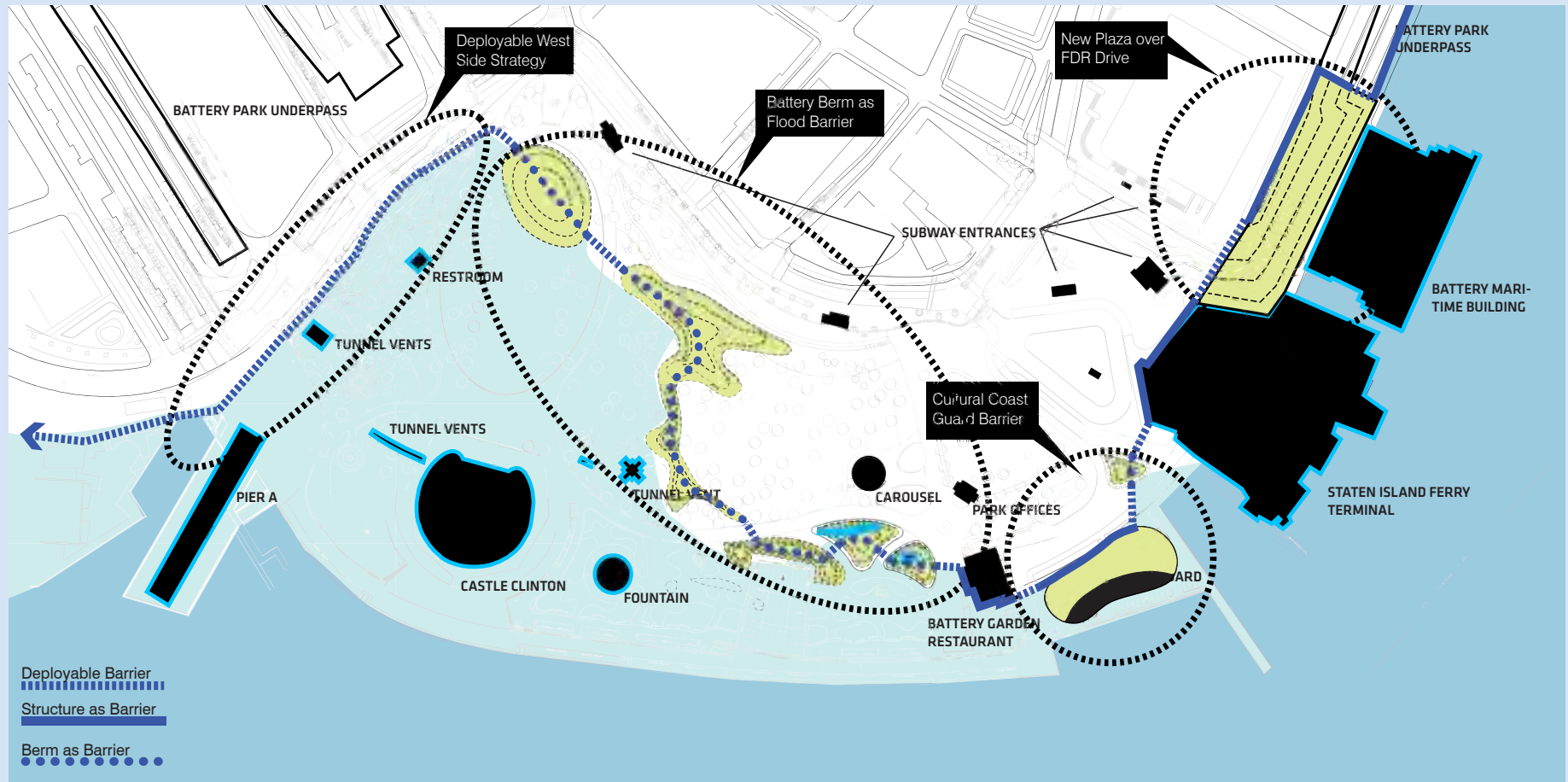
**Featured Project:** Conceptual design and implementation of future phases

This Proposed Project would allocate \$2 million in funding toward the construction of Phase 1 of a system of berms and adjoining deployable flood barriers at Battery Park. A Featured Project would entail the implementation of additional flood mitigation measures as part of Phase 1, as well as the conceptual design and implementation of future phases to expand flood protection to the east and west of the Phase 1 project site.

The Proposed Project would allocate \$2 million in funding towards the construction and implementation of Phase 1 of a flood protection strategy within Battery Park.

The Featured Project entails the implementation of additional flood mitigation measures as part of Phase 1, as well as the design and eventual implementation of potential future phases of the Battery Conservancy and the NYC Department of Parks and Recreation’s (NYC DPR) flood protection strategy for Battery Park, providing protection against a 500-year flood event. The phases outlined below

provide a key link and critical first step in protecting the tip of Lower Manhattan, employing flood protection strategies that would eventually link to similar strategies to the west within Battery Park City and Pier A, and to the east at the U.S. Coast Guard facilities and the Whitehall Ferry Terminal. This strategy is located at a critical connection point for any integrated flood protection strategy along Lower Manhattan’s bulkhead line and seeks to provide the first link in what the Planning Committee hopes to be a comprehensive chain of resiliency.



This project proposes berms and walls as part of a larger flood protection strategy for Battery Park. Source: Courtesy of The Battery Conservancy/Rebuild by Design “BIG U” Team.



Berms can function as attractive landscape features. Source: Mathews Nielsen Landscape Architects, P.C.

### **Phase 1: Berming and deployable walls**

Phase 1 of this strategy specifically includes the construction of berms through the Battery Lawn and Bosque, supplemented by deployable floodwalls across key pedestrian access points to ensure that safe access to the park's interior is maintained whenever a 500-year storm surge event is not imminent. The berm would be approximately 600 feet in length and five-to-six feet high at its tallest point. The berm would either be an unreinforced landmass with a permeable core, an unreinforced landmass with an impermeable core, or a reinforced structure with

an impermeable core, depending on the desired lifespan and efficacy of the measure. The deployable walls would be approximately 90 feet in length and four feet high at their tallest point, respectively. The berm would be a permanent intervention while the deployable floodwalls, supported by permanent foundations, are only put in place in the event of a storm. These interventions would be located mostly outside of the 100-year floodplain, but within the 500-year floodplain. The berm segment in the Bosque lies within the 100-year floodplain and would help protect the New York City Department of Transportation (NYC DOT) Battery Underpass vents in that location. The Proposed Project would allocate funding towards the completion of this phase, while the Featured Project would implement the strategies outlined here. It is anticipated that the Battery Conservancy would raise the additional funding required to construct and implement Phase 1.

### **Future phases: Conceptual design for an east side strategy**

In order to provide meaningful comprehensive flood protection, the interventions in Phase 1 need to connect to further interventions outside of the floodplain, as stipulated in the Featured Project. The Battery Conservancy and NYC DPR have developed preliminary concepts of what these phases might entail, including re-envisioning the restaurant and Coast Guard buildings to serve as a robust flood barrier incorporating visitor amenities and integrating with a berm/levee systems along Battery Place, connecting to high ground in Battery Park City. Further design is required to advance these concepts.

## Cost estimate

### \$2 MILLION

The \$2 million allocation would help complete Phase 1, covering 45% to 71% of the funding needed to construct the berm and adjoining flood barriers, depending on the type of berm put in place.

#### FEATURED PROJECT

### \$1.8–\$3.4 MILLION

Project Component	Cost Estimate
Berm and floodwalls	\$2.8 million to \$4.4 million
Conceptual design for further phase(s)	\$1 million
<b>TOTAL</b>	<b>\$3.8 million to \$5.4 million</b>

Phase 1 Options: \$2.8 million–\$4.4 million

- Unreinforced landmass with permeable core and deployable floodwalls: \$2.8 million
- Unreinforced landmass with impermeable core and deployable floodwalls: \$3.2 million
- Reinforced structure with impermeable core and deployable floodwalls: \$4.4 million

Depending on the desired level of protection, it is estimated that Phase 1 could cost in total between \$2.8 and \$4.4 million. Additionally, engineered design of subsequent phases necessary to connect the overall strategy with similar flood protection strategies to the east and west of Battery Park is estimated to cost \$1 million. In total, the cost for construction of Phase 1 and design of subsequent phases could cost an estimated \$3.8 to \$5.4 million. Given that the Proposed Project would allocate \$2 million in funding towards this total, the final cost for the Featured Project is estimated between \$1.8 to \$3.4 million.

The conceptual-level cost estimate was developed based on current unit pricing and typical soft cost assumptions. Cost estimates would continue to be refined as more information is developed about the project.<sup>37</sup>

## Benefits

This discussion of benefits is focused on the benefits of the Featured Project, as the Proposed Project may carry no benefits besides allocating a significant amount of funding towards the construction and implementation of the Featured Project.

### Economic Benefits

LOW

The Featured Project, the completion of Phase 1, would generate modest direct economic benefits, including generating a small number of temporary construction jobs.<sup>38</sup> Once linked to flood protection strategies to the east and the west of the project site, however, the Featured

Project would provide indirect flood risk reduction for key economic areas of Lower Manhattan, such as the many office buildings along the northern border of State Street.

### Environmental benefits

LOW

The berming involved in the Featured Project would be designed so as not to detract from the existing aesthetic appeal of the park and add to it wherever possible. The design of these projects should be careful to avoid any negative environmental impacts, including the removal of any existing trees. Besides creating a “new look” for portions of Battery Park, it is not anticipated that this project would provide any additional environmental benefits.

### Cost-benefit analysis

The main benefit of the strategy of the proposed and featured projects lies in their role as a critical first step in what may one day be a comprehensive flood protection strategy integrating Lower Manhattan’s diverse waterfront properties into a continuous line of defense that also improves the visitor experience at one of New York City’s most visited tourist sites. While the benefit of this strategy relies on alignment with the strategies of other organizations and sites, it nonetheless helps advance the Battery Conservancy and NYC DPR plans for building comprehensive flood protection. The proposed and subsequent featured project would provide an important precedent that might serve as a suitable pilot project for

similar projects in the Focus Area. Taking all of this into consideration, the modest cost of this pilot strategy is well worth the scalable precedent it provides in protecting Lower Manhattan from future storm surge without sacrificing the current appeal of existing assets.

### Risk reduction

HIGH

While the Proposed Project carries with it no risk reduction benefits, it is nonetheless a necessary first step in a future integrated flood protection strategy for the tip of Lower Manhattan, and eventually, the Lower Manhattan bulkhead line in its entirety. The Featured Project, once linked to flood protection strategies to the east and the west of the project site, would provide flood risk reduction in the event of a 500-year storm to the key economic assets located on the interior.

### Timeframe for implementation



Once all necessary funding is secured, final design of Phase 1 of the featured project would be completed within 6 months, with construction completed within one to two years after that time. Once funding is secured for future phases, the design of these phases is anticipated to be completed after one year. Overall, the full construction of this project and all of its phases is anticipated to take three to seven years.



## **Regulatory requirements**

The featured project is required to meet the regulations and standards of the NYC DPR. Additional review and/or requirements may need to be coordinated with New York State Historic Preservation Office.

## **Jurisdiction**

The featured project falls under the jurisdiction of NYC DPR, and input and approval from NYC DPR is required for the project to be implemented.

## Project Overview

### Recovery Support Functions



Health & Social Services



Community Planning & Capacity Building



Infrastructure



Economic Development

Cost  
**\$750,000**

#### Economic Benefits

HIGH

#### Environmental Benefits

MEDIUM

#### Health & Social Benefits

MEDIUM

#### Risk Reduction

HIGH

#### Timeline (years)



STRATEGY: PROTECT EDGE NEIGHBORHOODS FROM COASTAL FLOODING

# Targeted flood protection strategy for lower West Street

Proposed Project: Feasibility study and conceptual design  
Featured Project: Implementation

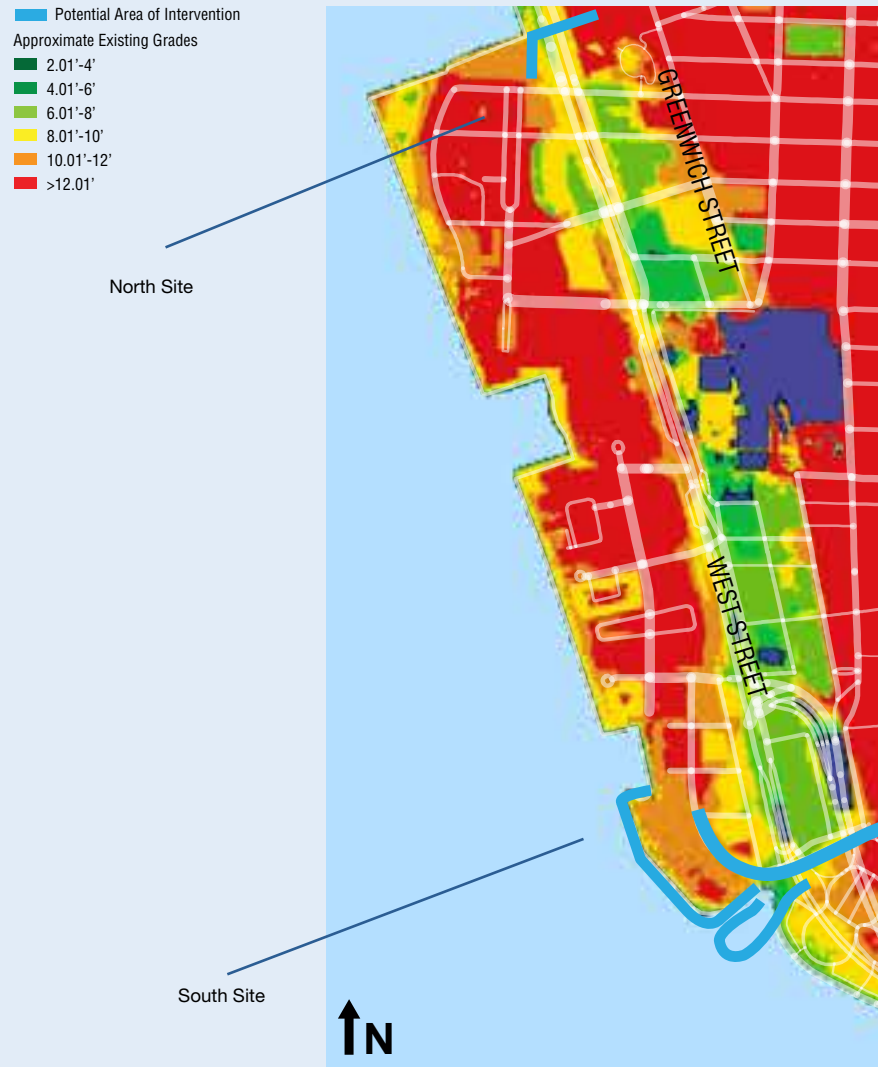
The Proposed Project would fund a feasibility study and conceptual design for a targeted strategy that would protect the West Street area south of Harrison Street against a 100-year flood event, using interventions at the southernmost edge of Hudson River Park and the northern edge of Battery Park along Battery Place. The Featured Project is the implementation of the strategy, which could ultimately provide comprehensive flood protection for this area around lower West Street.

## Proposed Project description

The Proposed Project would determine the feasibility and lay out the initial design of a flood protection strategy, consisting of both permanent and deployable interventions, to protect the lower portion of West Street from flooding during a 100-year storm. This would be achieved by strategically placing these interventions at the north and south ends of Battery Park City – specifically, at the southern end of Hudson River Park (North Site<sup>1</sup>) and

the northern edge of Battery Park and along Battery Place (South Site<sup>2</sup>) so that each intervention would “tie” into areas of higher ground (i.e., outside the floodplain). The maps at right Figures IV-3 and IV-4 depict the elevations and related flood hazard at each location. This strategy would leverage Battery Park City’s elevated bulkhead line as an effective existing barrier to prevent flooding from the west. As a result, the introduction of a relatively limited

**Figure IV-3: West Street elevation map**



**Figure IV-4: West Street floodplain map**



set of flood protection structures would result in the protection of a substantial area that is home to a number of economic assets and neighborhoods which together comprise millions of square feet of land area, homes, businesses, and infrastructure.

**North site:  
Southern end of Hudson River Park**

At Project Site 1, the Proposed Project would fund the feasibility and initial design study of a combination of permanent and deployable flood walls and a landscaped berm at the southern end of Hudson River Park, a vulnerable low point in Lower Manhattan, at an elevation at six to eight feet above sea level.

It is at this point where floodwaters entered Lower Manhattan during Superstorm Sandy and travelled south down West Street, inundating critical assets such as the World Trade Center project site. Flood protection strategies at Project Site 1 in Hudson River Park may include the following components:

- Landscaped berm
- Raised height of retaining wall at the site's existing basketball court
- Deployable walls to adjoin berm and retaining wall

**South site:  
Northern end of Battery Park along Battery Place**

This component of the Proposed Project would fund the feasibility and initial design study of a flood protection

strategy along the northern edge of Battery Park extending northwest along Battery Place and into Battery Park City. This strategy would be designed to extend to both the east and west outside of the 100-year floodplain, at a minimum. The study would recommend and design connections to existing and planned flood protection strategies overseen by other organizations, such as the Battery Park City Authority's plans to protect Pier A and the Battery Conservancy's plans for Battery Park, as discussed earlier in this plan.

**Cost estimate  
\$750,000**

**Proposed Project  
Feasibility and conceptual design \$750,000**

This Proposed Project would fund the feasibility and conceptual design of the Featured Project at an estimated contractual cost of \$750,000. The value of this contract would vary depending on its scope.

**Featured Project  
Implementation \$8.4 million**

The construction of the project components outlined here is estimated to cost \$8.4 million in total. The estimated costs for the implementation phases of the flood mitigation strategy are set forth below:

Project Component	Cost Estimate
Hudson River Park construction (berming, deployable barriers, and retaining wall)	\$3.9 million
Battery Park City construction (deployable barriers)	\$4.5 million
<b>TOTAL</b>	<b>\$8.4 million</b>

The conceptual-level cost estimate was developed based on current unit pricing and typical soft cost assumptions. Cost estimates would continue to be refined as more information is developed about the project.

### Benefits

This Proposed Project provides a critical first step in determining strategic interventions and projects that could provide significant reduction of flood risk and other associated benefits for specific areas of Lower Manhattan. While the Planning Committee recommends allocating funding towards the study of potential, long-term comprehensive coastal flood mitigation strategies for the entire Planning Area (see project description for “Coastal protection study for east and west side”), this project would specifically examine the feasibility and provide the initial conceptual design for a more targeted strategy that, if implemented, would increase the resiliency of key assets, address medium- and long-term risks, and balance costs and benefits.

### Economic benefits

**HIGH**

The Proposed Project provides no economic benefits beyond the value of the study’s contract. The Featured Project, however, would yield high economic returns. First, by protecting a key economic corridor along Lower Manhattan’s west side, the implementation of this project would save many businesses the cost of pursuing flood protection strategies privately while also potentially raising the real estate value of the properties the project would protect. The construction cost of this project is significantly lower than the cost of damage to building systems in large office buildings similar to those located along West Street, which could cost in the hundreds of millions of dollars.

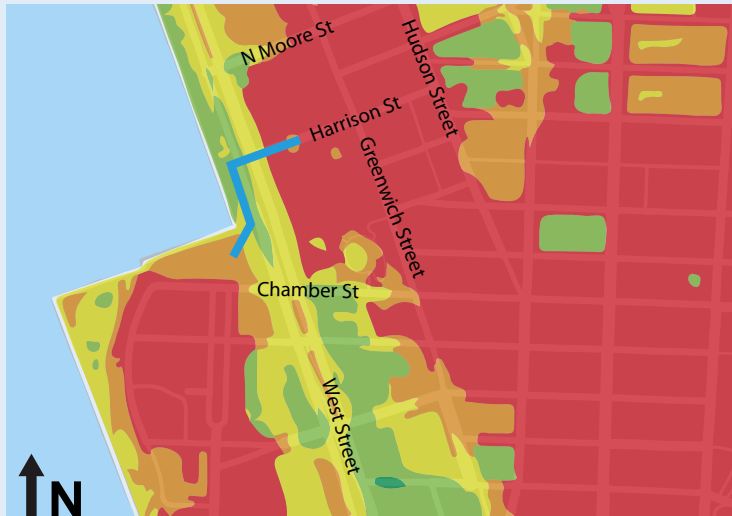
The implementation of this project would also create a moderate number of construction jobs. In addition, this project could spur additional investment by governmental agencies and third parties in additional large-scale infrastructure investment into Lower Manhattan and the many temporary and permanent jobs that investment might create.

### Environmental benefits








**MEDIUM**

While the Proposed Project provides no environmental benefits in and of itself, the implementation of the Featured Project’s flood mitigation strategy would protect critical local natural assets, including the parks within Battery Park City and near West Street, from future severe weather events. Parks such as the Battery Park City ballfields and

**Figure IV-5: North Site elevation map**










**LEGEND**

-  Proposed Flood Barrier
- Approximate Existing Grades
-  2.01-4
-  4.01-6
-  6.01'-8'
-  8.01'-10'
-  10.01'-12'
-  >12.01'

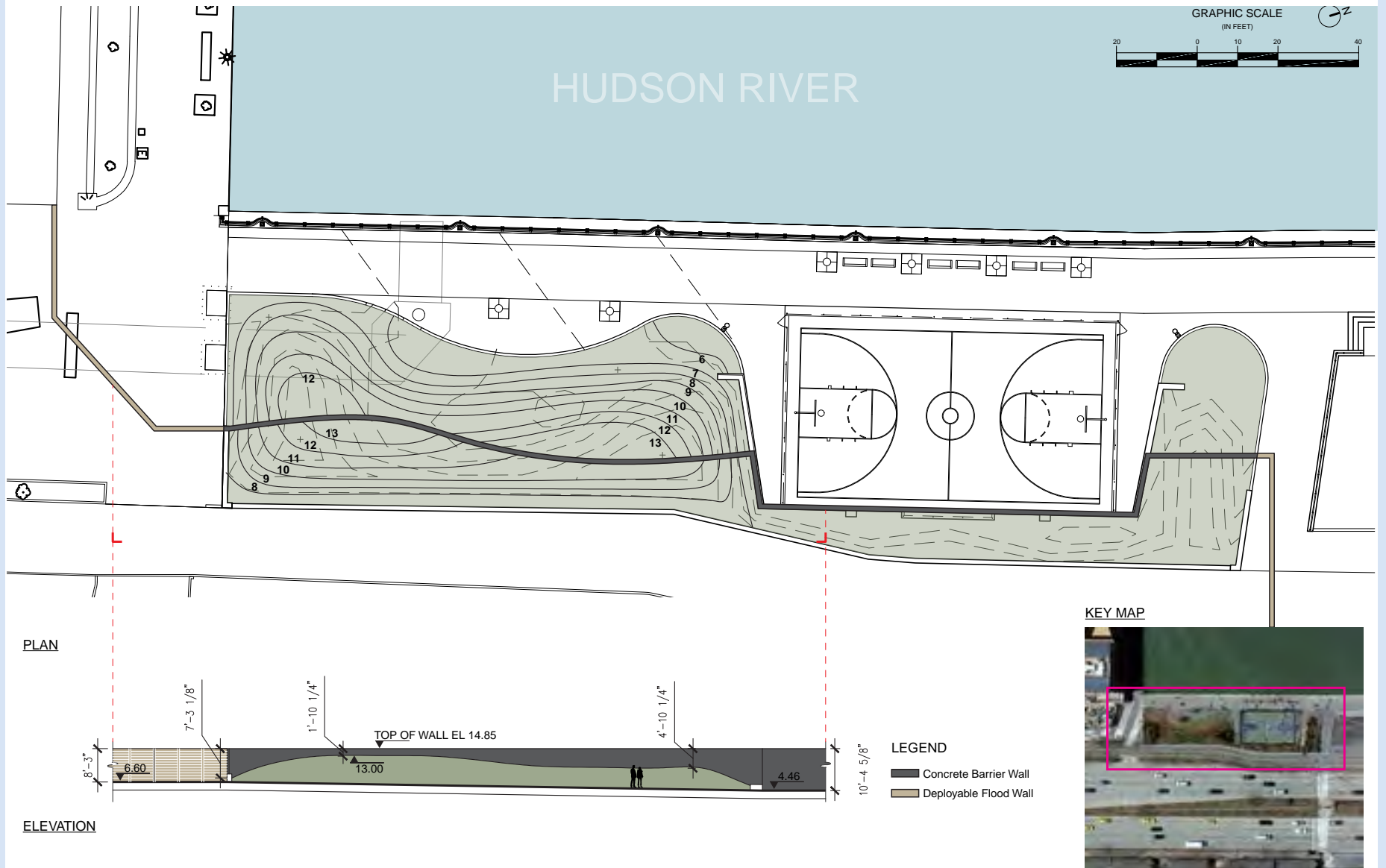
**Figure IV-6: North Site floodplain map**



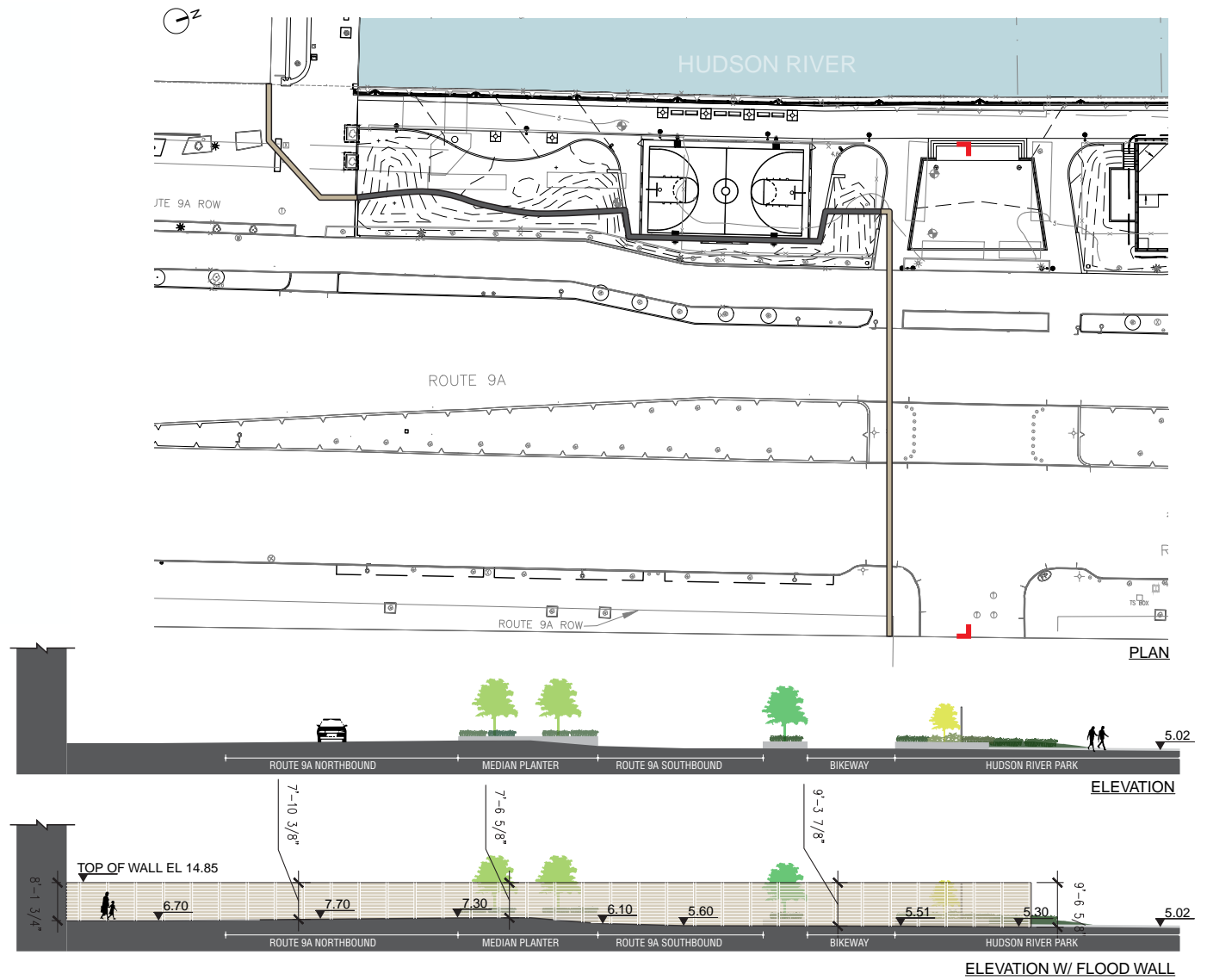
**LEGEND**

-  Proposed Flood Barrier
-  0.2 PCT Annual Chance Flood Hazard
-  1 PCT Annual Chance Flood Hazard
-  V-zone (subject to wave action >3')
-  A-zone / 100 year floodplain
-  500 year flood plain
-  14 Base Flood Elevation

**Figure IV-7: North Site plan**



**Figure IV-8: North Site plan**





West Thames Park are important to the livability and social resiliency of the communities around West Street and have served as important places for gathering and recreation.

### Health and social benefits

**MEDIUM**

While the Proposed Project in and of itself provides no health and social benefits, the implementation of the Featured Project would provide protection to critical health and emergency response assets such as the Battery Park City and World Trade Center emergency medical offices and the New York City Fire Department (FDNY) Engine 10, Ladder 10. It would also protect the Battery Park City School (PS/IS 276) and The Hallmark of Battery Park City, a seniors' assisted-living residence.

### Cost-benefit analysis

The Proposed Project would fund a meaningful investment towards an achievable medium-term Featured Project, the implementation of a targeted flood protection strategy for lower West Street. It therefore offers the potential for a significant return on investment, measured in terms of risk reduction benefits and within the context of potential flood risk-reducing projects in New York City.

By strategically intervening within floodplains along the west side, this coastal protection project leverages NY Rising Community Reconstruction (NYRCR) funding, as a first step towards providing flood protection that would otherwise cost hundreds of millions of dollars. The concept at the center of the Proposed and Featured Project is to

create meaningful, measurable protection for a relatively modest sum when compared to infrastructure projects that offer a similar level of protection. The value in this concept is significant, the protection of 62 buildings for a construction cost comparable to the cost of protecting a single large office building.

### Risk reduction

**HIGH**

While the Proposed Project carries no risk reduction benefits, it is a necessary step that would lead to the Featured Project, the construction and implementation of feasible and appropriately designed flood mitigation infrastructure strategies. The future implementation of the Featured Project carries significant risk reduction benefits. The conceptual design would set forth a strategy that, if determined feasible and constructed at its current level of design, targets specific and strategic locations vulnerable to storm surge, eliminating the risk of flooding for approximately 62 buildings and 24.5 million square feet of built floor area.

The Featured Project would implement a barrier at a low-lying area of Hudson River Park, providing for flood protection at a critical point of Lower Manhattan's bulkhead line. When joined with flood protection strategies farther south, near Battery Park, the Featured Project would serve as a comprehensive flood protection strategy for lower West Street, from Battery Place to Harrison Street, as well as for the adjoining neighborhoods and certain nearby critical assets such as the World Trade Center and Hugh L. Carey Tunnel entrance.

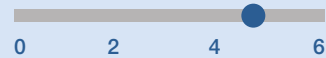
**Figure IV-9: South Site elevation map**



**Figure IV-10: South Site floodplain map**



## Timeframe for implementation



The project would begin with the feasibility study, which would set in motion the final engineering and design process that would ultimately result in construction. A preliminary timeline is set forth below:

### Proposed Project:

- Feasibility and conceptual design: 1 year from start of contract

### Featured Project:

- 100% construction design and engineering: two years from completion of conceptual design
- Final construction: one to two years following completion of 100% construction design
- Total: 4 - 5 years

## Regulatory requirements

Both the Proposed and Featured Projects would require direct coordination with several public agencies and non-profit organizations, including the following entities:

- Hudson River Park Trust
- Battery Park City Authority
- Battery Conservancy
- New York State Department of Transportation (NYS DOT)
- New York City Department of Parks and Recreation (NYC DPR)
- New York City Department of Transportation (NYC

DOT)

In addition, a single agency would likely be responsible for spearheading the project management of any conceptual design and/or engineering study under the Proposed Project. The Featured Project must meet the regulatory requirements of all involved New York City and State agencies listed above, particularly in the instances where flood protection interventions are placed in public open space and rights-of-way. This may also involve the NYS DEC, USACE and Coastal Zone Management (CZM) consistency concurrence (NYS DOS).

## Jurisdiction

While jurisdiction is not a factor for the Proposed Project, execution of the featured project requires the coordination of all the public agencies and non-profit organizations, listed above. Hudson River Park Trust is a city-state entity that oversees the design, construction, and design of Hudson River Park, where the majority of Project Site 1 resides. The Battery Park City Authority is a New York State public benefit corporation with jurisdiction over the 92 acres of Battery Park City. The Battery Conservancy is a non-profit corporation aimed at rebuilding and revitalizing historic Battery Park, a 25-acre public park at the southern tip of Manhattan, and the Castle Clinton National Monument. Battery Park is owned and maintained by NYC DPR. The public rights-of-way for this project would be overseen by both NYS DOT, which maintains jurisdiction over the public right-of-way at West Street, and NYC DOT, which has control over the public right-of-way along Battery Place and other City streets.

## Project Overview

### Recovery Support Functions



Natural & Cultural Resources



Infrastructure

Cost  
**\$2M**

### Economic Benefits

HIGH

### Environmental Benefits

HIGH

### Health & Social Benefits

HIGH

### Risk Reduction

MEDIUM

### Timeline (years)



STRATEGY: PROTECT EDGE NEIGHBORHOODS FROM COASTAL FLOODING

# Coastal protection study for east and west side

## Proposed Project

This project would fund a feasibility study and conceptual design for a series of multipurpose flood barriers for protection of the east and west sides of Lower Manhattan against a 100-year flood event, using measures such as a raised greenway, berming, and deployable walls.

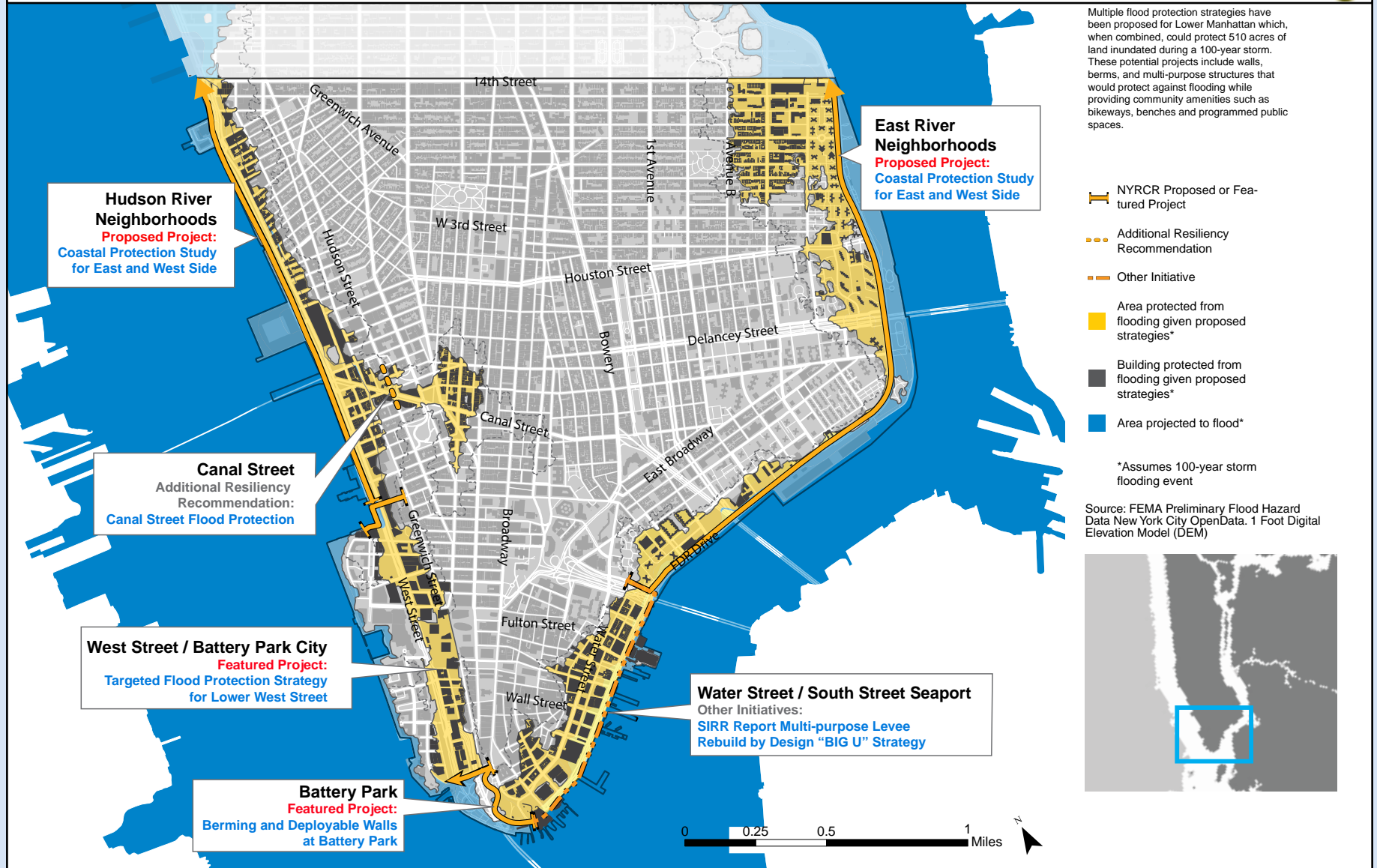
The feasibility study would assess flood protection strategies along the east side under the FDR Drive infrastructure from 14th Street to Montgomery Street (along the alignment of the East River Blueway Plan) and from Harrison Street to 14th Street on the west side. The project would focus on the use of raised greenways, berming, deployable and permanent barriers, and other interventions that may be adapted to serve a variety of uses.

The study would include the following elements:

- Analysis of existing and future conditions, including flooding history and projections for future risk and damage

- Review of existing proposals, including the East River Blueway Plan, the Rebuild by Design Big U, and the Special Initiative for Rebuilding and Resiliency (SIRR)
- Coordination with relevant City, regional, State, and Federal agencies, as well as with key stakeholders and the general public
- Detailed technical analysis of potential protection strategies, including (but not limited to) the following
  - Raised greenway with a walkway/bikeway atop
  - Deployable flood barriers
  - Permanent flood barriers
  - Berms

**Figure IV-11: Lower Manhattan Coastal Protection Scenario**



Based on this technical analysis, a series of potential coastal protection measures would be identified that could be implemented along the east and west sides of the Planning Area, including cost estimates, risk reduction estimates, construction schedules, and associated technical analyses.

## Cost estimate

### \$2M

While the eventual construction of comprehensive, multipurpose flood protection strategies spanning the length of the east and west sides of Lower Manhattan would likely cost hundreds of millions of dollars, the feasibility and conceptual study would cost approximately \$2 million. The Planning Committee recommends allocating \$1 million for an east side study and \$1 million for a west side study.

Project component	Cost estimate
West Side coastal protection study	\$1 million
East Side coastal protection study	\$1 million
<b>TOTAL</b>	<b>\$2 million</b>

## Benefits

### Economic benefits

HIGH

This project would design long-term flood- protection strategies identified by the feasibility study. On its own, this project would have no tangible economic benefits; however, eventual implementation of the project’s recommendations would protect key economic corridors along Lower Manhattan’s west and east sides, including Avenues C and D on the east side and West Street and Canal Street on the west side. It would also save many business owners the cost of pursuing flood protection strategies privately and protect small businesses within Lower Manhattan that otherwise would not be able to afford flood protection strategies, such as those in the Lower East Side and the East Village.

The study and design under this Proposed Project aligns with the goals of the New York City Regional Economic Development Council’s Strategic Plan, which identifies Lower Manhattan as an Opportunity Zone, and encourages the further development of the area’s commercial real estate market. Implementation would also create construction jobs, sustain businesses that would otherwise suffer during the aftermath of a severe weather event, and may increase the real estate value of properties in protected areas.

### Environmental benefits

HIGH

This study would lead to the design of more protected and diversely programmed park space, both within Hudson

River Park and East River Park, two of Lower Manhattan’s largest and most popular natural resources. In some specific instances, this study would lead to the creation of additional park space, particularly community assembly space and walkway and bikeway paths and connections. The designs for flood protection would also improve community access to the waterfront and integrate state-of-the-art sustainability features.

**Health and social benefits**

**HIGH**

This study would lead to the design of comprehensive protection from flooding for Lower Manhattan’s most vulnerable populations, including the elderly, disabled, and low-income populations. In particular, the majority of Lower Manhattan’s subsidized housing developments are located on the east side, within the 100-year floodplain. Comprehensive flood protection on both the east and west sides would also benefit residential owner entities (such as condo associations, cooperatives, and building owners) who otherwise would not be able to afford expensive comprehensive flood-protection building upgrades.

A comprehensive flood protection strategy would also protect schools, healthcare facilities, community organizations, and New York City Police Department (NYPD) and New York City Fire Department (FDNY) facilities currently located within the 100-year floodplain. Facilities serving seniors, such as the Two Bridges Senior Residence on the east side and The Hallmark Battery Park, a seniors residence on the west side, would be protected from the risk of flooding during a severe storm as well.

**Cost-benefit analysis**

For a modest cost, the feasibility study and conceptual design for needed flood protection in Lower Manhattan would build on the planning work that has been done to date, including the Blueway Plan, the Rebuild by Design BIG U project, and other designs, to result in a conceptual design. The Committee’s return on investment would result in a comprehensive study of coastal protection measures that could lead to infrastructure investments in the long term.

**Risk reduction**

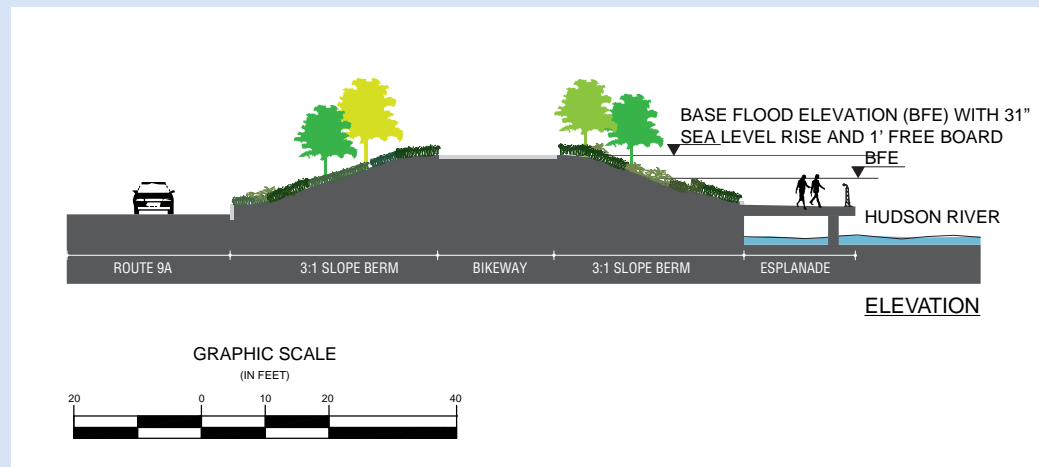
**MEDIUM**

While a feasibility study and conceptual design on their own provide no tangible risk reduction benefits, should the proposed study lead to the eventual construction of multipurpose flood strategies along the proposed corridors, this project carries significant risk reduction benefits, providing preliminary comprehensive coastal protection strategies for the entire Focus Area when tied with existing or planned flood protection strategies for Lower Manhattan. This would protect both a large group of vulnerable residents and a significant value of assets.

**Timeframe for implementation**



While the overall implementation of any recommended strategies that result from this study is a long-term endeavor, the study itself is short-term. This project requires the identification of a single New York State or



Strategies for the east side and west side may include berms with recreational amenities. Source: Courtesy of WXY Architecture + Urban Design for the East River Blueway Plan, with the addition of an elevated bikeway by the Consultant Team (top); Mathews Nielsen Landscape Architects, P.C. (bottom).



New York City agency to oversee project management, including the issuance of a RFP and subsequent selection of a consultant team to execute the study's scope, a process that is likely to take at least a year. Once that contract is secured, it is estimated that the feasibility study and conceptual design would be completed 18 months from the start of contract, divided approximately equally between study and design.

- New York City Economic Development Corporation (NYC EDC)

While this study requires a single agency to oversee project management, any implementation of recommended strategies would require the coordination of the agencies listed above along with various community stakeholders. This may also involve the NYS DEC, NYS DOS and USACE.

## Regulatory requirements

This project would have no regulatory requirements in the feasibility and conceptual design phase, but extensive coordination and approvals would be required from the agencies listed in the Jurisdiction section below to construct the recommended improvements.

## Jurisdiction

This project, depending on the specific siting of the interventions, falls under the jurisdiction of the following agencies:

- New York State Department of Transportation (NYS DOT)
- Hudson River Park Trust (HRPT)
- Hugh L. Carey Battery Park City Authority (BPCA)
- United States Coast Guard (USCG)
- New York City Department of Parks and Recreation (NYC DPR)
- New York City Department of Transportation (NYC DOT)





# V. Additional materials

Lower Manhattan is home to a diversity of neighborhoods.  
Source: Flickr user NYC [heart] NYC, licensed under Creative Commons.

## Additional resiliency recommendations

Lower Manhattan’s Proposed and Featured Projects represent the greatest priorities for funding with the available NY Rising Community Reconstruction Program (NYRCR) Community Development Block Grant-Disaster Relief (CDBG-DR) funds and other sources; however, Lower Manhattan’s long-term resiliency also relies upon the important initiatives detailed below in Table V-1. These recommendations, if implemented, would advance the resiliency strategies and community goals outlined earlier, including enhancing emergency preparedness, response, and recovery coordination and capacity; protecting vulnerable populations; and increasing the resiliency of utilities and transportation.

**Table V-1: Additional resiliency recommendations**

Strategy	Project name	Short project description	Regional project (Y/N)	Estimated cost
<b>Improve emergency preparedness through enhanced coordination and planning</b>	Improvement and capacity assessment of existing evacuation center and shelter system in Lower Manhattan	The Planning Committee recommends that the quality and capacity of existing evacuation facilities in Lower Manhattan be evaluated, including Seward Park High School. The Committee further recommends that findings from the evaluation lead to actionable steps to improve the capacity of the system to better accommodate Planning Area residents.	N	N/A
	Determine approach for storage of area flood barriers, funding of deployment activities	The Planning Committee recommends that the City determine an approach for the storage and deployment of flood barriers. This would include identifying and mobilizing the funding to support deployment activities in the days leading up to a storm.	Y	N/A
	Continue and expand Community Emergency Response Teams (CERTs)	The Planning Committee recommends that NYC OEM’s CERT program be expanded throughout New York City, and that efforts be made to ensure there are an adequate number of CERT volunteers in high- and extreme-flood risk areas in advance of a storm.	Y	N/A
	Support City’s efforts to expand the Worker Connect technology tool	The Planning Committee recommends that the City continue its efforts to enhance Worker Connect technology with a new Emergency Services Portal. Worker Connect compiles data on vulnerable populations from City agencies, and a new Emergency Services Portal would provide information from additional sources, including nonprofits, as well as expand reporting options and incorporate new location identifiers, which can have useful implications for tracking and delivering services to vulnerable populations.	Y	\$500K

Strategy	Project name	Short project description	Regional project (Y/N)	Estimated cost
<p><b>Improve emergency preparedness through enhanced coordination and planning</b></p>	<p>Support City's efforts to create an Emergency Notification Contact System</p>	<p>The City is currently investigating the creation of an online, voluntary Emergency Notification Contact System based on NYC HPD's existing tenant contact information system. The Planning Committee supports the development of this database, which would contain useful information for application in emergency response and recovery efforts, including tenant emergency contact information, information on building systems including presence of backup generators, and information on vulnerable populations.</p>	<p>Y</p>	<p>\$500K to \$1 million</p>
	<p>Expand opportunities for non-profit and philanthropic and engagement in emergency preparedness, response, and recovery</p>	<p>The Planning Committee recommends that the City introduce avenues through which philanthropies and non-profits may contribute to recovery efforts. This could include expanded opportunities to donate and volunteer, both to recovery efforts and to preparedness and response initiatives.</p>	<p>Y</p>	<p>N/A</p>
<p><b>Protect vulnerable populations</b></p>	<p>Finalize citywide registry for elderly and disabled</p>	<p>The Planning Committee recommends that the City finalize the development of a registry of vulnerable individuals.</p>	<p>Y</p>	<p>&gt;\$1 million</p>
	<p>Implement voluntary registry systems to track vulnerable populations and notify them prior to and during time of event</p>	<p>The Planning Committee recommends the development of a simple, plug-and-play database for use by CBOs, building owners/managers, small businesses, and others to track populations. It would also outline a process for data content management, procedures for contacting vulnerable populations through various networks (e.g., texting, phone trees, and door-knocking), and procedures for connecting vulnerable individuals with key resources (e.g., food, medicine, and medical attention). Specific attention would be paid to coordinating with schools and student populations. Oversight of the database might be linked to the community emergency preparedness program outlined in Section IV, in close coordination with NYC OEM and relevant third parties (e.g., Community Boards).</p>	<p>Y</p>	<p>&lt;\$500K</p>
	<p>Develop process for CBO coordination with City to track and serve vulnerable populations</p>	<p>The Planning Committee recommends that the City and CBOs active in emergency response coordinate to identify a process for tracking and serving vulnerable populations.</p>	<p>Y</p>	<p>N/A</p>

Strategy	Project name	Short project description	Regional project (Y/N)	Estimated cost
<b>Protect vulnerable populations</b>	Increase vulnerable populations' access to medications before, during, and after emergency events	The Planning Committee recommends that pharmacies, home health care services, and other facilities serving vulnerable populations take measures to ensure backup power and expanded inventory of medication before emergency events.	Y	>\$1 million
	Finalize citywide registry for elderly and disabled	The Planning Committee recommends that the City finalize the development of a registry of vulnerable individuals.	Y	>\$1 million
	Develop a pilot program to identify and test strategies for protecting vulnerable neighborhoods and populations from health impacts due to extreme heat and cold	The Planning Committee recommends that the City develop a pilot public health program focused on protecting vulnerable populations from the impacts of extreme heat and cold in the aftermath of an emergency event and associated outages to HVAC and other systems.	Y	\$500K to \$1 million
	Encourage the City and others to develop resiliency plans for schools and youth centers	The Planning Committee recommends that the City require schools and youth centers to develop resiliency plans. Regulations could apply to installing flood protection measures (e.g., deployable flood barriers) for these buildings and purchasing backup generators, and could also require schools to develop contingency plans for after-school programs and for meeting school-year-days requirements in the event of school closures.	Y	N/A
	Encourage the City to undertake measures to ensure the resiliency of the food supply	The Planning Committee recommends that the City offer incentives to supermarkets and other perishable food retailers which obtain backup power supply.	Y	N/A
<b>Strengthen the resiliency of existing residential buildings</b>	Expand the City's resiliency funding to multifamily owners to offset cost of resiliency upgrades	The Planning Committee recommends that new funding streams become available, or existing funding (e.g., Build It Back Program) extended, for floodproofing and making upgrades to mechanical systems in multi-family properties.	Y	>\$1 million
	Require building owners to develop and post emergency plans for building residents	The Planning Committee recommends that the City require building owners to develop and post emergency plans for buildings.	Y	N/A

Strategy	Project name	Short project description	Regional project (Y/N)	Estimated cost
<b>Strengthen the resiliency of existing residential buildings</b>	Advance/increase resiliency requirements in building code	The Planning Committee recommends that the building code expand resiliency requirements around elevation of building mechanicals; installing backup energy systems; limiting ground-floor uses in extreme- and high- flood-risk areas; and wet- and dry-floodproofing.	Y	N/A
	Expand energy efficiency incentive programs to include measures that provide resiliency co-benefits	The Planning Committee recommends that energy efficiency incentive programs also provide incentives for measures that offer resiliency co-benefits.	Y	N/A
	Encourage the development of educational materials for building owners purchasing property flood insurance	The Planning Committee recommends that the State and City expand existing and/or create new technical assistance programs that clarify flood insurance issues for multifamily residential property owners, by offering one-on-one counseling to building owners, producing easy-to-read manuals in multiple languages, and widely disseminating other resources online and in print.	Y	<\$500K
	Suggest the legislature offer tax incentives for property owners that install surge barriers	The Planning Committee recommends that the City, State, or Federal government create a tax incentive program for multifamily residential property owners that install flood barriers.	Y	N/A
	Recommend that Congress expand disaster recovery fund applicability to co-ops and condominium properties	The Planning Committee recommends that Congress expand the applicability of FEMA and CDBG-DR funds to cooperative and condominium developments, putting these funds in the reach of the more than 9,000 units of this type of housing in the Planning Area.	Y	N/A
	Support and expand design competitions to increase flood resiliency in residential building systems	The Planning Committee recommends that design competitions to explore flood resiliency measures in residential building systems be expanded to produce options for a broad range of building types and scales.	Y	>\$1 million
	Support purchase of backup generators for large residential developments	The Planning Committee recommends the development of a grant or financial incentive program targeted to support the purchase of backup generators for large multifamily residential properties.	Y	>\$1 million

Strategy	Project name	Short project description	Regional project (Y/N)	Estimated cost
<b>Empower small businesses to become more resilient</b>	Expand City financial and technical assistance to small businesses	The Planning Committee recommends that existing City grant and technical assistance programs around small business resiliency be expanded to offer increased support, especially for food retailers, which serve a vital function in relief and recovery.	Y	>\$1 million
	Expand NYSERDA's existing energy efficiency audit programs to include a resiliency component	The Planning Committee recommends that NYSERDA create a special resiliency audit program (e.g., an "Energy Resiliency Audit") or new component of an existing energy efficiency audit program to apply to commercial properties.	Y	>\$1 million
	Encourage City to develop educational materials on property and flood insurance for business owners	The Planning Committee recommends that the City create educational materials guiding businesses through the process of purchasing business and property flood insurance.	Y	>\$500K
	Establish a tax incentive for property owners that install surge barriers	The Planning Committee recommends that the City, State, or Federal government create a tax abatement program for commercial property owners that install flood barriers.	Y	>\$1 million
	Connect businesses to local communications networks to ensure seamless EBT and non-cash payment options	The Planning Committee recommends the establishment of resilient Wi-Fi networks across which seamless EBT and non-cash payment transactions may be made in the event of power outages.	Y	>\$1 million
	Support and expand design competitions to increase flood resiliency in commercial building systems	The Planning Committee recommends that design competitions to explore flood resiliency measures in commercial building systems be expanded to produce options for a broad range of building types and scales.	Y	>\$1 million
<b>Improve stormwater capture and retention</b>	Ensure that street reconstruction projects incorporate resiliency measures	The Planning Committee recommends that current and future street reconstruction projects in the Planning Area incorporate resiliency measures into street design and landscaping (e.g., increasing natural groundcover/permeable paving and investigating sloped street design to improve drainage).	N	N/A
	Encourage use of New York State Green Infrastructure Grant program funds run through DEP	The Planning Committee recommends that the City and relevant nonprofit and business organizations publicize the availability of the State's Green Infrastructure Grant program and its potential use in a variety of green infrastructure projects in the Planning Area.	N	N/A



Strategy	Project name	Short project description	Regional project (Y/N)	Estimated cost
<b>Protect edge neighborhoods from coastal flooding</b>	Establish and communicate flood protection project standards specific to the needs of Lower Manhattan communities	The Planning Committee recommends that the City and State establish and communicate flood protection project standards specific to Lower Manhattan communities' respective needs and character, including differing neighborhood cultural, ethnic, and socioeconomic makeup, as well as architectural and historic composition.	N	N/A
	Encourage the implementation of a deployable wall system to protect the Canal Street area east of Hudson Street	The Planning Committee recommends that the City and/or State implement a deployable wall system along four to six blocks of Hudson Street for protection of the mixed-use neighborhood to the interior as well as the Holland Tunnel entrance/exit portals against a 100-year storm at a minimum, up to a 500-year storm.	N	>\$1 million
<b>Advocate for the long-term resiliency and dependability of transportation and utility infrastructure</b>	Contract with cell service providers to enhance resiliency and hardening of cell tower sites	The Planning Committee recommends that the City ensure the resiliency and hardening of cell tower sites in the Planning Area.	N	N/A
	Explore potential for use of the NYCWiN network for key community organizations during emergencies	The Planning Committee recommends that the City explore options for use of the NYC Wireless Network (NYCWiN) by community-based organizations immediately before, during, and after emergency events.	Y	N/A
	Facilitate electric power restoration through mobile electric substations	The Planning Committee recommends that utility providers determine locations and construct pre-connections for mobile electric substations to facilitate service restoration post-storm events.	Y	>\$1 million
	Expand funding for New York City gas stations to install backup generators in case of power outages	The Planning Committee recommends that the State expand funding for the purchase of backup generators by New York City gas stations. Under a new State law, all gas stations located within a half-mile of a highway exit or hurricane evacuation route must have a backup generator. Under the Fuel NY initiative, grants of up to \$13,000 per station will be provided for the costs of generators, and the Committee recommends expanding funding availability to ensure that gas stations in New York City install backup power, and service disruptions are avoided during and after emergency events.	Y	>\$1 million

## Master table of projects

The master table of projects below includes all Proposed Projects and Featured Projects identified by the NYRCR Lower Manhattan Planning Committee and larger Community, as described in more detail in Section IV.

**Table V-2 : Master table of projects**

Strategy	Project name	Short project description	Project Category	Estimated cost	Regional project (Y/N)
<b>Improve emergency preparedness through enhanced coordination and planning</b>	<b>Community emergency preparedness program</b>	This project would create: (a) one or more local community emergency preparedness coordinators and (b) local emergency preparedness programs and plans, throughout the Planning Area.	Proposed Project	\$1.5 million to \$2 million	N
<b>Ensure CBO capacity to deliver key services to local populations during emergency events</b>	<b>Community resource/recovery center and CBO grant program</b>	This project would fund: a) A network of hardened community resource/recovery centers, to be based out of existing community facilities and organizations; and b) Grants to provide technical and financial assistance programs to CBOs to implement the functions of the community emergency preparedness plans.	Proposed Project	\$10 million to \$12 million	N
<b>Strengthen the resiliency of existing residential buildings</b>	<b>Residential resiliency and education program</b>	This project would fund: (a) the creation of a resiliency information assistance center for residential building owners, tenant associations, and building managers, as well as (b) technical assistance and individual counseling and (c) financial assistance for improving the resiliency of residential buildings.	Proposed Project	\$3.5 million to \$7 million	N

Strategy	Project name	Short project description	Estimated cost	Project Category	Regional project (Y/N)
Empower small businesses to become more resilient	Small business resiliency and education program	This project would fund: (a) the creation of an information and assistance center to connect ground-floor and below-grade small business retailers with existing programs and resources, as well as offer technical assistance for improving the resiliency of operations and retail spaces; and (b) financial assistance to help small businesses pay for technical audits and recommended resiliency upgrades.	\$2.25 million to \$3.75 million	Proposed Project	N
Improve stormwater capture and retention	Stormwater capture and retention study	This project would fund: (a) a study to examine the feasibility, costs, and benefits for various high-impact stormwater capture and retention approaches in the Planning Area, followed by (b) the implementation of recommended scalable pilot projects.	\$2 million	Proposed Project	
	Wetland creation at East River Park	This project would provide funding to support the creation of a constructed wetland in East River Park at a new composting facility.	\$1 million	Proposed Project	N
Protect edge neighborhoods from coastal flooding	Berming and deployable walls at Battery Park: Phase 1 construction	This Proposed Project would allocate \$2 million in funding toward the construction of the first phase of a system of berms and adjoining deployable flood barriers at Battery Park, for protection against a 500-year flood event.	\$2 million	Proposed Project	N
	Berming and deployable walls at Battery Park: Phase 2 construction and future conceptual design	This Featured Project would entail the next phase of implementation as part of Phase 1, as well as conceptual design for future phase(s) of work to the east and west of the Phase 1 project site.	\$1.8 million to 3.4 million	Featured Project	N

Strategy	Project name	Short project description	Estimated cost	Project Category	Regional project (Y/N)
Protect edge neighborhoods from coastal flooding	<b>Feasibility study and design of targeted flood protection strategy for lower West Street</b>	This Proposed Project would fund a feasibility study and conceptual design for a targeted strategy that would protect the West Street area south of Harrison Street against a 100-year flood event, using interventions at the southernmost edge of Hudson River Park and the northern edge of Battery Park along Battery Place.	\$750,000	Proposed Project	N
	<b>Implementation of targeted flood protection strategy for lower West Street</b>	This Featured Project would fund the implementation of the Proposed Project (described above), which could ultimately provide comprehensive flood protection for this area around lower West Street.	\$8.4 million	Featured Project	N
	<b>Coastal protection study for east and west side</b>	This project would fund a feasibility study and conceptual design for a series of multipurpose flood barriers for protection of the east and west sides of Lower Manhattan against a 100-year flood event, using measures such as a raised greenway, berming, and deployable walls.	\$2 million	Proposed Project	N



# Public engagement process

## Public engagement

**Public engagement has been central to all phases of development of the Lower Manhattan NY Rising Community Reconstruction (NYRCR) Plan.** Through public engagement and committee meetings, over 200 residents, including Committee members, elected officials, and professionals participated in Lower Manhattan NYRCR events. In addition to engagement through relationship- building in the community, the Committee used online tools such as an online Interactive Community Map to solicit feedback from community members unable to attend meetings. The Planning Committee utilized community guidance and feedback to identify assets, needs, and ultimately, the projects that are proposed for funding in the NYRCR Plan. Continuous public engagement has ensured that the NYRCR Plan reflects the community's priorities for rebuilding and resiliency.



Community members provided input at Public Engagement Event #1.

## Planning Committee

The Lower Manhattan NYRCR Planning Committee Members are volunteer members who represent various constituencies within the Planning Area, including, but not limited to, residents, business and community leaders, and community groups.

The boundary of the Planning Area underwent evolution at the beginning of the NYRCR process, having originally been defined as the area below Chambers Street on the west side and Frankfort Street on the east side. Committee members noted that a much larger area of Manhattan, south of approximately West 62nd Street along

the Hudson River and East 42nd Street on the East River was vulnerable to natural disasters associated with climate change during and after Superstorm Sandy. The Committee ultimately determined, however, that the area below 14th Street would be the subject of the planning process, as local businesses and residents,

experienced particularly acute effects due to Sandy’s impact in the area, with impacts to the greater region as well.

The Planning Committee held six Committee Meetings over the course of seven months. These meetings were venues for discussion and often lively debate among the Planning Committee Members. Members of the public and representatives of community groups attended Planning Committee Meetings and contributed to discussions and information-sharing. At some meetings, Planning Committee members divided into break-out groups to provide an intimate opportunity for collaboration; break-out group participants would then act as the “experts-on-hand” for the respective topic and report back to the general Committee. All Planning Committee Meetings were announced publicly on the NYRCR website. Meetings were open to the public and held at a variety of community facilities throughout the Lower Manhattan NYRCR Planning Area.

Planning Committee meetings addressed all topics covered in this Plan. Specific tasks and discussions held at the meetings included: identification of community assets; assessment of needs and opportunities; formalization of reconstruction and resiliency strategies; development of priority projects; and finalization



Community members provided input at Public Engagement Event #1.

of proposed and featured projects. The Committee spearheaded community outreach strategy, identifying avenues for outreach to the Planning Area’s diverse population, and solicited public feedback throughout the process.

In addition to Planning Committee meetings, the

Planning Committee created five Working Groups. Four of the Working Groups were structured to reflect the strategies formalized by the Planning Committee—Emergency Preparedness, Residential Resiliency, Open Space Resiliency, and Small Business Resiliency—and provided Planning Committee Members an additional

opportunity to foster discussions on the Proposed and Featured projects. The fifth Working Group focused on outreach and planning related to the Public Engagement Events.

## Public Engagement Events

Public Engagement Events were designed to be highly interactive and maximize community feedback on the priorities and needs of the community. Three Public Engagement Events were held prior to the submission of the

NYRCR Plan. The Planning Committee selected community-based venues with accessibility and proximity to targeted stakeholders, including low- and middle-income residents and seniors. At the Public Meetings, the Planning Committee offered general information about the NYRCR Plan process; presented outcomes and information gathered to-date; and solicited feedback through dynamic discussions and interactive displays. Following each Public Engagement Event, community feedback was aggregated and analyzed in order to guide discussion during Planning Committee meetings.

### Public Engagement Event #1 (October 2013)

**Program Scope; Goals, and Timeline;  
Feedback on Vision; Community Assets; and  
Needs and Opportunities**

Public Engagement Event #1 showcased the NYRCR Program scope and presented the Planning Committee's assessment of community assets and needs and opportunities. The Public Engagement Event began with a formal presentation that introduced NYRCR and the program's objectives to the community. Following the presentation, an open house style event was held in which Planning Committee



Community members provided input at Public Engagement Event #2.



members facilitated group discussion and invited community input on a number of topics including identification of assets, needs, opportunities, and goals as featured on the display boards. While the public engaged in conversation around the display boards, they were invited to take part in interactive exercises by placing stickers and notes on feedback boards. This feedback mechanism created a documented record of community discussion feedback from the Public Engagement Event for the Planning Committee to use during future meetings.

## **Public Engagement Event #2 (December 2013)**

### **Contents of Draft Conceptual Plan; Gathering Feedback on Strategies and Projects**

Public Engagement Event #2 solicited public responses to priority resiliency strategies determined by the Planning Committee and public. The meeting consisted of an introductory presentation followed by two breakout sessions in which the public and Planning Committee members gathered in groups organized by strategy. Planning Committee members staffed the breakout tables and led the discussions on potential strategies. The public was again invited to gather around display boards around the room and offer their feedback with stickers



Community members provided input at Public Engagement Event #3.

and written notes placed on feedback boards. Community members' comments at the tables and on the boards provided powerful guidance to the Planning Committee on the types of projects to pursue that address the Lower Manhattan Community's greatest priorities and concerns, and substantially shaped project development

going forward.

## **Public Engagement Event #3 (March 2014)**

### **Presentation of Proposed and Featured Projects, and Additional Resiliency Recommendations; Gathering Feedback on**

## Strategies and Projects

The third Public Engagement Event provided a critical opportunity to share the Proposed and Featured Projects with the Community and obtain feedback on these projects. The Lower Manhattan Committee organized a two-day open house, held in Community Boards 1, 2, and 3 to maximize the opportunity for a wide geographic swath of the public to provide comment.

Public Engagement Event #3 featured an introductory presentation followed by an open-house with display boards of the proposed projects placed throughout the venue. Community members traveled back-and-forth between the projects making general inquiries, engaging in small group conversations, and voicing their opinions on feedback boards. They then headed to a voting board and identified their top five projects with sticker voting. By the end of the meeting, the voting board displayed a colorful summary of the community discussions and members' perspectives on the projects. The voting tally was summarized at the next Planning Committee meeting during deliberations on the proposed projects.

## Public Engagement Event #4 (April 2014 or TBD)

### Presentation of Final Plan and announcement of projects

Public Engagement Event #4 will take place in April and conclude the Public Engagement Event series. At the Public Engagement Event, the Planning Committee will present the proposed projects and the NYRCR Plan to the public.

### Public Engagement Event outreach

The Planning Committee spearheaded outreach for Public Engagement Events. Planning Committee members leveraged community distribution channels to distribute emails, social media, community events, and printed material—palm cards, flyers, and storefront posters—with Public Engagement meeting information. Distribution channels included Community Boards, local newspapers, business organizations, local businesses, community centers and organizations, local schools, religious intuitions, and word-of-mouth. The Planning Committee also selected local publications for online and print advertisement campaigns. The Lower Manhattan Planning Committee requested Spanish and Chinese translators for all the Public Engagement meetings; printed materials were

additionally translated into Spanish and Chinese with specific mention of translators on hand at the Public Engagement Events.

### Online engagement and social media outreach

The NYRCR website, located at <http://www.stormrecovery.ny.gov/nycrcr>, served as a valuable public resource. The Lower Manhattan NYRCR page is located at <http://stormrecovery.ny.gov/nycrcr/community/lower-manhattan> and featured announcements, meeting dates and locations, and materials produced by the Planning Committee throughout the process. The NYRCR website also directed visitors to the NYRCR Facebook page (located at <https://www.facebook.com/NYStormRecovery>) and Twitter account (@NYStormRecovery). Communities were also able to submit comments through the NYRCR website and by emailing [info@stormrecovery.ny.gov](mailto:info@stormrecovery.ny.gov).

A customized interactive online public engagement tool was generated for the community through an online Interactive Community Map located at <http://lowermanhattan.nyrisingmap.org/>. The Community Map allowed users to confirm specific physical and cultural assets significant to Lower Manhattan, identify recovery and resiliency needs, and suggest rebuilding and resiliency

initiatives. The Planning Committee distributed flyers and conducted outreach to promote the Interactive Community Map. Public comments on the map were summarized and presented to the Planning Committee and utilized as an additional feedback metric.



Community members provided input through an online Community Map.

# Community asset inventory

Facilities Serving Vulnerable Populations
Name
ANDREWS HOTEL
ASSOCIATION FOR REHABILITATIVE CASE MANAGEMENT AND HOUSING
BAILEY HOUSE
BARRIER FREE LIVING
BONITAS YOUTH SERVICES
CENTERLIGHT HEALTHCARE COMPREHENSIVE CARE CENTER
CHINATOWN DAY CARE CENTER
COMMUNITY ACCESS HOUSING
COMMUNITY ACCESS TRANSITIONAL HOUSING PROGRAM
EVELYN AND LOUIS GREEN RESIDENCE AT COOPER SQ. (JASA)
GEORGE DALY HOUSE
GOUVERNEUR COURT
HARRY AND JEANETTE WEINBERG RESIDENCE (JASA)
HELEN'S HOUSE
HOUSING DEVELOPMENT FUND
HOUSING WORKS CYLAR HOUSE
THE HALLMARK BATTERY PARK CITY
JEWISH BOARD OF FAMILY AND CHILDREN'S SERVICES
LOWER EAST SIDE COALITION HOUSING DEVELOPMENT
MANHATTAN DETENTION COMPLEX
METROPOLITAN CORRECTIONAL CENTER
NATIONAL CENTER FOR PALLIATIVE CARE INNOVATION (UNDER CONSTRUCTION)
NEW EAST SIDE NURSING HOME
PROJECT RENEWAL
RENEWAL ON THE BOWERY
RIDGE STREET GARDENS
RIVINGTON HOUSE
SACRED HEART CONVENT
SALVATION ARMY CHINATOWN CORPS
SIROVICH CENTER
ST. MARGARET'S HOUSE
THIRD STREET WOMEN'S RESIDENCE

TWO BRIDGES SENIOR RESIDENCE
TWO BRIDGES TOWER
VILLAGE CARE REHABILITATION AND NURSING CENTER
WOMEN'S PRISION ASSOCIATION AND HOUSING

Key Housing Assets: Subsidized Housing	
Name	Asset Subcategory
BARUCH HOUSES (NYCHA)	Multi-Family Residence
CAMPOS PLAZA I (NYCHA)	Multi-Family Residence
CAMPOS PLAZA II (NYCHA)	Multi-Family Residence
GOUVERNEUR GARDENS (CO-OP)	Multi-Family Residence
KNICKERBOCKER VILLAGE (MITCHELL-LAMA)	Multi-Family Residence
LANDS END I (SECTION 8)	Multi-Family Residence
LANDS END II (SECTION 8)	Multi-Family Residence
LAVANBURG HOMES (NYCHA)	Multi-Family Residence
LOWER EAST SIDE II (NYCHA)	Multi-Family Residence
LOWER EAST SIDE III (NYCHA)	Multi-Family Residence
LOWER EAST SIDE REHAB (NYCHA)	Multi-Family Residence
RIIS HOUSES (NYCHA)	Multi-Family Residence
RIIS HOUSES II (NYCHA)	Multi-Family Residence
SMITH HOUSES (NYCHA)	Multi-Family Residence
TANYA TOWERS (MITCHELL-LAMA)	Multi-Family Residence
TWO BRIDGES HOUSES (NYCHA)	Multi-Family Residence
TWO BRIDGES TOWER (SECTION 8)	Multi-Family Residence
VILLAGE EAST TOWERS (MITCHELL-LAMA)	Multi-Family Residence
WALD HOUSES (NYCHA)	Multi-Family Residence
WEST VILLAGE HOUSES (CO-OP)	Multi-Family Residence

Key Infrastructure Assets	
Name	Asset Subcategory
BATTERY PARK UNDERPASS	Transportation
BROOKLYN BRIDGE	Transportation
CHERRY STREET SUBSTATION (CON EDISON)	Power Supply
DOWNTOWN HELIPORT	Transportation
GOVERNORS ISLAND FERRY	Transportation
HOLLAND TUNNEL	Transportation
HOUSTON STREET UNDERPASS	Transportation
HUGH L. CAREY TUNNEL	Transportation
L TRAIN TUNNEL	Transportation
LEONARD STREET SUBSTATION (CON EDISON)	Power Supply
MANHATTAN BRIDGE	Transportation
PIER 11 / EAST RIVER FERRY TERMINAL	Transportation
SOUTH STREET SUBSTATION (CON EDISON)	Telecommunications
SOUTH STREET TRUCK ROUTE	Transportation
STATEN ISLAND FERRY - WHITEHALL FERRY TERMINAL	Transportation
VERIZON SWITCHING STATION	Power Supply
WORLD TRADE CENTER PATH STATION	Transportation
WEST STREET TUCK ROUTE (ROUTE 9A)	Transportation
WHITEHALL FERRY TERMINAL	Transportation
WHITEHALL STATION AND SUBWAY TUNNELS	Transportation
WILLIAMSBURG BRIDGE	Transportation
13TH STREET SUBSTATION (CON EDISON)	Power Supply
140 WEST STREET VERIZON EXCHANGE	Telecommunications
BATTERY PARK CITY FERRY TERMINAL	Transportation
BATTERY PARK UNDERPASS	Transportation

Natural and Cultural Assets	
Name	Asset Subcategory
BATTERY PARK	Parks and Recreation
BATTERY PARK CITY BALLFIELDS	Parks and Recreation
BROOKFIELD PLACE PLAZA	Open Space
EAST RIVER ESPLANADE	Parks and Recreation
EAST RIVER PARK	Parks and Recreation
HUDSON RIVER PARK	Parks and Recreation
IRISH HUNGER MEMORIAL	Memorial
LOWER EAST SIDE COMMUNITY GARDENS	Parks and Recreation
MUSEUM OF JEWISH HERITAGE	Museums, Performing Arts Centers, and Stadiums
NATIONAL SEPTEMBER 11 MEMORIAL AND MUSEUM	Memorial
NELSON A. ROCKEFELLER PARK	Parks and Recreation
NEW AMSTERDAM MARKET	Natural and Cultural Resources
PIER 25	Parks and Recreation
PIER 35 ECO-PARK	Parks and Open Space
PIER 40	Parks and Recreation
PIER 42 PARK (UNDER CONSTRUCTION)	Parks and Recreation
POETS HOUSE	Cultural or Religious Establishments
SKYSCRAPER MUSEUM	Museums, Performing Arts Centers, and Stadiums
SOUTH STREET SEAPORT MUSEUM	Museums, Performing Arts Centers, and Stadiums
SOUTH STREET SEAPORT HISTORIC VESSELS	Museums, Performing Arts Centers, and Stadiums
TEARDROP PARK	Parks and Recreation
TRIBECA PERFORMING ARTS CENTER	Museums, Performing Arts Centers, and Stadiums
WESTBETH ARTISTS' HOUSING AND CENTER FOR THE ARTS	Museums, Performing Arts Centers, and Stadiums

Health and Social Services: Key Emergency Response Assets	
Name	Asset Subcategory
311 OFFICE	Key Community Organizations
BATTERY PARK CITY EMERGENCY MEDICAL OFFICE	Key Health Care Center
BATTERY PARK CITY SENIORS' GROUP	Key Community Organizations
BETANCES HEALTH CENTER	Key Health Care Center
BOWERY RESIDENTS' COMMITTEE (BRC)	Key Community Organizations
BRECHT FORUM	Key Community Organizations
CHARLES B. WANG COMMUNITY HEALTH CENTER	Key Health Care Center
CHINESE CONSOLIDATED BENEVOLENT ASSOCIATION	Key Community Organizations
COMMITTEE AGAINST ANTI-ASIAN VIOLENCE (CAAHV)	Key Community Organizations
COMMUNITY BOARD 1	Key Community Organizations
COMMUNITY BOARD 2	Key Community Organizations
COMMUNITY BOARD 3	Key Community Organizations
DEWITT REFORMED CHURCH	Key Community Organizations
DOWNTOWN ALLIANCE	Key Community Organizations
FDNY ENGINE 33, LADDER 9	FDNY Facility
FDNY ENGINE 15, LADDER 18	FDNY Facility
FDNY ENGINE 24, LADDER 5	FDNY Facility
FDNY ENGINE 28, LADDER 11	FDNY Facility
FDNY ENGINE 4, LADDER 15	FDNY Facility
FDNY ENGINE 5	FDNY Facility
FDNY ENGINE 55	FDNY Facility
FDNY SQUAD 18	FDNY Facility
FDNY LADDER 20	FDNY Facility
FDNY LADDER 8	FDNY Facility
FDNY ENGINE 7, LADDER 1 MANHATTAN BOROUGH COMMAND	FDNY Facility
FDNY ENGINE 10, LADDER 10	FDNY Facility
FDNY LADDER 3	FDNY Facility
FDNY ENGINE 6	FDNY Facility
FDNY ENGINE 9, LADDER 6	FDNY Facility
GOOD OLD LOWER EAST SIDE (GOLES)	Key Community Organizations

GOUVERNEUR HOSPITAL	Key Health Care Center
GRAND STREET SETTLEMENT	Key Community Organizations
HAMILTON MADISON HOUSE	Key Community Organizations
HENRY STREET SETTLEMENT	Key Community Organizations
NEW YORK DOWNTOWN HOSPITAL	Key Health Care Center
NYPD 1ST PRECINCT TROOP A	NYPD Facility
NYPD EMS STATION 4	NYPD Facility
NYPD LOWER MANHATTAN CENTER	NYPD Facility
NYPD SERVICE AREA 4	NYPD Facility
NYPD 5TH PRECINCT	NYPD Facility
NYPD 6TH PRECINCT	NYPD Facility
NYPD 7TH PRECINCT	NYPD Facility
NYPD 9TH PRECINCT	NYPD Facility
PRIMITIVE CHRISTIAN CHURCH	Key Community Organizations
SARA DELANO ROOSEVELT PARK COALITION BUILDINGS (VARIOUS SITES)	Key Community Organizations
SEWARD PARK	Evacuation Center
SEWARD PARK HIGH SCHOOL EVACUATION CENTER	Evacuation Center
TWO BRIDGES NEIGHBORHOOD COUNCIL	Key Community Organizations
UNIVERSITY SETTLEMENT	Key Community Organizations
WORLD TRADE CENTER EMERGENCY MEDICAL OFFICE	Key Health Care Center

Key Economic Assets	
Name	Asset Subcategory
55 WATER STREET	Employment Hub
BROOKFIELD PLACE	Employment Hub
NEW YORK STOCK EXCHANGE	Employment Hub
PIER A	Employment Hub
SOUTH STREET SEAPORT AND SEAPORT HISTORIC DISTRICT	Employment Hub
WORLD TRADE CENTER	Employment Hub



## Appendix A - Existing plans and initiatives

Plan/Program	Lead Organization(s)	Description	Recovery Functions						Sub-Category
			Community Planning & Capacity Building	Economic Development	Health & Social Services	Housing	Infrastructure	Natural & Cultural Resources	
A Stronger More Resilient New York (SIRR Report)	NYC Office of the Mayor and various City agencies	Citywide resiliency study proposed numerous initiatives relevant to Lower Manhattan. Key initiatives include: Install an integrated coastal protection system in Lower Manhattan; construct physical enhancements to Water Street; expand Take the H.E.L.M.; implement planned investments in South Street Seaport; retrofit public housing units damaged by Sandy and increase future resiliency of public housing; implement planned and ongoing investments at city parks and open space; establish a financial assistance program for small businesses affected by Sandy; and study feasibility of multipurpose levee on East River (Seaport City). Many more initiatives relevant to Lower Manhattan and the wider city are proposed, some of which are underway.	X	X	X	X	X	X	Resiliency
The Plan for Lower Manhattan	Lower Manhattan Development Corporation (LMDC), NYC Parks & Recreation Department (NYCDPR), New York Police Department (NYPD)	Finalized and ongoing efforts towards waterfront access and park improvements. LMDC hopes to expand and improve waterfront access at Peck Slip, Old Slip, Coenties Slip, Montgomery Slip, Catherine Slip, and Rutgers Slip. Upgrades are necessary for the Peck, Montgomery, and Catherine Slip medians, Pike/Allen Street malls, James Madison Park, Bowling Green, Brooklyn Bridge Plaza, Drumgoole Plaza, Sara D. Roosevelt Park, Washington Market Park, Wall Street Triangle, Canal Varick, and Collect Pond Park, among others.	X				X	X	Waterfront Access / Open Space
World Trade Center Redevelopment	Lower Manhattan Development Corporation (LMDC)	Improvements to the World Trade Center site and connections to the surrounding area.	X	X	X	X	X	X	Development
Fulton Corridor Revitalization Project	Lower Manhattan Development Corporation (LMDC)	Initiative calls to create and expand open spaces, implement retail and façade improvements, and complete streetscape and retail improvements.		X			X	X	Public Realm - Open Space



Plan/Program	Lead Organization(s)	Description	Recovery Functions					Sub-Category	
			Community Planning & Capacity Building	Economic Development	Health & Social Services	Housing	Infrastructure		Natural & Cultural Resources
Greenwich South (Corridor Plan)	Alliance for Downtown New York (ADNY)	The initiative calls for open space improvements, connections between WTC and Greenwich South, public realm activation, enhancing connections across Water Street, reimagining Greenwich Street as a gateway, the study of zoning and real estate development models to prioritize mixed-use development in Greenwich South, and coherence with community needs.	X	X		X	X	X	Corridor Plan
Water Street: A New Approach (Corridor Plan)	Alliance for Downtown New York (ADNY)	A proposal to rescale the streetscape of Water Street to create an iconic boulevard, strengthen connections to the historic core and waterfront, realign public and groundfloor spaces to encourage street life, and extend hours of activity.		X			X	X	Public Realm / Open Space
Hudson River Park	Lower Manhattan Development Corporation (LMDC), Hudson River Park Trust (HRPT), New York City Planning Commission (CPC), New York State Department of Environmental Conservation (NYSDEC)	Current or imminent park projects include: Pier 26 (boathouse and restaurant), Center Upland (including a dog run), and Hudson River Park Estuarium in Tribeca; Pier 40 infrastructural improvements; Gansevoort Peninsula and Pier 57 in the Meatpacking District; and the expansion of Pier 97 at Clinton Cove. Pier 57 is currently undergoing a review process to be converted to retail, restaurant, commercial, marina, educational, and cultural spaces with estimated completion in 2015. Pier 40 has received two bids - from the Durst Organization and Pier 40 Champions - for revitalization projects related to retail, commercial, and residential venues.		X		X	X	X	Waterfront Access / Open Space
East River Waterfront Esplanade	NYC Economic Development Corporation (EDC), Department of City Planning (DCP), Lower Manhattan Development Corporation (LMDC)	The first section of the East River Esplanade from Maiden Lane to Wall Street was completed in 2011. The esplanade will continue to be upgraded and piers installed. Resiliency measures might be able to be incorporated into sections that are not yet under construction such as the section between the Brooklyn and Manhattan Bridges.		X			X	X	Waterfront Access / Open Space

Plan/Program	Lead Organization(s)	Description	Recovery Functions						Sub-Category
			Community Planning & Capacity Building	Economic Development	Health & Social Services	Housing	Infrastructure	Natural & Cultural Resources	
Battery Garden Bikeway	Battery Conservancy, Piet Oudolf	Battery Garden Bikeway will link the Hudson River Park Bikeway to the East River Esplanade. Construction on the first phase is underway with completion of a section expected by the end of 2013. Later phases and sections of the bikeway may include resiliency components such as mild elevation or drainage technologies. The Conservancy is looking to increase the use of salt-tolerant plantings going forward.					X	X	Public Realm
The East River Blueway Plan (Waterfront to the People)	Office of Manhattan Borough President Scott Stringer, Office of New York State Assemblymember Brian Kavanagh, New York State Department of State Division of Coastal Resources, Community Boards 3 and 6, Lower East Side Ecology Center, LMDC	A community-based waterfront planning initiative for the East River, running from the Brooklyn Bridge to 38th Street, will incorporate storm recovery, integrate recreational activities, and connect neighborhoods to the waterfront. Though designed before Superstorm Sandy, the design has been adjusted in order to include more aggressive resiliency elements such as a flood wall that would protect the Con Edison substation and marsh design to absorb storm surge energy. As of May 2013, there were no plans in place for implementation though the borough president has committed \$3.5 million to study strategies and feasibility.	X			X	X	X	Waterfront Access / Open Space
Comprehensive Citywide Ferry Study	New York City Economic Development Corporation	Released in March 2011, the study evaluates potential opportunities for ferry expansion in New York City.					X	X	Transportation
Development of a Community-Based Plan	Chinatown Working Group (CWG), Lower Manhattan Development Corporation (LMDC)	The Chinatown Working Group is spearheading redevelopment efforts and generating a community-based plan for Chinatown improvements with support from a 2012 grant from the Lower Manhattan Development Corporation.	X	X	X	X	X	X	Neighborhood Planning

Plan/Program	Lead Organization(s)	Description	Recovery Functions						Sub-Category
			Community Planning & Capacity Building	Economic Development	Health & Social Services	Housing	Infrastructure	Natural & Cultural Resources	
Chinatown Rezoning Plan	Coalition to Protect Chinatown and the Lower East Side, Chinatown Working Group (CWG), Chinatown Business and Property Owners Group	Special Zoning District to Preserve Chinatown and the Lower East Side is being pursued. Previously, the Chinatown Business and Property Owners Group contracted with WXY Architecture + Urban Design to study the implications of rezoning Chinatown.	X	X		X			Zoning
Hudson Square: Rezoning, Special District, and Other Improvements	New York City Council, Department of City Planning (DCP), Landmarks Preservation Commission, Port Authority of New York and New Jersey, Department of Transportation (DOT), etc.	Proposals for Hudson Square's Rezoning and Special District, both approved March 2013, will add affordable housing units, fund open space and recreational amenities, and create a K-5 school. Thus far, half of the petitioned South Village Historic District will be preserved in light of rezoning efforts. Recent updates to Hudson Square also include the Freeman Plaza West opening; 2011 CityBench seating additions; 2012 Soho Square redevelopment; the Pedestrian Traffic Managers program establishment; ongoing pedestrian safety improvements at Hudson, Varick, and Canal Streets; and planned plaza renovations near the Holland Tunnel entrance.	X		X	X	X		Zoning
Seaport City	New York City Economic Development Corporation (EDC)	Feasibility study for a multi-purpose levee along Lower Manhattan's eastern edge to address coastal flooding and create economic development opportunities.	X	X	X	X	X	X	Coastal Protection / Economic Development
Essex Crossing (Seward Park, Lower East Side), also known as SPURA (Seward Park Urban Renewal Area)	Educational Alliance, Grand Street Settlement, Mayor's Office	\$1.1 billion mixed-use development for largest undeveloped City-owned property. Plan will include 1.65 million square feet encompassing 1,000 housing units, including 500 affordable housing units (with different affordability tiers); the renovation of Essex Market; an Educational Alliance school; a community center; a rooftop urban farm; the Andy Warhol Museum; 250,000 square feet of offices and retail; retail catered to small businesses; a bowling alley; and a movie theater. Announced Sept. 2013 with construction beginning Spring 2015.		X	X	X		X	Development, Housing, Public Realm

Plan/Program	Lead Organization(s)	Description	Recovery Functions						Sub-Category
			Community Planning & Capacity Building	Economic Development	Health & Social Services	Housing	Infrastructure	Natural & Cultural Resources	
Seaport Pier 17 Reconstruction	Mayor's Office, City Council, Community Board 1, Department of Cultural Affairs, Howard Hughes Corporation, Southstreet Seaport Museum	A three-year project to create a hub comprised of retail, entertainment, restaurants, bars, an amphitheater, and open space. The venture will produce over \$260 million and provide 1,000 jobs.		X				X	Development, Waterfront Access / Open Space
Paths to Pier 42	O.U.R. Waterfront Coalition/Lower East Side (LES) Waterfront Alliance, the Lower Manhattan Cultural Council, State Senator Daniel Squadron, New York City Department of Parks and Recreation	Pier 42 will be converted into a park based on community input. LES Waterfront Alliance initiated Paths to Pier 42 in summer 2013 to request proposals for art programming and events that will promote waterfront access. Hester Street Collaborative solicits public feedback for the project using its Waterfront on Wheels initiative. Since March 2012, Two Bridges Neighborhood Council has generated South Street Stakeholder discussions to brainstorm uses of the area around Pier 42 and increase access between the neighborhood and waterfront.	X					X	Waterfront Access / Open Space
Transforming the East River Waterfront	City of New York, SHoP Architects	A plan for reenvisioning the East River's access and open space creation dividing projects into categories by type and location and including Pier 42, Pike/Allen, the Slips, and the Esplanade. A comprehensive overview of ongoing projects.					X	X	Waterfront Access / Open Space
Hudson River Park Neighborhood Improvement District (NID)	Hudson River Park Trust (HRPT), Department of Small Business Services (SBS)	Nov. 2013 proposal to create a neighborhood improvement district that would generate revenue for Hudson River Park's maintenance and operations. Annual per-square-foot charges would be made of 7.5 cents and 15 cents for residents and commercial property owners, respectively, located in a three-block radius from the park.	X	X			X	X	Neighborhood Planning
Framework to Preserve Chinatown/Lower East Side	Two Bridges Neighborhood Council	2010 study analyzed preservation and affordability in Chinatown and the Lower East Side.	X	X		X			Housing

Plan/Program	Lead Organization(s)	Description	Recovery Functions						Sub-Category
			Community Planning & Capacity Building	Economic Development	Health & Social Services	Housing	Infrastructure	Natural & Cultural Resources	
East Side Action Plan	Transportation Alternatives, New York State Governor's Traffic Safety Committee, National Highway Traffic Safety Administration	Recommendations to improve the safety of Manhattan's eastern corridors (CB3, CB6, CB8, CB11) based on community studies in 2010.	X				X		Transportation
HUD Rebuild by Design	US Department of Housing and Urban Development (HUD), multiple firms	Design competition, hosted by HUD, seeks to solicit local resiliency designs that can provide regional and replicable solutions. In November 2013, ten ideas were selected to progress to the next round of analysis. Of those proposals, one is particularly relevant to Lower Manhattan: "The Big 'U'" proposal from the BIG Team. This proposal envisions an integrated protection system, wrapping around Manhattan from West 57th Street down to The Battery and up to East 42nd Street.	X	X	X	X	X	X	Housing, Neighborhood Planning, Resiliency
<b>TRANSPORTATION &amp; INFRASTRUCTURE PROJECTS</b>									
Sandy Recovery and Resilience Division	Metropolitan Transportation Authority (MTA)	Repairs and rehabilitation to critical projects including: - Rehab / Flood Mitigation for Metropolitan Transportation Authority (MTA) NYC Transit Lower Manhattan Stations - East River Tunnel Rehab and Repair - Original PATH Station repairs					X		Transportation
Hudson River Tunnel Resiliency Retrofits	Port Authority of NY & NJ (PATH)	Hudson River Tunnel Resiliency Retrofits (PATH tubes and Holland Tunnel)					X		Transportation
Tunnel and subway repairs	Metropolitan Transportation Authority (MTA)	Repairs to subway stations and tunnels including: - South Ferry subway station repairs - Montague Tunnel (R Train) - Hugh Carey/Battery Tunnel repairs					X		Transportation

Plan/Program	Lead Organization(s)	Description	Recovery Functions					Sub-Category
			Community Planning & Capacity Building	Economic Development	Health & Social Services	Housing	Infrastructure Natural & Cultural Resources	
DDC Capital Projects	NYC Department of Design and Construction (DDC)	Reconstruction of numerous projects including: - Worth Street, Chambers Street, Warren Street, Fulton Street, Cobble Stone Street, John Street, and Broadway and associated sewer upgrades - Morris Street pedestrian bridge replacement - Seward Park Sidewalk: Vault Replacement					X	Public Realm
PATH extension to Newark Airport	Port Authority of NY and NJ (PATH)	The PATH extension to Newark Airport is proposed and likely to be funded.					X	Transportation
World Trade Center Transportation Hub	Port Authority of NY and NJ (PATH)	Construction underway for transportation center that connects to PATH station and Battery Park City Ferry Terminal, is planned to connect to eleven subway lines, Hudson River ferries, the WTC towers, and will include a retail complex.		X			X	Transportation, Development
DOT Resiliency Retrofits	New York City DOT	Resiliency retrofits to Battery and West Street underpasses					X	Transportation
DEP Resiliency Retrofits	New York City DEP	Water and wastewater system resiliency upgrades					X	Utilities
"Go-Green" initiative - Car Share Program	Seward Park Co-op, Hertz, Manhattan Borough President Scott Stringer	As part of Hertz's car-sharing program and a larger push by the Co-op to undertake sustainable endeavors, in May 2011 Seward Park acquired electric hybrid vehicles and a charging station for use by tenants as well as non-residents.	X			X	X	Transportation, Housing
Local Spokes (Lower East Side-Chinatown Bicycling Coalition)	Two Bridges Neighborhood Council, Hester Street Collaborative, Asian Americans for Equality, and GOLES (Good Old Lower East Side)	A local initiative to promote bicycling in the Lower East Side. The project aims to use feedback from the community to generate a conceptual plan for transit.	X				X	Transportation, Public Realm



## Appendix B - Risk assessment tool

The following table provides the assets that were identified through the NYRCR planning process, which were then evaluated using the NYS DOS Asset Inventory and Risk Assessment tool. The table provides the baseline “risk score” for each asset and the scores for the following three risk evaluation components: hazard, exposure, and vulnerability. Hazard scores are based on each asset’s location relative to NYS





DOS risk areas and the assumption of a 100-year storm event. Exposure scores are based on landscape attributes, which were determined using publicly available data, aerial imagery, and site reconnaissance. Vulnerability scores are based on information regarding each asset’s performance during and after recovery after Superstorm Sandy and the asset’s current state of repair as described to the Committee, the public,

and in some instances, agency stakeholders and reports. More information, including a description of each table attribute, can be found at <http://stormrecovery.ny.gov/resources-0>.



Asset Information							Landscape Attributes							Risk			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score (*Yes* = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
<b>Community Board 1 housing in high DOS risk areas</b>	High	Housing	Multi-Family Residence	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	2	<b>15</b>
<b>Community Board 2 housing in high DOS risk areas</b>	High	Housing	Multi-Family Residence	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	2	<b>15</b>
<b>Community Board 3 housing in high DOS risk areas</b>	High	Housing	Multi-Family Residence	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	3	<b>23</b>
<b>Subsidized housing in high DOS risk areas</b>	High	Housing	Affordable Housing	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	4	<b>30</b>
<b>Housing serving vulnerable populations in high risk areas</b>	High	Housing	Supportive Housing	Yes	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	4	<b>30</b>
<b>Economic assets in high DOS risk areas centered around the Avenue C/D commercial corridor</b>	High	Economic	Employment Hub	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	3	<b>23</b>
<b>Economic assets in high DOS risk areas centered around the Canal Street commercial corridor</b>	High	Economic	Employment Hub	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	3	<b>23</b>
<b>Economic assets in high DOS risk areas centered around the Water/South Street commercial corridor</b>	High	Economic	Employment Hub	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	4	<b>30</b>

**Meaning of Risk Scores**

- Severe (>70) 
- High (24-53) 
- Moderate (6-23) 
- Residual (<6) 

Asset Information							Landscape Attributes							Risk			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
<b>Economic assets in high DOS risk areas centered around the West Street commercial corridor</b>	High	Economic	Employment Hub	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	2	<b>15</b>
<b>Hudson River Park</b>	Extreme	Natural and Cultural	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	3.50	3	<b>32</b>
<b>Battery Park</b>	High	Natural and Cultural	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	4	<b>30</b>
<b>East River Park</b>	Extreme	Natural and Cultural	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	No	No	1.5	3	3.50	3	<b>32</b>
<b>NYPD/FDNY Facilities in high DOS risk areas</b>	High	Health and Social Services	Emergency Operations/Response	No	Yes, FEMA	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	1	<b>8</b>
<b>Key healthcare facilities in high DOS risk areas</b>	High	Health and Social Services	Healthcare Facilities	No	Yes, FEMA	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	2	<b>15</b>
<b>Key community organizations in high DOS risk areas</b>	High	Health and Social Services	Community Centers	No	Yes, FEMA	High	No	Yes	Yes	Yes	No	No	1.5	3	2.50	3	<b>23</b>

**Meaning of Risk Scores**

- Severe (>70)
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- Residual (<6)



## Endnotes

1. Five of the 102 localities in the program—Nlagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.
2. Esri. Census 2010 Summary Profile: Lower Manhattan. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.
3. Esri. Census 2010 Summary Profile: Lower Manhattan. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.
4. New York City. Department of City Planning. NYC MapPLUTO 13v2. October 2013. Microsoft Excel file.
5. Esri. 2007-2011 American Community Survey Housing Summary: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
6. Esri. Census 2010 Summary Profile: Lower Manhattan. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.
7. Esri. 2007-2011 American Community Survey Population Summary: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
8. Esri. 2007-2011 American Community Survey Summary Profile: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
9. Esri. 2007-2011 American Community Survey Housing Summary: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
10. Esri. 2007-2011 American Community Survey Housing Summary: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
11. Mean Lower Low Water is the average height of the lowest tide recorded at a tide station each day during a specific recording period, and is often used as a benchmark for measuring the height of water levels.
12. New York City. Special Initiative for Rebuilding and Resiliency. A stronger, More Resilient New York. 11 June 2013, Web. 10 Mar 2014.
13. New York City. Special Initiative for Rebuilding and Resiliency. A stronger, More Resilient New York. 11 June 2013, Web. 10 Mar 2014.
14. New York City. Special Initiative for Rebuilding and Resiliency. A stronger, More Resilient New York. 11 June 2013, Web. 10 Mar 2014.
15. “HUB Bound 2012 Travel Data.” New York Metropolitan Transportation Council, Dec 2013. Web. 11 Mar 2014.
16. “Lower Manhattan.” New York City Economic Development Corporation. NYCEDC, n.d. Web. 11 Mar 2014.
17. New York City Housing Authority. “\$100 Million+ Coming to NYCHA for Post-Sandy Boiler Replacement.” *New York City Housing Authority Journal* 44(3). April 2014.
18. “Lower Manhattan.” New York City Economic Development Corporation. NYCEDC, n.d. Web. 11 Mar 2014.
19. “With Recent Tech Leases Totaling 351,000 Square Feet, Report Shows Spike in Growth for Lower Manhattan’s Tech Sector.” LaunchLM. LaunchLM, 15 Oct. 2013. Web. 11 Mar 2014.
20. “Pace University Housing and Residential Life”. Pace University. Pace University, n.d. Web. 11 Mar 2014.
21. New York City. Department of City Planning. NYC MapPLUTO 13v2. October 2013. Microsoft Excel file;
22. Esri. 2007-2011 American Community Survey Housing Summary: Lower Manhattan. Washington: US Census Bureau, 6 Dec

2012. Microsoft Excel file.
23. Rebuild by Design Stage III, The BIG “U” Team. “Promoting Resilience Post-Sandy through Innovative Planning and Design.” 3 Feb 2014. Presentation.
  24. Green and blue roofs collect rainwater that is falling on a roof and retain it so that it is not immediately released into the combined sewer system, either temporarily or until it evaporates naturally. Green roofs use vegetation and a growing medium to store and release rainwater, while blue roofs can use vegetation, storage tanks, or other features to retain water and release it later.
  25. Construction costs have been provided by VJ Associates, a construction cost consulting firm. To provide cost estimates that account for the preliminary level of design work that has been conducted, conservative markups were included. As a percentage of estimated hard costs these include: general requirement (10%), general contractor overhead and profit (21%), design contingency (25%), soft cost allowance (30%), and 3% annual escalation.
  26. All construction job estimates are based on local construction cost and construction wage data, as well as standard industry assumptions of labor as a percentage of total hard costs. Data source is Bureau of Labor Statistics, Quarterly Census of Employment and Wages 2012.
  27. Esri. 2007-2011 American Community Survey Population Summary: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
  28. Esri. 2007-2011 American Community Survey Summary Profile: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
  29. Esri. 2007-2011 American Community Survey Summary Profile: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
  30. Esri. 2007-2011 American Community Survey Summary Profile: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
  31. Esri. 2007-2011 American Community Survey Summary Profile: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
  32. Esri. 2007-2011 American Community Survey Summary Profile: Lower Manhattan. Washington: US Census Bureau, 6 Dec 2012. Microsoft Excel file.
  33. Rebuild by Design Stage III, The BIG “U” Team. “Promoting Resilience Post-Sandy through Innovative Planning and Design.” 3 Feb 2014. Presentation.
  34. A composting windrow is a row of compostable material that is arranged linearly while it is undergoing the composting process. It is used to improve the efficiency and effectiveness of large-scale composting operations. Photovoltaic cells generate electricity by converting solar radiation directly into electrical power.

# Glossary

## **ABFE**

Advisory Base Flood Elevation

The preliminary published computed elevation resulting from floodwater that has a 1% chance of equaling or exceeding that level in a given year.

## **ACS**

United States Census Bureau American Community Survey

A continuous survey provided by the United States Census Bureau that provides demographic data between decennial censuses.

## **ADA**

Americans with Disabilities Act

A law enacted by U.S. Congress that prohibits discrimination against people with disabilities in employment, transportation, public accommodation, communications, and government activities.

## **ADNY**

Alliance for Downtown New York

A not-for-profit organization that manages the Downtown-Lower Manhattan Business Improvement District.

## **BPCA**

Battery Park City Authority

A New York State public benefit corporation responsible for the creation and maintenance of

Battery Park City.

## **CBO**

Community-Based Organization

A not-for-profit organization that operates within a local community.

## **CDBG-DR**

Community Development Block Grant-Disaster Recovery

Federal grants administered by the U.S. Department of Housing and Urban Development (HUD) and allocated to cities, counties and States to facilitate rebuilding and recovery of disaster areas as designated by the President of the United States.

## **CDCs**

Community Development Corporations

A not-for-profit organization that provides services to promote and support community development.

## **CERT**

Community Emergency Response Team

An organization composed of volunteers trained and tasked to provide supplementary emergency care during a major disaster.

Con Ed Consolidated Edison

An investor-owned energy company that provides utility services to New York City and Westchester County, New York.

## **DASC**

Disaster Assistance Service Center

A temporary center established and designed by New York City Office of Emergency Preparedness (NYC OEM) to provide an array of resources for victims and evacuees after a disaster.

## **DHSES**

Division of Homeland Security and Emergency Services

The New York State governmental agency responsible for coordination of efforts around counter terrorism, emergency management, fire prevention and control, and interoperable and emergency communications.

## **FDNY**

Fire Department of New York

The New York City governmental agency responsible for providing first responders to fires, public safety and emergency situations, disasters, and terrorist acts.

## **FEMA**

**Federal Emergency Management Agency**

An agency within the U.S. Department of Homeland Security responsible for the coordination of the response to a state-of-emergency-declared-disaster.

**FIRMs**

**Flood Insurance Rate Maps**

The official map of a community used by FEMA to delineate a community’s Base Flood Elevations, flood zones, and floodplain boundaries.

**HRPT**

**Hudson River Park Trust**

A public benefit corporation responsible for the construction and maintenance of the Hudson River Park.

**HUD**

**United States Department of Housing and Urban Development**

The U.S. federal government executive department responsible for executing federal policies on housing and metropolises.

**HVAC**

**Heating, Ventilation, and Air Conditioning**

The technology of indoor environmental control.

**LES Ready!**

**Lower East Side Long-Term Recovery Group**

A coalition of community groups and organizations that provides education and training in emergency preparedness and coordinated emergency services during a disaster.

**LMCCC**

**Lower Manhattan Construction Command Center**

A joint City and State agency that provided construction and environmental coordination and oversight in Lower Manhattan, south of Canal Street.

**LMDC**

**Lower Manhattan Development Corporation**

A joint State-City corporation created in the aftermath of September 11, 2001, to coordinate rebuilding and revitalization in Lower Manhattan.

**MTA**

**Metropolitan Transportation Authority**

A public benefit corporation responsible for providing public transportation in 12 counties in southeastern New York and two counties in southwestern Connecticut.

**NFIP**

**National Flood Insurance Program**

A FEMA-run program that provides government-sponsored flood insurance to homeowners, renters and business owners.

**NPCC**

**New York City Panel on Climate Change**

An Intergovernmental Panel on Climate Change, convened by Mayor Michael Bloomberg in August 2008 as part of PlaNYC, the City’s long-term sustainability plan.

**NYC DEP**

**New York City Department of Environmental Protection**

The New York City governmental agency responsible for providing the City’s water supply; managing the City’s wastewater system; and regulating the City’s environment, including air quality, hazardous waste, and quality of life issues.

**NYC DOB**

**New York City Department of Buildings**

The New York City governmental agency responsible for the enforcement of building codes and zoning regulations; the issuance of building permits; and the inspection of new and existing buildings.

**NYC DOT**

**New York City Department of Transportation**

The New York City governmental agency responsible for the management of the City’s transportation infrastructure.

**NYC DPR**

**New York City Department of Parks and Recreation**

The New York City governmental agency responsible for the management of City parks, monuments, and historic house museums; the preservation of the City’s ecological diversity; and the provider of recreational and athletic facilities and programs.

**NYC HPD**

**New York City Department of Housing Preservation and Development**

The New York City governmental agency responsible for the development and maintenance of the City's housing stock.

**NYC OEM**

**New York City Office of Emergency Management**

The New York City governmental agency responsible for preparation, coordination and education of emergency response and recovery.

**NYCEDC**

**New York City Economic Development Corporation**

The City's official economic development organization charged with leveraging the City's assets to promote economic growth.

**NYCHA**

**New York City Housing Authority**

A public authority responsible for administering public housing for low- and moderate-income residents in New York City.

**NYPD**

**New York City Police Department**

The New York City governmental agency responsible for law enforcement and investigation within the City.

**NYS DEC**

**New York State Department of Environmental Conservation**

The New York State governmental agency responsible for the conservation, improvement, and protection of natural resources; the management of State owned lands; and the regulation of environmental laws and regulations.

**NYS DHSES**

**Division of Homeland Security and Emergency Services**

The New York State governmental agency responsible for coordination and support of counter terrorism, emergency management, fire prevention and control, and interoperable and emergency communications.

**NYS DOS**

**New York State Department of State**

The New York State governmental agency responsible for strategic investment in the revitalization and economic growth of regions.

**NYS DOT**

**New York State Department of Transportation**

The New York State governmental agency responsible for the development and management of State transportation infrastructure.

**NYS SHPO**

**New York State's Historic Preservation Office**

The New York State governmental agency responsible for helping identify, evaluate, preserve, and revitalize historic, archeological, and cultural resources.

**NYSERDA**

New York State Energy Research Authority  
A public benefit corporation tasked with helping New Yorkers increase energy efficiency via the implementation of reduced consumption and the use of renewable energy sources.

**PANYNJ**

**Port Authority of New York and New Jersey**

A joint agency between the States of New York and New Jersey responsible for the development and maintenance of regional transportation and the World Trade Center site.

**PATH**



**Port Authority Trans-Hudson**

A rapid transit railroad administered by the Port Authority of New York and New Jersey that provides service northern New Jersey and Manhattan.

A branch of the United States Armed Forces that operates under the U.S. Department of Homeland that provides maritime law enforcement.

**RFP**

**Request for Proposals**

A bidding process by which an agency or business outlines a procurement of services needed and accepts solicitations from potential suppliers.

**SIRR Report**

**A Stronger, More Resilient New York**

A comprehensive City plan commissioned by former Mayor Michael Bloomberg detailing actionable recommendations for the rebuilding and increased resiliency of communities and infrastructure impacted by Superstorm Sandy.

**USACE**

**United States Army Corps of Engineers**

The U.S. Federal agency under the Department of Defense composed of civilian and military personnel and responsible for providing public and military engineering services.

**USCG**

**United States Coast Guard**



NY Rising  
Community Reconstruction Program

