

A. INTRODUCTION

On October 29, 2012, Hurricane Sandy made landfall, greatly impacting the east side of Manhattan and highlighting the need for the City of New York (the City) to increase its efforts to protect vulnerable populations and critical infrastructure during extreme coastal storm events (the 100-year flood events with Sea Level Rise projections to the 2050s¹), referred to herein as the design storm event. Hurricane Sandy, a presidentially declared disaster, caused extensive coastal flooding, resulting in significant damage to residential and commercial property, open space, and critical transportation, power, and water and sewer infrastructure, which in turn affected medical and other essential services. As part of its plan to address vulnerability to such major flooding, the City is proposing the East Side Coastal Resiliency (ESCR) Project, which involves the construction of a coastal flood protection system along a portion of the east side of Manhattan (see **Figure 1.0-1**) and related improvements to City infrastructure (the proposed project).

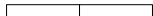
The area that would be protected under the proposed project (the protected area) includes lands within the Federal Emergency Management Agency (FEMA) 100-year special flood hazard area (SFHA), as well as those projected to be within the 100-year flood hazard area in the 2050s, taking into account the 90th percentile projection for sea level rise (see **Figure 1.0-2**). This includes portions of the Lower East Side and East Village neighborhoods, Stuyvesant Town, Peter Cooper Village, as well as East River Park and Stuyvesant Cove Park. Within the project area, the City is proposing to install a flood protection system generally located within City parkland and streets, which would consist of a combination of floodwalls, levees, closure structures (e.g., floodgates), and other infrastructure improvements to reduce the risk of flooding. In addition to providing a reliable coastal flood protection system for this area, another goal of the proposed project is to improve open spaces and enhance access to the waterfront, including John V. Lindsay East River Park (East River Park) and Stuyvesant Cove Park.

The proposed project area begins at Montgomery Street to the south and extends north along the waterfront to East 25th Street and is composed of two sub-areas: Project Area One and Project Area Two. Project Area One extends from Montgomery Street on the south to the north end of East River Park at about East 13th Street. Project Area One consists primarily of the Franklin Delano Roosevelt East River Drive (the FDR Drive) right-of-way, a portion of Pier 42, Corlears Hook Park, and East River Park. The majority of Project Area One is within East River Park and includes four existing pedestrian bridges across the FDR Drive to East River Park (Corlears Hook, Delancey Street, East 6th Street, and East 10th Street bridges) and the East Houston Street overpass. Project Area Two extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two includes the

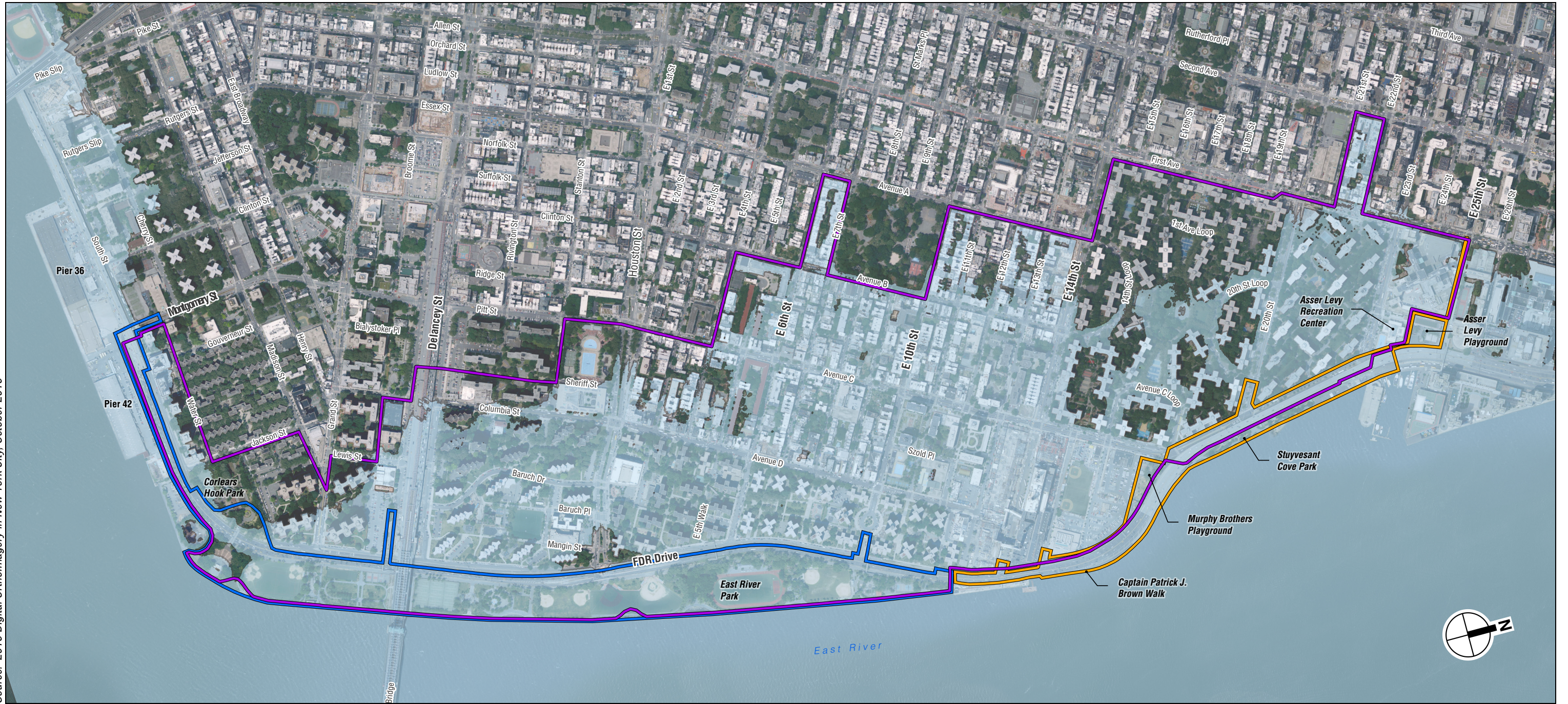
¹ Sea level rise estimate represents the 90th percentile value for 2050 as presented by the New York City Panel on Climate Change. See Chapter 2.0, “Project Alternatives,” for additional details on design principals and sea level rise.



 *Proposed Project Area*

0 1 MILES


Source: 2016 Digital Orthoimagery in New York City, October 2016



-  Project Area One
-  Project Area Two
-  Protected Area
-  100-year Flood Hazard Area with 90th Percentile 2050s Sea Level Rise

Consolidated Edison Company of New York (Con Edison), the East River Generating Station, Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Recreational Center and Playground, the VA Medical Center, and in-street segments along East 20th Street, East 25th Street, and along and under the FDR Drive. **Figure 1.0-3** is an aerial map depicting the limits of Project Area One and Project Area Two.

To implement the proposed project, the City and its federal partners have committed approximately \$1.45 billion in funding. The City has entered into a grant agreement with the U.S. Department of Housing and Urban Development (HUD) to disburse \$338 million of Community Development Block Grant-Disaster Recovery (CDBG-DR) funds for the design and construction of the proposed project. The City is the grantee of CDBG-DR funds related to Hurricane Sandy for the development of a coastal flood protection system, which would be provided to the City through the New York City Office of Management and Budget (OMB), acting under HUD's authority.

This chapter provides a brief background of the development of this project, and identifies the underlying purpose and need for the project. This chapter also identifies the primary objectives of the proposed project, along with its principal design and implementation considerations.

B. BACKGROUND OF THE PROPOSED PROJECT

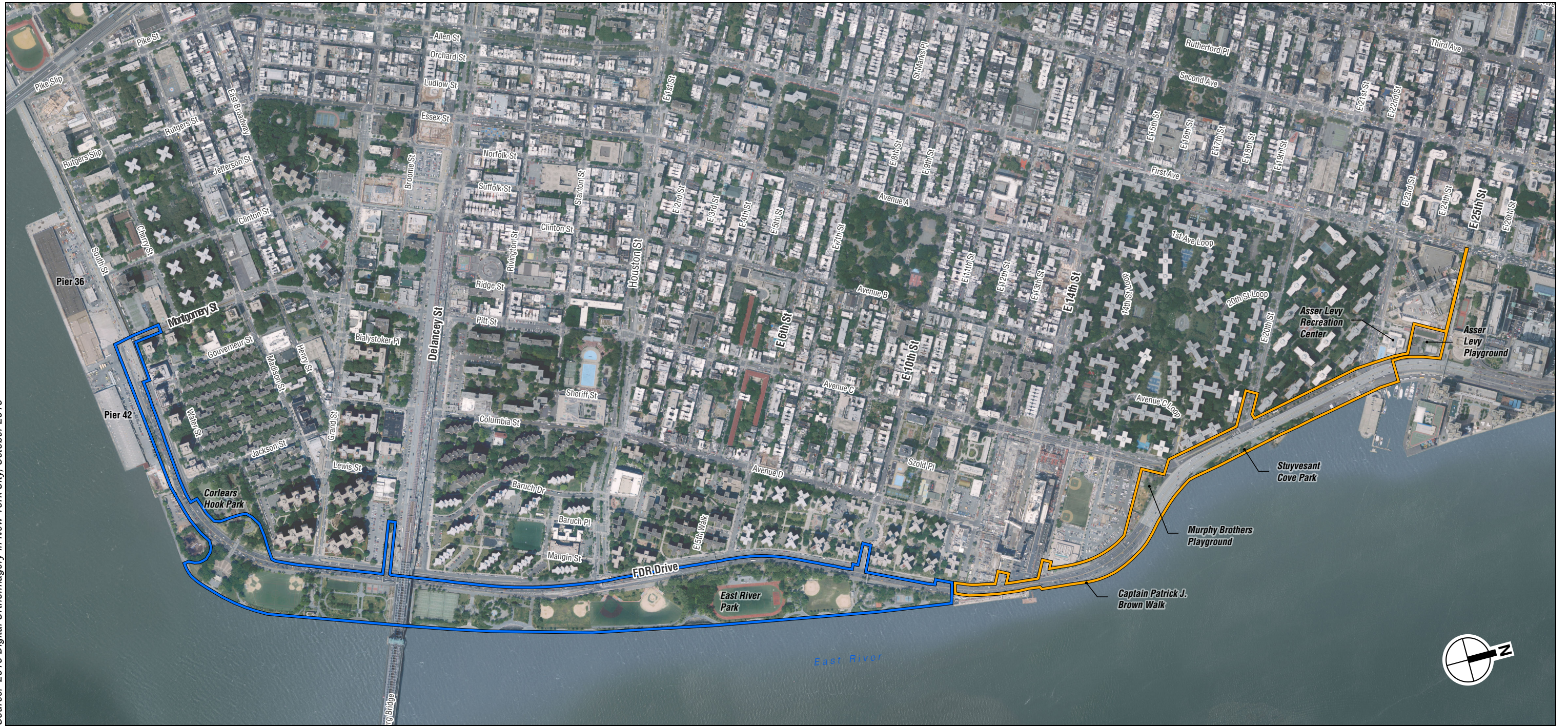
When Hurricane Sandy hit New York City in 2012, the resulting waves and storm surge battered the City's coastline, leading to 43 deaths, the destruction of homes and other buildings, and severe damage to critical infrastructure. The damage was particularly intense in neighborhoods across Southern Manhattan, Southern Queens, Southern Brooklyn, and the eastern and southern shores of Staten Island.

During Hurricane Sandy, Manhattan's East River waterfront between East 42nd Street and the Brooklyn Bridge experienced extensive coastal flooding, which affected millions of square feet of built space, including residential and commercial buildings, parks, and critical infrastructure. The East River storm surge overtopped the bulkhead, inundated East River Park, crossed the FDR Drive, and flowed inland two blocks and down Avenue C, with water depths of up to four feet reported along Avenue C. **Figure 1.0-4** shows the extent of Hurricane Sandy flooding. This flooding damaged critical mechanical systems within numerous buildings, including fire safety, life safety, and heating and cooling systems.

Hurricane Sandy also resulted in significant damage to critical elements of the City's utility infrastructure, including the energy grid, water supply and sewer service facilities, and transportation systems. As Hurricane Sandy approached New York City, Con Edison preemptively shut down two electrical networks in Lower Manhattan (the area south of the Brooklyn Bridge) to minimize the damage to their facilities and critical infrastructure. Nonetheless, the surge damaged substation facilities located at both East 13th Street and the South Street Seaport, shutting down electrical service to much of Manhattan below 34th Street for nearly four days after the storm.

Surge waters also damaged two New York City Department of Environmental Protection (DEP) wastewater facilities serving Southern Manhattan, including the Avenue D Pump Station (also referred to as the Manhattan Pump Station or the 13th Street Pump Station), located at East 13th Street and the FDR Drive, and the Canal Street Pump Station, located near the intersection of Canal and Varick Streets. The Manhattan Pump Station experienced service outages and was shut down for more than a day, exacerbating combined sewer overflow (CSO) discharges into the East

Source: 2016 Digital Orthoimagery in New York City, October 2016



- Project Area One
- Project Area Two

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Source: FEMA, 2012

- Project Area One
- Project Area Two
- Hurricane Sandy Flooding Extent

River during that time. Flooding also affected seven subway tunnels, including the 14th Street Tunnel for the L line (BMT-Canarsie Line). Damage to these tunnels resulted in their closure for up to a week after the storm.

In Hurricane Sandy's aftermath, the City formed the Special Initiative for Rebuilding and Resiliency (SIRR) to analyze the impacts of the storm on the City's buildings, infrastructure, and people; to assess climate change risks in the near term (2020s) and long term (2050s); and to outline strategies for increasing resiliency citywide. The PlaNYC report, "*A Stronger, More Resilient New York*," released in June 2013, was the result of that effort and contains Community Rebuilding and Resiliency Plans (CRRP) for five particularly vulnerable neighborhoods in the City, including Southern Manhattan.

The CRRP for Southern Manhattan outlines specific initiatives to address coastal defenses for buildings and critical infrastructure coupled with post-storm community and economic recovery. With respect to coastal protection, the City's proposals were based on a multi-faceted analysis that considered the types of coastal hazards and their likelihood of occurrence, the potential impact of these hazards on the built environment and on critical infrastructure, and the likely effectiveness of proposed measures to address these hazards. In addition, the coastal defense measures were informed by the New York City Department of City Planning's (DCP) *Urban Waterfront Adaptive Strategies* (UWAS) study, published in June 2013, and funded by a HUD Sustainable Communities Regional Planning Grant. The UWAS study examined the underlying geomorphology of the various regions, including categorizing each coastal reach of the City's shoreline by geomorphic type. The UWAS study provided an assessment of coastal resiliency measures that would be appropriate for each geomorphologic type along the City's shoreline. The CRRP built upon the results of the UWAS study to recommend coastal initiatives for Southern Manhattan's coastline, which includes the proposed project area.

Coastal Protection Initiative 21 of the CRRP calls for an integrated flood protection system in Lower Manhattan, extending from East 14th Street to Battery Park City, the first phase of which is intended to protect the Lower East Side and parts of Chinatown. Generally defined as the area south of East Houston Street and east of the Manhattan Bridge between the Bowery and the FDR Drive, the Lower East Side and Chinatown are home to a large residential population, including one of the greatest concentrations of low- and moderate-income households in the City, with over 9,000 New York City Housing Authority (NYCHA) housing units. In addition, critical infrastructure—including the City's subway system, Con Edison substations, the Manhattan Pump Station, and the FDR Drive—are all located here. It was recognized in the CRRP that potential storm damage to these critical assets would result in citywide impacts on thousands of housing units, transportation systems, parks, and the economy.

In June 2013, HUD launched the Rebuild by Design (RBD) competition to respond to Hurricane Sandy's devastation. Through this competition, which was funded using foundation and private-sector resources, selected proposals were identified for further analysis with the goal of identifying projects for implementation. In June 2014, following a year-long process during which the design teams met with regional experts—including government agencies, elected officials, community organizations, local groups, and individuals—HUD announced six winning proposals that included projects throughout the Hurricane Sandy-impacted area, including Long Island, New Jersey, the Bronx, Staten Island, and Manhattan. The concept for Manhattan was named "the Big U," which focused on a flood protection system around Manhattan extending along the Hudson River from West 57th Street to the Battery, and then north up the East River to East 42nd Street. As part of the RBD process, a more focused proposal was developed to reduce the flood risk for

vulnerable communities along the East Side. This proposal identified three waterfront compartments between the Battery and East 23rd Street. These compartments were determined based on the 100-year mapped SFHA (see **Figure 1.0-5**), topography, and sea level rise projections developed by the New York City Panel on Climate Change. Although the compartments were conceptualized together, each could provide flood protection independently of the others. CDBG-DR funds were subsequently allocated by HUD for the design and construction of the Montgomery Street to East 23rd Street compartment, which is the basis for the proposed project area. As design for this compartment advanced, the project area was extended north to East 25th Street and included the historic Asser Levy Recreational Center.

The importance of this project to the City was emphasized in “*One New York: The Plan for a Strong and Just City*,” (*OneNYC*) released in April 2015. In *OneNYC*, the City identified the proposed project as one of several vital projects to be completed throughout all five boroughs that would strengthen coastal defenses, building a stronger, more resilient New York City that is prepared for the impacts of climate change. Specifically, Vision 4 of *OneNYC* noted that the proposed project would benefit thousands of public housing and other residents of a particularly vulnerable part of Manhattan and would demonstrate a new model for integrating coastal protection into neighborhoods, consistent with the City’s resiliency vision.

C. PURPOSE AND NEED FOR THE PROPOSED PROJECT

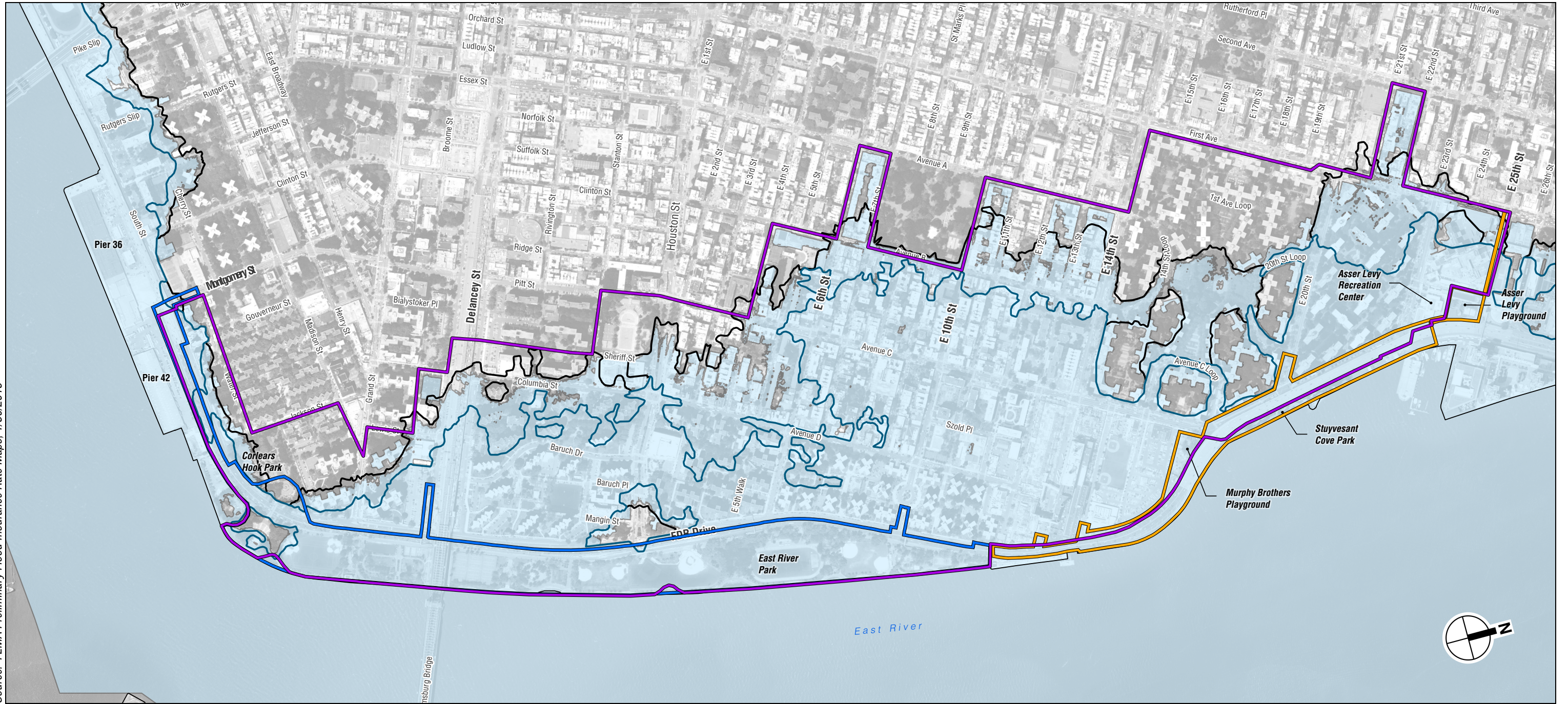
As established above, Hurricane Sandy underscored the City’s need to bolster its resiliency efforts to protect property, vulnerable populations, and critical infrastructure during design storm events. The need to protect the area is magnified by the potential for more frequent flooding events and would align with resiliency planning goals described in *OneNYC* and *A Stronger, More Resilient New York*. To that end, the purpose of the proposed project is to address this coastal flooding vulnerability in a manner that reduces the flooding risk while enhancing waterfront open spaces and access to the waterfront.

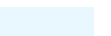
Absent the proposed project’s coastal flood protection measures, residents, businesses, critical infrastructure, and valuable open space amenities within the protected area will remain vulnerable to flooding during design storm events. Although some resiliency measures are expected to be completed at NYCHA’s Baruch Houses, Wald Houses, Riis Houses, and other developments, these areas as well as the broader protected area will continue to be vulnerable to flood damage during future storm events, and responders’ access to the dwellings would continue to be compromised during flood events. Additionally, residents in market rate and affordable dwellings in Stuyvesant Town and Peter Cooper Village, and many dwellings east of Avenue B, will remain vulnerable. Further, existing businesses, especially ground floor establishments along Avenues B, C, and D would remain vulnerable through potential loss of customers during flood events, and possibly by water damage to property. This outlines the importance of the proposed project which is needed to strengthen coastal defenses in this area in order to prepare for the impacts of climate change.

The principal objectives of the proposed project are as follows:

- Provide a reliable coastal flood protection system against the design storm event for the protected area;
- Improve access to and enhance open space resources along the waterfront, including East River Park and Stuyvesant Cove Park;

Source: FEMA Preliminary Flood Insurance Rate Maps, 1/30/2015



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|--|---|
|  Project Area One |  500-Year Flood Hazard Area (0.2% Annual Chance) |
|  Project Area Two |  100-Year Flood Hazard Area (1% Annual Chance) / Special Flood Hazard Area |
|  Protected Area |  100-year Flood Hazard Area with 90th Percentile 2050s Sea Level Rise |

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- Respond quickly to the urgent need for increased flood protection and resiliency, particularly for communities that have a large concentration of residents in affordable and public housing units along the proposed project area; and
- Achieve implementation milestones and comply with the conditions attached to funding allocations as established by HUD, including scheduling milestones.

Additionally, design considerations for the proposed project include the following:

- Reliability of the proposed coastal flood protection system;
- Urban design compatibility and enhancements;
- Improving the ecology and long-term resiliency of East River Park;
- Minimizing environmental impacts, including construction-related effects and disruptions to public right of way;
- Constructability;
- Operational needs;
- Maintenance needs;
- Minimizing use of pre-storm event deployable structures;
- FEMA accreditation;
- Scheduling that meets HUD milestones; and
- Cost effectiveness.

The City evaluated and reviewed conceptual designs against these principal objectives and design considerations and selected a Preferred Alternative for the proposed project. As described in detail in Chapter 2.0, “Project Alternatives,” under the Preferred Alternative, East River Park would experience significant risk reduction from flooding and inundation from sea level rise in addition to substantial enhancements to its value as a recreational resource and providing flood protection to the inland communities. Park user experience would be enhanced with the reconstruction of East River Park and the reconstruction of pedestrian bridges to improve access, which would enhance the park user experience. Additionally, a long-standing deficiency along the East River Greenway at the Con Edison 13th Street Generating Station would be remedied with the construction of a shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Patrick J. Brown Walk, substantially improving the City’s greenway network. In addition, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground would be reconstructed and improved, resulting in enhanced recreational spaces throughout the project area. The selection of the Preferred Alternative also allows for a shorter construction duration and park closure, earlier deployment of the flood protection system (which is expected to be completed in mid-2023), and reduced construction disruption along the FDR Drive. *