



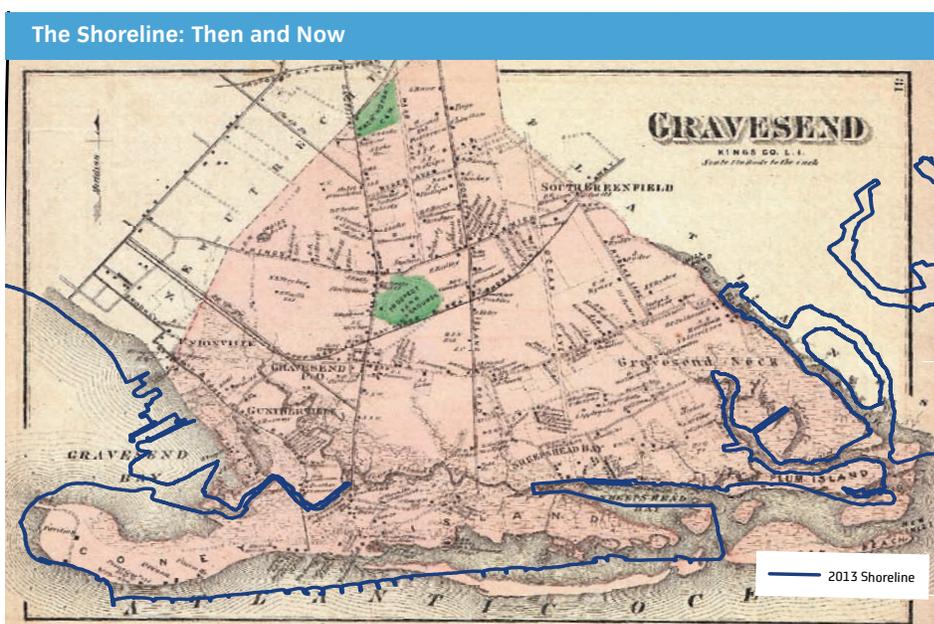
Coney Island, Brooklyn

Southern Brooklyn

The D, F, N, and Q trains converge at Stillwell Avenue in Coney Island, one of the most vibrant centers of residential and commercial life in Southern Brooklyn. Each year millions of visitors stream onto the boardwalk here overlooking the beach and Atlantic Ocean. Many move on to ogle the sea lions at the New York Aquarium or race down the famed wooden Cyclone, one of dozens of rides on offer.

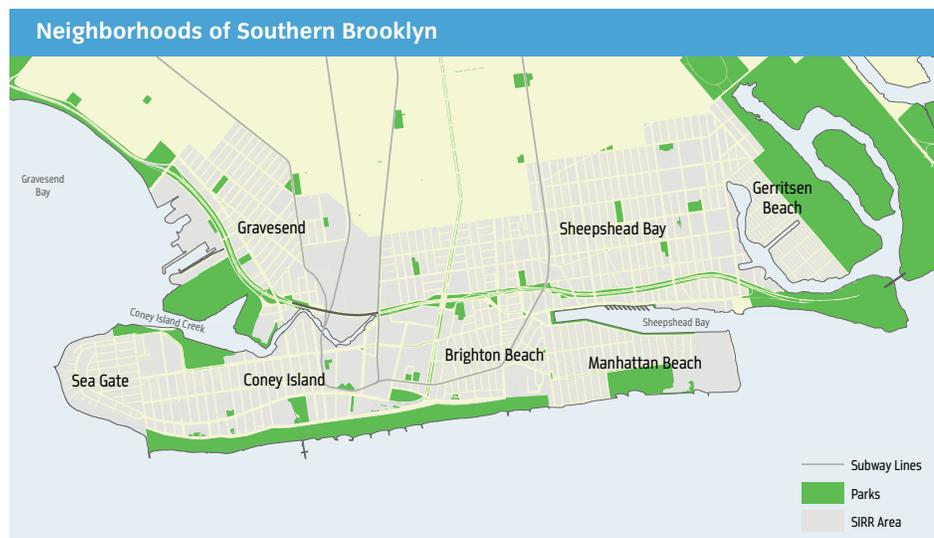
Coney Island was not always so lively—or so accessible. The peninsula that now contains Coney Island and three other Southern Brooklyn neighborhoods was once an actual island, separated from the mainland by Coney Island Creek and reachable only at low tide. The entire area was a collection of wetlands, tidal marshlands, bays, inlets, creeks, and barrier islands—first the fishing grounds of the Lenape people and then part of a quiet farming community. (See map: *The Shoreline: Then and Now*)

Over time, as the area evolved into a summer resort and further development took place, property owners (and later, the City) filled in the middle of Coney Island Creek, connecting the island to the mainland. Throughout the area, marshlands and waterways were also filled to yield new land for development. The coastline was extended into the ocean and Sheepshead and Gravesend Bays, subsuming smaller barrier islands. By the mid-20th century, summer bungalow communities had largely become year-round neighborhoods: Sea Gate, Coney Island, Brighton Beach, Manhattan Beach, Gravesend, Sheepshead Bay, and Gerritsen Beach. Home to an economically and ethnically diverse array of residents—some with roots that go back generations—these neighborhoods offer a range of housing types, along with access to beautiful beaches, bays, and a network of public parks. (See map: *Neighborhoods of Southern Brooklyn*)



But because of Southern Brooklyn's location, low-lying topography, and pattern of development, the area has long been vulnerable to damage from storm waves and flooding. While the Rockaway Peninsula provides some protection to eastern portions of Southern Brooklyn, the smaller barrier islands that once helped attenuate (or break up) waves elsewhere are gone, and some of the area's building stock, including bungalows built in the early 20th century for summer use, are particularly susceptible to damage. Portions of the shoreline have experienced continuous erosion—in fact, the first documented beach nourishment project in the United States was at Coney Island in the 1920s, and there have been many such projects in the area since then, including a major United States Army Corps of Engineers (USACE) effort in the mid-1990s along the oceanfront in Coney Island and Brighton Beach.

During Sandy, the beach that had been nourished by the USACE did indeed help buffer those two neighborhoods. However, storm waves battered buildings in areas without coastal protections, including Sea Gate and Manhattan Beach, and inundation in Southern Brooklyn was widespread, much of it caused by flooding originating not from the ocean but from the area's bays, creeks, and inlets. As of the writing of this report, local businesses remain slow to recover. Although the USACE plans to restore the beach along Coney Island and Brighton Beach to its pre-storm condition—replenishing the roughly 272,000 cubic yards of sand that were washed away or pushed inland during Sandy—all of Southern Brooklyn is expected to be subject to future risks from storm surge, rising sea levels, and increased storms and precipitation resulting from climate change.



Brighton Beach Boardwalk

Credit: Tom Geibel

To help Southern Brooklyn recover from Sandy and move forward on firmer footing, the City has developed a strategy that reflects the overarching goals of this report, which are to seek to limit the impacts of climate change, while enabling New York and its neighborhoods to bounce back quickly when those impacts cannot be averted. The plan will address Southern Brooklyn's most significant risk—its vulnerability to storm surge, particularly as sea levels rise—by strengthening oceanfront and backdoor exposures, by facilitating retrofits and resiliency in new construction and existing buildings, and by protecting vital infrastructure. The plan will also address other significant risks such as more frequent heavy downpours, heat waves, and high wind events by drawing on both citywide and locally tailored initiatives. Finally, the plan will build on the area's natural assets and local economic strengths to encourage reinvestment in its many neighborhoods.



Coney Island Beach

Credit: Ian Spanier

Area Characteristics

Southern Brooklyn is largely residential, encompassing a range of housing types, from small bungalows to large single-family homes to multi-family elevator buildings. While the vast majority of the area's residential buildings are private homes, most Southern Brooklyn households (76 percent) live in multi-family structures, each of which may contain scores or even hundreds of individual units. Small businesses on local commercial corridors primarily serve local residents, but Southern Brooklyn also has, of course, the destination entertainment attractions that draw people from all across the city and beyond, as well as large institutions and critical infrastructure. (See charts: *Area Buildings Characterized by Type*; *Area Housing Units Characterized by Building Type*)

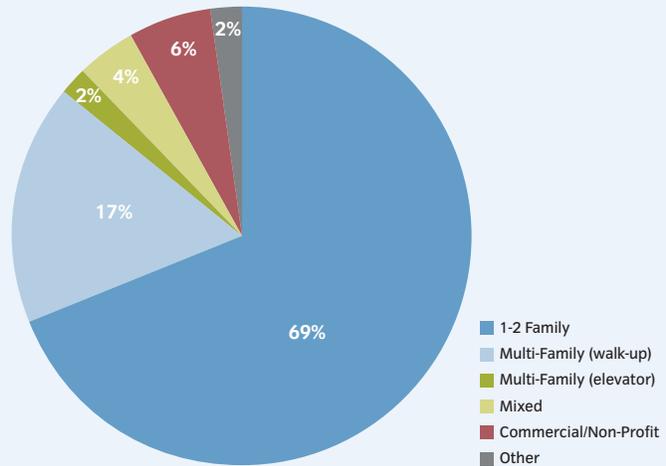
Neighborhoods and Residential Development

Seven major neighborhoods make up Southern Brooklyn. Though several share a number of characteristics, in some cases they are quite distinct from one another.

There are four primary neighborhoods on the Coney Island peninsula. On the western tip of the peninsula is Sea Gate, a private enclave developed as a planned community in the late 1890s and today operated by the Sea Gate Association. Sea Gate's 4,800 mixed-income residents live mostly in single-family homes on quiet streets near community-maintained private beaches and the waterfront Lindy Park.

Next to Sea Gate, at the center of the Coney Island peninsula is the neighborhood of Coney Island itself. Coney Island has a mix of multi-

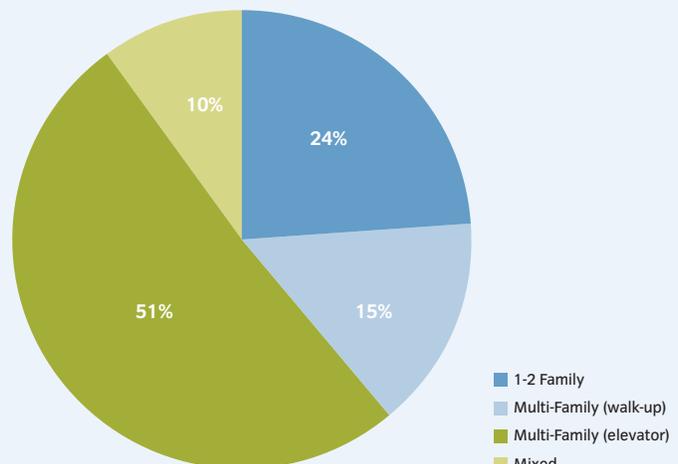
Area Buildings Characterized by Type



Total = 21,000 Buildings

Source: DCP PLUTO

Area Housing Units Characterized by Building Type



Total = 81,000 Housing Units

Source: DCP PLUTO

family buildings and single-family homes, with a high concentration of public housing and publicly-supported housing, including 37 buildings managed by the New York City Housing Authority (NYCHA) and approximately 6,300 units in the Mitchell-Lama program. Coney Island's main retail corridor is Mermaid Avenue; meanwhile, an entertainment district stretches along Surf Avenue and the Coney Island Boardwalk. On the north side of Coney Island is Kaiser Park, bordering Coney Island Creek.

To the east of Coney Island and sharing its broad beach is Brighton Beach, the most densely developed Southern Brooklyn neighborhood, at 102 residents per acre (more than twice the city average). Most of its 31,500 residents live in multi-family buildings, though some bungalows remain from the 1920s, and have now been adapted to year-round occupancy. An elevated train runs over Brighton Beach Avenue, the principal commercial corridor in the area. (See chart: *Area Population Density*)

Manhattan Beach is the easternmost neighborhood on the peninsula. Its 4,600 residents primarily occupy large single-family homes in an oceanfront setting. The neighborhood encompasses Manhattan Beach Park—dotted with playgrounds, baseball diamonds, and tennis courts—and Kingsborough Community College, which sits on a former Coast Guard base along the shoreline.

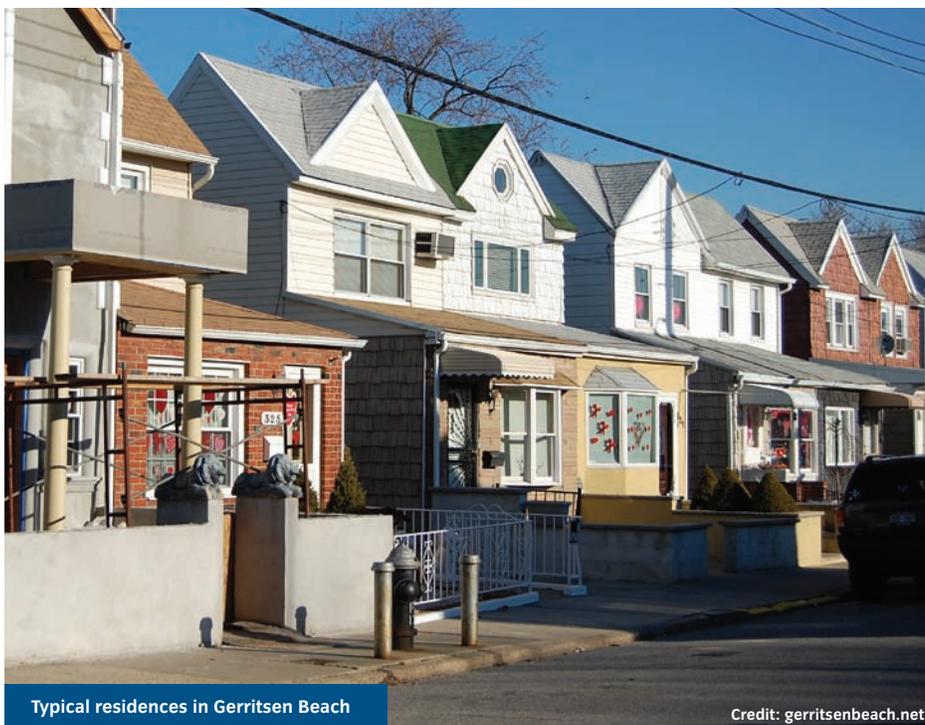
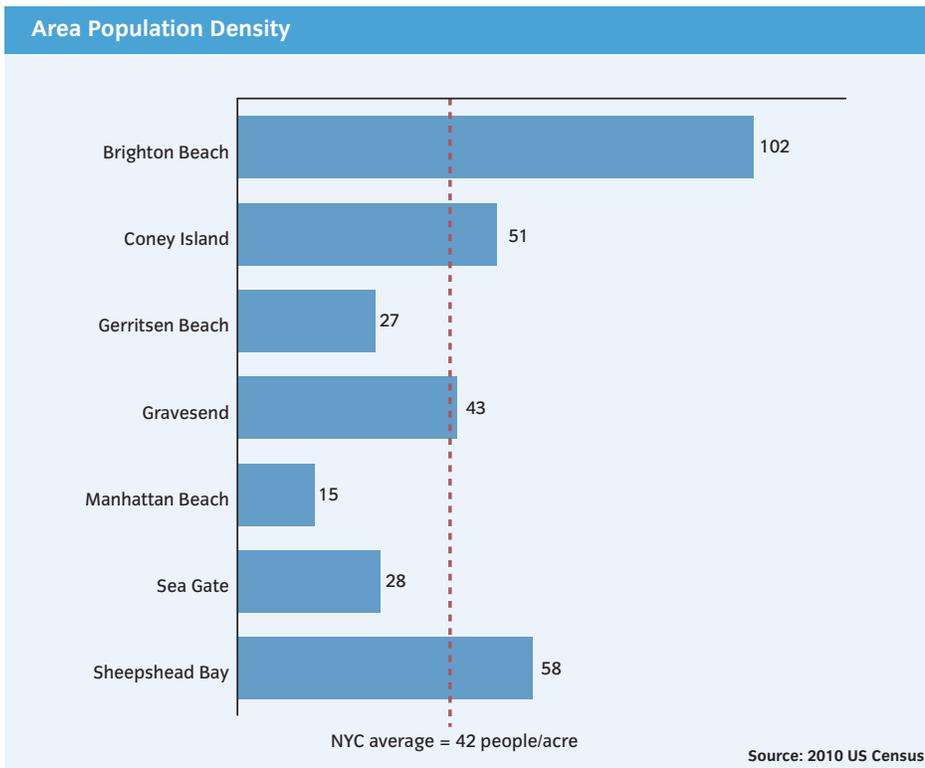
Farther inland are three other major Southern Brooklyn neighborhoods. Gravesend, one of the area's larger neighborhoods, has a population of 38,300 people primarily occupying single-family row houses and multi-family elevator buildings. The MTA's Coney Island Yards, Coney Island Hospital, and Calvert Vaux Park also lie within Gravesend's boundaries.

The neighborhood of Sheepshead Bay, fronting the water body of the same name, has 62,000 residents, most of whom live in single-family homes and newer multi-family buildings. Rows of bungalows, however, remain along pedestrian walks on the north and south sides of Emmons Avenue, one of Sheepshead Bay's main commercial corridors. Some of these bungalows are as much as 5 feet below the street grade (which has been raised over time), making them particularly susceptible to flooding.

Gerritsen Beach—located on Plumb Beach Channel and Shell Bank Creek, off Gerritsen Inlet—today is a tight-knit neighborhood of 5,200 residents who reside mostly in single-family homes. Developed in the 1920s as a planned community, Gerritsen Beach still has hundreds of bungalows. Despite renovations, alterations, and expansions over the decades, many of these structures not only were erected without the benefit of modern construction codes; they also were built at low elevations and today are at risk of flooding.

Socioeconomic Characteristics

Just as there are differences in population density and housing types among Southern Brooklyn's neighborhoods, so too do these neighborhoods differ in their socioeconomic makeup. Southern Brooklyn encompasses both wealthier and economically distressed neighborhoods. For example, in Manhattan Beach, where unemployment is 5 percent and the poverty rate 16 percent, the majority (over 75 percent) of residents owns their homes and the average property value is close to \$1 million. At the other end of the socioeconomic spectrum is Coney Island, where the unemployment rate is 13 percent and the poverty rate is 23 percent. Only one-fifth of Coney Island residents own homes. (See table: *Socioeconomic Characteristics*)



Typical residences in Gerritsen Beach

Credit: gerritsenbeach.net

Socioeconomic Characteristics								
Area	Population	Poverty Rate	Median Household Income	Households	Owner-Occupied Housing Units	% Homeowners	% Owner-Occupied Housing Units with Mortgage	Median Owner-Occupied Unit Value
Brighton Beach	31,500	24%	\$31,700	12,100	2,700	22%	58%	\$487,000
Coney Island	45,000	23%	\$32,100	18,000	3,800	21%	38%	\$320,800
Gerritsen Beach	5,200	7%	\$62,500	1,900	1,400	75%	78%	\$446,000
Gravesend	38,300	16%	\$38,900	13,800	4,700	34%	44%	\$546,200
Manhattan Beach	4,600	16%	\$84,800	1,600	1,200	77%	52%	\$922,300
Sea Gate	4,800	14%	\$61,500	1,500	730	48%	66%	\$614,600
Sheepshead Bay	62,000	14%	\$49,900	24,000	11,200	47%	55%	\$460,500
Citywide Total/Average	8,175,000	19%	\$51,300	3,050,000	993,500	33%	64%	\$514,900

Source: 2010 US Census, 2011 American Community Survey, 5-Year estimate

Vulnerable populations also reside in Southern Brooklyn. There are over 18,000 residents of NYCHA developments, including significant numbers of individuals who have impaired mobility or are on life-support equipment. The nine nursing homes in the area have capacity for approximately 2,400 inpatients; meanwhile, the area's seven adult care facilities house over 1,300 residents. Coney Island Hospital has 371 beds.

Business and the Local Economy

Most businesses in Southern Brooklyn (nearly 85 percent) are small enterprises employing fewer than five people, with many occupying

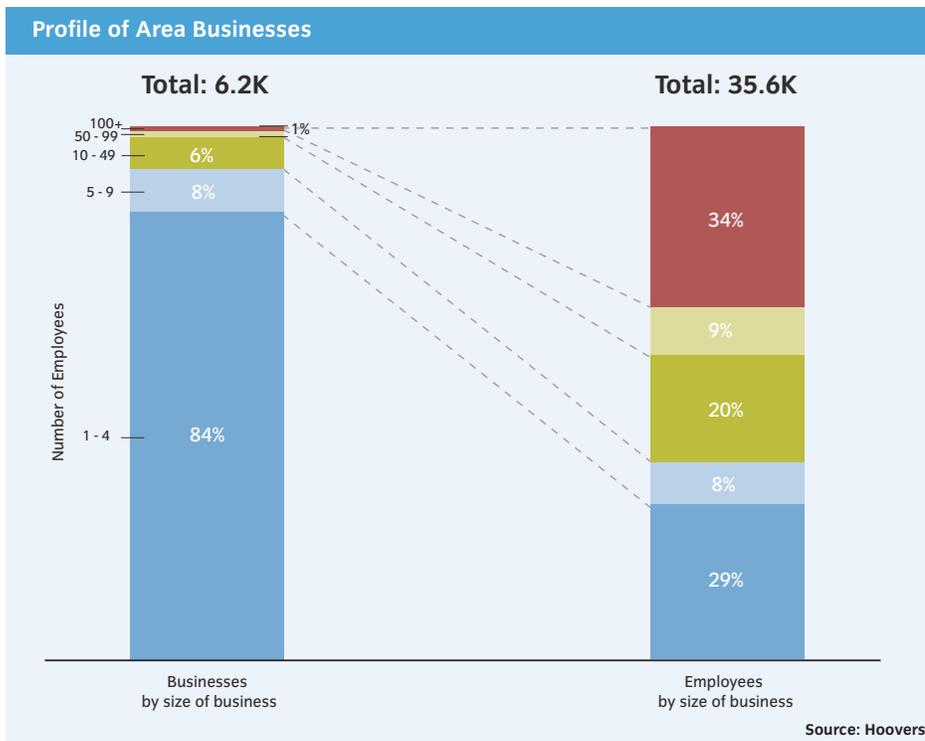
neighborhood commercial corridors that serve local residents. However, over one-third of the area's employees work for larger businesses or institutions, each of which may employ hundreds or even thousands of workers. For example, Coney Island Hospital, the biggest employer in the area and the largest medical facility in Southern Brooklyn, employs over 2,000 people. Coney Island Hospital is but one part of the area's healthcare sector, which plays a significant role in the local economy. The nursing homes, adult-care facilities, and other medical businesses serving Southern Brooklyn—including larger employers such as Shorefront

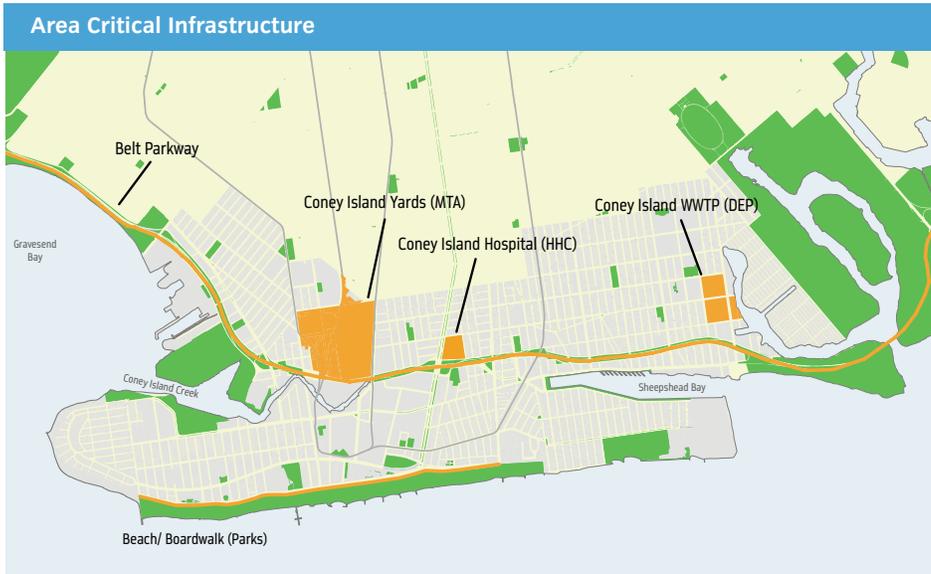
Geriatric and the Shore View Nursing Home—offer not only critical services but also valuable employment. Nonprofit organizations also provide significant local employment, in addition to valuable social services. (See graphic: *Profile of Area Businesses*)

The amusement area, including the Coney Island Boardwalk, is a significant economic engine, supported by seasonal visitation. The amusement area stretches from the New York Aquarium, a 14-acre campus at West 8th Street that draws 750,000 visitors annually, to MCU Park, home of the Brooklyn Cyclones, at West 17th Street. First developed in the late 19th century, the district has been undergoing a renaissance that started in the 1990s with the Cyclones and the renovation of the Stillwell Avenue subway station. Revitalization accelerated with the passage in 2009 of a comprehensive rezoning plan that has led to the opening of three new amusement areas, together with other year-round development in and around the amusement area.

Critical Infrastructure

Southern Brooklyn contains important infrastructure assets. While the 2.5-mile beach bordering Coney Island and Brighton Beach, maintained by the Department of Parks and Recreation (DPR), is a major recreational amenity, it is also critical for storm protection for the entire peninsula. The mid-1990s replenishment project by the USACE raised the beach by as much as 11 feet from Corbin Place in Manhattan Beach to West 37th Street at the edge of Sea Gate, to attenuate waves and protect adjacent flood-prone neighborhoods and shoreline buildings.





Credit: Fred R. Conrad/The New York Times

Damage in Sea Gate

Meanwhile, the Belt Parkway, an integral part of the regional highway network, extends 25 miles from the Gowanus Expressway in Brooklyn to the Cross Island Parkway in Queens. Built beginning in the 1930s, this major roadway has adjacent parks and esplanades maintained by DPR. Many sections of the Belt Parkway have oceanfront exposures and flood during rain or storm surge events, although a seawall or bulkhead exists along portions of the roadway. On Plumb Beach, a former barrier island east of Sheepshead Bay, the USACE has advanced renourishment projects to protect the roadway from erosion, including a recent project that involved the installation of geotubes (large, long textile tubes filled with sand).

Run by the Metropolitan Transportation Authority (MTA), Coney Island Yards facility is another integral part of the transportation infrastructure. The 75-acre facility—the largest rapid transit complex of its type in the world—includes workshops where maintenance and overhauls are performed on the subway fleet. The facility was constructed on former marshlands and near sea level, however, making the yard vulnerable to inundation.

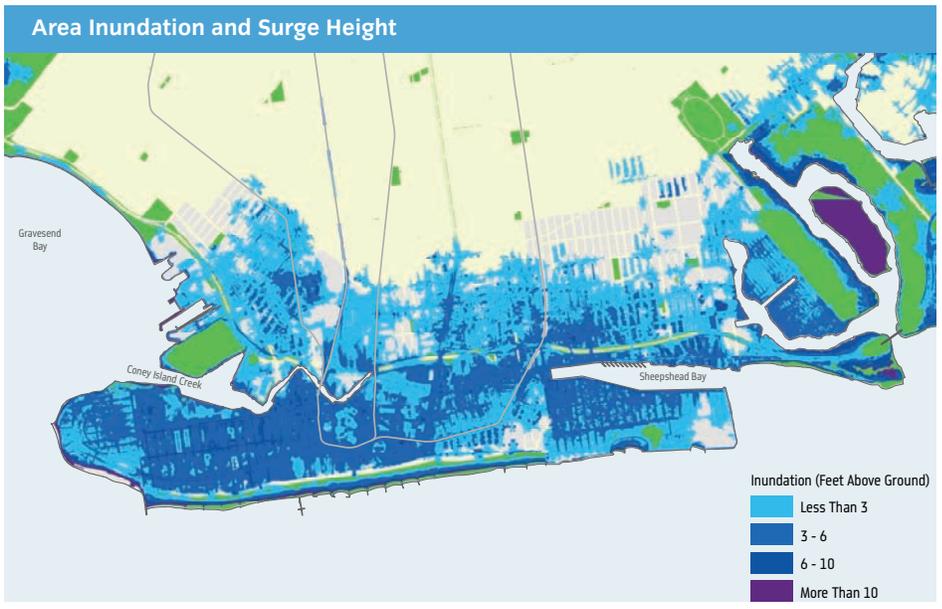
The Coney Island Wastewater Treatment Plant (WWTP) is also a critical infrastructure asset. Located on Shell Bank Creek within Gerritsen Inlet, this Department of Environmental Protection (DEP) facility has the capacity to process 110 million gallons per day. It serves most of Southern Brooklyn and areas to the north and east. (See map: *Area Critical Infrastructure*)

along ocean-facing areas, particularly in areas where coastal protections were lacking or inadequate, such as in Sea Gate and Manhattan Beach. Even more significant, though, was the inundation that occurred via inland waterways, and historic creeks and marshland that had been paved over decades before. Generally, waters that entered Southern Brooklyn through these routes resulted in “stillwater flooding,” where the water rose steadily through the peak of the storm, and then receded quickly after the surge and high tide had passed. At Sandy’s peak, floodwaters reached a height of 10 feet in some places, including, for example, along Neptune Avenue in Coney Island. (See map: *Area Inundation and Surge Height*)

In Sea Gate, powerful waves struck buildings along the waterfront, knocking out the first floors of a number of structures. Where owners

had built bulkheads at the edges of their properties, damage generally was mitigated. However, areas without bulkheads both were themselves vulnerable and allowed waves to scour and undermine neighboring seawalls and bulkheads. For example, the substandard bulkhead at Lindy Park collapsed as a result of severe wave impacts.

Along Coney Island and Brighton Beach, by contrast, the USACE nourishment project generally performed as intended, breaking waves before they made contact with buildings. However, the beach lost approximately 272,000 cubic yards of sand, according to USACE estimates, and some areas along the beach that were nourished to lower elevations experienced breaches, with waves pushing sand and water into adjacent neighborhoods. At Ocean Parkway, for instance, waves pushed thousands of tons of



Source: FEMA MOTF 11/6 Hindcast surge extent

What Happened During Sandy

Sandy’s storm surge struck Southern Brooklyn in two ways. The storm brought direct wave impacts

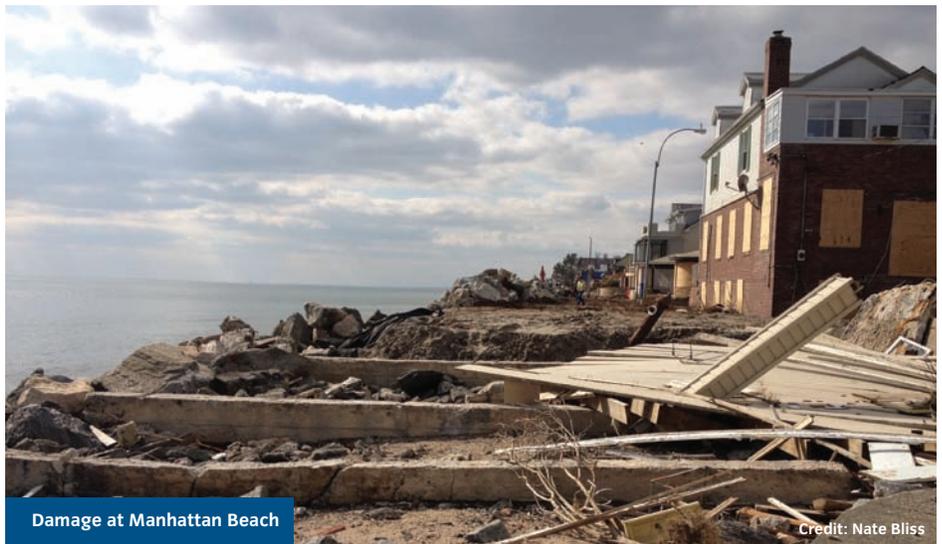
sand northward, with water traveling 1.5 miles north to Avenue W, joining floodwaters from Sheepshead Bay and Coney Island Creek.

Meanwhile, in Manhattan Beach and at Kingsborough Community College, the elevation of the area helped mitigate flooding. Waves, though, damaged esplanades, docks, and other structures at the water's edge, particularly along the Manhattan Beach waterfront, from Corbin Place to the college campus at the eastern tip of the peninsula.

Sheepshead Bay was a major source of the floodwaters that impacted the neighborhoods of Sheepshead Bay and Manhattan Beach. The swelling of Coney Island Creek, too, led to inundation in Coney Island and Gravesend. The surge overtopped the creek's low edges (in fact, there was flooding along Neptune Avenue, adjacent to Coney Island Creek, a full 12 hours before the surge's peak). Even in the ocean-facing neighborhoods of Coney Island, Brighton Beach, and Manhattan Beach, floodwaters came primarily from their "backdoors" until the peak of the storm when, in many areas, waters from the ocean met waters from the north side of the peninsula on land.

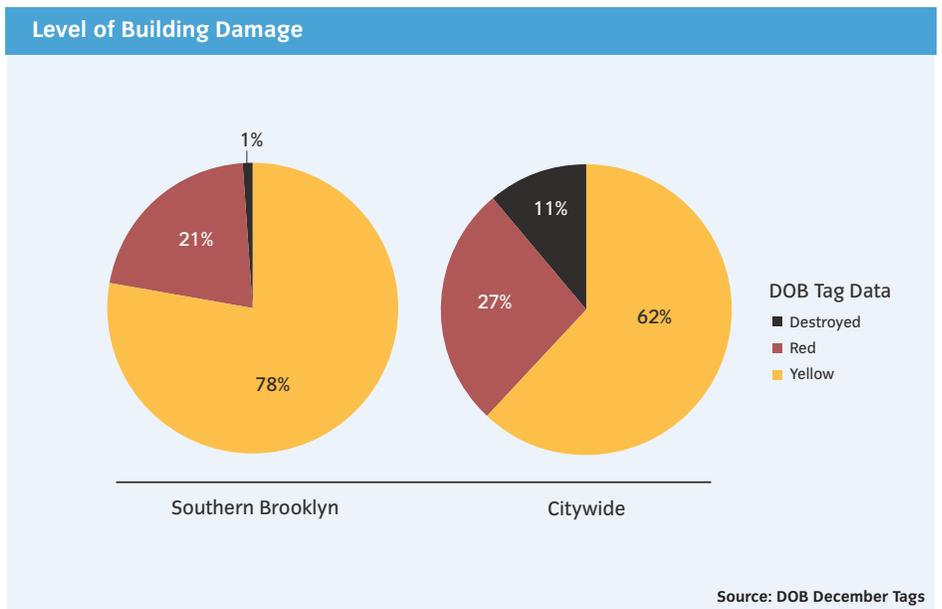
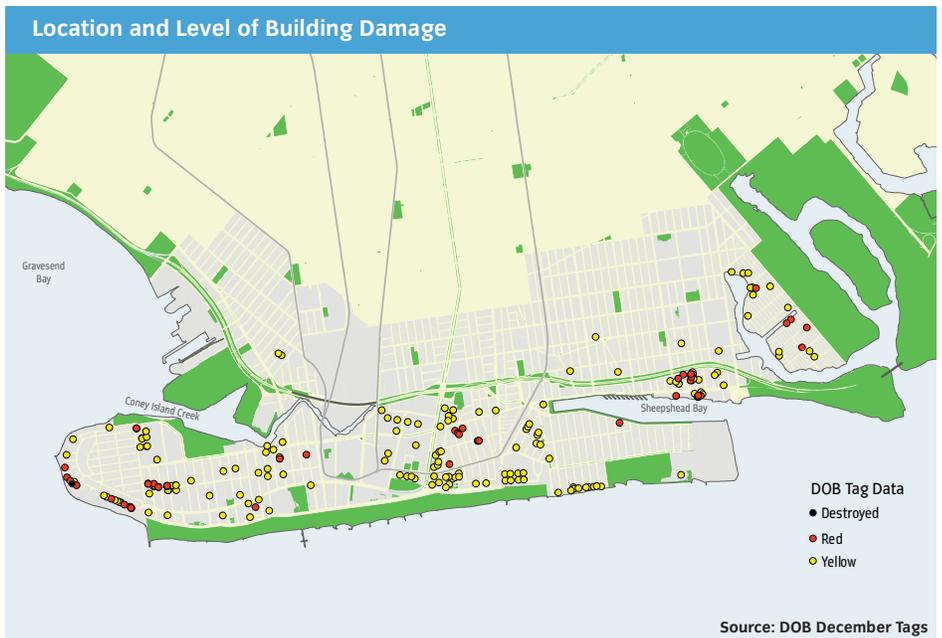
Elsewhere, storm surge pushed into Gerritsen Inlet, which then overflowed into the neighborhood of Gerritsen Beach (although floodwaters also came over Plumb Beach and the Belt Parkway). This water then flowed to Shell Bank Creek and up and over the creek's edges into adjacent homes.

The most methodologically rigorous building damage assessment undertaken by New York City of Buildings (DOB) was completed in December 2012. According to this assessment, of those buildings citywide that were tagged, either yellow or red (including those further classified as destroyed), 10 percent were located in Southern Brooklyn. The yellow and red tagged buildings in Southern Brooklyn tended to be clustered along Atlantic Avenue in Sea Gate, in Sheepshead Bay and Gerritsen Beach. Southern Brooklyn was unusual among ocean-facing parts of the city, with a larger percentage of red and yellow tagged buildings that were tagged yellow (78 percent) than neighborhoods such as South Queens (41 percent) and the East and South Shores (52 percent). This was reflective of the fact that, in Southern Brooklyn, although a significant number of buildings were damaged by powerful waves coming off of the ocean, the area also experienced significant "backdoor" (stillwater) inundation in its northern regions. (See map: *Location and Level of Building Damage*)



Damage at Manhattan Beach

Credit: Nate Bliss





Damage at the W. 37th Street jetty

Credit: Nate Bliss

Overall, the storm's impact on buildings in Southern Brooklyn was primarily from stillwater flooding. Inundation damaged ground-floor and basement spaces, destroying electrical equipment and other building systems, and disrupting power service. Thousands of commercial spaces were inundated, resulting in the loss of inventory and valuable equipment that

was not elevated, as well as the destruction of interior finishes.

Flooding had a huge impact on the homes and residents of Southern Brooklyn. Flooding of ground-floor residential units, single-family homes, and bungalows throughout the area resulted in temporary displacement of

residents. Repairs to electrical, heat, and elevator systems in high-rise buildings—including public housing and Mitchell-Lama buildings—took two to four weeks and, in some cases, even longer. Meanwhile, 10 Department of Education buildings had major damage, which impacted fifteen schools. In Coney Island, it was nearly two and half months before students could return to P.S. 288 (the Shirley Tanyhill School). In the interim, these students were sent to other schools.

Local businesses were also hit hard, with over 5,000 businesses employing over 30,000 people affected by the storm. Along neighborhood retail corridors, local grocery stores were closed, making it difficult for residents in Coney Island to access food following the storm. In turn, many businesses that managed to reopen found themselves with fewer customers because so many Southern Brooklyn residents had been displaced.

There were significant losses within the entertainment area as well. At the New York Aquarium, operated by the Wildlife Conservation Society, floodwaters poured into buildings, causing an estimated \$65 million in damage to life-support systems for fish and marine mammals and exhibit infrastructure. Sandy also destroyed the MCU Park front office, locker rooms, and field, and did millions of dollars of damage to rides and electrical systems at the area's amusement parks.

Southern Brooklyn's Jamaica Bay Neighborhoods

The neighborhoods of Southern Brooklyn that front on Jamaica Bay, including Marine Park, Bergen Beach, Mill Basin, Canarsie, and East New York, experienced Sandy in some ways that were similar to the neighborhoods on which this report focuses and in some ways that were different. However each was impacted in ways that continue to affect the residents and businesses of these neighborhoods.

During Sandy, most of the damage done to these neighborhoods was the result of inundation from Jamaica Bay. Sandy's floodwaters arrived with the storm, were pushed through Rockaway Inlet into the Bay and then made their way into creeks, basins, and inlets, overflowing sandy beaches and wetlands and overwhelming bulkheads. In the case of Canarsie, this neighborhood was flooded on multiple fronts, with waters coming both from Paerdegat Basin and Fresh Creek, impacting hundreds of structures.



Credit: Nate Bliss

Looking to the future, low-lying areas such as these neighborhoods are particularly at risk from rising sea levels that could exacerbate storm surges like that brought by Sandy. The initiatives described in this report are designed to help address these risks through a range of strategies. Among these are: new coastal protections (studying, for example, a potential storm surge barrier across Rockaway Inlet; see *Southern Brooklyn Initiative 4*); a program to raise bulkheads

and other shoreline structures in low-lying most at risk of flooding, including potentially these Bay-facing Brooklyn neighborhoods (see *Coastal Protection Initiative 6*); and wetland restoration measures in and around Jamaica Bay. At the same time, this report proposes other measures that will help with recovery in these neighborhoods by supporting housing and commercial rebuilding, building-level resiliency investments, and investments in critical infrastructure.

Risk Assessment: Impact of Climate Change

■ Major Risk
 ■ Moderate Risk
 ■ Minor Risk

Hazard	Scale of Impact			Comments
	Today	2020s	2050s	
Gradual				
Sea level rise				Minimal impact
Increased precipitation				Could result in combined sewer overflows and flooding of low-lying areas
Higher average temperature				Minimal impact
Extreme Events				
Storm surge				Significant risk of both flooding and wave action, as evidenced by Sandy; risk will grow as V Zone expands; increased storm frequency will leave less time to restore coastal protections
Heavy downpour				As with increased precipitation, likely to result in more combined sewer overflows and flooding
Heat wave				Greater strain on power system with potential for more failures; most significant impact on high-rise buildings
High winds				Overhead power lines are at risk of failure

Meanwhile, Coney Island Hospital and many area nursing homes, adult-care residences, and other outpatient medical facilities experienced flooding and power loss, resulting in evacuations in the days after the storm. In fact, Coney Island Hospital, which lost power and suffered significant damage to its mechanical and electrical systems, had to close the day after the storm—evacuating more than 220 patients—and it was months before the hospital could begin providing inpatient care (see Chapter 8, *Healthcare*).

Sandy also had a significant impact on key infrastructure in the area, resulting in damage and disruption to critical services. The Belt Parkway was inundated in sections, with damage to its seawall and bulkhead. At Coney Island Yards, there was flooding and significant damage to track switches. Transit service was down for nine days following the storm. The Coney Island WWTP lost power during the storm for two hours, and inundation inflicted modest damage on the facility. DEP workers heroically labored to get the plant back online quickly, which helped minimize the discharge of untreated wastewater following the storm.

What Could Happen in the Future

Going forward, given the area's coastal exposure and low topography, and as evidenced by Sandy's destructive impacts, the most significant risk to Southern Brooklyn is from flooding resulting from coastal storms, exacerbated by projected sea level rise.

Major Risks

Preliminary Work Maps (PWMs) were released in June 2013 by the Federal Emergency Management Agency (FEMA). According to these new PWMs, the boundaries for the 100-year floodplain—the area that has a 1 percent or greater chance of flooding in any given year—have expanded to include most portions of the area that were once marshlands. (See map: *Comparison 1983 FIRMs and Preliminary Work Maps*)

There is also a dramatic increase—215 percent—in buildings of all types in the 100-year floodplain of the PWMs compared to that of the 1983 FIRMs. Base Flood Elevations (BFE)—the height to which floodwaters could rise during a storm—shown on the maps have increased two to three feet in large swaths of

the area. Meanwhile, V Zones, the areas of the 100-year floodplain where waves could exceed three feet in height, have increased along the oceanfront and, in some cases, they even extend into residential areas. Sensitive facilities, such as Coney Island Hospital and Coney Island Yards, are now within the 100-year floodplain. (See table: *Buildings in the Floodplain*)

According to projections from the New York City Panel on Climate Change (NPCC), described in Chapter 2, sea levels are projected to rise through the 2020s and 2050s. During this period, the floodplain will likely expand, and throughout the area, the BFE will likely continue to rise, reflecting the risk of ever-higher floodwaters during storms. According to the NPCC's high-end projections, the 2050s, in Southern Brooklyn, approximately 20,000 buildings are expected to be in the floodplain (an increase of 30 percent over the PWMs), V Zones are also expected to expand, and BFEs are expected to increase. (See map: *Comparison of Preliminary Work Maps and Future Floodplains*)

Taking into account the combination of sea level rise and increased storm severity, existing coastal protections may prove no

Buildings in the Floodplain				
Buildings & Units	100-Year Floodplain			
	1983 FIRMs	2013 PWMs	Projected 2020s	Projected 2050s
Residential Buildings	4,240	14,220	16,880	18,560
Residential Units	28,100	61,400	73,700	78,800
Commercial and Other Buildings	700	1,340	1,540	1,650

Source: DCP PLUTO, FEMA, CUNY Institute for Sustainable Cities

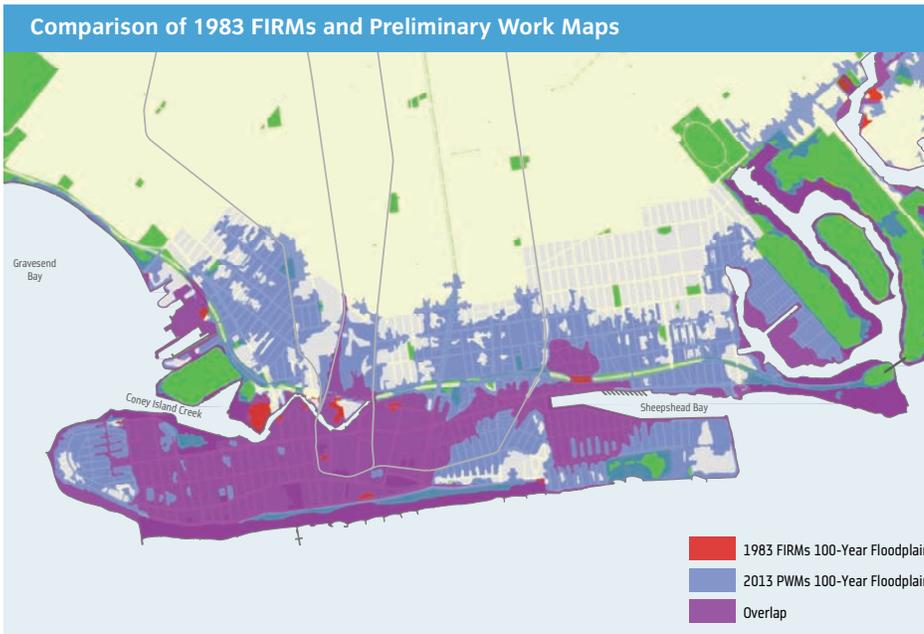
longer adequate. Additionally, increased storm frequency will make it challenging to restore coastal protections between extreme weather events.

Other Risks

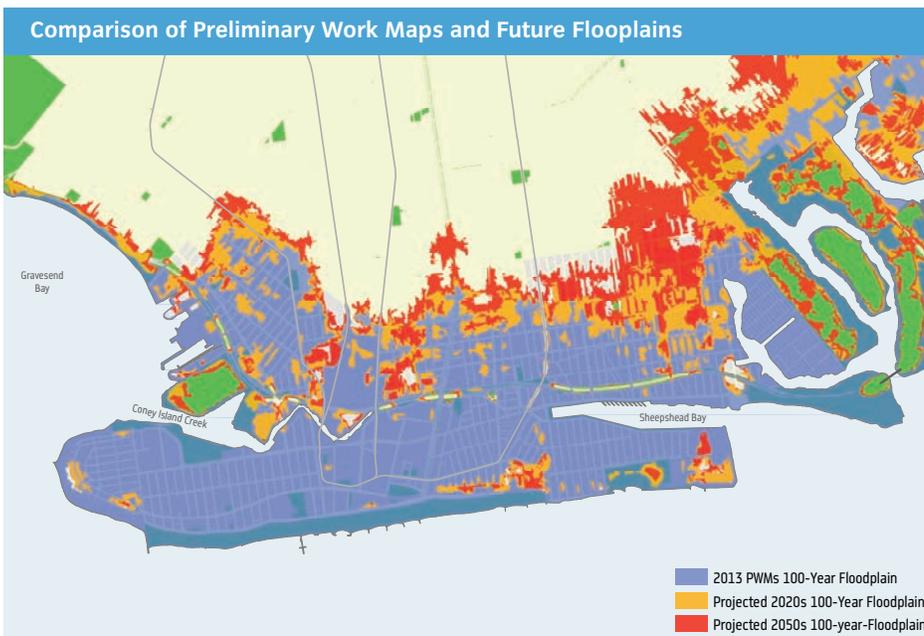
Though considerably less significant than the risk from storm surge, other moderate climate change risks do exist going forward for Southern Brooklyn. For example, increased precipitation and heavy downpours may overwhelm sewer systems, a phenomenon that already occurs today in some areas. Heavy rain events also could result in additional localized flooding.

While future projections for changes in wind speeds are not available from the NPCC, a greater frequency of intense hurricanes by the 2050s could present a greater risk of high winds in the New York area, which could result in downed overhead powerlines and trees, and potentially damage older buildings not constructed to modern wind standards. Heat waves may also strain power systems.

Because much of its land lies at least several feet above sea level, most of Southern Brooklyn is not expected to be threatened by sea level rise alone, under typical conditions, and in the absence of extreme weather events. However, isolated low-lying areas may experience increased regular tidal flooding. Higher average temperatures outside of the increase in the number of heat waves are not expected to have meaningful impacts on the area.



Source: FEMA



Source: FEMA, CUNY Institute for Sustainable Cities



Coney Island Creek

Credit: Charles Denson/
Coney Island History Project

Priorities from Public Engagement in Southern Brooklyn



Southern Brooklyn community outreach workshop

Since the Special Initiative for Rebuilding and Resiliency (SIRR) was launched in December 2012, the input of local stakeholders has helped shape an understanding of what happened during Sandy, what risks Southern Brooklyn faces in relation to climate change, and what approaches make sense to address these risks.

Southern Brooklyn is represented by a wide array of elected officials at the Federal, State, and local levels. It is also represented by three community boards. The area is further served by a large number of community-based organizations, civic groups, faith-based organizations, and other neighborhood stakeholders. All played an important role in relief and recovery efforts after Sandy. Throughout the process of developing this plan, SIRR staff benefited from numerous conversations—both formal and informal—with these groups and individuals, including, in Southern Brooklyn, two task forces that met regularly.

SIRR also held two public workshops in March of 2013 in Southern Brooklyn, part of a series

Task Force	Briefing Frequency	# of stakeholders from Southern Brooklyn
Elected Officials	Monthly	• 11 City, State, Federal elected officials
Community-Based Organizations	4 - 6 weeks	• 3 community boards • 40+ faith-based, business, and community organizations

of such workshops held citywide in which over 1,000 New Yorkers participated to discuss issues affecting their neighborhoods and communicate their priorities for the future of their homes and communities. Generally, the on-the-ground insights provided at these public workshops helped SIRR staff to develop a deeper understanding of the specific priorities of, and challenges facing, the communities of Southern Brooklyn.

Overall, out of the various task force and other meetings and public workshops attended by SIRR staff since January, several priorities for SIRR clearly emerged:

- Providing additional coastal/shoreline protection from wave action, beach erosion, and oceanfront vulnerabilities
- Adding protection from “back-door” inundation that can lead to flooding of inland areas.
- Focusing on infrastructure inadequacy, particularly drainage
- Improving communication, which was hindered after the storm
- Addressing the lagging recovery of some neighborhood services and commercial corridors



Coastal Protection

Selected Citywide Measures

- A** Continue to work with the USACE to complete emergency beach nourishment in Coney Island
- B** Install armored stone shoreline protection (revetments) in Coney Island
- C** Complete emergency bulkhead repairs adjacent to the Belt Parkway in Southern Brooklyn
- D** Continue to work with the USACE to complete its Plumb Beach breakwater and beach nourishment project in Southern Brooklyn
- E** Continue to work with the USACE to complete its Sea Gate project in Southern Brooklyn

* For additional Coastal Protection initiatives, see Coastal Protection section of Community Plan

- 1** Call on and work with the USACE to study additional Sea Gate oceanfront protection
- 2** Continue to work with the USACE to study strengthening the Coney Island/Brighton Beach nourishment

Buildings

Selected Citywide Measures

- 3** Call on and work with the USACE to study Manhattan Beach oceanfront protections
- 4** Call on and work with the USACE to study mitigating inundation risks through Rockaway Inlet, exploring a surge barrier and alternative measures
- 5** Develop an implementation plan and preliminary designs for new Coney Island Creek wetlands and tidal barrier
- F** Improve regulations for flood resiliency of new and substantially improved buildings in the 100-year floodplain
- G** Rebuild and repair housing units destroyed and substantially damaged by Sandy
- H** Study and implement zoning changes to encourage retrofits of existing buildings and construction of new resilient buildings in the 100-year floodplain

Critical Infrastructure

Selected Citywide Measures

- I** Amend the Building Code and complete studies to strengthen wind resiliency for new and substantially improved buildings
- J** Encourage existing buildings in the 100-year floodplain to adopt flood resiliency measures through an incentive program and targeted mandate
- K** Retrofit public housing units damaged by Sandy and increase future resiliency of public housing
- L** Launch a sales tax abatement program for flood resiliency in industrial buildings
- M** Clarify regulations relating to the retrofit of landmarked structures in the 100-year floodplain
- N** Amend the Building Code to improve wind resiliency for existing buildings and complete studies of potential retrofits
- 6** Study additional resiliency initiatives for ground-floor housing within NYCHA buildings

* For additional Buildings initiatives, see Buildings section of Community Plan

Critical Infrastructure

Selected Citywide Measures

- O** Work with utilities and the Public Service Commission (PSC) to harden key electric transmission and distribution infrastructure against flooding
- P** Work with utilities and the PSC to harden vulnerable overhead lines against winds
- Q** Work with utilities, regulators, and gas pipeline operators to harden the natural gas system against flooding
- R** Require the retrofitting of existing hospitals in floodplains
- S** Support the HHC's efforts to protect public hospital emergency departments from flooding
- T** Require retrofitting of nursing homes in floodplains
- U** Require retrofitting of adult care facilities in floodplains
- V** Reconstruct and resurface key streets damaged by Sandy
- W** Elevate traffic signals and provide backup electrical power



Community & Economic Recovery

X Call on non-City transportation agencies to implement strategies to address climate change threats

Y Expand the city's Select Bus Service (SBS) network

Z Restore city beaches

AA Harden or otherwise modify shoreline parks to protect adjacent communities

BB Harden wastewater treatment plants

CC Reduce combined sewer overflow with Green Infrastructure

* For additional Critical Infrastructure initiatives, see Critical Infrastructure sections of Community Plan

7 Support CUNY launch of study and pilot of new technologies for high-rise buildings

8 Study options to ensure resiliency of private cogeneration facilities in the area

9 Construct new Coney Island Hospital outpatient clinic to replace the destroyed Ida G. Israel facility

10 Call for the USACE to develop an implementation plan for the reinforcement of existing Belt Parkway edge protections

11 Restore recreational infrastructure along Southern Brooklyn beaches

12 Complete planned drainage improvements in Coney Island to mitigate flooding

13 Provide technical assistance to support Sea Gate in repairing Sandy-damaged infrastructure

Selected Citywide Measures

DD Launch business recovery and resiliency programs

EE Launch Neighborhood Game-Changer Competition

Call for Neighborhood Retail Recovery Program

- Brighton Beach Ave.
- Coney Island, including Neptune, Mermaid, and Surf Avenues
- Coney Island Ave.
- Emmons Ave.
- Gerritsen Ave.
- Nostrand Ave.
- Ocean Ave.
- Sheepshhead Bay Rd.

FF Support local merchants in improving and promoting local commercial corridors

GG Continue to support the FRESH program to increase the number of full-line grocers in underserved neighborhoods

14 Work with Brooklyn Chamber of Commerce to assist in organizing Sheepshhead Bay businesses

15 Support area recovery through the rebuilding and expansion of the entertainment district

16 Study opportunities along Coney Island Creek to generate economic activity and facilitate resiliency investments

17 Implement planned and ongoing investments by the City and private partners

- Calvert Vaux Park
- The West 8th Street Access Project
- Coney Island Commons and YMCA
- Coney Island Comprehensive Plan

This chapter contains a series of initiatives that are designed to mitigate the impacts of climate change on Southern Brooklyn. In many cases, these initiatives are both ready to proceed and have identified funding sources assigned to cover their costs. With respect to these initiatives, the City intends to proceed with them as quickly as practicable, upon the receipt of identified funding.

Meanwhile, in the case of certain other initiatives described in this chapter, though these initiatives may be ready to proceed, they still do not have specific sources of funding assigned to them. In Chapter 19 (*Funding*), the City describes additional funding sources, which, if secured, would be sufficient to fund the full first phase of projects and programs described in this document over a 10-year period. The City will work aggressively on securing this funding and any necessary third-party approvals required in connection therewith (i.e., from the Federal or State governments). However, until such time as these sources are secured, the City will only proceed with those initiatives for which it has adequate funding.

Southern Brooklyn Community Rebuilding and Resiliency Plan

Southern Brooklyn is an historic area containing some of New York City's most iconic attractions and unique neighborhoods. The area benefits from unparalleled access to a beautiful beach, the waterfront, and a network of public parks.

The following is a multilayered plan that not only applies citywide strategies to Southern Brooklyn, but also provides strategies designed to address the area's specific needs and particular vulnerabilities. In anticipation of future climate change-related risks, this plan proposes ways that Southern Brooklyn neighborhoods can adapt by: addressing wave action and inundation along the entire coastline; providing opportunities to retrofit the area's most vulnerable building stock while exploring potential redevelopment over time in certain neighborhoods; protecting and improving critical infrastructure; and focusing investments in strategic areas, such as the beachfront, to advance a long-term and sustainable recovery.

Coastal Protection

As Sandy illustrated, the greatest extreme weather-related risk faced by New York City is storm surge, the effects of which are likely to increase given current projections of sea level rise. Going forward, it is anticipated that climate change will render coastal regions of the city, including Southern Brooklyn, even more vulnerable to these risks.

While it is impossible to eliminate the chance of flooding in coastal areas, the City will seek to reduce its frequency and effects—mitigating the impacts of sea level rise, storm waves including erosion, and inundation on the coastline of the city generally and Southern Brooklyn in particular. Among the strategies that the City will use to achieve these goals will be the following: increasing coastal edge elevations; minimizing upland wave zones; protecting against storm surge; and improving coastal design and governance. When evaluating coastal protection, other priorities including navigation and ongoing efforts to improve water quality and natural habitats, also will be considered prior to implementation, where appropriate.

The initiatives described below provide important examples of how the City intends to advance its coastal protection agenda citywide. These initiatives will have a significant impact on the residents, businesses, and nonprofits of Southern Brooklyn. Taken together, when completed, the

first six coastal protection initiatives described below would provide enhanced protection for nearly 1,000 buildings in Southern Brooklyn, representing nearly 12,000 housing units as well as many businesses and much of the critical infrastructure in Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's comprehensive coastal protection plan, please refer to Chapter 3 (*Coastal Protection*).

Coastal Protection Initiative 1 Continue to work with the USACE to complete emergency beach nourishment in Coney Island

Though the beach at Coney Island helped to protect adjacent neighborhoods from some of the impacts of Sandy's surge, doing so came at the cost of significant beach erosion. The City, therefore, will support emergency beach nourishment work from Corbin Place to West 37th Street. The initiative will replace approximately 1 million cubic yards of sand, which replaces sand lost during Sandy and will restore the beach to its original design profile. As part of this initiative, the City and USACE will develop a plan for ongoing beach maintenance to ensure future events can be followed quickly by restoration of lost sand. The project will begin in July with completion expected by the end of 2013.

Coastal Protection Initiative 4 Install armored stone shoreline protection (revetments) in Coney Island

During Sandy, Coney Island Creek was the source of much of the "backdoor" flooding in Southern Brooklyn. Subject to available funding, the City, therefore, will raise the lowest edge elevations with revetments along Coney Island Creek to a consistent grade. The City, through the Office of Long-Term Planning and Sustainability (OLTPS) and the New York City Economic Development Corporation (NYCEDC), will begin design in 2013 with completion expected within three years.

Coastal Protection Initiative 6 Raise bulkheads in low-lying neighborhoods to minimize inland tidal flooding

Bulkheads provide the first line of defense against flooding in many neighborhoods, including Southern Brooklyn, but throughout the city many bulkheads are built to an elevation that may be insufficient given the latest projections of sea level rise by 2050. Subject to available funding, the City, therefore, will launch a program to raise bulkheads and other shoreline structures across the five boroughs in low-lying areas most at risk of daily or weekly

tidal flooding, a phenomenon that could impact over one mile of Southern Brooklyn's shoreline by the 2050s. OLTPS will work with NYCEDC to manage this program, to begin implementation in 2013, in conjunction with the new citywide waterfront inspections program described in Chapter 3.

Coastal Protection Initiative 7 **Complete emergency bulkhead repairs adjacent to the Belt Parkway in Southern Brooklyn**

Several critical bulkheads along the Belt Parkway failed during Sandy, leaving several portions of the roadway exposed and vulnerable to future extreme weather. The City, through DPR, therefore will complete bulkhead repairs in areas damaged during Sandy, including at 14th Avenue, 17th Avenue and 95th Street. These repairs will enhance protection during this year's hurricane season. These repairs are expected to be completed in 2013.

Coastal Protection Initiative 16 **Continue to work with the USACE to complete its Plumb Beach breakwater and beach nourishment project in Southern Brooklyn**

Shortly before Sandy's arrival, the USACE completed the first phase of a beach nourishment project at Plumb Beach, along the Belt Parkway. The project provided critical protection to the Parkway during the storm. The City, therefore, will support completion of the second phase of this existing project. The second phase will include additional nourishment and construction of an offshore breakwater. It is expected to be completed in 2014.

Coastal Protection Initiative 18 **Continue to work with the USACE to complete its Sea Gate project in Southern Brooklyn**

Sea Gate has very little coastal protection. As a result, during Sandy, the neighborhood sustained significant damage. The City, therefore, will support construction of groins in this neighborhood. These offshore structures are primarily intended to protect the terminal groin at West 37th Street, but also will provide a first line of protection to the neighborhood against some of the impacts of inundation and destructive wave action. This project is expected to be completed by 2014.

Beyond the priority coastal protection projects described in Chapter 3, including those summarized briefly above, the City is

proposing additional coastal protection initiatives specific to Southern Brooklyn's vulnerabilities. These initiatives are described below.

Southern Brooklyn Initiative 1 **Call on and work with the USACE to study additional Sea Gate oceanfront protection**

As described above, Sea Gate is highly vulnerable to wave action risks. This is due in part to the neighborhood's decision not to participate in the USACE replenishment project of the mid-1990s as a result of concerns relating to public access required in connection with the receipt of Federal funding. The City will call for the USACE to develop an implementation plan for additional protection measures at Sea Gate to address these lingering vulnerabilities. While the groin project referenced above will provide needed shoreline protection in the near-term, in developing its implementation plan, the USACE should investigate whether additional beach nourishment extending west of the existing West 37th Street jetty to Norton's Point and development of a reinforced sea wall or dune system on the coastal edge of Gravesend Bay may be appropriate. To obtain Federal funding for protective measures, the Sea Gate Association, which is the predominant owner of oceanfront property in the area, will likely be required to provide public access to the community's beaches. The goal is for USACE to begin work on this plan as part of its continuing studies of flood risk reduction in New York City, based on the recommendations of this report.

Southern Brooklyn Initiative 2 **Continue to work with the USACE to study strengthening the Coney Island/Brighton Beach nourishment**

While immediate restoration of these beaches to pre-storm conditions with sand replacement and reshaping is critical, rising sea levels and more frequent storm surge demands more protection, focused first on areas of the beach (such as that at the end of Ocean Parkway) that were breached in the recent storm. The City will call on the USACE to develop an implementation plan containing options for strengthening the protections offered by these beaches. Additional measures could include structured dune systems, seasonal installation of "snow-fencing" to control sand and sediment migration, and potential reinforcement or extension of existing groins. Working with DPR, the USACE should also explore such protective measures as part of its current comprehensive study. Certain low-cost interventions—such as temporary fencing—may be pursued or piloted by DPR in the near-term. The goal is for the USACE to begin work on this plan as part of its continuing

studies of flood risk reduction in New York City, based on the recommendations of this report.

Southern Brooklyn Initiative 3 **Call on and work with the USACE to study Manhattan Beach oceanfront protections**

In Manhattan Beach, an historic esplanade has been the subject of an ownership dispute and was not repaired following a 1993 nor'easter, leaving waterfront properties and the neighborhood behind them vulnerable, therefore, to Sandy's pounding waves. The City will call on the USACE to develop an implementation plan containing options for reinforcing protections along the Manhattan Beach waterfront from Corbin Place to Kingsborough Community College at the eastern tip of the Coney Island peninsula. The City will encourage private waterfront property owners to engage with the USACE and consider participating in the implementation of such protections. New or reinforced ocean-facing protections—such as sea walls, bulkheads and revetments—would serve to protect ocean-facing structures and homes from waves and upland areas from inundation. The Federal government would likely require public waterfront access in order to support additional oceanfront protections. The goal is for the USACE to begin work on this plan as part of its comprehensive study of flood risk reduction in New York City, based on the recommendations of this report.

Southern Brooklyn Initiative 4 **Call on and work with the USACE to study mitigating inundation risks through Rockaway Inlet, exploring a surge barrier and alternative measures**

Much of the flood damage from Sandy in the neighborhoods of Brooklyn and Queens that face Jamaica Bay came from water that flowed through Rockaway Inlet into the Bay. The extensive shoreline that surrounds Jamaica Bay supports a variety of land uses and densities, all of which are at risk of flooding. Because flood protection along the existing shoreline of Jamaica Bay would be extremely expensive and disruptive, and in some cases nearly impossible, the City will call on and work with the USACE to develop an implementation plan for a local storm surge barrier to be constructed across Rockaway Inlet approximately between Manhattan Beach in Brooklyn and Breezy Point in Queens. A Rockaway Inlet local storm surge barrier at this location could protect against significant inland flooding and wave risk in neighborhoods from Sheepshead Bay to Howard Beach, as well as JFK Airport, Broad Channel and the entire bayside of the Rockaway peninsula (provided that the barrier were completed in conjunction with dune enhancements along the oceanside of the

Rockaway peninsula and mitigation measures along Coney Island Creek). This project, in turn, would obviate the need for extensive localized coastal protections spread around the shoreline of the Bay. A preliminary feasibility assessment, to be performed by OLTPS in coordination with DEP, would examine impacts on water quality, habitat, hydrodynamics, and navigation, and would identify potential secondary coastline reinforcements.

The aforementioned study should also examine alternative approaches to coastal protection of the vulnerable areas behind this potential surge barrier, including localized options for protecting areas adjacent to Sheepshead Bay. Examples of alternative approaches could be the use of the elevated Belt Parkway as a levee with passive floodwalls at roadway underpasses; permanent levees along the perimeter of the Bay; and the “shallowing” of Jamaica Bay. As another alternative, the study should also examine the feasibility of a navigable or non-navigable surge barrier at Gerritsen Inlet, exploring costs and potential impacts to navigation and water quality.

The goal is for the USACE to begin work on this plan as part of its comprehensive study of flood risk reduction in New York City, based on the recommendations of this report.

Southern Brooklyn Initiative 5 Develop an implementation plan and preliminary designs for new Coney Island Creek wetlands and tidal barrier

Coney Island Creek presents a significant flood risk to Coney Island and Gravesend. Therefore, the City will develop an implementation plan and preliminary designs for a significant rethinking of the Creek that goes beyond the revetment project described above. This rethinking will include consideration of further protections, including edge-strengthening and edge-softening measures, such as wetland construction, and a potential up-creek tidal barrier or dam across the Creek to control tidal surge and improve water quality. A new levee and tide gate system could connect Calvert Vaux and Kaiser Parks. New culverts (pipes) that generally would allow normal tidal flow could be closed at low-tide in anticipation of a storm, converting the Coney Island Creek bed into a water detention basin

for the surrounding neighborhoods and holding back surge. Following a weather event, the culverts could be reopened and water could drain, flushing the Creek. *(See graphic: Conceptual Coney Island Creek culvert)*

While these changes would impede future navigation of the Creek, they would also present an unprecedented opportunity to mitigate flood risks for the entire Coney Island neighborhood, for much of the Gravesend neighborhood, and for sensitive infrastructure such as the MTA's Coney Island Yards, all of which were damaged by Sandy. Additionally, the Creek protections could serve to expand recreation options and public access, potentially transforming this ill-used waterway into a major public open space amenity for Southern Brooklyn. *(See rendering: Coney Island Creek)*

The implementation plan and preliminary designs, to be advanced by OLTPS and by the USACE subject to available funding, would investigate environmental impacts and benefits, hydrology, water quality issues, permitting issues, and operational considerations. The goal is for the USACE to begin work on this plan



Coney Island Creek

Conceptual rendering of Coney Island Creek wetlands and tidal barrier, with Rockaway inlet barrier

as part of its comprehensive study of flood risk reduction in New York City, based on the recommendations of this report.

Buildings

The city's buildings give physical form to New York. As Sandy demonstrated, however, the building stock citywide, including in Southern Brooklyn, is highly vulnerable to extreme weather events—a vulnerability that is expected to increase in the future. While the coastal protection measures outlined above are designed to reduce the effects of sea level rise, storm surge, and wave action on the city and Southern Brooklyn, these measures will not completely eliminate those risks. They also will take time to design, fund, and build. It is equally important, therefore, to supplement these measures by pursuing resiliency at the building level.

To achieve building-level resiliency, the City will seek to protect structures in Southern Brooklyn and throughout the five boroughs against a spectrum of climate risks, including not only flooding but also high winds and other extreme events. Among the strategies that the City will use to achieve these goals will be to construct new buildings to the highest resiliency standards and retrofit as many existing buildings as possible so that they will be significantly better prepared to handle the impacts of extreme weather events.

The initiatives described below provide important examples of how the City intends to advance building resiliency citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough building resiliency plan, please refer to Chapter 4 (*Buildings*).

Buildings Initiative 1 Improve regulations for flood resiliency of new and substantially improved buildings in the 100-year floodplain

Though buildings constructed to modern Construction Codes generally performed well during Sandy, given the increasing risk of flooding that is likely with climate change, modifications are warranted. The City, therefore, will seek to amend the Construction Codes and Zoning Resolution to provide for strengthened requirements that will, among other things, improve the design of new buildings through the application of appropriate resiliency measures that are calibrated to the best floodplain data available over time and provide that critical building systems are better-protected from flood risks. In 2013, the City, through OLTPS, will seek to implement these code changes and the Department of City Planning (DCP) will continue to take zoning changes through the public review process, with the goal of adoption before the end of the year. If adopted, they will improve resiliency

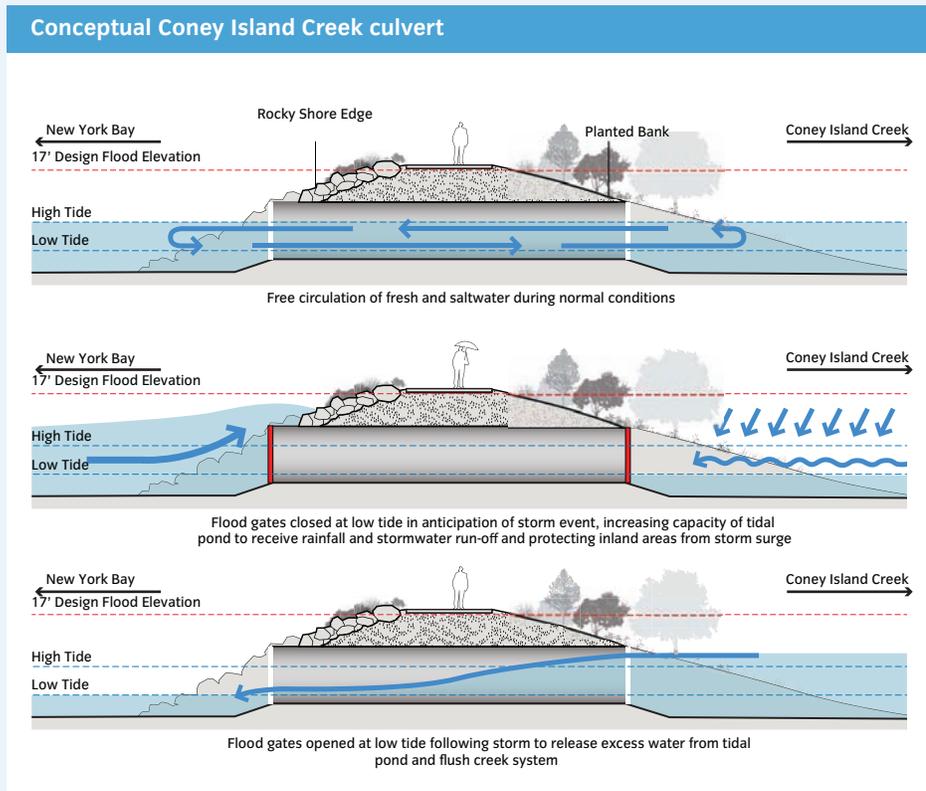
for developments throughout Southern Brooklyn, including as many as 4,500 units of new housing that are permitted to be constructed in the Coney Island neighborhood pursuant to the rezoning of that neighborhood approved by the City Council and City Planning Commission in 2009.

Buildings Initiative 2 Rebuild and repair housing units destroyed and substantially damaged by Sandy

Roughly 23,000 private residential buildings encompassing nearly 70,000 housing units were damaged or destroyed during Sandy. Subject to available funding, the City, therefore, through the Mayor's Office of Housing Recovery Operations (HRO), will provide financial and other assistance to owners of residential properties that were destroyed or substantially damaged during Sandy, including approximately 380 residential buildings encompassing approximately 1,500 housing units in Southern Brooklyn. To address the damages sustained and to more effectively prepare these significantly damaged buildings for future storm events, the City either will assist owners or, in limited cases meeting City criteria, will facilitate the acquisition of properties by new owners whom it will assist, in rebuilding and substantially improving these properties based on the best floodplain data available over time. Additionally, the City is seeking to incorporate resiliency measures into approximately 500 to 600 multifamily properties that sustained minor damage including many publicly-assisted properties such as those developed pursuant to the Mitchell-Lama program and other affordable housing programs. The City, therefore, will support the retrofit of these publicly-assisted buildings.

Buildings Initiative 3 Study and implement zoning changes to encourage retrofits of existing buildings and construction of new resilient buildings in the 100-year floodplain

The City, through DCP, will undertake a series of citywide and neighborhood-specific land use studies to address key planning issues in severely affected and vulnerable communities. As part of these studies, the City will identify ways to facilitate the voluntary construction of new, more resilient building stock, and to encourage voluntary retrofits of existing vulnerable buildings over time. To be undertaken in close consultation with local residents, elected officials, and other community stakeholders, these land use studies will focus on the challenges posed by the flood exposure of the applicable neighborhoods; the vulnerability



of the building types that are found in these neighborhoods (e.g., older, 1-story bungalows); and site conditions in these areas (e.g., narrow lots) that can make elevation or retrofit of vulnerable buildings expensive or complicated. In Southern Brooklyn, DCP will examine neighborhoods including Gerritsen Beach, exploring zoning and other land use changes that, in the future, could encourage residents, if they so choose, to make changes with respect to existing homes or build new homes that would result in significantly greater resiliency. Subject to available funding, the goal is for DCP to commence this study in 2013. Thereafter, DCP would move to implement changes, if any, that it deems to be appropriate based on the results.

Buildings Initiative 4 **Launch a competition to encourage development of new, cost-effective housing types to replace vulnerable stock**

Subject to available funding, the City, through the Department of Housing Preservation and Development (HPD), will launch an international Resilient Housing Design Competition. This competition will offer prizes to private-sector developers who design and develop new, high-quality housing prototypes that offer owners of vulnerable building types (e.g., older, 1-story bungalows), a cost-effective path that is consistent with city building and zoning requirements, and meet the highest resiliency standards. In addition to cash prizes, the winners of this competition will be given the opportunity to put these structures into service in connection with a City-sponsored development project. Prototypes will have applicability throughout the five boroughs, including in sections of Southern Brooklyn such as Gerritsen Beach and other vulnerable bungalow communities. The goal is for HPD to launch this competition in 2013.

Buildings Initiative 5 **Work with New York State to identify eligible communities for the New York Smart Home Buyout Program**

The City will evaluate opportunities for collaboration with the State in connection with its home buyout program, using an objective set of criteria developed by the City, including extreme vulnerability, consensus among a critical mass of contiguous local residents, and other relevant factors. It is anticipated that these criteria will be met in a limited number of areas citywide. As of the writing of this report, no areas have been identified for this program in Southern Brooklyn.

Buildings Initiative 6 **Amend the Building Code and complete studies to strengthen wind resiliency for new and substantially improved buildings**

As noted above, buildings constructed to modern Building Code standards generally performed well during Sandy. Sandy, however, brought relatively weak winds, compared to other hurricanes. Given the possibility of more frequent or intense wind events in the future, modifications to the Building Code are warranted. The City, therefore, through OLTPS, will seek to amend the Building Code to provide for strengthened requirements so that new buildings citywide can meet enhanced standards for wind resiliency. The City will further study whether additional wind resiliency standards should be required going forward. The amendments will be submitted to the City Council for adoption, and the study will commence, in 2013.

Buildings Initiative 7 **Encourage existing buildings in the 100-year floodplain to adopt flood resiliency measures through an incentive program and targeted mandate**

Even if every structure destroyed or damaged by Sandy were rebuilt to the highest resiliency standards, this would still leave tens of thousands of existing structures in the 100-year floodplain vulnerable—with more becoming vulnerable as the climate changes. Subject to available funding, the City, therefore, will launch a \$1.2 billion program to provide incentives to owners of existing buildings in the 100-year floodplain to encourage them to make resiliency investments in those buildings. Of the up to \$1.2 billion available through the program, the City will reserve up to \$100 million for 1- and 2- family homes, up to \$500 million for distribution to the five boroughs based on each borough's share of vulnerable buildings citywide, and \$100 million for affordable housing developments. The City also will mandate that large buildings (those with seven or more stories that are more than 300,000 square feet in size) undertake certain flood resiliency investments by 2030. If the City consistently achieves its stated goal of encouraging significant resiliency retrofit investments for the vast majority of the vulnerable built floor area in the five boroughs, nearly 45,000 units encompassing approximately 55 million square feet of built space in Southern Brooklyn would, over time, be made meaningfully less vulnerable. The goal is to launch these programs in 2013.

Buildings Initiative 8 **Establish Community Design Centers to assist property owners in developing design solutions for reconstruction and retrofitting, and connect them to available City programs**

The City, through HRO, will establish Community Design Centers in neighborhoods across the City, potentially including Southern Brooklyn, to assist property owners in developing design solutions for reconstruction and retrofitting, and connect them to available City programs. The Centers would be managed by the City—through agencies such as HRO, HPD, DOB, DCP, and NYCEDC—with support from local partners.

Buildings Initiative 9 **Retrofit public housing units damaged by Sandy and increase future resiliency of public housing**

During Sandy, public housing developments owned and operated by NYCHA suffered significant damage throughout the city. Still more were not impacted by Sandy but remain vulnerable to extreme weather, with even more likely to become vulnerable as the climate changes. The City, therefore, through NYCHA, will repair public housing developments across the city that were damaged by Sandy, incorporating new flood resiliency measures. In Southern Brooklyn, 40 buildings containing over 4,000 units will be repaired. NYCHA also will undertake a planning process to identify additional resiliency investments in developments that are vulnerable to weather-related events, even if they were unaffected by Sandy. In Southern Brooklyn, NYCHA is, subject to available funding, evaluating resiliency investments in 47 buildings containing nearly 3,000 additional units.

Buildings Initiative 10 **Launch a sales tax abatement program for flood resiliency in industrial buildings**

As Sandy demonstrated, many industrial buildings are vulnerable to extreme weather, with more likely to become vulnerable as the climate changes. However, many industrial buildings operate on thin margins, making it challenging to invest in resiliency. The City, through the New York City Industrial Development Agency (NYCIDA), therefore, will launch a \$10 million program to provide incentives to owners of industrial buildings to encourage them to make resiliency investments in those buildings. The program will prioritize 1- to 2-story buildings with more than four feet between their actual ground elevation and the applicable BFE. In Southern Brooklyn,

approximately 25 industrial buildings with over 200,000 square feet of floor area will be eligible for this program. This program will be launched in 2013.

Buildings Initiative 11 **Launch a competition to increase flood resiliency in building systems**

Many existing strategies for improving resiliency in buildings are either imperfect, expensive, or a combination of both. The City, through NYCEDC, therefore, will launch an approximately \$40 million Resiliency Technologies Competition using allocated Community Development Block Grant (CDBG) funding to encourage the development, deployment, and testing of new resiliency technologies for building systems. In Southern Brooklyn, 15,570 buildings will be eligible to benefit from this competition. The program will be launched in 2013.

Buildings Initiative 12 **Clarify regulations relating to the retrofit of landmarked structures in the 100-year floodplain**

The City, through the Landmarks Preservation Commission, will clarify the Commission's regulations to assist owners of landmarked buildings and properties in landmarked districts in the 100-year floodplain who are contemplating retrofit projects. In Southern Brooklyn, there are seven landmarked buildings or structures in the floodplain. The Commission will issue its clarifying regulations in 2013.

Buildings Initiative 13 **Amend the Building Code to improve wind resiliency for existing buildings and complete studies of potential retrofits**

As noted above, given the possibility for more frequent intense wind events in the future, modifications to the Building Code are warranted. The City, therefore, through OLTPS, will seek to amend the Building Code and expand the existing DOB Façade Inspection Safety Program for high-rise buildings to include rooftop structures and equipment. The City will further study whether additional wind resiliency standards are required going forward. These amendments will be submitted to the City Council for adoption and the study will commence in 2013.

Beyond the priority building resiliency projects described in Chapter 4, including those summarized briefly above, the City is proposing an additional building resiliency initiative that is specific to Southern Brooklyn's vulnerabilities. The initiative is described below.

Southern Brooklyn Initiative 6 **Study additional resiliency initiatives for ground-floor housing within NYCHA buildings**

NYCHA developments are a significant feature in Southern Brooklyn. One challenge in NYCHA's facilities is the presence of ground-floor residential units that are below the BFE, and are vulnerable to flooding. There are approximately 115 ground-floor units located in 37 NYCHA buildings in the Coney Island area.

To address this challenge, the City will explore the construction of new, resilient units in the Coney Island area to replace at-risk units. These units would be reserved for tenants of existing ground-floor units in public housing developments in Southern Brooklyn. Such a project, provided it were determined to be feasible and were funded, would include rent and occupancy protections for NYCHA residents and would allow residents to relocate into new, modern, and resilient units in their community. The study also will assess how NYCHA could best repurpose vacated ground floor units in current NYCHA buildings—exploring, for example, community or public-serving commercial uses.

The City's study will be undertaken in close consultation with the NYCHA resident community and will seek to identify new sources of capital funding and new operating resources. Such new sources of capital funding and operating resources are a necessary precondition for any project to proceed. The study will be completed by early 2014.

Insurance

Insurance can help provide residents and businesses with financial protection against losses from climate change and other types of risks. Sandy not only highlighted the importance of insurance, it also revealed that many New Yorkers are exposed to flood losses, which are not covered in standard homeowners or small business property insurance policies. Citywide, 95 percent of homeowners carry homeowners insurance, but when Sandy struck less than 50 percent of residential buildings in the effective 100-year floodplain had coverage through the National Flood Insurance Program (NFIP), a Federal program administered by FEMA that provides flood insurance to properties in participating communities like New York City. While larger properties, in particular large commercial properties, tend to purchase flood insurance through the private market, NFIP is the primary source of flood insurance for homeowners throughout the

country. The City estimates that in areas of Southern Brooklyn inundated by Sandy, less than 17 percent of residential properties typically insured under the NFIP, including 1- to 2-family homes, amongst others, actually had policies in force during Sandy. Furthermore, Sandy drew attention to the significant cost increases in flood insurance that many New Yorkers will soon face, resulting from recent reforms to the NFIP as required by the Biggert-Waters Flood Insurance Reform Act.

The City will use several strategies to encourage more New Yorkers to seek coverage and to help the NFIP meet the needs of policyholders citywide. Specifically, the City will work to: address affordability issues for the most financially vulnerable policyholders; define mitigation measures that are feasible in an urban environment such as Southern Brooklyn and create commensurate premium credits to lower the cost of insurance for property owners who invest in these measures; encourage the NFIP to expand pricing options (including options for higher deductibles) to give potential policyholders more flexibility to make choices about coverage; and launch efforts to improve consumer awareness, to help policyholders make informed choices. The initiatives described below are important examples of how the City will advance these strategies. These initiatives will have a major impact on the residents, small businesses and nonprofits in this community. For a full explanation of the following initiatives and a complete description of the City's five-borough insurance reform plan, please refer to Chapter 5 (*Insurance*).

Insurance Initiative 1 **Support Federal efforts to address affordability issues related to reform of the NFIP**

The City will call on FEMA to work with the National Academy of Sciences to complete the study of flood insurance affordability, as required under the Biggert-Waters Act. The City will urge its Federal government partners to comply with this provision of the Act and take swift action to enact the recommendations.

Insurance Initiative 4 **Call on FEMA to develop mitigation credits for resiliency measures**

The NFIP provides few incentives for property owners to protect their buildings from flood damage and reduce their premiums, other than by elevating their buildings—actually lifting structures above flood elevation levels. In an urban environment such as Southern Brooklyn, for a variety of reasons, elevation can be impractical, undesirable, and/or economically

infeasible. Fortunately, other mitigation options are available. The City, therefore, will call upon FEMA to provide appropriate premium credits for mitigation measures other than elevation.

Insurance Initiative 6

Call on FEMA to allow residential policyholders to select higher deductibles

Flexible pricing options can encourage more people, especially those not required to carry insurance, to purchase insurance coverage that suits their needs. A higher-deductible option can substantially reduce premium costs to policyholders while remaining truly risk-based. Currently under the NFIP, deductibles up to \$50,000 are allowed for commercial policies, but residential policies are limited to a maximum deductible of \$5,000. The City, therefore, will call upon FEMA to allow homeowners that are not required to carry NFIP policies to purchase high-deductible policies, protecting them from catastrophic loss; initial estimates indicate that doing so could reduce insurance premiums by about half.

Critical Infrastructure

A resilient New York requires protection of its critical services and systems from extreme weather events and the impacts of climate change. This infrastructure includes the city's utilities and liquid fuel system, its hospitals and other healthcare facilities, telecommunications network, transportation system, parks, wastewater treatment and drainage systems, as well as other critical networks—all vital to keeping the city, including Southern Brooklyn, running.

Utilities

The city's electric, natural gas, and steam systems are essential to everyday life in areas throughout the five boroughs, including Southern Brooklyn. As Sandy proved, however, these systems are highly vulnerable to extreme weather events with 800,000 customers losing electricity and 80,000 customers losing natural gas service during Sandy across the city, including approximately 160,000 that lost electricity service in the borough of Brooklyn. This vulnerability will only grow as the climate changes.

Among the strategies that the City will use to address these challenges for residents of Southern Brooklyn and other parts of the city will be to: call for risk-based analysis of low-probability but high-impact weather events to be incorporated into utility regulation and investment decision-making; call for capital

investments that harden energy infrastructure and make systems more flexible in responding to disruptions and managing demand; and better diversify the city's sources of energy. The initiatives described below provide important examples of how the City intends to advance utilities resiliency citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough utilities resiliency plan, please refer to Chapter 6 (*Utilities*).

Utilities Initiative 5

Work with utilities and the Public Service Commission (PSC) to harden key electric transmission and distribution infrastructure against flooding

Various transmission substations, distribution substations, utility tunnels, and underground equipment in the city are at risk of flooding during extreme weather. For example, 40 percent of transmission substations are in the 100-year floodplain today, and 67 percent are likely to be in the 100-year floodplain by the 2050s. The City, through OLTPS, will work with Con Edison and the Long Island Power Authority (LIPA) to prioritize these assets based on their roles in system reliability and to harden them as appropriate. This effort will begin in 2013.

Utilities Initiative 6

Work with utilities and the PSC to harden vulnerable overhead lines against winds

During extreme weather events, high winds and downed trees threaten overhead electric poles, transformers, and cables. The City, through OLTPS, will work with Con Edison and LIPA to manage the risk of wind and downed-tree damage through tree maintenance, line strengthening, and a line-relocation program. In some limited cases, rerouting lines underground may also be warranted, depending on the outcome of a cost-benefit analysis to be performed in partnership with the utilities. This effort will begin in 2013.

Utilities Initiative 7

Work with utilities, regulators, and gas pipeline operators to harden the natural gas system against flooding

Although the city's high-pressure gas transmission system performed relatively well during Sandy, there were instances where remote operation of parts of the system failed. Additionally, the distribution system had localized outages due to water infiltration. Seeking to limit the compromising effects of future floods on both the system's backbone and the ability of Con Edison and National Grid to control and monitor the

system, the City, through OLTPS, will work with the PSC, Con Edison, and National Grid to harden control equipment against flooding. In addition, the City will call upon Con Edison and National Grid to take steps to prevent water from infiltrating its gas pipes. This effort will begin in 2013.

Utilities Initiative 21

Work with public and private partners to scale up distributed generation (DG), including microgrids

The city's DG systems, including microgrids, have the potential for significant expansion—but are constrained by regulations, financing challenges, and lack of information. The City, through OLTPS and the New York City Distributed Generation Collaborative—a stakeholder group convened by the City in 2012—will continue efforts to achieve a PlaNYC goal of installing 800 megawatts of DG citywide by 2030. These efforts will include reform of PSC tariffs and other regulatory changes, expansion of low-cost financing, and provision of technical assistance to property owners and developers. This ongoing effort will continue in 2013.

Beyond the priority utilities resiliency projects described in Chapter 6, including those summarized briefly above, the City is proposing additional utilities resiliency initiatives that are specific to Southern Brooklyn's vulnerabilities. These initiatives are described below.

Southern Brooklyn Initiative 7

Support CUNY launch of study and pilot of new technologies for high-rise buildings

The City University of New York's Building Performance Lab intends to launch a study and pilot program in Southern Brooklyn to place backup renewable energy systems and on-site renewable energy generation at high-rise residential buildings, in part to aid resiliency. The City will provide technical assistance, as needed, for CUNY's study and the eventual launch. Such technologies may provide building-specific solutions for energy resiliency and help ease pressures on the grid in times of peak demand, while also producing cost savings for the relevant consumers. The CUNY Building Performance Lab will advance this study and pilot in the next two years.

Southern Brooklyn Initiative 8

Study options to ensure resiliency of private cogeneration facilities in the area

Several residential and commercial developments in Southern Brooklyn have on-site private cogeneration facilities that supply energy to certain buildings. Many of these facilities were damaged

during the recent storm, and are vulnerable to future extreme weather events. The City, through OLTPS, will explore changes to the Construction Codes or other regulations to ensure proper protection measures are in-place at these facilities. This effort will begin with a study of cogeneration facilities and their vulnerabilities.

Liquid Fuels

The liquid fuel supply chain is essential for everyday life throughout the five boroughs, including in Southern Brooklyn. Sandy demonstrated the vulnerability of this system to extreme weather events. In the aftermath of Sandy, citywide—and particularly in Southern Brooklyn—there were long lines at gas stations and other challenges for drivers, including emergency responders. The vulnerability of this system will only grow as the climate changes.

Among the strategies that the City will use to address these challenges for residents of Southern Brooklyn and other parts of the city will be to: develop a strategy for the hardening of liquid fuels infrastructure along the supply chain; increase redundancy and fuel supply flexibility; and increase supply availability for vehicles critical to the city's infrastructure, safety, and recovery from significant weather events. The initiatives described below provide important examples of how the City intends to advance its liquid fuel resiliency agenda citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough liquid fuels resiliency plan, please refer to Chapter 7 (*Liquid Fuels*).

Liquid Fuels Initiative 1

Call on the Federal government to convene a regional working group to develop a fuel infrastructure hardening strategy

The fuel supply shortage after Sandy was caused mainly by damage to infrastructure in New Jersey and other states, where the City and State of New York have no regulatory or legislative authority or oversight. The City, through OLTPS, will call on the Federal Hurricane Sandy Rebuilding Task Force and the United States Department of Energy to convene regional stakeholders to develop a strategy for hardening key infrastructure against future extreme weather. This effort will be launched in 2013.

Liquid Fuels Initiative 4

Work with New York State to provide incentives for the hardening of gas stations to withstand extreme weather events

New York State's 2013–2014 budget required that certain retail fuel stations invest in equipment that would allow them to connect generators quickly in the event of a power loss, and enter into supply contracts for emergency generators. The City, through OLTPS, will support the State in the design and implementation of this generator program, an effort that will include working with the New York State Energy Research and Development Authority (NYSERDA) to develop an incentive program to minimize the financial impact of the requirements on the businesses involved. In addition, OLTPS will work with the State to develop incentives to encourage retail fuel stations to implement resiliency measures other than backup power capability. This effort will be launched in 2013.

Liquid Fuels Initiative 5

Enable a subset of gas stations and terminals have access to backup generators in case of widespread power outages

Gas stations are vulnerable to widespread power outages resulting from extreme weather events, which could prevent them from dispensing fuel. In New York State's 2013–2014 budget, NYSERDA was directed to develop a generator pool program for gas stations. The City, through its Office of Emergency Management (OEM), will work with NYSERDA, FEMA, and the USACE in 2013 and beyond to develop such a pool and to create a pre-event positioning plan to enable the ready deployment of generators to impacted areas in the wake of a disaster.

Liquid Fuels Initiative 8

Develop a package of City, State, and Federal regulatory actions to address liquid fuel shortages during emergencies

Various regulations relating to the transportation and consumption of fuels in New York City limit the flexibility of the market to respond to disruptions, including following extreme weather events. The City, through OEM, will work with the State and Federal governments to prepare an “off-the-shelf” package of regulatory measures for use in the event of a liquid fuels shortage to allow supply-demand imbalances in the fuel supply to be mitigated more quickly. This effort will be launched in 2013.

Liquid Fuels Initiative 9

Harden municipal fueling stations and enhance mobile fueling capability to support both City government and critical fleets

The City must be able to respond quickly to a fuel supply disruption, providing continuous fueling to vehicles that are critical for emergency response, infrastructure rebuilding, and disaster relief. The City, through the Department of Citywide Administrative Services (DCAS), will procure fuel trucks, generators, light towers, forklifts, and water pumps to permit the City to put in place emergency fueling operations immediately following a disruption in the fuel supply chain. DCAS also will issue a Request for Expressions of Interest (RFEI) to potential suppliers of liquid fuels to evaluate options for sourcing such fuel during emergencies. The procurement effort will be launched in 2013, with the RFEI to follow in 2014.

Healthcare

The city's healthcare system is critical to the well-being of New Yorkers throughout the five boroughs, including in Southern Brooklyn. This system is also a major economic engine for the city as a whole. This is especially true for Southern Brooklyn, where a major New York City Health and Hospitals Corporation (HHC) hospital, numerous nursing homes and adult care facilities, and a network of community-based facilities, doctors' offices, and pharmacies support the local area. Sandy exposed this system's vulnerabilities, which are expected to grow as the climate changes.

Among the strategies that the City will use to address these challenges for residents of Southern Brooklyn and other parts of the city will be to: build new hospitals, nursing homes, and adult care facilities to higher resiliency standards and harden existing facilities to protect critical systems; seek to keep lines of communication open between patients and providers, even during extreme weather events; and enable community-based providers to reopen quickly after a disaster. The initiatives described below provide important examples of how the City intends to advance its healthcare resiliency agenda citywide. These initiatives will have a positive impact on the residents and healthcare providers of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough healthcare resiliency plan, please refer to Chapter 8 (*Healthcare*).

Healthcare Initiative 2 Require the retrofitting of existing hospitals in floodplains

Many existing hospital buildings in the floodplain remain vulnerable to the impact of storm surge, with more likely to become vulnerable as the climate changes. The City, through OLTPS, therefore, will seek to amend the Construction Code to require existing hospital buildings in the 500-year floodplain—including Coney Island Hospital—to meet by 2030 a subset of the amended Construction Code standards for flood-resistant design. To minimize the risk of emergency evacuations and extended closures, these hospitals will be required to protect their electrical equipment, emergency power system, and domestic water pumps to the 500-year flood elevation. These hospitals also will be required to install backup air-conditioning service for inpatient care areas in case of utility outages, pre-connections for temporary boilers and chillers if primary equipment is not elevated, and pre-connections for external generators as a backup power source. Coney Island Hospital already has begun exploring a number of these and other flood mitigation measures as part of its post-Sandy rebuilding process. OLTPS will propose these requirements to the City Council in 2013.

Healthcare Initiative 3 Support the HHC's efforts to protect public hospital emergency departments from flooding

Emergency departments (EDs) are critical access points for patients in need of hospital services, and at three public hospitals citywide—including Coney Island Hospital—EDs are at risk of flooding due to storm surge. Subject to available funding, the City, therefore, through HHC, will invest in measures to flood-protect these vulnerable EDs so they can remain available to provide care during extreme weather events. HHC has already begun exploring strategies to protect their EDs and will continue to develop their mitigation plans through 2013.

Healthcare Initiative 4 Improve design and construction of new nursing homes and adult care facilities

New nursing homes and adult care facilities are at risk of power failures due to storm surge, which could result in patient evacuations. The City, through OLTPS, therefore, will seek to amend the Construction Codes to require that new facilities are constructed with additional resiliency measures for their emergency power systems. New nursing homes also will be required to have emergency generators and

electrical pre-connections for external stand-by generators. Adult care facilities will be required to install either emergency generators that are adequately protected or pre-connections to external stand-by generators. OLTPS will propose these requirements to the City Council in 2013.

Healthcare Initiative 5 Require retrofitting of nursing homes in floodplains

Many existing nursing home facilities in the five boroughs are vulnerable to storm surge—a vulnerability that will only grow as the climate changes. The City, through OLTPS, therefore, will seek to amend the Construction Codes to require nursing homes in the 100-year floodplain—including five facilities in Southern Brooklyn—to meet standards for the protection of electrical equipment, emergency power systems, and domestic water pumps (if applicable) by 2030. These systems will be protected to the 100-year flood elevation, in accordance with specifications already in the Construction Codes, and will help enable patients to shelter in place safely or reoccupy quickly after a storm. OLTPS will propose these requirements to the City Council in 2013.

Healthcare Initiative 6 Require retrofitting of adult care facilities in floodplains

Nineteen adult care facilities in the city are vulnerable to storm surge, including six in Southern Brooklyn alone. The City, through OLTPS, will seek to amend the Construction Codes to require existing adult care facilities located in the floodplain to elevate or protect their electrical equipment to the 100-year flood elevation by 2030, in accordance with the specifications in the Construction Codes. In addition, the City will seek to require these providers to have either emergency generators that are adequately protected or electrical pre-connections to external generators. OLTPS will propose these requirements to the City Council in 2013.

Healthcare Initiative 7 Support nursing homes and adult care facilities with mitigation grants and loans

The primary challenge for most nursing homes and adult care facilities in implementing mitigation measures is obtaining financing. Subject to available funding, the City, through NYCEDC and the New York City Department of Health and Mental Hygiene (DOHMH), therefore, will administer competitive grants and subsidized loans to assist providers with mandated retrofit projects. The goal is for NYCEDC and DOHMH to launch the program when proposed

Construction Code amendments applicable to nursing homes and adult care facilities proposed in this report go into effect, likely in 2013.

Healthcare Initiative 8 Increase the air conditioning capacity of nursing homes and adult care facilities

Nursing homes and adult care facilities typically do not have enough emergency power capacity to run their air conditioning systems following the loss of power. This could cause some providers to evacuate during power outages that occur during hot summer months. The City will offer sales tax waivers totaling \$3 million citywide to assist eligible nursing homes and adult care facilities that install emergency power solutions for air conditioning systems.

Healthcare Initiative 9 Harden primary care and mental health clinics

In communities such as Southern Brooklyn that are at risk of extensive flooding during extreme weather events, primary care and mental health services may be compromised for weeks after a disaster due to extended facility closures. Subject to available funding, the City, through DOHMH and a fiscal intermediary, therefore, will administer a competitive financing program to harden large clinics providing primary care and mental health services in Southern Brooklyn and other high-need communities. The program will include grants and interest-free loans for capital investments that enable faster recovery of services—for example, installation of emergency power systems, protection of other critical building systems, and wet flood-proofing of facilities. The goal is for this effort to be launched in late 2013 or early 2014.

Healthcare Initiative 10 Improve pharmacies' power resiliency

Pharmacies dispense life-saving medicines essential for those with chronic conditions. However, without power, pharmacists cannot access the necessary patient records or insurance information to dispense these medicines. The City, through DOHMH, will work with pharmacies to improve their ability to leverage generators for power resiliency and address their other emergency preparedness needs—including the launch of an emergency preparedness website for pharmacies. This effort already has begun and will continue throughout 2013.

Healthcare Initiative 11 **Encourage telecommunications resiliency in the healthcare system**

In the aftermath of a disaster, it is important that New Yorkers be able to speak to their doctors for guidance on needed medical care. The City, through DOHMH, therefore, will develop a best practice guide and outreach plan to help community-based providers understand the importance of telecommunications resiliency. Resiliency solutions could include using backup phone systems (such as a remote answering service that would not be affected by local weather hazards), Voice over Internet Protocol (VoIP) technology that allows office phone lines to be used off-site, and pre-disaster planning to inform patients of available emergency phone numbers. This effort will begin in 2013.

Healthcare Initiative 12 **Encourage electronic health record-keeping**

Doctors rely on patients' medical records to provide and track care, but paper records may be compromised or destroyed due to extreme weather events. The City, through existing DOHMH programs, therefore, will call upon community-based providers located in the 100-year floodplain and other disaster-prone areas to implement electronic health records (EHR) systems for resiliency. DOHMH's Primary Care Information Project will sponsor initiatives to provide primary care and mental health providers citywide with EHR technical assistance. This effort will begin in 2013.

Beyond the priority healthcare resiliency projects described in Chapter 8, including those summarized briefly above, the City is proposing an additional healthcare resiliency initiative that is specific to Southern Brooklyn's vulnerabilities. This initiative is described below.

Southern Brooklyn Initiative 9 **Construct new Coney Island Hospital outpatient clinic to replace the destroyed Ida G. Israel facility**

Hurricane Sandy wreaked havoc on Coney Island Hospital's outpatient facility, the Ida G. Israel Clinic, which was located north of Neptune Avenue along Coney Island Creek. Instead of rebuilding the clinic in its existing flood-prone location, HHC has identified a likely permanent site at a higher elevation. In order to restore these vital outpatient services as soon as possible, the City, through HHC, will construct an interim clinic on City-owned property located on

Surf Avenue in Coney Island. This interim facility could be completed before the end of 2013.

Telecommunications

The city's telecommunications system is essential to individuals and businesses throughout the five boroughs, including in Southern Brooklyn. While this is true at all times, it is especially true during emergencies. As Sandy demonstrated, however, this system is highly vulnerable to extreme weather events—precisely when telecommunications are most needed. Citywide and in Southern Brooklyn, Sandy resulted in outages to landlines and mobile service, as well as to data service. The vulnerability of this system likely will grow as the climate changes.

Among the strategies that the City will use to address these challenges for residents, businesses, and nonprofits of Southern Brooklyn and other parts of the city will be to: increase accountability among providers to promote resiliency; use strengthened City regulatory powers and stronger relationships with providers to ensure rapid recovery after extreme weather events; encourage hardening of facilities to reduce weather-related impacts; and increase redundancy to reduce the impact of outages. The initiatives described below provide important examples of how the City intends to advance its telecommunications resiliency agenda citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough telecommunications resiliency plan, please refer to Chapter 9 (*Telecommunications*).

Telecommunications Initiative 1 **Establish an office within the Department of Information Technology and Telecommunications (DoITT) to focus on telecommunications regulation and resiliency planning**

While the City has regulatory authority over some aspects of telecommunications service, it has no entity focused broadly on ensuring the resiliency of the public communications networks. The City, therefore, will form within DoITT a new Planning and Resiliency Office (PRO) that will have the resources needed to develop, monitor, and enforce resiliency standards, in close cooperation with State and Federal regulators and providers. DoITT will launch the new office in 2013.

Telecommunications Initiative 2 **Establish new resiliency requirements for providers using scheduled renewals of the City's franchise agreements**

Flooding caused outages during Sandy in facilities that did not follow the Federal Communication Commission's recommended best practices for resiliency, including flood protection measures. The City, through DoITT, therefore, will encourage and enforce resiliency standards for telecommunications providers through the franchise renewal process and, through other agreements into which such providers enter with the City, explore options to increase conduit infrastructure redundancy and resiliency. The City will also seek to require standardized outage reporting and publishing. DoITT will launch this effort in 2014, in advance of 2020 franchise renewals.

Transportation

Without the city's expansive transportation system, New York would grind to a halt. This was illustrated starkly during Sandy when outages occurred across the system during and immediately following the storm. These outages severely impacted Southern Brooklyn, which found itself isolated by the shutdown of subway and other public transit systems, as well as by flooding on arterial and secondary roads. The vulnerability of this system will only grow as the climate changes.

Among the strategies that the City will use to address these challenges for residents of Southern Brooklyn and other parts of the city will be to: make the system more flexible and more resilient; protect critical elements of the system from damage; and seek to maintain system operations during extreme weather events; and, following extreme events, to enable quick recovery, while also putting in place plans for backup transportation options until regular service can be restored. The initiatives described below provide important examples of how the City intends to advance its transportation resiliency agenda citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough transportation resiliency plan, please refer to Chapter 10 (*Transportation*).

Transportation Initiative 1 **Reconstruct and resurface key streets damaged by Sandy**

Sandy's waves and flooding caused significant damage to area roadways. The City, through the Department of Transportation (NYCDOT), will reconstruct 60 lane-miles of streets that were damaged severely, and will repave approximately 500 lane-miles of streets with damaged surfaces. In Southern Brooklyn, this will include over a linear mile of reconstructed streets and over six linear miles resurfaced throughout the area. Wherever feasible, the reconstructed streets also will include resiliency features to prevent future damage. NYCDOT will launch this initiative in 2013 with funding from Federal and City sources.

Transportation Initiative 3 **Elevate traffic signals and provide backup electrical power**

New York's traffic signals—and particularly the controllers that operates these signals and communicate with the NYCDOT Traffic Management Center—are vulnerable to damage from flooding as well as to power loss from various extreme weather events. Accordingly, the City, through NYCDOT, will raise controllers at approximately 500 intersections in flood-vulnerable locations across the city, including in Southern Brooklyn. In tandem with this effort to place electrical hardware above the 100-year floodplain elevation, NYCDOT also will install power inverters in approximately 500 NYPD vehicles to allow these vehicles to provide backup electrical power to critical traffic signals. This effort will begin in 2013.

Transportation Initiative 8 **Call on non-City transportation agencies to implement strategies to address climate change threats**

Many non-City agencies that own and operate critical portions of New York City's transportation system have already announced resiliency and protection initiatives appropriate to their system. Without such action, the critical facilities managed by these agencies will remain vulnerable to damage and disruption from future weather-related events. The City, therefore, will call on these agencies to implement the initiatives that they have announced and take additional steps to protect their major transportation assets from climate change threats and prepare for quick restoration following an extreme weather event. Assets that may require hardening and/or preparation measures in Southern Brooklyn include: Coney Island Yard, the lower level of the Stillwell Avenue station, and the limited portions of the subway infra-

structure located at grade in the area. The City will work with these agencies to advance these plans in 2013.

Transportation Initiative 9 **Plan for temporary transit services in the event of subway system suspensions**

When major portions of the subway system are out of service, there simply is not sufficient capacity in the rest of the transit network or the roadway system to carry the increased volume of commuters and other travelers. The City, through NYCDOT, therefore, will work with the MTA and other transportation partners to develop and regularly update formal plans to provide temporary transportation services in such an event, including following extreme weather. These services could take the form of temporary, high-capacity "bus bridges" of the type implemented during Sandy, linking, for example, Southern Brooklyn to Midtown Manhattan via the Nostrand Avenue Select Bus Service route (see Initiative 16, below) or temporary point-to-point ferry services, for example connecting Coney Island and Lower Manhattan. This planning effort will begin in 2013.

Transportation Initiative 10 **Identify critical transportation network elements and improve transportation responses to major events through regular resiliency planning exercises**

Many of the facilities critical to the City's ability to respond effectively to a disaster are vulnerable to disruption and damage during extreme weather events, potentially impairing delivery of emergency services and supplies, as well as impairing the restoration of critical non-transportation infrastructure and economic activity. This vulnerability is expected to increase as the climate changes. To respond better to a variety of different possible transportation outage and restoration scenarios, the City, through NYCDOT, will work with transportation agencies around the region to identify the critical elements of the surface transportation network that need to be available quickly following different types of events. The key tool to identify these networks will be an ongoing series of detailed and multi-disciplinary resiliency planning exercises that will allow NYCDOT and its partners to understand where resources need to be focused before, during, and after an event. This effort will begin in 2013.

Transportation Initiative 16 **Expand the city's Select Bus Service (SBS) network**

Parts of the city lack subway access or have slow and unreliable public transportation. In these areas, the City and the MTA have been deploying SBS routes to improve general mobility. These routes can form the backbone of high-capacity bus service in the event of major subway outages, including following extreme weather events. The City, through NYCDOT, will work with the MTA to expand the SBS network significantly, building on a plan developed jointly in 2010. Implementation of this plan has already begun, with a new SBS route that will go into effect this year on Nostrand Avenue in Brooklyn.

Beyond the priority transportation resiliency projects described in Chapter 10, including those summarized briefly above, the City is proposing an additional transportation resiliency initiative that is specific to Southern Brooklyn's vulnerabilities. This initiative is described below.

Southern Brooklyn Initiative 10 **Call for the USACE to develop an implementation plan for the reinforcement of existing Belt Parkway edge protections**

The coastal edges along portions of the Belt Parkway not only protect this key piece of transportation infrastructure, but also have the potential to provide additional flood protection to mainland neighborhoods throughout Southern Brooklyn. The City and State have an opportunity to incorporate resiliency design measures into future roadway and bridge reconstruction projects along the highway. The City, therefore, will call on the USACE to develop an implementation plan containing various options for reinforcing and strengthening existing edge protections along the Belt Parkway beyond the immediate repairs underway. The Belt Parkway is maintained by the NYCDOT, but its coastal edges are generally maintained by the Parks Department, as is the surrounding parkland. The New York State Department of Transportation is also involved in certain capital work. The goal is for USACE to begin work on this plan by 2015.

Parks

During Sandy, it became clear that, in addition to serving as neighborhood front yards and recreation centers, in many places (including Southern Brooklyn), the City's parks serve as the city's front line of defense when extreme

weather events hit, buffering adjacent neighborhoods. As the climate changes, it will be even more critical that the city's parks are able to play all of these roles.

Among the strategies that the City will use to address these challenges for residents of Southern Brooklyn and elsewhere in the City will be to: strengthen the city's parks so that they are able to survive weather-related events more effectively and can act as stronger buffers for adjacent communities; and pursue technologies and approaches that will enable the City to monitor, analyze, and prepare the park system for its many roles in an era of increasing change. The initiatives described below provide important examples of how the City intends to advance its parks resiliency agenda citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough parks resiliency plan, please refer to Chapter 11 (*Parks*).

Parks Initiative 1 **Restore city beaches**

Beaches play an important recreational role in Southern Brooklyn and also are a vital component of the area's coastal defenses, but they cannot protect adjacent areas without being "renourished" (replenished with new sand to replace that lost to erosion) from time to time. Subject to available funding, the City, through DPR, will collaborate with Federal and State partners—including the USACE—to implement plans quickly to restore sand lost after extreme storm events and to conduct regular nourishment of beach and regular monitoring to detect the early signs of erosion. This will focus on key beaches, including Southern Brooklyn beaches such as Plumb Beach, Manhattan Beach, Brighton Beach and Coney Island. The goal is to begin this effort in 2013. To restore the beaches following Sandy, the City, in cooperation with many other City, State and Federal partners, conducted an expedited program of projects to provide new and elevated lifeguard stations and public bathrooms and improvements to other beachfront amenities in advance of Memorial Day 2013. This impressive achievement comprised the first phase of restoring the city's beaches. In the coming months and years, DPR will continue its efforts to provide emergency sand nourishment and to expedite planning, evaluation, and design work for long-term plans to restore the beaches, boardwalks, and other beachfront amenities of Southern Brooklyn.

Parks Initiative 2 **Harden or otherwise modify shoreline parks and adjacent roadways to protect adjacent communities.**

Approximately 24 percent of DPR parks and other open spaces are in the 100-year floodplain, which is expected to expand as sea levels rise—including in areas where parks front residential and commercial districts. Subject to available funding, the City, through DPR, will study and identify mitigation strategies, including cost-effective ways to use its park system to protect adjacent neighborhoods and the parks themselves. Strategies could include hardening or elevating park infrastructure, construction of levees or floodwalls to minimize flooding and attenuate waves, and using flood-tolerant materials in the construction of parks. Target sites in Southern Brooklyn include especially Marine Park, Manhattan Beach, Calvert Vaux Park, Kaiser Park, and other shoreline parks in the area. The goal is to complete this study in 2014.

Parks Initiative 4 **Expand the City's Greenstreets, including for Jamaica Bay**

Increased localized flooding is likely from more frequent heavy downpours in the future. Subject to available funding, the City, through DPR and in partnership with DEP, will expand its efforts to build more and larger Greenstreets to absorb stormwater, mitigate local flooding, improve urban heat island effects, increase pedestrian and traffic safety, and beautify neighborhoods. This will expand the installation of green infrastructure at appropriate locations in the City's streets, with technology similar to the NYC Green Infrastructure Plan, which improves water quality in combined sewer areas. The first phase of this expansion would focus on fourteen neighborhoods with the greatest potential for improvement, areas that are not slated for CSO improvements through the City's Green Infrastructure Plan, but could be well suited for greenstreets based on best available data showing low bedrock and ground water. An early priority for this effort will be the area surrounding Jamaica Bay, where DPR will collaborate with DEP and NYCDOT to reduce localized flooding and stormwater runoff, directly improving the health of the Bay. The goal is to begin with pilot projects in and around Coney Island, Marine Park, the Rockaways, and Canarsie Park, including greenstreets and parkland installations by 2014.

Parks Initiative 11 **Improve the health and resiliency of the city's urban forest**

The city's forests and trees provide an array of health and environmental benefits but are vulnerable to a variety of climate change-related impacts, including storm surge, wind, and even changes in average temperatures. Subject to available funding, the City, through DPR, will undertake a variety of efforts to protect trees—whether located in natural areas and parks, or along streets. This would include adding forest management crews, identifying locations in which to expand tree beds, and modifying regular tree inspection and pruning efforts to prioritize trees in areas vulnerable to extreme weather events. The goal is for DPR to launch this effort in 2013.

Beyond the priority park resiliency projects described in Chapter 11, including those summarized briefly above, the City is proposing an additional parks resiliency initiative that is specific to Southern Brooklyn's vulnerabilities. This initiative is described below.

Southern Brooklyn Initiative 11 **Restore recreational infrastructure along Southern Brooklyn beaches**

DPR will work to restore recreational infrastructure along Southern Brooklyn beaches, including facilities (comfort stations, lifeguard stations, and administrative buildings) at Plumb Beach, Manhattan Beach, Brighton Beach, and Coney Island. In each case, these replacement facilities will be more resilient than the structures that preceded them. DPR has also already begun the reconstruction of damaged playgrounds, ball fields, courts, neighborhood parks, and other park facilities. DPR will complete this restoration and reconstruction work by 2014.

Water and Wastewater

The city's water and wastewater system is one of the most complex in the world, not only supplying millions of New Yorkers with safe drinking water in all conditions, but also treating wastewater to ensure that the area's waterways remain clean, while draining rainwater to minimize flooding. Sandy demonstrated the system's vulnerability to a whole host of weather-related threats, ranging from surge and sea level rise, to heavy downpours—threats that are expected to worsen as the climate changes.

Among the strategies that the City will use to address these challenges for residents of Southern Brooklyn and other parts of the city will be to: protect wastewater facilities from storm surge; improve and expand drainage infrastructure; and promote redundancy and flexibility to make available a constant supply of high-quality drinking water. The initiatives described below provide important examples of how the City intends to advance its water and wastewater resiliency agenda citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough water and wastewater resiliency plan, please refer to Chapter 12 (*Water and Wastewater*).

Water and Wastewater Initiative 1 **Adopt a wastewater facility design standard for storm surge and sea level rise**

Sandy damaged wastewater treatment plants and pumping stations even though the design of City wastewater facilities has taken into account the highest historically recorded water height of nearby water bodies or the BFEs identified in FEMA maps. The City, therefore, will adopt an increased level of protection for design and construction of all wastewater facilities based on the latest FEMA maps, modified to reflect sea level rise projections for the 2050s. DEP will adopt the new design guidelines in 2013.

Water and Wastewater Initiative 2 **Harden pumping stations**

Many of the city's pumping stations are located in low-lying areas and are necessary to convey wastewater and stormwater out of communities; however, their location also increases their vulnerability to storm surge. Therefore, subject to available funding, the City, through DEP, will retrofit these pumping stations to improve their resiliency. These retrofits will include raising or flood-proofing critical equipment, constructing barriers, and installing backup power supplies. Preliminary estimates indicate that there are currently 58 at-risk pumping stations, of which several are already scheduled for capital improvements. Subject to available funding, DEP will pursue implementation of resiliency projects in conjunction with repairs and planned capital work, and as appropriate based on the level of risk, historical flooding, and potential community impacts, among other criteria. The goal is to begin implementation in 2014.

Water and Wastewater Initiative 3 **Harden wastewater treatment plants**

All 14 of the City's wastewater treatment facilities are located along the waterfront and are therefore at risk in the event of a coastal storm. Subject to available funding, the City, through DEP, will protect these critical treatment facilities by raising or flood-proofing assets that are critical to the treatment process, constructing barriers, improving waterfront infrastructure, or implementing redundancy measures to avoid failure of these critical treatment systems. DEP will initially target facilities that have been identified as either most at-risk, or most likely to create issues for adjacent communities and waterways, based on the findings of an in-depth study by DEP. These facilities include the Coney Island Wastewater Treatment Plant. The goal is for DEP to begin implementation of adaptation measures for these and other facilities in 2014 as part of repairs and other planned capital projects.

Water and Wastewater Initiative 8 **Reduce combined sewer overflow (CSO) with Green Infrastructure**

As climate change brings increasing rainfall volume to the New York area, the city may also experience shifts in the frequency and volume of CSOs. The City will continue to implement its Green Infrastructure Plan and CSO Long-Term Control Plans (LTCs) to reduce such CSOs. For this purpose, DEP, working with DPR and NYC-DOT, will continue to pursue its plan to capture the first inch of runoff in 10 percent of impervious surfaces citywide by 2030. At the same time, DEP also will continue to develop LTCs to evaluate long-term solutions to reduce CSOs and improve water quality in New York City's waterways. DEP will issue an LTC for Alley Creek in Queens in 2013, with nine additional waterbody-specific LTCs and one citywide LTC to follow through 2017—including for Coney Island Creek, the Gowanus Canal, Newtown Creek, and Jamaica Bay.

Beyond the priority water and wastewater resiliency projects described in Chapter 12, including those summarized briefly above, the City is proposing additional water and wastewater resiliency initiatives that are specific to Southern Brooklyn's vulnerabilities. These initiatives are described below.

Southern Brooklyn Initiative 12 **Complete planned drainage improvements in Coney Island to mitigate flooding**

DEP has identified Coney Island as an area where existing stormwater and other related infrastructure systems require upgrades based, in part, on anticipated new development in the area. In conjunction with robust coastal defenses, expanded drainage infrastructure may assist in protecting against damage from weather-related flooding. In Coney Island, the City, therefore, will complete approximately \$137 million in planned upgrades to stormwater and sewer infrastructure, including enlarging pipes and outfalls to handle additional flow. These projects are now being undertaken by DEP and the Department of Design and Construction (DDC), and are scheduled for phased completion over the next six years.

Southern Brooklyn Initiative 13 **Provide technical assistance to support Sea Gate in repairing Sandy-damaged infrastructure**

The Sea Gate community, where a private housing association owns and maintains the streets, parks, and sewer infrastructure, is outside of DEP's jurisdiction and thus faces unique challenge in the aftermath of Sandy. The neighborhood's Sandy-damaged infrastructure, which eventually ties into the City's sewer system, impacts not only Sea Gate but also poses downstream risks from clogs and back-ups. The City, through DDC, therefore, will work with the Sea Gate Association to assist it in obtaining all Federal funding for repairs for which it is eligible. The Sea Gate Association has engaged an engineering firm to study the condition of the area's infrastructure and suggest a scope for repairs, and the City will provide technical assistance in connection with that effort.

Other Critical Networks: **Solid Waste**

On a daily basis, the solid waste collection system in New York disposes of more than 12,000 tons of waste and recycling in a safe and sanitary fashion. Unlike many other critical City systems, during Sandy this one proved remarkably resilient, resuming many of its normal functions almost immediately after the storm. In fact, thanks to the efforts of the City's Department of Sanitation, even as the agency was dealing with its own storm-related challenges, it was able to assist with the recovery of Southern Brooklyn and the larger city by collecting the debris left by the storm in an organized and efficient manner.

However, the system does face real issues. For example, during Sandy, the city's solid waste disposal system experienced interruptions that interfered with its ability to convey refuse out of the city to its ultimate destination. Additionally, as the climate changes, it is likely that this system will become more vulnerable to extreme weather.

Among the strategies that the City will use to address these challenges for residents of Southern Brooklyn and other parts of the city will be to: harden critical City-owned solid waste assets to protect them from extreme weather-related impacts; and seek to improve the resiliency of the broader solid waste network—both City- and third-party owned—enabling it to resume operation quickly should disruptions occur. The initiatives in Chapter 13 describe how the City intends to advance its solid waste resiliency agenda citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a complete description of the City's five-borough solid waste resiliency plan, please refer to Chapter 13 (*Other Critical Networks*).

Other Critical Networks: Food Supply

Though the food supply chain generally emerged intact following Sandy, in certain local areas (including parts of Southern Brooklyn), residents found themselves without access to basic sustenance after the storm. In addition, had Sandy played out just a little differently, it is possible that significant links in the food supply chain—including the food distribution center in Hunts Point in the Bronx—could have been seriously threatened. As the climate changes, it is likely that risks such as these will grow.

Although initiatives outlined in several other sections above are important contributors to the overall resiliency of the food supply network (including especially those addressing utilities, liquid fuels, and transportation), the City also will pursue food-specific strategies to meet this goal for the benefit of residents of Southern Brooklyn and other parts of the city. These strategies will involve calling for resiliency investments at the most significant food wholesaling and distribution centers in the city and addressing issues relating to retail access in the event of extreme weather. The initiatives in Chapter 13 describe how the City intends to advance its food supply resiliency agenda citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a complete description of the City's five-borough food sup-

ply resiliency plan, please refer to Chapter 13 (*Other Critical Networks*).

Environmental Protection and Remediation

Sandy showed that extreme weather events—which are likely to increase in severity with climate change—not only have the potential to impact the city's people, built environment, and critical systems; they also can have a deleterious impact on the natural environment. To help minimize the impact of future extreme weather on the environment, the City will advance a range of initiatives to protect open and enclosed industrial sites containing hazardous substances in an economically feasible way, and to encourage the cost-effective remediation and redevelopment of brownfields in a resilient fashion. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn, which is home to approximately 130 industrial companies and one site designated under the New York City Brownfield Cleanup Program. For a complete description of the City's five-borough environmental protection and remediation plan, please refer to *Environmental Protection and Remediation*.

Community and Economic Recovery

New York is a city of neighborhoods, and these neighborhoods vary widely in size and nature. Notwithstanding this variety, successful neighborhoods across the city tend to share certain traits. Two of these are: a formal and informal network of community members who help and support one another in good times and bad; and vibrant commercial and nonprofit sectors that employ and provide goods and services to the people of the community.

As Sandy demonstrated, however, both the network of community-based organizations and the commercial and nonprofit sectors in New York's neighborhoods can be sorely tested when extreme weather hits. During these times (when contributions from these networks and sectors are desperately needed) these organizations and businesses themselves are frequently coping with the same set of challenges that the community at large is—a circumstance that can push even the most well-run organization or business to the breaking point. Even with these pressures, during and in the immediate aftermath of Sandy, New York's commercial and nonprofit sectors overcame many of their own difficulties, playing a critical role in the recovery of neighborhoods

across the city, including Southern Brooklyn. However, as the climate changes, difficulties such as these will likely arise more frequently, testing institutions mightily.

Among the strategies that the City will use to achieve the goal of making its neighborhoods and their critical institutions more resilient will be to: help build grassroots capacity and foster community leadership; help businesses and nonprofits impacted by Sandy to recover; help businesses and nonprofits in vulnerable locations to make resiliency investments that will better prepare them for future extreme weather; and bring new economic activity to neighborhoods recovering from the impacts of Sandy to enable these neighborhoods to come back even stronger than before.

The initiatives described below provide important examples of how the City intends to advance its community and economic recovery agenda citywide. These initiatives will have a positive impact on the residents, businesses, and nonprofits of Southern Brooklyn. For a full explanation of the following initiatives and a complete description of the City's five-borough community and economic recovery plan, please refer to *Community and Economic Recovery*.

Community Disaster Preparedness Initiative 1

Identify and address gaps in community capacity

The capacity of a community to organize to aid businesses and residents after an extreme weather event or other disaster is a strong predictor of the success of that community's recovery. To improve the capacity of vulnerable communities, OEM, working with the NYC Center for Economic Opportunity (CEO), will undertake a pilot assessment of the strengths and weaknesses of a Sandy-impacted community—which could be a neighborhood in Southern Brooklyn—to inform the creation of a plan to address needs uncovered by the assessment. Subject to available funding, the City, through OEM and CEO, will choose a pilot community and begin their study in 2013.

Community Disaster Preparedness Initiative 2

Continue and expand OEM's Community Emergency Response Teams

OEM currently trains 54 teams of 1,500 volunteers across the city, which staff Community Emergency Response Teams (CERTs). Before, during, and after disasters, including extreme weather events, members of these teams help to organize community disaster preparedness and participate in emergency response and recovery. In light of Sandy, OEM will work with

Coney Island Boardwalk



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Coney Island Boardwalk conceptual rendering including new protective dune and amusements

communities to create additional teams, ensuring that the volunteers are as representative as possible of the communities that they serve. Towards the same end, OEM, working with CEO, will identify low-income young adults to be trained to lead their communities in disaster preparedness. OEM and CEO will launch this program by 2014.

Economic Recovery Initiative 1 Launch business recovery and resiliency programs

During Sandy, over 27,000 businesses citywide, including over 5,500 in Southern Brooklyn, were impacted by the storm. For many, recovery has been challenging. To assist with this recovery, immediately after the storm, the City launched a series of programs described in *Community and Economic Recovery* including a \$25 million loan and grant program and a \$25 million sales tax waiver program designed to help businesses get back on their feet. Building on the momentum of these programs, which have assisted over 2,500 businesses as of the writing of this report, the City, through NYCEDC, will launch the CDBG-funded Business Resiliency Investment Program of up to \$100 million to help vulnerable businesses throughout the city make resiliency investments in their buildings and equipment, and the Business Loan and Grant

Program of up to \$80 million will assist businesses with recovery and rebuilding efforts. NYCEDC will launch these programs in 2013.

Economic Recovery Initiative 2 Launch the Neighborhood Game-Changer Competition

The recovery of many of the communities impacted by Sandy, including Southern Brooklyn, has been hampered by a lack of opportunities for economic advancement and employment among significant populations that were impacted by the storm. In many cases, these challenges existed even before Sandy, but have been exacerbated by the impacts of the storm. To address this, the City, through NYCEDC, will launch the CDBG-funded Neighborhood Game Changer Competition to invest up to \$20 million in public money in each of the five communities on which this report focuses, including Southern Brooklyn. This funding will be available on a competitive basis to help finance transformational projects. To win the competition, a project will have to spur incremental economic activity, generate new employment opportunities, and match public funding with significant private capital. Projects that would be eligible to be funded in Southern Brooklyn through this competition could include new attractions bringing new visitors, significant new opera-

tions of a major business or non-profit, the revitalization of important commercial corridors, the expansion of an existing neighborhood institution, or a major new transportation option. NYCEDC will launch this program in 2013.

Economic Recovery Initiative 3 Launch Neighborhood Retail Recovery Program

At the core of many Sandy-impacted neighborhoods are the local commercial corridors that provide employment opportunities and services to those who live and work around them. They include local retailers, institutions, and service providers—such as food markets, pharmacies, social service organizations, laundromats, and others. In many cases, though, these corridors were devastated by the storm. To address this, the City will call on the PSC and Con Edison to amend the preferential Business Incentive Rate (BIR) program, which offers a discount on Con Edison's electric delivery charges, to allow it to be extended to impacted small businesses in the five communities on which this report focuses, including Southern Brooklyn. Businesses and nonprofits with 10 or fewer employees that have received support from City-sponsored loan and grant programs will be eligible for the discount for five years up to a maximum discount of \$50,000 per business or nonprofit. The maximum aggregate benefit available across Southern Brooklyn will be \$1 million. The goal is for NYCEDC to launch this effort in 2013. Among the corridors where the benefit could be available in Southern Brooklyn include:

- Brighton Beach Avenue (between Ocean Parkway and West End Avenue)
- Coney Island, including Neptune, Mermaid, and Surf Avenues
- Coney Island Avenue (between Avenue X and Brighton Beach Avenue)
- Emmons Ave. (between West End Avenue and Knapp Street)
- Gerritsen Avenue (between Ave. U and Seba Avenue)
- Nostrand Avenue (between Avenue Z and Avenue U)
- Ocean Avenue (between Avenue W and Emmons Avenue)
- Sheepshead Bay Rd. (between Avenue Z and Emmons Avenue)

Economic Recovery Initiative 4 Support local merchants in improving and promoting local commercial corridors

As mentioned above, Sandy highlighted the important role played by local commercial corridors in many communities impacted by the storm. The City, through the Department of Small Business Services (SBS), will provide finan-

cial and/or technical assistance to area business improvement districts (BIDs), merchant associations, and other groups that work to improve, market, maintain, and otherwise promote primarily commercial corridors. Subject to review of applications received, SBS will prioritize allocating its resources, including its CDBG funding, to Sandy-impacted commercial corridors. Such funding could be used for a variety of purposes, including capacity building, façade improvement programs, streetscape improvements, and business recruitment and marketing efforts. In Southern Brooklyn, corridors that could receive this additional assistance include corridors in Brighton Beach, Sheepshead Bay, Gerritsen Beach, Coney Island, and Gravesend. SBS will provide this assistance beginning in 2013.

Economic Recovery Initiative 5 **Continue to support the FRESH program to increase the number of full-line grocers in underserved neighborhoods**

Even before Sandy, the residents of many communities impacted by Sandy, including parts of Southern Brooklyn, lacked adequate access to fresh fruits, vegetables, and other healthy foods. Noting this challenge, especially in underprivileged areas of the city, in 2009, the City launched the FRESH (Food Retail Expansion to Support Health) program, a series of zoning and financial incentives available to supermarkets to fill this gap in neighborhoods underserved by grocery retail. To promote the recovery of commercial corridors in these areas, the City will continue to support the FRESH program, with a particular focus on Sandy-impacted neighborhoods, including those in Southern Brooklyn.

Economic Recovery Initiative 6 **Reassess commercial properties citywide to reflect post-Sandy market values**

After Sandy, many commercial properties were worth less than before the storm. To reflect this fact and to help with recovery from the storm, the City has reassessed more than 88,000 properties impacted by the storm citywide. Overall, these reassessments have lowered the tax burden on Sandy-impacted properties—including both commercial and residential properties—by over \$90 million, with commercial properties in neighborhoods impacted by Sandy receiving a reduction, on average, of approximately 10 percent off of their pre-storm assessed values.

In addition to the measures described above, the City will advance the following initiatives to address Southern Brooklyn's community and economic recovery needs:

Southern Brooklyn Initiative 14 **Work with Brooklyn Chamber of Commerce to assist in organizing Sheepshead Bay businesses**

Strengthened local civic infrastructure can prepare communities for disaster response. In Sheepshead Bay, where no existing merchant group exists, increased cooperation among area merchants and stakeholders would result in multiple benefits. Since early 2013, the Brooklyn Chamber of Commerce has been working to convene local merchants and support the potential establishment of a new merchant association. Additionally, the FEMA Community Planning and Capacity Building program has identified the area as a potential recipient of technical assistance in connection with the development of a tailored revitalization strategy. The City will support this effort by providing technical assistance of its own and, through existing programs, potential financial support coordinated by the SBS to match local business investments.

Southern Brooklyn Initiative 15 **Support area recovery through the rebuilding and expansion of the entertainment district**

The entertainment attractions in Southern Brooklyn are an important symbol of the area. More significantly, they contribute to area business activity, enhance local quality of life, and drive visitor activity that benefits the local economy. The entertainment areas have witnessed growth in recent years, and this momentum must be sustained to anchor area recovery.

The City will support enhancement of key area attractions to anchor recovery and growth, including construction of major new amusements, construction of a new seasonal amphitheater and community arts center, and expansion of the New York Aquarium, the most-visited attraction in Brooklyn and a year-round asset in the entertainment district. The City also will support enhanced programming, marketing, and district improvements to set the stage for economic growth, and will continue to support programs to link this growth to the local residential neighborhood through workforce development and other initiatives.

Costs to enhance and expand the entertainment district—including the construction of a new state-of-the-art steel rollercoaster between West 15th and West 16th Streets on the Boardwalk—will be borne primarily by private operators. For the New York Aquarium, the repair of damages from Sandy and the planned expansion of the campus including the Ocean Wonders project

will be a joint effort of the Department of Cultural Affairs, the Wildlife Conservation Society, and FEMA. (See rendering: Coney Island Boardwalk)

Southern Brooklyn Initiative 16 **Study opportunities along Coney Island Creek to generate economic activity and facilitate resiliency investments**

In areas that contain particularly vulnerable buildings, vacant or underutilized properties, or unprotected privately owned waterfront edges, encouraging new construction can help to spur economic activity and achieve resiliency goals. The City will work to identify waterfront redevelopment and edge improvement opportunities along Coney Island Creek. Focusing on sites where existing utility and road infrastructure may be able to accommodate new development, the City will study opportunities to generate economic activity through resilient new construction, which could house a range of potential commercial and residential uses. By 2014, NYCEDC will launch and complete an economic development study of these potential sites along Coney Island Creek that will examine specific sites, regulatory constraints and infrastructure capacity.

Southern Brooklyn Initiative 17 **Implement planned and ongoing investments by the City and private partners**

Preservation and revitalization of neighborhoods most impacted by Sandy will be furthered by keeping planned development projects on-track. Among the development projects that the City will continue to pursue are the following:

Parks and Open Space

- *Calvert Vaux Park*, an enhancement project that includes new artificial turf fields, new coastal habitat along the shoreline, and other park improvements.
- *The West 8th Street Access Project*, a project to improve access from the W. 8th Street subway station by demolishing an extant pedestrian bridge and creating a new boardwalk entry at W. 10th Street.

Economic Development

- *Coney Island Commons and YMCA*, a mixed-use development project that will create over 190 units of affordable housing and Southern Brooklyn's first YMCA, opening in 2013.
- *Coney Island Comprehensive Plan*, including the development of the Coney Island amusement and entertainment district, including the new Luna Park, Scream Zone, and Steeplechase Plaza, the re-lighting of the iconic Parachute Jump, and the construction of a new seasonal amphitheater, as well as new housing and neighborhood amenities.