



Implementation

Since the launch of the Special Initiative for Rebuilding and Resiliency in December 2012, scores of City employees across a variety of agencies have invested thousands of hours in the development of *A Stronger, More Resilient New York*. But in many ways, the hard work really begins with the publication of this report. Only a focused, energetic, and sustained implementation effort can ensure that the strategies and initiatives outlined in this document are translated into specific actions that achieve the goal of increasing the resiliency of New York's buildings, infrastructure, and communities.

The 2007 PlaNYC report *A Greener, Greater New York* set similarly ambitious goals to improve the city's sustainability. The report noted, "This agenda will require tremendous effort: on the part of City officials and State legislators; by community leaders and our delegation in Washington; from the State government and from every New Yorker. It will not be easy, and it will not be free. But the payoff is real, and big; and the perils of inaction are far greater than the costs of action."

This statement is as true today as it was in 2007. Fortunately, the City's approach to PlaNYC provides a model for how to translate plans into results.

For example, in 2010, the international nonprofit ICLEI-Local Governments for Sustainability said, "Since the release of [PlaNYC], the City has made great strides towards implementing the plan—passing groundbreaking green buildings legislation, creating miles of bike lanes, opening acres of open space, cleaning the air, and reducing greenhouse gas emissions. PlaNYC is a success because it is not just a plan; it is an action-oriented agenda that provided the City with a framework for implementing bold changes." The organization went on to identify 10 factors contributing to PlaNYC's success.

The implementation of *A Stronger, More Resilient New York* will build on the systems and structures that have made PlaNYC a success, including four that will be particularly important in the months and years to come: assignment of clear accountability; development of regular, required reporting; identification of near-term milestones; and creation of a clear and compelling Federal agenda. (See sidebar: *Factors Contributing to PlaNYC's Success*)

Clear Accountability

An initiative without a clear owner is destined to fail. That is why the key to successful implementation of this plan is ensuring that each and every initiative is owned by a designated agency or

office, with interagency working groups where appropriate and coordination by a single entity.

A number of topics in this report align primarily to a single responsible agency—including transportation (Department of Transportation, or NYCDOT), water and wastewater (Department of Environmental Protection, or DEP), solid waste (Department of Sanitation, or DSNY), telecommunications (Department of Information Technology and Telecommunications, or DoITT), and parks (Department of Parks & Recreation, or DPR). Each of these agencies therefore, will be responsible for driving the implementation of initiatives contained within their respective chapters. In some other chapters, only selected initiatives are aligned clearly to a single agency. This includes, for example, the land use actions within the Community Rebuilding and Resiliency Plans (Department of City Planning, or DCP) and the recommendations for City-owned hospitals within Chapter 8 (*Healthcare*) (Health and Hospitals Corporation, or HHC). With respect to the remaining initiatives (those without a natural "owner"), it will be necessary to identify an appropriate lead agency responsible for implementing each.

Even with different agencies assigned to each initiative, it is necessary to appoint a single entity as the overall steward of this plan and its implementation. That entity should be experienced in interagency coordination, informed about climate change and its impacts on New York City, and practiced in driving the

development and implementation of long-term planning efforts.

Fortunately, the Mayor's Office of Long-Term Planning and Sustainability (OLTPS) is positioned perfectly to play this role, building on its success at driving the City's sustainability efforts during the last six years. OLTPS long has focused not just on making the city greener but also on identifying and protecting New York from climate change impacts. For example, well before Sandy, OLTPS staff had coordinated with the New York City Panel on Climate Change (NPCC) to develop local climate projections for New York City; engaged with the Federal Emergency Management Agency (FEMA) on the development of new flood maps (including forward-looking maps reflecting projected sea level rise); convened the Climate Change Adaptation Task Force to assess risks to critical infrastructure; and begun coordinating with the United States Army Corps of Engineers (USACE) on a study of potential protections for New York Harbor. During Sandy, OLTPS staff worked night and day to support recovery operations related to the City's energy and other critical infrastructure. Furthermore, as leaders and members of the Special Initiative for Rebuilding and Resiliency (SIRR), OLTPS staff members have been central to the creation of this report.

OLTPS, therefore, will lead the implementation of this plan. In addition to a small core of dedicated staff, the OLTPS Director of Resiliency will coordinate the work of three critical

Factors Contributing to PlaNYC's Success

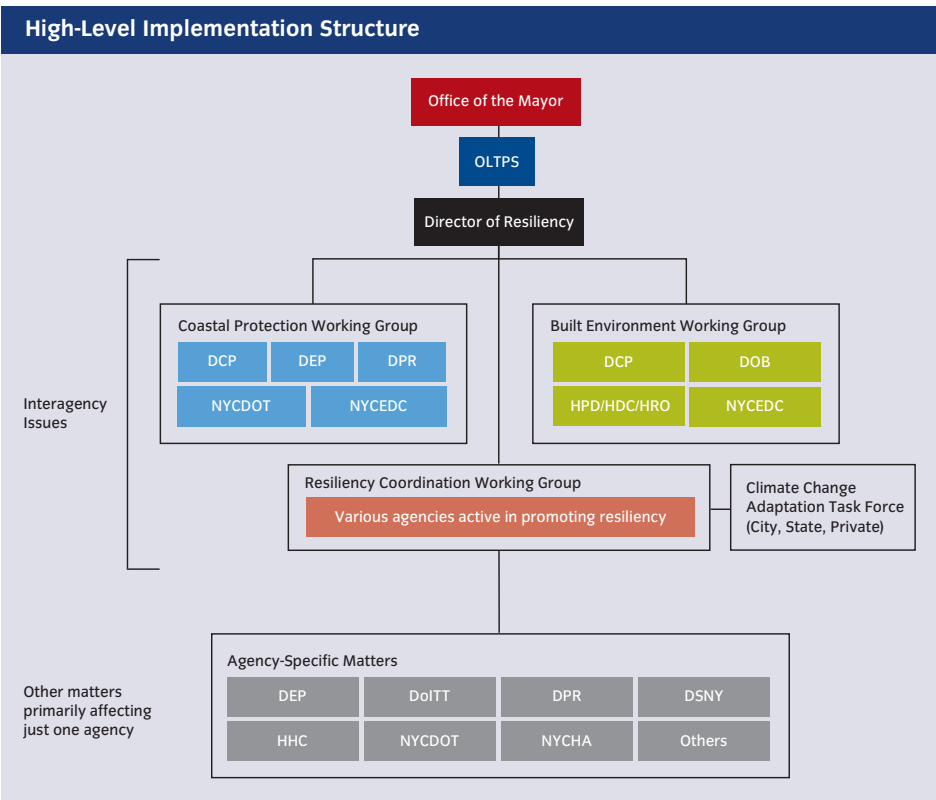
An independent organization, ICLEI-Local Governments for Sustainability, spent over a year researching and understanding the process New York City followed to develop PlaNYC, interviewing many of the key people involved. Through this research process, ICLEI identified the top 10 factors for PlaNYC's success:

1. Strong **mayoral leadership** and **cooperation between** the Mayor's Office and City Council.
2. A group of dedicated City agency staff performed **in-depth research and analysis**, involving extensive **coordination and collaboration** between the agencies.
3. A **methodical, transparent, and inclusive planning process**.
4. **Central management and coordination** provided by the Mayor's Office of Long-Term Planning and Sustainability.
5. An external Sustainability Advisory Board provided **best practice advice and guidance**.
6. A **comprehensive public outreach process** generated broad public support and helped to educate the general public about climate change and sustainability issues.
7. The Mayor's Office of Long-Term Planning and Sustainability **strategically released** the plan by coordinating announcements with key stakeholders.
8. The plan included an **implementation plan** with a timeline and a funded budget.
9. Swift **transition from planning to action**: the City is actively implementing all 127 initiatives.
10. **Openness for innovation** and policy-making not driven by politics or business as usual.

interagency working groups that will be established to address high-priority initiatives that cut across the typical boundaries of City government. The first of these areas is coastal protection, which will involve further risk assessment, review of technologies and equipment, coordination with the USACE, and implementation. This working group—to include DCP, DEP, DPR, NYCDOT, and the New York City Economic Development Corporation (NYCEDC)—will pursue the implementation of the initiatives in Chapter 3 (*Coastal Protection*), including securing necessary funding.

The second critical interagency working group will coordinate the implementation of buildings-related recommendations, including the various initiatives contained within Chapter 4 (*Buildings*), Chapter 5 (*Insurance*), and Chapter 8 (*Healthcare*). The intersection of the building code, mitigation measures, Federal flood insurance, and zoning requires a close working relationship among various agencies, including DCP, NYCEDC, the Department of Buildings (DOB), the Department of Housing Preservation and Development (HPD), and the Mayor’s Office of Housing Recovery Operations (HRO). OLTPS will coordinate this group and collaborate with the City Council to ensure sustained progress on the initiatives outlined herein.

The third interagency working group will provide operational support and coordination for citywide long-term recovery and resiliency efforts of all types, citywide. Made up of senior leaders from the most involved agencies, this working group will ensure cross-agency cooperation for various initiatives, particularly those assigned to one agency but needing support from others. In addition, this working group will seek to prevent duplication of efforts, promoting coordination between the resiliency efforts included herein and other post-Sandy



recovery initiatives (such as implementation of the recommendations in the City’s *Hurricane Sandy After Action Report*). This working group also will collaborate with the existing Climate Change Adaptation Task Force.(See *chart: High-Level Implementation Structure*)

In addition to leading these interagency working groups, OLTPS also will draw upon other lessons from its successful implementation of PlaNYC. For example, in order to solicit the continued input of third-party experts, OLTPS will consider supplementing the membership of the Sustainability Advisory Board to include expertise in resiliency and other fields needed

to ensure that the latest science, research, and community input is brought to bear to make New York City more resilient.

With the tools outlined above and the necessary additional resources, OLTPS is well positioned to oversee the implementation of this plan, even as it continues to implement the entire PlaNYC sustainability agenda.

Required Reporting

Renowned management theorist Peter Drucker famously said, “What gets measured, gets

Select Local Laws Supporting PlaNYC	
Local Law 17 of 2008	<ul style="list-style-type: none">Establishes OLTPS in the City CharterRequires OLTPS to issue an updated “comprehensive, long-term sustainability plan” every four years, and an annual progress update including sustainability indicatorsRequires DCP to issue updated population projections every four years
Local Law 22 of 2008	<ul style="list-style-type: none">Requires a 30 percent reduction in citywide greenhouse gas emissions by 2030 and City government emissions by 2017Requires annual inventory and analysis of greenhouse gas emissions
Local Law 42 of 2012	<ul style="list-style-type: none">Codifies the NPCC and requires updates to climate projections at least every three years, and within one year of an Intergovernmental Panel on Climate Change updateCodifies the Climate Change Adaptation Task Force and requires an updated risk assessment within one year of new projections
Various Other Local Laws	<ul style="list-style-type: none">Includes the production of regular or one-time studies on a variety of topics, including stormwater management, recycling and composting, food distribution, and undergrounding of power linesCreates the Office of Environmental Remediation and a “renewable energy portal”

managed.” The history of PlaNYC demonstrates the power of establishing clear metrics and monitoring progress against them. Since 2007, the Administration has worked closely with the City Council to adopt legislation requiring City agencies to submit regular progress reports relating to the plan. For example, Local Law 17 of 2008 requires OLTPS to issue an updated “comprehensive, long-term sustainability plan” every four years, and an annual progress update including sustainability indicators. Local Law 22 of 2008 requires a 30 percent reduction in citywide greenhouse gas emissions by 2030 and City government emissions by 2017. Critically, it also requires an annual inventory and analysis of these emissions. (See *table: Selection of Local Laws Supporting PlaNYC*)

Subsequent planning efforts, including the *Sustainable Stormwater Management Plan* (2008), the *Green Infrastructure Plan* (2010), and the *New York City Wetlands Strategy* (2012) all require reporting and periodic updates. In short, the requirement to monitor and report on the progress of sustainability initiatives has enabled observers both within and outside government to assess progress and, if necessary, advocate for change.

The City believes the same rigor that applies to its sustainability efforts should apply equally to its resiliency efforts. To that end, the Administration will work with the City Council to pass a new local law that requires OLTPS to issue an updated “comprehensive,

long-term resiliency plan” every four years, beginning in 2017, four years after the release of this plan. The local law should require that this update be developed in coordination with the City’s regularly updated Hazard Mitigation Plan, which is compiled by OEM in close partnership with DCP and other City agencies based on FEMA regulations. In addition, the local law should require OLTPS to include resiliency indicators in the annual progress update already issued by the office. OLTPS will work closely with other involved City agencies to identify a list of appropriate metrics. (See *table: Selected Citywide Infrastructure and Built Environment Resiliency Metrics, Preliminary*)

Selected Citywide Infrastructure and Built Environment Resiliency Metrics, Preliminary	
Category	Metrics
Coastal Protection	<ul style="list-style-type: none"> Federal dollars secured for coastal protection projects # of buildings with reduced coastal risk due to coastal protection projects
Buildings	<ul style="list-style-type: none"> # of buildings implementing Core Flood Resiliency Measures # of square feet of residential and non-residential buildings implementing Core Flood Resiliency Measures
Insurance	<ul style="list-style-type: none"> % of residences in 100-year floodplain purchasing flood insurance Average premium paid for NFIP policies
Utilities	<ul style="list-style-type: none"> % of electric generation capacity in the 500-year floodplain able to remain online after a 500-year flood Maximum % of peak load that could be lost due to failure of any one substation % of assets at or above their loading limits during peak demand periods (e.g., during heat waves) # of miles of cast iron and bare steel gas mains in the 500-year floodplain % of steam generation capacity in the 500-year floodplain able to remain online after a 500-year flood
Liquid Fuels	<ul style="list-style-type: none"> % of gas stations with quick-connects for generators % of regional fuel terminal capacity in the 100-year floodplain hardened against a 100-year flood % of regional refining capacity in the 100-year floodplain hardened against a 100-year flood
Healthcare	<ul style="list-style-type: none"> % of hospital beds in 500-year floodplain meeting resiliency requirements % of nursing homes and adult care beds in 100-year floodplain meeting resiliency requirements
Telecommunications	<ul style="list-style-type: none"> # of critical telecommunications facilities implementing Core Flood Resiliency Measures
Transportation	<ul style="list-style-type: none"> # of lane-miles reconstructed or resurfaced % of New York City transportation assets adapted for climate change resiliency
Parks	<ul style="list-style-type: none"> % of facilities in Sandy inundation zone upgraded for greater resiliency # of trees inspected and pruned # of cubic yards of beach sand nourishment
Water and Wastewater	<ul style="list-style-type: none"> # of wastewater facilities or assets protected or raised above the 100-year floodplain % of combined sewer area runoff managed by green infrastructure # of new sewer miles built in areas with no or partial sewers # of areas served by Bluebelt projects built citywide % of water quality samples complying with Surface Water Treatment Rule standard for turbidity
Solid Waste	<ul style="list-style-type: none"> # of DSNY facilities protected or raised above the 100-year floodplain
Food Supply	<ul style="list-style-type: none"> # of grocery stores with generators or quick connects for generators % of DCAS food procurement backstopped with more resilient distributors



Near-Term Milestones

In its 2010 report, ICLEI—Local Governments for Sustainability noted the importance of “swift transition from planning to action” as a factor contributing to PlanNYC’s success. Within the first year of releasing PlanNYC, the City had launched 118 of its 127 initiatives (over 90 percent). These initiatives included creating the Office of Environmental Remediation and the Brownfield Opportunity Area grants program; opening more than 100 schoolyards as playgrounds; signing legislation to require ultra-low sulfur diesel in City-owned ferries; issuing Executive Order 109 directing agencies to take steps to reduce City government’s energy consumption and CO₂ emissions by 30 percent from 2006 levels within 10 years; and launching the Mayor’s Carbon Challenge at 10 leading universities that committed to matching the City’s “30x17” goal (a 30 percent reduction in City government carbon emissions by 2017).

Climate change is a long-term problem, and many of the strategies and initiatives outlined in this report will evolve over a similarly long period of time. However, it is both possible and necessary to begin to make progress now. The achievement of near-term milestones can help build momentum for initiatives that take longer to implement, and generate lessons that can be applied across the entire plan.

To that end, the City has identified a series of resiliency milestones that can be achieved in 2013. These milestones include an array of concrete achievements that will result in material improvements to New York’s resiliency, including, but not limited to, the following:

- launch of housing and building recovery programs;
- launch of Neighborhood Game Changer and Resiliency Technology Competitions;
- appointment of a member of the senior leadership team of each relevant City agency as the point person for resiliency matters;
- establishment of the DoITT Planning and Resiliency Office;
- launch of the USACE comprehensive coastal protection study with active City participation;
- completion of emergency beach nourishment projects in Brooklyn and Queens by the USACE, and Staten Island by DPR;
- implementation of DCP’s Flood Resiliency Text Amendment to facilitate flood-resistant new construction retrofits;
- approval of amendments to the Construction Codes to provide for resiliency improvements for new and existing buildings, including healthcare facilities;
- implementation of a resiliency incentive program for properties in the 100-year floodplain facing increased flood risk;
- launch of flood insurance-related studies with FEMA for the National Flood Insurance Program (NFIP);
- introduction of a legislative package (City, State, and Federal) to provide regulatory relief in the event of a liquid fuel emergency;
- launch of an emergency fueling equipment and generator procurement program for critical fleets; and
- submission of testimony calling for significant investment in resiliency and storm-hardening measures as part of the 2013 Con Edison rate cases for electric, gas, and steam before the New York State Public Service Commission (PSC).

These near-term milestones and others identified will demonstrate the City’s commitment to protecting its coastal neighborhoods and all New Yorkers, and will represent a significant down payment on the years of hard work to come. (See *table: Selected 2013 Resiliency Milestones*)

Federal Agenda

Given the important role played by the Federal government in flood risk assessment, flood insurance, and coastal protection measures, a clear Federal agenda for the City to pursue (in partnership with the State and the Congressional delegation) is critical to the successful implementation of the plan outlined in this report.

The City, therefore, has developed a Federal Resiliency Agenda that it intends to bring to Washington immediately. While this list does

not reflect all of New York City’s needs from the Federal government, it does reflect a set of priorities that require immediate attention:

1. **Establish a Federal policy for using local climate projections:** Using different climate projections at the local and Federal levels will cause confusion and lead to conflicting measures for protecting against future risks. Federal policy should permit or require that, where local climate projections meet rigorous scientific standards, they should be deferred to by the Federal government within the applicable locality.
2. **Improve the national flood mapping program:** FEMA flood maps are one of the main tools for understanding coastal flood risks, but 30 years have passed since FEMA last completed a coastal flood study for New York—resulting in outdated maps that underestimate today’s coastal flood risk. In addition to more frequent updates, improvements to the program should include clearer technical guidance, increased transparency, and the incorporation of future risks such as sea level rise.
3. **Better reflect coastal protection measures in flood maps:** A primary goal of coastal protection measures is to mitigate the risks to New Yorkers that are reflected in Federal flood maps. As such, neighborhood- and site-specific improvements that provide defenses against floods should result in flood map amendments.
4. **Ensure completion of key USACE coastal protection studies with the right priorities, and secure supplemental funding for implementation:** Recent Federal legislation instructs the USACE—and provides the necessary funding—to complete a series of high-priority assessments, including, most importantly, a comprehensive New York Harbor study. These studies should prioritize an analysis of the City’s proposed coastal protection measures. In addition, the Federal government should ensure funding that will allow the recommendations of these studies to be implemented.
5. **Work with FEMA to update its requirements and best practices for flood protection to reflect the needs of a high-density urban environment:** New York City’s built environment differs significantly from coastal communities in most of the rest of the country. Upgrading FEMA guidance, practices, and policies, where warranted, can aid and encourage

adaptation in New York City and other urban contexts.

6. Develop NFIP mitigation credits for resiliency measures: Many buildings in urban environments have structural characteristics or site conditions that pose a challenge to elevation. Other mitigation options that reduce the risk of flood damage are available and should be encouraged through commensurate insurance premium reductions.

7. Address NFIP affordability: Implementation of the Biggert-Waters flood insurance reform legislation will adversely affect many property owners, especially low-income populations, and is likely to have broader impacts on home ownership affordability and neighborhood stability. The legislation called for FEMA and the National Academy of Sciences to conduct a study of methods for addressing flood insurance affordability. This study must be completed and its recommendations must be implemented as soon as possible.

8. Strengthen resiliency of the regional liquid fuel infrastructure: The City lacks the regulatory power to monitor or require resiliency in much of the liquid fuels infrastructure that serves New York. The Federal government must convene stakeholders to identify ways of ensuring the resiliency of this infrastructure and preventing future supply chain breakdowns.

Selected 2013 Resiliency Milestones	
Chapter	2013 Milestone
Climate Analysis	<ul style="list-style-type: none"> • Launch of interactive web platform for communicating flood-related risk information* • Release of NPCC climate projections for 2100, including humidity projections • Release of a set of metrics developed with the NPCC to measure actual climate change against predicted climate change
Coastal Protection	<ul style="list-style-type: none"> • Launch of USACE Harborwide coastal protection study with active City collaboration • Release of global competition to design integrated flood-protection systems* • Completion by USACE of emergency beach nourishment in the Rockaways, Coney Island, Brighton Beach and Plumb Island with active City collaboration • Completion by DPR of emergency beach nourishment at South Beach, New Dorp Beach, and Oakwood Beach in Staten Island
Buildings	<ul style="list-style-type: none"> • Approval of Construction Code amendments and zoning text amendments to provide for resiliency improvements for new and existing buildings • Launch of incentive program for properties in the 100-year floodplain facing increased to adopt Core Flood Resiliency Measures • Launch of Resiliency Technologies Competition, and Resilient Housing Design Competition* • Launch of sales tax abatement program for flood resiliency in industrial buildings • Initiation of studies related to wind risk and potential resiliency retrofit requirements*
Insurance	<ul style="list-style-type: none"> • Launch of mitigation credits study with FEMA • Launch of consumer education campaign on flood insurance*
Utilities	<ul style="list-style-type: none"> • Filing of comments in the Con Edison rate case, including proposals for a new approach to resiliency investment on the part of the PSC • Development of a generator plan with OEM, including coordination with the Federal government and with the State
Liquid Fuels	<ul style="list-style-type: none"> • Launch of discussions with the Federal government on liquid fuels infrastructure hardening • Introduction of a legislative package for liquid fuels emergency relief
Healthcare	<ul style="list-style-type: none"> • Amendments to Construction Code for new and existing facilities • Launch of resiliency incentive program for nursing homes and adult care facilities*
Telecommunications	<ul style="list-style-type: none"> • Establishment of the DoITT Planning and Resiliency Office* • Launch of WiredNYC and NYC Broadband Map programs to provide better information about building broadband access and resiliency
Transportation	<ul style="list-style-type: none"> • Raising of selected traffic signal controllers above flood elevations in vulnerable areas • Acquisition of power inverters to allow signals to operate on NYPD vehicle power during outages • First planning exercise for temporary measures to respond to extreme weather-related transit outage scenarios • Initiation of detailed planning for Select Bus Service bus rapid transit route on Woodhaven Boulevard
Parks	<ul style="list-style-type: none"> • Establishment of Jamaica Bay Science and Resilience Center • Expansion of DPR native plant seed collection

Selected 2013 Resiliency Milestones (Continued)	
Chapter	2013 Milestone
Water and Wastewater	<ul style="list-style-type: none"> • Adoption of infrastructure guidelines for new wastewater facilities that include storm surge and sea level rise • Completion of detailed facility risk assessment and adaptation study, and release of final report • Start of construction of the Catskill and Delaware interconnection, completion of Ultraviolet Disinfection Facility, and revision of EPA filtration waiver
Solid Waste	<ul style="list-style-type: none"> • Completion of detailed facility risk assessment
Food Supply	<ul style="list-style-type: none"> • Launch of comprehensive food distribution study to identify supply chain vulnerabilities*
All Communities	<ul style="list-style-type: none"> • Launch of Business Recovery and Resiliency programs • Launch of Neighborhood Game Changer contest
Brooklyn-Queens Waterfront	<ul style="list-style-type: none"> • Launch of pilot summer weekend ferry service expansion from Manhattan to Red Hook • Completion of enhancements to Mill Street and the BQE underpass to improve the connection between Red Hook and the rest of Brooklyn • Announcement of Brooklyn Bridge Park designation for John Street site, including elevated building and coastal edges
East and South Shores of Staten Island	<ul style="list-style-type: none"> • Issuance of RFEI for new concessions and services at City-controlled beachfront • Launch of detailed land use studies to encourage retrofits of existing buildings and construction of new resilient buildings in severely impacted East Shore communities* • Launch of the first capital project for the Mid-Island Bluebelt in Midland Beach • Launch of Great Kills Harbor comprehensive revitalization study to increase resiliency and draw additional investments* • Implementation of roadway and sewer capital projects along Hylan Boulevard, especially in vulnerable South Shore areas
South Queens	<ul style="list-style-type: none"> • Launch of Beach 116th Street commercial revitalization study to develop detailed redevelopment plan* • Launch of Far Rockaway commercial revitalization study to develop detailed redevelopment plan* • Launch of detailed land use studies to encourage retrofits of existing buildings and construction of new resilient buildings in Hamilton Beach and Broad Channel* • Start of pilot summer extension of weekday ferry and expansion of weekend ferry from Manhattan to the Rockaways
Southern Brooklyn	<ul style="list-style-type: none"> • Start of construction on a new iconic rollercoaster in Coney Island's amusement area • Launch of detailed land use studies to encourage retrofits of existing buildings and construction of new resilient buildings in Gerritsen Beach* • Completion of emergency repairs to bulkhead/floodwall along the Belt Parkway • Continuation of construction of the first phase of area drainage improvements in Coney Island
Southern Manhattan	<ul style="list-style-type: none"> • Launch of incentive program targeting new and renewing tenants in the 100-year floodplain* • Launch of Take the HELM competition for Sandy-impacted areas* • Start of streetscape and safety improvements on Water Street • Launch of initiative to encourage comprehensive upgrades of ground floors and adjacent Privately Owned Public Spaces along Water Street
Implementation	<ul style="list-style-type: none"> • Passage of local law outlining resiliency requirements for OLTPS • Appointment of Citywide Director of Resiliency at OLTPS • Issuance of executive order requiring agencies to appoint a resiliency point person and to build new facilities to most recent available 100-year floodplain plus appropriate freeboard, or equivalent standard
Funding	<ul style="list-style-type: none"> • Inclusion of resiliency funding in City capital budget

* Subject to available funding