



SECTION IV: MITIGATION STRATEGY

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1. Introduction

The Mitigation Strategy section consists of programs, plans, projects, and policies to reduce or eliminate potential losses from hazards identified in the Risk Assessment section. The Strategy includes existing and potential mitigation actions that will minimize the effects of a hazard event on New York City's population, economy, property, building stock, and infrastructure. It is the result of a coordinated effort by 41 New York City agencies and partners to develop and implement a comprehensive range of inventive and effective ways to mitigate hazards.

A. Mitigation Strategy Approach

- Establish mitigation goals and objectives that aim to reduce or eliminate New York City's long-term vulnerability to hazard events
- Identify and analyze a comprehensive range of hazard-specific mitigation actions to achieve the goals and objectives of the Mitigation Strategy
- Analyze the feasibility of these mitigation actions
- Describe how New York City will prioritize these mitigation actions
- Develop an implementation strategy

B. FEMA and New York State OEM Requirements Addressed in this Section

New York City's Mitigation Strategy was developed consistent with the process and steps presented in the Federal Emergency Management Agency (FEMA) *How-To-Guide: Developing the Mitigation Plan* (FEMA 386-3). This section satisfies the following FEMA requirements:

- **FEMA Requirement §201.6(c)(3):** [The hazard mitigation strategy *shall* include a] blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.
- **FEMA Requirement §201.6(c)(3)(i):** [The hazard mitigation strategy *shall* include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
- **FEMA Requirement §201.6(c)(3)(ii):** [The mitigation strategy *shall* include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.
- **FEMA Requirement: §201.6(c)(3)(iii):** [The mitigation strategy section *shall* include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized,

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implemented, and administered by the local jurisdiction. Prioritization *shall* include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

The following New York State OEM (NYS OEM) requirements are also addressed in this section:

- **NYS OEM Requirement §2:** The plan *should* identify any critical facility that has ever sustained flooding, even if it is not located in the 100-year floodplain on a current (adopted) or draft FEMA Flood Insurance Rate Map (FIRM). The plan *should* also analyze and document:
 - a) The mitigation strategy cost, and damages avoided since implementation;
 - b) Other options considered, their estimated costs, why they are deemed not feasible;
 - c) How well the project performed in subsequent events, if your basic assumptions were accurate, and what you'd change if you were doing it again;
 - d) Social, economic or environmental considerations that support/challenge the project.
- **NYS OEM Requirement §3:** Counties and communities containing a 100-yr floodplain on either (adopted) or draft FEMA FIRM *should* identify:
 - a) Sites for placement of temporary housing units to house residents displaced by a disaster.
 - b) Potential sites within the community suitable for relocating houses out of the floodplain, or building new houses once buildings in floodplain have been raised.
- **NYS OEM Requirement §4:** Communities with residential neighborhoods or critical facilities that have been flooded, inundated, or isolated by water, even if they are not located in the 100-year floodplain on a current or draft FEMA Flood Insurance Rate Map (FIRM), *should* develop evacuation routes and procedures and identify shelters, including provisions for a range of medical needs, accommodation for pets, and compliance with the Americans with Disabilities Act.
- **NYS OEM Requirement §5.a:** The Plan *should* include all mitigation projects on community's wish list even if they do not meet FEMA eligibility of Benefit-Cost Analysis requirements, since funding should be sought from multiple sources to achieve a community's mitigation goals most quickly. Each project *should* include a brief description of:
 - a) The problem and estimated annual damages;
 - b) The preferred option, its estimate cost, and the estimated annual damages that will be avoided if it is implemented;
 - c) How the proposal might be eligible under grant criteria other than mitigation (coastal, sustainability or climate change initiatives, brownfield funds);

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- d) Other options considered, their estimated costs, why they are deemed not feasible;
 - e) The social economic or environmental considerations that support/challenge it;
 - f) Any steps that need to be taken (e.g. engineering studies) before the project can be implemented, the person or organization with lead and supporting roles in completing those steps, and an estimated timetable for completion.
- **NYS OEM Requirement §5.b:** The Plan *should* include a list of potential local, State, and Federal funding sources that apply to the projects identified as well as public-private partnerships worth pursuing.
 - **NYS OEM Requirement §5.c:** The plan *should* include a section that documents previous mitigation projects completed by the county or the jurisdiction within the community's borders, whether funded locally or by private, state or federal agencies and organizations. Each project should include a description of:
 - a) The original problem and estimated annual damage;
 - b) The project, its cost, and the damages avoided since implementation;
 - c) How well the project performed in subsequent events, if your basic assumptions were accurate, and what you'd change if you were doing it again;
 - d) The social, political and environmental considerations that supported/challenged the proposal, and the stakeholders, approaches and other factors that contributed to its successful implementation.

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2. Developing Goals and Objectives

The first step in developing a hazard mitigation strategy for New York City was to establish goals and objectives. Mitigation goals are general guidelines about what New York City wants to achieve in terms of hazard and loss prevention. Objectives are specific, measurable strategies or implementation steps to achieve those goals. Developing clear goals and objectives helped reinforce New York City's overall purpose and mission for undertaking mitigation planning.

To this end, the Planning Team developed preliminary hazard mitigation goals and objectives based on the Risk Assessment findings and the New York State Multi-Hazard Mitigation Plan and presented them to the Steering Committee. The Planning Team also presented the goals at community involvement meetings. Incorporating input and suggestions from the Steering Committee, the Planning Team revised and refined the goals and objectives, producing the final five goals and 28 objectives (see Table 1). These goals and objectives provide the necessary framework to develop a mitigation strategy. New York City will re-evaluate its goals and objectives during each plan maintenance cycle to ensure they continue to represent New York City's hazard mitigation priorities.

Goal 1: Protect public health and safety	
Objective 1.1	Identify and reduce the impacts of hazards on vulnerable populations
Objective 1.2	Improve and promote systems that provide early warning and emergency communications
Objective 1.3	Strengthen state and local building and health code enforcement
Objective 1.4	Train emergency responders
Objective 1.5	Reduce public health risk from natural and non-natural hazards
Objective 1.6	Improve community engagement and outreach by organizations and agencies that provide services to vulnerable/special needs populations
Goal 2: Preserve property	
Objective 2.1	Implement mitigation programs that protect critical facilities and services and promote reliability of lifeline systems to minimize impacts from hazards, maintain operations, and expedite recovery from an emergency
Objective 2.2	Consider known hazards when identifying a site for new facilities and systems
Objective 2.3	Create redundancies for critical networks such as water, sewer, digital data, power, and communications
Objective 2.4	Adopt and enforce public policies to minimize negative impacts of development and enhance safe construction in high-hazard areas
Objective 2.5	Integrate new hazard and risk information into building codes and land use planning mechanisms
Objective 2.6	Educate public officials, developers, realtors, contractors, building owners, and the general public about hazard risks and building requirements

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Objective 2.7	Promote appropriate mitigation actions for all public and privately owned property within the City's jurisdiction including, but not limited to, residential units, commercial structures, educational institutions, healthcare facilities, cultural facilities, and infrastructure systems
Objective 2.8	Incorporate effective mitigation strategies into capital improvement projects within the city
Objective 2.9	Promote post-disaster mitigation as part of restoration and recovery
Objective 2.10	Encourage the development and incorporation of innovative technological solutions without compromising neighborhood or building character
Goal 3: Promote a sustainable economy	
Objective 3.1	Form partnerships to leverage and share resources
Objective 3.2	Develop feasible plans to continue critical business operations post-disaster
Objective 3.3	Partner with the private sector, including small businesses, to promote structural and non-structural hazard mitigation as part of standard business practices
Objective 3.4	Educate businesses about citywide contingency planning, targeting small businesses and those businesses located in high-risk areas
Objective 3.5	Partner with the private sector to promote employee/employer education about disaster preparedness at work and at home
Goal 4: Sustain a healthy environment	
Objective 4.1	Advance understanding of the relationship between climate change and natural hazards
Objective 4.2	Increase social resiliency by improving knowledge about climate-related hazards and promoting adaptive mitigation strategies
Objective 4.3	Develop hazard mitigation policies that protect the environment
Objective 4.4	Promote climate change adaptation strategies that protect against long-term effects on the environment
Goal 5: Encourage public preparedness for disasters	
Objective 5.1	Improve public outreach and access to hazard information, data, and maps to enhance understanding of natural hazards and the risks they pose
Objective 5.2	Improve hazard information, including databases and maps, by using the latest available data and scientific analysis about hazards and vulnerabilities
Objective 5.3	Improve public knowledge of hazards and protective measures so individuals are able to appropriately respond during hazard events

Table 1: Hazard Mitigation Goals and Objectives

3. Identification and Analysis of Mitigation Actions

Mitigation actions include programs, plans, projects, and policies that help reduce or eliminate the risk to human life and property from hazards. This plan presents a comprehensive range of hazard-specific mitigation actions for New York City, focusing on actions that affect new and existing buildings and infrastructure, that are the result of a careful identification and analysis process.

A. Identification of Actions

Mitigation Planning Council (MPC) members identified existing and potential mitigation actions for their respective agencies and organizations that meet the following criteria:

- Reduce or eliminate the risk to human life and property from at least one of the 13 hazards identified in the Risk Assessment section
- Fall under one or more of the six FEMA mitigation action categories
- Achieve one or more of the five hazard mitigation goals and 28 objectives

Of the 41 MPC members, 38 submitted preliminary mitigation actions to OEM for inclusion in the Mitigation Strategy. The New York City Housing Recovery Office (HRO) and the Regional Plan Association (RPA) submitted capabilities (see Table 12, "Capability Assessment") and provided guidance throughout the planning process but did not submit mitigation actions. Nor did the New York City Office of Management and Budget (OMB), though OMB is involved in the process of determining and overseeing funding for projects submitted by other MPC members. The Planning Team held one-on-one meetings with each MPC member to discuss its mitigation actions in detail and suggest potential changes and additions. The MPC then submitted final lists of actions to OEM, which resulted in a total of 626 mitigation actions (293 existing and 333 potential) that met the criteria above.

i. Mitigation Action Categories

FEMA organizes mitigation actions into six broad categories. These categories allow mitigation actions to be compared and provide a standardized method for eliminating unsuitable actions. All mitigation actions identified in the HMP fall within one of the FEMA mitigation action categories below:

1. **Prevention and Policy:** Government, administrative, or regulatory actions and processes that influence the way land and buildings are developed and built. These actions also include public activities that reduce hazard losses. Examples of this category include building and construction code revisions, zoning regulation changes, and hazard computer modeling.
2. **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples: seismic retrofits, roadway elevations, and flood-proofing.

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3. **Education and Awareness:** Actions to inform and educate citizens, elected officials, businesses, and property owners about the hazards they face and protective measures they can take to best prepare for or respond to hazards. Examples: programs that target severe repetitive loss properties and vulnerable populations.
4. **Coastal/Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural or coastal systems. Examples: projects that create open space, greenbelts, Bluebelts, or wetlands.
5. **Emergency Services:** Actions that protect people and property, or increase the capacity of emergency response during and immediately following a disaster event. Examples: enhancements that provide advanced warning and redundant communications.
6. **Infrastructure Projects:** Actions that involve the engineering of infrastructure systems to be more resistant to the impacts of hazards. Examples: projects that control floodwater, reconstruct dams and seawalls, and construct green roofs.

ii. Mitigation Action Summary

The final list of mitigation actions includes many structural projects that apply to both new and existing buildings and infrastructure. Many of the actions protect public health and safety, promote a sustainable economy, protect the environment, and increase public preparedness for disasters. Table 2 summarizes New York City's mitigation actions by hazard, mitigation action category, and goals/objectives addressed.

Category	Existing	Potential	Total
Number of Mitigation Actions	293	333	626
Mitigation Actions by Hazard Addressed*			
CBRN releases	5	7	12
Coastal erosion	2	3	5
Coastal storms	18	31	49
Cyber threats	1	2	3
Disease outbreaks	4	1	5
Drought	7	4	11
Earthquakes	3	8	11
Extreme temperatures	9	5	14
Flooding	97	77	174
Infrastructure failures	6	20	26
Severe weather	0	5	5
Wildfires**	0	0	0
Winter storms	2	2	4
Multi-hazard	139	168	308
Total	293	333	626

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Category	Existing	Potential	Total
Mitigation Actions by Category			
Prevention and policy	98	55	153
Property protection	68	91	159
Public education and awareness	31	30	60
Coastal/natural resource protection	17	8	25
Emergency services	45	91	136
Infrastructure projects	34	58	92
Total	293	333	626
Mitigation Actions by Goal/Objective Addressed***			
1.1	48	93	141
1.2	11	11	22
1.3	6	3	9
1.4	2	3	5
1.5	25	19	44
1.6	8	16	24
2.1	138	230	368
2.2	11	39	50
2.3	96	78	174
2.4	18	16	34
2.5	35	28	63
2.6	5	15	20
2.7	77	124	201
2.8	36	49	85
2.9	16	19	35
2.10	20	30	50
3.1	29	7	36
3.2	2	8	10
3.3	1	25	26
3.4	2	13	15
3.5	1	10	11
4.1	4	4	8
4.2	9	0	9
4.3	44	24	68
4.4	11	20	32
5.1	10	28	38
5.2	21	33	54
5.3	20	18	38
Total	704	963	1667
<p>*Since many actions address multiple hazards but are listed here only in connection with a single hazard, actions for each hazard may appear to be underrepresented.</p> <p>**Although wildfires are not individually addressed by any actions, they are addressed by the multi-hazard actions.</p> <p>***Many mitigation actions address more than one goal and/or objective.</p>			

Table 2: Mitigation Actions Summary Table

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For both existing and potential actions, projects are assigned an index reference which consists of an abbreviation of the primary hazard addressed (see y. Table 3) followed by a number listed in the order the actions appear in the table.

	Hazard	Abbreviation
Hazards	CBRN releases	CB
	Coastal erosion	CE
	Coastal storms	CS
	Cyber threats	CY
	Disease outbreaks	DO
	Drought	D
	Earthquake	EQ
	Extreme temperatures	ET
	Flooding	F
	Infrastructure failures	IF
	Multi-hazard*	MH
	Severe weather	SW
	Winter storms	WS
Project Status	Existing	E
	Potential	P

*Includes existing or potential actions addressing wildfires individually.

Table 3: Hazard Abbreviations for Mitigation Action Tables

iii. Existing Mitigation Actions

New York City has programs, plans, projects, and policies currently underway to mitigate hazards. These "existing" mitigation actions are either already being implemented or have already been approved and appropriated the necessary funding for implementation. By assessing what the city is currently doing to mitigate hazards, the Planning Team was able to determine how the city might expand or improve upon those programs.

The MPC identified 293 existing mitigation actions. Table 4 shows further details on the fields displayed in the table. Each mitigation action is assigned an index value to indicate the hazard addressed and whether it is an existing ("E") or potential ("P") action. The hazards are placed in alphabetical order. Within each hazard, actions are listed according to the alphabetical order of the lead agencies associated with the actions. For example, the mitigation action with the index F.E.1 is the first existing mitigation action that addresses flooding, which is being implemented by Con Edison, the first MPC agency in alphabetical order.

Not included in the table are actions that were listed as "existing" in the 2009 Hazard Mitigation Plan and since implemented, completed, or are no longer in effect. These actions are located in the Appendix not considered to be "existing" and appear in a separate table in the Appendix, entitled "NYC HMP (2014) Retired Mitigation Actions."

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Column Header	Description
Action Type	The associated mitigation action category (Prevention, Property Protection, Education and Awareness, Coastal/Natural Resource Protection, Emergency Services, and Infrastructure Projects)
Mitigation Action Description	Title and description of the action
Lead	The agency that has primary jurisdiction over the mitigation action and the primary point of contact for the mitigation action
Support	Supporting entities that will assist in the implementation, funding, or maintenance of the mitigation action
Timeline	Estimation of when the project will begin and approximately how long it will take to complete; "ongoing" refers to actions that are either under way or have no definitive end date
Cost Estimate	Estimated costs associated with implementing a mitigation action
Possible Funding Source(s)	Possible sources of funding including capital funding, grants, and bonds
2009 Action Progress Status	N/A or Blank: New No Change: Action has not changed since the 2009 Other text indicates a status update on the action since the 2009 HMP
Goals and Objectives	Hazard mitigation goals and objectives addressed by the mitigation action
Priority	Results of the mitigation action prioritization

Table 4: Implementation Key

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Index	Mitigation Action Type	Mitigation Action Description	Lead	Support	Timeline	Cost Estimate	Funding Source(s)	2009 Progress Status	Goals and Objectives
CBRN									
CB.E.1	Education & Awareness	Pro-bono environmental services: Provide expert services through the NYC Brownfield Partnership.	OER	N/A	In place for 12 months	No cost	Staff time	N/A	4.3
CB.E.2	Prevention & Policy	NYC Brownfield Cleanup Program: Clean up contaminated properties throughout NYC. Includes installation of vapor mitigation systems, protection of building inhabitants in the event of hazardous materials release; installation of cover systems, providing containment in the event of hazardous materials releases/spills; and groundwater remediation, improving groundwater quality for potential use during drought.	OER	N/A	In place since January 2011	No cost	Staff time	N/A	1.1, 2.3, 4.3
CB.E.3	Property Protection	NYC Brownfield Incentive Grant (BIG) program: Provide financial assistance to property owners seeking to investigate and clean up contaminated properties.	OER	EDC, USEPA	In place 12 months	\$200,000 for petroleum assessment and \$1.4 million cleanup loans and grants	Funding in place (USEPA)	N/A	4.3
CB.E.4	Education & Awareness	"Cleaning Up New York City" community education video series: Educate the public about environmental investigation, cleanup, and community protection and engagement	OER	N/A	In place 18 months	\$40,000	Funding from Rockefeller	N/A	4.3, 5.1

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Index	Mitigation Action Type	Mitigation Action Description	Lead	Support	Timeline	Cost Estimate	Funding Source(s)	2009 Progress Status	Goals and Objectives
		during the cleanup process.					Brothers Fund		
CB.E.5	Education & Awareness	NYC Green Property Certification: Increase public understanding and awareness of cleanup sites by recognizing that cleanup properties are the "safest places in NYC to live and work."	OER	EDC	In place 24 months; funding in place for 6 more months	\$10,000/year	Current funding provided by Rockefeller Brothers Fund	N/A	4.3, 5.1
COASTAL EROSION									
CE.E.1	Coastal/Natural Resource Protection	Protection of Rikers Island north shoreline: Rebuild and mitigate the north shoreline. This northerly exposure to the East River is the most vulnerable to erosion.	DOC	N/A	Design began January 2013; construction to be completed by December 2016	\$25 million	Capital, FEMA	Project design is 60% complete	1.1, 2.1, 2.7
CE.E.2	Property Protection	Rikers Island north shore administrative modular units: Relocate modular units currently located on the north shore, which was affected by Hurricane Sandy, from low-lying areas on the Island. Due to proximity to shoreline and temporary nature of construction, Rikers Island trailers, are vulnerable to extreme weather events.	DOC	N/A	This project must be implemented in conjunction with the	\$19 million	Capital, FEMA	No change	1.1, 2.1, 2.2, 2.7

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					rehabilitation of the north shoreline				
COASTAL STORMS									
CS.E.1	Education & Awareness	Urban Waterfront Adaptive Strategies report: Provide a systematic assessment of the coastal flood hazards that face New York City, a thorough survey of coastal protection and adaptation strategies that may be suitable for different shoreline and neighborhood types, and a framework for evaluating coastal protection alternatives. The report is intended to serve as a resource for planners, policymakers, and communities within New York City, the region, and elsewhere in the coastal United States.	DCP	Parks, DEP, DOB	2013	TBD	TBD	N/A	2.7, 4.2, 4.4
CS.E.2	Infrastructure Project	Drainage improvements: Expand use of green infrastructure (street trees, Greenstreets, right-of-way bioswales, etc.), in concert with DDC, DEP, and Parks partners, within the public right-of-way to capture and detain stormwater, thereby reducing loads on sewage treatment plants and consequent combined sewer overflows.	DOT	DDC, Parks, DEP	Ongoing	\$700-750 million	HMGP, TEP/TAP grants, City Capital Budget, City Expense Budget	Ongoing	2.1, 2.3, 2.10, 4.3

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CS.E.3	Property Protection	Far Rockaway multi-family design competition: Launch competition to enhance resiliency of planned Arverne East project.	HPD	N/A	Estimated date of completion October 2013	\$80,000	Grants	N/A	2.5, 2.6
CS.E.4	Property Protection	Build It Back: Work with private property owners (of small homes and multi-family housing) to secure funds to address storm damage and allow for resiliency upgrades including system and material enhancements or replacements.	HPD, HRO	HRO for 1-4 units, HPD for multi-family housing	4 years	\$160,000,000	Grants	N/A	1.1, 2.9, 3.1
CS.E.5	Education & Awareness	Annual Hurricane Tabletop Exercise: Challenge the agencies to respond to various hurricane scenarios. Response includes restoration, logistics, and communications	LIPA	NYS OEM, Nassau County OEM, Suffolk County OEM, NYC OEM	Annually	\$25,000	LIPA	N/A	1.4
CS.E.6	Emergency Services	Backup generator at Governors Island: Install a standby emergency generator at the Governors Island ventilation building for Hugh L. Carey Tunnel to provide capacity for pumps and other equipment in case of power outage.	MTA (Bridges and Tunnels)	N/A	1-2 years	\$3 million	HMGP, also seeking FEMA 406 funding	N/A	2.3

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CS.E.7	Infrastructure Project	Mitigation of Hugh L. Carey and Queens Midtown Tunnels: Install flood gates, tunnel plugs, and water-filled barriers; extend plaza retaining walls; protect vulnerable ingress locations and building openings; harden generators with flooding protection; and perform other associated mitigation work. At minimum, ABFE + 1 foot + additional elevation needed to account for wave action (additional study will be needed to complete design).	MTA (Bridges and Tunnels)	N/A	2-3 years	\$50 million	Seeking FEMA 406 mitigation funding	N/A	2.1, 2.7, 2.8
CS.E.8	Property Protection	Harlem River lift bridge: Replace facility houses and circuit break houses at higher elevations to protect from flooding. (Design under way through Sandy ER Program with construction to follow.)	MTA (MNR)	N/A	Complete within 2.5 years	\$5 to 10 million	Sandy Emergency Relief Program-Restoration, capital budget	N/A	2.1, 2.7
CS.E.9	Property Protection	Hudson Line substations (including Riverdale location): Replace and raise substations damaged by Hurricane Sandy to protect from flooding. (Design under way through Sandy ER Program with construction to follow.)	MTA (MNR)	N/A	Complete within 2.75 years	\$40 million	Sandy Emergency Relief Program-Restoration	N/A	2.1, 2.3, 2.7, 2.9
CS.E.10	Property Protection	Power and C&S infrastructure improvements: Replace critical power and C&S components damaged by Sandy and protect as feasible. (Preliminary design to be awarded through Sandy ER program with design-build to follow.)	MTA (MNR)	N/A	Complete within 5 years	\$237 million	Sandy Emergency Relief Program-Restoration	N/A	2.1, 2.3, 2.7, 2.9

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CS.E.11	Property Protection	Flood mitigation at MJ Quill, Castleton, Yukon, Casey Stengel, Ulmer Park depots: Relocate equipment to higher levels; install backflow preventers and high-capacity permanent pumps; reinforce/harden openings/entrances and other water-penetration points.	MTA (Buses)	N/A	TBD	TBD	TBD	N/A	2.1, 2.7
CS.E.12	Property Protection	Flood mitigation at Far Rockaway depot: Relocate equipment to higher elevation; install backflow preventers (10 feet above BFE).	MTA (Buses)	N/A	TBD	TBD	TBD	N/A	2.1, 2.7
CS.E.13	Infrastructure Project	NYC Clean Soil Bank: Launch full operation of the soil bank for use in elevating grades or creating natural barriers to mitigate impacts of storm surge or sea level rise.	OER	Many	In place for 7 months	\$125,000 /year (staff)	This action saves city \$5 million per year; 2% credit of savings to OER to hire staff	N/A	4.3
CS.E.14	Prevention & Policy	NYS 2100 Commission: Support the goals of the Commission to protect New York State, consumers, and businesses.	OLTPS	N/A	TBD	\$0	N/A	N/A	3.3, 5.3
CS.E.15	Prevention & Policy	Overhead utility lines: Work with utilities and the PSC to harden vulnerable lines against winds.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7, 3.1
CS.E.16	Infrastructure	Oakwood Beach (SI) levee and tidegate: Repair the levee and tidegate.	USACE, NYSDE	DEP	2 months	\$500,000	USACE	N/A	2.7, 2.9

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	Project		C						
CS.E.17	Infrastructure Project	Plumb Beach groins and breakwater: Complete work to protect Belt Parkway.	USACE, Parks	Parks	3 months	\$6,000,000	USACE, NYC	N/A	2.7
CS.E.18	Infrastructure Project	Study of South Shore of SI with recommendation for wall and levees: Complete Phase 1 (Ft. Wadsworth to Oakwood Beach) final draft report scheduled for spring 2014. Phase 2 (Great Kills Harbor to Tottenville) is in initial phase.	USACE, Parks	Parks	3-6 years	\$300,000,000	USACE, NYS, NYC	N/A	2.7, 5.2
CYBER THREATS									
CY.E.1	Property Protection	Protection of City's data, systems and services from cyber attack: Install advanced penetration technology and build a security operations center.	DoITT	N/A	24 months	\$4.4 million	UASI grant	N/A	2.1, 2.3
DISEASE OUTBREAKS									

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DO.E.1	Education & Awareness	CUNY stakeholder outreach: Conduct university-wide hazard mitigation and awareness regarding mass prophylaxis initiatives (scope: all 24 CUNY campuses with a population of 450,000+ students). Publish and disseminate information to university stakeholder populations.	CUNY	CUNY, NYC Department of Health, DOHMH, New York City Medical Reserve Corps (NYC MRC)	Ongoing, with an annual awareness campaign to university stakeholders	Nominal cost	CUNY Central Office (CO) and campus operating budgets, CUNY internal CO and campus staff time, outside agency staff time, where applicable	N/A	1.5, 5.1, 5.3

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DO.E.2	Prevention & Policy	<p>Maven Electronic Disease Surveillance and Outbreak Management: Install pre-configured surveillance, case management, and electronic workflow software system that supports over 80 reportable conditions including vaccine-preventable diseases, communicable diseases, STDs, and TB. Maven allows for follow-up care and management of cases and contacts, enables outbreak detection and management, and designs architecture for a flexible workflow case management.</p>	DOHMH	DOHMH	Ongoing need	Approximately \$800,000 per year	Department of Homeland Security UASI grant. Future funds unclear so additional funding sources are sought.	N/A	1.1, 1.2, 1.5

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DO.E.3	Prevention & Policy	StarLIMS: Invest in state-of-the-art Laboratory Information Management System (LIMS) essential to maintaining and strengthening DOHMH's ability to rapidly perform the laboratory testing required to detect and manage disease outbreaks of significant public health concern. This investment will provide the labs the ability to test for new emerging diseases, provide for OCME integration (electronic interface with the Chief Medical Examiner), and allow more tests to be performed during a biological or terrorist event where mass casualties may occur.	DOHMH	N/A	Ongoing need	\$500,000 per year	Funded by Department of Homeland Security UASI grant. Future funds unclear, seeking additional funding sources.	N/A	1.2, 1.5

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DO.E.4	Emergency Services	Pandemic plan: Provide guidance in the event of a pandemic outbreak in LIPA's service territory. This plan addresses prevention, response, and recovery due to a pandemic outbreak.	LIPA	NYS OEM, Nassau County OEM, Suffolk County OEM, NYC OEM	As required	TBD	LIPA TBD	N/A	5.3
DROUGHT									
D.E.1	Prevention & Policy	Hands-free sensors in restroom sinks: Install during renovations to 55 City-owned buildings.	DCAS	N/A	Ongoing	\$2,000,000	Capital budget	No change	2.3, 2.10, 4.3
D.E.2	Prevention & Policy	Low water-use toilets and flush sensors: Install during renovations to 55 City-owned buildings.	DCAS	N/A	Ongoing	\$2,000,000	Capital budget	No change	2.3, 2.10, 4.3
D.E.3	Infrastructure Project	Croton filtration facility: Activate this new filtration facility. Historically, 10% of the city's average daily water demand has been provided by the Croton system, although in times of drought it may supply significantly more water. While this part of the system has been offline, the new filtration facility will allow the city to use it once again.	DEP	Parks	Plant activation in 2014	\$145 million	Capital budget	N/A	2.2, 2.3
D.E.4	Prevention & Policy	Water Demand Management Plan and water shortage rules: Adopt new plan to conserve water citywide and the rules to impose use restrictions during drought and emergencies	DEP	FDNY, DOE, CUNY, NYCHA, Parks, DCAS	Plan will be implemented by 2021	\$146 million	Capital budget, operating budget	N/A	2.1, 2.3, 4.3

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D.E.5	Prevention & Policy	Hydrant locking program: Fit critical fire hydrants in the city with locks to limit water usage during a drought.	DEP	FDNY	Ongoing	Included in regular agency o/m budget	Operating budget	No change	2.1, 2.3, 2.7, 2.8
D.E.6	Infrastructure Project	179th Street pumping station rehabilitation: Provide additional redundancy for water supply operations by allowing DEP to move water between the Croton and Catskill/Delaware systems to supplement the local distribution system.	DEP	N/A	2023	\$12 million	Capital budget	No change	2.3
D.E.7	Prevention & Policy	Gouverneur Healthcare Services facility water conservation: Replace existing water fixtures with new code-compliant low water-use fixtures.	HHC	DASNY	4 years	\$680,000	General obligation bonds	This phase of the project is ongoing	1.1, 2.1, 2.3, 2.5, 2.8
EARTHQUAKE									
EQ.E.1	Property Protection	Wastewater treatment plant facility seismic retrofit: Retrofit wastewater treatment facilities and methane gas storage systems to withstand seismic activity. Design facilities to meet current building codes (most of the facilities were designed and constructed prior to current seismic standards).	DEP	N/A	Ongoing	Included in regular agency capital budget	Capital budget	No change	2.4, 2.5, 2.8, 4.3
EQ.E.2	Infrastructure Project	City Tunnel 3: Construct a seismically resistant and redundant third water tunnel. City Tunnels 1 and 2 currently distribute water to all five boroughs of New York City. These tunnels are nearly 90 and 70 years old, respectively, and have never been taken	DEP	DDC	Manhattan section of Phase 2 complete	\$389 million	Capital budget	No change	2.3, 2.5

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		out of service.			Completed in 2013, Brooklyn and Queens section to be completed in 2023				
EQ.E.3	Property Protection	Seismic studies and retrofit: Identify and incorporate seismic requirements in bridge and tunnel restoration projects.	MTA (Bridges and Tunnels)	N/A	Ongoing			These studies are being done for each facility under various projects	2.5, 2.7, 2.9
EXTREME TEMPERATURES									
ET.E.1	Prevention & Policy	Power conservation: Install energy-saving light fixtures in 55 City-owned buildings.	DCAS	N/A	5 years	\$10,000,000	Capital budget, PlaNYC	No change	2.3, 2.10, 4.3
ET.E.2	Prevention & Policy	Peak load management program: Conserve power during summer peak demand hours, usually noon to 6:00 p.m., on days designated by NYPA.	DCAS	DDC	9 years: 2013-2022 (fiscal years)	TBD	Expense budget	No change	2.1, 2.3, 4.3

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ET.E.3	Coastal/Natural Resource Protection	Wastewater treatment tanks upgrade: Increase blower output and diffuser density. During periods of extreme heat, increased levels of dissolved oxygen are necessary for safe and balanced wastewater treatment. The blower sends dissolved oxygen to the tank, and the diffuser distributes it throughout the tank.	DEP	N/A	2023	\$25 million	Capital budget	No change	2.1, 2.3, 2.8
ET.E.4	Education & Awareness	Code Blue and Code Red extended outreach: Coordinate personnel to increase efforts to keep New York City's street homeless population safe during extreme cold and heat weather events.	DHS	DOHMH, NYPD	Ongoing	\$120,000	City tax levy	Implemented: Added Code Red outreach for extreme heat events	1.1, 1.6
ET.E.5	Prevention & Policy	Construction Code Revision: Encourage more "cool roofs" installations.	DOB	N/A	In effect since July 2009	TBD	Staff time	N/A	2.5, 4.3
ET.E.6	Prevention & Policy	AC bed space: Build additional and/or upgrade existing AC in various facilities to accommodate different classifications pursuant to requirements imposed under Benjamin litigation.	DOC	N/A	TBD	\$20 million	Capital	N/A	1.1, 1.5, 2.5
ET.E.7	Property Protection	Protection of engines from heat-related damage: Protect engines and prepare for response to heat-related incidents including increased switch, bridge, signal, catenary (MNR only), and track circuit failures, as well as heat kinks.	MTA (LIRR/MNR)	N/A	TBD	TBD	TBD	Ongoing	2.1, 2.7

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ET.E.8	Prevention & Policy	Summer Operations Manual: Write guide on how to perform pre-trip bus inspections to confirm windows and hatches are closed and the air conditioning system is working properly. Provide bus operators with summer uniforms and information about heat stress.	MTA (Buses)	OEM	TBD	TBD	Agency operating budget	No change	2.1, 5.2
ET.E.9	Emergency Services	Communications Redundant System - Communications system is with surge protection to allow uninterrupted operation during potential power surges due to rolling black-outs or electrical storms. Additional system include steam generator back-up and "failsoft" computer based protection.	MTA (Buses)	N/A	TBD	TBD	TBD	No change	2.3
FLOODING									
F.E.1	Prevention & Policy	Mapping of flooding vulnerability data: Evaluate latest flooding information available post-Sandy to potentially update infrastructure maps to more accurately define flooding vulnerability of company assets.	Con Ed	N/A	Ongoing	N/A	Agency operating budget	No change	2.5, 2.9, 5.2
F.E.2	Education & Awareness	Designing for Flood Risk report: Identify key principles to guide the design of new buildings in flood zones to promote construction that can not only withstand coastal flood events, but also supports the vibrancy of the public realm. Recognizing the distinct character and needs of higher-density urban environments, such as New York City, the report provides recommendations for how regulations and	DCP	DOB	2013	TBD	TBD	N/A	2.2, 2.4, 2.5, 2.6

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		individual project design can incorporate resilient design principles.							
F.E.3	Infrastructure Project	High-level storm sewers: Supplement existing combined sewers with high-level storm sewers in certain areas near the water's edge. High-level storm sewers are able to capture 50% of rainfall before it enters combined sewers, reducing street flooding, sewer backups, and combined sewer overflows.	DEP	DDC, DOT	Ongoing	\$255 million	Capital budget	No change	2.3, 2.8, 2.10, 4.3
F.E.4	Infrastructure Project	Stormwater sewers in areas of Queens with limited drainage systems: Continue to build out the storm sewer systems in Queens locations in conjunction with DOT street improvements and other community infrastructure projects, including in areas with street flooding.	DEP	DOT, DDC	Ongoing	\$148 million	Capital budget	N/A	2.3, 2.8, 4.3
F.E.5	Coastal/Natural Resource Protection	Watershed Protection Program: Acquire land strategically in the watershed and continue stream, farm, and forestry programs.	DEP	NYS DEC, NYS DOH	Ongoing. Programs are regulated under 2007-	\$286 million	Capital budget	N/A	4.3

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					2017 Filtration Avoidance Determination				
F.E.6	Property Protection	Valve installation/plumbing improvements through enhanced outreach and education: Encourage appropriate installation of check valves and other property protection systems to mitigate flooding risk.	DEP	DOB	Ongoing	Funded by property owners	N/A	No change	2.1, 2.3, 2.7, 2.8, 5.3
F.E.7	Property Protection	Drainage improvement plan and design: Identify inland flood- and coastal flood-prone areas and determine appropriate improvements to drainage services and levels of stormwater management.	DEP	N/A	Ongoing	Included in regular agency O/M budget	Operating budget	N/A	2.2
F.E.8	Infrastructure Project	Sewer infrastructure upgrade: Make regulator improvements for sewer outfalls around East River, Westchester Creek, Hutchinson Creek, Flushing Bay, and Newtown Creek. Improved regulators will control releases from the sewer system during storms, reduce street flooding, and prevent sewer backups.	DEP	N/A	Project funded through 2015	\$94 million	Capital budget	N/A	2.1, 2.3, 2.7, 2.8, 4.3
F.E.9	Emergency Services	Drainage system maintenance and pre-storm inspections: Perform regular maintenance and repair of sewers and catch basins citywide. Perform pre-storm inspections of Bluebelt facilities and targeted areas of the city with potential for	DEP	Parks, DOT	Ongoing operation	Included in regular agency O/M budget	Operating budget	N/A	2.1, 2.3, 4.3

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		flooding to facilitate proper function during normal operations and storm events.							
F.E.10	Prevention & Policy	Dam inspection program: Implement New York City dam inspection program on both monthly and yearly cycles to facilitate appropriate maintenance and attain state of good repair.	DEP	N/A	Ongoing	Included in regular agency o/m budget	Operating budget	No change	2.4
F.E.11	Prevention & Policy	Property and infrastructure protection: Prepare large area drainage plans for the following locations that lack a fully built system or require upgrades: southeast Queens, Rockaway Peninsula, Coney Island, and Whitestone. These plans will examine and optimize how storm and floodwater is managed in these areas.	DEP	N/A	Ongoing	Included in regular agency o/m budget	Operating budget	No change	2.2, 2.5
F.E.12	Education & Awareness	Stormwater/flooding public outreach and education: Develop school curricula and public outreach materials to educate the public about flooding and stormwater.	DEP	N/A	Ongoing	Included in regular agency o/m budget	Operating budget	No change	2.6, 5.1, 5.3
F.E.13	Infrastructure Project	Sewage pumps upgrade: Replace main sewage pumps with higher-head units to overcome hydraulic resistance created by a flooding event.	DEP	N/A	2018	\$26 million	Capital budget	No change	2.1, 2.3, 2.7, 2.8

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F.E.14	Prevention & Policy	Construction code revision: Clarify current flooding regulations and adopt the latest national standards.	DOB	N/A	Council has not voted, revision was expected to pass fall 2013	TBD	Staff time	Implemented and ongoing	2.4, 2.5
F.E.15	Property Protection	Facility protection: Execute flood-elimination capital projects at 20 sites that need long-term solutions for recurring flood damage due to groundwater infiltration.	DOE	DOE-SCA	1 year	TBD	FEMA	No change	2.1, 2.8
F.E.16	Property Protection	Protection of NYCDOT facilities from flood impacts: Reconstruct bulkhead at Harper Street facilities; elevate mechanical equipment in flood-prone areas whenever possible; use mold-resistant building materials whenever possible at sites in flood zones; improve stormwater management through measures such as containment systems and green infrastructure (Some individual projects are completed, others are ongoing).	DOT	DDC, DEP, DCAS	TBD	TBD	TBD	N/A	2.1, 2.7
F.E.17	Property Protection	Protection of DOT tunnels in Lower Manhattan (BPU + WSU) from Flooding: Install permanent structures to mitigate against future flooding of the tunnels and damage to its electrical and mechanical systems by minimizing the entry of potential floodwater into the tunnels' structure via its openings.	DOT	MTA	5 years	\$7 million	FHWA	N/A	2.1, 2.7

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F.E.18	Coastal/Natural Resource Protection	Wetland or upland habitat restoration: Improve ability of land to absorb and retain water. Prevent flooding and release of silt and dirt into sewers and habitat. Parks' Natural Resources Group oversees upland and wetland restoration.	Parks	N/A	5 years	\$10,000 to \$50,000 per acre	HMGP, other grants	No change	4.3
F.E.19	Prevention & Policy	Water and air quality protection: Assess vulnerability of existing wetlands and identify additional policies to protect them.	Parks	NPS, EDC, DCP, EPA	8 years	TBD	TBD	No change	4.3
F.E.20	Emergency Services	Sandbagging of all fuel fill ports and manways: Prevent water intrusion, thereby ensuring fuel viability for continuity of operations.	DSNY	N/A	Duration of emergency/immediate	Manpower absorbed by agency	TBD	N/A	2.1, 2.3
F.E.21	Emergency Services	Roof drains and gutters: Have garage personnel do inspections and take action to clear roof drains, gutters, etc. to ensure facilities are protected from water intrusion.	DSNY	N/A	Duration of emergency/immediate	Manpower absorbed by agency	TBD	N/A	2.1, 2.7
F.E.22	Coastal/Natural Resource Protection	Wetlands restoration: Include wetlands restoration as part of waterfront development projects to comply with aesthetic permitting or stormwater management requirements.	EDC	NYSDEC	TBD	TBD	NYSDEC, City Capital	No change	4.3, 4.4
F.E.23	Coastal/Natural Resource	Flushing Airport wetlands restoration: Implement Flushing Airport Wetlands Mitigation Project in College Point, Queens.	EDC	NYSDEC	TBD	\$6,000,000	NYSDEC, City Capital	Currently in design and under review by	4.3, 4.4

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	Protection							NYSDEC	
F.E.24	Property Protection	Flood-resistant construction and materials for HPD-assisted projects: Revise construction specifics for substantial rehabilitation and new construction projects.	HPD	N/A	Estimated completion: 2014	\$20,000	City TL	N/A	2.4, 2.5
F.E.25	Property Protection	Temporary flood mitigation measures: Protect substations/equipment flooded during Sandy from future floods until permanent measures are completed.	LIPA	N/A	Completed September 2013	\$850,000 for NYC substation protection	FEMA 406, NYS CDBG fund, LIPA	N/A	2.1, 2.3, 2.7
F.E.26	Property Protection	Flood study of Long Island floodplain: Perform study and develop mitigation strategies based on findings.	LIPA	NYPA	Completed December 2013	\$125,000 prorated for NYC substations	FEMA 406, NYS CDBG fund, LIPA	N/A	5.2
F.E.27	Property Protection	Flood sensors: Install information-based sensors to aid transmission operations during a flood event.	LIPA	N/A	Completed September 2013	\$120,000 for NYC substation detection	FEMA, NYS CDBG fund, LIPA	N/A	2.3, 2.10, 5.2

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F.E.28	Property Protection	Emergency generators for contingency support to flood-damaged substations: Install mobile generators and secure additional capacity to ensure customers in the Rockaways do not experience long power outages should flood-damage substation equipment fail before it can be replaced.	LIPA	N/A	May 2013 start, December 2014 completion	\$3,500,000	FEMA 406, LIPA	N/A	2.3
F.E.29	Property Protection	Marine Parkway Bridge protection: Perform substructure and underwater work to prevent damage from flooding, including scour.	MTA (Bridges and Tunnels)	N/A	2 years	\$14 million	Capital; applying for FEMA 406	In procurement phase of construction	2.1, 2.7, 2.8
F.E.30	Infrastructure Project	Perimeter protection/drainage improvements and flood barriers for West Side Yard and East River tunnels: Implement improvements for flood protection at these critical facilities.	MTA (LIRR)	Amtrak	TBD	\$58.3 million	Potential FTA Local Priority Resiliency Funds	N/A	2.1, 2.7, 2.8
F.E.31	Property Protection	LIRR critical facilities protection: Define flood elevation criteria required to standardize ongoing and future flood protection projects throughout the network. Revise LIRR design standards, which would influence future construction projects.	MTA (LIRR)	N/A	TBD	TBD	TBD	N/A	2.1, 2.5, 2.7

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F.E.32	Infrastructure Project	Electrification of Tracks 7 and 8 in Long Island City Yard: Allow LIRR to divert more trains to Hunterspoint Avenue station when there is a service disruption at Penn Station/East River tunnels. This allows Manhattan-bound LIRR customers access to Hunterspoint Avenue to connect with #7 subway service to Manhattan. Project also restores damaged assets and improves drainage in the yard.	MTA (LIRR)	N/A	TBD	\$33.8 million	FTA Pro-Rated Recovery / Local Priority Resiliency	N/A	2.3, 2.9
F.E.33	Infrastructure Project	Portal floodgates for the East River tunnels: Install flood barriers in lieu of extensive tunneling dewatering improvements.	MTA (LIRR)	N/A	TBD	TBD	TBD	N/A	2.1, 2.7
F.E.34	Infrastructure Project	Drainage mitigation in LIRR track system: Design and install stormwater pump stations to relieve major flood-prone areas.	MTA (LIRR)	N/A	Ongoing	TBD	LIRR capital program, LIRR Operating budget	Ongoing	2.1, 2.3, 2.8
F.E.35	Prevention & Policy	Track drainage on the Harlem Line: Install drainage improvements at the Mott Haven Interlocking, located near 149th and 159th Streets in the Bronx, to improve drainage and reduce impact of flooding in this area.	MTA (MNR)	N/A	Completion - 1.5 years	\$9.0 million	Capital budget	N/A	2.1, 2.7, 2.8
F.E.36	Property Protection	Baisley Park depot drainage improvement: Implement corrective actions to mitigate repetitive flooding caused by moderate to heavy rain.	MTA (Buses)	DEP, FTA, NYSDEC	2 years	\$8,000,000	Capital budget	No change	2.1, 2.7, 2.8

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F.E.37	Prevention & Policy	Dewatering of oil-water separators at East New York, Castleton, Michael J. Quill, and Grand Avenue depots: Provide additional capacity for incoming rainwater. Drain 200,000-gallon stormwater retention tank to accept incoming rainwater. (This tank is normally full and used for bus washing.)	MTA (Buses)	N/A	Ongoing	TBD	TBD	No change	2.1
F.E.38	Infrastructure Project	JFK depot drainage improvement: Include on-site stormwater management improvements at new parking facilities to decrease flow to DEP treatment facilities during high-volume precipitation events.	MTA (Buses)	DEP, FTA, NYSDEC	2 years	\$3,234,000	Capital budget	No change	2.1, 2.8
F.E.39	Prevention & Policy	NYCT Hurricane Plan: Perform pre-storm flood mitigation actions in pre-identified flood-prone areas. Actions include checking drains, vents, and installed pumps as well as deploying covers and sandbags to pre-identified sites to cover vents and protect subway entrances.	MTA (NYCT-Subway)	NJT, PATH (PANYNJ)	Ongoing	TBD	TBD	Hurricane plan developed and is used as needed and updated periodically	2.1, 2.7
F.E.40	Prevention & Policy	Flood plan: Finalize plan, including mapping of critical areas, mitigation plan, and contingency plan.	MTA (NYCT-Subway)	DEP	Ongoing	TBD	Operating budget	Complete	5.2
F.E.41	Prevention & Policy	DEP/NYCT station inspection and cleaning program: Implement program featuring cleaning of catch basins, sewers, and siphons at locations in flood-prone areas.	MTA (NYCT-Subway)	NYCT	Ongoing	TBD	Agency operating budget	Ongoing	2.1, 2.8

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F.E.42	Property Protection	Stormwater drainage improvement: Raise vent grating and subway entrances at five locations: (1) Broadway-7th Avenue Line: 77th to 96th Street; (2) Broadway-7th Avenue Line: Chambers Street; (3) 8th Avenue Line: 34th Street; (4) Hill Avenue Line; and (5) Broadway Line.	MTA (NYCT-Subway)	DEP	Ongoing	TBD	NYCT, capital budget	Partially complete, with balance not currently funded	2.1, 2.7, 2.8
F.E.43	Property Protection	Station mitigation: Seal system openings from floodwaters through closure/hardening of stairs, elevators, vents, emergency exits, and manholes. Enhance emergency communication within stations.	MTA (NYCT-Subway)	MTA/FTA	2-6 years	\$184,000,000 currently allocated	FTA-Sandy grants	N/A	2.1, 2.7
F.E.44	Property Protection	Line equipment mitigation: Make improvements to pumping system including discharge lines, upsizing of pumps, power redundancy for pumps, mobile pump equipment and generators, and emergency equipment deployment. Harden subway equipment in flood-prone areas including hardening of fans, communication/EDR/relay rooms, subway equipment, and power supply equipment.	MTA (NYCT-Subway)	MTA/FTA	2-6 years	\$800,000,000 currently allocated	FTA-Sandy grants	N/A	2.1, 2.7, 2.8
F.E.45	Property Protection	Subway structures mitigation: Internally seal tunnels and station complexes through inflatable bladders, pre-engineering, and site mobilization for temporary structures to prevent flood damage along vulnerable service lines.	MTA (NYCT-Subway)	MTA/FTA	2-6 years	\$1,893,400,000 currently allocated	FTA-Sandy grants	N/A	2.1, 2.7

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F.E.46	Property Protection	Subway signals and communications mitigation: Make system improvements for subway service flexibility, including major and minor interlocking enhancements for short-turn terminal operations, additional interlocking reconfigurations, power redundancy improvements in underwater tubes, feeder redundancy and/or power storage for critical operations, passenger capacity enhancements at interim terminal stations and stations affected by reduced service levels, and new passenger transfer facilities. Add and enhance communications systems and technologies for improved coordination of emergency response and customer information.	MTA (NYCT-Subway)	MTA/FTA	2-6 years	\$850,000,000 currently allocated	FTA-Sandy grants	N/A	2.1, 2.3, 2.7
F.E.47	Property Protection	Traction power mitigation: Harden power cables and ducts to provide grid resiliency for critical locations.	MTA (NYCT-Subway)	MTA/FTA	2-6 years	\$300,000,000 currently allocated	FTA-Sandy grants	N/A	2.1, 2.3, 2.7
F.E.48	Property Protection	Subway car shops and yards mitigation: Perform flood mitigation at yard complexes, including protection of perimeters and portals.	MTA (NYCT-Subway)	MTA/FTA	2-6 years	\$325,000,000 currently allocated	FTA-Sandy grants	N/A	2.1, 2.7
F.E.49	Property Protection	Flood mitigation at miscellaneous facilities: Perform mitigation at police, revenue control, and administrative facilities, including backup power and employee emergency reporting flexibility.	MTA (NYCT-Subway)	MTA/FTA	2-6 years	\$137,700,000 currently allocated	FTA-Sandy grants	N/A	2.1, 2.3, 2.7

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F.E.50	Property Protection	Staten Island Railway flood mitigation: Protect critical stations, facilities, and tunnels from flood damage.	MTA (NYCT-Subway)	MTA/FTA	2-6 years	\$100,000,000 currently allocated	FTA-Sandy grants	N/A	2.1, 2.7
F.E.51	Property Protection	Incremental standards mitigation: Continue ongoing upgrade of design standards to improve resilience to seismic activity, wind, and fire events, and apply to new and existing facilities as capital work is performed.	MTA (NYCT-Subway)	NYCT	Ongoing	TBD	Core and future capital programs	N/A	2.1, 2.5, 2.7, 2.8
F.E.52	Property Protection	Flood mitigation and backup power for OCME Forensic Biology Laboratory: Install emergency generator and transfer switches and elevate petroleum bulk storage.	OCME	Con Ed, FDNY	Unknown	\$2,350,000.00	Capital	N/A	2.1, 2.3, 2.7
F.E.53	Property Protection	Flood mitigation and backup power for OCME main office (Manhattan Morgue) at 520 First Ave.: Install emergency generator and transfer switches, elevate petroleum bulk storage, and install flood barriers.	OCME	DDC	Unknown	\$6,263,000.00	Capital	N/A	2.1, 2.3, 2.7
F.E.54	Prevention & Policy	FEMA 100-year floodplain maps for New York City: Update maps reflecting current weather conditions and topography/bathymetry.	OLTPS	DOB, DCP, EDC, OEM	8 years	TBD	TBD	Ongoing	5.2
F.E.55	Prevention & Policy	Flood resiliency for buildings in the 100-year floodplain: Improve regulations for new and substantially improved buildings.	OLTPS	DOB, DCP	TBD	\$0	N/A	N/A	2.2, 2.4, 2.5
F.E.56	Prevention & Policy	FEMA flood mapping: Work with FEMA to improve the flood-mapping process.	OLTPS	DOB	TBD	\$0	N/A	N/A	3.1, 5.2

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F.E.57	Education & Awareness	Communication of flood risks: Work with FEMA to improve the communication of current risks.	OLTPS	N/A	TBD	\$1 million	CDBG, HMGP	N/A	3.1, 5.3
F.E.58	Prevention & Policy	Future flood mapping: Explore improved approaches for mapping future flood risks, incorporating sea level rise.	OLTPS	N/A	TBD	\$0	N/A	N/A	4.1, 5.2
F.E.59	Infrastructure Project	Flood protection in Coney Island: Install armor stone shoreline protection (revetments).	OLTPS	N/A	TBD	\$32 million	CDBG	N/A	2.1, 2.5
F.E.60	Infrastructure Project	Bulkhead improvements: Raise bulkheads in low-lying neighborhoods across the city to minimize inland tidal flooding.	OLTPS	N/A	TBD	\$80 million	CDBG + City Capital	N/A	2.1, 2.5
F.E.61	Infrastructure Project	Hospital Row flood protection: Install an integrated flood protection system.	OLTPS	N/A	TBD	\$60.3 million	CDBG	N/A	1.1, 2.1
F.E.62	Prevention & Policy	Comprehensive flood protection study of New York Harbor: Continue to work with the USACE to complete its study.	OLTPS	N/A	TBD	\$0	N/A	N/A	5.2
F.E.63	Prevention & Policy	USACE comprehensive study: Identify a lead entity for overseeing the collaboration on the study and the implementation of coastal flood protection projects.	OLTPS	N/A	TBD	\$0	N/A	N/A	5.2
F.E.64	Prevention & Policy	Flood protection project standards: Call on and work with the USACE and FEMA to collaborate more closely on standards.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.1, 2.4, 2.5
F.E.65	Prevention & Policy	Enclosed hazardous substances mitigation: Develop a catalog of best practices for storing hazardous substances in the 100-year floodplain.	OLTPS	OER	TBD	\$0	N/A	N/A	1.1, 4.3

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F.E.66	Prevention & Policy	New hospitals: Improve hospital design and construction.	OLTPS	N/A	TBD	\$0	N/A	N/A	1.1, 1.3, 2.5
F.E.67	Property Protection	Existing hospitals in the 500-year floodplain: Require the retrofitting of hospitals in the 500-year floodplain.	OLTPS	N/A	TBD	\$785 million	FEMA, CDBG, VA, NY State, Gap	N/A	1.1, 1.3, 2.4, 2.5
F.E.68	Prevention & Policy	New nursing homes and adult care facilities: Improve the design and construction of new nursing homes and adult care facilities.	OLTPS	N/A	TBD	\$0	N/A	N/A	1.1, 1.3, 2.5
F.E.69	Property Protection	Existing nursing homes in the 100-year floodplain: Require the retrofitting of nursing homes in the 100-year floodplain.	OLTPS	N/A	TBD	\$91 million	FEMA PA/406 (partially funded)	N/A	1.1, 1.3, 2.4, 2.5
F.E.70	Property Protection	Existing adult care facilities in the 100-year floodplain: Require the retrofitting of existing adult care facilities in the 100-year floodplain.	OLTPS	N/A	TBD	\$1 million	Federal	N/A	1.1, 1.3, 2.4, 2.5
F.E.71	Prevention & Policy	Affordability issues related to reform of the NFIP: Support federal efforts to address NFIP affordability issues.	OLTPS	DCP	TBD	\$1.1 million	CDBG	N/A	2.4
F.E.72	Property Protection	Flood protection standards and certifications: Develop FEMA-endorsed standards and certifications for existing urban buildings.	OLTPS	DOB, DCP	TBD	\$0	N/A	N/A	2.4
F.E.73	Property Protection	Mixed-use buildings as a building category: Call on FEMA to recognize such buildings as a distinct building category in relation to flood insurance.	OLTPS	DOB, DCP	TBD	\$0	N/A	N/A	2.5

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F.E.74	Property Protection	Mitigation credits: Call on FEMA to develop mitigation credits for resiliency measures.	OLTPS	DOB, DCP	TBD	\$0	N/A	N/A	2.7
F.E.75	Prevention & Policy	Higher deductibles for residential policyholders: Call on FEMA to allow flood insurance policyholders to select higher deductibles.	OLTPS	DOB, DCP	TBD	\$0	N/A	N/A	2.4
F.E.76	Prevention & Policy	Flood Insurance Policy Awareness: Call on New York State to improve flood insurance policyholder awareness at the point of sale or renewal	OLTPS	N/A	TBD	\$0	N/A	N/A	2.4, 5.3
F.E.77	Education & Awareness	Flood Insurance Engagement Campaign: Launch an engagement campaign targeting insurers	OLTPS	N/A	TBD	\$0	N/A	N/A	2.4, 5.3
F.E.78	Infrastructure Project	Dunes on the Rockaway Peninsula: Complete short-term dune improvements.	OLTPS	N/A	TBD	\$9 million	FEMA	N/A	2.7, 2.9
F.E.79	Infrastructure Project	Sea Gate oceanfront protections: Call on and work with the USACE to study additional protections in Sea Gate.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.2, 2.7
F.E.80	Prevention & Policy	Coney Island/Brighton Beach nourishment: Continue to work with the USACE to study strengthening the beach nourishment.	OLTPS	Parks	TBD	\$0	N/A	N/A	2.2, 2.7
F.E.81	Prevention & Policy	Manhattan Beach oceanfront protections: Call on and work with the USACE to study protections for the Manhattan Beach oceanfront.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.2, 2.7
F.E.82	Prevention & Policy	Study of mitigation of inundation risks through Rockaway Inlet: Call for USACE to develop an implementation plan to mitigate	OLTPS	DEP	TBD	\$0	N/A	N/A	2.2, 2.7

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		inundation risks through Rockaway Inlet in Southern Brooklyn and South Queens, exploring a surge barrier and alternative measures.							
F.E.83	Prevention & Policy	CUNY study and pilot of new technologies for high-rise buildings: Support CUNY launch of study and pilot.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.10
F.E.84	Prevention & Policy	Resiliency of private cogeneration facilities: Study options to ensure resiliency of such facilities.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7
F.E.85	Infrastructure Project	Reinforcement of Belt Parkway edge protections: Call for the USACE to develop an implementation plan for the reinforcement of existing Belt Parkway edge protections.	OLTPS	DOT, Parks	TBD	\$0	N/A	N/A	2.1, 2.7
F.E.86	Prevention & Policy	Flood protection standards for telecommunications equipment: Develop standards for placement of telecommunications equipment in buildings.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.1, 2.3
F.E.87	Prevention & Policy	Hardening power generators against flooding: Work with power suppliers and regulators to harden key power generators.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7, 3.1
F.E.88	Prevention & Policy	Hardening electric transmission and distribution infrastructure: Work with utilities and the PSC to harden key infrastructure against flooding.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7, 3.1
F.E.89	Prevention & Policy	Hardening the natural gas system against flooding: Work with utilities, regulators, and gas pipeline operators to harden the natural gas system.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7, 3.1

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F.E.90	Prevention & Policy	Hardening steam plants against flooding: Work with plant operators and the PSC to harden steam plants.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7, 3.1
F.E.91	Property Protection	Drainage improvements for Pump House # 4 and # 6 at LaGuardia Airport: Upgrade pumps and electrical power supply, and modify structural walks and platform decks.	PANYNJ (Aviation)	PANYNJ	3 years	\$7,500,000	Capital plan, HMGP, FEMA 406	Sandy 406 mitigation project	2.1, 2.7
F.E.92	Property Protection	Backflow preventers at PANYNJ-controlled buildings at Kenney Airport: Install backflow prevention devices and water meter upgrades in accordance with the New York State sanitary code and City regulations. Perform water meter upgrades as required.	PANYNJ (Aviation)	NYC, NYS	6 years	\$19,203,000	Capital budget, HMGP	No change	2.1, 2.3
F.E.93	Property Protection	Drainage improvement at Kennedy Airport: Install synthetic material at two locations at the intersection of runways 4L and 31L to increase permeable surfaces and enhance stormwater runoff capacity .	PANYNJ (Aviation)	FAA	8 years	\$29,998,000	Capital budget	No change	2.1, 2.3
F.E.94	Property Protection	Drainage improvement at Kennedy Airport: Retrofit and/or rebuild stormwater outfalls, including replacing terminating section of concrete triple box culvert to enhance drainage capacity.	PANYNJ (Aviation)	NYCDEP, NYSDEC	5 years	\$8,434,000	Capital budget, HMGP	No change	2.1, 2.3
F.E.95	Property Protection	Facility upgrade at Kennedy Airport: Redesign and retrofit runways 13R-31L, including raising existing grade, modifying existing drainage, and installing new lighting and concrete pavement.	PANYNJ (Aviation)	FAA	4 years	\$218,063,000	Capital budget	No change	2.1, 2.3

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F.E.96	Property Protection	Storm drainage rehabilitation at LaGuardia Airport, Phase III: Upgrade existing storm drainage pipe system by replacing pipe or installing an inner lining system to eliminate leaks in the stormwater pipe system.	PANYNJ (Aviation)	PANYNJ	8 years	\$12,000,000	Capital budget, HMGP	No change	2.1, 2.3
F.E.97	Property Protection	World Trade Center resiliency improvements: Make mitigation improvements to the WTC site including flood panels and site-wide ejector pumping to enhance the existing surcharged storm drain system.	PANYNJ(WTC)	PANYNJ	5 years	\$100,000,000	Capital budget, HMGP, FEMA 406	N/A	2.1, 2.3
INFRASTRUCTURE FAILURE									
IF.E.1	Emergency Services	Cogeneration equipment at North River Wastewater Treatment Plant: Install cogeneration equipment while hardening electrical assets. Using methane generated by the wastewater treatment process, cogeneration will produce electric power to keep wastewater treatment processes at North River online during power outages or peak summer load periods, when Con Ed may request that the facility reduce its power usage.	DEP	N/A	Design complete by 2015; construction timeline pending specifications	\$212 million	Capital budget	N/A	2.1, 2.3, 2.7, 2.8, 2.10, 4.3
IF.E.2	Prevention & Policy	Citywide VOIP: Allows users to move to a different location with minimal reconfiguration and have regular phone numbers restored within hours if a City office building becomes inaccessible due to severe impact to both the PBX and Centrex lines.	DoITT	N/A	TBD	\$10 million	TBD	N/A	2.1, 2.3

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IF.E.3	Prevention & Policy	Smart utility location: Explore the feasibility of consolidating utilities within the public right-of-way (e.g. into multi-utility corridors consistently located within the roadway cross-section) to protect them from hazard events and speed response and recovery times by removing the uncertainty and physical conflicts between utility locations.	DOT	DDC	1 year (consultant study)	\$500,000	HMGP, City Capital Budget, City Expense Budget	N/A	2.1, 2.3
IF.E.4	Property Protection	Breezy Point storm damage restoration: Rebuild distribution infrastructure throughout the fire-damaged section of Breezy Point in the Rockaway Peninsula (~150 homes)	LIPA	N/A	September 2013 start, November 2013 completion	\$630,000	Insurance, FEMA, LIPA	N/A	2.1, 2.3, 2.9
IF.E.5	Prevention & Policy	Fuel infrastructure hardening: Call on the federal government to convene a regional working group to develop a fuel infrastructure hardening strategy.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.1, 2.7
IF.E.6	Prevention & Policy	Post-emergency restoration for fuel infrastructure: Develop a reporting framework for fuel infrastructure operators to support restoration.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.9
MULTI-HAZARD									

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MH.E.1	Emergency Services	Improved weather forecasting: Develop and enhance high-resolution weather forecasting technology to forecast weather-caused damage at a micro-geographic level. Utilize various weather parameters (such as rain, wind speed and direction, and temperature) to assist in advance warning capabilities.	Con Ed	N/A	Ongoing	Aproximately \$200,000 /year	Agency operating budget	No change	1.2, 4.2, 5.2
MH.E.2	Coastal/Natural Resource Protection	Vegetation Management Program: Continue performing vegetation management to ensure infrastructure, as well as the public, is secure during and after a natural hazard event. Proper pruning and thinning of the tree canopy is important to minimize damage during hurricanes and wind events and cleanup after storms.	Con Ed	N/A	Ongoing	Approximately \$5 million/year	Agency operating budget	No change	2.1, 4.3
MH.E.3	Emergency Services	Improved Con Edison communications: Continue to provide and enhance communications on forecasted impact to Con Ed's system and updates on outages to customers, community leaders, and regulators. This includes notifications to customers on life-support equipment.	Con Ed	N/A	Ongoing	N/A	Agency operating budget	N/A	1.1, 1.2, 5.3
MH.E.4	Prevention & Policy	Load-reduction programs: Continue contingency and peak shaving demand response programs to mitigate constraint during times of high demand and electric infrastructure failure.	Con Ed	N/A	Ongoing	N/A	Agency operating budget	N/A	2.1

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MH.E.5	Prevention & Policy	Con Edison cyber security: Continue ensuring network and data integrity by implementing security measures; limiting access; maintaining traditional fire walls; deploying additional IPS/web and database monitoring technologies; segmenting the network; monitoring cyber attacks; and sharing information with local, state, and federal agencies.	Con Ed	N/A	Ongoing	N/A	Agency operating budget	N/A	2.1, 2.3
MH.E.6	Education & Awareness	CUNY stakeholder outreach: Conduct CUNY University-wide "all-hazards" mitigation training and awareness initiatives (Scope: all 24 CUNY campuses with a population of 450,000+ students). Publish and disseminate information to university stakeholder populations.	CUNY	CUNY, OEM, FEMA, DHS	Ongoing, with an annual awareness campaign to university stakeholders	Nominal cost	CUNY Central Office (CO) and campus operating budgets; CUNY internal CO and campus staff time; outside agency staff time, where applicable	N/A	5.1, 5.3

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MH.E.7	Emergency Services	Protection of City's fuel supply: Procure additional mobile fueling trucks, generators, light towers, forklifts, and water pumps to permit the City to harden its own fuel supply infrastructure and put in place emergency fueling operations immediately following a disruption in the supply chain. Light towers have been delivered.	DCAS	NYPD, OEM, DSNY, DOT, Parks, DEP	Fuel trucks, forklifts, generators and water pumps are in the specification process.	\$25,800,000.00	City-funded	N/A	2.1, 2.3, 2.9
MH.E.8	Emergency Services	Resiliency of food supply: Expand current pilots to backstop DCAS food procurement to strengthen resiliency and redundancy in case of future climate hazards. DCAS will work so that its supplier contracts for DOC, DYFJ, and HRA (food pantries and soup kitchens) have backstops in place by the end of 2013.	DCAS	DOC, ACS, HRA	Sysco contract available for use currently	N/A	Operating/emergency expense funds	N/A	1.1, 2.1, 2.3

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MH.E.9	Emergency Services	City fueling during emergencies: Harden municipal fueling stations and enhance mobile fueling capability to support City government and critical fleets. DCAS is increasing its mobile fueling fleet, negotiating with fuel suppliers and the NY National Guard to enhance emergency fueling operations, and the NYPD to prioritize fueling of city vehicles at select retail fueling locations. A new Fuel Operations Playbook was finalized and submitted to the City Council by OEM as required by law.	DCAS	NYPD, OEM, OLTPS, DSNY, DOT, Parks, DEP	Ongoing	\$8,750,000 (included in the \$25.8 million resiliency project above)	DCAS funded	N/A	2.1
MH.E.10	Emergency Services	Inter-agency fueling: Support inter-agency fueling citywide through fuel management system. DCAS is currently implementing the EJ Ward fuel tracking system Citywide. Agencies will have the ability to fuel at other agency locations and track fuel reserves electronically.	DCAS	N/A	Technology will be rolled out over FY 2014	\$6,750,000	DCAS funded	N/A	2.1, 3.1

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MH.E.11	Prevention & Policy	Open Industrial Uses Study: Promote a more sustainable and resilient working waterfront by assessing cost-effective, pollution-prevention controls for unenclosed industrial facilities. The study also recommends stronger safeguards for open activities and the storage of hazardous and non-hazardous materials along the waterfront and in flood zones.	DCP	EDC, DEP, DSNY, OLTPS, OER, DOB	2013	TBD	TBD	N/A	2.4, 4.3
MH.E.12	Coastal/Natural Resource Protection	Green infrastructure: Construct green infrastructure to capture the first inch of runoff in 10% of impervious surfaces citywide in areas within the combined sewer system by 2030. Green infrastructure is constructed primarily to reduce combined sewer overflows but can have co-benefits for flooding and the urban heat island effect.	DEP	Parks, DOT	Ongoing through 2030	\$1,026 million	Capital budget, private developers, HMGP	N/A	2.7, 2.8, 2.10, 4.3, 4.4
MH.E.13	Coastal/Natural Resource Protection	Bluebelts: Implement and accelerate Bluebelt drainage program to preserve and enhance natural areas, including streams, ponds, and other wetlands.	DEP	Parks	Ongoing	\$360 million	Capital Budget, HMGP, Emergency Watershed Protection Program (USDA), wetland mitigation	Action F.E. 15 from 2009 HMP is folded into this action	2.3, 2.8, 2.10, 4.3

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MH.E.14	Infrastructure Project	Interconnection between the Catskill and Delaware Aqueducts: Construct the Shaft 4 connection, a new engineered connection between the Catskill and Delaware Aqueducts at the Delaware Aqueduct's Shaft 4 location, where the two aqueducts cross. This connection will allow DEP to divert Delaware system water into the Catskill Aqueduct, thereby allowing DEP to reduce the flow of water from Ashokan Reservoir when turbidity is elevated while still maintaining sufficient flow to provide service to outside communities and meet overall demand. This increases operational flexibility, reduces turbidity levels entering Kensico, and improves water quality for outside communities.	DEP	N/A	Project complete in 2015	\$21 million	Capital budget	N/A	1.5, 2.3, 4.3
MH.E.15	Property Protection	Bridge reconstruction and stabilization: Reconstruct and stabilize DEP-owned bridges and culverts located in the Croton, Catskill, and Delaware watersheds. Adhere to NYSDOT bridge safety standards to meet 50-year storm event design standards and withstand seismic loading.	DEP		Ongoing project scheduled through 2022	\$233 million	Capital budget	N/A	2.4, 2.5, 2.7, 2.8

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MH.E.16	Infrastructure Project	Dam reconstruction: Reconstruct seven high-hazard dams to safely pass the probable maximum flood criteria in accordance with NYS dam safety guidelines and withstand seismic loading based on NYSDEC seismic guidance. The following dams are being reconstructed: Gilboa Dam (impounding Schoharie Reservoir), Olivebridge Dam (impounding Ashokan Reservoir), New Croton Dam (impounding New Croton Reservoir), Cannonsville Dam (impounding Cannonsville Reservoir), Merriman Dam (impounding Rondout Reservoir), Downsville Dam (impounding Pepacton Reservoir) and Neversink Dam (impounding Neversink Reservoir).	DEP		Ongoing project scheduled through 2023	\$352 million	Capital budget	No change	2.4, 2.5, 2.7, 2.8
MH.E.17	Infrastructure Project	Drainage improvements: Develop plan for drainage enhancements based on flooding and sewer backup issues.	DEP		Ongoing	Included in regular agency o/m budget	Operating budget	No change	2.1, 2.3, 2.8, 4.3
MH.E.18	Emergency Services	Mapping and analysis enhancement: Continue to leverage GIS data with modeling capabilities to provide information on areas experiencing issues, faster diagnostics of issues, and alternative analysis to weigh benefits of potential mitigation actions.	DEP		Ongoing	Included in regular agency o/m budget	Operating budget	No change	2.10, 5.2

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MH.E.19	Property Protection	Facility and infrastructure protection: Reconstruct and harden sludge-vessel docks and piping to ensure continuity of treatment and protection of marine fleet assets.	DEP	N/A	2023	\$20 million	Capital budget	No change	2.1, 2.7
MH.E.20	Education & Awareness	Public education on emergency preparedness and hazard mitigation actions: Develop and conduct educational forums or seminars.	DFTA	OEM	2 years	\$10,000	TBD	No change	1.1, 1.6, 5.3
MH.E.21	Education & Awareness	Public outreach to seniors: Increase enrollment in Carrier Alert program to prepare seniors to meet the challenges of disasters.	DFTA	Alzheimer's Foundation, HRA, MOPD, NYPD, USPS	2 years	TBD	Agency operating budget	No change	1.1, 1.6, 5.3
MH.E.22	Education & Awareness	Emergency planning and hazard mitigation literature: Reach 45,000 clients with literature in multiple languages.	DFTA	OEM, DOHMH	2 years	\$15,000	TBD	N/A	1.1, 1.6, 5.3
MH.E.23	Emergency Services	Communications equipment: Purchase/obtain (through DoITT) 600 radios to provide redundant 800 MHz communications to support agency and citywide communications. Develop pre-event radio operations training program.	DHS	OEM, HHC, DOHMH,	Ongoing	\$600,000	TBD	No change	1.1, 1.2, 2.3
MH.E.24	Emergency Services	Park Slope Armory garage facility improvements: Centralize emergency supply storage and logistics hub to support agency and citywide emergency operations.	DHS	N/A	Ongoing	\$250,000	TBD	N/A	1.1, 2.1

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MH.E.25	Prevention & Policy	Existing building code revision: Develop a building code that will promote the inclusion of natural hazard mitigation measures into existing building design and retrofit projects.	DOB	N/A	TBD	\$475,000	Agency operating budget	No change	2.5
MH.E.26	Prevention & Policy	Interagency coordination: Participate in regular interagency coordination with OEM to discuss natural hazard mitigation.	DOB	OEM	Ongoing	Staff time	Agency operating budget	No change	3.1
MH.E.27	Prevention & Policy	DOB staff development: Participate in natural hazard mitigation code and standards development by sending staff to national events and training sessions that focus on seismic, wind, and flood codes.	DOB	N/A	Ongoing	\$25,000	Agency operating budget	Implemented and ongoing	2.6
MH.E.28	Prevention & Policy	DOB training: Send staff to national training sessions and seminars on hazards and mitigation practices.	DOB	N/A	Ongoing	\$25,000	Agency operating budget	Implemented and ongoing	2.6
MH.E.29	Prevention & Policy	Construction Code revision: Develop Construction Code amendments to reduce energy demand and reliance on fossil fuels as part of PlaNYC. These amendments will apply to both existing and new buildings and in some cases may result in energy reductions beyond the requirements of the Energy Conservation Construction Code of New York State. Review literature on how climate change will impact New York City, and review provisions developed by other jurisdictions to mitigate the anticipated effects of climate change.	DOB	OLTPS	2 years	\$5,800,000	Agency operating budget	Implemented and ongoing	2.5, 4.1, 4.3

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MH.E.30	Emergency Services	Cogeneration plant: Install cogeneration plant to reduce reliance on Con Ed power while complying with the GreenNYC Plan for DOB.	DOC	N/A	Completion by December 2014	\$125 million	Capital	Project construction 60% complete. Planned construction completion December 2014	1.1, 2.3, 2.10, 4.3
MH.E.31	Property Protection	Emergency power upgrades and replacements: Install emergency generator ports to allow immediate portable generator installation. Purchase 10 900KW portable generators.	DOC	N/A	TBD	\$15 million	Capital	N/A	1.1, 2.3, 2.7
MH.E.32	Emergency Services	Redundant communications: Establish a redundant emergency communications system.	DOE	OEM	2 years	\$5,000,000	FEMA	No change	2.3
MH.E.33	Emergency Services	NYC Community Air Survey (NYCCAS): Collect integrated air quality data in response to emergencies and environmental hazards including combustion emissions, structural fires or brush fires, demolition and debris removal from storm damaged areas, and extensive use of temporary generators and boilers following widespread utility disruption. Use real-time ambient fine particulate matter (PM2.5) monitors to enhance agency preparedness capabilities.	DOHMH	Parks, DEP	Since 2008	\$200,000/year for staffing, equipment maintenance, and data communications	Staff time, grants	N/A	1.5, 5.2

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MH.E.34	Emergency Services	Citywide health and safety program for large-scale emergencies: Coordinate the development of an Incident Health & Safety Plan using the Citywide Health & Safety Plan (CHASP) as a model. The new plan would provide multi-agency health and safety guidance during large-scale emergencies. Program also provides training and symposia for City agencies to build capacity and disaster preparedness.	DOHMH	N/A	Ongoing	TBD	Operating budget, grants	N/A	1.1, 1.2, 1.5
MH.E.35	Emergency Services	Environmental emergency preparedness: Develop risk characterization and communication; training for multi-agency biological incident environmental sampling teams and guidance for emergency response staff; guidance and plans for biological and radiological remediation for agencies and other stakeholders including building owners, employers, and the public.	DOHMH	N/A	Ongoing		Operating budget, grants	N/A	1.1, 1.2, 1.4, 1.5

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MH.E.36	Prevention & Policy	Real-time surveillance of health outcomes: Utilize data about health-related behaviors that are already stored in an electronic format for syndromic surveillance, i.e., recognizing diseases based on signs and symptoms.	DOHMH	FDNY, 59 of 61 NYC hospital emergency departments, OCME	Ongoing need	Approximately \$2 million per year	Currently funded by CDC Public Health Emergency Preparedness and Epi and Lab capacity grants. Long-term sustainability of these funds is unclear so additional funding sources are needed.	Ongoing	1.1, 1.5

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MH.E.37	Emergency Services	Public health information for healthcare providers: Disseminate information, checklists, and specific guidance and provide timely and accurate health alerts, advisories, and updates to healthcare providers and agencies that provide services to vulnerable populations on extreme weather events and other environmental hazards like pollen, air pollution, and vector-borne disease. Use the Health Alert Network, Dialogic NXT Communications System, and blast fax to assist them in preparing themselves to protect their clients during extreme events and improve messaging coordination.	DOHMH	DFTA, OEM, HRA, organizations in the Health Alert Network	Ongoing	TBD	Operating budget, staff time	No change	1.1, 1.2, 1.5, 1.6
MH.E.38	Education & Awareness	Public health risk communication for the general public: Raise public awareness on how to reduce or prevent illness and mortality from extreme weather events and other environmental hazards including air pollution and environmental exposures (such as carbon monoxide releases, mold, toxic spills and other toxic releases). Use 311, nyc.gov, printed materials, media, and public forums and presentations.	DOHMH	NWS, OEM, DFTA, HRA	Ongoing	TBD	Operating budget, staff time	No change	1.5, 5.3

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MH.E.39	Emergency Services	Interagency field and environmental data gathering and exchange: Facilitate environmental data capture, exchange, and storage among government agencies using web-based data systems. Interagency data exchange supports timely identification and characterization of potential hazards and provides a means to mitigate impacts of natural disasters and emergencies.	DOHMH	OEM, FDNY, DEP	Ongoing	TBD	Staff time, grants	No change	1.5, 3.1, 5.2
MH.E.40	Education & Awareness	Interagency environmental data workshop: Host annual conference to improve interagency coordination, promote best practices, and introduce emerging tools for data sharing, risk analysis, and vulnerability assessment.	DOHMH	OEM	Ongoing	TBD	Staff time, grants	No change	1.5, 3.1, 5.2
MH.E.41	Prevention & Policy	Health Code revisions: Examine the New York City Health Code to identify what elements can be revised to bolster natural hazard mitigation and improve public safety and health during extreme weather events.	DOHMH	N/A	Ongoing	TBD	Staff time	No change	1.1, 1.3, 1.5
MH.E.42	Prevention & Policy	Climate change and public health assessment: Assess health risks of climate-related events, conduct vulnerability assessments, implement enhanced surveillance systems for climate-sensitive conditions, and promote climate-health strategies and interventions.	DOHMH	N/A	3-year program, just renewed for 3 years	\$173,000 - \$250,000 /year (not fully funded)	Grants	N/A	1.1, 1.5, 4.2

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MH.E.43	Education & Awareness	Climate and health community resilience: Conduct workshops and disseminate public health information and educational tools through community stakeholders, professional associations, faith-based coalitions, and agencies that provide services to vulnerable populations (children, seniors, inmates, the homeless, and the mentally ill). Workshops provide targeted instruction on how to reduce illness and mortality impacts of extreme weather on affected populations.	DOHM H	DFTA, OEM, HRA, external partners	3-year program, just renewed for 3 years	\$173,000 - \$250,000 /year (not fully funded)	Grants	N/A	1.1, 1.5, 1.6, 4.2
MH.E.44	Education & Awareness	Environmental health tracking portal: Facilitate environmental data dissemination to the public using web-based data systems. Data dissemination supports community preparedness, public education, and characterization of potential environmental hazards.	DOHM H	OLTPS	3-year program currently on its third year	\$753,000	Grants, staff time	N/A	1.1, 1.5, 5.1
MH.E.45	Emergency Services	Environmental monitoring information telemetry system: Implement wireless transmission of handheld and vehicle-mounted environmental monitoring data from field to office. Identification and characterization of radiological environmental hazards, including air emissions data, provides a means to mitigate public health impacts.	DOHM H	N/A	Ongoing	TBD	Grants	N/A	1.1, 1.5, 5.2

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MH.E.46	Education & Awareness	Assessing and communicating risks from drinking and recreational waters: Issue public advisories on health hazards from flooding/storm impacts to water supply and public waters/beaches, using 311, nyc.gov, printed materials and media.	DOHMH	DEP, Parks	Ongoing	TBD	Operating budget	N/A	1.1, 1.2, 1.5, 5.3
MH.E.47	Education & Awareness	Public education on mental health: Conduct a "Mental Health First Aid" education program to introduce the public to risk factors and warning signs of mental health problems, build understanding of their impact, and overview common treatments to increase individual and community resilience.	DOHMH	N/A	Immediately and ongoing	\$150,000	TBD	N/A	1.1, 1.5
MH.E.48	Emergency Services	Mental health system IT record redundancy: Convert paper records to electronic formats to prevent damage and loss in the event of a disaster and facilitate remote accessibility of client records. Include off-site backup capacity.	DOHMH	N/A	One year to implement	\$6,000,000	One-time expense to initiate project, followed by capital allocation	N/A	1.1, 1.5, 2.1

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MH.E.49	Prevention & Policy	Green Streets program: Transform unused road space into open (green) space to reduce volume of stormwater runoff by absorbing or storing water and reduce the impact of extreme heat events. The goal of this project is to add 40 Green Streets totaling 75 acres of open space with a storage capacity of four million gallons of stormwater.	Parks	DOT	8 years	\$15,000,000	Private donors	No change	1.5, 2.1, 4.3
MH.E.50	Prevention & Policy	Street trees: Fill every available street tree opportunity in New York City, thus improving drainage across the city and reducing the effects of extreme temperatures. The goal is to raise the street stocking level from 74% to 100%.	Parks	DOT, DOB	8 years	\$246,900,000	TBD	No change	1.5, 2.1, 4.3
MH.E.51	Property Protection	Conversion of asphalt fields to natural or synthetic turf fields: Convert 24 fields to asphalt or natural or synthetic turf with new drainage systems. Both scenarios would result in improved drainage and possible reduction of the urban heat island effect in large park areas.	Parks	HHC, DOHMH	8 years	\$42,100,000	TBD	No change	2.1, 4.3
MH.E.52	Coastal/Natural Resource Protection	Reforestation: Reforest 2,000 acres of parkland.	Parks	NPS	10 years	\$118,000,000	TBD	No change	4.3
MH.E.53	Coastal/Natural Resource Protection	Tree pruning: Implement a 5-year program to prune or remove old and overgrown trees. This program is designed to reduce the impact of severe weather including tornadoes, windstorms, and coastal storms.	Parks	N/A	5 years	\$5,000,000	TBD	No change	2.1, 4.3

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MH.E.54	Coastal/Natural Resource Protection	Wetlands protection: Assess the vulnerability of existing wetlands and identify additional policies to protect them.	Parks	DEP, OLTPS, NPS, EDC, DCP, EPA	8 years	TBD	TBD	No change	4.3
MH.E.55	Coastal/Natural Resource Protection	Tree planting: Partner with stakeholders to help plant one million trees by 2017. Trees reduce temperatures, absorb additional stormwater, and decrease flooding.	Parks	OLTPS, DOT, DOB, NPS	9 years	TBD	TBD	No change	1.5, 2.1, 4.3
MH.E.56	Infrastructure Project	Public safety land-mobile radio communications at the World Trade Center: Protect and enhance the reliability and resilience of communications infrastructure by installing redundant radio antenna and related equipment at the World Trade Center.	DoITT	N/A	18 months	\$1.8 million	FEMA grant	N/A	2.3
MH.E.57	Emergency Services	311 upgrade: Support future high call-volume events including re-architecture of the 311 platform, provide production environment for call center-specific version of applications, and implementing cloud-based mapping.	DoITT	N/A	18 months	\$29.3 million	TBD	N/A	2.1, 2.3, 2.8
MH.E.58	Emergency Services	311 alternate site: Build out an operating environment in a hardened facility to insure that 311 operations can relocate to an alternate site should primary facility be impacted.	DoITT	N/A	12 months	\$13 million	TBD	N/A	2.1, 2.3

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MH.E.59	Prevention & Policy	Hardening the optical backbone: Implement new omni-directional optical technology to enable DoITT to remotely switch the light and route traffic around failed fiber path. Citynet, the City's dedicated optical fiber backbone, is already undergoing a significant upgrade to increase its capacity and resiliency. While the network has the ability to dynamically switch the IP at the ethernet layer, it does not have ability to remotely switch the light through multiple fiber paths during emergencies.	DoITT	N/A	6 months	\$17 million	TBD	N/A	2.1, 2.3, 2.8
MH.E.60	Prevention & Policy	Internet/DMZ management: Sustain advanced bandwidth management devices to regulate appropriate usage of ISP links during emergencies.	DoITT	N/A	TBD	\$1.55 million	TBD	N/A	2.1, 2.3
MH.E.61	Property Protection	Protection of New York City bridges from hazards: Implement measures including seismic retrofits, structural hardening, inspections, and retrofits to protect moveable bridge machinery.	DOT		10 years	\$1 billion	Federal, city, state	Construction under way on Brooklyn, Manhattan, and Williamsburg Bridges	2.1, 2.7, 2.8
MH.E.62	Prevention & Policy	Toolbox of climate resiliency features for ROW capital projects: Develop a toolbox of hazard-resilient design treatments that can be incorporated into right-of-way capital projects (streets, bulkheads/seawalls, retaining walls) and a selection process/methodology for applying the most appropriate and cost-effective	DOT	DDC	1 year (consultant study)	\$1,000,000	HMGP, City Capital Budget, City Expense Budget	Ongoing	2.8, 2.10, 5.2

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		treatments to particular locations based on the hazards those locations face.							
MH.E.63	Property Protection	Climate resiliency features in future capital projects: Apply the toolbox of hazard-resilient design treatments developed in MH.E.62 to an initial set of existing capital projects in high-risk areas. As these strategies are refined and their effectiveness and cost-effectiveness are demonstrated, apply them in a standardized way to all right-of-way capital projects going forward.	DOT	DDC	2 years (design, construction)	\$20,000,000 per year	HMGP, TEP/TAP grants, City Capital Budget	Ongoing	2.8
MH.E.64	Infrastructure Project	Resiliency in DOT Planning and Project Development: Integrate resiliency in planning and project development.	DOT	N/A	1 year (in-house study) plus ongoing (1 new staff person focused on infrastructure resiliency)	\$150,000 per year	HMGP, City Expense Budget	N/A	2.7

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MH.E.65	Property Protection	Protection of ferry terminals: Protect terminals from flooding and storm damage.	DOT	N/A	6 years	\$200,000,000	FTA ER	N/A	2.1, 2.7
MH.E.66	Infrastructure Project	Ferry use during emergencies: Deploy the Staten Island Ferry's Austen Class vessels on the East River Ferry during transportation disruptions.	DOT	N/A	As necessary	\$100,000/week/vessel	Expense	N/A	2.1
MH.E.67	Property Protection	Traffic signal equipment: Elevate equipment in flood zones.	DOT	N/A	3 years	\$3,000,000	HMGP, FHWA	N/A	2.1, 2.7
MH.E.68	Prevention & Policy	Traffic management measures in emergencies: Plan for measures including HOV restrictions, temporary transit services, special bike/pedestrian routes, and emergency public information protocols. Conduct resiliency planning exercises.	DOT	PD, MTA	Ongoing	\$10,000,000	HMGP	N/A	2.1
MH.E.69	Infrastructure Project	Pedestrian and bicycle facilities: Plan for and install new facilities to improve connectivity to key transportation hubs.	DOT	DDC	Ongoing	\$10,000,000	CMAQ, FHWA	N/A	2.1, 4.3
MH.E.70	Prevention & Policy	Bus priority strategies: Expand Select Bus Service and other bus priority strategies.	DOT	MTA, DDC	Ongoing	\$20,000,000	CMAQ, FTA	N/A	2.1
MH.E.71	Emergency Services	Emergency power generators: Provide five large and 60 small emergency power generators to facilities during a hazard event.	DSNY	N/A	Duration of emergency/immediate	Fuel/equipment cost only/absorbed by agency	TBD	No change	2.3

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MH.E.72	Property Protection	Green roofs: Install green roofs on facilities where appropriate to reduce the volume of stormwater runoff by absorbing or storing water and help reduce the urban heat island effect.	EDC	NYCDEP	TBD	TBD	TBD	No change	2.8, 2.10, 4.3, 4.4
MH.E.73	Emergency Services	EDC emergency power generators: Provide emergency power generators to facilities during a natural hazard event.	EDC	N/A	Ongoing	TBD	EDC, OEM	No change	2.3

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MH.E.74	Infrastructure Project	Expansion of ferry landings available for regular and emergency use. Design and procure two new ferry landing barges that are outfitted with the required equipment for providing basic ferry service, including self-contained generators. These barges will be stored in a secure and protected location. When the need arises, they will be deployed within 24 to 48 hours as temporary landings, allowing for the rapid establishment of interim service. Deploy four new permanent ferry landings at strategic locations selected based on the results of the ongoing Citywide Ferry Study. The landings will be designed to be mobile so that, in an extreme situation, they can be temporarily relocated to provide alternative transit services where needed.	EDC	DOT	5 years	\$15,000,000.00	FTA	N/A	2.1, 2.2
MH.E.75	Emergency Services	Backup water main system: Develop system to transmit fire suppression water throughout the city if existing infrastructure is disrupted due to a drought or earthquake.	FDNY	DEP, DDC, OEM	TBD	TBD	TBD	Ongoing	2.3, 2.7
MH.E.76	Emergency Services	Power redundancy at FDNY facilities: Install backup electrical power generators	FDNY	OEM, DDC	TBD	TBD	Capital budget	Ongoing	2.3

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		in all FDNY facilities.							
MH.E.77	Emergency Services	Water supply redundancy: Increase water drafting capabilities citywide. Drafting, which entails the suction of water from a body of water to a fire apparatus, can decrease the demand on the water supply system and provide redundant fire suppression water in the event of a drought or earthquake-induced water supply disruption.	FDNY	DEP, U.S. EPA	TBD	TBD	Grants	Ongoing	2.3
MH.E.78	Property Protection	Enterprise Asset Management System: Develop and implement the system for equipment tracking and digital inventorying.	FDNY	N/A	First quarter 2014	TBD	TBD	N/A	2.1
MH.E.79	Emergency Services	Continuity of Operations Plan (COOP): Create, distribute, and implement a COOP plan to ensure continuity of all FDNY operations in the event of a disaster.	FDNY	OEM	TBD	\$810,000	Grants	N/A	2.1, 2.3
MH.E.80	Emergency Services	Emergency Action Plans: Require non-fire emergency plans for office buildings.	FDNY	N/A	TBD	\$1,400,000	Grants	N/A	2.1, 2.5
MH.E.81	Emergency Services	IT disaster recovery: Create, distribute, and implement a recovery plan to ensure continuity of IT operations in the event of a disaster.	FDNY	DOITT	TBD	\$2,400,000	Grants	N/A	2.1, 2.3
MH.E.82	Emergency Services	Redundant emergency generators: Install generators for Group 2, 3, and 4 general hospitals, D&TC centers, and nursing facilities.	HHC	Dormitory Authority of the State of New	5 years	\$90,000,000	General obligation bonds	Ongoing	1.1, 2.1, 2.3

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				York					
MH.E.83	Education & Awareness	Annual NYC/LI Emergency Management Conference: Provide emergency management professionals with an opportunity to explore and discuss concerns, issues, and initiatives for effective emergency preparedness and planning.	LIPA	NYS OEM, Nassau County OEM, Suffolk County OEM, NYC OEM	May 2013	\$25,000	LIPA and other sponsors of the event	N/A	5.3
MH.E.84	Education & Awareness	Flooding technical assistance to owners of landmarked structures: Provide technical assistance to owners of locally landmarked structures affected by flooding and other hazards.	LPC	DOB, DOT	Ongoing	TBD	LPC expense budget	Implemented (scope has been revised)	2.9
MH.E.85	Coastal/Natural Resource Protection	Tree Pruning (LIRR): Reduce probability of downed trees or limbs due to tornadoes, windstorms, and coastal storms along active rail lines through preventive tree pruning.	MTA (LIRR)	N/A	Ongoing	TBD	LIRR operating budget	Ongoing	2.1
MH.E.86	Coastal/Natural Resource Protection	Tree Pruning (MNR): Reduce probability of downed trees or limbs due to tornadoes, windstorms, and coastal storms along active rail lines through preventive tree pruning.	MTA (MNR)	N/A	Immediate, 2-year contract duration	\$1.6 million	Capital budget, operating budget, Sandy Emergency Relief Program	Ongoing	2.1

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							- Resiliency		
MH.E.87	Infrastructure Project	Harlem River lift bridge: Develop threat scenario report, threat vulnerability and risk assessment, and prioritized list of security projects. This single point of failure for all MNR traffic into/out of the CBD is vulnerable to a broad spectrum of threats.	MTA (MNR)	N/A	Completion May 2014	\$2.6 million	2011 TSGP	N/A	5.2
MH.E.88	Emergency Services	Operations/communications redundancy: Use secondary facility at North White Plains to create redundancy for the Operations Control Center, allowing for continued operational capability for the railroad.	MTA (MNR)	N/A	TBD	\$25-30 million	TBD	N/A	2.3
MH.E.89	Emergency Services	Contingency planning for substitute bus service: Purchase mobile emergency command center vehicles, fuel tank trucks, and mobile and fixed equipment for bus operations including electronic variable message signs, pumps, portable generators, and portable tower lights.	MTA (Buses)	N/A	TBD	TBD	TBD	N/A	2.1, 2.3
MH.E.90	Emergency Services	Bus command center and radio system: Replace obsolete facility and system with state-of-the-art command center and radio communication system.	MTA (Buses)	N/A	TBD	TBD	TBD	N/A	2.1
MH.E.91	Emergency Services	Contingency bus fleet: Establish fleet of approximately 50 buses to support emergencies.	MTA (Buses)	N/A	TBD	TBD	TBD	N/A	2.1
MH.E.92	Property Protection	Emergency generators: Install at depots at Kennedy and LaGuardia Airports and	MTA (Buses)	N/A	TBD	TBD	TBD	N/A	2.3

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		Baisley Park to provide electrical power backup.							
MH.E.93	Property Protection	Emergency Action Plan: Revise plan including lessons learned from Sandy. Include necessary NYCHA operational actions required 7 days, 72 hours, 48 hours, and 24 hours prior to a forecasted weather event and within the first 24 hours following the event.	NYCHA	TBD	TBD	TBD	TBD	N/A	1.1, 2.1, 5.2
MH.E.94	Property Protection	Protective roofing: Install new flashing and four-ply torch-applied modified bitumen roofing with high-reflective coating over polyisocyanurate tapered insulation in 46 developments (524 buildings) citywide. This project, which will involve removal of existing roofing and insulation and asbestos abatement, will increase storm resiliency and reduce the impacts of extreme heat events.	NYCHA	DOE-SCA	1 year	\$126,184,945	Capital improvement budget	No change	1.1, 2.5, 2.7, 2.8, 2.10
MH.E.95	Property Protection	Window protection: Install new shatter-resistant operable windows and frames and repair lintels and sills in nine developments (62 buildings) citywide. Remove existing windows and conduct asbestos abatement.	NYCHA	DOE-SCA	2 years	\$14,388,787	Capital improvement budget	No change	1.1, 2.5, 2.7, 2.8, 2.10
MH.E.96	Property Protection	Copping: Remove all loose and damaged brick, stucco, and copping to reduce flying debris during wind storms, coastal storms, and tornadoes. Install new brick and copping in 34 developments (313 buildings) citywide.	NYCHA	N/A	2 years	\$237,141,686	Capital improvement budget	No change	1.1, 2.5, 2.7, 2.8

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MH.E.97	Emergency Services	Continuity of Operations (COOP): Ensure City agencies can provide essential services to the public during emergencies while maintaining internal critical functions. Develop plans that build contingencies around essential services, mitigate the impact of disruptions to services, and enhance the ability to provide CIMS operations, social services, and government operations.	OEM	DoITT	Ongoing	\$1.5 million	U.S. Dept. of Homeland Security Urban Area Security Initiative Grant	Ongoing	2.1, 2.3
MH.E.98	Emergency Services	Advance warning system integration: Integrate Notify NYC and NY-ALERT advance warning and emergency capabilities. When fully operable, this system will provide advance warning to New York City residents prior to hazard events. The public is able to enroll in Notify NYC and receive messages via e-mail, phone calls, text message, or by subscribing to the RSS feed. Messages are also sent via Twitter and Twitter Alert. Depending on the severity of the emergency, Wireless Emergency Alerts and Emergency Alert System can be activated to broaden the audience that receives the notification.	OEM	DoITT, FEMA SEMO	TBD	TBD	HMGP	On-going (scope is expanding to include additional alert mechanisms including Blackberry Messenger, Instant Messenger, and TTY/TDD)	1.1, 1.2

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MH.E.99	Education & Awareness	Incident-based distribution project: Implement program to track and study areas impacted by natural disasters using OEM Watch Command data and Geographic Information Systems technology. Target affected areas for post-disaster outreach and Ready New York materials. Encourage property owners to incorporate mitigation measures during recovery.	OEM	N/A	Ongoing	\$25,000	U.S. Dept. of Homeland Security Urban Area Security Initiative Grant	The program has been increasing its capacity. By 2013, it was regularly sending several thousand guides each month.	1.1, 2.9, 5.1, 5.2, 5.3
MH.E.100	Education & Awareness	Insurance Working Group: Leverage the insurance industry and regulators to partner with the private sector and provide information on insurance-related mitigation measures.	OEM	NYS Insurance Department	TBD	TBD	TBD	OEM's Public/Private and Legal units held several meetings with representatives of the insurance industry under the auspices of the Insurance Working Group. The information that came from these conversations informed the language used during presentations to businesses and residents. The New York State	3.1, 3.5

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								Department of Insurance was designated as the industry's primary link to OEM's based on its ability to share information widely	
MH.E.10 1	Education & Awareness	Public education through Ready New York guides: Promote Ready New York guides as a tool to educate New Yorkers about natural hazards. This program offers all-hazards guides; hazard-specific guides for hurricanes, floods, and heat; and guides geared specifically for seniors and people with disabilities, children, and businesses. Guides contain information on how to mitigate, prepare for, and respond to an emergency, and are offered in up to 14 languages as well as audio tapes and braille. In 2012/13 OEM mailed over 2.2 million hurricane guides to households that lie in the city's hurricane evacuation zones.	OEM	DOE, DEP, Mayor's Office, SBS, DFTA, Mayor's Office for People with Disabilities	Ongoing	\$1,060,000	U.S. Dept. of Homeland Security Urban Area Security Initiative Grant	The program has been increasing its capacity. By 2013 it was regularly sending out several thousand guides each month.	1.1, 5.1, 5.3

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MH.E.10 2	Education & Awareness	Public outreach through Ready New York program: Provide public outreach throughout the city by presenting and tabling at community and private-sector events. Encourage communities to understand the impact of hazards so they may better mitigate, prepare, and respond to hazards.	OEM	N/A	Ongoing	\$50,000	U.S. Dept. of Homeland Security Urban Area Security Initiative Grant	From 400-500 outreach events annually, the program is now closing in on doubling its capacity. During hurricane/coastal storm season, mailings of around 1,500 pieces target elected officials, non-profits, senior centers, houses of worship, and schools around the city. In 2013, OEM mailed the updated hurricane guide to 1.4 million households and businesses in the city's hurricane evacuation zones.	1.1, 5.1, 5.3

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MH.E.103	Prevention & Policy	Hazard mitigation grant program planning: Pursue grant funding to support additional analysis for NYC Hazard Mitigation Plan.	OEM	DCP, OLTPS	3 years	\$1 million	HMGP	N/A	2.9
MH.E.104	Emergency Services	Regulatory actions on liquid fuel shortages: Develop a package of city, state, and federal regulatory actions to address shortages during emergencies.	OEM	DCAS	Ongoing	TBD	Agency operating budget	N/A	2.3
MH.E.105	Education & Awareness	Urban Post-Disaster Housing Prototype Program: Develop a series of tools and public education programs that build capability to supply post-disaster housing that meets the unique needs of urban areas. Create an option for interim housing that will provide more suitable living spaces for New Yorkers displaced by disaster than existing federal interim housing solutions.	OEM	DDC	1 year	\$100,000	FEMA, city tax levy, U.S. Dept. of Homeland Security Regional Catastrophic Preparedness Grant Program	N/A	1.1, 1.6
MH.E.106	Prevention & Policy	Urban Post-Disaster Housing prototype: Evaluate phases of implementation of rapidly deployable solution that provides proof-of-concept for providing interim housing at the speed and scale NYC may need.	OEM	FEMA, USACE, DOB, DEP, DOT, MTA	1 year	\$1,600,000	FEMA, city tax levy, U.S. Dept. of Homeland Security Regional Catastrophic	N/A	1.6, 2.10

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							Preparedness Grant		
MH.E.107	Prevention & Policy	Performance specifications for Urban Post-Disaster Housing: Mitigate population loss after disaster by providing NYC with operational details for procuring manufactured housing that has stringent requirements for safety, environmental quality, durability, and universal design.	OEM	FEM, HUD, USACE, DDC, DOB, DEP, DOT, private sector	4 years	\$50,000	FEMA, city tax levy, U.S. Dept. of Homeland Security Regional Catastrophic Preparedness Grant	N/A	1.1, 2.5, 2.10
MH.E.108	Education and Awareness	Ready New York Mobile App: Develop Mobile iPhone and Android application for the City's Ready New York preparedness program to help New Yorkers prepare for emergencies, build emergency plans, and utilize during emergencies.	OEM	DOHMH	1 year	\$50,000	CDC PHEP	N/A	1.5, 5.1, 5.3
MH.E.109	Prevention & Policy	Brownfield climate change resiliency: Launch audits and improve storm preparedness of brownfields.	OER	OLTPS	In place for 2 months	\$40,000	Funding in place (OMB)	N/A	4.3
MH.E.110	Prevention & Policy	Building Code amendments: Amend the Building Code to address the impacts of climate change.	OLTPS	DOB	8 years	TBD	TBD	Ongoing	2.5, 4.4

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MH.E.11 1	Prevention & Policy	Coordination on local climate change projections: Call on the state and federal governments to coordinate with the City on local climate change projections.	OLTPS	N/A	TBD	\$0	N/A	N/A	3.1, 4.1
MH.E.11 2	Prevention & Policy	Local climate change projection improvements: Continue to refine projections to inform decision-making.	OLTPS	N/A	TBD	\$0	N/A	N/A	4.1, 4.2
MH.E.11 3	Prevention & Policy	Food distribution system: Study the system to identify vulnerabilities.	OLTPS	N/A	TBD	\$3M	CDBG	N/A	1.1, 2.3
MH.E.11 4	Education & Awareness	Preparedness guidelines for retailers: Call on New York State to issue retailer preparedness guidelines for extreme weather events.	OLTPS	N/A	TBD	\$0	N/A	N/A	3.1, 3.4
MH.E.11 5	Infrastructure Project	Pipeline booster stations: Work with Buckeye and New York State to safely build pipeline booster stations in New York City to increase supply of liquid fuel and withstand extreme weather events.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7
MH.E.11 6	Prevention & Policy	Hardening gas stations: Work with New York State to provide incentives for hardening of gas stations to withstand extreme weather events.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7
MH.E.11 7	Prevention & Policy	Transportation fuel reserve: Explore the creation of a fuel reserve to temporarily supply the private market during disruptions.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.3
MH.E.11 8	Prevention & Policy	Fuel availability during disruptions: Call on New York State to modify price gouging laws and allow flexibility of gas station supply contracts to increase fuel availability	OLTPS	N/A	TBD	\$0	N/A	N/A	2.3

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		during disruptions.							
MH.E.119	Prevention & Policy	Strategies to address climate change threats: Call on non-City agencies to implement strategies to address climate change threats.	OLTPS	N/A	TBD	\$0	N/A	N/A	3.1, 4.2, 4.4
MH.E.120	Prevention & Policy	Utility system upgrade plan: Work with utilities and regulators to develop a cost-effective system upgrade plan to address climate risks.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	3.1, 4.2, 4.4
MH.E.121	Prevention & Policy	Utility system design and equipment: Work with utilities and regulators to reflect climate risks in design and equipment standards.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	3.1, 4.2, 4.4
MH.E.122	Prevention & Policy	Performance metrics for climate risk response: Work with utilities and regulators to establish performance metrics for climate risk response.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	3.1, 4.2, 4.4
MH.E.123	Prevention & Policy	New York City power supply: Work with industry partners, New York State, and regulators to strengthen the city's power supply.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7, 3.1
MH.E.124	Prevention & Policy	Plant capability: Require more in-city plants to be able to restart quickly in the event of blackout.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.3
MH.E.125	Prevention & Policy	Resiliency plan for the electric distribution system: Work with Con Ed and the PSC to develop a long-term resiliency plan.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.1, 2.3, 2.7, 3.1

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MH.E.12 6	Prevention & Policy	Minimizing electric outages: Work with utilities and regulators to minimize outages in areas not directly affected by climate impacts.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.1, 2.3, 3.1
MH.E.12 7	Prevention & Policy	Smart grid technology: Work with utilities and regulators to implement smart grid technology to assess system conditions in real time.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.3, 2.10, 3.1
MH.E.12 8	Prevention & Policy	Utility service restoration for critical customers: Work with utilities and regulators to speed service restoration for critical customers via system configuration.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.3, 3.1
MH.E.12 9	Prevention & Policy	Utility service restoration for mobile substations: Work with utilities and regulators to speed service restoration via pre-connections.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.3, 3.1
MH.E.13 0	Prevention & Policy	Natural gas supply: Work with pipeline operators to expand and diversify supply.	OLTPS	N/A	TBD	\$0	N/A	N/A	2.3, 3.1
MH.E.13 1	Prevention & Policy	Gas transmission and distribution system: Work with utilities and regulators to strengthen the in-city system.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.3, 3.1
MH.E.13 2	Prevention & Policy	Utility demand response programs: Work with utilities and regulators to expand such programs citywide.	OLTPS	Con Ed, PSC, DCAS	TBD	\$0	N/A	N/A	2.3, 3.1
MH.E.13 3	Prevention & Policy	Building energy efficiency: Work with government and private sector partners to expand building energy efficiency.	OLTPS	DOB	TBD	\$0	N/A	N/A	3.1, 4.3, 4.4
MH.E.13 4	Prevention & Policy	Electric vehicles: Incorporate resiliency into the design of City electric vehicle initiatives and pilot storage technologies.	OLTPS	Con Ed, PSC	TBD	\$0	N/A	N/A	2.10

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MH.E.135	Emergency Services	Emergency notification system at Kennedy Airport: Install advanced automated early warning and emergency notification system in the Green and Blue quadrants of the central terminal area. System includes variable message signs along main access roads.	PANYNJ (Aviation)	DOT	5 years	\$18,033,000	Capital budget	No change	1.2
MH.E.136	Education & Awareness	Emergency response unit: Support team of business counselors that assist businesses in recovering and reopening in the wake of a disaster or emergency. Team can provide information on mitigation practices.	SBS	OEM, other city, state, and federal partners as necessary	Ongoing	TBD	Agency operating budget	No change	3.2, 3.4
MH.E.137	Emergency Services	SBS Continuity of Operations Plan (COOP): Maintain plan to ensure critical agency functions and services are available after a hazard.	SBS	OEM and other City partners as necessary	Ongoing	TBD	Agency operating budget	N/A	2.3, 3.2
MH.E.138	Coastal/Natural Resource Protection	Emergency restoration of the Rockaway shoreline: Restore to pre-Sandy conditions and to originally authorized beach profile. Mitigation of long-term impacts will require periodic beach maintenance.	USACE, NYSDEC	Parks	4 months	\$26,000,000	USACE	N/A	2.7, 2.9

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MH.E.139	Coastal/Natural Resource Protection	Emergency restoration of the Coney Island shoreline: Restore to pre-Sandy conditions and to originally authorized beach profile. Mitigation of long-term impacts will require periodic beach maintenance.	USACE/NYSED	Parks	5 months	\$7,000,000	USACE	N/A	2.7, 2.9
WINTER STORMS									
WS.E.1	Prevention & Policy	Construction Code revision: Apply the latest national standards for the determination of snow load, snow drift loads, and sliding snow loads.	DOB	N/A	In effect since July 2009	TBD	Staff time	Implemented	2.5
WS.E.2	Property Protection	Infrastructure and equipment protection for subway trains: Store trains underground when forecast calls for temperatures 10 degrees below zero, ice storms, icing conditions, or greater than five inches of snow.	MTA (NYCT-Subway)	N/A	Ongoing	\$220,000 /per year	Agency operating budget	Winter operations plan developed and is used as needed and updated periodically	2.1, 2.7

Table 5: New York City Hazard Mitigation Action Table (Existing)

iv. Potential Mitigation Actions

Potential mitigation actions are programs, plans, projects, or policies New York City may implement to help reduce or eliminate the risk to human life and property from hazards. The MPC Planning Team, Steering Committee, and membership identified, analyzed, and prioritized the potential actions in the table below. (For further details on the fields displayed in this table, see Table 4) Each mitigation action is assigned an index value to indicate the hazard addressed and its alphabetized placement by agency in the list. For example, the mitigation action with the index EQ.P.8 is the eighth potential mitigation action that addresses earthquakes. The Planning Team prioritized these actions by using a FEMA (STAPLEE) evaluation tool in addition to looking at other criteria. For more information about the prioritization process please see section Prioritization.

The following table of potential actions is for planning purposes only and creates no obligation on agencies to fulfill the potential actions listed. Potential actions may be undertaken or fulfilled should appropriate funding become available at a future date. Prioritization of potential actions is required under FEMA grant guidelines; it will not be used to determine eligibility for funding or implementation of potential projects in the future.

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Index	Action Type	Mitigation Action Description	Lead	Support	Timeline	Cost Estimate	Possible Funding Sources	2009 Progress Status	Goals and Objectives	Prioritization
CBRN										
CB.P.1	Property Protection	Construction Code revision: Adopt improved fire protection standard and emergency egress standard for buildings over 420 feet from recent International Building Code.	DOB	N/A	Latest revision expected to be passed by City Council in fall 2013 and go into effect by fall 2014	TBD	Staff time	N/A	2.5, 2.7, 1.5	High
CB.P.2	Infrastructure Project	Harlem River lift bridge: Design and build security and hardening measures including fencing, lighting, access control and CCTV, structural hardening, stand-off measures, alternate alignment plans, alternate operations plans, and consequence management plans for this single point of failure for all MNR traffic into/out of the CBD.	MTA (MNR)	N/A	10-15 years	\$35 million	TSGP, capital budget	N/A	2.1, 2.2, 2.3	Medium
CB.P.3	Prevention & Policy	NYCHA fresh water supply: Outfit all 334 NYCHA developments with oversized water storage tanks so that in the event of a water-contamination event, the buildings can be shut off from the city supply while fresh water is provided to residents for an extended period.	NYCHA	TBD	TBD	TBD	TBD	N/A	1.1, 2.1, 2.3	Medium

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CB.P.4	Coastal/Natural Resource Protection	Brownfield cleanup in the 100-year floodplain: Establish bonus cleanup grant for projects in flood zones to accelerate cleanup to prevent release of pollutants during floods.	OER	OMB, NYSEDC, NYCEDC	3 months pending funding	\$150,000/year	Budget allocation, state Regional Economic Development Council (REDC) grant	N/A	2.1, 2.4	High
CB.P.5	Prevention & Policy	Environmental research: Update SPEED, the City's online environmental research engine.	OER	DoITT	3 months	\$200,000	CDBG grant	N/A	5.1, 5.2, 5.3	High
CB.P.6	Education & Awareness	BrownfieldWORKS!: Support placement of green job trainees on brownfield cleanup sites throughout New York City.	OER	Law Department, OMB	3 months pending funding	\$100,000/year	Budget allocation	N/A	2.1, 2.4	Medium

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CB.P.7	Education & Awareness	Environmental Project Information Center (EPIC): Develop this online public environmental communication portal and cleanup project tracking database for developers, industry, and community to speed projects while also hosting a public document repository, information sharing portal, bulletin boards, dialogue centers, and other community resources.	OER	DoITT, EDC	Expected completion summer 2014	\$400,000	Seeking \$200,000 from NYS DOS and \$200,000 CDBG grant	N/A	5.1, 5.2, 5.3	High
Coastal Erosion										
CE.P.1	Coastal/Natural Resource Protection	Protection of Rikers Island east, west, and south shorelines: Rebuild and mitigate shorelines.	DOC	N/A	FY 2017-2021	\$38 million	Capital	No change	1.1, 2.1, 2.7	Medium
CE.P.2	Coastal/Natural Resource Protection	Beach restoration: Conduct repairs to Parks beaches and infrastructure damaged in recent nor'easters. Beaches and roadways have been subject to severe erosion from these storms.	Parks	TBD	TBD	\$10,000,000 total (\$4,500,000 for Rockaway Beach)	TBD	No change	2.1, 2.7, 4.3	Medium

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CE.P.3	Coastal/Natural Resource Protection	Renourishment of Orchard Beach, Bronx: Periodically renourish Orchard Beach to prevent greater erosion and protect infrastructure. (USACE classifies this project as "Recreational" and not for flood damage reduction.)	USACE, Parks	NYSDEC	3 years	\$1,000,000	USACE	No change	4.1, 4.3, 4.4	Medium
COASTAL STORMS										
CS.P.1	Prevention & Policy	Resilient neighborhoods planning studies: Identify and address vulnerabilities specific to communities in flood zones, as designated by new federal flood maps, and those neighborhoods severely affected by Hurricane Sandy. Goals include: reducing risk from natural hazards such as flooding and coastal storms, fostering economically and socially vibrant communities that are able to adapt to changing conditions, coordinating land use planning with rebuilding activities and infrastructure investment, and including a robust stakeholder-engagement process.	DCP	N/A	N/A	N/A	N/A	N/A	1.1, 1.6, 2.4, 2.5, 3.3	High

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CS.P.2	Prevention & Policy	DCP planning support and technical assistance for Sandy disaster recovery: Support a variety of rebuilding and resilience activities with data analysis and mapping, coastal resilience planning, legal and technical support, community outreach and coordination, demographic analysis, tracking of housing permit activity, NYCHA resilience and replacement housing, and open space and Bluebelt planning.	DCP	N/A	N/A	N/A	N/A	N/A	2.1, 2.5, 5.2	Medium
CS.P.3	Emergency Services	Emergency contracts: Have contracts (tree removal, sidewalk and roadway repair, etc.) ready in advance to reduce response times when hazards occur.	DDC	OMB, DOT	TBD	TBD	TBD	N/A	2.1	Medium
CS.P.4	Infrastructure Project	Hardening pumping stations: Retrofit pumping stations for resiliency including 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.	DEP		Ongoing	\$128 million	Capital budget, HMGP, Public Assistance	N/A	2.1, 2.7, 2.8	Medium

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CS.P.5	Infrastructure Project	Hardening wastewater treatment plants: Protect critical 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 critical treatment systems. 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.	DEP	N/A	Ongoing	\$190 million	Capital Budget, HMGP, Public Assistance	N/A	2.1, 2.2, 2.7, 2.8	High
CS.P.6	Infrastructure Project	Alternatives for Rockaway Wastewater Treatment Plant: Consider conversion to a pumping station, which would be less expensive to protect, and potentially transferring treatment to a less vulnerable wastewater treatment facility elsewhere in the city.	DEP	N/A	Initiate feasibility study in 2014	\$150 million	Capital budget	N/A	2.1, 2.2, 2.7, 2.8	Medium

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CS.P.7	Property Protection	Vernon C. Bain Center (VCBC) Mooring System and site access improvement: Build marine vessel mooring above the FEMA 500-year flood advisory elevation of 15.36 feet. Currently VCBC mooring arm is designed at maximum 10.3 feet.	DOC	N/A	TBD	\$25 million	Capital/H MGP	No change	1.1, 2.1, 2.7	High
CS.P.8	Property Protection	Division I, II and III storehouse: Build a replacement for this main warehouse, which is condemned, beyond asset design life, and does not adequately support storage space for up to four weeks of isolated operation.	DOC	N/A	This is a long-term project and will not be implemented in the near future (FY17-21)	\$25 million	Capital	N/A	2.1	Medium
CS.P.9	Property Protection	FDNY storehouse improvement: Expand and create additional storehouses that would assist in ensuring continuity of basic agency operations as well as response operations.	FDNY	DCAS	TBD	TBD	TBD	N/A	2.1, 2.3	Medium

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CS.P.10	Emergency Services	EMS Battalion: Relocate part of EMS Battalion 43 due to damage sustained during Hurricane Sandy.	FDNY	DCAS	TBD	TBD	TBD	N/A	2.1, 2.2	Medium
CS.P.11	Emergency Services	EMS fallback sites: Identify fallback sites within the EMS facility network for EMS stations (23 percent of FDNY EMS stations) located in or near flood zones. Sites would be equipped with basic technology and sufficient storage capacity to allow EMS staff to initiate operations in the event of a catastrophe.	FDNY	DCAS	TBD	TBD	TBD	N/A	2.1, 2.3	Medium
CS.P.12	Emergency Services	FDNY emergency services: Expand FDNY capabilities to respond to natural hazards. In the wake of Hurricane Sandy, the FDNY identified initiatives that would enhance its capabilities—including GPS for apparatus, additional boats for high-water rescue and pumping, and other all-weather vehicles—and ultimately allow the FDNY to act as the City's primary response agency.	FDNY	DHS	TBD	TBD	DHS	N/A	2.1, 2.3	Medium

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CS.P.13	Education & Awareness	Outreach to residential building owners: Develop a methodology and technology solution to provide pre- and post-disaster outreach and information to residential building owners.	HPD	N/A	2 years	\$5,000,000	Grants	N/A	1.6, 2.6, 2.9, 2.10, 5.1	High
CS.P.14	Property Protection	Resilient home design competition: Launch a competition for resilient 1- to 4-family homes.	HPD	N/A	N/A	\$80,000	Grants	N/A	2.1, 2.9	Medium
CS.P.15	Infrastructure Project	Bridge and tunnel improvements and study: Design and install floodgates and barriers at Brooklyn-Battery Tunnel and Queens-Manhattan Tunnel (AW-98). Determine the coastal storm vulnerability of the Triborough Bridge.	MTA (Bridges and Tunnels)	TBD	TBD	TBD		BBT/QMT work has been subsumed into "Mitigation of Hugh L. Carey Tunnel and Queens Midtown Tunnel," above. Triborough Bridge work is under "Detailed Engineering Flood Studies at Non-Tunnel Facilities," above.	2.1, 2.7, 2.8, 2.9	Medium

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CS.P.16	Property Protection	Flood-hardening of vital communications, substations, transformers, mechanical equipment, revenue equipment, and other electronic systems at all MTA B&T facilities: Perform work to harden those areas that are required to maintain B&T operations and relocate electronic systems to less vulnerable locations at the respective service buildings. Facilities will be elevated above ABFE + 1 foot.	MTA (Bridges and Tunnels)		2-3 years	\$15 million	Applying for funding from FEMA HMGP. Also seeking 406 funding.	Conceptual stage	2.1, 2.2, 2.10	Medium
CS.P.17	Infrastructure Project	Raising Governors Island seawall for Hugh L. Carey Tunnel: Raise the seawall around the artificial island on which the Governors Island ventilation building is located to prevent stormwater from entering the tunnel through the vents.	MTA (Bridges and Tunnels)		5 years	\$18 million	Applying for funding from FEMA HMGP. Also seeking 406 funding	Conceptual stage; design study will be needed	2.1, 2.2, 2.9	Medium

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CS.P.18	Emergency Services	Water-level monitoring/alarm systems/CCTV: Provide for water-level monitoring/alarm systems/CCTV throughout Metro-North's right-of-way. Install water-level monitoring and alarm devices, including cameras, at critical key locations such as power substations, central instrument locators, yards, and stations to provide Metro-North management with information to facilitate power shutoff to avoid equipment damage and risks to customer and employee safety.	MTA (MNR)	FTA	3-4 years	\$25 million	Sandy Emergency Relief Program Resiliency	N/A	2.1, 2.10	High
CS.P.19	Property Protection	Power and communications/signal infrastructure mitigation: Elevate power supply components including sectionalizing switches, snowmelters, and bond boxes; explore making equipment watertight; raise critical substation equipment at key locations; and elevate central instrument locators, signal boxes, and other on-ground signal apparatus to minimize equipment susceptibility to flooding.	MTA (MNR)	FTA	4 years	\$25 million	Sandy Emergency Relief Program Resiliency	N/A	2.1, 2.2	Medium

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CS.P.20	Property Protection	Hardening of vulnerable healthcare facilities: Assess facilities' risk for water intrusion and power loss from a coastal storm (including those considered to be receiving facilities for surge patients) to identify gaps and inform future planning.	NYS DOH	DOHMH	Potentially 2 years	\$1.12 million	SSBG is being pursued	N/A	1.1, 2.1	High
CS.P.21	Property Protection	Protection of hurricane shelter windows: Retrofit windows to withstand winds associated with coastal storms.	OEM	DOE, FEMA, NYS OEM	TBD	TBD	HMGP, PDM-C	No change	1.1, 2.2, 2.7	Medium
CS.P.22	Emergency Services	Hazards U.S. Multi-Hazard (HAZUS-MH) modeling: Use HAZUS-MH computer modeling to determine losses generated by a coastal storm/hurricane and engineering effectiveness and cost-benefit of various coastal storm mitigation measures. Evaluate various flood and wind design enhancements for prototypical New York City building types.	OEM	DOB	3 months	TBD	Agency operating budget	No change	2.5, 5.1, 5.2	High

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CS.P.23	Emergency Services	Backup power for evacuation centers: Install 30 permanent generators and 30 quick-connects for the 60 schools that also serve as evacuation centers and/or hurricane shelters during a hurricane evacuation or other large-scale citywide emergency. Install eight permanent generators at schools that serve as "special medical needs shelters."	OEM	DOE, SCA, CUNY	3 years	TBD	HMGP	N/A	1.1, 2.1, 2.3	Medium
CS.P.24	Emergency Services	Storm shutters for the Emergency Operations Center: Protect the City's Emergency Operations Center from hurricane-force winds and flying debris by installing storm shutters at 165 Cadman Plaza East, Brooklyn.	OEM	DCAS	2 years	\$2,600,000	HMGP	No change	2.1, 2.7	High
CS.P.25	Emergency Services	Storm surge/tidal gauge real-time monitoring system: Install first set of gauges well offshore to act as an early warning system; install second set at the coastline so surge levels can be assessed as surge makes landfall; install third set inland to assess expanse and height of surge impacts.	OEM	USACE, FEMA, USGS, DCAS	TBD	TBD	TBD	N/A	5.2	Medium

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CS.P.26	Property Protection	Evacuation center/ hurricane shelter ADA retrofit program for DOE facilities: Upgrade key elements of the Coastal Storm Plan's facilities to ensure access by individuals with special needs and disabilities. Retrofit entrances and restroom facilities in compliance with Americans with Disabilities Act (ADA).	OEM	DOE, SCA	1 year	\$10,000,000	Capital, CDBG	N/A	1.1, 2.1, 2.7	Medium
CS.P.27	Prevention & Policy	Updates to Urban Post-Disaster Interim Neighborhood Design Guidelines: Incorporate lessons learned from Sandy into playbook developed with DCP in 2010 for post-disaster interim housing construction and site selection. Address permitting processes and legal requirements for implementation of deployable housing on a large scale, thereby creating a way to keep communities together.	OEM	DCP, DDC, DOB, HRO	1 year	\$100,000	FEMA, U.S. Dept. of Homeland Security Regional Catastrophic Preparedness Grant, private foundation funds	N/A	1.1, 2.5, 2.6	

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CS.P.28	Prevention & Policy	Cleanup standards for waterfront brownfields: Explore strengthened cleanup standards for waterfront brownfields.	OER	Law Department	3 months	No cost	Staff time	N/A	1.5, 2.1, 2.4, 2.6, 5.2	High
CS.P.29	Prevention & Policy	Building Code update for wind resiliency in new buildings: Amend the Building Code and complete studies to improve wind resiliency for new and substantially improved buildings.	OLTPS	N/A	TBD	\$5 million	Funding not yet secured	Not started	1.3, 2.4, 2.5, 5.2	High
CS.P.30	Prevention & Policy	Building Code update for wind resiliency in existing buildings: Amend Building Code to improve wind resiliency for existing buildings and complete studies of potential retrofits.	OLTPS	N/A	TBD	\$5 million	Funding not yet secured	Ongoing	1.3, 2.4, 2.5, 5.2	High
CS.P.31	Emergency Services	Power exercises: Continue to conduct power exercises. The 249th Engineering Battalion, OEM and other municipalities and counties on the Regional Catastrophic Disaster Team will conduct emergency generator power assessments throughout the NYC metro Area.	USACE, OEM, RCPT	NYSDEC, NYCDPR	TBD	TBD	USACE, RCPT	N/A	2.1, 2.3	Medium
CYBER THREATS										

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CY.P.1	Prevention & Policy	Supplementation of IT security: Develop plan to potentially utilize a future DoITT backup facility and/or identify cloud services that satisfy security concerns.	HRA	DoITT	2-year plan	TBD	Expense budget	N/A	1.1, 2.10	Medium
CY.P.2	Prevention & Policy	Cyber-security strategy: Develop MNR-wide cyber-security strategy and operational plan to identify threats and vulnerabilities to all cyber systems (including SCADA, communications, signals, corporate data, security networks) and put operational plans in place to mitigate those threats and reduce vulnerabilities.	MTA (MNR)	N/A	Indefinite/12 months	\$500,000	Staff time	N/A	2.1, 2.3, 2.10	Medium
DISEASE OUTBREAKS										
DO.P.1	Prevention & Policy	Pandemic planning: Develop plans and procure PPE addressing protection of employees; maintenance of essential functions and services; support for local, state, and federal response; and communication with customers about pandemic planning and response.	MTA (MNR)	TBD	TBD	TBD	TBD	N/A	1.1, 2.1	Medium
DROUGHT										

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D.P.1	Infrastructure Project	Maximizing capacity for water delivery from the Catskill/Delaware system: Pressurize the Catskill Aqueduct between Kensico Reservoir and DEP's ultraviolet disinfection facility to give DEP the ability to maximize use of water from Kensico Reservoir and flow to Hillview Reservoir.	DEP	N/A	Project deferred until after repair of Delaware Aqueduct leak	\$535 million	Capital budget	N/A	2.1, 2.7, 2.8	Medium
D.P.2	Infrastructure Project	Catskill Aqueduct capacity: Increase capacity to allow movement of water out of the Catskill systems, thereby providing up to 60 million gallons per day of additional flow from the Catskill Watershed in the event of a localized drought or loss of access to the Croton and Delaware systems.	DEP	N/A	Project completed by 2021	\$196 million	Capital budget	No change	2.1, 2.7, 2.8	Medium
D.P.3	Prevention & Policy	Construction Code revision: Provide standards to encourage water recycling.	DOB	N/A	Latest revision expected to be passed by City Council in fall 2013 and go into effect by fall 2014	TBD	Staff time	Ongoing	2.5, 4.3	High

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D.P.4	Prevention & Policy	Drought effects monitoring: Measure, monitor, and enforce the effects of droughts on hydrant use and availability.	FDNY	DEP	TBD	TBD	TBD	N/A	1.1, 1.5, 2.1	Medium
EARTHQUAKE										
EQ.P.1	Property Protection	Mechanical equipment seismic upgrade: Install new mechanical equipment to resist seismic forces in 55 City-owned buildings.	DCAS	N/A	Ongoing	\$500,000	Capital budget, New York Power Authority	No change	2.1, 2.7	High
EQ.P.2	Property Protection	Seismic protection for sewers: Inspect and repair structural deficiencies in intercepting sewers to reduce the impact of seismic activity.	DEP	N/A	Ongoing	Unknown	Capital/expense budget	No change	2.1, 2.7, 2.8	High
EQ.P.3	Property Protection	Seismic inspection and retrofit for drinking water distribution system: Conduct study to determine seismic design standards and seismic resiliency of drinking water distribution system (tunnels, piping, clean water pump stations, dams, shafts, and tanks). Use study results to prioritize and retrofit distribution	DEP	N/A	Ongoing	Unknown	Capital/expense budget	No change	2.1, 2.7, 2.8, 5.2	High

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		infrastructure to appropriate seismic standards as needed.								
EQ.P.4	Property Protection	Seismic study and retrofit for tall buildings: Perform seismic study of existing tall buildings, and retrofit buildings to exceed new Building Code seismic provisions.	DOE	DOE-SCA, DOB	10 years	TBD	FEMA	No change	1.1, 2.1, 2.5, 2.7	High
EQ.P.5	Prevention & Policy	Building upgrades to seismic codes: Retrofit MLK, Ron Brown, and Kountz pavilion superstructures at the Harlem Hospital Campus to meet new seismic codes.	HHC	DASNY	12 months	\$12,986,500	General obligation bonds	Scope expanded to include MLK, Ron Brown and Kountz pavilions	1.1, 2.1, 2.7	Medium

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EQ.P.6	Property Protection	HPD facility improvement: Retrofit HPD site offices to withstand a magnitude 8 earthquake.	HPD	DCAS	2 years	\$10,000,000	Grants	N/A	2.1, 2.7	Medium
EQ.P.7	Property Protection	UPACA (Site 6): Reinforce building to meet earthquake codes.	NYCHA	TBD	TBD	TBD	TBD	N/A	1.1, 2.1, 2.7	Medium
EQ.P.8	Emergency Services	HAZUS-MH modeling: Evaluate various seismic building design enhancements using HAZUS-MH to identify enhancements that reduce losses generated by earthquakes.	OEM	DOB	3 months	TBD	Agency operating budget	No change	2.5, 5.1, 5.2	High
EXTREME TEMPERATURES										

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ET.P.1	Emergency Services	Power redundancy in City-owned buildings: Install generators in select buildings to provide power during blackouts and emergency operations.	DCAS	N/A	5 years	\$10,000,000	Capital budget	Ongoing	2.1, 2.3	Medium
ET.P.2	Emergency Services	AC upgrade for senior centers: Continue to monitor status of AC systems at senior centers to help mitigate the effects of heat. Provide for repair or replacement as required.	DFTA	NYCHA	2 years	TBD	TBD	Ongoing	1.1, 1.5, 2.7	Medium
ET.P.3	Prevention & Policy	AC availability and affordability: Advocate for state and city funding to make ACs available and affordable to qualified seniors and people with disabilities and chronic disease.	DOH MH	City: OEM, Mayor's Office, DFTA, HRA. State: NYSDO H, OTDA	TBD	TBD	Staff time	No change	1.1, 1.5, 1.6	Medium

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ET.P.4	Prevention & Policy	Urban heat island effect mitigation: Map and evaluate mitigation strategies implemented in New York City.	DOH MH	OLTPS, Parks, NYC Service/ Mayor's Office, NPCC, academ ic partner	3 years	\$1 million	CDBG funding	N/A	1.1, 1.5, 5.2	High
ET.P.5	Prevention & Policy	Cooling centers: Classify all NYCHA community centers as resident cooling centers and retrofit with enhanced AC systems.	NYCH A	TBD	TBD	TBD	TBD	N/A	1.1, 2.7	Medium
FLOODING										
F.P.1	Prevention & Policy	Flooding Prevention: Avoid occupying space near or in SLOSH zones A and B, even if the HRA-General Support Services program can accept the space from DCAS.	DCAS	HRA	TBD	TBD	Agency lease budget	Ongoing	2.1, 2.2	Medium

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F.P.2	Property Protection	Infrastructure flood protection: Create spill vaults to minimize damage from flooding in below-grade fuel- storage containers.	DCAS	DOE	TBD	TBD	FEMA	No change	2.1, 2.7	Medium
F.P.3	Education & Awareness	Flood Resilient Building Design Manual: Provide guidance for planning and design of new construction and retrofit of existing buildings in areas subject to flooding. Guidance will mitigate property damage and life safety dangers posed by structurally and superficially damaged buildings.	DCP	DOB	2014	N/A	N/A	N/A	2.4, 2.5, 2.6, 2.7, 2.8, 2.10	High
F.P.4	Prevention & Policy	Zoning for flood-resistant construction, Phase I and II: Make text amendments to modify zoning to encourage flood-resistant construction. The regulations would be consistent with updated flood area construction practices and the need for greater resilience in the larger flood zones established by FEMA.	DCP	DOB	2013	N/A	N/A	N/A	2.4, 2.5	High

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F.P.5	Coastal/Natural Resource Protection	Ecologically sensitive industrial area planning: Conduct area plans for ecologically significant maritime and industrial areas that have significant environmental contamination. Work with Brownfield Opportunity Area grant recipients, local communities, and elected officials to identify next steps, and seek funding for further studies of existing conditions and strategies to promote maritime businesses and address environmental issues.	DCP	N/A	N/A	N/A	N/A	N/A	2.4, 2.5, 2.6	High
F.P.6	Infrastructure Project	Croton Falls pump station rehabilitation: Provide additional redundancy for water supply operations by allowing DEP to move water between the Croton and Catskill/Delaware systems to supplement the local distribution system. Upgrade pump stations to provide 87 million additional gallons per day into distribution if there is an emergency service disruption in the Catskill or Delaware system.	DEP	N/A	2017	\$41 million	Capital budget	No change	2.1, 2.7, 2.8	Medium

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F.P.7	Infrastructure Project	Bergen Basin and Tallman Island Wastewater Treatment Plant drainage upgrades: Reconfigure and expand sewer system capacity in Bergen Basin and Tallman Island Wastewater Treatment Plant drainage areas to capture more stormwater, reduce combined sewer overflows into surrounding water bodies, and prevent sewer backups and street flooding.	DEP	N/A	2023	\$106 million	Capital budget	No change	2.1, 2.7, 2.8	Medium
F.P.8	Emergency Services	Server capacity improvements: Enhance agency servers housing necessary data. Agency servers crashed due to flooding. Additional servers outside of flood zones are necessary to ensure safety of customer data and reimbursement of partners.	DFTA	DoITT, HRA	2 years	\$636,700	DFTA, TBD	N/A	1.1, 2.3, 2.10	High
F.P.9	Property Protection	DHS electrical improvements: Relocate electrical closets from the lower floors/basements to higher levels at the 26 DHS sites.	DHS	N/A	Ongoing	\$13,500,000	TBD	Scope reduced to 26 DHS sites from 29 DHS sites	1.1, 2.1, 2.2	Medium

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F.P.10	Property Protection	Borden Avenue facility: Dig an exterior trench around foundation to divert water to Newtown Creek, waterproof foundation, and elevate first floor level.	DHS	DEP, DOB	Ongoing	\$16,000,000	HMPG	N/A	1.1, 1.5, 2.1	Medium
F.P.11	Emergency Services	Data system upgrade: Computerize data system to assist in post-storm inspections.	DOB	N/A	Latest revision expected to be passed by City Council in fall 2013 and go into effect by fall 2014	TBD	Staff time	Ongoing	2.3, 2.5	High
F.P.12	Infrastructure Project	Rikers Island roadway regrading: Redesign and elevate roadways on Rikers Island to alleviate flooding conditions.	DOC	N/A	TBD	\$4.6 million	Capital	No change	1.1, 2.1, 2.7	Medium

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F.P.13	Property Protection	Water infiltration prevention: Do thermal imaging of roofs and building facades of all DOHMH facilities to determine areas and extent of existing water infiltration.	DOH MH	N/A	6-12 months	\$80,000	Grant funds	N/A	1.1, 2.1, 5.2	Medium
F.P.14	Property Protection	Flood-proofing 125 Worth Street vault: Seal the existing window with masonry, move the HVAC system to the building's roof, install large-capacity sump pumps in the floor to pump any water out, and install a new FM-200 fire suppression system that does not use water.	DOH MH	DCAS	6-18 months	\$463,275	N/A	N/A	2.1, 2.2, 2.7	Medium
F.P.15	Infrastructure Project	Permeable pavement: Expand use of permeable pavement in roadways, plazas, and (where appropriate) sidewalks to capture and detain stormwater to mitigate localized flooding of streets, reduce flooding of structures, make streets passable to emergency vehicles more quickly, and reduce loads on sewage treatment plants and consequent combined sewer overflows.	DOT	DDC	5 years (design, construction)	\$30,000,000	HMGP, DEP G.I. funding (within Priority CSO areas), state GIGP grants, TEP/TAP grants, City	Incorporates several 2009 projects (2009 Indices: MH.P.37, F.E.15, F.E.36, F.P.8)	2.1, 2.7, 2.8, 2.9	High

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							Capital Budget			
F.P.16	Emergency Services	Protection for the Manhattan 1,2,5 facility: Do new design planning for the Manhattan 1,2,5 facility under construction to provide for automated flood protection gates built into the sidewalks.	DSNY	N/A	Implemented as needed--immediately	Unknown	Capital budget	N/A	2.1, 2.7, 2.8	Medium
F.P.17	Prevention & Policy	Stapleton waterfront flood mitigation: Construct a new tidal wetlands area at the Stapleton waterfront, between Canal and Water Streets, and a pilot stormwater management system in an adjacent public open space to capture stormwater before it reaches the bay.	EDC	N/A	24 months	\$12,500,000	HMGP	Currently pending grant review	2.7, 4.3, 4.4	Medium

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F.P.18	Property Protection	Brooklyn Army Terminal passive flood barrier system: Install 550 linear feet of passive flood barriers at Building A to prevent future flood damage.	EDC	N/A	24 months	\$1,243,533	HMGP	Currently pending grant review	2.1, 2.7	High
F.P.19	Property Protection	EDC operations centers flood mitigation: Raise the emergency generator at the Brooklyn Emergency Operations Center, and upgrade emergency backup systems related to MIS equipment at Brooklyn Emergency Operations Center and Manhattan Asset Management Emergency Operations Center.	EDC	N/A	24 months	\$1,200,000	HMGP	Currently pending grant review	2.1, 2.2, 2.3, 2.7	High
F.P.20	Property Protection	Flood effects reduction program: Install electronic check valves at the street level to prevent sewer and stormwater backflow at firehouses and other locations prone to flooding and damage associated with storms.	FDNY	DDC	TBD	TBD	TBD	N/A	2.1, 2.10	Medium

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F.P.21	Emergency Services	Dewatering pumps at FDNY facilities: Purchase and install dewatering pumps at FDNY facilities in the revised FEMA flood zones, and acquire portable dewatering pumps for field units.	FDNY	DHS	TBD	TBD	TBD	N/A	2.1	Medium
F.P.22	Property Protection	New construction flood mitigation: Raise newly built and in-construction structures (e.g., firehouses and EMS stations) several feet in the designated flood zone(s) according to FEMA standards.	FDNY	DDC	TBD	TBD	TBD	N/A	1.1, 2.1, 2.2	Medium
F.P.23	Property Protection	Coney Island Hospital flood-proofing: Install flood-proofing in Coney Island Hospital basement as part of the Phase II modernization.	HHC	TBD	7 years	\$13,293,000	General obligation bonds	No change	1.1, 2.1, 2.7, 2.8	Medium

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F.P.24	Property Protection	Coney Island Hospital emergency department mitigation: Relocate and elevate the Emergency Department and its critical systems (imaging and generators) above the base flood elevation.	HHC	TBD	3-4 years	\$60 million additional (some parts damaged/covered)	FEMA 406, HMGP, CDBG, general obligation bonds	N/A	1.1, 2.1, 2.8	Medium
F.P.25	Property Protection	Coney Island Hospital/critical system protection: Elevate or harden electrical gear.	HHC	TBD	1 year	\$42 million (included in plans for new structure)	FEMA HMGP, general obligation bonds	N/A	1.1, 2.1, 2.2, 2.7, 2.8	Medium
F.P.26	Property Protection	Metropolitan Hospital: Install flood barriers.	HHC	TBD	1-2 years	\$60 million additional (some parts damaged/covered)	HMGP, general obligation bonds	N/A	1.1, 2.1, 2.7, 2.8	Medium

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F.P.27	Property Protection	Metropolitan Hospital: Relocate and elevate Emergency Department and its critical systems (imaging and generators) above the base flood elevation.	HHC	TBD	2 years	\$7 million	HMGP, CDBG, general obligation bonds	N/A	1.1, 2.1, 2.8	Medium
F.P.28	Property Protection	Coler Hospital: Protect electrical equipment.	HHC	TBD	1 year	\$40 million	HMGP, general obligation bonds	N/A	1.1, 2.1, 2.7, 2.8	Medium
F.P.29	Property Protection	Coler Hospital: Install emergency fuel tanks and pumps.	HHC	TBD	1 year	\$12 million	HMGP, general obligation bonds	N/A	1.1, 2.1, 2.7, 2.8	Medium

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F.P.30	Property Protection	Building flood protection: Supply buildings susceptible to flooding with sandbags and/or request that landlord do so.	HRA	N/A	Plan semi in place	TBD	Expense budget	N/A	1.1, 2.1, 2.6, 2.7	Medium
F.P.31	Property Protection	Portable generators: Maintain an inventory of portable generators for facility staff to use to operate tradesman tools.	HRA	N/A	Generators now in storage	\$6,000	Agency capital budget	N/A	1.1, 2.1, 2.3	Medium
F.P.32	Infrastructure Project	Substation mitigation: Raise replacement equipment in Sandy-flooded substations to protect against another storm of similar magnitude.	LIPA		November 2013 start, TBD completion	\$ 28,500,000 (Far Rockaway, Arverne, Rockaway Beach, and Neponsit)	Insurance, FEMA 406, NYS CDBG fund, LIPA	N/A	2.1, 2.2, 3.3	Medium

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F.P.33	Emergency Services	Water-balance study: Study flood-prone areas to determine ways to prevent water from entering system. This study will involve analyzing inflow and outflow capacity, storage, etc.; identify funding. Implement drainage master plan, if recommended by study.	MTA (NYCT - Subway)	DEP	5 years (study)	TBD	FEMA, NYCT	No change	2.1, 2.7	Medium
F.P.34	Infrastructure Project	Double Track Main Line, Phase 2. Complete second track on the Main Line between Farmingdale and Ronkonkoma to allow LIRR to operate increased off-peak service on the Main Line. -This added service is critical should a catastrophic event halt LIRR service on Long Island's South Shore, impacting southeast Queens stations.	MTA (LIRR)	N/A	TBD	\$300 million	Potential FTA Local Priority Resiliency funds	N/A	2.1, 2.3	Medium
F.P.35	Infrastructure Project	Ventilation grate improvements: Make improvements in Atlantic Avenue tunnels.	MTA (LIRR)	N/A	TBD	\$4 million	Potential FTA Local Priority Resiliency Funds	N/A	2.1, 2.7	Medium

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F.P.36	Property Protection	Long Island City Yard protection: Determine perimeter protection measures for the Yard.	MTA (LIRR)	N/A	TBD	TBD	TBD	N/A	2.1, 2.7	Medium
F.P.37	Property Protection	Safeguarding of basement/cellar equipment: Install duplex sump pumps for dewatering and additional floor drains; raise switchgear where possible; use watertight seals on electrical panels subject to flooding; and install elevated platforms for vital equipment. Avoid using cellars for public use (meeting rooms, centers, etc.).	NYCHA	TBD	Estimated time of completion 2016	\$7,700,000	Insurance, FEMA	To be incorporated with Hurricane Sandy development re-design efforts	2.2, 2.7, 2.8	Medium
F.P.38	Property Protection	New NYCHA building or development: Construct a building/development adding a number of units to the NYCHA portfolio equal to the number of first-floor apartments in Evacuation zones 1, 2, and 3 to be vacated and used for other purposes.	NYCHA	TBD	TBD	TBD	TBD	N/A	1.1, 2.2	Low

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F.P.39	Property Protection	NYCHA floodgates and barriers: Install floodgates and barrier mechanisms to control the rate of water infiltration into building areas prone to flooding.	NYCHA	TBD	Estimated time of completion 2016	TBD	Insurance, FEMA	N/A	2.1, 2.7, 2.8	Medium
F.P.40	Property Protection	NYCHA boiler rooms and electrical equipment: Relocate low-lying boiler rooms and electrical switchgear/panels submerged during Hurricane Sandy to areas within existing structures, new extensions, or stand-alone facilities at higher elevations.	NYCHA	TBD	Estimated time of completion 2016	TBD	Insurance, FEMA	N/A	1.1, 2.1, 2.2	Medium
F.P.41	Property Protection	Sump pump protection: Upgrade sump pumps in facilities located within 100-year floodplain.	NYPD	N/A	TBD	TBD	TBD	N/A	2.1, 2.7, 2.8	Medium

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F.P.42	Property Protection	Building electrical protection: Relocate existing electrical distribution within Police Department buildings to areas or floors above the 100-year flood level.	NYPD	N/A	TBD	TBD	TBD	N/A	2.1, 2.2, 2.7, 2.8	Medium
F.P.43	Property Protection	Boiler protection: Raise boilers in buildings to locations above 100-year flood level.	NYPD	N/A	TBD	TBD	TBD	N/A	2.1, 2.2, 2.7, 2.8	Medium
F.P.44	Property Protection	Short-term flood mitigation of OCME emergency management storage facility at 18th Street and FDR Drive: Relocate all equipment to a leased warehouse in a centralized area not prone to flooding.	OCME		Unknown	\$4,400,000	Capital	N/A	2.1, 2.2, 2.7, 2.9	Medium

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F.P.45	Property Protection	Flood mitigation measures for New York City's backup Emergency Operations Center: Implement flood mitigation measures, including sump-pumps, wet flood-proofing, and drainage improvements.	OEM	DCAS, FEMA	2–3 years	\$10,000,000	HMGP, PDM-C, SRL, RFC	No change	2.1, 2.7	Medium
F.P.46	Emergency Services	HAZUS-MH modeling: Evaluate various building design enhancements using HAZUS-MH to identify opportunities to reduce flooding.	OEM	DOB	3 months	Staff time	Agency operating budget	No change	2.5, 5.1, 5.2	Medium
F.P.47	Prevention & Policy	National Flood Insurance Program (NFIP) Community Rating System: Enroll in NFIP Community Rating System. By implementing floodplain management initiatives and reducing the city's flood risk, residents can receive discounted flood insurance.	OEM	OLTPS, DCP, DOB	5 years	TBD	Agency operating budget	No change	2.4, 2.7	Medium

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F.P.48	Education & Awareness	Public information and guidance: Disseminate mitigation information and help provide technical assistance to property owners affected by flood events.	OEM	DEP, FEMA, NYS OEM	TBD	TBD	HMGP, PDM-C, SRL, RFC	No change	2.6, 5.1, 5.2, 5.3	High
F.P.49	Education & Awareness	Outreach and education for owners of Severe Repetitive Loss properties: Compile and map SRL properties throughout the city. Determine SRL funding eligibility and target these properties for outreach.	OEM	DEP, FEMA, NYS OEM	TBD	TBD	HMGP, PDM-C, SRL, RFC	Assessment still pending	2.9, 5.1, 5.2, 5.3	Medium
F.P.50	Infrastructure Project	Local storm surge barrier for Gowanus Canal: Call on and work with the USACE to develop an implementation plan and preliminary designs for a surge barrier.	OLTP S	N/A	TBD	\$2 million	Funding not yet secured	N/A	4.3, 4.4	High
F.P.51	Infrastructure Project	Plan for flood protection along the Williamsburg, Greenpoint, and Long Island City coastlines: Create an implementation plan for comprehensive improvements on public and private property.	OLTP S	DCP, DOT, Parks	TBD	\$1 million	Funding not yet secured	N/A	4.3, 4.4	High

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F.P.52	Infrastructure Project	Floodgate repairs at Oakwood Beach, Staten Island: Continue to work with the USACE to complete emergency floodgate repairs at Oakwood Beach.	OLTP S	N/A	TBD	\$1 million	USACE	N/A	4.3, 4.4	Medium
F.P.53	Infrastructure Project	Primary and secondary dune systems in Rockaway Peninsula: Call on and work with the USACE to study and install dunes in vulnerable neighborhoods (such as Breezy Point).	OLTP S	Parks	TBD	\$20.5 million	Funding not yet secured	N/A	1.1, 4.3, 4.4	High
F.P.54	Infrastructure Project	Offshore breakwaters adjacent to and south of Great Kills Harbor: Call on and work with the USACE to study and install offshore breakwaters.	OLTP S	N/A	TBD	\$250 million	Funding not yet secured	N/A	4.3, 4.4	High
F.P.55	Infrastructure Project	Flood protection in Hunts Point: Install an integrated flood protection system.	OLTP S	N/A	TBD	\$171 million	Funding not yet secured	N/A	2.1, 4.3, 4.4	Medium
F.P.56	Infrastructure Project	Flood protection in East Harlem: Install an integrated flood protection system.	OLTP S	N/A	TBD	\$189 million	Funding not yet secured	N/A	1.1, 2.1, 4.3, 4.4	Medium
F.P.57	Infrastructure Project	Lower Manhattan flood protection: Install an integrated flood protection system in Lower Manhattan, including the Lower East Side.	OLTP S	N/A	TBD	\$315 million	Funding not yet secured	N/A	1.1, 2.1, 4.3, 4.4	Medium

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F.P.58	Infrastructure Project	Integrated Flood Protection System for Red Hook: Design and construct a flexible, integrated flood protection system for Red Hook that is composed of elements such as terraced berms; benches, park walls, flood-proofed buildings, or bridge abutments; drainage improvements; and temporary features such as deployable floodwalls, which can be erected in advance of an extreme weather event.	OLTP S	N/A	TBD	\$315 million	Funding not yet secured	N/A	1.1, 2.1, 2.7	Medium
F.P.59	Infrastructure Project	Protection of Farragut substation: Continue to work with Con Ed to protect the substation.	OLTP S	N/A	TBD	\$0	Ratepayers	N/A	2.1, 2.7, 3.3	High
F.P.60	Infrastructure Project	Newtown Creek flood protection: Call on and work with the USACE to study and install local storm surge barriers at Newtown Creek.	OLTP S	N/A	TBD	\$1 billion	Funding not yet secured	N/A	1.1, 2.1, 4.3, 4.4	High
F.P.61	Prevention & Policy	Flood protection research: Evaluate soft infrastructure as flood protection and study innovative coastal protection techniques.	OLTP S	N/A	TBD	\$4 million	Funding not yet secured	N/A	4.3, 4.4	High
F.P.62	Prevention & Policy	Prevention of drainage pipe flooding: Evaluate the city's vulnerability to drainage pipe flooding and identify appropriate	OLTP S	N/A	TBD	\$13 million	Funding not yet secured	N/A	2.1, 4.3, 5.2	High

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		solutions to minimize those risks.								
F.P.63	Infrastructure Project	Floodgate at Mill Creek: Call on and work with the USACE to study the construction of a floodgate at Mill Creek.	OLTP S	N/A	TBD	\$0	N/A	N/A	4.3, 4.4	High
F.P.64	Prevention & Policy	Community Rating System: Study approaches for New York City to join FEMA's Community Rating System program.	OLTP S	DOB, DCP	TBD	\$0.5 million	CDBG	N/A	1.6, 5.1	High
F.P.65	Infrastructure Project	Coney Island Creek wetlands and tidal barrier: Develop an implementation plan and preliminary designs for new Coney Island Creek wetlands and tidal barrier.	OLTP S	N/A	TBD	\$1 million	Funding not yet secured	N/A	4.3, 4.4	High
F.P.66	Prevention & Policy	Integrated flood protection for southern Manhattan: Create an implementation plan and design for an integrated flood protection system for remaining southern Manhattan areas.	OLTP S	N/A	TBD	\$1 million	Funding not yet secured	N/A	2.1, 4.4	High
F.P.67	Property Protection	Flood protection of vital infrastructure at LaGuardia Airport: Construct a floodwall around the West Field Lighting Vault; protect West End Substation by installing dikes and re-grading; construct a new East Field Lighting Vault Building.	PANY NJ (Aviation)	FAA	4 years	\$21,800,000	Capital budget, HMGP	N/A	2.1, 2.7	Medium

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F.P.68	Property Protection	Flood protection of vital infrastructure at Kennedy Airport: Restore capacity to handle stormwater runoff captured in catch basins and conveyed into outfalls 1 and 2 through storm drainage system.	PANY NJ (Aviation)	FAA	4 years	\$5,000,000	Capital budget, HMGP	N/A	2.1, 2.7	Medium
F.P.69	Property Protection	Drainage improvements at Kennedy Airport: Install tide gates/drainage check valves to manage drainage outfalls in low-lying areas vulnerable to reverse flow through the drainage system.	PANY NJ (Aviation)	DEP, NYS DEC	4 years	\$60,000,000	Capital budget, HMGP	N/A	2.1, 2.7	Medium
F.P.70	Infrastructure Project	Protection of Kennedy Airport fuel farm tanks: Redesign "moat" system that surrounds each fuel farm tank to prevent flooding.	PANY NJ (Aviation)	PANYNJ	4 years	\$7,000,000	Capital budget, HMGP	No change	2.1, 2.7, 4.1	Medium
F.P.71	Infrastructure Project	LaGuardia Airport dike wall: Reinforce dike wall along Bowery Bay and runways 13-31.	PANY NJ (Aviation)	FAA	4 years	\$5,000,000	Capital budget, HMGP, 406	No change	2.1, 2.7	Medium

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F.P.72	Property Protection	Kennedy Airport sanitary lift station: Redesign and upgrade sanitary lift station in central terminal area to prevent facility flooding.	PANY NJ (Aviation)	PANYNJ	5 years	\$8,000,000	Capital budget, HMGP	No change	2.1, 2.7	Medium
F.P.73	Property Protection	Kennedy Airport runway upgrade: Redesign and retrofit runways 4R and 22L including raising the grade, modifying existing drainage, and installing new lighting and concrete pavement.	PANY NJ (Aviation)	FAA	4 years	\$40,000,000	Capital budget	No change	2.1, 2.7	Medium
F.P.74	Property Protection	Kennedy Airport runway upgrade: Redesign and retrofit runways 4L and 22R including raising the grade, modifying existing drainage, and installing new lighting and concrete pavement.	PANY NJ (Aviation)	FAA	4 years	\$47,997,000	Capital budget	No change	2.1, 2.7	Medium
F.P.75	Property Protection	Improvements to George Washington Bridge anchorage drainage system: Install new passive drainage system and rehabilitate the New Jersey anchorage sump pump room to mitigate the effects of heavy rainfall on the structural components in the anchoring of the bridge.	PANY NJ (TBT)	NJ DEP, NYS DEC	4 years	\$9,200,000	Capital budget, HMGP	N/A	2.1, 2.7	Medium

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F.P.76	Property Protection	Flood-proofing at Olmsted site: Implement flood-proofing (including possible elevation and creation of additional drainage capacity) at the Olmsted Center, Parks' capital division headquarters, which suffers repetitive flooding.	Parks	N/A	5 years	\$10,000,000	TBD	No change	2.1, 2.2, 2.7	Low
F.P.77	Emergency Services	Tidegate upgrade in Flushing Meadow Corona Park: Update and upgrade tidegates in the floodwater flow control structure under the north fascia of the Purpose Bridge. Install automated system that can be opened and closed based on tides, replacing the current gate system which is manually controlled and difficult to operate.	Parks	DEP	TBD	\$5,000,000	HMGP, other funding	N/A	2.1, 2.3, 2.7	High
INFRASTRUCTURE FAILURES										
IF.P.1	Emergency Services	Expansion of cogeneration: Explore the feasibility of expanding cogeneration and other energy-related reliability measures to other wastewater treatment plants in the city besides North River, including the Wards Island WWTP. These measures—which could include energy efficiency, increased generation, and use of renewable energy supplies such as methane	DEP	N/A	2014	\$0.5million	Operating budget	N/A	2.1, 2.3, 2.7, 4.3	High

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		gas and solar energy, and cogeneration—would improve the ability of wastewater treatment plants to operate reliably during electrical disruptions.								
IF.P.2	Infrastructure Project	Repair of the Delaware Aqueduct leak: Implement planned repairs to the Delaware Aqueduct—which conveys, on average, 50% of the city's water from upstate sources—by constructing a bypass tunnel and repairing sections of the tunnel.	DEP	N/A	Project to be completed in 2022	\$760 million	Capital budget	N/A	2.1, 2.7, 2.8	High
IF.P.3	Property Protection	Utilities on Buono Bridge: Build redundancy, including additional water and gas mains and upgraded generators, to protect against bridge collapse.	DOC	DOT	TBD	\$211 million	Capital	No change	1.1, 2.1, 2.3	Low

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IF.P.4	Infrastructure Project	Facility electrical power and data infrastructure upgrade: Provide necessary upgrades for building services during emergency situation.	DOH MH	DDC	12-36 months	\$5,000,000	Capital budget	N/A	2.1, 2.3	High
IF.P.5	Emergency Services	DOHMH generators and retrofits: Equip facilities with generators for continuity of building services during power outages, including making any necessary structural improvements to support generators.	DOH MH	DDC	12 to 24 months	\$500,000	Capital budget	N/A	1.1, 2.3	High
IF.P.6	Infrastructure Project	Session Initiation Protocol (SIP): Implement SIP for voice communication between 311 and the carrier's public network, enabling the City to be less reliant on one carrier central office and have the ability to fail over to alternate locations.	DoITT	N/A	TBD	\$3.5 million	TBD	N/A	1.2, 2.1, 2.3, 2.10	High

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IF.P.7	Emergency Services	Citywide IVR for employee announcements: Expand the City's in-house audio conferencing solution to support 500 simultaneous calls, with overflow of another 1,000 calls to be handled in the cloud.	DoITT	OEM	TBD	\$1.05 million	TBD	N/A	1.2, 2.1, 2.3, 2.10	High
IF.P.8	Infrastructure Project	Telecommunications Planning and Resiliency Office: Create new unit in DoITT to study telecommunications risks and formulate and advocate for solutions.	DoITT	N/A	Federal grant for 2-year period; long-term funding TBD	\$1.2 million	Federal block grant approved	N/A	2.1, 2.3, 2.10, 3.3	High
IF.P.9	Infrastructure Project	IP routing network: Harden the network, providing the City with required advanced bandwidth management devices to regulate appropriate use of ISP links during emergencies.	DoITT	N/A	TBD	\$2.9 million	TBD	N/A	1.2, 2.1, 2.2, 2.10	High

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IF.P.10	Property Protection	Purchase of mobile substation: Mitigate substation outage by developing specifications and purchasing mobile substation equipment suitable for NYC applicability due to loss of key substation equipment.	LIPA	N/A	February 2013 start, September 2014 completion	\$ 2,900,000 (two units)	FEMA 406, NYS CDBG fund, LIPA	N/A	2.1, 2.3, 3.3	High
IF.P.11	Property Protection	Purchase of mobile switchgear: Mitigate substation outage by developing specifications and purchasing mobile switchgear for use in event of switchgear disruption in or near substation.	LIPA	N/A	February 2013 start December 2013 completion	\$ 2,000,000 (two units)	FEMA 406, NYS CDBG fund, LIPA	N/A	2.1, 2.3, 3.3	High
IF.P.12	Emergency Services	Emergency generators in NYCHA properties: Install natural gas-powered, emergency generators throughout NYCHA properties to ensure building corridors and stairwells remain lit and provide power for vital domestic water pumps (high-rise buildings) and boilers for hot water and heating during utility outages.	NYCHA	TBD	Estimated time of completion 2016	\$ 120,000,000	CDBG	N/A	1.1, 2.1, 2.3	Medium

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IF.P.13	Prevention & Policy	Stand-alone power generation in NYCHA developments: Re-engineer and re-configure all 334 NYCHA developments for enhanced stand-alone power generation. Consider all latest technologies including Microgrid, COGEN, and CHP.	NYCHA	TBD	TBD	TBD	TBD	N/A	1.1, 2.1, 2.3	Medium
IF.P.14	Emergency Services	Backup generators for Police Department facilities: Procure and install backup generators and automatic transfer switches.	NYPD	N/A	TBD	TBD	TBD	N/A	2.1, 2.7, 2.8	Medium
IF.P.15	Infrastructure Project	Flood mitigation of 520 First Ave. (Manhattan Morgue) and Forensic biology building: Purchase approximately 100,000 square feet of space due to history of flooding in these structures. Relocate records, evidence, samples, back up OCME training lab, special operations equipment/ vehicles, and records to a temperature-controlled, secured, CCTV-monitored warehouse under the control of OCME.	OCME	N/A	Unknown	\$50,000,000	Capital	N/A	2.1, 2.2, 2.7, 2.9	Medium

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IF.P.16	Emergency Services	Kings and Queens facilities: Acquire backup generators and storage for generators.	OCME	N/A	Unknown	Unknown	Capital	N/A	2.1, 2.3	Medium
IF.P.17	Emergency Services	Generator assessment and installation of quick-connects for critical infrastructure: Expand the Prime Power Assessment Program citywide to include a generator quick-connect and/or generator installation in addition to the survey.	OEM	USACE, FEMA, DCAS, City agencies	Immediate	\$50,000,000	Capital budget	No change	2.1, 2.3, 2.7	Medium
IF.P.18	Emergency Services	Backup generators for gas stations and terminals: Ensure that a subset of gas stations and terminals have access to backup generators in case of widespread power outages.	OEM	N/A	1 year	TBD	Agency operating budget	N/A	2.1, 2.3	Medium
IF.P.19	Prevention & Policy	Protection from utility service interruptions: Amend the Construction Codes and develop best practices to protect against service interruptions.	OLTPS	N/A	TBD	\$1 million	Funding not yet secured	N/A	1.3, 2.5, 5.2	High
IF.P.20	Prevention & Policy	Distributed generation (DG) and micro-grids: Work with public and private partners to scale up DG and micro-grids.	OLTPS	N/A	TBD	\$5 million	HMGP, CDBG	N/A	2.1, 2.3	High
MULTI-HAZARD										

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MH.P.1	Prevention & Policy	Overhead electric system improvements: Fortify the overhead system from wind and tree damage by reducing circuits into smaller segments, isolating open wire spurs from feeder main runs, improving auto-loop reliability, and selective undergrounding of overhead infrastructure.	Con Ed	N/A	4 years	Approximately \$250 million	Agency operating budget	N/A	2.7, 3.3	Medium
MH.P.2	Prevention & Policy	Underground electric system improvements: Fortify the underground system by installing submersible equipment in flood-prone areas and applying sectionalizing strategies to minimize number of customers impacted by flooding.	Con Ed	N/A	4 years	Approximately \$200 million	Agency operating budget	N/A	2.7, 3.3	Medium
MH.P.3	Prevention & Policy	Gas system Improvements: Fortify the gas system by installing special valves to prevent water infiltration and replacing cast-iron and bare-steel mains in flood zones.	Con Ed	N/A	2 years	Approximately \$100 million	Agency operating budget	N/A	2.7, 3.3	Medium
MH.P.4	Prevention & Policy	Storm-hardening of critical facilities: Install new and modify existing flood protection to improve storm-hardening at critical facilities to new flood protection levels. Modify equipment housing and penetrations to minimize water intrusion.	Con Ed	N/A	3 years	Approximately \$400 million	Agency operating budget	N/A	2.2, 2.7, 3.3	Medium

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MH.P.5	Property Protection	Window upgrades: Replace windows at 100 Centre Street, 1 Centre Street, 2 Lafayette Street, 125 Worth Street, and 80 Centre Street.	DCAS	DDC	10 years	\$15,000,000	Capital budget	No change	2.1, 2.2	Medium
MH.P.6	Prevention & Policy	Retail resiliency study: Examine commercial corridors in the flood zone to better understand resiliency options.	DCP	N/A	2013	N/A	N/A	N/A	3.3	Medium
MH.P.7	Prevention & Policy	Building Identification Numbers (BINs): Assign BIN numbers to buildings that currently don't have them and to structures (such as bridges, tunnels, subway stations, monuments, and temporary structures) to allow the FDNY to better inspect these buildings and structures as part of its Risk Based Inspection System (RBIS).	DCP	N/A	N/A	N/A	N/A	N/A	2.1, 2.5, 5.2	Medium
MH.P.8	Prevention & Policy	BIN Working Group recommendations: Implement recommendations made as result of the seven-month analysis of BIN usage.	DCP	N/A	N/A	N/A	N/A	N/A	2.1, 2.5, 5.2	Medium

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MH.P.9	Property Protection	Inspection and upgrade program for DEP facilities: Implement programmatic inspection and upgrade program to ensure all critical DEP facilities maintain continuity of operations during flood, hurricane, or earthquake events. This program will include flood-proofing and structural retrofits of DEP offices, field locations, and other critical facilities.	DEP	N/A	Ongoing	Included in regular agency capital/operating budget	Capital/expenditure budget	No change	2.1, 2.3, 2.7, 2.8	Medium
MH.P.10	Infrastructure Project	Groundwater development: Construct treatment facilities throughout the southeast Queens groundwater system to provide up to 55 million gallons per day of additional water treated to meet EPA Safe Drinking Water Act standards.	DEP	N/A	TBD	TBD	TBD	No change	1.5, 2.1, 2.7	Medium
MH.P.11	Infrastructure Project	Groundwater treatment plant: Construct a treatment facility in southeast Queens with four existing groundwater wells to provide an additional 12 million gallons of water supply for the city. Remove and treat groundwater to meet EPA Safe Drinking Water Act standards.	DEP	N/A	2021	\$40 million	Capital budget	No change	1.5, 2.1, 2.7, 2.8	Medium

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MH.P.12	Emergency Services	Laptops for DFTA essential staff: Purchase additional laptops for essential personnel to continue operations in the event of flooding at DFTA offices.	DFTA	HRA, DoITT	2 years	\$10,000	TBD	N/A	1.1, 2.3	High
MH.P.13	Emergency Services	Generator for neighborhood hub: Purchase generator for one senior center hub in each borough.	DFTA	CBOs	3 years	TBD	TBD	N/A	1.1, 2.3	Medium
MH.P.14	Emergency Services	Headlamps for home-delivered meals deliverers: Purchase headlamps to deliver meals safely to homebound individuals during power outages.	DFTA	CMOW	2 years	\$10,000	TBD	N/A	1.1, 1.6, 2.3	Medium

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MH.P.15	Property Protection	Upgrades to DHS buildings: Add exterior reinforcements and energy performance enhancements to 29 DHS-owned buildings, exceeding the requirements of the New York City Building Code.	DHS	N/A	Ongoing	TBD	TBD	No change	1.1, 2.1, 2.4, 2.5	Medium
MH.P.16	Property Protection	DHS building roof improvements: Add ballast to flat roofs of 21 DHS-owned facilities to protect against high winds, heavy rain, and flying debris, exceeding the requirements of the City's Building Code.	DHS	N/A	Ongoing	\$2,000,000	TBD	No change	1.1, 2.1, 2.4, 2.5	High
MH.P.17	Property Protection	Window upgrade in DHS buildings: Retrofit windows in 29 DHS-owned facilities by glazing to withstand effects of coastal storms, windstorms, and tornadoes, exceeding the requirements of the City's Building Code.	DHS	N/A	Ongoing	\$18,000,000	TBD	No change	1.1, 2.1, 2.4, 2.5	Medium
MH.P.18	Emergency Services	Power redundancy at DHS buildings: Install redundant power supply at all DHS-owned facilities.	DHS	N/A	Ongoing	\$6,500,000	TBD	Scope expanded to include purchase of emergency generators to provide redundant power supplies for critical operations at the remaining 26 DHS-owned buildings.	1.1, 2.3	Medium

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MH.P.19	Prevention & Policy	DHS shelter protection: Obtain restrictive covenants on six DHS shelters to replace with non-residential structures in areas within the flood and SLOSH zone.	DHS	N/A	Ongoing	TBD	TBD	No change	1.1, 1.5, 2.1, 2.2	Medium
MH.P.20	Property Protection	Bellevue shelter facility improvements: Elevate mechanical systems, create independent heating system, purchase emergency generator, and improve windows and roofing.	DHS	N/A	Ongoing	\$42,825,000	HMGP	N/A	1.1, 1.5, 2.1, 2.4, 2.5	Medium
MH.P.21	Property Protection	LIFE Family Residence facility improvements: Elevate mechanical systems and purchase emergency generator.	DHS	N/A	Ongoing	\$17,000,000	HMGP	N/A	1.1, 1.5, 2.1, 2.2, 2.3	Medium
MH.P.22	Emergency Services	Mobile command stations: Procure three permanently available mobile command stations for flood zones in Brooklyn, Queens, and Staten Island.	DOB	N/A	TBD	\$150,000	TBD	N/A	2.3	Medium
MH.P.23	Emergency Services	DOB backup generators: Procure backup generators for 280 Broadway to sufficiently meet the needs of DOB to operate the EOC and power the central servers, which house data for all five boroughs, among other core functions.	DOB	N/A	TBD	TBD	TBD	N/A	2.3	Low

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MH.P.24	Emergency Services	DOB radios: Procure 80 communication radios to effectively carry out inspections and communicate with command posts during disasters when cell phone services are typically down or unreliable.	DOB	N/A	TBD	\$120,000	TBD	N/A	2.3	Medium
MH.P.25	Emergency Services	DOB vehicles: Procure 25 SUVs and 75 hybrid vehicles outfitted with "emergency packages" for disaster use to expedite inspector response and guarantee service levels, and to address the addition of nearly 40 inspectors.	DOB	N/A	TBD	\$2,750,000	TBD	N/A	2.3	Medium
MH.P.26	Infrastructure Project	Stormwater management: Upgrade steam tunnel pumps to remove water that may enter during a coastal storm or flooding event.	DOC	DEP	TBD	\$15 million	TBD	No change	1.1, 2.1, 2.7	Medium
MH.P.27	Infrastructure Project	Rikers Island ferry dock: Add new docking facility to provide additional access to Rikers Island for inmate transport and supplies such as food and medicines.	DOC	DOT	TBD	\$25 million	Capital/F TA	N/A	1.1, 2.1, 2.7	Medium
MH.P.28	Property Protection	Roof and façade improvements: Upgrade roofs and facades to withstand extreme weather events.	DOC	N/A	TBD	\$78 million	Capital	N/A	1.1, 2.1, 2.7	Medium

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MH.P.29	Property Protection	Emergency Operations Center improvements: Upgrade Emergency Operations Center building infrastructure and communications.	DOC	N/A	TBD	TBD	Capital	N/A	1.1, 1.2, 2.1	Medium
MH.P.30	Emergency Services	Off-island satellite Emergency Operations Center (EOC) for Rikers Island: Procure an off-island satellite EOC to allow for continuity of operations. Currently Rikers Island Bridge is the only means of egress, and should the bridge become impaired due to high winds or collapse, operation of the existing EOC would be comprised.	DOC	N/A	TBD	TBD	Capital	N/A	1.1, 1.2, 2.1, 2.3	Medium
MH.P.31	Emergency Services	MDC cellar/backup emergency system: Provide second emergency generator for 100% capacity.	DOC	N/A	TBD	\$3 million	Capital	N/A	2.1, 2.3	Medium
MH.P.32	Emergency Services	Provision of power redundancy: Acquire portable generators, pumping station, lighting systems, radios, and other essential equipment to create redundancy for critical networks.	DOE	N/A	TBD	\$1,000,000	FEMA	No change	1.1, 2.1, 2.3	Medium

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MH.P.33	Property Protection	Protection of DOE facilities from electrical system damage from trees: Implement program to prune or remove old and overgrown trees near DOE facilities to prevent damage to the electrical distribution grid and nearby structures during tornadoes, windstorms, and coastal storms.	DOE	DOE, SCA	TBD	TBD	TBD	No change	1.1, 2.1, 2.7	Medium
MH.P.34	Property Protection	DOE green roof installation: Install updated building management systems that include green roof structures for DOE facilities to reduce the volume of stormwater runoff.	DOE	DOE, SCA	TBD	TBD	TBD	No change	1.1, 2.1, 2.7, 4.4	Medium
MH.P.35	Emergency Services	Surge protection for DOE critical electrical systems: Install surge suppression protection to minimize impacts from severe weather.	DOE	DOE, SCA	TBD	TBD	TBD	No change	1.1, 2.1, 2.7	Medium
MH.P.36	Emergency Services	Emergency power at DOE facilities: Install emergency power-generation systems at existing facilities.	DOE	DOE, SCA	TBD	\$1,250,000	FEMA	Not started	1.1, 2.1, 2.3	Medium

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MH.P.37	Prevention & Policy	Emergency preparedness plans and training for DOE custodian engineers and building managers: Develop site-specific plans for 72 buildings, and engage consultants to do training.	DOE	DOE	1 year	\$150,000	TBD	N/A	1.1, 1.4, 2.1	High
MH.P.38	Education & Awareness	Psychological First Aid (PFA): Train New York City responders in PFA, an evidence-informed modular approach to help children, adolescents, adults, and families in the immediate aftermath of disaster to reduce the initial distress caused by traumatic events and foster short- and long-term adaptive functioning and coping.	DOH MH	OEM	Immediate and ongoing	\$20,000	TBD	N/A	1.4, 1.6, 1.5	High
MH.P.39	Education & Awareness	"Mental Health First Aid" public education program: Conduct a "Mental Health First Aid" public education program to introduce non-mental health professionals to risk factors and warning signs of mental health problems and build understanding of their impact, and provide an overview of common treatments to increase individual and community resilience.	DOH MH	N/A	Immediate and ongoing	\$150,000	TBD	N/A	1.6	Medium

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MH.P.40	Emergency Services	Mental health system IT improvement: Convert paper records to electronic formats (including off-site backup capacity) to prevent damage and loss in the event of a disaster and to facilitate remote accessibility of client records.	DOH MH	N/A	One year to implement	\$6,000,000	One-time expense and capital combined	N/A	2.3	Medium
MH.P.41	Emergency Services	Mental health system power backup: Purchase generators and needed equipment for community-based providers. Include gasoline reserves.	DOH MH	N/A	Immediate and ongoing	\$1,500,000	Capital	N/A	1.1., 2.3	Medium
MH.P.42	Education & Awareness	Mental health system support network: Establish a network of community-based mental health organizations (different types of programs located in various zones) that may develop a COOP plan to share resources and collaboratively ensure consumer safety and provide services during and following an emergency.	DOH MH	N/A	One year to implement and ongoing	\$500,000	One-time expense	N/A	1.1, 1.6, 2.3, 5.3	High
MH.P.43	Education & Awareness	Mental health volunteer preparedness and response: Promote involvement of mental health consumers in volunteer preparedness and response activities. Peer volunteers would receive training on emergency preparedness and be linked to a	DOH MH	N/A	One year to implement and ongoing	\$250,000	Expense	N/A	1.1, 1.4, 1.5, 1.6	High

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		network of programs that mobilize volunteers to respond to an emergency such as Community Emergency Response Teams, American Red Cross, City Serve, and NYC Cares.								
MH.P.44	Infrastructure Project	DOHMH IT systems protection: Safeguard crucial DOHMH applications and systems through the creation of a mirror system or DR Data Center (cloud). The current DOHMH Data Center at 22 Cortlandt Street in downtown Manhattan, in a flood zone, competes for power resources and priorities with the city's financial institutions.	DOH MH	N/A	18 months to implement; yearly contracting	\$ 1,500,000 up front and \$1,000,000 per year	N/A	N/A	2.1, 2.3	High
MH.P.45	Property Protection	DOHMH primary data center availability: Increase DOHMH's network infrastructure capacity and redundancy to improve preparedness and response during a major system failure.	DOH MH	N/A	1 year to implement	\$6,000,000 one-time investment	N/A	N/A	2.3	Medium

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MH.P.46	Property Protection	Riverside clinic upgrade: Equip the new back-up DEOC with the appropriate infrastructure and technology to support DOHMH public health response to a citywide emergency.	DOH MH	DDC, DCAS	Estimated implementation by February 2014	\$447,000	Capital and CDC Public Health Emergency Preparedness (PHEP) grant funds	N/A	2.3	Medium
MH.P.47	Infrastructure Project	DOHMH warehouse and print shop capacity: Develop and install a new inventory tracking system for the DOHMH warehouse (520 Kingsland Ave.) destroyed by Hurricane Sandy. Purchase critical equipment for the DOHMH print shop to produce secure documents that can only be issued by DOHMH.	DOH MH	N/A	6- 12 months	\$550,000	Operating and IT development staff	N/A	2.1, 2.3	High
MH.P.48	Emergency Services	Health data and provider portal: Create a centralized provider directory and associated reporting portal to communicate with providers as well as gather information from providers. Data can be analyzed and used to generate reports during emergencies.	DOH MH	NYS DOH	Potentially 2 years	\$2.6 million	SSBG is being pursued	N/A	1.2, 1.5, 5.2	High

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MH.P.49	Emergency Services	Enhanced emergency response communication operations at DOHMH headquarters: Equip 2 Gotham with enhanced Motorola 800Mhz radio capacity to allow DOHMH response operations and communication to continue even if IT and phone networks are down.	DOH MH	OEM, NYS DOH	Potentially 2 years	\$1.046 million	CDC PHEP	N/A	1.2, 2.3	High
MH.P.50	Property Protection	Generators for healthcare facilities: Ensure that the 53 nursing homes and 26 ACFs located in hurricane evacuation zones 2-4 have backup power capacity by purchasing portable generators and installing quick-connects.	DOH MH	OEM, NYS DOH	Potentially 3 years	\$34.9 million	HMGP	N/A	1.1, 1.5, 2.3	Medium
MH.P.51	Prevention & Policy	Small grants program to support community-based social cohesion: Support 10 longstanding community-based organizations, schools, or faith-based organizations that serve diverse vulnerable populations (e.g. children, undocumented immigrants, precariously un-domiciled and homeless, and the elderly). Funding will be will be in two increments of \$25,000 each for a total award of \$50,000 per site.	DOH MH	Possibly DOE	12-24 months	\$500,000	N/A	N/A	1.5, 1.6, 5.1, 5.3	Medium

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MH.P.52	Prevention & Policy	"Hub the Hood" program: Develop a grant program in which neighborhood associations compete for seed money to become a "Hub" for their neighborhood by connecting block associations, buildings, and social service providers for a more socially cohesive neighborhood.	DOH MH	DOB/HP D	Potentially 2 years	TBD	TBD	N/A	1.6, 5.1, 5.3	Medium
MH.P.53	Property Protection	DOHMH facility repair and upgrade: Restore and strengthen DOHMH buildings, including DOHMH clinics and the Public Health Laboratory (PHL). Repair building facades, walls, parking lots, water infiltration and drainage systems, and install sump pumps and generators.	DOH MH	DDC, EDC, DCAS	Existing: 12-24 months; potential: 24 – 60 months	\$15,000,000	Capital or grant funds	N/A	1.1, 1.5, 2.1	Medium
MH.P.54	Emergency Services	Notification system for City employees: Develop an enhanced system for contacting City employees using a variety of communications media to notify, alert, and/or instruct City employees prior to and during emergencies.	DoITT	OEM	Ongoing	TBD	TBD	No change	1.2, 2.1, 2.3	Medium
MH.P.55	Infrastructure Project	Hardening of NYCWiN network: Install fixed generators at 126 NYCWiN sites to protect and enhance the reliability and resiliency of communications	DoITT	N/A	18 months	\$11.2 million	FEMA Grant	N/A	2.1, 2.3, 2.10	Medium

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		infrastructure.								
MH.P.56	Infrastructure Project	Data Center Site B: Provide consolidated Site B capability and capacity for applications not already hosted at DoITT's 2 MTC Data Center.	DoITT	N/A	12-18 months	\$50 million	TBD	N/A	2.1, 2.2, 2.10	Medium
MH.P.57	Property Protection	Secure HAZMAT at DOT facilities: Prevent release, in the event of hazard event, of herbicides at Arterials yards; combustible materials at sites such as Webster Fleet Services Shop; fuel from above-ground tanks at sites such as Conner Street Yard.	DOT	DDC, DCAS	TBD	TBD	TBD	N/A	2.1, 2.2	Medium
MH.P.58	Emergency Services	Redundant power for all mission-critical DOT sites: Provide and/or upgrade generators at fleet fueling stations.	DOT	DCAS, OEM	TBD	TBD	TBD	N/A	2.1, 2.3	Medium
MH.P.59	Emergency Services	Continuity of Operations sites: Prepare sites within each borough to support operations and permitting immediately following an event. Fit out sites with redundant power and infrastructure.	DOT	DDC, DCAS	TBD	TBD	TBD	N/A	2.1, 2.3	Medium

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MH.P.60	Emergency Services	Information tracking: Follow formalized response to natural hazard-based incidents to identify repetitive loss locations or hazards. Use this information to inform the creation and implementation of future mitigation actions.	DOT	OEM	2 years	\$150,000	Expense and capital budgets	No change	2.1, 5.2	High
MH.P.61	Infrastructure Project	High-reflectivity pavements: Explore and incorporate high-reflectivity/high-albedo paving (e.g. lighter-colored roadways) into street resurfacing and reconstruction to reduce the urban heat island effect. Explore and test material sourcing (e.g. for asphalt aggregate) and new approaches (e.g. whitetopping). Feasible and cost-effective options will ultimately be added to DDC and DOT's standard specifications.	DOT	DEP	Ongoing	\$5,000,000 for study plus testing	TBD	No change	2.1, 2.7, 2.8, 2.9, 5.2	Medium
MH.P.62	Emergency Services	Critical facility loss estimation: Conduct a detailed natural and non-natural hazard loss estimation on critical facilities (including bridges) using increased positional accuracy-building attribute databases and available hazard maps.	DOT	DOB, OEM	TBD	\$500,000	Expense	No change	5.2	Medium
MH.P.63	Infrastructure Project	Staten Island Ferry fleet upgrade: Purchase new vessels to replace the Barberi class vessels, thereby improving the capability of the	DOT	N/A	6 years	\$300,000,000	FTA ER	N/A	2.1, 2.7	Medium

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		fleet.								
MH.P.64	Infrastructure Project	Staten Island Ferry vessel improvement: Install high-lift rudders on vessels.	DOT	N/A	TBD	\$5,000,000	FEMA HMGP, FTA ER	N/A	2.1, 2.7	Medium
MH.P.65	Emergency Services	COOP trailer compound: Purchase COOP trailer compound (minimum 7 trailers) to operate daily district operations while affected permanent facilities are being repaired.	DSNY	N/A	Action would take approximately 24 hours to re-locate trailer or trailers to staging area	Approximately \$400,000	Capital budget	N/A	2.1, 2.3	Medium
MH.P.66	Property Protection	Industrial property upgrades: Implement planned upgrades to vulnerable City-owned industrial properties.	EDC, BNYDC	N/A	60 months	\$10,000,000	HMGP	EDC: \$300,000 for study	2.7, 4.3	Medium
MH.P.67	Property Protection	Hardening Staten Island Ferry and private ferry terminals from climate change-related threats: Construct physical improvements to the floating infrastructure, loading gangways, pilings, and piers, as well as develop a stock of spare parts to be stored in a secure upland location.	EDC	DOT	60 months	\$15,000,000	FTA	Ongoing	1.2, 2.1, 2.3, 4.4	Medium

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MH.P.68	Infrastructure Project	Construction of new ferry landings to support private ferry services: Expand the network of ferry landings available for both regular and emergency use. Design and procure two new ferry landing barges that are outfitted with the required equipment for providing basic ferry service, including self-contained generators.	EDC	DOT	60 Months	\$15,000,000	FTA	N/A	1.1, 2.1	Medium
MH.P.69	Prevention & Policy	Waterfront fueling facilities: Retrofit one or two waterfront fueling facilities to accommodate large commercial vessels, including ferry boats and other government vessels.	EDC	N/A	24 months	\$5,000,000	TBD	N/A	2.1, 2.3	Medium
MH.P.70	Prevention & Policy	Mobile/portable ferry ticketing machines: Procure up to 15 mobile ticketing machines to provide a flexible ticketing solution that can be moved to ferry landings experiencing high-volume ridership in post-storm periods to reduce wait times and enable a more efficient flow of passengers to final destinations.	EDC	DOT	TBD	Approximately \$50,000 per machine.	Capital budget	N/A	2.3	Medium

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MH.P.71	Infrastructure Project	Use of the Staten Island Ferry's Austen Class vessels for East River Ferry service during weather-related storm disruptions: Supplement East River Ferry capacity during transit service disruptions that cause large numbers of commuters to use ferry services by retrofitting existing ferry landings to accommodate the Austen Class vessels.	EDC, DOT	N/A	24 months	Cost included in MH.P. 69	EDC	N/A	2.1, 2.7	Medium
MH.P.72	Property Protection	Storm shutters project: Install storm shutters at FDNY facilities in flood-prone areas subject to punishing winds, flying debris, and horizontal, driving rain during storms.	FDNY	N/A	TBD	TBD	TBD	N/A	2.1, 2.7	High
MH.P.73	Emergency Services	Backup communications carrier: Research the feasibility of using a commercial carrier to back up NYCWiN until NYCWiN can be hardened and made more resilient.	FDNY	DoITT	TBD	TBD	TBD	N/A	2.1, 2.3, 2.10	Medium
MH.P.74	Emergency Services	Voice-over IP architecture: Explore feasibility of switching to more resilient voice-over IP architecture.	FDNY	N/A	TBD	TBD	TBD	N/A	1.1, 2.1, 2.3, 2.10	Medium
MH.P.75	Emergency Services	Next-generation satellite phones: Purchase "smart" satellite phones for critical staff.	FDNY	N/A	TBD	TBD	TBD	N/A	2.1, 2.3, 2.10	Medium

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MH.P.76	Infrastructure Project	FDNY facilities survey: Conduct a survey of FDNY facilities and facility components (e.g., roofs, doors, windows) in the revised FEMA flood zones, and schedule upgrades.	FDNY	N/A	TBD	TBD	TBD	N/A	2.1, 2.7	Medium
MH.P.77	Emergency Services	FCOC cell phone coverage: Improve cell phone coverage of FCOC, which FDNY staffs with additional personnel during major events, taxing the already overcrowded and sometimes unavailable cell network.	FDNY	N/A	TBD	TBD	TBD	N/A	2.1, 2.10	Low
MH.P.78	Emergency Services	FDNY cable network: Upgrade FDNY's cable network, which connects dispatch centers with firehouses to relay 911 calls, to fiber to improve resiliency and reduce outages.	FDNY	N/A	TBD	TBD	TBD	N/A	1.1, 2.1, 2.3, 2.10	High
MH.P.79	Emergency Services	Spare radios: Acquire additional portable radios to facilitate more widespread use of FDNY trunking system during cell carrier outages.	FDNY	N/A	TBD	TBD	TBD	N/A	1.1, 2.1, 2.10	Medium
MH.P.80	Prevention & Policy	Home-work plans: Explore feasibility of telecommuting options for non-emergency personnel who support critical operations during disasters.	FDNY	N/A	TBD	TBD	TBD	N/A	2.1, 2.10	Medium

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MH.P.81	Emergency Services	Gas vendors: Negotiate with vendors to ensure they maintain spare fuel supply in the event of shortages.	FDNY	N/A	TBD	TBD	TBD	N/A	2.1	Medium
MH.P.82	Emergency Services	Cache of vaccinations: Ensure a sufficient supply of vaccines to inoculate all first responders.	FDNY	DOHMH	TBD	TBD	TBD	N/A	2.1	Medium
MH.P.83	Emergency Services	Urban search and rescue team: Increase the number of trained officers and firefighters in New York Task Force 1 to meet the growing demands of a professional, trained, and proven search and rescue team.	FDNY	US DHS	TBD	TBD	TBD	N/A	1.1, 2.1	Medium
MH.P.84	Prevention & Policy	Coney Island Hospital HVAC: Protect hospital's HVAC system.	HHC	TBD	2 years	\$30 million	HMGP, general obligation bonds	N/A	1.1, 2.1, 2.8	Medium
MH.P.85	Emergency Services	Coney Island Hospital power pre-connections: Install pre-connections on the perimeter wall of the existing building above the 500-year BFE for connection to rollup generators, chillers, and high-pressure steam boilers. This will enable the facility to rent portable, roll-up equipment and quickly restore critical services should facility equipment be subject to damage during a flood.	HHC	TBD	1 year	\$7 million	HMGP, general obligation bonds	N/A	1.1, 2.1, 2.7, 2.8	Medium

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MH.P.86	Prevention & Policy	Metropolitan Hospital HVAC: Protect the HVAC system.	HHC	TBD	2 years	\$30 million	HMGP, CDBG, general obligation bonds	N/A	1.1, 2.1, 2.7, 2.8	High
MH.P.87	Emergency Services	Metropolitan Hospital pre-connections: Install pre-connections for critical systems.	HHC	TBD	1 year	\$42 million (included in plans for new structure)	HMGP, general obligation bonds	N/A	1.1, 2.1, 2.7, 2.8	High
MH.P.88	Prevention & Policy	Bellevue Hospital: Protect HVAC system.	HHC	TBD	1 year	\$35 million	HMGP, CDBG, general obligation bonds	N/A	1.1, 2.1, 2.7, 2.8	High
MH.P.89	Emergency Services	Bellevue Hospital power pre-connections: Install pre-connections for critical systems.	HHC	TBD	1 year	\$5 million	HMGP, CDBG, general obligation bonds	N/A	1.1, 2.1, 2.7, 2.8	High
MH.P.90	Emergency Services	Central Office Emergency Command Center (ECC) and alternate ECC: Designate and equip a new central office command center, as well as an alternate central office command center.	HHC	TBD	3 months	\$300,000	HMGP, CDBG, general obligation bonds	N/A	1.1, 2.1, 2.3	Medium

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MH.P.91	Emergency Services	Henry J. Carter Hospital improvements: Purchase backup generator and make associated structural improvements.	HHC	TBD	2 months	\$920,000	HMGP, CDBG, general obligation bonds	N/A	1.1, 2.1, 2.3, 2.7, 2.8	High
MH.P.92	Education & Awareness	Outreach to residential building owners: Develop a methodology and technology solution to provide pre- and post-disaster outreach and information to residential building owners. This may include the creation of a new online emergency notification contact system.	HPD	N/A	2 years	\$1,500,000 plus ongoing maintenance costs	Grants	N/A	1.2, 1.6, 2.6, 5.1	Medium
MH.P.93	Education & Awareness	Flood protection for critical facilities: Evaluate flood-protection measures in long-term-lease buildings in or near flood zones and Coastal Storm Evacuation zones 1 and 2. Make recommendations to building owners.	HRA	N/A	5 years	TBD	Lease budget, Administrative Other-Than-Personal-Services (AOTPS) Budget	Equipped key buildings that are most vulnerable with sandbags. Maintaining an inventory of portable generators.	1.1, 2.1, 2.6, 2.7	High

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MH.P.94	Property Protection	Overhead electric infrastructure: Raise/relocate the overhead electric infrastructure to mitigate proximity violations as a result of homes being raised to comply with FEMA guidelines.	LIPA	N/A	Ongoing and as required	\$500,000	Insurance, FEMA, NYS CDBG, LIPA	N/A	1.1, 2.1, 2.2, 3.3	Low
MH.P.95	Infrastructure Project	Storm damage mitigation: Place overhead distribution lines underground in high-risk areas with extreme exposure to falling trees, and replace existing lines with aerial spacer cable construction in areas of moderate risk. Install automated sectionalizing switches to isolate flood zones.	LIPA	N/A	March 2014 start, June 2015 completion	\$3,500,000	FEMA 406, LIPA	N/A	2.1, 2.2, 2.7, 3.3	Low
MH.P.96	Education & Awareness	Exploration of loss-reduction actions for landmarked properties: Assist owners of locally designated landmarked structures in flood hazard areas to identify appropriate resiliency measures.	LPC	DOB, DOT, DCP, DEP	As needed	TBD	Expense budget	Studying need	2.6, 2.9	High

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MH.P.97	Education & Awareness	Public education and outreach for landmarked buildings: Provide information on site and building preservation issues for locally designated landmarked structures in flood hazard areas.	LPC	DCP	Unknown	TBD	Expense budget	Studying need	2.6, 2.9, 5.1, 5.3	High
MH.P.98	Prevention & Policy	Marine Parkway/Cross Bay Bridge mitigation master plan: Compare various long-term capital investment strategies to rehabilitate/reconstruct the crossings while building resiliency and robustness into the structures.	MTA (Bridges and Tunnels)	N/A	3 years	\$10 million	Applying for funding from FEMA HMGP	Procurement for study has commenced	2.1, 2.7, 2.8, 2.9	High
MH.P.99	Prevention & Policy	Engineering flood studies at non-tunnel facilities: Determine vulnerabilities and prepare conceptual designs for mitigation work.	MTA (Bridges and Tunnels)	N/A	2 years	\$6 million	Capital budget. May apply for funding from HMGP	Contracts have been awarded for studies several bridges and one facility.	2.1, 2.7, 2.8, 2.9	Medium

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MH.P.100	Infrastructure Project	Far Rockaway depot green roof: Design and install green roof to reduce the volume of stormwater runoff and help reduce the urban heat island effect.	MTA (Buses)	NYSDE, DEP, FTA	2 years	\$4,703,730	Capital improvement budget	No change	2.1, 2.7	Medium
MH.P.101	Prevention & Policy	Hazards/threats planning: Develop comprehensive planning guidance and contingency/response plans for all hazards/threats.	MTA (MNR)	N/A	Indefinite/12 months	\$500,000	Staff time	N/A	2.1, 5.2	High
MH.P.102	Prevention & Policy	Fueling capabilities/backup for emergency response: Conduct an assessment for providing emergency fueling capabilities to MNR's rubber tire fleet.	MTA (MNR)	N/A	12 months	\$500,000	Staff time	N/A	2.1, 2.3	High

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MH.P.103	Infrastructure Project	Penn Station access: Provide Metro-North and the region with resiliency to the Metro-North system to enable the New Haven Line service to access Manhattan in the case of a catastrophic event. There are three single points of failure for Metro-North Service into Manhattan – Mott Haven Junction, the Harlem River Lift Bridge and GCT and its viaduct and tunnel approaches. Each individually or collectively requires resiliency to protect service into midtown Manhattan. Without the resiliency inherent in these improvements, a catastrophic event at any of the three points would cut off Metro-North service to midtown Manhattan affecting over 700 trains and over 220,000 commuters daily. In addition, there is a risk of terrorist attack, a ship or large construction barge with a crane hitting the bridge, or fire.	MTA (MNR)	Amtrak, LIRR	Design completion 3-4 years	\$40 million	Sandy Emergency Relief Program Resiliency	N/A	2.1, 2.2, 2.8	High

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MH.P.10 4	Infrastructure Project	Harlem-125 Street Station improvements: Make improvements to the Harlem-125 Street Station to allow Metro-North to maintain service to and from Manhattan should a catastrophic event disrupt service at Grand Central Terminal.	MTA (MNR)	N/A	TBD	TBD	TBD	N/A	2.1, 2.2, 2.8	High
MH.P.10 5	Property Protection	Emergency management equipment: Purchase mobile vehicle fueling equipment, install East End fueling station, make communication upgrades to trucks and mobile command center, purchase mobile trailer mounted substations and emergency generators.	MTA (LIRR)	N/A	November 2013 - November 2014	\$20 million	Potential FTA Local Priority Resiliency Funds	N/A	2.1, 2.3, 2.7, 2.10	High
MH.P.10 6	Property Protection	NYCHA grounds, pavements, and drainage improvements: Install planting for soil stabilization and to create buffer zones. Strengthen anchorage/footings for play equipment and pole lighting in nine developments (91 buildings).	NYCHA	TBD	TBD	\$9,390,708	Capital improvement budget	Ongoing	2.1, 2.7	High

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MH.P.10 7	Property Protection	Category 4 distributed power-generation feasibility studies: Assess NYCHA developments severely damaged by Hurricane Sandy in an effort to combine/centrally locate utility systems where feasible. Combine developments to continue operations during utility outages and include within future NYCHA distributed power-generation systems (CHP, COGEN, micrgrid, etc.). Current developments include RedHook East and West, Ocean Bay (Bayside), Coney Island Site 8, O'Dwyer Gardens, and Surfside, but may include others if deemed appropriate by future feasibility studies.	NYCHA	TBD	Estimated time of completion 2016	TBD	TBD	N/A	2.1, 2.2, 2.3	Medium
MH.P.10 8	Property Protection	Morrisania Air Rights: Repair/re-support building.	NYCHA	TBD	TBD	TBD	TBD	N/A	2.1, 2.7	Low

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MH.P.109	Prevention & Policy	NYCHA AC improvements: Outfit all 334 NYCHA developments with central AC systems. AC central chiller plants can increase COGEN/CHP efficiencies during summer months, provide cool air to building residents during extreme heat events, and keep buildings pressurized, thereby preventing airborne hazardous waste from entering buildings.	NYCHA	TBD	TBD	TBD	TBD	N/A	1.1, 2.1	Medium
MH.P.110	Property Protection	NYPD precinct facility protection: Enhance design of the 40 th , 66 th , 70 th , 110 th , 120 th , 121 st , and Central Park precinct facilities to withstand severe wind, rain, and flooding events.	NYPD	TBD	TBD	TBD	TBD	No change	2.1, 2.7, 2.8	Medium
MH.P.111	Property Protection	NYPD facility protection: Enhance facility design of Public Safety Answering Center I, Public Safety Answering Center II, and Joint Operations Center to withstand severe wind, rain, and flooding events.	NYPD	TBD	TBD	TBD	TBD	No change	2.1, 2.7, 2.8	Medium

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MH.P.11 2	Property Protection	NYPD critical facilities protection: Promote hardening of existing and future critical facilities from the primary and secondary effects of natural hazards.	NYPD	N/A	TBD	TBD	TBD	No change	2.1, 2.7, 2.8	Medium
MH.P.11 3	Emergency Services	OCME unified agency command center: Relocate all critical communications function into one unified workspace on emergency generator power.	OCME	DDC	Unknown	\$2,267,710	Capital budget	N/A	2.1, 2.10	High
MH.P.11 4	Education & Awareness	Educational outreach to private sector: Coordinate and provide educational outreach on mitigation strategies the private sector can use to reduce or eliminate the impact of hazards on private-sector services and infrastructure. Opportunities to educate OEM's private-sector partners include conferences, OEM website, and presentations.	OEM	N/A	TBD	TBD	TBD	OEM's website hosts information on hazard mitigation.	3.1, 3.3, 3.4, 3.5	Medium

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MH.P.11 5	Property Protection	OEM facilities protection: Conduct or update natural-hazard vulnerability assessments for all OEM facilities, and harden facilities to prevent or minimize damage from natural hazard events.	OEM	DCAS, FEMA, NYS OEM	TBD	TBD	HMGP, PDM-C	Assessments still pending	2.1, 2.7, 2.8	Medium
MH.P.11 6	Emergency Services	HAZUS-MH software: Update software to optimize of HAZUS-MH modeling for New York City's unique urban environment. The software update will allow New York City to generate more accurate loss estimates for various hazards.	OEM	FEMA, NYS OEM	1 year	TBD	HMGP, PDM-C	No change	2.5, 5.1, 5.2	High
MH.P.11 7	Education & Awareness	Community Emergency Response Team (CERT) Curriculum: Adapt CERT curriculum to educate team members on strategies that mitigate the impact of natural hazards on the city, including protecting utility services, redundant communication, continuity of business services (for corporate CERTs), and property protection.	OEM	NYPD, FDNY	Ongoing	\$200,000	US Departm ent of Homelan d Security Initiative, grants	No change	3.2, 3.4, 3.5, 5.3	High

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MH.P.118	Emergency Services	Infrastructure systems modeling: Coordinate the development of a multi-hazard infrastructure vulnerability model.	OEM	FEMA, NYS OEM, academic institutions	3 years	TBD	HMGP	No change	5.1, 5.2	Medium
MH.P.119	Emergency Services	Loss estimation: Assist agencies in determining loss estimates using HAZUS-MH.	OEM	MPC	5 years	TBD	HMGP, PDM-C, FEMA	No change	5.1, 5.2	Medium
MH.P.120	Emergency Services	Natural hazard event database: Create a natural hazard event database to capture description, severity, location, impact, and potential loss/damage estimates from an event. Use data to update the hazard analysis and mitigation actions for New York City.	OEM	FEMA, NYS OEM	5 years	TBD	Agency operating budget	No change	5.1, 5.2	Medium

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MH.P.12 1	Education & Awareness	CERT collaboration with community groups: Partner the CERT program with local community organizations—including civic, faith-based, and tenant associations—to promote mitigation strategies.	OEM	NYPD, FDNY	Ongoing	\$200,000	U.S. Department of Homeland Security Urban Area Security Initiative, grants	No change	3.1, 3.3, 3.4, 3.5, 5.3	High
MH.P.12 2	Education & Awareness	Ready New York update: Expand guide for seniors and people with disabilities.	OEM	DFTA, MOPD	1 year	TBD	OEM	Ready New York: My Emergency Plan, created especially for seniors and people with special needs, launched in October 2011.	1.1, 1.6, 5.3	High
MH.P.12 3	Education & Awareness	Public/private mitigation initiatives: Support the resiliency of New York City's private sector through information sharing, partnership building, and education on mitigation principles and the City's HMP.	OEM	N/A	Ongoing	TBD	TBD	No change	3.1, 3.3, 3.4, 3.5	High

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MH.P.12 4	Emergency Services	Regional critical infrastructure mapping: Map critical infrastructure for the New York City region to better understand the interrelationships among components of the region's infrastructure and to support the HMP's Risk Assessment section.	OEM	DHS, NYSOH, NYSOH, PANYNJ	12 months	TBD	TBD	No change	5.1, 5.2	Medium
MH.P.12 5	Emergency Services	Subway depths mapping: Collaborate with NYCT to assign depth below-street-level and absolute-depth-below-sea-level elevations for subway stations and tunnels to support planning for flooding and secondary impacts from other natural hazards.	OEM	NYCT	12 months	TBD	TBD	No change	5.1, 5.2	Medium
MH.P.12 6	Prevention & Policy	Vegetation data: Develop vegetation data for New York City for use in HAZUS-MH and other hazard-impact models to allow for better debris estimates and to identify areas more susceptible to the urban heat island effect.	OEM	Parks	6 months	TBD	TBD	No change	5.1, 5.2	Medium

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MH.P.12 7	Prevention & Policy	Zoning for hazard-prone areas: Correlate natural hazard-vulnerable areas with existing zoning districts to identify areas where mitigation actions would be necessary to maintain responsible and sustainable development.	OEM	DCP	12 months	TBD		No change	2.4, 2.5, 5.1, 5.2	Medium
MH.P.12 8	Education & Awareness	Mitigation public outreach: Develop a mitigation guide and online training course for homeowners and property managers on risk reduction before and after a hazard event, and work with community-based organizations and non-governmental organizations to engage the community in advance of an emergency.	OEM	N/A	3 years	\$1 million	HMGP	No change	1.6, 2.6, 2.9, 5.1, 5.3	High
MH.P.12 9	Emergency Services	Emergency Operations Center (EOC): Create and build out a new backup EOC to include room and capability for all citywide operations (e.g., EOC, Logistics Center [LC], Unified Operations and Resource Center [UORC], Commodity Distribution Point Command Center [CCC], Healthcare Evacuation Center [HEC], and other Continuity of Operations [COOP]	OEM	DCAS, FEMA	2-3 years	\$100,000, 000	Capital budget, HMGP	Real estate search underway—250,000 square feet of space has been scoped out	2.1, 2.2, 2.3, 2.7	Medium

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		working needs).								
MH.P.130	Emergency Services	OEM Warehouse: Identify a new warehouse space or build out a new OEM warehouse (the current warehouse is not large enough to accommodate the existing stockpile of supplies to support NYC for an emergency). Include adequate spacing for all citywide operational needs, storage, and functioning.	OEM	DCAS	2-3 years	\$25,000,000	Capital budget	N/A	2.1, 2.2	High
MH.P.131	Education & Awareness	New York City mitigation guide and education: Educate New Yorkers about hazard mitigation techniques that they can use to reduce long-term risks from natural hazards. Include a mitigation guide for homeowners and property managers; online training; flood-risk information; and CBO/NGO outreach—all to be incorporated into OEM's website.	OEM	OLTPS, DEP, DOB, DOHM, DOF, DOT, NYC Service/ Citizen Corps Council member	1 year	\$1,000,000	HMGP (5%)	Citizen Corps Sponsored a hazard mitigation presentation to Citizen Corps members on September 17, 2013 and followed up with outreach on information on hazard mitigation on OEM's website.	1.6, 2.6, 2.9, 5.1, 5.3	High

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				agencies/other City agencies						
MH.P.13 2	Education & Awareness	Building community capacity: Launch pilot program to identify and address gaps in community capacity.	OEM	N/A	Ongoing	\$1 million	CDBG	N/A	1.6, 5.1, 5.3	Medium
MH.P.13 3	Prevention & Policy	Urban Post-Disaster Housing site identification in New York City: Prepare communities and agencies for deployment of post-disaster housing units by identifying potential sites and evaluating feasibility for use in terms of constructability and livability.	OEM	FEMA, USACE, DOB, DEP, DOT, MTA	1 year	\$100,000	FEMA, city tax levy, U.S. Department of Homeland Security Regional Catastrophic Preparedness	N/A	1.1, 2.1, 2.5	

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							Grant Program			
MH.P.134	Prevention & Policy	Executive decision-making guide for deployable post-disaster housing: Provide executives with information needed to evaluate deployable post-disaster housing option, with the goal of preventing population loss and creating quality interim housing.	OEM	DDC, DOB, USACE, FEMA, HUD, EDC, NYCHA, CAU	2014	\$25,000	FEMA, city tax levy, U.S. Dept. of Homeland Security Regional Catastrophic Preparedness Grant Program	N/A	1.1, 2.5, 2.9	

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MH.P.13 5	Prevention & Policy	Request for Proposal for Urban Post-Disaster Housing: Prepare RFP to procure deployable housing to help people soon after a disaster. This is a time-of-event document for the USACE to select housing manufacturers who can meet the City's criteria for urban deployable housing.	OEM	DDC, USACE, FEMA, HUD	6 months	\$10,000	FEMA, City Tax Levy, U.S. Department of Homeland Security Regional Catastrophic Preparedness Grant Program	N/A	1.1, 2.5, 2.9	
MH.P.13 6	Property Protection	Storm shutter protection at OEM headquarters: Install storm shutters at OEM headquarters to protect windows from flying debris.	OEM	N/A	3–5 years	\$800,000	HMGP, PDM-C	No change	2.1, 2.7	High

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MH.P.137	Property Protection	NYC Brownfield Incentive Grant (BIG) program: Seek more funding to facilitate financial assistance to property owners seeking to investigate and clean up contaminated properties, as well as to community groups, for public outreach, planning, and technical assistance.	OER	OMB, NYSEDC, EDC, USEPA	3 months pending funding	\$2.5 million per year	OMB budget allocation, NYS Regional Economic Development Council grants, USEPA grants	N/A	1.5, 2.1, 2.4, 2.6, 2.10	High
MH.P.138	Emergency Services	Fuel advance warning system: Implement advance-warning system for emergency fuel shutoff during a natural disaster.	PANY NJ (Aviation)	PANYNJ	3 years	\$500,000	Capital budget	No change	1.1, 1.2, 4.1	High
MH.P.139	Emergency Services	Kennedy Airport electrical system resiliency: Rehabilitate Bergen substation to enhance the airport's ability to withstand extreme events that disrupt power transmission.	PANY NJ (Aviation)	FAA	5 years	\$39,820,000	Capital budget, HMGP	N/A	2.1, 2.7, 2.10	Medium

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MH.P.14 0	Emergency Services	LaGuardia Airport central electric substation: Rehabilitate the supervisory controls and data acquisition of the Central Electric and West End substation SCADA system to enhance the airport's ability to manage and recover from emergencies.	PANY NJ (Aviation)	PANYNJ	4 years	\$1,500,000	Capital budget, HMGP	N/A	2.1, 2.7, 2.10	High
MH.P.14 1	Emergency Services	LaGuardia Airport electrical system enhancement: Enhance old generator equipment to provide upgraded and enhanced capacity. Currently outdated backup power sources cannot provide reliable power during critical periods.	PANY NJ (Aviation)	PANYNJ	2 years	\$31,000,000	Capital budget, HMGP	N/A	2.1, 2.3	Medium
MH.P.14 2	Emergency Services	LaGuardia Airport power system redundancy: Install a secondary power supply for the airport.	PANY NJ (Aviation)	Con Ed	5 years	\$25,100,000	Capital budget, HMGP	N/A	2.1, 2.3	Medium

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MH.P.14 3	Emergency Services	Kennedy Airport power system redundancy: Install a secondary power supply for the airport.	PANY NJ (Aviation)	Con Ed	4 years	\$50,000,000	Capital budget, HMGP	N/A	2.1, 2.3	Medium
MH.P.14 4	Emergency Services	Stewart Airport standby emergency generator: Provide power redundancy to allow for safe evacuation of the airport and limited operations to continue during extreme weather events.	PANY NJ (Aviation)	PANYNJ	2 years	\$2,500,000	Capital budget, HMGP	N/A	2.1, 2.3	High
MH.P.14 5	Emergency Services	Stewart Airport power system redundancy: Install a secondary power supply for the airport.	PANY NJ (Aviation)	Con Ed	4 years	\$10,000,000	Capital budget, HMGP	N/A	2.1, 2.3	High

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MH.P.14 6	Infrastructure Project	Kennedy Airport fuel storage: Elevate storage tank and pumping station a structural platform.	PANY NJ (Aviation)	PANYNJ	4 years	\$2,000,000	Capital budget, HMGP	N/A	2.1, 2.3	High
MH.P.14 7	Emergency Services	Intelligent Transportation System (ITS) program at Kennedy and Newark Airports: Enhance intra-agency visibility and regional situation awareness—critical to manage traffic during emergencies—by investing in a comprehensive multi-facility Intelligent Transportation System (ITS) program.	PANY NJ (Aviation)	New York DOT, New Jersey DOT	5 years	\$69,300,000	Capital budget, HMGP	N/A	2.1, 2.10	Medium
MH.P.14 8	Emergency Services	Emergency generator capacity for Red Hook and Howland Hook container terminals: Add backup power to improve the resiliency of the terminals and mitigate the effects of power loss from a flooding or other weather event.	PANY NJ (Ports)	PANYNJ	2 years	\$1,500,000	Capital budget, HMGP	N/A	2.1, 2.3	High

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MH.P.149	Emergency Services	Lincoln Tunnel electrical and power system improvements: Upgrade the electrical and power system to avert the loss of power to pumps and ventilation systems, which can cause flooding and disruption in tunnel use.	PANY NJ (TBT)	PANYNJ	3 years	\$14,000,000	Capital budget, HMGP	N/A	2.1, 2.7, 2.10	Medium
MH.P.150	Emergency Services	George Washington Bridge (GWB) electrical and power system improvements: Upgrade GWB's emergency power feed and low-voltage power distribution, and rehabilitate high-tension switchgear.	PANY NJ (TBT)	PSE&G, Con Ed	4 years	\$40,600,000	Capital budget, HMGP	N/A	2.1, 2.7	Medium
MH.P.151	Emergency Services	GWB tower transformers: Replace the GWB tower transformers to provide a reliable source of power for tower lighting, communications systems, tower elevators, and security system.	PANY NJ (TBT)	PANYNJ	3 years	\$3,200,000	Capital budget, HMGP	N/A	2.1, 2.7	High

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MH.P.15 2	Emergency Services	Multi-facility real-time traffic information software: Develop Enterprise Transportation Management Center software to process data collected from sensors in the field and present up-to-minute information to operators.	PANY NJ(TB T)	New York DOT, New Jersey DOT	5 years	\$18,500,000	Capital budget, HMGP	N/A	2.1, 2.10	Medium
MH.P.15 3	Emergency Services	Intelligent Transportation System (ITS) program: Develop a comprehensive multi-facility ITS program to provide a cost-effective system to unify multiple facilities within PANYNJ and connect with other regional transportation agencies to provide real-time traffic information for emergencies.	PANY NJ (TBT)	New York DOT, New Jersey DOT	5 years	\$146,000,000	Capital budget, FHA, HMGP	N/A	2.1, 2.10	Medium
MH.P.15 4	Property Protection	Green roofs on Parks buildings: Install green roofs on select Parks facilities to reduce stormwater runoff and help reduce the urban heat island effect. Estimated cost is \$25 per square foot.	Parks	DOE, SCA	2 years	\$30,000 to \$50,000 per site	HMGP, other grants	No change	2.7, 2.8, 4.3, 4.4	High

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MH.P.15 5	Coastal/Natural Resource Protection	Green Streets: Transform selected traffic medians from concrete to areas densely planted with trees and horticulture to reduce stormwater runoff and help reduce the urban heat island effect.	Parks	DOT	2 years	\$50,000 per site	HMGP, other grants	No change	2.7, 2.8, 4.3, 4.4	High
MH.P.15 6	Property Protection	Wetlands and other land in a natural state: Leave purchased or donated land and wetlands in a natural state to absorb floodwaters, mitigate storm surge impacts, reduce heat impacts, and prevent construction in flood zones.	Parks	N/A	5 years	\$1,000,000 per acre	HMGP	No change	2.2, 2.5, 2.7, 4.3	Medium
MH.P.15 7	Infrastructure Project	Seawall, pier, and marina structural repairs: Restore docks and other seawall structures at the 79th Street Boat Basin in Manhattan. Seawalls help mitigate erosion and prevent flooding.	Parks	N/A	5 years	\$1,500,000 (\$10 per square foot for piers and \$20 per linear foot for bulkheads)	HMGP	Emergency repairs to Shore Road seawall in Brooklyn completed	2.1, 2.7	High

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MH.P.158	Property Protection	Upgrades to Parks buildings' systems: Protect vulnerable Parks buildings from flooding and other hazards by hardening or elevating electrical and mechanical systems.	Parks	DOB, DOHMH	TBD	\$12,000,000	HMGP	N/A	2.1, 2.2, 2.7	Medium
MH.P.159	Education & Awareness	SBS outreach: Update SBS website with information on emergency preparedness and mitigation best practices, and email-blast business and neighborhood organization customers to inform them of mitigation best practices and how to prepare for upcoming hazard.	SBS	TBD	TBD	TBD	TBD	N/A	3.3, 3.4, 5.1, 5.3	Medium
MH.P.160	Emergency Services	Toolkit and training materials for city volunteer groups: Create toolkit and training materials to enable volunteer groups to help businesses. Materials may include training videos, best practices documentation, and checklists. Volunteers will communicate available services to business owners in the field as well as gather critical data that would allow SBS to connect business owners to necessary recovery services.	SBS	OEM and other City partners as necessary	TBD	TBD	TBD	N/A	3.2, 3.3, 3.4, 3.5, 5.1	Medium

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MH.P.16 1	Education & Awareness	Small business outreach: Partner with OEM to hold a series of workshops for small businesses in areas vulnerable to coastal storms and flooding. Workshops will cover disaster preparedness and recovery planning, marketing, social media, and financing.	SBS	OEM	TBD	TBD	TBD	N/A	3.2, 3.3, 3.4, 3.5, 5.1	Medium
MH.P.16 2	Education & Awareness	Hazard mitigation education for businesses: Work with OEM to create hazard mitigation planning materials/resources to be distributed/presented during business services (launches, courses, and financing assistances) to encourage businesses to include hazard mitigation planning in their business plans, thereby increasing the likelihood of businesses surviving a hazard.	SBS	OEM	TBD	TBD	TBD	N/A	3.1, 3.2, 3.3, 3.4, 3.5	Medium
MH.P.16 3	Education & Awareness	Ready New York materials: Work with OEM to update/create Ready New York materials geared towards businesses with information on mitigation actions.	SBS	OEM	TBD	TBD	TBD	N/A	3.2, 3.3, 3.4, 5.3	Medium

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MH.P.16 4	Education & Awareness	Toolkit and training materials for BIDs and LDCs on mitigation best practices: Partner with OEM to create toolkit and training materials to train BIDs and LDCs on mitigation best practices. BID representatives and AvenueNYC contract managers will partner with OEM to present on mitigation best practices at meetings in the field.	SBS	OEM	TBD	TBD	TBD	N/A	3.1, 3.2, 3.3, 3.4, 3.5	Medium
MH.P.16 5	Education & Awareness	Hazardous mitigation seminar for BIDs and LDCs: Partner with OEM to hold annual seminar on hazardous mitigation best practices.	SBS	OEM	TBD	TBD	n/a	N/A	3.1, 3.2, 3.3, 3.4, 3.5	Medium
MH.P.16 6	Education & Awareness	Dissemination of hazard information: Distribute personal preparedness materials created by OEM on an occasional basis to 200,000+ jobseekers in SBS database. Help New Yorkers be better prepared for or more aware of potential hazards by getting information out about impending hazards (like a hurricane or tornado warning) or how to react in the wake of a hazard.	SBS	OEM	TBD	TBD	n/a	N/A	3.1, 3.2, 3.3, 3.4, 3.5, 5.1, 5.3	Medium

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MH.P.167	Coastal/Natural Resource Protection	Rockaway Reformulation Study: Complete Rockaway Reformulation Study with sea level rise considerations for future long-term coastal protection recommendations, design, and construction.	USACE, NYS DEC	Parks	3 years	TBD	USACE, NYC, RCPT	N/A	4.1, 4.3, 4.4	High
MH.P.168	Coastal/Natural Resource Protection	T-groins at Coney Island: Construct T-groins at Coney Island to protect coastline.	USACE, NYS DEC	NYSDE, Parks	1 year	TBD	USACE, NYC, RCPT	N/A	2.7, 4.3	High
SEVERE WEATHER										
SW.P.1	Property Protection	Protection of NYCDOT facilities from high winds: Focus on locations including trailer yards and roofs.	DOT	DDC, DCAS	TBD	TBD	TBD	N/A	2.1, 2.7	Medium
SW.P.2	Emergency Services	Sign inspection program: Develop enhanced inspection program of key street, parking, and life-protecting signs throughout the city to ensure these do not become potentially hazardous debris during high-wind events.	DOT	N/A	3 years	\$3,250,000	Consolidated Highway Improvement Program	N/A	2.1, 2.7	High

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SW.P.3	Property Protection	Rooftop equipment protection at HRA facilities: Secure rooftop equipment to withstand high-wind events.	HRA	OEM, DEP, DDC, DCAS, FEMA	5 years	\$5,000,000	Agency capital budget	Recommendations were made to landlord	1.1, 2.1, 2.7	Medium
SW.P.4	Property Protection	Increased line clearance tree trim program: Expand line clearance tree trim program to shorten tree trim cycle and increase removal of hazardous trees outside normal trim zones.	LIPA	N/A	January 2014 start, December 2014 completion	\$500,000	NYS (CDBG fund), LIPA	N/A	2.1, 2.7, 3.3	Medium
SW.P.5	Infrastructure Project	Bridge reinforcement: Study and design to construct bridge features that mitigate the effects of high-wind events.	MTA (Bridges and Tunnels)	N/A				Incorporated into facility "State-of-Good Repair" projects	2.1, 2.7, 2.8, 2.9	Medium
WINTER STORMS										
WS.P.1	Infrastructure Project	Improved snow and ice melt: Research and, if appropriate, test and monitor the effectiveness of permeable pavement and other paving techniques to speed snowmelt and icemelt on streets. The goal is to clear them more quickly, thereby reducing vehicular crashes and improving emergency access post-snowstorm.	DOT	N/A	1 year (consultant study)	\$250,000	HMGP, city capital budget, city expense budget	No change	2.1, 2.7, 2.8, 2.9, 5.2	Medium

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WS.P.2	Education & Awareness	Outreach to property owners on impacts of snow loads: Partner with DOB to educate property owners about the impacts of snow load, snow drift loads, and sliding snow loads.	OEM	DOB	1 year	TBD	Agency operating budget	No change	2.6, 3.4, 5.3	High

Table 6: New York City Hazard Mitigation Action (Potential)/Implementation Table

DRAFT

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v. **Private Institutions and Non-Profit Organizations—Potential Mitigation Actions**

Like other groups in New York City, private institutions and non-profit organizations are vulnerable to hazards and interested in formulating mitigation strategies. The City works closely with private institutions and non-profits before, during, and after emergencies. This partnership is critical to strengthen resiliency and preparedness throughout the entire city. The private and non-profit world in New York City encompasses hundreds of entities that can be categorized according to five primary sectors:

- Human services—special needs
- Healthcare
- Cultural institutions
- Education
- Emergency services

For each sector, there are corresponding mitigation actions.

Human Services—Special Needs

The human services sector includes organizations that aim to improve quality-of-life issues for the local community, addressing the human element in response and recovery operations. This sector includes organizations that provide services and advocacy to special needs populations and thus make the City's plans and operations all-inclusive, reaching as diverse a population as possible to ensure that no group is left behind. The sector also encompasses organizations responsible for mass-care operations including sheltering, feeding, and volunteer and donation coordination and management. Also included in this sector are affordable housing providers, nursing homes, and assisted living complexes.

Organizations within the human services sector may implement a variety of mitigation actions to help reduce or eliminate long-term risk. For instance, they may take property protection actions to prevent flooding at an affordable housing complex and, in addition, install backup generators to ensure continuity in a power outage.

Public messaging is a key component of ensuring inclusive human services efforts.

Healthcare

The organizations in this sector include private hospitals and other healthcare facilities, such as nursing homes, adult care facilities, senior centers, and dialysis centers. In New York City, many hospitals belong to a larger umbrella organization called Greater New York Hospitals Association (GNYHA), a trade association comprising nearly 250 hospitals and continuing care facilities, both voluntary and public, in the metropolitan New York area and throughout New York State, as well as New Jersey, Connecticut, and Rhode Island. After Hurricane Sandy, New

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York City hospitals reviewed general building codes and healthcare regulations to determine recommendations for existing buildings and new construction standards.

In particular, NYU Langone Medical Center and Memorial Sloan-Kettering Cancer Center have been identified several mitigation projects focusing on property protection and emergency services. Such mitigation actions within this sector can include floodgate installation and equipment elevation to ensure that critical hospital functions and research programs continue to uninterrupted under hazardous conditions. Additional emergency power distribution is vital to mitigate power outages, which rendered all hospital functions at these facilities inoperable during Sandy.

Cultural Institutions

Museums, cultural facilities, libraries, historic places, and conservation societies are all included in the cultural institutions sector. Many of these organizations make up the Alliance for Response NYC, an initiative of the non-profit organization Heritage Perseveration, which brings cultural institutions and the first responder community together to prepare and respond for emergencies. These organizations may propose actions to mitigate flooding, such as designing drainage systems, constructing seawalls, and installing leak-detection equipment. Property protection mitigation actions may include elevating generator equipment or moving historic collections from the basements of buildings to higher floors.

Education

The education sector includes high schools, private colleges, universities, and other educational institutions. Many of the mitigation actions proposed by these entities address emergency services (for instance, promoting backup power generation to ensure continuity in the event of a power outage); others address property protection (facilities in low-lying areas may consider elevating electrical equipment or installing drainage systems to protect buildings from flooding). It is critical to maintain power and ensure that physical structures are resilient in the face of hazardous environments.

Emergency Services

Organizations that provide ambulatory services and/or alert notification systems are part of the emergency services sector. These organizations may propose backup power mitigation actions to prevent the loss of communication services due to power outages during an emergency.

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B. Analysis

The Planning Team and Steering Committee analyzed potential mitigation actions using the FEMA STAPLEE (social, technical, administrative, political, legal, economic, and environmental) review method. This analysis helped determine whether actions achieved one or more of the five hazard mitigation goals and 28 objectives of the HMP. The analysis also established the opportunities and constraints of implementing each potential mitigation action.

i. STAPLEE Analysis

The STAPLEE review method is an evaluation process developed by FEMA that is a systematic method to help identify the benefits and constraints of a particular mitigation action. Figure 1, below, provides a summary of the STAPLEE criteria.

Social Technical Administrative Political Legal Economic Environmental

Social: The public must support the overall implementation and specific mitigation actions.

Will the proposed action adversely affect one segment of the population?
Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
Is the action compatible with present and future community values?

How effective is the action in avoiding or reducing future losses?
Will it create more problems than it solves?
Does it solve the problem or only the symptom?

Technical: It is important to determine if the proposed action is technically feasible and will help reduce losses in the long term.

Administrative: Determine if the city has the staff and capabilities necessary to implement the action.

Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
Can the community provide the necessary maintenance?
Can it be accomplished in a timely manner?

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<p>Is there Political support to implement and maintain the action?</p> <p>Is there a local champion willing to see the action to completion?</p> <p>Is there enough public support to ensure the success of the action?</p>	<p>Political: Understanding how the community and political leadership feel about issues related to the environment, economic development, safety and emergency management.</p>
<p>Legal: Without appropriate legal authority, the action cannot lawfully be undertaken.</p>	<p>Are the proper laws, ordinances, and resolutions in place to implement the action? Are there potential legal consequences? Will the community be liable for the actions or support of actions, or lack of action? Is the action likely to be challenged by stakeholders who may be negatively affected?</p>
<p>Are there currently sources of funds that can be used to implement the action?</p> <p>What benefits will the action provide? Does the cost seem reasonable for the size of the problem and likely benefits?</p> <p>What burden will be place on the tax base to implement the action?</p> <p>Does the action contribute to the community economic goals, such as capital improvements or economic development?</p>	<p>Economic: Economic considerations must include the present economic base and projected growth.</p>
<p>Environment: Impact on the environment is an important consideration because of public desire for sustainable and environmentally healthy communities.</p>	<p>How will this action affect the environment (land, water, endangered species)?</p> <p>Will this action comply with local, state, and federal environmental laws or regulations?</p> <p>Is the action consistent with community environmental goals?</p>

Figure 1: STAPLEE Summary Table

The Planning Team used the seven STAPLEE evaluation criteria to assign values to the actions. A score of plus (1) was assigned if the proposed action is favorable, a minus (-1) if the action is unfavorable, or a Not Applicable (0) if the evaluation criteria does not apply to the mitigation action.

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CBRN																				
CB.P.1	Construction Code revision	DOB	1	1	1	1	0	0	0	0	1	1	1	1	0	1	1	1	0	1
CB.P.2	Harlem River lift bridge	MNR	1	0	1	1	1	1	0	0	1	1	0	1	1	1	1	0	0	0
CB.P.3	NYCHA fresh water supply	NYCHA	1	1	1	1	0	1	0	-1	1	1	1	1	0	1	0	0	0	1
CB.P.4	Brownfield cleanup in the 100-year floodplain	OER	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1
CB.P.5	Environmental research	OER	1	0	1	1	0	0	0	-1	1	0	1	1	1	1	1	1	1	1
CB.P.6	BrownfieldWORKS!	OER	1	-1	1	1	-1	1	0	0	1	1	1	1	-1	1	1	-1	1	1
CB.P.7	Environmental Project Information Center (EPIC)	OER	1	0	1	1	0	0	0	-1	1	1	1	1	1	1	1	-1	1	1
Coastal Erosion																				
CE.P.1	Protection of Rikers Island east, west, and south shorelines	DOC	1	1	1	1	0	0	0	0	1	0	1	1	1	1	0	1	0	0
CE.P.2	Beach restoration	Parks	1	1	1	-1	-1	0	0	-1	1	1	1	1	0	1	0	0	0	0

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CE.P.3	Renourishment of Orchard Beach, Bronx	USACE/NYC P&R	1	0	1	-1	-1	1	0	-1	1	1	1	1	-1	1	1	1	-1	0
Coastal Storms																				
CS.P.1	Resilient neighborhoods planning studies	DCP	1	1	1	0	1	0	0	0	1	1	1	1	1	1	0	0	0	1
CS.P.2	DCP planning support and technical assistance for Sandy disaster recovery	DCP	1	1	1	0	1	0	0	0	1	1	1	1	1	1	0	0	0	1
CS.P.3	Emergency contracts	DDC	1	0	1	0	0	0	0	0	1	1	1	1	-1	1	0	0	0	1
CS.P.4	Hardening pumping stations	DEP	1	1	0	1	-1	-1	0	-1	1	1	1	1	0	1	-1	-1	0	0
CS.P.5	Hardening wastewater treatment plants	DEP	1	0	1	1	1	1	1	1	1	1	1	1	1	-1	1	1	1	1
CS.P.6	Alternatives for Rockaway Wastewater Treatment Plant	DEP	1	0	1	-1	-1	0	0	0	0	0	1	1	0	1	-1	1	0	0
CS.P.7	VCBC mooring system and site access improvement	DOC	1	0	1	1	0	0	0	0	1	1	1	1	0	1	0	1	0	1
CS.P.8	Division I, II and III	DOC	1	0	1	0	0	0	-1	-1	1	0	1	1	0	1	0	1	0	1

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	storehouse																			
CS.P.9	FDNY storehouse improvement	FDNY	1	0	1	1	0	0	0	-1	1	1	1	1	0	1	0	0	0	1
CS.P.10	EMS Battalion	FDNY	1	1	0	1	-1	0	0	0	1	1	1	1	1	1	0	0	0	1
CS.P.11	EMS fallback sites	FDNY	1	1	1	0	1	0	0	0	1	1	1	1	1	1	0	0	0	1
CS.P.12	FDNY emergency services	FDNY	1	1	0	1	0	1	0	-1	1	1	1	1	1	1	0	0	0	1
CS.P.13	Outreach to residential building owners	HPD	1	1	1	0	0	1	0	1	1	1	1	1	1	1	1	-1	0	1
CS.P.14	Resilient home design competition	HPD	1	1	1	0	0	1	0	0	1	1	1	1	1	1	1	1	0	1
CS.P.15	Bridge and tunnel improvements and study	MTA (Bridges and Tunnels)	1	1	0	0	-1	-1	0	-1	1	1	1	1	0	1	0	0	0	0
CS.P.16	Flood-hardening of vital communications, substations, transformers, mechanical equipment, revenue equipment, and other electronic systems at	MTA (Bridges and Tunnels)	1	1	0	0	-1	-1	0	-1	1	1	1	1	0	1	0	-1	0	0

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	all MTA B&T facilities																			
CS.P.17	Raising Governors Island seawall for Hugh L. Carey Tunnel	MTA (Bridges and Tunnels)	1	0	1	1	1	0	0	-1	1	1	1	1	0	1	-1	1	0	1
CS.P.18	Water-level monitoring/alarm systems/CCTV	MTA (MNR)	1	1	1	1	0	0	0	-1	1	1	1	1	0	1	0	-1	0	1
CS.P.19	Power and communications/signal infrastructure mitigation	MTA (MNR)	1	0	0	1	0	0	0	1	1	1	1	1	0	1	0	-1	0	1
CS.P.20	Hardening of vulnerable healthcare facilities	NYS DOH	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	-1	0	1
CS.P.21	Protection of hurricane shelter windows	OEM	1	1	1	1	0	0	0	0	1	1	1	1	0	1	0	0	0	1
CS.P.22	Hazards U.S. Multi-Hazard (HAZUS-MH) modeling	OEM	1	0	0	0	0	1	0	1	1	1	1	1	1	1	0	-1	0	1

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CS.P.23	Backup power for evacuation centers	OEM	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	0	-1	-1	0
CS.P.24	Storm shutters for the Emergency Operations Center	OEM	1	1	1	1	0	0	0	-1	1	1	1	1	0	1	1	0	0	1
CS.P.25	Storm surge/tidal gauge real-time monitoring system	OEM	1	1	0	1	0	-1	0	-1	1	1	1	1	0	1	0	-1	0	1
CS.P.26	Evacuation center/hurricane shelter ADA retrofit program for DOE facilities	OEM	1	1	-1	1	0	-1	0	-1	1	1		1	-1	1	0	-1	0	1
CS.P.27	Updates to Urban Post-Disaster Interim Neighborhood Design Guidelines	OEM	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	-1	0	1
CS.P.28	Cleanup standards for waterfront brownfields	OER	1	1	1	0	1	0	0	0	1	1	1	1	0	1	1	1	1	1
CS.P.29	Building Code update for wind resiliency in new buildings	OLTPS	1	1	0	1	0	0	0	0	1	1	1	1	0	1	1	-1	0	1

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CS.P.30	Building Code update for wind resiliency in existing buildings	OLTPS	1	1	0	1	0	0	0	0	1	1	1	1	0	1	1	-1	0	1
CS.P.31	Power exercises	USACE/NYCOEM/RCP T	1	1	1	0	0	0	0	0	1	1	1	1	0	1	0	1	0	1
Cyber Threats																				
CY.P.1	Supplement IT Security	HRA	1	1	1	1	0	1	-1	-1	1	1	1	1	1	1	-1	-1	0	0
CY.P.2	Cyber-Security Strategy	MTA (MNR)	0	0	1	1	0	0	1	-1	1	0	1	1	0	1	-1	1	0	0
Disease Outbreaks																				
DO.P.1	Pandemic Planning	MTA (MNR)	1	1	1	-1	1	1	0	0	1	1	1	1	1	1	0	0	0	0
Drought																				
D.P.1	Maximizing capacity for water delivery from the Catskill/Delaware system	DEP	1	0	1	1	0	-1	1	-1	1	0	1	1	-1	1	-1	0	0	1
D.P.2	Catskill Aqueduct capacity	DEP	1	0	1	1	0	-1	1	-1	1	0	1	1	-1	1	-1	0	0	1
D.P.3	Construction Code revision	DOB	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
D.P.4	Drought effects monitoring	FDNY	1	-1	1	1	-1	-1	1	-1	1	1	1	1	1	1	0	0	1	1

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Earthquakes																				
EQ.P.1	Mechanical equipment seismic upgrade	DCAS	1	1	1	1	0	0	0	1	1	1	0	1	1	1	1	1	0	0
EQ.P.2	Seismic protection for sewers	DEP	1	1	1	1	0	1	1	-1	1	1	1	1	1	1	0	0	1	1
EQ.P.3	Seismic inspection and retrofit for drinking water distribution system	DEP	1	1	1	0	0	1	1	0	1	1	1	1	1	1	0	0	1	1
EQ.P.4	Seismic study and retrofit for tall buildings	DOE	1	1	1	1	1	0	1	-1	1	1	1	1	1	1	0	1	0	0
EQ.P.5	Building upgrades to seismic codes	HHC	1	1	1	1	1	0	-1	-1	1	1	1	1	1	1	-1	-1	0	0
EQ.P.6	HPD facility improvement	HPD	1	1	1	1	1	-1	-1	0	1	1	1	1	1	1	-1	-1	0	0
EQ.P.7	UPACA (Site 6)	NYCHA	1	1	1	1	-1	-1	0	-1	1	1	1	1	1	1	0	0	0	0
EQ.P.8	HAZUS-MH modeling	OEM	0	1	1	1	0	1	-1	1	1	1	0	0	1	1	-1	1	0	0
Extreme Temperatures																				
ET.P.1	Power redundancy in City-owned buildings	DCAS	1	1	1	0	-1	0	0	-1	1	1	1	1	1	1	0	1	0	0
ET.P.2	AC upgrade for senior	DFTA	1	1	1	0	0	0	0	-1	1	1	1	1	1	1	0	0	0	0

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	centers																			
ET.P.3	AC availability and affordability	DOHMH	1	1	1	1	-1	0	-1	0	1	1	-1	0	0	1	-1	-1	-1	-1
ET.P.4	Urban heat island effect mitigation	DOHMH	1	1	1	1	1	-1	0	0	1	1	0	1	0	1	0	-1	1	1
ET.P.5	Cooling centers	NYCHA	1	1	1	0	-1	0	0	-1	1	1	1	1	1	1	0	0	-1	-1
Flooding																				
F.P.1	Flooding Prevention	DCAS	0	1	1	1	-1	0	0	1	-1	-1	0	0	0	1	0	0	0	0
F.P.2	Infrastructure flood protection	DCAS	0	1	1	1	0	0	-1	0	0	0	0	1	0	1	-1	0	1	1
F.P.3	Flood Resilient Building Design Manual	DCP	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
F.P.4	Zoning for flood-resistant construction, Phase I and II:	DCP	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
F.P.5	Ecologically sensitive industrial area planning	DCP	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
F.P.6	Croton Falls pump station rehabilitation	DEP	1	1	1	1	0	0	-1	-1	1	1	-1	1	0	1	-1	0	1	1

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F.P.7	Bergen Basin and Tallman Island Wastewater Treatment Plant drainage upgrades	DEP	1	1	1	1	0	0	-1	-1	1	1	-1	1	0	1	-1	0	1	1
F.P.8	Server capacity improvements	DFTA	1	1	1	1	0	0	-1	1	1	1	0	1	0	1	-1	0	0	0
F.P.9	DHS electrical improvements	DHS	1	1	1	1	0	0	-1	1	1	1	0	1	0	1	-1	0	0	0
F.P.10	Borden Avenue facility	DHS	1	1	1	1	0	0	-1	1	1	0	0	1	0	1	-1	0	-1	-1
F.P.11	Data system upgrade	DOB	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	-1	0	1
F.P.12	Rikers Island roadway regrading	DOC	1	1	1	1	0	0	-1	1	1	0	0	1	0	1	-1	0	0	0
F.P.13	Water infiltration prevention	DOHMH	0	0	1	1	0	0	-1	1	0	0	0	1	0	1	-1	0	0	0
F.P.14	Flood-proofing 125 Worth Street vault	DOHMH	1	1	1	1	0	0	-1	0	1	1	0	1	0	1	-1	-1	0	1
F.P.15	Permeable pavement	DOT	1	0	1	1	1	1	-1	-1	1	0	1	1	1	1	1	-1	1	1
F.P.16	Protection for the Manhattan 1,2, and 5 facility	DSNY	1	1	1	1	-1	0	0	-1	0	1	0	1	0	1	-1	0	1	1
F.P.17	Stapleton waterfront	EDC	1	1	1	1	1	0	0	0	1	1	0	1	0	1	-1	0	1	1

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	flood mitigation																			
F.P.18	Brooklyn Army Terminal passive flood barrier system	EDC	1	1	1	1	-1	0	0	-1	0	1	0	1	0	1	-1	0	1	1
F.P.19	EDC operations centers flood mitigation	EDC	1	1	1	1	-1	0	0	-1	0	1	0	1	0	1	-1	0	1	1
F.P.20	Flood effects reduction program	FDNY	1	1	1	1	-1	0	0	-1	0	1	0	1	0	1	-1	0	1	1
F.P.21	Dewatering pumps at FDNY facilities	FDNY	1	1	1	1	-1	0	0	-1	0	1	0	1	0	1	-1	0	1	1
F.P.22	New construction flood mitigation	FDNY	1	0	1	1	0	-1	-1	1	1	1	1	1	0	1	0	-1	0	1
F.P.23	Coney Island Hospital flood-proofing	HHC	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.24	Coney Island Hospital emergency department mitigation	HHC	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.25	Coney Island Hospital/critical system protection	HHC	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0

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F.P.26	Metropolitan Hospital	HHC	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.27	Metropolitan Hospital	HHC	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.28	Coler Hospital	HHC	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.29	Coler Hospital	HHC	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.30	Building flood protection	HRA	1	1	1	0	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.31	Portable generators	HRA	1	1	1	0	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.32	Substation mitigation	LIPA	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.33	Water-balance study	MTA (NYCT-Subway)	1	1	1	0	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.34	Double Track Main Line, Phase 2	MTA/LIRR	1	1	1	1	1	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.35	Ventilation grate improvements	MTA/LIRR	1	1	1	0	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.36	Long Island City Yard protection	MTA/LIRR	1	1	1	1	0	0	0	-1	0	1	0	1	0	1	-1	0	0	0
F.P.37	Safeguarding of basement/cellar equipment	NYCHA	1	1	1	1	0	0	0	-1	1	1	0	1	0	1	-1	0	0	0
F.P.38	New NYCHA building or development	NYCHA	-1	-1	1	1	-1	0	-1	-1	0	-1	-1	1	-1	1	-1	-1	-1	0

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F.P.39	NYCHA floodgates and barriers	NYCHA	1	1	1	1	0	0	0	-1	1	1	0	1	0	1	-1	0	0	0
F.P.40	NYCHA boiler rooms and electrical equipment	NYCHA	1	1	1	1	0	0	0	-1	1	1	0	1	0	1	-1	0	0	0
F.P.41	Sump pump protection	NYPD	1	1	1	1	0	0	0	-1	1	1	0	1	0	1	-1	0	0	0
F.P.42	Building electrical protection	NYPD	1	1	1	1	0	0	0	-1	1	1	0	1	0	1	-1	0	0	0
F.P.43	Boiler protection	NYPD	1	1	1	1	0	0	0	-1	1	1	0	1	0	1	-1	0	0	0
F.P.44	Short-term flood mitigation of OCME emergency management storage facility at 18 th Street and FDR Drive	OCME	1	1	1	0	0	0	0	-1	1	1	0	1	0	1	-1	0	0	0
F.P.45	Flood mitigation measures for New York City's backup Emergency Operations Center	OEM	1	1	1	1	0	0	0	-1	1	1	0	1	0	1	-1	0	0	0
F.P.46	HAZUS-MH modeling	OEM	0	0	1	1	0	-1	0	-1	1	1	0	1	0	1	-1	0	0	0

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F.P.47	National Flood Insurance Program (NFIP) Community Rating System	OEM	1	1	1	1	1	0	0	0	1	1	0	1	0	1	-1	0	0	0
F.P.48	Public information and guidance	OEM	1	1	1	1	1	0	0	0	1	1	0	1	0	1	1	0	0	0
F.P.49	Outreach and education for owners of Severe Repetitive Loss properties	OEM	1	1	1	1	-1	0	0	0	1	1	0	1	-1	1	0	0	0	0
F.P.50	Local storm surge barrier for Gowanus Canal	OLTPS	1	1	1	1	1	0	0	0	1	1	0	1	0	1	0	-1	1	0
F.P.51	Plan for flood protection along the Williamsburg, Greenpoint, and Long Island City coastlines	OLTPS	1	1	1	1	1	0	-1	0	1	1	0	1	0	1	1	0	1	1
F.P.52	Floodgate repairs at Oakwood Beach, Staten Island	OLTPS	1	1	1	1	1	0	-1	-1	1	1	0	1	0	1	-1	-1	0	0
F.P.53	Primary and secondary dune systems in	OLTPS	1	1	1	1	1	0	1	0	1	1	0	1	0	1	0	0	1	1

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	Rockaway Peninsula																			
F.P.54	Offshore breakwaters adjacent to and south of Great Kills Harbor	OLTPS	1	1	1	1	1	0	1	0	1	1	0	1	0	1	0	0	1	1
F.P.55	Flood protection in Hunts Point	OLTPS	1	1	1	1	0	0	-1	0	1	1	0	1	0	1	-1	-1	1	1
F.P.56	Flood protection in East Harlem	OLTPS	1	1	1	1	0	0	-1	0	1	1	0	1	0	1	-1	-1	1	1
F.P.57	Lower Manhattan flood protection	OLTPS	1	1	1	1	0	0	-1	0	1	1	0	1	0	1	-1	-1	1	1
F.P.58	Integrated Flood Protection System for Red Hook	OLTPS	1	1	1	1	1	0	-1	0	1	1	0	1	0	1	1	0	1	1
F.P.59	Protection of Farragut substation	OLTPS	1	1	1	1	1	0	0	0	1	1	0	1	0	1	0	0	1	1
F.P.60	Newtown Creek flood protection	OLTPS	1	1	1	1	1	0	1	0	1	1	0	1	0	1	0	0	1	1
F.P.61	Flood protection research	OLTPS	1	1	1	1	1	0	0	0	1	1	0	1	0	1	0	0	1	1
F.P.62	Prevention of drainage pipe flooding	OLTPS	1	1	1	1	1	0	0	0	1	1	0	1	0	1	0	0	1	1
F.P.63	Floodgate at Mill Creek	OLTPS	1	1	1	1	1	0	1	0	1	1	0	1	0	1	0	0	1	1

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F.P.64	Community Rating System	OLTPS	1	1	1	1	1	0	0	0	1	1	0	1	0	1	0	0	1	1
F.P.65	Coney Island Creek wetlands and tidal barrier	OLTPS	1	1	1	1	1	0	-1	0	1	1	0	1	0	1	1	0	1	1
F.P.66	Integrated flood protection for southern Manhattan	OLTPS	1	1	1	1	1	0	0	0	1	1	0	1	0	1	0	0	1	1
F.P.67	Flood protection of vital infrastructure at LaGuardia Airport	PANYNJ (Aviat.)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0
F.P.68	Flood protection of vital infrastructure at Kennedy Airport	PANYNJ (Aviat.)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0
F.P.69	Drainage improvements at Kennedy Airport	PANYNJ (Aviat.)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0
F.P.70	Protection of Kennedy Airport fuel farm tanks	PANYNJ (Aviation)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0
F.P.71	LaGuardia Airport dike wall	PANYNJ (Aviation)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0
F.P.72	Kennedy Airport sanitary lift station	PANYNJ (Aviation)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0

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F.P.73	Kennedy Airport runway upgrade	PANYNJ (Aviation)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0
F.P.74	Kennedy Airport runway upgrade	PANYNJ (Aviation)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0
F.P.75	Improvements to George Washington Bridge anchorage drainage system	PANYNJ(TBT)	0	0	1	1	1	0	-1	-1	1	1	1	-1	0	1	-1	-1	1	0
F.P.76	Flood-proofing at Olmsted site	Parks	0	0	1	1	0	0	0	0	0	0	0	-1	0	1	-1	0	0	0
F.P.77	Tidegate upgrade in Flushing Meadow Corona Park	Parks	1	1	1	1	0	1	1	-1	1	1	1	1	1	1	1	-1	1	1
Infrastructure Failures																				
IF.P.1	Expansion of cogeneration	DEP	1	1	1	1	0	-1	1	0	1	1	0	0	1	1	1	1	1	1
IF.P.2	Repair of the Delaware Aqueduct leak	DEP	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
IF.P.3	Utilities on Buono Bridge	DOC	-1	1	1	1	0	1	-1	-1	-1	-1	0	1	1	1	-1	1	0	0
IF.P.4	Facility electrical power and data	DOHMH	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0

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	infrastructure upgrade																			
IF.P.5	DOHMH generators and retrofits	DOHMH	1	1	1	-1	0	1	1	1	1	1	0	1	1	1	1	1	0	0
IF.P.6	Session Initiation Protocol (SIP)	DoITT	1	1	1	1	0	1	1	0	1	1	0	1	1	1	1	0	0	0
IF.P.7	Citywide IVR for employee announcements	DoITT	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	0	0	0
IF.P.8	Telecommunications Planning and Resiliency Office	DoITT	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0
IF.P.9	IP routing network	DoITT	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0
IF.P.10	Purchase of mobile substation	LIPA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	0	0
IF.P.11	Purchase of mobile switchgear	LIPA	1	1	1	1	1	1	1	-1	1	1	0	1	1	1	1	-1	0	0
IF.P.12	Emergency generators in NYCHA properties	NYCHA	1	1	1	-1	0	1	-1	-1	1	1	0	1	1	1	0	0	0	0
IF.P.13	Stand-alone power generation in NYCHA developments	NYCHA	1	1	1	1	-1	1	-1	-1	1	1	1	1	1	1	-1	-1	0	0

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IF.P.14	Backup generators for Police Department facilities	NYPD	1	1	1	-1	0	1	1	1	1	1	0	1	1	1	0	0	0	0
IF.P.15	Flood mitigation of 520 First Ave. (Manhattan Morgue) and Forensic biology building	OCME	1	1	1	1	-1	0	1	1	1	1	0	1	1	1	-1	1	0	0
IF.P.16	Kings and Queens facilities	OCME	0	0	1	-1	1	1	1	1	1	1	0	1	1	1	0	-1	0	0
IF.P.17	Generator assessment and installation of quick-connects for critical infrastructure	OEM	1	1	1	-1	0	-1	1	-1	1	1	1	1	1	1	0	-1	0	0
IF.P.18	Backup generators for gas stations and terminals	OEM	1	1	1	-1	1	-1	1	-1	1	1	1	1	1	1	0	-1	0	0
IF.P.19	Protection from utility service interruptions	OLTPS	1	1	1	1	1	1	-1	0	1	1	1	1	1	1	0	0	1	1
IF.P.20	Distributed generation (DG) and micro-grids	OLTPS	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0
Multi-Hazards																				
MH.P.1	Overhead electric	Con Ed	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	-1	1	0	1

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	system improvements																			
MH.P.2	Underground electric system improvements	Con Ed	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	-1	1	0	0
MH.P.3	Gas system Improvements	Con Ed	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	-1	0	0	0
MH.P.4	Storm-hardening of critical facilities	Con Ed	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	-1	0	0	1
MH.P.5	Window upgrades	DCAS	1	0	1	1	0	0	0	-1	1	1	1	1	1	1	0	1	0	1
MH.P.6	Retail resiliency study	DCP	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0
MH.P.7	Building Identification Numbers (BINs)	DCP	1	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1
MH.P.8	BIN Working Group recommendations	DCP	1	1	0	1	0	0	0	0	1	1	0	0	0	1	0	0	0	1
MH.P.9	Inspection and upgrade program for DEP facilities	DEP	0	0	0	1	0	0	0	-1	1	1	1	1	0	1	0	0	0	1
MH.P.10	Groundwater development	DEP	0	0	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1
MH.P.11	Groundwater treatment plant	DEP	0	1	0	0	1	0	0	-1	1	1	1	1	-1	1	0	1	1	1
MH.P.12	Laptops for DFTA essential staff	DFTA	1	1	1	0	0	1	0	-1	1	1	1	1	0	1	1	0	0	1

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MH.P.1 3	Generator for neighborhood hub	DFTA	1	1	0	0	-1	0	0	-1	1	1	1	1	0	1	0	0	-1	0
MH.P.1 4	Headlamps for home-delivered meals deliverers	DFTA	1	1	1	0	0	0	0	0	1	1	1	1	0	1	1	0	0	1
MH.P.1 5	Upgrades to DHS buildings	DHS	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	0	0	0	1
MH.P.1 6	DHS building roof improvements	DHS	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	1	0	0	1
MH.P.1 7	Window upgrade in DHS buildings	DHS	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	0	0	0	1
MH.P.1 8	Power redundancy at DHS buildings	DHS	1	1	0	1	0	0	0	0	1	1	1	1	0	1	1	0	0	0
MH.P.1 9	DHS shelter protection	DHS	0	0	0	1	-1	0	0	0	0	-1	0	0	-1	1	0	0	0	1
MH.P.2 0	Bellevue shelter facility improvements	DHS	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	0	-1	-1	0
MH.P.2 1	LIFE Family Residence facility improvements	DHS	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	0	-1	-1	0
MH.P.2 2	Mobile command stations	DOB	1	0	1	0	0	0	0	0	0	0	0	0	-1	1	1	0	0	1
MH.P.2 3	DOB backup generators	DOB	1	0	1	0	0	0	0	-1	1	0	1	1	0	1	0	0	-1	0

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MH.P.2 4	DOB radios	DOB	1	0	1	1	0	0	0	0	1	0	1	1	0	1	-1	0	0	1
MH.P.2 5	DOB vehicles	DOB	1	0	1	1	-1	0	0	-1	1	0	0	0	0	1	1	0	-1	0
MH.P.2 6	Stormwater management	DOC	1	1	0	0	1	0	0	0	1	0	1	1	0	1	0	0	0	1
MH.P.2 7	Rikers Island ferry dock	DOC	1	0	0	0	0	0	0	-1	1	0	1	1	0	1	0	0	0	1
MH.P.2 8	Roof and façade improvements	DOC	1	1	0	1	0	0	0	-1	1	0	1	1	0	1	0	1	0	1
MH.P.2 9	Emergency Operations Center improvements	DOC	1	1	0	1	0	0	0	0	1	0	1	1	0	1	0	1	0	1
MH.P.3 0	Off-island satellite Emergency Operations Center (EOC) for Rikers Island	DOC	1	0	0	1	0	0	0	-1	1	0	1	1	0	1	0	1	0	1
MH.P.3 1	MDC cellar/backup emergency system	DOC	1	0	1	1	-1	0	0	-1	1	1	1	1	0	1	1	1	-1	0
MH.P.3 2	Provision of power redundancy	DOE	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	1	0	0	0
MH.P.3 3	Protection of DOE facilities from electrical system	DOE	1	1	1	0	0	0	0	-1	1	0	1	1	0	1	0	0	0	0

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	damage from trees																			
MH.P.3 4	DOE green roof installation	DOE	1	1	1	1	1	0	0	-1	1	1	1	1	0	1	0	0	1	1
MH.P.3 5	Surge protection for DOE critical electrical systems	DOE	1	1	0	1	0	0	0	0	1	1	1	1	0	1	0	0	0	1
MH.P.3 6	Emergency power at DOE facilities	DOE	1	0	1	1	0	0	0	-1	1	0	1	1	0	1	1	0	-1	0
MH.P.3 7	Emergency preparedness plans and training for DOE custodian engineers and building managers	DOE	1	0	1	0	0	0	0	0	1	0	1	1	0	1	1	0	0	1
MH.P.3 8	Psychological First Aid (PFA)	DOHMH	1	1	1	1	0	-1	0	1	1	1	1	1	0	1	1	1	0	1
MH.P.3 9	"Mental Health First Aid" public education program	DOHMH	1	1	1	0	0	0	0	1	1	1	1	1	0	1	1	1	0	1
MH.P.4 0	Mental health system IT improvement	DOHMH	1	1	0	1	0	0	0	0	1	1	1	1	0	1	1	1	0	1
MH.P.4 1	Mental health system power backup	DOHMH	1	1	0	0	-1	0	0	-1	1	1	1	1	0	1	1	1	-1	0

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MH.P.4 2	Mental health system support network	DOHMH	1	1	1	0	0	0	0	0	1	1	1	1	0	1	1	0	0	1
MH.P.4 3	Mental health volunteer preparedness and response	DOHMH	1	1	1	0	0	0	0	0	1	1	1	1	0	1	1	1	0	1
MH.P.4 4	DOHMH IT systems protection	DOHMH	1	0	0	1	0	0	0	-1	1	1	1	1	0	1	1	0	0	1
MH.P.4 5	DOHMH primary data center availability	DOHMH	1	0	0	1	0	0	0	0	1	1	1	1	0	1	1	0	0	1
MH.P.4 6	Riverside clinic upgrade	DOHMH	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	1	0	0	1
MH.P.4 7	DOHMH warehouse and print shop capacity	DOHMH	1	0	0	1	0	0	0	0	1	1	1	1	0	1	1	1	0	1
MH.P.4 8	Health data and provider portal	DOHMH	1	1	0	1	0	0	0	-1	1	1	1	1	0	1	1	0	0	1
MH.P.4 9	Enhanced emergency response communication operations at DOHMH headquarters	DOHMH	1	0	1	1	0	0	0	0	1	0	1	1	0	1	1	-1	0	1
MH.P.5	Generators for	DOHMH	1	1	1	0	0	0	0	-1	1	1	1	1	0	1	0	-1	-1	0

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0	healthcare facilities																			
MH.P.5 1	Small grants program to support community-based social cohesion	DOHMH	1	1	1	1	1	0	-1	0	1	1	0	-1	-1	1	0	0	0	0
MH.P.5 2	"Hub the Hood" program	DOHMH	1	1	1	1	1	0	0	0	1	1	0	-1	-1	1	0	0	0	0
MH.P.5 3	DOHMH facility repair and upgrade	DOHMH	1	1	1	1	1	-1	-1	-1	1	1	0	-1	-1	1	-1	-1	0	0
MH.P.5 4	Notification system for City employees	DoITT	1	1	1	1	0	0	-1	-1	1	1	1	1	1	1	-1	0	0	0
MH.P.5 5	Hardening of NYCWiN network	DoITT	1	1	1	1	0	0	-1	-1	1	1	1	1	1	1	-1	0	0	0
MH.P.5 6	Data Center Site B	DoITT	1	1	1	1	0	0	-1	-1	1	1	1	1	1	1	-1	0	0	0
MH.P.5 7	Secure HAZMAT at DOT facilities	DOT	1	1	1	1	0	-1	0	0	1	1	1	1	1	1	0	0	1	1
MH.P.5 8	Redundant power for all mission-critical DOT sites	DOT	0	0	1	1	1	1	-1	1	1	0	1	1	1	1	1	-1	0	0
MH.P.5 9	Continuity of Operations sites	DOT	1	1	1	1	1	-1	-1	-1	1	1	0	0	-1	1	-1	-1	0	0
MH.P.6 0	Information tracking	DOT	0	0	1	1	1	1	0	-1	1	0	1	1	1	1	1	0	0	0

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MH.P.6 1	High-reflectivity pavements	DOT	1	1	1	1	1	-1	-1	-1	1	1	0	0	-1	1	-1	0	0	0
MH.P.6 2	Critical facility loss estimation	DOT	1	0	1	1	1	0	-1	0	1	-1	0	0	-1	1	0	0	0	1
MH.P.6 3	Staten Island Ferry fleet upgrade	DOT	1	1	1	1	1	0	-1	0	1	1	0	0	0	1	-1	-1	0	0
MH.P.6 4	Staten Island Ferry vessel improvement	DOT	1	0	1	1	1	0	-1	0	1	1	0	-1	-1	1	-1	0	0	0
MH.P.6 5	COOP trailer compound	DSNY	1	1	1	1	1	-1	-1	-1	1	1	0	0	0	1	-1	0	0	0
MH.P.6 6	Industrial property upgrades	EDC/BNYDC	1	1	1	1	1	1	-1	-1	1	1	1	1	1	1	1	-1	1	1
MH.P.6 7	Hardening Staten Island Ferry and private ferry terminals from climate change-related threats	EDC	1	1	1	1	1	-1	-1	-1	1	-1	0	0	-1	1	-1	-1	1	1
MH.P.6 8	Construction of new ferry landings to support private ferry services	EDC	1	0	1	1	1	-1	-1	-1	1	1	0	0	-1	1	-1	-1	0	0
MH.P.6 9	Waterfront fueling facilities	EDC	1	0	1	1	1	-1	-1	-1	1	1	0	0	-1	1	-1	-1	0	0

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MH.P.7 0	Mobile/portable ferry ticketing machines	EDC	1	1	1	1	1	0	-1	-1	1	1	0	0	0	1	-1	-1	0	0
MH.P.7 1	Use of the Staten Island Ferry's Austen Class vessels for East River Ferry service during weather-related storm disruptions	EDC/DOT	1	1	1	1	1	-1	0	-1	1	1	0	0	-1	1	-1	-1	0	1
MH.P.7 2	Storm shutters project	FDNY	1	0	1	1	0	1	-1	1	1	1	1	1	0	1	0	-1	0	1
MH.P.7 3	Backup communications carrier	FDNY	1	0	1	1	1	1	-1	-1	1	1	1	1	0	1	-1	-1	0	0
MH.P.7 4	Voice-over IP architecture	FDNY	1	0	1	1	1	0	-1	0	1	1	0	-1	-1	1	-1	0	0	0
MH.P.7 5	Next-generation satellite phones	FDNY	1	1	1	1	1	0	-1	-1	1	1	0	1	1	1	-1	-1	0	0
MH.P.7 6	FDNY facilities survey	FDNY	1	1	1	1	1	-1	0	0	1	1	0	0	0	1	-1	0	0	1
MH.P.7 7	DCOC cell phone coverage	FDNY	1	-1	1	1	1	0	-1	0	0	0	0	-1	-1	1	0	0	0	0
MH.P.7	FDNY cable network	FDNY	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	-1	0	0

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8																				
MH.P.79	Spare radios	FDNY	1	1	1	1	1	1	0	-1	1	1	1	1	0	1	-1	0	0	0
MH.P.80	Home-work plans	FDNY	1	1	1	1	1	1	0	1	-1	-1	-1	-1	-1	1	0	0	0	0
MH.P.81	Gas vendors	FDNY	1	1	1	1	-1	0	0	0	1	1	0	0	-1	1	0	0	0	0
MH.P.82	Cache of vaccinations	FDNY	1	0	1	1	1	1	1	1	1	1	0	-1	-1	1	-1	-1	0	0
MH.P.83	Urban search and rescue team	FDNY	1	1	1	1	1	-1	0	0	1	1	0	-1	0	1	1	0	0	0
MH.P.84	Coney Island Hospital HVAC	HHC	1	1	1	1	1	0	-1	-1	1	1	0	0	0	1	-1	-1	0	0
MH.P.85	Coney Island Hospital power pre-connections	HHC	1	1	1	1	1	0	-1	-1	1		0	0	0	1	-1	-1	0	0
MH.P.86	Metropolitan Hospital HVAC	HHC	1	1	1	1	1	0	0	-1	1	1	1	1	0	1	-1	0	0	0
MH.P.87	Metropolitan Hospital pre -connections	HHC	1	1	1	1	1	0	0	-1	1	1	1	1	0	1	-1	0	0	0
MH.P.88	Bellevue Hospital	HHC	1	1	1	1	1	0	0	-1	1	1	1	1	0	1	-1	0	0	0

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MH.P.89	Bellevue Hospital power pre-connections	HHC	1	1	1	1	1	0	0	-1	1	1	1	1	0	1	-1	0	0	0
MH.P.90	Central Office Emergency Command Center (ECC) and alternate ECC	HHC	1	1	1	1	1	0	0	-1	1	1	1	1	0	1	-1	-1	0	0
MH.P.91	Henry J. Carter Hospital improvements	HHC	1	1	1	1	1	0	-1	-1	1	1	1	1	0	1	-1	0	0	0
MH.P.92	Outreach to residential building owners	HPD	1	1	1	1	1	-1	-1	-1	1	1	0	0	-1	1	-1	0	0	0
MH.P.93	Flood protection for critical facilities.	HRA	1	1	1	1	1	-1	1	1	1	1	0	1	0	1	0	1	1	0
MH.P.94	Overhead electric infrastructure	LIPA	-1	-1	1	-1	-1	0	0	0	0	-1	0	-1	-1	0	-1	-1	0	0
MH.P.95	Storm damage mitigation	LIPA	-1	0	1	0	0	0	-1	-1	-1	-1	0	0	-1	0	-1	0	-1	0
MH.P.96	Exploration of loss-reduction actions for landmarked properties	LPC	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0
MH.P.97	Public education and outreach for	LPC	1	1	1	1	0	1	1	-1	1	1	0	1	1	1	0	1	0	0

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	landmarked buildings																			
MH.P.9 8	Marine Parkway/Cross Bay Bridge mitigation master plan	MTA (Bridges and Tunnels)	1	1	1	1	1	-1	0	0	1	1	1	1	0	1	0	0	0	0
MH.P.9 9	Engineering flood studies at non-tunnel facilities	MTA (Bridges and Tunnels)	1	0	1	1	1	0	-1	0	1	1	-1	-1	-1	1	-1	0	0	0
MH.P.1 00	Far Rockaway depot green roof	MTA (Buses)	1	1	1	1	1	1	1	-1	1	1	0	1	1	1	1	1	1	1
MH.P.1 01	Hazards/threats planning	MTA (MNR)	1	1	1	1	1	-1	0	0	1	1	1	1	0	1	0	0	0	0
MH.P.1 02	Fueling capabilities/backup for emergency response	MTA (MNR)	1	1	1	1	1	-1	0	0	1	1	1	1	0	1	0	0	0	0
MH.P.1 03	Penn Station access	MTA (MNR)	1	1	1	1	-1	1	1	-1	1	1	0	1	1	1	-1	1	0	0
MH.P.1 04	Harlem-125 Street Station improvements	MTA (MNR)	1	1	1	1	-1	1	1	-1	1	1	1	1	1	1	0	0	0	0
MH.P.1 05	Emergency management equipment	MTA/LIRR	1	0	1	1	0	1	1	1	1	1	1	1	0	1	-1	-1	-1	1

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MH.P.1 06	NYCHA grounds, pavements, and drainage improvements	NYCHA	1	1	1	1	1	-1	1	-1	1	1	0	1	1	1	1	1	1	1
MH.P.1 07	Category 4 distributed power-generation feasibility studies	NYCHA	1	1	1	1	1	-1	0	0	1	1	0	1	1	1	-1	-1	0	0
MH.P.1 08	Morrisania Air Rights	NYCHA	-1	-1	1	1	-1	-1	0	-1	-1	-1	1	1	1	1	-1	-1	0	0
MH.P.1 09	NYCHA AC improvements	NYCHA	1	1	1	0	-1	-1	1	-1	1	1	0	1	1	1	0	0	-1	0
MH.P.1 10	NYPD precinct facility protection	NYPD	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	-1	0	0
MH.P.1 11	NYPD facility protection	NYPD	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	-1	0	0
MH.P.1 12	NYPD critical facilities protection	NYPD	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	-1	0	0
MH.P.1 13	OCME unified agency command center	OCME	1	0	1	-1	1	1	1	1	1	1	0	1	1	1	1	1	0	0
MH.P.1 14	Educational outreach to private sector	OEM	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	-1	0	0
MH.P.1 15	OEM facilities protection	OEM	1	0	1	1	1	1	-1	-1	1	1	0	1	1	1	0	-1	0	0

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MH.P.1 16	HAZUS-MH software	OEM	1	0	1	1	1	1	1	1	1	1	0	1	1	1	-1	-1	1	0
MH.P.1 17	Community Emergency Response Team (CERT) Curriculum	OEM	1	1	1	1	0	1	1	-1	1	1	0	1	1	1	1	1	0	0
MH.P.1 18	Infrastructure systems modeling	OEM	1	1	1	-1	1	1	1	1	1	1	1	1	-1	1	0	-1	-1	1
MH.P.1 19	Loss estimation	OEM	1	0	1	-1	0	1	-1	1	1	1	0	1	1	1	0	-1	0	0
MH.P.1 20	Natural hazard event database	OEM	1	0	1	-1	0	1	1	1	1	1	0	1	1	1	0	1	0	0
MH.P.1 21	CERT collaboration with community groups	OEM	1	-1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0
MH.P.1 22	Ready New York update	OEM	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
MH.P.1 23	Public/private mitigation initiatives	OEM	1	0	1	1	1	1	-1	-1	1	1	0	1	1	1	0	-1	1	0
MH.P.1 24	Regional critical infrastructure mapping	OEM	1	0	1	-1	0	1	-1	-1	1	1	0	1	1	1	0	-1	0	0
MH.P.1 25	Subway depths mapping:	OEM	-1	0	1	-1	0	1	-1	1	1	1	0	1	-1	1	0	-1	0	0

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MH.P.1 26	Vegetation data	OEM	-1	0	1	-1	0	1	-1	1	1	1	0	1	-1	1	0	-1	0	0
MH.P.1 27	Zoning for hazard-prone areas	OEM	1	1	1	1	1	1	-1	-1	1	1	0	1	-1	1	0	-1	1	1
MH.P.1 28	Mitigation public outreach	OEM	1	1	1	1	1	-1	-1	-1	1	1	1	1	1	1	0	-1	1	1
MH.P.1 29	Emergency Operations Center (EOC)	OEM	1	0	1	1	1	1	-1	-1	1	1	0	1	1	1	-1	-1	0	0
MH.P.1 30	OEM Warehouse	OEM	1	1	1	1	1	1	1	-1	1	1	0	1	1	1	1	1	0	0
MH.P.1 31	New York City mitigation guide and education	OEM	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	-1	1	1
MH.P.1 32	Building community capacity	OEM	1	1	1	-1	0	-1	-1	-1	1	1	0	1	1	1	1	0	0	0
MH.P.1 33	Urban Post-Disaster Housing site identification in New York City	OEM	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	1
MH.P.1 34	Executive decision-making guide for deployable post-disaster housing	OEM	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	1

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MH.P.1 35	Request for Proposal for Urban Post-Disaster Housing	OEM	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	-1	0	1
MH.P.1 36	Storm shutter protection at OEM headquarters	OEM	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	1	-1	0	1
MH.P.1 37	NYC Brownfield Incentive Grant (BIG) program	OER	1	1	1	1	1	-1	-1	1	1	1	1	1	1	1	1	-1	1	1
MH.P.1 38	Fuel advance warning system	PANYNJ (Aviation)	1	0	1	-1	0	1	1	1	1	1	1	1	1	1	1	1	0	0
MH.P.1 39	Kennedy Airport electrical system resiliency	PANYNJ(Aviat.)	1	1	1	1	1	1	1	-1	1	1	1	1	1	1	0	-1	0	0
MH.P.1 40	LaGuardia Airport central electric substation	PANYNJ(Aviat.)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	0	0
MH.P.1 41	LaGuardia Airport electrical system enhancement	PANYNJ(Aviat.)	1	1	1	-1	1	1	1	-1	1	1	1	1	1	1	-1	-1	0	0
MH.P.1 42	LaGuardia Airport power system redundancy	PANYNJ(Aviat.)	1	1	1	-1	1	1	1	-1	1	1	1	1	1	1	-1	-1	0	0

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MH.P.1 43	Kennedy Airport power system redundancy	PANYNJ(Aviat.)	1	1	1	-1	1	1	-1	1	1	1	1	1	1	-1	-1	0	0	
MH.P.1 44	Stewart Airport standby emergency generator	PANYNJ(Aviat.)	1	1	1	-1	1	1	-1	1	1	1	1	1	1	1	-1	0	0	
MH.P.1 45	Stewart Airport power system redundancy	PANYNJ(Aviat.)	1	1	1	-1	1	1	-1	1	1	1	1	1	1	1	-1	0	0	
MH.P.1 46	Kennedy Airport fuel storage	PANYNJ(Aviat.)	1	1	1	1	-1	1	1	1	1	1	1	1	1	1	-1	-1	-1	
MH.P.1 47	Intelligent Transportation System (ITS) program at Kennedy and Newark Airports	PANYNJ(Aviat.)	1	1	1	-1	1	1	1	1	1	1	1	1	1	-1	-1	0	0	
MH.P.1 48	Emergency generator capacity for Red Hook and Howland Hook container terminals	PANYNJ(Ports)	1	1	1	-1	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	
MH.P.1 49	Lincoln Tunnel electrical and power system improvements	PANYNJ(TBT)	1	1	1	1	1	1	-1	1	1	1	1	1	1	-1	-1	0	0	

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MH.P.1 50	George Washington Bridge (GWB) electrical and power system improvements	PANYNJ(TBT)	-1	1	1	1	-1	1	1	-1	1	1	1	1	1	1	-1	-1	-1	0
MH.P.1 51	GWB tower transformers	PANYNJ(TBT)	1	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	-1	0	0
MH.P.1 52	Multi-facility real-time traffic information software	PANYNJ(TBT)	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	0	0
MH.P.1 53	Intelligent Transportation System (ITS) program	PANYNJ(TBT)	0	0	1	1	1	1	-1	0	1	1	1	1	1	1	-1	-1	0	0
MH.P.1 54	Green roofs on Parks buildings	Parks	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	1	-1	1	1
MH.P.1 55	Green Streets	Parks	1	1	1	1	1	1	1	-1	1	1	0	1	1	1	1	1	1	1
MH.P.1 56	Wetlands and other land in a natural state	Parks	1	1	1	1	1	1	-1	-1	1	1	0	0	-1	1	-1	-1	1	1
MH.P.1 57	Seawall, pier, and marina structural repairs	Parks	1	1	1	1	1	1	1	-1	0	0	-1	-1	1	1	1	1	-1	0
MH.P.1 58	Upgrades to Parks buildings' systems	Parks	1	1	1	1	0	1	-1	-1	1	1	1	1	1	1	0	0	1	1

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MH.P.1 59	SBS outreach.	SBS	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	0	0	0
MH.P.1 60	Toolkit and training materials for city volunteer groups	SBS	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	0	0	0
MH.P.1 61	Small business outreach	SBS	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	0	0	0
MH.P.1 62	Hazard mitigation education for businesses	SBS	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	0	0	0
MH.P.1 63	Ready New York materials	SBS	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	0	0	0
MH.P.1 64	Toolkit and training materials for BIDs and LDCs on mitigation best practices	SBS	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	0	0	0
MH.P.1 65	Hazardous mitigation seminar for BIDs and LDCs	SBS	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	0	0	0
MH.P.1 66	Dissemination of hazard information	SBS	1	1	1	1	1	1	-1	-1	1	1	0	1	1	1	0	0	0	0
MH.P.1 67	Rockaway Reformulation Study	USACE/NYSDEC	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	-1	1	1

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MH.P.1 68	T-groins at Coney Island	USACE/NYSDEC	1	1	1	1	1	1	1	-1	1	1	1	1	1	0	-1	1	1	
Severe Weather																				
SW.P.1	Protection of NYCDOT facilities from high winds	DOT	1	1	1	1	1	0	0	-1	1	1	-1	-1	-1	1	0	0	0	0
SW.P.2	Sign inspection program	DOT	0	0	1	1	1	1	-1	1	1	0	1	1	1	1	1	-1	0	0
SW.P.3	Rooftop equipment protection at HRA facilities	HRA	1	1	1	1	0	-1	0	-1	1	1	-1	-1	1	1	0	0	0	0
SW.P.4	Increased line clearance tree trim program	LIPA	-1	-1	1	1	0	-1	0	-1	1	1	1	1	1	1	0	0	1	1
SW.P.5	Bridge reinforcement	MTA (Bridges and Tunnels)	1	1	1	1	-1	-1	-1	-1	1	1	-1	-1	1	1	-1	1	0	0
Winter Weather																				
WS.P.1	Improved Snow & Ice Melt	DOT	-1	0	1	1	-1	0	-1	-1	1	-1	1	1	-1	1	-1	-1	1	1
WS.P.2	Public Outreach	OEM	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	1	1

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ii. Previous Mitigation Projects

Below is a narrative overview of select mitigation actions. This provides additional information beyond the STAPLEE analysis and explains the many considerations that are applied to each project identified in the HMP.

1. Prevention and Policy - The Flood Resilience Zoning Text Amendment (Capability Assessment and FP.4)

- **Original Problem**
 - Coastal storms and flooding events have repetitively damaged buildings along the coastline of New York City. In 2012, Hurricane Sandy flooded an area that included approximately 88,700 buildings; of these, according to Department of Buildings (DOB) inspections, 82,000 were identified as having some form of damage. Since owners are required to comply with flood-resistant construction standards when they rebuild if their properties are more than 50% damaged, many of the zoning regulations made it difficult for owners to rebuild after Sandy.
- **Project Description**
 - The Flood Resilience Zoning Text Amendment encourages flood-resilient building construction throughout designated flood zones. The amendment removes regulatory barriers that would hinder or prevent the reconstruction of storm-damaged properties. It also enables new and existing buildings to comply with new, higher flood elevations issued by FEMA in addition to new requirements in the New York City Building Code. The text amendment became effective after a vote by City Council on October 9, 2013.
 - Project Cost - Staff time at the Department of City Planning (DCP)
- **Social, political, and environmental considerations**
 - *Social*
 - There is public support for the text amendment by homeowners so that they are permitted to rebuild homes to be flood-resistant.
 - Constraints: New York City's dense urban environment may make it difficult to implement flood-proofing strategies in denser neighborhoods.
 - *Political*
 - The text amendment was a recommendation identified in *A Stronger, More Resilient New York*, which is a City document with mayoral support.
 - Mayor Bloomberg issued a temporary executive order to allow property owners rebuilding after Sandy to meet updated Federal Emergency Management Agency (FEMA) flood standards.
 - *Environment*
 - The amendment facilitates adaptation to a changing environment.

- The amendment facilitates the replacement of existing buildings at slightly higher elevations, with few new environmental impacts.

2. Property Protection – Building Code Update (FE.14)

- **Original Problem**
 - Buildings in New York City are often damaged during coastal storms and flooding events. For example, many of the buildings damaged by Sandy were built prior to 1983 and thus were constructed to codes and standards that did not incorporate flood resistance.
 -
- **Project Description**
 - On January 31, 2013, the New York City Building Code was updated to match New York State standards for flood protection. The update will help protect newly constructed buildings because it incorporates the latest flood-resistant building requirements and references the Flood Insurance Rate Maps that are based on most recent data.
 - The update requires new and substantially improved buildings in the 100-year floodplain to protect to a level one or two feet higher than the FEMA-designated flood elevation, depending on building type. Single- and two- family homes are now required to provide two feet of extra protection above flood elevation, and most other buildings are required to provide a foot of freeboard.
 - Project Cost - Staff time at DOB
- **Social, political, and environmental considerations**
 - *Social*
 - The Building Code update will help New Yorkers limit the cost of future federal flood insurance premiums by ensuring flood zone compliance, better protect properties in flood-prone areas from risk and damage, and reduce the likelihood of housing displacement in the future.
 - *Political*
 - The Building Code update ensures homeowners are in compliance with FEMA flood-resistant construction standards and allows New York City to continue to be eligible to participate in the National Flood Insurance Program.
 - *Environmental*
 - The building code update facilitates adaptation to a changing environment.

3. Infrastructure Projects – Expansion of the Bluebelt Program (MH.E.13)

- **Original Problem**

- Periods of heavy rainfall can lead to excess stormwater causing flood-related damage to property.
- **Project Description**
 - The Bluebelt Program, which was launched in Staten Island in the early 1990s, makes use of natural drainage corridors including streams, ponds, and other wetland areas to manage stormwater. More specifically, Bluebelt systems perform the function of conveying, storing, and filtering stormwater. This system has saved millions of dollars by relying on sustainable solutions and reducing the need to build traditional sewer systems.
 - Since the program's inception, the City has acquired 325 acres of wetland property. Furthermore, it has provided effective stormwater management for more than 14,000 acres of Staten Island. While the City continues to build out the Bluebelt in Staten Island, it is also applying the Bluebelt concept in other parts of the city. For instance, in July 2011, the City expanded the bluebelt program to Oakland Lake Park in Queens. In 2012, the City completed construction of the first bluebelt in the Bronx at the New York Botanical Garden.
 - *Project Cost:* Millions of dollars have been spent in Staten Island and continue to be spent as the City extends the system both in Staten Island and to other boroughs.
- **Social, political, and environmental considerations**
 - *Social*
 - Bluebelt systems help reduce street flooding, raise property values, improve water quality for recreation, and provide attractive open spaces for the community.
 - *Political*
 - Bluebelt systems decrease the financial impacts on the local tax base by relying on natural systems instead of costly "grey" infrastructure (traditional sewer systems).
 - Expanding the Bluebelt Program is a strategy identified in *PlaNYC, Vision 2020: New York City Comprehensive Waterfront Plan*, and *A Stronger, More Resilient New York*—all City documents with mayoral support.
 - *Environment*
 - Bluebelt systems enhance the environment by protecting natural ecosystems, restoring natural habitats, and maintaining natural floodplains. The Bluebelt Program is a sustainable system that allows for adaptation to climate change.

4. Emergency Services – Notify NYC (part of MH.E.98)

- **Original Problem**

- Communicating emergency information to New York City residents is an essential component in emergency management. But prior to Notify NYC, the City lacked a central system for communicating localized emergency information to city residents. Emergency information was distributed through press releases and/or press conferences or directly by emergency personnel on the street. Several incidents that occurred in 2007—such as tornadoes, a steam pipe explosion, a major fire, and crane collapses—prompted the City to look for ways to quickly provide New Yorkers emergency information.
- **Project Description:**
 - In May 2009, New York City created a dedicated emergency notification program, Notify NYC, operating out of the Office of Emergency Management (OEM). Notify NYC staff work in OEM Watch Command, where they constantly monitor emergency activity in New York City and the larger metropolitan area. Notify NYC communicates localized emergency information quickly to city residents. This alert system includes the following types of notifications: emergency alerts, significant event notifications, public health notifications, Public School Closing/Delay Advisories, unscheduled parking rules suspensions, and combined sewer overflow notifications.
 - Since its inception, Notify NYC has sent out thousands of notifications about local emergencies. In addition, more than 180,000 people receive information directly.
- **Social, political, and environmental considerations**
 - *Social*
 - The Notify NYC service is available to the general public by signing up via the OEM website.
 - *Political*
 - There is political acceptance for disseminating emergency information to the public.
 - *Environmental*
 - There is no significant adverse effect on the environment.

5. Coastal/Natural Resource Protection – Wetlands Restoration and Creation (FE.5)

- **Original Problem**
 - Although much of New York City's original waterfront consisted of wetlands, over the past century many of the wetlands have been overtaken by development or degraded due to human modifications to natural systems, industrial pollution, and changes to water and sediment quality.
- **Project Description**

- To protect existing wetlands, which improve water quality and aid in the retention of stormwater, the City has designated three Special Natural Waterfront Areas (SNWAs): Northwestern Staten Island, Jamaica Bay, and the East River-Long Island Sound area. The Waterfront Revitalization Program helps protect and restore the SNWAs by prioritizing both public and private actions.
- Over the past 20 years, the City has completed or planned restoration projects on 69 acres of salt marsh and 18 acres of freshwater marsh. Some of these projects are in connection with the construction of recent CSO detention facilities. For example, at Alley Pond Park in Queens, the city recently completed 16 acres of restoration to revive the local ecosystem and improve water quality.
- The City's work with state and federal partners has resulted in over 175 acres of restored or enhanced wetlands since 2002.
- *Project cost:* Working with state and federal partners, the city has invested over \$74 million to restore wetlands since 2002.
- **Social, political, and environmental considerations:**
 - *Social*
 - Restoring and creating wetlands offers a variety of social benefits, including improving water quality for recreation, protecting properties from storm surge, and creating attractive environments for community use.
 - *Political*
 - Restoring and creating wetlands is a strategy identified in *PlaNYC* and aligns with strategies put forth in *Vision 2020: New York City Comprehensive Waterfront Plan* and *A Stronger, More Resilient New York*—all City documents with mayoral support.
 - *Environment*
 - Preserving and enhancing the city's valuable wetlands improves the city's natural environment, provides habitats for diverse wildlife, and aids in reducing the impacts of coastal erosion.

6. Education and Awareness - Ready New York Campaign (MH.E.103)

- **Original Problem**
 - If New Yorkers are not aware of hazards and prepared for hazard events, they may be at greater personal risk.
- **Project Description**
 - The Ready New York campaign, launched in 2003 and expanded every year, encourages New Yorkers to be ready for all types of emergencies. Geared to

both the public and private sectors, it provides instruction on how to develop a disaster plan, how to gather emergency supplies, and how to keep informed about the hazards that may occur in New York City. In 2013 the program participated in over 1,000 events, providing a variety of presentations and maintaining a presence at a range of resource fairs across the city. Ready New York also publishes a dozen guides and workbooks and has produced several informational DVDs.

- *Project cost:* The budget is \$2 million per year for staff, guide development, translation, printing, and related costs.
- **Social, political, and environmental considerations**
 - *Social*
 - Government agencies (NYS and NYC), community boards, houses of worship, schools (elementary through senior high), senior centers, social service agencies, private non-profits, grassroots organizations, large and small businesses, organized labor, and many other groups request OEM to do Ready New York presentations.
 - The campaign makes a strong effort to reach all populations, including seniors, youth (and their households), people with special needs, immigrant populations and communities with limited English proficiency, low-income New Yorkers, and university/college students. Brochures and materials are available in as many as 23 languages for 2013.
 - *Political*
 - There is local, state, and federal support for emergency preparedness education.
 1. The Ready New York campaign facilitated National Preparedness Month in New York City during September 2013. OEM Commissioner Joseph Bruno and FEMA Administrator Craig Fugate hosted the kickoff event at the Staten Island Children's Museum.
 - *Environment*
 - This campaign has no adverse impact on the environment.

4. Prioritization

The Planning Team developed a methodology for prioritizing the potential mitigation actions using the STAPLEE criteria and implementation criteria presented above. By assigning a numerical value to each action based on a set of 10 criteria, the Planning Team was able to give each action a high, medium, and low ranking. (The Planning Team did not prioritize existing mitigation actions because they have already secured funding and have been scheduled for implementation.)

A. Methodology

The Planning Team established 10 criteria: The first seven criteria are based on the STAPLEE analysis; the remaining three are based on: (1) number of objectives the action meets, (2) projected costs, and (3) projected timeline. Each criterion was assigned a value of -1, 0, or 1. These values represent whether the criterion is unfavorable or negative (-1); neutral, not applicable, or moderate (0); or favorable or positive (1).

1. Project Timeline	2. Project Cost	3. Number of objectives the action meets
-1 = ≥ 10 yrs 0 = TBD, ongoing, ≥ 5 yrs to < 10 yrs 1 = ≤ 5 yrs	-1 = $> \$100$ million 0 = TBD, $> \$10$ million to $< \$100$ million 1 = $< \$10$ million	-1 = 1 objective 0 = 2 to 3 objectives 1 = 4+ objectives

i) STAPLEE Criteria

To determine the value of the seven STAPLEE criteria, the Planning Team assessed each of the 18 measures addressed in the STAPLEE analysis. For each criteria (social, technological, administrative, political, legal, economic, and environmental), two to three measures are taken into consideration. Table 7 shows how the planning team determined the criteria's overall value based on the number of -1s, 1s, or 0s assigned to the measures. For example, the administrative criterion has three measures: staffing, funding allocation, and maintenance/operations. If these three measures are given a value of 1, 1, and -1, the administrative criterion's overall value is a 1.

Prioritization

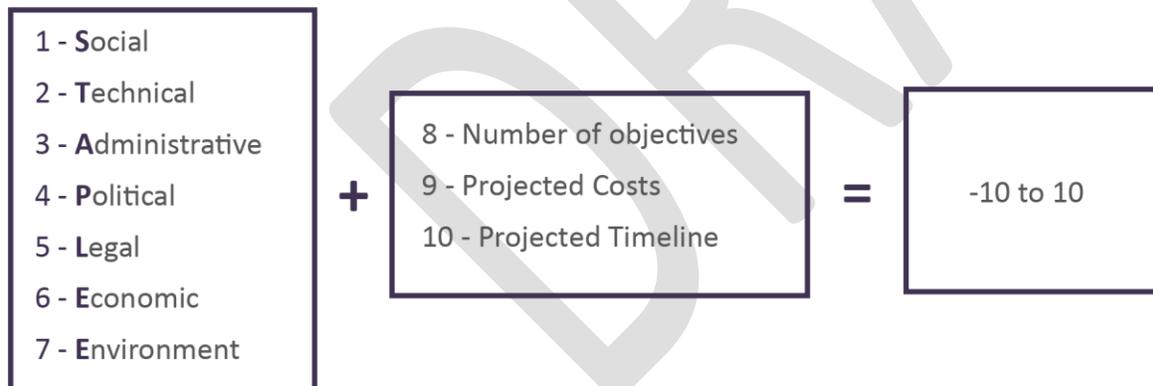
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Mitigation Action	Administrative (Measures)			Score
	Staffing	Funding Allocation	Maintenance/Operations	Final Score
Construction Code	1	1	0	1
Property Protection	-1	-1	1	-1
Public Outreach	0	1	-1	0

Table 7: Applying STAPLEE Criteria to Prioritization

ii) Implementation Criteria

For the three remaining criteria (number of objectives met, projected cost, and projected timeframe), the Planning Team evaluated the distribution of each criteria's values. Using this information, the Planning Team established quantifiable ranges for each criterion that met the parameters of the -1, 0, or 1 values.



Adding up the values of the 10 criteria was the next step in prioritizing the mitigation actions. The 161 potential mitigation actions received a cumulative value ranging from -10 to 10. These values were sorted in ascending order. Based on the overall value distribution, the Planning Team assigned a final prioritization value of "low" to actions with a final score of zero or lower because these actions have as many or more negative attributes as positive attributes. Actions with a final score of 1–5 were prioritized as "medium," while actions with a final score of 6–10 were prioritized as "high" because they have many positive attributes and few, if any, negative attributes. Table 8 presents the distribution of actions by final prioritization value. Clearly, these final prioritization values are determined from very general criteria, and additional information or data not included in this analysis could affect the prioritization results.

Prioritization

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Hazard	Priority Ranking			
	Low	Medium	High	Total
CBRN releases	0	3	4	7
Coastal erosion	0	3	0	3
Coastal storms	0	19	11	31
Cyber threats	0	2	0	2
Disease outbreaks	0	1	0	1
Drought	0	3	1	4
Earthquakes	0	3	5	8
Extreme temperatures	0	4	1	5
Flood	2	53	22	78
Infrastructure failures	1	7	12	20
Severe weather	0	4	1	5
Winter storms	0	1	1	2
Multi-Hazards*	5	109	51	168
Total	8	212	111	334

* Although wildfires are not individually addressed by any actions, they are addressed by the multi-hazard actions.

Table 8: Summary of Mitigation Action Prioritization

B. Benefit-Cost Analysis for Specific Projects

A benefit-cost analysis (BCA) is a method for determining the potential positive effects of a specific mitigation action and comparing them to the cost of the action. To assess and demonstrate the cost-effectiveness of mitigation actions, FEMA has developed a suite of BCA software, including hazard-specific modules. Agencies seeking funding from one of FEMA's mitigation grant programs must perform a detailed BCA using this software for the submission of the grant application. OEM will assist agencies with this effort.

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CBRN														
CB.P.1	Construction Code revision	DOB	1	1	0	1	1	1	1	1	0	0	7	High
CB.P.2	Harlem River lift bridge	MNR	1	1	0	1	1	1	0	-1	0	0	4	Medium
CB.P.3	NYCHA fresh water supply	NYCHA	1	1	0	1	1	0	1	0	0	0	5	Medium
CB.P.4	Brownfield cleanup in the 100-year floodplain	OER	1	1	0	1	1	1	1	1	1	0	8	High
CB.P.5	Environmental research	OER	1	1	0	1	1	1	1	1	1	0	8	High
CB.P.6	BrownfieldWORKS!	OER	0	0	0	1	0	0	1	1	1	0	4	Medium
CB.P.7	Environmental Project Information Center (EPIC)	OER	1	1	0	1	1	0	1	1	1	0	7	High
Coastal Erosion														
CE.P.1	Protection of Rikers Island east, west, and south shorelines	DOC	1	1	0	1	1	1	0	0	0	0	5	Medium
CE.P.2	Beach restoration	Parks	1	0	0	1	1	0	0	0	0	0	3	Medium
CE.P.3	Renourishment of Orchard Beach, Bronx	USACE/NYC P&R	1	0	0	1	0	1	-1	1	1	0	4	Medium
Coastal Storms														
CS.P.1	Resilient	DCP	1	1	0	1	1	0	1	0	0	1	6	High

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	neighborhoods planning studies													
CS.P.2	DCP planning support and technical assistance for Sandy disaster recovery	DCP	1	1	0	1	1	0	1	0	0	0	5	Medium
CS.P.3	Emergency contracts	DDC	1	0	0	1	0	0	1	0	0	-1	2	Medium
CS.P.4	Hardening pumping stations	DEP	1	0	-1	1	1	0	0	0	-1	0	1	Medium
CS.P.5	Hardening wastewater treatment plants	DEP	1	1	1	1	1	0	1	0	-1	1	6	High
CS.P.6	Alternatives for Rockaway Wastewater Treatment Plant	DEP	1	0	0	0	1	0	0	1	-1	1	3	Medium
CS.P.7	VCBC mooring system and site access improvement	DOC	1	1	0	1	1	1	1	0	0	0	6	High
CS.P.8	Division I, II and III storehouse	DOC	1	0	-1	1	1	1	1	0	0	-1	3	Medium
CS.P.9	FDNY storehouse improvement	FDNY	1	1	0	1	1	0	1	0	0	0	5	Medium
CS.P.10	EMS Battalion	FDNY	1	0	0	1	1	0	1	0	0	0	4	Medium
CS.P.11	EMS fallback sites	FDNY	1	1	0	1	1	0	1	0	0	0	5	Medium
CS.P.12	FDNY emergency	FDNY	1	0	0	1	1	0	1	0	0	0	4	Medium

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	services													
CS.P.13	Outreach to residential building owners	HPD	1	0	1	1	1	0	1	1	1	1	8	High
CS.P.14	Resilient home design competition	HPD	1	0	0	1	1	1	1	0	0	0	5	Medium
CS.P.15	Bridge and tunnel improvements and study	MTA (Bridges and Tunnels)	1	0	-1	1	1	0	0	0	0	1	3	Medium
CS.P.16	Flood-hardening of vital communications, substations, transformers, mechanical equipment, revenue equipment, and other electronic systems at all MTA B&T facilities	MTA (Bridges and Tunnels)	1	0	-1	1	1	0	0	1	0	0	3	Medium
CS.P.17	Raising Governors Island seawall for Hugh L. Carey Tunnel	MTA (Bridges and Tunnels)	1	1	0	1	1	0	1	0	0	0	5	Medium
CS.P.18	Water-level monitoring/alarm systems/CCTV	MTA (MNR)	1	1	0	1	1	0	1	1	0	0	6	High

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CS.P.19	Power and communications/signal infrastructure mitigation	MTA (MNR)	1	0	0	1	1	0	1	1	0	0	5	Medium
CS.P.20	Hardening of vulnerable healthcare facilities	NYS DOH	1	0	0	1	1	0	1	1	1	0	6	High
CS.P.21	Protection of hurricane shelter windows	OEM	1	1	0	1	1	0	1	0	0	0	5	Medium
CS.P.22	Hazards U.S. Multi-Hazard (HAZUS-MH) modeling	OEM	1	0	1	1	1	0	1	1	0	0	6	High
CS.P.23	Backup power for evacuation centers	OEM	1	0	0	1	1	0	-1	1	0	0	3	Medium
CS.P.24	Storm shutters for the Emergency Operations Center	OEM	1	1	0	1	1	1	1	1	1	0	8	High
CS.P.25	Storm surge/tidal gauge real-time monitoring system	OEM	1	0	-1	1	1	0	1	0	0	-1	2	Medium
CS.P.26	Evacuation center/hurricane shelter ADA retrofit program for DOE facilities	OEM	1	0	-1	1	0	0	1	1	0	0	3	Medium
CS.P.27	Updates to Urban Post-Disaster Interim	OEM	1	1	1	1	1	1	1	1	1	0	9	High

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	Neighborhood Design Guidelines													
CS.P.28	Cleanup standards for waterfront brownfields	OER	1	1	0	1	1	1	1	1	1	1	9	High
CS.P.29	Building Code update for wind resiliency in new buildings	OLTPS	1	0	0	1	1	0	1	0	1	1	6	High
CS.P.30	Building Code update for wind resiliency in existing buildings	OLTPS	1	0	0	1	1	0	1	0	1	1	6	High
CS.P.31	Power exercises	USACE/NYCOEM/RCPT	1	0	0	1	1	1	1	0	0	0	5	Medium
Cyber Threats														
CY.P.1	Supplement IT Security	HRA	1	1	-1	1	1	-1	0	1	0	0	3	Medium
CY.P.2	Cyber-Security Strategy	MTA (MNR)	0	1	0	1	1	1	0	0	1	0	5	Medium
Disease Outbreaks														
DO.P.1	Pandemic Planning	MTA (MNR)	1	1	1	1	1	0	0	0	0	0	5	Medium
Drought														
D.P.1	Maximizing capacity for water delivery from the Catskill/Delaware system	DEP	1	1	-1	1	1	0	1	-1	-1	0	2	Medium

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D.P.2	Catskill Aqueduct capacity	DEP	1	1	-1	1	1	0	1	0	-1	0	3	Medium
D.P.3	Construction Code revision	DOB	1	1	1	1	1	1	1	1	0	0	8	High
D.P.4	Drought effects monitoring	FDNY	0	1	-1	1	1	1	1	0	0	0	4	Medium
Earthquakes														
EQ.P.1	Mechanical equipment seismic upgrade	DCAS	1	1	1	1	1	1	0	0	1	0	7	High
EQ.P.2	Seismic protection for sewers	DEP	1	1	1	1	1	1	1	0	0	0	7	High
EQ.P.3	Seismic inspection and retrofit for drinking water distribution system	DEP	1	1	1	1	1	1	1	0	0	1	8	High
EQ.P.4	Seismic study and retrofit for tall buildings	DOE	1	1	0	1	1	1	0	0	0	1	6	High
EQ.P.5	Building upgrades to seismic codes	HHC	1	1	-1	1	1	-1	0	1	0	0	3	Medium
EQ.P.6	HPD facility improvement	HPD	1	1	-1	1	1	-1	0	1	0	0	3	Medium
EQ.P.7	UPACA (Site 6)	NYCHA	1	1	-1	1	1	1	0	0	0	0	4	Medium
EQ.P.8	HAZUS-MH modeling	OEM	1	1	1	1	0	1	0	1	0	0	6	High
Extreme Temperatures														
ET.P.1	Power redundancy	DCAS	1	0	0	1	1	1	0	0	0	0	4	Medium

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	in City-owned buildings													
ET.P.2	AC upgrade for senior centers	DFTA	1	0	0	1	1	0	0	1	0	0	4	Medium
ET.P.3	AC availability and affordability	DOHMH	1	0	0	1	0	0	-1	0	0	0	1	Medium
ET.P.4	Urban heat island effect mitigation	DOHMH	1	1	0	1	0	0	1	1	1	0	6	High
ET.P.5	Cooling centers	NYCHA	1	0	0	1	1	0	-1	0	0	0	2	Medium
Flooding														
F.P.1	Flooding Prevention	DCAS	1	1	1	-1	0	1	0	0	0	0	3	Medium
F.P.2	Infrastructure flood protection	DCAS	1	1	-1	0	1	0	1	0	0	0	3	Medium
F.P.3	Flood Resilient Building Design Manual	DCP	1	1	1	1	1	1	1	1	0	1	9	High
F.P.4	Zoning for flood-resistant construction, Phase I and II:	DCP	1	1	1	1	1	1		1	0	0	7	High
F.P.5	Ecologically sensitive industrial area planning	DCP	1	1	1	1	1	1	1	0	0	0	7	High
F.P.6	Croton Falls pump station rehabilitation	DEP	1	1	-1	1	0	0	1	1	0	0	4	Medium

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F.P.7	Bergen Basin and Tallman Island Wastewater Treatment Plant drainage upgrades	DEP	1	1	-1	1	0	1	1	0	-1	0	3	Medium
F.P.8	Server capacity improvements	DFTA	1	1	0	1	1	0	0	1	1	0	6	High
F.P.9	DHS electrical improvements	DHS	1	1	0	1	1	0	0	0	0	0	4	Medium
F.P.10	Borden Avenue facility	DHS	1	1	0	1	1	0	-1	0	0	0	3	Medium
F.P.11	Data system upgrade	DOB	1	1	1	1	1	1	1	1	0	0	8	High
F.P.12	Rikers Island roadway regrading	DOC	1	1	0	1	1	0	0	0	1	0	5	Medium
F.P.13	Water infiltration prevention	DOHMH	0	1	0	0	1	0	0	1	1	0	4	Medium
F.P.14	Flood-proofing 125 Worth Street vault	DOHMH	1	1	-1	1	1	-1	1	1	1	0	5	Medium
F.P.15	Permeable pavement	DOT	1	1	-1	1	1	1	1	0	0	1	6	High
F.P.16	Protection for the Manhattan 1,2, and 5 facility	DSNY	1	1	-1	1	1	0	1	1	0	0	5	Medium
F.P.17	Stapleton waterfront flood mitigation	EDC	1	1	0	1	1	0	1	1	0	0	6	Medium
F.P.18	Brooklyn Army Terminal passive	EDC	1	1	-1	1	1	0	1	1	1	0	6	High

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	flood barrier system													
F.P.19	EDC operations centers flood mitigation	EDC	1	1	-1	1	1	0	1	1	1	1	7	High
F.P.20	Flood effects reduction program	FDNY	1	1	-1	1	1	0	1	0	0	0	4	Medium
F.P.21	Dewatering pumps at FDNY facilities	FDNY	1	1	0	1	1	0	1	0	0	-1	4	Medium
F.P.22	New construction flood mitigation	FDNY	1	1	-1	1	1	0	1	0	0	0	4	Medium
F.P.23	Coney Island Hospital flood-proofing	HHC	1	1	-1	0	1	0	0	0	0	1	3	Medium
F.P.24	Coney Island Hospital emergency department mitigation	HHC	1	1	-1	0	1	0	0	0	0	1	3	Medium
F.P.25	Coney Island Hospital/critical system protection	HHC	1	1	-1	0	1	0	0	0	0	1	3	Medium
F.P.26	Metropolitan Hospital	HHC	1	1	-1	0	1	0	0	0	0	1	3	Medium
F.P.27	Metropolitan Hospital	HHC	1	1	-1	0	1	0	0	0	0	1	3	Medium
F.P.28	Coler Hospital	HHC	1	1	-1	0	1	0	0	0	0	1	3	Medium
F.P.29	Coler Hospital	HHC	1	1	-1	0	1	0	0	0	0	1	3	Medium
F.P.30	Building flood	HRA	1	1	-1	1	1	0	0	1	0	1	5	Medium

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	protection													
F.P.31	Portable generators	HRA	1	1	-1	1	1	0	0	1	1	0	5	Medium
F.P.32	Substation mitigation	LIPA	1	1	-1	1	1	0	0	1	0	0	4	Medium
F.P.33	Water-balance study	MTA (NYCT-Subway)	1	1	-1	1	1	0	0	0	0	0	3	Medium
F.P.34	Double Track Main Line, Phase 2	MTA/LIRR	1	1	-1	1	1	0	0	0	-1	0	2	Medium
F.P.35	Ventilation grate improvements	MTA/LIRR	1	1	-1	1	1	0	0	0	1	0	4	Medium
F.P.36	Long Island City Yard protection	MTA/LIRR	1	1	-1	1	0	1	0	0	0	0	3	Medium
F.P.37	Safeguarding of basement/cellar equipment	NYCHA	1	1	-1	1	1	0	0	1	1	0	5	Medium
F.P.38	New NYCHA building or development	NYCHA	-1	1	-1	-1	-1	-1	-1	0	0	0	-5	Low
F.P.39	NYCHA floodgates and barriers	NYCHA	1	1	-1	1	1	0	0	1	0	0	4	Medium
F.P.40	NYCHA boiler rooms and electrical equipment	NYCHA	1	1	-1	1	0	0	0	1	0	0	3	Medium
F.P.41	Sump pump protection	NYPD	1	1	-1	1	1	0	0	0	0	0	3	Medium
F.P.42	Building electrical protection	NYPD	1	1	-1	1	0	0	0	0	0	1	3	Medium
F.P.43	Boiler protection	NYPD	1	1	-1	1	1	0	0	0	0	1	4	Medium

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F.P.44	Short-term flood mitigation of OCME emergency management storage facility at 18 th Street and FDR Drive	OCME	1	1	-1	1	1	0	0	0	1	1	5	Medium
F.P.45	Flood mitigation measures for New York City's backup Emergency Operations Center	OEM	1	1	-1	1	1	0	0	1	0	0	4	Medium
F.P.46	HAZUS-MH modeling	OEM	0	1	-1	1	1	0	0	1	0	0	3	Medium
F.P.47	National Flood Insurance Program (NFIP) Community Rating System	OEM	1	1	0	1	1	0	0	0	0	0	4	Medium
F.P.48	Public information and guidance	OEM	1	1	0	1	1	1	0	0	0	1	6	High
F.P.49	Outreach and education for owners of Severe Repetitive Loss properties	OEM	1	1	0	1	0	1	0	0	0	1	5	Medium
F.P.50	Local storm surge barrier for Gowanus Canal	OLTPS	1	1	0	1	1	0	1	0	1	0	6	High

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F.P.51	Plan for flood protection along the Williamsburg, Greenpoint, and Long Island City coastlines	OLTPS	1	1	-1	1	1	1	1	0	1	0	6	High
F.P.52	Floodgate repairs at Oakwood Beach, Staten Island	OLTPS	1	1	-1	1	1	-1	0	0	1	0	3	Medium
F.P.53	Primary and secondary dune systems in Rockaway Peninsula	OLTPS	1	1	1	1	1	1	1	0	0	0	7	High
F.P.54	Offshore breakwaters adjacent to and south of Great Kills Harbor	OLTPS	1	1	1	1	1	1	1	0	-1	0	6	High
F.P.55	Flood protection in Hunts Point	OLTPS	1	1	-1	1	1	-1	1	0	-1	0	2	Medium
F.P.56	Flood protection in East Harlem	OLTPS	1	1	-1	1	1	-1	1	0	-1	1	3	Medium
F.P.57	Lower Manhattan flood protection	OLTPS	1	1	-1	1	1	-1	1	0	-1	1	3	Medium
F.P.58	Integrated Flood Protection System for Red Hook	OLTPS	1	1	-1	1	1	1	1	0	-1	0	4	Medium
F.P.59	Protection of Farragut substation	OLTPS	1	1	0	1	1	1	1	0	1	0	7	High

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F.P.60	Newtown Creek flood protection	OLTPS	1	1	1	1	0	1	1	0	-1	1	6	High
F.P.61	Flood protection research	OLTPS	1	1	0	1	1	1	1	0	1	0	7	High
F.P.62	Prevention of drainage pipe flooding	OLTPS	1	1	0	1	1	1	1	0	0	0	6	High
F.P.63	Floodgate at Mill Creek	OLTPS	1	1	1	1	1	1	1	0	1	0	8	High
F.P.64	Community Rating System	OLTPS	1	1	0	1	1	1	1	0	1	0	7	High
F.P.65	Coney Island Creek wetlands and tidal barrier	OLTPS	1	1	0	1	0	1	1	0	1	0	6	High
F.P.66	Integrated flood protection for southern Manhattan	OLTPS	1	1	0	1	1	1	1	0	1	0	7	High
F.P.67	Flood protection of vital infrastructure at LaGuardia Airport	PANYNJ (Aviat.)	0	1	-1	1	0	-1	1	1	0	0	2	Medium
F.P.68	Flood protection of vital infrastructure at Kennedy Airport	PANYNJ (Aviat.)	0	1	-1	1	0	-1	1	1	0	0	2	Medium
F.P.69	Drainage improvements at Kennedy Airport	PANYNJ (Aviat.)	0	1	-1	1	0	-1	1	1	0	0	2	Medium
F.P.70	Protection of Kennedy Airport	PANYNJ (Aviation)	0	1	-1	1	0	-1	1	1	1	0	3	Medium

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	fuel farm tanks													
F.P.71	LaGuardia Airport dike wall	PANYNJ (Aviation)	0	1	-1	1	0	-1	1	1	1	0	3	Medium
F.P.72	Kennedy Airport sanitary lift station	PANYNJ (Aviation)	0	1	-1	1	0	-1	1	0	1	0	2	Medium
F.P.73	Kennedy Airport runway upgrade	PANYNJ (Aviation)	0	1	-1	1	0	-1	1	1	0	0	2	Medium
F.P.74	Kennedy Airport runway upgrade	PANYNJ (Aviation)	0	1	-1	1	0	-1	1	1	0	0	2	Medium
F.P.75	Improvements to George Washington Bridge anchorage drainage system	PANYNJ(TBT)	0	1	-1	1	0	-1	1	1	1	0	3	Medium
F.P.76	Flood-proofing at Olmsted site	Parks	0	1	0	0	-1	0	0	0	0	0	0	Low
F.P.77	Tidegate upgrade in Flushing Meadow Corona Park	Parks	1	1	1	1	1	1	1	0	1	0	8	High
Infrastructure Failures														
IF.P.1	Expansion of cogeneration	DEP	1	1	0	1	0	1	1	1	1	1	8	High
IF.P.2	Repair of the Delaware Aqueduct leak	DEP	1	1	1	1	1	1	1	0	-1	0	6	High
IF.P.3	Utilities on Buono Bridge	DOC	0	1	0	-1	1	0	0	0	-1	0	0	Low

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IF.P.4	Facility electrical power and data infrastructure upgrade	DOHMH	1	1	1	1	1	1	1	1	1	0	9	High
IF.P.5	DOHMH generators and retrofits	DOHMH	1	0	1	1	1	1	1	1	1	0	8	High
IF.P.6	Session Initiation Protocol (SIP)	DoITT	1	1	1	1	1	1	0	0	1	1	8	High
IF.P.7	Citywide IVR for employee announcements	DoITT	1	1	1	1	1	1	0	0	1	1	8	High
IF.P.8	Telecommunications Planning and Resiliency Office	DoITT	1	1	1	1	1	0	0	1	1	1	8	High
IF.P.9	IP routing network	DoITT	1	1	1	1	1	1	0	0	1	1	8	High
IF.P.10	Purchase of mobile substation	LIPA	1	1	1	1	1	0	0	1	1	0	7	High
IF.P.11	Purchase of mobile switchgear	LIPA	1	1	0	1	1	0	0	1	1	0	6	High
IF.P.12	Emergency generators in NYCHA properties	NYCHA	1	0	0	1	1	0	0	1	-1	0	3	Medium
IF.P.13	Stand-alone power generation in NYCHA developments	NYCHA	1	0	-1	1	1	-1	0	0	0	0	1	Medium
IF.P.14	Backup generators for Police	NYPD	1	0	1	1	1	0	0	0	0	0	4	Medium

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Prioritization

Section IV: Mitigation Strategy

HMP Index No.	Mitigation Action	Lead Agency	S	T	A	P	L	Ec	Ev	TIMLINE	Project Cost	GOALS and OBJECTIVES	Prioritization Score	Prioritization
	Department facilities													
IF.P.15	Flood mitigation of 520 First Ave. (Manhattan Morgue) and Forensic biology building	OCME	0	0	1	1	1	0	0	0	0	1	4	Medium
IF.P.16	Kings and Queens facilities	OCME	0	0	1	1	1	0	0	0	0	0	3	Medium
IF.P.17	Generator assessment and installation of quick-connects for critical infrastructure	OEM	0	0	0	1	1	0	0	1	0	0	3	Medium
IF.P.18	Backup generators for gas stations and terminals	OEM	1	0	0	1	1	0	0	1	0	0	4	Medium
IF.P.19	Protection from utility service interruptions	OLTPS	1	1	0	1	1	0	1	0	1	0	6	High
IF.P.20	Distributed generation (DG) and micro-grids	OLTPS	1	1	1	1	1	1	0	0	1	0	7	High
Multi-Hazards														
MH.P.1	Overhead electric system improvements	Con Ed	1	0	0	1	0	0	1	1	-1	0	3	Medium

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MH.P.2	Underground electric system improvements	Con Ed	1	0	0	1	0	0	0	1	-1	0	2	Medium
MH.P.3	Gas system Improvements	Con Ed	1	0	0	1	0	0	0	1	-1	0	2	Medium
MH.P.4	Storm-hardening of critical facilities	Con Ed	1	0	0	1	0	0	1	1	-1	0	3	Medium
MH.P.5	Window upgrades	DCAS	1	1	0	1	1	1	1	-1	-1	0	4	Medium
MH.P.6	Retail resiliency study	DCP	1	0	0	1	1	0	0	1	0	-1	3	Medium
MH.P.7	Building Identification Numbers (BINs)	DCP	1	0	0	1	0	0	1	0	0	0	3	Medium
MH.P.8	BIN Working Group recommendations	DCP	1	0	0	1	0	0	1	0	0	0	3	Medium
MH.P.9	Inspection and upgrade program for DEP facilities	DEP	0	0	0	1	0	0	1	0	0	1	3	Medium
MH.P.10	Groundwater development	DEP	0	1	1	1	0	1	1	0	0	0	5	Medium
MH.P.11	Groundwater treatment plant	DEP	1	0	0	1	0	1	1	0	0	1	5	Medium
MH.P.12	Laptops for DFTA essential staff	DFTA	1	0	0	1	0	1	1	1	1	0	6	High
MH.P.13	Generator for neighborhood hub	DFTA	1	0	0	1	0	0	-1	0	0	0	1	Medium
MH.P.14	Headlamps for home-delivered	DFTA	1	0	0	1	0	1	1	0	1	0	5	Medium

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	meals deliverers													
MH.P.15	Upgrades to DHS buildings	DHS	1	0	0	1	0	0	1	0	0	1	4	Medium
MH.P.16	DHS building roof improvements	DHS	1	0	0	1	0	1	1	0	1	1	6	High
MH.P.17	Window upgrade in DHS buildings	DHS	1	0	0	1	0	0	1	0	0	1	4	Medium
MH.P.18	Power redundancy at DHS buildings	DHS	1	0	0	1	0	1	0	0	1	0	4	Medium
MH.P.19	DHS shelter protection	DHS	0	0	0	-1	0	0	1	0	0	1	1	Medium
MH.P.20	Bellevue shelter facility improvements	DHS	1	0	0	1	0	0	-1	0	0	1	2	Medium
MH.P.21	LIFE Family Residence facility improvements	DHS	1	0	0	1	0	0	-1	0	0	1	2	Medium
MH.P.22	Mobile command stations	DOB	1	0	0	0	0	1	1	0	1	-1	3	Medium
MH.P.23	DOB backup generators	DOB	1	0	0	1	0	0	-1	0	0	-1	0	Low
MH.P.24	DOB radios	DOB	1	1	0	1	0	0	1	0	1	-1	4	Medium
MH.P.25	DOB vehicles	DOB	1	0	0	1	0	1	-1	0	1	-1	2	Medium
MH.P.26	Stormwater management	DOC	1	0	0	1	0	0	1	0	0	0	3	Medium
MH.P.27	Rikers Island ferry dock	DOC	1	0	0	1	0	0	1	0	0	0	3	Medium

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MH.P.28	Roof and façade improvements	DOC	1	0	0	1	0	1	1	0	0	0	4	Medium
MH.P.29	Emergency Operations Center improvements	DOC	1	0	0	1	0	1	1	0	0	0	4	Medium
MH.P.30	Off-island satellite Emergency Operations Center (EOC) for Rikers Island	DOC	1	0	0	1	0	1	1	0	0	1	5	Medium
MH.P.31	MDC cellar/backup emergency system	DOC	1	0	0	1	0	1	-1	0	1	0	3	Medium
MH.P.32	Provision of power redundancy	DOE	1	0	0	1	0	1	0	0	1	0	4	Medium
MH.P.33	Protection of DOE facilities from electrical system damage from trees	DOE	1	0	0	1	0	0	0	0	0	0	2	Medium
MH.P.34	DOE green roof installation	DOE	1	1	0	1	0	0	1	0	0	1	5	Medium
MH.P.35	Surge protection for DOE critical electrical systems	DOE	1	0	0	1	0	0	1	0	0	0	3	Medium
MH.P.36	Emergency power at DOE facilities	DOE	1	1	0	1	0	1	-1	0	1	0	4	Medium
MH.P.37	Emergency preparedness plans and training for DOE custodian engineers	DOE	1	0	0	1	0	1	1	1	1	0	6	High

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	and building managers													
MH.P.38	Psychological First Aid (PFA)	DOHMH	1	1	0	1	0	1	1	0	1	0	6	High
MH.P.39	"Mental Health First Aid" public education program	DOHMH	1	0	0	1	0	1	1	0	1	-1	4	Medium
MH.P.40	Mental health system IT improvement	DOHMH	1	0	0	1	0	1	1	1	1	-1	5	Medium
MH.P.41	Mental health system power backup	DOHMH	1	0	0	1	0	1	-1	0	1	0	3	Medium
MH.P.42	Mental health system support network	DOHMH	1	0	0	1	0	1	1	1	1	1	7	High
MH.P.43	Mental health volunteer preparedness and response	DOHMH	1	0	0	1	0	1	1	1	1	1	7	High
MH.P.44	DOHMH IT systems protection	DOHMH	1	0	0	1	0	1	1	1	1	0	6	High
MH.P.45	DOHMH primary data center availability	DOHMH	1	0	0	1	0	1	1	1	1	-1	5	Medium
MH.P.46	Riverside clinic upgrade	DOHMH	1	0	0	1	0	1	1	1	1	-1	5	Medium

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MH.P.47	DOHMH warehouse and print shop capacity	DOHMH	1	0	0	1	0	1	1	1	1	0	6	High
MH.P.48	Health data and provider portal	DOHMH	1	0	0	1	0	1	1	1	1	0	6	High
MH.P.49	Enhanced emergency response communication operations at DOHMH headquarters	DOHMH	1	1	0	1	0	0	1	1	1	0	6	High
MH.P.50	Generators for healthcare facilities	DOHMH	1	0	0	1	0	0	-1	1	0	0	2	Medium
MH.P.51	Small grants program to support community-based social cohesion	DOHMH	1	1	0	1	-1	0	0	1	1	1	5	Medium
MH.P.52	"Hub the Hood" program	DOHMH	1	1	0	1	-1	0	0	1		0	3	Medium
MH.P.53	DOHMH facility repair and upgrade	DOHMH	1	1	-1	1	-1	-1	0	1	0	0	1	Medium
MH.P.54	Notification system for City employees	DoITT	1	1	-1	1	1	0	0	0	0	0	3	Medium
MH.P.55	Hardening of NYCWiN network	DoITT	1	1	-1	1	1	0	0	1	0	0	4	Medium
MH.P.56	Data Center Site B	DoITT	1	1	-1	1	1	0	0	1	0	0	4	Medium
MH.P.57	Secure HAZMAT at	DOT	1	1	0	1	1	0	1	0	0	0	5	Medium

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	DOT facilities													
MH.P.58	Redundant power for all mission-critical DOT sites	DOT	0	1	1	1	1	1	0	0	0	0	5	Medium
MH.P.59	Continuity of Operations sites	DOT	1	1	-1	1	0	-1	0	0	0	0	1	Medium
MH.P.60	Information tracking	DOT	0	1	0	1	1	1	0	1	1	0	6	High
MH.P.61	High-reflectivity pavements	DOT	1	1	-1	1	0	0	0	0	1	1	4	Medium
MH.P.62	Critical facility loss estimation	DOT	1	1	0	0	0	0	1	0	1	-1	3	Medium
MH.P.63	Staten Island Ferry fleet upgrade	DOT	1	1	0	1	0	-1	0	0	0	0	2	Medium
MH.P.64	Staten Island Ferry vessel improvement	DOT	1	1	0	1	-1	0	0	0	1	0	3	Medium
MH.P.65	COOP trailer compound	DSNY	1	1	-1	1	0	0	0		1	0	3	Medium
MH.P.66	Industrial property upgrades	EDC/BNYDC	1	1	-1	1	1	1	1	0	0	0	5	Medium
MH.P.67	Hardening Staten Island Ferry and private ferry terminals from climate change-related threats	EDC	1	1	-1	0	0	-1	1	1	0	1	3	Medium
MH.P.68	Construction of new ferry landings to support private	EDC	1	1	-1	1	0	-1	0	1	0	0	2	Medium

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	ferry services													
MH.P.69	Waterfront fueling facilities	EDC	1	1	-1	1	0	-1	0	1	1	0	3	Medium
MH.P.70	Mobile/portable ferry ticketing machines	EDC	1	1	-1	1	0	-1	0	1	1	-1	2	Medium
MH.P.71	Use of the Staten Island Ferry's Austen Class vessels for East River Ferry service during weather-related storm disruptions	EDC/DOT	1	1	-1	1	0	-1	1	1	0	0	3	Medium
MH.P.72	Storm shutters project	FDNY	1	1	1	1	1	0	1	0	0	0	6	High
MH.P.73	Backup communications carrier	FDNY	1	1	-1	1	1	-1	0	0	0	0	2	Medium
MH.P.74	Voice-over IP architecture	FDNY	1	1	0	1	-1	0	0	0	0	1	3	Medium
MH.P.75	Next-generation satellite phones	FDNY	1	1	-1	1	1	-1	0	0	0	0	2	Medium
MH.P.76	FDNY facilities survey	FDNY	1	1	0	1	0	0	1	0	0	0	4	Medium
MH.P.77	DCOC cell phone coverage	FDNY	0	1	0	0	-1	0	0	0	0	0	0	Low
MH.P.78	FDNY cable network	FDNY	1	1	1	1	1	0	0	0	0	1	6	High

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MH.P.79	Spare radios	FDNY	1	1	0	1	1	0	0	0	0	0	4	Medium
MH.P.80	Home-work plans	FDNY	1	1	1	-1	-1	0	0	0	0	0	1	Medium
MH.P.81	Gas vendors	FDNY	1	1	0	1	0	0	0	0	0	-1	2	Medium
MH.P.82	Cache of vaccinations	FDNY	1	1	1	1	-1	-1	0	0	0	-1	1	Medium
MH.P.83	Urban search and rescue team	FDNY	1	1	0	1	0	1	0	0	0	0	4	Medium
MH.P.84	Coney Island Hospital HVAC	HHC	1	1	-1	1	0	-1	0	1	0	0	2	Medium
MH.P.85	Coney Island Hospital power pre-connections	HHC	1	1	-1	1	0	-1	0	1	1	1	4	Medium
MH.P.86	Metropolitan Hospital HVAC	HHC	1	1	0	1	1	0	0	1	0	1	6	High
MH.P.87	Metropolitan Hospital pre-connections	HHC	1	1	0	1	1	0	0	1	0	1	6	High
MH.P.88	Bellevue Hospital	HHC	1	1	0	1	1	0	0	1	0	1	6	High
MH.P.89	Bellevue Hospital power pre-connections	HHC	1	1	0	1	1	0	0	1	1	1	7	High
MH.P.90	Central Office Emergency Command Center (ECC) and alternate ECC	HHC	1	1	0	1	1	-1	0	1	1	0	5	Medium
MH.P.91	Henry J. Carter	HHC	1	1	-1	1	1	0	0	1	1	1	6	High

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	Hospital improvements													
MH.P.92	Outreach to residential building owners	HPD	1	1	-1	1	0	0	0	1	1	1	5	Medium
MH.P.93	Flood protection for critical facilities.	HRA	1	1	1	1	0	1	1	1	0	1	8	High
MH.P.94	Overhead electric infrastructure	LIPA	-1	-1	0	0	-1	-1	0	0	1	1	-2	Low
MH.P.95	Storm damage mitigation	LIPA	-1	0	-1	-1	0	0	0	1	1	1	0	Low
MH.P.96	Exploration of loss-reduction actions for landmarked properties	LPC	1	1	1	1	1	1	1	0	0	0	7	High
MH.P.97	Public education and outreach for landmarked buildings	LPC	1	1	1	1	1	1	0	0	0	1	7	High
MH.P.98	Marine Parkway/Cross Bay Bridge mitigation master plan	MTA (Bridges and Tunnels)	1	1	0	1	1	0	0	1	0	1	6	High
MH.P.99	Engineering flood studies at non-tunnel facilities	MTA (Bridges and Tunnels)	1	1	0	1	-1	0	0	1	1	1	5	Medium
MH.P.100	Far Rockaway depot green roof	MTA (Buses)	1	1	1	1	1	1	1	1	1	0	9	Medium

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MH.P.10 1	Hazards/threats planning	MTA (MNR)	1	1	0	1	1	0	0	1	1	0	6	High
MH.P.10 2	Fueling capabilities/backup for emergency response	MTA (MNR)	1	1	0	1	1	0	0	1	1	0	6	High
MH.P.10 3	Penn Station access	MTA (MNR)	1	1	1	1	1	1	0	1	0	0	7	High
MH.P.10 4	Harlem-125 Street Station improvements	MTA (MNR)	1	1	1	1	1	1	0	0	0	0	6	High
MH.P.10 5	Emergency management equipment	MTA/LIRR	1	1	1	1	1	-1	0	1	0	1	6	High
MH.P.10 6	NYCHA grounds, pavements, and drainage improvements	NYCHA	1	1	-1	1	1	1	1	0	1	0	6	High
MH.P.10 7	Category 4 distributed power-generation feasibility studies	NYCHA	1	1	-1	1	1	-1	0	1	0	0	3	Medium
MH.P.10 8	Morrisania Air Rights	NYCHA	-1	1	-1	-1	1	-1	0	0	0	0	-2	Low
MH.P.10 9	NYCHA AC improvements	NYCHA	1	0	-1	1	1	0	-1	0	0	0	1	Medium
MH.P.11 0	NYPD precinct facility protection	NYPD	1	1	1	1	1	-1	0	0	0	0	4	Medium

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MH.P.11 1	NYPD facility protection	NYPD	1	1	1	1	1	-1	0	0	0	0	4	Medium
MH.P.11 2	NYPD critical facilities protection	NYPD	1	1	1	1	1	-1	0	0	0	0	4	Medium
MH.P.11 3	OCME unified agency command enter	OCME	1	1	1	1	1	1	1	0	1	0	8	High
MH.P.11 4	Educational outreach to private sector	OEM	1	1	-1	1	1	0	0	0	0	1	4	Medium
MH.P.11 5	OEM facilities protection	OEM	1	1	-1	1	1	0	0	0	0	0	3	Medium
MH.P.11 6	HAZUS-MH software	OEM	1	1	1	1	1	-1	1	1	0	0	6	High
MH.P.11 7	Community Emergency Response Team (CERT) Curriculum	OEM	1	1	1	1	1	1	0	1	1	1	9	High
MH.P.11 8	Infrastructure systems modeling	OEM	1	0	1	1	0	0	0	1	0	0	4	Medium
MH.P.11 9	Loss estimation	OEM	1	0	1	1	1	0	0	0	0	0	4	Medium
MH.P.12 0	Natural hazard event database	OEM	1	0	1	1	1	1	0	0	0	0	5	Medium
MH.P.12 1	CERT collaboration with community groups	OEM	0	1	1	1	1	1	0	1	1	1	8	High
MH.P.12 2	Ready New York update	OEM	1	1	1	1	1	1	0	1	0	0	7	High

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MH.P.12 3	Public/private mitigation initiatives	OEM	1	1	0	1	1	0	0	1	0	1	6	High
MH.P.12 4	Regional critical infrastructure mapping	OEM	1	0	-1	1	1	0	0	1	0	0	3	Medium
MH.P.12 5	Subway depths mapping:	OEM	-1	0	1	1	1	0	0	1	0	0	3	Medium
MH.P.12 6	Vegetation data	OEM	-1	0	1	1	0	0	0	1	0	0	2	Medium
MH.P.12 7	Zoning for hazard-prone areas	OEM	1	1	-1	1	0	0	1	1	0	1	5	Medium
MH.P.12 8	Mitigation public outreach	OEM	1	1	-1	1	1	0	1	1	1	1	7	High
MH.P.12 9	Emergency Operations Center (EOC)	OEM	1	1	-1	1	1	-1	1	1	-1	1	4	Medium
MH.P.13 0	OEM Warehouse	OEM	1	1	0	1	1	1	0	1	0	0	6	High
MH.P.13 1	New York City mitigation guide and education	OEM	1	1	1	1	1	1	1	1	1	1	10	High
MH.P.13 2	Building community capacity	OEM	1	0	-1	1	1	1	0	1	1	0	5	Medium
MH.P.13 3	Urban Post-Disaster Housing site identification in New York City	OEM	1	1	1	1	1	1	1	1	1	0	9	High
MH.P.13 4	Executive decision-making guide for	OEM	1	1	1	1	0	1	1	1	1	0	8	High

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	deployable post-disaster housing													
MH.P.13 5	Request for Proposal for Urban Post-Disaster Housing	OEM	1	1	1	1	0	1	1	1	1	0	8	High
MH.P.13 6	Storm shutter protection at OEM headquarters	OEM	1	1	-1	1	1	0	1	1	1	0	6	High
MH.P.13 7	NYC Brownfield Incentive Grant (BIG) program	OER	1	1	-1	1	1	0	1	1	1	1	7	High
MH.P.13 8	Fuel advance warning system	PANYNJ (Aviation)	1	0	1	1	1	1	0	1	1	0	7	High
MH.P.13 9	Kennedy Airport electrical system resiliency	PANYNJ(Aviat.)	1	1	0	1	1	0	0	0	0	0	4	Medium
MH.P.14 0	LaGuardia Airport central electric substation	PANYNJ(Aviat.)	1	1	1	1	1	0	0	1	1	0	7	High
MH.P.14 1	LaGuardia Airport electrical system enhancement	PANYNJ(Aviat.)	1	1	1	1	1	-1	0	1	0	0	5	Medium
MH.P.14 2	LaGuardia Airport power system redundancy	PANYNJ(Aviat.)	1	1	1	1	1	-1	0	0	0	0	4	Medium
MH.P.14 3	Kennedy Airport power system redundancy	PANYNJ(Aviat.)	1	1	1	1	1	-1	0	1	0	0	5	Medium

The prioritization analysis of proposed actions is for planning purposes only and will not be used to determine eligibility for funding or implementation of potential projects in the future.

Prioritization

Section IV: Mitigation Strategy

HMP Index No.	Mitigation Action	Lead Agency	S	T	A	P	L	Ec	Ev	TIMLINE	Project Cost	GOALS and OBJECTIVES	Prioritization Score	Prioritization
MH.P.14 4	Stewart Airport standby emergency generator	PANYNJ(Aviat.)	1	1	1	1	1	1	0	1	1	0	8	High
MH.P.14 5	Stewart Airport power system redundancy	PANYNJ(Aviat.)	1	1	1	1	1	1	0	1	0	0	7	High
MH.P.14 6	Kennedy Airport fuel storage	PANYNJ(Aviat.)	1	1	1	1	1	1	-1	1	1	0	7	High
MH.P.14 7	Intelligent Transportation System (ITS) program at Kennedy and Newark Airports	PANYNJ(Aviat.)	1	1	1	1	1	-1	0	0	0	0	4	Medium
MH.P.14 8	Emergency generator capacity for Red Hook and Howland Hook container terminals	PANYNJ(Ports)	1	1	1	1	1	1	-1	1	1	0	7	High
MH.P.14 9	Lincoln Tunnel electrical and power system improvements	PANYNJ(TBT)	1	1	1	1	1	-1	0	1	0	0	5	Medium
MH.P.15 0	George Washington Bridge (GWB) electrical and power system improvements	PANYNJ(TBT)	0	1	1	1	1	-1	-1	1	0	0	3	Medium
MH.P.15 1	GWB tower transformers	PANYNJ(TBT)	1	1	1	1	1	1	0	1	1	0	8	High

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Prioritization

Section IV: Mitigation Strategy

HMP Index No.	Mitigation Action	Lead Agency	S	T	A	P	L	Ec	Ev	TIMLINE	Project Cost	GOALS and OBJECTIVES	Prioritization Score	Prioritization
MH.P.15 2	Multi-facility real-time traffic information software	PANYNJ(TBT)	0	1	1	1	1	1	0	0	0	0	5	Medium
MH.P.15 3	Intelligent Transportation System (ITS) program	PANYNJ(TBT)	0	1	0	1	1	-1	0	0	-1	0	1	Medium
MH.P.15 4	Green roofs on Parks buildings	Parks	1	1	-1	1	1	1	1	1	1	1	8	High
MH.P.15 5	Green Streets	Parks	1	1	-1	1	1	1	1	1	1	1	8	High
MH.P.15 6	Wetlands and other land in a natural state	Parks	1	1	-1	1	-1	-1	1	0	1	1	3	Medium
MH.P.15 7	Seawall, pier, and marina structural repairs	Parks	1	1	1	1	1	-1	1	0	1	0	6	High
MH.P.15 8	Upgrades to Parks buildings' systems	Parks	1	1	-1	1	1	0	1	0	0	0	4	Medium
MH.P.15 9	SBS outreach.	SBS	1	1	-1	1	1	1	0	0	0	1	5	Medium
MH.P.16 0	Toolkit and training materials for city volunteer groups	SBS	1	1	-1	1	1	1	0	0	0	1	5	Medium
MH.P.16 1	Small business outreach	SBS	1	1	-1	1	1	1	0	0	0	1	5	Medium
MH.P.16 2	Hazard mitigation education for	SBS	1	1	-1	1	1	1	0	0	0	1	5	Medium

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Prioritization

Section IV: Mitigation Strategy

HMP Index No.	Mitigation Action	Lead Agency	S	T	A	P	L	Ec	Ev	TIMLINE	Project Cost	GOALS and OBJECTIVES	Prioritization Score	Prioritization
	businesses													
MH.P.16 3	Ready New York materials	SBS	1	1	-1	1	1	1	0	0	0	1	5	Medium
MH.P.16 4	Toolkit and training materials for BIDs and LDCs on mitigation best practices	SBS	1	1	-1	1	1	1	0	0	0	1	5	Medium
MH.P.16 5	Hazardous mitigation seminar for BIDs and LDCs	SBS	1	1	-1	1	1	1	0	0	0	1	5	Medium
MH.P.16 6	Dissemination of hazard information	SBS	1	1	-1	1	1	1	0	0	0	1	5	Medium
MH.P.16 7	Rockaway Reformulation Study	USACE/NYSDEC	1	1	1	1	1	0	1	1	0	0	7	High
MH.P.16 8	T-groins at Coney Island	USACE/NYSDEC	1	1	1	1	1	0	1	1	0	0	7	High
Severe Weather														
SW.P.1	Protection of NYCDOT facilities from high winds	DOT	1	1	0	1	-1	0	0	0	0	0	2	Medium
SW.P.2	Sign inspection program	DOT	0	1	1	1	1	1	0	1	1	0	7	High
SW.P.3	Rooftop equipment protection at HRA facilities	HRA	1	1	-1	1	-1	0	0	1	1	0	3	Medium
SW.P.4	Increased line clearance tree trim	LIPA	-1	1	-1	1	1	0	1	1	1	0	4	Medium

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Prioritization

Section IV: Mitigation Strategy

HMP Index No.	Mitigation Action	Lead Agency	S	T	A	P	L	Ec	Ev	TIMLINE	Project Cost	GOALS and OBJECTIVES	Prioritization Score	Prioritization
	program													
SW.P.5	Bridge reinforcement	MTA (Bridges and Tunnels)	1	1	-1	1	-1	1	0	0	0	1	3	Medium
Winter Weather														
WS.P.1	Improved Snow & Ice Melt: Permeable pavement	DOT	0	1	-1	0	1	-1	1	1	1	1	4	Medium
WS.P.2	Public Outreach	OEM	1	1	0	1	1	0	1	1	0	0	6	High

The prioritization analysis of proposed actions is for planning purposes only and will not be used to determine eligibility for funding or implementation of potential projects in the future.

5. Implementation and Administration

The implementation strategy for existing and potential actions is located in the Existing and Potential Mitigation Action tables (Table 5 and Table 6), respectively. Both tables further identify the following categories of information for each action that will guide New York City in the implementation and administration of the actions: description, lead and supporting agencies, timeframe, cost, funding source, and priority (see Table 4). It also serves to coordinate agencies to avoid duplicating or conflicting efforts. The Mitigation Strategy produced for New York City contains a wide variety of prioritized actions that will mitigate the effects of natural hazards on population, the economy, and property. Some mitigation actions in the Strategy can take as little as three months to implement, while others may take more than 50 years. Actions range from a \$20,000 training program to major infrastructure improvements costing \$760 million.

A. Capability Assessment

The Capability Assessment evaluates the tools in the city's toolbox for implementing mitigation strategies to reduce disaster losses. The primary capability types to accomplish mitigation and reduce long-term include: planning and regulatory, administrative and technical, financial, and education and outreach (see **Figure 2**).

New York City, through its various agencies and departments, has local policies, regulations, funding, and practices currently in place that will help facilitate its hazard mitigation strategy. These mechanisms include: building and construction codes, floodplain management plans, land use plans, local laws and ordinances, master and comprehensive plans, and zoning and land use regulations.



Figure 2: Capability Assessment Types

Implementation and Administration

Section IV: Mitigation Strategy

The Planning Team and Steering Committee created the following table to assess New York City's current capabilities to implement mitigation actions. It contains the agency responsible, classification, description for each initiative or capability, and how it relates to hazard mitigation. In addition to OEM's hazard mitigation planning program, as outlined in the Plan Maintenance section of the HMP, the following planning mechanisms (Table 9, Table 10, Table 11, and Table 12) will serve to implement many of the actions described in the plan:

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
Land Use Plan - <i>DCP Initiated Rezoning</i>	DCP	DCP is responsible for zoning amendments that change the applicable use, bulk, and density regulations for a location or area. Since 2002, DCP has sponsored 80 area-wide rezoning projects that are adopted into law, covering approximately one sixth of the city. All rezonings are required to pass through the City Environmental Quality Review (CEQR). Many of the rezonings incorporate additional provisions for waterfront access and green spaces and hazard mitigation considerations, such as flood-resilience measures, where appropriate.	These rezonings incorporate goals established in the Flood Resilience Text Amendment and the Waterfront Revitalization Program and help mitigate the impact of the following hazards: coastal erosion, coastal storms/hurricanes, tornadoes/windstorms, extreme temperatures, earthquakes, flooding, winter storms, and utility disruptions.
Local Waterfront Revitalization Plan - <i>VISION 2020: New York City Comprehensive Waterfront Plan</i>	DCP	<i>Vision 2020</i> is a 10-year plan for the future of the city's 520 miles of shoreline. This plan provides a sustainable framework for more water transport, increased public access to the waterfront, and economic opportunities that will help make the water part of New Yorkers' everyday lives.	<i>Vision 2020</i> and associated waterfront revitalization plans address flooding hazards and associated risks such as: coastal erosion, coastal storms/hurricanes, and tornadoes/windstorms.
Plan - <i>Urban Waterfront Adaptive Strategies (UWAS)</i>	DCP	<i>Urban Waterfront Adaptive Strategies</i> is a resource to help guide planners and policy makers in New York City and beyond in identifying and evaluating potential coastal protection strategies.	<i>Urban Waterfront Adaptive Strategy</i> addresses flooding hazards and associated risks such as: coastal erosion, coastal storms/hurricanes, tornadoes/windstorms, and utility disruptions.
Plan - <i>Designing for Flood Risk</i>	DCP	<i>Designing for Flood Risk</i> identifies key principles to guide the design of new buildings in flood zones to promote construction that can not only withstand coastal flood events, but also supports the vibrancy of the urban public realm.	<i>Designing for Flood Risk</i> addresses flooding hazards and associated risks such as: coastal erosion, coastal storms/hurricanes, tornadoes/windstorms, and utility disruptions.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
Plan - Hazard Mitigation Plan	DCP/OEM	The <i>Hazard Mitigation Plan</i> (HMP) is a federally mandated compliance document required for update every five years to maintain eligibility for certain disaster recovery and future mitigation funding. DCP has partnered with OEM under a FEMA-funded grant to update the City's 2009 HMP.	The HMP addresses a comprehensive list of identified hazards: coastal erosion, coastal storms, disease outbreaks, drought, earthquakes, extreme temperatures, flooding, severe weather, wild fires, winter storms, CBRN, Cyber Threats, and Infrastructure Failures.
Plan - <i>New York City Design Manual for Risk and Resilience: A Guide for New Construction and Retrofitting of Existing Buildings in Flood Zones</i>	DCP	The plan provides guidance for planning and design of new construction and retrofitting existing buildings in areas subject to flooding. Guidance mitigates property damage and life safety dangers posed by structural and superficial damage buildings.	The plan addresses flooding hazards and associated risks such as: coastal erosion, coastal storms/hurricanes, tornadoes/windstorms, and utility disruptions.
Site Plan Review Requirements - <i>City Planning Commission Discretionary Review</i>	DCP	In cases where discretionary action by the City Planning Commission is necessary, various borough and technical staff members review site plan applications for consistency with sound planning policy, environmental reviews consistent with CEQR guidelines, and any other relevant findings as applicable.	Discretionary reviews ensure consistency with environmental review and address a wide range of hazards, such as flooding, coastal erosion, and hurricanes, as appropriate.
Steep slope ordinances – <i>Hillsides Preservation Districts; Special Natural Area Districts</i>	DCP	The City Planning Commission reviews site plans to maximize protection of natural areas, including the goals of reducing hillside erosion, landslides, and excessive stormwater runoff associated with development. This is accomplished through conserving vegetation and protecting natural terrain.	Natural area preservation helps ensure consistency with DCP's sustainability goals and address a wide range of hazards, such as flooding, coastal erosion, and hurricanes, as appropriate.
Zoning/land use restrictions – Zoning Resolution	DCP	The Zoning Resolution sets forth the regulations governing land use and development. Articles I through VII contain the use, bulk, parking, and other applicable regulations for each zoning district.	The zoning resolution helps promote green, sustainable land use and mitigates a wide range of hazards, including: coastal erosion, coastal storms/hurricanes, tornadoes/windstorms, extreme temperatures, earthquakes, flooding, winter storms, and utility disruptions.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
Zoning/land use restrictions - <i>Flood Resilience Zoning Text Amendment</i>	DCP	The Flood Resilience Zoning Text Amendment encourages flood-resilient building construction throughout designated flood zones. The amendment removes regulatory barriers that would hinder or prevent the reconstruction of storm-damaged properties. It also enables new and existing buildings to comply with new, higher flood elevations issued by the Federal Emergency Management Agency (FEMA) and to new requirements in the Building Code.	The Flood Resilience Text Amendment addresses flooding hazards and associated risks such as: coastal erosion, coastal storms/hurricanes, tornadoes/windstorms, and utility disruptions.
Codes Building Site/Design - <i>New York City Construction Codes</i>	DOB	The New York City Construction Codes are patterned after the International Code Council (ICC) family of codes. The codes are updated on a 3-year cycle similar to the revision cycles of the ICC codes. This ensures the codes are updated regularly to the most recent safety and technological advances.	Many mitigation strategies and goals—such as protecting public health and safety, preserving properties, sustaining a healthy environment, and disaster preparedness—can be achieved by applying the Codes to building construction and site preparation. The Codes address, to a certain extent, many of the risks identified, such as flood, drought, extreme heat, earthquakes, wind, and building collapses.
Plan Review Requirements - <i>Plan Review</i>	DOB	Except for minor alterations and repairs, construction work generally requires a construction permit, which can only be obtained if the work is found to be in compliance with NYC Construction Codes. If an owner chooses not to have the project done by a NYS-registered design professional, the work must then be reviewed by a DOB plan examiner before a permit is given. DOB possesses an extensive plan review system to ensure lawful compliance with the City's Building Code, Electrical Code, Zoning Resolution, New York State Labor Law, and New York State Multiple Dwelling Law.	By ensuring construction work is designed in accordance with the NYC Construction Codes and other applicable laws, buildings and properties are protected a variety of hazards.
Land Use Plan - <i>Parks Department Parkland Plan</i>	Parks	The Planning Division coordinates specific plans for new uses of parkland and for remediation of environmental damage.	Planning staff have grant experience and experience remediating brownfields and other damaged sites.
Local Waterfront Revitalization Plans - <i>Consistency Review</i>	Parks	Local discretionary actions, including those subject to land use (ULURP), environmental (CEQR) and Board of Standards and Appeals (BSA) review procedures, are reviewed for consistency with the New York City Waterfront Revitalization Program	Staff are aware of requirements for appropriate siting of waterfront infrastructure to reduce damage from hazard events.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
		policies.	
Site Plan Review Requirements - <i>Parks Department Site Review</i>	Parks	The Forestry Division reviews site plans for capital work and ensures that all trees and horticulture are protected. Parks also reviews any work that might affect street trees and governs the removal or planting of any public tree in New York City.	Protection of existing trees helps mitigate future events due to rainwater absorption, reduction of flooding, and other factors.
Site Plan Review Program – <i>Tree and Horticulture Protection</i>	Parks	The Forestry division reviews site plans citywide for capital work and ensures that all trees and horticulture are protected. The Capital division reviews plans for projects in parks to ensure the protection of trees and horticulture.	Trained forestry staff review design and construction practices to ensure preservation of healthy trees to reduce risk and protect the environment.
Master/Comprehensive Plan - <i>PlaNYC</i>	OLTPS	PlaNYC is the city's long-term, comprehensive sustainability plan that focuses on improving the city's environment while accommodating an increase in population of almost one million people by 2030.	PlanNYC will help prepare the city for population growth, combat climate change, and become more resilient to future hazards.
Plan – <i>A Stronger, More Resilient New York</i>	OLTPS, EDC	The report, produced by the Special Initiative on Rebuilding and Resiliency (SIRR), addresses how to create a more resilient New York City in the wake of Hurricane Sandy, with a focus on preparing for and protecting against the impacts of climate change. The report presents actionable recommendations both for rebuilding the communities impacted by Sandy and increasing the resilience of infrastructure and buildings citywide.	The SIRR report offers strategies to make New York City more resilient in the face of coastal storms, flooding events, and other climate changed-related effects.
Codes Building Site/Design – <i>PlaNYC Green Building Task Force</i>	OLTPS	OLTPS will lead a task force that will develop amendments to the City's Building Code to incorporate climate change impacts.	Amendments to the building code will make the built environment more resistant to future hazards.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
Plan - <i>NYC Green Infrastructure Plan</i>	DEP	The plan presents an alternative approach to improving water quality that integrates "green infrastructure," such as swales and green roofs, with investments to optimize the existing system and build targeted, cost-effective "grey" or traditional infrastructure.	Green infrastructure projects capture rainwater that would otherwise enter the combined sewer system, thereby reducing street flooding and combined sewer overflows (CSOs) in New York Harbor. Grey infrastructure retains combined water and wastewater until the end of a rain event, reducing the volume of CSOs in New York Harbor.
Local Emergency Plans - <i>Water Shortage Operations Plan</i>	DEP	During droughts, DEP procedures are modified to maximize different water sources, prioritize leak detection programs that minimize water loss, and review hydrant-locking procedures to ensure areas with illegal hydrant use are compliant with water-use restrictions.	This capability reduces the impact of natural and non-natural water shortages on the city's population and critical water-dependent operations.
Long-term Water Shortage Plan - <i>Water Demand Management Plan 2021</i>	DEP	DEP plans for water shortage as a result of natural conditions and planned and unplanned infrastructure outage by identifying demand management strategies in government, residential, and commercial properties and by optimizing system operation to reduce water loss.	Reduces overall in-city water consumption in advance of planned shutdown of Rondout-West Branch Tunnel as part of Water for the Future, and mitigates future natural and non-natural water shortages.
Other Hazard Mitigation Plan - <i>Downstream Flooding Reduction Program</i>	DEP	The plan provides for the reduction of downstream flooding through attenuation of runoff by lowering reservoir elevation at a controlled rate in anticipation of forecasted storms and snow pack melting.	Mitigates impacts of flooding caused by forecasted storms and snow pack melting.
Other Hazard Mitigation Plan - <i>Reservoir Release Notification Plan</i>	DEP	The plan provides for the notification of reservoir releases/spilling rates at predefined levels to all downstream counties' emergency management officials.	Assesses and mitigates impacts of reservoir releases on stream and river flooding of downstream communities.
Hydrological/Hydraulic Studies – Reservoir Basin Hydrologic/Hydraulic Study	DEP	DEP conducts H&H studies to confirm probable maximum precipitation and probable maximum flood for reservoir basins.	Assess impacts of precipitation and flooding on reservoir operations and water quality.
Hydrological/Hydraulic Studies – High Hazard Dams	DEP	Bureau of Water Supply (BWS) maintains studies of its high hazard dams and dikes.	Assesses risk of dam failure, impacts to watershed communities, and impacts to in-city supply.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
Hydrological/Hydraulic Studies – Hydraulic Analyses of Problem Areas	DEP	DEP performs hydraulic analyses of sewer systems in areas experiencing sewer problems to determine the need for and scope of future capital projects. These studies often occur before a drainage plan is developed and guide the determination of where improvements will be focused.	DEP's sewer construction program seeks to improve storm and wastewater drainage in areas lacking a fully built-out system or whose population and land use characteristics have changed significantly to warrant system reconstruction. Sewer upgrades may increase system capacity, alleviate flooding, and increase the reliability of the system.
Land Use Regulations - <i>Recreational Land Use Regulations</i>	DEP	BWS maintains regulations for the public recreational use of New York City-owned lands and waters.	Protects water quality in City reservoirs.
Property Set-Back Ordinance - <i>Wildland -Urban Interface</i>	DEP	Bureau of Water & Sewer Operations (BWSO) enforces a 25-foot setback around vegetated areas, where possible, to help mitigate potential for wildfire in the Staten Island Bluebelt.	Reduces impacts of wildfire on properties surrounding the Staten Island Bluebelt.
Site Plan Review Requirements - <i>Site Connection Applications for New Developments</i>	DEP	BWSO issues certifications indicating the ability of existing sewers to accommodate increased usage to all new development projects. Certification is needed before a construction permit is issued.	Ensures that the sewer system has the capacity to handle additional wastewater and stormwater flow from new developments.
Storm Water Ordinances – <i>Guidelines for the Design and Construction of Stormwater Management Systems</i>	DEP	DEP is responsible for providing adequate draining services to the city. DEP also governs the construction of private sewers and drains to ensure compliance and adequate drainage capabilities.	Ensures that new developments have adequate stormwater management systems to reduce pressure on City sewers
Watershed Ordinance – Watershed Rules and Regulations	DEP	DEP enforces and develops regulations to protect New York City's reservoirs from contamination from human activity and stormwater.	Protects water quality in City reservoirs.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
<i>Climate Change Plan - NYC Wastewater Resiliency Plan</i>	DEP	DEP has developed cost-effective strategies for reducing flooding damage to wastewater infrastructure and safeguarding public health and the environment. This comprehensive study examined buildings and infrastructure at DEP's 96 pumping stations and 14 wastewater treatment plants, identifying and prioritizing infrastructure that is most at risk of flood damage. Through the study, DEP developed a set of recommended design standards and cost-effective protective measures tailored to each facility to improve resiliency in the face of future flood events.	DEP will consider climate risk in capital planning and incorporate a design standard of the 100-year floodplain plus 30 inches of sea level rise in all new wastewater infrastructure projects.
Maps of Right-To-Know Facilities	DEP	Mapping of facilities with hazardous substances located within the NYC flood map. Such maps may be used for planning purposes and as a resource to determine potential contamination during a flood event	Focuses facility-level planning and outreach in advance of coastal storms to mitigate flood risk.
Waterfront Vision and Enhancement Strategy (WAVES)	EDC	The Waterfront Action Agenda is the three-year implementation component of the Waterfront Vision and Enhancement Strategy (WAVES). It establishes a set of 125 specific, high-priority projects for realizing New York City's waterfront and waterways as a world-class destination, a globally competitive port, and a rich and vital natural resource that draws all New Yorkers to its edge and onto the water.	Several of the goals identified in the WAVES agenda address hazard mitigation, including restoring the natural waterfront, improving water quality, enhancing water-borne transportation, and increasing climate resilience.
New York City Fire Code	FDNY	The Fire Code is compiled and periodically revised by the Fire Department of New York (FDNY). The Fire Code deals with the operation and maintenance of buildings and fire safety systems, emergency planning and preparedness, regulation of hazardous materials, and regulation of businesses and activities involving fire safety concerns.	The Fire Code revision process and adoption takes into account changing factors and lessons learned through experience and applied fire science. The code helps protect property from structural collapses, fires, and other infrastructure failures.
Strategic Plans	FDNY	FDNY's Strategic Plans outline the goals and objectives deemed priority to the Fire Commissioner and the Chief of the Department and guide the Department's planning, decision-making, and resource allocation.	The Strategic Plans respond to the challenges anticipated in the coming decade, and the actions it plans to take to deter them, largely based on natural and non-natural hazards.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
Continuity of Operations Plan (COOP)	FDNY	In the event of a disaster, the FDNY would implement its COOP. The Department yearly updates the COOP for its major bureaus, including Fire Operations, EMS Operations, Bureau of Health Services, Communications, Fire Prevention, and Fire Investigations.	Specific COOP plans are designed and implemented by bureau. The plans are encompassing, and draw from experience and best practices.
Community Wildfire Protection Plan	FDNY	The Community Wildfire Protection Plan positions fire protection agencies, community leaders, and natural resource professionals to be better prepared to protect the community's residents and natural resources from the negative impacts of wildfire.	The Community Wildfire Protection Plan enables the Department to deliver a planned, effective, and deliberate response to any wildfire and describes the impacts/damages associated with wildfires.
Evacuation Plans	MTA	Evacuation plans facilitate an orderly and efficient evacuation when ordered by the Mayor.	Reduces the risk of people without access to private cars being harmed during an event requiring evacuation. Even those with access to cars may not be able to evacuate due to congestion if all try to use them rather than using public transportation.
System Shut Down Plan	MTA	A plan to affect an orderly shutdown of the system to protect employees and assets.	Shutting the system down helps minimize damage to infrastructure and rolling stock as well as protect employees and customers.
Disaster Housing Recovery Plan	OEM	The Disaster Housing Plan provides guidance for the implementation of interim housing and the restoration of permanent housing following a catastrophic event. It is a start-up kit, outlining coordination and communication of all participants involved in post-disaster housing recovery. It serves as a template for any jurisdiction to implement after a disaster.	This plan guides the deployment of temporary housing after a disaster.
Community Recovery Playbook	OEM	A Guide to Using Community Development Block Grants for Disaster Recovery: helps people and communities receive assistance as quickly as possible through block grant distributions. It contains a user-friendly catalog of 60 block-grant-funded programs that can form the basis for a comprehensive housing recovery effort and associated waivers. The Housing Group/State Led Disaster Task Force/Recovery Authority can activate these programs immediately.	This playbook helps communities receive assistance after a disaster.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
Housing Recovery Center Plan	OEM	Enables a one-stop-shop for people who need housing assistance and other related services after a catastrophic event. It outlines the Concept of Operations for the entire Housing Recovery Center network so all participating service providers can efficiently provide housing recovery services. This plan is a scalable and flexible administrative and management system that will be essential to coordinated and consistent operation of the housing recovery center(s).	This plan helps people in need of housing assistance after a disaster.
Participatory Urban Planning Toolkit	OEM	Resource for coordinating emergency management response and recovery operations with Non-Governmental Organizations. It contains a Participatory Urban Planning Interagency Task Force document with key roles and actions and a Communications Guide that facilitates recovery of the whole community.	This toolkit helps non-governmental organizations receive help in response and recovery operations after a disaster.
Hydrological/Hydraulic Studies – SLOSH Study	OEM	OEM performs SLOSH modeling for New York City to determine what areas would be inundated in a coastal storm.	These models guide planning and evacuation operations as outlined in the Coastal Storm Plan.
Other Hazard Mitigation Plan – Coastal Storm Plan	OEM	The Coastal Storm Plan describes the citywide efforts before, during, and after a coastal storm event, particularly a hurricane. The plan contains components relating to decisions-making, sheltering, advance warning systems, logistics, public information, debris management, and post-disaster reconstruction.	This plan guides the city's efforts in preparedness, response, and recovery for coastal storm events.
Other Hazard Mitigation Plan – Flash Flood Plan	OEM	The Flash Flood Plan contains detailed procedures to mitigate the effects of a flash flood on people and property and guides agency stakeholders through the decisions and actions that will be required before, during, and after such an event.	This plan guides the city's efforts in preparedness, response, and recovery for flash floods.

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Capability Type: Plans/Ordinances/Regulations	Agency	Description	How does this capability address mitigation and risk assessment?
Other Hazard Mitigation Plan – Heat Emergency Plan	OEM	The Heat Plan contains detailed procedures to mitigate the effects of extreme heat conditions on critical infrastructure, at-risk populations, and New York City operations. The contents of the plan guide New York City stakeholders (including city and state agencies, the private sector, non-profits, and volunteer organizations) through the complex decisions that may be necessary during a heat emergency.	This plan guides the city's efforts in preparedness, response, and recovery for extreme heat events.
H1N1 Playbook	OEM	The H1N1 Playbook guides interagency support to a public health response to an H1N1 outbreak in New York City.	This plan guides response to pandemic flu spread.
Earthquake Response Playbook	OEM	The Earthquake Response Playbook provides a framework for guiding and coordinating the City's initial (immediate hours and days) response to a major earthquake in the NYC area.	This plan guides response to a major earthquake.
Other Hazard Mitigation Plan – Winter Weather Emergency Plan	OEM	The Winter Weather Emergency Plan outlines procedures to reduce the hazardous effects of winter weather on general and at-risk populations. It details specific strategies for snow plowing and salt spreading on city streets and responding to incidents, such as frozen fire hydrants, heat outages, and carbon monoxide emissions.	This plan guides the city's efforts in preparedness, response, and recovery for winter weather storms.

Table 9: Planning and Regulatory Capabilities

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Capability Type: Administration/Staff/Technical	Agency	Description	How does this capability address mitigation and risk assessment? (New requirement 2014 Plan)
Planning Commission	DCP	The City Planning Commission is responsible for the conduct of planning relating to the orderly growth and development of the city, including adequate and appropriate resources for the housing, business, industry, transportation, distribution, recreation, culture, comfort, convenience, disaster protection and recovery, health and welfare of its population. The Commission meets regularly to hold hearings and vote on applications concerning the use, development and improvement of real property subject to City regulation. Its consideration of these applications includes an assessment of their environmental impacts where required by law.	The Planning Commission helps promote green and sustainable land use, ensures consistency with environmental review, and considers mitigation actions that address a wide range of hazards, such as flooding, coastal erosion, and hurricanes, as appropriate.
Hazard Mitigation Staff	DCP	As part of the Hazard Mitigation Plan Grant, the Department of City Planning has hired two new staff to help develop and manage the Hazard Mitigation Plan and associated projects, such as the New York City Design Manual for Risk and Resilience: A Guide for New Construction and Retrofitting of Existing Buildings in Flood Zones.	The new staff helps ensure that the HMP addresses a comprehensive list of identified hazards, such as: coastal erosion, coastal storms/hurricanes, tornadoes/windstorms, extreme temperatures, earthquakes, flooding, winter storms, and utility disruption.
Chief Building Official	DOB	New York City Department of Buildings (DOB) ensures the safe and lawful use of more than 950,000 buildings and properties through enforcing the City's Building Code, Electrical Code, Zoning Resolution, New York State Labor Law, and New York State Multiple Dwelling Law. DOB's main activities include performing plan examinations, issuing construction permits, inspecting properties, and the maintenance of construction codes and licensing trades.	DOB has the authority in ensuring code compliances and enforcing the rules and regulations related to hazards.

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Capability Type: Administration/Staff/Technical	Agency	Description	How does this capability address mitigation and risk assessment? (New requirement 2014 Plan)
Floodplain Administrator	DOB	The floodplain administrator has the capacity and responsibility to implement and enforce floodplain regulations that meet National Flood Insurance Program (NFIP) criteria.	The floodplain administrator has the authority for issuing/denying floodplain development building permits, inspecting properties for floodplain compliance, assisting in the preparation of floodplain maps, and helping residents to obtain information on flood hazards, flood map data, and proper construction measures. After a flood, the administrator determines what damage has occurred.
Advance Warning System	DOB	Provide advanced warning of wind and other weather hazards to registered construction superintendents, site safety managers, and the media.	This system allows construction sites to take mitigating steps prior to the onset of hazardous weather.
Storm Drainage Systems Maintenance Program – City Park Drainage Maintenance	Parks	The Central Technical Services Division and Borough Shops maintain catch basins and storm drains in all the city parks.	Catch basin and drain maintenance reduces flooding.
Stream Maintenance Program – Bronx River Natural Resources Group	Parks	The Natural Resources Group, in conjunction with the Bronx River Alliance, an associated non-profit, maintains and cleans rivers, other wetlands, and riparian areas in the city.	Wetlands absorb runoff and prevent flooding and damage to the built environment.
Vegetation Maintenance Program – Tree Pruning Program	Parks	The Central Forestry division oversees the block pruning and commitment-pruning program. Block pruning is done by contractors on a 7- to 8-year schedule and involves pruning of all street trees on a block. Commitment pruning addresses emergency issues, such as tree limbs obscuring traffic signals. Parks also performs in-park pruning of trees.	Pruning maintains tree health and reduces damage during extreme weather events by removing weak limbs.
Storm Drainage Systems Maintenance Program – Sanitary, Storm, and Combined Sewer Maintenance and Programmatic Catch Basin Inspection and Cleaning	DEP	DEP's Bureau of Water & Sewer Operations is responsible for the maintenance of sanitary, storm, and combined sewers. DEP inspects and cleans the city's 140,000 catch basins on a three-year cycle. The agency makes repairs to the sewer system as needed.	Programmatic sewer and catch basin maintenance increases system capacity and reliability and reduces the risk and extremity of street flooding.

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Capability Type: Administration/Staff/Technical	Agency	Description	How does this capability address mitigation and risk assessment? (New requirement 2014 Plan)
Stream Maintenance Program – <i>Watersheds Stream Maintenance</i>	DEP	DEP rehabilitates and stabilizes stream banks to mitigate turbidity as part of its filtration avoidance determination obligations in New York City watershed areas.	Reduces impacts of extreme weather and flooding on water quality in City reservoirs.
CBIDAS/Risk Based Inspection System (RBIS)	FDNY	The Coordinated Building Inspection and Data Analysis System (CBIDAS) is a state-of-the-art risk-based inspection system for collecting and sharing data in real time to prevent fires and protect firefighters. The FDNY's new Analytics Unit is working towards incorporating 13 different factors that will actively play in determining risk.	RBIS' purpose is to gauge risk, and appropriately mitigate it, by priority ranking, increasing the likelihood firefighters will enter and inspect a building before a fire incident occurs there.
Urban Search and Rescue Teams	FDNY	FDNY's Urban Search and Rescue (USAR) Teams have extensive training and experience in structural collapses, confined spaces, and high-angle rescues.	Utilizing USAR teams in unique, challenging settings enables FDNY to guarantee a level of professionalism and a technically proficient force to meet the ever-changing disaster-like situations, intermittently present to NYC.
Identification of Alternate Work Sites	MTA	Identify and maintain availability of alternative work locations available immediately for executive decision-makers required to participate in executive activities during an emergency in case current locations are unavailable or at risk.	Ensures management can continue to function and lead during an emergency.
Advance Warning System	MTA	Monitors forecasts of wind speed to issue speed restrictions or ensure suspension of service prior to major wind impact (all elevated structures).	Protects rolling stock, customers, and employees from possible harm during a high-wind event.
Survey Property for Areas Subject to Flooding	MTA	Identify and develop plans to protect against flooding under various weather scenarios.	Identifies appropriate project locations to mitigate potential water intrusion projects.
Commissioner's Orders	DOHMH	Issues the Commissioner's orders related to the enforcement of the NYC Health Code.	This capability will help enforce health codes that protect the public health of New York City residents.

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Capability Type: Administration/Staff/Technical	Agency	Description	How does this capability address mitigation and risk assessment? (New requirement 2014 Plan)
BioWatch and Bio Threat Response Laboratory (BTRL) and Other Specimens Testing	DOHMH	The Public Health Laboratory analyzes collected samples from BioWatch and trains others to assist in surge sampling. The BTRL operates in the public interest by testing samples/specimens deemed to pose a significant biological hazard of morbidity and mortality.	This capability helps protect the public health of New York City residents.
Critical Complaint Response	DOHMH	Critical Complaints (those needing to be addressed within 24 hours) for Environmental Health (FSCS, Child Care, PCS/Vector/VPHS Lead, OEI, and PHE/RAD)	Critical Complaint Response allows for better response to public health-related hazards.
Public Beach Surveillance	DOHMH	Beach water surveillance (including specimen transport) and notification of public of results.	This capability helps protect the health of New York City residents.
Larval Adult Mosquito Surveillance and Control	DOHMH	Provides larval surveillance and larvicide application to potential breeding sites. Performs mosquito population and arborvirus surveillance. Applies adulticide if human health or the quality of life is impacted.	This capability helps protect New York City residents from mosquito-borne viruses.
Communicable Disease Surveillance and Investigation	DOHMH	Analyze electronic data from syndromic surveillance systems to detect citywide increases or clusters that may signify outbreak	Surveillance and Investigation helps detect disease outbreaks.
Life Safety Operations	NYPD	Life Safety and Site Security: Mobilized officers respond to an incident, secure devastated regions, and ensure the safety and wellness of citizens.	This capability aids response protocols.
Search and Rescue Operations	NYPD	Search and Rescue Operations: Conducted primarily by personnel assigned to the Special Operations Division, including Emergency Services, Harbor and Aviation personnel.	This capability aids response protocols.
Crime Suppression	NYPD	Crime Suppression: Ensure the safety and security of affected regions by suppressing opportunistic crimes.	This capability helps protect the safety of New York City residents.
Site Security and Force Protection	NYPD	Provides security and protection at important locations such as gas stations and critical infrastructure locations. Preserves evidence when necessary.	This capability helps protect the safety of New York City residents.

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Capability Type: Administration/Staff/Technical	Agency	Description	How does this capability address mitigation and risk assessment? (New requirement 2014 Plan)
Traffic Management	NYPD	Ensures the free flow of traffic to and from affected areas, assists stranded motorists when necessary, and performs escorts for critical relief supplies.	This capability assists in minimizing transportation disruptions caused by a disaster.
Personnel Management	NYPD	Deploys personnel resources based on operational needs. Includes extending tours and cancelling days off when necessary.	This capability aids response protocols.
Supply and Equipment Management	NYPD	Provides necessary supplies and equipment to affected areas to ensure personnel are able to perform their duties.	This capability aids response protocols.
NYC Brownfield Partnership	OER	Provides expert pro-bono environmental services through the NYC Brownfield Partnership.	This capability helps facilitate hazardous waste cleanup of contaminated properties.
Continuity of Operations (COOP):	OEM	Ensures City agencies can provide essential services to the public during emergencies, while maintaining internal critical functions. Agencies are developing plans that build contingencies around essential services, mitigate the impact of disruptions to services, and enhance the ability to provide CIMS operations, social services, and government operations.	The COOP planning process helps minimize disruptions and allows agencies to continue critical services after a disaster.

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Capability Type: Administration/Staff/Technical	Agency	Description	How does this capability address mitigation and risk assessment? (New requirement 2014 Plan)
Technical	OEM	Sahana is a database application that gives the City of New York the ability to manage the complex tasks needed to activate and operate the Coastal Storm Plan sheltering system or any other response operation that requires a large number of staff deployed, messaged (via phone, email, text) and tracked among facilities. The Sahana system can also track clients of a facility or group of facilities discretely using a check-in/check-out system. Pre-events scenarios are loaded into the deployment module of the system to facilitate immediate staff contact for deployment.	This capability aids response protocols for New York City's sheltering system pre-disaster.
Notify NYC	OEM	Notify NYC communicates localized emergency information quickly to city residents. This alert system includes the following types of notification types: emergency alerts, significant event notifications, public health notifications, public school closing/delay advisories, and unscheduled parking rules suspensions.	This tool supports preparedness for New York City residents.
Advance Warning System	OEM	The Special Needs Advance Warning System (AWS) is an all-hazards tool designed to push targeted information to individuals with special needs during hazardous weather, utility or transportation disruptions, public health emergencies, and incidents requiring evacuation. AWS is designed to alert individuals with special needs to these and other hazards that may affect their independence and their daily lives.	This tool supports preparedness, disaster response, and post-disaster recovery.

Table 10: Administrative and Technical Capabilities

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Capability Type: Financial	Agency	Description	How does this capability address mitigation and risk assessment? (New Requirement 2014 Plan)
Capital Improvement or Development Plan – <i>Parks Department Capital Improvement Plan</i>	Parks	The Capital Projects division is responsible for capital improvements and reconstruction of playgrounds, structures, and parkland. The division currently has over \$1 billion in active restoration contracts under way. The Operations division assists with drafting of maintenance and operational agreements for new park developments such as the Highline.	Capital architects and engineers and capital funds are available to assist with mitigation and design of mitigation.
Capital Improvement or Development Plan – <i>Drainage Plan for Areas Lacking Sewers</i>	DEP	The Bureau of Water and Sewer Operations (BWSO) develops drainage plans to provide adequate storm and sanitary infrastructure for areas of the City lacking a fully built-out sewer system. Build out is concentrated in populated areas lacking existing infrastructure and where improvements or a need is identified.	DEP's sewer construction program seeks to improve storm and wastewater drainage in areas lacking a fully built-out system or whose population and land use characteristics have changed significantly to warrant system reconstruction. Sewer upgrades may increase system capacity, alleviate flooding, and increase the reliability of the system.
Capital Improvement or Development Plan – <i>Trunk Water Main Master Plans</i>	DEP	BWSO creates plans for expansion and improvement of the water distribution system.	Provides adequate water supply and fire protection for existing and future development.
Capital Improvement or Development Plan – <i>Agency Capital Budget</i>	DEP	DEP's Capital Budget is used to achieve and maintain a state of good repair for the water and wastewater infrastructure as well as address increased regulatory requirements.	DEP's capital budget plans for future capital projects, including those cited here and in the Mitigation Actions worksheet.
Capital Improvement or Development Plan - <i>Green Infrastructure Grant Program</i>	DEP	DEP funds up to \$6 million in design and construction costs for green infrastructure projects that manage 1 inch of stormwater from the contributing impervious area on private property in combined sewer areas of New York City.	Green infrastructure projects capture rainwater that would otherwise enter the combined sewer system, reducing street flooding and CSO volumes in New York Harbor.

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Capability Type: Financial	Agency	Description	How does this capability address mitigation and risk assessment? (New Requirement 2014 Plan)
Capital Improvement Program – Sewer Construction	DEP	DEP maps and studies areas of New York City to create a comprehensive plan for sewer upgrades.	DEP's sewer construction program seeks to improve drainage and wastewater infrastructure in areas lacking a fully built-out system or whose population and land use characteristics have changed significantly to warrant system reconstruction. Sewer upgrades may increase system capacity, alleviate flooding, and increase the reliability of the system.
Water and sewer funds	DEP	DEP's water and wastewater operating budget and debt service are paid by the New York City Water Board with revenue collected per water and sewer rates.	Water and sewer funds represent the primary source of funding for DEP operations and capital improvements, including those cited here and in the Mitigation Actions worksheet.
PS/OTPS Budget	FDNY	City budget allocations for Personal Services and Other Than Personal Services, such as office materials and supplies.	This capability allows for basic agency services.
Capital Budget	FDNY	City budget allocations for capital expenses including physical plant and large vehicle acquisitions.	This capability allows for basic agency services.
Grant Funding	FDNY	City budget funds received via the competitive grant application process from federal and state governments and private and non-profit sources.	This capability allows for basic agency services.
Revenue	FDNY	City budget that includes income sources such as payments received from FDNY ambulance transports and FDNY permit and license fees.	This capability allows for basic agency services.
Capital Program	MTA	Identifies and prioritizes capital projects to be undertaken over a five-year period.	Insures mitigation projects are included in capital funding envelope.
Financial Assistance Search Tool (FAST)	OER	Helps the public find grants and other financial assistance for environmental investigation and cleanup in NYC.	This capability helps facilitate hazardous waste cleanup of contaminated properties.
Brownfield Incentive Grant (BIG) Program	OER	Provides financial assistance to property owners seeking to investigate and clean up contaminated properties, as well as to community groups for public outreach, planning, and technical assistance.	This financial tool helps mitigate the impact of hazardous waste release.

Table 11: Financial Capabilities

Capability: Education and Outreach	Agency	Description	How does this capability address mitigation and risk assessment? (New Requirement 2014 Plan)
Floodplain Maps/Flood Insurance Studies – <i>NFIP Compliance</i>	DOB	As part of the NFIP, New York City has adopted floodplain maps developed by FEMA.	Informs the public of floodplain requirements by communications and provides floodplain design training for design professionals.
Public Education/Awareness Programs – Recreation and Education Programming	Parks	The Recreation Division runs 34 recreation centers and provides extensive recreation and education programming. The Urban Park Rangers provide classroom and on-site environmental programming and operate 10 Nature Centers. The Operations division runs educational programs promoting the use of marinas and the waterfront. Parks is also associated with non-profit partners such as the City Parks Foundation and Historic House Trust. These partners augment the agency's educational and cultural offerings.	Increasing public awareness of risk factors related to climate changes increases social resilience.
Anticipate Future Vulnerabilities and Needs – <i>DEP Long-term and Strategic Planning</i>	DEP	Assess and communicates DEP's long-term and strategic goals, vulnerabilities, and opportunities for management of the water supply system for optimal dependability/reliability.	On a three-year cycle, DEP reassesses long-term and strategic goals, including hazard mitigation, resilience, regulatory reform, and dependability.
Hazard Awareness Program – Annual Right to Know and Hazardous Communication	DEP	DEP conducts annual Right to Know and Hazard Awareness Communications with its employees and submits SARA III reports that inform the public of any hazardous and toxic chemicals at DEP facilities.	Reduces risk and mitigates impacts of hazardous materials release at DEP facilities.
Public Outreach - <i>Right-To-Know Outreach</i>	DEP	Provides recommendations (via palm card and email blast) to private and public facilities to address chemical safety and spill prevention during flood events.	Educates facilities about proper hazardous materials management handling procedures during flood events to reduce the risk of hazardous materials release.

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Capability: Education and Outreach	Agency	Description	How does this capability address mitigation and risk assessment? (New Requirement 2014 Plan)
Public Outreach - <i>Bureau of Public Affairs</i>	DEP	DEP's Bureau of Public Affairs is responsible for the agency's communications with the public, public officials, and members of the media. Public Affairs staff distributes valuable information about readiness, hazard mitigation, and response through in-person outreach, mailings, press releases, and events.	Educates the community about proper preparation for and response to hazards including flooding, drought, coastal storms, extreme weather, air contamination, and hazardous materials release.
Fire Safety Education	FDNY	Meets the fundamental mission of protecting the lives and property of New York City residents and visitors through fire safety education programs held and offered throughout the city. The Fire Safety Education Unit's strategy to reduce fire deaths and injuries is to focus on prevention by identifying and rectifying unsafe behaviors.	Through the outreach programs the Fire Safety Education unit manages, it is able to address fire safety issues and concerns throughout the city, directly impacting and affecting members focus and awareness on relevant fire safety issues.
CPR Training	FDNY	Equips New Yorkers with the skill to act in the event of cardiac arrest by offering free instruction across the five boroughs. The program, taught by certified FDNY EMS personnel, has successfully trained over 50,000 New Yorkers in CPR.	Community CPR training guarantees public awareness of CPR and moves to increase the survival rate dramatically of those who experience cardiac arrest.
Fire Code Outreach	FDNY	Contemporaneous with, and as part of the latest Fire Code revision process, the FDNY is hosting information sessions for all affected industries.	By addressing industries impacted by Fire Code revisions, the FDNY is able to provide justification and ensure understanding across the board for changes, ensuring compliance that ultimately protects lives and property.
Rebuild by Design Roundtables	RPA	RPA is partnering with MAS and VAI in Phase III of Rebuild by Design, a competition launched by the President's Hurricane Sandy Task Force to identify and implement locally appropriate but regionally scalable design solutions to the region's resilience challenges. This effort will involve knowledge building and knowledge-sharing, a broad public engagement campaign, and convening stakeholders on key resiliency, rebuilding, and disaster preparedness issues.	This capability promotes capacity building, education, and public outreach.

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Capability: Education and Outreach	Agency	Description	How does this capability address mitigation and risk assessment? (New Requirement 2014 Plan)
Outreach to all employees about personal planning for a possible hurricane.	MTA	All employees receive a communication early in hurricane season advising them to develop a hurricane plan with their families. It includes information on how to do this and what should be included.	Most MTA employees will be expected to work before, during, and/or after the storm; this program ensures they are aware of the need to work out a plan in advance so their families will be safe while they are at work.
Translation and Interpretation	DOHMH	Makes critical health information available to non-English-speaking (or less English-proficient) New Yorkers through translation and interpretation	Prevents the spread of infectious diseases through education and outreach to vulnerable populations
Community and Government Relations	DOHMH	Assists elected officials in responding to constituent issues/ concerns and maintains communications with key external stakeholders during critical public health events.	This capability promotes education and public outreach on public health matters.
Health Information Campaigns	DOHMH	Raises the public's awareness of personal and community health topics and issues through leaflets, posters, bulletins, billboards, and electronic media.	This capability promotes education and public outreach on public health matters.
Messaging, Communication and News Media Relations	DOHMH	Communicates internally and externally via email messaging and DOHMH websites; disseminates accurate and timely health information to the public through mass media.	This capability promotes education and public outreach on public health matters.
Ready New York	OEM	The Ready New York campaign encourages New Yorkers to be ready for all types of emergencies, develop a disaster plan, and keep informed about the hazards that may impact New York City.	This program promotes preparedness for all hazards that may affect the city.
"Cleaning up New York City"	OER	Educates the public about environmental investigation, environmental cleanup, and community protection and engagement during the cleanup process.	This capability promotes education on the hazardous waste removal cleanup process.

Table 12: Education and Outreach Capabilities

6. Emergency Planning and Operations:

OEM has developed many plans and protocols that guide New York City's response to emergencies, from extreme weather to a power outage. These plans focus on the other three phases of a disaster: preparedness, response, and recovery. These phases complete the disaster cycle, with mitigation as the fourth phase.

An essential and important plan for New York City is the Coastal Storm Plan (CSP), which is a series of operational plans that detail the City's response to a coastal storm, but can be utilized to direct many all-hazard operations.

Coastal Storm Plan

In 2000, New York City first released its citywide plan for hurricanes. In 2006, the Coastal Storm Plan was updated to account for New York City's changing population and the lessons learned from Hurricane Katrina. The plan was re-designed to anticipate a Category 4 hurricane making landfall in Atlantic City, New Jersey—the worst-case scenario for a hurricane affecting New York City—and was activated for Hurricane Irene in 2011 and Hurricane Sandy in 2012. OEM continues to revise and improve the plan based on experience and new information.

The current CSP is New York City's blueprint for responding to coastal storms. It is flexible, readily tailored to the size and impact of any storm, and it is comprehensive. The plan is a series of plans, each focusing on a different component: storm tracking and notification, decision-making, special needs advance warning system, evacuation (including procedures used to evacuate at-risk populations such as homebound residents and residents of healthcare facilities), sheltering, commodity distribution, logistics, debris management, public information, recovery and restoration.

Evacuation Operations

The New York City Office of Emergency Management (OEM) has a robust evacuation plan within the CSP which coordinates New York City's many transportation agencies.

OEM has designated a series of coastal evacuation routes on major roadways throughout the Bronx, Brooklyn, Queens, and Staten Island. These routes are clearly signed to direct drivers out of evacuation zones and towards evacuation centers. The New York City Department of Transportation (DOT), in coordination with OEM, erects and maintains evacuation route signage. The New York City Police Department (NYPD) supports movement of traffic along these routes through designated traffic control post locations and pre-positioning of tow trucks to quickly clear obstructions.

OEM also works closely with the Metropolitan Transportation Authority (MTA) to plan for and implement enhanced subway and bus service during evacuations. These efforts are designed to increase capacity along routes serving evacuation zones and modify certain routes to improve

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subway and bus connections. In addition, MTA disseminates special messaging on buses and trains to direct people to evacuation centers.

OEM's Homebound Evacuation Operation addresses the evacuation of people with special needs who are not able to evacuate on their own. Working with New York City's 311 and 911 services, this effort categorizes people in need of assistance according to their level of mobility, and transportation is arranged through either MTA Paratransit or the New York City Fire Department in conjunction with the Department of Education's Office of Pupil Transportation.

One of the key components of the evacuation operation is planning for shutdown of transit service and transportation facilities, which must be completed in time for the onset of tropical-storm-force winds (39 mph), otherwise known as zero-hour. OEM works with the National Weather Service to establish the zero-hour and use it to plan for shutdowns. To allow sufficient time to secure equipment, MTA subway service must cease hours prior to zero-hour.

The Regional Bridge and Tunnel Closure Protocol provides a framework for coordinated closure of the New York area's bridges and tunnels. This is crucial for ensuring a status of the road network and preventing incidents of stranded motorists. The protocol was developed in partnership with the 13 major bridge, tunnel, highway, and law enforcement agencies in New York and New Jersey and establishes a common understanding of closure practices, wind-speed thresholds, and messaging.

Health and Medical

The healthcare facility evacuation operation is a critical sub-plan of the CSP because New York City has half of the healthcare facilities in New York State. In a worst-case scenario, up to 25 hospitals, 71 nursing homes, 39 adult care facilities, and 6 psychiatric hospitals—representing around 30,000 patients/residents—would be required to evacuate. A successful evacuation requires each facility to expend every effort and available resource. It also requires coordination and support between government agencies and partners.

In the Healthcare Facility Evacuation Plan, the goal is to begin the evacuation of healthcare facilities 72 hours before the onset of tropical-force winds and complete the operation within 48 hours. The evacuation is managed by the Healthcare Facility Evacuation Center (HEC), a tactical communications center that centralizes support for an ordered evacuation of healthcare facilities. Run by the New York State Department of Health with support from city, state, regional, and federal partners, the HEC supports evacuating healthcare facilities with information, resources, and troubleshooting. It finds beds for evacuating facilities when those facilities cannot locate beds through existing relationships, arranges transportation between facilities, provides guidance to receiving facilities on how to maximize their surge capacity, and troubleshoots evacuation issues.

Sheltering

The CSP includes a Shelter Plan, which was designed to activate and manage a safe, accessible, secure, staffed, and supplied emergency shelter system to give refuge from coastal storms to

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more than 700,000 New Yorkers and visitors who are unable to find alternative shelter outside storm surge areas. The more than 400 shelters, 64 evacuation centers, and eight special medical needs shelters are grouped into "solar systems" across the five boroughs, each consisting of one evacuation center and 5 to 10 hurricane shelters each. Each hurricane shelter is assigned to an evacuation center that acts as the hub of a solar system.

The New York City sheltering system is intended to be fully integrated and accommodating to the diversity of New Yorkers seeking sheltering during an emergency. To that end, OEM has developed a number of plans and procedures that provide people with disabilities the opportunity to meaningfully access the city's sheltering system. This inclusive approach dictates that the City's emergency plans and supporting materials do not segregate the needs of and responses to people with disabilities into any separate and discrete "special needs" plan. Rather, the plans, operational guides and manuals, and accompanying training all contain components that address functional needs that people with disabilities will likely encounter during an emergency.

Facilities:

Upon arriving at an evacuation center, individuals complete a triage form used to determine how to best assist any person in need of an accommodation. Hurricane shelters support the needs of the majority of people with disabilities. If the shelter does not provide the level of accessibility a person needs, the individual may choose to be transported to a shelter that provides more suitable support. Accessible transportation is provided to everyone who needs it.

The eight special medical needs shelters are intended to shelter individuals whose needs exceed the capabilities of hurricane shelters but who do not require hospitalization. All are wheelchair-accessible. The New York City Health and Hospitals Corporation is responsible for the medical operations within the special medical needs shelters.

All staff is required to make sure that people with disabilities are able to safely enter the special medical needs shelter and access its services. To confirm the accessibility of their facility, staff is required to complete an accessibility checklist before opening the facility and use it to continually check accessibility during each shift. The checklist also requires that any accessibility issues be immediately raised and addressed by the facility manager.

Signage indicating accessible areas of a shelter is provided to each facility, and specially designed signage encourages shelter residents to ask for any accommodation they may need. "Emergency communications boards" are also distributed to all the facilities in the shelter system. Containing pictures and symbols related to emergency situations and basic needs, these aids are used to help individuals who have difficulty communicating.

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Training:

OEM has created a number of training programs to address issues related to people with disabilities and people with special needs. A suite of online and in-classroom training courses is available to all CSP staff types. Supplemental training and instructional videos can be made available in the event of an actual incident. These training opportunities address issues related to working with and accommodating people with disabilities and include general and specific communication tips for people with a variety of disabilities.

Logistics:

Since Hurricane Sandy there has been a doubling of supplies at special medical needs shelters, including wheelchairs, special medical needs cots, crutches, airway kits, bandage compress kits, diabetic testing kits, electrolytes kits, spill kits, first aid kits, and sphygmometer kits. Items to accommodate people with disabilities at general shelters include durable medical equipment such as wheelchairs and raised toilet seats with grab bars.

Emergency Communication:

New York City uses the Advance Warning System (AWS), a communication tool that sends emergency messages to agencies providing services to people with disabilities, seniors, and people with health vulnerabilities. The agencies then convey the information to their clients and contracted agencies. Through the AWS, emergency information is provided to individuals specific to their needs through trusted, pre-existing relationships. Often, the contact agency will play a role in an individual's emergency plan, providing an essential service that supports continued independence in the community.

Although the AWS is extensive, some individuals who live independently in the community and are not affiliated with a service provider are encouraged to sign up for Notify NYC to receive specialized emergency alerts and updates. Notify NYC messages can be received via text message, phone call, Twitter, Facebook, nyc.gov, and mayoral press releases.

Animal Sheltering:

The CSP provides for the co-location of companion and service animals (for example, guide dogs) with their owners in all hurricane shelters. Therefore, individuals with pets who do not have any other shelter options are allowed to bring their pets with them to hurricane shelters.

7. New York City Office of Emergency Management's Housing Recovery Projects related to Hazard Mitigation

OEM has mitigated the possible impacts of disaster on communities through two special efforts: the Urban Post-Disaster Housing Prototype Program and the Regional Catastrophic Preparedness Grant Program's Housing Recovery Program. OEM continues to build resiliency for New York City through these programs, and to leverage the capabilities developed through them to identify sites for temporary housing and develop a community-based site planning process that uses deployable housing to restore neighborhoods.

Because of New York City's high population density, lack of open space, and a mission to resettle as many residents as possible in their former neighborhoods, the Urban Post-Disaster Housing Prototype Program was born. The program will outline a new plan for interim housing that will provide more suitable living spaces for New Yorkers displaced by disaster than conventional interim housing solutions used in other parts of the country. The cornerstone of the project is a three-story, three-unit housing prototype now being built in Brooklyn that will be in place for one year. The unit on the ground floor will serve as a gallery to provide public education about the project and raise awareness about resiliency. The second and third floor will be occupied by OEM staff and media representatives, where living conditions will be evaluated as part of a partnership with NYU-Poly Environmental Psychology Program.

Three projects were critical to the prototype's development and serve as resources for urban recovery. First, the 2008 "What If New York City..." design competition for urban post-disaster housing gathered ideas from around the world. Then the Urban Interim Housing Unit Specification used the best ideas from the competition, along with information from the modular building industry, to create a universal performance specification with stringent requirements for safety, environmental quality, durability, and universal design that any municipality can use to procure housing at massive speed and scale. Finally, the Playbook for Urban Neighborhood Design addresses how to use rapidly deployable housing to reconstruct neighborhoods and keep people close to home.

As of fall 2013, OEM has created a portfolio of housing recovery resources that identify policies and prevention strategies that support community resiliency building and educate the public on housing recovery. These include the Disaster Housing Recovery Plan; the Community Recovery Playbook: A Guide to Using Community Development Block Grants for Disaster Recovery; the Housing Recovery Center Plan; the Design Center Guidance document; and the Participatory Urban Planning Toolkit. All these resources focus on the planning, response, and recovery needs specific to urban areas, and were developed with a planning team of over 200 representatives from local, state, and federal government offices; community-based organizations; and the private sector. While these resources focus on the greater New York

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metropolitan area, they are applicable to any jurisdiction in the country. The resources focus on strengthening economic and community recovery as well as restoring housing after disaster.

The Disaster Housing Recovery Plan provides guidance for the implementation of interim housing and the restoration of permanent housing following a catastrophic event. The Plan breaks the work of housing recovery into manageable pieces by creating interagency task forces that bring together the right people from local, state, and federal agencies, as well as non-profit organizations and the private sector, to address problems efficiently.

After a catastrophic event, the greatest amount of relief and recovery funding will come through the U.S. Department of Housing and Urban Development's Disaster Community Development Block Grants for Disaster Recovery (CDBG-DR). The Community Recovery Playbook is an easy-to-use resource that helps federal, state, and local emergency management professionals, non-governmental organizations, and businesses involved in post-disaster housing and community recovery collaborate to implement block grant-eligible programs.

The Housing Recovery Center Plan describes how to plan, manage and operate one-stop-shop assistance centers for people who need housing assistance after a catastrophic event. As repair and rebuilding are a key part of recovery, the Design Center Guidance document was created to help develop special centers for design and construction services that are resources for homeowners and also support community-based resiliency projects.

Engaging the whole community is the most effective route to recovery, and the Participatory Urban Planning (PUP) Toolkit for post-disaster land use planning promotes effective coordination between the government, community-based organizations and the public at large. In 2013-2014, PUP will be used throughout the region to form partnerships between government emergency response agencies and local housing advocates. In collaborative exercises, local representatives working with government agencies will identify potential sites for temporary housing in their communities.

Through these tools, New York City has developed many capabilities to respond to and prepare for disaster.

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