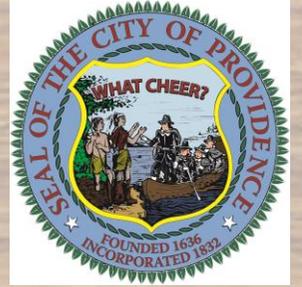




# City of Providence Hazard Mitigation Plan 2019 Update



**Public Workshop March 20, 2019 6:00 pm**

Providence Emergency Management Agency  
591 Charles Street—Conference Room  
Providence, RI 02904

Craig Pereira, CFM, Senior Planner  
Horsley Witten Group, Inc.



# Progress to Date...

Working with the LHMC, the Project Team has completed the following:

- Updated Risk Assessment
- Conducted Vulnerability Analyses
  - FEMA 100 yr/500 yr Flood Zones
  - Mean Higher High Water
  - Mean Higher High Water plus 1 foot Sea Level Rise
  - Mean Higher High Water plus 7 feet Sea Level Rise
  - Sea, Lake and Overland Surge (Category 1, 2, 3, and 4 Hurricanes)
- Completed Capability Assessment

# Progress to Date...

Working with the LHMC, the Project Team has completed the following:

- Conducted Research (plans, studies, reports)
- Conducted Municipal/Stakeholder Interviews
- Developed draft Mitigation Actions for consideration
  - Confirmed actions with responsible lead (s)
- Conducted Public Outreach
  - Project Webpage
  - Online Survey Map
  - Online Community Survey

# Progress to Date...

Working with the LHMC, the Project Team has completed the following:

- Conducted Public Outreach
  - PEMA/City/Project Team Meetings
    - April 6, 2018
    - August 9, 2018
    - September 14, 2018
    - February 19, 2019
  - LHMC Meetings
    - May 25, 2018
    - July 13, 2018
    - October 26, 2018
    - March 1, 2019
  - Public Workshops
    - July 25, 2018
    - November 16, 2018

# Mitigation Action Plan

The LHMC determined that the identified objectives could be met by considering actions aligned to the following Mitigation Categories:

- Public Education and Awareness
- Property Protection
- Natural Resource Protection
- Structural Projects
- Emergency Services
- Planning and Prevention

# Mitigation Action Plan

The time frames used for this strategy are as follows:

- Short Term = 0 to <6 Months
- Medium Term = >6 to 24 Months
- Long Term = >24 Months

# Mitigation Action Plan

The cost ranges used for this strategy are as follows:

- Staff Time – Municipal staff time
- Minimal – less than \$5,000
- Moderate – more than \$5,000, but less than \$25,000
- Significant – over \$25,000

# Mitigation Action Plan

## STAPLEE Criteria

1. Social: Is the action compatible with present and future local community needs and values?
2. Technical: Is the action feasible with available local resources (or as supplement by outside resources as necessary)?
3. Administrative: Does the community have the administrative capacity to implement the action?
4. Political: Is there strong public support to implement and maintain the action?
5. Legal: Does the community have the legal authority to implement the action?
6. Economic: Is the action cost-effective?
7. Environmental: Does the action impact environmental resources, and is the impact positive, negative, or neutral?

# PUBLIC EDUCATION AND AWARENESS

## Action #1

Create a Stormwater Learning Center in Roger Williams Park.

### Staff/Agency/Organization Interviews

Partner with academic institutions, government agencies, and nonprofits to create a living laboratory for green infrastructure. The primary functions are to 1) provide opportunities for learning best practices for project design, construction and maintenance, 2) scientific research and analysis to measure water quality impacts of stormwater management practices, and 3) training, outreach and education to build the community of practice and foster broad public engagement in sustainable environmental practices.

- Action Type: Planning, Pre-Disaster
- Priority Score: 23
- Lead: Office of Sustainability
- Supporting: Community institutions/agencies/non-profits
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: City budget
- Cost Estimate: Staff time
- Benefit: Institutional awareness of hazards, impacts on stormwater system and water quality
- Vulnerable Area: A-V Zone properties, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# PUBLIC EDUCATION AND AWARENESS

## Action #2

Implement Mitigation Education and Incentive Program.

*Rhode Island 2018 State Hazard Mitigation Plan*

The Inspection and Standards Department will provide information to contractors and homeowners on risks of building in hazard-prone areas and inform builders and homeowners of the benefits of building and renovating structures to current standards. The City will use FEMA's *Home Builder's Guide to Coastal Construction* (Publication #499), FEMA's *Coastal Construction Manual*, (Publication #55CD Third Edition), *No Adverse Impact (NAI) Coastal Land Management Guidelines* developed by the Association of State Floodplain Managers, *R.I. Coastal Properties Guide*, and other FEMA publications, as applicable.

Consider developing public/private partnership incentives to implement mitigation measures in coordination with local, state, and federal funding opportunities. Incentives could include tax incentives, cost-sharing, and regulatory streamlining or acceleration of the permit process for those who implement mitigation activities.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Inspection and Standards Department
- Supporting: Department of Planning and Development
- Time Frame: 0 – 6 months (Short-term)
- Financing Options: City budget
- Cost Estimate: Staff Time
- Benefit: Institutional awareness of hazards for contractors/homeowners, increased property protection/improved resiliency
- Vulnerable Area: A-V Zone properties, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# PUBLIC EDUCATION AND AWARENESS

## Action #3

Identify municipal personnel to become a Certified Floodplain Manager.

**LHMC**

Personnel from the Inspection and Standards Department should become a Certified Floodplain Manager (CFM) through the Association of State Floodplain Managers and serve as the City's Floodplain Coordinator. In addition to providing floodplain coordination information to the public, a CFM can assist with floodplain mapping, elevation certificates and floodplain mitigation alternatives.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Inspection and Standards Department
- Supporting: Department of Planning and Development
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: City budget
- Cost Estimate: Staff time
- Benefit: Institutional awareness of hazards for contractors/homeowners, increased property protection/improved resiliency
- Vulnerable Area: A-V Zone properties, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# PUBLIC EDUCATION AND AWARENESS

## **Action #4**

Implement a public outreach campaign to inform citizens about evacuation routes and which bridges and roads are subject to periodic flooding.  
*Rhode Island 2018 State Hazard Mitigation Plan*

Steps should be taken to inform residents about which bridges and roads are subject to flooding, as well as about indicators to begin evacuation. Principles of the Emergency Response Plan that are pertinent to given neighborhoods or the population in general should be summarized and distributed. Hazardous locations and warning signs, along with critical phone numbers and evacuation routes, could be conveyed on a calendar, a refrigerator magnet, or some other item commonly displayed in households. Outreach to residents could also be in the form of an annual mailing prior to hurricane season to give information on property protection and preparedness. Public service messages in the newspaper, on the radio, or during public forums may be alternatives.

- Action Type: Planning, Pre-Disaster
- Priority Score: 22
- Lead: PEMA
- Supporting: DPW/RIDOT
- Time Frame: 0 – 6 months (Short-term)
- Financing Options: City budget
- Cost Estimate: Staff Time
- Benefit: Protection of life, institutional awareness of hazards, accelerated evacuation
- Vulnerable Area: A-V Zone properties, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# PUBLIC EDUCATION AND AWARENESS

## Action #5

Strengthen storm resilience at the port through strategic partnerships and planning.

*City of Providence Harbor Management Plan*

*Resilient Rhody*

Shipping lines will turn to ports that rapidly resume normal operations after hurricanes. The City of Providence should approach storm resilience and climate change as a business opportunity through inclusion of resilience planning such as, developing pre-contracts for debris removal after an event, or businesses could implement data backup mechanisms to help the port resume operations more quickly after an event. Encourage the establishment of a new collaborative partnership between the state and port community to better understand the economic implications of severe weather events and benefits of resiliency planning.

Prior to the start of hurricane season (June 1<sup>st</sup>), PEMA will:

- Develop and implement an annual Disaster Mitigation Workshop for businesses, industries, and shoreline users
  - Develop and implement an education/training program for harbor and shorefront users that includes the distribution of the Harbor Hazard Mitigation Plan and a storm readiness checklist for boaters
  - Update accurate lists of principal marine interests and pumpout facilities including marinas, waterfront businesses, neighboring Harbormasters, Coast Guard, Towing and Salvage Companies, Environmental teams, Key vessel operators, and fishing cooperatives
- Action Type: Planning, Pre/Post-Disaster
  - Priority Score: 20
  - Lead: Harbor Management Commission/Office of Strategic Partnerships and Economic Advancement
  - Supporting: RIEMA/Department of Planning and Development
  - Time Frame: 6 – 24 months (Medium- term)
  - Financing Options: City budget
  - Cost Estimate: Staff time and materials cost
  - Benefit: Reduced losses/damages, improved resiliency, accelerated recovery
  - Vulnerable Area: A-V Zone properties, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# PUBLIC EDUCATION AND AWARENESS

## Action #6

Develop and implement a public outreach program to notify property owners in A- and V-zones of the requirements to comply with new floodplain standards.

*Strategy for Reducing Risks from Natural & Human-Caused Hazards in Providence, Rhode Island: A Multi-Hazard Mitigation Plan 2013*

The Inspection and Standards Department enforces compliance of building permits with floodplain standards. A public outreach program would inform residents/contractors in in the application process.

- Action Type: Planning, Pre-Disaster
- Priority Score: 23 (2013 Score: High)
- Lead: Inspection and Standards
- Supporting: Department of Planning and Development
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: FEMA Flood Mitigation Assistance Program
- Cost Estimate: Staff time and materials cost
- Benefit: Reduced damage, improved resiliency
- Vulnerable Area: A-V Zone properties

# PUBLIC EDUCATION AND AWARENESS

## Action #7

Conduct periodic review on the feasibility of enrolling in the NFIP's Community Rating System (CRS) as a means to soften the likely increase in many flood insurance policy rates resulting from new reforms to the NFIP.

*Rhode Island 2018 State Hazard Mitigation Plan*

*Strategy for Reducing Risks from Natural & Human-Caused Hazards in Providence, Rhode Island: A Multi-Hazard Mitigation Plan 2013*

CRS is a voluntary program that recognizes and encourages a community's efforts that exceed the NFIP minimum requirements for floodplain management. The CRS program emphasizes three goals:

- the reduction of flood losses
  - facilitating accurate insurance rating
  - promoting the awareness of flood insurance
- 
- Action Type: Planning, Pre/Post-Disaster
  - Priority Score: 25 (2013 Score: Medium)
  - Lead: Inspection and Standards/Department of Planning and Development
  - Supporting: RIEMA
  - Time Frame: >24 months (Long-term)
  - Financing Options: FEMA Flood Mitigation Assistance Program
  - Cost Estimate: Staff time
  - Benefit: Reduced flood insurance policy premiums
  - Vulnerable Area: A-V Zone properties, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# PLANNING AND PREVENTION

## Action #8

Conduct a full-scale exercise to test RI's Medical Emergency Distribution System (MEDS) and its ability to rapidly dispense medical countermeasures to the general public at PODs and to predefined populations in hospitals and nursing homes within the City of Providence.

*Rhode Island 2018 State Hazard Mitigation Plan*

MEDS is intended to mitigate the spread of morbidity and mortality during public health emergencies (such as large-scale disease outbreak or bioterrorism attack) through the timely provision of countermeasures.

The City of Providence should:

- Prepare to receive and dispense medical countermeasures to their entire population within 48 hours of the decision to do so as part of the federal Cities Readiness Initiative
  - Conduct annual exercises of POD
  - Utilize POD for: Flu vaccine, water distribution during hurricanes, and Tdap/Seasonal flu vaccinations
  - Train staff, volunteers, and medical professionals
- 
- Action Type: Planning, Pre/Post-Disaster
  - Priority Score: 28
  - Lead: PEMA
  - Supporting: RIDOH/Healthcare Coalition of RI
  - Time Frame: 6 – 24 months (Medium-term)
  - Financing Options: RIDOH MEDS Budget, FEMA HMA/EMPG
  - Cost Estimate: RIDOH MEDS budget/PEMA Staff time
  - Benefit: Protection of life
  - Vulnerable Area: City of Providence

# PLANNING AND PREVENTION

## Action #9

Develop a climate resilience checklist for new construction and large renovations.

LHMC

Boston, MA (<https://www.boston.gov/departments/public-works/climate-resilient-design-standards-and-guidelines>)

Checklist to dictate the design of all new construction and major rehabilitation projects to be evaluated based on climate change variables, including temperature, precipitation, and sea level rise. This checklist will inform future policy decisions, as well as help guide developers to consider long-term climate impacts.

Action Type: Planning, Pre-Disaster

Priority Score: 28

Lead: Office of Sustainability, Department of Planning and Development

Supporting: Inspection and Standards

Time Frame: 6 – 24 Months (Medium-term)

Financing Options: City budget

Cost Estimate: Staff time

Benefit: Protection of life/property, reduced losses/damages, improved resiliency,

Vulnerable Area: City of Providence

# PLANNING AND PREVENTION

## Action #10

Develop a report to reflect the long-term monitoring of climate change projections for Rhode Island/City of Providence that evaluates the efficacy of the hurricane barrier to protect the City of Providence.

*Analyzing Coastal Flood Protection Strategies for Providence, Rhode Island*

The City of Providence continues to investigate the impacts of climate change on the frequency of flood events within the city, more recently with a focus on the Fox Point Hurricane Barrier. A 2016 analysis quantitatively assessed risks and potential economic losses due to sea level rise, as well as informing the timing of decisions for future climate resilience investments. The primary concern is whether the hurricane barrier will continue to protect against future storm surge due to sensitivity of the sea level rise projection used in the long-term. Results of this analysis indicate if a low-probability, high sea level rise projection is used, then the optimal strategy is to build a new, taller barrier by the end of the century. However, under the highest-probability, lower sea level rise projections, the existing barrier is expected to be cost effective in protecting the city from storm surge well into the 22<sup>nd</sup> century (assuming it can be maintained past its design lifetime).

A 2016 analysis determined the most cost-effective approach to address tidal flooding is to raise the threshold at which the hurricane barrier is shut and prepare the waterfront to be periodically flooded, rather than invest in infrastructure to stop the infiltration of water. The construction of sea walls to prevent nuisance flooding was also an examined alternative of this analysis.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Office of Sustainability/Operations Department
- Supporting: Army Corps, PEMA, RIEMA, DPW, NBC, CRMC
- Time Frame: >24 months (Long-term)
- Financing Options: City budget
- Cost Estimate: Staff time
- Benefit: Protection of life/property, reduced damage, improved resiliency, accelerated recovery
- Vulnerable Area: A-V Zone properties, Hurricane Barrier, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# PLANNING AND PREVENTION

## Action #11

Promote resiliency, protection and improvement of water and air quality, compatible uses, port/community relations and economic vitality in the port area by encouraging port-area businesses to participate in certification programs such as Green Marine.

*City of Providence Harbor Management Plan*

Support development of green port initiatives designed to encourage port operators to adopt best practices in areas such as stormwater management, green infrastructure, renewable energy, energy conservation, air quality, habitat protection, living shorelines, public access, and future climate change considerations for operations and expansion plans. Enforce compliance with hazard mitigation and debris management regulations and work with the Harbormaster and others to manage the cleanup of large debris after storms, including derelict vessels, damaged and derelict piers, and downed tree limbs.

- Action Type: Planning, Pre/Post-Disaster
- Priority Score: 19
- Lead: Department of Planning and Development/office of Sustainability
- Supporting: EPA/RI DEM/Harbor Management Commission, Strategic Partnerships
- Time Frame: Medium-term
- Financing Options: City budget
- Cost Estimate: Staff time
- Benefit: Continuity of services, improved resiliency, accelerated recovery
- Vulnerable Area: Port area (industrial sites)

# PLANNING AND PREVENTION

## Action #12

Develop a stakeholder committee to execute Phase III of the Upper Narragansett Bay Regional Stormwater Management (UNBRSM) Initiative to develop a regional stormwater utility.

*Exploring Regional Solutions to Regional Problems Upper Narragansett Bay Regional Stormwater Utility Feasibility Study - Phase I Final Report  
Resilient Rhody  
City of Providence Harbor Management Plan*

A long term, sustainable solution to stormwater management is needed in the Upper Narragansett Bay region due to real, growing, shared and unresolved challenges in managing stormwater. City staff identified several concerns regarding limited public awareness about a stormwater utility within the city, including aging infrastructure, flooding problems (local streets), MS4 permit compliance, and water quality concerns. City staff also indicated a significant gap in funding for routine maintenance of the CSS and MS4 systems, as well as capital improvements to address water quality. A public education/awareness campaign perhaps hosted on the City's website could provide the information necessary for the City to make more informed decisions on the topic.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Office of Sustainability/Operations Department
- Supporting: Stakeholder Committee
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: City budget
- Cost Estimate: Significant
- Benefit: Public awareness regarding minimized flood losses/damages, improved water quality
- Vulnerable Area: A-V Zone properties

# PLANNING AND PREVENTION

## Action #13

Support green infrastructure techniques/applications to reduce flooding, ease the burden on traditional stormwater systems, and improve and protect water quality.

*Rhode Island 2018 State Hazard Mitigation Plan*

*Resilient Rhody*

*City of Providence Harbor Management Plan*

The City already encourages the use of green infrastructure techniques/applications in development/redevelopment proposals. This is a continuation of standard operating procedures to reduce flooding, minimize impacts on stormwater systems, and improve/protect water quality.

- Action Type: Planning, Pre-Disaster
- Priority Score: 26
- Lead: Department of Planning and Development, Office of Sustainability, DPW
- Supporting: RI Department of Environmental Management/RIDOT
- Time Frame: >24 months (Long-term)
- Financing Options: FEMA HMGP/PDM funds
- Cost Estimate: Significant
- Benefit: Reduced losses/damages and improved resiliency
- Vulnerable Area: A-V Zone properties

# PROPERTY PROTECTION

## Action #14

Identify new location for vital municipal documents.

*Strategy for Reducing Risks from Natural & Human-Caused Hazards in Providence, Rhode Island: A Multi-Hazard Mitigation Plan 2013*

For the most part, City Hall is protected from serious flooding by the Hurricane Barrier. In the unlikely event that the barrier should fail, the City's Department of Public Property must insure that vital documents are stored in upper stories or in flood-proof cabinets or located outside of a flood zone.

- Action Type: Planning, Pre-Disaster
- Priority Score: 27 (2013 Score: Low)
- Lead: Department of Public Property, City Archives, Public Records
- Supporting: Department of Planning and Development
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: City budget, FEMA, FMAP
- Cost Estimate: Significant
- Benefit: Minimized losses/damages, protection of vital documents
- Vulnerable Area: City Hall and Other Public Properties

# PROPERTY PROTECTION

## **Action #15**

*Retrofit older buildings to comply with current code requirements.*

*Strategy for Reducing Risks from Natural & Human-Caused Hazards in Providence, Rhode Island: A Multi-Hazard Mitigation Plan 2013*

Like City Hall, Downtown Providence is protected from serious flooding by the Hurricane Barrier. Moreover, most new buildings are earthquake resistant. Some buildings both in and out of downtown would require some retrofitting. Buildings constructed after the end of the World War II would have been designed according to then- accepted structural engineering practice, resembling current code requirements, to withstand hurricane force winds. Some pre-war buildings may not have utilized structural engineering criteria resembling current code requirements. Structural analysis should be provided by property owners to determine which buildings are structurally consistent with current code requirements and currently accepted engineering practice.

- Action Type: Planning, Pre-Disaster
- Priority Score: 21 (2013 Score: High)
- Lead: Department of Public Property
- Supporting: Inspection and Standards
- Time Frame: >24 months (Long-term)
- Financing Options: City budget/private funds
- Cost Estimate: Significant
- Benefit: Minimized damage, improved resiliency
- Vulnerable Area: Buildings with Archaic Structural Systems

# PROPERTY PROTECTION

## Action #16

Develop a dam safety notification system to coordinate the actions of officials at the federal, state, and local levels.

### *Resilient Rhody*

Establish a notification system for dam safety to coordinate the actions of officials at the federal, state, and local levels. The system should use the process developed by the National Weather Service for severe weather, including a dam advisory, a dam watch, and a dam warning.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: RI Department of Environmental Management
- Supporting: RIEMA
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: RIDEM
- Cost Estimate: Staff time
- Benefit: Minimized flood losses/damages
- Vulnerable Area: A-V Zone properties

# PROPERTY PROTECTION

## **Action #17**

Mitigate impacts of coastal and riverine flooding on stormwater infrastructure and its performance by conducting a risk assessment.

*Rhode Island 2018 State Hazard Mitigation Plan*

*Resilient Rhody*

Identify at-risk structures, then develop projects and/or policies to address risks and establish process for maintenance of stormwater ponds.

- Action Type: Planning, Pre-Disaster
- Priority Score: 18
- Lead: DPW/NBC
- Supporting: RI Department of Environmental Management
- Time Frame: >24 months (Long-term)
- Financing Options: Pre-Disaster Mitigation/Hazard Mitigation Grant Program funds
- Cost Estimate: Moderate
- Benefit: Reduced losses/damages, improved resiliency
- Vulnerable Area: A-V Zone properties

# NATURAL RESOURCE PROTECTION

## **Action #18**

Facilitate redundancy of supply across water supply districts throughout the state.

*Rhode Island 2018 State Hazard Mitigation Plan*

*Resilient Rhody*

Assist water suppliers in developing local Emergency Interconnection Programs. Emergency water system interconnections provide redundancy of supply and the ability to address water emergencies rapidly and efficiently across water supply districts particularly in small systems throughout the state.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: RI Water Resources Board
- Supporting: RI Department of Health
- Time Frame: >24 months (Long term)
- Financing Options: Drinking Water State Revolving Fund
- Cost Estimate: Staff time
- Benefit: Continuity of services
- Vulnerable Area: Public Buildings and Critical Infrastructure

# NATURAL RESOURCE PROTECTION

## Action #19

Ensure spillway management and coordination between water suppliers and downstream municipalities.

*Rhode Island 2018 State Hazard Mitigation Plan*

*Resilient Rhody*

Advance common goal setting and communication between water suppliers that manage reservoirs and downstream municipalities. Ensure downstream flood mitigation via proactive spillway management without adverse impacts on safe yield.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Providence Water Supply Board
- Supporting: RIDOH/RIEMA/NOAA/NWS
- Time Frame: 0 – 6 months (Short-term)
- Financing Options: Drinking Water State Revolving Fund
- Cost Estimate: Staff time
- Benefit: Reduced losses/damages, improved resiliency
- Vulnerable Area: Public Buildings and Critical Infrastructure

# NATURAL RESOURCE PROTECTION

## Action #20

Use Total Maximum Daily Loads (TMDLs), watershed plans and local land use analysis and planning to identify areas of existing impervious surface that can be removed/minimized.

### *Resilient Rhody*

There may be opportunities to include drainage and/or Low Impact Development techniques, such as infiltration strips and reduced pavement, in existing commercial and municipal parking lots that are being resurfaced. As the City continues to assess the feasibility of a Stormwater Management Utility District, provisions should be made to incorporate the development of 'criteria' relative to incentive credits for stormwater improvements across three typologies: retrofit of existing paved surfaces (reductions); new/expansion of parking for commercial sites; and, residential conversions. The City should also consult the Urban Forest Management Plan.

- Action Type: Mitigation, Pre-Disaster
- Priority Score: 28
- Lead: Department of Planning and Development
- Supporting: Office of Sustainability
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: City Budget, FEMA grants, private funds
- Cost Estimate: Staff time
- Benefit: Reduced flow/loading to the WWTF, increased infiltration onsite, increased property protection/resiliency
- Vulnerable Area: A-V Zone properties

# NATURAL RESOURCE PROTECTION

## Action #21

Develop erosion mitigation strategies for shoreline areas including India Point, Richmond Square, and the Seekonk River along River Drive, and promote living shorelines along currently hardened shoreline where appropriate and feasible.

*City of Providence Harbor Management Plan  
Resilient PVD Lab Report*

- Action Type: Mitigation, Pre-Disaster
- Priority Score: 25
- Lead: Parks Department, Department of Planning and Development, DPW
- Supporting: CRMC
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: City Budget, FEMA grants, private funds
- Cost Estimate: Moderate
- Benefit: Improved water quality, improved resilience
- Vulnerable Area: A-V Zone properties

# STRUCTURAL PROJECTS

## Action #22

Support implementation of Resilience Strategies for the NBC's Bucklin Point and Field's Point Wastewater Collection and Treatment Facility.

*Implications of Climate Change for RI Wastewater Collection and Treatment Infrastructure  
Resilient Rhody*

NBC is currently developing a climate resiliency plan to ensure the continuity of their operations based on sea level rise and climate change projections anticipated for Providence/Rhode Island.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: Narragansett Bay Commission
- Supporting: DPW, Office of Sustainability
- Time Frame: >24 months (Long-term)
- Financing Options: NBC
- Cost Estimate: Significant
- Benefit: Minimized flood losses/damages, continuity of operations, improved resiliency
- Vulnerable Area: NBC WWTF

# EMERGENCY SERVICES

## **Action #23**

*Develop partnerships with businesses to provide public/private collaboration for coordinated mitigation, preparedness, response and recovery (Business Continuity Plans).*

*Rhode Island 2018 State Hazard Mitigation Plan*

PEMA, in coordination with the RI Alliance for Business will develop strategies to help local businesses in flood prone areas recover from the effects of a natural disaster. These strategies will include organizing business owners for collective clean-up of their properties after a disaster and the creation of a list of businesses and the people connected with those businesses that are authorized to enter the businesses in the period immediately following a disaster. This list would be used by the Police Dept. in their role of guarding properties after a disaster. The Police Dept. will develop criteria for determining when safety considerations outweigh the rights of a given business owner to access their property.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: PEMA
- Supporting: RI Alliance for Business
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: Private businesses
- Cost Estimate: Staff time
- Benefit: Accelerated clean-up and recovery
- Vulnerable Area: A-V Zone properties, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# EMERGENCY SERVICES

## Action #24

Evaluate options to determine the best long-term solution to protect the City's Fire Station on Atwells Avenue from flooding.

*Strategy for Reducing Risks from Natural & Human-Caused Hazards in Providence, Rhode Island: A Multi-Hazard Mitigation Plan 2013*

The City's Fire Station on Atwells Avenue at Valley Street is in a floodplain and floods periodically.

- Action Type: Planning, Pre-Disaster
- Priority Score: 18 (2013 Score: High)
- Lead: Fire Department
- Supporting: PEMA
- Time Frame: 6 – 24 Months (Medium-term)
- Financing Options: City budget, FEMA grants, Army Corps, Bonds
- Cost Estimate: Staff time
- Benefit: Minimized flood losses/damages, continuity of operations
- Vulnerable Area: Public Buildings and Critical Infrastructure

# EMERGENCY SERVICES

## Action #25

Enhance the coordination and capabilities between the City and all wireless providers.

*Staff/Agency/Organization Interviews*

Wireless providers have capabilities during emergencies that could be coordinated with various municipal departments for enhanced emergency services and recovery citywide, including:

- Establish a virtual bridge with PEMA (Presence/communication line to EOC, Primary Point of Contact/direct line for more proactive coordination)
  - Provide priority access to emergency personnel
  - Share 24/7 monitoring of coverage/internal plans during emergencies
  - Consider linking network assets to shelters/gathering locations
  - Share deployable assets during emergencies such as mobile cell towers and generators
- 
- Action Type: Planning, Pre/Post-Disaster
  - Priority Score: 23
  - Lead: PEMA
  - Supporting: Wireless providers
  - Time Frame: 6 – 24 Months (Medium-term)
  - Financing Options: City/Wireless provider budgets
  - Cost Estimate: Staff time
  - Benefit: Expedited recovery, continuity of operations
  - Vulnerable Area: Public Buildings and Critical Infrastructure

# PLANNING AND PREVENTION

## Action #26

Work collaboratively with RIDOT to prioritize improvements for transportation assets evaluated under various sea level rise scenarios throughout the city.

*Technical Paper 167 – Vulnerability of Municipal Transportation Assets to Sea Level Rise and Storm Surge  
RIDOT Resiliency Pilot*

RIDOT has conducted several studies over the past few years evaluating impacts to transportation assets impacted by various sea level rise scenarios. Most recently, RIDOT adopted NOAA's 'High Model' sea level rise projection which anticipates an increase of 8.99 feet by 2100. The study is intended to be a resource for the state and affected communities to incorporate sea level rise data into informed decision-making regarding spending, planning, goal setting, communication and capacity building, and for additional analysis. This High Model should be the baseline for planning purposed regarding improvements to transportation assets throughout the city.

- Action Type: Planning, Pre-Disaster
- Priority Score: 26
- Lead: RIDOT
- Supporting: DPW/Department of Planning and Development
- Time Frame: >24 Months (Long-term)
- Financing Options: Transportation Improvement Program (TIP)
- Cost Estimate: Staff time
- Benefit: Minimized losses/damages disruption to transportation assets, improved resiliency
- Vulnerable Area: A-V Zone properties, Woonasquatucket River, WaterPlace Park to the Hurricane Barrier, Port of Providence

# PLANNING AND PREVENTION

## **Action #27**

Ensure agency and municipality data consistency.

*Rhode Island 2018 State Hazard Mitigation Plan*

Updating, coordinating, and standardizing foundational resilience data including GIS layers (e.g. STORMTOOLS, critical infrastructure, precipitation projections) and related metadata should be centralized. Hosting coordinated data will provide support for municipal/agency decision-making on infrastructure/public facility investments.

- Action Type: Planning, Pre/Post-Disaster
- Priority Score: 28
- Lead: GIS Department/Information Technology Department/PEMA
- Supporting: State Agencies
- Time Frame: 0 – 6 months (Short-term)
- Financing Options: City budget
- Cost Estimate: Staff time
- Benefit: Improved resiliency
- Vulnerable Area: Public Buildings and Critical Infrastructure

# PLANNING AND PREVENTION

## **Action #28**

*Develop and maintain a database of technological and human-related vulnerabilities.*

*Rhode Island 2018 State Hazard Mitigation Plan*

Work with the state to include how technological and human-related threats and hazards impact communities, in addition to documenting frequency and intensity of past threats and future probabilities.

- Action Type: Planning, Pre/Post-Disaster
- Priority Score: 28
- Lead: RIEMA
- Supporting: PEMA
- Time Frame: >24 months (Medium-term)
- Financing Options: RIEMA
- Cost Estimate: Staff time
- Benefit: Improved resiliency
- Vulnerable Area: Public Buildings and Critical Infrastructure

# PLANNING AND PREVENTION

## Action #29

Consider the acquisition of properties in the Special Flood Hazard and Repetitive Flood Loss Areas.

*Rhode Island 2018 State Hazard Mitigation Plan*

Providence now includes 24 (8 residential and 16 non-residential) repetitive flood loss properties, as well as properties subject to periodic flooding. The City will work with private property owners in these areas and FEMA to identify an acquisition project (s), obtain approval by the State and FEMA, and seek funding to purchase the property. By purchasing these residential properties, the City is utilizing an effective program designed to move people and property away from high-risk areas to reduce disaster losses. The buildings are either demolished or relocated, and the land is then restricted to open space, recreation, or wetlands in perpetuity.

- Action Type: Mitigation, Pre/Post-Disaster
- Priority Score: 16
- Lead: Operations/Law Department
- Supporting: Department of Planning and Development/RIEMA/FEMA
- Time Frame: >24 Months (Long -term)
- Financing Options: City Budget, State/FEMA/Open Space grants
- Cost Estimate: Significant
- Benefit: Reduced losses/damages, improved resiliency, also satisfies other community objectives of additional open space, parks/recreation sites and/or scenic areas
- Vulnerable Area: A – V Zone properties

# PLANNING AND PREVENTION

## Action #30

Work with the state to develop an education/outreach campaign for the public and private sector on ways to mitigate cyber threats affecting personal, private, municipal, and state agency security and other sensitive information.

*Rhode Island 2018 State Hazard Mitigation Plan*

*Providence Healthcare and Higher Education Cluster*

- Action Type: Planning, Pre-Disaster
- Priority Score: 23
- Lead: RIEMA
- Supporting: PEMA
- Time Frame: >24 Months (Long -term)
- Financing Options: City Budget
- Cost Estimate: Staff/Personnel time
- Benefit: Improved resiliency
- Vulnerable Area: Public Buildings and Critical Infrastructure

# PLANNING AND PREVENTION

## Action #31

Design and implement a comprehensive, targeted strategy addressing energy security vulnerabilities at the municipal and/or facility level, based on findings of the Energy Assurance Plan.

### *Resilient Rhody*

This strategy should address risks specific to discrete critical infrastructure assets, including hospitals, police and fire, water and wastewater infrastructure, nursing homes, shelters, fueling stations, and grocery stores. Smart energy security investments at these locations and energy resilience solutions could alleviate the impacts of power outages and fuel supply disruptions in energy emergencies (i.e. backup generation, fuel reserves, distributed generation, combined heat and power, energy storage, and microgrids).

- Action Type: Planning, Pre-Disaster
- Priority Score: 22
- Lead: Department of Planning and Development
- Supporting: Utility providers
- Time Frame: >24 Months (Long -term)
- Financing Options: City Budget, FEMA PDM/FMA/HMGP funds
- Cost Estimate: Staff time
- Benefit: Reduced disruption of services, improved resiliency
- Vulnerable Area: Public Buildings and Critical Infrastructure

# PLANNING AND PREVENTION

## Action #32

Update the Fox Point Hurricane Barrier Coordination Guidebook to include the Narragansett Bay Commission in the communication flow for operations.

### *Staff/Agency/Organization Interviews*

The NBC will be included in the communication protocol outlined in the Fox Point Hurricane Barrier Coordination Guidebook since the operation of the hurricane barrier can have a significant impact on the Fields Point Wastewater Treatment Facility and large portions of the sewerage collection system.

- Action Type: Planning, Pre-Disaster
- Priority Score: 28
- Lead: PEMA
- Supporting: NBC
- Time Frame: 0 – 6 months (Short-term)
- Financing Options: City/NBC budgets
- Cost Estimate: Staff time
- Benefit: Protection of property, improved resiliency
- Vulnerable Area: Public Buildings and Critical Infrastructure

# PLANNING AND PREVENTION

## **Action #33**

Host annual interactive workshop/tabletop exercise with key City officials, community members, and other stakeholders.

### *Staff/Agency/Organization Interviews*

This workshop/tabletop exercise is an evolution of the “Game of Floods” event hosted in 2018 in Providence with great success. It is an engaging way for decision-makers to understand long-term climate risks, conduct vulnerability assessments, prioritize assets, and mitigate impacts.

- Action Type: Planning, Pre-Disaster
- Priority Score: 22
- Lead: Office of Sustainability
- Supporting: Department of Planning and Development
- Time Frame: 6 – 24 months (Medium-term)
- Financing Options: City budget
- Cost Estimate: Staff time
- Benefit: Protection of property, improved resiliency
- Vulnerable Area: Public Buildings and Critical Infrastructure

# Update Process...next steps

- **Public Comment Period:** ends March 29, 2019
- **LHMC Review/Acceptance:** LHMC meeting March 29, 2019
- **Update Draft Plan based on feedback**
- **Complete ‘Local Mitigation Plan Review Tool’**
- **Submit Plan to RIEMA:** April 19, 2019

# Contact Us...

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Complete draft Plan available online at:  
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**Thank You!**