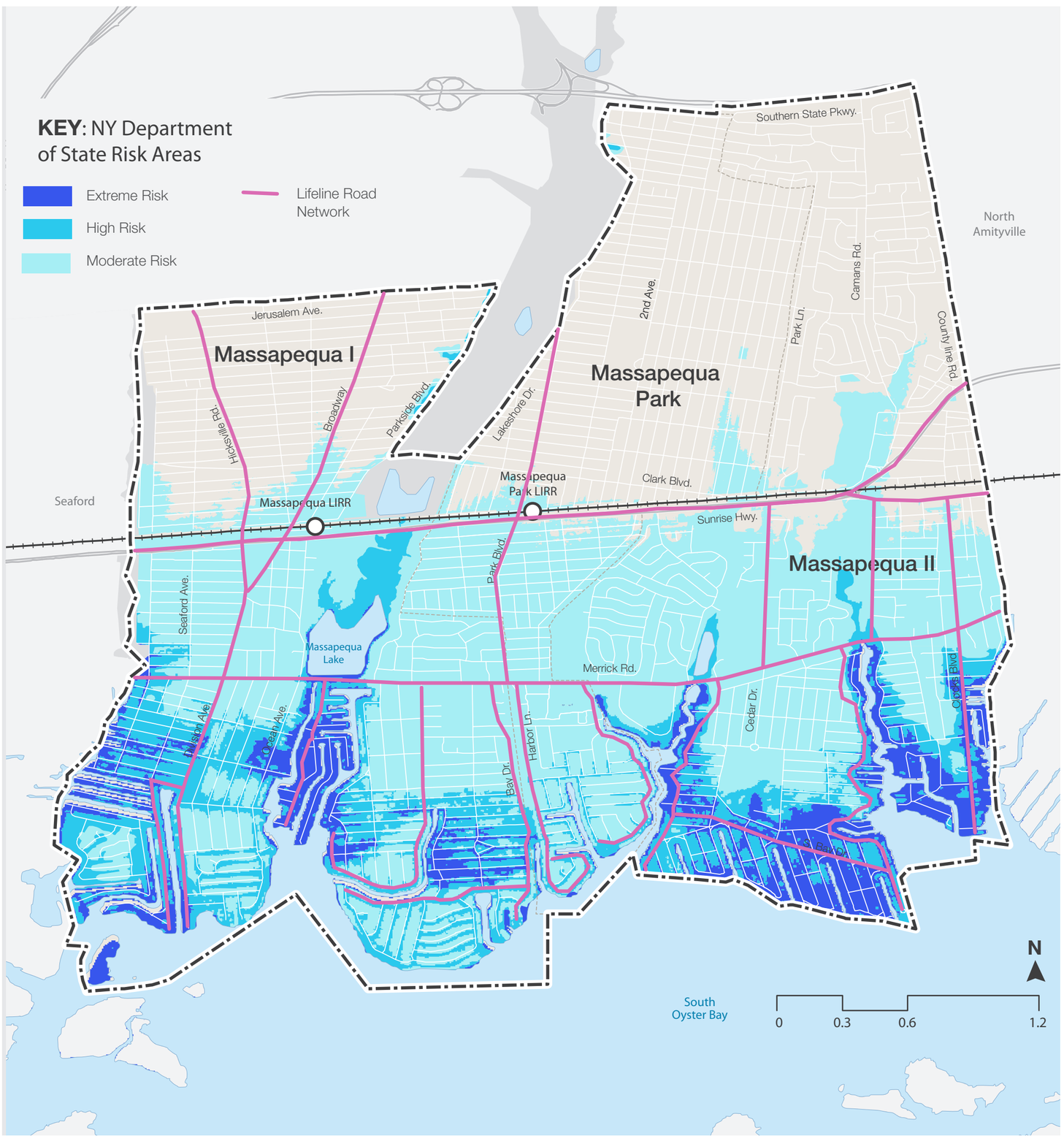
# P1 Lifeline Road Network Study

## Determine the critical access routes, or "lifeline roads," used within the community

**Cost Estimate: $35,000 for study**




## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Infrastructure
- Project Location/Municipality:
- Massapequas - Massapequa (I and II) and Village of Massapequa Park
- Primary Target Area Affected: 29 miles of roads (shown at left)
- Consistency with NYRCR: Address short, medium, and long term risks
- Potential Beneficiaries: Residents, businesses, and visitors - particularly those south of Merrick Road

## Project Information

The Lifeline Road Network, currently shown in draft form, would begin with a study to determine the critical access routes, or "lifeline roads," used within the community. The network would focus on life safety and redundancy measures along these streets in order to ensure evacuation and emergency service routes are maintained before, during, and after major storm events.

Once the Lifeline Network is confirmed, these roads would be targeted for these further projects:

**P2 Signage** - develop and install "Lifeline Network" signage

**P3 Streetlighting** - install solar powered lights and battery backup

**P4 Elevate Roadways** - raise key streets susceptible to tidal flooding or storm surge

In the long term, tree trimming programs and undergrounding of utilities may also occur along these roads.

RESPONSE TO STORM: During Superstorm Sandy, roadways flooded and were unlit during storm. Residents needed directions for safe/preferred routes for evacuation and reaching shelter. Downed trees blocked roadways and knocked over utility poles and wires.

Powerlines knocked over during Superstorm Sandy

Flooding on Merrick Road during Sandy

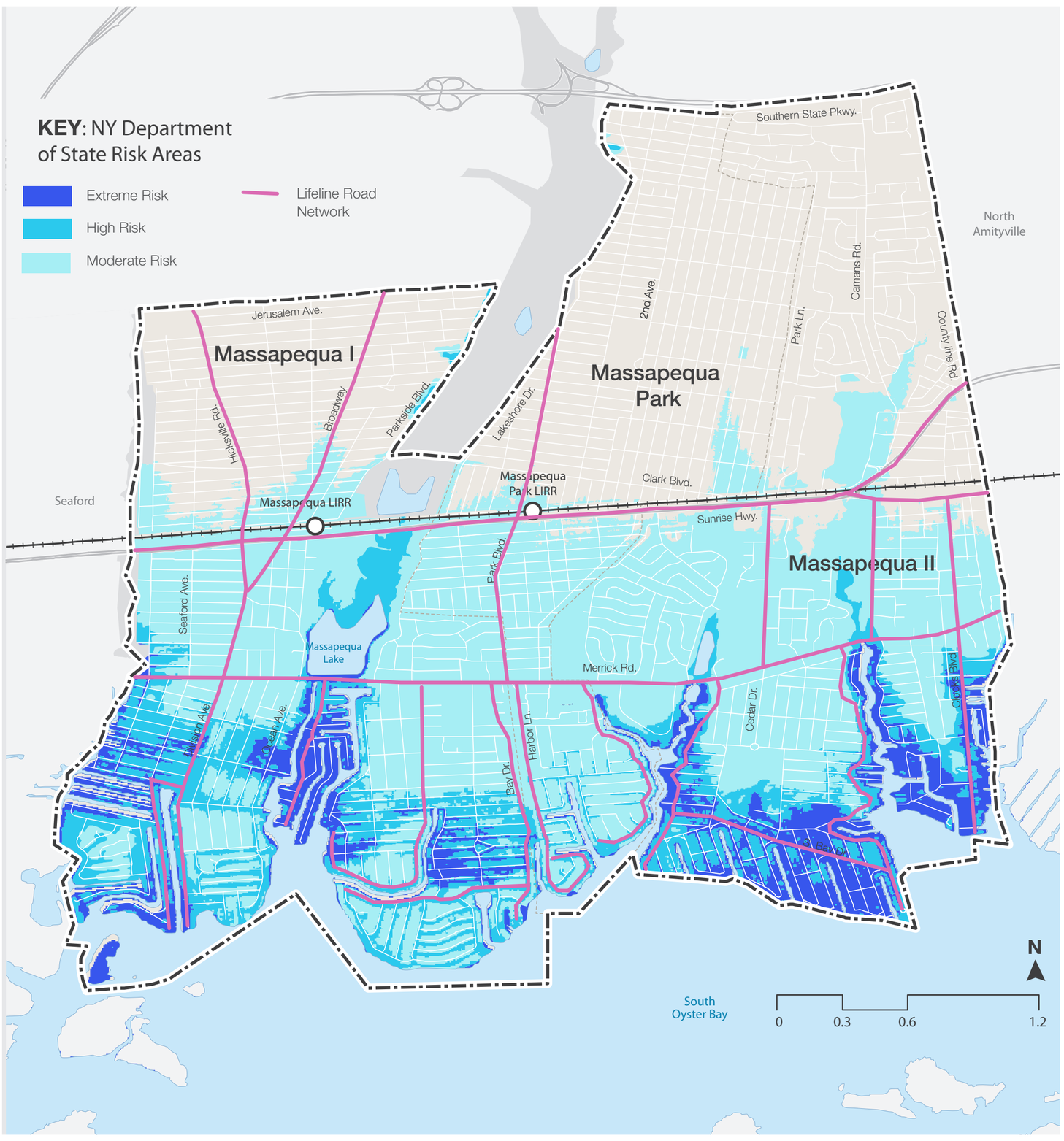
Images: www.ctpost.com and cbsnewyork.files.wordpress.com

# P2 Signage

## Lifeline Road Network

Develop and install local “Lifeline Network” signage

**Cost Estimate: $57,000**




## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Infrastructure
- Project Location/Municipality: Massapequas - Massapequa (I and II) and Village of Massapequa Park
- Primary Target Area Affected: 29 miles of roads (shown at left)
- Consistency with NYRCR: Address short, medium, and long term risks
- Potential Beneficiaries: Residents, businesses, and visitors - particularly those south of Merrick Road

## Project Information

The Lifeline Road Network, would be signed to help residents determine the best local route to take out of the flood risk zone. This system would work in conjunction with existing designated evacuation routes like State Route 135 that are already equipped with signs.

After developing and installing ‘Lifeline Network’ signage, additional signage should direct residents to information or meet-up centers, community centers, and other centralized public locations with back-up power.

The cost of this project is based on the anticipated development, purchase and installation of signage.

RESPONSE TO STORM: During Superstorm Sandy, residents needed directions for safe and preferred routes for evacuation and reaching shelter.

Sample signage from Palm Beach, Florida

Signage in Tampa, Florida for storm event transport

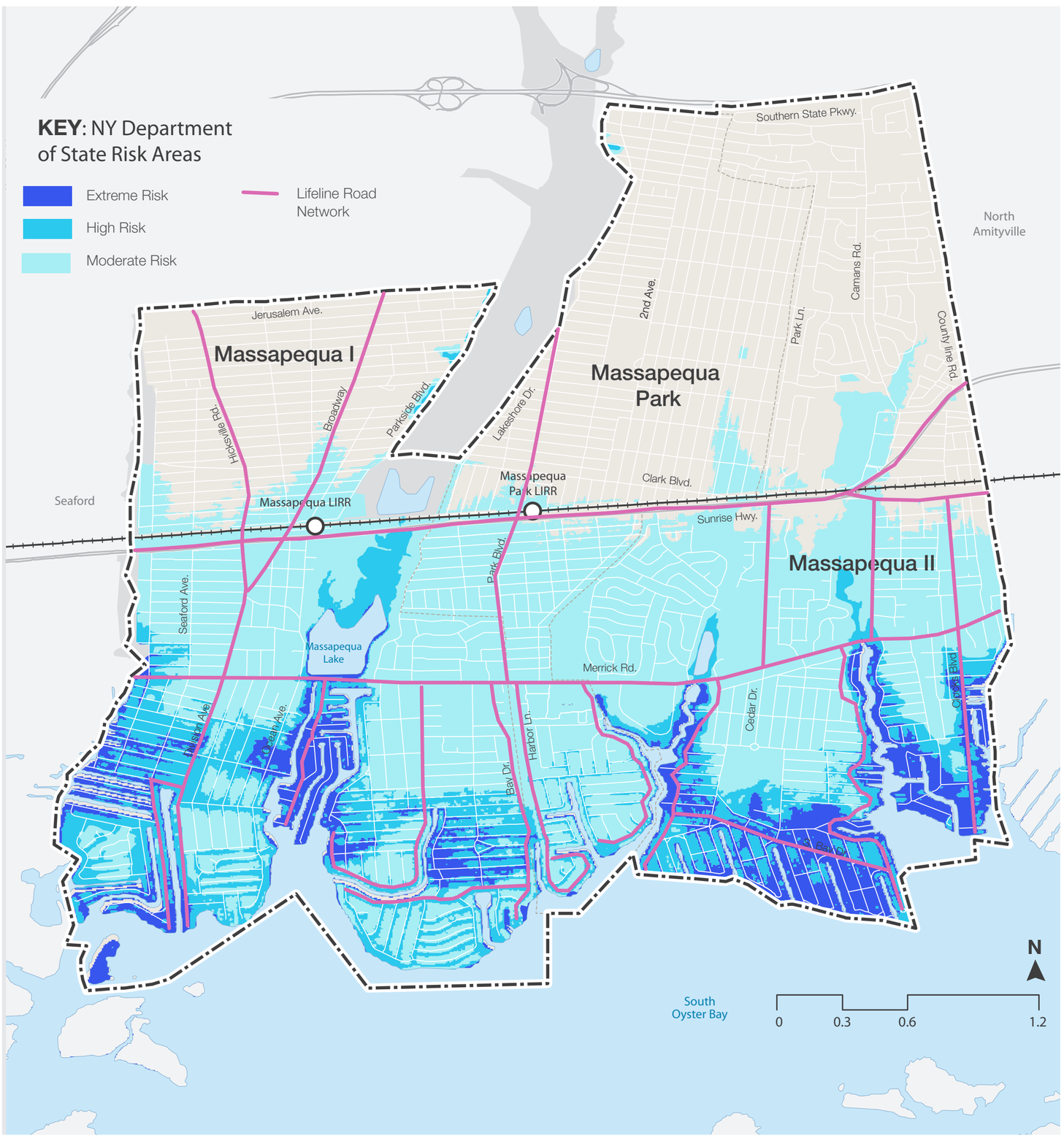
Images: www.pbcgov.com and www.gohart.org

# P3 Streetlighting

## Lifeline Road Network

Retrofit streetlights and signals along these roads with solar power and battery back-up

**Cost Estimate: $9,100,000**




## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Infrastructure
- Project Location/Municipality: Massapequas - Massapequa (I and II) and Village of Massapequa Park
- Primary Target Area Affected: 29 miles of roads (shown at left)
- Consistency with NYRCR: Address short, medium, and long term risks
- Potential Beneficiaries: Residents, businesses, and visitors - particularly those south of Merrick Road

## Project Information

To maintain functionality during power outages, streetlights and signals along the Lifeline Road Network, would be retrofitted to operate on solar power with battery back up power. This would make it safe for residents to evacuate during power outages whether by car or on foot and improve security.

Priority will be given to Merrick Road, Sunrise Highway, and intersections.

The cost of this project is based on the anticipated purchase and installation of these lights in locations selected in the study. The estimate includes the entire proposed network.

RESPONSE TO STORM: During Superstorm Sandy, residents needed directions for safe and preferred routes for evacuation and reaching shelter. Downed trees knocked over utility poles and wires making alternative power sources for lights and signals vital.

Solar lighting option

Solar lighting option

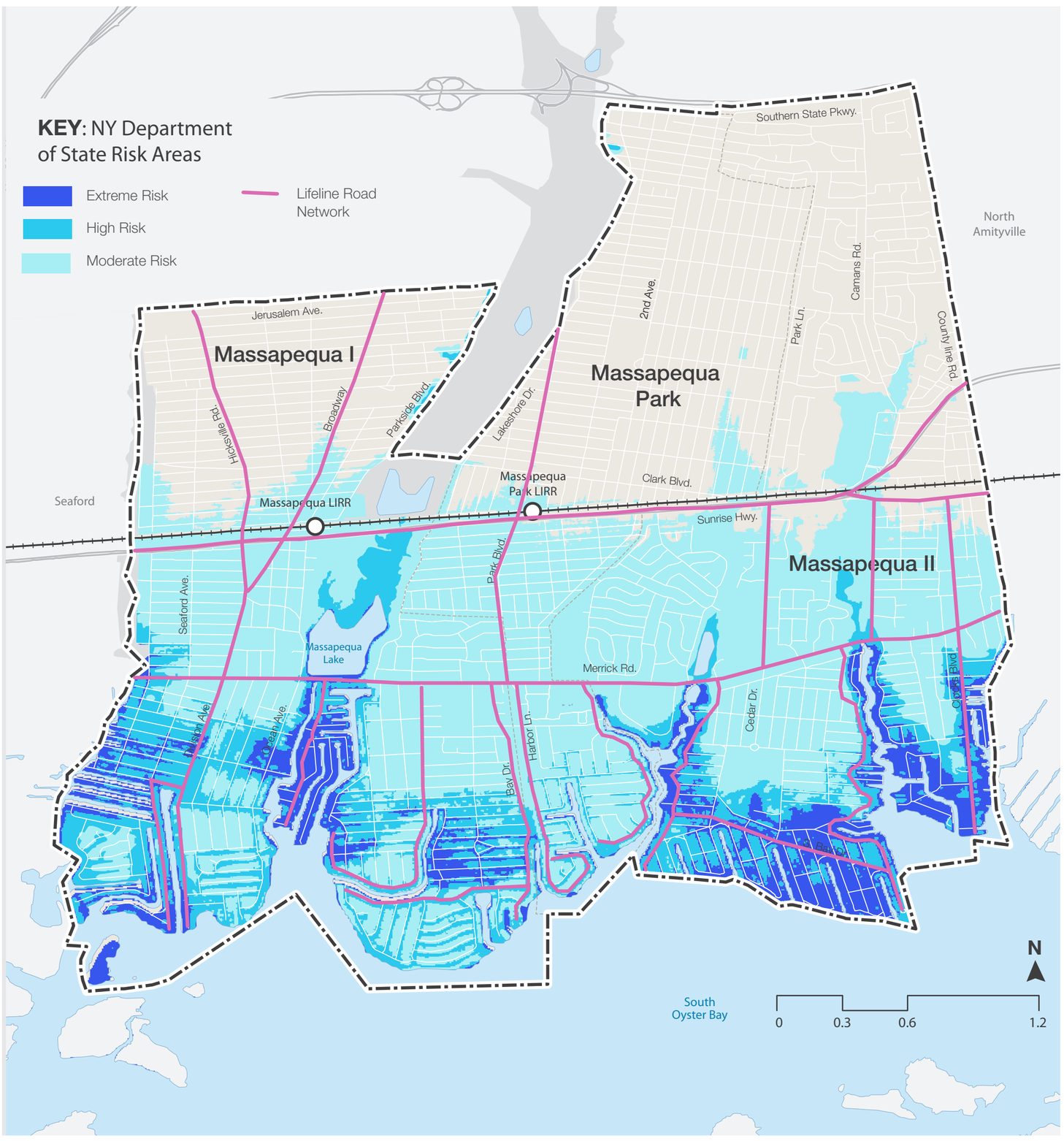
Images: www.greenfirst.in and www.seda-eg.com

# P4 Elevate Roadways

## Lifeline Road Network

Raise key streets susceptible to tidal flooding or storm surge

**Cost Estimate: $460,000**




## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Infrastructure
- Project Location/Municipality: Massapequas - Massapequa (I and II) and Village of Massapequa Park
- Primary Target Area Affected: subset of 29 miles of roads (shown at left)
- Consistency with NYRCR: Address short, medium, and long term risks
- Potential Beneficiaries: Residents, businesses, and visitors - particularly those south of Merrick Road

## Project Information

To maintain provide safe egress along major roads during flood events, key streets susceptible to tidal flooding or storm surge will be raised. Some streets in the proposed Lifeline Road Network, such as Alhambra Road, have already been elevated. The initial study would identify those most in need of elevation and concentrate on these areas, particularly south of Merrick Road.

The cost of this project reflects the construction of a subset of the most critical roadways to elevate after conducting a study to identify them.

RESPONSE TO STORM: During Superstorm Sandy, roadways flooded and clear, elevated evacuation routes were needed for people living south of Merrick Road.

Roadway flooding in Massapequas during Sandy

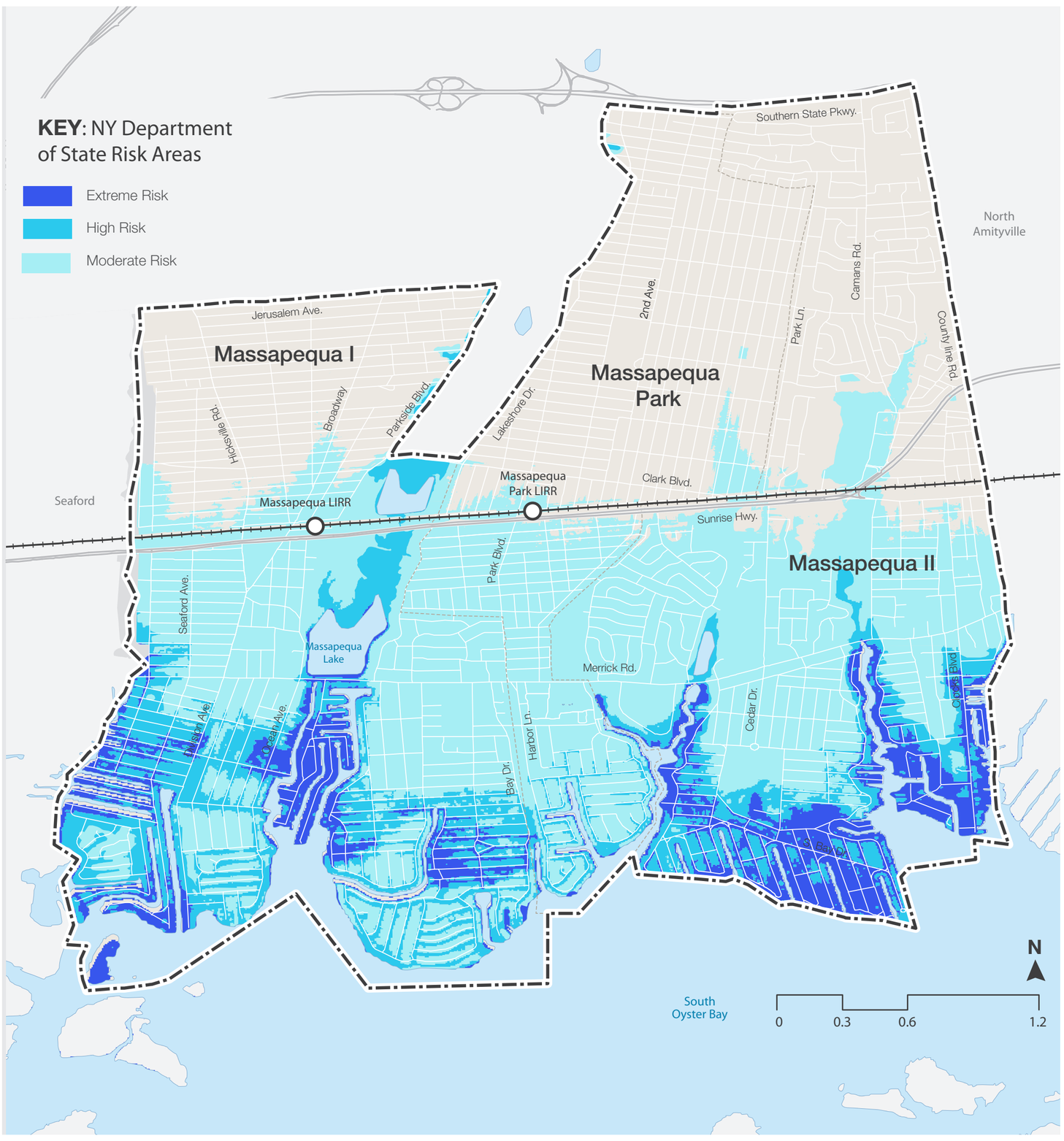
Roadway flooding in Massapequas during Sandy

Images: massapequa.patch.com (October 30, 2012)

# P5 Flood Diversion and Control

## Install structural and natural drainage features including flood valves and outfall pipe lining

**Cost Estimate: $4,900,000**




## Key Facts

- Project Type: Other Capital Project
- Recovery Function: Infrastructure
- Project Location/Municipality: Massapequas - Massapequa (I and II) and Village of Massapequa Park
- Primary Target Area Affected: community-wide, particularly south of Sunrise Highway
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Residents, businesses, and visitors

## Project Information

To address flooding throughout the Massapequas, this project will strategically locate structural and natural drainage features to divert flood waters into designated catchment areas. After commissioning an initial study to determine overland flow patterns in flood-prone areas, locations will be identified for drainage, detention, and check-valves on outfall pipes.

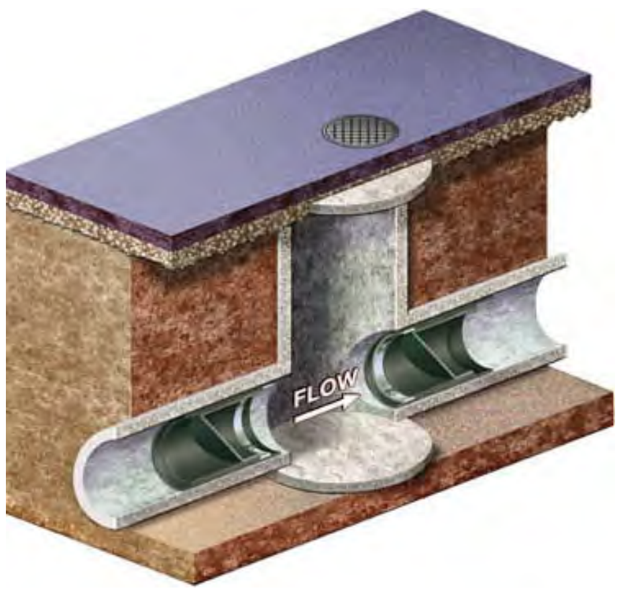
The following measures are proposed for diverting and controlling flood waters in the future:

- Install new tidal check valves and backflow preventers to protect roads and adjacent structures from flooding
- Upgrade, inspect and regularly maintain flood valves
- Install outfall pipe lining on 10 pipes in Massapequa Park
- Redirect flows or install new infrastructure to address flooding along Front Street between Philadelphia Avenue and East Lake Avenue

The cost of this project reflects the installation of flood valves, outfall pipe linings, and additional sumps at appropriate identified locations

RESPONSE TO STORM: During Superstorm Sandy, flood valves and drainage pipes failed causing additional damage. This infrastructure needs replacement and repair.

Tidal check valve with backflow preventer



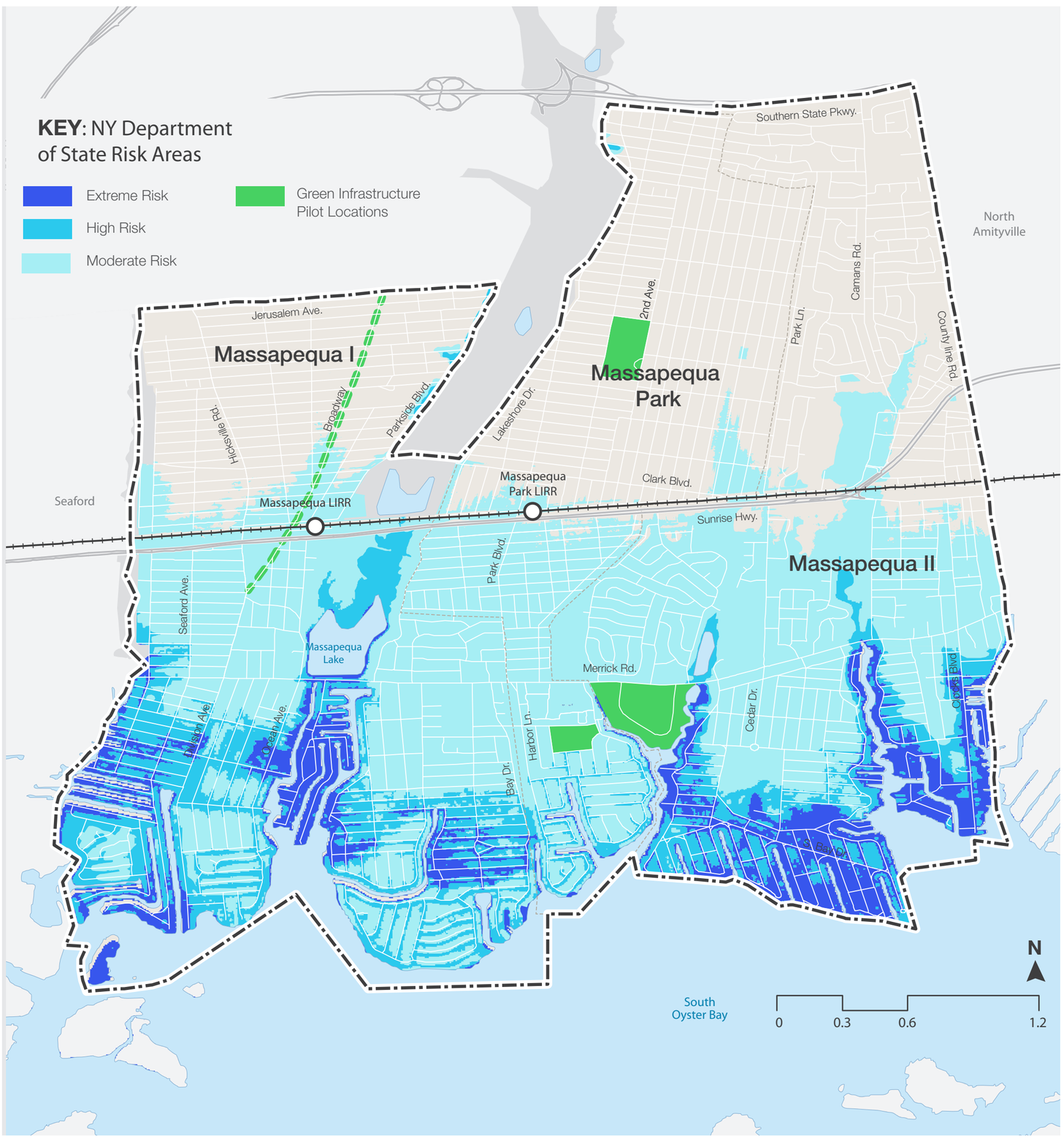

Tideflex check valve

Images: news.thomasnet.com and www.tideflex.com

# P6 Green Infrastructure Pilots

## Control flooding with a combination of hard infrastructure and natural systems

**Cost Estimate: $2,200,000**




## Key Facts

- Project Type: Other Capital Project
- Recovery Function: Natural and Cultural Resources
- Project Location/Municipality: Massapequa I and Village of Massapequa Park
- Possible Pilot Locations: Broadway, Birch Lane Elementary,McKenna Elementary School & Nassau County Police Academy, John Burns Town Park
- Consistency with NYRCR: Address short, medium, and long term risks
- Potential Beneficiaries: Residents, businesses, and visitors

## Project Information

Flooding occurs regularly with storms and tides. Green infrastructure designed to make the community more resilient by controlling flooding with a combination of hard infrastructure and natural systems. In the Massapequas, green infrastructure will improve stormwater management by addressing pump stations, storm drains, culverts, and outflow valves.

A preliminary study will collect information to identify road elevations and drainage improvements on major roads for stormwater management, improved drainage, flood control, and pollution reduction.

The pilot projects will test different project types: public realm (roads), private realm (parking lots) and open space (parks and preserves). After installation, potential infiltration and open channel bioswale projects will be studied.

Broader green infrastructure policy would encourage the installation of permeable paving in new developments, mall parking lots, and school parking lots, as well as developing a rain barrel program for residential properties across the Massapequas. The community should also work with neighboring hamlets, villages, and Nassau County to establish a region-wide stormwater management program and to create and implement a comprehensive green infrastructure plan.

Bioswale in Milwaukee, Wisconsin

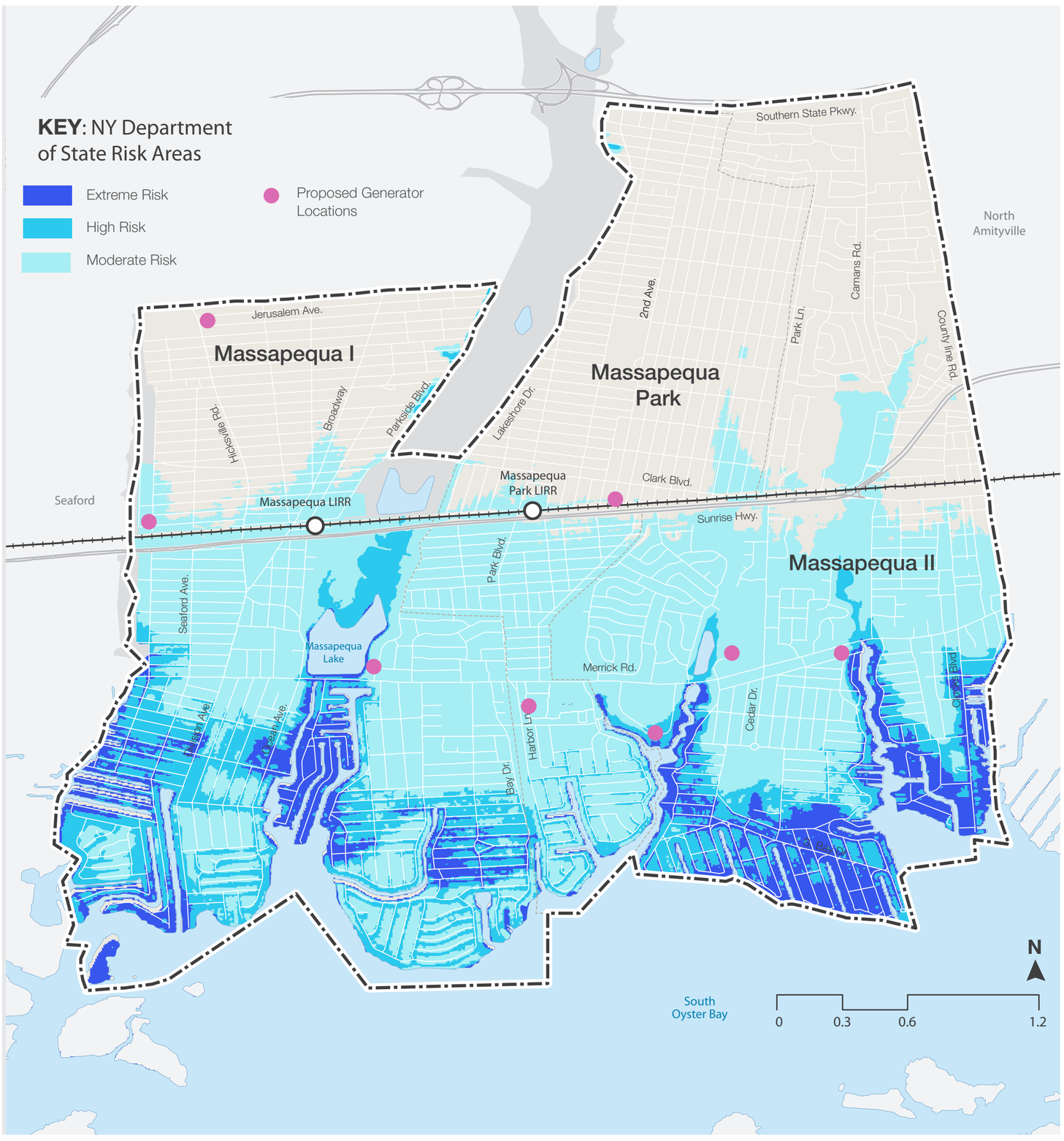
Permeable paving

More information about Green Infrastructure is available at:
www.cnt.org/repository/gi-values-guide.pdf

# P7 Generators for Critical Facilities

## Ensure that critical facilities have backup power during and after major storm events

**Cost Estimate: $2,000,000**




## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Community Planning and Capacity Building
- Project Location/Municipality: Massapequas - Massapequa (I and II) and Village of Massapequa Park
- Primary Target Area Affected: Critical facilities such as fire and police centers and emergency shelters
- Consistency with NYRCR: Balance costs and benefits
- Potential Beneficiaries: Residents during storm events

## Project Information

Intended to create necessary redundancy as a safety measure, alternative power generators will be purchased and installed at critical facilities. Emergency shelters, community centers, and fire stations need to have backup power during and after major storm events. At critical assets and evacuation sites, permanent generators will be installed on the roofs or upper floors to prevent flood damage during storm events.

At minimum, the following locations (shown on the map above) will receive generators:

- Town Hall South and Town Hall North (in Oyster Bay)
- Community Center in Marjorie Post Park
- Bay Constable Building at John Burns Park
- Massapequa Park Community Center at Brady Park
- Southgate Community Center
- All local fire stations

The Red Cross Shelter at McKenna Elementary and Massapequa Park Village Hall already have generators in place.

RESPONSE TO STORM: Residents have voiced concerns that there were too few centers in the community with power during Superstorm Sandy. This project is a response that provides more critical facilities that will be operable during a storm.

Sample 600kW Natural Gas Generator

Sample 600kW Natural Gas Generator

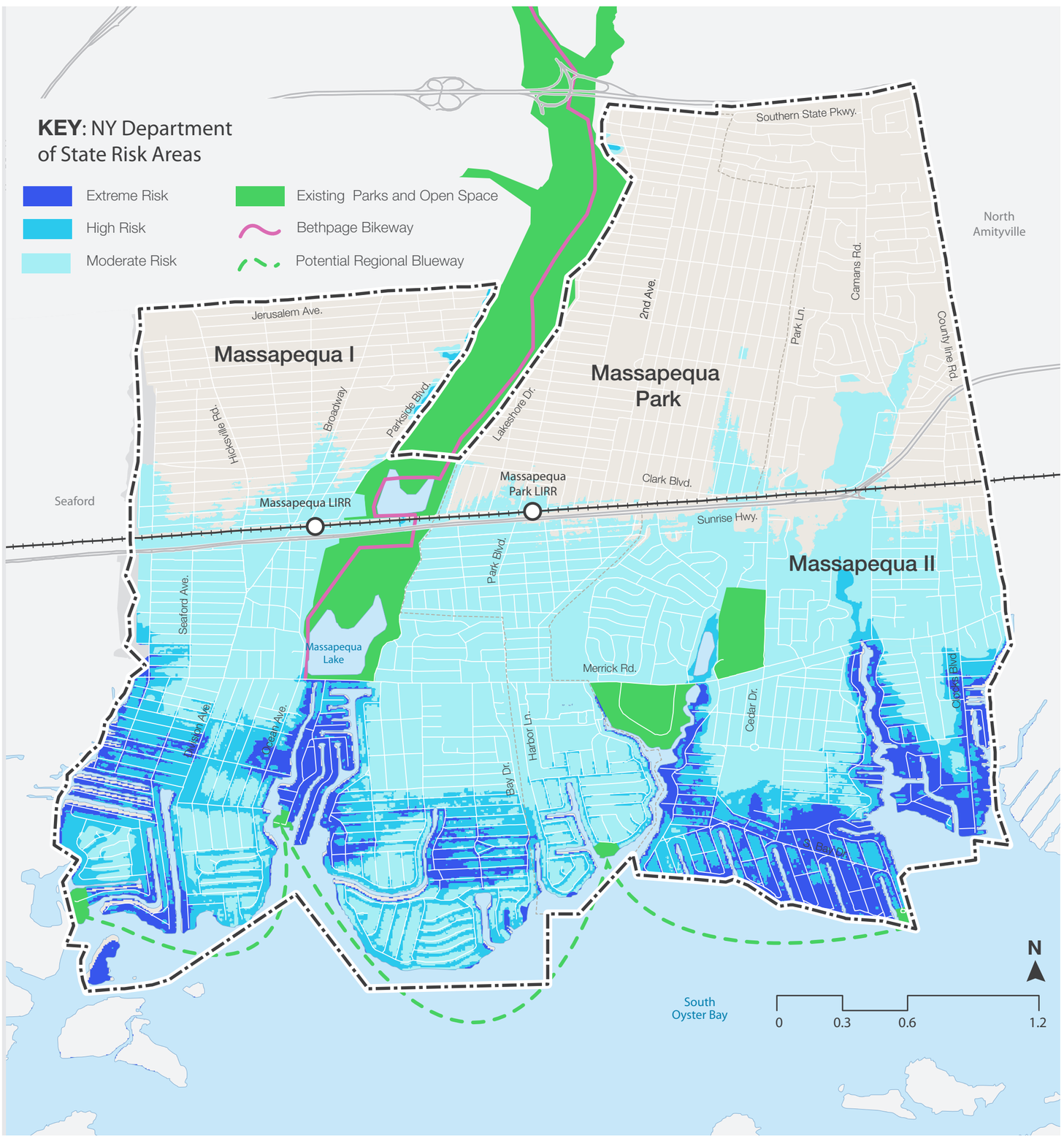
Images: www.gensetdiesel-generator.com and www.sunecochina.com

Note: Alternative Power for the generators is a high priority. Photovoltaic generators were also priced and cost 18 times more than natural gas generators.

# P8 Redesign Parks & Open Space

## Redesign waterfront parks, public access, and ecological open space to help absorb storm water

**Cost Estimate: $200,000 for study**




## Key Facts

- Project Type: Recreation
- Recovery Function: Natural and Cultural Resources
- Project Location/Municipality: Massapequas - Massapequa (I and II) and Village of Massapequa Park
- Primary Target Area Affected: Neighborhoods south of Merrick Road
- Consistency with NYRCR: Address short, medium and long term risks
- Potential Beneficiaries: Residents and visitors with improved access to the waterfront and more resilient parks

## Project Information

Building on the Massapequas' ecological and waterfront assets this project would create a plan that ensured that the parks and open spaces in the community served to improve resilience, enhance economic development, and add value to the surrounding homes and quality of life. The goal of the study is to identify ways to develop and expand tourism activities and infrastructure related to the beaches and marine resources; revise zoning to allow new uses in new areas including waterfront restaurants and retail and more outdoor dining; incorporate water retention and drainage into active and passive open space; address and mitigate beach-front and park erosion in ways that respond naturally to coastal processes; and ensure revitalization and redevelopment plans incorporate expanded open space to preserve neighborhood character, improve recreational access, and improve local environmental quality.

Unique projects will focus on improvements to

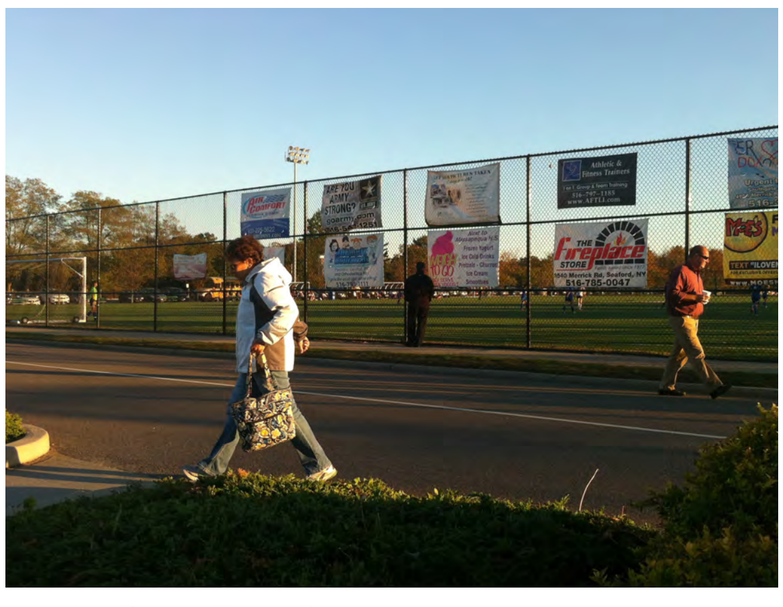
**P9 Alhambra Park**

**P10 Bayfront Park**

**P11 Colleran Park**

RESPONSE TO STORM: Existing parks were severely damaged during Superstorm Sandy and have the potential to be rebuilt in ways that make them more resilient.

Massapequa Preserve - existing open space asset



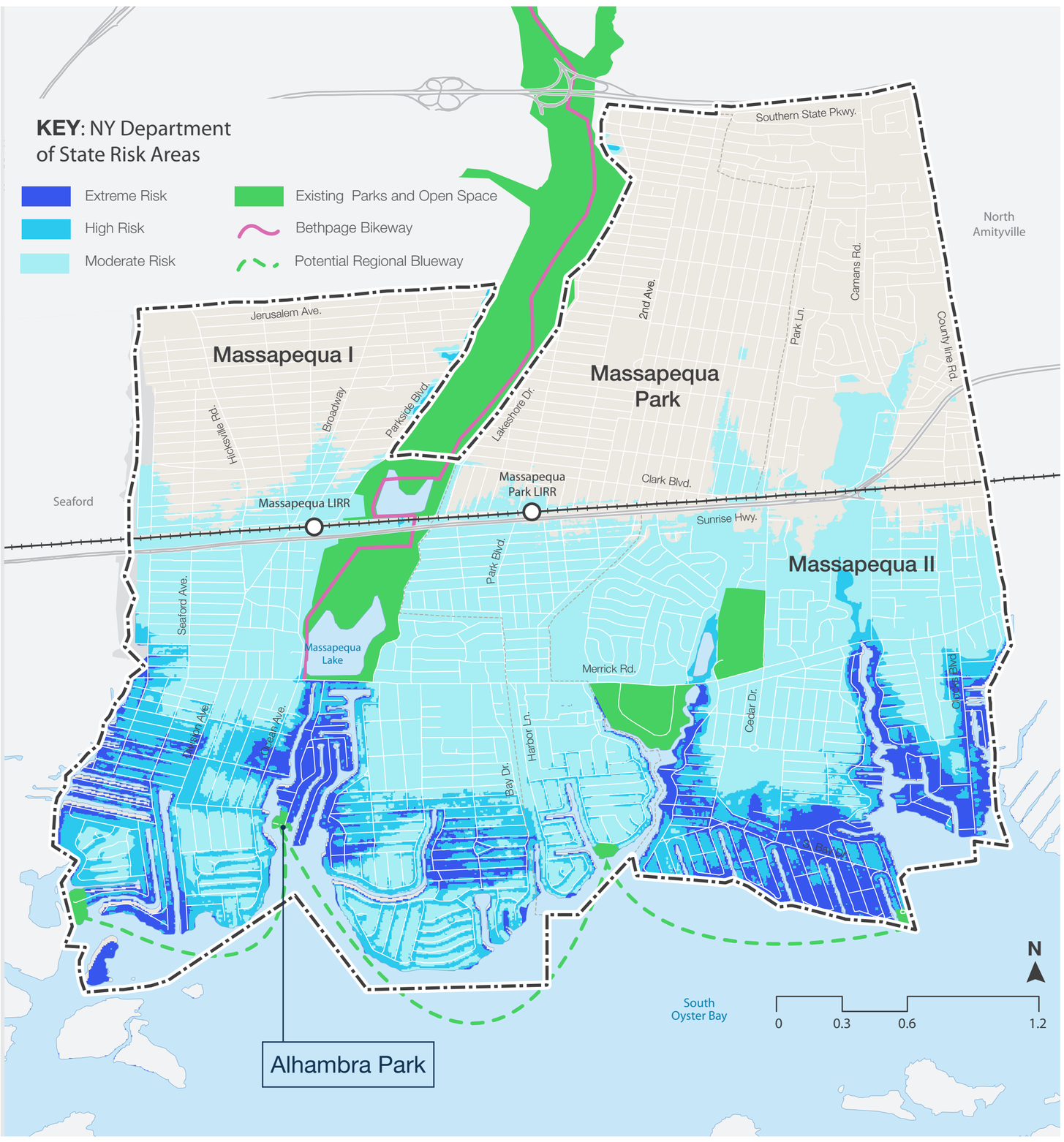
John Burns Town Park - existing park asset

Images: Sasaki

# P9 Alhambra Park

## Redesign waterfront park then install playground, kayak launch, and permeable paths and parking

**Cost Estimate: $4,000,000**




## Key Facts

- Project Type: Social/ Community Services
- Recovery Function: Natural and Cultural Resources
- Project Location/Municipality: Massapequa I (owned by the Town of Oyster Bay)
- Primary Target Area Affected: Neighborhoods south of Merrick Road, particularly along Alhambra road
- Consistency with NYRCR: Address short, medium and long term risks
- Potential Beneficiaries: Residents and visitors with improved access to the waterfront and more resilient parks

## Project Information

The Town of Oyster Bay plans to install a new playground, permeable parking area, gazebo, kayak-launching area, and a new bulkhead in the new expanded Alhambra Park where property has recently been acquired and already undergone remediation. Additionally, the development of walking paths with permeable paving around bioswales and storm water retention ponds, and the installation of energy-efficient lighting and signage will make the park more environmentally sustainable and better able to withstand future storm damage.

With its easy access for kayaks, the park will also be linked to the proposed regional Blueway, and being due south of the Massapequa Preserve, it will be linked to the existing Bethpage Bikeway.

The cost of this project is based on the anticipated construction of bulkheads, kayak launch, gazebo, playground, and permeable parking lot.

RESPONSE TO STORM: Adjacent storm damaged parcels were purchased to expand the existing park. Public access to the waterfront enhances public awareness and contributes to community building.

Aerial of Alhambra Park site

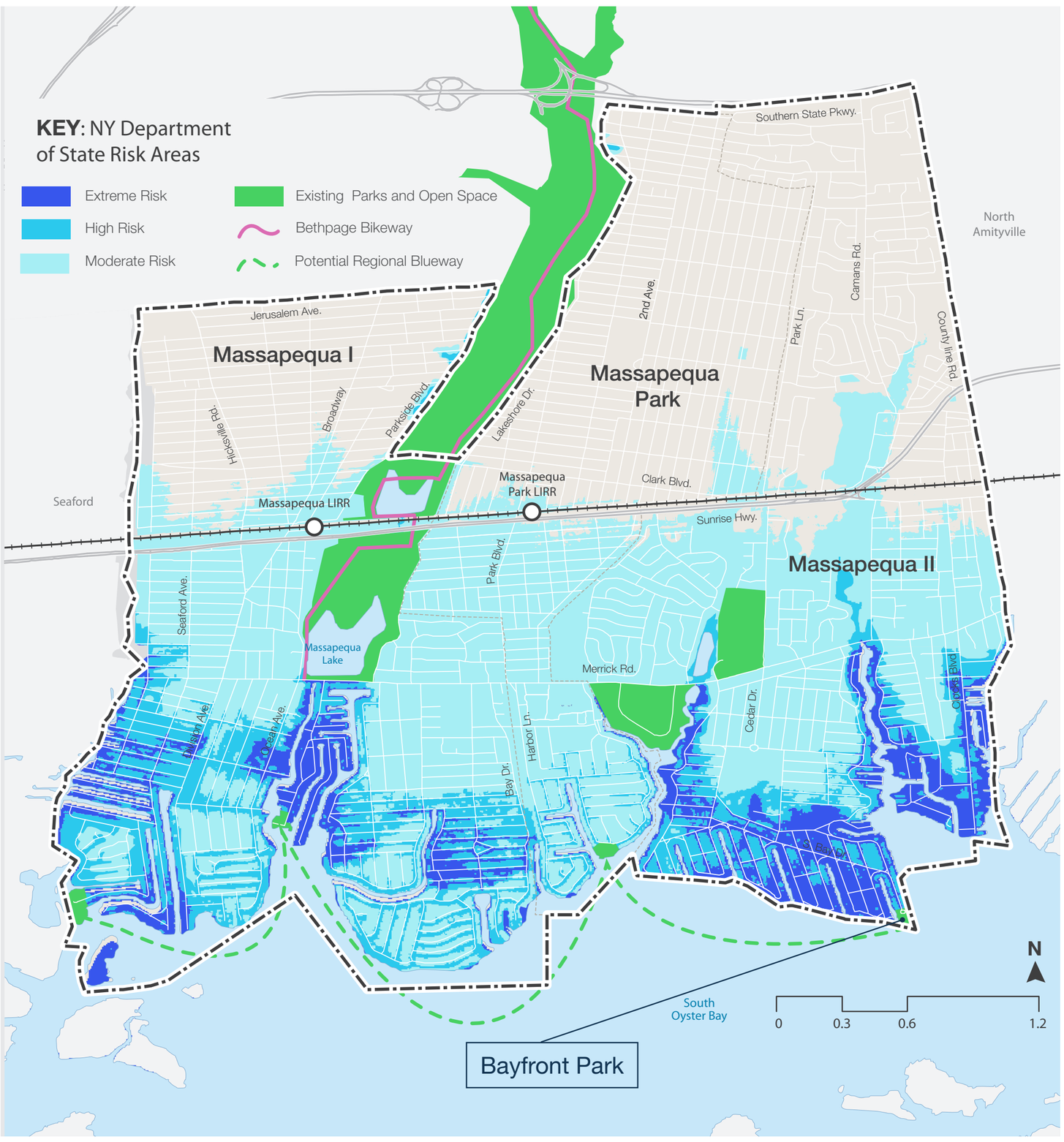
Kayak launch in Port Washington, New York

Images: storms.ngs.noaa.gov and Fred Hsu on en.wikipedia

# P10 Bayfront Park

## Redesign waterfront park installing playground, repairing bulkhead, and expanding pier

**Cost Estimate: $4,100,000**




## Key Facts

- Project Type: Social/ Community Services
- Recovery Function: Natural and Cultural Resources
- Project Location/Municipality: Massapequa II (owned by the Town of Oyster Bay)
- Primary Target Area Affected: Neighborhoods south of Merrick Road, particularly in Nassau Shores
- Consistency with NYRCR: Address short, medium and long term risks
- Potential Beneficiaries: Residents and visitors with improved access to the waterfront and more resilient parks

## Project Information

The Town of Oyster Bay plans to install a new playground and repair the bulkhead at Bayfront park to address damage from Superstorm Sandy. Additionally, the Town will add walkways with permeable paving around bioswales and storm water retention ponds, rest area for cyclists, fitness stations, an expanded pier, and energy efficient lighting.

The park will also be linked to the proposed regional Blueway and the existing Bethpage Bikeway.

The cost of this project is based on the anticipated construction and repair of bulkheads, playground, walkways, and pier.

RESPONSE TO STORM: Existing park was severely damaged during Superstorm Sandy. Public access to the waterfront enhances public awareness and contributes to community building.

Aerial of Bayfront Park site

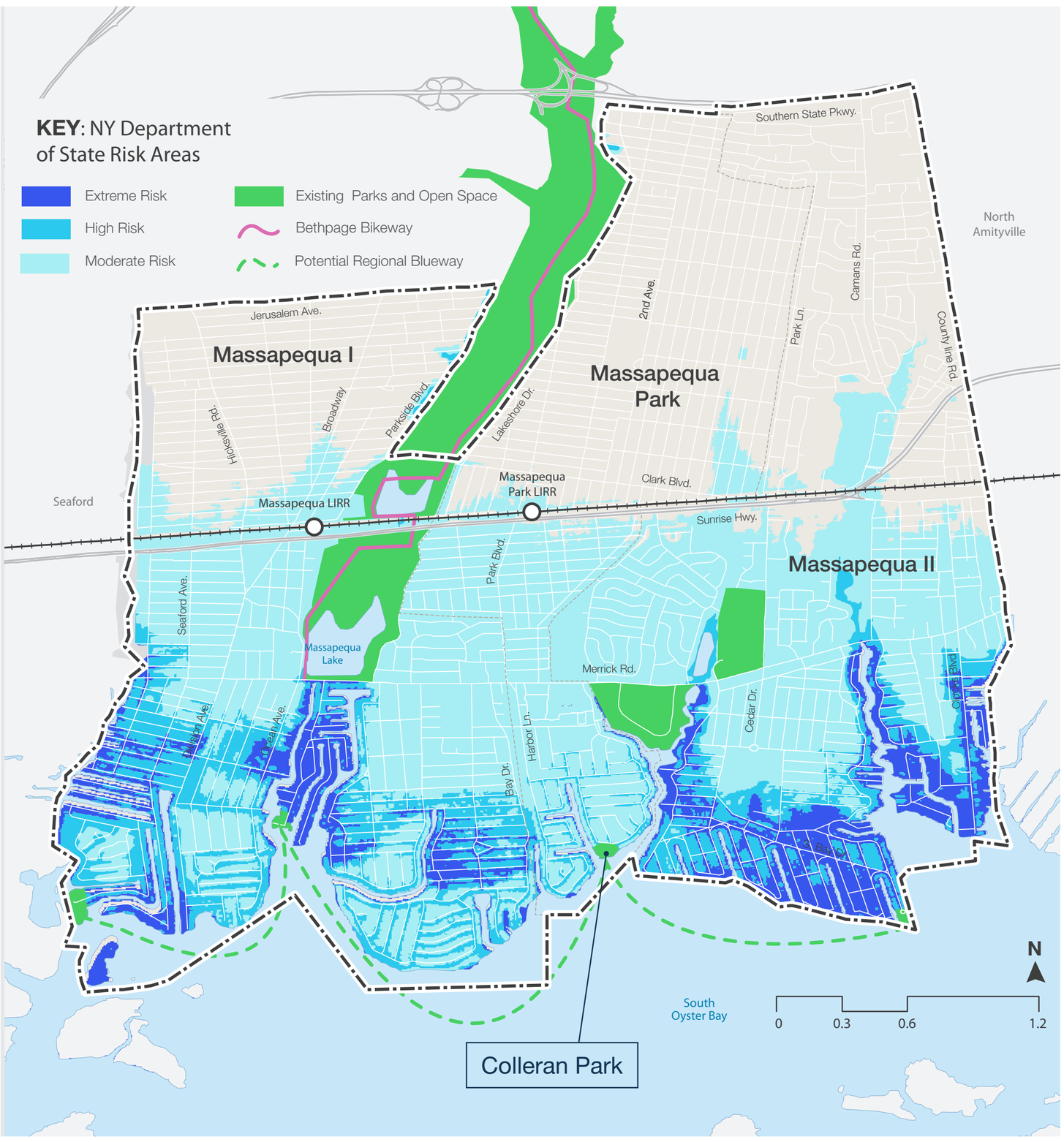
Cyclist rest area in Red Mountain Park, Mesa, AZ

Images: storms.ngs.noaa.gov and www.djwriter.com

# P11 Colleran Park

## Stabilize shoreline with bulkhead and riprap then resurface playground

**Cost Estimate: $1,700,000**




## Key Facts

- Project Type: Social/ Community Services
- Recovery Function: Natural and Cultural Resources
- Project Location/Municipality: Massapequa Park
- Primary Target Area Affected: Neighborhoods south of Merrick Road, particularly in Bar Harbour
- Consistency with NYRCR: Address short, medium and long term risks
- Potential Beneficiaries: Residents and visitors with improved access to the waterfront and more resilient parks

## Project Information

The Village of Massapequa Park plans to stabilize the shoreline of Colleran Park with bulkhead and riprap based on the community approved plan to prevent further erosion. The Village will also resurface the playground to repair protective rubber damaged by Superstorm Sandy.

With a beach landing, the park will be linked to the proposed regional Blueway, and the existing Bethpage Bikeway.

The cost of this project is based on the anticipated installation of bulkhead, riprap, and rubber playground surface

RESPONSE TO STORM: Existing park was severely damaged during Superstorm Sandy. Public access to the waterfront enhances public awareness and contributes to community building.

Aerial of Colleran Park site

Bulkhead and riprap revetment

Images: storms.ngs.noaa.gov and farrellmarine.com

# P2 Bulkhead Upgrades

Inspect, replace and raise existing bulkheads at street and canal ends owned by Town of Hempstead

**Cost Estimate: $2,000,000**

## Key Facts

- Project Type: Protective Measures
- Recovery Function: Infrastructure
- Project Location/Municipality: Seaford and Wantagh
- Primary Target Area Affected: Seaford and Wantagh
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Seaford and Wantagh residents

## Project Information

This project will inspect and identify the bulkheads at street ends and canal ends that fall under the Town of Hempstead ownership that require replacement and raising.

Potential street/canal ends that appear to be under TOH jurisdiction include: Riverside Dr (Islip Ct, Seaford Ct), Shore Rd (Shore Pl, Island Channel Rd), Ocean Ave (Brant Pl, Plover Pl, Anglers Pl), Almo Pl (Somserset Dr), Somerset Dr, Bayview St (Island Channel, Ocean Ave, Peconic Ave, Neptune Ave, Seminole Ave), Beacon Rd (Seamans Neck Rd), and Ellsworth St (Atlantic View Ave).

The following ends have been excluded due to TOH proposed road raising projects: Narragansett Ave, Niami St, Anchor Pl, Plover Pl, Widgeon Pl, and Anglers Pl.

Bulkheading along canals in NYRCR Seaford-Wantagh

Many bulkheads are aging and in need of repair

# P3 Stormwater: Priority Roads

Clean out, survey, and verify stormwater drainage infrastructure along critical access routes

**Cost Estimate: $1,900,000**

## Key Facts

- Project Type: Debris Removal
- Recovery Function: Infrastructure
- Project Location/Municipality: Seaford and Wantagh
- Primary Target Area Affected: Seaford and Wantagh
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Seaford and Wantagh residents

Storm drains need to be regularly cleaned

Flooded streets in the wake of Superstorm Sandy

## Project Information

There were areas that were inaccessible by road during and after Sandy due to flooding. The flooding also caused significant debris buildup in drainage systems as a result of Sandy.

This project will supplement efforts by the Town of Hempstead and Nassau County to clean out stormwater along priority local roads within Seaford and Wantagh. In addition to the clean outs, this project will collect and reconfirm the condition and types of stormwater infrastructure that exist in order to understand any other immediate needs as well as feed into the overall capital and asset management of the stormwater infrastructure.

The priority local roads within Seaford and Wantagh selected are key roads that allow evacuation from areas that are prone to flooding and access to areas on higher ground with critical help facilities. The priority local roads within Seaford and Wantagh are assumed to be Sunrise Highway, Merrick Road, Bayview Avenue, Wantagh Avenue, Seaford Avenue, Willoughby Ave, Neptune Ave, Seamans Neck Road, Washington Ave.

# P4 Stormwater: Southern Roads

Clean out, survey, and verify stormwater drainage infrastructure in areas south of Merrick Road

**Cost Estimate: $2,700,000**

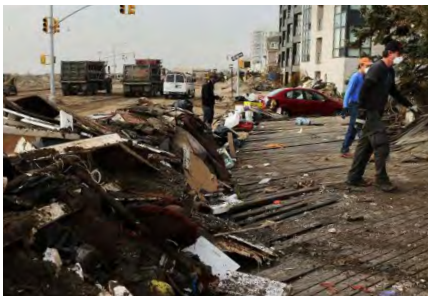
## Key Facts

- Project Type: Debris Removal
- Recovery Function: Infrastructure
- Project Location/Municipality: Seaford and Wantagh
- Primary Target Area Affected: Seaford and Wantagh
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Seaford and Wantagh residents

## Project Information

There was significant debris buildup in drainage systems as a result of Sandy, particularly in areas south of Merrick Road.

This project will supplement efforts by the Town of Hempstead and Nassau County to clean out stormwater along roads south of Merrick Road within Seaford and Wantagh. In addition to the clean outs, this project will collect and reconfirm the condition and types of stormwater infrastructure that exist in order to understand any other immediate needs as well as feed into the overall capital and asset management of the stormwater infrastructure.



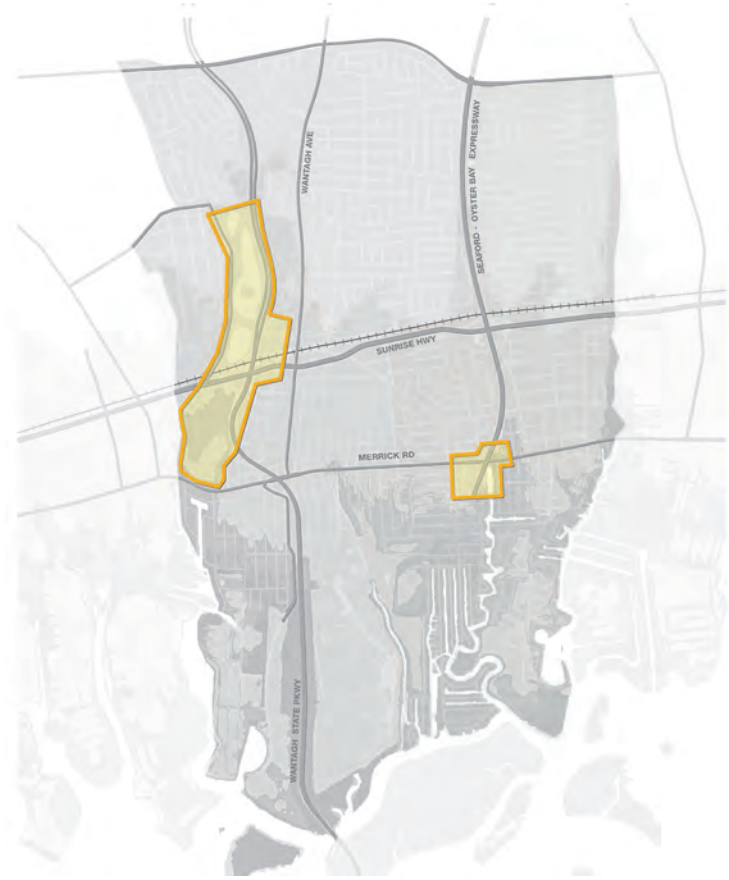
Debris clean up post-Sandy

Residential streets south of Merrick Road post-Sandy

# P5 Drainage Improvements

Design of stormwater management and drainage improvements along Sunrise Highway, Merrick Road, and Park Avenue

**Cost Estimate: $1,200,000**




## Key Facts

- Project Type: Roads and Bridges
- Recovery Function: Infrastructure
- Project Location/Municipality: Sunrise Highway at Wantagh State Parkway, Merrick Road at Mill Pond Park, Merrick Rd at Wantagh State Parkway, Merrick Rd at Seaford Oyster Bay Expressway, and Park Avenue
- Primary Target Area Affected: Seaford and Wantagh
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Seaford and Wantagh

Wantagh Ponds and other local ponds may have additional potential stormwater storage capacity

Green Infrastructure can help to address drainage issues

## Project Information

Several major and critical roads have been identified to have flooded during Sandy and/or Irene. These areas have been identified as Sunrise Highway at Wantagh State Parkway, Merrick Road at Mill Pond Park, Merrick Rd at Wantagh State Parkway, Merrick Rd at Seaford Oyster Bay Expressway, and Park Avenue by the Fire Station.

This project will study and design the improvements that are necessary to improve stormwater management and drainage at these particular locations.

The areas along Sunrise Highway and Merrick Road coincide with locations of several ponds that likely contribute to the flooding. The study will analyze condition of all local ponds (Mill Pond, Wantagh Pond, Seaman Pond, and Tackapausha Pond) and the potential to improve storage capabilities. In order to drain the ponds north of Sunrise Highway, Nassau County has indicated that siphons are used to move water under the 72 inch conduit that runs underneath Sunrise Highway. A siphon study will be part of the study to analyze the storage potential of the ponds.

Once the likely improvements have been identified, the project will proceed into the design of the drainage improvements. The design will consider and incorporate green infrastructure solutions to address drainage issues where possible.

# P6 Priority Road Improvements

Design of infrastructure improvements along critical access roads

**Cost Estimate: $1,000,000**

## Key Facts

- Project Type: Roads and Bridges
- Recovery Function: Infrastructure, Health and Social Services
- Project Location/Municipality: Seaford and Wantagh
- Primary Target Area Affected: Seaford and Wantagh
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Seaford and Wantagh residents

## Project Information

The selected priority local roads within Seaford and Wantagh are key roads that allow evacuation from areas that are prone to flooding and access to areas on higher ground with critical help facilities. The priority local roads within Seaford and Wantagh are assumed to be Sunrise Highway, Merrick Road, Bayview Avenue, Wantagh Avenue, Seaford Avenue, Willoughby Ave, Neptune Ave, Seamans Neck Road, Washington Ave.

As a follow on project to the stormwater drainage clean out, survey and verification of these priority local roads, this project will identify and design the necessary infrastructure improvements along these roads with the exception of Merrick Road and Sunrise Highway which will be the focus of a different project. This project will focus mainly on the north-south running local priority roads.

Potential infrastructure upgrades may include burying existing overhead power lines

Potential infrastructure upgrades may identify the need for green infrastructure structures and bioswales

# P7 Priority Road Streetlight Retrofits

Install LED streetlights with solar PV and battery backup on existing utility poles

**Cost Estimate: $2,800,000**

## Key Facts

- Project Type: Roads and Bridges
- Recovery Function: Infrastructure, Health and Social Services
- Project Location/Municipality: Seaford and Wantagh
- Primary Target Area Affected: Seaford and Wantagh
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Seaford and Wantagh residents

## Project Information

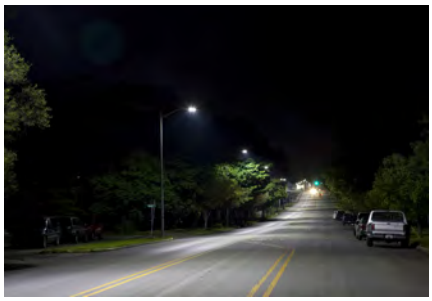
Following Sandy, with the loss of power, neighborhoods were difficult to navigate at night and limited the amount of recovery work and movement to daylight hours.

This project involves the installation of LED street lights powered by solar panels with battery backup on existing utility poles along the north-south running local priority roads: Bayview Ave, Wantagh Ave, Seaford Ave, Willoughby Ave, Neptune Ave, Seamans Neck Rd, and Washington Ave.

Having these priority local roads lighted with independently powered more efficient lights will provide a lighted pathway of evacuation and increase the safety of these streets for access after a power outage.

If future undergrounding of utility lines occurs and new separate street lights are installed, the LED/PV street lights could be reused in other parts of the community.

Solar PV street lights incorporate batteries to store power generated during the day for use at night



LED street lights use less energy, and require less maintenance than traditional lamps

# P8 Community Resource Centers

Community Resource Centers are places for residents to find emergency information and recovery resources

**Cost Estimate: $2,800,000**

## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Health and Social Services, Community Planning and Capacity Building
- Project Location/Municipality: Seaford and Wantagh
- Primary Target Area Affected: Seaford and Wantagh
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Seaford and Wantagh residents

Wantagh Library could be used as a Community Resource Center

Community Resource Centers can collect and distribute emergency supplies to displaced residents

## Project Information

Community Resource Centers are places for residents to find emergency preparedness information during normal conditions. During and after a storm, these centers would become a place to gather, collect and distribute resources (emergency supplies, deployable showers, non-perishable food, potable water/iodine tablets, blankets and tarps, emergency evacuation instructions, bicycles, toiletries, winter clothing, OTC medications, first aid, and hand tools), charge cell phones, and access the internet.

A Local Disaster Recovery Manager will provide preparedness training sessions and ensure all information is accessible and understandable to all residents.

The installation of permanent natural gas generators at the Community Resource Centers would ensure power supply to critical resources such as heating, cooling, charging and internet access.

Possible locations include Seaford and Wantagh Libraries and the Seaford High School.

# P9 County Shelter Resilience

## Retrofit and install permanent generators at Wantagh High School, a designated emergency shelter

**Cost Estimate: $1,200,000**

## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Health and Social Services, Community Planning and Capacity Building
- Project Location/Municipality: Wantagh High School
  3301 Beltagh Avenue
  Wantagh, NY 11793
- Primary Target Area Affected: Nassau County
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Nassau County Residents

## Project Information

Wantagh High School is a designated emergency shelter for Nassau County. An assessment of the utilization of Wantagh HS during Sandy will inform any additional fortifications or amenities that are necessary to ensure that Wantagh High School is accessible and able to accommodate the needs of community members during a future event. This assessment will also include a study to determine the wind resistant design level of the school and then seek funding for any mitigation required.

This project also includes the installation of air conditioning and heating to the cafeteria or whatever other room is used as the main shelter location. A permanent natural gas powered generator will be installed to provide backup power to the heating, cooling, lighting and other critical facilities in the event of a local power failure.

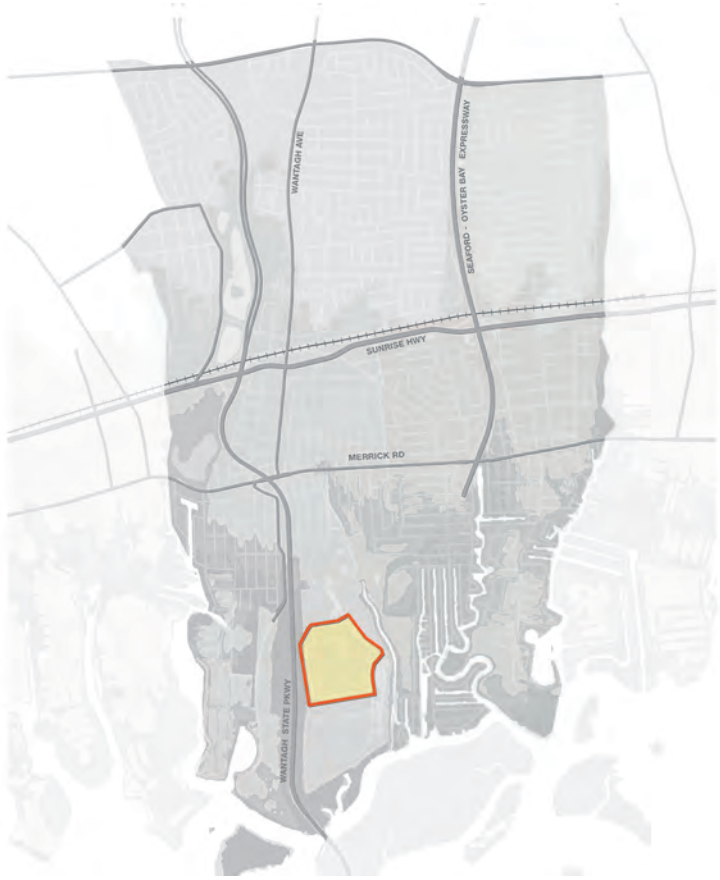
Wantagh High School is currently a Nassau County designated emergency shelter

Placing generators on rooftops or upper floors protects the backup power supply from flood damage

# P10 Cedar Creek Microgrid Design

Design of a microgrid to provide power to critical facilities near the Cedar Creek WPCP

**Cost Estimate: $500,000**




## Key Facts

- Project Type: Utilities
- Recovery Function: Infrastructure
- Project Location/Municipality: Cedar Creek Park (Wantagh)
- Primary Target Area Affected: Critical facilities around Cedar Creek Park
- Consistency with NYRCR: Address short, medium, and long-term risks
- Potential Beneficiaries: Seaford and Wantagh residents

## Project Information

A microgrid is a small-scale version of the centralized electricity system which includes all the necessary components to operate in isolation of the centralized grid. Microgrids can operate independently of the grid and can also be connected to the grid allowing the import or export of electricity. The New York State Energy Research and Development Authority (NYSERDA) is currently conducting a feasibility study of a microgrid at the Cedar Creek WPCP to serve critical facilities near the WPCP. Based on the results of the feasibility study, this project would fund the detailed design of the microgrid.

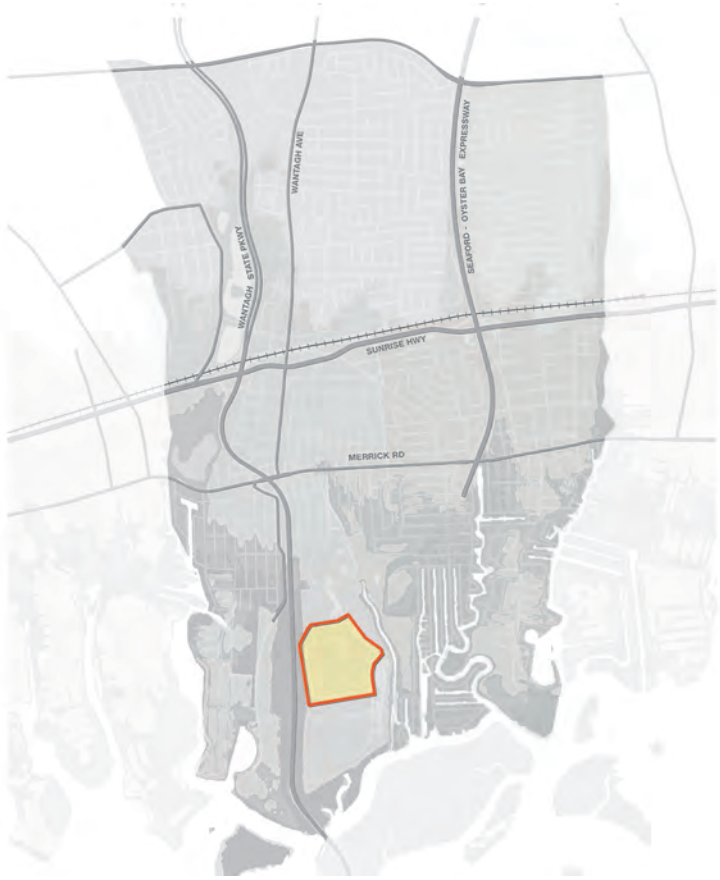
Cedar Creek Park; a potential location for a microgrid

An independent power source could provide for emergency services (above) in a time of crisis

# P11 Cedar Creek Hazard Mitigation

Develop a hazard mitigation strategy to protect the Cedar Creek WPCP against future storms

**Cost Estimate: $100,000**



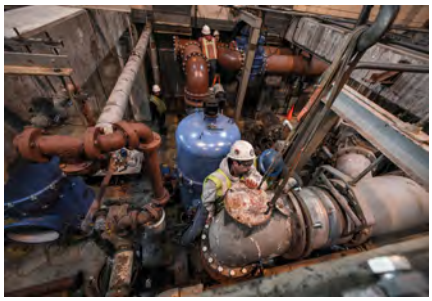

## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Infrastructure
- Project Location/Municipality: Cedar Creek Park (Wantagh)
- Primary Target Area Affected: Nassau County
- Consistency with NYRCR: Address short, medium, and long-term risks
- Potential Beneficiaries: Nassau County residents

## Project Information

The Cedar Creek WPCP remained in operation throughout the storm, but the storm surge overwhelmed the facility causing damages to internal and external equipment and materials, as well as clogging up systems with debris which required extensive cleaning. The Nassau County DPW Sandy Damage Assessment Report of the Cedar Creek WPCP recommended the development of a hazard mitigation strategy to provide a level of protection against future storm events. Strategic planning and redesigning for flood protection will safeguard the assets and will allow the plant to continue servicing the community.

Cedar Creek is vulnerable to future storm damage



A hazard mitigation strategy would help prevent outages and damage from flooding or susained power loss

SHARED
P12
PROJECT

# Integrated Communication Network

## A regionally-coordinated, one stop shop for disaster and emergency information, communication and training

Cost Estimate: (Phase 1) $20,000 - 100,000 per CR Area

## Project Information

Create a single source for comprehensive information and emergency assistance and establish a communication network that more effectively links the local government with emergency management agencies, faith-based groups, and non-profit organizations to direct aid and recovery efforts to the community's socially vulnerable populations.

Benefits: Phase 1 of this project would evaluate existing emergency communication systems and determine additional needs, with an emphasis on coordination across multiple jurisdictions. Phase 2 would establish a centralized location (such as a website) with consistent "branding" to make disaster information identifiable, and regular updates to keep information current. Phase 3 would include the creation of an educational component, using the website to promote educational seminars on disaster planning. Both Phase 2 and 3 have the potential for private and nonprofit sponsorships and partnerships.

Relationship to Disasters: During and after Superstorm Sandy many residents did not know where to look for emergency information. Some community members did not understand the severity of the storm and were unable to evacuate after conditions became unsafe, putting themselves and emergency responders at risk. Following the storm, power outages and lack of cellphone service left residents unable to communicate with friends and family members, and without a means to find emergency resource information.

## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Community Planning and Capacity Building
- Project Location/Municipality: Nassau County
- Primary Target Area Affected: Nassau County
- Consistency with NYRCR: Coordinate with regional initiatives
- Potential Beneficiaries: All Nassau County residents impacted by future disasters

SHARED
P13
PROJECT

# Business Continuity Program

## Establish a business continuity program to ensure that businesses can maintain essential functions during and after emergency events

Cost Estimate: $35,000 - $40,000 per CR Area

## Project Information

Business continuity planning ensures that businesses have the capability to maintain essential functions during a range of potential emergencies. The assistance provided by a Business Continuity Program would include planning assistance, access to alternative spaces or facilities, communications provisions, and provisions for vital records backup and management.

Benefits: The Business Continuity Program would help small businesses to create their own plans for continuing operations under adverse conditions, such as a major storm. The program would work with Adelphi University and the Business Continuity Institute to lead training sessions for local business owners. Training sessions will include assisting business owners to create a database to store, update and/or view temporary emergency power requirements for their establishments. This data will help owners procure emergency power generation supplies before a disaster, and prioritize temporary power requirements.

Relationship to Disasters: After Superstorm Sandy some 95 Seaford and Wantagh businesses, representing 288 employees, applied for disaster management assistance. These applications verified a total of $3.4 million in real property damage, $1.5 million of machinery damage, an inventory loss of $1.2 million and a leaseholder improvement loss of $952,077. Of these applications, only 25 (26.3%) were approved for an amount totaling slightly less than $1.5 million, roughly one fifth of the $7.1 million in verified damage assistance applied for.

## Key Facts

- Project Type: Emergency Readiness
- Recovery Function: Economic, Community Planning and Capacity Building
- Project Location/Municipality: Nassau County
- Primary Target Area Affected: Nassau County
- Consistency with NYRCR: Drive economic growth
- Potential Beneficiaries: Nassau County businesses impacted by future disasters

SHARED
P14
PROJECT

# South Shore Stormwater System Modeling and Analysis

## Evaluate condition and ownership of stormwater drainage systems and identify solutions for stormwater management

Cost Estimate: $500,000 - 600,000 per CR Area

## Project Information

This project would document the condition and ownership of stormwater drainage systems in the region, and use hydraulic and hydrologic modeling to study surface and subsurface stormwater drainage patterns. A study of the Sunrise Highway Conduit would also be performed to address drainage issues in upland areas.

Benefits: Modeling and analysis is necessary to help identify and prioritize solutions for stormwater management. This includes capital projects, updated maintenance requirements, regulatory improvements, public awareness programs, and other property owner assistance measures. These initiatives would increase the capacity of the stormwater system and reduce flooding issues in the region.

Relationship to Disasters: Rain and storm surge during Sandy overwhelmed the stormwater drainage system and exacerbated flooding. Additionally, localized flooding is frequently observed during heavy rainfall or high tides.

## Key Facts

- Project Type: Planning and Additional Study
- Recovery Function: Infrastructure
- Project Location/Municipality: Nassau County
- Primary Target Area Affected: Nassau County
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Nassau County residents and businesses

SHARED
P15
PROJECT

# South Shore Shoreline Conditions Analysis and Restoration Program

## Analyze shoreline conditions and incentivize coordinated improvements to reduce erosion and mitigate flooding

Cost Estimate: $100,000 - $200,000 per CR Area

## Project Information

Develop a program to incentivize and provide support for coordinated and continuous shoreline improvements along private waterfront properties, including measures to to reduce erosion and provide protection against tidal action and storm surge. This program would include the creation of a digital inventory to assess shoreline conditions, and analyze potential strategies to restore shorelines to pre-Irene and pre-Sandy conditions. Pilot projects should be implemented and monitored at a local level.

Benefits: Shoreline improvements such as hard or hybrid structures, living shorelines, wave attenuation measures such as oyster reefs, and other natural solutions can help mitigate shoreline erosion and protect coastal properties from flooding and degradation.

Relationship to Disasters: Irene and Sandy caused widespread damage to Long Island's southern coastline. Many protective coastal features were affected, compromising their ability to control erosion and flooding.

## Key Facts

- Project Type: Protective Measures
- Recovery Function: Natural and Cultural Resources, Infrastructure
- Project Location/Municipality: Nassau County
- Primary Target Area Affected: Nassau County
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Nassau County residents

SHARED
P16
PROJECT

# Lifeline Transportation Network

## Identify and establish a system of local roads that lead to evacuation routes and Community Resource Centers

Cost Estimate: $100,000 - 120,000 per CR Area

## Project Information

Perform a study to identify a system of local roads that lead to Nassau County designated evacuation routes, Community Resource Centers, and evacuation centers. These "Lifeline Roads" should be prioritized for resilience and response measures such as debris cleaning, and clearly identified with uniform signage. Street lights and signals should be independently powered, and cell phone towers in proximity to the network should be required to maintain additional backup power resources.

Benefits: Establishing and publicizing a designated lifeline transportation network would ensure that residents and emergency responders can move throughout the community during and immediately after a major storm event.

Relationship to Disasters: Emergency responders had difficulty accessing heavily flooded areas during Sandy, and some residents who did not or were unable to evacuate before the storm made landfall were trapped in their homes. Even after the storm, debris on roadways made movement difficult.

## Key Facts

- Project Type: Planning and Additional Study
- Recovery Function: Infrastructure
- Project Location/Municipality: Nassau County
- Primary Target Area Affected: Nassau County
- Consistency with NYRCR: Increase resiliency of key assets
- Potential Beneficiaries: Nassau County residents

SHARED
P17
PROJECT

# Regional Energy Action Plan

## Evaluate options for distributed generation and microgrid implementation, and smart grid technology integration

Cost Estimate: (Initial study) $1,000,000

## Project Information

Perform a study to identify opportunities for distributed generation and microgrid deployment, and smart grid integration into the existing electricity distribution system. Potential projects should incorporate community-driven planning and design, and leverage public-private partnerships for funding resources.

Benefits: Distributed generation resources can lower energy costs, and combined with a microgrid system can enhance grid reliability for all electricity customers. Smart grid technology can help utilities identify and service faults and outages faster, and allows for more efficient and reliable operation. These technologies also create new opportunities for jobs in clean energy industries, and contribute to a cleaner environment.

Relationship to Disasters: During Sandy, Irene, and many other minor storms damage to overhead utility lines resulted in power outages, which lasted for days in some parts of the region.

## Key Facts

- Project Type: Utilities
- Recovery Function: Infrastructure
- Project Location/Municipality: Nassau County
- Primary Target Area Affected: Nassau County
- Consistency with NYRCR: Coordinate with regional initiatives
- Potential Beneficiaries: Nassau County residents and businesses