



## **East Bronx Waterfront Planning Committee Meeting #4**

September 3, 2014

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# Agenda for Planning Committee Meeting #4

1. **Public meeting preparation** 6:00 PM
2. Review initial strategies 6:20 pm
3. Strategy development 6:45 pm
3. Schedule and next steps 7:45 pm

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## Public Meeting Preparation

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- Venue
- Meeting Format
  - Opening presentation / overview of strategies
  - Open House with strategy stations
  - Report back
  - Summary / next steps
- Advertising
- Outreach

# Station Board Organization (coastal protection example)

## Coastal Protection

Strategy: Address existing vulnerabilities from coastal flooding  
Use natural systems to enhance ecosystems and Community health

**Event-Base Hazards: Surge & Waves**      **Gradual Hazards: Sea Level Rise**

**FEMA Preliminary Work Maps**  
The preliminary work maps are an essential step in FEMA's process of identifying flood risk. These maps are currently the best available information on current flood risk. They are anticipated to be released in 2015.

**Elevation**  
Close coastal wetlands and areas. Canarsie is a very low-lying area. Much of the area is below what FEMA estimates will be the high water table with 2050 and level rise projections.

**Understanding FEMA Flood Risk Information**  
The FEMA Flood Risk Zones and what they are defined as. Flood zones are defined as areas with a 1% or greater chance of flooding each year. To find it is progressive. This is called a 100-year flood. It is a 100-year flood. This 1% zone is also subject to reduce over 2' high.

**Considering Future Change**  
FEMA flood risk maps reflect risk if a storm were to happen today. They do not take into account potential future change such as rising sea levels.

**Canarsie NY Rising Community Reconstruction Plan**

Background Information (101)

## Coastal Protection

Strategy: Address existing vulnerabilities from coastal flooding  
Use natural systems to enhance ecosystems and Community health

**Existing Conditions**

**The Water's Edge**  
In Canarsie, the shoreline is largely soft and inaccessible, therefore accompanying waterfront access is an important element of any coastal protection measure selected.

**Historic Shoreline**  
As historical maps indicate, a large amount of Canarsie is flood wetlands. These flood areas correspond to large areas to the flood plain and low-lying areas of the neighborhood.

**Land Ownership**  
Multiple land owners would need to be engaged to provide coastal protection to the community. In addition, public funding for shoreline protection or private property can be difficult and require requirements for the property owner.

**Understanding the edge**  
In June of 2013, The New York City Department of City Planning released "Urban Waterfront Adaptive Strategies". This report is intended to be a guide for identifying and evaluating potential strategies for increasing the resilience of waterfront communities to coastal flooding and sea level rise. The report examined coastal conditions - the geomorphology as well as land use and density - and proposed adaptive strategies appropriate to different neighborhoods across the city.

**Canarsie NY Rising Community Reconstruction Plan**

Existing Conditions

## Coastal Protection

Strategy: Address existing vulnerabilities from coastal flooding

**Potential Strategies**  
Place the number of your preferred strategy where you would like to see it employed on the map to the right.

**Shorelines**

- 1 Bulkheads
- 2 Revetments
- 3 Living Shorelines
- 4 Floodwalls
- 5 Dunes
- 6 Berms/Levees

**In-Water**

- 7 Wetlands
- 8 Breakwaters
- 9 Reefs
- 10 Floating Breakwaters
- 11 Breakwater Islands
- 12 Tide Gates

**Community Ideas**

**Canarsie NY Rising Community Reconstruction Plan**

Strategy/Opportunity for Comments

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## Strategies (in no particular order)

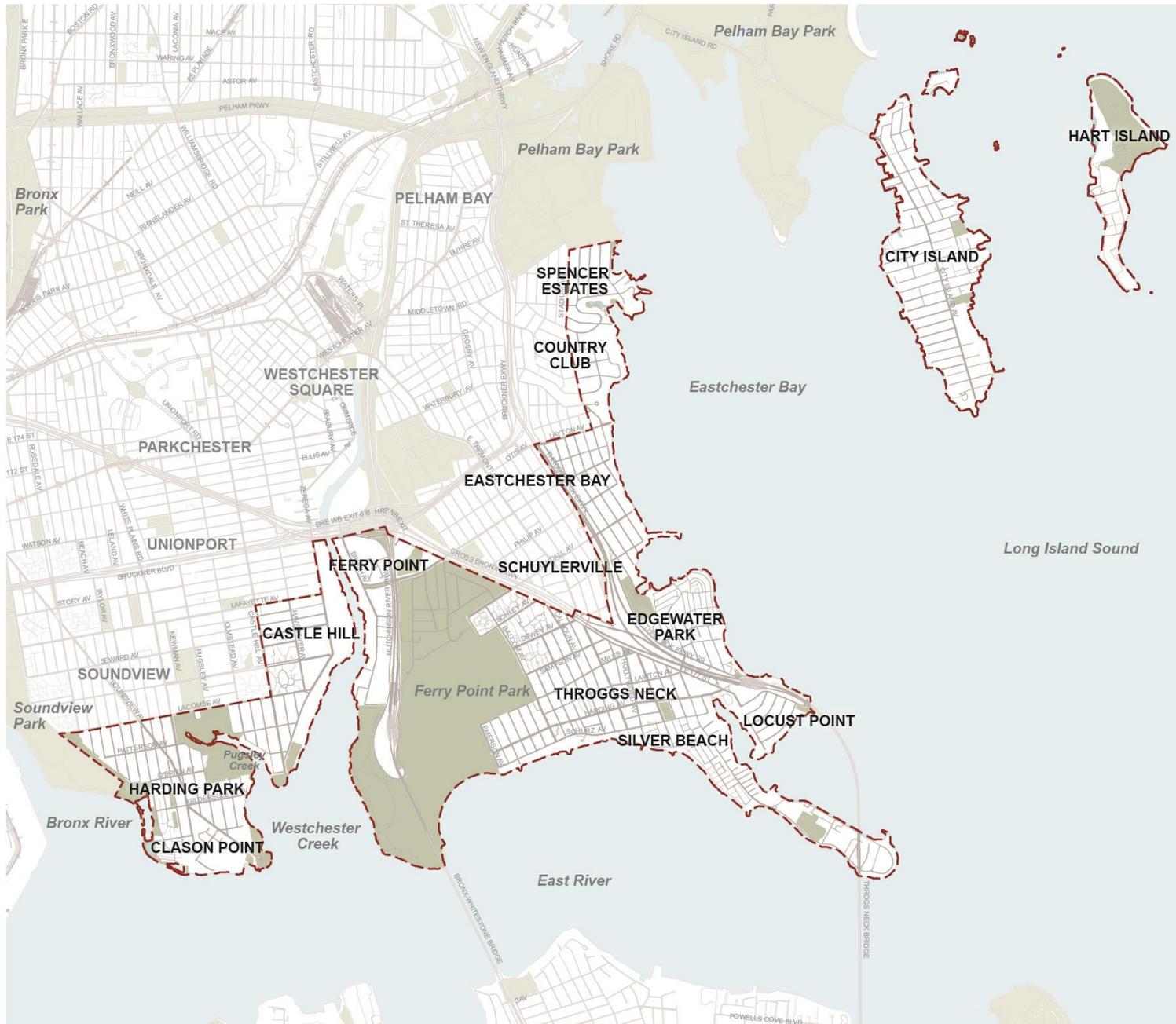
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1. Maintain community's close relationship to the water by developing **diverse coastal edge protection** measures
2. Provide **alternative power sources** in housing and key community facilities
3. Develop local community plan to **improve emergency preparedness**
4. Ensure **economic resiliency** for property owners in flood prone areas
5. **Improve** and increase the capacity of **storm water management** infrastructure



**New York Rising  
Community Reconstruction Program  
East Bronx Waterfront Planning Area**

East Bronx Waterfront Planning Area



*New York City Department of City Planning, MAPPluto v13.1; Street Centerlines.*



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## Strategy Review

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1. Storm Damage & Flooding
2. Emergency Preparedness - Recovery Centers
3. Power Outage

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## Strategy Review

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### Storm Damage & Flooding

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## Storm Intensity and Frequency is Increasing



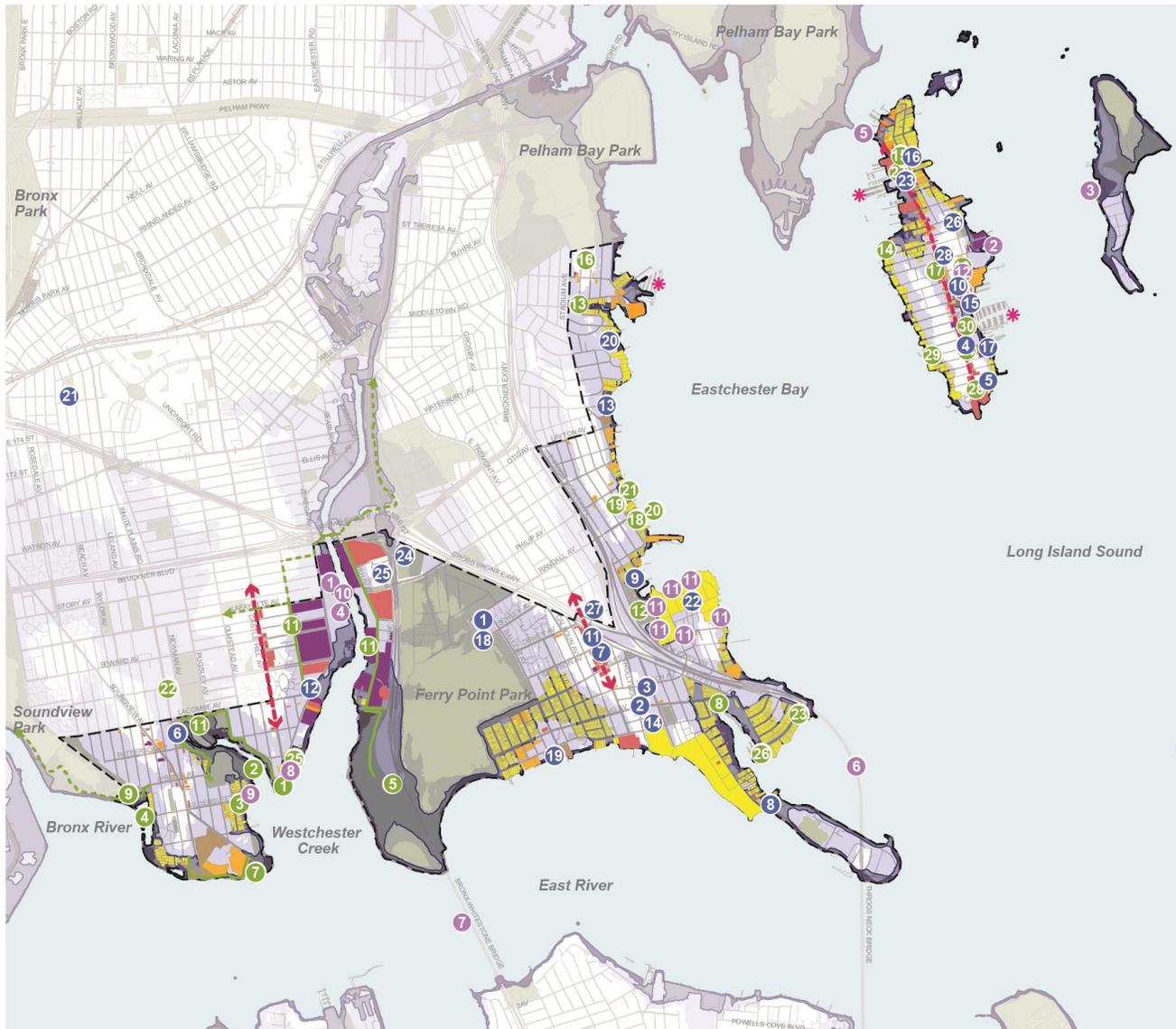
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## Diverse Waterfront Conditions

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# Significant assets close to edge

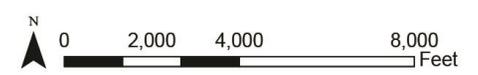


**New York Rising  
Community Reconstruction Program  
East Bronx Waterfront Planning Area**

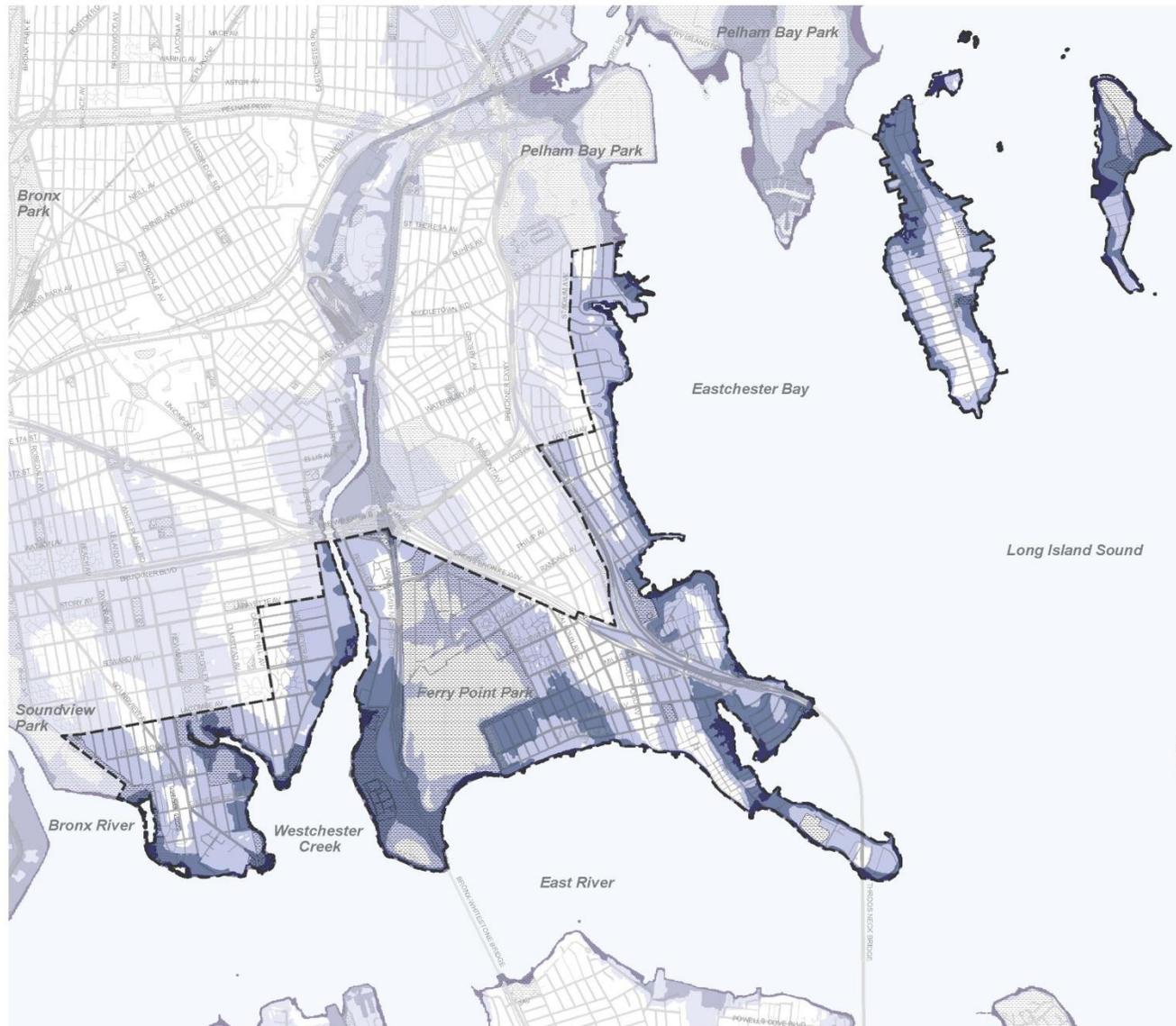
**Assets Map**

- Planning Area
- Extent of High & Extreme Risk Zones
- NYS DOS Risk Areas**
- Extreme
- High
- Moderate
- Assets**
- Health and Social Services Assets
- Natural and Cultural Resources Assets
- Infrastructure Assets
- Economic Asset Typologies**
- Commercial Corridors
- Commercial Marinas
- Mixed Commercial/Residential Building
- Commercial/Office Building
- Industrial/Manufacturing
- Residential Asset Typologies**
- One and Two Family Residents
- Multi-Family Walk-Up Buildings
- Multi-Family Elevator Buildings

Source: NYS Department of State (DOS) Risk Assessment, NYC Department of City Planning (DCP), MAPPluto v13.1, Street Centerlines, NYC DCP Facilities, Planning Committee and Public.



# Mapping Future Coastal Risk – According to NYS



New York Rising  
Community Reconstruction Program  
East Bronx Waterfront Planning Area

## NYS DOS Risk Areas

Planning Area

Extreme

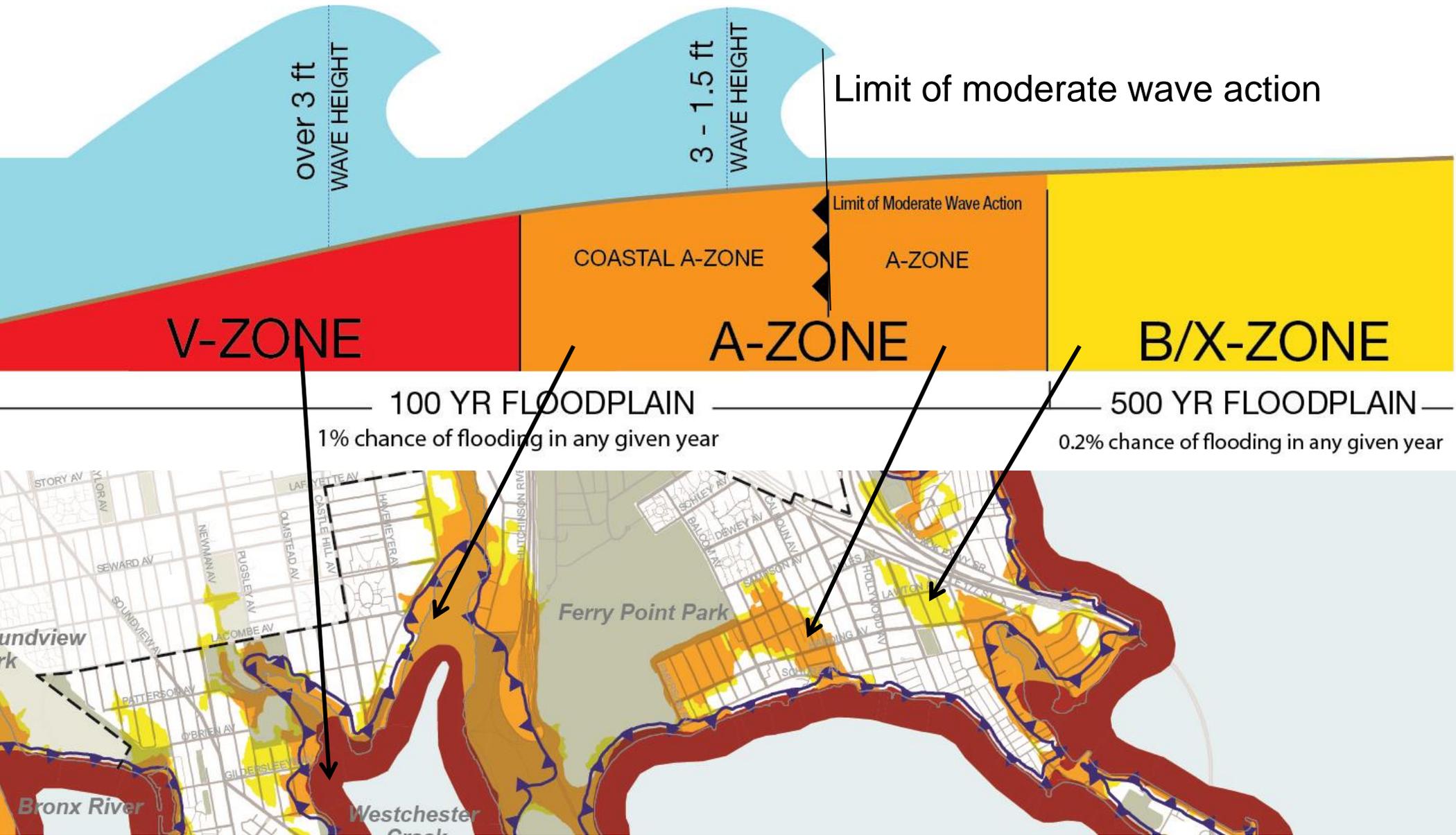
High

Moderate

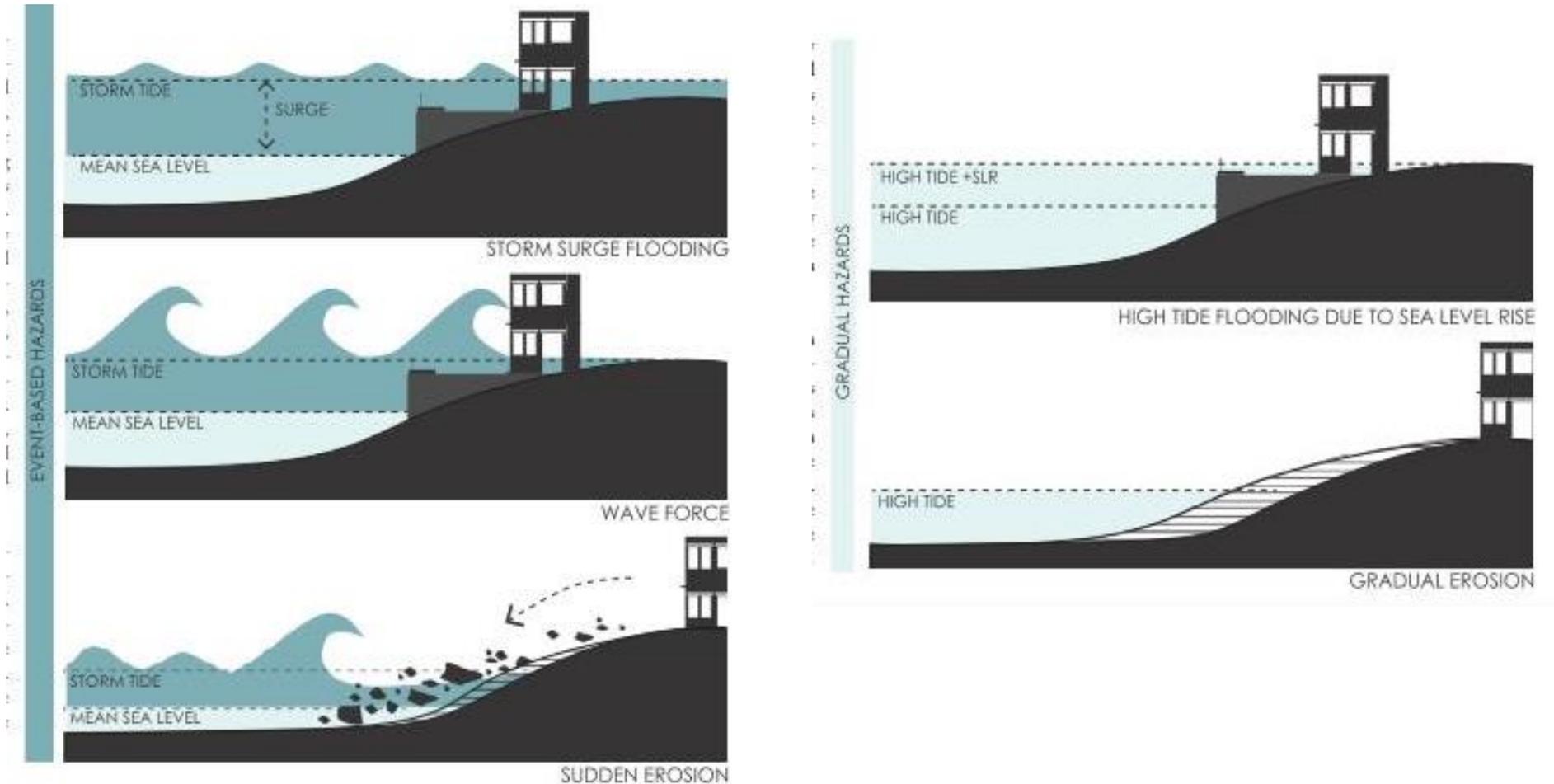
Source: New York State Department of State (DOS) Risk Assessment; New York City Department of City Planning, MAPPluto v13.1; Buildings, Street Centerlines.



# FEMA FIRMS: What do the zones mean?

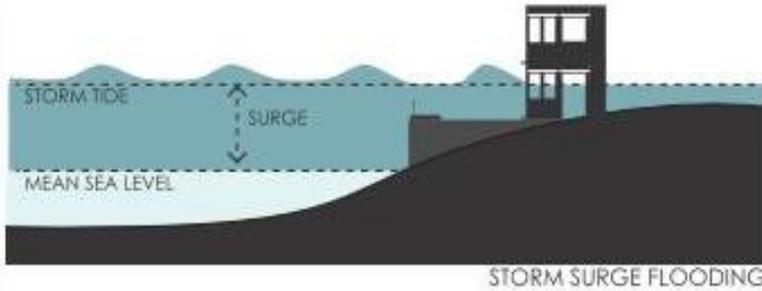


## What is coastal risk? What causes it?



Source: New York City Dept. Of City Planning, “Urban Waterfront Adaptive Strategies” (2013)

# Topography



New York Rising  
Community Reconstruction Program  
Bronx Planning Area

Anticipated Depth of Flooding in 100-Year Storm

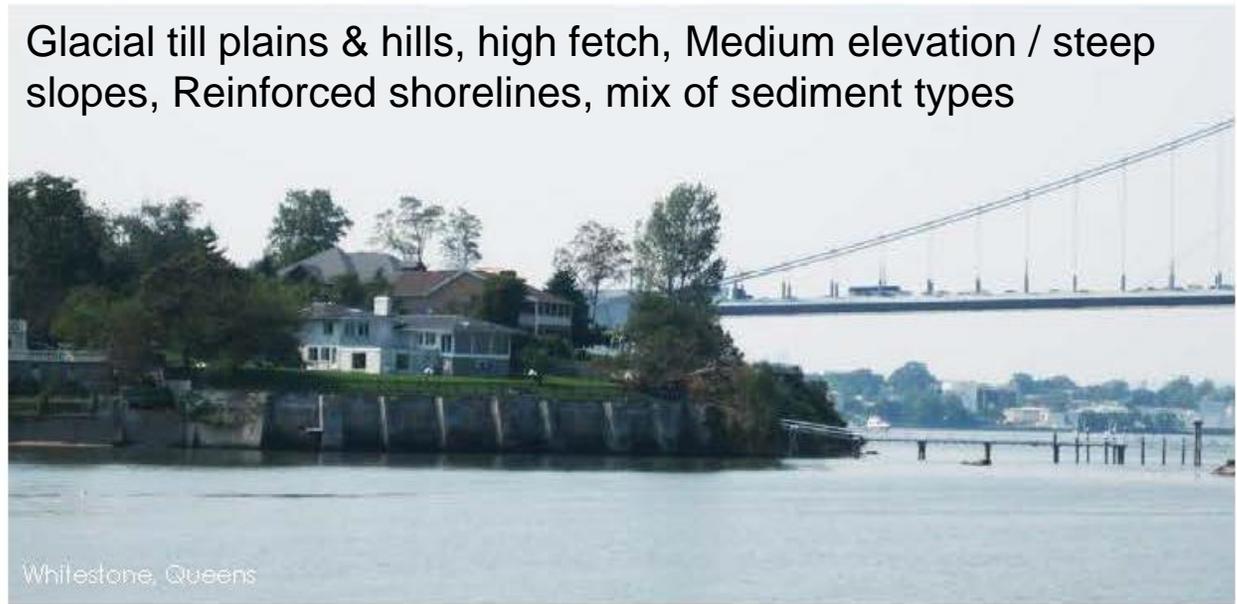
Planning Area

- > 9 feet
- 6 - 8.99 feet
- 3 - 5.99 feet
- 1-2.99 feet
- 0 - .99 feet

***much of the planning area is high and outside the flood plain with only a few low-lying areas that extend more than a block inland.***



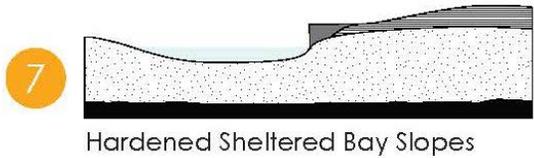
# Coastal Geomorphology



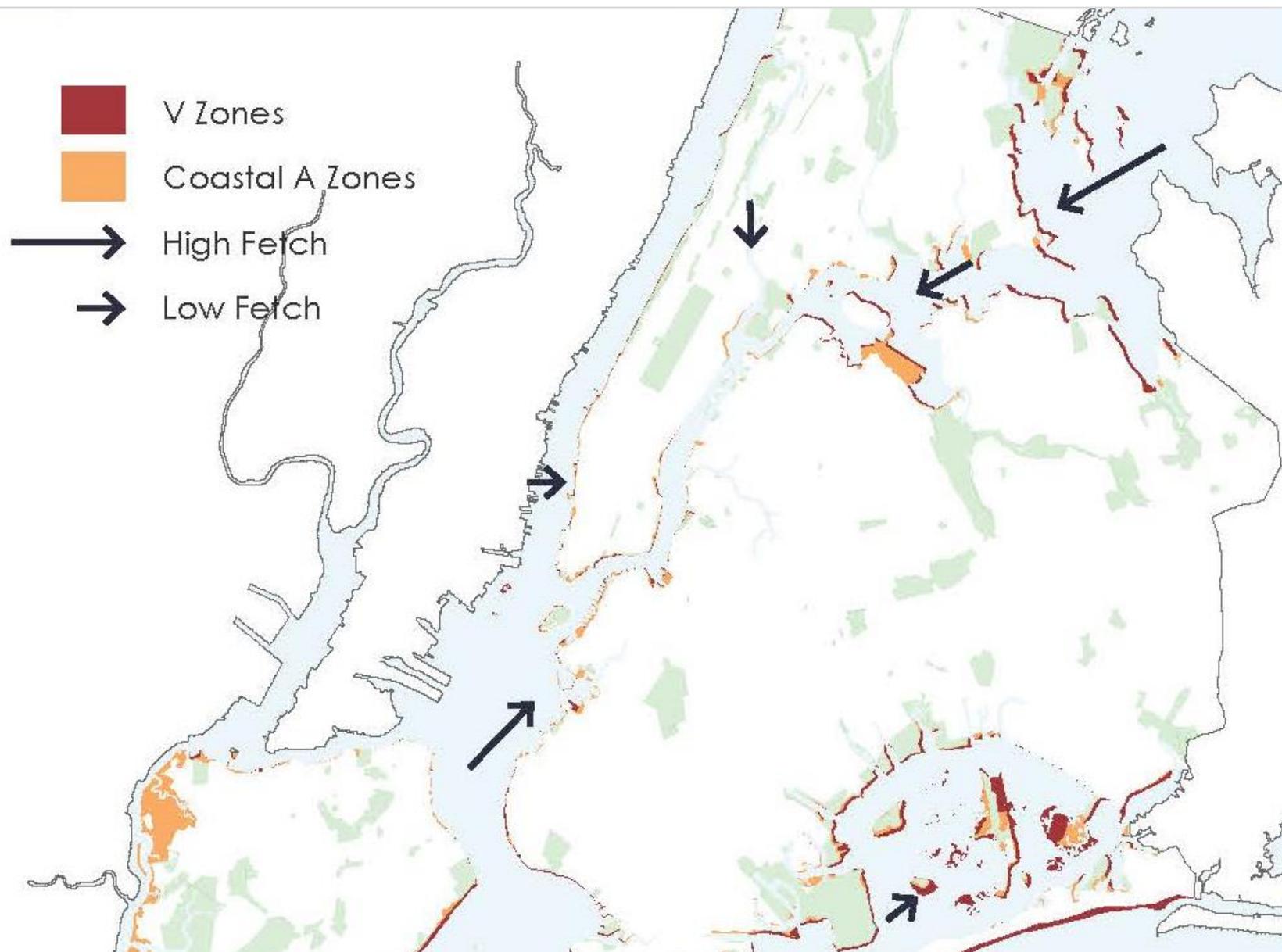
## GEOMORPHOLOGY CATEGORIES



DEGREE OF EXPOSURE TO COASTAL HAZARDS				
EVENT BASED			GRADUAL	
Storm Surge	Wave Action	Sudden Erosion	Sea Level Rise	Erosion
◐	○	○	◐	○



## Exposure to wave force

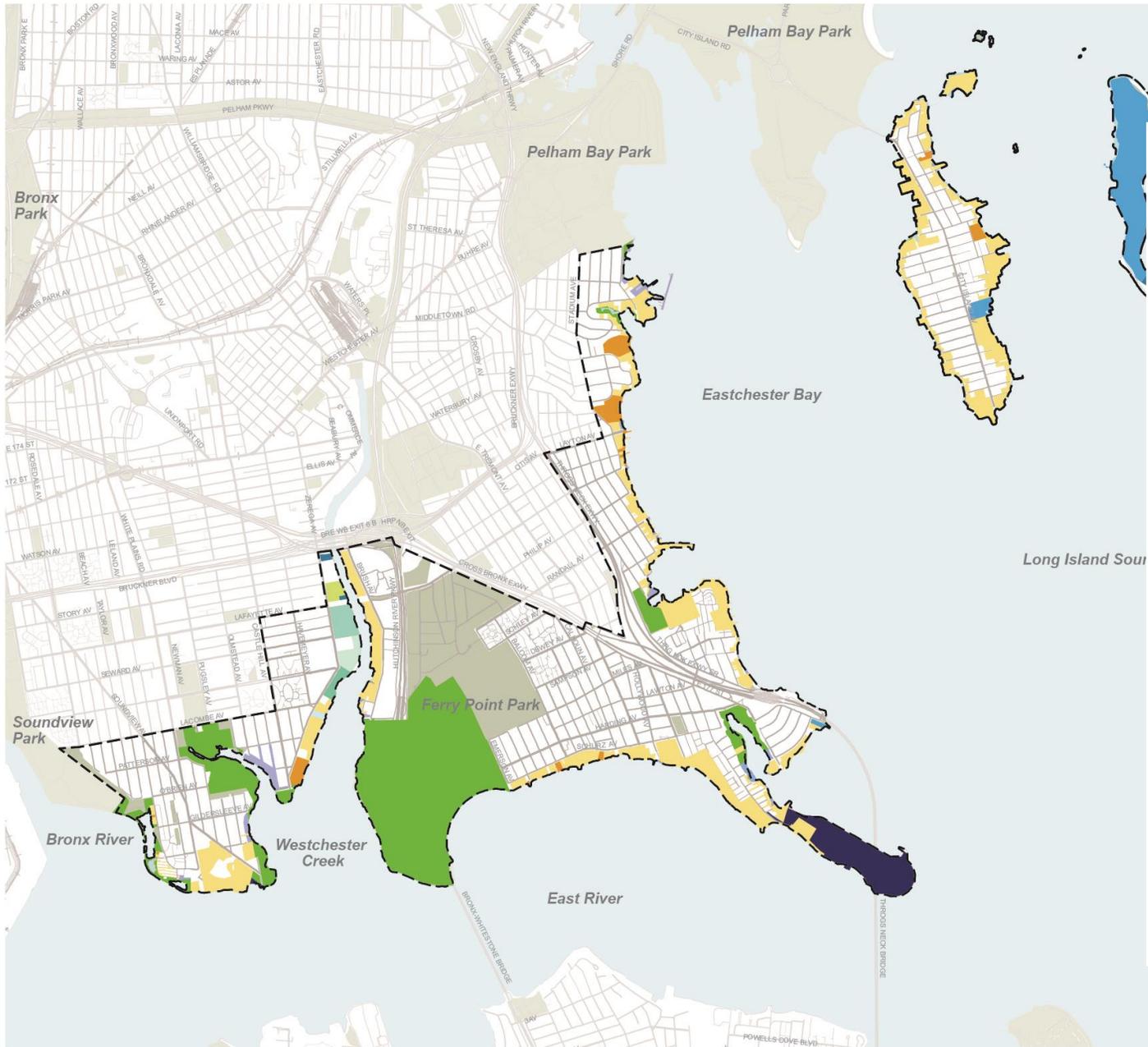


Source:  
New York City Dpt. Of City Planning, "Urban Waterfront Adaptive Strategies" (2013)

# Ownership



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Community Reconstruction Program  
Bronx Planning Area



## Ownership

Planning Area

### City, State, Federal Ownership Type

- Parks And Recreation
- Department of Sanitation
- D C A S
- Department of Environmental Protection
- Department of General Service
- Department of Small Businesses
- New York City Industry
- NYC Economic Development Corporation
- NYC Transit Authority
- The City of New York
- NY State Public Works
- State of New York

### Other Owner Type

- Private
- Other/Mixed



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## Waterfront activities & Land uses

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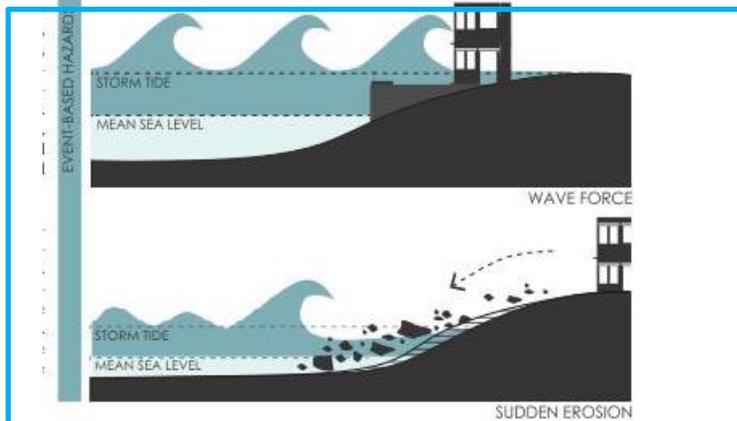


## Types of Strategies



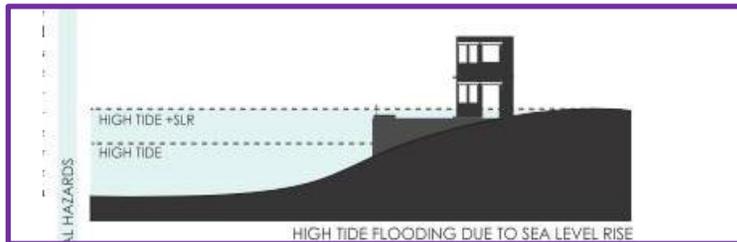
### Storm Surge

*Protect against storm surge*



### Wave Action and Coastal Erosion

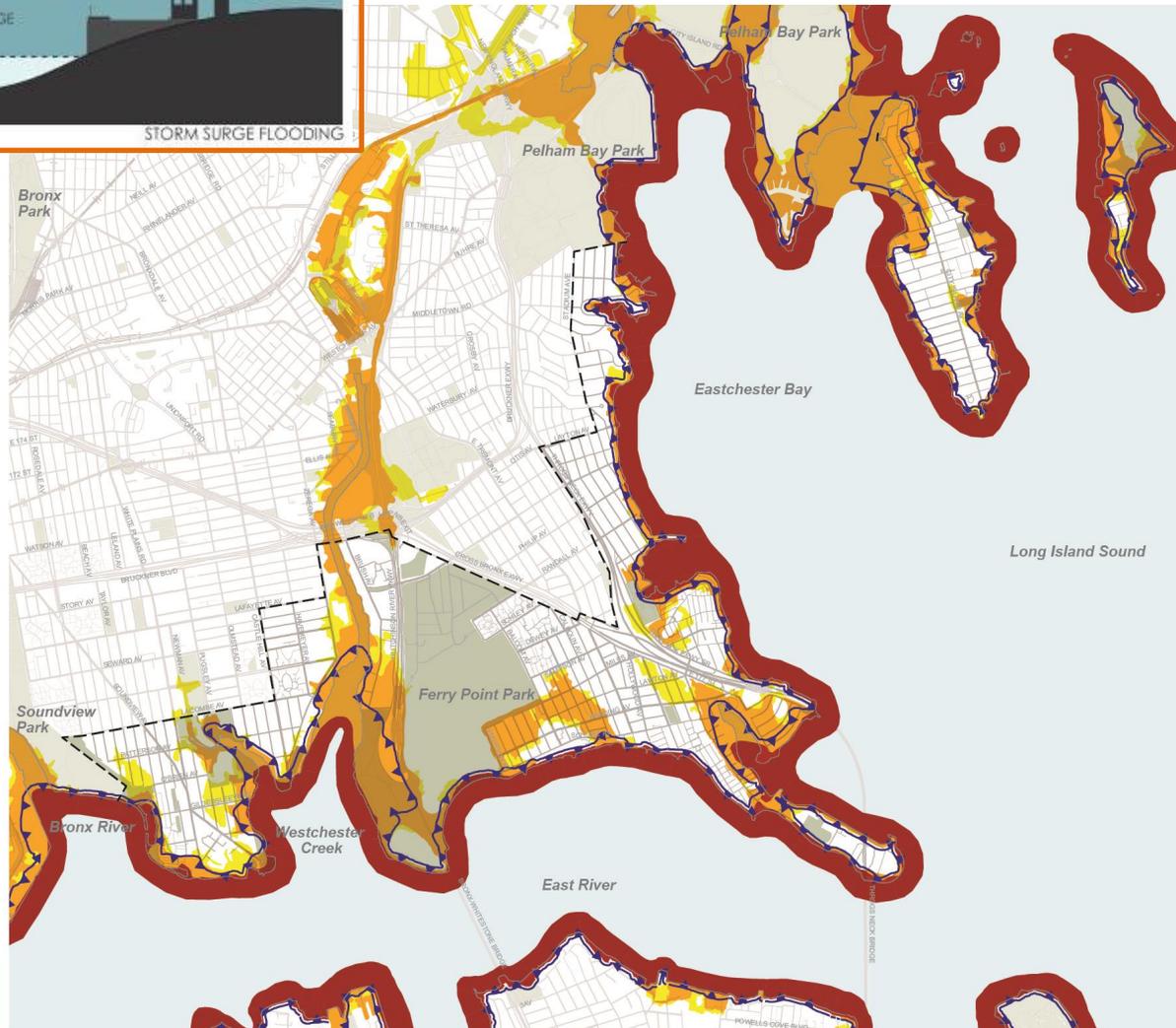
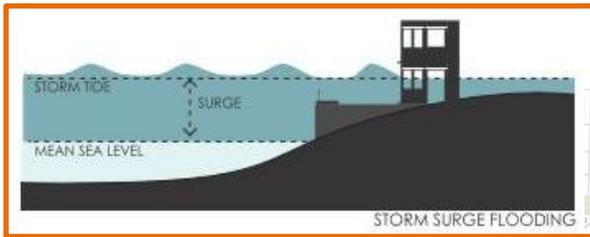
*Reduce wave energy / Minimize upland wave zones, manage longshore currents*



### High Tides, Sea Level Rise

*Raise coastal edge elevations*

# Protecting Against Storm Surge – 22 Miles of Coastal Edge



New York Rising  
Community Reconstruction Program  
Bronx Planning Area

FEMA Preliminary Work Map

--- Planning Area

Flood Zone

- V-zone (Subject To Wave Action >3')
- A-zone / 100 Year Floodplain (1% Annual Chance Of Flooding)
- 0.2 Pct Annual Chance Flood Hazard
- ▲ Limit Of Moderate Wave Action (1'-3' Waves)

Source: Federal Emergency Management Agency; New York City Department of City Planning, MAPPluto v13.1; Street Centerlines.



# Surge Protection

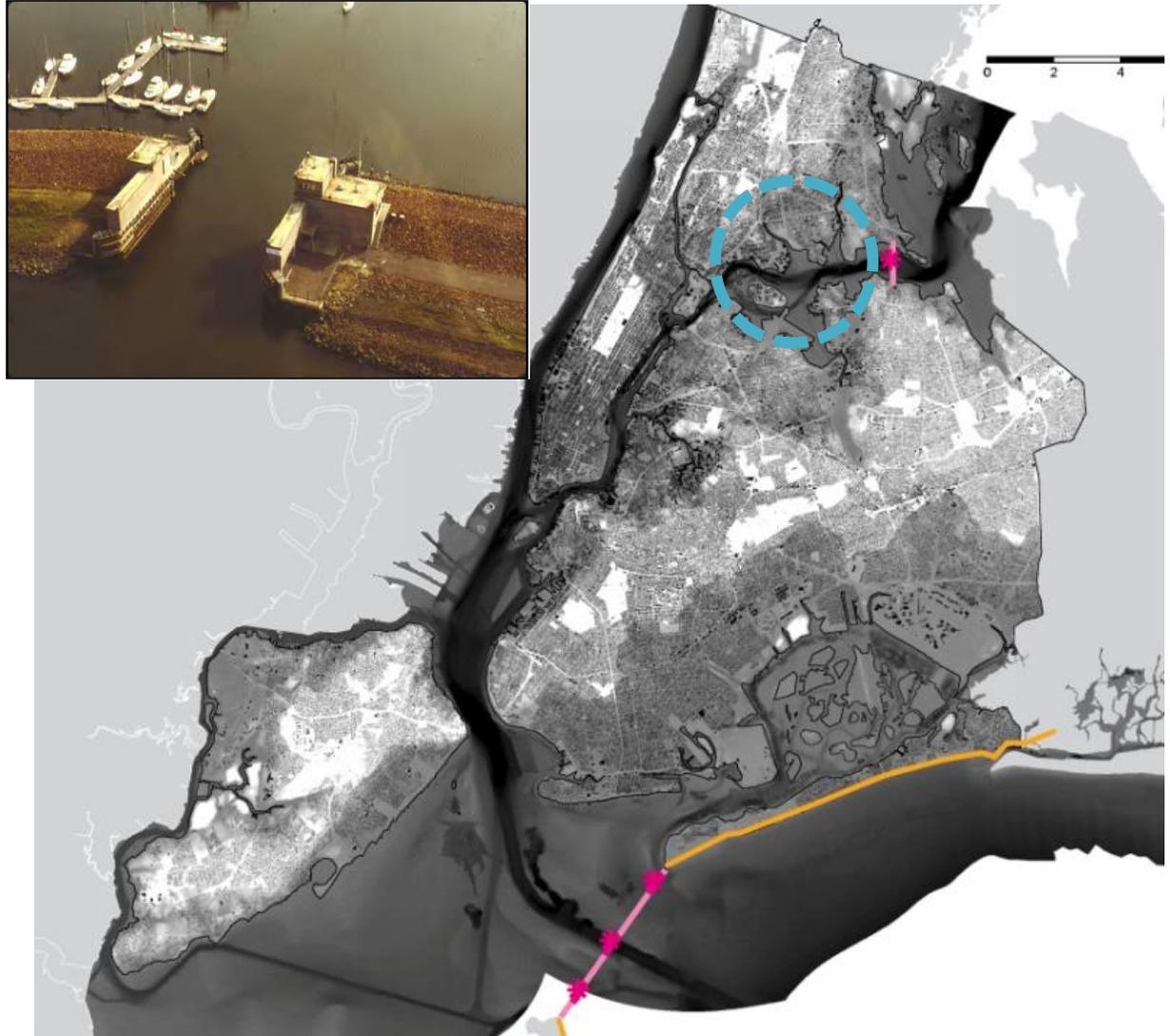
## Regional: City-wide surge barriers

- Pros

- Provides Harbor-wide protection (to a point)

- Concerns

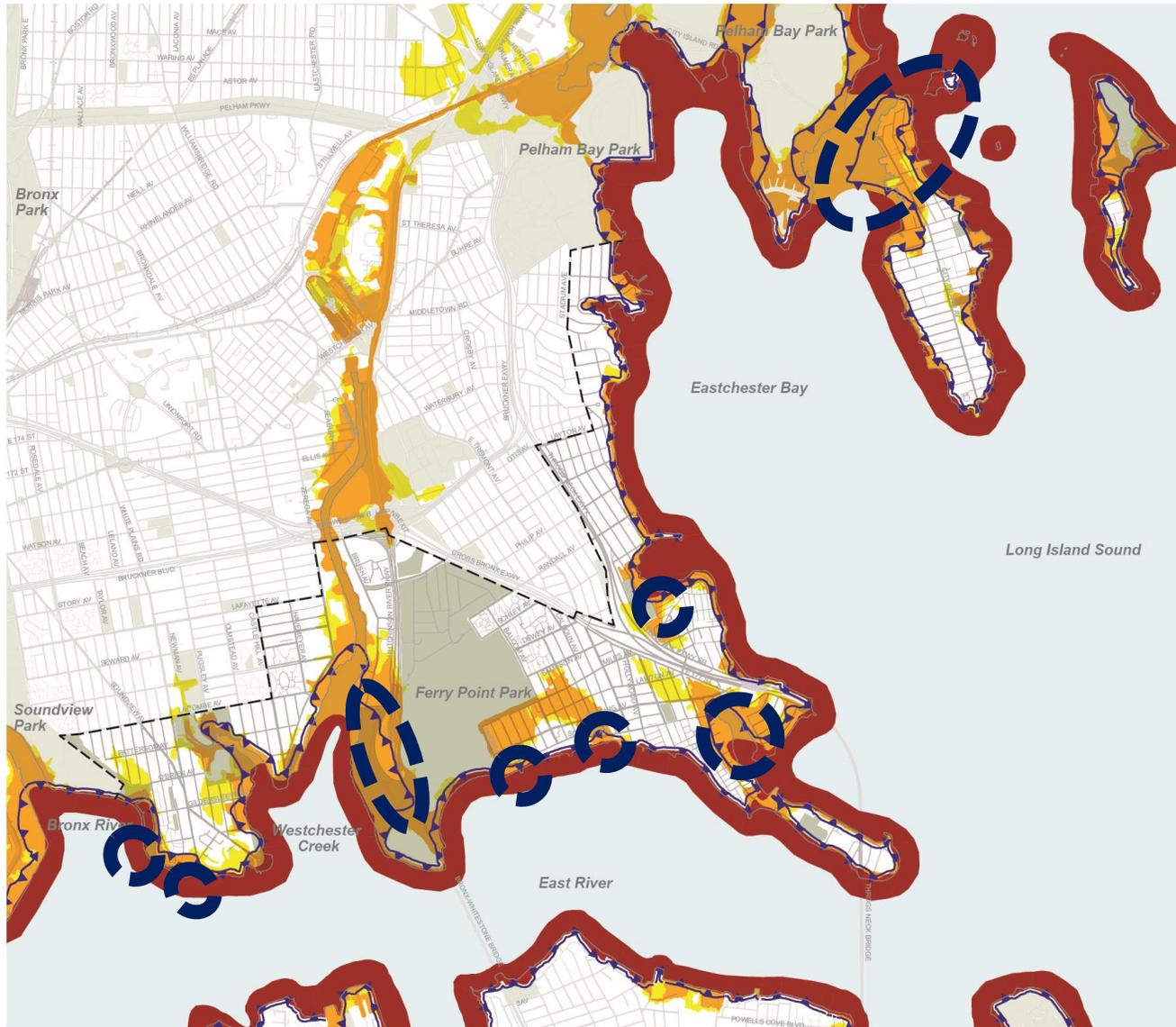
- Extremely expensive: \$20-25 Billion to construct with ongoing maintenance costs
- Requires extensive coordination among, city, state, and federal agencies
- Likely to have significant negative environmental and hydrologic impacts
- Would still require large-scale coastal protection infrastructure on the ocean-side of the Rockaways



Sandy-hook to rockaway surge barrier (including connecting levees / walls in NY and NJ) + Surge Barrier at Throgs Neck

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# Surge Protection: Local: targeted locations



New York Rising  
Community Reconstruction Program  
Bronx Planning Area

FEMA Preliminary Work Map

--- Planning Area

Flood Zone

- V-zone (Subject To Wave Action >3')
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- Limit Of Moderate Wave Action (1'-3' Waves)

Source: Federal Emergency Management Agency, New York City Department of City Planning, MAPPluto v13.1; Street Centerlines.



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# Local Techniques to Protect Against Storm Surge

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Permanent Floodwalls



Sea Walls



Levees



Deployable Floodwalls

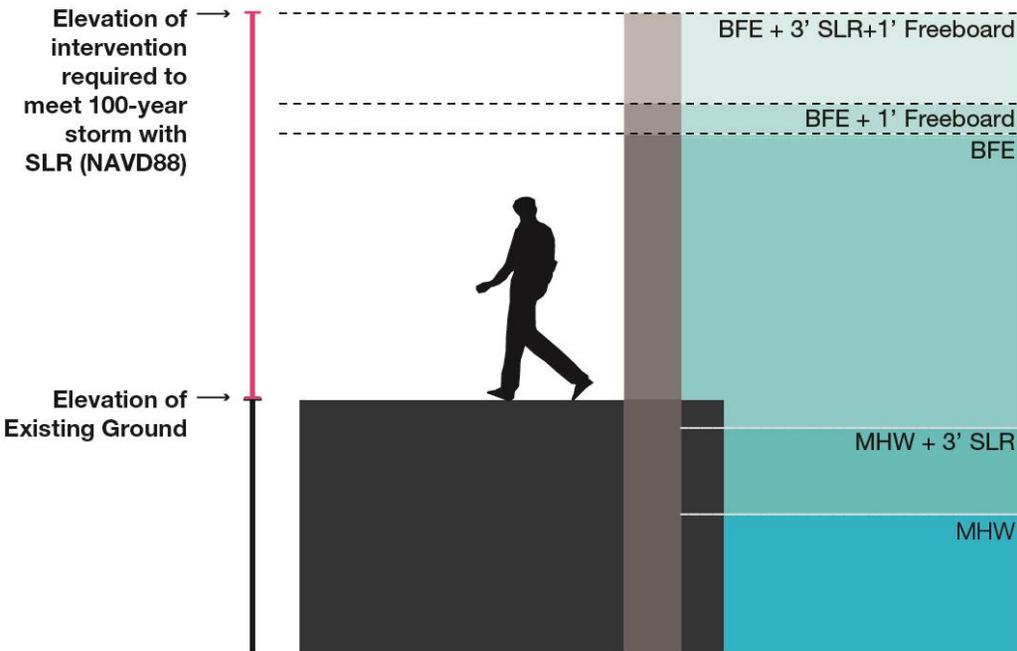


Flood Walls

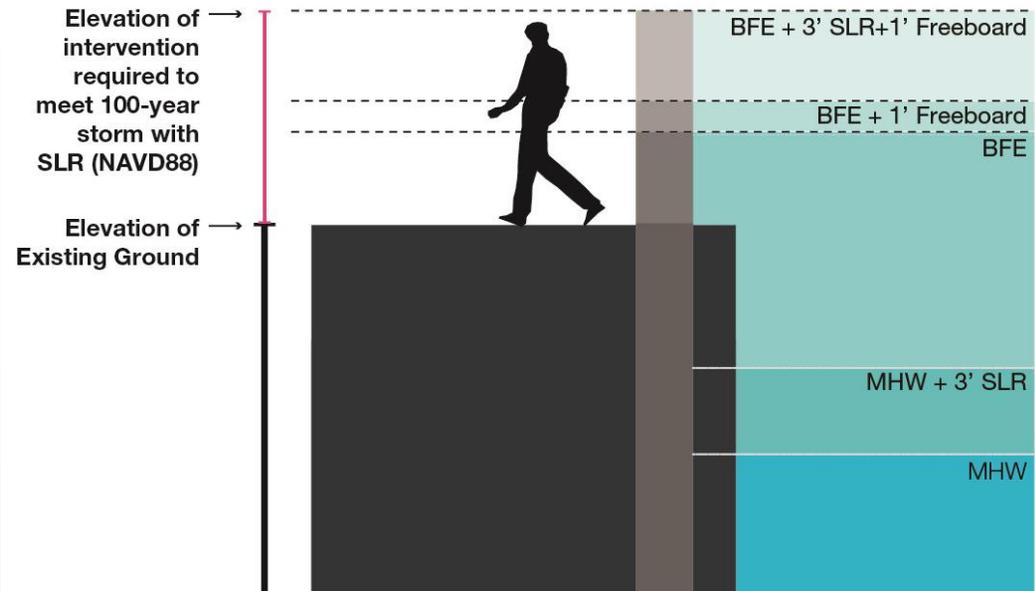


Deployable Floodwalls

# Local Surge Protection: what it means on the ground



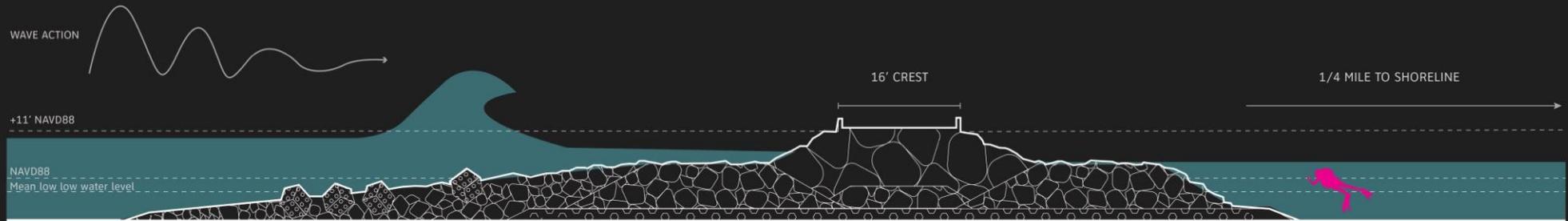
Protection at the edge



Protection further inland

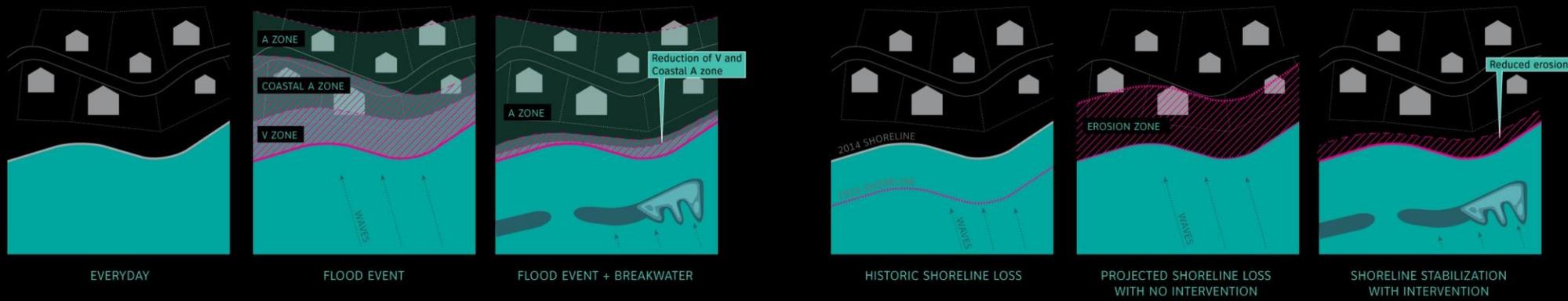
# Wave attenuation: How it works

## Wave attenuation with breakwaters: how it works



Impact: reduces upland wave zones

Impact: reduces coastal erosion



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# Strategies to Reduce Wave Action (both EVENT BASED and GRADUAL)

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Floating Breakwater



Constructed Wetlands



Reefs



Groins



Groins



Constructed Breakwater Islands



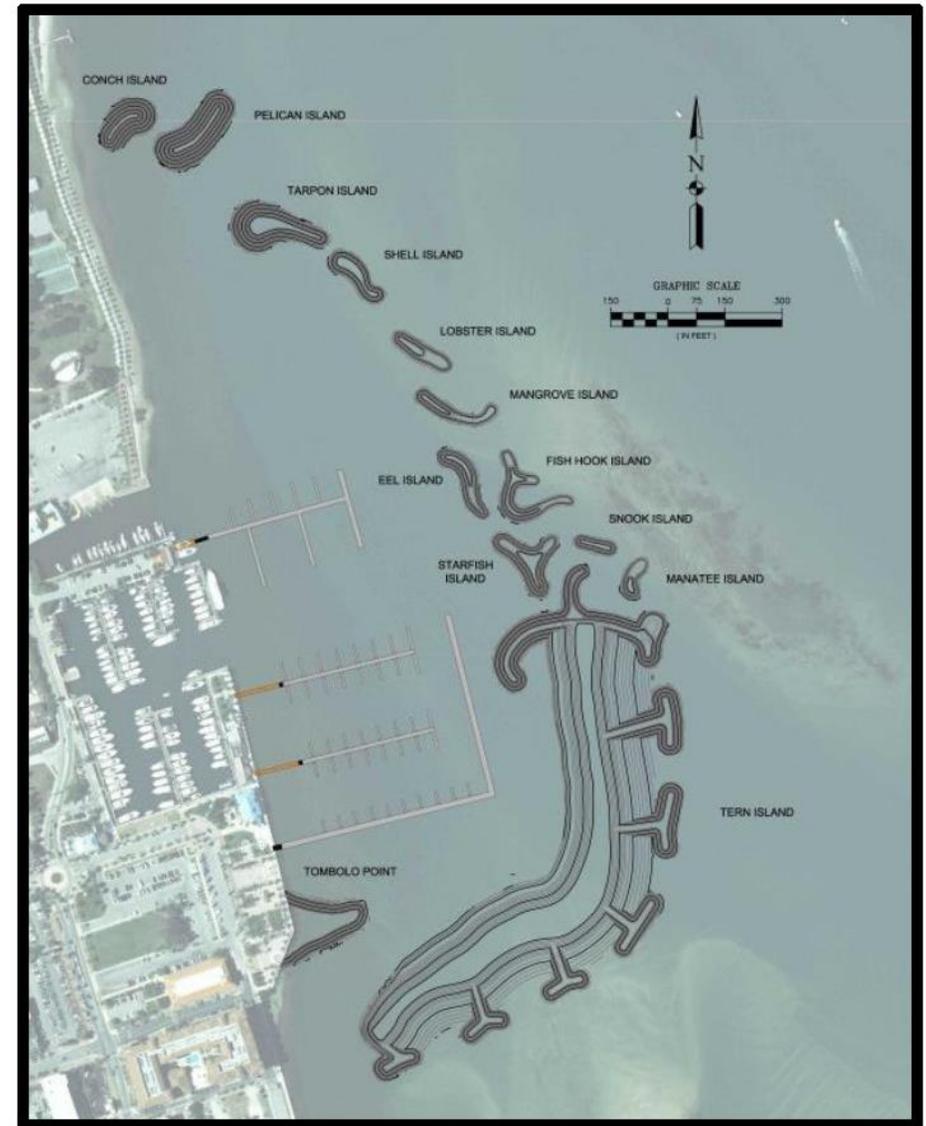
Breakwaters



Living Shorelines

# Precedent: City of Fort Pierce Marina Island Breakwater Creation

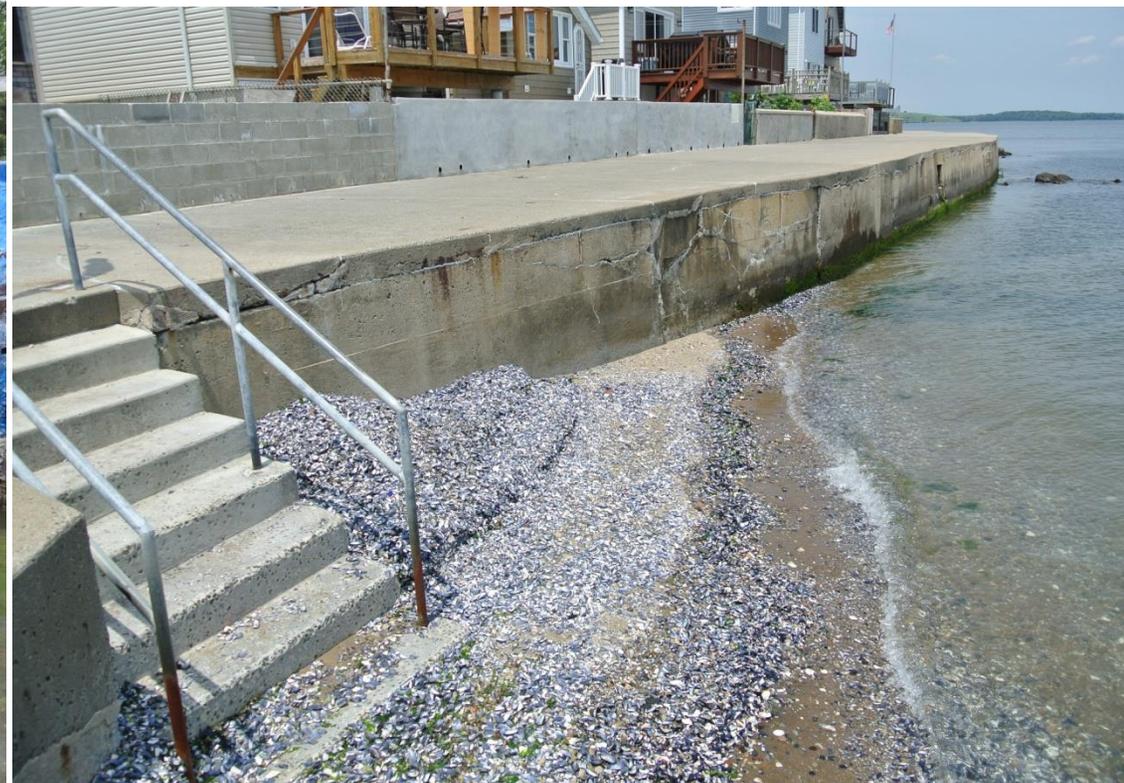
- 12 Island Breakwaters & 1 Peninsular Structure
  - Total of 14.66 Acres
- Ecological Enhancements
  - > 12 Acres
    - Oyster Recruitment
    - Mangrove Habitat
    - Juvenile Fish Habitat
    - Shore Bird Habitat
- \$18.9 Million Construction Cost
  - NTP Issued February 2012
  - Construction Finishes End of May 2013



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## Hazards: Shoreline Erosion

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## Strategies to Combat Sea Level Rise: Raise Coastal Edge Elevations

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Raise / repair bulkheads



Revetments / low berms

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## Strategy Review

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### Emergency Preparedness - Recovery Centers

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What we have heard from you...

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## **CRITICAL ISSUES**

- Lack of community space that can be used during recovery efforts
- Lack of communication between and among communities before, during, and after an emergency event

## **NEED**

Multiple storm recovery facilities in central locations



## **OPPORTUNITY**

Using existing, geographically convenient community facilities

**STRATEGY:** Develop local plan to improve emergency preparedness

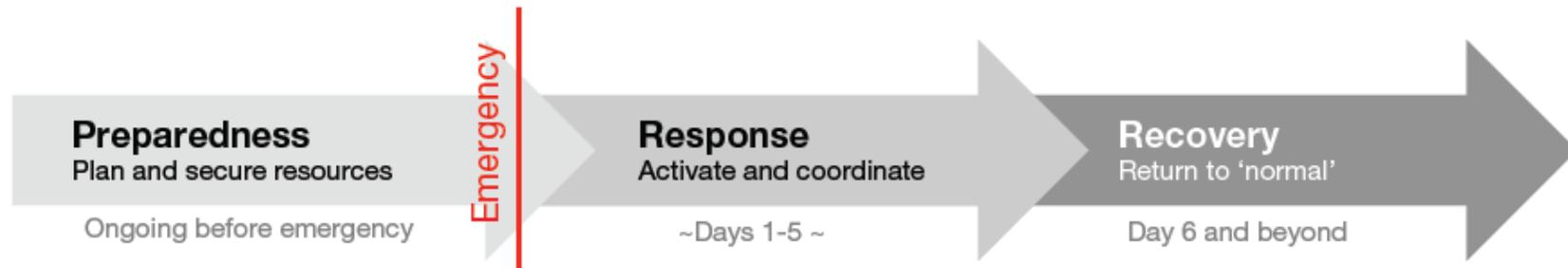
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## Disaster preparedness and social resiliency

Preparedness, response, and recovery are critical

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### Preparedness, response, and recovery process



### Disaster preparedness saves lives and minimizes damage through:

- Prepared communities
- Trained responders
- Robust supply lines
- Effective coordination

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## Creating a relief center

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### What is a relief center?

- Provides emergency services (access to health and social services, food, water, supplies)
- Information hub after an emergency
- *It is not a shelter or evacuation center*

### Considerations

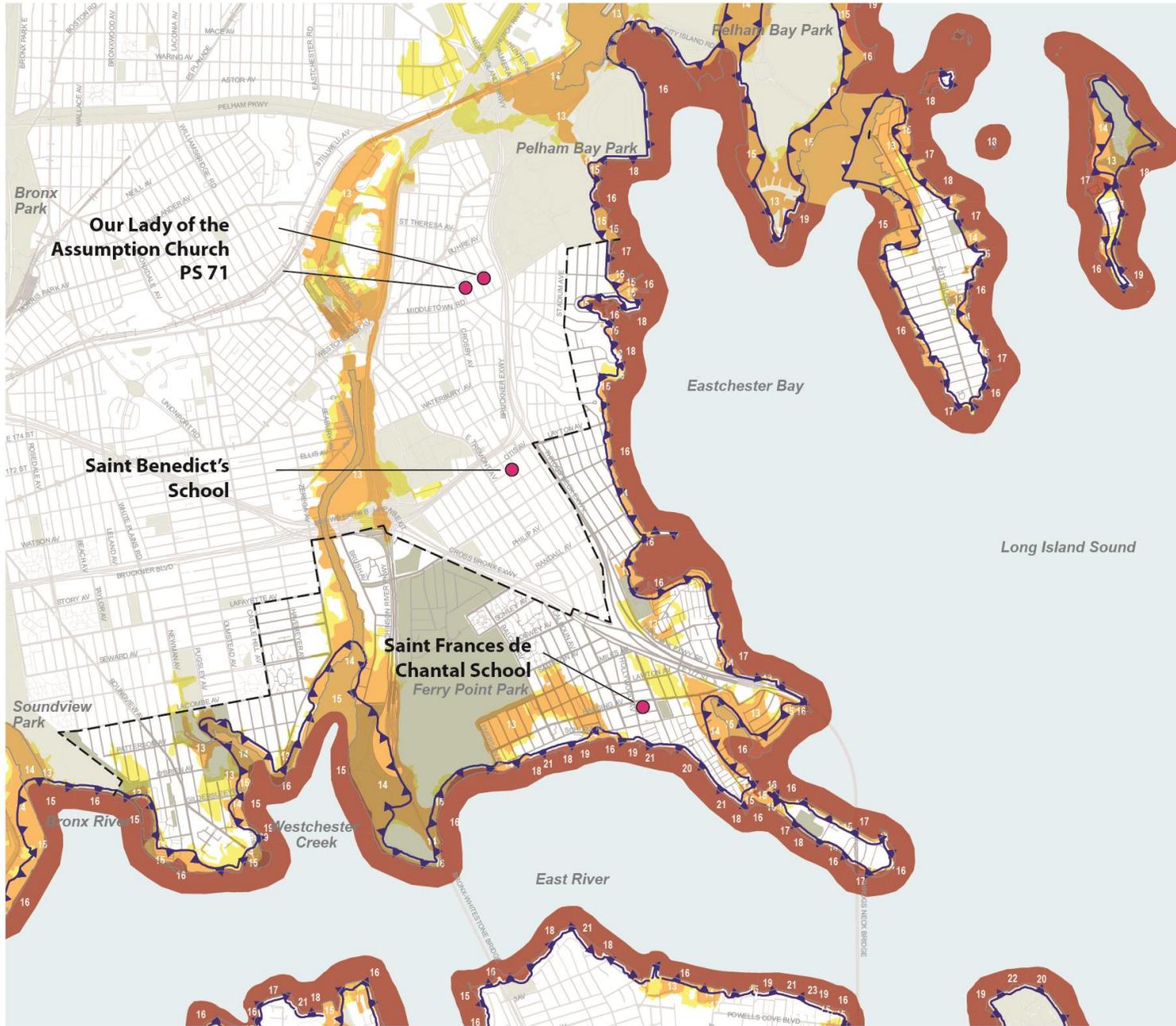
- How the center functions 365 days a year (stewardship, maintenance, programming)
- Location within community
- Overall ownership and governance – day-to-day and in an emergency

### Precedent:

#### Sandy Response at St. Frances de Sales Parish – Belle Harbor, NY



Relief efforts at St. Frances de Sales Parish (Source: Ramaa Reddy Raghavan, Public Radio International)



**Potential Candidates for Recovery Centers**

Planning Area

**FEMA Preliminary Work Map Flood Zone**

- V-zone (Subject To Wave Action >3')
- A-zone / 100 Year Floodplain (1% Annual Chance Of Flooding)
- 0.2 Pct Annual Chance Flood Hazard
- Limit Of Moderate Wave Action (1'-3' Waves)

Community Facilities Identified as Potential Candidates for Recovery Centers

Source: FEMA Preliminary FIRI, NYC Department of City Planning, MAPPluto v13.1; Street Centerlines.



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## Relief center screening criteria

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### **LOCATION**

- Outside of extreme flood-risk zone
- Proximity to:
  - Evacuation route or near road with quick, reliable access to route
  - Vulnerable populations
  - Commercial centers, corridors
- Has a large outdoor space to accommodate possible building expansion and outdoor space
- Ease of access and approachability from street

### **BUILDING**

- Floodproof: building must be able to be hardened
  - Should not be an unreinforced masonry building or made of lightweight materials
- Reliable source of power and heat/cooling
- Potable water system
- Restrooms with showers
- Parking lot/car-accessible
- Large space on ground floor
- Must be capable of accommodating and providing services to people within designated catchment area
- ADA-accessible

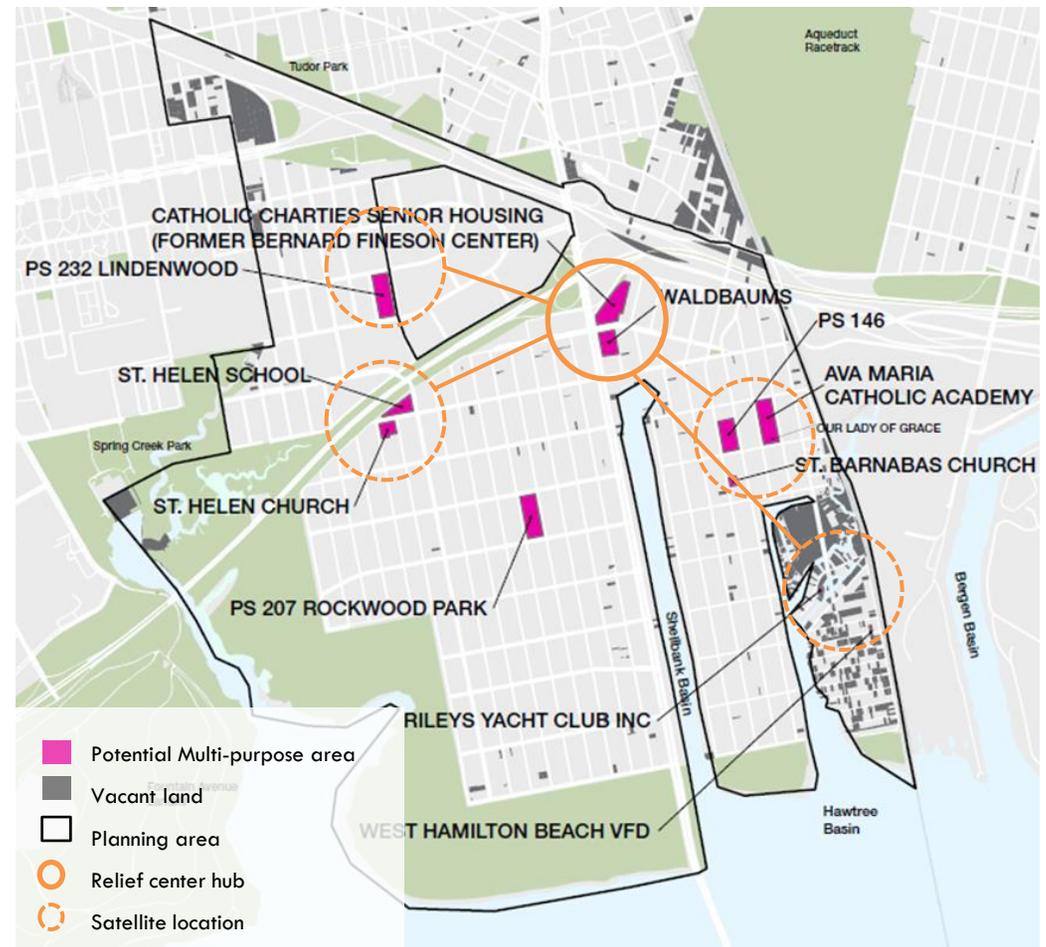
### **ORGANIZATION**

- Manages programming and operations
- Has a long history of community engagement
- Provides regular programming and has capacity to provide emergency programming
- Conducts outreach to vulnerable populations
- Has capacity to provide social and health services
- Has a long-term occupancy agreement
- Is open 6 days a week
- Has a business continuity plan
- Is financially stable

## Example project: Howard Beach relief campus satellite system

Howard Beach proposed the following relief center projects in its NY Rising Community Reconstruction Plan:

- **Relief center hub:** Main relief center that would provide a central location to organize relief efforts, provide a safe haven for charging electronic equipment, distribute supplies and services, and provide a central communications hub during relief efforts.
- **Satellite relief centers:** A smaller distribution network linked to central hub that can also provide information and supplies at neighborhood level.



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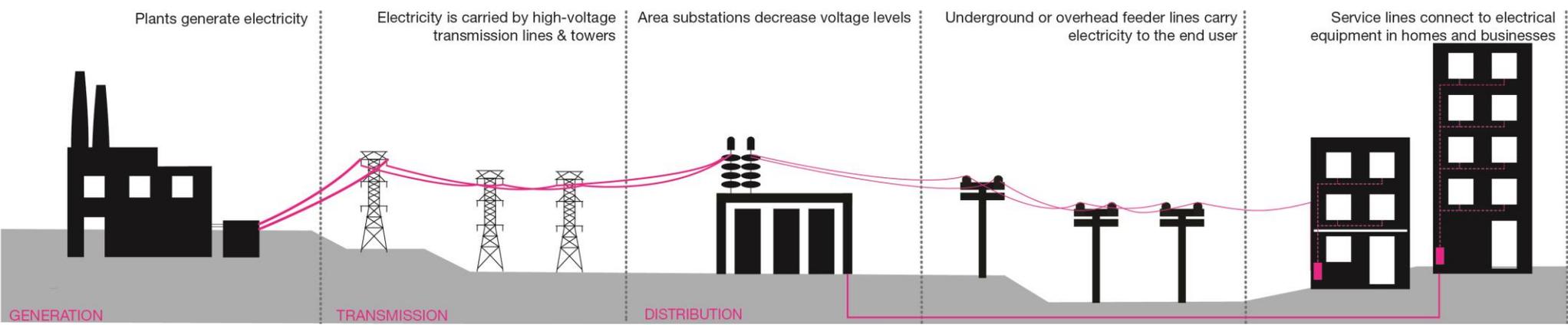
## Strategy Review

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### Power Outage

# How the System Works

- Generation, Transmission, Distribution - Plants generate electricity

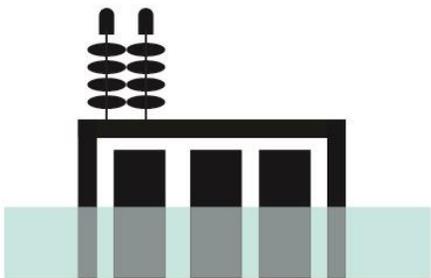


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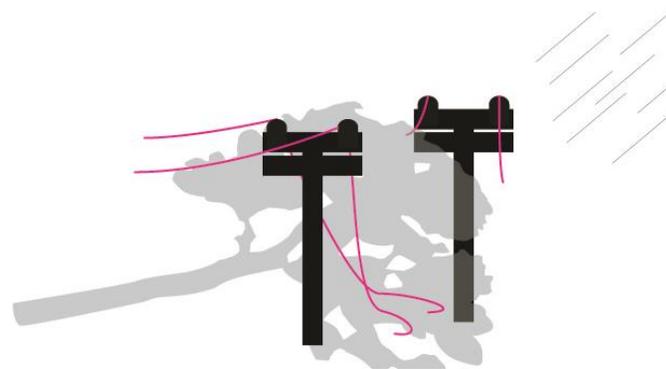
## Threats to the power system from coastal storms

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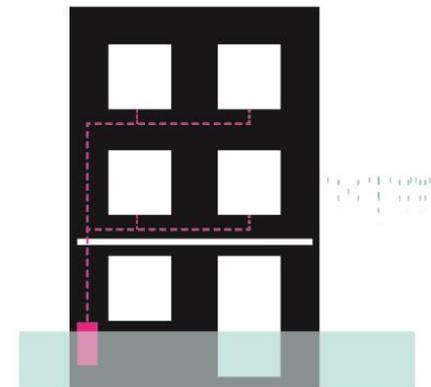
Most electrical outages during Sandy were caused by damage to the electricity distribution system



- Substations not effected during Sandy



- Topped trees and intense winds damaged overhead power lines.



- Individual household/apartment building equipment was flooded from seawater and took longer to get back on line after power was restored.

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## Considerations: Power Distribution

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- Many powerlines are above ground lines within the planning area and a major cause of outages was downed lines.
- Loss of local power due to preemptive shutdown of substations to prevent flood damage
- Extensive infrastructure with a private supplier and many diverse stakeholders / constituencies

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## Considerations: Power Delivery

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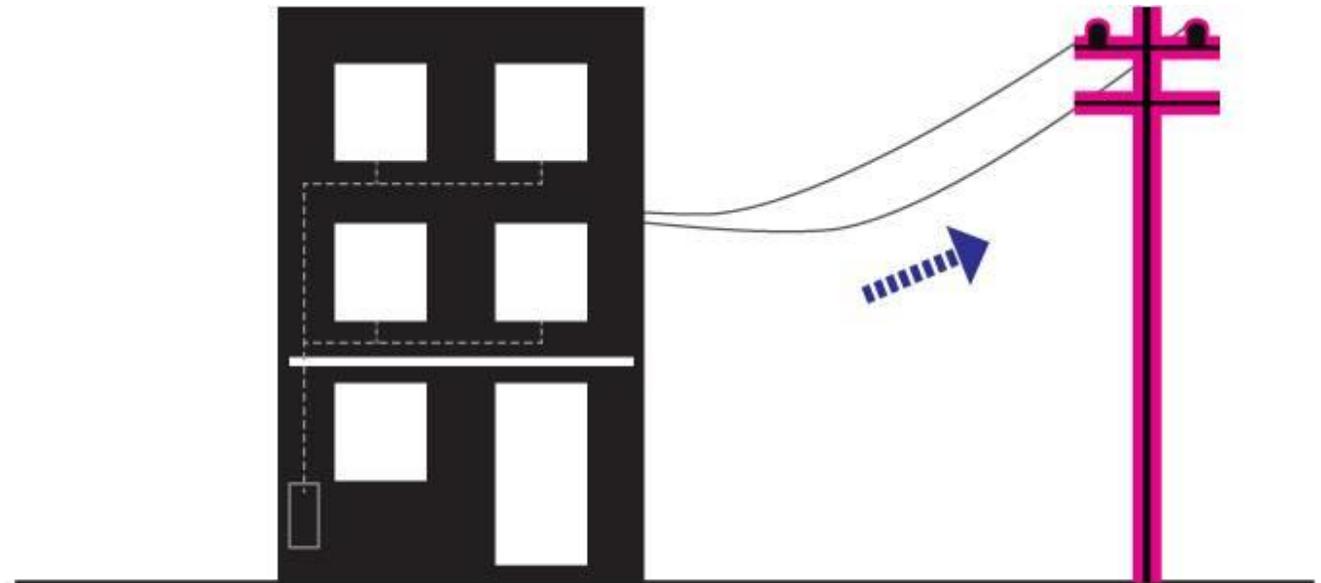
- In the hands of the individual property owner / any property owner can undertake
- Following a storm event, even after power has been restored the electrical grid, individual home and building electrical equipment must be repaired. Additional delays may also be caused by the need to inspect systems before they go back online

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## Potential Techniques: Protect Distribution System

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- Protect service lines
  - Strengthen/harden power lines
  - Proper tree maintenance
  - Relocate some/all of system underground
  - Install smart-grid technologies to rapidly identify location of problem and minimize extent of impact

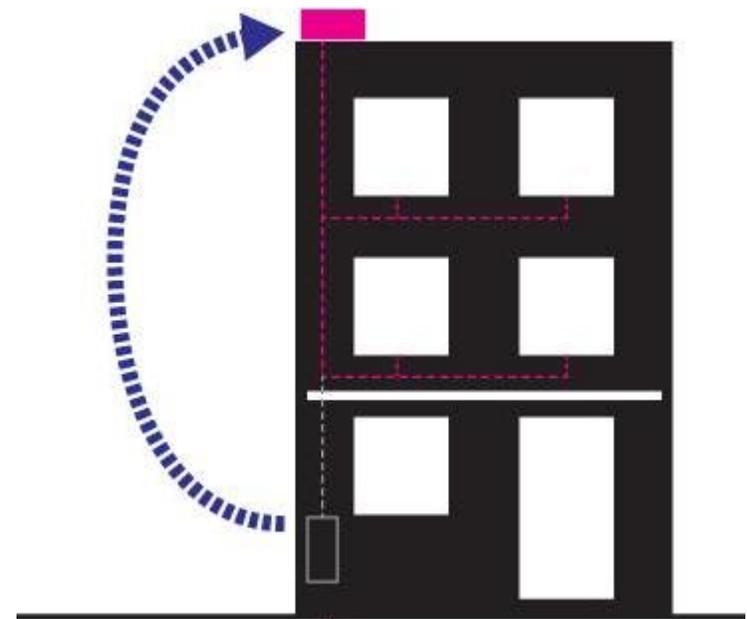
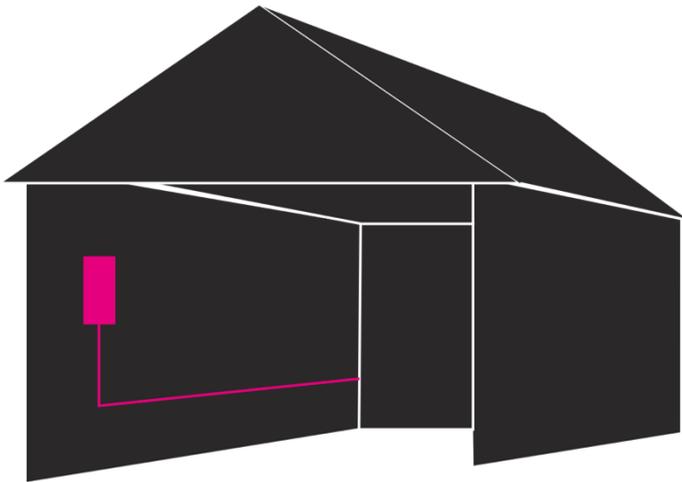


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## Potential Techniques: Protect delivery systems at the receiving end

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- Protect home equipment
  - Get it out of harm's way
    - Raise switches, sockets, breakers, and wiring
  - Make it floodable
    - Replace with submersible equipment



*Opportunities: Rapid Repairs (FEMA): made licensed electricians available to repair customer-side electrical damage*

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## Potential Techniques: Alternative Power: Solar

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- Panels on individual buildings or covering parking areas

### Pros

- Resilient: can function when grid goes out
- Retains benefit of using grid power during normal operations
- Can reduce electricity costs
- Low maintenance
- Both benefits and negatives to the grid

### Cons

- High up-front costs
- Intermittent
- Expensive energy storage (batteries)
- Space requirements and FDNY restrictions
- Not market competitive



### Components

- *Panel for generation*
- *Battery for storage and smoothing fluctuation*
- *Connection to grid*
- *Smart inverters*

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## Alternative Power Opportunities - solar

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- NY State Residential Solar Tax Credits
- NY State Property Tax Incentives
- NY State Loan Program
- NY Power Authority State Rebate Program
- NYSERDA State Rebate Program
- ConEd Utility Rebate Programs
- EmPower New York State Grant Program

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## Potential Techniques: Alternative Power: Wind

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### Pros

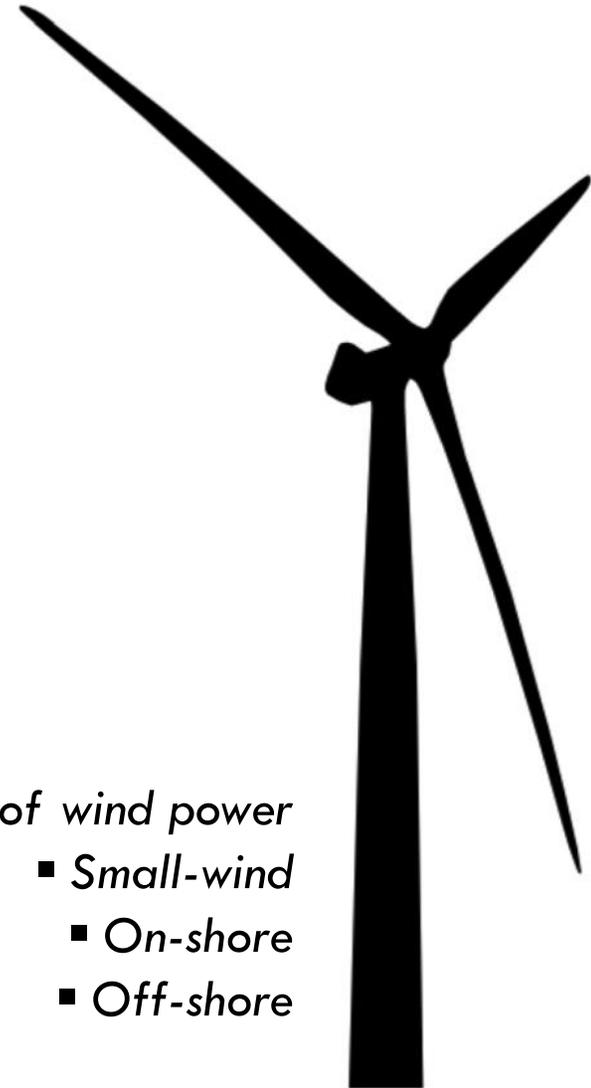
- Strong winds, high capacity factors
- Functions when grid goes out
- Feeds into grid during normal operations

### Cons

- Should be combined with an energy storage system
- Upfront costs
- Avian & other environmental impacts
- Large space requirements
- Regulatory restrictions
- Needs proper conditions

*Three types of wind power*

- *Small-wind*
- *On-shore*
- *Off-shore*



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## Alternative Power Opportunities - wind

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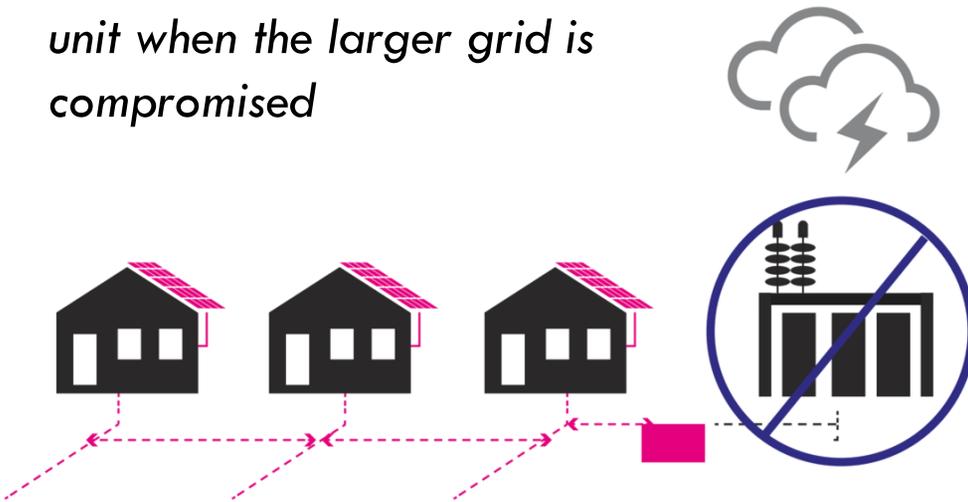
- NY State Loan Program
- NY State Rebate Program
- NYSERDA Wind Incentive Programs
- NYPA Wind Power Initiatives

## Potential Techniques: “Microgrid”

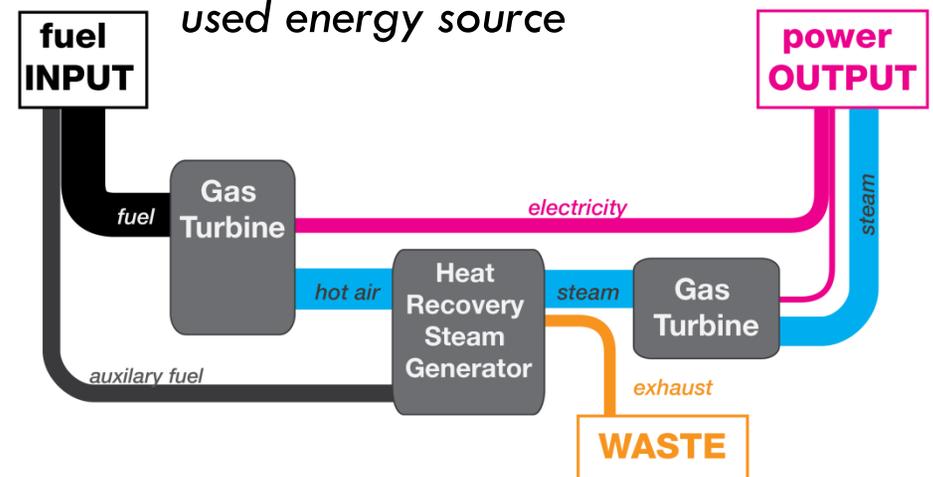
### New / alternative distribution systems with independent energy sources

- What is it?
  - Smaller portion of the larger electrical grid
  - Can be disconnected from the larger grid during emergency
  - Powered by an independent power generation source (frequently Co-generation) that allows the micro grid to be self sufficient during an emergency

*A micro-grid acts as a self-sufficient unit when the larger grid is compromised*



*Co-generation is a commonly used energy source*



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## Potential Techniques: “Microgrid”

### New / alternative distribution systems with independent energy sources

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- Pros
  - Can disconnect from the larger grid if there is a widespread problem
  - Excess power can be sold back to utilities
- Cons
  - Long term only
  - Still in pilot phase around the country and the world
  - Legal and regulatory hurdles
  - Works most effectively with single meter (aka CO-OP)



## Potential Techniques: Cogeneration

Cogeneration uses a fossil fuel-powered engine to simultaneously produce electricity and heat. This is more efficient than purchasing grid power and natural gas/oil separately.

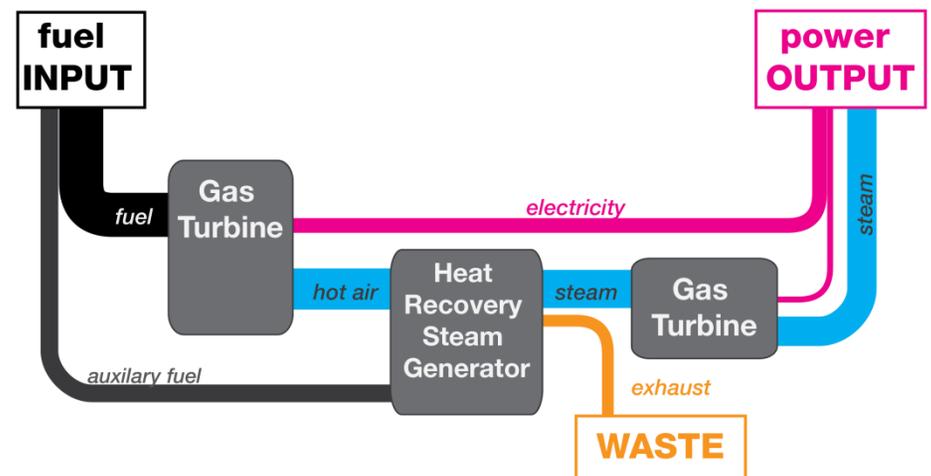
Cogeneration is commonly used as the power source for microgrids

### Pros

- Reliable
- Efficient
- Proven
  - Starrett City (Brooklyn)
  - NYU (Manhattan)
- Gas prices at historic lows

### Cons

- Require highly skilled maintenance
- Powered by fossil fuels



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## Microgrid Opportunities

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- Look for currently net-metered locations
- NYSERDA funding programs
- NYPrize (NYSERDA competition)

# Agenda for Planning Committee Meeting #4

1. Public meeting preparation 6:30pm
2. Review initial strategies 6:45pm
3. Strategy development 7:15pm
4. **Schedule and next steps** **7:45pm**

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## Strategies (in no particular order)

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1. Maintain community's close relationship to the water by developing diverse coastal edge protection measures
2. Provide alternative power sources in housing and key community facilities
- 3. Develop local community plan to improve emergency preparedness – communications network**
- 4. Ensure economic resiliency for property owners in flood prone areas**
- 5. Improve and increase the capacity of storm water management infrastructure**



## **East Bronx Waterfront Planning Committee Meeting #4**

September 3, 2014

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