NY Rising Community Reconstruction Plan

MARCH 2014

This document was developed by the Fire Island Planning Committee as part of the NY Rising Community Reconstruction (NYRCR) Program within the Governor's Office of Storm Recovery (GOSR). The NYRCR Program is supported by NYS Homes and Community Renewal, NYS Department of State, and NYS Department of Transportation. Assistance was provided by the following consulting firms (NYRCR Consultant Team):

- *Jacobs*
- *Cameron Engineering & Associates, LLP*

Table 1: Fire Island NYRCR Committee Member List

Committee Role	Name
Co-Chair	Susan Barbash
Co-Chair	Suzy Goldhirsch
Member	John Adams
Member	Alan Altman
Member	Dominic Bertucci
Member	Forrest Clock
Member	Judy Corcoran
Member	Alan Goldberg
Member	Vern Hendrickson

Committee Role	Name
Member	Scott Hirsch
Member	Marsha Hunter
Member	John Lund
Member	Patrick Macri
Member	Tim Mooney
Member	Steve Norring
Member	Mary Parker
Member	Steve Placilla
Member	Jennifer Rider

Committee Role	Name
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Municipal Representative	Steve Brautigam*
Municipal Representative	Bob Cox*
Municipal Representative	Paul Fusco*
Municipal Representative	Jim Mallot*
Municipal Representative	Tom Marquardt*
Municipal Representative	Tim Mazzei*
Municipal Representative	Matthew Miner*
Municipal Representative	Mario Posillico*
Municipal Representative	Harry Sundin*
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***Non-voting member**

JACOBS

CAMERON ENGINEERING & ASSOCIATES, LLP

FOREWORD

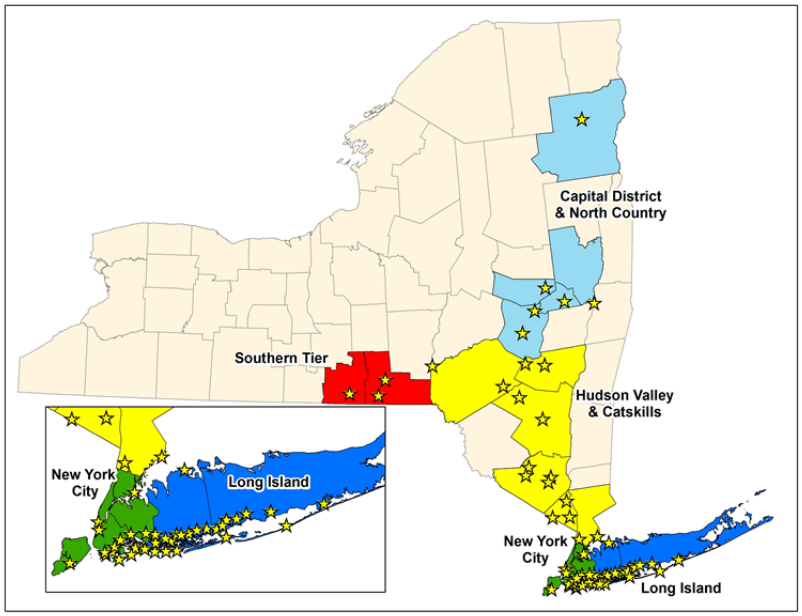
Introduction

In the span of approximately one year, beginning in August 2011, the State of New York experienced three extreme weather events. Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy wreaked havoc on the lives of New Yorkers and their communities. These tragic disasters signaled that New Yorkers are living in a new reality defined by rising sea levels and extreme weather events that will occur with increased frequency and power. They also signaled that we need to rebuild our communities in a way that will mitigate against future risks and build increased resilience.

To meet these pressing needs, Governor Andrew M. Cuomo led the charge to develop an innovative, community-driven planning program on a scale unprecedented and with resources unparalleled. The NY Rising Community Reconstruction (NYRCR) Program empowers the State's most impacted communities with the technical expertise needed to develop thorough and implementable reconstruction plans to build physically, socially, and economically resilient and sustainable communities.

Program Overview

The NYRCR Program, announced by Governor Cuomo in April of 2013, is a more than $650 million planning and implementation process established to provide rebuilding and resiliency assistance to communities severely damaged by Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy. Drawing on lessons learned from past recovery efforts, the NYRCR Program is a unique combination of bottom-up community participation and State-provided technical expertise. This powerful combination recognizes not only that community members are best positioned to assess the needs and opportunities of the places where they live and work, but also that decisions are best made when they are grounded in rigorous analysis and informed by the latest innovative solutions.



Note: Map includes those NYRCR Communities funded through the CDBG-DR program, including the NYRCR Communities announced in January 2014.

One hundred and two storm-affected localities across the State were originally designated to participate in the NYRCR Program. The State has allocated each locality between $3 million and $25 million to implement eligible projects identified in the NYRCR Plan. The funding for these projects is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program.[1]

Forty-five NYRCR Communities, each comprising one or more of the 102 localities, were created and led by a NYRCR Planning Committee composed of local residents, business owners, and civic leaders. Members of the Planning Committees were identified in consultation with established local leaders, community organizations, and in some cases municipalities. The NYRCR Program sets a new standard for community participation in recovery and resiliency planning, with community members leading the planning process. Across the State, more than 500 New Yorkers represent their communities by serving on Planning Committees. More than 400 Planning Committee Meetings have been held, during which Planning Committee members worked with the State's NYRCR Program team to develop community reconstruction plans and identify opportunities to make their communities more resilient. All meetings were open to the public. An additional 125-plus Public Engagement Events attracted thousands of community members, who provided feedback on the NYRCR planning process and proposals. The NYRCR Program's outreach has included communities that are traditionally underrepresented, such as immigrant populations and students. All planning materials are posted on the NYRCR Program's website (www.stormrecovery.ny.gov/nyrcr), providing several ways for community members and the public to submit feedback on materials in progress.

Throughout the planning process, Planning Committees were supported by staff from the Governor's Office of Storm Recovery (GOSR), planners from New York State (NYS) Department of State (DOS) and NYS Department of Transportation (DOT), and consultants from world-class planning firms that specialize in engineering, flood mitigation solutions, green infrastructure, and more.

With the January 2014 announcement of the NYRCR Program's expansion to include 22 new localities, the program comprises over 2.7 million New Yorkers and covers nearly 6,500 square miles, which is equivalent to 14% of the overall State population and 12% of the State's overall geography.

The NYRCR Program does not end with this NYRCR Plan. Governor Cuomo has allocated over $650 million of funding to the program for implementing projects identified in the NYRCR Plans. NYRCR Communities are also eligible for additional funds through the program's NY Rising to the Top Competition, which evaluates NYRCR Communities across eight categories, including best use of technology in the planning process, best approach to resilient

[1] Five of the 102 localities in the program—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.

economic growth, and best use of green infrastructure to bolster resilience. The winning NYRCR Community in each category will be allocated an additional $3 million of implementation funding. The NYRCR Program is also working with both private and public institutions to identify existing funding sources and create new funding opportunities where none existed before.

The NYRCR Program has successfully coordinated with State and Federal agencies to help guide the development of feasible projects. The program has leveraged the Regional Economic Development Council's State Agency Review Teams (SARTs), comprised of representatives from dozens of State agencies and authorities, for feedback on projects proposed by NYRCR Communities. The SARTs review projects with an eye toward regulatory and permitting needs, policy objectives, and preexisting agency funding sources. The NYRCR Program is continuing to work with the SARTs to streamline the permitting process and ensure shovels are in the ground as quickly as possible.

On the pages that follow, you will see the results of months of thoughtful, diligent work by NYRCR Planning Committees, passionately committed to realizing brighter, more resilient futures for their communities.

The NYRCR Plan

This NYRCR Plan is an important step toward rebuilding a more resilient community. Each NYRCR Planning Committee began the planning process by defining the scope of its planning area, assessing storm damage, and identifying critical issues. Next, the Planning Committee inventoried critical assets in the community and assessed the assets' exposure to risk. On the basis of this work, the Planning Committee described recovery and resiliency needs and identified opportunities. The Planning Committee then developed a series of comprehensive reconstruction and resiliency strategies, and identified projects and implementation actions to help fulfill those strategies.

The projects and actions set forth in this NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in this NYRCR Plan does not necessarily indicate the NYRCR Community's prioritization of these projects and actions. **Proposed Projects** are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding. **Featured Projects** are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. **Additional Resiliency Recommendations** are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects. The Proposed Projects and Featured Projects found in this NYRCR Plan were voted for inclusion by official voting members of the Planning Committee. Those voting members with conflicts of interest recused themselves from voting on any affected projects, as required by the NYRCR Ethics Handbook and Code of Conduct.

NYRCR Fire Island is eligible for up to $3.0 million in CDBG-DR implementation funds.

While developing projects for inclusion in this NYRCR Plan, Planning Committees took into account cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. Planning Committees also considered the potential likelihood that a project or action would be eligible for CDBG-DR funding. Projects and actions implemented with this source of Federal funding must fall into a Federally-designated eligible activity category, fulfill a national objective (meeting an urgent need, removing slums and blight, or benefiting low to moderate income individuals), and have a tie to the natural disaster to which the funding is linked. These are among the factors that the Governor's Office of Storm Recovery will consider, in consultation with local municipalities and nonprofit organizations, when determining which projects and actions are best positioned for implementation.

The total cost of Proposed Projects in this NYRCR Plan exceeds the NYRCR Community's CDBG-DR allocation to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in this NYRCR Plan are subject to applicable Federal, State, and local laws and regulations, including the Americans with Disabilities Act (ADA). Inclusion of a project or action in this NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented. The Governor's Office of Storm Recovery will actively seek to match projects with funding sources.

In the months and years to follow, many of the projects and actions outlined in this NYRCR Plan will become a reality helping New York not only to rebuild, but also to build back better.

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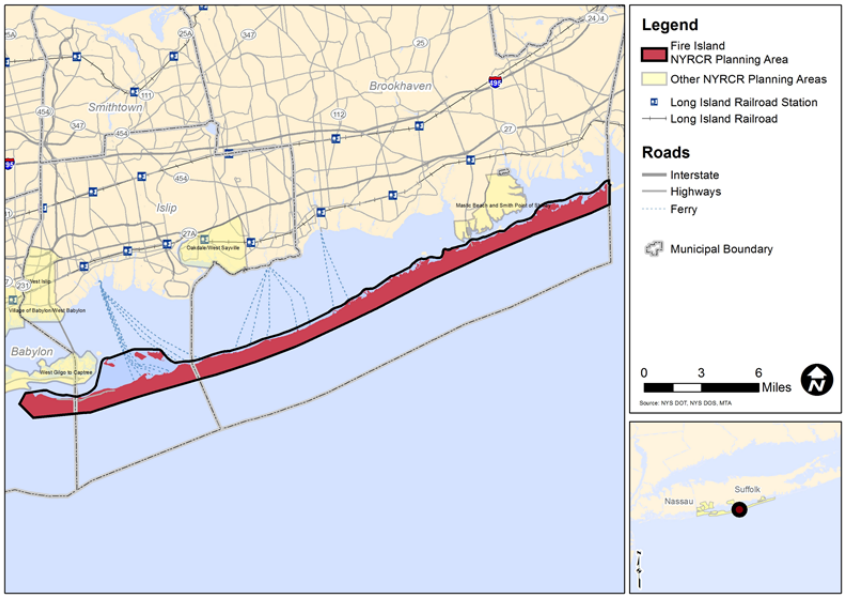
Executive Summary

Overview of NY Rising Community Reconstruction Community: Fire Island

Fire Island Lighthouse
Photo Credit: Consultant Team

NY Rising Community Reconstruction (NYRCR) Fire Island (Community) is one of eight NYRCR Communities identified within Suffolk County. The geographic scope of the NYRCR Fire Island Community includes the western tip of Robert Moses State Park eastward approximately 30 miles to the municipal Town boundary of Brookhaven and Southampton, including the Cupsogue Beach County Park on the east side of Moriches Inlet. With the exception of a number of bay islands within the Towns of Islip and Brookhaven and the three large public parks (Robert Moses State Park at the west end of Fire Island and Smith Point County Park and Cupsogue Beach County Park at the east end of the Fire Island), the bulk of the NYRCR Fire Island Community lies within the boundary and jurisdiction of the Fire Island National Seashore (FINS). Within this area is all of the Community "in-holdings" or privately-owned real estate within the outer beach portions of the Towns of Islip and Brookhaven.



A total of up to $3 million has been allocated for resiliency projects within this Community.

The Fire Island "neighborhoods" are distinct and discrete Villages and hamlets totaling 4,000 homes in all, from Kismet on the west end to Davis Park on the east. Each Village or hamlet averages less than 1% of Fire Island's total land area. All the rest of this special island – more than 80% – consists of spectacular beaches, dunes, and undeveloped parkland and visitor facilities. FINS contains the Otis Pike Wilderness area, a unique "Sunken Forest," a historic lighthouse, recreational facilities including nature trails and waterfront access for canoeing, boating and fishing, campgrounds and the marinas at Watch Hill and Sailors Haven. Residents and visitors alike get to the island by ferry across the Great South Bay.

There are no paved roads on Fire Island, although there is an emergency access route through the sand for essential service and emergency vehicles.

Fire Island has a rich maritime history that predates the European colonization of Long Island. Much of this history is celebrated at the museum at the base of the Fire Island Lighthouse. Native Americans hunted and fished in the vicinity long before Colonists established settlements and expanded salt hay harvesting, waterfowl hunting and shell fishing as their primary industries. The booming growth of New York Harbor after the Civil War also saw the development of the U.S. Life Saving Service (USLSS), the pre-cursor of the U.S. Coast Guard (USCG), which maintains a base at the western end of the island at Robert Moses State Park.

Today, land use on Fire Island consists mostly of residences with some institutional and community facilities and small commercial businesses. Other than two bridges which terminate at parking areas at the western (Robert Moses Causeway to Robert Moses State Park) and the eastern ends (William Floyd Parkway to Smith Point County Park), Fire Island is only accessible by boat.

The impact of Superstorm Sandy on Fire Island was significant. The barrier beach was battered on both the ocean and the bay sides by storm surges and high tides which eroded protective beaches and dunes. A study conducted by the United States Geological Survey (USGS) after Superstorm Sandy found that "beaches and dunes lost more than half of their pre-storm volume… leaving the area more vulnerable to future storms." In several places, floodwaters washed completely over the island. The overwash scoured the primary travel route westward, towards Robert Moses Causeway, residential walkways and critical infrastructure. And, in one place, a new inlet was created, thereby preventing the evacuation of vehicles and pedestrians eastward, toward William Floyd Parkway.

Waterfront infrastructure such as freight and recreational docks, and bulkheads were destroyed. A helipad was damaged. Low-lying infrastructure, especially the electrical components of drinking water pump stations, the sewage treatment plant in Ocean Beach, and communication facilities, was damaged. Approximately 1,600 homes were damaged. And, some commercial areas were so severely damaged they required emergency rebuilding in time for the next peak season. In total, over 62,000 cubic yards of material were removed from the island, enough to cover a football field three stories high.

Fire Island faces unique challenges in its efforts to recover and rebuild after Superstorm Sandy. The FINS is one of the treasures of the New York Metropolitan region, as well as one of the most unique sites within the United States National Park System. The U.S. National Park Service's stewardship has helped preserve and protect Fire Island's unique ecosystem. This barrier island is also home to 17 distinct communities. These communities range in size, structure, and composition, with many experiencing large influxes of part-time residents and visitors during the summer season. Despite this fluctuating seasonal population, recovery efforts have been collaborative in nature, in which residents have chosen to focus on critical, Island-wide issues ahead of individual needs.

The constructive dialogue now taking place among Island communities has been one of the most beneficial outcomes stemming from the NYRCR process.

NYRCR Program: A Community-Driven Process

The NYRCR Fire Island Committee expressed concern for a variety of resiliency issues relating both to protecting the life and safety of Community members in the face of storm events and fostering stewardship of the unique barrier island landscape. Some of the most significant and widespread issues included:

- Creating a mechanism for enhanced communication, collaboration and regional planning among the many Fire Island interests and the Long Island mainland;
- Sustaining commercial, recreational and tourism assets and functions;
- Developing a comprehensive island-wide ocean and bay shoreline management strategy;
- Maintaining safe access to all communities;
- Ensuring that municipalities and first responders, including fire departments, have the necessary resources to prepare for and protect the public, property and the natural environment during and after disasters; and
- Mitigating repetitive flooding

These critical issues inform every aspect of the plan.

The NYRCR Fire Island Planning Committee (Committee) spent significant time and effort in developing a vision for their community's resilient future. This final vision was informed by public input from community members. The Community Vision Statement represents a consensus assessment of the direction this Community wishes to move towards, and is as follows:

As an integral component of the Fire Island National Seashore, the communities of Fire Island are united in their determination to strengthen and preserve this unique, dynamic barrier island for future generations.

We recognize Fire Island's critical importance to the entire region – as Long Island's first line of defense against destructive storm surges, a precious natural resource and ecosystem, and an engine for the Long Island and New York State economy.

Working collaboratively, we will partner with governmental agencies on every level to ensure the island's resiliency and sustainability, and to secure Fire Island's future.

All strategies and projects identified were measured against the Community Vision Statement to ensure that recommended actions would help the community achieve its desired goals.

The Public Engagement Process did not end with the development of the Community Vision Statement. In keeping with Governor Cuomo's emphasis on bottom-up planning, members of the Community were involved in each step of the NYRCR Program. The NYRCR Committee was composed of residents who could speak directly from experience of the character of the community, its needs, and strengths in good times and bad. Five Committee meetings have been held. All Committee meetings were open to the public, with meeting dates and times posted on the NYRCR website (www.stormrecovery.ny.gov/nyrcr).

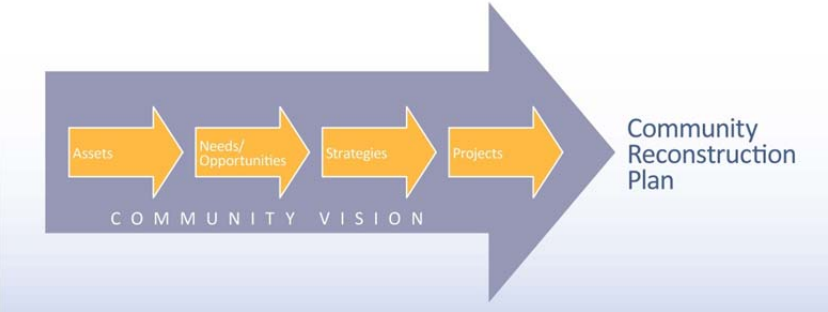
The Community at-large was invited to take part in the NYRCR Program through a variety of methods. Their feedback was reviewed by the Committee and incorporated into the decision-making that informed the development of this Plan.

Engagement activities included in-person and web-based opportunities for participation. Three open-house style events were held during the development of the plan and a fourth will present this final document.

The Fire Island Community is unique in that many of the residents and employees and virtually all of the visitors are not on Fire Island in the winter and are dispersed throughout the metropolitan region. Therefore in order to reach as broad a segment of the Fire Island Community as possible, Online Public Meetings were held in conjunction with the initial three public engagement events to allow anyone to provide feedback on the process through the internet. The overall format for the online events provided a digital open house which could be attended at any time 24 hours a day, seven days a week for a ten-day timeframe. The Online Public Meeting provided identical stations to the in-person meeting and resulted in thousands of comments from hundreds of people which were summarized for the Committee's review and consideration in the planning process.

Younger members of the community were invited to participate in a web-based "Next Generation" survey to gather feedback on proposed projects that would likely affect their futures in the Community. The NYRCR Fire Island website (http://stormrecovery.ny.gov/nyrcr/community/fire-island) served as a repository for downloadable versions of all public information and event notifications. E-mail comments and requests for information could be sent to the State and comment forms were available at Committee meetings and public engagement events to provide an opportunity for the public to contribute their feedback.

NYRCR Final Plan: A Blueprint for Resiliency



An asset inventory was conducted for the Community to identify assets, both built and natural, which are critical to the safety, resiliency, and character of the Community. The identified assets were evaluated in detail to understand their value to the community, and the level of risk or potential for damage, during future storm events. Identification of risks to critical assets provided the framework within which resiliency strategies were developed. Strategies are general approaches to types of projects, programs, policies, or other actions that specifically address an identifiable need or leverage an existing opportunity within the Community. Potential strategies were developed to address these needs and opportunities.

Projects were developed in order to respond to the identified needs and opportunities and execute the strategies in order to increase the Community's resiliency. Three tiers of projects were identified.

- **Proposed Projects** are projects proposed for funding through the NYRCR Fire Island Community's allocation of up to $3 million of CDBG-DR funding.
- **Featured Projects** are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.
- **Additional Resiliency Recommendations** are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects.

It is important to note that there is no priority order or ranking of projects aside from the project tier.

The need to maintain safe access to all communities is addressed by a strategy to ensure safe and reliable evacuation routes for both emergency personnel and the general public. A Proposed Project was developed to repair and increase resiliency of the island's primary vehicular east-west emergency access route. Additional Resiliency Recommendations that also support this strategy include repairs and improvements to walks in several communities.

The need to protect the shoreline and reduce flooding is addressed by a strategy to develop a comprehensive island-wide shoreline management program. Two Proposed and one Featured Project would approach bayside shoreline problems and solutions in a more comprehensive fashion, reduce future vulnerability, mitigate repetitive flooding and improve the natural functioning of storm

protective wetlands, dunes and beaches. Additional Resiliency Recommendations in individual communities were also developed to support this strategy.

The Committee realized that many issues related to resiliency cannot be solved on an individual Village or hamlet level. Shoreline protection has to be looked at comprehensively so one community's improvements do not jeopardize neighboring shorelines. Water systems need to be interconnected so damage in one area can be addressed by another undamaged source. Emergency response needs to be coordinated so that neighboring forces can lend aid and equipment. The strategy to create a mechanism for enhanced communication, collaboration, and regional planning will address these types of issues and provide better coordination of essential services, and increased public awareness regarding resiliency and emergency preparedness.

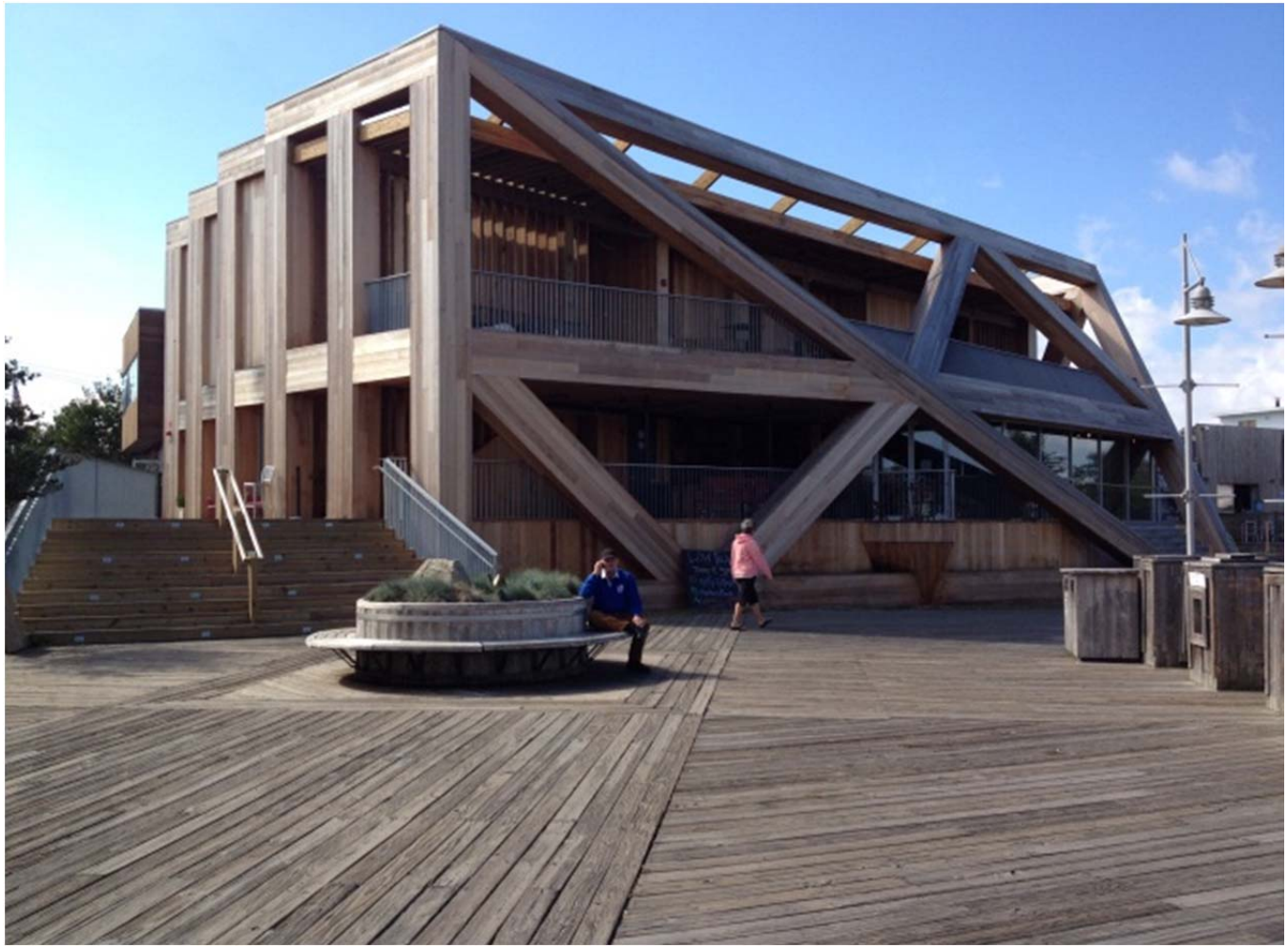
The Proposed Project to implement this strategy is the development of a Fire Island Planning Forum to bring all voices to the table and address Fire Island-wide issues in a comprehensive way. This forum would be an ongoing entity that could seamlessly address issues as they arise, and before they grow into larger concerns.

An Additional Resiliency Recommendation associated with this strategy is an Education Campaign for homeowners, renters and visitors on stewardship and emergency response procedures.

The following table presents all Proposed and Featured Projects by Strategy:

NYRCR Fire Island Resiliency Projects		
Strategy	**Project Name**	**Project Category**
Create a mechanism for enhanced communication, collaboration and regional planning among the many Fire Island interests and the Long Island mainland	Fire Island Planning Forum	Proposed
Preserve local home values by minimizing risk of storm damage and flood insurance rates	Employ Local Disaster Recovery Manager (LDRM)	Proposed
Enable municipalities to track structures, damage to structures, permits, etc.	Implement an Enhanced GIS Emergency Management System	Proposed
Enhance communications to improve the ability to communicate vital information not only on the beach but to the off-island agencies that may be assisting	Emergency Communication Systems	Proposed
Support businesses before and after an event	Enhance Revive FI Campaign	Proposed
Ensure Fire Department personnel have proper access, rescue and fire suppression equipment for rescue operations and addressing other hazards (hazardous materials, restricted access, etc.).	Air Compressor – Kismet Fire Department	Proposed
	Back-up Power Generation for Critical Facilities	Proposed
Keep emergency access route passable for emergency vehicles	Emergency Access Route	Proposed
Develop a comprehensive island-wide shoreline management strategy that includes natural restoration and engineered stabilization techniques	Engineering and design study for bayside shoreline management with regulatory coordination and pilot projects (Phase 1)	Proposed
	Bayside Shoreline Management Implementation (Phase 2)	Proposed
	Bayside Shoreline Management Implementation (Phase 2)	Featured
Identify bayside assets and redundancy for resource and emergency access	Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 1 – Design)	Proposed
	Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 2 – Construction)	Proposed
	Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 3 – Construction)	Featured

Section 1: Community Overview



Fire Island Pines Pavilion

Dune damage

The people of Fire Island live in a far-flung collection of small, sandy places with poetic names and magnetic appeal. We are separated from the mainland of Long Island by a 30-minute ferry ride across the Great South Bay – an island off an island; an impossibly narrow barrier beach less than 1300 feet in width, a place of sandy beaches, dunes, sunken forests and back bay coves that beguiles us with its laid back charm and breathtaking natural splendor. Fire Islanders had company when Superstorm Sandy struck Long Island with a singular ferocity that savaged utilities, sewage treatment plants, mass transit systems and other massive public works. We knew that despite the heroic efforts of first responders and officials at all levels of government, working together in ways rarely seen in these fragmented suburbs, and Superstorm Sandy routed hundreds of thousands of people from their mainland homes and businesses and stranded many for weeks without power and other services. Coming hard on the heels of Hurricane Irene and Tropical Storm Lee, we knew the impact was not just financially draining; it was deeply emotional.

But Fire Islanders experienced the storm in a significantly different way than "mainlanders" living in denser, more accessible neighborhoods. As the "first line of defense," Fire Island absorbed a direct and unimpeded hit on our homes, businesses, docks, bulkheads, walkways, emergency routes, and every public service. The storm surge and winds left swaths of destruction and

Young and old, owners and renters, these are the voices of our Fire Island:

We know how important Fire Island is to the rest of Long Island as a barrier beach. We know we are stewards for more than an antique lighthouse and rare flora and fauna…

Fire Island provides a unique opportunity to escape the hustle and bustle of everyday life by bringing us closer to nature and returning to a simpler way of living…

We as children were brought up on frightening stories of the 1938 hurricane that devastated Saltaire. I remember people saying, "When the big one comes, I hope the house floats in one piece!"

It was sad to see how many homes were badly hurt by Superstorm Sandy. Rebuilding in a resilient manner should be encouraged!

decimated our protective sand dunes. Very few structures survived unscathed. The ocean shoreline shifted northward up to 190 feet. In three places, the surge cut breaches between ocean and bay.

Home damage

While Fire Island residents were spared serious injury, year-rounders and summer residents alike had to wait for agonizing days to gain entry onto the island to find out if their home had been swept into the ocean or damaged beyond repair. A magnet for tourists and vacationers, reachable most of the year only by ferry, our 17 communities were temporarily more isolated than ever and inaccessible even to many emergency vehicles. That the storm struck after the summer season had ended was fortuitous in that thousands of people did not have to be removed from harm's way. But it also created difficulties in communicating with thousands of owners whose primary residences were elsewhere.

> *"Without the natural habitat we have nothing…"*
>
> *"The loss of so many trees is reducing habitat for birds. Fire Island is a key flyover refuge for migrating birds. The numbers and species seem to be much less now…"*
>
> *"Restoring and maintaining the island's natural resources are most important…"*
>
> *--Posted on virtual town hall meeting*

Since November 2012, the effects of Superstorm Sandy on Fire Island have been well documented in news reports, video, still photography, social media, narrative, scientific study, and civic debate. The effects of Superstorm Sandy have certainly highlighted at once both the fragility and resilience of the barrier island. To fully understand the effects of the storm on Fire Island it is vital to look at the connections between its people, its communities, and its unique natural environment.

The dynamic nature of Fire Island's shorelines (both on the ocean and bay side), coupled with the desire of residents and visitors alike to use and enjoy these shorelines, presents unique challenges for rebuilding and recovery after Superstorm Sandy. The Fire Island National Seashore (FINS) is one of the treasures of the New York region, as well as one of the most unique sites within the United States National Park System. The stewardship provided by the U.S. National Park Service has helped to preserve Fire Island's unique natural environment and

ensure its protection for the future. Yet Fire Island is also home to a collection of 17 distinct communities. These communities range in size, structure, and composition, with many communities experiencing large influxes of part-time residents and visitors during the summer season. Despite this fluctuating seasonal population, an interesting aspect of Fire Island's recovery efforts has been the collaborative work of these communities and residents to focus on critical, Island-wide issues ahead of individual needs. The opportunity for dialogue among Island communities has been one of the most beneficial outcomes stemming from the NY Rising Community Reconstruction (NYRCR) process.

The work of the NYRCR Fire Island Planning Committee (Committee) and the hundreds of people who participated in the community-driven planning set in motion by New York Governor Andrew M. Cuomo, as well as local and Federal officials, was important to our Community. With the assistance of our State planners and State-provided Consultant Team (Jacobs and Cameron Engineering), the process produced what we believe to be sound plans for recovery and resiliency. Perhaps more importantly for the long haul, it also offered us a planning forum that recognized and respected our experiences, expertise, and preferences. It was a process, from traditional on-site meetings to "virtual town halls" that empowered people and promoted constructive dialogue. The long hours and sound, constructive ideas contributed by hundreds of Fire Islanders paid a relatively quick dividend, driven by the same energy and can-do attitude that saw us open for business in the 2013 summer season. This collective planning and rebuilding push is emblematic of our intense commitment to recover from Sandy and prepare for the next disaster. As Governor Cuomo has said on numerous occasions, "It is not a matter of whether but when, and we need to be prepared."

Fire Islanders believe this plan and the projects within it represent the best ideas and professional practices developed by our communities and the Consultant Team. The NYRCR Fire Island Committee and our neighbors that participated in the planning process are not surprised by the risk assessment findings that put most of our slender island at the most vulnerable levels. We are confident that we have correctly identified the

Fire Island has been a source of food, shelter, and jobs/recreation for centuries. Within the last century it saw the greatest development as people migrated to Fire Island to escape the pressure and chaos of the world headquarters of almost everything 50 miles to the west of Fire Island. That was a great time - limited or no electric, no phones, and basic water systems utilizing hand pumps; sunny warm days with Bay and Ocean playgrounds; and lots of boats to sail and fish from. Those of us fortunate enough to have been there in the middle of the last century watched our Island change as the girls of summer Carol, Donna, Agnes, Belle, Gloria, and recently Irene and Sandy changed our paradise forever.

We always return, repair, and rebuild.

We can't escape; it is in our blood.

--John Lund, NYRCR Committee Member

needs and opportunities. But before we describe these projects, as well as talk more about our island, we want to be clear about a few more things. We understand that recovery remains an ongoing task that will require continued Federal, State, and local collaboration. We also recognize that we will not get everything we want, certainly not right away. But we are prepared to work together to refine our priorities and do everything we can to get what we need. When we are confronted by these and other challenges – such as balancing infrastructure planning and environmental protection – we know that the spirit of our collaborative Community remains as strong as it was in the face of Sandy.

Most of the challenges faced in recovering from Superstorm Sandy, as well as complex issues involving development, transportation, emergency services, and others, are rooted in our geography, geology, governance, and history. Fire Island is a 31-mile long barrier island, which varies in width from 500 to 1,300 feet, and encompasses 9.6 square miles of land. The Fire Island National Seashore (FINS), established in 1964 and governed by the U.S. National Park Service, stretches across 26 miles of the barrier island and includes 17 communities. The FINS enabling legislation recognized the existence of these communities and pre-existing commercial uses but stipulated that any future development should be consistent with specific zoning standards. These standards and building code regulations are administered by the incorporated Villages of Ocean Beach and Saltaire, by the Town of Islip, which has jurisdiction over nine unincorporated hamlets, and by the Town of Brookhaven, which has jurisdiction over six unincorporated hamlets. Jurisdiction is further complicated by additional regional oversight vested with State and Federal agencies, such as the Federal Emergency Management Agency (FEMA), U.S. Army Corps of Engineers (USACE), NY State Department of State (NYS DOS), and NY State Department of Environmental Conservation (NYS DEC).

The Fire Island "neighborhoods" are distinct and discrete Villages and hamlets totaling 4,000 homes in all, from Kismet on the west end to Davis Park on the east. Each Village or hamlet averages less than 1% of Fire Island's total land area. All the rest of this special island – more than 80% – consists of spectacular beaches, dunes, and undeveloped parkland and visitor facilities. FINS contains the Otis Pike Wilderness area that is larger than all of the developed Fire Island hamlets combined. FINS also offers a unique "Sunken Forest," a historic lighthouse, recreational facilities including nature trails and waterfront access for canoeing,

I have heard it said that, "from every tragedy comes something good."

A highlight in the aftermath of Sandy was and is the comradeship it has fostered among the members of our brand new business group, ReviveFI.

We share a common bond which was the Herculean struggle to put our lives back in place, under remarkably difficult and stressful conditions.

We survived together.

We helped each other.

We lifted each other.

Now we grow together.

---Scott Hirsch, NYRCR Committee Member

boating and fishing, campgrounds and the marinas at Watch Hill and Sailors Haven. Residents and visitors alike get to the island by ferry across the Great South Bay. There are no paved roads on this island, although there is an emergency access route through the sand for essential service and emergency vehicles.

Fire Island has a rich maritime history that predates the European colonization of Long Island. Much of this history is celebrated at the museum at the base of the Fire Island Lighthouse, located on the western end of the island, which suffered extensive damage and has not been fully repaired. Native Americans hunted and fished in the vicinity long before Colonists established settlements and expanded salt hay harvesting, waterfowl hunting and shell fishing as their primary industries. The booming growth of New York Harbor after the Civil War also saw the development of the U.S. Life Saving Service (USLSS), the pre-cursor of the U.S. Coast Guard (USCG), which maintains a base at the western end of the island at Robert Moses State Park. Manned USLSS facilities scattered along the beach enabled emergency evacuation of vessels that ran aground on their way to New York Harbor.

We know about storms like Sandy…In March 1962 a monster, slow-moving, nor'easter crawled along the coastline, ripping out pieces of some communities and causing some developers to start promoting a four-lane highway-dike down the island, with heavy development potential. Luckily, those few thousand who lived on the island, and their friends, got together and focused on getting most of the island designated a National Seashore by Congress in 1964…. It's now a park monument as to what citizens can do when they love a unique and eternal spot on this planet.

Those that now live on Fire Island will continue the heritage of caring enough to protect the natural wild-beach feeling. This feeling surrounds the neighborhood-communities that were allowed to cohabitate the island with the terns, piping plovers, ducks, white-tailed deer and other wildlife.

This is the natural essence of Fire Island.

---Bob Spencer, Davis Park resident

Today, land use on Fire Island consists mostly of residences with some institutional and Community facilities and small commercial businesses. Other than two bridges which terminate at parking areas at the western (Robert Moses Causeway to Robert Moses State Park) and the eastern ends (William Floyd Parkway to Smith Point County Park), Fire Island is only accessible by boat.

New York State recently allocated $23,000,000 in Federal funds to begin beach stabilization and infrastructure protection at Robert Moses State Park. Funds will be used to nourish park beaches and strengthen the shoreline buffers protecting the Robert Moses traffic circle and Ocean Parkway from future storms.[1] Another State project will replace the Robert Moses Causeway bridge over Fire Island Inlet.[2]

For those without private boats, several water taxis and ferry routes serve Fire Island from Patchogue, Sayville, and Bay Shore on the mainland. Transportation on the island is generally by foot, bicycle, or water taxi, as vehicles (other than emergency and service vehicles) are

prohibited on Fire Island during the summer. Year-round residents can access the Island in the off-season with vehicle permits.

Fire Island offers all types of recreational activities such as boating, sailing, tennis, biking, clamming, swimming, surfing, fishing, hiking, bird watching, and camping at Watch Hill. Sunken Forest, a maritime forest with wooden boardwalks winding through more than 40 acres of unusual tree formations, is popular with educational tours, hikers, and bird watchers. Fire Island Lighthouse, which is owned by FINS, but restored and managed by the Fire Island Light House Preservation Society, is open to the public and offers panoramic vistas and museums. Fire Island's commercial areas offer dining, entertainment and unique shops. Several of the communities have small grocery stores, delis, and ice cream shops.

Before we move on to the section on Geographic Scope, we would like to introduce each of our Island communities. These short profiles give a sense of the size, character, variety and history of Fire Island places, all of which contributes to the appeal and challenges for owners, renters, and visitors. The profiles are based upon a National Park Service report: *Ethnographic Overview and Assessment – Fire Island National Seashore* (July 2006). The communities are listed from west to east, in the order they are located.

With the exception of the bayside access to Point O' Woods and a few private marinas, each of the communities, the ocean beaches, the walks, and the wilderness areas are open to the public.

Stairs crossing the dunes

Kismet

Kismet is the westernmost of all Fire Island communities. The "Long Island Express" Hurricane of 1938 destroyed 90% of building in three neighborhoods that were rebuilt and consolidated as one hamlet of the Town of Islip. The hamlet began to grow rapidly in the '60s and '70s. Since 2007, when new concrete sidewalks were constructed throughout the Community, upscale new homes have been added. There are about 225 houses and two small condominiums. At the bay front, a small commercial district serves as the Community center, including two restaurants, a pizzeria, a general store, and Fire House located close to the ferry terminal. There are two tennis courts and a children's playground adjacent to the area.

Village of Saltaire

The Fire Island Beach Development Company purchased the land that would become Saltaire and seven years later residents grouped together to form the incorporated Village. Although some structures were lost in the 1938 “Long Island Express” Hurricane, enough survived to give Saltaire a distinct appearance. The Community has a grid layout similar to most other Fire Island communities, with concrete walks running east and west and diagonally planked wooden walks running north and south. A 1965 zoning amendment by the Village government doubled the number of lots needed to construct a new home limiting the maximum residential density. Saltaire has its own drinking water system.

Saltaire Fire Department

> *“Yes, Fire Island is enjoyed by thousands of people each summer. But many beach lovers do not understand how crucially important this fragile barrier island is to the Long Island mainland and the regional economy. In the coming age of rising sea level and more frequent storm events, Fire Island will become ever more important as Long Island's first line of defense.”*
>
> *--Susan Barbash, Co-Chair of the NYRCR Fire Island Committee*

Fair Harbor

Fair Harbor is the third community on the western end of Fire Island. With about 350 homes within its 13 walkways, Fair Harbor has everything anyone might want with a few stores, a restaurant and a pizza shop, giving it old-style charm with the security of a state-of-the-art Fire Department and EMS. Known for singles and its "share" houses in the '70s and '80s, Fair Harbor turned into a small community of families, as those people met at the dock at sunset, married, had children, and bought houses. It's now a favorite summer vacation destination.

Dunewood

Dunewood was the last community to be developed on Fire Island, beginning in 1958 and ending in 1980. It has wide, concrete walks that contribute to the open and quiet atmosphere of this family oriented community which has two tennis courts and runs a popular sailing and swimming program for children and adults. There are no restaurants or stores.

Lonelyville

Off the beaten path, Lonelyville is one of the oldest communities on Fire Island. Like the adjoining community of Dunewood, Lonelyville does not have a commercial district, and its walks do not form a complete grid.

Atlantique

Atlantique saw little real estate development until 1965. It lacks a bayside commercial district and consists of only 16 widely dispersed houses. The Atlantique Beach and Marina is a Town of Islip marina and recreational facility situated on an 875-foot-wide Town park that extends across the width of the barrier island, from the bay to ocean. The park offers lifeguard-protected beaches, a snack bar, and approximately 150 marina boat slips[3].

Robbins Rest

Robbins Rest is among the smallest communities on Fire Island, consisting of 40 privately owned homes. It is separated from other communities by two large, undeveloped tracts of land owned by FINS and has no commercial district or visitor services. Within the community are two bay-to-ocean pathways, one constructed of concrete and the other of sand.

Corneille Estates and Summer Club

Corneille Estates is two blocks wide and includes the Woodhull School which serves all of Fire Island. The community has one bay-to-ocean walk, known locally as Clipper Walk, which is unique to other walks across Fire Island in that its elevation follows the ground topography.

School bus on sand access route

Summer Club is a small residential community located just west of the Village of Ocean Beach and between the communities of Corneille Estates and Robbins Rest. Within the community are two bay-to-ocean walks. Summer Club is a condominium association with its own clubhouse, which is used by the residents of its community. There are no commercial district or visitor services within the community.

Ocean Beach commercial area

Village of Ocean Beach

In 1921, Ocean Beach and a neighboring community formerly known as Stay-a-While Estates merged to form Fire Island's largest community and the closest thing to a commercial hub. An incorporated Village, Ocean Beach has a ball field, courthouse, post office, police station, fire hall, ferry terminal, and Village offices. A wide variety of shops, restaurants, bars, and service facilities are located in the central commercial district which mainly adjoins the Village Green. During the summer, local groups sponsor parades, free concerts and art shows around the Village. Located within easy walking distance of both the Great South Bay and the Atlantic Ocean, the Village offers numerous water-related recreational opportunities at its life guarded beaches.

The Village is well equipped to serve both residents and visitors with full time police, volunteer emergency services, and a Village-owned water system.

Seaview

Seaview's first community supported a fish processing business area in the late 19th century. Today, there are approximately 360 houses serviced by a market, a liquor store, and a nursery. The Seaview Association owns and maintains the sidewalks, marina, beaches, water system, children's playground and wading pool, tennis courts, ball field, and other common areas.

People on the beach

Ocean Bay Park

Ocean Bay Park has evolved into a family community with second and third generations settling there to share their youthful experiences of sand castle building, fishing, swimming, trips to the local grocery store and endless games. Renters and visitors alike realize what an oasis they have discovered and set up their own roots to revel in these same activities and to enjoy dining in our two bay-front restaurants. Ocean Bay Park also houses one of the premiere Fire Departments on Fire Island providing mainland quality of safety and emergency services.

Point O' Woods

Originally founded as part of the Chautauqua movement in the late 1880s, Point O' Woods is a membership community where homebuyers retain the title to the house, with all land owned by the Point O' Woods Association. The community is also unique as there is common ownership of the landward dune by the Point O' Woods Association, which makes it easier to coordinate and fund dune replenishment projects. The area is not laid out in a grid like the other communities on Fire Island.

Point O' Woods church

Oakleyville

Oakleyville consists of 11 small houses on winding lanes in brushy woods within the Sunken Forest. There are no docks or ferry terminals and residents must arrive by private vessel, creating a very secluded atmosphere.

Cherry Grove

Cherry Grove is supposedly the oldest inhabited resort on Fire Island. By 1920, Cherry Grove had many small cottages along a single walk. In the late 1920s, the area attracted theater people from Ocean Beach, who enjoyed the informal atmosphere and thus beginning Cherry Grove's affiliation with the gay community. Today there are nearly 300 homes and a commercial area with stores, hotels, bars, and restaurants. In 2013 Cherry Grove's Community House and Theater was added to the National and New York State Registers of Historic Places.

Cherry Grove commercial area

Cherry's On the Bay

Fire Island Pines

Fire Island Pines has approximately 620 homes, making it the second-largest community on the island after Ocean Beach. While The Pines started as rustic campsites in the 1930s, it became a favorite destination of artists, writers, boaters, and families in the 1950s, and today it boasts many notable modernist homes. In addition to a recently built beachside community house, the bayside harbor area includes a ferry dock and marina, grocery and other stores, bars and restaurants. The Pines has consistently been a leader in the planning and financing of dune and beach re-nourishment projects.

Water Island/Blue Point Beach

Located east of the Talisman/Barrett Beach area, Water Island and Blue Point Beach are quiet, family-oriented communities without any public services. Water Island is a collection of 40 homes, while Blue Point Beach has 11 homes. The area rarely receives casual visitors from the mainland.

Davis Park

Davis Park began as two separate communities: Davis Park to the west and Ocean Ridge to the east. The area currently has about 250 homes, and is home to the easternmost ferry stop before the Otis Pike Wilderness Area, with service from Patchogue. The Town of Brookhaven-owned marina in the hamlet of Davis Park offers approximately 200 slips. The commercial area includes the Casino bar/restaurant with ocean views and a commercial area with stores and a small boatel by the marina.

Casino Café in Davis Park

A. GEOGRAPHIC SCOPE

The maps below are essential to understanding the complexities of the NYRCR Fire Island Community, which includes the western tip of Robert Moses State Park eastward approximately 30 miles to the municipal Town boundary of Brookhaven and Southampton, including the Cupsogue Beach County Park on the east side of Moriches Inlet.

With the exception of a number of bay islands within the Towns of Islip and Brookhaven and the three large public parks (Robert Moses State Park at the west end of Fire Island and Smith Point County Park and Cupsogue Beach County Park at the east end of the Fire Island), the bulk of the NYRCR Fire Island Community lies within the boundary and jurisdiction of the FINS. Within this area is all of the Community "in-holdings" or privately-owned real estate within the outer beach portions of the Towns of Islip and Brookhaven.

Getting things done on Fire Island can be complicated. For purposes of implementing the plan, projects within the NYRCR Fire Island Community will take into account, depending on the project, Suffolk County requirements and the building and zoning codes of two Towns (Islip, Brookhaven) and two incorporated Villages (Ocean Beach and Saltaire), both of which are within the Town of Islip and. All zoning and building codes of these four municipalities have been somewhat standardized to the requirements of the FINS. The maps on the following pages show the geographic scope and jurisdictional boundaries of the NYRCR Fire Island Community.

Damage at the junction of a bulkhead and natural shoreline

Figure 1: Geographic Scope

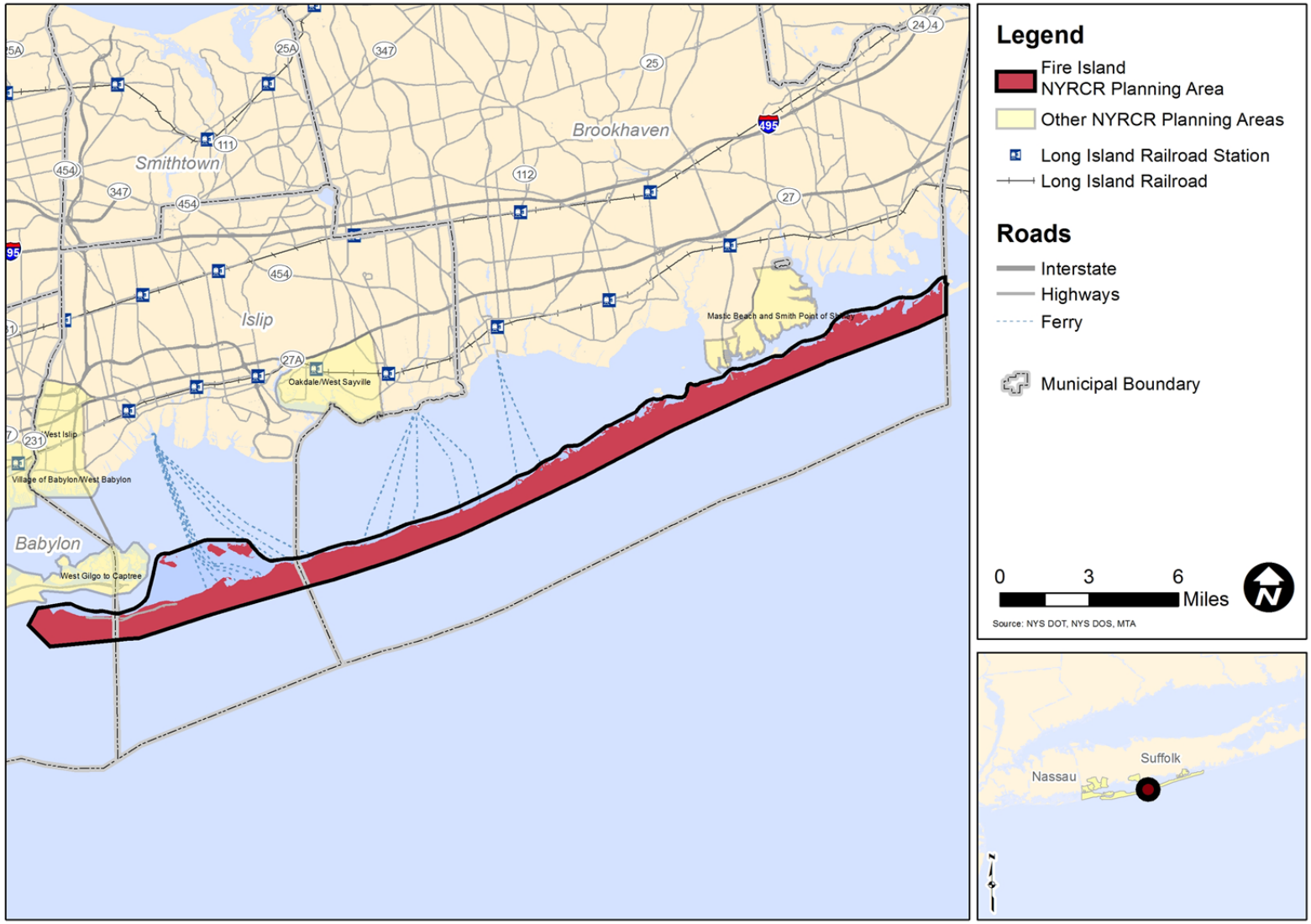


Figure 2: Geographic Scope and Land Ownership, Map 1 of 3

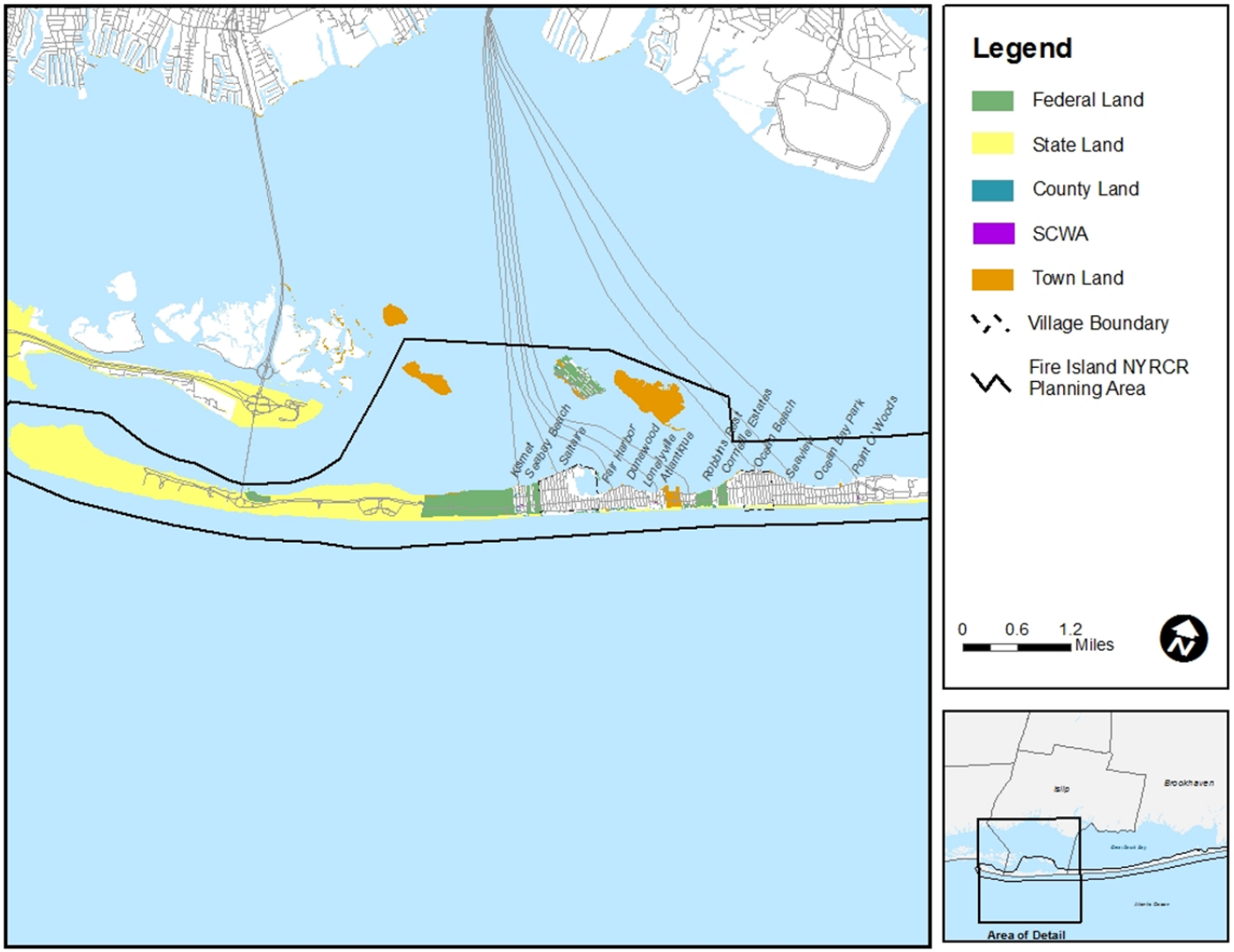


Figure 3: Geographic Scope and Land Ownership, Map 2 of 3

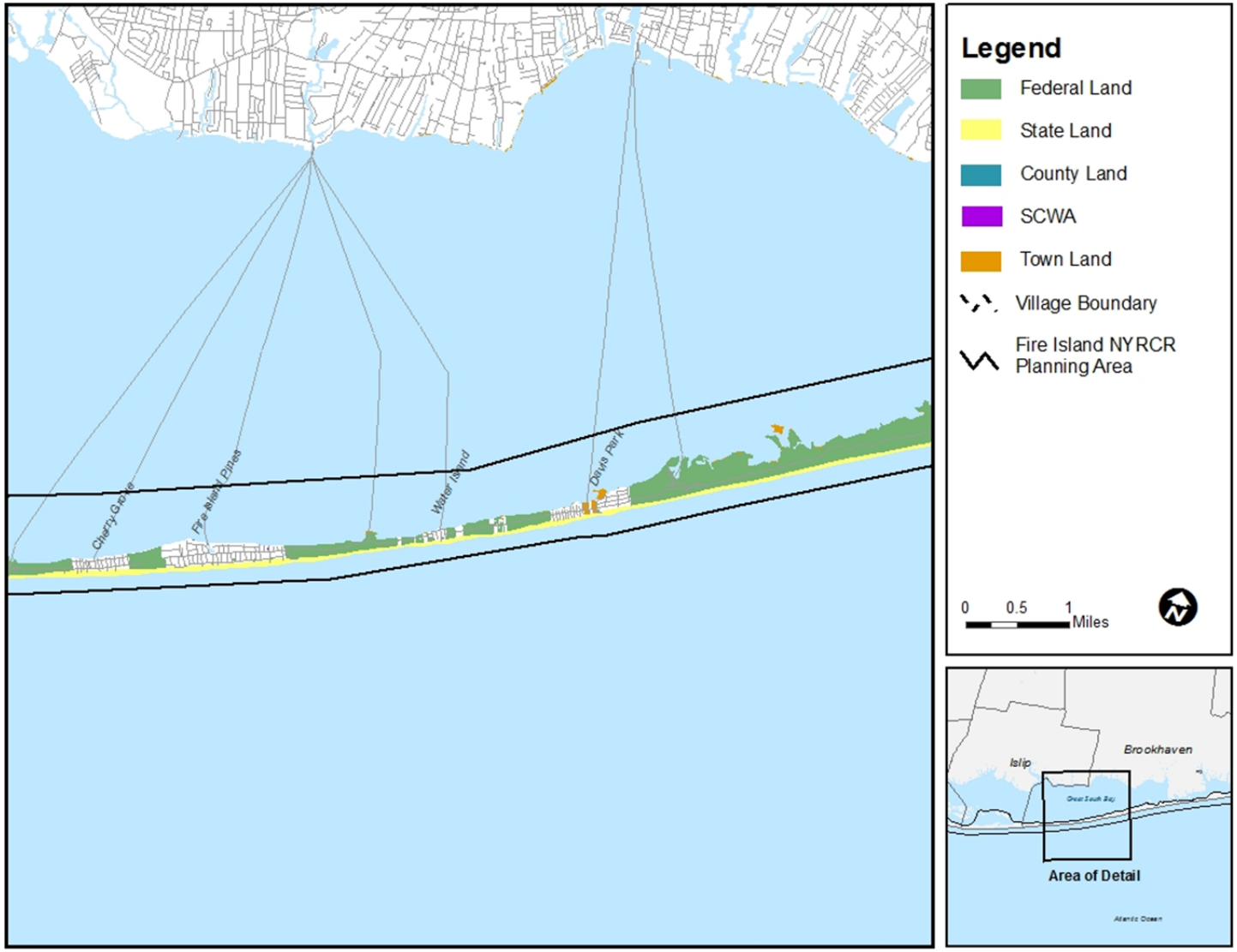


Figure 4: Geographic Scope and Land Ownership, Map 3 of 3

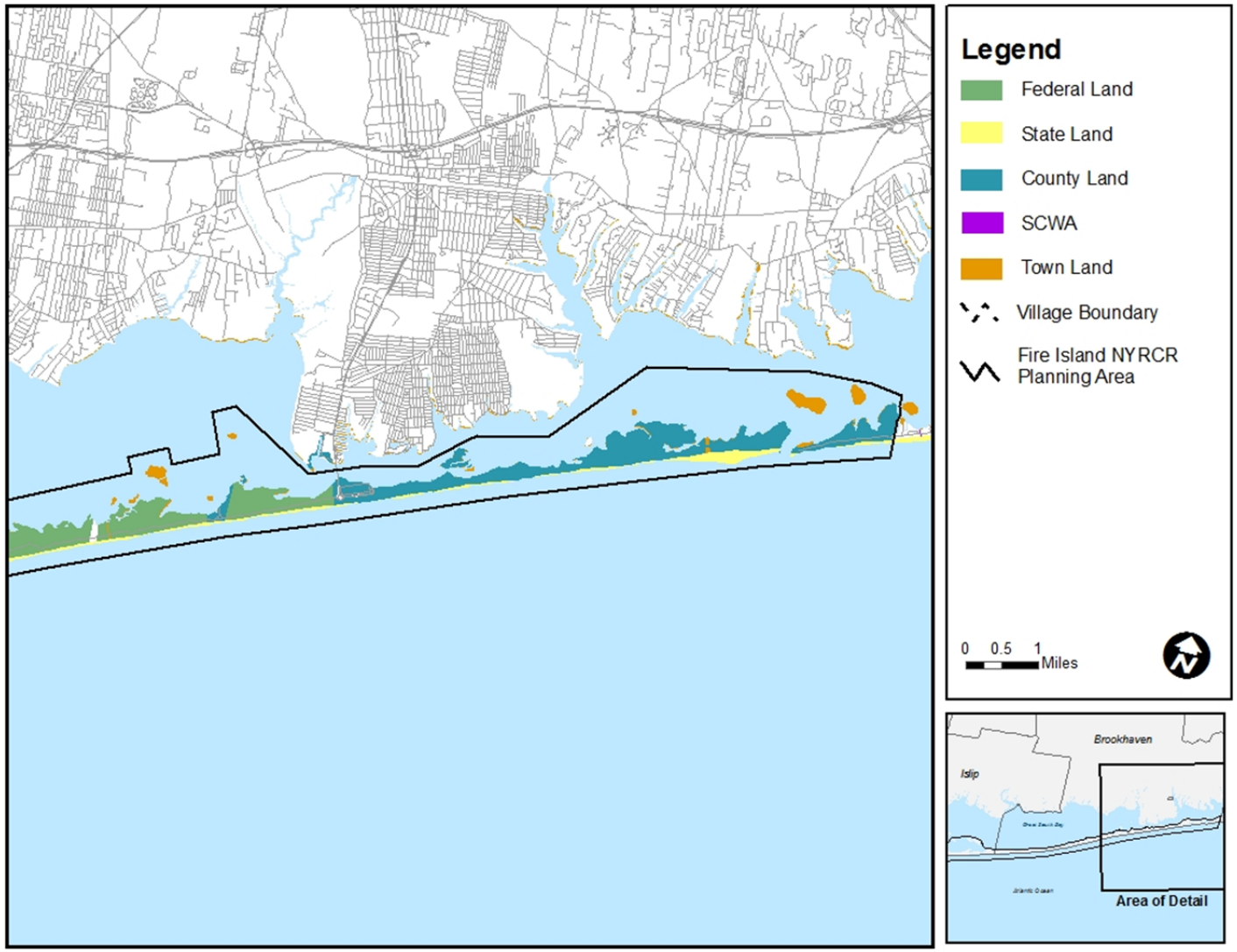


Figure 5: Jurisdiction Map[4]

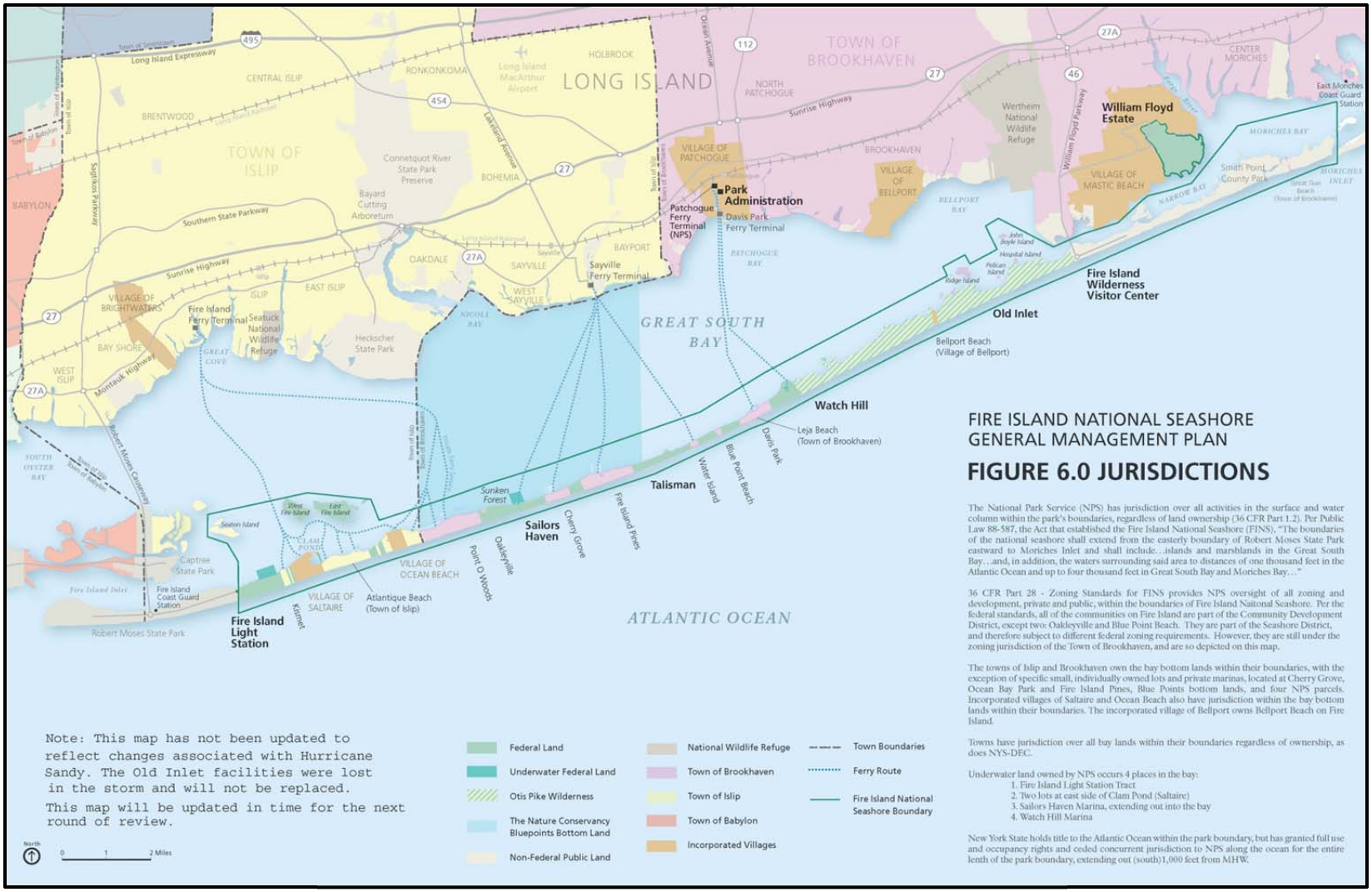


Figure Source: Chris Soller, Superintendent, Fire Island National Seashore

Demographic Overview

Geographic Area and Data

The demographic data depicted below is taken from the US Census Bureau's (Census) American FactFinder website at the Census Designated Place (CDP) level, and reflects data from the most recent American Community Survey (ACS) that provided complete coverage for the CDP. For most data sets, this was the 2005-2009 ACS data.

The CDP/Village level of data aggregation was selected because the availability, detail, and geography of other data aggregation levels (e.g., Census Tracts, Groups, and Blocks) are subject to variation across the decennial censuses. The CDP/Village level provides a uniform level of data aggregation and reporting period. While the NYRCR Community extends slightly beyond the Fire Island CDP and Village boundaries, it is noted that the Census data's intended use in this report is to provide an overview of the composition and general habits of the Community.

Fire Island General Demographics[5]

The NYRCR Fire Island Community comprises the Fire Island CDP and the Villages of Ocean Beach and Saltaire. Based on the 2010 U.S. Census, the Fire Island CDP had a population of 408 year-round residents and 4,461 housing units, of which 4,262 are seasonal homes. The Village of Ocean Beach had a population of 79 year-round residents and 607 housing units, which includes 562 seasonal homes. The Village of Saltaire had a population of 37 year-round residents and 459 housing units, including 444 seasonal homes. The median household income is $113,889 in Fire Island CDP, $41,875 in the Village of Ocean Beach, and $112,917 in the Village of Saltaire. The median value of owner-occupied housing units is $469,200 in the Fire Island CDP, $823,300 in the Village of Ocean Beach, and over $1,000,000 in the Village of Saltaire.

Disembarking in Ocean Beach

Almost half of the full-time population in the NYRCR Fire Island Community is between 35 and 54 years old. About 30% are less than 35 years old, and 20% are more than 55 years old.

Ninety-four percent (94%) of the year-round population of Fire Island is White, with 3% Black or African American, 2% classified as other,

and 1% classified as two or more races. Six percent of the population is Hispanic or Latino, and the residents report that the majority in the Community either speak English as the only language at home or rate their English proficiency as "very good."

Income and Poverty

The NYRCR Fire Island Community includes a range of individual wage earnings skewed toward the higher end. Almost half of the individuals earn less than $35,000 but more than 25% earn $75,000 or more. Fewer than 10% earn less than $10,000; similarly, less than 10% of the population is under 150% of the poverty level. It is probable that the population reporting individual income under $10,000 is primarily composed of retirees and individuals in similar circumstances instead of individuals or families who represent an economically disadvantaged population.

Employment and Journey to Work

Understanding the general character of the NYRCR Fire Island Community's workforce helps identify needs and opportunities to restore, maintain and enhance the economic vitality of the Community. Almost 70% of the year-round residents of Fire Island work within Suffolk County, and all of the remaining year-round residents work somewhere else within New York. While workers residing in the Community support a diverse array of industries, educational, and professional services (e.g., scientific, management, and administration) dominate.

Freight boat for delivery of materials and supplies

Housing

According to the Census, the majority of housing units on Fire Island are owner-occupied, but less than 5% of the units are occupied year round. The majority of the homes are used by owners (or rented out) during the spring, summer and fall seasons.

Guidance and Insight from Demographic Analysis

The demographic analysis indicated a few important trends and characteristics that shaped the identification of needs, opportunities, and projects for the NYRCR Fire Island Community. One is the seasonal nature of housing stock on Fire Island. Housing type and occupancy rates revealed that the majority of the housing stock is used seasonally, whether by owners, vacationers, or summer renters. This indicates that the majority of homes that may be at risk in the next storm are secondary residences and the owners may not need to find temporary housing.

These Census findings were incorporated into the dialogue with the NYRCR Fire Island Committee and reflected in our work as we identified projects to help ensure Community resiliency.

"As a grateful Cherry Grove homeowner, I hope everyone acknowledges why we were as successful as we were in surviving Sandy. It is the decades of dedicated maintenance and nurturing of our strong dunes…"

"We can only be a strong barrier if we building strong and sustainable dunes and continue to add sand retaining plants…"

--Posted during a virtual town hall meeting

Ferry arriving at Ocean Beach

B. DESCRIPTION OF STORM DAMAGE

The impact of Superstorm Sandy was significant across the entire barrier island. Storm surge and high tides resulted in erosion of protective beaches and dunes, damage to waterfront infrastructure (e.g., docks and bulkheads) and helipads, and numerous overwashes, leaving walkways and travel ways impassable when the overwash scoured and eroded the walkways and left debris. Low-lying infrastructure, especially the electrical components of drinking water pump stations, the sewage treatment plant in Ocean Beach, and communication facilities, was damaged. Concentrations of commercial areas were severely damaged requiring emergency rebuilding in time for the next peak season.

Damage to dunes and fencing

Damage from gap in bulkhead at end of walkway

Since November 2012, the effects to Fire Island from Superstorm Sandy have been well documented in news reports, video, still photography, social media, narrative, scientific study and civic debate. The Fire Island to Montauk Point Reformulation Study includes this description of the damage:

"The impacts to the island were extensive. The majority of oceanfront homes in the communities within Fire Island National Seashore were damaged or destroyed. Enormous volumes of sand were carried from the beach and dunes to the central portion of the island, forming large overwash deposits, and the island was breached in multiple locations. With few exceptions, lower-relief dunes were overwashed and flattened.

High dunes, which are more commonly found within undeveloped portions of the island, experienced severe erosion and overwash. The elevation of the beach was lowered and the dunes form vertical scarps where they survived."[6]

It is important to characterize the effects of the storm on the land, the people, and the economy for the purpose of understanding the context for strategies and projects formulated in this plan.

The effects of Superstorm Sandy can be loosely categorized into three broad perspectives:

1. The line of defense - As the first line of defense during severe weather, Fire Island functions naturally as a barrier to high energy ocean waves and strong winds to reduce the impact on the Great South Bay and the "mainland" coastal communities of Long Island.

2. The developed communities - For well over a century, there have been seasonal and year-round settlements on Fire Island that have a long history of being battered by storms.

3. The visitor destination - Fire Island's proximity to the NY Metro area, coupled with its vibrant mix of public and private recreation and accommodations make it important to Long Island's economic/tourism base.

Home damage

The Line of Defense

The visible impact of Superstorm Sandy highlighted both the fragility and resilience of the barrier island. The energy absorbing characteristics of the natural and developed areas were put to the test with the storm, which exhibited wind and wave action and a sharp turn to the west, unlike the more common coastal hurricane pathways. Superstorm Sandy's strong winds and waves impacted Fire Island from both the ocean and bay side forcing floodwaters to completely overwash several locations. A study by the United States Geological Survey (USGS) after Sandy found that "beaches and dunes lost more than half of their pre-storm volume during Hurricane Sandy, leaving the area more vulnerable to future storms."

Further, the study found that the "dunes experienced overwash along 46.6% of the island, dramatically changing the island's shape." Field surveys immediately after the storm indicated that most of the sand from the beaches and dunes was swept out to sea, but that 14% of the material was deposited inland. Follow-up studies during the winter months after Sandy, indicated that the shoreline position shifted as much as 190 feet inland. Later in the spring of 2013, further measurements on the beach indicated that only 18% of the material washed out to sea had returned. Sandy created three new inlets on Fire Island; the Cupsogue County Park breach and Smith Point County Park breach were closed in November and December 2013, respectively, and the third breach, which occurred in the FINS's Wilderness Area, remains open pending continuous monitoring by the U.S. National Park Service, SUNY Stony Brook University's School of Atmospheric and Marine Sciences, and NY Sea Grant.

This awesome power and energy was mitigated in some areas by dunes, natural vegetation, and occasionally man-made structures. The Committee's perception is that generally the areas with healthy dunes fared the best in their ability to absorb the shock, the velocity, and the energy of the wind and wave action. The dynamic nature of Fire Island's ocean and bayside shorelines, coupled with the desire of residents and visitors alike to use and enjoy these shorelines, presents unique challenges for sustainable rebuilding and recovery after Superstorm Sandy. The United States Army Corps of Engineers (USACE) massive dune rebuilding effort, known as the Fire Island Inlet to Montauk Point (FIMP) Reformulation Study, which includes beach nourishment, dune reconstruction, property/easement acquisition and potentially elevating thousands of homes, has been ongoing since 1960 and was recently revived with $700,000,000 in disaster funding appropriations and a far greater sense of urgency[7]. In March 2014, the U.S. Army Corps of Engineers and the U.S. Department of Interior agreed on the details of the project, allowing it to move forward.[8] This major construction project will protect natural resources and significantly increase the resiliency of Fire Island.

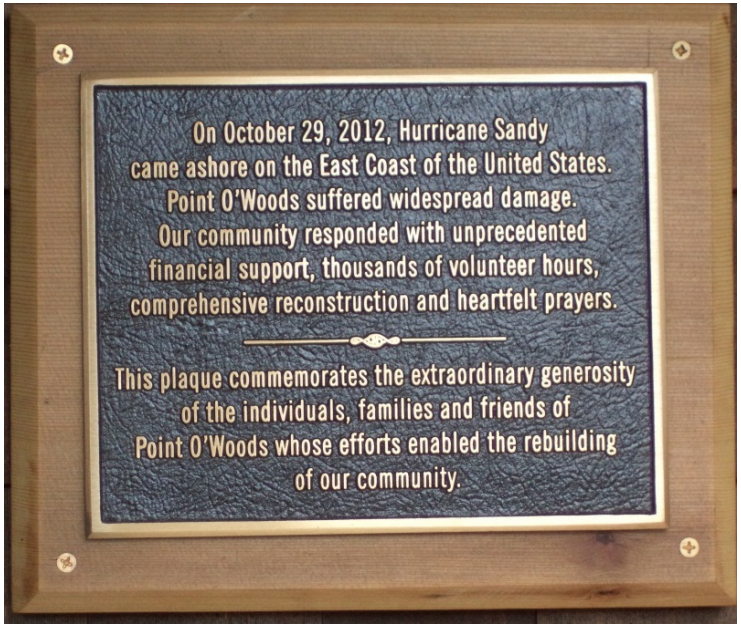
We have learned many lessons about building construction, water quality, storm drainage and the ability of nature to bounce back and heal itself. A greater appreciation has been gained of just how important Fire Island is to the mainland as a storm protection barrier between Long Island's South Shore communities and the Atlantic Ocean.

The Developed Communities

The destruction or displacement of homes, boardwalks, bulkheads, infrastructure, fences, decks, and whatever else was not tied down, left no doubt about the powerful forces of wind and water. The "fixed" world of boundary lines, survey and property monuments, fences, and borders was swept away, reminding us of the challenges of living and working on a barrier island in the Atlantic Ocean.

Community rebuilding

The logistics posed by the geographical isolation of the island, its limited transportation infrastructure, its seasonal economy, and its low year-round population were complicated by the fact that its land mass is regulated by two Towns, two Villages, the County, the State, and the National Park Service. In spite of these unique logistical and geographic issues, the residents of Fire Island banded together with Suffolk County and the Towns of Islip and Brookhaven to coordinate recovery activities. The National Park Service was part of this working partnership.



Point O'Woods commemorative plaque

Because of the spring time restrictions on beach driving in order to protect piping plover nesting areas, debris removal had to be carried out around the clock from late Fall 2012 to March 2013. Debris was collected, transferred to barges for day and nighttime removal, or trucks for daytime removal along the beach, under a contract overseen by the NY Recovery Field Office of USACE, at a cost of over $10,000,000. The contract also required separation of different types of debris in a safe and environmentally sound manner. After March 15, 2013, all collection and removal operations were transferred inland along the walkways, streets, boardwalks and the "Burma Road" to Robert Moses State Park. Approximately 1,600 homes damaged by

the storm were eligible for debris removal and over 62,000 cubic yards of material were removed from the area, enough to cover a football field three stories high.

Superstorm Sandy showed the people of Fire Island's communities that they could be resilient, that they could bounce back, and that they could work together. They found support and strength in their connections with each other. The storm and its aftermath have given the Fire Island communities an opportunity to rebuild and plan for the future with understanding, insight, and intelligent forethought.

Members of the community at a public engagement event

The Visitor Destination

That the devastation came during the "off-season" did not diminish the sense of urgency on Fire Island. The media and emergency services spotlight may have shone most brightly on mainland communities as they raced to get their roads, power systems, transportation, and temporarily homeless populations back into their homes. But Fire Island's residents and the leadership of the County, the Towns, and the FINS became a team almost immediately. They worked together to find ways to communicate and to overcome obstacles to reconstruction and to seek opportunities for change and improvement. All affected parties knew that the isolation of Fire Island would slow down reconstruction and present logistical difficulties to preparations for the 2013 summer season. Many of the developed communities rely on visitors and renters as does the National Park Service to fulfill its mission to highlight for park visitors the preservation and understanding of Fire Island as a natural resource. Tourism is a key element of the Fire Island economy, which makes it important to Long Island's economy, particularly its tourism and recreation sectors.

The Fire Island Lighthouse, located near the western end of Fire Island, is a high-profile visitor destination. It experienced basement flooding and damage to its museum exhibits and gift shop inventory. The boardwalk leading from the lighthouse to the beach was destroyed, as was a boardwalk leading from the Fresnel Lens building to the gravel road and the boardwalk connecting these buildings to the bayside dock. The dune between the lighthouse and the Atlantic Ocean was flattened. Access from the Lighthouse and annex was disrupted with the destruction of the boardwalk connecting these buildings to the bayside dock. The dock was completely destroyed except for the pilings. Because this lighthouse enterprise is run by a not-for-profit organization, repairs have been a difficult to get started. The dock itself and the associated walkways leading to and from it have not yet been repaired while the boardwalk from the Lighthouse to the beach may not be replaced at all. But repair of the visitor pedestrian "lifeline" boardwalk and pathway from Robert Moses Field 5 to the Lens Building is nearing completions. The lighthouse location typified both the Ocean and bay-side devastation from the storm and the difficulties of recovery, but also the cooperative nature of the response to reclaim, restore, and rebuild.

Elsewhere in the FINS properties, 6,000 linear feet of boardwalk required complete replacement. Repairs also were necessary to damaged Ocean access walks and staircases at multiple locations, areas at Sailors Haven Marina and Watch Hill Marina, housing and shop areas in multiple locations. The helipad at Sailors Haven required replacement. The Old Inlet dock was so damaged it had to be demolished. (See Figure 3 for the locations of these assets within FINS.) Damaged vehicles, equipment, fuel systems, and park travel ways, and storm debris in parklands necessitated cleanup and removal.

Fire Island Lighthouse

Fire Island is getting back on its feet. The fast-track response by islanders after the storm produced a successful 2013 summer season, and gave both a psychological and fiscal boost to the people and the economy. But the experiences also triggered a critical discussion of how to use the storm aftermath as an opportunity for building increased resiliency. These new ideas can range from large scale dune rebuilding projects to bay side flood mitigation projects, from regional improvements in communication systems to elevation of local Community centers above anticipated storm water levels.

Fire Island is a place in which parks, open lands, and people coexist, without paved highways and within close proximity to one of the largest urban centers in the world. Superstorm Sandy underscored the urgent need for the County, Towns, National Park Service, and the developed communities to cooperate for a common purpose to protect Fire Island's environmental quality, economic vitality and the health and well-being of its residents and visitors.

View of the dunes and beach

National Parks information sign

C. CRITICAL ISSUES

The NYRCR Fire Island Committee expressed concern for a variety of resiliency issues relating both to protecting the life and safety of Community members in the face of storm events and fostering stewardship of the unique barrier island landscape. Some of the most significant and widespread issues included:

- Creating a mechanism for enhanced communication, collaboration and regional planning among the many Fire Island interests and the Long Island mainland;
- Sustaining commercial, recreational and tourism assets and functions;
- Developing a comprehensive island-wide ocean and bay shoreline management strategy;
- Maintaining safe access to all communities;
- Ensuring that municipalities and first responders, including fire departments, have the necessary resources to prepare for and protect the public, property and the natural environment during and after disasters; and
- Mitigating repetitive flooding.

These critical issues inform every aspect of the plan and are discussed in more detail in later sections.

Home elevation construction

D. COMMUNITY VISION

The Committee developed the following vision statement to guide the entire planning process and to ensure that the recommended actions included in the Final Plan address the critical issues identified by the Committee.

Community Vision Statement:

As an integral component of the Fire Island National Seashore, the communities of Fire Island are united in their determination to strengthen and preserve this unique, dynamic barrier island for future generations.

We recognize Fire Island's critical importance to the entire region – as Long Island's first line of defense against destructive storm surges, a precious natural resource and ecosystem, and an engine for the Long Island and New York State economy.

Working collaboratively, we will partner with governmental agencies on every level to ensure the island's resiliency and sustainability, and to secure Fire Island's future.

View of the dunes and beach

E. RELATIONSHIP TO REGIONAL PLANS

One of the major outcomes following Superstorm Sandy was a collective realization that many of the significant issues affecting Long Island communities must be addressed at the regional level. Due to the geography of Long Island, many of the municipalities, comprising Towns, Villages, and Counties, share similar challenges as well as opportunities relative to the natural environment, physical infrastructure, and other built systems. Additionally, it is important to understand the cause and effect relationship that occurs between the barrier beach islands and the mainland. Potential regional issues are expanded upon below.

Potential Regional Issues and Concerns

Natural Environment: Long Island has 1,180 miles of shoreline fronting the Atlantic Ocean, the Long Island Sound, and a number of lakes, bays, inlets, and canals including over 75 miles of shoreline on Fire Island. Approximately one-fifth of Long Island's land and much of Fire Island is protected from development by Federal, State, County, or municipal entities. About half of this land represents over 800 public parks on Long Island ranging from small community playgrounds to larger parks like the FINS and Bethpage State Park. The Pine Barrens contain wetlands and dry upland areas that are inhabited by an array of wildlife species, many of which are endangered or threatened. The continued protection of Long Island's water supply from sole source aquifers is also a significant regional issue.

Developable Land Supply: Almost two-thirds of Long Island's land surface is urbanized, i.e., developed with buildings, pavement, and other manmade structures. This condition in combination with the large amount of protected/preserved land, results in a constrained supply of available vacant land to accommodate new housing or economic development activities.

Water Quality: Long Island's aquifers receive their fresh water from precipitation which percolates into the ground and is recharged into the groundwater system. The greatest threat to the quality of this water is development (residential/commercial/industrial) in sensitive areas that would add pollutants and impede the absorption of precipitation. As water is drawn for use in coastal areas, and barrier islands in particular, less groundwater is available to be discharged into the estuaries. The subsequent loss of water and pressure allows saltwater from the ocean to flow into the aquifer, causing the groundwater to become saline and undrinkable. This is known as "saltwater intrusion" and is a threat to drinking supply on Fire Island and the mainland as well.

Other threats to water quality include non-point source pollution and storm water runoff, which are County-wide concerns. Non-point sources typically include fertilizer and pesticides, oil and other automobile fluid, as well as animal and pet waste. While Fire Island has limited vehicle activity, and less volume of fertilizers and pesticides, some degree of these non-point sources exist. This type of pollution has the potential to seep into ground water and impact surface waters such as the Great South Bay.

While the Great South Bay is a surface water body, it is also a significant habitat comprised of features such as barrier beaches and islands, wetlands and marsh islands. Additionally, the bay is a key component of the local economy which relies on the health and stability of the bay ecology. As a result, the bay is in many ways a regional resource. Degradation of water quality as a result of non-point source runoff is of rising concern relative to the bay.

Non-point source releases into the bay can result in increased bacteria levels which in turn can lead to the closure of large areas of the bay to economic activities like fishing as well as recreational marine-dependent uses. The continued discharge to ground and surface waters in addition to increased runoff from roadways and septic systems have been adversely impacting water quality and vegetation in the vicinity of the Great South Bay. These water quality concerns also have the potential to impact spawning habitats as well as many marine species that are dependent on these systems.

Utilities: Electricity and the susceptibility of the power grid are both national and regional issues of concern. Long Island's Regional Economic Development Council (REDC) Strategic Economic Development Plan August 2012 Progress Report update (in its "Vital Projects" section and its Infrastructure strategy) similarly stressed the importance of addressing utility vulnerabilities which currently exist across the Island. More specifically, one of the longest-lasting impacts of Superstorm Sandy was the vulnerability of Long Island's electric power grid.

The Smarter Grid Research, Innovation, Development, Demonstration & Deployment (SGRID3) initiative is a collaboration between Stony Brook University and Brookhaven National Laboratory that initially focused on the development and deployment of new smart grid technologies as a mechanism to reduce energy and associated costs to consumers. However, this objective changed in the wake of Superstorm Sandy with the focus shifting to autonomous control capabilities that when employed would make Long Island's grid more resilient during weather events and able to recover more quickly in the aftermath. On Fire Island, there is no natural gas service which creates the need to transport propane tanks to Fire Island. The reliability of telephone and data communication is also of concern.

Utility room in Ocean Beach

Sea Level Rise: As a coastal area, Long Island is susceptible to rising sea levels, especially as it relates to storm surges. According to a report prepared by Columbia University, the City University of New York, and Cornell University, coastal flooding associated with rising sea levels will very likely increase in intensity, frequency, and duration[9]. Sea level is anticipated to increase by 2 to 5 inches in the New York City and Long Island region by the 2020s and by 12 to 23 inches by 2080. Should polar icecaps melt rapidly, climate models project that sea levels will rise even more. As a result, low-lying coastal communities on Long Island and New York City could experience greater flooding from high-tides and storm events, with consequent property damage. Fire Island plays an extremely important role as a barrier island in slowing down and absorbing storm surge as it approaches the mainland of Long Island, and as such, strengthening of its oceanfront and bay front shorelines is critical.

Other issues that are pertinent on a regional level include those related to public health and economic equity. These include projects designed to improve the quality of life for the Island's impoverished, underinsured, or at-risk populations. Emergency preparedness projects are also important to improve the overall safety of the Island's population. These include: maintaining evacuation route access; improving the communication capability for a multi-jurisdictional response during emergency events; and emergency access to healthcare services.

Review of Existing Plans and Studies

Plans and studies have been prepared at the regional, County, and local levels that encompass the communities of Fire Island. At the regional level, broad findings and strategies are made that do not specifically address the Fire Island communities but whose policies and actions can affect the lives of all residents of the region. At the local level, specific plans can have a more direct effect on the day-to-day lives of residents.

The following is a list and summary of regional plans and studies identified to date that may be relevant to the NYRCR Fire Island Plan.

> *"Our docks have to be repaired because almost everything comes and goes by water…"*
>
> *"I would not like to see roadways that would change the character of the community…"*
>
> *"We need access so that emergency vehicles can always get through…"*
>
> - *Posted on virtual town hall meeting*

Regional

Long Island's Future Economy- Long Island Regional Economic Development Council (2011) - This plan was initiated by New York State as a means of reviving the regional economy. The plan contains six major strategies that cover a broad spectrum of economic and quality of life issues. The Executive Summary of the Plan describes the strategies as follows:

- Create a cohesive education and workforce training strategy;
- Develop innovation and industry clusters in transformative locations;
- Enhance and develop multi-faceted, interdisciplinary facilities for commercialization of innovative products;
- Reinvigorate Long Island's manufacturing sector;
- Produce a new generation of sustainable, good-paying jobs; and
- Rebuild and expand infrastructure.

The *2012 Progress Report* added strategies in these areas:

- Innovation and Industry Clusters
- Infrastructure Strategies
  - Revitalize Downtowns, Blighted Areas and Commercial Centers;
  - Repair and Upgrade Aging Infrastructure;
  - Create New Housing Opportunities; and
  - Promote New Government Policies to Foster Economic Growth.
- Natural Assets Strategies
  - Improve Sustainable Agriculture Enterprises;
  - Improve the Economic Potential and Employment Opportunities of Fisheries and Aquaculture; and
  - Enhancing Ecotourism and Cultural Tourism Activities.
- Workforce and Education Strategies
  - Strategies for Growth Sectors;
  - Science, Technology, Engineering, and Mathematics (STEM);
  - Advanced manufacturing / information technology;
  - Healthcare/Life Sciences; and
  - Green technologies.
- General Strategies
  - Provide support services, incubators, and skills development for new businesses;
  - Create partnerships between sectors to improve educational outcomes;
  - Encourage collaborative relationships to provide quality, affordable childhood education; and
  - Promote arts organizations, artists, and programs.

The *Five-Year Strategic Economic Development Plan for Nassau and Suffolk Counties* (September 2013 Update) adds two new strategies:

- Protect Long Island from the perils of climate change; and
- Revitalize Long Island's poorest places.

While many of these strategies do not apply to Fire Island, these studies highlight a few of the regional concerns important to the NYRCR Fire Island Community, such as rebuilding infrastructure, and enhancing ecotourism and cultural tourism activities. In particular, partnerships between local Island-based businesses which heretofore came together after the storm as "Revive Fire Island[10]" are now reformulating the joint marketing of businesses and responsible visitorship in the communities. The future economic development planning is critical in the reconstruction of community and recreation facilities within the beach communities, and the Fire Island National Seashore facilities all linked to a sustainable visitor economy. Critical transportation links are being recognized as important regional components, including transportation enhancement of the rail to ferry link in Bay Shore from the LIRR station to the Fire Island ferry dock, and the links to FINS facilities from Sayville and Patchogue.

Regional Comprehensive Sustainability Plan- Long Island Regional Planning Council (2010) - The plan noted the inability of Long Island to sustain itself fiscally, environmentally and socially based on current governance methods and policies. The plan put forward that fundamental change would be necessary to alter the course of the future by noting the following, “Despite these challenges, Long Island has a tremendous opportunity to redefine what it means to live in a sustainable 21st century suburban Community, recognizing it is possible for Long Island to be affordable and prosperous, bringing a return to economic growth and strength. Our ability to act today – and leave behind the status quo -will have a tremendous impact on the future of the region.”

The aftermath of the Superstorm Sandy highlighted the critical importance of the FINS, USACE, FEMA, and other Federal agencies working with various State agencies, two Towns, two incorporated Villages, and 17 communities to coordinate reconstruction and rebuilding. The effort is leading to a call for a more sustainable relationship between these entities, such as a recurrent Fire Island Planning Forum.

Ferry dock and marina

Truck utilizing the beach as a travel way

Fire Island Inlet to Montauk Point (FIMP) Reformulation Study (in progress) - U.S. Army Corps of Engineers (USACE) - According to a summary of the planning process prepared by the USACE, the purpose of the study is to identify, evaluate and recommend long- term solutions for hurricane and storm damage reduction for homes and businesses within the floodplain along the ocean and bay shoreline from Fire island Inlet to Montauk Point. The planning area extends northward to Sunrise Highway on the mainland.

The study is expected to be completed in the near future. Upon approval, funding will become available to complete projects recommended in the study. It is expected that this will include increasing the height and width of the primary dune on the ocean side of Fire Island in selected, vulnerable locations, and raising, demolishing or relocating homes away from the planned primary dune line. The Fire Island to Montauk Point Reformulation Study Update was prepared to account for the impacts of Superstorm Sandy and to coordinate several ongoing interim projects. The overall purpose of the study is "to evaluate a range of possible alternatives to address storm damage risk, including the screening of various Storm Damage Reduction (SDR) alternatives and their designs, analysis of potential impacts associated with various designs, design optimization, and selection of a recommended plan for the Project area." The issues and needs described in the study pertaining to long shore sediment transport, cross-shore sediment transport, dune growth and evolution, bayside shoreline processes, and circulation and water quality, are vital issues for Fire Island. The study treats the beaches, dunes, sediments, and marshes as one system that must be managed in order to increase resiliency. Likewise, the NYRCR Committee may approach their landscape as a similar system in which all components must be strengthened to truly reduce risk and achieve resiliency.

The USACE New York District website on the FIMP Reformulation study[11] was last updated on March 17, 2014 to reflect the following information on the status of the study:

- The *Draft Hurricane Sandy Limited Re-evaluation Report (HSLRR)* is complete. The HSLRR identifies the area's vulnerability, discusses existing/future conditions with vs. without FIMP-related restoration, provides an overall construction schedule (currently anticipated as September 2014 through August 2015) and acquisition maps, and an overall cost estimate for the project of $161,514,000 based on October 2013 price levels. The HSLRR includes stabilization layouts throughout the project extents, including contours and grading and berm heights.
- The project's *Draft Environmental Assessment (DEA)* is available online for public review and comment. Comments provided by April 2, 2014 will be considered going forward, and included in the project record.
- The DEA includes prior engineering and design efforts, surveys, and environmental compliance analysis. Topics include economics, transportation, and natural resources, all compared to the "No Action" condition. It identifies a Tentatively Selected Plan (TSP) with maps, plans, and volumetric calculations, based on analyzing multiple alternatives, many of which were found to be cost-effective. Multiple measures are necessary because no single alternative can address every storm risk management problem. Recommended features thus far include Inlet Bypassing Plans; Breach Response Plans; Non-Structural Plans (6-year and 10-year levels of risk management); and beachfill with new 13-15 foot tall dunes. The DEA analyzes the beachfill feature combined with incremental levels of the other features (storm management, dunes, and structural alternatives).

Long Island South Shore Estuary Reserve Comprehensive Management Plan (SSER CMP) - Long Island South Shore Reserve Council, NYS DOS (2001) - The South Shore Estuary Reserve (SSER) stretches 70 miles from the western border of Nassau County to the center of Suffolk County encompassing all the Bays (Hempstead, South Oyster, Great South, Moriches, and Shinnecock) between Fire Island and Jones Beach Island and mainland Long Island. The SSER CMP takes a holistic approach managing the South Shore Estuary for both human and environmental needs. It makes recommendations to improve and maintain the SSER's water quality, to protect and restore living resources, to expand public use, and to sustain and improve related economies. The goals of the SSER CMP are in consonance with the efforts of the FINS and the NYRCR Committee on Fire Island.

County Plans and Studies

Suffolk Country Comprehensive Plan 2035 (2011), Suffolk County Planning Commission - This report was issued as the first volume of a series that will cover all aspects of the Suffolk County environment, economy, sustainability and resource protection. Volume One began the process by presenting updated information on demographics and socio-economic information, development trends, as well as a summary of prior regional and local plans. Fire Island will be an important aspect of environmental recommendations in the resultant plan with respect to the protective aspect of the barrier island and back bay estuary, and the importance of the recreational / tourism economy.

View of the shoreline along Great South Bay

Suffolk Country Demographic, Economic, and Development Trends, Suffolk County Department of Planning (2008, updated 2013) - This report provides information on demographic, socioeconomic, and development trends for Suffolk County, and in some cases for Nassau County as well. The report is updated on a regular basis with the most recent update occurring in August 2013. The 2013 report found a slight growth in jobs in the bi-county area (+ 19,400, an increase of 1.54%, compared to June 2012). Of note is the finding that the number of businesses increased 1.7% in the five years between 2006 and 2011. Also of note, the report specifically discusses the importance of tourism and recreation, in that Eastern Suffolk County (including Fire Island) is "a large tourist market…a major tourist and second-home destination, with one of the largest concentrations of second homes of any county in the United States." According to the report, there are "approximately 37,000 second homes in eastern Suffolk" – and the ±4,500 homes in Fire Island comprise a significant percentage of this number. Suffolk County's approximately 150,000 part-time residents are likewise comprised in large part of the part-time residents of Fire Island.

Comprehensive Water Resources Management Plan (in progress), Suffolk County Department of Health - This is a very significant study that is being conducted by Suffolk County. It is for the purpose of updating a similar study that was done in 1987, the antecedent of which was the Long Island 208 Study (1978). The study has involved the collection and testing of extensive groundwater samples as well as the mapping of land uses and build-out projection. The purpose of the

study is to ascertain if the County is meeting water quality standards that are necessary to ensure a safe drinking water supply.

Since Suffolk County's 1,500,000 residents rely on groundwater as their sole source of drinking water, the quality and quantity of groundwater water is critical. There are no surface water supplies in the County, e.g., reservoirs. The study has produced some important reports but is not yet final. Plan recommendations will impact Fire Island with respect to existing sanitary waste disposal systems, requirements for future sanitary waste disposal systems associated with new development, drinking water standards, and sampling/testing procedures for drinking water distribution systems.

Smart Growth Policy Plan for Suffolk County, Suffolk County Department of Planning (2000) – This report describes the Smart Growth planning process and also discusses eight Smart growth principles and how they can be implanted in the County.

Land Available for Development and Population Analysis Western Suffolk County, Suffolk County Planning Department (2009) - This study was done as a component of the County's Comprehensive Water Resources Management Plan. Its purpose was to determine the potential for population growth and the subsequent potential demand for ground water.

In the Town of Brookhaven, there are 56 acres zoned residential (≥ 6,000 square feet) and one (1) acre of vacant commercially zoned property available for potential development, for a total of 57 acres. However, per discussions with Suffolk County, this land is primarily wetlands and is therefore not available for development.

In the Town of Islip, there are 14 acres zoned residential (≥ 6,000 square feet) and one (1) acre of vacant commercially zoned property available for potential development, for a total of 15 acres.

This report also singles out Fire Island as having "significant numbers of seasonal or second homes." The County report tabulates 2000 Census data that reflects those Suffolk County communities with more than 100 seasonal homes, and finds that, "mostly on Fire Island," the seasonal population increases the populations of the entire Towns of Brookhaven and Islip by respective percentages of 2.6% and 2.8%. In Islip, the seasonal population increases the population density by a factor of 23.4. In Brookhaven the increase is a factor of 51.9.

Local Plans

The barrier beach system of offshore islands stretching from Southampton, NY to New York Harbor was formed after the retreat of glaciers from Long Island 10,000 years ago. An eddy current of the Gulf Stream running from east to west began the process of erosion at Montauk Point - providing long shore transport (or littoral drift) and subsequent deposition to create a barrier island and back-bay system typical of glaciated outwash coastal areas seen from Cape Cod in Massachusetts to the Outer Banks of North Carolina.

As these coastal areas became important for commerce, tourism, recreation, and development, the government roles of protecting public health, safety, and welfare grew in importance. For Fire Island, its post-colonial role grew in prominence with the growth of trans-Atlantic shipping in and out of New York Harbor.

Its importance for navigation began the development and settlement of places along the beach to house the U.S. Life Saving Service (USLSS) that became the U.S. Coast Guard (USCG). From that mid-19th century era, development on Fire Island has continued to the present day and numerous studies have been conducted and programs developed addressing the management challenges of Fire Island. Following is an abbreviated timeline of activities/ milestones/ publications concerning Fire Island.

1960 – Congress authorizes the USACE to examine the coastline and find solutions to coastal erosion from Fire Island Inlet to Montauk Point.

1964 – Congress authorizes the creation of the Fire Island National Seashore (FINS) and shortly thereafter the National Park Service (NPS) begins to formulate plans for park management in both developed and undeveloped areas of FINS.

1977 – The FINS publishes its first *General Management Plan (GMP)*, which includes regulations as to how the NPS will interact with local municipalities who regulate zoning and building controls within the FINS.

Fire Island National Seashore information sign

1982 – The National Flood Insurance Program, begun in 1968 and amended in 1973 is amended again, deepening the connection between national floodplain property protection policy and locally conformed building ordinances.

1984 – *Hurricane Damage Mitigation Plan* published by the Long Island Regional Planning Board focuses on policies that let nature run its course.

1994 – Coastal Science and Engineering, Inc. publishes *Report for New York Coastal Partnership* and the Governor's Coastal Erosion Task Force also publishes their findings, both regarding Fire Island public policy and cost estimates associated with various engineering responses.

1995- Economic Analysis: Fire Island Reach, Lee Koppelman, New York Coastal Partnership, undertakes a Benefit/Cost analysis of Fire Island and concludes "that proper attention to beach stabilization yields a public net gain" including but not limited to real estate and income tax revenue that benefit the Townships of Islip and Brookhaven and Suffolk County.

1998 – USACE publishes an *Alternative Screening Report Atlantic Coast of Long Island, Fire Island Inlet to Montauk Point* with an overview of various storm protection alternatives.

2003 – The Budget Review Office of the Suffolk County Legislature produces a report titled *Impact of the Atlantic Ocean Beaches to the Economy of Suffolk County*. The report details the positive economic value of the Fire Island beaches to the Suffolk County economy.

2007 –The FINS begins a new GMP process and update.

2007 – Jay Tanski of the NY Sea Grant Extension Program produces *Long Island's Dynamic South Shore: A Primer on the Forces and Trends Shaping our Coast*. The report explores the issues underlying decisions that balance conservation of the natural environment with the significant demand to use a prime recreational and tourism resource.

2008 – SUNY Press publishes *The Fire Island National Seashore – A History,* containing an extensive look at public policy, publications bibliography, studies, and activities to date.

C. Soller, Fire Island National Seashore Superintendent with Watch Hill visitor information sign

Post-Superstorm Sandy:

2013 – In response to Superstorm Sandy, USGS published *#2013-1231 Coastal Change from Hurricane Sandy and 2012-13 Winter Storms, Fire Island, NY*, which assesses the morphological impacts to the beach and dune system at Fire Island, New York.

2013 – As indicated above, the *Fire Island to Montauk Point Reformulation Study Update* was prepared to account for the impacts of Superstorm Sandy and to coordinate several ongoing interim projects. In March 2014, the USACE and the U.S. Department of Interior agreed on the details of the project, allowing it to move forward.

From an appreciation of the formation and natural functioning of the barrier island to an understanding of the regulatory aspects associated with the creation of the FINS, a key “local plan" is actually a Federal plan: the proposed revision of the General Management Plan of FINS, which is a work in progress (see 2007 above).

This new plan formulation has engaged the communities and the local planning and zoning jurisdictions and it draws on a body of knowledge springing from the many plans, publications and efforts cited above from 1960 to the present day. The FINS GMP Newsletter 2, April 2010, described "Action Alternative Commonalities" or critical themes, regardless of the chosen implementation activities, which include the concepts of:

1. Cooperative Stewardship;
2. Educational Outreach;
3. Submerged Marine Resources;
4. Climate Change and Sea Level Rise;
5. Roadless Island; and
6. Public Information, Orientation, and Wayfinding.

These six concepts have helped to inform the discussion, influence the Community vision statement, and have had a major impact on the formulation of the NYRCR Fire Island planning effort.

View of dunes and homes

Section 2: Assessment of Risk and Needs

Fire Island Lighthouse

A. DESCRIPTION OF COMMUNITY ASSETS AND ASSESSMENT OF RISK

One goal of the NY Rising Community Reconstruction (NYRCR) Plan is to ensure that the social, economic, and natural resource assets and systems that were affected by Superstorm Sandy are made more resilient against future storms. Toward that end, assets potentially at risk from storm events were identified and then evaluated in more detail. This risk assessment yielded information that aided in the development of specific projects and actions to reduce risk and sustain Community functions.

Description of Community Assets

Assets are places or entities where economic, environmental, and social functions of the NYRCR Fire Island Community occur. Examples of assets include public facilities such as schools, medical facilities; emergency and public safety services including fire and police protection; as well as natural, cultural, and recreational resources such as wetlands, beaches, and parks. Assets also include critical infrastructure such as transportation roadways, utility networks, and storm water systems required to support those essential public facilities.

The purpose of the inventory is to create a comprehensive description of the assets within or outside of the Community whose loss or impairment due to flood events would compromise essential functions or critical facilities of the Community. The inventory documents both landscape features and vulnerable elements of the asset itself that contribute to flood risk.

Assets were identified in three geographic areas at risk to storm inundation and sea level rise. The three risk areas, described below, help identify which assets have likely been affected by coastal hazards, or could be affected in the future:

- **Extreme Risk Area**: Assets located in the extreme risk area are currently at risk of frequent inundation, vulnerable to erosion in the next 40 years, or likely to be inundated in the future due to sea level rise.
- **High Risk Area:** Assets upland of the Extreme risk area that are currently at occasional risk of inundation or at future risk from sea level rise.
- **Moderate Risk Area:** Assets upland of the High Risk Area that are currently at infrequent risk of inundation or at risk in the future from sea level rise.

The data and methods to create the three risk areas are available on the NYRCR website.[12]

Figure 6: Risk Area and Hurricane Inundation, Map 1 of 4

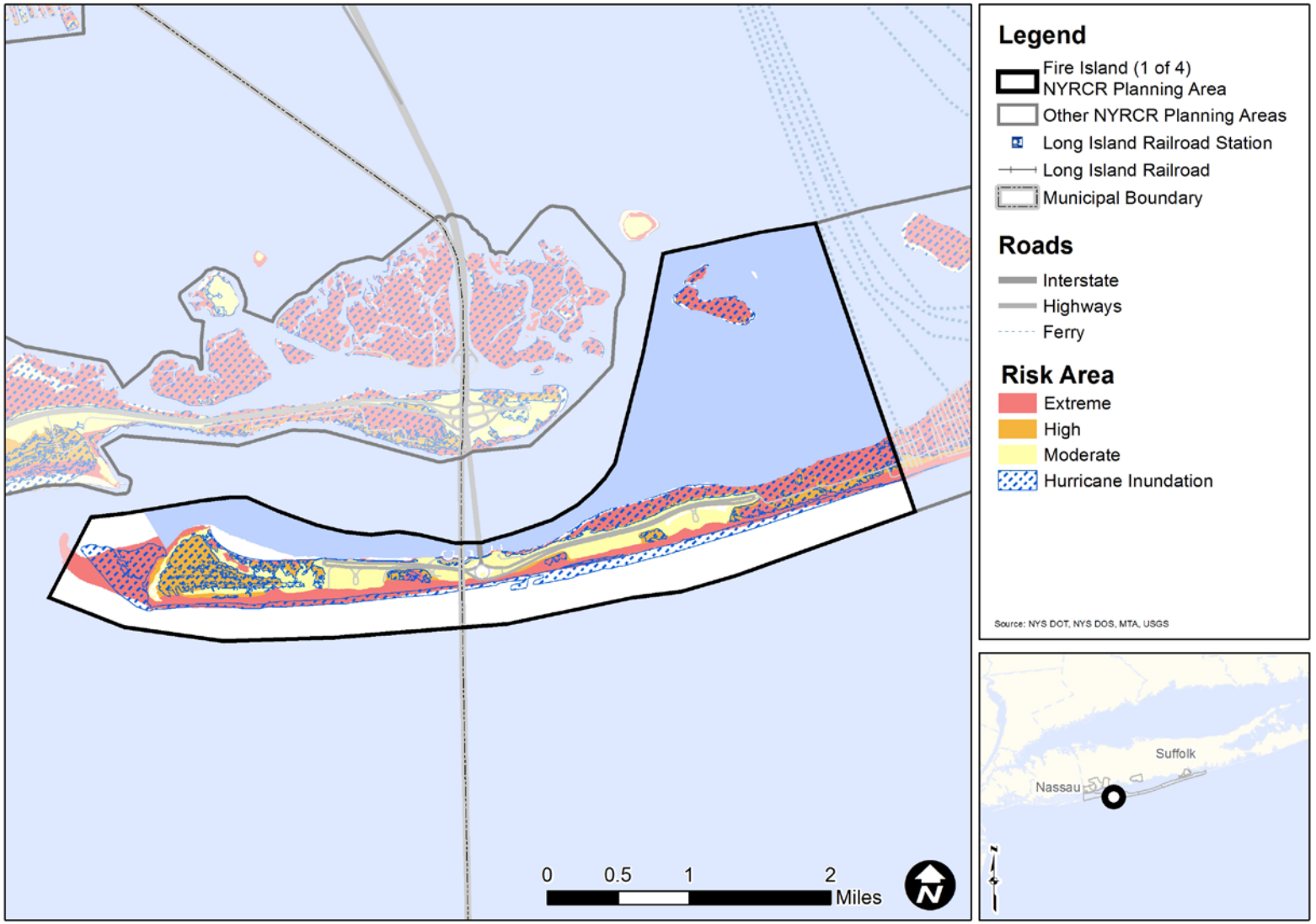


Figure 7: Risk Area and Hurricane Inundation, Map 2 of 4

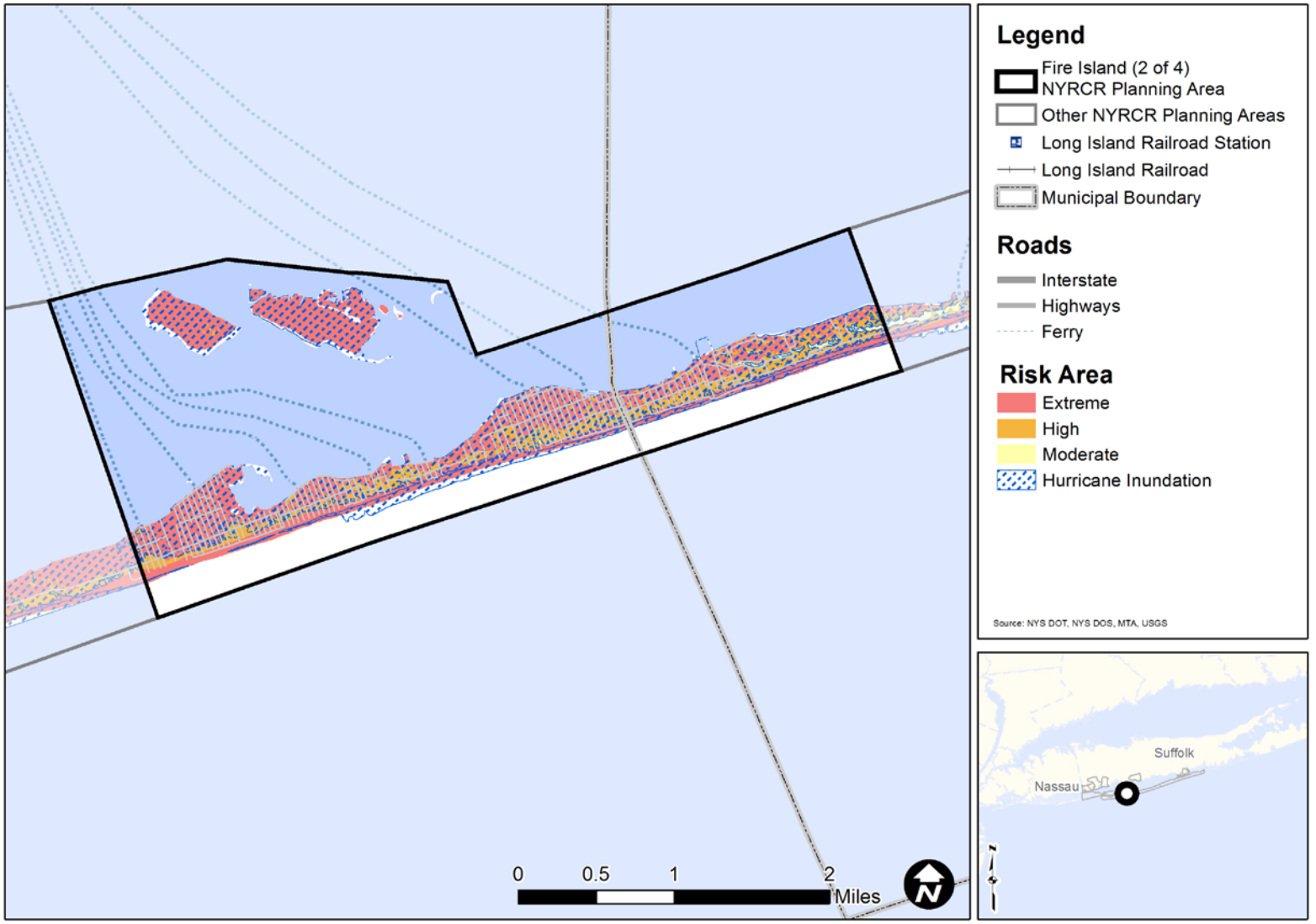


Figure 8: Risk Area and Hurricane Inundation, Map 3 of 4

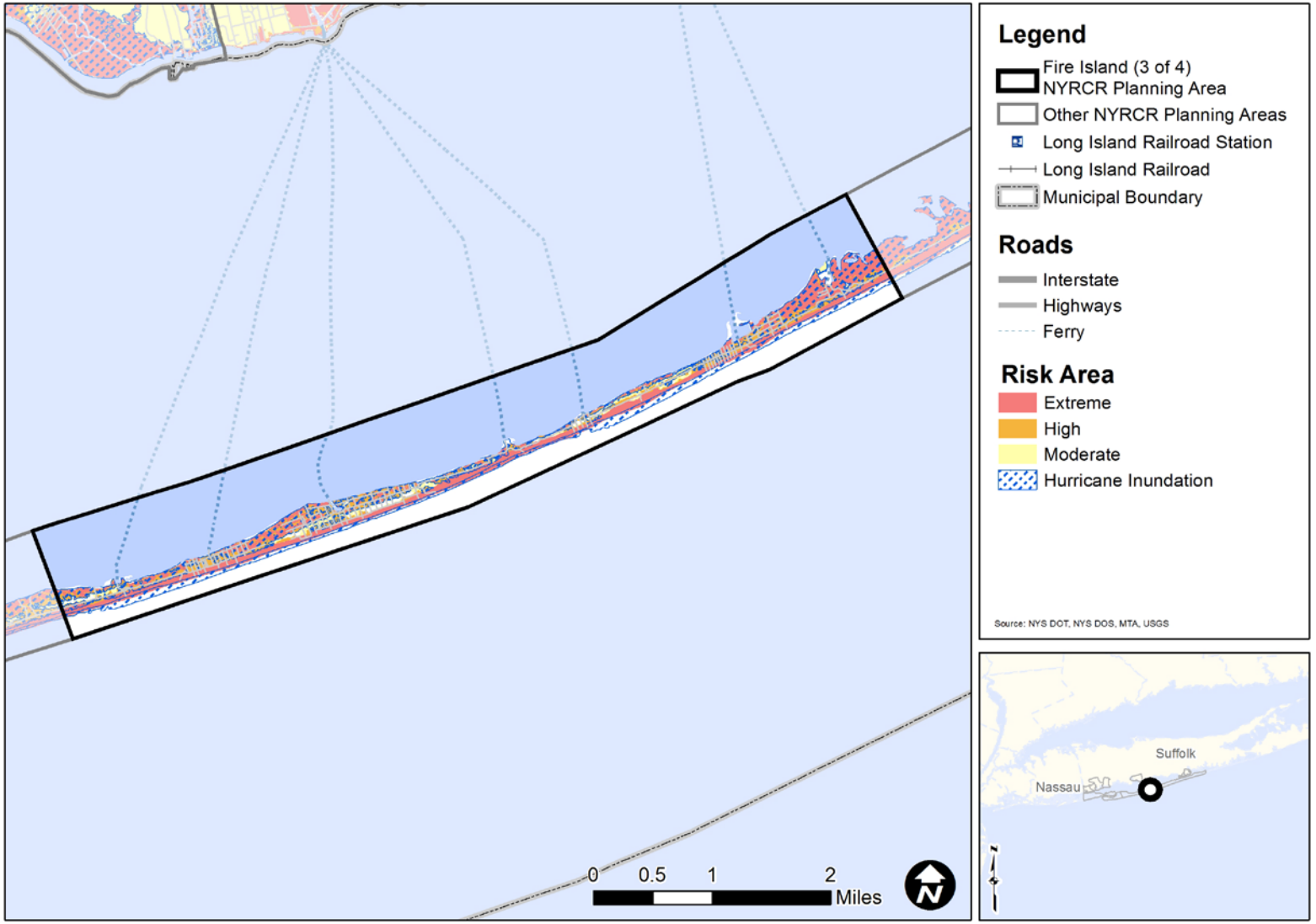
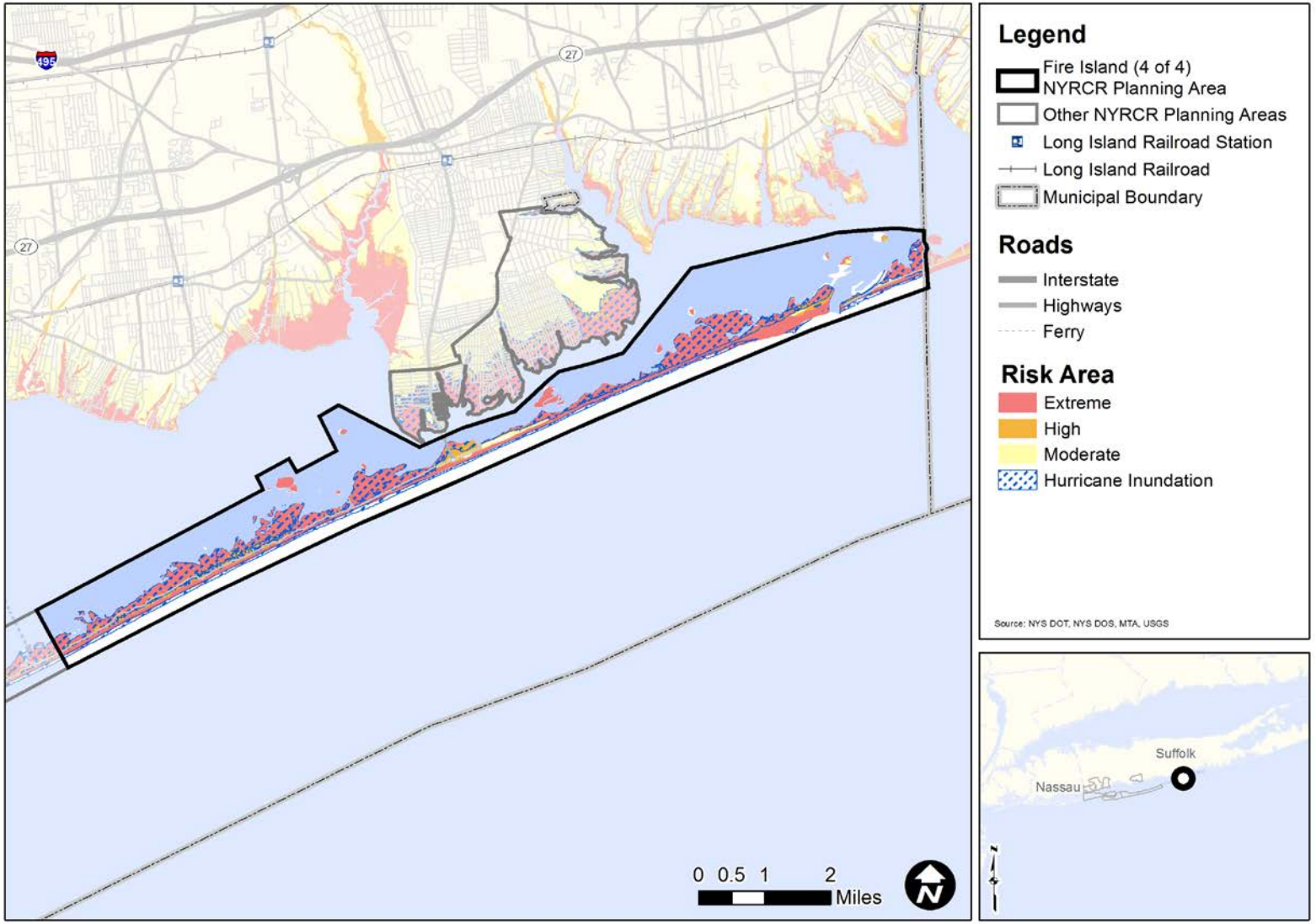


Figure 9: Risk Area and Hurricane Inundation, Map 4 of 4



The complete asset inventory, found in Section 5, Part D, provides detailed information on each identified asset, such as its classification as a critical or non-critical facility, whether the asset serves a vulnerable population, and the relative value, or importance, of the asset to the Community. The NYRCR Fire Island Planning Committee (Committee) identified the assets' value as high, medium, or low.

Low: Assets(s) that play a role in the functioning of a community's day to day life, but whose loss could be managed and overcome with in a community without substantial impact to that community's functioning. Can be started, replaced, or temporarily duplicated in a short-term time frame with limited burden to a community's long-term health.

Medium: Asset(s) that are important to the functioning of that community's day to day life and that the loss of that asset or extended lack of functioning would cause hardship to the community's well-being but whose function could be replaced or duplicated in a mid-term time frame without significant burden to a community's long-term health.

High: Asset(s) that are so significant in the support of that community's day to day function that the loss of that asset or extended lack of functioning would create severe impacts to the community's long-term health and well-being or result in the loss of life or injury to residents employees or visitors.

As part of the complete inventory contributing landscape attributes and physical features of the asset that contributed to the severity of storm impacts were noted. For example, assets located near shorelines lacking the protective features of wide beaches, healthy dunes, and stable, indigenous vegetation are at increased risk of flooding. Specific features of the asset that are at risk (e.g., mechanical equipment below flooding elevation) are also recorded in the inventory. These important observations will help guide the selection of appropriate strategies and projects for risk reduction.

Below is an overview of Community assets, including the risk area in which they are located and identification of community value.

Economic

All of the commercial properties within the NYRCR Fire Island Community are located within or adjacent to a risk area. Of the 126 at-risk commercial properties within the NYRCR Fire Island Community, 94 and 31 are located in Extreme and High Risk Areas, respectively. One commercial property is located in a Moderate Risk Area.

Therefore, most of the stores, restaurants, and other businesses that support these communities and tourism can be damaged in one major storm, making it difficult for the communities to function and for tourism to recover until these assets are again operable.

Table 2: Economic Resources

Asset	Risk Area	Community Value
94 commercial properties	Extreme	Medium
31 commercial properties	High	Medium
1 commercial property	Moderate	Medium

Health and Social Services: Life Safety

Health and Social Services: Life Safety includes fire protection, police services, hospitals, and emergency operations facilities. There are five Emergency Operations Facilities in Suffolk County. These facilities would coordinate emergency services during an emergency. Two of these facilities are along the South Shore of Long Island: the Babylon Town Civil Defense facility is located directly north of the NYRCR Village of Lindenhurst Community and the Islip Public Safety facility is located between the NYRCR West Islip and the Oakdale/West Sayville Communities. As none of these Emergency Operations Facilities are located on Fire Island, communication between these facilities and Fire Island emergency responders is a critical issue.

The NYRCR Fire Island Community has one police station, the Ocean Beach Police Department. The Police Station is located in the extreme risk area. In addition, there are four Suffolk County Police booths located on Fire Island – all of which are operated seasonally and located in the extreme risk area. With all of the police facilities located in extreme risk areas, they could all become inoperable and/or inaccessible in a major storm, requiring alternate facilities to be located.

The NYRCR Fire Island Community has nine Fire Stations within it. Seven fire stations are located in the extreme risk area. Davis Park Fire Station and the Cherry Grove Fire Station are located in the high risk area. As with the police facilities these facilities are also located in extreme and high risk areas. Some of these facilities flood regularly and improvements to shoreline defenses are required to resolve this issue. Additionally, backup power is necessary to keep these facilities operational during and after storms.

There are a few doctors' offices but no hospitals located within the NYRCR Fire Island Community. The closest hospital, Good Samaritan Hospital Medical Center, is located in West Islip. Therefore it is important that helicopter pads, docks, and emergency access routes for air, water, and land transport to mainland hospitals are maintained.

Table 3: Police Stations

Asset	Risk Area	Community Value
Ocean Beach Police Department	Extreme	High
Suffolk County Police Booth: Ocean Bay Park	Extreme	High
Suffolk County Police Booth: Fire Island Pines	Extreme	High
Suffolk County Police Booth: Kismet	Extreme	High
Suffolk County Police Booth: Atlantique	Extreme	High

Table 4: Fire Stations

Asset	Risk Area	Community Value
Fair Harbor Fire Station	Extreme	High
Ocean Beach Fire Station	Extreme	High
Ocean Bay Park Fire Station	Extreme	High
Kismet Fire Station	Extreme	High
Point O Woods Fire Station	Extreme	High
Saltaire Fire Station	Extreme	High
Davis Park Fire Station	High	High
Cherry Grove Fire Station	High	High
Fire Island Pines Fire Station	Extreme	High

Health and Social Services: Administration and Education

Community assets related to Health and Social Services: Administration and Education serve a variety of public functions, from health treatment facilities to general purpose shelters in public schools, and post offices to town halls. During a storm event, these facilities may potentially serve as critical disaster response and recovery centers, the identification of which is essential to future disaster management and preparedness.

There is a U.S. Coast Guard Station located in the NYRCR Fire Island Community but outside of the risk areas.

Table 5: Federal Non-Recreation Area

Asset	Risk Area	Community Value
U.S. Coast Guard Station	None	High

The Woodhull School is located at Surf Road and Midway Walk in a moderate to high risk area of Ocean Beach. This school serves the year-round population and was not damaged during Superstorm Sandy due to its location on slightly higher ground.

Table 6: Schools

Asset	Risk Area	Community Value
Woodhull School	Moderate and High	Low

One State-owned building is located within a moderate risk area near the entrance of the Robert Moses State Park.

Table 7: State-owned Buildings and Properties

Asset	Risk Area	Community Value
Main Office Parks & Recreation	Moderate	Medium

The NYRCR Fire Island Community is served by two Village halls, located in Saltaire and Ocean Beach. Both are located along the northern Fire Island shoreline inside moderate to extreme risk areas.

Table 8: Town/Village/City Hall

Asset	Risk Area	Community Value
Village of Ocean Beach	Moderate, High, and Extreme	Low
Village of Saltaire	Moderate, High, and Extreme	Low

Housing

From the early 1970s to the present day, the National Flood Insurance Program has been a major asset in bolstering real estate values of private property in the NYRCR Fire Island Community. The past four decades have seen the construction of large modern homes in some communities that co-exist with the simple beach shacks built on the island prior to that time. Many of these newer homes have been retrofitted with heating and air conditioning systems, which have required upgrading of the electrical cabling going from the mainland to the beach.

There are approximately 3,963 single-family, 18 two-to-three-family, and 165 multi-family structures that are at-risk in the NYRCR Fire Island Community. The remaining structures which are not within a risk area are typically directly adjacent to one. In addition, single-family homes comprise 96% of all residential structures within the NYRCR Fire Island Community. It is important to note that there are approximately 165 at-risk multi-family residential structures in the NYRCR Fire Island Community.

With so many homes in risk areas, assistance to elevate homes or to perform other hardening would make the Community safer. In addition, as these homes are closely spaced, maintaining adequate fire protection facilities at all times – but especially after storms – is important to contain fires to a single building.

Table 9: Housing Resources

Asset	Risk Area	Community Value
2,369 single-family, 9 two-three-family, 117 multi-family structures	Extreme	High
1,453 single-family, 7 two-three-family, 46 multi-family structures	High	High
141 single-family, 2 multi-family units	Moderate	High

Infrastructure: Transportation

Assets in this category include transportation infrastructure as well as transportation-related facilities, which in the NYRCR Fire Island Community includes water-borne modes of transit including ferries and water taxis as well as helipads for emergency air transport. Seasonal ferry service serving Fire Island emanates from Bay Shore, Sayville, and Patchogue. The walkable distance between the Bay Shore train station and the ferries going to most of the developed communities on the beach, make Fourth Avenue/Maple Avenue in Bay Shore seasonally one of the busiest pedestrian corridors in all of Suffolk County. In Sayville, part of the ferry infrastructure includes an extensive livery service from the train station to the ferry docks on Brown's River because the distance is not very walkable. In Patchogue, one train-ferry connection of a mere 100-yard distance from the LIRR station to the National Park Service terminal, makes this connection the most popular for visitors and campers heading for the FINS Watch Hill facility. Ferry landing points are indicated below.

Ferry docks, by their function, must be in extreme risk areas. As they are so critical to evacuation and important at all times for transport of people and materials, the dock facilities need to be strong enough to withstand major storms.

Table 10: Ferry Terminals

Asset	Risk Area	Community Value
Ocean Bay Park	Extreme	High
Ocean Beach	Extreme	High
Seaview	Extreme	High
Cherry Grove	Extreme	High
Point O Woods	Extreme	High
Saltaire	Extreme	High
Kismet	Extreme	High
Davis Park	Extreme	High
Atlantique	Extreme	High
Fair Harbor	Extreme	High
Dunewood	Extreme	High
Fire Island Pines	Extreme	High
Sunken Forest	Extreme	High

There are three helipads on Fire Island, with ball fields and State and County parking fields used as well for emergency air transport.

Table 11: Helipads

Asset	Risk Area	Community Value
Davis Park	Extreme	High
Fire Island Pines	Extreme	High
Sailor's Haven	Extreme	High

There are no roads listed, as Fire Island by design does not have roadways. However, many of the walkways used by pedestrians and emergency vehicles, and the unpaved access route for emergency vehicles, are located in high and extreme risk areas and were damaged by Superstorm Sandy. In fact, part of the emergency access route is still inoperable as of March 2014 due to the breach at Old Inlet. Maintenance of these walkways and routes is essential to support the communities.

The State data review indicated that the following bridges were designated as in poor condition.[13] As previously noted, New York State recently allocated $23,000,000 in Federal funds to begin beach stabilization and infrastructure protection at Robert Moses State Park to nourish park beaches and strengthen the shoreline buffers protecting the Robert Moses traffic circle and Ocean Parkway from future storms. Another State project will replace the Robert Moses Causeway Bridge over Fire Island Inlet.

Table 12: Bridges in Poor Condition

Asset	Risk Area	Community Value
William Floyd Parkway Ext. crossing Narrow Bay (BIN # 3300770)	Extreme	High
Robert Moses Causeway (908J) at Fire Island Inlet (BIN # 1058770)	Extreme	High

Infrastructure: Utilities

The utilities in the NYRCR Fire Island Community comprise water supply facilities – for drinking water pumping and treatment – and communications towers. Almost all of these water supply facilities are situated in extreme and high risk areas. Back-up power for wells and treatment facilities, and interconnections between systems, can help to ensure continuity of water supply. Water and electrical power lines and telephone infrastructure, though extant throughout the developed portions of the NYRCR Fire Island Community, have not been mapped and quantified here. It has been noted that the telephone infrastructure on Fire Island was severely damaged during Sandy and according to Verizon, will be replaced with a fiber optic network on the western portion of the Island.

Table 13: Infrastructure Resources

Asset	Risk Area	Community Value
14 utility properties (including 1 sewage treatment plant, 6 drinking water plants, 17 drinking water wells, 1 microwave tower)	Extreme	High
17 utility properties (including 8 drinking water plants, 17 drinking water wells)	High	High
1 utility property (including 1 drinking water plant, 2 drinking water wells)	Moderate	High

Dock and water tower

Natural and Cultural Resources

Natural and Cultural Resources include natural habitats, wetlands and marshes, recreation facilities, parks, open space, religious establishments, libraries, museums, historic landmarks, and performing arts venues.

There are numerous regional natural and recreational assets beginning with the parks facilities scattered along the beach, but concentrated at the ends and in the middle. The Robert Moses State Park and Smith Point County Park are accessible by vehicle unlike the rest of the NYRCR Fire Island Community. Off-road vehicle use east of Robert Moses and both east and west from Smith Point County Park bring into conflict the recreational aspect of off-roading with potential impacts to portions of the natural beachfront, fore-dune and middle-of-the-island areas and the fragile plants that hold the sand in place in these areas. However, the vehicle control points of the FINS at Fire Island Lighthouse and the entrance to the Otis Pike Wilderness area near Smith Point are considered Community assets for their ability to screen unauthorized vehicle traffic. Taken as a whole, Fire Island barrier beach and its ability to shield the mainland from extensive flooding and wave damage constitute a regional asset for these mainland communities. An unusual asset for the western developed beach communities from Kismet to Point O' Woods would include the large hard-surface parking lot expanse of "Field Five" of Robert Moses State Park, which has doubled as a staging area for supplies, emergency electrical generation, construction equipment, etc.

Other important recreational assets for Fire Island include sheltered marinas and boat basins on the Great South Bay. Winter and early spring ice melt after especially cold winter freezes, combined with northeast winds, can and does send floating ice chunks crashing into exposed marine facilities on the bayside of the beach in locations where no back bay wetlands or natural shoreline exist.

Many of the recreational and natural resources on Fire Island are located in the extreme risk area and are at risk of frequent inundation or are vulnerable to erosion. Improvements to wetland systems and other shoreline defenses, docks, and marinas are needed to address these concerns.

Table 14: Parkland Resources

Asset	Risk Area	Community Value
Robert Moses State Park	Moderate, High, and Extreme	Medium
Fire Island National Seashore	Moderate, High, and Extreme	Medium
Smith Point County Park	Moderate, High, and Extreme	Medium
Cupsogue County Park	High and Extreme	Medium

Regional natural/cultural/historic sites which are identified as assets in the NYRCR Fire Island Community include the Sunken Forest and the Flight 800 memorial.

Table 15: Natural Resources

Asset	Risk Area	Community Value
Inland Freshwater Wetlands	Moderate, High, and Extreme	Medium
Great South Bay Underwater Lands (Bluepoints)	Extreme and None	High
Webster Preserve (within FINS)	Extreme	Medium
Libutti Preserve (within FINS)	Extreme	Medium
Natural Heritage Communities: Maritime Beach (length of island) and Maritime Dunes (western end of island)	Extreme	High
Flight 800 Memorial (within Smith Point County Park)	Extreme	Low
Sunken Forest (within FINS)	Moderate and Extreme	Medium

Two National Register-Listed resources are located in the NYRCR Fire Island Community. The Fire Island Light Station lighthouse is located within the FINS and was damaged during Superstorm Sandy.

Table 16: National Register Listed Historic Resources

Asset	Risk Area	Community Value
Fire Island Light Station	High	Low
Cherry Grove Community House and Theater	High	Low

Fire Island Lighthouse

Assessment of Risk to Assets and Systems

Risk is the chance that an asset will be damaged or destroyed. Assessing the risk to Community assets and systems helped the Committee identify projects and understand measures that would help to restore and protect assets at the greatest flood risk while also ensuring appropriate long-term economic growth. The three factors that contribute to the measure of overall risk for each asset are:

- Hazard: The likelihood and magnitude of future storm events. Examples of the most common hazard risks include coastal flooding, flooding in a 100-year floodplain, sea level rise, or hurricanes. Typically, an asset located in an Extreme risk area experiences hazards with greater frequency and intensity that assets in a High or Moderate risk area. This risk assessment uses the "100-year" flood event, which has a 1% annual chance of occurrence, as the baseline event.
- Exposure: The variability of topographic and shoreline features which tend to increase or decrease storm effects on assets. If assets are more exposed (e.g., situated on low-lying floodplains, directly exposed to a probable storm surge, or otherwise unprotected), they are more likely to suffer storm effects than similar assets located at a higher elevation or on a rocky shoreline protected by dunes. Similarly, landscape features and vegetation are more important for an asset proximate to a flood source than an asset further inland.
- Vulnerability: The level of impairment or consequences that assets may experience from a storm event, expressed as the capacity of an asset to return to service after a storm. If an asset recovers quickly with limited interruption in service it has low vulnerability. An asset with extended service loss or permanently reduced capacity would be considered to be significantly vulnerable.

The NYRCR Consultant team used a standardized Risk Assessment Tool to assist the Committee in estimating the risk to their assets and, later, to test whether various projects and management measures will reduce the risk to those assets. The Risk Assessment Tool is available at http://www.stormrecovery.ny.gov/nyrcr.

The asset inventory provided a baseline to identify the most critical assets in the Community to be advanced through the Risk Assessment Tool for further analysis. The assets selected from the inventory for input into the Risk Assessment Tool include:

- Assets situated in extreme and high risk areas,
- Critical Assets (FEMA-critical) in moderate risk areas,
- Locally-significant Community identified (High Community Value) in moderate risk areas,
- Assets with high community value in non-risk areas, and
- Assets providing critical life safety services

In addition, similar assets were grouped as a single asset to the maximum extent possible because these assets would likely experience the same effects from storm events and have similar risk scores. For example, residential neighborhoods with similar construction were combined by risk area.

For each asset input into the Risk Assessment Tool, the three factors that contribute to risk are scored and multiplied to produce a final risk score. The information collected during the Asset Inventory is automatically entered into the Risk Assessment Tool to calculate the Risk Score. The formula to calculate risk is:

Hazard x Exposure x Vulnerability = Risk[14]

The final risk scores will provide the community with a general sense of which assets are at greatest risk and where projects and management measures are needed to adapt assets to future storms and environmental changes. The complete list of assets advanced through the Risk Assessment Tool, and their corresponding risk scores, are provided in Section 5 Additional Materials.

NYRCR Fire Island Risk Assessment Results

The inventory catalogued over 150 assets gathered from NYS databases and Committee and Community knowledge of the area. These were carried through for analysis in the Risk Assessment Tool. These assets ranged from residential housing, located primarily within the extreme and high risk areas to the small commercial districts located along the bay front and primarily within the extreme risk area. Similarly, the majority of the natural and cultural resources on Fire Island are located within the extreme risk area. These assets include parks (both Community parks and the larger, State, and Federal parks), Community centers, historical structures, and Community-owned marinas and docks. Other asset categories included infrastructure facilities (encompassing both utilities and transportation facilities), health and social services, and socially-vulnerable populations. Notably, both the Community and Committee identified many high value resources within the infrastructure category.

The assets input into the Risk Assessment Tool received a final risk determination of severe, high, moderate, or residual, as illustrated in Table 17 and Figure 10 to Figure 13. The identification number on the table corresponds to the ID number shown on the map. The table is also color coded by risk level, as follows:

Severe Risk assets are shown in red in the table and map. Assets at severe risk have both very high exposure and very high vulnerability to storm effects, which could represent that the asset is in a dangerous situation or location.

High Risk assets are shown in orange. Assets at high risk have either very high exposure or very high vulnerability to storm effects, which could lead to significant negative outcomes from a storm event.

Moderate Risk assets are shown in yellow. Storm events pose moderate to serious consequences on these assets, but adaptation may be of lower priority due to one factor, either the exposure or vulnerability, remaining relatively low.

Residual Risk assets are shown in green. Both the exposure and vulnerability of these assets are relatively low. This situation suggests floods would pose a minor threat or infrequent consequences.

Table 17: Asset Key

ID#	Name
1	Belvedere Hotel, Cherry Grove
2	Cherry Grove Commercial District
3	Grocery, Seaview
4	Market, Saltaire
5	Ocean Beach Commercial District
6	Davis Park Commercial Buildings
7	Fire Island Pines Commercial District
8	Kismet Commercial District
9	US Post Office, Ocean Beach
10	Fair Harbor Commercial District
11	Ocean Bay Park Commercial District
12	Point O' Woods Commercial District
13	Fire Island Hotel, Ocean Bay Park
14	Cherry Grove Post Office
15	Fire Island Pines Community Health Center - Seasonal Doctor Office
16	Cherry Grove Fire Station
17	Doctor's House, Seaview
18	Ocean Beach Fire Department
19	Ocean Beach Union Free Church
20	Our Lady of the Magnificat Church, Ocean Beach
21	Police Station, Ocean Beach
22	Saltaire Volunteer Fire Company
23	St. Andrews Church, Saltaire
24	Village of Ocean Beach Community House
25	Village Office, Ocean Beach
26	Community Owned Tennis Courts, Dunewood
27	Doctor's Office, Davis Park
28	Fair Harbor Fire Department Station
29	Fire Island Pines Police Station
30	Fire Island Synagogue, Seaview
31	Ocean Bay Park Volunteer Fire Department
32	Post Office/Library, Saltaire
33	Public Restrooms, Davis Park
34	Village of Saltaire City Hall
35	Our Lady Star of the Sea Church, Saltaire
36	Church, Davis Park
37	Davis Park Fire House
38	Helipad, Davis Park
39	Rectory, Davis Park
40	Water Co. Police, Davis Park
41	Church, Point O' Woods
42	Kismet Fire Department
43	Kismet Fire House
44	Point O' Woods Fire Department Station
45	Point O' Woods Post Office
46	Suffolk County Police Booth, Ocean Bay Park
47	U.S Coast Guard Station
48	Cherry Grove Police Station
49	Doctor's Office, Ocean Beach
50	Doctor's House / Healthcare Office, Cherry Grove
51	Fire Island Pines Fire Station
52	Public Restrooms, Fair Harbor
53	Woodhull School, Corneille Estates
54	Suffolk County Police Helipad, Fire Island Pines
55	Fire Island Residential Housing - Extreme Risk Area
56	Fire Island Residential Housing - High Risk Area
57	Fire Island Residential Housing - Moderate Risk Area
58	Helipad - destroyed in Sandy, Cherry Grove
59	Water Island Fire Wells
60	Atlantique Ferry Dock
61	Dune X-ing, Coast Guard Walk
62	Dune X-ing, Davis Park, 200' east of Trustees walk
63	Dune X-ing, east end of Fire Island Blvd thru FINS
64	Dune X-ing, east end Traffic Ave, 240' east of Seneca
65	Dune X-ing, Sth of Center Walk, 200' east of Trustees
66	Emergency Access Route
67	Ocean Beach Ferry Dock
68	Point O Woods Ferry Dock
69	Island-wide Roads/Walkways - Extreme Risk Area
70	Saltaire Water Drinking Water Treatment and Well
71	SCWA Drinking Water Treatment & Well, Fire Island Pines
72	SCWA Harbor Walk Water Treatment Plant, Fire Island Pines
73	Cherry Grove Ferry Dock
74	Davis Park Ferry Dock
75	Davis Park Marina
76	Dunewood Ferry Dock

COLOR KEY:	
	Extreme Risk Area
	High Risk Area
	Moderate Risk Area
	Residual Risk Area

Table 17 (cont'd)

ID#	Name
77	Kismet Ferry Dock
78	Microwave Tower, Davis Park
79	Microwave Tower, Ocean Beach
80	Ocean Bay Park Ferry Dock
81	Saltaire Ferry Dock
82	SCWA - Bayview Walk Drinking Water Treatment, Cherry Grove
83	SCWA Drinking Water Treatment & Well, Dunewood
84	SCWA Drinking Water Well, Davis Park 1
85	Seaview Ferry Dock
86	Water Island Community Dock (seasonal)
87	SCWA Harbor Walk Water Well, Fire Island Pines
88	SCWA Wells - Inground Storage, Ocean Bay Park
89	Electric Power Center, Fire Island Pines
90	Robert Moses Water Tower
91	Roads/Walkways - High Risk Area
92	SCWA Drinking Water Treatment, Davis Park
93	SCWA Drinking Water Well, Davis Park 2
94	Transfer Station, Saltaire
95	Fair Harbor Ferry Dock
96	Ocean Beach Water District - drinking water wells
97	Point O' Woods Marina
98	Sailors Haven Ferry Dock
99	SCWA - Drinking Water Treatment, Corneille Estates
100	SCWA building, Lonelyville
101	SCWA, Lonelyville
102	Sunken Forest Ferry Dock
103	Village of Ocean Beach - water treatment
104	Village of Ocean Beach Sewage
105	Watch Hill Ferry Dock
106	Roads/Walkways - Moderate Risk Area
107	Point O' Woods SCWA Water Treatment Plant and Well
108	Water interconnect, Border of Ocean Beach & Corneille Estates
109	Fire Island Pines Ferry Dock
110	Fire Island Pines Freight Dock
111	NY Telephone Co., Ocean Beach
112	SCWA Drinking Water Treatment, Fair Harbor
113	SCWA Well, Fair Harbor
114	Seaview/Ocean Bay Park Garbage Transfer Station
115	Village of Ocean Beach - water tower
116	Water Interconnect, Border of Seaview & Ocean Beach
117	SCWA - Well, Kismet
118	SCWA Drinking Water Treatment, Kismet
119	Seaview Water Company
120	Talisman Beach Drinking Water Well
121	Water Interconnect, Border of Seaview & Ocean Bay Park
122	Verizon vehicle storage, Fire Island Pines
123	Bay beach, Fair Harbor
124	Community-owned dock #1, Lonelyville
125	Community-owned dock #2, Lonelyville
126	Youth Group "Windswept", Ocean Beach
127	Atlantique Beach and Marina
128	Baseball Diamond, Saltaire
129	Brodkin Park, Saltaire
130	Cherry Grove Community House - Historical Landmark
131	Community-Owned Dock, Atlantique
132	Dunes
133	Nature Preserve, Saltaire
134	Robert Moses State Park
135	Saltaire Camp & Recreation
136	Saltaire Yacht Club, Inc.
137	Seaview Community Marina
138	Yacht Club Dock & Pier, Fair Harbor
139	Kismet Marina
140	Saltaire Marina
141	Seaview Community Center
142	Atlantique Park
143	Robert Moses State Park Field Houses
144	Fire Island Lighthouse
145	Fire Island National Seashore West District Ranger Station
146	Dock owned by FI Ferries, Dunewood
147	Fire Island National Seashore
148	Ocean Bay Park Tennis Courts
149	Park, Ocean Bay Park
150	Two boat slip clubs off of Seabay Walk
151	Watch Hill Visitor Center and Marina
152	Yacht Club, Point O' Woods
153	Summer Club House, Corneille Estates
154	Kismet Tennis Courts

COLOR KEY:

Extreme Risk Area
High Risk Area
Moderate Risk Area
Residual Risk Area

Figure 10: Assets at Risk, Map 1 of 4

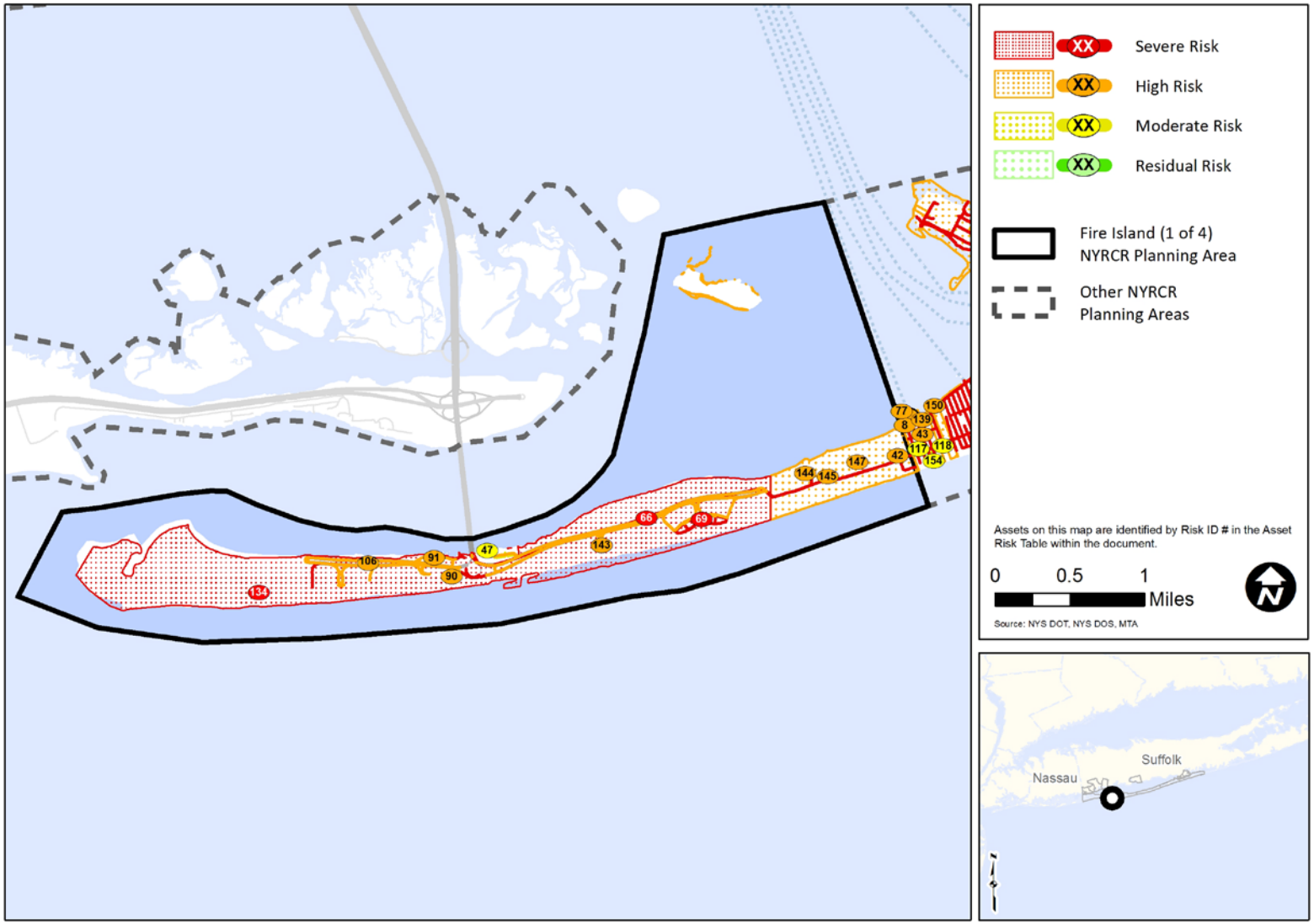


Figure 11: Assets at Risk, Map 2 of 4

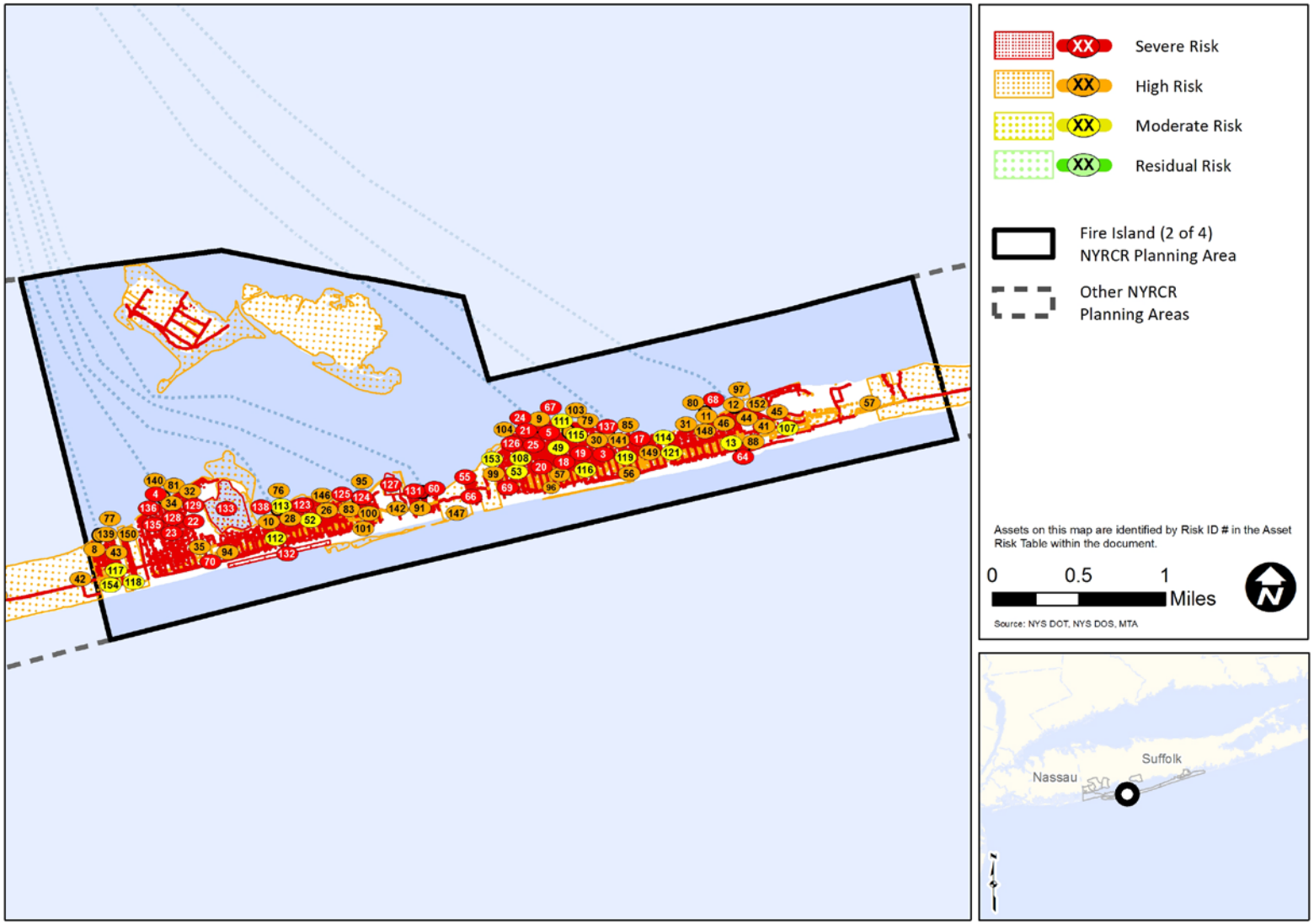


Figure 12: Assets at Risk, Map 3 of 4

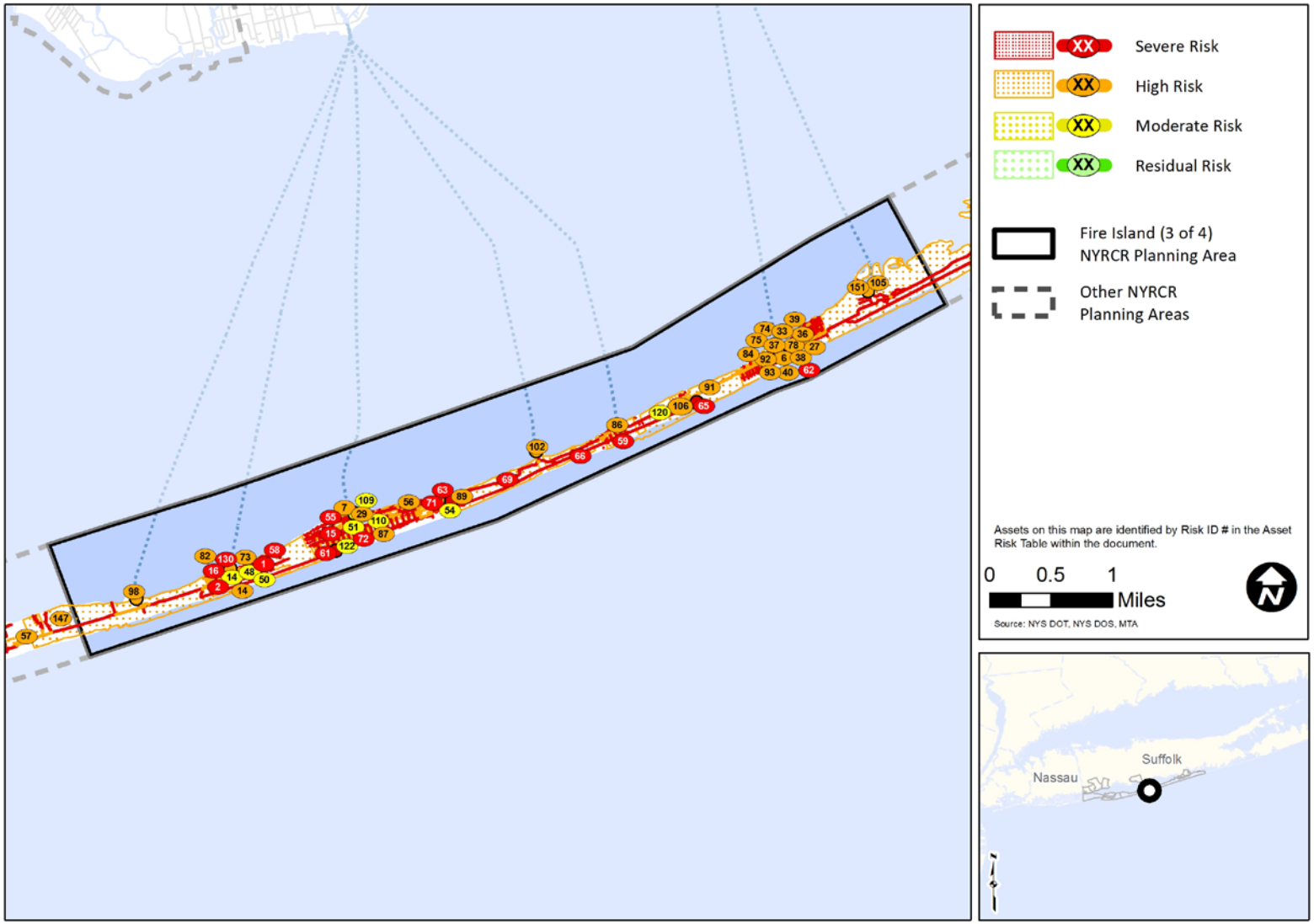
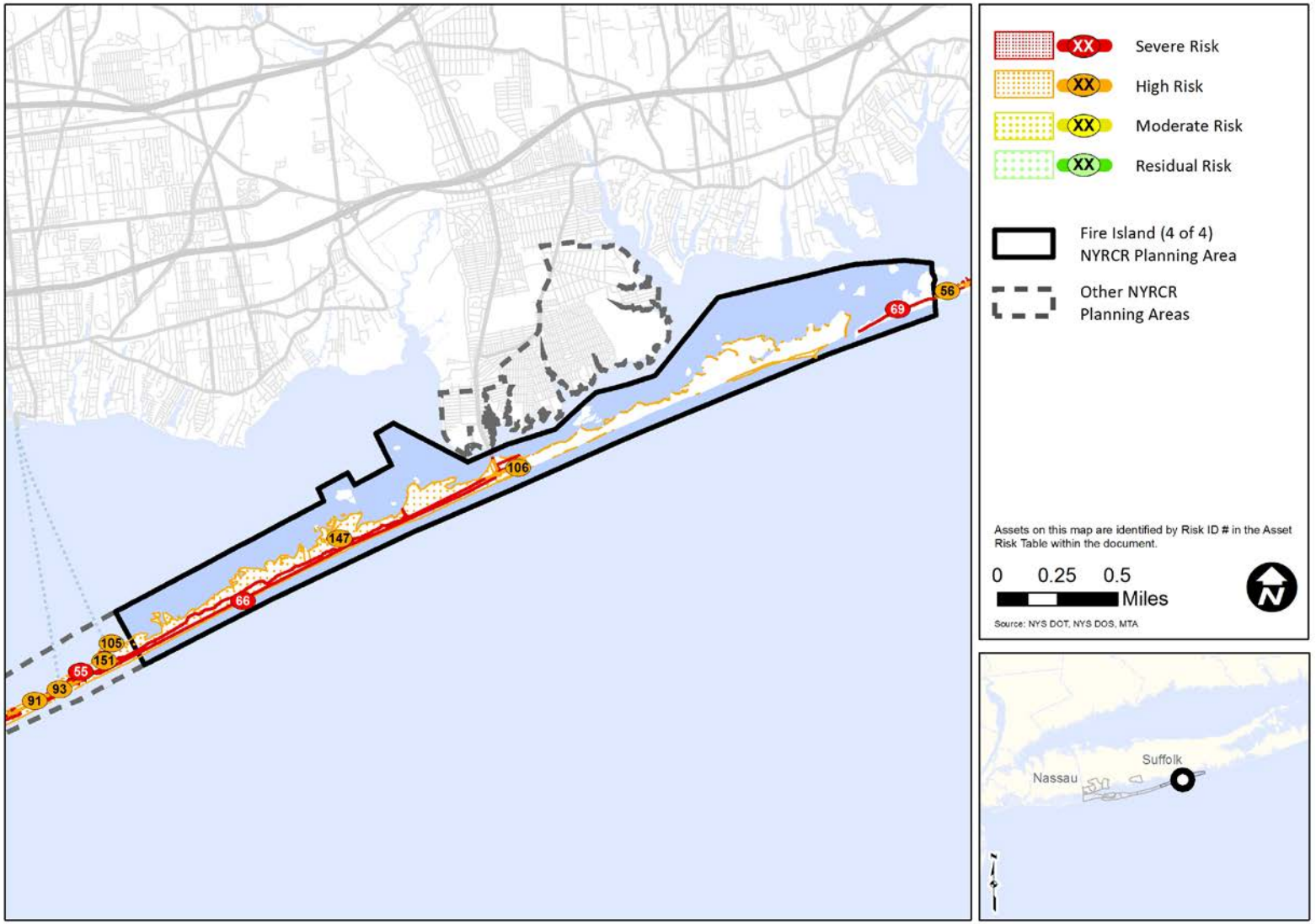


Figure 13: Assets at Risk, Map 4 of 4



Overall risk score classifications ranged from Moderate Risk at facilities like the Suffolk County Police Department helicopter pad in Fire Island Pines to Severe Risk at the Windswept Youth Center in Ocean Beach. Resources located along the bay front generally scored in the Severe Risk range with some High Risk assets interspersed. Nearly all of the marinas, Community docks, and ferry docks were classified as assets subject to Severe Risk. It is significant to note that forty-eight assets or systems identified by the Risk Assessment Tool (out of 154) were classified as being at severe flood risk and an additional 78 were classified as being at high flood risk. These results are indicative of the extremely vulnerable situation that many of the Fire Island communities face in regards to confronting future storm events.

The following assets received the highest risk score among the inventoried assets: the Youth Group "Windswept" in Ocean Beach; the Fire Island Pines Community Health Center and Seasonal Doctor Office; the Cherry Grove Helipad destroyed in Superstorm Sandy; the Water Island Fire Wells; two Community-owned docks in Lonelyville; and Bay beach in Fair Harbor. These assets received such a high risk score because many of these assets have experienced a permanent loss of service or had a service interruption of six months or more.

Two of these assets, the Water Island Fire Wells and the Cherry Grove helipad, are considered critical facilities that are necessary for the effective deployment of emergency services and operations within these Fire Island communities.

Damaged dune crossing stairs[15]

Additionally, emergency facilities, beaches and dunes, and marinas (docks) were all rated as high value Community assets by the Committee; which further supports the need to protect and strengthen the resiliency of these assets.

The scoring of these assets helped to inform, focus, and provide context for types of projects considered by the NYRCR Committee. As will be described later in this report, many of these critical assets are addressed in the proposed, features or additional resiliency projects. Improvements to passenger and ferry docks are included in the proposed and featured projects. Repair of the Windswept Facility and a new water supply service for Water Island are Additional Resiliency Recommendations.

B. ASSESSMENT OF NEEDS AND OPPORTUNITIES

The NYRCR Fire Island Committee initially identified needs and opportunities based on the Community's reconstruction and economic growth goals, existing plans and studies, and the Community's overall vision for its future.

The term "need" is used here to illustrate infrastructure and services that were damaged or rendered inoperable by Superstorm Sandy as well as methods and operations that failed to work during the storm event or experienced insufficient capacity to respond effectively. During a disaster, many things can go wrong, from communications breakdowns, equipment failure, infrastructure damage and more.

Thinking through what took place during the storm event, as well as what was damaged, provided the Committee with insights as to the inherent resiliency of those structures, procedures, and operations. This assessment process led to a frank discussion of Community needs and includes recognition of changing climate patterns and the economic and practical necessity of factoring resiliency and adaptive capacity into recovery actions.

Opportunities are based on the idea that additional resiliency benefits, whether economic, environmental, social, or cultural, may be achieved through the integration of new methods, procedures, and materials into the normal course of rebuilding.

The post-disaster environment also presents opportunities to rebuild in such a way to create a Community that is stronger and more resilient to future storms. Resilient communities tend to have redundant infrastructure and communication systems, diverse and flexible adaptation strategies, and collaborative public and private partnerships.

Elevated homes

Throughout this plan, strategies and projects are categorized and discussed in terms of their Recovery Support Function (RSF). An RSF is an operational or coordinating structure first introduced by FEMA in 2011 in the "National Disaster Recovery Framework"[16]. The purpose of the RSF method is to support local governments by facilitating problem solving, improving access to resources, and fostering coordination among State and Federal agencies, nongovernmental partners, and stakeholders.

There are six RSFs, which are listed and defined below.

- Community Planning and Capacity Building (CPCB): The Community's ability both to implement storm recovery activities and to plan to mitigate the effects of future storms;
- Economic Development: Returning economic and business activities to a state of health and developing new economic opportunities that result in a stronger, more resilient Community;
- Health and Social Services (HSS): The restoration, and potential expansion of public health programs, healthcare facilities, and essential social services, especially for vulnerable populations on the island;
- Housing: An assessment of local housing conditions and associated risk levels is critical as communities continue to rebuild;
- Infrastructure: Investments in infrastructure can be effective both in rebuilding capabilities lost during the storm and in reducing future risks to critical assets; and
- Natural and Cultural Resources (NCR): The rehabilitation, management, and protection of the natural and cultural resources that define the Community's physical and human character. Natural resources include aspects of a Community's underlying ecological habitat such as ground and surface waters, streams and creeks, woodlands, wetlands and open marsh, beaches and dunes. Cultural resources may include historic properties and places that are part of that Community's identity and social life.

Community Planning and Capacity Building

Following Superstorm Sandy, the Committee observed that the emergency response entities did an excellent job but were hampered by equipment problems, including those having to do with communications. Also, given the number of communities along Fire Island and the variation of authority jurisdictions (incorporated Villages, unincorporated hamlets within Towns, State, and Federal facilities), the working relationships between communities is important to maintain and refresh as leadership changes over time. All of this contributed to an increase in risk, potentially jeopardizing life and property and prolonging recovery efforts. Due to the vulnerability of the nature of being located on a barrier island, there is an overall need to make homes, businesses, as well as public and privates facilities more resilient. On Fire Island, it is particularly important to provide information about barrier island issues because the large influx of seasonal renters and visitors are often unaware of these risks and unfamiliar with local emergency procedures.

The NYRCR Fire Island Community includes Federal, State, County, Town, and Village interests, along with the Fire Island Association, real estate groups, homeowner associations, property owner associations, and local business associations scattered throughout the small communities. As such, projects and strategies developed during the NYRCR process must take into account this complex jurisdictional framework. Both the public and Committee agreed that ongoing communication among the various jurisdictional entities is a critical requirement for improving island-wide resiliency and disaster preparedness. Coordination amongst the jurisdictions, especially those involved in construction, will also benefit homes, businesses, and Community facilities in rebuilding efforts. Communication between key agencies on the mainland and Fire Island communities on a regular basis will ensure a coordinated and efficient rescue and response effort in the event of an emergency. It would also allow first responders and emergency personnel an opportunity to communicate with each other and direct supplemental services into the Community when necessary. A robust public information program will provide an opportunity to educate visitors and seasonal renters regarding evacuation, communication, and preparedness procedures.

Economic Development

Superstorm Sandy caused extensive damage to many homes and businesses on Fire Island. While the storm occurred at the close of the busy season, the impacts extended well into the following year. Part of the impact to Fire Island's economy was due to the time required for the rebuilding process. Because of the configuration of access within communities, storm debris removal was slow and the shipment of new building materials from the mainland to Fire Island was also slow. However, the Committee observed that much of the impact in 2013 was due to a perception that Fire Island remained in a severely damaged state and thus was not a suitable summer destination for seasonal rentals or day trips. This perception differed from reality, but nevertheless, the economic impact was real. The NYRCR Committee felt that a primary need moving forward is to sustain the commercial, recreational and tourism assets on Fire Island in order to maintain a solid tax base. The Committee hopes to address this need with a publicity and informational campaign.

Fire Island is an economic generator both in the short term and seasonal housing rental activity within the 17 individual communities as well as in its role as a regional tourism and recreational destination typified by visitors to the communities and State and Federal Park facilities. These activities drive a large seasonal economy associated with the Fire Island National Seashore along with State, County and local beaches, parks and marinas. The economy is also fueled by a large second home and rental market, which demands a wide variety of goods and services. Consequently, opportunities exist to strengthen the business ties to the tourists and other visitors. A 2003 Study by Suffolk County on the impact of beaches on the economy noted 2.2 million annual visits to Fire Island communities, with $50.12 million spent and $66.83 million in total economic activity (in 1999 dollars) with 756 jobs.[17] Targeting economic development programs, low interest loans, and marketing programs helps to maintain the base of important taxable assets.

Ocean Beach shops

Health and Social Services

The threat of vector-borne diseases, such as West Nile virus and Lyme disease, were identified as a long time public health issue on Fire Island, particularly for young children and the elderly. The Committee recognized the need to explore any possible negative connections between the health issues and storm damage. For example, overwash or scouring related to moving water has created new areas of standing water or altered vegetation, possibly becoming new breeding grounds for mosquitoes or habitat for ticks. The opportunity presents itself to reduce exposure to potential harmful disease vectors through well-understood and practiced management strategies.

Free roaming deer

Housing

The U.S. Department of Housing and Urban Development (HUD), Office of Policy Development and Research, prepared an Analysis of Communities Impacted by Hurricane Sandy (January 29, 2013, draft). It estimated that 99 year-round homes in the Fire Island CDP were damaged, of which 82 sustained “heavy” damage (>50%) or “strong” damage (20% to 50%). Ninety-five (95) of the damaged homes (96%) experienced flooding, primarily in the range of one to four feet of water. In total, 56% of the entire year-round housing stock in the Community was damaged.

Data for seasonal homes is not available at this time, but as the seasonal homes are interspersed with the year-round homes, similar types of damage likely occurred.

The Committee and Community took note of the substantial damage to the housing stock in many of the communities. Almost all of Fire Island is in the extreme or high risk areas. Thirty-two and a half percent of the year-round households within the Fire Island CDP were constructed before 1950, 36.1% between 1950 and 1970, and 31.4% from 1970 to the present. Many structures pre-date current flood resistant design standards and were severely damaged. With nearly 70% of year-round households constructed prior to 1970, there may be significant opportunities to modernize homes to become more resilient to floods and wind storms. The Committee strongly supported efforts to encourage flood resistant designs that would minimize damage from future storms. This would involve such improvements as the elevation of structures, the relocation of heating systems and electrical panels above projected flood levels, upgrading windows, doors, and any other openings, roof strapping, and overall reinforcing the structural integrity of the homes, all proven best design practices to address these construction and location issues.

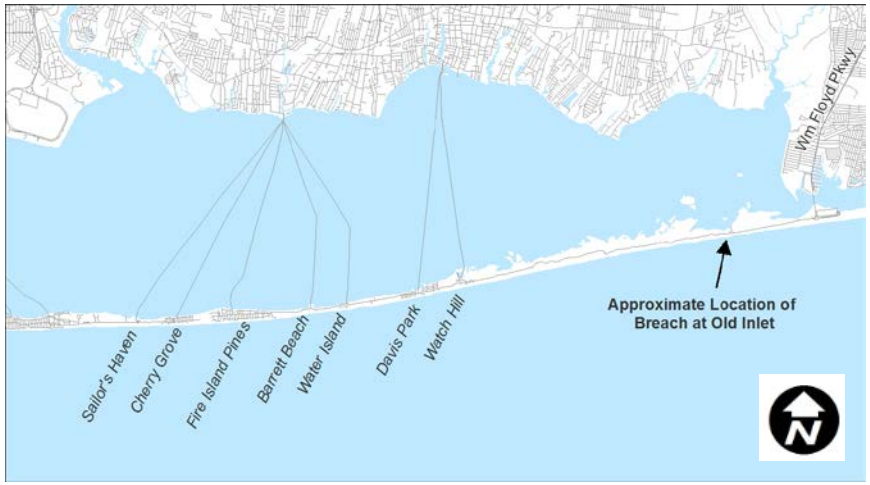
Infrastructure

One need specifically identified by the Committee was the protection of the bay front edge along the north side of the island. The Great South Bay coastline of Fire Island, principally in the developed communities, is best described as a patchwork of public and private land, with a combination of bulkheading, rip-rap, and natural shoreline features. The complex and discontinuous nature of the bay shoreline requires a far more comprehensive management approach than exists today. Like most barrier islands, the bayside is at a lower elevation than the ocean side, which leaves the many facilities and structures in this low area highly vulnerable to storm surge, erosion, and flooding. Committee members reported that the greatest flooding issues in the Villages and hamlets were/are caused by bayside shoreline erosion and the lack or loss of protective features. The Committee is recommending a comprehensive study to identify steps that can be taken to reverse these problems and provide greater resiliency against future storms.

View of bayside shoreline

The Committee found that Fire Island had extensive challenges to emergency response. Part of this is due to the physical circumstances of island geography coupled with 10-units-per-acre densities in the developed communities and less than 50 -foot separations between homes. The population can vary from hundreds in winter months to approximately 20,000 in the summer months, plus day-trippers[18]. Emergency services are provided by volunteers, many of whom may be on the mainland when needed. It was also noted that access throughout the island is limited since vehicle use is generally prohibited. The primary emergency access route, running roughly midway between the Ocean and the Bay, along Fire Island sustained considerable damage during Superstorm Sandy, which made providing timely and efficient emergency services very difficult. With widespread evacuation of people possible via the ferries with sufficient forewarning, the closely spaced structures, taxable assets, Community facilities, inundated or buried switches, valves, pumps, travel ways, and other infrastructure are the focus of emergency response and emergency service. Maintaining access routes (generally east-west) and walkways (generally north-south) is not only important for emergency service providers during storm events – it is also vital for daily activities within Fire Island's communities. Therefore, the improvement and stabilization of a reliable route for emergency access and evacuation purposes was viewed as a highly important improvement throughout the barrier island. The newly created inlet, near "Old Inlet" (see Figure 14 below) prevents vehicles and pedestrians from evacuating the island to the east toward William Floyd Parkway. This new breach especially affects the easterly communities of Cherry Grove, the Pines, and Davis Park.

Figure 14: Breach at Old Inlet Location



Emergency responders should be well prepared to safely and effectively assist the needs of the communities that they serve. It is important to note that Superstorm Sandy occurred after the peak season and that a similar storm occurring mid-season could create significantly greater challenges for emergency responders. The Committee identified many equipment needs for both communications and emergency response. During and after Superstorm Sandy, communications were frequently inoperable. Life safety for those critical public safety personnel who needed to remain on Fire Island, and property, with the potential for looting and the quick spread of fire, were at an extreme risk.

In addition to issues of flooding and access (both by land and water), power outages and inoperable communications equipment during and after Superstorm Sandy were the strongest themes voiced by Committee and Community members. Critical infrastructure for Fire Island includes the east-west emergency access (Burma) route mentioned previously, as well as key dock facilities located at the northern ends of a few north-south walkways or in the bayside business areas. These are critical for evacuation, emergency access and the delivery of recovery materials. The improvement of the Burma route as a vital east-west emergency/ evacuation route was important to the Community. Similarly, the reconstruction of damaged dock facilities at Davis Park, Cherry Grove, Fire Island Pines, Ocean Beach, and Atlantique that serve emergency and essential services (e.g., debris removal, solid waste removal, delivery of construction materials, etc.) were also viewed as important by the Committee. Power supply and communications equipment were also severely affected and disruptions of service continued for many weeks and months following Superstorm Sandy. Hardening of much of this infrastructure through examination and identification of "weak links" will go a long way to reduce future vulnerability.

Freight boat carrying construction materials

The Suffolk County Water Authority (SCWA) provides the majority of interconnected public water service on Fire Island, with the exception of Water Island, Blue Point Beach, Seaview, and the Villages of Ocean Beach and Saltaire. Water Island and Blue Point Beach still rely on private wells, while Ocean Beach and Saltaire have their own municipal systems. The Seaview Association operates its own independent water system.

Rising water tables and storm surges have infiltrated wells on the Island, requiring pumping out of the wells, or modifications to wells. Another issue related to water supply is the availability of adequate water and water pressure for fire response especially in areas which

are not close enough to the bay for pumping. Strengthening the systems can be accomplished with more interconnections and back-up facilities to improve pressure, flow, and resiliency. An individual well can only perform to its maximum design, but when sources are connected, the flow and pressure can go up significantly.

Natural and Cultural Resources

Fire Island is a narrow, low elevation barrier island with beaches, dunes, wetlands, and woodlands that are part of the allure of the Island as a destination and are also a vital part of the geomorphology and, indeed, the life of the island. Much of Fire Island is within the Fire Island National Seashore which includes over 5,000 acres of parkland, open space, recreational areas, and historical sites plus almost 15,000 acres of aquatic or submerged lands[19]. The Fire Island Lighthouse, visitor facilities at Watch Hill, Sailors Haven, and Talisman were storm damaged, as were Community cultural facilities in Ocean Beach, Cherry Grove, and other communities. Protective dunes were leveled, wetlands over washed with sand, and beaches severely diminished by Superstorm Sandy.

From an economic perspective, while restoring and enhancing cultural facilities is vital to the long-term well-being of the Island economy, the restoration of dunes, wetlands and the South Shore Estuary are also critical to the viability of popular recreational uses, including boating, fishing, swimming, surfing, bird-watching, and other maritime activities.

The importance of the barrier beach as the first line of defense for the South Shore Estuary is of critical importance to the flood-prone communities on the north side of the estuary. The acknowledged ability of the beaches, dunes, and wetlands to absorb energy from damaging wind and water speaks to the opportunity and importance of restoring and enhancing these natural features. These assets are important to both the protection of Fire Island as well as to the mainland of Long Island.

Table 18 follows and summarizes the Needs and Opportunities identified through the planning process.

View of a marina and bayside shoreline

Table 18: Needs and Opportunities

Community Planning and Capacity Building
Need: Better coordination of essential services, including communication **Opportunity:** Improve working relationships among Fire Island communities and the mainland municipalities/agencies
Need: Lack of public awareness regarding resiliency and emergency preparedness **Opportunity:** Public education on barrier island issues for resiliency and preparedness
Need: Increase resiliency of homes, businesses and public and private facilities **Opportunity:** Examine local codes and ordinances and their relationship to State and Federal programs for improved coordination
Economic Development
Need: Sustain commercial, recreational and tourism assets and functions **Opportunity:** Utilize strategies that can build on and improve synergies amongst businesses and tourism.
Need: Protect and maintain taxable assets **Opportunity:** Target the facilities important to tax base to determine methods to bolster these assets.
Health and Social Services
Need: Examine health impacts from storm damage, which may have improved conditions for potential disease vectors. **Opportunity:** Utilize management strategies to reduce exposure to potentially harmful species such as mosquitoes and ticks
Housing
Need: Encourage resilient housing construction **Opportunity:** Survey best practices with location and construction issues for application to housing restorations and reconstructions, as well as new construction

Table 18: Needs and Opportunities - continued

Infrastructure
Need: Improve bayside shoreline management **Opportunity:** Approach bayside shoreline problems and solutions in a more comprehensive fashion.
Need: Strengthen public water supply infrastructure and systems **Opportunity:** Examine interconnections between systems, pressure, and backup requirements.
Need: Maintain safe access to all communities **Opportunity:** Examine storm damaged problem areas and emergency access/evacuation routes to determine ways to maintain safe access.
Need: Ensure that municipalities and first responders, including fire departments, have the necessary resources to prepare for and protect the public, property and the natural environment during and after disasters **Opportunity:** Explore new methods, new technologies, procedures, and materials needed to improve necessary disaster-related resources.
Need: Hardening of infrastructure to reduce future vulnerability and mitigate repetitive flooding, especially power, communication, and docks **Opportunity:** Examine, and record "weak links" to determine priorities for hardening infrastructure
Natural and Cultural Resources
Need: Maintain and improve cultural and recreational facilities damaged by storms **Opportunity:** Restoration of public recreational infrastructure for residents and tourists
Need: Improve the natural functioning of storm protective wetlands, dunes and beaches **Opportunity:** Restore and enhance wetlands, dunes, and beaches

Section 3: Reconstruction and Resiliency Strategies

View of boats docked at a marina

The process of identifying the Community's post-storm needs and opportunities informed the Committee's development of strategies to resolve these needs and realize opportunities. In turn, the strategies assisted in the conceptualization and design of projects to specifically address these needs and opportunities. Strategies can be types of projects, programs, policies, or other actions that specifically address an identifiable need. Typically, there exist several strategies to address a given need. For example, communities are most successful when they blend traditional stabilization and repair actions with a holistic, long-range, forward-looking view of recovery and economic development. This section presents the strategies developed by the NYRCR Fire Island Committee for how best to use Community assets, capitalize on opportunities, and resolve critical issues.

For every need or opportunity, potential strategies were generated for each resiliency issue from multiple management angles. The list of strategies spans an array of methodologies and timeframes, from preparedness to retrofits, from immediate procedural improvements to long-range capital investment programs. Strategies also include conservation of natural protective features, regulatory changes and building code updates, structural defenses, resilient retrofits, market measures, land use planning, and education and outreach in an effort to employ multiple, complementary actions rather than relying on a single means of protection.

Homes being elevated

Careful consideration was given to what is at risk, what resources are available, and the capacity to implement various management measures. As general resiliency strategies evolved to specific projects and actions several factors were considered to begin prioritizing the most effective and feasible strategies, and thus identify the best use of recovery funds. These considerations included how each strategy relates to Superstorm Sandy's impacts on Fire Island; to what extent each strategy would reduce current and projected risk; whether it contributed to protection of vulnerable populations; feasibility of successful implementation; compliance with existing regulations; upfront and long-term maintenance costs; direct and indirect benefits; and public perception.

To rebuild a more resilient Community, the Committee developed reconstruction strategies which were derived from the assets that were identified as being at risk relative to the Community's needs; all of which was discussed in the previous section of this report. Each reconstruction strategy was designed to take into account the following considerations:

- Whether it reduced the level of risk and met an identified Community need;
- Whether it helped (or improved the resilience of) vulnerable populations; and
- Whether it could be implemented through discrete programs and/or projects.

The Community's reconstruction strategies are discussed and then summarized in Table 19 through Table 27 on the following pages.

Strategy: Create a mechanism for enhanced communication, collaboration, and regional planning among the many Fire Island interests and the various levels of government on the Long Island mainland.

This Community Planning and Capacity Building Recovery Support Function strategy provides the opportunity for the communities of Fire Island to jointly address the need for better coordination of essential services and improving relationships among Fire Island communities and the main land through joint problem solving. This strategy addresses several needs identified by the Committee including better coordination of essential services, and increasing public awareness regarding resiliency and emergency preparedness. By bringing all voices to the table, Fire Island-wide issues can be addressed in a comprehensive way with everyone working towards an equitable solution for each issue. The strategy will also provide vulnerable populations the opportunity to have their issues discussed and addressed across the barrier island as the forum would be open to all residents and would address all issues brought before it.

The Proposed Project to implement this strategy is the development of a Fire Island Planning Forum. This forum would build upon similar efforts accomplished through prior inter-municipal agreements that have been used to implement major construction projects on Fire Island. Instead of ending those agreements when a project is complete, this would be an ongoing entity that could seamlessly address issues as they arise. Also, by having a group that meets on an ongoing basis, issues can be addressed before they grow into larger concerns.

Many issues related to resiliency cannot be solved on an individual Village or hamlet level. Shoreline protection has to be looked at comprehensively so one community's improvements do not jeopardize neighboring shorelines. Water systems need to be interconnected so damage in one area can be addressed by another undamaged source. Emergency response needs to be coordinated so that neighboring forces can lend aid and equipment. Addressing these types of issues, as well as many others, all add to the resiliency of the entire Fire Island environment and communities. And finally, establishing an ongoing dialogue with all levels of government and regulatory entities will lead to better relationships and understanding of the others concerns and viewpoints, allowing the best decisions to be made in the urgency of an emergency situation. An Additional Resiliency Recommendation associated with this strategy is an Education Campaign for homeowners, renters and visitors. See Table 28 in Section 5 (Additional Materials) for more information on Additional Resiliency Recommendations.

Table 19: Strategy Summary 1

Strategy: Create a mechanism for enhanced communication, collaboration, and regional planning among the many Fire Island interests and the Long Island mainland.				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Fire Island Planning Forum	Convene a planning forum to discuss issues and policies affecting all of Fire Island.	$50,000	Proposed	Y

Strategy: Preserve local home values by increasing access to additional hazard mitigation funds to minimize risk of storm damage and lower flood insurance rates.

Home being elevated

Many seasonal and year-round homes were damaged or destroyed. This Community Planning and Capacity Building Recovery Support Function and Housing Recovery Support Function strategy is intended to increase the capacity of Fire Island residents to make homes more resilient by increasing access to competitive grants to fund resilient retrofits. This strategy also responds to the need identified by the Committee to encourage resilient housing construction including best practices for housing restorations and reconstructions, as well as new construction.

There is one proposed project that was developed to implement this strategy and that is the employment of a Local Disaster Recovery Manager (LDRM) who would be responsible for procuring grants and/or low interest loans that would offer affordable options to homeowners with insufficient funds for raising homes above surge and flood hazard areas, thereby reducing vulnerability of those at risk of losing their home and being homeless. The LDRM project would serve infrastructure strategies as well, as indicated below.

Table 20: Strategy Summary 2

Strategy: Preserve local home values by increasing access to additional hazard mitigation funds to minimize risk of storm damage and lower flood insurance rates.				
Project Name	**Short Project Description**	**Estimated Cost**	**Project Type**	**Regional Project (Y/N)**
Employ LDRM	Hire one or more LDRMs to write grants and manage Federal/State grants.	$300,000	Proposed	Y

Strategy: Support businesses before and after an event.

View of a dock and the water

This Economic Development Recovery Support Function strategy addresses resiliency issues related to Economic Development. The Committee identified the need sustain commercial, recreational and tourism assets and functions and protect and maintain taxable assets including commercial businesses. After Superstorm Sandy, businesses did their best to rebuild quickly and be ready for the summer season, but lacked the funding to let people know that Fire Island was open for business. Fire Island businesses have faced an uphill battle since Superstorm Sandy to attract comparable numbers of tourists to the island compared to pre-Sandy, which has led to economic stagnation. This strategy addresses the opportunities to increase resiliency by improving synergies between businesses and tourism, and bolster facilities important to the tax base. By promoting visitorship to Fire Island's businesses and recreational and cultural facilities, economic vitality island-wide will be enhanced. The strategy would improve the opportunities for local employment on Fire Island, particularly for lower-income Fire Island and mainland residents including students. The Proposed Project for the Enhance Revive FI Campaign was developed to implement this strategy.

Table 21: Strategy Summary 3

Strategy: Support businesses before and after an event.				
Project Name	**Short Project Description**	**Estimated Cost**	**Project Type**	**Regional Project (Y/N)**
Enhance Revive FI Campaign	Provide funding to Revive FI to market the recreational and economic opportunities of the entire Island.	$150,000	Proposed	Y

Strategy: Ensure Fire Department personnel have sufficient equipment for rescue operations, fire suppression, and response to other hazards.

This Infrastructure Recovery Support Function strategy addresses resiliency issues related to Infrastructure for both equipment and adequate water systems to fight fires. In terms of equipment, this strategy addresses the needs of the Fire Departments on Fire Island to have the necessary resources to prepare for and protect the public, property and the natural environment during and after disasters, and takes advantage of the opportunity to explore new methods, technologies, procedures and materials needed to improve disaster-related resources. In terms of water system capacity and reliability, the strategy addresses the need to strengthen public water supply infrastructure and systems and the opportunities to examine interconnections between systems, pressure and backup requirements. It envisions additional equipment necessary to respond appropriately to major storm events and other disasters, that is, above and beyond response abilities provided by current equipment limitations. Adequate equipment, supplies and water systems will help ensure that all residents, including vulnerable populations, will receive necessary aid during disasters and other emergencies. To implement this strategy, the Committee developed three projects: the purchase of an Air Compressor for the western fire departments to supplement the existing one located at Ocean Beach, the addition of back-up power generation for critical facilities, and employing a LDRM.

Additional Resiliency Recommendations that also support this strategy include:

- the purchase of an emergency medical supply storage trailer;
- the establishment of EMS services for Cherry Grove;
- the purchase of a mini-pumper for the Village of Saltaire;
- the purchase of a new fire truck for the Cherry Grove firehouse;
- the winterizing of the Davis Park firehouse; and
- water system improvements to improve the redundancy and capacity of the water supply system for firefighting needs including water main extensions between Fire Island Pines and Davis Park, installation of hydro-pneumatic water tank and building in the Village of Saltaire, and upgrade of the Lighthouse Promenade water main in the Village of Saltaire.

These additional resiliency recommendations are described in Section 5 (see Table 28).

Table 22: Strategy Summary 4

Strategy: Ensure Fire Department personnel have sufficient equipment for rescue operations, fire suppression, and response to other hazards.				
Project Name	**Short Project Description**	**Estimated Cost**	**Project Type**	**Regional Project (Y/N)**
Air Compressor	Purchase an Eagle Air Compressor and fill station to refill used breathing apparatus for Firefighters.	$42,500	Proposed	Y
Back-up Power Generation for Critical Facilities	Evaluate needs, purchase, and install generators.	$600,000	Proposed	Y
Employ LDRM	Hire one or more LDRMs to write grants and manage Federal/State grants.	$300,000	Proposed	Y

Strategy: Enable municipalities to track structures, damage to structures, permits, etc.

This Community Planning and Capacity Building Recovery Support Function strategy addresses the need to provide better coordination of essential services and improve working relationships among Fire Island communities and the mainland towns of Islip and Brookhaven. This strategy provides local governments with the technical and computer resources to improve and increase effectiveness of their response and recovery efforts during and following an emergency event. Additionally, on Fire Island, building addresses are not currently located with street names and numbers, making it difficult for emergency responders to respond. While enhanced GIS capacity is a statewide issue, this particular project is a local response to a regional need which has been recognized by Islip and Brookhaven towns. The strategy would address risk for both towns by coordinating emergency management communications and reducing the gaps in information flow and accuracy. It would increase the efficiency of post-disaster data gathering, hasten response and recovery actions, and reduce the vulnerability of those at risk of becoming homeless. The Proposed Project for an Enhanced GIS Emergency Management System was developed to implement this strategy.

Table 23: Strategy Summary 5

Strategy: Enable municipalities to track structures, damage to structures, permits, etc.				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Implement an Enhanced Geographic Information System (GIS) Emergency Management System	Install an enhanced (GIS)-enabled program for the Town of Islip and Town of Brookhaven to improve emergency planning, response and recovery from severe storm events.	$50,000	Proposed	Y

Strategy: Enhance communications to improve the ability to communicate vital information not only on Fire Island but to the off-island agencies that may be assisting in an emergency response effort.

This Community Planning and Capacity Building Recovery Support Function strategy addresses the need to provide local governments with a more reliable and rapid means of communicating with rescue and other service providers during and following an emergency event. As noted earlier, all of the Emergency Response Facilities are located on the mainland and it is vital for local emergency responders to communicate with those facilities. While this strategy would address risk for the entirety of Fire Island, it would particularly reduce the risk for persons who are elderly or persons with a disability who may not be able to evacuate in time and might require emergency services. The project also would enhance general protection of property. The Proposed Project for an Emergency Communication System was developed to implement this strategy.

Table 24: Strategy Summary 6

Strategy: Enhance communications to improve the ability to communicate vital information not only on the beach but to the off-island agencies that may be assisting in an emergency response effort.				
Project Name	**Short Project Description**	**Estimated Cost**	**Project Type**	**Regional Project (Y/N)**
Emergency Communication Systems	Purchase the Ground Control TOUGHSAT system and replace primary and second radio repeaters.	$200,000	Proposed	Y

Strategy: Ensure safe and reliable evacuation routes for both emergency personnel and the general public.

This Infrastructure Recovery Support Function strategy addresses the need to maintain safe access to all communities and provides an opportunity to examine storm damaged problem areas and emergency access/evacuation routes to determine ways to maintain safe access. The island's primary vehicular east-west emergency access route was severely damaged by Superstorm Sandy, and temporary repairs are not adequate to withstand future storms. This strategy would increase resilience by improving the condition of the only emergency access route between the Lighthouse Checkpoint and Kismet and between Corneille Estates and Robbins Rest by making it more resilient to storm damage. This strategy will improve response time of emergency vehicles. Similarly to the communications strategy, this strategy would address risk for the entirety of Fire Island, but would particularly reduce the risk for persons who are elderly or persons with a disability who may not be able to evacuate in time and might require emergency services. The project also would enhance general protection of property and would reduce economic damages through improved response time.

Additional Resiliency Recommendations that also support this strategy include:

- Central Walk Improvements in the Town of Islip,
- Walkway Repairs in Corneille Estates,
- Dune Crossings in the Town of Islip,
- Dune Crossings in Dunewood,
- Lighting on Trustee Walk in Davis Park, and
- Boardwalk repairs and brush clearing in Davis Park.

See Table 28 in Section 5 (Additional Materials) for more information on Additional Resiliency Recommendations.

Table 25: Strategy Summary 7

Strategy: Ensure safe and reliable evacuation routes for both emergency personnel and the general public.				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Emergency Access Route	Stabilize the emergency access route so that resources can be delivered and the route is available for emergency vehicles with improved response times.	$610,000	Proposed	Y

Strategy: Identify bayside transportation assets and create redundancies for resource and emergency access.

This strategy addresses resiliency issues related to Infrastructure. The docks are used for delivery and offloading of critical supplies by water during an emergency, evacuation of the population prior to storms, transport of firefighters from the mainland when needed to support fire fighters on Fire Island, removal of debris after storms, and the transport of debris and construction materials. Many of the docks on the island were damaged by the storm or by the activities related to storm recovery. The strategy ensures that the docks will be functional before, during, and after a storm to fulfill all the required functions noted above.

This strategy would also help minimize delays in the delivery of resources and supplies to vulnerable populations, particularly those who have limited mobility. To implement this strategy, the Committee developed two proposed projects and one featured project that aim to repair and improve resiliency of key freight and passenger docks. An Additional Resiliency Recommendation that also supports this strategy is dock restoration and improvements in Dunewood. See Table 28 in Section 5 (Additional Materials) for more information on Additional Resiliency Recommendations.

Table 26: Strategy Summary 8

Strategy: Identify bayside assets and create redundancies for resource and emergency access.				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 1 – Design)	Design repairs and improvements of freight and passenger docks at Davis Park, Cherry Grove, Fire Island Pines, and Ocean Beach to enhance emergency access and increase accessibility.	$750,000	Proposed	Y
Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 2 – Construction)	Construction of dock repairs and improvements at one or more of these facilities: Davis Park, Cherry Grove, Fire Island Pines, Ocean Beach, and Atlantique.	$1,500,000	Proposed	Y
Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 3 – Construction)	Complete construction of dock repairs and improvements at Davis Park, Cherry Grove, Fire Island Pines, Ocean Beach, and Atlantique.	$8,500,000	Featured	Y

Strategy: Develop a comprehensive island-wide shoreline management program that includes natural restoration and engineered stabilization techniques.

This Infrastructure Recovery Function strategy aims to address flooding and erosion issues on the bayside shoreline of Fire Island. This strategy addresses many needs identified by the Committee including improving bayside shoreline management, maintaining safe access to all communities, hardening of infrastructure to reduce future vulnerability and mitigate repetitive flooding and improving the natural functioning of storm protective wetlands, dunes and beaches. At the same time it provides opportunities to approach bayside shoreline problems and solutions in a more comprehensive fashion, examine and record "weak links" to determine priorities for hardening infrastructure, and restore and enhance wetlands, dunes, and beaches. The strategy includes the integration of natural and engineered approaches to mitigate flooding associated with regular high tides and extreme storm events. Additionally, the chronic and progressive rise in sea level may exacerbate losses and increase the risk of inundation. Addressing this concern will require a progressive approach that incorporates structural measures where necessary in combination with land use planning and natural protective features. As shorelines change with sediment supply from season to season, this strategy should take into account the natural variations and unique conditions of the bayside.

To implement this strategy, the Committee developed three phased projects (two proposed, one featured) for the development and implementation of a comprehensive Bayside Shoreline Management Program. Additional Resiliency Recommendations that also support this strategy include:

- Reconstruct Clam Pond Peninsula in the Village of Saltaire
- Ocean Bay Park Drainage Repairs
- Seaview Bayside Bulkhead Raising
- Bayside Improvements in Dunewood

Additional Resiliency Recommendations that support this strategy on the ocean frontage include dune plantings in Davis Park and the Town of Islip. See Table 28 in Section 5 (Additional Materials) for more information on Additional Resiliency Recommendations.

Table 27: Strategy Summary 9

Strategy: Develop a comprehensive island-wide shoreline management strategy that includes natural restoration and engineered stabilization techniques.				
Project Name	**Short Project Description**	**Estimated Cost**	**Project Type**	**Regional Project (Y/N)**
Engineering and design study for bayside shoreline management with regulatory coordination and pilot projects (Phase 1)	Engineering and design study to assess the feasibility of different natural infrastructure, as well as hard structure stabilization solutions for the unique conditions along the bayside shoreline of Fire Island's communities. The project would include several pilot projects that would address different types of shoreline deficiencies.	$1,500,000	Proposed	Y
Bayside Shoreline Management Implementation (Phase 2)	Pilot projects from Phase 1 would be evaluated for effectiveness and then replicated across the island where similar conditions exist.	$1,500,000	Proposed	Y
Bayside Shoreline Management Implementation (Phase 3)	Pilot projects from Phases 1 and 2 would be evaluated for effectiveness and then replicated across the island where similar conditions exist.	$24,000,000	Featured	Y

Section 4: Implementation – Project Profiles

Bayside shoreline

The NYRCR Program has allocated to the Community up to $3.0 million. The funding is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program. While developing projects and actions for inclusion in the NYRCR Plan, Planning Committees took into account cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. Planning Committees also considered the potential likelihood that a project or action would be eligible for CDBG-DR funding.

The projects and actions set forth in the NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in the NYRCR Plan does not necessarily indicate the Community's prioritization of these projects and actions. Proposed Projects are projects proposed for funding through the Community's allocation of CDBG-DR funding. Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. Additional Resiliency Recommendations (see Section V) are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects.

The total cost of Proposed Projects in the NYRCR Plan exceeds the NYRCR Community's CDBG-DR allocation to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in the NYRCR Plan are subject to applicable Federal, State, and local laws and regulations, including the Americans with Disabilities Act (ADA). Inclusion of a project or action in the NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented.

This section provides a complete Project Profile for each Proposed or Featured Project identified by the NYRCR Committee and Community. In addition to providing a detailed description of each project, the profiles include information on two important elements used by the Committee to evaluate each project – a Cost-Benefit Analysis and a Risk Reduction Analysis. Before proceeding to the projects themselves, it is important to understand these two analytical elements of the Project Profiles.

Cost-Benefit Analysis

A cost-benefit analysis (CBA) evaluates and compares the benefits and costs associated with a project. The CBA provides decision-makers with a framework for comparing different projects (i.e., anticipated cost of implementation against total expected benefits), and determining whether the benefits of a particular project outweigh the costs. More specifically, the value of the CBA is two-fold: (1); to inform the selection of projects for implementation and (2) to support grant applications for funds.

Because the NYRCR Program is a Community-driven process, the CBA has focused on identifying project costs and benefits that easily relate to the communities that the NYRCR Planning Committees represent. Community and Committee input – informed by a true

understanding of local conditions, needs, and Community values – plays a crucial role in the selection of projects that are implemented. With this in mind, the CBA has used a mix of both quantitative and qualitative factors in its analysis.

The CBA cannot evaluate cost or benefits with complete certainty; rather it provides the Community with a practical understanding of the potential estimated costs of project implementation and the potential benefits that will accrue to the Community with the project in place. The costs and benefits used to evaluate projects through the CBA are explained further below.

Project Costs

Project Profiles include a description of anticipated costs, including soft costs, contingency costs and the hard "costs" associated with implementation (labor and materials). Soft costs refer to costs associated with design, procurement, permitting, or any other "up-front" costs associated with project implementation (up to 25% of construction costs). Contingency costs refer to additional costs that have been factored into a project (up to 25% of construction costs) due to the conceptual nature of the projects and the potential for cost escalations due to unknowns.

The cost of implementing a project is just one aspect of the justification for funding these Proposed Projects. Conversely, another important variable is the future costs of not implementing these projects, which have the potential to negatively impact the long-term viability of the Fire Island communities, whether individually or collectively. While these costs are more difficult to quantify, they are no less important to our analysis, and are therefore addressed qualitatively. These costs include:

- Extensive, repetitive damage to personal property (vehicles, residences) and public infrastructure resulting from frequent recurring flooding and future storm events;
- Economic loss to residents and to local and regional employers as a result of the inability to work; and
- Hindrance in the provision of life safety and emergency services resulting in repeated inability to access areas of the Community.

Project Benefits

The types of benefits considered in the CBA include:

- Risk Reduction: The extent to which a project reduces the risk of damage to a Community asset from a future storm event (discussed further below under "Risk Reduction Analysis");
- Economic Resiliency: The project's potential to help minimize economic costs and reduce the time it takes for the local economy to rebound from a storm event. Economic data included, where applicable, an estimate of permanent jobs secured/added; relationship to, and/or furtherance of, Regional Economic Development Plan goals; potential for additional economic activity; and the net effect on local municipal expenditures;
- Health, Social and Public Safety Services: Qualitative information was provided on the overall population benefits of improved access to health and social service facilities and public safety

services; type and size of socially vulnerable population secured; and degree to which essential health and social service facilities are able to provide services to a Community during a future storm or weather event as a result of the project; and

- Environmental Protection: Benefits include the protection of crucial environmental assets or high-priority habitat, threatened and endangered species, migration or habitat connectivity; any clean-up resulting from the action; creation of open space or a new recreational asset.

Risk Reduction Analysis

A Risk Reduction Analysis estimates the extent to which Proposed and Featured Projects will reduce flooding risk to specific Community assets when the project is in place. (The extent to which a project reduced such risk is also considered as a benefit in the Cost Benefit Analysis – see "Project Benefits" above.) Risk "reduction" is different from the risk "assessment" in the previous section in a very important way – risk assessment looks at storm and flood risks to Community assets before the project is implemented; risk reduction looks at anticipated reduced flood risk assuming the project is implemented.

For this risk reduction analysis, projects were evaluated using a three-foot rise in sea level scenario for their potential to reduce an asset's level of exposure and/or vulnerability to future storms. This helps communities and decision-makers understand the potential environmental, social, and economic outcomes associated with implementing the project.

For a more detailed discussion of the methodology and factors used in the risk reduction analysis, see Section 5, Part D.

View of a boardwalk and dock in Ocean Beach

PROPOSED PROJECT: Convene Fire Island Planning Forum

Convene Fire Island Planning Forum

Recovery Support Function: Community Planning and Capacity Building

Cost: $50,000

Assets made more Resilient:
All assets through additional planning

Risk Reduction & Benefits:
Increased collaboration and coordination among Fire Island communities

Project Description

Fire Island is a unique place in New York State due to the interrelated communities and governmental jurisdictions from the Village to Federal level that co-exist on the Island. The NY Rising Community Reconstruction (NYRCR) process has provided a mechanism for enhanced communication on a regular basis among these entities that did not exist before Superstorm Sandy. The NYRCR process has advanced the dialogue and level of cooperation on important issues facing the island, which requires balancing human and environmental concerns.

The Committee would like to continue this dialogue so that issues and policies affecting the island can be addressed in a comprehensive and cohesive manner with all parties' viewpoints represented. Most of the potential participants are working together though the NYRCR process thereby creating an opportunity to establish a more permanent group. Therefore the Committee proposes to convene a Fire Island Planning Forum that would meet regularly, perhaps on a quarterly basis, to include representatives of Federal, State, County, and Village governments; residents; businesses; emergency responders; utilities; and all other appropriate entities.

Estimated Project Costs

The cost for a part time staff person to schedule meetings, take minutes, prepare correspondence, and perform other administrative tasks is estimated at $50,000 over a two-year period. The cost would include salary and benefits, computer, and supplies, with other costs such as office space provided by the participating communities.

Project Benefits

Risk Reduction and Resiliency

A Fire Island Planning Forum would provide the Island's communities with the opportunity for continued discussion and cooperation on topics of mutual concern, particularly those which require balancing the needs of humans (e.g., commerce, safety, recreation, etc.) and natural ecosystems. One potential project of the Fire Island Planning Forum could be encouraging Town and Village participation in the National Flood Insurance Program's (NFIP) Community Rating System. Participation in the Community Rating System involves completing a variety of floodplain management activities that exceed the NFIP's minimum requirements. In turn, property owners may receive discounts on flood insurance premiums that reflect their reduced flood risk. The other objectives of the planning forum - creating a better relationship with the utility companies and improving the resiliency of communication services through backup systems and/or expansion of existing services - address the reduction of risks prior to and following disasters through the hardening of the power distribution infrastructure and enhancement of the communications system.

Economic Benefits

This project would create one part-time position (1.25 FTE over a two-year period[20]). Additionally, if the municipalities participate in the NFIP Community Rating System as a result of this project, property owners could reduce their flood insurance rate premiums by between 5% and 45%, providing economic benefit to residents of the island. Another economic benefit is improved efficiency of intergovernmental actions.

Environmental Benefits

One of the defining features of Fire Island is the relationship between the natural environment and developed communities. A Fire Island Planning Forum would allow local communities to discuss environmental issues with government and regulatory agency representatives, thereby enhancing coordination and communication among these entities for the purpose of implementing the projects identified in this plan as well as future projects.

Health and Social Benefits

The Fire Island Planning Forum could provide several health and social benefits to Island residents and visitors by improving the flow of essential emergency and educational information to residents and visitors.

Cost-Benefit Analysis

This is a low cost project that would have many co-benefits for all of the Fire Island communities in the long-term. Benefits include increased communication and collaboration between each of the 17 communities as well as with two Towns, the County, the State, and the National Park Service. The Forum would allow the 17 communities to speak with one voice and with all levels of government to accomplish shared goals and objectives. The Forum would create a more efficient way to leverage limited resources, address policies of regional concern, and work together to deliver services in a cohesive, cost-effective manner.

Risk Reduction Analysis

The project has the potential to reduce risk to all assets on Fire Island through better collaboration and communication among the communities.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, this Project has potential for immediate implementation (0 to 12 months).

Regulatory Requirements Related to Project

No permits or approvals would be required for implementation of this project.

Jurisdiction

This project falls under multiple jurisdictions including the Villages of Ocean Beach and Saltaire, the Town of Islip, the Town of Brookhaven, Suffolk County, New York State, and the Fire Island National Seashore (FINS).

Members of the community sign in at a public engagement event

PROPOSED PROJECT: Employ Local Disaster Recovery Manager (LDRM)

Project Description

As described by the Federal Emergency Management Agency (FEMA), the role of the Local Disaster Recovery Manager (LDRM) is to organize, coordinate, and advance the recovery at the local level. Their primary role is to manage and coordinate the redevelopment plans and rebuilding activities within a Community. Another major role is to collaborate with State, Federal, and other stakeholders and supporters (such as the business and nonprofit communities) to raise financial support (including long-term capital investment in local businesses) for the Community's recovery, leverage the resources where possible and resolve potential duplication of assistance.[21]

Employ Local Disaster Recovery Manager

Recovery Support Function: Community Planning and Capacity Building

Cost: $300,000

Assets made more Resilient:
Potentially all assets

Risk Reduction & Benefits:
Increased access to Federal and State funding sources, particularly for important environmental projects

Increased collaboration and coordination among Fire Island communities

Knowing that there may be many grant opportunities each year, many with short application time frames, the Committee seeks to set aside a portion of NYRCR Program funding to hire a LDRM with experience in funding for public and private mitigation projects, grant writing, and Federal/State grants management. The LDRM, who would hold a multi-year position, would increase access to hazard mitigation and other funding by seeking out and applying for grants for Village and Hamlet facilities/infrastructure, as well as manage the grants to ensure State and Federal compliance.

The Committee adopted a regional approach to the proposed projects, recognizing that the communities had many more projects that affected one or a group of communities, with funding needs running into millions of dollars. The Committee wanted to create a mechanism whereby these Community level projects could be funded through other grant opportunities in the future to address the many assets still at extreme or high risk and in need of resiliency measures.

There are no anticipated obstacles to implementing this project. It is anticipated that an Inter-municipal agreement, as has been used successfully on Fire Island, would be developed between the two Towns and two Villages. This agreement would establish which governmental agency would hire the LDRM and how the various municipalities would share the services of the LDRM in an equitable manner that would address the needs of all of the seventeen communities.

Project Estimated Costs

The cost for a LDRM is estimated at $300,000. This would be either a multi-year position for a full time employee, or a part-time position over a longer period. The cost would include salary and benefits, computer and supplies, with other costs such as office space provided by the participating communities.

Project Benefits

Risk Reduction & Resiliency

The LDRM will help to reduce risk on Fire Island by increasing access to hazard mitigation and other funding, and managing grants to ensure State and Federal compliance. A key benefit of this project is the anticipated additional funding for Fire Island communities which would enable them to implement longer-term resiliency/risk reduction projects. Additionally, the project will help create better coordination, particularly in regards to emergency management and preparedness efforts, between the multiple jurisdictional authorities on Fire Island.

Economic Benefits

One or more full time equivalent positions[20] would be created. These could be either full time employees or part time employees, as needed. Indirect benefits will occur due to better management, and the potential for more grant funding.

Environmental Benefits

The LDRM will assist with the procurement and management of funding opportunities, many of which are awarded through the United States Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (DEC). These agencies actively seek to fund projects, policies, and initiatives that protect and enhance the environment. For barrier islands like Fire Island, the DEC is particularly instrumental in the management of the shorelines and intertidal wetland areas.

Cost Benefit Analysis

This is a low cost project that will have very substantial benefits to all communities on Fire Island through increased opportunity to access grants and other funding sources for needed projects. The potential amount of funding received because of this LDRM would far outweigh the cost.

Risk Reduction Analysis

The LDRM would not directly decrease the risk of any particular assets on Fire Island but it could help secure additional funding to enhance and repair wetlands, docks, and hard infrastructure across Fire Island to make residential, commercial, and public assets at less risk of flooding. Therefore, the position could help decrease risk for all assets on Fire Island.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, this Project has potential for immediate implementation (0 to 12 months).

Regulatory Requirements Related to Project

There are no anticipated regulatory requirements for implementation of this project.

Jurisdiction

This project would fall under multiple jurisdictions including the Town of Islip, the Town of Brookhaven, the Village of Saltaire, and the Village of Ocean Beach.

PROPOSED PROJECT: Implement an Enhanced GIS Emergency Management System

Project Description

This project would help to fund the development of an enhanced Geographic Information System (GIS) for the Town of Islip, and the portion of Fire Island within the Town of Brookhaven, to improve storm preparedness planning, as well as response and recovery from severe storm events.

The Town of Islip experienced a devastating shock to the Emergency Management Information System during Superstorm Sandy. The call center was inundated with phone calls from residents who were reporting damages to their homes, electrical outages, and medical emergencies. The Town was tasked with recording these reports, assessing the severity of the incident, and then dispatching the appropriate resources to the location. To compound the problem, the electrical power to the Town's Information Technology (I.T.). Department was lost and the emergency generators could not provide adequate power to the computer system. Floodwaters entered the I.T. department and prevented the use of the network. Therefore, the existing GIS system could not be used to track the locations of the incidents nor could the crews be tracked. A makeshift system was cobbled together at the Town Hall West site and the information was collected and mapped. This was a herculean effort that helped with deploying resources to the correct locations.

Implement an Enhanced GIS Emergency Management System

Recovery Support Function: **Community Planning and Capacity Building, Health and Social Services**

Cost: $50,000

Assets made more Resilient:
All assets through additional planning

Risk Reduction & Benefits:
Increased capacity to track storm damage and deploy necessary resources

Increased inter-agency and inter-Town collaboration and coordination

Improved coordination among emergency personnel and first responders

Figure 15: GIS Emergency Management Map

However, this emphasized the need to seek out solutions to provide a more robust GIS system to manage this information and track damages and document costs associated with storm events. While both Towns have had GIS systems for many years, the systems are not adequate to accommodate the needs of the Towns to manage severe storm events and other disasters.

The GIS system will enable better communication and record keeping among Town agencies and emergency responders. The system will track in coming reports of flooding, damages, utility outages and blocked roads and enable more rapid and efficient deployment of resources. The system will also allow for better record keeping of storm response and damage, providing better accountability and reimbursement of eligible costs to FEMA (Federal Emergency Management Agency), the State, and any other agencies. The project is technically feasible and involves the use of demonstrated technology. By way of example, a similar system was implemented for the State of Vermont and many other communities with proven success. However, it will require coordination between the Towns of Islip and Brookhaven.

The system will be based upon a full web GIS infrastructure. Proposed applications would include:

- E911 Information Application – enabling e911 operators and responders;
- Road Obstruction Application – tracking fallen trees, power lines and other road obstructions;
- Damage Assessment Application – provide initial damage assessment to FEMA as well as organize and track recovery data essential for FEMA reimbursement; and
- Public Information Application – provide key information to the public in advance, during and after emergency events.

Estimated Project Costs

The Committee is proposing an allocation of $50,000 towards the overall project cost. The total capital and soft costs are estimated at $300,000. The project will be implemented as an Islip Town-wide asset with coordination from the Town of Brookhaven for Fire Island. It is expected that other NYRCR Communities in the Towns of Islip and Brookhaven may provide the balance of funds. The required funds may also be supplemented with other Town of Islip funds.

Operation and maintenance costs are estimated at $2,300 per year for three years. Total life cycle costs are estimated at $57,000.

Project Benefits

Risk Reduction & Resiliency

This project will fund part of the cost of an enhanced GIS-enabled program for the Town of Islip and the Town of Brookhaven to improve planning, response and recovery from severe storm events. The system will be able to track incoming reports of flooding, damages, utility outages, and medical emergencies and enable rapid and efficient deployment of resources. The system's ability to track costs and resources is projected to enable the Towns to document and report actual costs to FEMA and the State for quick reimbursement, thereby minimizing a future storm's impact to the local government budget and services.

Economic Benefits

The project will improve the efficiency of municipal services associated with storm preparedness, response, and recovery. It will enable better utilization of staff resources and cost efficiencies.

Health and Social Benefits

An enhanced GIS program will allow the system to assign a specific location to each structure in the Community, enabling emergency responders to locate an address more quickly. This is vital for accessing and providing services to vulnerable populations in the Community. The program will also facilitate inter-agency coordination with the Suffolk County Emergency Preparedness Registry, which includes a database of people with special and/or functional medical needs. Additionally, the project is expected to help create better coordination among first responders.

Cost Benefit Analysis

The project represents a low investment of capital to provide a more efficient data management system that would benefit all communities across Fire Island. The potential benefits of this project are considered to outweigh the cost of implementation.

Risk Reduction Analysis

While this project does not directly reduce risk for any particular assets on Fire Island, it does offer the ability to manage information about asset risks, vulnerability, damage, and repair. By having a centralized data management system in place, Fire Island communities could more efficiently prioritize those assets that are at most risk in the event of future storms for repair or replacement.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, this Project has potential for immediate implementation (0 to 12 months).

Regulatory Requirements

There are no anticipated regulatory requirements for this project.

Jurisdiction

This project falls under the jurisdiction of the Town of Islip and Town of Brookhaven.

PROPOSED PROJECT: Repair and Reconstruction of Emergency Access Route

Superstorm Sandy flooding on emergency access route[22]

Repair and Reconstruction of Emergency Access Route

Recovery Support Functions: Infrastructure, Health and Social Services

Cost: $600,000

Assets made more Resilient:
Emergency Access Route

Risk Reduction & Benefits:
Improved response time by emergency responders

Improved public access to primary evacuation route off Fire Island

Project Description

The purpose of the project is to repair and reconstruct sections of the Emergency Access Route to protect against ocean flooding and erosion and to allow for emergency access. Before Superstorm Sandy, the Route spanned almost the entire length of Fire Island (32 miles) from Robert Moses State Parkway in the west to William Floyd Parkway in the east. A Sandy-caused breach toward the east end of Fire Island has since cut off emergency access from the east end of the island.

A majority of the Route consists of hard packed sand covered by a layer of sand and stone aggregate. The Route faces ocean water flooding and erosion from regular and extreme storm events that prohibits access to the route for emergency vehicles. Superstorm Sandy deteriorated or destroyed previous maintenance work completed on the access route. The surface condition of the emergency access route has been compromised in several places, particularly between the Fire Island National Seashore (FINS) Checkpoint and Kismet. The emergency access route between Corneille Estates and Robbins Rest also requires stabilization.

Superstorm Sandy introduced a thick layer of beach sand on the trail that has made it difficult to manage and the route is no longer capable of keeping a stable profile. Reinforcement of the access route requires a layer of hard packed sand covered by a layer of sand and stone aggregate. The stone aggregate allows that route to be shaped and crowned, facilitating rainwater runoff and better drainage. The stone aggregate is also heavier than beach sand and is not prone to wind erosion. The emergency access route is a critical asset to the entire Fire Island Community, as it represents the primary vehicular evacuation route for the Island. Depending on the time of year and the severity of the storm year-round residents will use the route to evacuate their families and belongings. This is especially important when weather and water conditions make ferry transportation difficult.

In determining the evacuation process the estimated time of the road flooding determines when evacuation needs to be completed. If the high tide cycle floods the route, emergency personnel are stuck on the beach. Additionally, utility trucks and fire company vehicles actually evacuate Fire Island. They are the last to leave. Most fire companies send 50% of their fleet off Fire Island during storm events. The route needs to be stable enough for them to leave and re-enter.

Estimated Project Costs

The implementation of this project has been estimated to cost approximately $600,000 in total and includes $500,000 for materials for repairs related to damage caused by Superstorm Sandy and $100,000 in contingency costs. Historically, this work has been performed with pro bono expertise; therefore the estimated costs of these improvements are restricted solely to materials. The volunteer service has always played a strong role in maintaining the road and they will continue to do so. Year-round resident organizations and fire service personnel have always stepped up to maintain what the Community has. As the route exists and is maintained on a regular basis, there would be no change in operations and maintenance costs.

Project Benefits

Risk Reduction and Resiliency

Since this route is the only vehicular access route on the island, the project will facilitate greater capacity of services and improved response during and after events. The project will benefit land, air, and water rescue operations, since a combination of at least two of these are sometimes necessary to move someone to a mainland emergency facility, thereby reducing risk for all communities across Fire Island.

Figure 16: Emergency Access Route Repair and Reconstruction Locations

Economic Benefits

As the project would be constructed by volunteers, the only jobs created or maintained would be related to production and delivery of the materials. If half of the material and delivery cost is related to labor, 7.5 full time equivalents (FTE) would be created[20].

Health and Social Benefits

The health and safety of all residents and visitors on Fire Island depends on their ability to access very limited evacuation options, of which this overland route is the sole vehicular route to the west. Particularly during the summer season when Fire Island's population swells with tens of thousands of tourists, many of whom are not familiar with Fire Island, the ability of emergency responders to reach people and properties quickly is of utmost importance.

Cost Benefit Analysis

This project represents a medium investment of capital that has many potential public benefits for the Community as a whole that outweigh the costs, including risk reduction, enhanced protection of life and property, enhanced ability to rebuild after a disaster, economic development, as well as environmental and public health benefits.

Risk Reduction Analysis

The implementation of this project is anticipated to reduce the access route's risk to flooding and degradation. With the proposed improvements to the access route in place, the risk of a long-term (i.e., one month) service disruption following future storm events would be diminished. The installation of shore defenses, such as that proposed by the Fire Island Inlet to Montauk Point study and the bayside shoreline management plan improvements, would further reduce the route's exposure to storm erosion and overwash, thereby improving the ability of emergency responders to access residents who may be in dangerous situations.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, this Project has potential for immediate implementation (0 to 12 months).

Regulatory Requirements Related to Project

The emergency access route is within the FINS and requires agreement with FINS as to the scope of work and permission to perform the work on their property. There has been expressed willingness to work towards agreement by a FINS representative to the Committee. As this work would occur within a Coastal Barrier Resources System, Federal monies can be spent within the system for certain exempted activities, after consultation with the U.S. Fish and Wildlife Service[23]. It is anticipated that this work would fall within the exceptions for reconstruction and repair (but not expansion) of publicly-owned or -operated roads.

Jurisdiction

This project falls under the jurisdiction of Villages of Ocean Beach and Saltaire, the Town of Islip, the Town of Brookhaven, NYSDEC, and FINS.

PROPOSED PROJECT: *Emergency Communication Systems*

Figure 17: TOUGHSAT System

Emergency Communication System

Recovery Support Function: Community Planning and Capacity Building

Cost: $200,000

Risk Reduction & Benefits:
Increased resiliency of Island-wide communications

Improved first response time and efficiency

Improve cross-agency collaboration and communication

Project Description

This project would fund the purchase of the Ground Control TOUGHSAT satellite communication system, which will allow first responders and emergency management personnel to set up a wireless hotspot in order to use phones, tablets, or laptops during an emergency when electricity and land-based communication lines have been compromised. The other component of the project would be to replace primary and second repeaters and install equipment for expanded communications and alarm and trouble indications for the system.

During and after Superstorm Sandy, communication problems posed one of the greatest challenges for emergency responders and getting Fire Island back up and running again. Immediately following the storm, the island-wide radio system was temporarily down but even when running again it was not able to open communications with the mainland or with Community groups. Cell phone and internet services were also temporary or basically non-existent after the Storm. This system is portable. The Fire Chiefs have investigated various communication systems and believe that this is the best equipment for their application and that a fixed system would not meet their needs during a disaster.

The portable nature of this equipment is critical since all of the Fire Departments on Fire Island are located in an extreme or high risk area and are potentially vulnerable to flooding in future storm events. During an emergency, emergency responders are likely to have to use the satellite communication system from remote command trailers and fire chief cars as they respond to events across the island.

As described by an emergency responder:

The nine fire companies located on the island stretch between 30 linear miles (all with in the national park). There are several concerns with satellite receivers that will be affixed to the outside of the firehouse. The receiver is a complicated piece of equipment that will be exposed to a very harsh environment. The salt air environment corrodes and destroys outside equipment much more rapidly than the normal environment. The emergency responders do not believe the equipment is built well enough to with stand the harsh marine environment it would be exposed to (especially over the course of several years) day after day. In addition, we need the equipment immediately after a large-scale weather event; there is a good chance that the receiver would not survive such event if attached to the roof of a firehouse as many roofs did not survive Superstorm Sandy.

Even more compelling is the story of Ocean Bay Park and Point O' Woods. The two communities got hit very hard with floodwaters at the heart of the storm. Both Fire Chiefs and a handful of individuals decided to stay at the firehouses as opposed to evacuating. When the flood waters came in they realized they had to abandon the firehouse. We in the mainland command center were trying to monitor their movements. It was a very dangerous situation. They eventually set up shelter in a large private residential dwelling that was on high ground. A similar event occurred in Ocean Beach where the residents broke in to the school building. We were unable to communicate well with these groups. Their firehouses were out of service for a few weeks. The satellite communication system as presented would allow them to set up in the new location and keep the mainland agencies updated on their status.

There are no challenges anticipated for implementing this project. The satellite system and radio components would be specified by the Fire Island Fire Chiefs Council and purchased and maintained by the Villages of Ocean Beach and Saltaire.

Estimated Project Costs

The purchase price for the satellite system and improvements to the radio system, including four years of service for the satellite system, is estimated at $200,000. After the initial contract, the satellite system requires an ongoing service contract at an estimated cost of $15,000 per year for the remaining 16 years of its projected 20-year life. Total lifecycle costs are thus expected to be $440,000. The cost for the ongoing service contract would be shared among the emergency response entities through an inter-municipal agreement.

Project Benefits

Risk Reduction Benefits

Communication was a major issue during Superstorm Sandy, particularly for fire personnel and first responders working in extremely challenging conditions. By making critical upgrades to the Island's communication infrastructure, this project is anticipated to improve inter-agency coordination by creating a platform that enables improved response time which could mitigate injury and property loss or damage.

Economic Benefits

There will be reduced losses to property due to improved communications as to where men and equipment are needed. Additionally, there will be reduced costs of fire-fighter and police and other government staff time and energy to communicate essential information.

Health and Social Benefits

Improved emergency response time during an emergency or disaster can reduce the risk of injury or death.

Cost Benefit Analysis

This is a low cost project that could have life-saving ramifications and benefits during future storm events for the residents and emergency personnel on Fire Island that outweigh the costs. The project will benefit the entire Fire Island Community since the communication system could be deployed across all Fire Departments.

Risk Reduction Analysis

While this project does not specifically reduce the flood risk to any particular asset in Fire Island, it will help enable improved response time which could mitigate property loss or damage for many assets across Fire Island.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, this Project has potential for immediate implementation (0 to 12 months).

Regulatory Requirements

There are no anticipated regulatory requirements for this project.

Jurisdiction

This project falls under the jurisdiction of the Fire Island Fire Chief Council.

PROPOSED PROJECT: *Air Compressor*

Figure 18: Air Compressor[24]

Project Description

This project involves the purchase of an Eagle Air Compressor and fill station. The compressor is used to refill used breathing apparatus worn by Firefighters during all structural fires. Immediately following Superstorm Sandy, there was a large residential fire that required the use of the breathing apparatus worn by Fire Fighters, which then needed to be refilled with an air compressor.

Air Compressor – Kismet Fire Department

Recovery Support Function: Community Planning and Capacity Building, Health and Social Services

Cost: $42,500

Risk Reduction & Benefits:
Will address existing equipment deficiencies

Ensures the health and safety of emergency responders

Enhance capacity of Fire Departments to respond during an emergency event

Currently, there is only one air compressor on Fire Island in Ocean Beach, which is difficult to access, especially after a storm. There are no expected challenges for project implementation. The system would be specified by the Kismet Fire Department and purchased. The Kismet Fire Department would own the air compressor and develop a mutual benefit sharing agreement with the other Fire Departments on the island.

Estimated Project Costs

The purchase price including installation for the air compressor is estimated at $42,500. Operations and maintenance costs to the Community are anticipated to be minimal: $50 per year for annual

synthetic oil changes, for twenty years, for a total lifecycle cost of $43,500. Any additional incidental costs will be absorbed by the local Fire Departments.

Project Benefits

Risk Reduction & Resiliency

This specialized emergency response and disaster recovery equipment will address an existing equipment deficiency for the Fire Departments on the West End of Fire Island. This is a critical piece of equipment that ensures the health and safety of emergency responders, allowing these responders to deliver optimal emergency response services.

The Fire Departments played a key role in providing both storm preparation and recovery functions. During Superstorm Sandy, the Fire Departments, which comprise volunteer firefighters, put their lives at risk, working tirelessly despite hazardous environmental conditions and numerous public health threats. The Fire Departments are small in size but are required to cover a large geographic area that has limited transportation options around the island and to the mainland. By reducing risk to emergency responders, the Fire Departments would be able to more effectively respond to Community needs in a disaster situation and deliver services to residents during and after events.

Economic Benefits

There will be ongoing cost savings related to the avoided costs of refilling each bottle, as fire departments do today at a cost of $34.50/bottle. There will also be savings in employee travel time and expense currently incurred in travel off of Fire Island to refill the bottles.

Health and Social Service Benefits

The project would enhance the capacity of the Fire Departments to respond and serve affected areas during emergency events.

Cost Benefit Analysis

This is a low cost project that could provide resiliency as well as health and social service benefits across the West End portion of Fire Island, which accounts for the largest proportion of fire fighters on the island.

Risk Reduction Analysis

This specialized emergency response and disaster recovery equipment will help make the West End Fire Departments on Fire Island more resilient but will not directly reduce risk of flooding or damage to the Fire Departments. However, enhancing the capacity of the Fire Department to respond to affected areas during an emergency event could mitigate property loss or damage for many assets across Fire Island.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, this Project has potential for immediate implementation (0 to 12 months).

Regulatory Requirements

There are no anticipated regulatory requirements for implementation.

Jurisdiction

This project falls under the jurisdiction of the Kismet Fire Department.

PROPOSED PROJECT: Back-Up Power Generation for Critical Facilities

Sample generator

Project Description

The project would confirm which facilities need generator equipment, either as new installations or replacements. Generators would then be purchased and installed so as to be fixed in place. Due to its physical location relative to the mainland, Fire Island communities need reliable back-up power for critical facilities in the event of a power outage during an emergency. Critical facilities would include government buildings, fire stations, and drinking water and wastewater infrastructure. Specific locations of identified critical facilities in need of generators are shown in the graphic below. Additional locations may be determined.

Back-up Power Generation for Critical Facilities

Recovery Support Function:

Infrastructure, Health and Social Services

Cost: $610,000

Assets Made More Resilient:

Critical facilities in Kismet, Cherry Grove, Fair Harbor, and the Villages of Saltaire and Ocean Beach

Risk Reduction & Benefits:

Increase resiliency of key critical infrastructure by ensuring uninterrupted power

Provides dependable back-up power

The project is considered to be highly feasible since many locations requiring generators have already been identified and these can be purchased and installed in a very short period of time. It is anticipated that a few additional facilities will be identified.

Estimated Project Costs

The total estimated capital and soft costs for project implementation are $610,000, including $485,000 for equipment, $80,000 in soft costs, and $45,000 in contingency costs. The purchase price for each of six 60 KWH generators is estimated at $60,000. The purchase price

for the seventh, slightly larger generator for the Saltaire Village Hall and Fire House is $125,000. Operations and maintenance costs are anticipated to be $30,000 per year for twenty years, for a total lifecycle cost of $1,210,000.

Project Benefits

Risk Reduction and Resiliency

The project would increase the resiliency of critical facilities on Fire Island and allow them to operate at needed capacity if electricity fails during an emergency.

Economic Benefits

There will be avoided losses of property damage due to back-up generators being available to run pumps and keep governmental facilities operating. There will be avoided costs related to locating a portable generator, bringing it in, setting it up, and manning the generator.

Health and Social Benefits

Backup power is essential for the provision of key emergency response and health services, as well as the Island's critical infrastructure facilities. Service interruptions to these facilities can be catastrophic, particularly during emergency events, when these services are most needed. Given the relative isolation of Fire Island, it is critically important that the Island has dependable back up power.

Cost Benefit Analysis

Back-up power generation is absolutely critical during an emergency event to ensue uninterrupted service and response. The potential benefits of the purchase of back-up generators are believed to outweigh the costs of not having this essential power source in an emergency. The project provides public benefits for the entire region since critical facilities receiving back-up generators are located across the island.

Risk Reduction Analysis

The project would increase the resiliency of critical facilities on Fire Island and allow them to operate at needed capacity if electricity fails during an emergency. For each asset that gets a generator, the project is likely to reduce the vulnerability of these assets by lessening the risk of service interruption. For several critical assets, such as the Saltaire Volunteer Fire Company, the Saltaire Drinking Water Treatment and Well, and the Police Station and Village Office in Ocean Beach, the project is anticipated to reduce the pre-intervention risk level from severe to a post-intervention risk level of high. For the remaining facilities the project is anticipated to reduce the risk level from high to moderate.

General Timeframe for implementation

It is estimated that, from the time implementation begins, this Project has potential for immediate implementation (0 to 12 months).

Regulatory Requirements

There are no anticipated regulatory requirements for implementation.

Jurisdiction

This project would fall under multiple jurisdictions depending on the generator location, including the incorporated Villages of Ocean Beach and Saltaire, and the Towns of Brookhaven and Islip.

Figure 19: Back-up Power Generation Location Map

PROPOSED PROJECT: Engineering and design study for bayside shoreline management with regulatory coordination and pilot projects (Phase 1)

PROPOSED PROJECT: Bayside Shoreline Management Implementation (Phase 2)

FEATURED PROJECT: Bayside Shoreline Management Implementation (Phase 3)

Project Description

The first phase of the project would include an engineering and design study to assess the feasibility of natural infrastructure, as well as hard structure stabilization solutions. Depending on the costs of the proposed improvements and the available funding, the first phase would also include initiating several pilot installations designed to resolve different types of shoreline situations.

The second phase would include additional pilot installations designed to resolve additional types of shoreline situations and/or replication of pilot projects. These pilot installations would then be evaluated for effectiveness and replicated across the island in Phase 3.

One of the biggest concerns of the Committee is protection of the ocean side and bay side of the barrier island from storm surges and wave action. The Committee acknowledges the U.S. Army Corps of Engineers (USACE) Fire Island Inlet to Montauk Point (FIMP) project is the appropriate mechanism to provide oceanfront protection, but believes that the bay side would benefit from a similar protective strategy, particularly in consideration of rising sea level and more frequent and powerful storms.

Bayside Shoreline Management (Phases 1 & 2)

Recovery Support Function: Infrastructure Strategies

Cost: Phase I $1,500,000; Phase 2 $1,500,000, Phase 3 $24,000,000

Assets Made More Resilient:
Over 100 assets located in the extreme and high risk zones, including residences, commercial facilities, docks, and public buildings

Risk Reduction & Benefits:
Mitigate extreme bayside erosion

Prevent flooding related to high tide and storm events, saving millions of dollars in restoration

Restore natural shoreline where possible

Protect and enhance existing tidal wetlands

One shoreline improvement can have an erosion-inducing impact on adjacent properties and therefore projects need to be coordinated and the end conditions evaluated. Therefore the Committee proposes to develop and implement an island-wide approach to cohesive shoreline management. This project would require a coordinated effort among the various jurisdictional authorities on the island, including the Towns of Islip and Brookhaven, the Incorporated Villages of Ocean Beach and Saltaire, the NYS Department of Environmental Conservation (DEC), the NYS Department of State (DOS), the Fire Island National Seashore (FINS), and representatives of communities across Fire Island. Another desired outcome of the project would be expedited permitting of the pilot and replicated installations.

Bay front shoreline

Project Costs

The engineering and design study for bayside shoreline management with regulatory coordination and pilot projects (Phase 1) is estimated at $1,500,000 including $525,000 for the study phase and $975,000 for implementation of the pilot projects. This includes $600,000 for construction, $225,000 in soft costs including permitting, and $150,000 in contingency costs. Operations and maintenance costs are anticipated to be $25,000 per year for twenty years, for a total lifecycle cost of $2,000,000.

The Proposed implementation Project (Phase 2) is estimated at $1,500,000 including $925,000 for construction costs, $345,000 in soft costs including permitting, and $230,000 in contingency costs. Operations and maintenance costs are anticipated to be $40,000 per year for twenty years, for a total lifecycle cost of $2,300,000.

The Featured project component with replicate installations (Phase 3) is estimated to be a $24,000,000 project including $15,000,000 for construction costs, $5,500,000 in soft costs including permitting, and $3,500,000 in contingency costs. Operations and maintenance costs are anticipated to be $600,000 per year for twenty years, for a total lifecycle cost of $36,000,000.

Project Benefits

Risk Reduction & Resiliency

The proposed project along with the featured project will reduce future flooding and erosion risk for the 17 communities. This project will help mitigate the extreme erosion that has occurred on the bayside of Fire Island, which was worsened by Superstorm Sandy. This project will also help reduce flooding that occurs at high tide that is likely to increase as sea level rises. Generally, the overall exposure of the hundreds of affected assets is expected to be reduced through the construction of shore defenses that are anticipated to withstand future storms and sea level rise conditions. Additionally, for most assets, the project was anticipated to reduce overall vulnerability of the assets, further reducing the overall risk score. The amount of risk reduction will be directly related to the height of the protection put into place.

Economic Benefits

The study phase will create approximately 2 full time equivalent (FTE) jobs[25]. If labor accounts for 50% of the construction costs in Phase 1 and Phase 2, approximately 12 full time equivalent jobs would be created in Phase 1, approximately 19 full time equivalent jobs would be created in Phase 2, and approximately 300 full time equivalent jobs would be created during Phase 3[20]. The prevention of flooding damage would alleviate the need to spend millions of dollars on restoration.

Environmental Benefits

The engineering and design study will look at a variety of coastline management measures. These may include natural shoreline management techniques, such as adding native coastal wetland plantings which are resistant to salt spray and inundation. Where feasible, restoration of the natural shoreline profile could help reduce erosion, protect and enhance existing tidal wetlands and allow for the creation of new wetland habitats. Tidal wetlands, are critically important to the ecological health of Fire Island as well as the South Shore Estuary Reserve; supporting avian and aquatic wildlife that draws tourists from across the region.

Health and Social Benefits

The proposed bayside management project could greatly reduce flooding for many communities on Fire Island. Flood events are particularly dangerous for the vulnerable populations on the Island – as mobility and access to services can be severely limited.

Cost-Benefit Analysis

The project provides public and private benefits for the entire island. Although the cost of the project is relatively high, the avoidance of damage caused by flooding during high tide and extreme storm events and those associated costs are considered to outweigh the capital investment of the project.

Risk Reduction Analysis

The amount of risk reduction will be directly related to the height of the protection put into place. For the purposes of this analysis, a protective height to an elevation of four feet above sea level was analyzed. Approximately one hundred identified assets between the bay and higher ground are currently at or below four feet in elevation. As groups of assets such as homes in the high-risk area are grouped as a single asset, there are many more than 100 individual structures, facilities, or resources which would be affected. If the effective height of protection is lower, risk will be reduced for fewer assets; if the effective height is higher, risk will be reduced for a greater number of assets. In any event, if the level of sea level rise or surge for a specific event is higher than the effective height of the shore defenses, this would reduce effectiveness.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, this proposed project including the initial design phase has potential for immediate implementation (0 to 12 months). However, implementation of the pilot projects, evaluation, and replicated installations would stretch into the mid- and long-term (12 to 36+ months).

Regulatory Requirements

Initial discussion with FINS, USACE, USFWS (U.S. Fish and Wildlife Service), NYS DEC, NYS DOS, both Towns, and both Villages indicate a willingness to work together on this project. However, permits and approvals would be required by all of the identified agencies and municipalities before pilot installations could begin.

Jurisdiction

This project would fall under multiple jurisdictions as previously indicated but would include the incorporated Village of Ocean Beach and Saltaire, the Towns of Islip and Brookhaven, NYSDEC, NYSDOS, USACE and FINS.

View of a dock and boats

PROPOSED PROJECT: *Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 1 – Design/Phase 2 – Construction)*

FEATURED PROJECT: *Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 3 – Construction)*

***Boardwalk damage*[15]**

Project Description

This project provides for the repair of freight and passenger docks located on the bay side of Fire Island. The dock repairs will enhance emergency access via boat, thereby increasing the accessibility of residents and visitors to needed resources. Fire Island docks serve as critical transportation hubs for both people and materials.

Make Docks More Resilient (Phases 1 & 2)

Recovery Support Function: Infrastructure Strategies

Cost: Phase 1 $750,000; Phase 2 $1,500,000;
Phase 3 $8,500,000

Assets Made More Resilient:
Davis Park, Cherry Grove, Fire Island Pines, Ocean Beach, and Atlantique docks

Risk Reduction & Benefits:
More reliable access to resources and shorter emergency response times

Enhanced evacuation opportunities

The docks are used for evacuation prior to storms, to bring over fire fighters from the mainland when needed to support fire fighters on Fire Island, to remove debris after storms, to remove solid waste to the mainland, and to bring over construction materials. Since there is very limited vehicular access between Fire Island and the mainland, these docks are essential to Fire Island. The docks on Fire Island were substantially damaged by Superstorm Sandy.

The locations and ownership of the docks which are proposed to be repaired are shown in the graphic (Figure 20 on page 125).

The dock repairs will facilitate the marine transfer of equipment, materials and solid waste, which otherwise would have to be transported overland on the emergency access route, which is not designed to handle heavy traffic. The overall project is larger than the allocation from the NYRCR Program so has been split between design phase of engineering drawings and specifications (proposed project) and construction (featured project). These are all existing docks so there should not be any issues in repairs and making them more resilient.

Estimated Project Costs

The Proposed Project of the engineering and design study (Phase 1) for making docks more resilient, including freight dock repairs and improvements, is estimated at $750,000.

The Proposed Project of the initial construction phase (Phase 2) is estimated at $1,500,000, including $1,000,000 for construction costs, $250,000 in soft costs including permitting, and $250,000 in contingency costs. As these are existing docks there would be no increase in operation and maintenance costs.

The Featured Project of the second phase of construction (Phase 3) is estimated at $8,500,000 to complete the work including $5,600,000 for construction costs, $1,500,000 in soft costs including permitting, and $1,400,000 in contingency costs. As these are existing docks there would be no increase in operation and maintenance costs.

Project Benefits

Risk Reduction & Resiliency

The Community would benefit greatly from more reliable access to resources and shorter emergency response times. The freight portions of the docks can also replace some of the daily vehicular transfer of equipment, materials, and solid waste with marine transfer, thus reducing road traffic. The passenger portion of the docks will aid in evacuation when needed, thus reducing risk to residents and visitors.

Economic Benefits

The study phase will create approximately 2.4 full time equivalent jobs[25]. If labor accounts for 50% of the construction costs[20], approximately 19 full time equivalent jobs would be created during Phase 2, and approximately 106 full time equivalent jobs would be created during Phase 3. The prevention of storm damage to more resilient docks would alleviate the need to spend millions of dollars on restoration.

Health and Social Benefits

The docks that serve the various communities of Fire Island are essential to the health and safety of all Island residents. With very limited vehicular access on Fire Island, the docks are vital for the evacuation of residents, transportation of emergency responders and to deliver essential services and supplies.

Cost Benefit Analysis

Passenger and freight docks represent critical transportation assets across the entirety of Fire Island. They support multiple functions including regular ferry service, evacuation routes, movement of supplies and goods, and emergency response hubs. The cost of the project is outweighed by the multiple co-benefits that these docks provide for all the communities on Fire Island.

Risk Reduction Analysis

The Community would benefit greatly from more reliable access to resources and shorter emergency response times. The freight portions of the docks can also replace some of the daily vehicular transfer of equipment, materials, and solid waste with marine transfer, thus reducing traffic and wear and tear on the emergency access route. The passenger portion of the docks will aid in evacuation when needed, thus reducing risk to residents and visitors.

This project is anticipated to reduce the risk for the five identified ferry docks. The project will provide sufficient shore defenses to withstand storm surge and sea level rise, thereby reducing the exposure of the assets to future flooding. Additionally, the dock repairs and improvements are expected to minimize the length of time the docks would be out of service following future storm events.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, the Proposed project (design phase component) has potential for immediate implementation (0 to 12 months) while the Featured project component would likely be a long-term (36+ months) implementation.

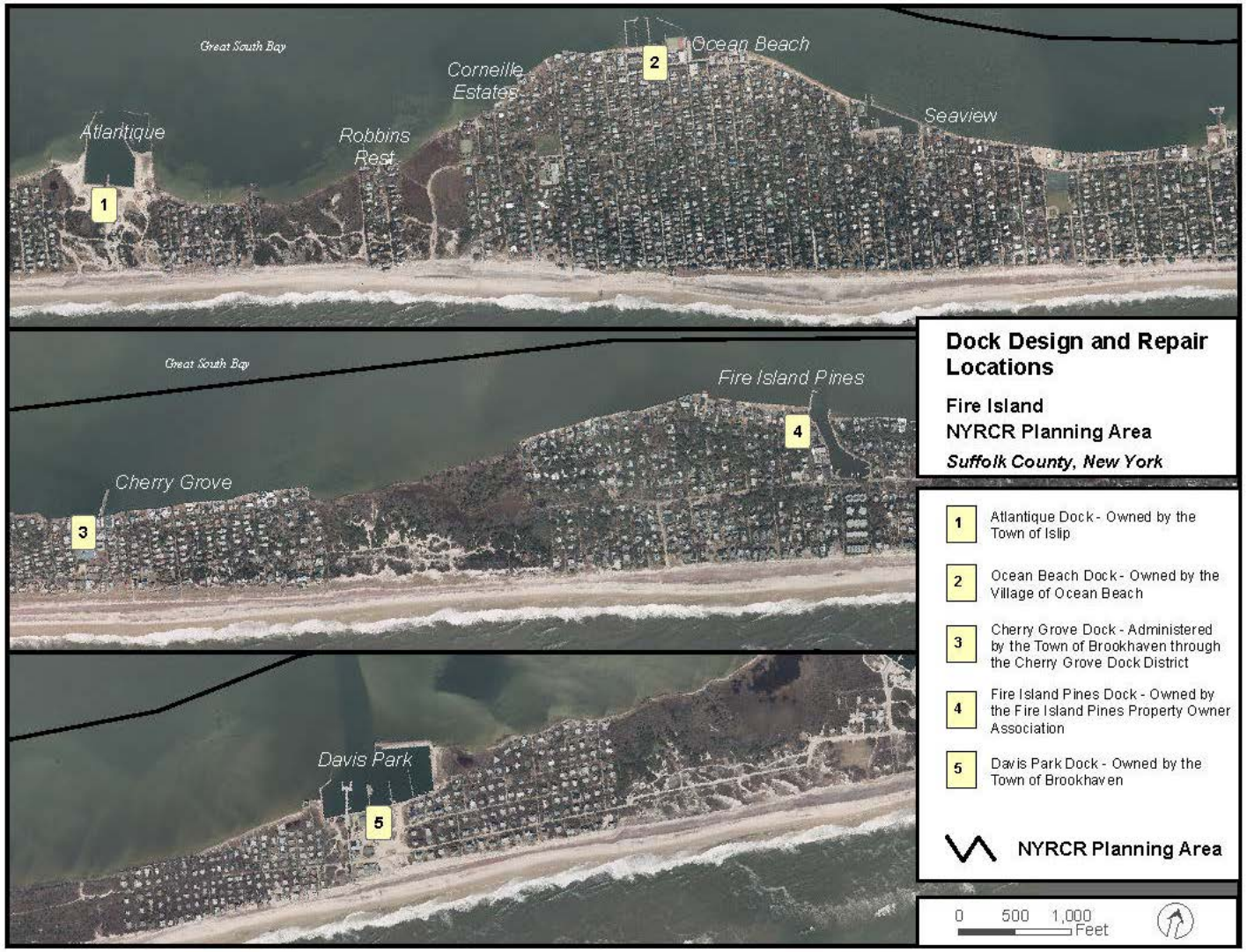
Regulatory Requirements

Since the initial phase of the project involves engineering design drawings and specifications for the identified docks, there are no anticipated regulatory approvals required. However, collaboration and communication with the NYS DEC, NYS DOS, the Towns of Islip and Brookhaven, the Villages of Saltaire and Ocean Beach and Federal agencies will be a crucial part of the first phase, so that all of the necessary approvals and appropriate permits will be able to be secured from these entities for the construction phase.

Jurisdiction

This project will fall under multiple jurisdictions including the Villages of Saltaire and Ocean Beach, the Town of Islip and the Town of Brookhaven.

Figure 20: Dock Design and Dock Repair Locations



PROPOSED PROJECT: *Enhance Revive FI Campaign*

Figure 21: Revive FI Logo

Project Description

This project would provide additional support to Revive FI to increase the number of communication outlets reached with the advertising campaign. The Revive FI campaign is an effort by commercial interests in Fire Island to market the available recreational and economic opportunities of the entire Island and ensure that the public in the New York tri-State area are aware that Fire Island is well on the way to recovery from Superstorm Sandy and is open for business. Revive FI has already raised funds through private donations to develop an advertising campaign. Since the campaign has already been designed, the allocation would be used to pay for on-air time on radio and TV, and for placement in print media, billboard type display, and vehicle wraps.

Estimated Project Costs

The Committee has agreed to provide $150,000 to support the continued advertising efforts of the Revive FI campaign.

Enhance Revive FI Campaign

Recovery Support Function: Economic Development

Cost: $150,000

Risk Reduction & Benefits:
Enhance economic activity through promotion of tourism

Ensure sustainable local economy and strong tax base

Project Benefits

Economic Benefits

The businesses on Fire Island rely heavily upon tourism with visitors coming from all parts of the tri-state area. An enhanced Revive FI campaign will help stimulate tourism and its associated jobs, which is one of the primary goals of the Long Island Regional Economic Development Council, whose Strategic Economic Development Plan August 2012 Progress Report update's "Vital Projects," Vision, and Economic Strategies include the following: Produce a new generation of sustainable, well-paying jobs in the legacy sectors of agriculture, aquaculture, fisheries and tourism by expanding export opportunities, infrastructure, recreation facilities, research partnerships and workforce training.

As tourism will be enhanced there will be an anticipated increase in economic activity on Fire Island. Tourists will patronize the

restaurants, bars, store and hotels, rent houses for the season, rent boat slips, and buy ferry tickets or fuel for personal boats. While the economic benefit cannot be quantified, it is reasonable to assume that an increase in tourism and spending would result from a successful advertising campaign. The campaign will bring revenue to the local economy and tax revenue to the municipalities on Fire Island. Tourists will be more likely to visit Fire Island if they are aware of the business and facilities that are open.

Cost Benefit Analysis

This is a low cost project that could provide public benefits for all of Fire Island as well as the greater tri-state region. Not only would business owners benefit from increased tourism, but homeowners would be able to rent their homes throughout the peak season and would feel tangible economic benefits from more people visiting the island.

Risk Reduction Analysis

The project is not anticipated to reduce flood risk to any assets on Fire Island but will increase the resiliency of commercial assets by supporting a strong and continued tourism industry. Since tourism is the primary economic driver on Fire Island, this project is anticipated to increase the economic resiliency of businesses on Fire Island, enabling them to recover economically in a timelier manner following a natural disaster.

General Timeframe for Implementation

It is estimated that, from the time implementation begins, this proposed project has potential for immediate implementation (0 to 12 months).

Regulatory Requirements

There are no anticipated regulatory requirements to implement this project.

Jurisdiction

This project will fall under multiple jurisdictions including the Villages of Saltaire and Ocean Beach, the Town of Islip and the Town of Brookhaven.

View of a marina

Section 5: Additional Materials

Ferry dock in Ocean Beach

A. ADDITIONAL RESILIENCY RECOMMENDATIONS

Table 28: Additional Resiliency Recommendations				
Strategy	**Project Name**	**Short Description**	**Estimated Cost**	**Regional (Y/N)**
Develop a committee to create and distribute educational booklets and resources and provide better information to the public prior to emergencies about the risk and evacuation information.	Education Campaign	Develop and disseminate: (1) A Homeowner and Renter Handbook addressing "what does it mean to be living on a barrier island (stewardship) and what are your responsibilities?" and (2) public outreach campaign and/or booklet with online version for visitors about sustainable ways to visit and enjoy the region (beach-goer etiquette)	$100,000	Y
Ensure Fire Department personnel have proper access, rescue and fire suppression equipment for rescue operations and addressing other hazards (hazardous materials, restricted access, etc.).	Emergency Storage Trailer & Supplies	This project would fund the purchase of an emergency medical supply storage trailer with lighting and back-up power for the eastern communities that would have supplies available for whichever emergency responder needed it.	$100,000	N
	EMS - Cherry Grove	This project would provide the initial start-up funds to establish an EMS service for Cherry Grove, which currently does not have an existing EMS.	$60,000	N
	Mini-Pumper	Purchase a mini-pump for the Village of Saltaire.	$175,000	N
	Fire Truck - Cherry Grove	Purchase a new fire truck for the Cherry Grove firehouse.	$150,000	N
	Davis Park Fire Department	Winterize firehouse to be better prepared for next emergency.	$50,000	N
Identify bayside assets and redundancy for resource and emergency access	Dock Restoration/ Improvements - Dunewood	Reconstruction of L dock and Community owned bulk heading to improve resilience in the face of rising sea level and increased storm risk	$2,000,000	N

Table 28: Additional Resiliency Recommendations - continued				
Strategy	**Project Name**	**Short Description**	**Estimated Cost**	**Regional (Y/N)**
Evaluate and enhance existing public water supply infrastructure	Water Main between Fire Island Pines and Water Island	Construct a water main between Fire Island Pines and Water Island. This would create redundancy in the system to enhance fire protection.	$1,617,000	Y
	Davis Park to Water Island Water Main	Construct a water main between Water Island and Davis Park. A connection between these two eastern communities would also make water available to Blue Point Beach (a Community that currently has no public water supply) as well as to the FINS facilities at Talisman and Watch Hill.	$515,000	Y
	Water Main Extension - Water Island	Construct a water main extension in Water Island.	$1,100,000	Y
	Installation of Hydro-pneumatic Water Tank and Building - Village of Saltaire	Install Hydro-pneumatic water tank and building at Well #2 to serve as backup to Well #1.	$1,200,000	N
	Relocation of Beacon Walk Maintenance Building - Village of Saltaire	Relocate (reconstruct) key maintenance building at Beacon Walk Facilities further away from ocean at higher elevation to assure that the buildings and the vital equipment that they house can withstand storm water damage.	$2,400,000	N
	Upgrade Lighthouse Promenade Water Main - Village of Saltaire	Upgrade Lighthouse Promenade Water Main to 12 inch diameter and all other water mains to a minimum of 6 inch size diameter, to provide adequate water flow during post storm fire events.	$1,600,000	N
	Reconstruct Clam Pond Peninsula - Village of Saltaire	Reconstruct Clam Pond Cove	$2,650,000	N

Table 28: Additional Resiliency Recommendations - continued				
Strategy	**Project Name**	**Short Description**	**Estimated Cost**	**Regional (Y/N)**
Repair existing drainage systems.	Ocean Bay Park Drainage Repairs	This would be a mitigation project that impacts the entire Community since flooding occurs on a regular basis, particularly during high tides. The drainage system needs an extension on Midway and Seneca to the main drain on Bayview. The main system on Bayview needs the drain on Ontario and Bayview to be repaired and relocated to mitigate the flooding from the open lot on the bayside. The system also should be extended to Bayview and Superior which also has a flooding issue since the area is lower than the main walk.	$500,000	N
Develop a comprehensive island-wide shoreline management strategy that includes natural restoration and engineered stabilization techniques	Seaview Bayside Bulkhead Raising	There are 6 contiguous properties along Bay Walk in Seaview, between the Ocean Beach border and Duneway Street in Seaview, which have bulkheads that should be raised at least two feet in order to prevent the disastrous flooding of the Community's bayside during Sandy.	$500,000	N
	Bayside Improvements	Reconstruction of L dock and community-owned bulk heading to improve resilience in Dunewood	$1,000,000	N
Restore recreational facilities.	Repair Village of Ocean Beach Camp - Windswept	This building serves the Ocean Beach Youth Group ages 5 to 16 years. The building was severely damaged and unusable this past summer. The project would elevate and repair the building to ensure continued operation.	$850,000	N
	Repair Cherry Grove Community House	The Cherry Grove (CG) Community House is a multi-purpose facility that serves as a town hall, Community center, art gallery and theater all rolled into one. The building needs to be elevated and repairs made from Sandy-related damage.	$565,000	N
	Fire Hall Repairs - Ocean Beach	Repair Ocean Beach Fire Hall as needed.	$200,000	N
	Atlantique Beach and Marina	Improvements at Atlantique Beach & Marina – Ferry Dock and bulkhead improvement	$4,000,000	N

Table 28: Additional Resiliency Recommendations - continued				
Strategy	**Project Name**	**Short Description**	**Estimated Cost**	**Regional (Y/N)**
Restore recreational facilities.	Fair Harbor Bay Beach Dredging Project	Dredge Fair Harbor Bay	$125,000	N
	Davis Park Playground	Repair and restore damage to playground caused by Sandy.	$81,000	N
Provide safe walkways	Central Walk Improvements	Central Walk Improvements	$1,000,000	N
	Walkway Repairs - Corneille Estates	Repair damaged walkways in Corneille Estates as needed to ensure safe access for residents and emergency vehicles.	$300,000	N
	Dune Crossings	Replace damaged dune crossings	$300,000	N
	Dune Crossings – Dunewood	Reconstruct to FEMA standards	$50,000	N
	Lighting on Trustee Walk - Davis Park	Install pedestrian scale lighting on Trustee Walk to improve safety.	$130,000	N
	Boardwalk repairs - Davis Park	Davis Park boardwalk repairs	$2,800,000	N
	Brush Clearing - Davis Park	Davis Park brush clearing	$11,000	N
Reinforce and maintain oceanfront dune system.	Dune Plantings	Plantings on dunes to reinforce and mitigate erosion.	$100,000	N
	Dune Planting - Davis Park	Plantings on dunes to reinforce and mitigate erosion.	$33,000	N

B. MASTER TABLE OF PROJECTS

Table 29: Master Project Table

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Create a mechanism for enhanced communication, collaboration and regional planning among the many Fire Island interests and the Long Island mainland	Fire Island Planning Forum	Convenes a planning forum that meets regularly to discuss issues and policies along with government and Community representatives.	Proposed	$50,000	Y
Preserve local home values by minimizing risk of storm damage and flood insurance rates	Employ LDRM	Hire one or more LDRMs with experience in funding for public and private mitigation projects, grant writing, and Federal/State grants management.	Proposed	$300,000	Y
Enable municipalities to track structures, damage to structures, permits, etc.	Implement an Enhanced GIS Emergency Management System	The procurement and installation of an enhanced Geographic Information System (GIS)-enabled program for the Town of Islip and Town of Brookhaven to improve emergency planning, response and recovery from severe storm events. Program would enable real-time transmission of risk and safety information for rapid deployment of resources.	Proposed	$50,000	Y
Enhance communications to improve the ability to communicate vital information not only on the beach but to the off-island agencies that may be assisting	Emergency Communication Systems	Purchase the Ground Control TOUGHSAT system, which allows users to set up a wireless hotspot in order to use phones, tablets, or laptops during an emergency when electric and communication lines have been compromised. Replace primary and second repeaters; install equipment for expanded communications and alarm and trouble indications for the system.	Proposed	$200,000	Y

Table 29: Master Project Table - continued

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Support businesses before and after an event	Enhance Revive FI Campaign	This project would provide additional support to Revive FI, an effort by commercial interests in Fire Island to market the available recreational and economic opportunities of the entire Island, for them to increase the number of communication outlets reached with the advertising campaign.	Proposed	$150,000	Y
Ensure Fire Department personnel have proper access, rescue and fire suppression equipment for rescue operations and addressing other hazards (hazardous materials, restricted access, etc.).	Air Compressor – Kismet Fire Department	Purchase an Eagle Air Compressor and fill station. The compressor is used to refill used breathing apparatus worn by Firefighters during all structural fires. The equipment would be beneficial to all West End Departments.	Proposed	$42,500	Y
	Back-up Power Generation for Critical Facilities	The first step would be to evaluate which facilities need generator equipment, either as new installations or replacements. Generators would then be purchased and installed.	Proposed	$610,000	Y
Keep emergency access route passable for emergency vehicles	Emergency Access Route	Stabilize the emergency access route so that resources can be delivered and the route is available for emergency vehicles with improved response times.	Proposed	$600,000	Y
Develop a comprehensive island-wide shoreline management strategy that includes natural restoration and engineered stabilization techniques	Engineering and design study for bayside shoreline management with regulatory coordination and pilot projects (Phase 1)	This project would include an engineering and design study to assess the feasibility of different natural infrastructure, as well as hard structure stabilization solutions for the unique conditions along the bayside shoreline of Fire Island's communities. The project would include several pilot projects that would address different types of shoreline deficiencies.	Proposed	$1,500,000	Y
	Bayside Shoreline Management Implementation (Phase 2)	Additional pilot projects would be constructed and/or pilot projects from Phase 1 would be evaluated for effectiveness and then replicated across the island where similar conditions exist.	Proposed	$1,500,000	Y

Table 29: Master Project Table - continued

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Identify bayside assets and redundancy for resource and emergency access	Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 1 – Design)	This project would allow for the repair of freight and passenger docks to enhance emergency access via boat and increase the accessibility of residents and visitors to needed resources. The design phase would involve engineering design drawings and specifications for the docks at Davis Park, Cherry Grove, Fire Island Pines, and Ocean Beach.	Proposed	$750,000	Y
	Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 2 – Construction)	This project would allow for the repair of freight and passenger docks to enhance emergency access via boat and increase the accessibility of residents and visitors to needed resources. The second phase would be for the construction of dock repairs and improvements at Davis Park, Cherry Grove, Fire Island Pines, Ocean Beach, and Atlantique.	Proposed	$1,500,000	Y
Identify bayside assets and redundancy for resource and emergency access	Make Docks More Resilient - Freight and passenger dock repairs and improvements (Phase 3 – Construction)	This project would allow for the repair of freight and passenger docks to enhance emergency access via boat and increase the accessibility of residents and visitors to needed resources. The second phase would be for the construction of dock repairs and improvements at Davis Park, Cherry Grove, Fire Island Pines, Ocean Beach, and Atlantique.	Featured	$8,500,000	Y
Develop a comprehensive island-wide shoreline management strategy that includes natural restoration and engineered stabilization techniques	Bayside Shoreline Management Implementation (Phase 3)	Pilot projects from Phases 1 and 2 would be evaluated for effectiveness and then replicated across the island where similar conditions exist.	Featured	$24,000,000	Y

Table 29: Master Project Table - continued

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Ensure Fire Department personnel have proper access, rescue and fire suppression equipment for rescue operations and addressing other hazards (hazardous materials, restricted access, etc.).	Emergency Storage Trailer & Supplies	This project would fund the purchase of an emergency medical supply storage trailer with lighting and back-up power for the eastern communities that would have supplies available for whichever emergency responder needed it.	Additional	$100,000	N
	EMS - Cherry Grove	This project would provide the initial start-up funds to establish an EMS service for Cherry Grove, which currently does not have an existing EMS.	Additional	$60,000	N
	Mini-Pumper	Purchase a mini-pumper for the Village of Saltaire.	Additional	$175,000	N
	Fire Truck - Cherry Grove	Purchase a new fire truck for the Cherry Grove fire house.	Additional	$150,000	N
	Davis Park Fire Department	Winterize firehouse to be better prepared for next emergency.	Additional	$50,000	N
Develop a committee to create and distribute educational booklets and resources and provide better information to the public prior to emergencies about the risk and evacuation information.	Education Campaign	Develop and disseminate: (1) A Homeowner and Renter Handbook addressing “what does it mean to be living on a barrier island (stewardship) and what are your responsibilities?” and (2) public outreach campaign and/or booklet with online version for visitors about sustainable ways to visit and enjoy the region (beach-goer etiquette)	Additional	$100,000	Y

Table 29: Master Project Table - continued

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Evaluate and enhance existing public water supply infrastructure	Water Main between Fire Island Pines and Water Island	Construct a water main between Fire Island Pines and Water Island. This would create redundancy in the system to enhance fire protection.	Additional	$1,617,000	Y
	Davis Park to Water Island Water Main	Construct a water main between Water Island and Davis Park. A connection between these two eastern communities would also make water available to Blue Point Beach (a Community that currently has no public water supply) as well as to the FINS facilities at Talisman and Watch Hill.	Additional	$1,100,000	Y
	Water Main Extension - Water Island	Contract a water main extension in Water Island.	Additional	$515,000	Y
	Installation of Hydro-pneumatic Water Tank and Building - Village of Saltaire	Install Hydro-pneumatic water tank and building at Well #2 location to serve as backup to Well #1 location.	Additional	$1,200,000	N
Evaluate and enhance existing public water supply infrastructure	Relocation of Beacon Walk Maintenance Building - Village of Saltaire	Relocate (reconstruct) key maintenance building at Beacon Walk Facilities further away from ocean at higher elevation to assure that the buildings and the vital equipment that they house can withstand storm water damage.	Additional	$2,400,000	N
	Upgrade Lighthouse Promenade Water Main - Village of Saltaire	Upgrade Lighthouse Promenade Water Main to 12-inch diameter and all other water mains to a minimum of 6 -inch diameter, to provide adequate water flow during post storm fire events.	Additional	$1,600,000	N
	Reconstruct Clam Pond Peninsula - Village of Saltaire	Reconstruct Clam Pond Cove	Additional	$2,650,000	N

Table 29: Master Project Table - continued

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Repair existing drainage systems.	Ocean Bay Park Drainage Repairs	This would be a mitigation project that impacts the entire Community since flooding occurs on a regular basis, particularly during high tides. The drainage system needs an extension on Midway and Seneca to the main drain on Bayview. The main system on Bayview needs the drain on Ontario and Bayview to be repaired and relocated to mitigate the flooding from the open lot on the bayside. The system also should be extended to Bayview and Superior which also has a flooding issue since the area is lower than the main walk.	Additional	$500,000	N
Develop a comprehensive island-wide shoreline management strategy that includes natural restoration and engineered stabilization techniques	Seaview Bayside Bulkhead Raising	There are 6 contiguous properties along Bay Walk in Seaview, between the Ocean Beach border and Duneway Street in Seaview, which have bulkheads that should be raised at least two feet in order to prevent the disastrous flooding of the Community's bayside during Sandy.	Additional	$500,000	N
	Bayside Improvements	Reconstruction of L dock and Community owned bulk heading to improve resilience - Dunewood	Additional	$1,000,000	N
Restore recreational facilities.	Repair Village of Ocean Beach Camp - Windswept	This building serves the Ocean Beach Youth Group ages 5 to 16 years. The building was severely damaged and unusable this past summer. The project would elevate and repair the building to ensure continued operation.	Additional	$850,000	N
	Repair Cherry Grove Community House	The Cherry Grove (CG) Community House is a multi-purpose facility that serves as a town hall, Community center, art gallery and theater all rolled into one. The building needs to be elevated and repairs made from Sandy-related damage.	Additional	$565,000	N

Table 29: Master Project Table - continued					
Strategy	**Project Name**	**Short Description**	**Project Category**	**Estimated Cost**	**Regional (Y/N)**
Restore recreational facilities. *continued*	Fire Hall Repairs - Ocean Beach	Repair Ocean Beach Fire Hall as needed.	Additional	$200,000	N
	Atlantique Beach and Marina	Improvements at Atlantique Beach & Marina – Ferry Dock and bulkhead improvement	Additional	$4,000,000	N
	Walkway Repairs - Corneille Estates	Repair damaged walkways in Corneille Estates as needed to ensure safe access for residents and emergency vehicles.	Additional	$300,000	N
	Fair Harbor Bay Beach Dredging Project	Dredge Fair Harbor Bay	Additional	$125,000	N
	Davis Park Playground	Repair and restore damage to playground caused by Sandy.	Additional	$81,000	N
Provide safe walkways	Central Walk Improvements – Fair Harbor	Central Walk Improvements	Additional	$1,000,000	N
	Dune Crossings - Islip	Replace damaged dune crossings	Additional	$300,000	N
	Dune Crossings – Dunewood	Reconstruct to FEMA standards	Additional	$50,000	N
	Lighting on Trustee Walk - Davis Park	Install pedestrian scale lighting on Trustee Walk to improve safety.	Additional	$130,000	N
	Boardwalk repairs - Davis Park	Davis Park boardwalk repairs.	Additional	$2,800,000	N
	Brush Clearing - Davis Park	Davis Park brush clearing.	Additional	$11,000	N
Reinforce and maintain oceanfront dune system	Dune Plantings – Islip	Plantings on dunes to stabilize and mitigate erosion.	Additional	$100,000	N
	Dune Planting - Davis Park	Plantings on dunes to stabilize and mitigate erosion.	Additional	$33,000	N

C. PUBLIC ENGAGEMENT PROCESS

Governor Cuomo has been a strong proponent of bottom-up, Community-driven planning; in other words, the real "experts" are the residents of the communities that have been confronted first-hand by these natural disasters. A critical component, therefore, of the NYRCR Program is the exchange of information between the NYRCR Consultant Team, the Committee, and the public to identify appropriate projects, strategies, and solutions that are likely to carry Community support. The public in this case is defined as area residents, employees, civic groups, neighborhood and homeowner associations, environmental and other interest groups, business interests, governmental agencies, educational, medical, religious, and other institutions, the media, elected/ appointed officials, as well as other stakeholders who express interest in the process.

The Public Engagement Strategy:

- Established the means to engage and facilitate information-sharing with the public throughout the development of the NYRCR Plan;
- Educated the public and elicited public comments and suggestions regarding all aspects of the Plan within the NYRCR Communities;
- Employed outreach techniques that allowed for collection and coordination of public communication and comments; and
- Reached out to groups that might normally be under-represented in a planning study, such as minorities, non-English speaking residents, low-income residents, seniors, youth, and the disabled.

Outreach Techniques for Disseminating and Receiving Information

The Committee utilized a number of dissemination techniques to achieve a thorough, responsive, open, and transparent communication process.

Committee Meetings

All Committee Meetings were open to the public, with meeting dates and times posted on the NYRCR website (http://www.stormrecovery.ny.gov/nyrcr). For each Committee Meeting, notifications were sent and meeting materials were prepared. They included agendas, sign-in sheets, minutes, comment logs, PowerPoint presentations, graphics/boards, and handouts. The Public was invited to comment on the work of the Committee by filling out a comment form available at each Committee Meeting. The Committee held five meetings.

Public Engagement

While the Committee represents the interests of many, it was important to provide opportunities for the public to participate in the development of the Plan. While the primary vehicle was public engagement events, additional outreach opportunities for comment were provided at different venues online and through the NYRCR website.

Public Engagement Events

Each public engagement event included a presentation of work done to date and an opportunity for attendees to provide feedback. The NYRCR Consultant Team provided the following for each event: public notice (including press releases, announcements, individual mailings, and other appropriate means), outreach to underserved communities and displaced stakeholders, information gathering from those attending, and the collection and inclusion of feedback into the ongoing planning process. A summary of each public outreach session is available in hard copy and electronically. Public engagement events were scheduled to coincide with major milestones. A good public involvement process educates, or brings people along, during the development of the Plan, so when it is time to implement the Plan, the public and the elected decision-makers have had an opportunity to participate in the decision-making process. Members of the public who were informed and engaged in the process were more likely to support a recommended course of action. Event materials were available in English and if requested, in Spanish.

Presentation materials were developed for each event that illustrated the key points of the information presented using plain language, graphics, simulations, etc. These were available following the event on the NYRCR website for download. An annotated summary of events was prepared and available for public distribution.

Community member reviewing plans at public engagement event

The process included a series of four public engagement events:

1. To define the Community Vision and solicit initial input on the asset inventory and assessment of risk to Community assets;
2. To solicit input from the public concerning the content of the Conceptual Plan;
3. To confirm projects and implementation frameworks; and
4. To present the investment and action strategies and the Final Plan.

Outreach for public engagement events included: posting on the State NYRCR webpage and other electronic media; ads in weekly print media when time and budget allows; flyers and posters at strategic locations throughout the Community including libraries, Community centers, and other centers of activity; e-mails and/or texts to lists available from chambers, civics, school districts, churches, synagogues, American Legion, VFW, AARP, Hibernians and other Community leaders. Outreach also included requests to Community organizations to post information on their websites. Phone calls were made to: elected officials and other key players in the local residential and business community and calls to each Committee member to assist them with their outreach effort (e.g., calls/e-mails to their contacts and announcements at their events).

Each event was formatted as an open house that the public could attend during any part of the allotted two to three hours. Stations were positioned around the room for the various topics. Committee members, municipal representatives, State planners and the NYRCR Consultant Team were present at each station to provide opportunity for the Community to exchange ideas in a comfortable setting. This structure provided an opportunity for each attendee to work within their own schedule and comment on all or some of the specific aspects of the process in a meaningful way.

As the project progressed, the public was presented with maps, a geographic scope, Community assets, risk to assets, and a vision statement, needs and opportunities, strategies and projects that had been vetted and/or created by the Committee. The desired outcome of each public engagement event was to obtain the public's reactions and feedback to the Committee's work in order to incorporate their input.

At the first meeting the public viewed information on the process, commented on the Vision, contributed to the Word Cloud, identified Community assets, and indicated their highest needs and opportunities. At the second meeting the public viewed the Conceptual plans, reviewed strategies and potential projects, and indicated the assets which had highest Community value. At the third meeting the public viewed the risk assessment maps and indicated their level of support for the proposed projects. The third event was held in New York City to capture seasonal Fire Islanders.

The following summarizes the total participation for each of the public, in-person events:

- Event #1, Saturday, December 7, 2013 – 74 participants;
- Event #2, Saturday, January 25, 2014 – 38 participants;
- Event #3, Tuesday, February 25, 2014 – 86 participants; and
- Event #4, to be held in Spring 2014.

Comments were compiled by the NYRCR Consultant Team and provided to the Committee in a clear and comprehensive manner at follow-up Committee meetings. The Committee reviewed the public's feedback and incorporated it into the NYRCR Plan. The fourth public engagement event is planned for after the release of this NYRCR Plan.

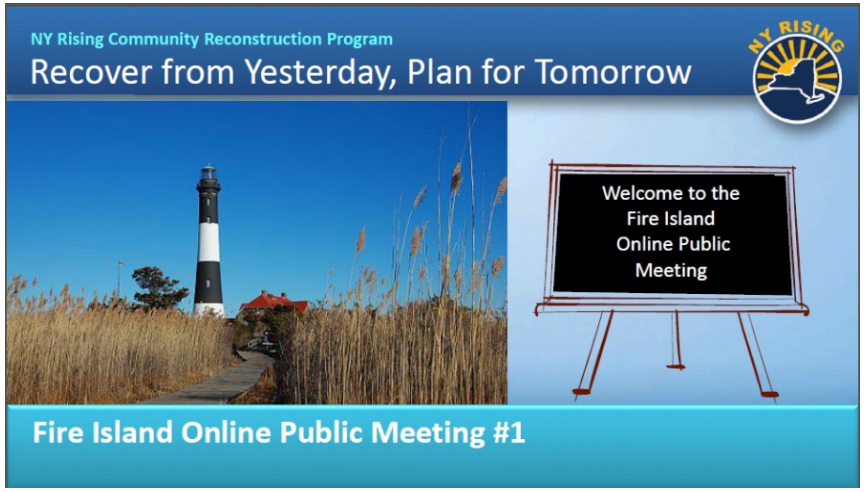
Online Meetings

The Fire Island Community is unique in that many of the residents and employees and virtually all of the visitors are not on Fire Island in the winter and are dispersed throughout the metropolitan region. Therefore in order to reach as broad a segment of the Fire Island Community as possible, online Public Meetings were in conjunction with the initial three public engagement events to allow anyone to provide feedback on the process through the internet. The overall format for the online events provided a digital open house which could be attended at any time 24 hours a day, seven days a week for a ten-day timeframe.

The Online Public Meeting provided identical stations to the in-person meeting. Respondents were asked to identify their relationship to Fire Island (owner, renter, employee, or visitor) and were able to view the Planning process and comment on all of the materials provided. The Online Meetings provided thousands of comments from hundreds of people which were summarized for the Committee's review and consideration in the planning process. The following summarizes the total participation for each of the online events:

- Event #1 – 567 responses;
- Event #2 – 103 responses; and
- Event #3 – 143 responses.

Figure 22: View of the Online Public Meeting Website



Expert Sessions

A Power (Electric/Gas) Resiliency Education Session was held on Tuesday, December 17, 2013 at the West Islip Community Center on Higbie Lane. Over 30 members from the various Suffolk County NYRCR Planning Committees were in attendance. The education session focused on National Grid/LIPA (now operated by PSEG Long Island as of January 1, 2014) lessons learned post-Superstorm Sandy as well as current and future hardening projects/initiatives that are being undertaken by the utilities within the County. Committee members who attended stated that the session was valuable in understanding how hardening infrastructure or raising a road can impact the utilities below the road.

Other Committee members indicated that it was valuable to meet other Suffolk NYRCR Committee Members from adjacent Communities.

A Flooding & Erosion Protection Education Session was held on January 21, 2014, at the West Islip Fire Department, 309 Union Boulevard in West Islip. NY Sea Grant discussed the interplay between the natural and built environments that converge at the "living edge" and presented innovative shoreline treatments, including "living shorelines" which are being implemented in other states. The presentation also noted that Long Island's coastline is home to a dynamic variety of habitats that supports a range of plants and animals, some of which are endangered and threatened. The Nature Conservancy provided information about wetlands restoration and the NYS DEC discussed the permitting requirements and thresholds for approval for various types of projects being considered by the Committees.

Other Considerations

Although the public engagement events were advertised as events for the NYRCR Program, some Community members were more interested in assistance with individual property concerns. To accommodate these individuals, at each public engagement event tables were available in a separate area for State, FEMA, and NGO staff from the various intake centers to provide individual assistance. These Community members were subsequently encouraged to participate in the NYRCR planning process.

Website

The NYRCR website served as a repository for downloadable versions of all public information, events, and event notifications. Posted materials included an overview of the planning process, reports, maps, and documents, summaries of public engagement events, notices of public engagement events, and contact information. The website allowed for the inclusion of public comment, as well as a section for Frequently Asked Questions (FAQs). All materials and information on the website is kept up to date. The address is: http://www.stormrecovery.ny.gov/nyrcr.

Print and Broadcast Media

Study information was also disseminated through selected local, print, radio, and TV media to keep the community informed and to respond to media inquiries. A particular effort was made to include publications, radio, and TV stations that targeted traditionally underrepresented populations.

Outreach Techniques for Receiving Input

An important component of the outreach program was to understand public sentiment and to be able to answer questions and address public concerns. Several methods were provided for the public to make comments and ask questions.

The NYRCR Committee and Consultant Team used these comments to enhance and improve the NYRCR plan. The team documented all

comments received and added them to the record. Comments were also reviewed by the Committee.

NYRCR Communication

NYRCR staff is available to directly answer specific questions and receive comments. The primary contact is the NYRCR Suffolk County Regional Lead.

E-Mail

E-mail comments and requests for information can be sent to the State's e-mail address at: info@stormrecovery.ny.gov. This email address is prominently displayed on the website so that it is widely disseminated and available for public use. The NYRCR Consultant Team incorporated input and/or responded, as appropriate based on guidance from the State. The team worked with NYS to post comments or questions (with responses) that appeared repeatedly to the FAQ page on the State's website.

Comment Forms

Comment forms were available at Committee meetings and public engagement events and on the State's website to provide an opportunity for the public to contribute their thoughts, which were then passed along to the Committee and the NYRCR Consultant Team.

Requests for Information

All requests for information were acknowledged by the NYRCR Consultant Team within a week with a letter or email accompanied by the materials requested or by a referral to the State's website where the material can be downloaded. If a response to the request required more than a week, the individual making the request would be contacted with an estimate of the anticipated delivery date. An offer was always made to provide further assistance should it be necessary.

D. COMMUNITY ASSET INVENTORY

The NYRCR Consultant Team used the asset inventory compiled as part of the Conceptual Plan as a baseline in which to identify assets that may potentially be inputted into the Risk Assessment Tool. The pre-screening was designed to advance assets that were either:

- Situated in Extreme and High Risk Zones,
- Critical Assets (FEMA-critical) in Moderate Risk Zones,
- Locally-significant Community identified (High Community Value) in Moderate Risk Zones,
- Assets with High Community Value in Non Risk Areas, or
- Life safety services.

The asset inventory included in the Conceptual Plan was based both on Community identified assets and State identified assets. The assets catalogued in the Conceptual Plan included basic data such as Community, asset name and type, asset category, as well as risk area and asset class. As previously indicated, as an initial data management step, the NYRCR Consultant Team consolidated all Community identified assets and State identified assets into one database.

Assets filtered out include those that fell outside of Extreme, High or Moderate risk areas or were non-critical assets located in Moderate risk areas. As previously mentioned, Committee-identified or locally significant high value assets were also included.

Group Like Assets

Similar assets were grouped as a single asset to the maximum extent possible because these assets would likely experience the same effects from storm events and have similar vulnerabilities. Examples included:

- Walkway network or electric infrastructure with similar construction and exposure, and
- Residential neighborhoods or business districts by risk area.

In the event that a building or parcel spanned multiple risk areas, the "worst-case or more at-risk" risk area was used for the purposes of analysis.

Determining Community Value

The value that a Community places on an asset may differ by Community and/or region. As a result, NYSDOS has indicated that a suitable identification methodology for NYRCR Communities should be determined in consultation between the State and the NYRCR Consultant Team. Although, the "Community value" field in the Risk Assessment Tool did not directly impact risk, it was useful in terms of identifying locally significant assets as determined by each respective NYRCR Committee and Community.

Community Value on Fire Island

The NYRCR Consultant Team engaged their respective NYRCR Committees in preliminary "pilot" Community value identification exercises throughout the course of the planning process. During a Committee Meeting held on January 6, 2014, the Committee participated in a Community Value and Critical Asset pilot exercise. During this exercise, a Critical Assets Worksheet containing roughly 23 asset classes was distributed to the Committee to complete. The contents of critical asset classes were developed using a collaborative approach with the Committee. Similarly, asset classes were also presented at the second Public/Online Meeting (January 25, 2014) in order to solicit verbal commentary from the public on the Community value placed on assets and its importance relative to the resilience of the locality. The various asset classes included a number of functions ranging from life safety services to residential housing and infrastructure (see Table 30). The purpose of this exercise was to get the Committee to think about each asset class and its importance relative to the resiliency of Fire Island. Committee members were presented with worksheets with asset value definitions (see below) and then asked to identify each asset class as high, medium, or low value.

A High Value Community Asset is determined by the Community to be so significant in the support of that Community's day to day function that the loss of that asset or extended lack of functioning would create severe impacts to the Community's long-term health and well-being or result in the loss of life or injury to residents, employees, or visitors. High Value Community Assets will also generally be limited in number within a Community and be difficult to replace in the short- to mid-term.

A Medium Value Community Asset is an individual asset or grouping of assets that are determined by a Community to be important to the functioning of that Community's day to day life and that the loss of that asset or extended lack of functioning would cause hardship to the Community's well-being but who's function could be replaced or duplicated in a mid-term time frame without significant burden to a Community's long-term health. Median Value Community Assets are generally more frequent in occurrence in a Community than a High Value Asset.

A Low Value Community Asset is an individual asset or grouping of assets that are determined by a Community to play a role in the functioning of a Community's day to day life but whose loss could be managed and overcome within a Community without substantial impact to that Community's functioning. These assets are generally more frequent in a Community than a High or Medium Value Community Asset and can be restarted, replaced or temporarily duplicated in a short-term time frame with limited burden to a Community's long-term health.

The NYRCR Consultant Team tabulated Committee responses which included:

- **Low Value Assets** (5): Homes and Facilities for Vulnerable Populations, Historic Buildings, Cultural/Community Facilities, Government Buildings, Schools

- **Medium Value Assets** (5): Business Areas, Wetlands, Parks and Recreation Facilities, Department of Public Works, Medical Facilities
- **High Value Assets** (10): Great South Bay, Beaches and Dunes, Fire, Police, Emergency Facilities, Marinas, Residential Housing, Electric and Gas Infrastructure, Telephone/Cellular Communications Infrastructure, Walkways, Ferries, Bay Front Protection

The purpose of this exercise was to get the Committee to identify the "highest" of the priority assets in order to better inform the risk assessment process.

Using the Risk Assessment Tool

The dual purpose of the Risk Assessment Tool was: (1) to provide risk information as a means to identify and prioritize management measures; and (2) to provide a standardized risk assessment process for the NYRCR Program.

Most of the risk assessment tool fields were populated using data from GIS or collected during the inventory. Three important aspects to the tool are how to accurately determine the hazard, exposure, and vulnerability scores.

Hazard Score

The hazard score was automatically populated in the Risk Assessment Tool based on the likelihood and magnitude of a 100-year storm event (1% annual chance). For the purpose of the NYRCR Plan, the Hazard Score was equal to three (3), which can be described as a high intensity storm event that is about as likely as not (possible). The probability of this type of storm to occur within the planning timeframe is considered to be 33-66%.

Exposure Score

The exposure score was automatically populated in the Risk Assessment Tool based on landscape attribute information. Grouped assets based on similar exposure were given the same exposure score. Data that informed the exposure score included a review of Coastal Erosion Hazard Area (CEHA) maps, aerial imagery, and site reconnaissance as well as a reliance on local knowledge and input from the Project Manager and/or Committee.

Vulnerability Score

The vulnerability score of each asset was determined using the State guidance (based on Table 3: Vulnerability Based on Impact on Service or Function of Community Assets contained in Guidance for Community Reconstruction Zone Plans) as well as local background knowledge. Vulnerability generally pertains to length of time that a resource is out of service or a reduction in service capacity. This was determined through local knowledge of how assets responded in previous storm events.

Risk Score Range

After populating the Risk Assessment Tool with attribute information (basic data/hazard area/exposure/vulnerability, etc.) a Risk Score was automatically generated. The Risk Score relied on past experience as a predictor of future risk and included some subjective analysis. For a 100-year event the Risk Score ranges from Residual (less than 6) to Moderate (6 to 23) to High (24 to 53) to Severe (54 or greater).

Presented on the following pages is a baseline inventory of assets in the Fire Island Community. Included in the risk assessment spreadsheet for each asset is the asset name, risk area, asset class, critical facility designation, Community value, landscape attributes, and risk assessment scores.

Elevated home

Table 30: Asset Inventory Worksheet

Asset Information							Landscape Attributes					
Asset Name	**Risk Area**	**Asset Class**	**Asset Subcategory**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate**	**Beach Width**	**Shore Defenses**	**Vegetation**	**Dunes or Bluffs**	**Soils**
Saltaire Yacht Club, Inc.	Extreme	Economic	Marina/ Water Based Business	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Village of Saltaire City Hall	Extreme	Health and Social Services	Government and Administrative Services	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
St. Andrews Church, Saltaire	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Kismet Commercial District	Extreme	Economic	Downtown Center	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Kismet Fire Department	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Brodkin Park, Saltaire	Extreme	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Kismet Fire House	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Fair Harbor Commercial District	Extreme	Economic	Downtown Center	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Fair Harbor Fire Department Station	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
SCWA Drinking Water Treatment, Fair Harbor	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Saltaire Water Drinking Water Treatment and Well	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
SCWA Well, Fair Harbor	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	**Risk Area**	**Asset Class**	**Asset Subcategory**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate**	**Beach Width**	**Shore Defenses**	**Vegetation**	**Dunes or Bluffs**	**Soils**
SCWA, Lonelyville	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
SCWA building, Lonelyville	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
SCWA Drinking Water Treatment & Well, Dunewood	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Summer Club House, Corneille Estates	Extreme	Natural and Cultural Resources	Community Centers	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
SCWA - Drinking Water Treatment, Corneille Estates	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Seaview Community Center	Extreme	Natural and Cultural Resources	Community Centers	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Doctor's House, Seaview	Extreme	Health and Social Services	Healthcare Facilities	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Grocery, Seaview	Extreme	Economic	Grocery/Food Suppliers	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Village of Ocean Beach - water tower	Extreme	Infrastructure Systems	Water Supply	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Beach Commercial District	Extreme	Economic	Downtown Center	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
NY Telephone Co., Ocean Beach	Extreme	Infrastructure Systems	Tele-communications	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Beach Union Free Church	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	**Risk Area**	**Asset Class**	**Asset Subcategory**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate**	**Beach Width**	**Shore Defenses**	**Vegetation**	**Dunes or Bluffs**	**Soils**
Police Station, Ocean Beach	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Village Office, Ocean Beach	Extreme	Health and Social Services	Government and Administrative Services	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Village of Ocean Beach Community House	Extreme	Natural and Cultural Resources	Community Centers	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Youth Group "Windswept", Ocean Beach	Extreme	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Our Lady of the Magnificat Church, Ocean Beach	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Beach Water District - drinking water wells	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Village of Ocean Beach - water treatment	Extreme	Infrastructure Systems	Wastewater	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Synagogue, Seaview	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Beach Fire Department	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
US Post Office, Ocean Beach	Extreme	Health and Social Services	Government and Administrative Services	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	Risk Area	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate	Beach Width	Shore Defenses	Vegetation	Dunes or Bluffs	Soils
Village of Ocean Beach Sewage	Extreme	Infrastructure Systems	Wastewater	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Seaview Community Marina	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Seaview/Ocean Bay Park Garbage Transfer Station	Extreme	Infrastructure Systems	Hazardous Materials, Solid Waste, Recycling	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Bay Park Volunteer Fire Department	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Suffolk County Police Booth, Ocean Bay Park	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Point O' Woods Post Office	Extreme	Health and Social Services	Government and Administrative Services	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Yacht Club, Point O' Woods	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Point O' Woods Fire Department Station	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Church, Point O' Woods	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Cherry Grove Police Station	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	**Risk Area**	**Asset Class**	**Asset Subcategory**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate**	**Beach Width**	**Shore Defenses**	**Vegetation**	**Dunes or Bluffs**	**Soils**
SCWA - Bayview Walk Drinking Water Treatment, Cherry Grove	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Cherry Grove Community House - Historical Landmark	Extreme	Natural and Cultural Resources	Historic Landmarks and Facilities	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Cherry Grove Fire Station	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Belvedere Hotel, Cherry Grove	Extreme	Economic	Lodging	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Pines Police Station	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Pines Community Health Center - Seasonal Doctor Office	Extreme	Health and Social Services	Healthcare Facilities	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
SCWA Drinking Water Treatment & Well, Fire Island Pines	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Doctor's Office, Davis Park	Extreme	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Public Restrooms, Davis Park	Extreme	Health and Social Services	Public Works Facilities	Yes	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes
Watch Hill Visitor Center and Marina	Extreme	Economic	Tourism Destinations	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Doctor's Office, Ocean Beach	Extreme	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	Medium	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	**Risk Area**	**Asset Class**	**Asset Subcategory**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate**	**Beach Width**	**Shore Defenses**	**Vegetation**	**Dunes or Bluffs**	**Soils**
Water Interconnect, Border of Seaview & Ocean Beach	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Park, Ocean Bay Park	Extreme	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Dunes	Extreme	Natural and Cultural Resources	Natural Protective Features	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Nature Preserve, Saltaire	Extreme	Natural and Cultural Resources	Natural Habitats	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Helipad - destroyed in Sandy, Cherry Grove	Extreme	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Community Owned Tennis Courts, Dunewood	Extreme	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Baseball Diamond, Saltaire	Extreme	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Davis Park Marina	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
SCWA Harbor Walk Water Treatment Plant, Fire Island Pines	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Davis Park Commercial Buildings	Extreme	Economic	Downtown Center	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	Risk Area	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate	Beach Width	Shore Defenses	Vegetation	Dunes or Bluffs	Soils
SCWA Drinking Water Well, Davis Park	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Water Island Fire Wells	Extreme	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Pines Commercial District	Extreme	Economic	Downtown Center	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Pines Freight Dock	Extreme	Infrastructure Systems	Marine commerce facilities	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Cherry Grove Commercial District	Extreme	Economic	Downtown Center	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Point O' Woods Commercial District	Extreme	Economic	Downtown Center	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Bay Park Commercial District	Extreme	Economic	Downtown Center	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Bay Park Tennis Courts	Extreme	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Community-Owned Dock, Atlantique	Extreme	Infrastructure Systems	Marine commerce facilities	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Atlantique Beach and Marina	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Community-owned dock #1, Lonelyville	Extreme	Infrastructure Systems	Marine commerce facilities	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Community-owned dock #2, Lonelyville	Extreme	Infrastructure Systems	Marine commerce facilities	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Dock owned by FI Ferries, Dunewood	Extreme	Infrastructure Systems	Marine commerce facilities	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	Risk Area	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate	Beach Width	Shore Defenses	Vegetation	Dunes or Bluffs	Soils
Bay beach, Fair Harbor	Extreme	Natural and Cultural Resources	Natural Habitats	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Yacht Club Dock & Pier, Fair Harbor	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Saltaire Marina	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Kismet Marina	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Two boat slip clubs off of Seabay Walk	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Saltaire Camp & Recreation	Extreme	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Point O' Woods Marina	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Water Island Community Dock (seasonal)	Extreme	Economic	Marina/Water Based Business	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Lighthouse	High	Natural and Cultural Resources	Historic Landmarks and Facilities	Yes	No, Locally Significant	Low	Yes	No	Yes	Yes	Yes	Yes
Fire Island National Seashore West District Ranger Station	High	Health and Social Services	Government and Administrative Services	Yes	No, Locally Significant	Medium	Yes	No	Yes	Yes	Yes	Yes
SCWA Drinking Water Treatment, Kismet	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
SCWA - Well, Kismet	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	Risk Area	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate	Beach Width	Shore Defenses	Vegetation	Dunes or Bluffs	Soils
Transfer Station, Saltaire	High	Infrastructure Systems	Hazardous Materials, Solid Waste, and Recycling	Yes	No, Locally Significant	High	Yes	No	Yes	Yes	Yes	Yes
Our Lady Star of the Sea Church, Saltaire	High	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	Low	Yes	No	Yes	Yes	Yes	Yes
Public Restrooms, Fair Harbor	High	Health and Social Services	Public Works Facilities	Yes	No, Locally Significant	Low	Yes	No	Yes	Yes	Yes	Yes
Atlantique Park	High	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	No	Yes	Yes	Yes	Yes
Church, Davis Park	High	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	Low	Yes	No	Yes	Yes	Yes	Yes
Woodhull School, Corneille Estates	High	Health and Social Services	Schools	Yes	No, Locally Significant	Low	Yes	No	Yes	Yes	Yes	Yes
Seaview Water Company	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Point O' Woods SCWA Water Treatment Plant and Well	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Cherry Grove Post Office	High	Health and Social Services	Government and Administrative Services	Yes	No, Locally Significant	Low	Yes	No	Yes	Yes	Yes	Yes
Doctor's House / Healthcare Office, Cherry Grove	High	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	Medium	Yes	No	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	**Risk Area**	**Asset Class**	**Asset Subcategory**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate**	**Beach Width**	**Shore Defenses**	**Vegetation**	**Dunes or Bluffs**	**Soils**
Fire Island Pines Fire Station	High	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Davis Park Fire House	High	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Police Station, Davis Park	High	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
SCWA Drinking Water Well, Davis Park	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
SCWA Drinking Water Treatment, Davis Park	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Rectory, Davis Park	High	Natural and Cultural Resources	Cultural or Religious Establishments	Yes	No, Locally Significant	Low	Yes	No	Yes	Yes	Yes	Yes
Water Interconnect, Border of Seaview & Ocean Bay Park	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Kismet Tennis Courts	High	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	No	Yes	Yes	Yes	Yes
Helipad, Davis Park	High	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Talisman Beach Drinking Water Well	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
SCWA Harbor Walk Water Well, Fire Island Pines	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	**Risk Area**	**Asset Class**	**Asset Subcategory**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate**	**Beach Width**	**Shore Defenses**	**Vegetation**	**Dunes or Bluffs**	**Soils**
Fire Island Hotel, Ocean Bay Park	High	Economic	Lodging	Yes	No, Locally Significant	Medium	Yes	No	Yes	Yes	Yes	Yes
SCWA Wells - Inground Storage, Ocean Bay Park	High	Infrastructure Systems	Water Supply	Yes	No, Locally Significant	High	Yes	No	Yes	Yes	Yes	Yes
Water interconnect, Border of Ocean Beach & Corneille Estates	High	Infrastructure Systems	Water Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Robert Moses State Park Field Houses	Moderate	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	No	Yes	Yes	Yes	Yes
U.S Coast Guard Station	Moderate	Health and Social Services	Government and Administrative Services	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Verizon vehicle storage, Fire Island Pines	Moderate	Infrastructure Systems	Tele-communications	Yes	No, Locally Significant	Low	Yes	No	Yes	Yes	Yes	Yes
Robert Moses Water Tower	Moderate	Infrastructure Systems	Water Supply	Yes	No, Locally Significant	High	Yes	No	Yes	Yes	Yes	Yes
Suffolk County Police Helipad, Fire Island Pines	Moderate	Health and Social Services	Emergency Operations/ Response	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Electric Power Center, Fire Island Pines	Moderate	Infrastructure Systems	Power Supply	Yes	Yes, FEMA	High	Yes	No	Yes	Yes	Yes	Yes
Emergency Access Route	Extreme	Infrastructure Systems	Transportation	Yes	Yes, FEMA	High	Yes	Yes	Yes	Yes	Yes	Yes
Dunewood Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Fair Harbor Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	Risk Area	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate	Beach Width	Shore Defenses	Vegetation	Dunes or Bluffs	Soils
Atlantique Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Beach Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Ocean Bay Park Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Pines Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Sunken Forest Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Kismet Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Saltaire Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Seaview Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Sailors Haven Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Cherry Grove Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Davis Park Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Watch Hill Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island National Seashore	Extreme	Natural and Cultural Resources	Natural Habitats	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	Risk Area	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate	Beach Width	Shore Defenses	Vegetation	Dunes or Bluffs	Soils
Microwave Tower, Ocean Beach	Extreme	Infrastructure Systems	Tele-communications	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Microwave Tower, Davis Park	Extreme	Infrastructure Systems	Tele-communications	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Residential Housing - Extreme Risk Area	Extreme	Housing	Single-Family Residence	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Fire Island Residential Housing - High Risk Area	High	Housing	Single-Family Residence	Yes	No, Locally Significant	High	Yes	No	Yes	Yes	Yes	Yes
Fire Island Residential Housing - Moderate Risk Area	Moderate	Housing	Single-Family Residence	Yes	No, Locally Significant	High	Yes	No	Yes	Yes	Yes	Yes
Roads/Walkways - Extreme Risk Area	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Roads/Walkways - High Risk Area	High	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	No	Yes	Yes	Yes	Yes
Roads/Walkways - Moderate Risk Area	Moderate	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	No	Yes	Yes	Yes	Yes
Robert Moses State Park	Extreme	Natural and Cultural Resources	Parks and Recreation	Yes	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes
Dune X-ing, east end Traffic Ave, 240' east of Seneca	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Dune X-ing, Coast Guard Walk	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 (cont'd)

Asset Information							Landscape Attributes					
Asset Name	Risk Area	Asset Class	Asset Subcategory	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion Rate	Beach Width	Shore Defenses	Vegetation	Dunes or Bluffs	Soils
Dune X-ing, east end of Fire Island Blvd thru FINS	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Dune X-ing, Davis Park, 200' east of Trustees walk	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Dune X-ing, South of Center Walk, 200' east of Trustees walk	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes
Point O' Woods Ferry Dock	Extreme	Infrastructure Systems	Transportation	Yes	No, Locally Significant	High	Yes	Yes	Yes	Yes	Yes	Yes

**** The following five Landscape Attributes have the same value ("Yes") for every asset, and are therefore not included in Table 31:***

- Erosion Rate ≥1 foot per year or unknown,
- Shore defenses absent, not constructed to anticipated conditions, or deteriorating,
- Protective vegetation between asset and flood source absent,
- Dunes absent, below BFE, eroding, little vegetation; bluff slope unstable, little vegetation, and
- On coastal barrier island or filled wetland

Table 31: Risk Assessment Tool

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Youth Group "Windswept", Ocean Beach	Extreme	Natural and Cultural Resources	Parks and Recreation	Low	Yes	3	**3**	**5.00**	**5**	**75**
Fire Island Pines Community Health Center - Seasonal Doctor Office	Extreme	Health and Social Services	Healthcare Facilities	Med	Yes	3	**3**	**5.00**	**5**	**75**
Helipad - destroyed in Sandy, Cherry Grove	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**5**	**75**
Water Island Fire Wells	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**5**	**75**
Community-owned dock #1, Lonelyville	Extreme	Infrastructure Systems	Marine commerce facilities	High	Yes	3	**3**	**5.00**	**5**	**75**
Community-owned dock #2, Lonelyville	Extreme	Infrastructure Systems	Marine commerce facilities	High	Yes	3	**3**	**5.00**	**5**	**75**
Bay beach, Fair Harbor	Extreme	Natural and Cultural Resources	Natural Habitats	High	Yes	3	**3**	**5.00**	**5**	**75**
Saltaire Yacht Club, Inc.	Extreme	Economic	Marina/Water Based Business	Med	Yes	3	**3**	**5.00**	**4**	**60**
St. Andrews Church, Saltaire	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Low	Yes	3	**3**	**5.00**	**4**	**60**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Brodkin Park, Saltaire	Extreme	Natural and Cultural Resources	Parks and Recreation	Med	Yes	3	**3**	**5.00**	**4**	**60**
Market, Saltaire	Extreme	Economic	Grocery/Food Suppliers	Med	Yes	3	**3**	**5.00**	**4**	**60**
Saltaire Volunteer Fire Company	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**4**	**60**
Saltaire Water Drinking Water Treatment and Well	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**4**	**60**
Doctor's House, Seaview	Extreme	Health and Social Services	Healthcare Facilities	Med	Yes	3	**3**	**5.00**	**4**	**60**
Grocery, Seaview	Extreme	Economic	Grocery/Food Suppliers	Med	Yes	3	**3**	**5.00**	**4**	**60**
Ocean Beach Commercial District	Extreme	Economic	Downtown Center	Med	Yes	3	**3**	**5.00**	**4**	**60**
Ocean Beach Union Free Church	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Low	Yes	3	**3**	**5.00**	**4**	**60**
Police Station, Ocean Beach	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**4**	**60**
Village Office, Ocean Beach	Extreme	Health and Social Services	Government and Administrative Services	Low	Yes	3	**3**	**5.00**	**4**	**60**
Village of Ocean Beach Community House	Extreme	Natural and Cultural Resources	Community Centers	Low	Yes	3	**3**	**5.00**	**4**	**60**
Our Lady of the Magnificat Church, Ocean Beach	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Low	Yes	3	**3**	**5.00**	**4**	**60**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Ocean Beach Fire Department	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**4**	**60**
Seaview Community Marina	Extreme	Economic	Marina/Water Based Business	High	Yes	3	**3**	**5.00**	**4**	**60**
Cherry Grove Community House - Historical Landmark	Extreme	Natural and Cultural Resources	Historic Landmarks and Facilities	Low	Yes	3	**3**	**5.00**	**4**	**60**
Cherry Grove Fire Station	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**4**	**60**
Belvedere Hotel, Cherry Grove	Extreme	Economic	Lodging	Med	Yes	3	**3**	**5.00**	**4**	**60**
SCWA Drinking Water Treatment & Well, Fire Island Pines	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**4**	**60**
Dunes	Extreme	Natural and Cultural Resources	Natural Protective Features	High	Yes	3	**3**	**5.00**	**4**	**60**
Nature Preserve, Saltaire	Extreme	Natural and Cultural Resources	Natural Habitats	Med	Yes	3	**3**	**5.00**	**4**	**60**
Baseball Diamond, Saltaire	Extreme	Natural and Cultural Resources	Parks and Recreation	Med	Yes	3	**3**	**5.00**	**4**	**60**
SCWA Harbor Walk Water Treatment Plant, Fire Island Pines	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**4**	**60**
Cherry Grove Commercial District	Extreme	Economic	Downtown Center	Med	Yes	3	**3**	**5.00**	**4**	**60**
Community-Owned Dock, Atlantique	Extreme	Infrastructure Systems	Marine commerce facilities	High	Yes	3	**3**	**5.00**	**4**	**60**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Atlantique Beach and Marina	Extreme	Economic	Marina/Water Based Business	High	Yes	3	**3**	**5.00**	**4**	**60**
Yacht Club Dock & Pier, Fair Harbor	Extreme	Economic	Marina/Water Based Business	Med	Yes	3	**3**	**5.00**	**4**	**60**
Saltaire Camp & Recreation	Extreme	Natural and Cultural Resources	Parks and Recreation	Med	Yes	3	**3**	**5.00**	**4**	**60**
Emergency Access Route	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Atlantique Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Ocean Beach Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Fire Island Residential Housing - Extreme Risk Area	Extreme	Housing	Single-Family Residence	High	Yes	3	**3**	**5.00**	**4**	**60**
Roads/Walkways - Extreme Risk Area	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Robert Moses State Park	Extreme	Natural and Cultural Resources	Parks and Recreation	Med	Yes	3	**3**	**5.00**	**4**	**60**
Dune X-ing, east end Traffic Ave, 240' east of Seneca	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Dune X-ing, Coast Guard Walk	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Dune X-ing, east end of Fire Island Blvd thru FINS	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Dune X-ing, Davis Park, 200' east of Trustees walk	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Dune X-ing, South of Center Walk, 200' east of Trustees	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**
Point O Woods Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**4**	**60**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Village of Saltaire City Hall	Extreme	Health and Social Services	Government and Administrative Services	Low	Yes	3	**3**	**5.00**	**3**	**45**
Kismet Commercial District	Extreme	Economic	Downtown Center	Med	Yes	3	**3**	**5.00**	**3**	**45**
Post Office/Library, Saltaire	Extreme	Health and Social Services	Government and Administrative Services	Low	Yes	3	**3**	**5.00**	**3**	**45**
Fair Harbor Fire Department Station	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**3**	**45**
SCWA Drinking Water Treatment & Well, Dunewood	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**3**	**45**
Seaview Community Center	Extreme	Natural and Cultural Resources	Community Centers	Low	Yes	3	**3**	**5.00**	**3**	**45**
Fire Island Synagogue, Seaview	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Low	Yes	3	**3**	**5.00**	**3**	**45**
US Post Office, Ocean Beach	Extreme	Health and Social Services	Government and Administrative Services	Low	Yes	3	**3**	**5.00**	**3**	**45**
Ocean Bay Park Volunteer Fire Department	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**3**	**45**
SCWA - Bayview Walk Drinking Water Treatment, Cherry Grove	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**3**	**45**
Fire Island Pines Police Station	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**3**	**45**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Doctor's Office, Davis Park	Extreme	Health and Social Services	Healthcare Facilities	Med	Yes	3	**3**	**5.00**	**3**	**45**
Public Restrooms, Davis Park	Extreme	Health and Social Services	Public Works Facilities	Low	Yes	3	**3**	**5.00**	**3**	**45**
Community Owned Tennis Courts, Dunewood	Extreme	Natural and Cultural Resources	Parks and Recreation	Med	Yes	3	**3**	**5.00**	**3**	**45**
Davis Park Marina	Extreme	Economic	Marina/Water Based Business	High	Yes	3	**3**	**5.00**	**3**	**45**
Davis Park Commercial Buildings	Extreme	Economic	Downtown Center	Med	Yes	3	**3**	**5.00**	**3**	**45**
SCWA Drinking Water Well, Davis Park	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**3**	**45**
Fire Island Pines Commercial District	Extreme	Economic	Downtown Center	Med	Yes	3	**3**	**5.00**	**3**	**45**
Saltaire Marina	Extreme	Economic	Marina/Water Based Business	High	Yes	3	**3**	**5.00**	**3**	**45**
Kismet Marina	Extreme	Economic	Marina/Water Based Business	High	Yes	3	**3**	**5.00**	**3**	**45**
Water Island Community Dock (seasonal)	Extreme	Economic	Marina/Water Based Business	High	Yes	3	**3**	**5.00**	**3**	**45**
Dunewood Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**3**	**45**
Ocean Bay Park Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**3**	**45**
Kismet Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**3**	**45**
Saltaire Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**3**	**45**
Seaview Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**3**	**45**
Cherry Grove Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**3**	**45**
Davis Park Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**3**	**45**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Microwave Tower, Ocean Beach	Extreme	Infrastructure Systems	Telecommunications	High	Yes	3	**3**	**5.00**	**3**	**45**
Microwave Tower, Davis Park	Extreme	Infrastructure Systems	Telecommunications	High	Yes	3	**3**	**5.00**	**3**	**45**
Our Lady Star of the Sea Church, Saltaire	High	Natural and Cultural Resources	Cultural or Religious Establishments	Low	No	2.5	**3**	**3.50**	**4**	**42**
Atlantique Park	High	Natural and Cultural Resources	Parks and Recreation	Med	No	2.5	**3**	**3.50**	**4**	**42**
SCWA Harbor Walk Water Well, Fire Island Pines	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**4**	**42**
SCWA Wells - Inground Storage, Ocean Bay Park	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**4**	**42**
Fire Island Residential Housing - High Risk Area	High	Housing	Single-Family Residence	High	No	2.5	**3**	**3.50**	**4**	**42**
Robert Moses State Park Field Houses	Moderate	Natural and Cultural Resources	Parks and Recreation	Med	No	2.5	**3**	**3.00**	**4**	**36**
Robert Moses Water Tower	Moderate	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.00**	**4**	**36**
Electric Power Center, Fire Island Pines	Moderate	Infrastructure Systems	Power Supply	High	No	2.5	**3**	**3.00**	**4**	**36**
Fire Island Residential Housing - Moderate Risk Area	Moderate	Housing	Single-Family Residence	High	No	2.5	**3**	**3.00**	**4**	**36**
Fire Island Lighthouse	High	Natural and Cultural Resources	Historic Landmarks and Facilities	Low	No	2.5	**3**	**3.50**	**3**	**32**
Fire Island National Seashore West District Ranger Station	High	Health and Social Services	Government and Administrative Services	Med	No	2.5	**3**	**3.50**	**3**	**32**
Transfer Station, Saltaire	High	Infrastructure Systems	Hazardous Materials, Solid Waste, and Recycling	High	No	2.5	**3**	**3.50**	**3**	**32**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Church, Davis Park	High	Natural and Cultural Resources	Cultural or Religious Establishments	Low	No	2.5	**3**	**3.50**	**3**	**32**
Davis Park Fire House	High	Health and Social Services	Emergency Operations/Response	High	No	2.5	**3**	**3.50**	**3**	**32**
Police Station, Davis Park	High	Health and Social Services	Emergency Operations/Response	High	No	2.5	**3**	**3.50**	**3**	**32**
SCWA Drinking Water Well, Davis Park	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**3**	**32**
SCWA Drinking Water Treatment, Davis Park	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**3**	**32**
Rectory, Davis Park	High	Natural and Cultural Resources	Cultural or Religious Establishments	Low	No	2.5	**3**	**3.50**	**3**	**32**
Helipad, Davis Park	High	Health and Social Services	Emergency Operations/Response	High	No	2.5	**3**	**3.50**	**3**	**32**
Roads/Walkways - High Risk Area	High	Infrastructure Systems	Transportation	High	No	2.5	**3**	**3.50**	**3**	**32**
Kismet Fire Department	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**2**	**30**
Kismet Fire House	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**2**	**30**
Fair Harbor Commercial District	Extreme	Economic	Downtown Center	Med	Yes	3	**3**	**5.00**	**2**	**30**
SCWA, Lonelyville	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**2**	**30**
SCWA building, Lonelyville	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**2**	**30**
SCWA - Drinking Water Treatment, Corneille Estates	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**2**	**30**
Ocean Beach Water District - drinking water wells	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**2**	**30**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Village of Ocean Beach - water treatment	Extreme	Infrastructure Systems	Wastewater	High	Yes	3	**3**	**5.00**	**2**	**30**
Village of Ocean Beach Sewage	Extreme	Infrastructure Systems	Wastewater	High	Yes	3	**3**	**5.00**	**2**	**30**
Suffolk County Police Booth, Ocean Bay Park	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**2**	**30**
Point O' Woods Post Office	Extreme	Health and Social Services	Government and Administrative Services	Low	Yes	3	**3**	**5.00**	**2**	**30**
Yacht Club, Point O' Woods	Extreme	Economic	Marina/Water Based Business	Med	Yes	3	**3**	**5.00**	**2**	**30**
Point O' Woods Fire Department Station	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**2**	**30**
Church, Point O' Woods	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	Low	Yes	3	**3**	**5.00**	**2**	**30**
Watch Hill Visitor Center and Marina	Extreme	Economic	Tourism Destinations	High	Yes	3	**3**	**5.00**	**2**	**30**
Park, Ocean Bay Park	Extreme	Natural and Cultural Resources	Parks and Recreation	Med	Yes	3	**3**	**5.00**	**2**	**30**
Point O' Woods Commercial District	Extreme	Economic	Downtown Center	Med	Yes	3	**3**	**5.00**	**2**	**30**
Ocean Bay Park Commercial District	Extreme	Economic	Downtown Center	Med	Yes	3	**3**	**5.00**	**2**	**30**
Ocean Bay Park Tennis Courts	Extreme	Natural and Cultural Resources	Parks and Recreation	Med	Yes	3	**3**	**5.00**	**2**	**30**
Dock owned by FI Ferries, Dunewood	Extreme	Infrastructure Systems	Marine commerce facilities	High	Yes	3	**3**	**5.00**	**2**	**30**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Two boat slip clubs off of Seabay Walk	Extreme	Economic	Marina/Water Based Business	High	Yes	3	**3**	**5.00**	**2**	**30**
Point O' Woods Marina	Extreme	Economic	Marina/Water Based Business	High	Yes	3	**3**	**5.00**	**2**	**30**
Fair Harbor Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**2**	**30**
Sunken Forest Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**2**	**30**
Sailors Haven Ferry Dock	Extreme	Infrastructure Systems	Transportation	Med	Yes	3	**3**	**5.00**	**2**	**30**
Watch Hill Ferry Dock	Extreme	Infrastructure Systems	Transportation	Med	Yes	3	**3**	**5.00**	**2**	**30**
Fire Island National Seashore	Extreme	Natural and Cultural Resources	Natural Habitats	High	Yes	3	**3**	**5.00**	**2**	**30**
Roads/Walkways - Moderate Risk Area	Moderate	Infrastructure Systems	Transportation	High	No	2.5	**3**	**3.00**	**3**	**27**
Point O' Woods SCWA Water Treatment Plant and Well	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**2**	**21**
Fire Island Hotel, Ocean Bay Park	High	Economic	Lodging	Med	No	2.5	**3**	**3.50**	**2**	**21**
Water interconnect, Border of Ocean Beach & Corneille Estates	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**2**	**21**
U.S Coast Guard Station	Moderate	Health and Social Services	Government and Administrative Services	High	No	2.5	**3**	**3.00**	**2**	**18**
SCWA Drinking Water Treatment, Fair Harbor	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**1**	**15**
SCWA Well, Fair Harbor	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**1**	**15**
Summer Club House, Corneille Estates	Extreme	Natural and Cultural Resources	Community Centers	Low	Yes	3	**3**	**5.00**	**1**	**15**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Village of Ocean Beach - water tower	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**1**	**15**
NY Telephone Co., Ocean Beach	Extreme	Infrastructure Systems	Telecommunications	High	Yes	3	**3**	**5.00**	**1**	**15**
Seaview/Ocean Bay Park Garbage Transfer Station	Extreme	Infrastructure Systems	Hazardous Materials, Solid Waste, and Recycling	High	Yes	3	**3**	**5.00**	**1**	**15**
Cherry Grove Police Station	Extreme	Health and Social Services	Emergency Operations/Response	High	Yes	3	**3**	**5.00**	**1**	**15**
Doctor's Office, Ocean Beach	Extreme	Health and Social Services	Healthcare Facilities	Med	Yes	3	**3**	**5.00**	**1**	**15**
Water Interconnect, Border of Seaview & Ocean Beach	Extreme	Infrastructure Systems	Water Supply	High	Yes	3	**3**	**5.00**	**1**	**15**
Fire Island Pines Freight Dock	Extreme	Infrastructure Systems	Marine commerce facilities	High	Yes	3	**3**	**5.00**	**1**	**15**
Fire Island Pines Ferry Dock	Extreme	Infrastructure Systems	Transportation	High	Yes	3	**3**	**5.00**	**1**	**15**
SCWA Drinking Water Treatment, Kismet	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**1**	**11**
SCWA - Well, Kismet	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**1**	**11**
Public Restrooms, Fair Harbor	High	Health and Social Services	Public Works Facilities	Low	No	2.5	**3**	**3.50**	**1**	**11**
Woodhull School, Corneille Estates	High	Health and Social Services	Schools	Low	No	2.5	**3**	**3.50**	**1**	**11**
Seaview Water Company	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**1**	**11**
Cherry Grove Post Office	High	Health and Social Services	Government and Administrative Services	Low	No	2.5	**3**	**3.50**	**1**	**11**
Doctor's House / Healthcare Office, Cherry Grove	High	Health and Social Services	Healthcare Facilities	Med	No	2.5	**3**	**3.50**	**1**	**11**

Table 31 (cont'd)

Asset Information					Landscape Attributes (see note)*		Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Community Value**	**Waterline frequently at shore defense or upland vegetation**	**Landscape Attribute Score**	**Hazard Score**	**Exposure Score**	**Vulner-ability Score**	**Risk Score**
Fire Island Pines Fire Station	High	Health and Social Services	Emergency Operations/Response	High	No	2.5	**3**	**3.50**	**1**	**11**
Water Interconnect, Border of Seaview & Ocean Bay Park	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**1**	**11**
Kismet Tennis Courts	High	Natural and Cultural Resources	Parks and Recreation	Med	No	2.5	**3**	**3.50**	**1**	**11**
Talisman Beach Drinking Water Well	High	Infrastructure Systems	Water Supply	High	No	2.5	**3**	**3.50**	**1**	**11**
Verizon vehicle storage, Fire Island Pines	Moderate	Infrastructure Systems	Telecommunications	Low	No	2.5	**3**	**3.00**	**1**	**9**
Suffolk County Police Helipad, Fire Island Pines	Moderate	Health and Social Services	Emergency Operations/Response	High	No	2.5	**3**	**3.00**	**1**	**9**

E. GLOSSARY

Acronyms

AARP
American Association of Retired Persons

ACS
American Community Survey

CBA
Cost-benefit analysis

CDP
Census Designated Place

EMS
Emergency Medical Services

FEMA
Federal Emergency Management Agency

FIMP
Fire Island Inlet to Montauk Point

FINS
Fire Island National Seashore

FTE
Full-time equivalent

GIS
Geographic Information Systems

HUD
U.S. Department of Housing and Urban Development

LDRM
Local Disaster Recovery Manager

LIRR
Long Island Rail Road

NGO
Non-governmental organization

NPS
U.S. National Park Service

NYRCR
NY Rising Community Reconstruction

NYS DEC
New York State Department of Environmental Conservation

NYS DOS
New York State Department of State

REDC
Regional Economic Development Council

RSF
Recovery Support Function

SCWA
Suffolk County Water Authority

SDR
Storm Damage Reduction

SGRID3
Smarter Grid Research, Innovation, Development, Demonstration, and Deployment

USACE
U.S. Army Corps of Engineers

USCG
U.S. Coast Guard

USFWS
U.S. Fish and Wildlife Service

USGS
U.S. Geological Survey

USLSS
U.S. Life Saving Service

VFW
Veterans of Foreign Wars

Terms

Asset
Places or entities where economic, environmental, and social functions of the Community occur

Asset Inventory
Completing an inventory of the Community's social, economic, and natural resource assets that have been, or will be, affected by coastal or riverine hazards

Community Vision
The overall goal of the Community throughout the NYRCR planning process

Conceptual Plan
A snapshot of the current thoughts of the Community and Planning Committee. The plans will evolve as communities analyze the risk to their assets, their needs and opportunities, the potential costs and benefits of projects and actions, and their priorities.

Exposure
Local landscape characteristics that tend to increase or decrease storm effects

Geographic scope
The community identified by the Community and State guidelines where assets are most at risk; where future construction or reconstruction of existing development should be encouraged or discourage; or where key investment to improve the local economy can be instituted

Hazard
The likelihood and magnitude of anticipated hazard events.

Hazus
Hazus is a geographic information system-based natural hazard loss estimation software package developed & freely distributed by FEMA.

Implementation Schedule
Preparing an implementation schedule of the actions needed to implement the strategies

Lidar
A remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light

Need
Infrastructure and services that were damaged or rendered inoperable by Superstorm Sandy as well as methods and operations that failed to work during the storm event or experienced insufficient capacity to respond effectively.

Needs and Opportunities Assessment
Determining needs and opportunities to improve local economic growth and enhance resilience to future storms.

Opportunity
Additional resiliency benefits, whether economic, environmental, social, or cultural, that may be achieved through the integration of new methods, procedures, and materials into the normal course of rebuilding.

Public Engagement
Offering opportunities for public input and involvement at key milestones in the planning process

Resilience
The ability of a system to absorb impacts while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt

Risk
The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes

Risk Area
Geographic areas at risk from coastal hazards according to differences in the exposure of the landscape

Risk Assessment
Assessing risk to key Community assets based on the three factors contributing to risk: hazard, exposure, and vulnerability

Risk Assessment Tool
Evaluation of risk based on the formula: Hazard x Exposure x Vulnerability

Risk Score
The result of the risk assessment tool evaluation

Strategy
A specific way or ways to address the needs and realize opportunities presented by the Committee

Strategies for Investment and Action
Developing strategies and the projects and actions needed to implement the strategies; identifying potential costs and benefits of chosen projects and actions, as well as potential funding sources

Vulnerability
The capacity of an asset to return to service after an event

F. END NOTES

Sources

All photographs included in this report were provided by the Consultant Team, except where noted.

[1] Governor Cuomo Announces $23 Million in Federal Funds to Strengthen Shoreline Protections at Robert Moses State Park and Traffic Circle, http://www.governor.ny.gov/press/03072014-shoreline-protections

[2] Bridge Replacements – Long Island, http://www.governor.ny.gov/bridge-replacements#longisland

[3] Town of Islip Recreation - Atlantique Beach & Marina - Fire Island, http://www.theislips.com/atlantique.php#.Uyjz1MJOWJc

[4] Provided by C. Soller, Fire Island National Seashore Superintendent

[5] American FactFinder, http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

[6] Fire Island Inlet To Moriches Inlet Fire Island Stabilization Project Hurricane Sandy Limited Reevaluation Report, Appendix A

[7] Governor Cuomo Announces Support for $700 Million, Federally Funded Project for Storm Damage Reduction from Fire Island to Montauk Point http://www.governor.ny.gov/press/06152013cuomo-announces-support-700mil-damage-reduction-fire-island-montauk-point

[8] Legislative Gazette - Sandy shows need for protection on Long Island's South Shore, http://www.legislativegazette.com/Articles-Top-Stories-c-2014-03-03-87028.113122-Sandy-shows-need-for-protection-on-Long-Islands-South-Shore.html

[9] New York State Energy Research and Development Authority (NYSERDA) ClimAID Team. (2011). *Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation Final Report.* C. Rosenzweig, W. Solecki, A. DeGaetano, M. O'Grady, S. Hassol, P. Grabhorn, Eds. New York State Energy Research and Development Authority, 17 Columbia Circle, Albany, NY 12203. Retrieved from http://www.nyserda.ny.gov/climaid

[10] Concerned Friends of Fire Island, Inc. dba ReviveFI

[11] U.S. Army Corps of Engineers - Fire Island to Montauk Point Reformulation Study, www.nan.usace.army.mil/Missions/CivilWorks/ProjectsinNewYork/FireIslandtoMontaukPointReformulationStudy.aspx

[12] NY Rising Recovery Resources Center, http://www.stormrecovery.ny.gov/resources-0

[13] NYS Department of Transportation New York State Highway Bridge Data, https://www.dot.ny.gov/main/bridgedata

[14] The hazard score for a 100-year event is 3. (Hazard scores may range from 1 to 5 depending on whether a higher- or lower-magnitude event was chosen for the baseline risk assessment). The exposure score ranges from 0.5 to 5 depending on whether the asset in question is located in an extreme, high, or moderate risk area and based on the presence and condition of nearby protective landscape attributes. The vulnerability score ranges from 1 to 5 depending on how well the asset is able to return to service after an event. Multiplied together, the maximum possible risk score is 75.

[15] Photo Credit: T. Marquardt, Town of Islip Planning Department

[16] FEMA National Disaster Recovery Framework, http://www.fema.gov/national-disaster-recovery-framework

[17] Impact of the Atlantic Ocean Beaches to the Economy of Suffolk County, May 13, 2003

[18] Fire Island Inlet to Moriches Inlet Fire Island Stabilization Project Draft Environmental Assessment, March 2014

[19] Park Statistics, http://www.nps.gov/fiis/parkmgmt/statistics.htm

[20] The full time equivalent position is calculated by applying an average of $40,000 per job. The $40,000 salary is based on the Bureau of Labor Statistics' May 2012 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates for Nassau-Suffolk, NY Metropolitan Division for Construction and Extraction Occupations (http://www.bls.gov/oes/current/oes_35004.htm#47-0000).

[21] FEMA National Disaster Recovery Framework, http://www.fema.gov/pdf/recoveryframework/local_disaster_recovery_managers.pdf

[22] Photo credit: Vern Hendrickson, NYRCR Committee member

[23] Fire Island Inlet to Moriches Inlet Fire Island Stabilization Project Draft Environmental Assessment, March 2014

[24] Photo Credit: David W. Smith, South Shore Fire & Safety Service Manager

[25] The full time equivalent position is calculated by applying an average of $150/hour.

NY Rising Community Reconstruction Program
www.stormrecovery.ny.gov/nyrcr