

An aerial photograph of Piermont, New York, showing a mix of urban development and natural wetlands. The town is built along a narrow strip of land between a large body of water and a complex network of marshes and tidal creeks. A marina with numerous boats is visible on the right side. The buildings are mostly multi-story structures, and there are several sports fields and a baseball field. The marshland is a mix of green and brown, indicating different stages of vegetation and water levels.

**RESILIENCE
ROADMAP:
PLANNING FOR
PIERMONT'S FUTURE**

*Report of the Piermont
Waterfront Resilience
Task Force*
**EXECUTIVE
SUMMARY**

RESILIENCE ROADMAP: PLANNING FOR PIERMONT'S FUTURE

REPORT OF THE PIERMONT WATERFRONT RESILIENCE TASK FORCE

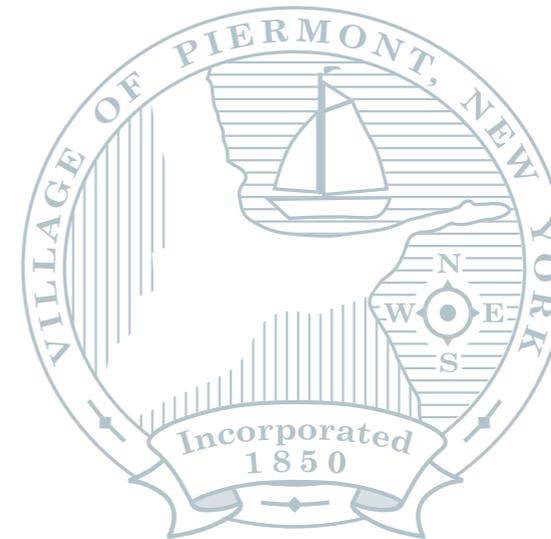
September 30, 2014

Suggested Citation:

Village of Piermont. 2014. *Resilience Roadmap: Planning for Piermont's Future. Report of the Piermont Waterfront Resilience Task Force.*

Available at:

[http://www.scenichudson.org/ourwork/
riverfrontcommunities/waterfrontresiliencetaskforces/
piermont](http://www.scenichudson.org/ourwork/riverfrontcommunities/waterfrontresiliencetaskforces/piermont)



This document was prepared for the Village of Piermont and the Hudson River Estuary Program, New York State Department of Environmental Conservation, with support from the New York State Environmental Protection Fund, in cooperation with the New England Interstate Water Pollution Control Commission. The viewpoints expressed here do not necessarily represent those of NEIWPCC or NYSDEC, nor does mention of trade names, commercial products, or causes constitute endorsement or recommendation for use.

Additional support and technical assistance for this project was provided by Scenic Hudson, the Lincoln Institute of Land Policy, the Consensus Building Institute, and Catalysis Adaptation Partners.

We are a river village, nestled at the break in the Palisades at the confluence of the Sparkill and the Hudson. This place is an undeniably charmed location, one that enticed native Lenape to make their home here. Later, European settlers found both easy access to the interior farmlands of Tappan and a direct commercial route to a growing market downriver. It is this commercial access to the river that attracted the establishment of the eastern terminus of the Erie railroad, which brought the Village of Piermont to life. Generations of Piermonters have made their living from the river and have established their family history along its banks; its waters are in our blood.

Piermonters are wedded to the Hudson – born and privileged by its presence, benefiting from its bounty, but always mindful of its demeanor and at the mercy of its temperament. We enjoy the river at its best - wondrous, tranquil and benevolent. We have also borne its fury, overwhelming its banks in nor'easters and tropical storms. It is this relationship to the Hudson that recalls the poem by Henry Wadsworth Longfellow:

There was a little girl, who had a little curl, right in the middle of her forehead.

When she was good, she was very good indeed, but when she was bad she was horrid.

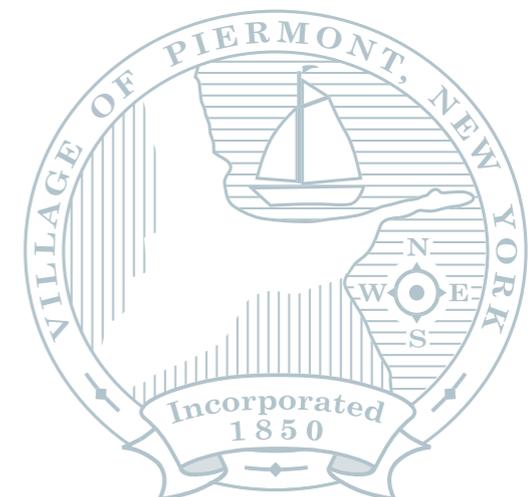
The Hudson is a unique river among rivers. It is, in the language of the native Lenape, the “Muhheakantuck” - the river that flows both ways. Ours is a ‘drowned’ river, a tidal estuary, flowing at sea level south of Troy, experiencing two tide cycles each day. At Piermont, we see an average tidal range of 3 1/2 feet, with astronomical extremes over 5 feet. Our highest tides, along with a minor storm surge, routinely bring water onto Village streets in low-lying neighborhoods. Hurricane Irene and Sandy brought storm tides of up to 9 1/2 feet through the Village.

In actuality, Piermont is a seaside village, directly connected to the Atlantic Ocean and at the mercy of its slowly rising waters. Sea Level Rise is not an abstract notion for our Village, but an intimate encroachment that is growing more evident on a yearly basis. One may debate the root cause, but the trend is undeniable. Over 150 years of data show that the mean sea level is rising at a rate of over one inch per decade. More alarming are predictions for this trend to accelerate, dependent on the increased rate of melting glaciers and potential changes in ocean currents.

Rising sea levels will impact the future of our Village. More areas of the Village will be covered by tidal water more often, and storms will bring on higher flood levels and damage to public and private property. As Piermonters, we have learned to live with the Hudson, and this document outlines a variety of tools that would enable us to continue to thrive along its banks throughout the next 75 years and beyond. I ask the current Village board to adopt these findings and urge future Village boards to heed the recommendations to become a more resilient Piermont.

My heartfelt thanks to the members of the Task Force - for their tireless effort, thoughtful attention and dedication to the process of developing this document. I also wish to thank the NYS DEC and Hudson River Estuary Program for their support of this effort, and to their representatives for their attendance and input. Lastly, this would not have been possible without the collaboration, steady guidance and project management of Scenic Hudson and the Consensus Building Institute. Their assistance was invaluable to the success of this process and I am most grateful for their partnership.

*- Chris Sanders
Mayor, Village of Piermont
September 11, 2014*



EXECUTIVE SUMMARY

Nestled between the northern extension of the Palisades and the Hudson River, Piermont is a village of approximately 400 acres and 2,500 residents. Piermont's unique location on the banks of the Hudson River and the mouth of the Sparkill Creek is perhaps its greatest asset and, at the same time, poses a significant challenge. The same confluence of waterways and land that has attracted residents and commerce to the Village presents the risks of waterfront flooding and, over the long term, sea level rise.

When Hurricanes Irene and Lee hit in the late summer of 2011, the Village of Piermont experienced significant flooding driven by stormwater flows in the Sparkill Creek and storm surge from the Hudson River. Just over a year later, Superstorm Sandy hit the northeast, bringing with it a historic coastal storm surge and additional flooding. The village endured Sandy without loss of life, but with severe damage along its waterfront to private homes, marinas, boats and businesses. One hundred fifty homes were flooded; many business were forced to close for weeks and even months.

The village has been working actively to envision and promote a comprehensive revitalization and recognizes the central role of the waterfront in the community. When Superstorm Sandy arrived, the Village of Piermont was in the midst of updating its Local Waterfront Revitalization Program. The intersection of the Village's revitalization goals and the community's new appreciation of the risks to the waterfront from flooding and sea level rise highlighted





the need for better information about future flood risks as it advances its objectives. Seeking solutions, the Village, together with its partners Scenic Hudson and the Consensus Building Institute, sought and was awarded support from the New York State Department of Environmental Conservation's Hudson River Estuary Program, for an initiative to address coastal flooding risks related to sea level rise.

The Piermont Waterfront Resilience Task Force project was formally launched by Mayor Sanders in November 2013 to begin creating a safer, more vibrant waterfront. The Task Force worked to develop a shared vision for the waterfront and a set of concrete steps that will move Piermont toward its vision for greater resilience. Throughout, the Task Force sought to align immediate recovery actions with a longer-term perspective of how the Village will adapt to rising seas and higher floods.

The Task Force, with its project partners and with input from the public, has synthesized a list of recommendations which, if implemented by the village, can be used as a flood and sea level rise resilience action plan. This report details these recommendations and the studies that support them, which span policy and planning updates, capital investments, municipal operations and infrastructure, and future studies that will better position Piermont to begin taking action and to attract future support for waterfront improvements.

Planning for Piermont's resilience will be an ongoing civic conversation in the community for decades to come. With this report, the Task Force makes an opening contribution to that dialog.

Sea Level Rise and Planning for the Future

Along the Hudson River, from the Battery in Manhattan to the Federal Dam at Troy, sea level has risen approximately one foot over the past century. There is evidence that annual rates of sea level rise along the Hudson River have accelerated over the past two decades and will continue to outpace the global average.

After considering a range of sea level rise projections prepared by the New York State Sea Level Rise Task Force and the New York State 2100 Commission, the Task Force selected sea level rise values of 10" in the 2020s, 29" in the 2050s and 72" in 2100 for planning and analysis during the project.

year	2020s	2050s	2100
sea level rise projection	10"	29"	72"

The task force chose these projections for planning and analysis because it opted to develop solutions for the most severe case and guard against under-preparation, not because it considered these to be the most likely sea level rise outcomes. Indeed, slower rates of sea level rise are possible, or even likely. In this case the use of higher projections would mean that the projection levels would be reached at some later date than those used by the Task Force, as future projections resulting from increased greenhouse gas emission continue to rise after 2100.

Vulnerability of the Piermont Waterfront Area

Public health and safety, damage to assets, business downtime, and accessibility are some of the top concerns motivating Piermont to take action against future flooding events that are likely to increase

due to more frequent intense downpours, storm surge events, and sea level rise that exacerbates the impact of both upland and coastal flooding.

The financial impact of Hurricane Sandy on Piermont exceeded \$20 million. Risk and vulnerability assessments suggest that, over the coming century damages to structures alone could total nearly \$200 million, with many homes permanently impacted and several key public assets like the sewage treatment pump station, the Fire Department's boat house, the Department of Public Works, and many roads increasingly at risk, if no action is taken.

The financial impact of Hurricane Sandy on Piermont exceeded \$20 million. By the end of this century damages could dwarf that amount if no action is taken to mitigate and adapt to climate change.

A Vision of a Resilient Piermont

With input from the public and a range of stakeholders, the Task Force identified several key principles that should guide Piermont's adaptation actions now and into the future. A resilient Piermont will...

- adapt gradually to avoid and minimize risks
- help its residents and businesses to recover quickly from floods and storms
- maintain the Village's relationship with the Hudson River
- maintain a vibrant business district and local economy.
- foster and build community
- be environmentally responsible
- be a model for others

Adaptation Strategies

Examining a wide-range of adaptation types and tools, and evaluating their strengths and weaknesses, was an important part of the Task Force's process for considering both short-and long-term adaptation alternatives for the Village of Piermont. Many tools exist to implement community-wide adaptation, from land-use planning and regulation, urban design, and coastal engineering to market- & tax-based incentives, grants from state and federal agencies, spending, and public outreach actions.

The Task Force worked to launch the process of planning and designing a more resilient waterfront, not to complete it. Task Force members learned about the range of conceptual, architectural, and regulatory approaches to adaptation currently in practice or development in other coastal areas in the United States and abroad. With this perspective, the Task Force developed and evaluated a portfolio of "Adaptation Alternatives" - alternate scenarios for how specific neighborhoods or the entire Village might reduce risks and achieve the vision statements and principles.

Photo-simulation of a vegetated levee, constructed marsh and recreational park along the north side of the Condominium neighborhood.

A wider range of Adaptation Alternatives and Benefit-Cost Case Studies were considered by the Task Force and are available in this report and in its Supplemental Materials.



TASK FORCE RECOMMENDATIONS

The Task Force recommends the following proactive steps toward a safer, vibrant waterfront and a more resilient Piermont, both for the next storm event and for a future of rising seas.

The recommendations target a broad spectrum of Piermont's physical, natural and social fabric and are focused on actions that tie immediate recovery needs to long-term adaptation goals.

Each recommendation is phased to a specific timeline and implementers have been identified to establish clear lines of responsibility.

Most importantly, these recommendations comprise an integrated set of actions that will make substantive contributions to the well-being of the community and its residents.

- 1. Improve emergency communications in the Village.*
- 2. Develop a comprehensive emergency management plan.*
- 3. Work with local utilities, in particular electric, gas, water, sewer, and telecommunications, to improve resilience.*
- 4. Advocate and coordinate with Rockland County and Orangetown to increase infrastructure, access, and stormwater resilience.*
- 5. Conduct a risk and engineering review to analyze adaptation, relocation, building and decommissioning options for municipal infrastructure.*
- 6. Work through the Rockland County Multi-Jurisdictional Natural Hazard Mitigation Plan to position Piermont for resiliency actions and funding opportunities.*
- 7. Establish a permanent Flooding and Storm Resilience committee.*
- 8. Proceed with application to the National Flood Insurance Program's Community Rating System (CRS) and evaluate other options to reduce the impact of increasing flood insurance rates on the community.*
- 9. Create and implement a Floodplain Management Plan.*
- 10. Incorporate findings/recommendations of the Piermont Waterfront Resilience Task Force into the new Local Waterfront Revitalization Program.*
- 11. Identify properties which may be of high priority for acquisition/relocation in long-term resiliency plans and implement a fund to acquire such properties upon their availability.*
- 12. Continue exploring long-range adaptation possibilities for the Village of Piermont, including structurally and economically viable solutions that offer a long-term pathway and can help guide wise near-term investments.*
- 13. Create a Municipal Village Master Plan that incorporates flood resilience, adaptation planning, and other land use issues.*

14. *Adopt and periodically update sea level rise and flood projections recommended by New York State and FEMA for municipal decision making and planning purposes.*
15. *Train all municipal staff and emergency managers in the use of the Task Force's risk and vulnerability assessments, sea level rise projection maps, as well as changing coastal hazards risks such as storm surges.*
16. *Research financing options for supporting flooding adaptation, mitigation and protection measures.*
17. *Integrate departmental budget requests into a village-wide Capital Improvement Plan.*
18. *Consider cost-benefit analyses and long-term flood risk due to sea level rise and stronger storms in asset design and the prioritization of strategies to manage key municipal assets.*
19. *Initiate Climate Smart Communities actions and participate in the program's new certification program.*
20. *Post flood preparedness, flood-resilient building, and mitigation resources on village website.*
21. *Provide presentations and public training opportunities to inform the public of flood-related issues and solutions.*
22. *Design and install high-water-mark signs throughout the 100/500 year floodplain areas to educate the community about flood risk and refer interested residents/property owners to additional sources of flood preparedness information*
23. *Share the findings of the Piermont Waterfront Resilience Task Force and collaborate with other waterfront communities to improve understanding of and planning for coastal hazards such sea level rise and storm surge.*
24. *Advocate to the state on climate change and flooding resilience issues.*

Implementation: Top Priorities

The Task Force has prioritized the following recommendations as the most strategic to tackle first, both for near-term recovery and to set the stage for long-term resilience.

Establish a permanent Flooding and Storm Resilience Committee to follow up on implementing the Task Force recommendations.

Improve emergency communications

Incorporate Task Force findings/ recommendations into the Local Waterfront Revitalization Program (LWRP) update.

Develop a Comprehensive Emergency Management Plan.

Work with local utilities to improve resilience.

Identify financing options, including grants, for supporting flood adaptation, mitigation and protection measures.

