



Staten Island residents rescued during Sandy

Credit: Michael Kirby Smith/The New York Times

# Introduction





After Sandy, volunteers helped out at Beach 41st Street Houses in Far Rockaway.

**When Hurricane Sandy roared into New York on October 29**, it drove the waters around our city right up to, and then over, our doorstep. Forty-three people died in the deluge and untold numbers were injured. Along the shoreline the storm surge smashed buildings and engulfed entire communities. It flooded roads, subway stations, and electrical facilities, paralyzing transportation networks and causing power outages that plunged hundreds of thousands into darkness. Fires raged. Wind felled trees. Heartache and hardship—and at least \$19 billion in damage—are the storm's legacy.

An unpredictable series of meteorological phenomena combined to create this disaster—Sandy arrived during a full moon, when the Atlantic tides were at their highest; the storm was enormous and when it collided with other weather fronts, it turned sharply and made land-fall in New Jersey, subjecting the city to onshore winds that drove its devastating storm surge right into our coastal communities.

When the waters receded, New York was, in many ways, a changed city. Certainly the lives of many New Yorkers had changed. Friends and loved ones were lost. Homes that families had passed down for generations were gone. Businesses that New Yorkers had started from scratch were wiped out. New Yorkers looked around and saw beloved parks and beaches in ruins. Even residents of inland areas that escaped direct storm damage were affected when workplaces and schools could not open because of power outages. The subway system was shut down. In some places, the mail could not be delivered.

New Yorkers across all five boroughs felt more vulnerable. Sandy was a cruel reminder of how destructive coastal storms can be in our dense urban environment—storms that, with climate change, are expected to increase in intensity.

Under Mayor Bloomberg's leadership, relief and recovery efforts kicked in immediately. Teams from countless City agencies fanned out across New York, removing debris and beginning the process of restoring what had been lost. The Bloomberg Administration created the Mayor's Office of Housing Recovery Operations to work with the City's Department of Housing Preservation and Development and other agencies to rebuild and repair homes and return people who had been displaced to safe, sustainable housing. It established loan and grant programs to help businesses clean up and reopen their doors.

New Yorkers themselves also rose to the occasion. People from all boroughs streamed to the Rockaways and Red Hook, to Coney Island and Staten Island, and to other hard-hit communities, bringing with them food, fuel for

## Public Engagement

*"To succeed, the plans must include the input of the people who live and work in these communities—and they will. Members of the community will assist in shaping and implementing each community plan—and that will be just the beginning of our work."*

— Mayor Michael Bloomberg, announcing the Special Initiative for Rebuilding and Resiliency on December 6, 2012

Public outreach has been a priority for the Special Initiative for Rebuilding and Resiliency (SIRR) throughout the formulation of *A Stronger, More Resilient New York*. SIRR consulted elected officials, community leaders, and the general public in areas impacted by Sandy, as well as citywide organizations with a stake in sustainability and resiliency. This outreach has been conducted with numerous stakeholders:

<b>Government Partners Engaged</b>	30+	City, State, and Federal Agencies
<b>Public Officials Briefed</b>	65+	Elected Offices
	19	Community Boards
<b>Organizations Briefed</b>	320+	Business, Civic, Community-Based, Environmental, Faith-Based, and Labor
<b>General Public Engagement</b>	11	Public Workshops
	1,000+	New Yorkers Briefed In Person

Building a more resilient New York in the face of long-term climate change is work that will take years beyond the publication of *A Stronger, More Resilient New York*. Ultimately it is the public who will carry forward this plan. SIRR offers sincere thanks to those who participated in the development of the report, which we hope will benefit generations to come.



generators, and ready hands to help in whatever way they could. Volunteers went door-to-door in high-rise buildings to assist the elderly or those with disabilities left stranded when elevators stopped functioning. They worked with the National Guard and the Red Cross to distribute emergency supplies.

But even as the people of the city focused on Sandy and the destruction it had wrought across the five boroughs, it became clear that relief and recovery efforts alone would not be a sufficient response to this disaster. It was critical for the City also to turn simultaneously to the future and to prepare—not just for “the next Sandy,” and not just for hurricanes and storm surge. It was essential to redouble the broader preparations for climate change begun with PlaNYC.

In December 2012, Mayor Bloomberg delivered a speech announcing a major new effort to ready the city for the future. *A Stronger, More Resilient New York* is the response to the Mayor’s call to action. The nearly \$20 billion plan contained in this report (towards which the City will contribute up to \$1 billion in new

funding) includes over 250 initiatives. Together these initiatives will further protect the coastline—our first defense against storms and rising sea levels—as well as strengthen the buildings in which New Yorkers live and work, and all the vital systems that support the life of the city, including our energy grid, transportation systems, parks, telecommunications networks, healthcare system, and water and food supplies. Meanwhile, for the areas of New York that Sandy hit especially hard, this plan proposes local rebuilding initiatives that will help these communities emerge safer, stronger, and better than ever.

The underlying goal of this report is resiliency. That is, to adapt our city to the impacts of climate change and to seek to ensure that, when nature overwhelms our defenses from time to time, we are able to recover more quickly.

In short, we have to be tough.

And toughness, as we all know, is one of the defining traits of New Yorkers.

In just the first few years of this century, we have been through the September 11, 2001 terrorist attacks, financial crises and blackouts, and now, Sandy. With each challenge, we have become more united as a city.

We must come together again with an even stronger commitment to slow the progress of climate change while simultaneously preparing for the changes already evident around us—and those yet to come.

If we embrace this plan today, we will be positioned to meet the challenges that climate change may bring tomorrow, and almost certainly will bring in the years and decades ahead. If we take action now, we will make New York City stronger, safer, and more resilient—not only for our own benefit, but for the benefit of future generations of New Yorkers.

**The time has come to make our city even tougher.**



Volunteers in New Dorp Beach in Staten Island

Credit: Katie Orlinsky/The New York Times



# What Resiliency Means

It was October 30, 2012, the immediate aftermath of Sandy. Homes and businesses across the Rockaways lay in ruins, devastated by the storm's surge. Yet a new oceanfront housing development named Arverne by the Sea stood as a stalwart survivor. While planning the development, the City had required the developer to install a wide, planted dune system on the beach in front of the site and to elevate homes, incorporating special drainage features. During Sandy, the dunes absorbed the storm's destructive waves. The site's elevation and drains kept water out of most homes. All of these measures protected property and possibly saved lives.

Over in Southern Brooklyn, meanwhile, the Shorefront Center for Rehabilitation and Nursing Care was able to remain open, despite the area's widespread inundation. Constructed to City standards intended to protect against storms just like Sandy, the facility not only was a safe haven for its residents, it also sheltered members of the wider community whose own homes were flooded.

And in Lower Manhattan, Battery Park City, too, stood strong even though it fronts directly on the Hudson River. When built, its site had been raised, and its buildings were set back behind parks and an esplanade. As a result, residents and businesses emerged from Sandy largely unscathed.

The threats of climate change are significant and growing. Others have said that the only answer to these threats—rising sea levels, powerful storms, and other chronic and extreme events—is to wall the city in, or to retreat from the shore. But the success stories above—and many other examples across the five boroughs—make clear that it is possible to build a more resilient New York.



Arverne by the Sea was minimally affected by Sandy.

Credit: Gerard Ronski

A resilient city is not one that is shielded from climate change all of the time—because, sadly, when it comes to nature's powerful forces, that is simply not possible. But a resilient city is one that is: first, protected by effective defenses and adapted to mitigate most climate impacts; and second, able to bounce back more quickly when those defenses are breached from time to time.

It is based on these convictions that we have formulated the following resiliency principles—principles that underlie all aspects of this report. These are the principles that should also guide our city in the years and decades ahead as we all work together to create a stronger, more resilient New York:

**We can embrace our coastline.** A strong coastline—with vibrant waterfront neighborhoods, critical infrastructure, and cherished natural and cultural resources—is essential to New York's present and future. We can fight for and rebuild what was lost, fortify the shoreline, and develop waterfront areas for the benefit of all New Yorkers. The city cannot, and will not, retreat.

**We must plan ambitiously.** Even with limited resources, we must make investments in smart, effective protections for our city, modifying and expanding strategies as we learn more about the threats we face and piloting projects that can be scaled up over time.

**We will make New York a stronger, more resilient city.** The city must be able to withstand the forces of climate change and bounce back quickly when extreme weather strikes. Climate change affects all New Yorkers. Not just those whose homes or businesses were flooded during Sandy, or those in the South Bronx or East Harlem or a hundred other neighborhoods that could be struck during a future storm, but every man, woman, and child who may not be able get to work or school because the subway is shut due to flooding, or whose health is at risk during a prolonged heat wave or power outage—that is, every man, woman, or child who calls New York City home.

Out of the heartbreaking catastrophe that was Sandy has come this *can-do, must-do, will-do* plan.

**The time to act on this plan is now.**



Dunes around Arverne By The Sea absorbed the storm's destructive waves.

Credit: Gerard Ronski





New Yorkers return to the Coney Island Boardwalk in full force on Memorial Day weekend 2013

Credit: Jim McDonnell