FIVE YEARS LATER:
ARE WE LEARNING FROM THE STORM?

THE IMPORTANCE OF INSTITUTIONAL LEARNING AND
COMMUNITY-CENTRIC APPROACHES TO BUILDING LOCAL RESILIENCE

A NARRATIVE OF SANDY-AFFECTED COASTAL COMMUNITIES IN NEW YORK CITY

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Dedication

      I would like to thank many key people, without whom, I would not have the richness of information or tenacity to write this thesis. I would first like to thank my mentor, Professor Kian Tajbaksh, for helping me mold my interests into a viable research question, and for all the valuable advice and resources to expand my knowledge and literature on resilience. My sincere gratitude to all my interviewees who provided me with a spectrum of their perspectives and personal stories that bestowed very real, human insights into how Hurricane Sandy impacted their lives, and the urgency with which amplifying local resilience needs to occur. I would like to thank my reader and *Design and Planning for Risk and Resilience* professor, Thaddeus Pawlowski, for providing me with his time and patience in reading and reviewing my thesis and giving me honest feedback through his experience and expertise working in the field.

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Ch. 1 Introduction

1.1 Abstract: Flood Risk, Vulnerabilities, and Resilience

Section 1.1 | Figure 1: Homes inundated by flooding from Superstorm Sandy
Photo Credit: Mario Tama/Getty Images

Climate change has posed tremendous threats to nations worldwide, and the impacts have been widely felt across the United States. In recent years, natural disasters have affected some of our country's most densely populated areas, leaving coastal areas vulnerable, many communities and businesses at-risk, and thousands struggling even today (Anderson, 2016). In fact, evidence shows that "beyond tearing apart physical infrastructure and claiming lives, natural disasters damage social bonds and community networks, debilitating communities even after infrastructure is rebuilt" (Landau, 2017). With the prevalence and frequency of natural disasters steadily increasing, the question of how to best build community resilience in a way that not only

mitigates hazards, but also significantly reduces vulnerabilities and social impact is more crucial than before.

Because the topic of disaster resiliency is fairly young and has only recently become an organizing principle of disaster policy and practice, the evidence base regarding best practices for implementing resilience at the local level is still emerging. According to Susan Cutter and Christopher Emrich, "less attention has also been attributed to scholarly analyses of policy learning and change" given that recovery is still the least understood (and least studied) part of the emergency management cycle (Cutter & Emrich, 2015). However, research shows that recovery is most difficult in areas where "people do not mobilize the internal and external resources available to address the vulnerabilities and issues they face" (Dieye, 2012). Yet, according to *Disaster Resilience: A National Imperative,* building community resilience in the face of disaster risk can also have multiple benefits for a community even in the absence of a disaster, helping resolve "mundane challenges" as well (NAP, 2012). In such cases, community-based organizations can be an important contribution to cultivating resilient efforts.

In the case of Hurricane Sandy, critical lessons demonstrate that underlying issues of lack of trust and the absence of sustainable engagement with community-based organizations create significant disparities in resilient outcomes following emergencies and disasters (Plough, 2013). Recognizing this, over the past five years since Hurricane Sandy, New York City policymakers, researchers, and planners have been exploring ways in which top-down resiliency policy along with innovative community-driven projects can be integrated to foster social bonds, community

networks, and organization within struggling communities. This study aims to narrate how City and local agencies have restructured their priorities to focus on resilience since Sandy, and understand the importance of community-based organizations and community-centric approaches in facilitating recovery efforts and strengthening local communities for long-term sustainability.

1.2 Organization of Study

Section 1.2 | Figure 2: A man walks along the beach through the debris-stricken and heavily damaged Rockaway neighborhood in Queens, where a large section of the iconic boardwalk was washed away in November 2, 2012 in New York. With the death toll over 70 and millions of homes and businesses without power, this image is representative of the millions who struggled to recover from the effects of floods, fires, and power outages brought on by Hurricane Sandy. Photo Credit: Spencer Platt/Getty Images

The United Nation's Sustainable Development Goal to "Empower Inclusive, Productive, and Resilient Cities" proposes that all cities develop "participative, accountable, and effective city governance to support rapid and equitable urban transformation" (Revi & Solecki, 2013). Although this may be effective, if people do not mobilize the internal and external resources available to address the issues they face, then whether or not these top-down policies or initiatives take place, offers no baseline value (Dieye, 2012). It is not only important that community-based insight and contribution is incorporated into plans, and resilience policies are implemented in the

City, but also that investment in the community encourages social engagement and cohesion, in a way that stands the test of time.

Mark Pelling's definition of resiliency as *adaptive transformation* is what we will be referring to in this paper – "the ability of a City or a community to open adaptive possibilities for organizations or individuals, either forced by systems failure or chosen in anticipation of collapse and movement to a novel socio-ecological state" (Pelling, 2011). This interpretation ascribes transformation to "adaptive actions that have the ability to shift existing systems onto alternative development pathways," even before resistance and challenges to current adaptive pathways are met (Pelling, 2011). Ben Wisner argues, this adjusted view of transformation forces decision-makers to look "past the concerns of proximate risk, into more structural or root causes, formed by social, cultural, and economic relationships" (Wisner et al 2004) that ultimately "help justify choices made between incremental and transformative agendas of change" (Pelling, 2011). In an effort to learn more about the nuances in identifying transformative modes of change, this thesis strives to contribute to resilience literature with the following main research inquiries:

Over the past five years since Hurricane Sandy, how have local and governmental agencies in New York City realigned resilience strategies and priorities, and what lessons have we learned? How effective are community-based organizations in filling in the gaps in marginalized areas where top-down resilience policies and strategies prove insufficient?

Structured in four parts, this thesis will begin with literature review focused on how resilience theory was formulated, and how lessons from Hurricane Katrina have influenced the ways policymakers responded after the Superstorm Sandy. Second, through qualitative interviews with government-affiliates, policymakers, developers, planners, and technical consultants, this study will narrate how the City and local agencies have realigned their resilience work since the storm, through lessons learned over the past five years. Third, using these lessons learned, we will observe four distinct resilience strategies in Sandy-affected coastal communities that demonstrate the value of community engagement and organization or lack thereof. Lastly, conclusions will then address best practices embodied from all three steps.

Ch. 2 Understanding Superstorm Sandy: Response and Recovery

2.1 Learning from the Past: Lessons from Hurricane Katrina

Section 2.1 | Figure 3: Entire neighborhoods were entirely destroyed after Hurricane Katrina hit. Photo Credit: Rick Wilking/Reuters

Reflecting back, Hurricane Katrina was a huge turning point in disaster management and recovery, and a great amount of literature exists underlining major flaws in red tape, response and recovery phases, leaving vulnerable communities in precarious conditions without resources or aid. However, disasters like Superstorm Sandy, Hurricane Katrina, and many other ones that have preceded them have highlighted a pattern during recovery; which is, during the gap period immediately after such a shock, it is community response that strongly determines the tenacity and duration of recovery and resilience – reminiscent of Eric Klinenberg's findings based on

the 1995 Heatwave in Chicago. In addition to state and city policies focused on improving physical infrastructure, it is important to note that, "social connections, cohesion, and networks visible after disasters can also make ordinary lives richer and more resilient" (Remes, 2015). In addition to improving recovery policies, government should – as a matter of integrating resilience within communities – build communities that foster and encourage connection and solidarity (Remes, 2015).

Hurricane Katrina marked a period in time where disaster management and recovery in the United States was put to the test; and on August 29, 2005, the entire Mississippi coastline was affected with severe storm surges and floods from one of the deadliest hurricanes to land in the South; according to reports, "1,833 people across five states were killed, $108 billion attributed to property damage," and millions of people were left homeless and displaced along the Gulf Coast in New Orleans (Zimmermann, 2015). Though the hurricane was foreseen as far more dangerous than its wind speeds and intensity suggested, the United Stated federal government, the Federal Emergency Management Agency (FEMA), and the Army Corps of Engineers were thoroughly unprepared for what was to come.

The aftermath of Hurricane Katrina portrayed major flaws in disaster preparedness, recovery and relief from the federal, state and local levels. On one hand, there was widespread confusion among federal officials about designated roles and responsibilities, and on the other hand, knowledge failure in terms of expertise and coordination that led to barriers forming between layers of government, that ultimately paralyzed command and control units from acting efficiently. The Federal Emergency Management Agency (FEMA), which focused on community assistance, had

emergency supply failures and was completely incompetent in delivering aid to struggling communities. Overall, indecisions in part by government officials, arbitrary organization, fraud and abuse in allocation of tax money for immediate aid, culminated in a disastrous delay in the recovery process, leaving many vulnerable communities to fend for themselves (FEMA).

Perhaps the biggest challenge during Post-Katrina recovery was the uncertainty of who was in charge, and this led to a cascading set of consequences onto marginalized communities. The federal government's emergency response system was too complex, with multiple agencies overlapping roles and responsibilities, and confusing coordination on the ground. Top-down decision-making was far too centralized and lacked the "efficiency, learning, innovation, and quality performance," that is generally required to facilitate recovery (HUD, 2012). At the time, FEMA lacked the local expertise and knowledge needed to critically evaluate the situation, and lost opportunities to mobilize community-based organizations, utilize existing resources, and tap into local businesses to form effective partnerships, that would have provided quicker and more efficient aid to the locals.

On the contrary, government agencies like the Coast Guard helped decentralize operations and facilitate decision-making, to act rapidly and deploy rescue operations on the ground. According to the Department of Housing and Urban Development (HUD), "existence of cross-state agreements for sharing personnel and assets helped provide relief from medical care to law enforcement, and was considered invaluable by both Louisiana and Mississippi officials" (HUD, 2012). While "non-profit organizations like The Red Cross, Charity Hospital, and The Salvation Army housed thousands of

evacuees in shelters and served meals to hurricane survivors, for-profit businesses

such as Walmart, and Home Depot delivered meals, cash donations, free merchandise,

and a promise of jobs" for survivors that had lost everything to the storm (HUD, 2012).

However, over time, the delay in "infrastructural investment" such as housing, schools,

local businesses, or aid to rebuild for poor communities led to "poverty-stricken

neighborhoods, major displacement, and even forced many people to move out of

State" (HUD, 2012). Urban renewal projects, often times targeting poor neighborhoods,

further exacerbated the issue by victimizing survivors and pushing them out. Hurricane

Katrina, although physically catastrophic, established and catapulted the need for

resilience in policies, plans, and multi-scalar government structures. Moreover, it

highlighted the need for community-based resilience through innovative programming,

local partnerships, and equitable community participation to spur more effective and

longstanding change.

Section 2.1 | Figure 4: Most homes in the seaside community were inundated by the ocean
storm surge caused by Superstorm Sandy.
Photo Credit: John Moore/Getty Images

Less than a decade later, on October 29, 2012, while the United States was still recovering from the shock of Katrina, Superstorm Sandy struck the coastal northeast. The storm caused unprecedented destruction as catastrophic storm surges wreaked havoc across the East Coast (Salvatore and Kattalia, 2012). Though Hurricane Katrina was deemed "deadlier" than Hurricane Sandy, Governor Andrew Cuomo termed the latter "more impactful" overall since its magnitude, size, and scale impacted a broader region. Hurricane Sandy was unique in direction and timing; the storm took a "left hook" turn into the coastal northeast, "striking at high tide," when water levels were already "elevated five feet higher" than normal (M. Umberger, personal communication, January 27, 2017). According to HUD's *Hurricane Sandy Rebuilding Strategy* report, Hurricane Sandy became the largest Atlantic hurricane to hit the east coast, "costing over $65 billion in damages and causing more than 200 deaths in seven countries, including 132 deaths just on the US mainland" (HSRS, 2013).

However, learning from past challenges in preparing for, and aiding recovery efforts after Hurricane Katrina, the federal government during Hurricane Sandy disseminated control to FEMA and subsidiary departments, and began to place staff and assets in the predicted impact areas before the storm made landfall. They also worked with state counterparts to coordinate potential emergency response and relief. And this time, "before the impending storm hit the east coast, President Obama signed emergency declarations for six states, allowing FEMA to directly transfer resources to state, regional, and local organizations to make the necessary community-adaptive preparations in advance of the storm" (HUD, 2012). FEMA was more proactive than reactive, and a special Hurricane Sandy rebuilding task force was created to minimize

disruptions, increase coordination among government agencies, and disseminate aid to local communities in a smooth and coordinated fashion. Individual states also did their part to anticipate response by "leveraging existing relationships with the private sector, community-based, philanthropic, media, and other organizations to communicate with residents and business owners to act as first-responders on the scene" (HUD, 2012). Local coordination and cohesion proved to be the most effective during this critical time.

Looking back, Hurricane Sandy marked a significant shift in the way recovery and preparedness had evolved less than a decade since Hurricane Katrina hit. Though Sandy recovery revealed its own flaws, it demonstrated clarity within the federal government structure, and this in turn allowed for quicker access to federal resources and increased communication and partnerships between federal, state, and local agencies. Post-Sandy brought forth the topic of adaptation through learning, and the importance of resiliency efforts that had long been debated in academic, corporate, and policy circles. Most importantly, Post-Sandy marked a period in time where resilience terminology changed the way people began to look at disaster recovery. With hurricanes and flood risk on the rise, resilience in New York's coastal metropolitan region no longer meant transforming things back to the way they were, but adapting and transforming communities in a way that 'leapt forward' rather than 'bounced back'.

2.2 Growth of Resilience in Emergency Management

Section 2.2 | Figure 5: Building resilience after Hurricane Sandy.
Photo Credit: Emily C. Dooley, Oct. 2014

To understand resilience as it is today, it's important to see how the term has transformed over time. The term "resilience" was first used to describe the stability of communities and their resistance to external shocks. It is not only the ability of an ecosystem to return to its current state after a shock, but also how much disturbance it can withstand while still remaining within critical thresholds (Pelling, 2011). According to resilience expert Daniel Aldrich, resilience at the community level can be defined as "the collective ability of a neighborhood or geographically defined area to deal with stressors and efficiently resume the rhythms of daily life through cooperation following shocks" (Aldrich, 2015).

Many researchers have analyzed and drawn from narrower and broader visions of resilience to model conditions in urban planning, especially pertaining to communities recovering from shocks and stresses in the urban environment. Because regions are "complex systems of overlapping economies and social and political networks", it is unsurprising that resilience has become a "key framework for analyzing regional capacity" (HUD, 2012). In the context of social resilience, Pelling argues that resilience is a community's "ability to persist, to adapt," and the ability of a system to survive and thrive in the face of disturbance (Pelling, 2011). This kind of social resilience offers stability and support within a community during the face of a disaster, and is advantageous during recovery and beyond.

Mark Pelling's framework of resilience is a great example, because he focuses on the term as a means of advancing forward, not just simply 'bouncing back'. He speaks of adaptation as resilience – "a form that seeks to secure the continuation of desired systems functions into the future in the face of changing context, through enabling alteration in institutions and organizational form" (Pelling, 2011). Pelling's classification of adaptation practices "identifies three levels of adaptation: resilience, transition and transformation" (Hordijk et al. Resilience) and this framework is very helpful in establishing the need for intersectional and interdisciplinary interventions that practice not only physical resilience through infrastructural changes, but also social capital, social cohesion and ecological resilience as well. It is important to critically analyze structure and community in places, because as we learn from disasters through technical resilience policies, whether we have truly learned or not from past lessons is

more nuanced, case-sensitive and requires more granular insight into organization and networks at the community scale.

Hurricane Sandy marked a threshold for recovery that not only acknowledged the importance of multi-scalar resilience, but also the need for adaptive and transformative policy that would foster community growth at the local level. Disasters act as triggers that unveil inherent vulnerabilities and spur societies to reassess community assets, resources, and opportunities to advance the design and efficacy of vulnerable communities. The sudden destruction of physical infrastructure and archaic systems "enables significant reorganization of services and organizational structures to create more optimal measures" (NCBI), and dispense with those that may have been thwarting communities from reaching their full potential. By doing so, additional resources can then be carefully mobilized with the specific intent of assisting communities with needs-based factors that are related to rebuilding mentally, socially, ecologically and physically.

It's important to note that after Hurricane Sandy, resilience became a national priority, causing the release of many plans and policies focused on rebuilding affected cities and communities within the New York metropolitan region, with the mindset of building back stronger. Alternatively, Hurricane Katrina and Superstorm Sandy can be seen as lessons and influences on "ongoing practices that seize opportunities of reinvestment" to address long-standing problems that compromise the resilience and overall welfare of local communities (NCBI). Reports and plans like *One City, Rebuilding Together* from the Office of Housing Recovery Operations, *SIRR Report* from the City*, Hurricane Sandy FEMA After-Action Report,* and Mayor De Blasio's *One*

New York – The Plan for a Strong and Just City, all worked to implement resilience on many scales to address issues from revamping policies to community building on the ground; however, many of these strategies lacked multiple benefits. As Moser addresses in his piece on *Global Transformation in a New Global Urban Agenda, "*while progress has been recognized in soft sectors, such as health and education, this has been less the case in hard sectors such as urban infrastructure, land and housing." In efforts to strengthen this area, FEMA created an Innovation Team – "a multi-sector, cross-functional group made up of people from various backgrounds, including non-profit and international organizations, volunteer groups, businesses, and government, as well as concerned community members- to creatively solve problems for survivors." In addition, City agencies such as the Department of City Planning, New York City Emergency Management, Office of Long Term Sustainability (currently the Office of Recovery and Resilience), Housing Preservation Department, and the City's Economic Development Corporation, employed new staff with expertise, cross-cultivated knowledge, and deployed their own recovery and resilience strategies City-wide to identify vulnerabilities in impacted coastal communities for multi-scalar resilience (T. Pawlowski, personal communication, February 21, 2017). This was crucial, because although policies and plans were being implemented to build resiliency, these measures were not solely survivor-centric; whether implementation of these policies into practice truly helped those vulnerable in the long term, always remained in question. While these efforts eased the recovery process for a large number of affected individuals, opportunities to streamline processes to better serve survivors' needs remained outstanding.

Section 2.2 | Figure 6: Most homes in the seaside community were inundated by the ocean storm surge caused by Superstorm Sandy and some remain damaged even a decade later. Photo Credit: Spencer Platt/Getty Images

To this day, many Sandy-affected regions face numerous roadblocks and challenges, however increasing their resilience at the community level may enable them to better withstand and adapt to the shocks and disturbances they may experience in the future. According to HUD, it is proven that "regions that anticipate the many challenges of protecting and improving existing assets and resources" will do much more to guard against stresses (HUD, 2012) that will affect our most vulnerable residents, and thereby exhibit greater resilience in the long-term. This is important, because due to a warming climate and rising sea levels, coastal communities such as those in Red Hook, Staten Island, Coney Island's shores, and Edgemere, are likely to experience more hurricanes, storms and flooding in the future. This puts coastal areas

within the flood zone as well as vulnerable communities in the region at high risk. In these cases, and more, it is evident that recovery policies and programs that simply address resilience through singular pathways for preparation or protection are not enough; further understanding and insight into how resilience programs and initiatives can provide multi-scalar efficacy to reap multiple benefits, need to be made.

Since Hurricane Sandy's devastating landing on the northeast border of the Unites States, many established programs such as the Rockefeller Foundation have established resilience as a top priority. Programs like 100 Resilient Cities, an organization pioneered by the Rockefeller Foundation, and Rebuild by Design, the international design competition tasked by President Obama's administration with developing innovative plans to protect New York from hurricanes like Sandy, are model organizations that strive to combine community-based design with collaborative research processes to create multi-faceted designs for long-term resiliency and growth (T. Eisenberg, personal communication, January 25, 2017). Rebuild by Design, through the Sandy Disaster competition in the aftermath of the hurricane, brought together more than 500 organizations - non-profits, universities, research academies - in cities and neighborhoods across the Metropolitan area, to collaborate in teams to map vulnerable floodplains, impoverished neighborhoods, and community assets; its main focus being to tackle challenges in ways that are community-driven, intersectional, and equitable in the way designs are produced, as they confront today's problems and plan for future risks (T. Eisenberg, personal communication, January 25, 2017). And as they state as their mission, "one of the keys to building urban resilience is to take the most effective tools - tools that have worked in other places" and tailor them to different regions

depending on need (J. Colon, personal communication, February 14, 2017). Learning

from past lessons helps hone generational skills to identify the best way to engage with

a community, identify its needs, and help mold best practice solutions to cater to them.

2.3 Purpose: Importance of Social Resilience

This first section will focus on the importance of a community-centric resilience approach, by analyzing existing literature and looking for links between policy, community integration, and disaster resilience. Many of the lessons learned from Hurricane Katrina and Superstorm Sandy have revolved around the importance of community sustenance and resilience, especially during the gap period immediately after the storm. In that crucial time frame, it was the strength of community organizing that produced the most effective results in terms of building the roots of resilience for a quicker recovery. While technical policies such as elevating structures or flood proofing homes are effective in producing tangible results, research shows that its the intangible elements such as social capital, social cohesion, and social networks that are the most difficult to cultivate on the ground, but are the most valuable in terms of sustainability and social resilience. Depending on the storm, physical infrastructural improvements and design processes are only as good as the communities that strongly advocate and compete for them. For historically fractured and severed communities, this means comprehending residents' needs and putting more investment in civic infrastructure and programs that foster community, stewardship, and community organization more than anything else. As Keith Hinds, Mayor of Portmore, Jamaica, at the Global Platform for Disaster Risk Reduction said, "To meet the goals of building a resilient city, we will need to commit significant resources at the local level. To do so in the midst of the economic challenges and in the face of scarcity of resources, will not be easy. But we have no option, we have to do it."

New York City's coastal neighborhoods face many unique problems compared to other disaster prone cities. Given residents' reliance on public transit, geographically isolated communities like Red Hook and the Rockaway peninsula are especially vulnerable sites during emergencies (Williams, 2014). During Hurricane Sandy, mandatory evacuation orders were issued 20 hours prior to the storm, while public transportation – subways and buses – shut down approximately 12 hours in advance (M. Umberger, personal communication, January 27, 2017). This prevented many residents without vehicles, disabled, elderly, and children form evacuating easily, if at all. Additionally, due to a major power outage during the storm, bringing aid to these impacted communities became even more difficult when critical infrastructure was damaged or destroyed. However, the City sent emergency response teams to go door-to-door canvassing to support basic life-sustaining needs, and implemented commodity distribution points for food, water, and service centers. The recovery after the storm made it readily apparent that social cohesion, social capital, and community organization were critical factors in determining how well and how quickly a community could bounce back.

Social Cohesion

Social networks are key in determining who recovers better, stronger, and quicker from disasters. Thousands of people whose homes were damaged by Sandy lived in coastal neighborhoods that lacked strong support networks or community organizations capable of mounting a large relief effort. According to Eric Klinenberg, author of *Heat Wave*, a social autopsy of disaster in Chicago, these areas tended to be poorer, less educated than typical New Yorkers, and often minority communities with

weaker ties to their neighborhoods as well as to political power (Klinenberg, 2015). As Michael McDonald, head of Global Health Initiatives, observed, "what was actually happening on the ground was not under an incident command system, it was the fragile, agile networks that made a difference in situations like these. It's the horizontal relationships like the ones we are building that create security on the ground, not the hierarchical institution." Though governments, with their unmatched resources and capacity to coordinate large-scale initiatives, will do more than any other institution to shape our response to the climate crisis, Klinenberg believes that civil society will also play a significant role in determining who lives and who dies during disasters (Klinenberg, 2015). As planners, we can either develop robust social infrastructure in vulnerable neighborhoods that foster social networks, provide residents with accessibility to resources, and extend life both everyday and during disasters; or, we can confine resilience to complex rebuilding procedures, technical expertise, and longer recovery durations when flood waters come or sea levels start to rise. The latter pushes the process to extremes, admittedly putting tremendous stress and pain to already vulnerable populations and helping only those who can afford it. As Klaus Jacob, climate scientist at the Earth Institute, says, "we can't keep rebuilding after every disaster, we need to pro-build with the future of climate change in mind." Increasingly, governments and disaster planners are recognizing the importance of social infrastructure: the people, places and institutions that foster cohesion and support, and community resilience is now front and center in our approach (Kleinenberg, 2015).

Social Capital

Using Bourdieu's definition, social capital is viewed as "the aggregate of the actual or potential resources that are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (Bourdieu, 1985). And Lin further connects social capital to networks of relationships, defining it as "resources embedded in one's social networks" that can then be accessed or mobilized through social ties (Lin, 2001). In times of crisis, these social networks prove most helpful in terms of short-term recovery and response.
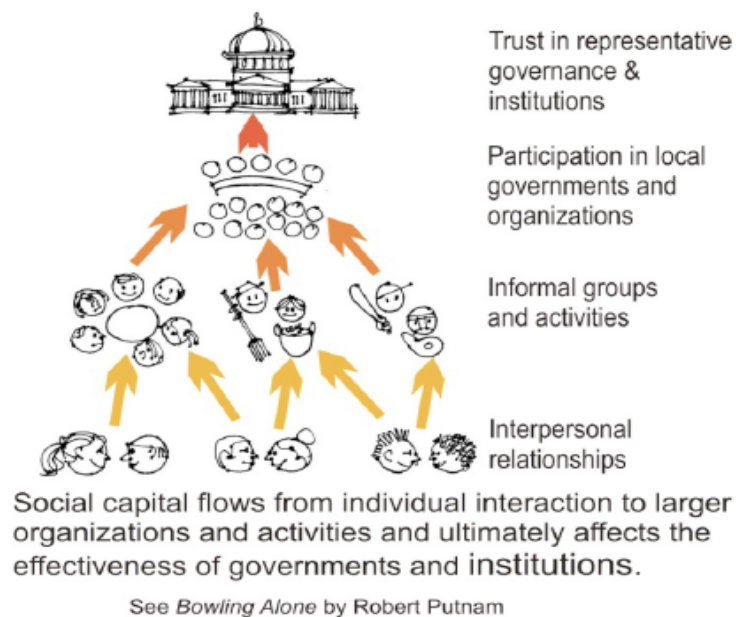
Section 2.3 | Figure 7: Robert Putnam's social capital flows diagram
Photo Credit: Putnam/*Bowling Alone, The Collapse and Revival of American Community*

In his book, *Bowling Alone*, *The Collapse and Revival of American Community*, Robert Putnam argues convincingly that effective democratic governance depends on "social capital" - the connections among individuals and their social networks, and the reciprocity and trustworthiness that arise from them. Because social capital is largely

generated at the individual, local and community levels, planners working at the community, municipal and regional scales can play a large role in "fostering the social capital that will facilitate more effective and inclusive governance" (Putnam, 2001). Since community bonds and relations impact how individuals react in the face of adversity, any interventions in communities should be sensitive of these inherent networks in order to generate positive social value. Putnam observes that "people's engagement, whether as individuals or in small groups, organizations, activities, or other means of social interaction, translate into participation in local government," and ultimately into trust in larger governmental and institutional organizations (Putnam, 2001). This is important to understand, since many struggling individuals Post-Sandy voiced feelings of distrust, betrayal, and animosity against current recovery and resilience efforts. Therefore, diversifying methods of community engagement to reach vulnerable and marginalized populations is highly important to foster equitable participation and trust. Though generating social capital isn't immediately profitable, and federal grants allocate limited funds to this area, this method of strengthening inherent community networks has been proven time and time again to yield long-term benefit.

Daniel Aldrich in his book, *Building Resilience: Social Capital in Post-Disaster Recovery*, observes that "population growth, increasing inequality, migration and development in hazard-prone areas, specifically coastal regions," place more people and poverty in harm's way and exacerbates vulnerability. Natural disasters such as Sandy threaten the strength and stability of urban communities, yet the difference between resilience and disrepair lies in the capacity of a community's social capital. Aldrich argues that In addition to having financial and physical assistance, communities

with an abundance of social capital were able to minimize the migration of people and valuable resources out of the area (Aldrich, 2012) while isolated individuals with fewer social ties were less likely to be rescued or take preventative action (Kleininberg, 2002). And though common disaster policy response to risks has been aimed at strengthening physical infrastructure - protecting assets, building up sea walls, elevating buildings, and conforming to building code - it is difficult to deduce if physical infrastructure will be able to reduce all risk and eliminate vulnerability; it will perform well for a limited timeframe, but struggling communities today demand even more. Furthermore, spending on disaster preparation is "highly dependent on political cycles," not necessity (Healy & Malhotra, 2009) and when priorities change, communities are exposed to long durations of flux.

Robert Putnam defines social capital broadly as the "features of social organizations, such as networks, norms, and trust that facilitate action and cooperation for mutual value" (Putnam, 1993). Combining Putnam and Aldrich's definitions of social capital, research has shown that the most effective form of social capital is by bridging ties. Access to opportunity and information assist in long-term recovery, however ties to social organizations provide both connection to an organization that can provide support through institutional channels and potential informal ties to individuals who may not be accessible through bonding social capital due to social divides. This is not only helpful in providing assistance when local governments fail to do their part in the interim, but also points to the importance of building long-term community resilience as well.

Community Organization

Community organizing and community-based organizations (CBOs), have also largely been successful in maintaining a focus on resilience through an emphasis on disaster protocol and keeping residents committed to a cause (Debucquoy, 2015). Community organizing is when local groups partake in the actual process of building resilience through an actionable cause, which generates networks and trust. Community groups often get involved in research, capacity-building, or infrastructure projects by advocating their priorities and "having a say in how funding can better be allocated" to projects that serve and benefit the community (Debucquoy, 2015). And even though City and local agencies have found this to be crucial component in terms of community recovery and resilience, many struggling communities Post-Sandy lack the power, strength, or outreach to fully organize. In this thesis, we will analyze the Red Hook Initiative in Brooklyn's Red Hook community, as an example of the strength and empowering nature of community organizing.

2.4 Organization of Study

The second section of this paper then dives into the institutional restructuring of agencies in New York City after Hurricane Sandy through interviews with public agencies, and highlights current influences and lessons learned from the storm. And the following chapter evaluates unique resilience projects in the Red Hook, Staten Island, Coney Island, and Edgemere communities, to provide examples of the robustness and potential of community organization in building local resilience.

Selected interviewees covered an entire range of respondents with a stake in or involved in post-Sandy policy-making, community-based planning, or community organizing. Interview questions related to community organizing for disaster preparedness and resilience before, during and after Superstorm Sandy; work that communities are currently engaged in; types of community engagement; financing alternatives; as well as challenges faced in the process, to answer key questions related to the importance of community-based organization and community-centric resilience. All interviews were then analyzed through thematic patterning related to shifts in how contexts, social factors, and entities have influenced current resilience discourse.

Ch. 3 Findings

From the eleven interviews conducted during the course of this thesis, eleven major findings were identified that signify the organizational restructuring, reformulation, and lessons learned from distinct decision-makers and planners after Hurricane Sandy. Interviewees ranged from government officials, emergency management personnel, to policymakers, planners, and architects who helped facilitate policy, financing, or design interventions on the ground. These eleven findings demonstrate immense growth within these agencies, and exude challenges observed through the process of strengthening communities to build local resilience.

3.1 Institutional Changes and Growth

Lesson 1: Ensure Consistent Collaboration of City and Local Agencies

Superstorm Sandy became the turning point for Federal disaster recovery, and for the local government and agencies in New York City that meant reorganizing, restructuring, and clarifying visions and goals. Thaddeus Pawlowski, an urban designer at the Department of City Planning states that, "the biggest challenge after Sandy was lack of coordination and collaboration, and in the aftermath of such a large shock, it was crucial that the City and related agencies were given discrete roles and responsibilities to ensure collaborative planning efforts were effectively addressing recovery and future storms" (T. Pawlowski, personal communication, February 21, 2017). Group collaborative efforts like PlaNYC and the SIRR report (Special Initiative for Recovery and Resiliency) were affirming in that the City of New York and the Mayor expressed their dedication and commitment to ensuring quick recovery and urgency for resilience in Sandy-affected communities across the coast. But what was more remarkable was the comprehensive process of several agencies working collectively on a very rapid planning process for recovery. These processes included hundreds of meetings, workshops with experts and technical consultants, and constant community engagement to build a basis of shared knowledge and resources. Collaboration with various stakeholders within communities enabled a much richer and resourceful process as well.

Lesson 2: Create Annual Hazard Profiles in Vulnerable Communities

Through these collaborations, zoning and land use were identified as crucial factors in determining hazards and vulnerabilities; and therefore, correlated government agencies should play a more active role in planning and engaging with communities for climate change. Additionally, collaboration with local experts, stakeholders, and invested members of the community with informal knowledge of inherent hazards and vulnerabilities of a place, could also be beneficial as the main engines for recovery and resiliency. In establishing community-based resilience, Jessica Colon from the Office of Recovery and Resiliency recommended from experience that "when hazard profiling communities, investigation needs to occur at a smaller level for physical defenses" (J. Colon, personal communication, February 14, 2017). We have to be granular on where the physical risks are to identify the best need-based interventions, given the specific set of vulnerabilities and stresses in that neighborhood. She explains that, "communities don't possess a master vision, as topographies in the urban fabric differ due to the uniqueness of each community" (J. Colon, personal communication, February 14, 2017). It is important not to generalize and carry over techniques, because hazards and vulnerabilities will most likely be different from one context to the next. However, if community members were trained to hazard profile along with technical experts, this would not only create local stewardship but would be extremely beneficial in terms of creating an active knowledge base and a common set of resources for to build from during emergencies.

Lesson 3: Strengthen Community networks and Community-Based Organizations

"Community-level success stories didn't come from government actions, but came from individuals taking leadership roles within these communities or CBO's stepping up to meet the needs of a community during a time of hardship."

<div style="text-align: right">-Thaddeus Pawlowski</div>

After Hurricane Katrina it was clear to the New York City's Emergency Management to create a coastal storm plan for New York City in the case of a similar storm in the future. The first time the City's coastal storm plan was activated was during Hurricane Irene in 2011, when NYCEM issued mandatory evacuations for Zone A (Special Flood Hazard Area), the Rockaways, City Island, and Hamilton Beach. However contrary to predictions, Irene's impacts shifted to upstate New York and there was minimal damage in Zone A, an area marked as high risk for flooding. Based on the memory of Hurricane Irene, many residents in high-risk areas were highly unprepared for the magnitude and force of Hurricane Sandy and were less willing to evacuate a second time. Hurricane Sandy, entirely different in nature from Irene, shook the City, shutting down infrastructure and transportation in many parts, and trapping vulnerable communities at the fringes (M. Umberger, personal communication, January 27, 2017).

Melissa Umberger, a hazard mitigation project manager at the New York City Emergency Management (NYCEM), describes one of the Post-Sandy response protocols as "ad hoc" in nature, but necessary on the ground (M. Umberger, personal communication, January 27, 2017). During recovery, NYCEM deployed an operation called Support to Residents in their Homes (SRITH) now called the Post-Event Canvassing Operation (PECO), where teams went door-to-door canvassing, checking

up on individuals that couldn't or didn't evacuate and asking them what they needed. Operation SRITH, a collaboration between NYCEM, DOH (Dept. of Housing), Army Corps, and the National Guard, was ad-hoc and spontaneous but was essential to ensure people's safety and well-being. Although the coastal storm plan was activated, the aftermath of Sandy underlined the necessity of strengthening community networks and organizations that could have replaced SRITH in many areas out of reach. And in areas lacking community organization, recovery highlighted the need to provide adequate services, resources, and training for people to help themselves.

Lesson 4: Diversify Methods of Community Engagement

In hurricane-prone regions, communities are the first responders after major disasters, in terms of finding access to water, food, shelter, and electricity; thus, social cohesion and social capital are two areas that are vital to community recovery and resilience. While speaking with climate scientist Joyce Rosenthal from Columbia's Earth Institute, Rosenthal expressed value in diversifying community engagement methods to reach vulnerable populations such as the elderly, disabled, minority, or NYCHA populations, that may not have the ability to voice their needs (J. Rosenthal, personal communication, February 5, 2017). Areas that lack community engagement or interaction, and are spatially fractured and divided, are hazardous environments for residents who become easily susceptible to risk due to lack of cohesion and networks. Finding ways to engage these populations as well, not only creates equitable recovery, but also has the ability to transform communities to prepare and resist better in the next storm. Therefore, efforts to cultivate social resilience through integrated, community-

driven projects that educate and protect residents in the process, is beneficial in preserving and nurturing communities to become more resilient.

Lesson 5: Contextualize Projects Based on Community Needs, Priorities, and Culture

According to Elijah Hutchinson, the Vice President of Resilience at the New York City Economic Development Corporation (NYCEDC), resilience planning in New York City has become more holistic in the definition of what resilience means. Whether it's a project in Red Hook, Coney Island, Lower Manhattan or Hunts Point, resilience highly pertains to the local context, community vulnerabilities, and community-specific needs. In the case of Red Hook, he explains that "resilience means not hindering the community from the waterfront" because it's interconnected with people's jobs and livelihood. In the case of Coney Island, "resilience is more about water quality, habitat, and ecology" and so projects like the Living Breakwaters project are exemplary case studies for resilience. In the case of Lower Manhattan where there is "constrained real estate, and where limited vertical integration can be made because of density, resilience is about providing world-class work and open space" for recreation and community. And at Hunt's Point, where the "City's food distribution center is located, resilience takes the form of alternative power generation, micro grids, and renewable energy," in an area prone to blackouts and power shutdowns post-disaster (E. Hutchinson, personal communication, January 23, 2017). Hutchinson describes that the variability and flexibility of community resilience that is sensitive to place, context, culture, and needs is an important lesson. Communities may vary in the way they envision resilience, yet that

is where the challenge and strength of resilience planning stems from - it is unique in every situation.

Lesson 6: Engage Communities from Start to Finish to Guide the Process

Another important lesson learned was engaging communities from start to finish to guide the design process, gain feedback and create a transparent relationship that would prosper into community ownership of these projects. HPD, the City's department of housing and preservation, is all too familiar with this lesson, as they worked closely with Edgemere residents on strategic buyouts and creating resilience against nuisance flooding in their community. Zachary Lemel, Senior Resiliency Office within the Planning Division of HPD, argues that, "the most important aspect of resiliency planning is being transparent and honest with communities about limitations in scope, zoning and building codes, feasibility of rebuilding, or in some instances buyouts of homes that were too damaged to be rebuilt, or are located too close to the floodplains" (Z. Lemel, personal communication, February 13, 2017). In areas like Edgemere, that deal with multiple vulnerabilities such as nuisance flooding, a poor economy, urban renewal and buy-outs, Lemel says that "carefully and precisely choosing areas for strategic retreat, and realizing what you have power over as a planner and what you don't, is critical in building trust within a community; and that type of planning will ensure whether projects get implemented or not" (Z. Lemel, personal communication, February 13, 2017). The clearer you are about what you can offer the community and what your boundaries are, the more specific feedback and viability you can get with designing better projects, gaining investment, and acquiring more funding.

Lesson 7: Empower Communities by Leveraging Urban Assets to Create Social and Economic Value

Asima Jansveld, Principal at HR&A Advisors explains that with disasters like Katrina and Sandy, there has been "almost a decade of thinking about capital investments, infrastructure, and innovative approaches to making the most efficient use of resources" (A. Jansveld, personal communication, January 30, 2017). With infrastructure aging and disasters causing economic losses, it is crucial that resilience planners think of smarter ways of investing scarce capital, by using a combination of private and public resources. Jensveld argues that when you "creatively leverage urban assets to create social value," you are empowering urban communities that are facing pressing resilience challenges, to think outside of the box (A. Jansveld, personal communication, January 30, 2017). The key is to help communities identify their urban assets whether it's infrastructure, properties, streetscapes, or public space that may be developable as key anchor institutions and build out from there. An added incentive is having social impact investors, or groups that are interested in investments that don't just provide a financial return, but also a social return. By creating social and economic value from existing assets, communities have the ability to attract public and private investors to invest and buy-in. Moreover, future generations are able to inherit the social value produced over time. Resilience through this lens means reimagining and repurposing existing and aging assets to tackle multiple problems for the future.

Lesson 8: Create Dynamic Adaptive Pathways for Flexible Investments

  Chief of Staff, Douglas Le from the Office of Recovery and Resiliency, provided insight into making flexible investments now with the knowledge of the lifecycle of those investments in its lifetime. Le argues that it's "just as important to make longer-term hard investments thinking of future impacts and benefits, as it is making short-term soft investments for the immediate future of communities" (D. Le, personal communication, February 28, 2017). Having a project that does both is crucial in creating flexibility with the aim of promoting continual learning and adaptation in response to experience over time (Haasnoot, 2013). In areas like Edgemere where the City (HPD in particular) has barely begun cracking the surface in identifying infrastructural needs for today and in the future, the clock is ticking. In Edgemere, vulnerable populations currently reside on areas historically designated as tidal marshland, which risk homes (even if rebuilt) and more importantly people's lives, if continually hit by storms. The City and HPD are grappling with issues like these to try and find ways to gather the funding to work strategically, by taking steps today to incrementally save for the future. It's important that not only long standing flood risk infrastructural projects take place, but also that deep-seated community engagement processes and smaller social investments are made to mobilize a community to work towards building resilience in various phases, not just one.

Lesson 9: Create Multi-Faceted Projects that Reap Multiple Benefits of Social and Physical Value through a Layered Approach

Non-profit organizations like Rebuild by Design, are exemplary in the innovative design approaches they take in integrating resilience within communities. The program was inspired by a post-Katrina trend in recovery where outside designers and contractors created a community plan that was largely rejected by the very community it was intended. The process was "largely discredited" for involving local residents "too late" in the conceptual and design processes, and thus Rebuild by Design was born to create a more inclusive process of community engagement (L. Englum, personal communication, January 25, 2017). Tara Eisenberg, project manager on the RBD team, explains that their mission is to involve communities right from the start to create large social investments that would pay off in the end (T. Eisenberg, personal communication, January 25, 2017). Rebuild by Design is unique in that design problems aren't seen as problems, but as challenges to break complexities and barriers within communities, and think innovatively and holistically at creating new forward-looking projects to combat climate change.

When asked about the strengths of their local resilience projects, Englum explains that, "successful projects are ones that have strong community support" from community groups that are "fully active and present" (L. Englum, personal communication, January 25, 2017). Funding competitions provide incentives for community groups to activate and mobilize in fertile settings where active communities and innovative governments set the stage for experimentation and innovation. However, in many areas that lack the community support, therein lies the struggle in generating

those community groups and networks, which often times lead to futile outcomes. However, one way to look at this issue is through projects that take on a multi-layered approach and instill a multitude of benefits, buffering against failure (T. Eisenberg, personal communication, January 25, 2017). Multi-faceted projects that are extensively integrated within a community touch a chord with people, as projects themselves become assets and instill a sense of pride within the community, whereas piecemeal projects don't necessarily create the same effect.

Rebuild by Design projects consist of a combination of green and gray infrastructure that enhance and integrate the natural landscape into the urban fabric as much as possible in areas prone to flooding. With policymakers and planners facing the challenge of working with limited funds and scarce resources, Rebuild by Design is an example of an organization that is making thoughtful strides in treating local resilience as an opportunity for communities to see what is possible. The communities that thrive in the long run aspire to be more inspiring than enforcing, empowering the people throughout the process and making sure that needs are resolved where they existed, while adding extra components to ensure that the value of the investment is everlasting.

Lesson 10: Implement Smaller Social Projects that can be a Part of Capital Renewal Cycles or Capital Investment Cycles

Jamie Springer, Principal at HR&A Advisors a technical consulting firm, argues that "implementing projects that can be a part of capital renewal cycles or capital investment cycles" is highly beneficial for building resilience because it's far less costly (J. Springer, personal communication, March 3, 2017). In a time where many private and public sectors lack the funding, incremental investments generate higher benefits

and value, but this requires behavioral modifications. Springer says, "we cannot just invest in large physical infrastructure, but need to invest in social and intangible interventions" within the community that have a more sustainable, long-term impact, that changes attitudes when it comes to way of living (J. Springer, personal communication, March 3, 2017). This enables local communities to equitably plan for resilience as well, a lesson still not being consistently applied across the board.

Post-Sandy, there was great intention to build capacities within communities, given that $90 million dollars in grant funding went to small businesses services that would enable local business owners to comply and adapt to regulations to recover. However, this funding was soon reduced to a $3 million dollar program due to inability to acquire proper paperwork and the complexities of working with small business owners at an individual level. Additionally, Springer explains, "it became very hard to hold technical conversations with local communities after a certain point" in the design process, and "money was always limited when it came to funding non-technical projects" or programs (J. Springer, personal communication, March 3, 2017). Springer argues, that there needs to be financing in cities to develop smaller, social initiatives in order to build community development capacities that are tied to major infrastructure projects, in order for projects to live longer and more sustainably. It is important for local residents within a community to be aware and incentivized in the long-term to adapt to protective measures such as razing and elevating buildings, but there has to be local capacity and knowledge building in the terminology and process as well. Here, Springer notices a trend, where "if there are large government investments in projects, then people are more open to talking about social components with the excitement about the

large, capital funds." However, "if there are no government resources or funds allocated towards social capital, then communities continue to limit themselves" in terms of project investment and struggle (J. Springer, personal communication, March 3, 2017).

He argues that New York City in particular managed to sustain continuity on large infrastructural projects, and while the majority of these long-term projects only have visible projections, objectives, and milestones - this process works very effectively in ensuring assets are protected and infrastructure is safe. However, on the community side, there is little "coherent capacity" from the City to help support those communities and neighborhoods that are still struggling (J. Springer, personal communication, March 3, 2017), and that is because of a very uneven distribution of resources. The bottom line is that there needs to be a larger focus on creating equitable means of investment and capacity-building to ensure that communities are protected in the short as well as long term.

Lesson 11: Create Avenues for Effective Communication and Easy Access to Resources for Knowledge Sharing

Marion McFadden, Vice President in Public Policy at Enterprise and a former HUD employee, shares her Post-Sandy experience stating that since there was a long delay between the hurricane hitting and funding being passed; and whether or not communities have federal funds attached to their projects, it is important for alternative methods of community protection and asset-management to be investigated (M. McFadden, personal communication, March 8, 2017). She emphasizes that it is not important to put back what was lost, if what was lost was risky to begin with; but, there is a need to make communities safer to live in, and fixing those challenges requires

community-scale conversations. McFadden states that though "social cohesion and community networks have proven time and time again to be most effective" immediately after a disaster, she admits that there aren't many examples anywhere where the government is investing in social programs (M. McFadden, personal communication, March 8, 2017). People learn best when they see someone they can identify with, and facilitating connections between communities through policy may help introduce people to their own neighbors and create a buy-in level where professionals and technical experts are then introduced. McFadden suggests it is largely a political problem where there is a calculus of where to put investment, and the Federal government may be overstepping in this area, where authority over local decision-making and strategic planning should rather be given to local governments. The reality is that with every storm like Sandy, Federal funds are slowly drying up, and local governments need to start stepping up, to ensure that they are adequately prepared with resources and services to protect communities from future disasters.

Conclusions

After speaking with several agencies that played an integral role during and after Sandy recovery, it is evident that community-based organizations can be major contributors to building local resilience. Not only do they play an integral role during immediate short-term recovery, but also in the long-term by bridging social ties, fostering relationships, disseminating knowledge, and ultimately determining how capable a community and its constituents are in recovering and thriving from shocks and stresses. The interviews also portray several strategies to interact with communities through technical workshops, training, and community-driven projects that advocate for

a more community-centric approach to resilience planning, that devotes time and investment in developing stronger social ties and social capital. Though community-centric approaches have already started becoming a priority in resiliency planning, many interviewees mentioned the minimal investment put into social infrastructure and community growth, due to larger infrastructural reliance and priorities. However, this distinction between physical and social resilience agendas needs to be reevaluated due to evidence that shows community resilience is better attained where local leaders are the catalysts for change. That is to say, resilience is a shared responsibility. When local residents are actively invested within their communities, and are provided with the adequate resources and skills, they in return become stewards and can ensure the longevity of community resilience for the future.

3.2 Case Study Methodology

These findings brought to light ways in which public agencies and organizations restructured priorities after the hurricane, the lessons they learned, and also outlined seven important elements that are integral to community resilience work. The following seven elements captured are: community organization, knowledge sharing, investment, public-private partnerships, capacity building, urban design and development, and cultural ties and networks. Though these elements may vary in capacity based on the type of resilience intervention, they are important criteria to evaluate the ways in which communities are engaged at a local level. It's also important to understand that no one case is the same, and community resilience can be achieved through multiple strategies and outlooks pertaining to specific challenges and contexts.

This next chapter will analyze four unique community interventions in the Coney Island, Red Hook, Tottenville, and Edgemere communities to highlight strategic ways community resilience can be achieved through the robustness of community-based organizations or lack thereof. These case studies were chosen based on their contexts, unique challenges after Hurricane Sandy, and the ways in which their communities and local stakeholders approached the issue of resilience after the storm. Each case study visualizes resilience in a unique way, and will highlight the extent to which the seven elements mentioned are present in these communities. Finally, recommendations will be provided that indicate best practices to promote institutional learning and community-based resilience.

Ch. 4 Community Mobilization: A Case Study of Coney Island

**4.1 Sandy's Impacts on the Coney Island Community and Response**

Section 4.1 | Figure 8: Coney Island landmarks are visible as crews work to place sand and restore the beach.
Photo Credit: New York District, U.S. Army Corps of Engineers/Flickr

On October 29, 2012, Coney Island, one of the City's poorest waterfront neighborhoods even before the hurricane, was heavily impacted by Hurricane Sandy's torrential 14-foot storm surge. Murky waters from Coney Island Creek, the Atlantic Ocean and ruptured sewers, flooded thousands of apartments in seconds, along Brooklyn's southernmost peninsula (Weichselbaum, 2013). Many neighborhoods were damaged, homes and local businesses were flooded, public services and infrastructure damaged, and its biggest asset and attraction, the Coney Island waterfront amusement park, was desolate after the storm. Hurricane Sandy highlighted the City's vulnerable

entry points, with Coney Island Creek being the first breach point for the peninsula due to its low-lying edges and the strength of the surge (NYCEDC).
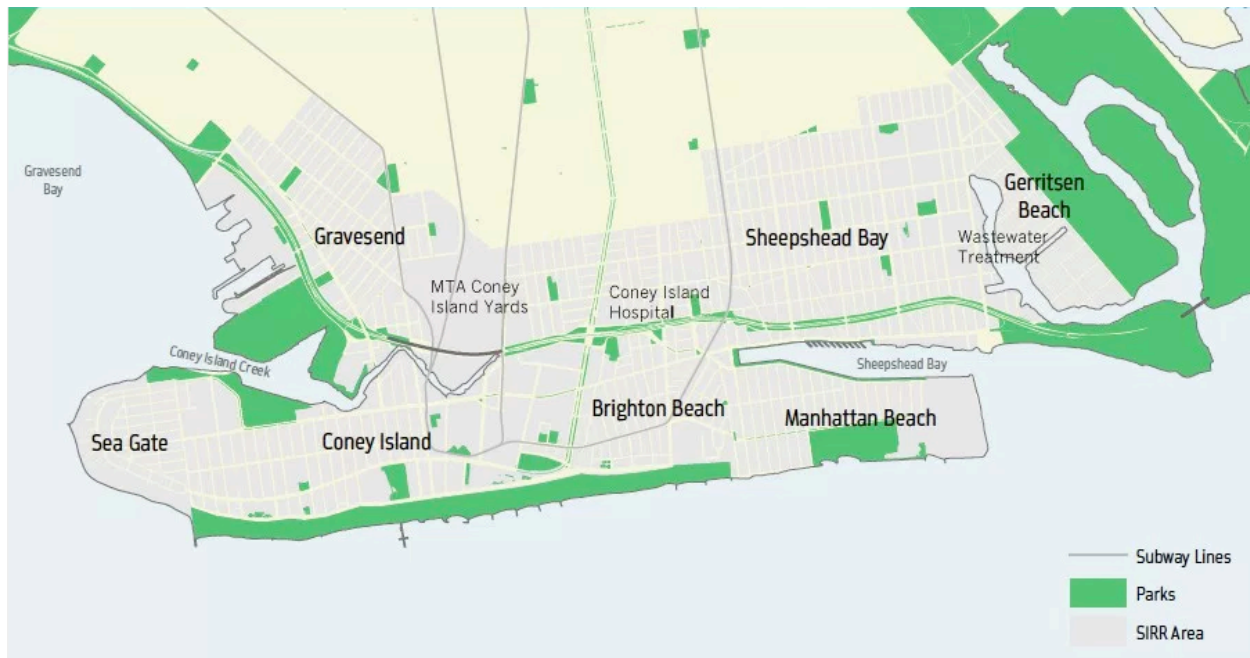
Section 4.1 | Figure 9: Map of Coney Island Creek.
Photo Credit: SIRR Report

Coney Island Creek is situated between the Gravesend and Coney Island neighborhoods of Brooklyn, New York and was originally composed of two inlets: Gravesend Bay on the west and Sheepshead Bay on the east (NYCEDC). As noted in NYCEDC's report, though the creek functioned as a strait connecting these two distinct water bodies in the 1960s, through industrialization and rapid urbanization, wetlands and the natural shorelines had been filled in. Due to historical changes in hydrology combined with the effects of low-lying topography and climate change, this area was extremely vulnerable to tidal flooding and storm surge even prior to the storm (NYCEDC). At Sandy's peak, floodwaters reached a high of ten feet and caused the most damage to physical infrastructure and building systems. Due to transportation shutdowns and lack of community organization, the Coney Island community was

difficult to reach during this time of emergency, leaving many residents without electrical, heat, and limited options for food or aid (E. Hutchinson, personal communication, January 23, 2017). According to NYCEDC, over 5,000 businesses and 30,000 employees were affected by the recovery aftermath of the storm

In response to Sandy and in anticipation of future storms and sea level rise, the City formed the SIRR report in order to assess physical, social, and ecological risks and formulate a resilience strategy to alleviate those risks entirely. The June 2013 report titled, "A Stronger, More Resilient New York," recommended 257 special initiatives to rebuild Sandy-impacted neighborhoods and make the City more resilient. Southern Brooklyn Initiative 5 of the SIRR report in particular, suggested "reimagining Coney Island Creek to strengthen and soften its fringe areas through wetland construction or a tidal barrier to mitigate storm surge and flooding." New York City's Economic Development Corporation (NYCEDC), the Mayor's Office of Recovery and Resiliency (ORR), in coordination with the Coney Island community, City, State, and Federal agencies, led this study in particular to evaluate the feasibility of long-term flood protection for the Creek as well as its implications for the future (E. Hutchinson, personal communication, January 23, 2017). Local stakeholders and community residents played an integral part in providing insight, local knowledge, and expertise on what a resilient Coney Island Creek could be for the future.

"The Creek is a crucial part of the Coney Island community and it is important that it continue to be an educational and recreational asset."

(EDC, 2016)

The study is a key component of the City's OneNYC vision, to ensure that New York City neighborhoods, economy, and public services would emerge stronger from the impacts of storms and future impacts of climate change. As noted by NYCEDC, the study area encompassed "residential, commercial, and industrial land uses - road, bridge, and rail infrastructure as well as parks and marine environments" and was developed into a shared resiliency agenda between the City and Coney Island community. It included both short-term investments and longer-term measures, complementing the over $2 billion dollar existing investment to make the neighborhoods of Coney Island safer (NYCEDC). For the purpose of this chapter, we will be looking into how community engagement tied to capital investment could empower and mobilize community stakeholders around the topic of building local resilience.

4.2 Historical Background and Community Dynamics

Section 4.2 | Figure 10: People wait in line to collect food and water at a distribution point in Coney Island in the wake of Hurricane Sandy.
Photo Credit: Mario Tama/Getty Images

Coney Island's community is very transient, possessing high levels of poverty, poor quality of housing stock and limited community organization. Before the storm, City data showed that "nearly one in seven Coney Islanders were unemployed, household income was approximately $31,000 per year, and one in four residents were impoverished" and could not afford to rebuild their lives (Weichselbaum, 2013). Here along the coast, many residents live in public housing, affordable housing (including senior housing), or middle-income co-ops; and according to 2013 FEMA data, after Superstorm Sandy hit, "more than a quarter of the area's more than 48,000 residents" told officials that their homes were ruined beyond repair.

Springer describes Coney Island's waterfront as a "poorly organized community with hardly any public investment after the storm" and a lack of community organization at the local level (J. Springer, personal communication, March 3, 2017). Coney Island's

community illustrated the "frustrations and inertia" that turned the rebuilding process into "a nightmare" (Kensinger, 2014), where very little had changed during the course of recovery and rebuilding, leaving much of the landscape littered with boarded up homes, empty lots, and abandoned construction projects. A fractured, isolated, and poor community, Coney Island lacked pre-existing community cohesion and active organization, two components that would have otherwise been able to help the community regroup, resist, and recover from Superstorm Sandy in a more effective manner. Because of this issue, it was important for EDC and the ORR to consider alternatives to ensure that the Coney Island Creek's study wasn't its own patchwork for resilience, but part of a larger vision to function sustainably in the long-term.

Prior to Hurricane Sandy, the Army Corps was undertaking the Jamaica Bay Reformulation Effort, to identify a long-term solution for the Atlantic Ocean shoreline (E. Hutchinson, personal communication, January 23, 2017). This reformulation effort consisted of a long-term study of a tidal barrier across Jamaica Bay, but did not include input from South Brooklyn or the Coney Island community in its initial scoping and plan. According to the DEIS for the project, awareness of the need for a more "integrated approach" to Coastal Storm Risk Management (CSRM) opportunities in Jamaica Bay and surrounding communities increased after Hurricane Sandy in 2012, and as a result of the devastation, USACE was tasked to address "coastal resiliency" and "long-term sustainability" objectives in their plan (DEIS 2016). Seeing this as a social, ecological and economic opportunity to efficiently conduct a feasibility study for the Coney Island Creek as well, the City worked successfully with USACE to expand its Reformulation Study area to include the neighborhoods of Southern Brooklyn surrounding Coney

Island Creek. This would allow EDC and the City to work with USACE to incorporate

community input concerning environmental, social, and community benefits (access,

amenities), into their long-term reformulation plan for the shoreline.

Hutchinson argues that in order for projects to move forward, "it is crucial to build

social resilience along with physical infrastructure" since community coordination would

be crucial to attaining local knowledge, spreading awareness, and building trust for

project support (E. Hutchinson, personal communication, January 23, 2017). In this

case, extensive community outreach involved identifying community needs, developing

key questions, and benchmarking community priorities to inform the Army Corps' work.

Through several interactions and engagement workshops with community residents,

EDC established a set of guiding principles that covered community priorities like,

recreational spaces, educational opportunities, ecology and flood protection, and a low-

maintenance integrated flood protection system, to set a design standard and a list of

priorities for the region; and in turn, this was helpful in providing a concept template of

what the Coney Island community envisioned for resilience, and criteria to follow

(NYCEDC). To accomplish these tasks throughout the process, EDC set up an active

working group called the Coney Island Creek Committee, which consisted of local

advocates for the waterfront, environmental advocates, and city wide waterfront

advocates (municipal arts society, the aquarium), to perform hyper local research that

would provide local input for EDC's study (E. Hutchinson, personal communication,

January 23, 2017). By taking a more community-centric approach to resilience planning,

the City and EDC were able to better inform the Army Corps to alter their reformulation

work to incorporate Coney Island Creek and many other regions bordering the

waterfront, into their tidal barrier study across Jamaica Bay.

4.3 Coney Island Creek Study: Community Engagement for Capital Investment

Section 4.3 | Figure 11: Coney Island today; and a rendering of the Creek with a series of tidal barriers.
Photo Credit: NYC Economic Development Corporation

For large long-term projects like the Army Corp's reformulation work across Jamaica Bay, it is crucial that the Army Corps work with technical consultants and planners to study and incorporate the priorities and needs of the communities residing within their study area. However, Coney Island's community is representative of several New York City's waterfront communities where low-income, poor, and vulnerable communities are fighting for lower crime, better schools, open space, and transportation access; yet, they are not empowered with the authority to do so. Though policy improvements such as the resilience text amendment, Appendix G of the building code, propose technical engineering guidelines to elevate buildings that do not require local input, the institutional expression of community input is still imperative to informing and guiding studies and plans like EDC's and the Army Corps', in order to gain a more multi-faceted perspective on what community-based resilience means (E. Hutchinson, personal communication, January 23, 2017). Without the City and EDC approaching the

Army Corps to alter its methodology to incorporate a more community-centric engagement style, the reformulation plan wouldn't have had the richness of information and local knowledge it has today.

Additionally, capital flood mitigation improvements such as the Army Corps reformulation work, decrease individual construction costs of rebuilding; thereby, reducing flood risk to help support the future development of community infrastructure, vital in an area like Coney Island where small retailers are needed. Reduced costs also serve to strengthen interest among retailers, investors, and developers thereby able to provide needed services, generating more jobs, and activating key area corridors (EDC, 2016). Though areas like Coney Island face challenges related to poor connectivity and complex redevelopment conditions, there are opportunities for creative and interconnected solutions – especially where resiliency measures require reimagining and reexamining relationships that didn't exist before.

By creating a more regional approach through community involvement, the City along with the community and the Army Corps were able to comprehensively visualize a solution with short-term as well as long-term benefits. Though the City along with EDC finished scoping for the Environmental Impact Assessment (EIA) just last December of 2016, EDC maintains ongoing checkpoints with the community. Active working groups consist of the city council member, local community members, community board, and environmental justice organizations, that inform consultants on a consistent basis and actively convene to make sure the project goals are equitable and align with community needs and priorities (E. Hutchinson, personal communication, January 23, 2017). These working groups are critical to both decision makers and community members in the

recovery and resilience process, as members act as community liaisons and can better disseminate information, facilitate discussions, and spread awareness among neighbors in their community.

Section 4.3 | Figure 12: Alliance of Coney Island community members.
Photo Credit: Coney Island Alliance

Activating community engagement pathways to inform resilience processes was crucial after the storm, but coordinating with community organization efforts from the start would've helped accelerate and alleviate the process of short-term recovery by providing access to the right resources in time of need. Due to a lack of community organization immediately after the storm, the Alliance of Coney Island, a small non-profit organization initially intended on marketing and recreation, formed to revitalize and improve the community in Coney Island. Over the past five years, in addition to its initial efforts providing neighborhood services such as the Coney Island Sanitation Team after Hurricane Sandy, the Alliance slowly expanded to "promote local business, encourage economic development, and coordinate Coney Island-centric events" to bring the
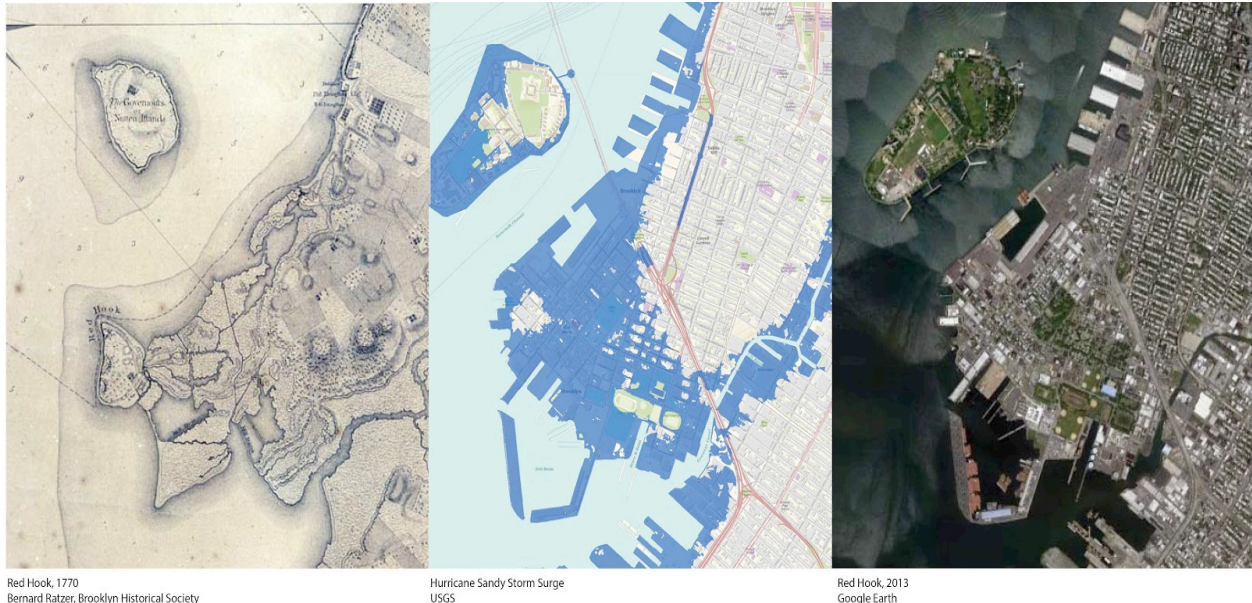
community together (Alliance for Coney Island). Spurred by the aftermath of the storm, Alliance for Coney Island became an organization dedicated to promoting a safer, more secure, cleaner and better functioning Coney Island, through local community job training, work placement opportunities, and interagency coordination to build local resilience. Although Hurricane Sandy devastated a poor Coney Island community, it revealed a critical need for community organization and engagement in an area that was isolated, split, and desperately lacking cohesion, networks, or funds.

While the Strategic Plan for Coney Island continues, a great deal of progress has also been made by the City's Coney Island Revitalization Plan, that includes: the opening of several sit-down restaurants, Coney Commons (a mixed-use residential building featuring a community center), design and construction of new stormwater collection sewers and streets, and public space improvements. Additionally, NYCEDC and its community partners, such as the newly formed Alliance for Coney Island, continually work to market and program Coney Island in addition to ongoing maintenance of the beach and boardwalk. To this date, the Alliance of Coney Island has proven to be an integral part of Coney Island life, by "promoting programming, marketing and tourism, community development, and advocacy and representation" (Alliance for Coney Island). As seen on their main webpage, "by expanding communication efforts, improving quality of life, strengthening connections, representing the local businesses, and advocating for equitable policies and resources", the Alliance of Coney Island "strives to maintain and develop a Coney Island that is vibrant and resilient" for future generations.

Meanwhile, located within the same borough of Brooklyn, the community of Red Hook was dealing with its own set of challenges after the storm. Contrary to Coney Island, in the case of Red Hook, we will explore a context where community organizations played a strong role in instigating self-driven change.

Ch. 5 Community Organization: A Case Study of Red Hook, Brooklyn

5.1 Sandy's Impacts on the Red Hook Community and Response

Red Hook, 1770
Bernard Ratzer, Brooklyn Historical Society

Hurricane Sandy Storm Surge
USGS

Red Hook, 2013
Google Earth

Section 5.1 | Figure 13: Red Hook, 1770; Hurricane Sandy storm surge; Red Hook, 2013
Photo Credit: (L to R) Brooklyn Historical Society; USGS; Google Earth

Red Hook, a dense low-lying coastal community in Southwest Brooklyn was
inundated from all three sides of its coastline - the Upper Bay, Buttermilk Channel and
the Gowanus Canal, the night Hurricane Sandy hit. As noted in the SIRR report, "most
of Red Hook lies within the second-most hazardous FEMA flood zone," where the water
near Red Hook is "capable of rising up to three feet" in the event of a flood (SIRR
Report. 2013). Adding to its vulnerabilities, the neighborhood, a mix of waterfront,
industrial usage, public housing (Red Hook houses are the second-largest housing
development in New York State) and new developments, including an IKEA, are
spatially separated and cannot be directly accessed by subway (T. Pawlowsky,
personal communication, February 21, 2017). Given that almost 80% of families with

children live below the poverty level in Red Hook, this was terribly concerning (RHI, 2012). Two weeks after Sandy struck, thousands of the neighborhood's residents were stranded and remained without heat and power, many local businesses were unable to reopen, and street sewers were overflowing with debris and murky water. According to Craig Hammerman, district manager for Community Board 6, which includes Red Hook, "there were no back-up generators" and the existing electrical and mechanical systems that were below ground had to wait until the ground dried and the equipment was retested before energy could be supplied. The trauma suffered by the community - especially those who lived in a NYCHA public housing complex - raised public policy questions about how the community would approach planning for storm-related surges and resiliency (Crean, 2012). However, Red Hook's community organizations proved to be its most valuable assets before, during, and after the storm.

Section 5.1 | Figure 14: Red Hook Initiative
Photo Credit: RHI

Red Hook Initiative (RHI), a community-inspired and self-driven organization that strives to build social and economic resiliency, emerged to help its community during its time of need. "Creating Change from Within" is their motto, and RHI's vision of "community building, networking, and creating social resilience" played a unique role in strengthening Red Hook's future. RHI uses formal and informal strategic approaches to youth development and community building, that incorporate the field's best practices using a survivor-centric approach. When Superstorm Sandy hit the Red Hook community, RHI deployed its pilot WIFI program within NYCHA housing, which became the primary communication platform for public housing residents, as they are deemed the most vulnerable during disasters (Tony, 2015). Even when power and cell networks blacked out across most of Brooklyn's neighborhoods, Red Hook WiFi kept residents connected (Byrum, 2014). Through this community wireless mesh network, residents were able to locate where help was needed and where it was available, facilitating the distribution of food, blankets, supplies throughout the region. It was able to fabricate social cohesion in an area that is often overlooked and difficult to reach during storms of this magnitude. Though Red Hook WIFI may have been a small recovery effort by youth, it provided backup communication for elderly, disabled, and patient communities - vulnerable populations - that may have otherwise suffered immensely during and after the storm.

Over the past three years, this innovative technology has "expanded to 15 hotspots through the neighborhood, serving hundreds of Red Hook residents and visitors" - designed, installed, maintained, and promoted by young residents of public housing in Red Hook (Tony, 2015). With such growth, Red Hook Initiative and New York

Rising estimate that Red Hook WIFI will cover 80% of the commercial areas in the neighborhood in the future, making it the largest community-developed and maintained free WIFI program in the United States.

Red Hook WIFI has since partnered with The Beautiful Earth Group to enhance the stability and resilience of the network through solar backup energy, and have already proposed an innovative distributed mesh network with designed redundancy in the event of another power outage (RHI, 2015). According to Red Hook Initiative, "the expansion of Red Hook WIFI will be sustained by young residents of public housing in Red Hook, employed by RHI in a year-long paid tech fellowship that will help them enter the tech sphere through employment or continuing education." What is inspiring is Red Hook Initiative's capability as an organization to provide a platform for self-driven youth to explore and innovate for the betterment of society; and its unique community-inspired model of social resilience is what sets it apart.

For the long term, Red Hook's community is also working to implement an integrated resilient flood protection system that provides access to the waterfront while creating layers of defense during a storm. For many Red Hook residents, the waterfront is the source of job opportunity, livelihood, and a vital asset to the community; however,

the process of building resilience is not just through large physical infrastructure, but also in innovation and engagement practices that not only involve the community, but are spurred by them. The next two sections will delve into the strength of Red Hook's community-based organizations and the extent to which they hold authority over decision making.

5.2 Historical Background and Community Dynamics

A historically vibrant and diverse community in South Brooklyn, Red Hook was once a thriving industrial town with a rich maritime history as one of the world's busiest ports. Many dockworkers, labor workers, and their families lived in this area once, with industrial warehouses, manufacturing, and commercial uses lining the waterfront (T. Pawlowski, personal communication, February 21, 2017). However over time, due to rapid urbanization, many of the City's poorest populations were forced into urban fringes, and Red hook quickly became the site of the second largest public housing complex in New York City, bringing in wide socio-economic disparities and issues which reached their peak in 1990 (Wolff, 2013). Known previously as the community of last resort, artists began setting up studios and lofts in warehouse-type structures, small business owners opened mom n pop shops on street corners, and few destination weekenders trickled in for an urban escape (T. Pawlowski, personal communication, February 21, 2017). Due to location, several Red Hook residents struggle most of the year due to cold weather, inconsistent business, and unstable income (Eisenhardt, 2013), and Hurricane Sandy only exacerbated the poor conditions and impacts felt by this community.

Though spatially divided and financially challenged, the majority of Red Hook's strength comes from its community-based organizations that have sprung up over the years through its close-knit community. Red Hook Initiative, Red Hook Community Justice Center, and Red Hook Hub, are just a sample of the community's longstanding local partners that take part in creating integrated social and economic resilience for the community. These community-based organizations are centered on the belief that to

overcome systemic change, social change begins with empowering and nurturing youth. By empowering young residents with access to services, new skills, and a chance to develop as leaders, the community chooses to invest in its own to pull themselves out of poverty. Red Hook's community-based organizations believe that instilling a sense of ownership and belonging to residents is the basis of healthier, more innovative, and therefore more resilient communities. By tackling disasters through multi-pronged approaches, communities can achieve resilience directly related to climate-issues and indirectly through innovative responses to vulnerabilities.

Section 5.2 | Figure 16: Red Hook Justice – your community, your court.
Photo Credit: Red Hook Justice

In 2000, the Red Hook Community Justice Center became the nation's first multi-jurisdictional community court, with a mission to solve neighborhood problems with unique community-based sanctions and services. This courthouse became the hub for

an array of unconventional programs that contribute to reducing fear and improving public trust in government. In a community like Red Hook, with many vulnerable residents already marginally excluded from the status quo, the Justice Center's unconventional programs provides unique alternatives for building community resilience. According to Red Hook Justice, to some, "the center is their classroom where they earn their degrees; to others, it is where they resolve their conflicts with families or neighbors; and for some, it is a place to hone leadership skills or a safe haven to receive needs-based support and opportunity" to get back on the road to recovery.

In 2002, the Red Hook Health Initiative began as a program of a local hospital, in response to the severity of health and social issues in Red Hook (RHI, 2016). And in 2006, the Red Hook Initiative, an independent nonprofit, formed to expand their scope to focus on community needs. Through this platform, the Red Hook Local Leaders program was launched in July 2014, to bring local residents together to improve individual and family preparedness, as well as strengthen the social resiliency of public housing residents. Training programs ensured that residents living in these precarious facilities gained the "proper knowledge and skills required for emergency response," and to become "community leaders of the first response and recovery teams" of any future emergencies or disasters (RHI, 2016). Since the creation of this program, RHI has trained 175 local leaders, the majority of whom are residents in Red Hook houses themselves. Training topics range from Ready New York, CPR/First Aid certification, Heat and Health Preparedness, to Psychological First Aid, Coordinating with Government Agencies and much more (RHI, 2016). These programs were derived from pinpointing the roots of Red Hook's vulnerabilities – poverty, crime, health and social

issues - and transforming them into opportunities to build strength and social resilience against any future disaster that may come their way.

5.3 Red Hook Initiative: Strength of Community Organization

Section 5.3 | Figure 17: Red Hook Initiative community members actively engaged at a meeting. Photo Credit: RHI

The same determined spirit and genuine concern for neighbors that was seen in Red Hook in the days after Hurricane Sandy, can still be visible and growing stronger (Eisenhard, 2014). Over the years, Red Hook's community organizations and local stakeholders have proven to be a force to reckon with, even on larger platforms advocating for community needs and priorities. At a panel at NYU's Rudin's Center for Transportation, AECOM – a large construction firm - proposed a plan to transform the entire Red Hook neighborhood to mitigate flooding and storm surge while spurring development. AECOM's ambitious vision included "thousands of new apartments in the neighborhood along with storm resiliency infrastructure along the waterfront, a creation of a new subway line that would extend to South Ferry, improvements to Red Hook Houses, and sprucing up the existing streetscape" in the neighborhood (Warerkar,

2016). However intriguing as a plan, it was highly contested for lacking community outreach and involvement. Although Chris Ward, the New York Chief of the company, reiterated the fact that "the vision wasn't a proposal but the start of a conversation," many local Red Hook stakeholders explained concerns about a "development of this scale and the lack of community outreach" to Red Hook's robust community organizations, while envisioning this plan (Warerkar, 2016). Michelle de la Uz, a City Planning Commissioner and director of Fifth Avenue Committee in South Brooklyn, argued that, "though the project was multi-faceted, the lack of community engagement and initiation earlier in the process" would prove detrimental in gaining project support in the end (Warerkar, 2016). The panel demonstrated that though multi-faceted infrastructural growth is a key component to resilience, without consistent community collaboration and support, it would be difficult to determine the sustainability and viability of such projects in the long-term. Without the community at the forefront spearheading these large efforts, visions like AECOM's will stay visions, as long as community organizations and local stakeholders stay true to their values.

Section 5.3 | Figure 18: Red Hook Initiative local youth leaders.
Photo Credit: RHI

The Red Hook community is unique in that it has made social and behavioral modifications by investing in its youth, its residents, and its strong community network through nuanced interventions that have a more sustainable and long-term impact. Though the Mayor's Office of Recovery and Resiliency (ORR), with support from NYCEDC, is working with local stakeholders to advance resiliency in Red Hook through a federally-funded integrated flood protection system (EDC, 2016), infrastructural designs like these are decades long projects that are implemented in phases, or are modified due to funding constraints over time. If an integrated flood protection system is necessary and will act as a primary defense to mitigate storm surge and flooding, then Red Hook's community members, social networks and cohesiveness are its subsequent layers of defense, and require equal investment if not more.

Resiliency visions for southwest Brooklyn, like AECOM's, may be "a new way of designing cities," but these visions need "further refinement" in how they consider, communicate with, and represent "the public" they intend to design for (AN, 2016). They require an advanced understanding of "vulnerability" and "equity" as they seek to build resilience in designing adaptation plans (AN, 2016). In this process, the strength of community-based organizations is essential to combat the politics behind physical resilience, and ground projects in a way that ensures needs are properly met. In the case of Red Hook, its community, local leaders, and youth are the ones spurring change to ensure that long-term resilience measures are designed appropriately, and put in place.

The past two case studies have shown interventions where community engagement efforts inform capital investments, and where community organizations focus on social resilience while advocating for proper capital infrastructural projects. However, we will now look at a case where the two are merged in an innovative resilience project that caters to the needs of a community through synergy.

Ch. 6 Community Engagement: A Case Study of Tottenville, Staten Island

6.1 Sandy's Impacts on the Tottenville Community and Response

Section 6.1 | Figure 19: Hurricane Sandy decimated Staten Island homes in Tottenville
Photo Credit: Maureen Donnelly

Tottenville, a community located on the southernmost shores of Staten Island, an area susceptible to wave action and erosion, was severely ravaged by Hurricane Sandy's storm surges and subsequent floods. As reported in the EIS, "peak storm tides in Tottenville measured approximately 16 feet, almost five feet higher than at the Battery in Manhattan, killing a record 23 residents" (more than any other borough) while destroying many homes and small businesses along Tottenville's coastline (EIS, 2016). The fast-moving storm ravaged the southern and eastern shorelines of the island bringing a "deluge of physical, financial, and emotional hardships," where "roughly 16% of the borough was inundated with flooding that impacted approximately 75, 651

residents" in total (DeJohn, 2013). According to a City report, Staten Island contained the "highest percentage of people living within the floodplain," damaging people's lives, critical infrastructure, and community spirit. Following the storm, the City's SIRR report and PlaNYC, documents that outlined strategies to increase resiliency citywide, contained "Community Rebuilding Resiliency Plans for five particularly vulnerable neighborhoods in NYC, one of which studied the East and South shores of Staten Island" (SIRR, Report, 2013). The Plan highlighted specific initiatives that addressed "coastal protection, critical infrastructure, social and economic recovery," to examine possibilities for coastal protection as well as waterfront accessibility in the future; and, examined the underlying geomorphology and soils of various regions as well. What the plan also revealed that was the South Shore was particularly vulnerable to coastal erosion that would not only cause persistent damage to infrastructure close to the water's edge, but also adversely affect the soils and diverse aquatic biota in Raritan Bay (AKRF DEIS, 2015).

Coastal Protection Initiative 15, recommended in the Community Rebuilding Resiliency Plan for the East and South Shores of Staten Island, called specifically for the implementation of a "living shoreline project" along with Coastal Protection Initiative 24, which called for "USACE to work with the City" to complete its longstanding study on the shores and develop a plan for beach nourishment" after extreme weather events (AKRF DEIS, 2015). In June 2013, HUD launched Rebuild by Design, a competition to respond to Superstorm Sandy's devastation through innovative design proposals that had the opportunity to win CDBG-DR (Community Development Block Grant - Disaster Recovery) funding as well as other public and private-sector funding sources, for

affected communities in need (T. Eisenberg, personal communication, January 25,

2017). After a yearlong community-based design process, which involved design teams

meeting with government entities, elected officials, issue-based organizations, local

community-based organizations, and individuals within the Staten Island community,

HUD announced the winning Living Breakwaters Project led by SCAPE (T. Eisenberg,

personal communication, January 25, 2017). With $60 million of CDGB-DR program

funds, the Breakwaters Project would implement a layered resiliency approach to

strengthen Tottenville's shoreline, by promoting risk reduction through erosion

prevention, wave energy attenuation, and enhancement of ecosystems and social

resiliency (AKRF DEIS, 2015). Additionally, the NY Rising Community Reconstruction

Program, established by the State to provide rebuilding and revitalization assistance to

communities severely affected by Sandy, proposed the Tottenville Dune Project that

would implement a stone-core dune with plantings, as secondary defense strategy to

the living breakwaters (AKRF DEIS, 2015). This method of creating multiple barriers of

protection is what makes this Rebuild by Design Project extremely successful from an

infrastructural standpoint. But to understand its entire resilience potential, it's important

to take note of its community's dynamics.

6.2 Historical Background and Community Dynamics
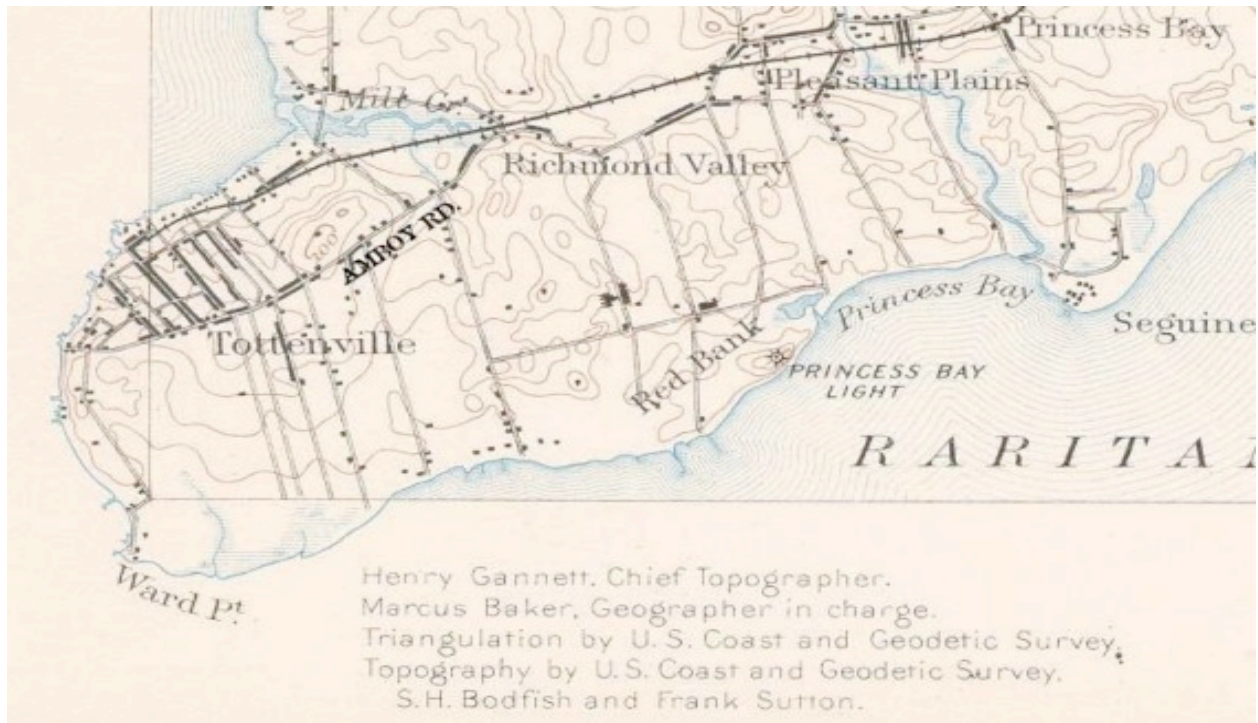
Section 6.2 | Figure 20: Seaside village of Tottenville in the southwestern shores of Staten Island.
Photo Credit: Henry Gannett and Marcus Baker/US Coast and Geodetic Survey

The village of Tottenville came in existence around 1840, with an economy and culture surrounding oyster fishing, shipbuilding, ship repair, and agriculture. It became the "largest town in Westfield, the historic name for this part of Staten Island, and though the community has advanced over time, the feeling of a small coastal town still prevails today" (Shepherd, 2008). Between 2000 and 2011, the City Planning Department reported that Staten Island currently had the smallest immigrant population (99,000) of all the City's boroughs, although it sustained "the highest percentage growth among the foreign-born, increasing 36%," where over one-third of the borough's foreign-born residents were Caucasian and came from countries in Europe, like Italy, Russia and Poland (SI Advance, 2015). Next, are borough residents born in South Asia, mainly

India, Pakistan, mainland China, etc who account for another 30% of the foreign-born

population (SI Advance, 2015). Contrary to the past two case studies, Tottenville

consists of a largely white and affluent community, and provides an example of an area

that lacked community-based organizations, but possessed the capital resources,

investment, and political support to gain physical and social resiliency after the storm (L.

Englum, personal communication, January 25, 2017). However, this case study also

demonstrates that regardless of socio-economic background, community organization is

critical and could have been more beneficial for immediate recovery. Though the

community was cohesive and had access to resources, its socio-economic isolation and

lack of ties to surrounding organizations within Staten Island, prevented the Tottenville

community from a better recovery during and after the storm. It was through this need

for community organization that a long-term community-centric defense scheme was

proposed.

"The project team understand that you cannot keep back coastal flooding in the context

of climate change, but what you can do is ameliorate the force and impact of 100 and

500-year storm surges to diminish the damage through ecological interventions, while

simultaneously catalyzing dialog to nurture future stewards of the built environment."

- *Fuller Challenge juror Bill Browning (SI Advance, 2015)*

Tottenville's Living Breakwaters, through its $60 million dollar grant, is a very

innovative defense scheme that provides layers of coastal protection, while keeping the

community and people as its focal point (L. Englum, personal communication, January

25, 2017). The accessible and interactive layout of the Breakwaters is intended for current and future generations to explore them, to learn from them, and immerse themselves in marine life (Lo, 2015). The Living Breakwaters is an example where educational components are at the heart of community involvement plans, and partnerships with the neighboring New York Harbor School and the Billion Oyster Project help to educate the surrounding community and youth about preserving marine ecology (Rebuild by Design, 2016). The Living Breakwaters acts as a coastal defense mechanism, which also "aims to restore a billion live oysters to New York Harbor," an area that has been barren of oysters for years due to overharvesting, dredging, and water contamination (Lo, 2015). The project is driven by a series of 'water hubs,' the first of which is built along the Tottenville shoreline. The first hub at Tottenville "consists of basic services for beachgoers, hosting classrooms, a wet lab for the New York Harbor School, flexible meeting spaces, a bird watching station, as well as storage facilities," to help drive local engagement and economic opportunity to an area still recovering from the devastation of Sandy (Lo, 2015). Not only does this project cater to Tottenville's direct needs, but after a disastrous storm like Sandy, it also reconfigures people's relationships with their marine habitats into one that embraces nature and is closely tied to educating and informing communities about resilience, in more ways than one.
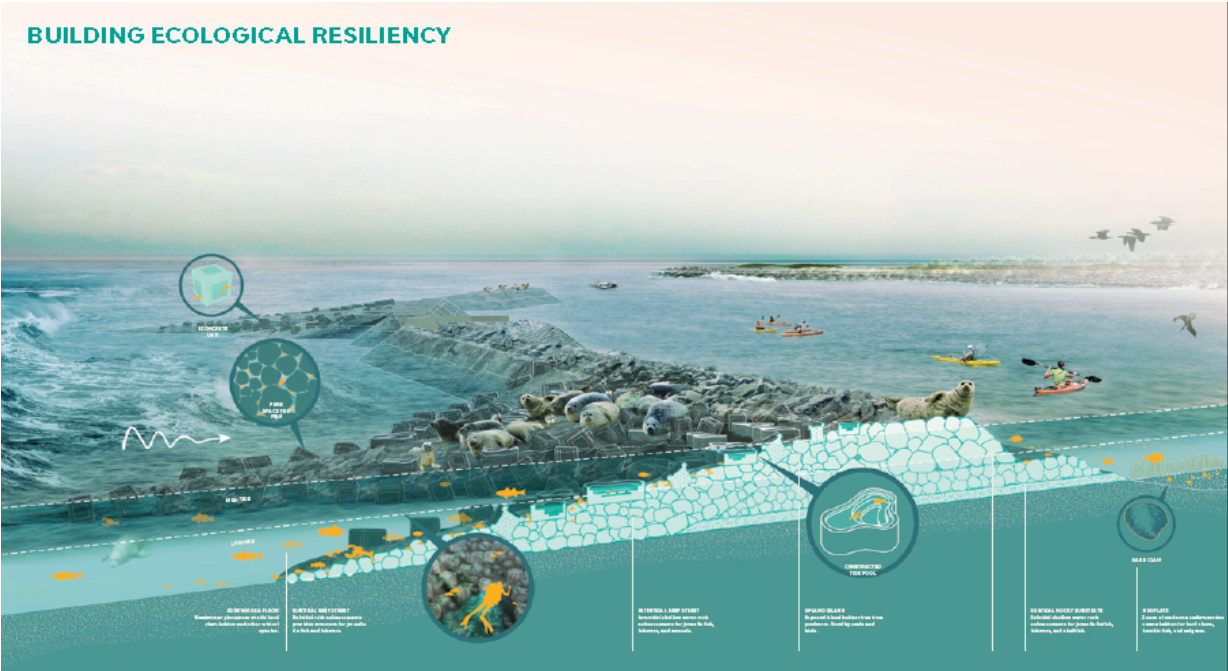
6.3 Breakwaters Project and Rebuild by Design:
Community Engagement and Integration
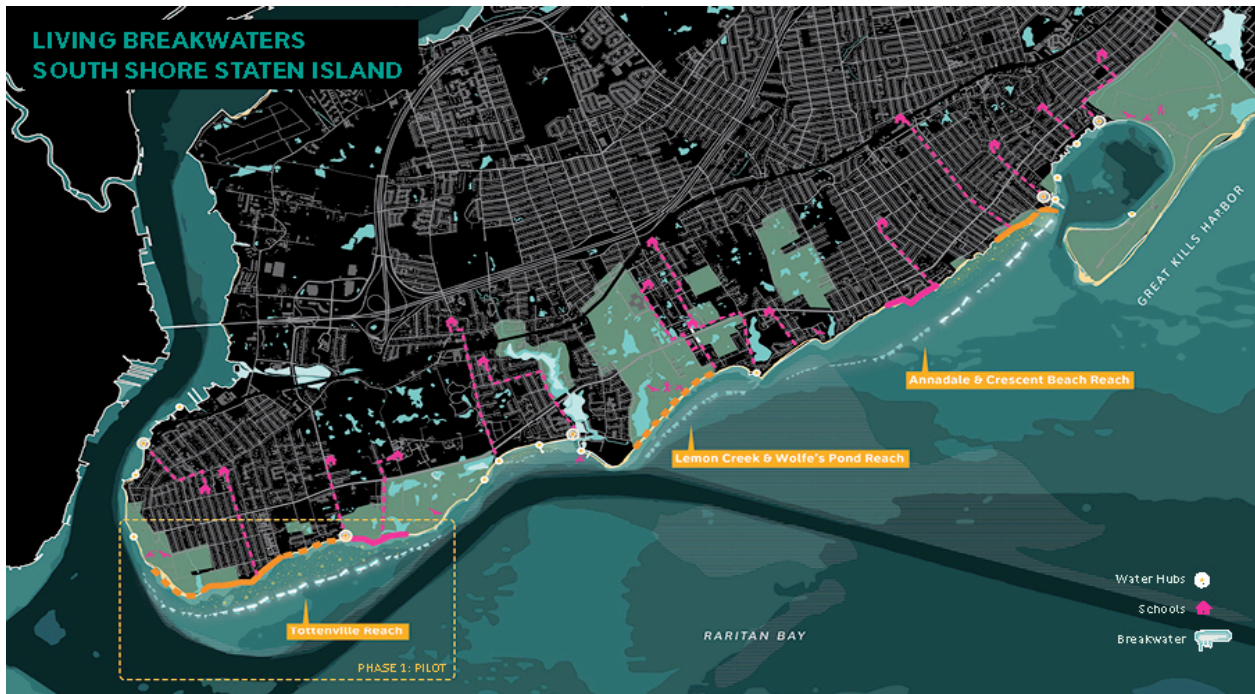
Section 6.3 | Figure 21: Living Breakwaters project.
Photo Credit: Rebuild by Design in partnership with 100 Resilient Cities

Rebuild by Design's Living Breakwaters project utilizes the assets and strengths of the Tottenville community in Staten Island to build local resilience. The community's willingness to encourage and foster an ambitious project like the Living Breakwaters is a testament to how open and active the community was to initiating resilience measures as well (L. Englum, personal communication, January 25, 2017). The core purpose of the design according to Rebuild by Design, was to "consolidate addressing Sandy's impacts, shoreline erosion, coastal flooding, and future sea level rise into one project that improves access to the water's edge, enhances community stewardship on and off-shore," and increases access to educational and recreational activities. The project creates flexibility through multi-purpose functionality and integrates resilience through physical and social layers.

Section 6.3 | Figure 22: Living Breakwaters project - building ecological resiliency.
Photo Credit: Rebuild by Design in partnership with 100 Resilient Cities

Section 6.3 | Figure 23: Living Breakwaters project – building social resiliency.
Photo Credit: Rebuild by Design in partnership with 100 Resilient Cities

The Living Breakwaters is multifaceted and consists of "(1) a 3/4 mile long system of specially designed breakwaters that include active habitat enhancements on the breakwater system and in the waters surrounding it, (2) oyster cultivation and activities supporting oyster restoration including oyster hatcheries and setting facilities, shell collection and curing, and oyster nurseries, (3) a water hub to serve as a public facility providing space for programming, and (4) interactive programming including educational, stewardship, and capacity-building activities related to the project components" (Rebuild by Design). What makes this project as successful as it is in scope and practice, is not only its physical coastal landscaping, but also its social learning aspect that functions as a fundamental component of adaptation (Hordijk et al. Resilience). Ultimately, the Living Breakwaters seeks to instill a sense of social responsibility through awareness and learning; it fosters experimentation and innovation in such a way that it transcends its duty as a living barrier. And in terms of community development, the community itself is engaged through interactive design workshops, council meetings, shore walks, and beach clean-ups, in order to carry out the project's purpose, so that it is streamlined into education and residents' daily lives.

There is no one case that fits all scenarios when it comes to building resilience, so identifying a community's assets, local networks and partnerships, while designing projects that reap multiple benefits, is crucial to generating the kind of flexibility and strength that empowers impacted communities. Rebuild by Design's methods in Staten Island's South Shore Living Breakwater's project, not only promote local resilience for recovery, but also foster a sense of community and growth, that has the ability to spur long-term transformative change for the future (Braud & Siedman). Accessibility,

comfort, communication, and investment are all important building blocks for resilience, and to some degree can indicate whether or not a community is susceptible to disasters. However, connecting with the community and creating bonds through design is even more fruitful in the long term.

Section 6.3 | Figure 24: Living Breakwaters project – engaging communities.
Photo Credit: Rebuild by Design in partnership with 100 Resilient Cities

Researchers have proven that the compounding of smaller-scale investments and coordinated projects that ensure basic quality of life and community development are crucial in the revitalization of an entire city, and the Living Breakwaters embodies those best practices. Ultimately, it is important to recover in ways that empower the community, strengthen citizen participation and establish clear communication between sectors to effectively build long-term efficacy. The aftermath of such devastating hurricanes and disasters serve as lessons and reminders that resilience is simply a function of the strength of a community (Remes, 2015). And if adequate measures are

taken to integrate values and investment within a community, long-term sustainability and longstanding resilience can be achieved. Rebuild by Design's Living Breakwaters project was key to building a long-term resilience vision for the Tottenville community, and construction is expected to begin by June 2018. However, Rebuild Design colleagues Englum and Eisenberg, both acknowledge that the project could not have been possible without collaboration with nearby community organizations that came together; the Billion Oyster Project, the Tottenville Civic Association, the Tottenville Historical Society, the NY/NJ Baykeeper as well as the city Parks Department, all played an integral part in the process. Without these community-based organizations constantly involved and engaged in the social and physical aspects of the project, the Living Breakwaters wouldn't have the richness, capability, or resilience layers that it has today.

However it raises the question, that in fractured communities that do not possess any of these critical components for resilience, how do we as planners build value and investment? The next case study will examine the Edgemere community on the Rockaways, and how resilience can be detrimental in many ways, if strategic and innovative efforts are not applied.

Ch. 7 Community Cultivation: A Case Study of Edgemere, South Queens

7.1 Sandy's Impacts on the Edgemere Community and Response

Section 7.1 | Figure 25: Long neglected Queens neighborhood of Edgemere.
Photo Credit: Nathan Kensinger/NY Curbed

      Edgemere, a low-lying waterfront community built on historic tidal marshland on the Rockaways Peninsula, experienced a unique challenge following the destruction that Sandy brought forth. Edgemere's high water table and flat topography made it extremely susceptible to the storm; here, New York City photographer, Nathan Kensinger describes, "streets were intensely flooded, many beachfront businesses and residents were completely dismantled and destroyed, and the Edgemere boardwalk was ripped from its concrete roots and thrown inland into houses and front yards" (Kensinger, 2012). Residents of Edgemere survived, however most if not all residents

lost their houses and properties, their biggest assets, to the storm. Living on a low-lying topography like Edgemere, many residents were forced to flee to higher ground without any of their possessions, to avoid getting swept in by the waves or injured in the process (Z. Lemel, personal communication, February 13, 2017). Making matters worse, in addition to the MTA removing train service off the Rockaway peninsula prior to the storm, the A train crossing over Jamaica Bay, south of Howard Beach station, was completely decimated which cut off any possible bus service or transportation (DelMundo, 2012). Half a million people were disconnected, marginalized, and left over to survive on their own after Sandy, crippling the entire peninsula and exacerbating the storm's events in the region (Z. Lemel, personal communication, February 13, 2017). An area physically and socially outcasted from the rest of the City, with scattered community organizations, residents of the Rockaways were simply left to fend for themselves in the face of disaster.

This case study demonstrates not only the debate over providing physical infrastructure resilience in areas like Edgemere, but also the need to unify and rebuild trust within a fractured community, to tackle challenges ahead. This last example highlights the urgency for transparent communication and engagement throughout the physical rebuilding process, as well as the need for community-based programs that educate and inform Edgemere's residents, especially youth. In an area where sea level rise could potentially decimate this waterfront community in the near future, both physical and social resilience are equally important to gain consensus on community issues.

7.2 Historical Background and Community Dynamics

Section 7.2 | Figure 26: Edgemere, South Queens study area.
Photo Credit: Wall Street Journal

For many Rockaway residents, the peninsula has been seen as the City's "dumping ground" for unwanted public and institutional uses and waste. Public housing on the peninsula arrived as a means to provide housing for the poor displaced by urban renewal by locating it on cheap, underutilized land at the city's fringes (Debucquoy, 2016). Many of the City's poorest residents have been pushed out to the peripheries into the Rockaways, and even within the Rockaways lies a "polarity" or a disparity between the more affluent western and far poorer eastern (Far Rockaway) ends of the peninsula (Debucquoy, 2016). Historically a fractured and socio-economically divided community, an inherent lack of trust and connection persists among residents as well as

organizations in the Rockaways, to invoke any possibility of collaboration for resilience action (Z. Lemel, personal communication, February 13, 2017). As Pawlowski and Debucquoy describe, "many of the recovery groups that had formed during the recovery phase dispersed after internal political conflict in which power dynamic and issues of mistrust prevented the community from working together efficiently"; yet, without community cohesion and organization the community would suffer immensely in the future.

Since the 1990s, Edgemere's community has existed as an urban renewal site, giving the City of New York ability to buy-out property in order to develop housing, parks, and open space for the community (Z. Lemel, personal communication, February 13, 2017). However, Edgemere's 1997 Urban Renewal Plan, which created a "framework for a $100 million investment in street and sewer improvements as well as 700-units of housing," failed to fulfill community needs and lacked the infrastructural improvements to face future climate change risk (HPD, 2016). The Urban Renewal Plan was thus incomplete and stalled, and only approximately 307 one- and two- family homes were constructed (HPD, 2016). Since then, the Edgemere community has been left "plagued with vacant city-owned land and abandoned blighted structures," which has led to a "domino-effect of disinvestment" in properties and limited opportunities for the predominantly low-income population of Edgemere (HPD, 2016). Years of distrust and loss of faith in government have made Edgemere residents wary of City promises (Z. Lemel, personal communication, February 13, 2017); and therefore, any future efforts to build resiliency would have to involve policymakers cultivating trust, support, and stewardship within the community.

**7.3 Resilient Edgemere: Cultivating Cohesion, Capital, and Organization**

Section 7.3 | Figure 27: Collaborative community meetings took place for *Resilient Edgemere.*
Photo Credit: HPD

Rooted in these values, The Resilient Edgemere Community Planning Initiative presented a joint effort of New York City agencies to align New York City's Sandy recovery and rebuilding investments in Edgemere with a comprehensive long-term community vision, to avoid paralysis of this community again. With the Department of Housing Preservation and Development (HPD) owning over 50% of the properties in Edgemere, there was a unique opportunity to align existing resources, and identify new ones to collaborate and develop an integrated plan (HPD, 2015). HPD's senior resiliency officer, Zachary Lemel, explains that the current acquisition program is two-pronged; either the City buys property (they will not develop) that residents want to sell to put restrictions on them, or they will acquire sites with limited damage to redevelop

into affordable housing (Z. Lemel, personal communication, February 13, 2017).

However in a region where future climate change would make Edgemere unlivable

without comprehensive intervention, strategic buy-outs on where to reinforce and

where to retreat were important to realize. Lemel states that through the buy-out

program, "residents that are displaced would receive temporary relocation and

assistance," to ensure that the community at large would be taken care of while they

regained their lives (Z. Lemel, personal communication, February 13, 2017).

Though this initiative has been criticized for its displacement of residents in

recovery, the alternatives are bleak. Allowing residents to live in an area identified as

high-risk would not only raise flood-insurance rates, but also risk their lives. In a

situation like this, where mitigation is too costly or inadequate in reducing risk, and

where other adaptation strategies like elevating structures are also ineffective on a low-

lying terrain, local residents and business owners are left with the financial burden of

relocating to higher ground or face the possibility of rebuilding their properties time and

time again with every new storm (RPA, 2015). Unlike the previous three case studies,

the issue of resilience adversely impacts Edgemere, where the physical, economic, and

social costs of retreat are felt directly by a community already impaired by its inherent

vulnerabilities. In Edgemere, it is crucial to avoid creating "zones of disinvestment" that

exacerbate existing socio-economic disparities (RPA, 2015). Instead, creating more

resilient affordable housing on higher ground, while creating community consensus

around the possibility of returning some flood-prone land back to nature, can ensure

that more adaptive measures take place.

The most important components highlighted in the Resilient Edgemere

Community Plan are creating resilient housing, protecting the neighborhood from

flooding and storms, while improving access to the water, improving mobility and

circulation, and encouraging neighborhood services and amenities (HPD, 2015).

Historically characterized as a fractured and divided community, the City through this

recent planning initiative has created new opportunities and pathways for community

engagement to build trust. By fostering environmental stewardship through consistent

public workshops, residents are able to develop a shared understanding of existing

conditions, concerns, and desires for the future of Edgemere. Along with obtaining

input from concerned residents and stakeholders to ensure that the final plan

incorporates the local knowledge, aspirations, and concerns, HPD's Resilient

Edgemere Initiative strives to build trust and cohesion in a community that's seen

much disrepair.
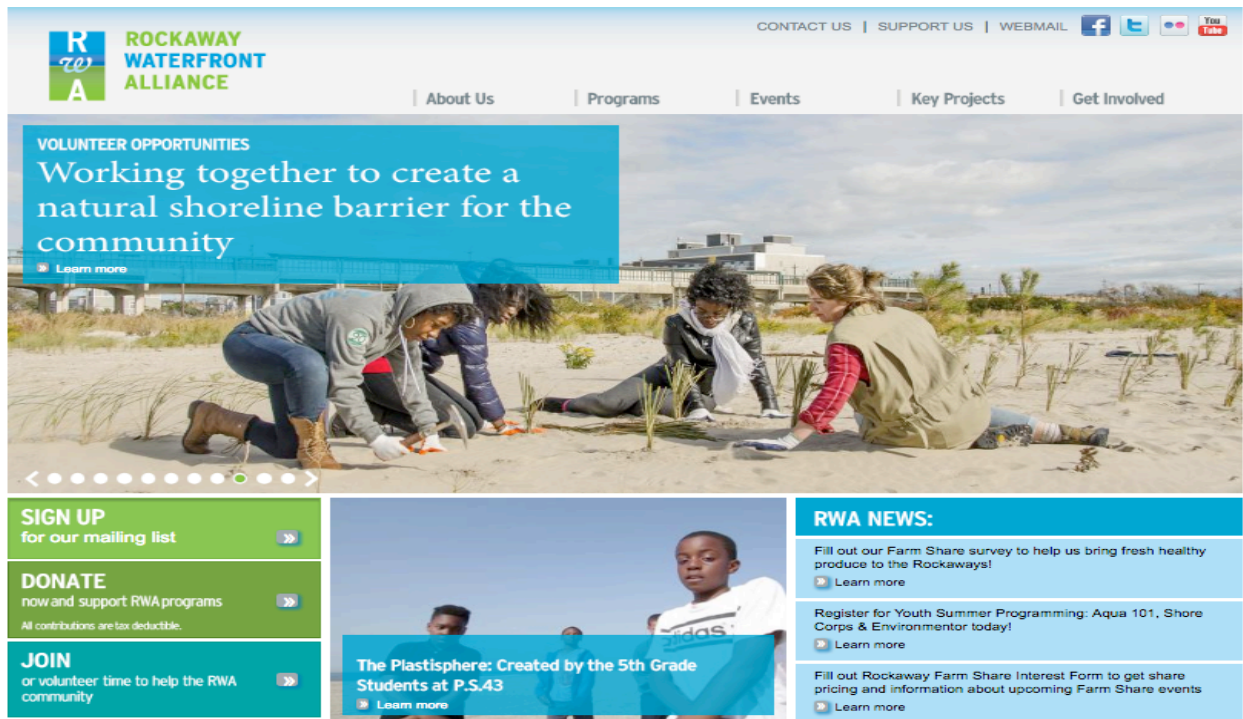
Section 7.3 | Figure 28: Community events and programs conducted by RWA to build resilience. Photo Credit: Rockaway Waterfront Alliance.

However, apart from the community plan, Edgemere's community-based organizations are also showing major strides in aiding community members to facilitate change. Rockaway Waterfront Alliance is one great example of an organization that strives to empower residents of underserved Rockaway communities to play a crucial role as environmentally and socially responsible stewards. The Waterfront Alliance provides educational and community programming which fosters a deeper understanding, respect, and connection between the Rockaway community and its waterfront, to ensure the long-term sustainability and economic health of the Rockaway community (RWA). Key projects that stem from RWA are RISE: Rockaway Institute for a Sustainable Environment, a community-based program that strives to build social and environmental awareness by connecting emerging artist and scientists with local residents; Edgemere Farm, which explores ways to farm share within the

community and create agricultural benefits; Combating Rockaway's Unmet Mental Health Needs, a partnership between RWA and NYC's Department of Health that works with local nonprofits, health providers, and community members to tackle trauma and mental health needs; Resiliency Speakers, a speaker series hosted by RISE focused on engaging the public on issues pertaining to environmental resilience, urban planning, and sustainable development; and Project Underway, an effort to rally residents, business owners, transit advocates, and government agencies in working together to repurpose an underutilized freeway underpass space. While the Resilient Edgemere Community Plan Initiative strives to mitigate flooding impacts through a strategic buyout approach, integrating City-led initiatives along with social and civic initiatives like the Rockaway Waterfront Alliance, have the ability to make actionable items on the plan more feasible. As of March 2017, HPD and partner agencies have started to implement the community plan; however, to maximize efficiency, the Edgemere community will "need to play an active, engaged role over the next several years" to ensure the successful implementation of the community plan (HPD, 2017). Through efforts like these, there is still hope that Edgemere can cultivate the social cohesion, trust, and investment that the community has lacked in the past.

Conclusions

These four case studies demonstrate very unique community-centric approaches to building local resilience, however many of the themes still stay the same. Of the seven criteria for successful resilience projects, those that involved or were spurred by community-based organizations were the most fruitful. Community

organization, as seen in the Red Hook case study, is undoubtedly an integral

component to successful recovery, both in immediate and long-term defense. It is

apparent that even with knowledge sharing, financing, local partnerships, capacity

building, urban design and development, and cultural ties and networks – community

organizations are key to quicker recovery and building social resilience. Though

physical defenses and infrastructural resilience mechanisms may vary in scale and are

most definitely needed in these seaside communities, community-based organizations

do more than mitigate hazards and reduce vulnerabilities – they provide support groups,

safe networks, and platforms to empower and mobilize community members in the

aftermath of disasters and in daily life. Disasters like Hurricane Sandy can severely

debilitate a community by breaking social bonds and tearing networks, however

stronger community organizations have the power to withstand the impact. The last

chapter will observe best practices that are dissected from the case studies discussed

thus far and form the links for subsequent growth in the field.

Ch. 8 Conclusions

8.1 Importance of Building Local Resilience and Social Capital through Community Organization

Rebuilding, resisting, retaining, restoring and retreating are the five R's that the Fourth Regional Planning Assembly has outlined as the foundational blocks of building resilience, and have been embodied through different strategies observed in the case studies in the last chapter. With the increasing challenges of future climate change risk in vulnerable coastal communities, it is one's ability to respond to risk-induced events in the short term along with the flexibility of adapting and transforming for longer-term threats that ensures recovery, adaptation, mitigation, and persistence over a time span. The four case studies investigated in this thesis demonstrate that building capacities for social cohesion, social capital, and community organization not only provide layers of resilience that are community-specific, but help foster social resilience and stewardship that have the ability to outlast any kind of infrastructural feat. Therefore, layering and diversifying resilience policy and community engagement efforts to magnify existing community-based efforts with technical expertise on a larger platform, could be the basis for a research or think tank environment in various communities to define and innovate for local resilience.

Equally as important, is community organization, since many communities now face the expense of resist and rebuild strategies, where they are most feasible in places with higher population density, higher economic value, or higher social vulnerability - excluding communities that do not fit the 'criteria' fit to build resiliency (RPA, 2015). Retain and restore are equally debatable components, since physical let alone social

investments in vulnerable communities are increasingly harder to attract, and alternative methods of financing is an issue many agencies are still trying to grasp. Retreat, is a highly sensitive issue and unlike the others, not an engineered resilience solution but one that imposes costs directly on those affected, which carries high-risk of creating a domino-affect if not done strategically. However, community organizing is a concept very heavily invested in by community-based organizations and highly successful projects; it not only forces stakeholders to look at the challenges of coastal flooding through a variety of approaches that integrate community needs through physical, social, economic, and educational layers – but also, creates advocacy at the local level.

From the eleven findings and lessons extracted from interviews with policymakers, government officials, agency coordinators, urban planners, technical consultants, and architects, every single interviewee expressed the importance, strength, and enrichment of working alongside community-based organizations from the beginning, to ensure that the strongest community plans, policies and programs are put forth while long-term resilience is incrementally built up from within. Capacity-building efforts and adaptive pathways that look at flexible investments for the longevity of a community through its youth and innovation are alternative methods of creating sustainable futures for many of these communities as well. Though technical policies ensure that resilience is adapted from a structural point of view and land use is reconfigured to adapt to climate change needs, these policies need to be more multi-faceted to be able to speak to communities in a way that is informative yet case specific - inspiring yet viable.

8.2 Best Practices

Agencies across the City of New York have made great strides in advancing local resilience, and throughout the ones listed in this thesis, a few best practices have emerged. First, the future of resilient communities relies not only on physical infrastructural improvements, but also social and intangible investments to nurture and develop social capacity, social cohesion, and social capital in vulnerable areas. Second, effective capacity building requires diversifying and directing technical expertise to engage with marginalized communities in ways that best suit their needs, while keeping in mind sensitivity to culture and context. Third, local stakeholders and community leaders are critical liaisons between decision makers and the community, and can help guide projects and facilitate community engagement; so, working with them closely can help build trust and transparency. Fourth, coordination of local agencies, stakeholders, technical expertise, and community members through various charrettes and place-based workshops, can help disseminate roles, instill social responsibility and ensure continuous feedback and contribution from the community. Finally, community-based organizations are resourceful and can help unlock social and economic value from urban assets that open innovative pathways of resilience for community longevity, through potential of youth and organizational impact. By repurposing and reimagining one's environment and vulnerabilities through collaborative social policy and program, the missing gaps in establishing and ensuring community-based resilience can be filled.

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- Tara Eisenberg – Rebuild by Design
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- Elijah Hutchison – New York City Economic Development Corporation
- Asima Jensveld – HR&A Advisors
- Douglas Le – Chief of Staff; Office of Recovery and Resiliency
- Zachary Lemel – New York City Housing Preservation and Development
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- Joyce Rosenthal – Columbia Earth Institute
- Jamie Springer – HR&A Advisors
- Melissa Umberger – New York City Office of Emergency Management

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