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CAN WE REBUILD BY DESIGN?



BIG Team, "Retractable Flood Barrier."

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+ DESIGN, CLIMATE SCIENCE, RESILIENCE THEORY

Can we rebuild by design? This question emerged from the chaos and carnage of Superstorm Sandy during the fall of 2012. New York, the nation's most densely-populated region, appeared wholly unprepared for the relatively mild storm: subway service ceased as tunnels submerged, economic activity ground to a halt as portions of Manhattan lost power for several days, and several coastal communities faced wholesale erasure. The region's recent history, replete with near misses and false alarms,¹ helps explain why Sandy proved so destructive.² Though it differs considerably from the environmental history of New Orleans, the Crescent City proved equally incapable of bracing for Hurricanes Katrina and Rita in 2005.³ After Katrina, a cadre of urban designers, policy-makers, and scholars began to explore the construct of resilience as a framework for the city's recovery. Their work called for distributed, multi-functional infrastructural systems capable of delivering flood-protection, ecological function, and social cohesion.⁴ But political corruption and ineptitude left much of this work mired in the depths of theoretical abstraction and unbuilt design proposals.⁵ After Sandy, the City of New York, the U.S. Department of Housing and Urban Development (HUD), and a network of non-profit institutions led by the Rockefeller Foundation began working to ensure a different story would unfold across the Northeast.⁶

First, the City of New York, led by then-Mayor Michael Bloomberg, initiated the Special Initiative for Rebuilding and Resiliency (SIRR), a planning effort resulting in 250 recommendations for protecting the city's coastlines at a cost of \$19.5 billion.⁷ But the city's mayoral succession cast doubt over the SIRR's future which, even if fully-implemented, would struggle to alter the regional landscape of risk. This led the Hurricane Sandy Rebuilding Task Force to reimagine the federal role in disaster recovery.⁸ The Task Force's resulting recommendations culminated in the four-stage design competition known as Rebuild by Design (Rebuild). The competition received considerable praise from the press, which inspired HUD to launch the National Disaster Resilience Competition in the summer of 2014.⁹

But as HUD rushes to replicate Rebuild's model, a critical question remains unanswered: to what extent does the "recovery-through-competition" model create resilient cities? This paper challenges the perception that Rebuild has been an unassailable success through two methods. First, the competition's structure and three of its six winning proposals are critically assessed according to the Rebuild's core aims: innovation, feasibility, and resilience. Then, a broader critique of the recovery-through-competition model is developed around the process, politics, and products of Rebuild.

An Anatomy of Rebuild by Design

Rebuild launched in the summer of 2013 as a four-stage, interdisciplinary design competition to "promote innovation



BIG Team, "Battery Berm and Bridging Berm."

by developing regionally-scalable but locally-contextual solutions that increase resilience in the region.¹⁰ The first stage, an RFP, generated 148 team submissions, from which 10 were chosen to proceed. The second stage provided each team with a unique site to research and the third challenged those teams to develop design proposals for their respective sites.¹¹ The competition concluded in June 2014 with the selection of six winning proposals by a national jury of design and planning experts. In the fourth stage, these six proposals received a share of approximately \$1 billion in federal recovery funding to further refine and, in some cases, construct an initial phase of the project. Three of the teams focused on sites in New York City: the Bjarke Ingels Group (BIG), PennDesign and Olin (Penn/Olin), and SCAPE. Their sites vary widely, but their collective attention on the breadth of issues threatening New York's coastline provides an intriguing framework for assessing Rebuild.¹² The BIG proposal develops an infrastructural strategy for armoring Manhattan's Financial District, while the Penn/Olin and SCAPE proposals blend physical infrastructure, social policy, and economic development into a pair of resilience strategies in Hunts Point and Staten Island, respectively. But the unifying factor between these proposals rests in their shared socio-political context and in their limited scale. Put another way, each of these proposals focuses on a densely settled coastal community within New York that is geographically delimited. The winning proposals excluded from this assessment included a comprehensive plan for Hoboken, New Jersey, a restoration and management plan for the Meadowlands, New Jersey, and a regional plan for Long Island, New York.

BIG and the "BIG U" for Southern Manhattan

The BIG U proposal for Southern Manhattan is comprised of three components: [1] the Battery Berm, [2] the Bridging Berm, and [3] a retractable flood barrier along strategic portions of FDR Drive. Each berm anchors a sweeping network of green infrastructure aimed at integrating recreation and flood protection around the borough's Financial District and Lower East Side. The retractable barriers along FDR Drive provide ephemeral flood control between the berms. Together, the three elements form a U-shaped system of flood protection around Southern Manhattan, completely reshaping the borough's iconic waterfront in the process. This approach appears to build on the "New Urban Ground" proposal developed by dlandstudio for the 2010 *Rising Currents* exhibition at MoMA.¹³

BIG's proposal received \$335 million, the highest amount awarded to a Rebuild finalist.¹⁴ But the project's wholesale reconfiguration of Southern Manhattan's waterfront raises some important concerns about the proposal and Rebuild in general. At an estimated cost of \$1.2 billion for phase one, implementing all or most of the proposal would be a multi-

billion dollar,¹⁵ decades-long endeavor.¹⁶ This is problematic for at least three reasons. First, Rebuild failed to identify a long-term funding or financing strategy for delivering its winning proposals. The more time that passes, the less likely the city or the federal government is to prioritize funding for the BIG U. Second, the competition's novelty rests in its decision to assign a different site to each team. This leaves New Yorkers without a true point of reference with which to assess the merits of BIG's proposal. Though this a competition-wide issue, it is especially troublesome for this proposal given its specific site and high cost. Finally, the competition's approach to public engagement rests dangerously close to what Arnstein describes as "tokenism" or "non-participation."¹⁷ Public meetings appeared sparsely attended and often served as a mechanism for communicating information to residents rather than engaging in dialogue with them. But the uncertainty surrounding the BIG U's timeline could actually provide BIG and HUD with the time necessary to step back from their vision and truly engage with New Yorkers on the future of this site.

Penn/Olin's "Lifelines" for Hunts Point (The Bronx)

The Penn/Olin proposal for Hunts Point contains four overlapping elements: [1] The Flood Protection Levee Lab, [2] the Livelihoods initiative, [3] the Maritime Emergency Supply Line Hub, and [4] the "Cleanways" tri-generation refrigeration facility.¹⁸ The Lab and Livelihoods initiatives

1 "NYC Hazards: NYC Hurricane History," The Official Website of the City of New York, accessed July 30, 2014, http://www.nyc.gov/html/oem/html/hazards/storms_hurricanehistory.shtml. This includes discussion of Hurricane Irene, a tropical storm that made landfall in August 2011. Irene was initially predicted to directly impact New York City, initiating the mass-evacuation of 375,000 residents and the citywide mobilization of first responders. However, the storm shifted shortly before making landfall, sparing the city all but isolated and minor incidences of flooding and wind damage. This likely contributed to the city's poor preparation as Superstorm Sandy approached New York.

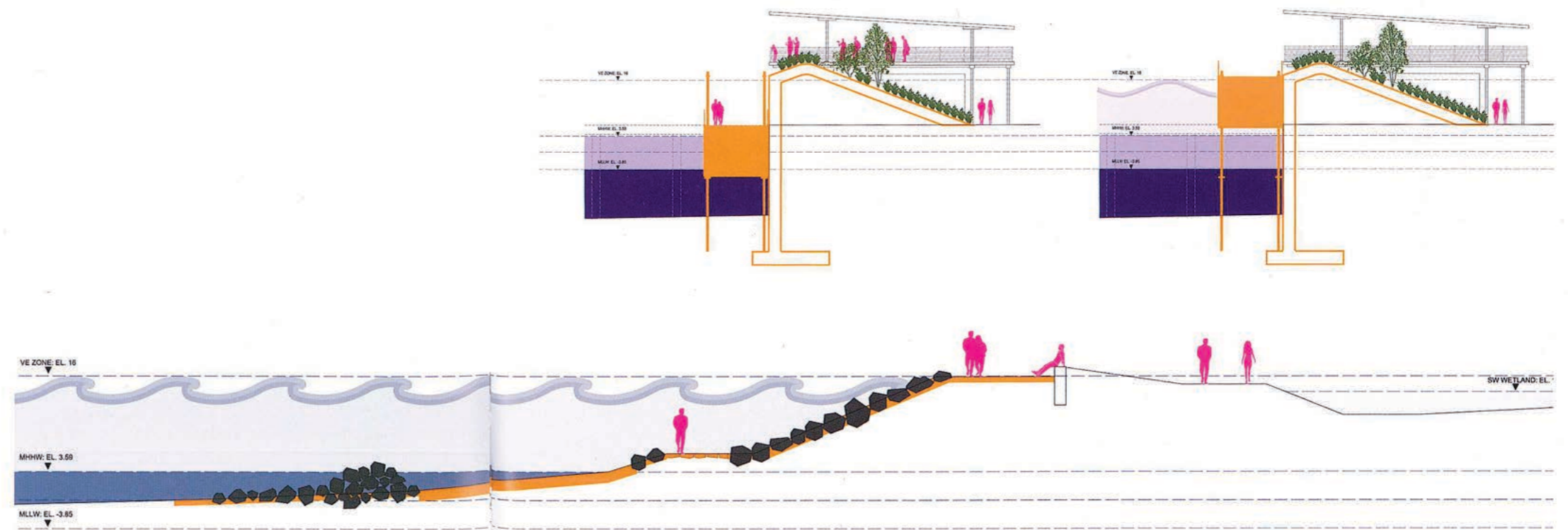
2 John Englander, *High Tide on Main Street: Rising Sea Level and the Coming Coastal Crisis* (Boca Raton, FL: The Science Bookshelf, 2012).

3 Eugenie Birch & Susan Wachter, *Rebuilding Urban Places after Disaster: Lessons from Hurricane Katrina* (Philadelphia: University of Pennsylvania Press, 2006). Hurricane Katrina caused at least \$108 billion in property damage, killed 1,833 people, displaced hundreds of thousands of New Orleans residents, and is considered the most destructive natural disaster in American history.

4 Chris Reed & Nina-Marie Lister, *Projective Ecologies* (Cambridge, MA: Actar, 2014).

5 Robert Olshansky & Laurie Johnson, *Clear as Mud: Planning for the Rebuilding of New Orleans* (Chicago: APA Planners Press, 2010).

6 "Hurricane Sandy Rebuilding Strategy: Stronger Communities, A Resilient Region,"



Penn/Olin, "Passive floodgate system and seawall variations."

towards full implementation. The project's ecological infrastructure is bolstered through a series of "water hubs" along the shoreline, which act as social anchors for neighborhoods along the waterfront by providing opportunities for recreation, public space, and educational programming. Living Breakwaters received \$60 million in funding from HUD.²³

The modularity and redundancy created by the proposal hews closely to the central tenets of resilience theory, and its creative use of oysters as an organizing device clearly fulfills the competition's desire for innovation.²⁴ But the project's reliance upon crustaceans creates a troubling vulnerability to an incipient threat from climate change: ocean acidification. Oyster farms throughout the Pacific Northwest are already facing species collapse as a result of rising ocean acidity.²⁵ Would the Living Breakwaters proposal be possible in a future scenario that limited or foreclosed upon the viability of oysters around Staten Island?²⁶ Also, despite SCAPE's use of hydrological modeling to test the efficacy of their proposal under existing conditions, it is not clear how the reefs would perform as sea levels continue to rise. But the project's modularity and deliberate phasing does provide for ample time and opportunity to address these concerns.

Can We Rebuild by Design?

As the Rebuild competition drew to a close, HUD announced its policy successor: the "National Disaster Resilience Competition."²⁷ HUD's decision to extrapolate the post-Sandy model of recovery-through-competition is unsurprising given the competition's fawning press coverage, the massive investment of financial and political capital by HUD and its partner organizations, and the resulting perception that Rebuild has been an unequivocal success.²⁸ But rushing to launch a national-scale competition before Rebuild has been independently assessed is a risky proposition.

The development of more critical perspectives on Rebuild is vital in determining whether it is a model worth replicating. Scholars exploring the competition's processes should consider three important lines of inquiry: [1] to what extent is the recovery-through-competition model producing projects of similar or higher quality than traditional means of urban design and development?; [2] to what extent is the model's emphasis on expediency foreclosing on meaningful levels of dialogue with local communities?; and [3] to what extent has the experience of the design firms been

core goals. But its use of social policy also raises three unique issues for the project. First, the Levee Lab creates organizational tensions, as it remains unclear who would manage the conventional flood-control system, who might direct the research, and how they would interact. Second, the proposal's workforce development recommendations may encounter resistance from local unions. Assessing how these unions might respond to the proposal is difficult given the paucity of information regarding public meetings available from Rebuild. Third, the competition's insistence on producing designs that are contextually sensitive yet scalable across the region may prove unrealistic. The Penn/Olin proposal focuses acutely on Hunts Point and none of its four elements appear well suited to regional extrapolation. Held to this standard, Lifelines (and most, if not all, of the winning proposals) may be perceived as a failure. But if its products prove non-exportable, perhaps the proposal's integrative methods can deliver on Rebuild's call for projects of regional significance.

SCAPE and "Living Breakwaters" around Staten Island

The SCAPE proposal for Staten Island is organized around a series of oyster reefs and other designed ecologies. The reefs—first proposed in Kate Orff's "Oyster-ecture" project within the 2010 *Rising Currents* exhibition at the MoMA—are seductive in their simplicity.²² The Living Breakwaters act to reduce wave energy and improve local water quality, in addition to providing opportunities for local economic development through aquaculture and eco-tourism. Also, the concept's modularity enables SCAPE to employ a successive series of pilot projects and, in doing so, to calibrate the Living Breakwaters iteratively as it proceeds



The Hurricane Sandy Rebuilding Task Force, accessed July 30, 2014, <http://portal.hud.gov/hudportal/documents/huddoc?id=hsrebuildingstrategy.pdf>.

7 "A Stronger, More Resilient New York," The City of New York's Special Initiative for Rebuilding and Resilience, accessed July 30, 2014, available at http://www.nyc.gov/html/sirr/downloads/pdf/final_report/Ch_13_CriticalNetwork_Final_singles.pdf. Shortly after the report's publication, New York elected Bill De Blasio to succeed Michael Bloomberg as mayor. It is unclear how closely he plans to follow the report's recommendations.

8 "Executive Order – Establishing the Hurricane Sandy Rebuilding Task Force," The White House Office of the Press Secretary, accessed July 29, 2014, <http://www.whitehouse.gov/the-press-office/2012/12/07/executive-order-establishing-hurricane-sandy-rebuilding-task-force>. The Hurricane Sandy Rebuilding Task Force, authorized by President Obama through Executive Order 13632, is an inter-agency collaboration charged with leading the federal government's recovery efforts throughout the Northeast.

9 "Fact Sheet: National Disaster Resilience Competition," The White House Office of the Press Secretary, accessed August 10, 2014, <http://www.whitehouse.gov/the-press-office/2014/06/14/fact-sheet-national-disaster-resilience-competition>. This competition is being funded with approximately \$1 billion of federal aid initially appropriated for the post-Sandy recovery throughout the Northeast.

10 "Promoting Resilience Post-Sandy through Innovative Planning and Design," U.S. Department of Housing and Urban Development: Rebuild by Design, accessed July 10, 2014, <http://portal.hud.gov/hudportal/documents/huddoc?id=REBUILDBYDESIGNBRIEF.pdf>.

11 Ibid.

12 "Finalists," Rebuild by Design, accessed July 10, 2014, available at <http://www.rebuildbydesign.org/winners-and-finalists/>.

13 See Barry Bergdoll, *Rising Currents: Projects for New York's Waterfront* [New York: The Museum of Modern Art, 2011].

14 Graham Beck, "Massive New Storm-Protection Barrier Funded for Lower Manhattan," *Next City*, June 2, 2014, accessed July 15, 2014, <http://www.nextcity.org/daily/entry/massive-new-storm-protection-barrier-funded-for-lower-manhattan/>.

15 Inae Oh, "Could this 'BIG U' Save NYC from Another Superstorm Sandy?" *The Huffington Post*, June 3, 2014, accessed July 15, 2014, http://www.huffingtonpost.com/2014/06/03/rebuild-by-design-_n_5438603.html/.

16 Klaus Jacob, "Climate Scientist: Manhattan Will Need Venice-Like Canals to Stop Flooding," *Next City*, June 25, 2014, accessed July 30, 2014, <http://www.nextcity.org/daily/entry/climate-scientist-manhattan-needs-venice-like-canals-flooding/>.

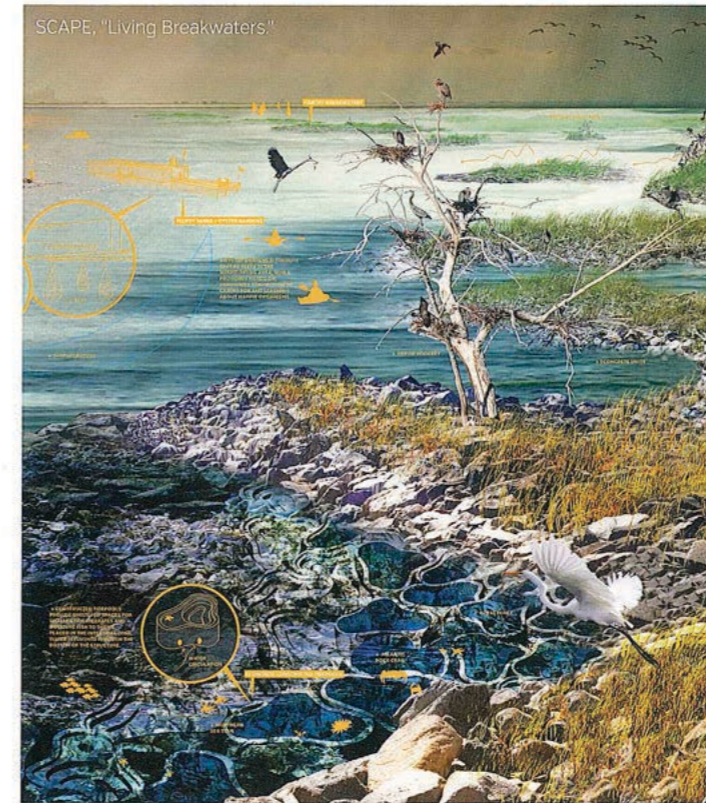
17 Sherry Arnstein, "A Ladder of Citizen Participation," *Journal of the American Institute of Planners* 35 (1969): 216-224.

18 Hunts Point is a working-class community in The Bronx and is home to the New York Region's primary food distribution center. Every



deliver a mutually reinforcing blend of design and policy innovation. The Lab merges conventional flood control with applied research space for testing experimental materials, designed ecologies, and new management protocols. Its dual purpose as a space for protection and innovation epitomizes a core principle of resilience theory: to facilitate adaptation amidst uncertainty by learning from past experience.¹⁹ The Livelihoods initiative is a policy mechanism aimed at preserving a significant share of the Lab's permanent jobs for local residents. This would bolster the skills and earning power of the community's local workforce. Lifelines also calls for the creation of a Maritime Emergency Supply Lines Hub—an ephemeral logistics base capable of leading emergency relief efforts during future flood events—along the shoreline. The final component, Cleanways, centers on the construction of a tri-generation refrigeration warehouse within the Hunts Point food distribution center.²⁰ The Lifelines proposal received \$20 million from HUD.²¹

Lifelines' blend of physical infrastructure, social policy, and economic development clearly delivers on the competition's



positive or negative, and how might that experience influence the replicability of Rebuild in other contexts? The salience of these inquiries rests in the novelty of Rebuild, which eschewed the traditional design competition model by assigning different sites to each team. This provides an opportunity to assess both the internal products of Rebuild as well as a more comparative exploration of the conventional and recovery-through-competition models of post-disaster design. Meanwhile, scholars interested in the *products* of Rebuild should consider at least three additional fields of inquiry: (1) how should the performance of these resilience-oriented projects be evaluated and to what end?; (2) to what extent did each team's assigned site influence the jury's decision to select the winning proposals?; and (3) to what extent are these projects and their diversion of Community Development Block Grants²⁹ from traditional anti-poverty measures affecting spatial inequality?

Rebuild provides a robust collection of ideas and information for designers, policy-makers, and scholars to adopt, adapt, and assess. But if the competition's success aims to move beyond rhetoric and towards reality, these six lines of inquiry should be addressed. Only then might a national model premised on the idea of recovery-through-competition adhere to the core principle of the very resilience it aims to create: the ability to learn from the past in order to adapt to and prepare for the future.

perishable food item available to the region's 22 million residents passes through this center.

¹⁹ Andrew Zoll & Ann Marie Healy, *Resilience: Why Things Bounce Back* (New York: Free Press, 2012).

²⁰ "A Stronger, More Resilient New York," The City of New York's Special Initiative for Rebuilding and Resilience.

²¹ "Finalists," Rebuild by Design.

²² Barry Bergdoll and Michael Oppenheimer, *Rising Currents: Projects for New York's Waterfront* (New York: The Museum of Modern Art, 2011).

²³ "Finalists," Rebuild by Design.

²⁴ Zoll & Healy, *Resilience: Why Things Bounce Back*, 61–90.

²⁵ Richard Feely et al., "Scientific Summary of Ocean Acidification in Washington State Marine Waters: Washington Shellfish Initiative Blue Ribbon Panel," *NOAA Special Report*, accessed August 10, 2014, <https://fortress.wa.gov/ecy/publications/publications/1201016.pdf/>.

²⁶ Nina Bednarsek et al., "Extensive Dissolution of Live Pteropods in the Southern Ocean," *Nature Geoscience* 5 (2012): 881–885.

²⁷ Will Doig, "HUD Announces \$1 Billion Competition for Disaster Recovery Ideas," *Next City*, July 16, 2014, accessed August 10, 2014, <http://www.nextcity.org/daily/entry/hud-announces-1-billion-competition-for-new-disaster-recovery-ideas>.

²⁸ Graham Beck, "Building for Resilience without the Feds Breathing Down Your Neck," *Next City*, March 6, 2014, accessed July 30, 2014, <http://www.nextcity.org/daily/entry/building-for-resilience-without-the-feds-breathing-down-your-neck>.

²⁹ Kevin Fox Gotham & Miriam Greenberg, *Crisis Cities: Disaster and Redevelopment in New York and New Orleans* (Oxford: Oxford University Press, 2014).