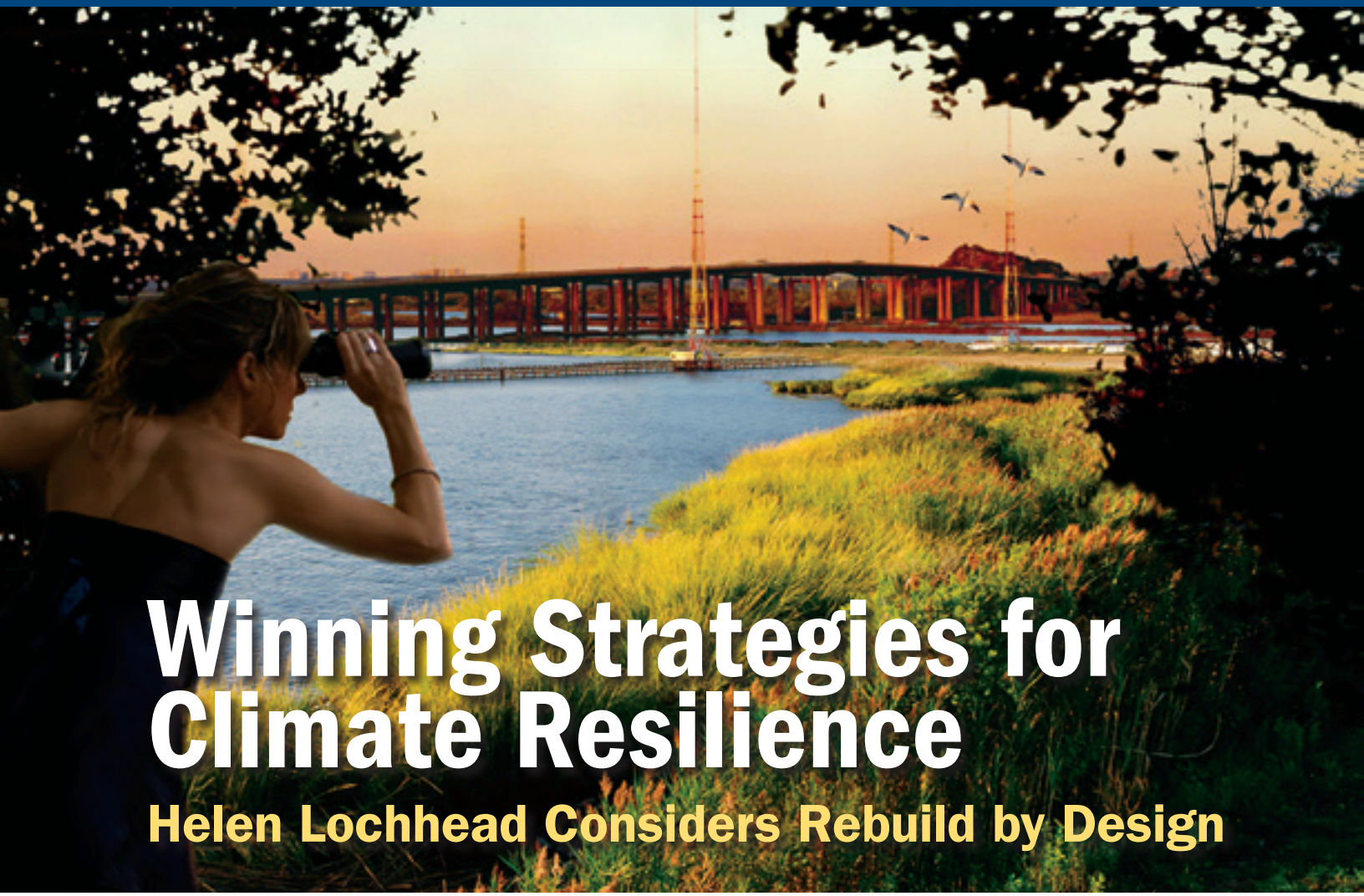


Winning Strategies for Climate Resilience

Helen Lochhead Considers Rebuild by Design

MIT CAU+ZUS+Urbanisten

The "New Meadowlands Productive City + Regional Park" in New Jersey will rebuild ecosystems that store and retain water while enriching biodiversity in an environment that is already a breeding ground for many local species.

In the wake of Hurricane Sandy, with more frequent extreme weather events and rising sea levels, the vulnerability of coastal cities and towns has become a matter of urgency. But out of disasters can come opportunities for innovation. Post-Sandy, a range of new initiatives, tools, policies, governance frameworks, and incentives are being tested, including competitions such as Rebuild by Design (RBD). Spearheaded by the Hurricane Sandy Rebuilding Task Force and the U.S. Department of Housing and Urban Development (HUD), the contest used design as a key tool for creating integrated strategies to build resilience, sustainability, and livability.

After HUD announced the winners in June, *Land Lines* discussed RBD with Helen Lochhead, an architect, urban and landscape designer, and 2014 Lincoln/Loeb Fellow at the Graduate School of Design at Harvard University and the Lincoln Institute. Previously, she was the Executive Director of Place Development at Sydney Harbour Foreshore Authority. She is also an adjunct professor at the University of Sydney.

Land Lines: **How did Hurricane Sandy differ from other storms in the United States?**

Helen Lochhead: Sandy caused unprecedented damage and underscored the vulnerability of coastal cities and towns to more frequent extreme weather events. Given the financial costs, topping $65 billion, and the excessive human toll, with 117 people dead and more than 200,000 displaced from their homes, it was clear from the outset of the recovery process that rebuilding what existed before was not a viable option.

All levels of government—federal, state, and city—clearly articulated the imperative to build greater resilience in the Sandy-affected areas of New York, New Jersey, and Connecticut. To ensure the tri-state region fares better next time around, it was acknowledged that we had to build differently. Because every $1 spent on mitigation and preparation can save $4 down the road on post-disaster rebuilding, government agencies are testing a range of new initiatives, including competitions that promote resilience through innovative planning and design, such as Rebuild by Design.

Land Lines: **How did Rebuild by Design differ from other recovery efforts and design competitions?**

Helen Lochhead: The RBD competition acknowledged design as a key tool for dealing with extreme weather events, with potential to reframe questions and develop new paradigms that challenge the status quo. Designers are collaborators, visualizers, and synthesizers. RBD provided them the opportunity to unpack issues and put together scenarios in new and different ways.

RBD's approach was also regional. Hurricane Sandy defied political boundaries, so the competition aimed to address structural and environmental vulnerabilities that the storm exposed across all affected areas. It also promised to strengthen our understanding of regional interdependencies, fostering coordination and resilience both at the local level and across the United States.

The procurement strategy was different as well. The standard model for federal design competitions is to define an existing problem, develop a brief, and solicit solutions from the best experts in the field. But a problem of such unprecedented scale and complexity as Sandy cannot easily be defined until it's understood in all its dimensions. This takes time. Such unchartered territory suggested the need for an open-ended question and an interdisciplinary, cross-jurisdictional approach.

First, a diverse pool of talent was engaged by a unique consortium of project partners—President Obama's Hurricane Sandy Rebuilding Task Force and HUD in collaboration with New York University's Institute for Public Knowledge (IPK), the Municipal Art Society (MAS), Regional Plan Association (RPA), and the Van Alen Institute (VAI), with financial support from the Rockefeller Foundation and other major foundations. Rather than limiting the field, the project partners sought integrated teams of interdisciplinary, collaborative thinkers, to facilitate a broad range of ideas and approaches as well as more holistic strategies.

Every $1 spent on mitigation and preparation can save $4 down the road on post-disaster rebuilding.

Second, the competition process itself was different. Eight months total, it was short, sharp, and focused. The process involved research *and* design to interrogate the issues and maximize the breadth and range of ideas through open innovation paradigms. The process was research-led,

The "New Meadowlands" regional park, to the left of the Hudson River in this aerial rendering, will dwarf Manhattan's Central Park, to the right.

MIT CAU+ZUS+Urbanisten

The SCAPE Team

SCAPE's "Living Breakwaters" around Staten Island, New York, will create marine habitats for oysters and other species, providing shoreline protection, food, and an outdoor classroom for local students.

open-source, and collaborative, to better refine the nature and scope of the complex regional challenges and develop comprehensive design solutions.

Third, RBD set aside HUD Community Development Block Grants (CDBG-DR) funding—$920 million specifically—to help implement winning projects and proposals. Typically, grantees are required to develop action plans only *after* receiving these funds. But RBD informally changed this procedure by fostering innovative proposals *before* awarding money. Thus, federal dollars became a catalyst for innovation as well as a mechanism to facilitate implementation. Teams were encouraged to secure their own funding for additional design development as well, fueling the extension of their outreach and their project's scope.

Finally, RBD interacted with communities, not-for-profits, government agencies, and local, state, and federal leaders at every stage to build new coalitions of support and capacity in tandem with each design proposal.

Land Lines: **How effective was Rebuild by Design as a vehicle for driving innovation and delivering resilience across the region? And what are the key possibilities and challenges of such a design-led process?**

Helen Lochhead: We will not know for some time if RBD will ultimately deliver innovations that better prepare and adapt the region to a changing climate or whether the projects can be successfully implemented and leveraged to build resilience in other vulnerable communities. However, it is possible to identify where the competition has demonstrated innovation and potential impact over and above more standard processes.

The sheer number of participants, range of disciplines, and integrated team structures facilitated a multiplicity of ideas and approaches but also more holistic strategies. From a field of 148 submissions, RBD selected 10 multidisciplinary design teams to research and develop a range of proposals. These finalists included more than 200 experts primarily from planning, design, engineering, and ecology.

The multifaceted research phase, which began in August 2013, also differentiated the competition process from the start. Teams immersed themselves in design-based research, targeted discussions, and field trips to Sandy-affected areas to help understand the enormity of the challenge. The Institute for Public Knowledge led this stage as a way to address a broad range of issues and involve

BIG-Bjarke Ingels Group

Protecting the Lower East Side of Manhattan from future storm surge and rising sea levels, BIG's "Bridging Berm" is a park planted with salt-tolerant trees, shrubs, and perennials, providing a resilient urban habitat.

local community input and fieldwork. The IPK research identified vulnerabilities and risk, for which the design teams could then propose better, more resilient alternatives. This framework enabled the project teams not only to identify, understand, and respond to core problems, but to define opportunities and create scenarios. The process also facilitated the sharing of research and ideas across teams.

The designers undertook extensive precedent studies, examined global best practice, and met with community members to elicit input on what might be most effective in local contexts. They identified new and emerging approaches to coastal protection, finance, policy, and land-use planning, as well as communication models that demonstrated promise in other contexts and could be adapted in the Sandy-affected region. Visual tools were key to the exploration. Teams tested scenarios using GIS mapping tools to collate, synthesize, and communicate complex data. Three-dimensional visualizations helped to convey various options and engage stakeholders.

The power of design-led propositions cannot be underestimated as a means to translate intangible problems into tangible solutions that stakeholders can relate to and discuss in meaningful ways.

Land Lines: **You mentioned that RBD built new coalitions of support. How was the outreach different?**

Helen Lochhead: Ten ideas were selected for design development in October, commencing the final stage of the competition. Teams worked closely with MAS, RPA, and VAI to transform their design ideas into viable projects that would inspire cooperation from politicians, communities, and agencies across the region and thus facilitate implementation and funding. Because of the regional approach of these far-reaching projects, the role of the partner organizations was pivotal here in bringing together local networks of often vastly different interests.

Coalition building was essential to ensuring that the approach was inclusive as well as comprehensive. Even more important was the grassroots support for implementation, to create the necessary momentum to deliver projects in the long run, as inevitably some will roll out over time as funds become available.

Land Lines: **What were some key themes in the proposals?**

Helen Lochhead: The overarching logic in the proposals is that the greatest benefit and value is

created when investment addresses not just flood or storm risk, but also the combined effects of extreme weather events, environmental degradation, social vulnerability, and vital network susceptibility. By restoring ecosystems and creating recreational and economic opportunities, the projects will enhance sustainability and resilience.

What prevailed were layered approaches that incorporate more ecological green/blue infrastructure as well as gray infrastructure systems, along with proposals for new, more regionally based governance models, online tools, and educational initiatives that build capacity within communities. Many demonstrated place-based solutions that also had wider application. All highlighted interdependencies, fostering coordination and inclusion.

Land Lines: **Among the winning projects, announced by HUD Secretary Shaun Donovan on June 2, what are some of the key innovations?**

Helen Lochhead: SCAPE/Landscape Architecture's "Living Breakwaters" could have far-reaching application if the engineered protective oyster reefs are successful. Although the proposal faces some challenges—in-water permitting and potential broader environmental impacts that need to be worked through—it has the potential to be piloted and tested on a much smaller scale, with the buy-in of local communities and champions such as the New York Harbor School, to iron out teething problems early on. If feasible, it has the added benefit of self-sustaining biological systems that keep replenishing themselves. The ingenuity of this scheme is the use of a pilot project to challenge the policy and regulatory framework with a radical rethink of the possibilities. Regulatory hurdles are often a significant barrier to innovation, so a small-scale trial is a low-risk investment. If it fails, there is little downside; if it succeeds, it will have circumvented major policy hurdles, paving the way for other new approaches to more ecologically based storm protection.

MIT CAU + ZUS + URBANISTEN's "New Meadowlands: Productive City + Regional Park" proposal for the New Jersey Meadowlands affords another equally innovative approach to implementation. It's a striking example of green infrastructure in the form of thick, multifunctional, landscaped berms along the water's edge that act as a flood barrier but also allow occupation. The proposal features a productive regional park, with berms and wetlands ringing the waterway, that buffers vital property and infrastructure from floods, rebuilds biodiversity, and hosts recreational and social programs as well as a mix of development to take advantage of the new parklands.

The project also proposes a compelling opportunity for a regionally based governance model to help implement the vision. The New Jersey Meadowlands Commission—with existing land use zoning in 14 municipalities—is a case study in intermunicipal collaboration with latent powers that position it well for a coalition-building

PennDesign/OLIN

Through the use of a levee and other mechanisms, PennDesign/ OLIN's "Lifelines" project aims to protect the Hunts Point Food Market in the Bronx—a key link in the New York City food supply and a major economic hub.

PennDesign/OLIN

A "cleanway" at Hunts Point in the Bronx intercepts storm water and water-borne chemicals in a planted canal on the site of a former creek—providing a safe, green, and interesting path between the community and the Hudson River.

effort over this regional landscape. With some re-engineering, it could potentially become an ecological and economic development agency. There are many regulatory hurdles embedded in this proposal that a strong governance body such as this one could potentially streamline. The regional scale of many of the proposals means that they cross jurisdictional boundaries, which complicates implementation. By identifying the untapped potential of this existing governance framework, this team has shifted a major roadblock.

The BIG Team's "BIG U" is a compartmentalized, multipurpose barrier designed to protect vulnerable precincts in lower Manhattan from floods and storm surge. The team focused on the Lower East Side. The project integrates green space and social programs and, in the longer term, proposes much-needed transit. While it aims to redress the lack of recreational open space in the neighborhood, it inadequately addresses systemic shortcomings, such as the shortage and quality of low-income housing in the area, access to services, and the potential gentrification this project could accelerate.

In Nassau County, Long Island, the Interboro Team's "Living with the Bay" sought to enhance the region's quality of everyday life in nonemergency times while addressing flood risk. Taken as a whole, the initiatives present a collection of relatively low-risk propositions that can be readily implemented and that sow seeds for a more strategic and resilient future. Over the long term, improvements would include denser housing close to mass transit and a new community land trust.

PennDesign/OLIN's "Hunts Point Lifelines" proposal for the Bronx focused on social and economic resilience. While the team considered environmental vulnerabilities, its chief concern was the critical role that the Hunts Point Food Market plays in the local community and the regional food chain. The team worked with the community and industrial property owners to develop site-specific designs for integrated storm protection as well as green infrastructure that offers high-quality social space using components that can be manufactured locally and built cooperatively. The project demonstrated the potential of hybrid port protection and ecology throughout the estuary.

OMA's comprehensive strategy for Hoboken—"Resist, Delay, Store, Discharge"—represents a catalogue of interventions that incorporates extensive green/blue infrastructure as well as a protective barrier for critical transport infrastructure. While it shares many similarities with the Hoboken Sustainable Communities project, its strength is

The Interboro Team's "Living with the Bay" proposal will employ swales, marshes, and dikes to manage storm water and build resilience along the South Shore in Nassau County, New York.

Credit: Interboro Team—Interboro/Apex/Bosch Slabbers/Deltares/H+N+S/Palmbout/IMG Rebel with Center for Urban Pedagogy, David Rusk, NJIT Infrastructure Planning Program, Project Projects, RFA Investments, TU Delft

the comprehensive approach achieved through a series of key initiatives that brought Hoboken and Jersey City to the table with more than 40 stakeholders who will be essential to implementation.

Land Lines: **What were the most winning aspects of projects that didn't win?**

Helen Lochhead: Open-source frameworks enabled online engagement that informed both the process and the public, so teams could tap into a much broader range of users than just those who traditionally attend community meetings. For example, Sasaki's "CrowdGauge for Rebuild" first asked users in Asbury Park, New Jersey, to rank a set of priorities. Then it demonstrated how a series of actions and policies might affect those priorities. Finally, it gave users a limited number of coins, asking them to put that money toward the actions they supported most.

Various teams demonstrated a kit-of-parts approach, drawing on economic development initiatives, how-to toolkits, and urban improvement projects in various combinations to achieve resiliency objectives. HR&A Cooper Robertson's proposal for Red Hook, Brooklyn, is an example of this method. With all the layers in place, a number of these strategies could be scaled up and result in systemic transformation and benefits. Such granular approaches facilitate phased implementation and with funding are immediately actionable, impactful, and scalable.

Sasaki/Rutgers/Arup's "Resilience + the Beach" shifted the focus inland from the Jersey Shore to higher, drier headlands, by redefining the coastal zone as the six-mile deep ecosystem between the beach and the New Jersey Pine Barrens. By revealing the scenic attributes and recreational potential of the hinterland's waterways and forests, the strategy encourages development to migrate from the barrier island edge to stable inland areas to grow a more layered tourism economy. The site for this project is Asbury Park, but the approach has broader regional application by capitalizing on the geographical attributes characteristic of the New Jersey coast—the Pine Barrens, inland bays, and barrier islands—to create new attractions.

The strategy includes a range of actions including new green/blue infrastructure, open space and development, and a community toolkit to educate landowners on local risk and options for resilience.

Another prototype for regional coastal cities, WB's "Resilient Bridgeport" consists of a resilience framework and specific design proposals for the Long Island Sound region. A set of integrated coastal, urban, and riparian design strategies and planning principles provide multiple lines of defense to protect Bridgeport against flooding and storm surge while stimulating environmental restoration, economic development, and neighborhood revitalization focused around social housing.

Land Lines: **In sum, what have been the key successes of the competition so far?**

Helen Lochhead: The urgency of the problem and the fast pace of the competition provided a level of intensity, drive, and momentum that yielded results in a short time frame. Many of the design solutions were characterized by a quantum and richness of ideas, depth of resolution, and cleverness of approach. The focus was not just on recovery and risk reduction, such as flood and storm mitigation, but on long-term resilience and sustainability. All propositions deliver multiple social, economic, and environmental benefits—improvements related to amenities, ecology, education, capacity building, long-term savings, and community health and well-being—and so tend to be higher-performing, holistic solutions.

The impact to date has already been catalytic. If nothing else, RBD has generated momentum and delivered major benefits to the region by starting the conversation on resilience by design. Granted, the real measure of success is in the implementation, but a robust, innovative process is required to provoke cultural change in practice. RBD has set that example.

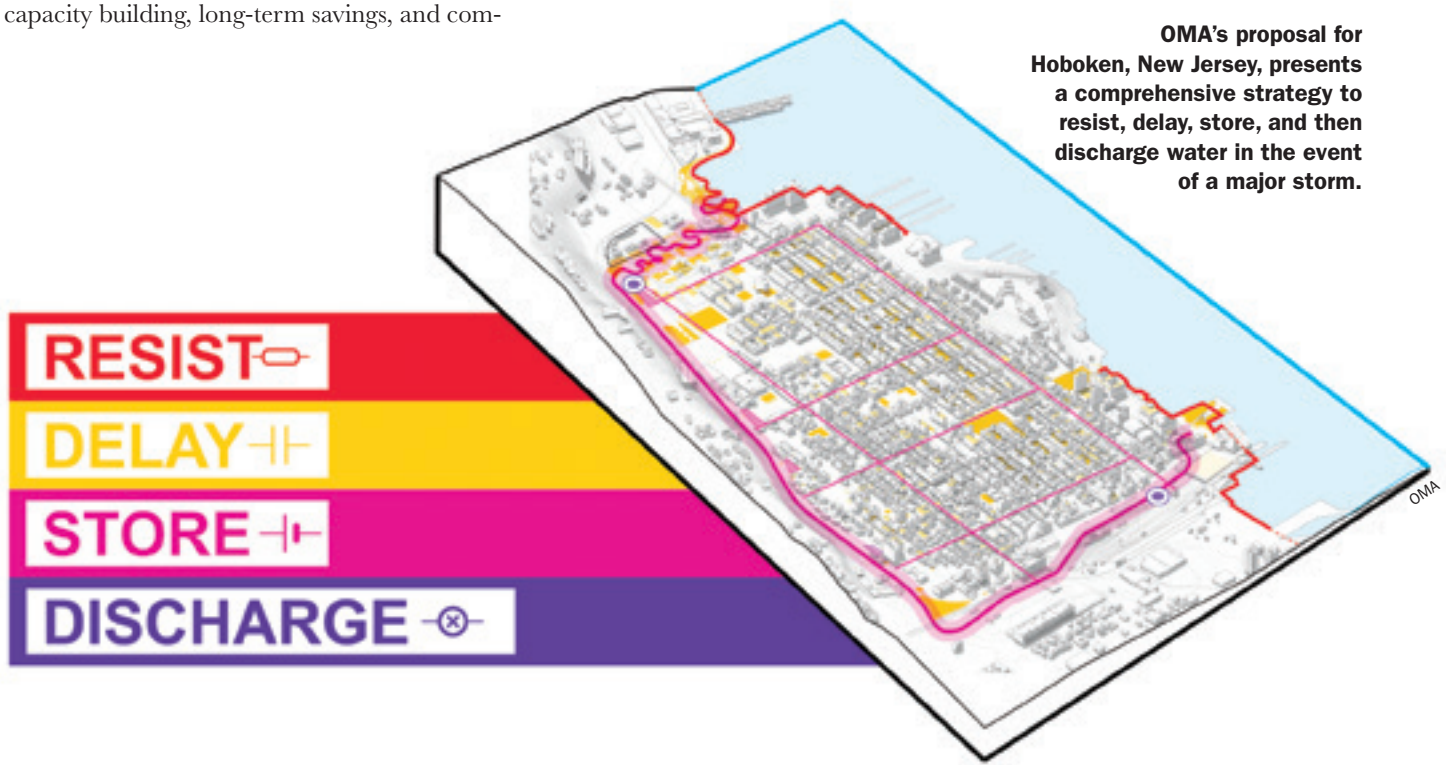
Land Lines: **What will be the key challenges of implementation?**

Helen Lochhead: Finding the sweet spot between the visionary and the pragmatic.

The carrot for the winners was the possibility of building these projects with disaster recovery grants from HUD and other sources of public- and private-sector funding. As such, a key part of the final phase was an implementation strategy that demonstrated feasibility, support of local grantees, phasing, and short-term deliverables that can be delivered with CDBG-DR funding as well as ongoing revenue streams for later stages.

The real opportunity for HUD now is to leverage this process and its exemplary projects to benefit other regions at risk on a national scale.

Contact: helen.m.lochhead@gmail.com



OMA's proposal for Hoboken, New Jersey, presents a comprehensive strategy to resist, delay, store, and then discharge water in the event of a major storm.