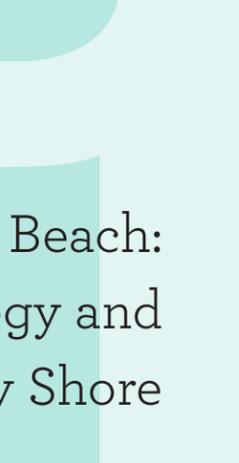




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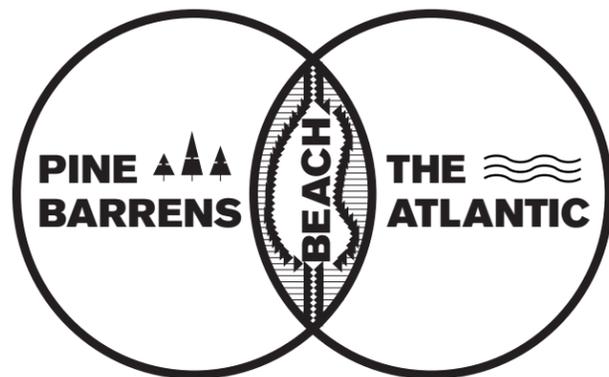


Resilience + the Beach:
A Regional Strategy and
Pilot Projects for the Jersey Shore

DEEPER THAN THE BEACH

Our team's research and design strategies focus on the value of "the beach," a place of special significance to memory, state and local economies, and a vital component of coastal ecosystems. New Jersey's northern shore (Ocean and Monmouth counties) is an ideal place to study the identity and function of the beach, since it includes the three coastal typologies found across the eastern seaboard of the United States: Barrier Island, Headlands, and Inland Bay. Over the past century, Jersey Shore tourism has evolved to play a significant role in the state's economy and in regional cultural identity. At the same time, practices to support tourism and other development have impacted the underlying ecology and resiliency of the beach and shore communities.

Our research has led us to understand that the shore's relevancy and position is ultimately much deeper than the narrow strand of sand, where the ocean waves fall, the beach. In New Jersey, sandy soils extend inland to the expansive, ecologically rich pine forests (the Pine Barrens). A series of twenty two coastal lakes and myriad rivers and creeks extend estuarine and wetlands environments inland



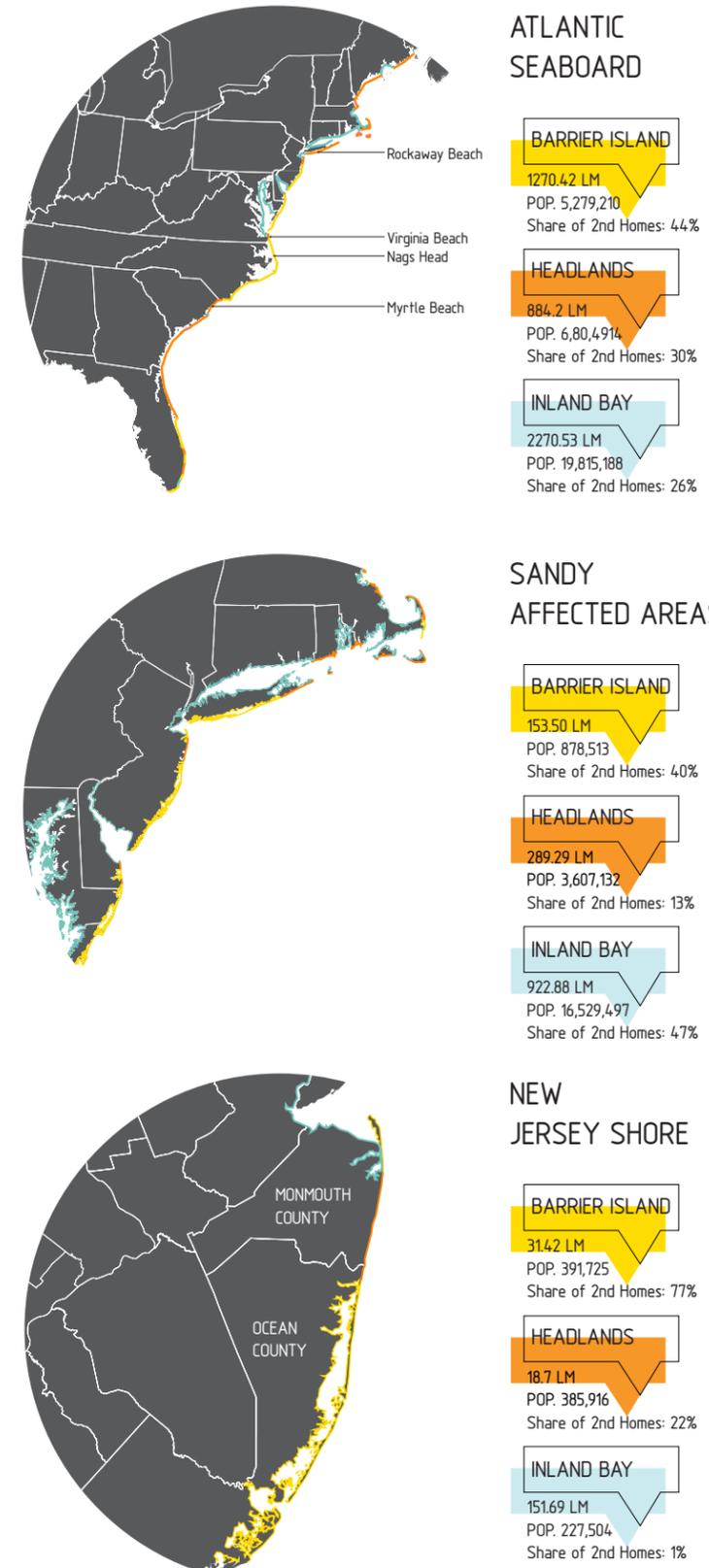
miles from the coast. While storm surge and coastal flooding will pose increasing threats to the coastline, the inland environment and patterns of development mean that watershed stormwater impacts will also constitute a significant portion of the future threat for flooding in the region. Ultimately, the Jersey Shore's future resiliency cannot only be solved through engineering solutions that address the immediate coast; a resilient beach must be linked to projects that deepen the physical extent, ecological reach, and cultural understanding of the beach.

Informed by a close reading of the ecological, economic, and cultural conditions of the Jersey Shore, the Sasaki team has developed two approaches to resiliency for the Jersey shore. These approaches are transferable to large sections of the east coast of the United States:

1. **A regional program for future resilience along the Shore, building on the strategic strengths of each community and developing coalitions and collaboration spanning from Barnegat Bay north to Raritan Bay; and**
2. **Local interventions in three specific sites that will serve as replicable "pilot" solutions for the diverse issues that sea level rise and future weather events will bring to the entire shore.**

The three pilot sites represent each of the three coastal typologies along the Jersey Shore, as well as the types that exist along the entire Atlantic coast. The Barrier Island strategy is tested in a district including **Berkeley Township, Toms River Township, and Seaside Heights. Asbury Park** represents the Headlands condition, where mainland

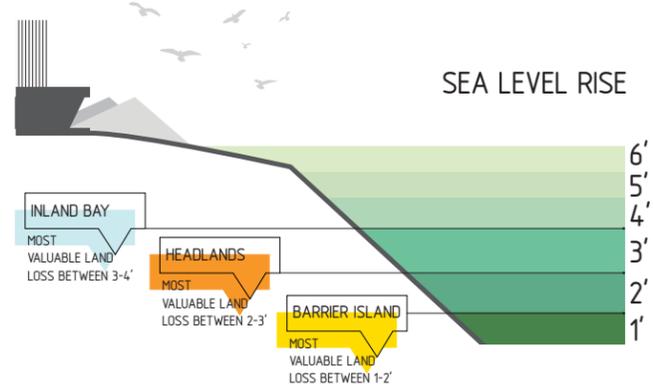
REGIONALLY AND NATIONALLY RELEVANT TYPOLOGIES



meets the ocean directly. Finally, several communities surrounding **Natco Lake – Keansburg, Union Beach, and Hazlet** – provide a pilot site for the Inland Bay condition. Each of these sites has local and site specific needs, yet also embodies typical conditions that allow the projects to be replicable across other communities on the Jersey Shore as well as the entire Atlantic seaboard.

ECONOMIC, ECOLOGICAL, AND CULTURAL VALUE

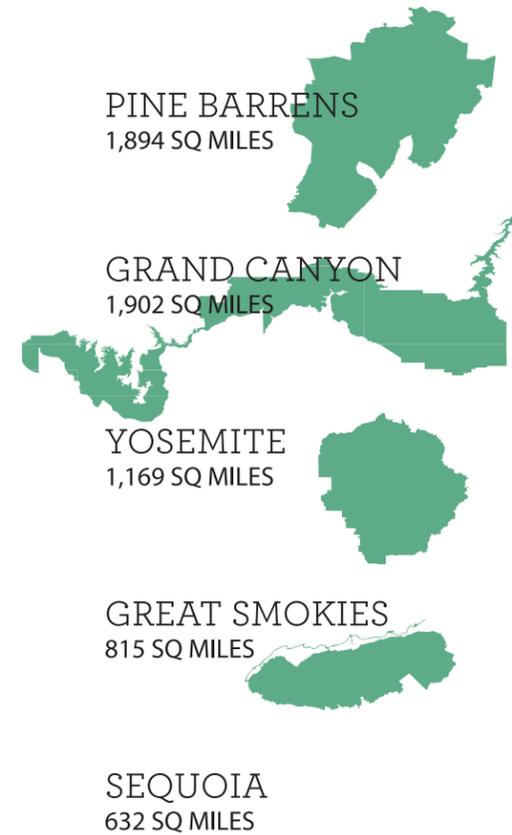
While many economies are driven by urbanism that is linked to dense cities, the economies of American beaches are an exception, driven instead by the underlying and diverse coastal ecology. Our research focused on understanding the characteristics and vulnerabilities of the coast, considering specifically the links between economy, ecology, and culture along the beach. These three topics provided three lenses to focus and direct our research, and they have continued to inform our regional resiliency program and pilot projects. The coastal environment is often understood as the interface of land and the ocean. Since the human experience and impact on the coast is such an integral part of our research, we defined our coastline as much deeper than this literal edge, reaching miles inland from the ocean to encompass a more diverse ecology as well as patterns of residential and commercial development. Along the Jersey shore, which became our area of focus, this transect reached from the Atlantic Ocean inland to the Pinelands/ Pine Barrens, a heavily forested national reserve of coastal plain stretching across multiple counties in southern New Jersey.



Impact of variations in sea level rise

Understanding Ecology and Environment

The shore is defined by the three environmental typologies that comprise all coastlines, including any part of the Atlantic Seaboard, the Sandy-affected region, and – where our research has focused – along the Jersey Shore. These three coastal typologies are the Barrier Island, Headlands, and Inland Bay. These three typologies have provided the foundation for the ways that adjacent Shore communities have grown and evolved. Our research has shown that coastal type also directly relates to vulnerability to sea level rise. This comprehensive understanding of the different coastal types along the Jersey Shore has helped us to shape a regional response to sea level rise challenges. For example, a Headlands community is typically higher and dryer (at an average elevation of 13 feet) than a Barrier Island community (at 3'). Likewise Barrier Island communities in NJ, with densely developed, high value land along ocean or bay edges are highly susceptible to very early levels of sea level rise (1'-2'). Finally, the NJ Inland Bay communities that we have



NJ's Pine Barrens rival national parks

studied are already vulnerable to regular flooding from inland drainage and storms; sea level rise only increases this risk. Understanding the different development patterns and vulnerabilities of the Shore through the underlying coastal structure has helped us shape both our local pilot projects as well as an overall strategy for a resilient future for the Shore.

An ecological understanding of the beach is also enhanced by the conception of the shore as deeper than the beach. With this understanding, Jersey Shore ecosystems encompass the ocean, the barrier islands, the bay, mainland, rivers, creeks, coastal lakes, urban parks and streets, and New Jersey's Pine Barrens forest. Central to a new perspective of the Shore, the Pine Barrens include 1.1 million

acres that have been designated by Congress as the Pinelands National Reserve; this amounts to 22% of New Jersey's land. Despite their proximity to many developed communities, the Pinelands remain largely rural and undisturbed. Their vast size and unusual ecology make the Pine Barrens critical to habitat and species persistence, as well as to local culture and economy. Forty-three endangered or threatened species make home in the Pine Barrens. The land also helps to recharge the 17 trillion gallon Kirkwood-Cohansey aquifer, a critical regional resource. Culturally, the Pine Barrens have developed their own identity, spawning the folklore of the Jersey Devil, recent pride around "Piney" communities, encompassing heritage going back to colonial days, and meriting being memorialized in a book by John McPhee. The Pine Barrens extend from the barrier island coast, such as at Island Beach State Park, inland nearly to Camden. This deep reach, defined by an ecologically and environmentally sensitive area, is emblematic of the need to re-imagine the Jersey Shore as much deeper than the beach.

Together, these geographies are one ecological zone. For example, recreational and commercial fishing are concentrated in the ocean, east of the barrier island, but these resources depend on habitat for juvenile fish in the bay, and nutrients, food web species, and clean water that flows out from the pinelands. Healthy fish populations require a functioning bay and Pine Barrens. Similarly, the rich bird life along the bay and barrier island, which gives the coast character and charm for visitors, requires nesting and feeding sites in the bay and refuge and resting areas in the pinelands. If any single element is removed, by human intervention or sea level rise changes, the ecological structure crumples, damaging the human culture of the shore. The vegetation fringing the bay and the

river mouths cleans the water and minimizes erosion, critical during storm events and necessary at all times to keep the bay water healthy for human uses and for wildlife persistence. Keeping Barnegat Bay healthy is a high priority of the State and Governor's office. The Pinelands habitat advances this goal and consequently keeps the economic base strong. "Jersey Strong" is not just a descriptor of our people; it is an environmental necessity to make coastal resilience possible.

In all parts of our Jersey Shore sites, we have developed a Habitat Engine framework to enhance the sustainability of living coastal features. In order to maintain critical resources, all elements of the habitats will have to move to appropriate conditions as sea levels rise. Plants and animals will need a dispersal method and speed to reach safe ground and a target location that is favorable for species to persist and spread. Although we do not know precisely the speed or scope of sea level rise, we can "set the stage" for the inevitable movement of our coastal resources by modifying the landscape so that the Habitat Engine can work in sync with changing hydraulic conditions. The Habitat Engine builds on the similarly named Sand Engine methodology, a geomorphology engineering approach, is being tested for landform alterations. However, for living species, a more complex set of needs must be secured for the future. Like a mechanical engine, the Habitat Engine can pull along elements of living communities as the vegetation structure matures, and conditions for animal life history needs become available.

Along water corridors, we can simultaneously design flood protective strategies as well as landscape plans to secure continuous, favorable habitats for the movement of coastal living resources. This may

include modifying the width and depth of coastal wetland corridors, removing impediments to migration routes, modifying small areas that interrupt now separated, but favorable landscape parcels, removing stresses (such as atypical fill) from sites or adding specific needs for the introduction of critical coastal species (e.g. nesting areas for terrapins or birdlife). Similarly, uplands may be modified to add to the carrying capacity of the site to allow movement of habitats as the waters rise.

Protecting Tourism Economies and Social Dynamics

Through conversations with Jersey Shore stakeholders, the Shore was repeatedly described as "an economic engine for the state." Monmouth and Ocean Counties specifically generate approximately \$28 billion annually in tourism revenue for the state. In effect, the Jersey Shore's economic impact extends much deeper than the immediate beach localities,



supporting counties and the state as a whole. As we re-imagine the resilience of Shore communities, protecting the Shore's ecologically-driven economy is one of our primary goals. For the Shore, our projects are addressing economic aspects of resilience as well as storm damages.

Research and conversations with the New Jersey Office of Tourism illuminated the diversity of this economy, from lodging to food to beach badge sales, as well as income generation from second home rentals. Certainly not all communities along the Shore experience the impacts of Shore tourism equally. Significantly, approximately half of the shore's hotels are concentrated in the Headlands area, while the Barrier Islands have the greatest share (77%) of second homes. The seasonal nature of the shore economy stresses social and communities ties, embodied in towns with small populations that swell to ten or more times their year round population in the summer. Seasonal tourism results in seasonal retail in some locations, including a creative two-sided



New Jersey shore beach nourishment costs, 1930-Today

retail solution along the boardwalk in Asbury Park. However, other Shore communities struggle with retail health year round; a stunning 90% of all retail storefronts in Keansburg lie vacant today.

The strong economic role of the beach has motivated decades of efforts to protect it, both along the Jersey Shore and the entire Atlantic coast. Ever since beaches became places for recreation, tourism, and economy, they have also become places that are increasingly preserved and nourished through coastal engineering. Beginning in the 1930's, beach nourishment began and continues today as a major part of the Army Corp's projects along the Jersey Shore. Today, more money has been spent on beach nourishment in New Jersey than in any other state. This ongoing investment affirms the significant role that the shore's beaches play in state economics and in cultural memory. Additionally, much of the shore's edge has been transformed and is controlled by sea walls, revetments, groins and jetties. Our survey of our study area's shoreline showed that the naturally dynamic, moving barrier beach is now armored with two systems that attempt to fix it into place: 99% seawalls on the bayside and 99% groins or jetties on the ocean side. This armor may protect real estate from routine winter storm erosion, but it will increasingly be tested by sea level rise. Our understanding of the "vicious" cycle of coastal infrastructure in such a dynamic environment supported our search for design opportunities that better integrate ecological solutions and processes into beach protection or transformation.

Building a Resilience Network

In popular culture, the Jersey Shore is frequently identified as a place of pleasure and entertainment. This image persists through generational memory, television shows, and Shore souvenirs. The original design ideas for each of our three pilot sites built on this reputation, linking cultural icons for each of the coastal types to ecological strategies to create a more resilient, culturally reminiscent response. Yet, the Shore's cultural challenges in the face of sea level rise ultimately go beyond regeneration of the icons of the pier, the boardwalk, or the marina. One of the most difficult issues facing shore communities is the limited local capacity for resiliency planning and the individualized governance structure of small communities along the Shore. To this end, regional advocacy non-profits, such as NJ Future, Urban Coast Institute, or the Jersey Shore Partnership, have begun to augment planning in small communities. NJ Future, for example, has temporarily placed a number of resiliency planners in communities across the Shore to support both post-Sandy recovery and future planning. (NJ Future has been an important partner in this process, helping to spread the work about our ideas and public meetings to their existing networks.)

Given the Shore's need for improved capacity and multi-jurisdictional operations, a regional strategy for a resilient shore requires a connected "Resilience Network", rather than single project owners or partners. Tony McDonald, director of the Urban Coast Institute (UCI) at Monmouth University, has been working through his own research to champion the formation of a resilience network for the Shore as well. We have been building on this idea, working to facilitate conversations among communities,

advocates, and all scales of government when possible. The goal is that these coalitions can easily scale up or down to support projects of different scales, serve as resource sharing platforms, and be mechanisms to support disaster response in emergency situations as well. Continual feedback from community members reported that one of the most critical elements to disaster response in the days after Sandy was social networks, but these networks tend to go no further than the municipal borders.

Through the Stage III process, we have been getting to know the many people who have a stake in the Jersey Shore's success: state, county and local governments, environmental advocates, development or business-oriented groups, and local residents. While the Rebuild by Design outreach and coalition building process has successfully facilitated many conversations among different groups and across existing boundaries, there is still work to be done to continue reinforce the network. Some of these organizations, such as the Governor's Office of Recovery and Rebuilding, Ocean and Monmouth County administrative offices, or non-profits like the American Littoral Society, span multiple jurisdictions already. There is untapped potential through NJ's Office of Travel and Tourism which operates Destination Marketing Offices state-wide. Others are geographically specific, such as Asbury Park's Environmental and Shade Tree Commission or property owners. Still others are topically focused, but link multiple communities. The Deal Lake Commission, which manages improvements and daily functioning of Deal Lake, brings together representatives from the seven different communities that have ownership stake in Deal Lake. Additional details about partners and coalitions are outlined with each project site.

CrowdGauge: Gathering Regional Values and Priorities

With the physical and emotional trauma of Sandy as a catalyst, and the sustained dialogue provided by the Rebuild by Design competition, disparate groups on the Shore have the opportunity to develop a common resiliency language and set of shared values. To facilitate this conversation across the broad geography of the Shore, we deployed Sasaki's CrowdGauge tool, which, through an online game-like interface, helps communities achieve better public participation and understanding of trade-offs.

CrowdGauge is an open-source framework for creating educational online maps and surveys. It first asks users to rank a set of priorities, then gives users a limited number of coins, asking them to put that money towards the actions they support most. A meter at the bottom of the priorities page lets survey users know how their priorities increase or decrease sea level rise risk behaviors.

CrowdGauge gathered responses from the Jersey Shore and beyond, indicating the broad reach of the Shore. 32% of responses were from Monmouth County, where our Asbury Park and Natco Lake projects are located. Only 7% of responses were from Ocean County, where our Berkeley Township/Toms River project is, indicating that greater future outreach should be done there. The majority of the remainder of replies came from other counties in New Jersey and New York.

The responses indicate that shared values around resiliency already exist: concerns around clean air, water and land, well-maintained infrastructure, and conservation rank highest among all priorities. Projects that support tourism, alternative transportation, and infrastructure maintenance rank high among investments.

Top 10 Community Values	Score	Top Supported Projects	Score
1. We have clean air, water, and land	27.42	1. Reduce congestion through pedestrian, bicycling, and transit	706
2. We invest in conservation efforts to protect the beaches, Pine Barrens, and other natural resources	25.00	2. Upgrade infrastructure systems	663
3. There is well-maintained infrastructure	19.89	3. Bolster Jersey Shore tourism	625
4. The Jersey Shore is a cultural and recreational amenity for future generations	16.28	4. Increase in open space by building new parks and protecting natural resources	625
5. I am safe from flooding and storm surge	13.41	5. Invest in new development and job creation	529
6. I have views and/or access to the water	9.20	6. Reduce stormwater flooding problems	499
7. There is a vibrant, year-round tourism and recreation economy	8.73		
8. I can live and work in my community	7.48		
9. I know my neighbors and I feel like I belong to a community	7.09		
10. There is less traffic	4.50		

Characterizing Sea Level Rise and Loss

The analysis of sea level rise was intended to retain its dynamic nature when characterizing potential losses and threats to our three coastal typologies. Using NOAA sea level rise data and parcel-level data from Monmouth and Ocean Counties, parcels were reclassified according to their relationship to inundation envelopes for one to six feet of sea level rise as well as their location in the three coastal types. By linking sea level rise projections, coastal typologies, and county assessor's data, the team was able to understand the magnitude of losses (land, value, and tax income) for each coastal typology within a range of sea level rise scenarios. The findings on overall magnitude of projected physical land and land value losses showed steady increases between each 1-foot increment and an eventual leveling off in the rate of growth of losses at the 5-foot mark.

However, a critical finding was the pronounced variation across coastal typologies in rate of change in value per acre lost in each foot of sea level. This illuminated the differences in how proximity to the water is valued and mediated in each of the coastal typologies in New Jersey. For example, in the Jersey Shore barrier island study area, the highest value land is lost between 1- and 2-feet of sea level rise, while in the Inland Bay the most valuable land is lost between 3- and 4-feet of sea level rise. Ultimately, across all three typologies in Ocean and Monmouth counties, \$526.6 million in annual tax dollars (measured in this year's dollars) will be lost by 3-feet of sea level rise. This analysis helped frame the threats, confirmed our understanding that the Barrier Island typology is the most immediately vulnerable, and helped structure a greater intervention in the Barrier Islands vs. the other typologies.

JERSEY SHORE REGIONAL PROGRAM + 3 PILOT SITES

In addition to the overall strategy for understanding the Shore as deeper than the beach, we have also studied the barrier island, headlands, and inland bay conditions individually in order to propose replicable solutions within them and identify key pilot projects that can be implemented and realized through Rebuild by Design. The commonalities among Barrier Island, Headlands, and Inland Bay communities are described in the next section to highlight the replicability of certain solutions along the Shore. A pilot project and first implementation steps for each coastal type has been framed, planned, phased and budgeted to set the stage for building a resilient Shore.

REGIONAL RESILIENCE FOR BARRIER ISLANDS

The barrier islands are the most vulnerable stretch of the New Jersey shore, the low-lying lands constantly shifting with the energy of tide and storm.

Continuous change characterizes life on New Jersey's barrier islands. As Rutgers ecologist Joanna Burger observes, "A series of barrier beach islands absorbs most of the forces of the ocean's wave front, but the entire coast is a living thing, shifting ever so gradually from year to year. The very shape of the land itself is altered over centuries... Nowhere are the changes more rapid and evident than coastal margins." While such ecological dynamism has been a source of value for barrier island tourism economies, it will be their principal threat in the future. Under a three-foot sea

Barrier Island Vulnerabilities

Among the three coastal typologies, Barrier Islands experience high ecological, economic, and cultural vulnerability to sea level rise projections. Communities along the Jersey shore's barrier islands swell exponentially in summer months: Seaside Heights grows from a year round population of 2,887 (2010) to 65,000 in the summer months, and the second-home community of Harvey Cedars grows from 337 year round dwellers to 2,000 in the summer. These social characteristics challenge traditional community ties and social services during storms and recovery. While public rail lines serve Inland Bay and Headlands beach communities, rail service terminates just north of the Barrier Islands. Ninety five percent of tourists arrive by car, reliant on the single, central road layout and bridge connections, both of which experienced failure during Hurricane Sandy. Without even taking into account future

storm probability, \$13.77 billion worth of property and 43,820 acres of land are vulnerable to the first foot of sea level rise.

While intergenerational memory figures highly in today's sentiment about homes on the shore, the built form of the barrier islands is relatively new. A building boom occurred in the decades following the 1962 Northeaster, which swept New Jersey's barrier islands virtually clean; many communities reached full build-out by the time of Hurricane Sandy. Much of this development was residential and intended for seasonal occupation: barrier islands account for over three quarters of second homes on the New Jersey coast (77%), and have the highest percentage of beach frontage in private ownership. As a result of the high values placed on beach access, public piers serve as episodic public moments along the shore, acting as a community's economic and social center.



Barrier Island conditions, today.



level rise scenario, barrier islands are projected to lose half of their land area; in a six-foot scenario, popular beachside tourist destinations nearly disappear. Compounded by a sensitivity to tidal and storm forces, New Jersey's barrier islands may be uninhabitable a century from now. Rather than permanently fight this shift, our project seeks ways to diversify the traditional beach economy, allowing the economic, social, and ecological health of the barrier island communities to persist and be resilient, even as the environment of the shore shifts and changes.

Barrier Island Resilience Network

Through this process, the team has worked closely with state, local and community levels that are essential to the future resilience of the region. These conversations and meetings form the foundation for a resilience network moving forward. This network of key representatives is envisioned to be the core group for future planning as well as the client team for the pilot project around Toms River. Given the emphasis on economic development, the tourism industry, and the significant threat to Barrier Islands, the Barrier Island's network includes representatives from federal and state government agencies, as well as local advocates and governments. State Parks and Travel and Tourism have been particularly strong partners at the state level, helping with everything from data provision analysis to critiques of ideas. State Parks has been an advocate since the project builds on their tourism efforts to promote Island Beach State Park, Cattus Island and other mainland parks. Further, Travel and Tourism identified that the eco-tourism market is an untapped resource area, but aligns with growing markets such as birding. While Travel and Tourism does not traditionally "create"

destinations like our project, they would be a likely candidate to market it and support its growth after it is implemented. A key recommendation that came out of conversations with the Governor's Office is the near-term need for a market and tourism study to identify the true market feasibility and size of the potential eco-tourism draw in this part of the barrier islands; we suggest doing that study in the first phase of implementation. Cape May County already stresses this sector; the Barnegat Bay/Pinelands region can build on that nearby success.

Core members of the Barrier Island stakeholder group have included:

- Governor's Office of Recovery and Rebuilding
- US DOT
- US Dept of Commerce
- State of New Jersey – State Parks, EDA, DEP, Travel & Tourism, DOT
- Barnegat Bay Partnership
- Surfrider Foundation Jersey Shore Chapter
- Ocean County
- NJ Future
- Jersey Shore Partnership

Development of our pilot project, located in the communities surrounding Toms River, also required us to augment the federal and regional group with a more local coalition there, including the local planner and Mayor for Berkeley Township, the planning department from Toms River Township, and the planning director and department for Ocean County;

these groups are aligned to carry the project through implementation. The Ocean County planning director, David McKeon, has been enthusiastic and supportive of the project ideas, helping us to ensure they also support local community goals, transportation realities, and existing plans and projects. Erika Stahl and Jay Lynch, planners for Toms River Township, and Jim Orris, contracted planner for Berkeley Township, similarly supported the plan through regular critiques that helped to align it with each township's public land ownership, ongoing planning, and redevelopment efforts (i.e. the Toms River downtown redevelopment area and Berkeley Town Center, which is contiguous to our site). Toms River Township hosted our local community meeting at the Ocean County branch library in late January, which brought government officials, advocacy groups, and local residents together to imagine new activities that could be part



Public meeting activities in Toms River.

of a visionary, yet pragmatic, eco-tourism strategy for the region.

One large, private landowner is also key to implementation of the pilot project. NJ Pulverizing Company, based in Nassau, NY, owns multiple active and inactive sand mine sites. Their holdings include an over 700 acre site in Berkeley Township that has been re-envisioned through this RBD process as the central development and conservation site in future regional ecotourism. The owner has been in ongoing conversations with Ocean County Planning in recent years about potential future uses for the land, and is open to repositioning it. An important next step to implement the project will be to work closely with the landowner to determine an acquisition plan.

Barrier Island Design Solution

In Stage II of Rebuild by Design, our design solutions imagined creating resiliency by marrying a classic cultural icon of the Shore with an ecological partner. In the Barrier Island, this cultural icon is the pier and the ecological partner is the Pine Barrens landscape. Along the Jersey Shore, the pier is currently limited to a small infrastructure along the beach. However there is an opportunity to extend the iconic language of the perpendicular beach pier deeper inland to the New Jersey Pinelands, broadening the experience of the rich barrier island ecosystems and encouraging a shift in development to more stable, higher zones. The new "pier" will be a transect encompassing beach, dune, marsh, and pineland habitats and communities, enabling a more layered tourism economy to take shape while providing connectivity, including different types of transit that brings people to the changing barrier beaches. In this way, the ecological reality of a

functionally connected geography will be expressed by economic and cultural linkages. The inland pier will re-connect fragmented ecosystem patches, allowing ecological structures to migrate after sea level rise, maintaining habitat, and fostering food web security. Biotic movement and connections from the pineland forests to estuaries will help secure ecological functions needed for healthy people and persisting wildlife. While our pilot project is focused around Toms River, many other sites along the Barrier Island

could adapt their tourism economies similarly, such as Long Beach Island, Beach Haven / Staffordville, and Port Republic. We expect that the Toms River strategy could be assessed for success after it is implemented, and then replicated through other ecotourism sites in the Barrier Islands. This network of enriched sites can add new value, in economic and environmental health, to the region.

Along New Jersey's Garden State Parkway, there are many active and abandoned sand mining pits and

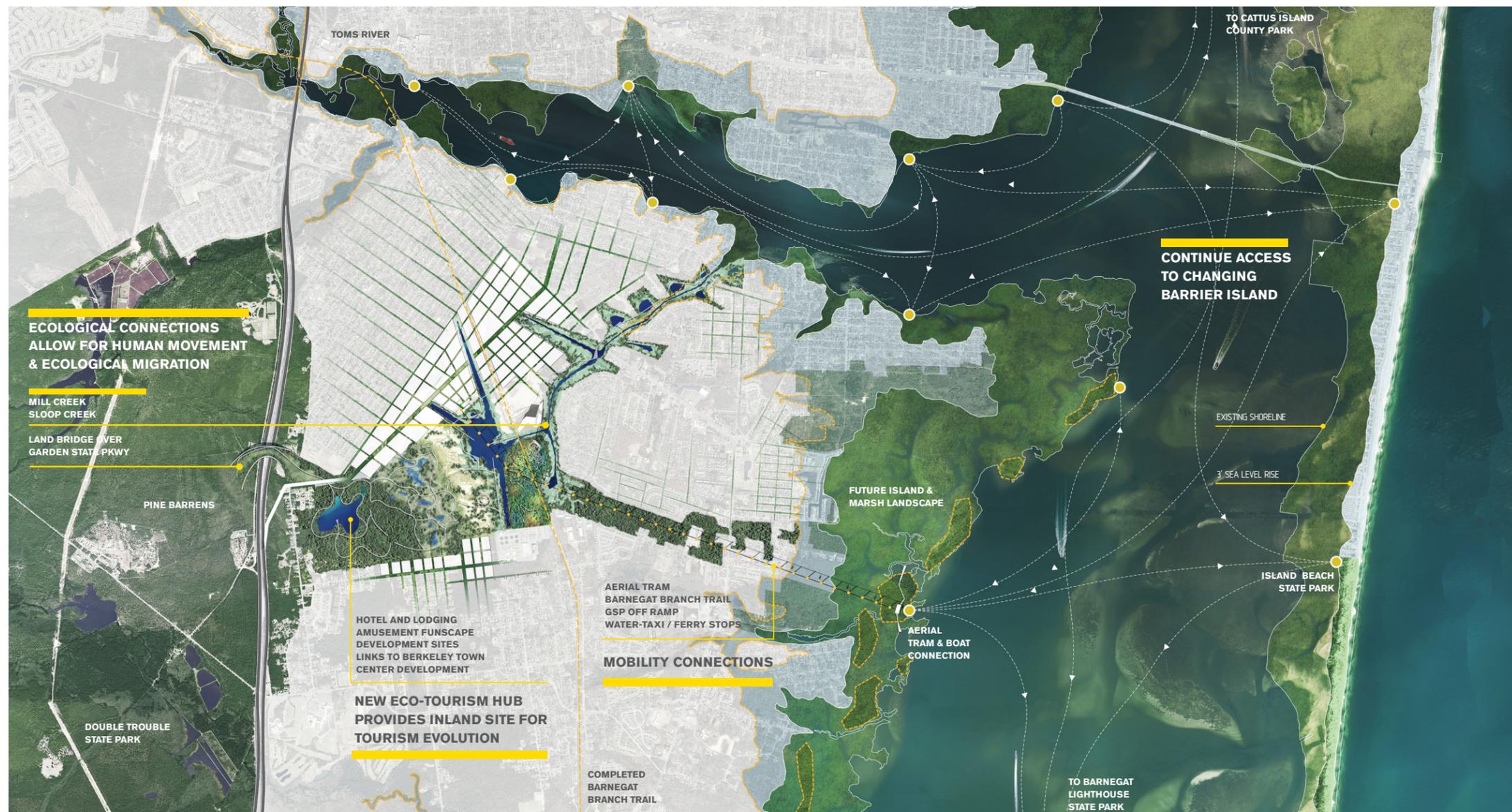
other post-industrial sites that present an opportunity to transfer value away from the barrier islands to higher and drier development options. These post-industrial sites, such as the NJ Pulverizing Co. site in Berkeley Township, are large in scale and sited near existing population growth areas. They are potential opportunities to transition into sites for urban or open space development on high and dry land. The New Jersey Pinelands Transfer of Development Rights (TDR) program provides a precedent for

transferring value from ecologically sensitive areas to more appropriate growth zones. Berkeley Township has land on both the mainland and barrier island so offers interesting potential for use of the TDR within a single jurisdiction, easing concerns about the loss of property tax revenue from its barrier island sections.

Beginning with the pilot project around Toms River, the "Pier-to-Pinelands" design opportunity will ultimately help to shift the barrier island communities away from an over-reliance on the beach toward a more nuanced, diverse, sustainable relationship to the shore.

Barrier Island Pilot Project: Barnegat Bay Ecotourism

Understanding the extreme vulnerability of the barrier island coastal type, coupled with the state-wide significance of the Shore economy and culture, our main goal for the first Barrier Island project is to diversify the tourism economy and ensure that the ecology and culture can sustain under future sea level rise. To broaden the experience of the rich barrier island ecosystems and encourage safe sites for future development, the iconic language of the perpendicular beach pier is extended into an ecotourism zone that redefines the coast as a single linked ecosystem between the ocean beach and the N.J. Pinelands. Ultimately, this will enable migration of development from the barrier island edge to stable inland areas and to growth of a more layered tourism economy. The site for our pilot project links three municipalities who share the Barnegat Bay, Toms River, ocean access, and other ecological assets such as the New Jersey Pinelands forest, marsh landscapes, and Mill Creek: Seaside Heights, Toms



River, and Berkeley Township. These communities are also a prime site due to the existing infrastructure linking the barrier island to the mainland and the strong state and local support for an ecotourism expansion in this region.

The Toms River-Berkeley area is currently a relatively low-density, suburban complex of mostly middle-income residential communities, with strip commercial abutting highway corridors. There is a shift in income and tenure that exists in relation to the beach, with some barrier island communities composed of almost exclusively second homes, and value of homes and income of occupants declining with distance from the shore. The majority of second homes have views and private access to the beach, limiting public beach access to small entries every few blocks. A couple of modest commercial “town centers” exist in the area, one in Seaside Heights on the Barrier Island, and another centered in the historic downtown of Toms River Township. The town centers and strip malls on the islands like the one in Seaside Heights provide necessary business to residents and visitors to the barrier islands and tend to overshadow town centers and economic corridors inland. The existing connection between the beach and access to beneficial services is one that could be leveraged through programming of complimentary, nearby services and experiences.

The team proposes to diversify the tourism experience of the barrier island communities and open new opportunities for integrated development inland. It accomplishes this by working with natural systems – as opposed to against them – and layering new forms of mobility and programs with recreational and entertainment values on a retiring sand mine in high-and-dry Berkeley Township. The result is a connected

experience that captures the many facets of the area and expands cultural and ecotourism, while providing space for its continued evolution and inland migration over time.

The strategy requires both a core site for a major mixed use, eco-tourism development and conservation, as well as a plan to link to additional “satellite” sites in the area that support ecotourism and the broader experience of the region. Key components of the plan include:

DEVELOPMENT

- ~5,000 new housing units for permanent and seasonal residents, to support the transition away from occupation of the barrier island
- A new civic node with resiliency center, public education and entertainment programs
- Coordination with a planned mixed-use Berkeley Town Center

ECO-TOURISM

- Eco-tourism conservation zones and open areas for habitat migration
- New development to support inland tourism such as ecologically-oriented lodging areas, including an eco-lodge, cabins, and areas for camping, hiking, fishing, boating, and areas for active sports, including an off-road vehicle park on a portion of the former sand mine
- Preserved habitats for eco-tourism, and new habitat zones – such as a landbridge over the Garden State Parkway -to create connected habitats

- Space for the creation of new wetlands and small islands as the barrier islands and bay side coast transform with sea level rise, to maintain local character and functioning.

MOBILITY

- Potential for improved access into the development area from Garden State Parkway (same infrastructural element as the landbridge to support habitat)
- Enhanced transit including an aerial tram system with new marinas and a water taxi hub on Barnegat Bay, at the mouth of Potter Creek
- Completion of the Barnegat Branch rail trail, already planned and under way, which links through the center of the study area

The most developed area of the site intersects with a new zone of active recreation and a “funscape” that draws on and reinterprets the classic beach experience, integrating development with ecological zones and amusement activities. Hence, the culture of the Jersey shore can continue to grow, even as some parts of it get inundated. The funscape overlaps at multiple nodes with different types of mobility infrastructure; allowing people to choose methods for travelling between points of interest by car, tram, bike, or boat.

Implementation

The Barnegat Bay Ecotourism Project represents a shift in tourism market, land use, and ecological approach. While the long-term strategy for the Barnegat Bay Ecotourism Project is ambitious, the



Ecotourism funscape

initial investments in infrastructure and regulations are modest and achievable, and will unlock future private development in Berkeley Township. The shift will help move the Shore toward a resilient future path, yet it also requires careful, studied implementation. To this end, the first step in implementing this project is to conduct a detailed Master Development Plan over the next 9-12 months. The detailed master plan will be developed to ensure documents are prepared for permitting requirements. A tourism and travel study will be initiated as part of the implementation strategy to identify existing local and regional values within the study area. Both the market study and the detailed master plan design plan to take advantage of Economic Development Administration (EDA) grants and HUD Community Development Block Grants related to disaster recovery (CDBG-DR). Once the permitting and land acquisition process is complete, design and development permitting will be initiated and continue over the final nine to twelve months of the design process. The study will result in preparation of an RFP for a master developer.

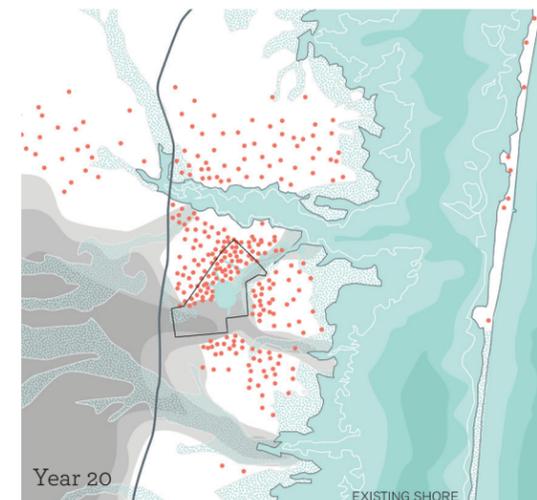
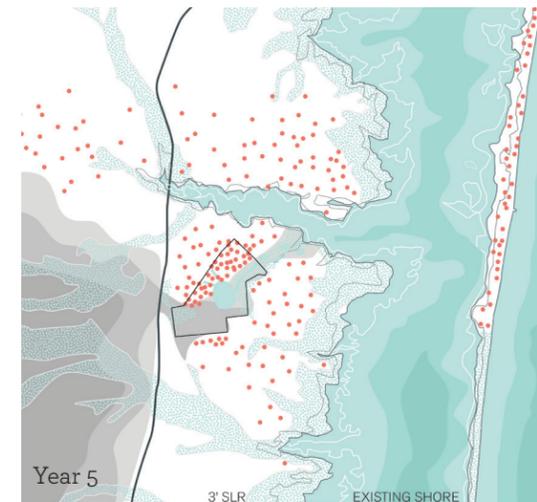
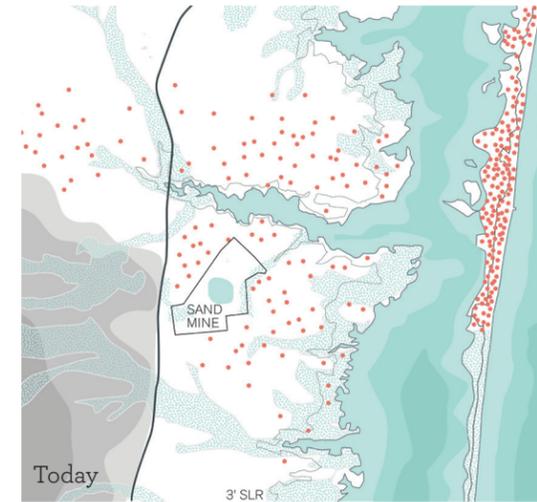
The initial market study, land acquisition and permitting process will take approximately two years to complete, at which point the Barnegat Rail trail will be complete and a water taxi service from downtown Toms River to Island Beach State Park and Seaside Heights will be studied and advanced.

This first phase would include detailed study of:

- Ecotourism market study for Barnegat Bay and Toms River, including perceptions of various ecotourism options
- Supporting traffic/ transit studies for an off-ramp from GSP, the rail trail, aerial tram feasibility and funding, and water taxi feasibility/ funding

- Supporting hydraulics/ hydrology studies for dredging of Mill and Potter Creeks for navigability, and functionality of the water bodies on the core site
- Ecology and habitat study
 - » Study of existing biotic resources and the potential for their persistence during sea level rise.
 - » Ecological plans to strengthen ecological features and opportunities to parallel the development planning
 - » Solutions for constraints that may redefine the local shore natural heritage character during sea level rise
- Development studies for redevelopment of the sand mine site to support ecotourism activities
- Study of property ownership and easement/ acquisition strategies
- Study of social understandings of coastal hazards and preferences for proposed design options, to enhance local understanding of resiliency and acceptance and use of design elements
- Assessment of local historical and cultural resources that could be enhanced by the project
- Preparation of a master developer RFP

The long-term implementation process for the pilot site in Berkeley Township presents a unique opportunity vital to the success of the project; the creation of a new resiliency development authority. The development agency could be a quasi-public entity to initiate and oversee relationships between

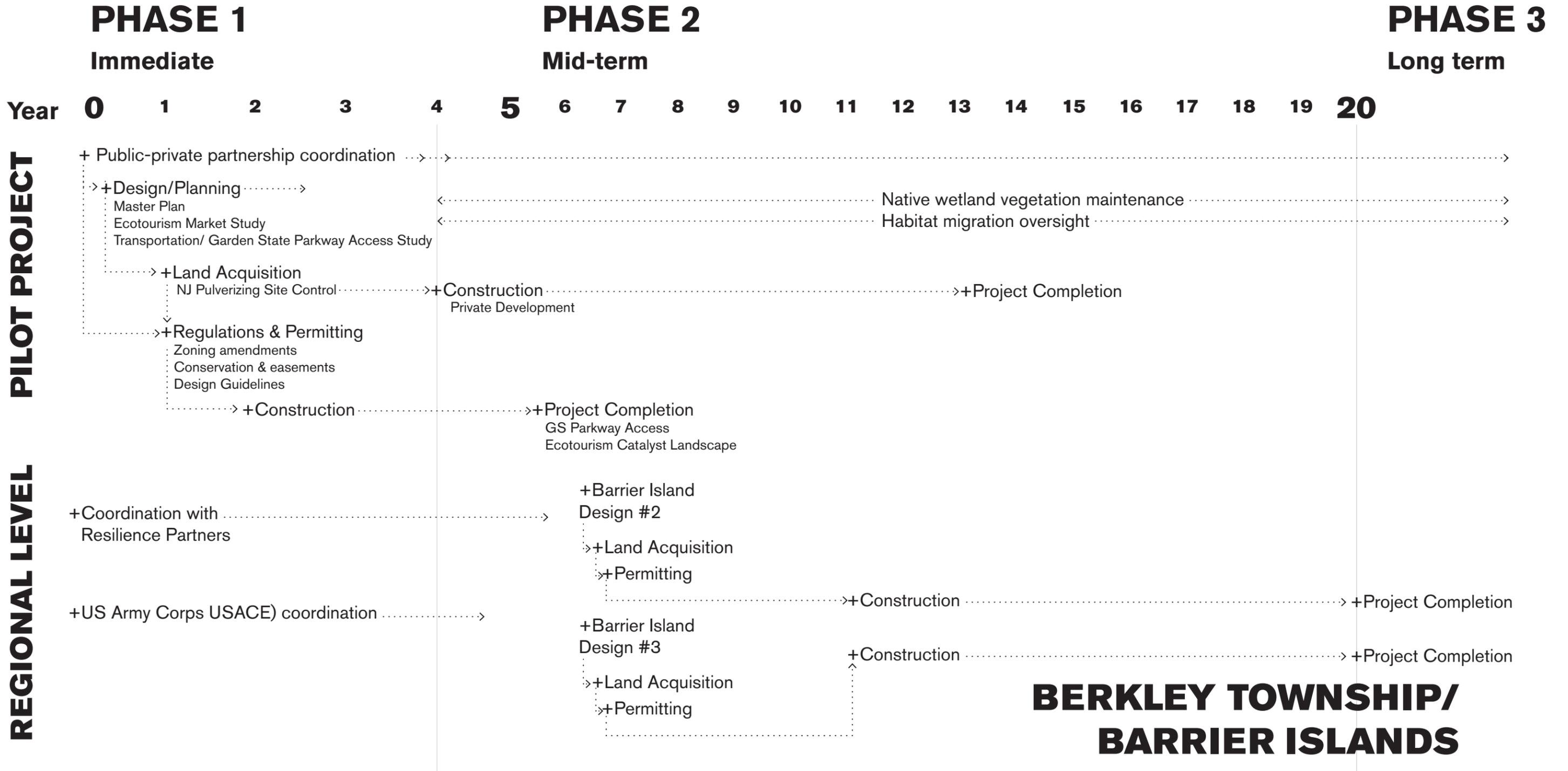


Potential Coastline Change and Land Use Diversification

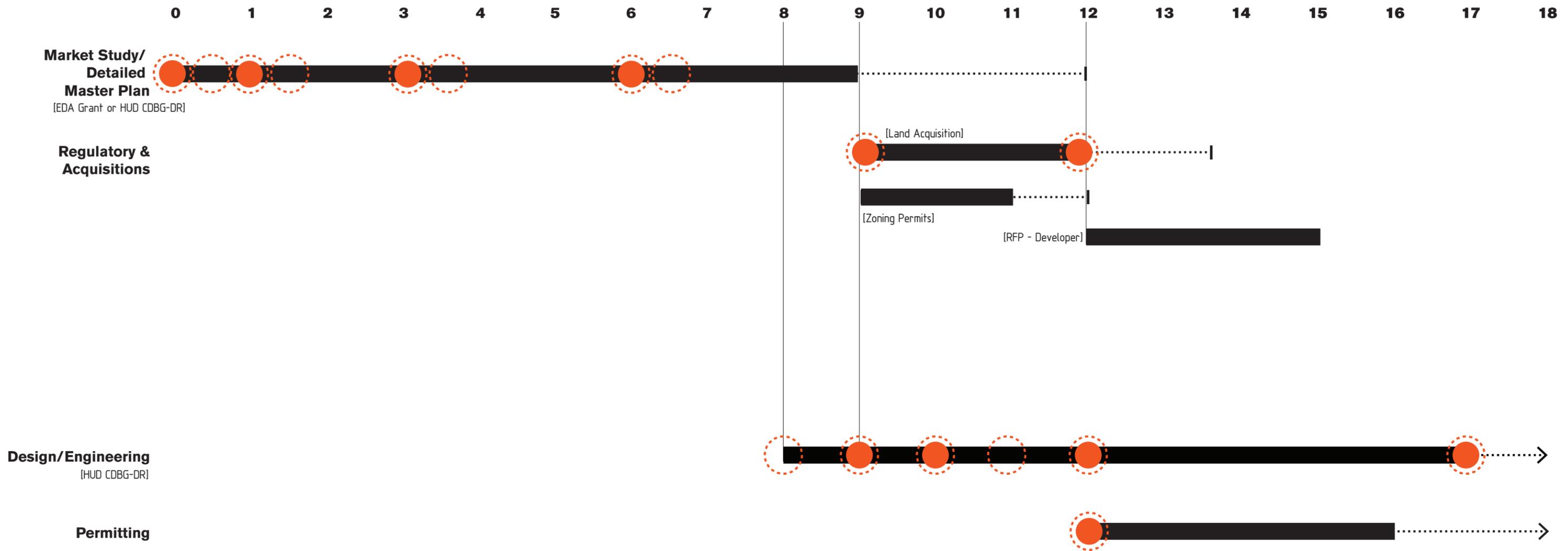
the resilience network partners and potential developers central to the design and development of the pilot site. Traditionally, New Jersey's home-rule regulations deter communities from collaborating with one another towards common goals. The Barnegat Bay Ecotourism Project extends through three communities, all of which will see drastic shifts in development patterns and economic outputs once the project has been implemented.

The construction of a new northbound on-ramp/ off-ramp to the site, as well as an underpass, will provide access to the site and stimulate private development. Within the multi-modal options being developed between the barrier islands and inland development, an aerial tram will connect into newly constructed civic and habitat programs on the sand mine development site. Major trail networks including the Double Trouble State Park and Pine Barrens trail network will also connect back to the site, enhancing the current Coastal Heritage Trail. Regular circulator service between Berkeley Town Center, Downtown Toms River, and the NJ-37 economic corridor will commence and connect communities and regional visitors to the vibrant town centers and new tourism attractions.

In fifty years the master plan suggests a full build-out of the residential component of the Berkeley Town Center. The fifty year timeframe coincides with an expected sea level rise of about 31", enabling Barrier Island communities like Seaside Heights (which lies within the Toms River jurisdiction) the opportunity to shift inland to the newly developed town center. A rapid transit service on the Garden State Parkway or via abandoned rail corridor between key Jersey Shore communities will further advance these secure sites which double as economic drivers for our citizens.



Barrier Island Pilot Project Proposed Timeline (Near Term)



FUNDING REQUEST:

\$ 5,000,000

Funding: HUD CDBG-DR

Other potential sources: NJEDA or DOC EDA, NJDEP, NJDOT, landowner/private developer

PHASE 1 SPENDING (12 to 18 months):

DESIGN/ENGINEERING/PERMITTING/MANAGEMENT COST = \$5,000,000

CONSTRUCTION COST = \$ Public private partnership

**BERKLEY TOWNSHIP/
BARRIER ISLANDS**

Phase 1 project includes detailed master plan, acquisition, permitting and detailed design.

- Public Coordination
- Resilience Network Coordination

REGIONAL RESILIENCE FOR THE HEADLANDS

The Headlands have open ocean views subject to the direct action of wind and wave and are patterned by a series of twenty-two coastal lakes that both manage stormwater and increase flooding vulnerability. As the highest and driest of the three shore typologies, they are an attractive zone for continued investment in the waterfront.

New Jersey's Headlands were the first major tourism sites along the North Jersey coast. Resorts, hotels, and vacation home communities sprung up in the late 19th and early 20th century to provide summertime relief for the wealthy and middle class populations of New York and Philadelphia. The iconic boardwalk came into being in this era and was popularized as a space for casual promenades, recreation, and amusement. The first boardwalk was built in New Jersey to prevent sand from entering beachside buildings and over time, boardwalks have become an iconic emblem of Jersey Shore tourism. They are the front line between the beach and inland development, however, they do nothing to protect communities or enable ecological health. To address both coastal and watershed flooding and acknowledge the Headland's natural resilience, our strategy for the Headlands is layered. It integrates three components: a boardwalk-dune system that provides protection from coastal flooding, hyper-absorbent lakes and streets to mitigate watershed flooding, and east-west connections to link all parts of the community to the oceanfront.



Boardwalk



Lake Edge



Streets

Headlands Vulnerabilities

While sea level rise projections show only minimal impact on the coastline in the headlands, compared to other shore typologies, the series of inland coastal lakes make the communities vulnerable to more frequent, upland flooding. In our pilot community of Asbury Park, the most noticeable impact of sea level rise will be surrounding the city's three inland lakes. Twenty-two coastal lakes line the shore in the Headlands, with Deal Lake in Asbury Park as the largest of all coastal lakes; Deal Lake manages 98% of the run-off from the watershed. Once rich tidal estuaries, New Jersey's coastal lakes are contaminated by urban run-off, vulnerable to storm surge blow-outs, and lack edge habitats to support birds and fish needed for higher ecological value. Many have aging bulkheads and are silted up with debris from everyday use and Hurricane Sandy. Both dredging and a more holistic, ecological approach to the design are needed to help them better function for stormwater management to reduce future flooding.

The mature communities of the Headlands today contain traces of the socioeconomic stresses common in older urban areas: an aging population, a large low and moderate-income population, older and less valuable housing stock, and lower rates of homeownership. Much of this can be attributed to the seasonal character of the economy; yet, fewer seasonal visitors to the Headlands own second homes (particularly compared to barrier island communities). A substantial lodging sector exists in the headlands, with 130 hotels occupying over eighteen miles of coastline, most within six

blocks of the beach. Many year-round residents are employed in seasonal occupations oriented to tourism; however, while the average income of a shore tourist is \$99,000, the average per capita income of a shore resident is \$39,000.

Mobility is also a considerable challenge in the headlands. Despite periodic transit stops on the New Jersey Coast Line commuter rail, which has a southern terminus at Bayhead, the culture of the car dominates. The Headlands' built environment reflects this with a prevalence of parking lots occupying prime real estate in commercial and tourist destinations, space that could be programmed for more tourism-centered and ecologically significant uses.

Since the 1930's, beach enthusiasm has been accompanied by extensive investment to control beach erosion, and today the Headlands is marked by groins, jetties, seawalls, and revetment. Now the beach is raked and shaped for human use only, minimizing its function for the diverse ecology needed for a coastal landscape and for the ever-changing wrack line, necessary for vibrant life near the surf. Approximately \$688 million has been spent on beach nourishment in New Jersey, more than any other state along the Atlantic Seaboard. These protective engineering efforts have hastened erosive processes, leaving the headlands beaches dependent on human action for continuing existence. As Orrin Pilkey and Katharine Dixon wrote, "Newjerseyization' eventually became the term used for the process of stemming erosion at the price of the beach."

Headlands Resilience Network

Asbury Park is an engaged, informed, activist community which has thrown its support behind our project in a compelling and inspiring way. While the city's leadership was at first difficult to reach, efforts at grassroots outreach produced unprecedented returns in terms of open dialogue, sharing of issues and concerns, high attendance at public events, strong local identity, and a community who surprised us by turning our questions around and asking: "How can we help? How can we do more?"

Our February public workshop and the March 22 Rebuild by Design-organized parade and event have facilitated conversations around risks and opportunities for the Headlands region. They were also a way to identify key stakeholders for involvement as part of the resilience network. Our February public meeting was held in the City's art house theater The Showroom, offered by the theater's owners as a showing of support for the project. Attendance exceeded our expectations, requiring us to quickly adjust and conduct two meetings in a row that evening to accommodate everyone who wanted to attend. The local Environmental and Shade Tree Commission, select City Council members, advocacy groups like NJ Surfrider and the American Littoral Society, and local residents all came together to promote the event, resulting in its impressive success. The community has followed up by producing letters of support and offering clear, critical and constructive feedback on our ideas to make them compatible with community goals.

Stakeholders include state, county, and local regulators as well as many, many advocacy groups, youth groups, religious groups and property owners.

They have demonstrated that they understand the growing costs associated with protecting unsustainable landscapes and are ready to make a change.

Core members of this group have included:

- NJ Department of State, Division of Travel & Tourism
- Monmouth County
- NJ Future
- Asbury Park: Mayor, City Council, planning department, and residents
- Urban Coast Institute (UCI) at Monmouth University
- Asbury Park's Environmental and Shade Tree Commission
- Deal Lake Commission
- Jersey Shore Partnership
- American Littoral Society
- NJ Surfrider

Stakeholders in the Headlands region understand the cost to continually nourish beaches – the federal government covers 65% of the cost for beach nourishment while the state and local government split the remainder. With the high probability of 31" of sea level rise over the next fifty years, local regulators and advocacy groups understand the threat. The Jersey Shore chapter of the Surfrider Foundation is an example of a partner organization within the resiliency network representing the Headlands region.

The Foundation is committed to the conservation of ecological coastal conditions and protection of public access to beaches through public awareness. The Deal Lake Commission (DLC), with members including Asbury Park Deputy Mayor Sue Henderson, will be a critical partner for implementation of coastal lake improvements and regional coordination. In their management and visioning role for Deal Lake, the Commission brings together members from each of the seven communities that contain a portion of the lake, making that lake an ideal site for our first lake intervention. The DLC and Surfrider, along with many other advocacy groups and municipal governments, have played a key role in the public process this past winter.

Headlands Pilot Project: Resilient Asbury Park

The site for this project is the City of Asbury Park, chosen for its iconic boardwalk, coastal lakes, diverse population, cultural history, and redevelopment energy. Asbury Park is on average 13' higher in elevation than most Barrier Island towns on the northern Jersey Shore. Asbury's beach naturally captures sand due to a combination of prevailing winds and tidal flow, making it an ideal location for investment and a safer location for coastal occupation. While Asbury Park is vulnerable to sea level rise and storm surge, the coastal community has the infrastructure and high elevation to develop



Rebuild One City parade and event in Asbury Park

implementable projects for long term protection. Currently, while 29% of the land area of Asbury Park is directly impacted by a 100-year storm, only 2% of the city's residential population is vulnerable due to the high elevation from the beach.

Asbury Park has emerged in recent years as a revitalized arts and culture hub that integrates music and industrial heritage with the strong beach culture and boardwalk. Demographically Asbury Park is also very different from the rest of New Jersey – the city has a minority population of about 64% and 33% of businesses are minority run. The city's composition is also compounded by a high poverty rate (31%) and significant violent crime rate, which is harming its reputation and revitalization. The dynamic nature of the community presents multiple opportunities for infrastructural improvements, new development

directed towards affordable housing and access, as well as economic development along commercial corridors. Racial tensions still linger in the city from days of segregated beaches and race riots, dating to the early 1970's. Physical divisions in infrastructure and roadways make it difficult to establish and sustain connections. Resiliency for Asbury Park needs to be inclusive and address community as well as environmental challenges.

Watershed flooding related to the coastal lakes is as important to consider in Asbury Park as coastal flooding. To address the complexity of the community, we have integrated three design projects to provide protection from the ocean, create inland protection through improvements to coastal lakes and streets, and connect the beach to the community.

These three projects include:

- **Boardwalk-Dune:** Creation of a hybrid boardwalk-dune infrastructure along the oceanfront that honors the social function of the boardwalk while redesigning it to create dunes and vegetation within its edges that can protect the development behind it,
- **Hyperabsorbent Lakes:** Improvements to coastal lakes to increase stormwater management function, useful ecological habitat, and recreation activities, and
- **Hyperabsorbent Streets:** Creation of green streets that help to clean and manage stormwater through the community as it flows to the coastal lakes.

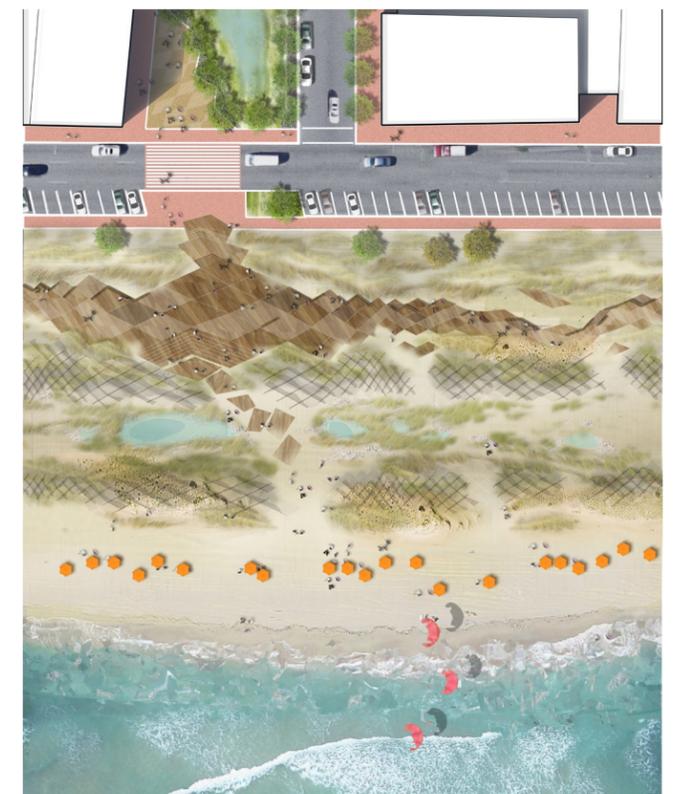
Although these three projects can comprehensively cover the full city over time, there are key sites to begin with to address imminent vulnerabilities and align with community support. The first implementable projects will be: design and construction of the northern segment of the boardwalk-dune near Deal Lake and to protect the wastewater treatment plant; improvements to the Asbury Park section of Deal Lake, connecting to the new boardwalk; and 3rd Street green infrastructure to connect neighborhoods across racial lines.

Boardwalk-Dune

Asbury Park's boardwalk, streets, and coastal lakes share a common trait: each today exists merely as infrastructure with hard edges, rather than as functioning ecosystems with natural, soft edges. The edge conditions along the coastal lakes, where



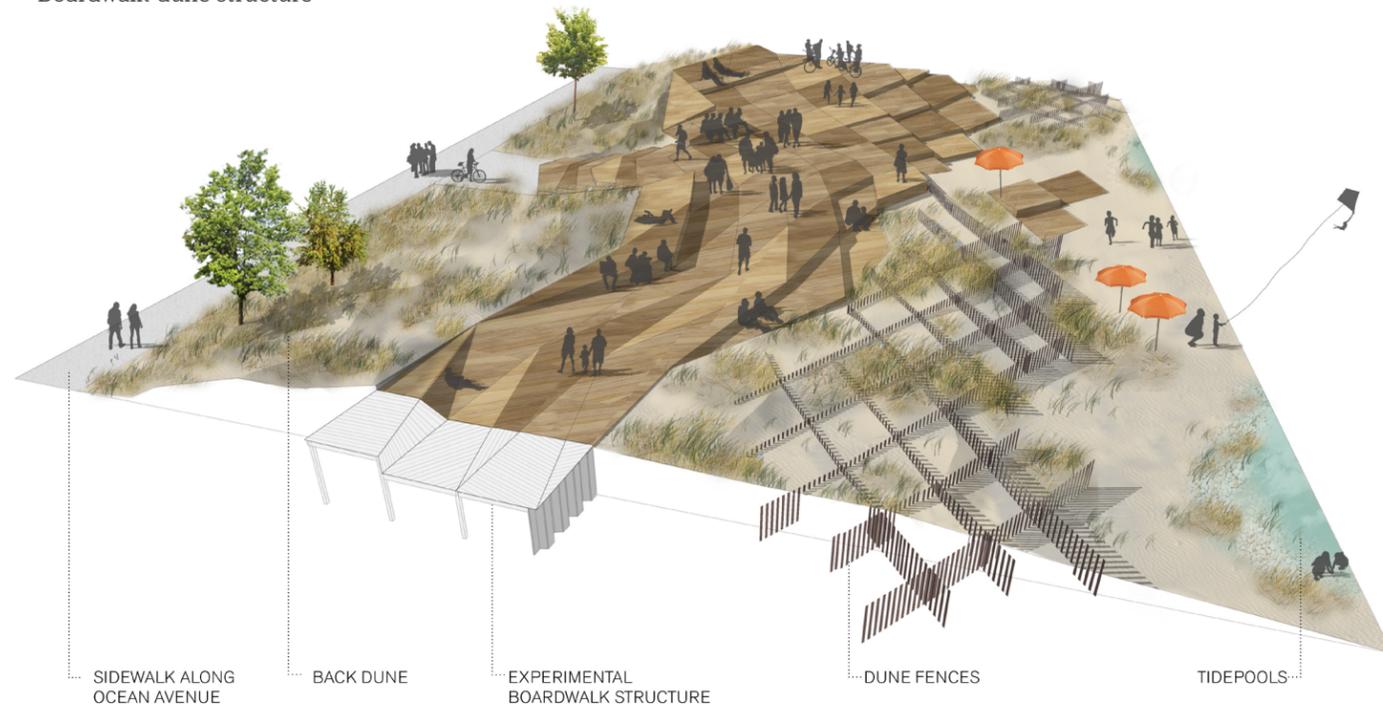
Retro-fitting the civic core of the boardwalk



Experimental form for the northern boardwalk area



Boardwalk-dune structure



the sidewalks meet the street, and on the boardwalk present the opportunities to redesign more resilient infrastructure, affording protection.

The boardwalk offers an opportunity to rethink the beach's monoculture through a more organic boardwalk form and topography that has a new relationship to beachside development and promotes a healthier ecology. The design of the boardwalk maintains its important social role while providing a new shape to capture sand and form dunes over time, creating protection and habitat area for beach wildlife. The incomplete segment of boardwalk north of the convention center and south of the casino will be implemented first. Since no boardwalk currently exists, it is a prime site to include experimental dune/habitat creation strategies, all of which will protect the wastewater treatment facility and link to

a new park near Deal Lake. The area between the boardwalk and ocean includes a sacrificial forming dune, tidal pool, and primary dune. In narrower, constrained sections of the beach to the south, the boardwalk-dune design will retrofit the existing boardwalk, creating social spaces and protection through redesign of the boardwalk's edges. As sand accumulates and vegetation develops, the Habitat Engine process adds life history spaces, food resources, and protection for beach-loving wildlife. The speed and type of habitat change will be determined by the physical process of sand accretion and the biotic processes of vegetative spread and succession. Together, these actions build resiliency as well as civic charm to the landscape adjacent to the public's boardwalk experience.

The design for the first implementation zone, the northern experimental boardwalk-dune, takes design cues from the existing boardwalk's wooden herringbone pattern and wooden sand fences that



Future boardwalk-dune system

are used to structure dunes. Protection, habitat, and design will be meshed, creating a destination.

Hyper-absorbent Lakes

Deal Lake, which borders the edge of Asbury Park, will undergo a thorough restoration process that includes dredging and removal of the hard edge to make way for soft, sloping shorelines. Since fishing in inland lakes in New Jersey is broadly attractive to people across racial and ethnic groups, lake improvement will be a centerpiece for the project's aims of enhancing community connections. The new living shoreline aligns with NJDEP goals and will increase native vegetation to increase habitat for migratory birds, aquatic inhabitants and native animal species. Habitat islands within the lake will be created as well to create bird rookeries and additional differentiation. To enhance recreation, boat launches and small piers will be installed, connecting residents

and visitors to the improved water ecology. The lake flume also needs engineering re-examination for a more effective solution at managing lake levels. Through this strategy for resilience in the headlands, the condition and absorptive function of coastal lakes will be improved in order to manage storm water and clean watershed runoff. Sunset Lake is linked to Deal Lake so should be considered in the near term as well, with Wesley Lake to follow or proceed under a different path. Deal Lake will be a model for the regional lake network.

Hyper-absorbent Streets

Asbury Park experienced major development booms in parallel to the rise of a car culture across the country. The urban form is characterized by unnecessarily wide streets with narrow sidewalks and minimal street landscaping. Existing conditions benefit the summer population swell and encourage

vehicular use rather than engaging a pedestrian audience through livable, walkable spaces and business districts. To be resilient, Asbury's streets need to better manage stormwater run-off and clean it before it reaches the coastal lakes. Street improvements will capture and treat storm water to further protect the town from long term flooding. Major east-west corridors with business frontage will have wider sidewalks and incorporate a seasonal streets plan for managing parking and summer swell traffic through the popular beach destination. 3rd Street is our pilot site for the first hyper-absorbent street in Asbury Park, since it connects from the west side of town all the way to the beach. 3rd Street has an ample cross section and also contains many community centers along it, such as churches or parks, with sites that could be used for larger stormwater management sites. The low points for the road at the railroad and the beach.

Implementation

While Asbury Park has an intact boardwalk in place within its historic core, the northern part of the beach is discontinuous and lacks a boardwalk today. This wider area of the beach connects to Deal Lake and is the idea site for the first implementation project, linking a boardwalk-dune pilot project with renewal of Deal Lake, creating a resilient, protected district. Ultimately, this project can be a model for other boardwalk and dune rebuilding projects along the Jersey Shore coast that are underway by the USACE and the state, so early implementation will allow it to be tested and measured for success or adjustments.

The first six months of implementation will be devoted to initial steps in the state permitting process and concurrent design/engineering development for the three pronged approach to water management

and protection. Most of the project is sited along waterways and the ocean and will necessitate Coastal Area Facility Review Act (CAFRA) permits. United States Army Corps of Engineers permits for boardwalk construction and dune creation will be needed as well.

The first six months will also be an important time to work with stakeholders to refine the design and gather community feedback. This phase will include multiple resiliency network meetings and a several public meetings to engage residents and interested parties in the future of their city, and the region. These ongoing community discussions about resiliency projects will strengthen the resiliency network.

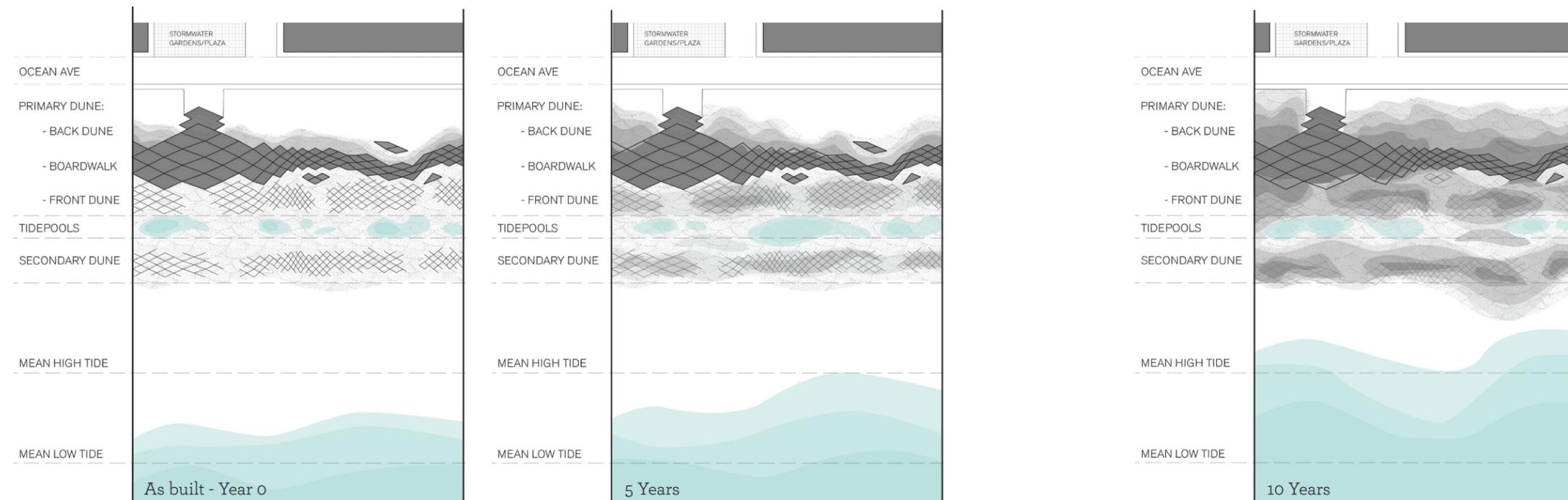
Within a year, once the permits have been secured and the design phase completed, the boardwalk construction and retrofitting process will begin.

Keeping construction schedules to September through May timelines will encourage economic stability for the city around tourism. Due to recent reconstruction of Asbury Park's boardwalk, the segment of boardwalk between the convention center and casino will be retrofitted, rather than designed anew. Dredging, planting, and deconstruction of the edge conditions along Deal Lake will also begin. The street improvement plan will be released and street construction along 3rd street will commence during the fall and winter months to accommodate the summer swell and remain cognizant of business and retail operations.

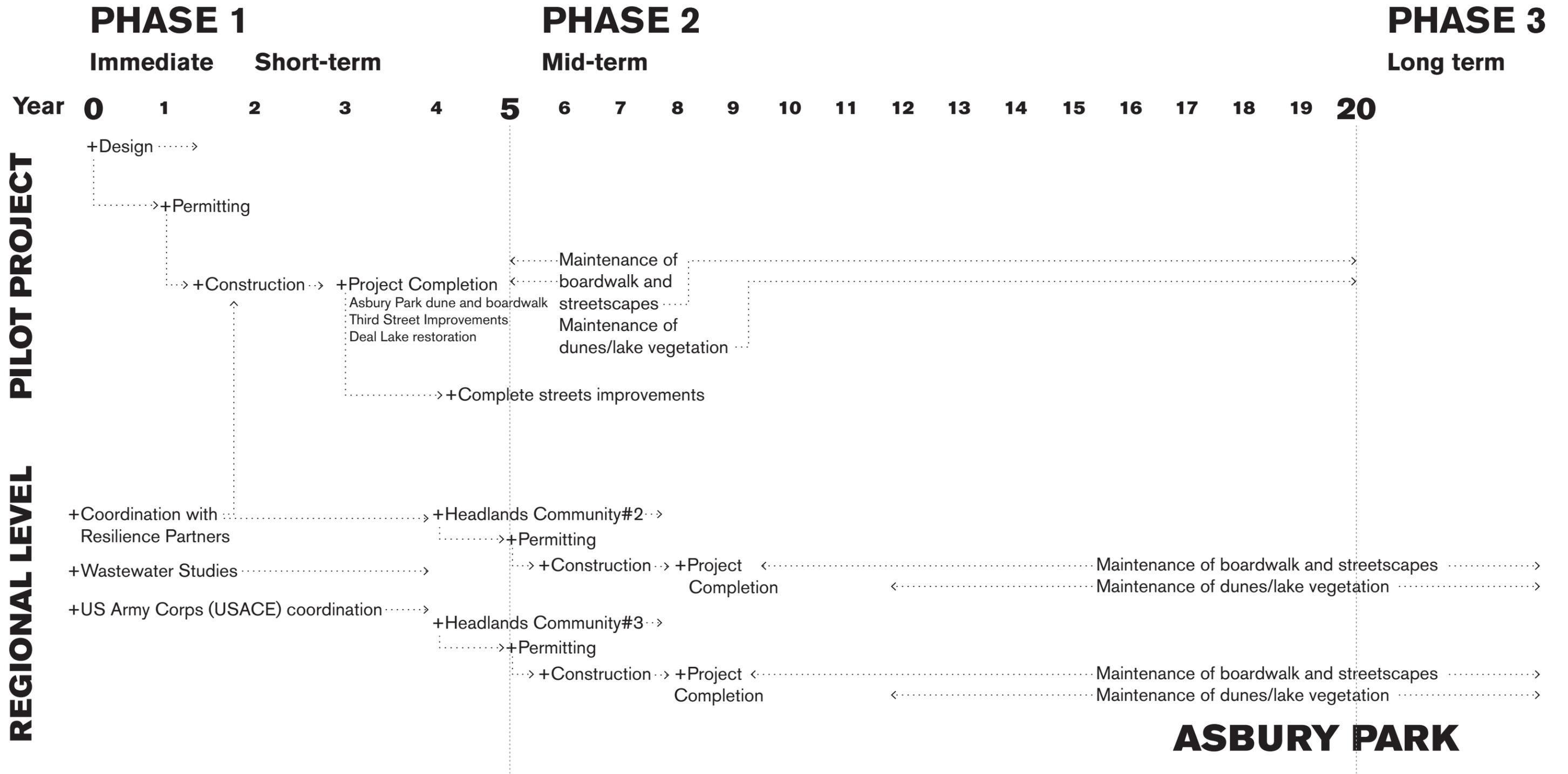
Within five years the boardwalk-dune project will be complete and the first signs of natural dune nourishment will begin to occur. The 3rd street corridor will also provide early signs of commercial corridor development spurring private development along the beachfront on previously vacant parcels. Ongoing maintenance and collection of metrics will be important to measure the success of the projects and their replicability to other communities. New tourist activities can parallel physical changes.

Between five and twenty years, Asbury Park will most likely experience continued population growth as the lake project is completed and commercial corridors north and south of 3rd Street become absorbent, multi-functional streets. In twenty years, the community will be able to invest in water treatment facility renovations or identify potential relocation ideas for a new site. Dune maintenance, habitat improvements and sand replenishment will naturally occur within the dunes. The boardwalk will be nearing its projected useful life (twenty-five years) and plans for boardwalk retrofits and reconstruction will begin alongside replacement plans for the century-old (2012) sewer line.

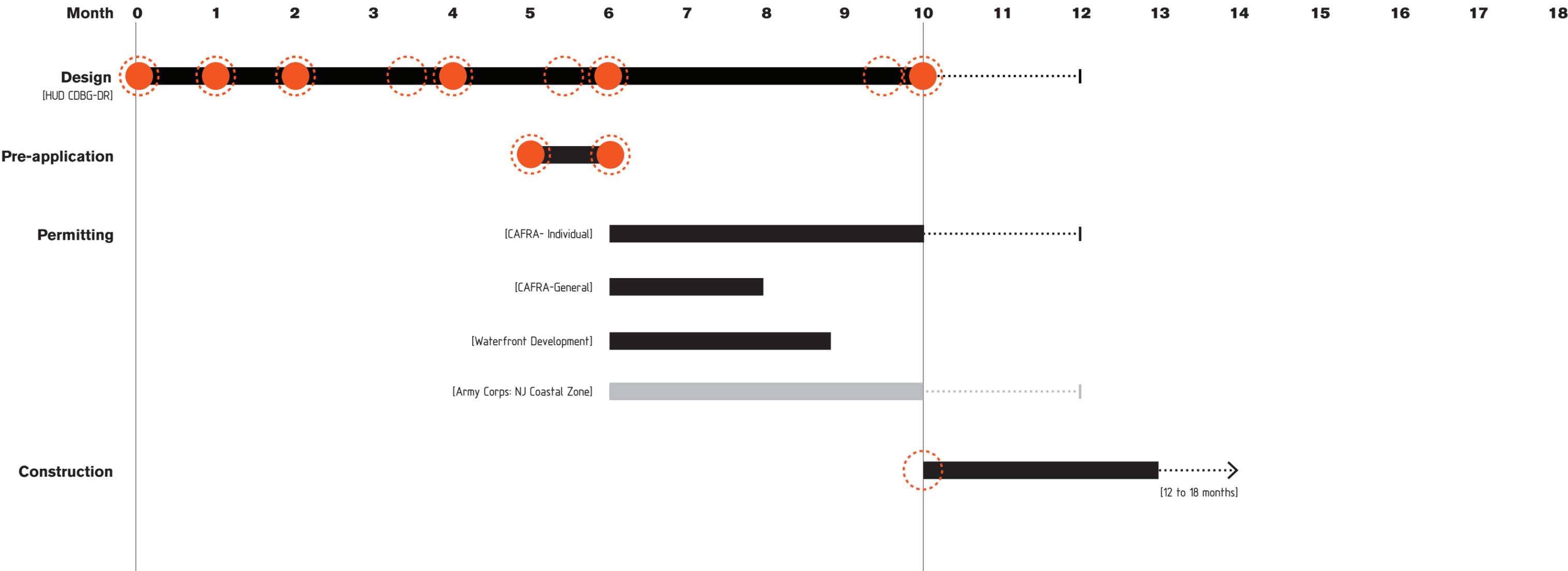
Dune formation over time, through the boardwalk structure



Headlands Proposed Timeline (Long Term)



Asbury Park Pilot Project Timelin (Near Term)



FUNDING REQUEST:
 \$ 5,000,000 + \$55,000,000
 Funding: HUD CDBG-DR
 Other potential sources: USACE, NJEDA or DOC EDA, NJDEP

PHASE 1 SPENDING (12 to 18 months):
 DESIGN/ENGINEERING/PERMITTING/MANAGEMENT COST = \$5,000,000
 CONSTRUCTION COST = \$55,000,000

- Public Coordination
- Resilience Network Coordination

ASBURY PARK

Phase 1 project includes portions of boardwalk-dune, Deal Lake, and 3rd Avenue

REGIONAL RESILIENCE FOR THE INLAND BAY

The Inland Bay is the most complex region of the New Jersey shore, with a legacy of industrial uses, densely-populated maritime communities, increasing levels of integration into the Greater New York City economy, and a rich estuarine environment.

Over 50% of the Atlantic coast can be categorized as an Inland Bay condition. Along the Atlantic Seaboard and Sandy-affected areas, Inland Bay communities support the greatest population, with 62% and 79% respectively. Only along the Jersey Shore does this pattern switch, with just 23% of the Jersey Shore population living in the Inland Bay. Yet the long history of settlement in these New Jersey bay areas have created problems that are typical or emerging in other inland bays, including contamination from industrial activities, and residences and businesses built with few protections against flooding. Inland Bay communities in the northern Jersey shore are located within the New York City metropolitan area commuter shed, with access to both the New Jersey Coast Line commuter rail and ferries to New York City.

The Inland Bay coastline encompasses a range of diverse habitats conditioned by the fine gradient of salinity and low energy water found along its edge. New Jersey's Inland Bay communities have grown around the distinct characteristics and opportunities of Raritan Bay's protected, brackish waters. In comparison to the ocean, the bay contains lower and varying salinity in water at small scales, generally ranging from fifteen to thirty parts per thousand. This lower salinity is critical for survival and perpetuation of key species, and has made the bays popular for recreational and commercial fishing. Species such

as blue crabs require the highly productive marsh habitats that thrive in bay waters. Yet, despite a reliance on water for livelihood, the Raritan Bay's water quality suffers from an influx of contaminants, limiting fish and crab resources for eating and commerce. Contaminants from adjacent industrial uses or other human dominated land raise nutrient levels in bay waters and reduce species persistence.

Inland Bay Resilience Network

The Inland Bay in northern New Jersey, also known as the Bayshore region, includes many small communities that line the shore. Many of these communities were heavily impacted by Hurricane Sandy and are still struggling through early phases of the rebuilding process today. Keansburg's retail vacancy rate has been lingering around 90% since the storm. Union Beach, where 75% of all homes were flooded, is working hard to rebuild innovatively, with creative financing for 15 new solar homes, all built to FEMA standards.

Despite the ongoing, immediacy of post-Sandy needs, members of the community have been enthusiastic to embrace resiliency conversations and ideas through this process. At our January public meeting, graciously hosted by Keansburg, residents from Union Beach and Keansburg were ready to discuss issues of recreation, open space, flooding, and community identity. Likewise, the local USACE, Union Beach City Administrator Jennifer Maier, and staff from Monmouth County's Economic Development, Planning, Emergency Management, Engineering, and Community Development helped to make sure that our project ideas aligned with ongoing Army Corps projects and county transportation and planning efforts.

Inland Bay Vulnerabilities

While seemingly not as vulnerable as the Barrier Islands to sea level rise, Inland Bay communities suffered flooding from both the ocean and the inland rivers during Hurricane Sandy. Routine flooding persists between storm events, leaving communities perpetually at risk. In fact, sea level rise will present only an incremental increase in vulnerability for Union Beach and Keansburg because so much of the community is already vulnerable: 43% of the population is impacted by a 100 year flood event today, with \$1.274 billion dollars in property value also at risk. As local Bayshore blogger Middletown Mike remarked: "When it rains, it floods. "

Topographic gradients affect exposure to flooding and future weather events. The Inland Bay is characterized by low-lying communities and higher, inland communities on a ridgeline. 9% of NJ Inland Bay is zoned industrial, so post-industrial waterfronts provide some buffer from value loss. It is not until 3-4 feet of sea level rise that higher value land becomes vulnerable. The gradient of real estate value is the reverse of the pattern on the barrier islands, where the highest value lots are nearest the beach.

In the Bayshore, the loss of industrial jobs and shift of retail to nearby state highways have resulted in working class communities that are largely residential, and towns with thin budgets. Amusement facilities in Keansburg have lost business to tourist beaches to the east and to amusements on barrier island piers. But, families' investments in their Bayshore houses commit them

to living in this vulnerable zone. Participation in long-term planning is difficult for some residents who are still awaiting government and insurance payments to rebuild. Yet a core of advocates in city councils, town agencies, and local organizations are eager to press forward with longer-term visions for their towns. These advocates have been enthusiastic about plans that integrate flood protections, recreational facilities and open space, and revitalized streets that can prompt other improvements in their towns.

Inland Bay communities also demonstrates significant unmet need for open space. Park space per person in Union Beach and Keansburg is half of what is recommended by national standards. The prevalence of aging or abandoned industrial uses along the Inland Bay waterfronts and a lack of open space provide an opportunity to reposition the Inland Bay's edges toward productive, protective, and recreational landscapes that will improve flood protection and community benefits.



Inland Bay today

Core members of this group have included:

- NJ Department of State: Department of Environmental Protection, Department of Planning Advocacy
- Monmouth County
- International Flavors and Fragrances (IFF)
- NJ Future
- Keansburg
- Union Beach
- Urban Coast Institute (UCI) at Monmouth University
- American Littoral Society
- USACE – New York District

- Together North Jersey
- Jersey Shore Partnership
- Monmouth County
- Occupy Sandy

Similar to the Barrier Island Ecotourism Project, there is one large, private landowner that is central to implementation of the Inland Bay pilot project. The International Flavors and Fragrances, Inc. (IFF) is a research, development, and manufacturing business headquartered in New York City, with offices internationally and domestically. Sandwiched between Keansburg and Union Beach, IFF owns hundreds of acres of land around Natco Lake, including wetlands, a brownfields site under active remediation, and some developed land. IFF suffered considerable damage to its facilities and is undertaking its own

flood protection projects. IFF's cooperation in re-imagining Natco Lake as a community resource and flood mitigation project is critical to implementation. Through this process, we have initiated several meetings with IFF leadership to open the lines of communication about their land. IFF, who has high sustainability goals as a firm, has been open to the discussions and ideas. They have convened an internal committee to lead an exploratory process internally. If this project is selected to go forward, solid groundwork has been laid with this critical property owner and partner.

INLAND BAY PILOT PROJECT: NATCO LAKE COASTAL PARK

The Inland Bay's complex, mixed use conditions create different risks for storms and sea level rise, making New Jersey's Inland Bay resistant to a singular form of intervention. Water culture in the Inland Bay is centered on the bay, for commercial fishing, commuting, and recreation. A system of creeks, wetlands, and small lakes line the shore; today these creeks are prone to flooding because of uncontrolled sediment flows from upland areas, but the community still has memories of previous recreation use. Building on their its recreational and commercial role, there is an opportunity to restore and re-use these water bodies to enhance coastal protection while providing new sources of recreational value from for adjacent ecosystems for these and communities.

The Natco Lake district is an ideal site for a multi-layered approach to water culture opportunities. Located in Union Beach and Hazlet and adjacent to Keansburg, it is illustrative of a range of troublesome

shore conditions and contains a man-made lake. The Natco Lake District encompasses dense residential neighborhoods, post-industrial lands, and a diverse ecosystem around the lake with the potential to be an ecological and community asset as well as to offer significant storm protection and flood mitigation.

Both Union Beach and Keansburg are waterfront towns that border Natco Lake and were heavily impacted by Hurricane Sandy, but in vastly different ways. Keansburg's topography represents a bowl-like condition where the berms and dunes act as protective barriers against storm surge. The bowl topography also means that during normal rain events, the community is prone to localized flooding as the storm sewer outlet is below high tide sea levels, trapping water on land. In Union Beach, the town is on a higher elevation that has unprotected views to Raritan Bay and houses constructed right up to the bulkhead. After Hurricane Sandy, Keansburg suffered no initial building destruction; however, floodwaters failed to drain for days and ultimately ruined entire buildings along the first few blocks of waterfront. Union Beach encountered limited long term flooding, but suffered from severe storm surge that destroyed a number of buildings instantly. Combining all residents of Keansburg, Union Beach, and Hazlet; 57% live within the 2050 500-year flood hazard zone. A present value of \$1.274 billion in property is vulnerable to a 100- year flood.

Through this project Natco Lake, an "accidental lake" created by an earlier brick-making operation, and the surrounding burgeoning marshland will be nurtured and transformed into an ecological system that helps manage storm surge and water inflow, as well as provides a destination for recreational boating and wildlife viewing. In combination with new



Public meeting activities with Keansburg, Union Beach, and other stakeholders



SUPERLEVEE DEVELOPMENT

PROTECTS EXISTING NEIGHBORHOOD WHILE PROVIDING NEW RESIDENTIAL OPPORTUNITIES (WITH VIEWS OF NYC)

GREEN INDUSTRY: INTERNATIONAL FLAVORS & FRAGRANCES (IFF)

MODIFIED INDUSTRIAL FLOW, GREEN PARKING & STORMWATER FILTRATION

RECREATION CENTER PROVIDES AMENITIES FOR UNDERSERVED COMMUNITIES

3 BASEBALL FIELDS
5 MULTIPURPOSE FIELDS
ENVIRONMENTAL EDUCATION CENTER
BIOREMEDIATION OF CONTAMINATED INDUSTRIAL SITE MADE VISIBLE:
PHYTOREMEDIATION GARDENS WITHIN THE AGING FOUNDATIONS OF THE OLD CLAY BRICK FACTORY

NATCO LAKE RENEWED

DIVERSIFIED EDGE TO INCREASE HABITAT
NEIGHBORHOOD CONNECTIONS TO WATER
RECREATION VIA PIERS

SOFTENED EDGES BETWEEN WETLAND & DEVELOPMENT

MICRO MARINAS
WET STREETS

HIGH & DRY DEVELOPMENT

LAKE VIEWS & PARK ACCESS
DIVERSE RESIDENTIAL OPPORTUNITIES
MIXED-USE ALONG ROUTE 36

CREATE MORE SPACE FOR FUTURE WETLANDS

marina functions, marsh landscapes will be designed to mitigate contamination, contributing to a cleaner bay and supporting the future economic health of estuarine occupations such as fishing. The objective is to simultaneously reduce localized flooding from heavy storm events, protect communities from storm surge risks, and reconnect residents and visitors to a regional recreation amenity that provides better drainage into watersheds and wetlands.

These towns are still in the process of building back homes, businesses and government buildings – as lower-middle income communities with higher than average poverty rates and rental rates, the communities lack the capital, staff resources, or foundations to plan for future events. The communities currently have a combined open space deficit of 74 acres – only 5.5 acres of open space exist per 1,000 people, instead of the ideal 10 acres per 1,000 people. The Natco Lake Coastal Park project would close this gap.

A major landowner and stakeholder in the Bayshore region and Natco Lake, International Flavors and Fragrances (IFF), owns large parcels of land around Natco Lake including creeks, wetlands, contaminated sites from previous industrial uses, and a few relatively high and dry parcels where its research facilities stand. In the long term, it is possible that the state and local municipalities (Union Beach, Keansburg, and Hazlet) can encourage the creation of a public-private partnership to transfer property rights, allowing for the design and development of absorbent recreational green space and educational centers on the remediated land along Raritan Bay.

Natco Lake is surrounded on the east and west sides by creeks, two of the many creeks in the Inland Bay.

These creeks caused significant flooding during Hurricane Sandy, for residents and for IFF. The creek watersheds will be cleaned and made more function through dredging, in cooperation with more targeted USACE dredging plans. Non-native vegetation will be removed to make way for native, salt tolerant species and to expand the wetland surface area to absorb more flood waters from neighboring towns. This Habitat Engine response will intensify and evolve over time, responding to the speed and scope of rising waters in this region. Productive marine resources will follow the changing physical and biotic conditions,

building value for residents and the bay and lake themselves. Trails will be constructed to tie between the community and the new regional recreation sites to the north of Natco Lake. With water quality improvements and testing, plantings for varieties of birds, shore alterations to diversify species, piers and canoes for community use will be added. While today the community has expressed little knowledge and even less use of the Natco Lake area, through this plan in the future they will have a new major community and regional recreation resource.

Implementation

Once initial CDBG-DR funding is secured, design development for the ecological and recreational redevelopment of Natco Lake will commence and continue the community engagement process in the surrounding communities – gaining traction among communities and constituents in the Bayshore region.

For the first five months of initial design development, the project will continue to focus on schematic design while also beginning the CAFRA/ wetlands permitting processes. The design portion of this immediate phase will entail strategic engineering studies and



Future Natco Lake Coastal Park

designs for creek dredging. Although on privately owned land, IFF has given verbal permission for design interventions with public access on the creeks on both sides of their land. Most of the project is based along waterways and along the ocean which require Coastal Area Facility Review Act (CAFRA) permits as well as United States Army Corps of Engineering coordination. The first six months will also include multiple resiliency network meetings and a few public meetings to engage residents and interested parties in the future of their city.

The short term phase (two to five years) of the project entails water contamination clean up through constructed and re-vegetated wetlands and dredged water bodies. International Flavors and Fragrances (IFF) has agreed to sell back all “unusable” industrial land to the state which includes flooded parcels, wetlands, and other low-lying areas. The funds to purchase IFF properties can come from the Green Acres, Water Supply and Floodplain Protection, and Farmland and Historic Preservation Bond Act of 2009 state grant program, which allows for large redevelopment parcels to be purchased from a willing party for the purpose of increasing green space for public benefit. New Jersey will in turn land bank the parcels from IFF with additional Hazlet and Union Beach parcels for the remediation and dredging process.

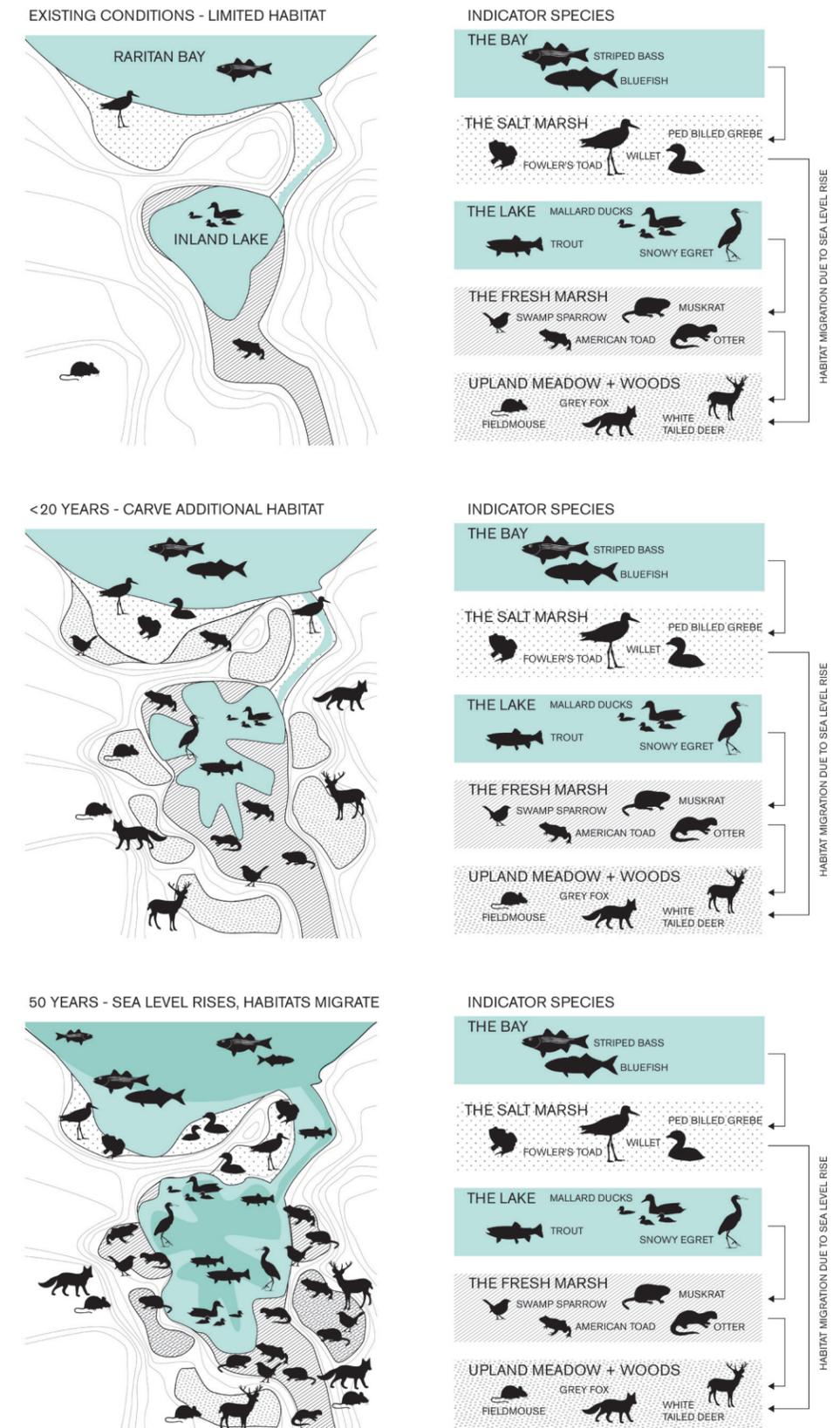
On a regional scale, the Henry Hudson trail is already planned to connect along the bay from Natco Lake to Sandy Hook State Park. Amenity

and path improvements will be made to increase the safety of the trail and acknowledge its role as a resilient barrier to inland flooding from storm surge. Design and permitting will complete in the first year and a half and will allow stream dredging to begin instantaneously. A community toolkit and resiliency planning documents will be released to the public and generate pilot projects for community development and individual resilience purposes.

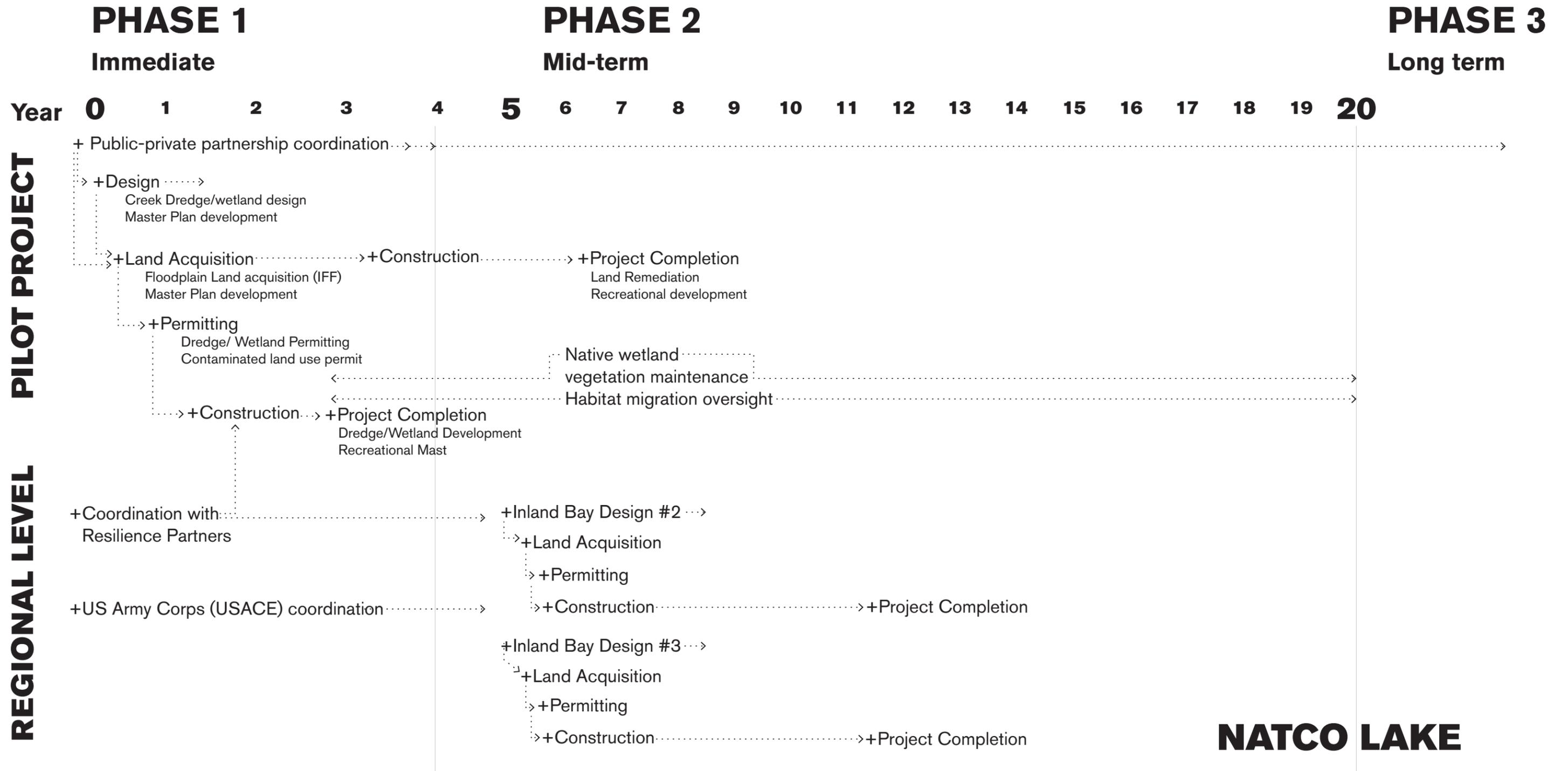
The midterm phase (twenty years) for the Natco Lake project entails the conclusion of the public-private partnership between IFF and the state of New Jersey. This will allow the state to take over contaminated land for remediation purposes prior to construction of the recreation park and resilience center. Habitat terracing and habitat migration landscaping will be incorporated into the development of the new ecological park, the Natco Lake Coastal Park.

Over the long term (fifty years) Natco Lake will develop from a strictly fresh water lake to a brackish water body connected to the increasingly salient creeks and wetlands made possible through sea level rise. Ecological habitat migration corridors and terracing practices will be instituted along the edge of the lake and inland creeks. New development, with affordable housing options and ground level retail, will fill out the Route 35 corridor along Natco Lake. Wetland maintenance and vegetation reintroduction of native species will be required as invasive species move back into the healthy watershed.

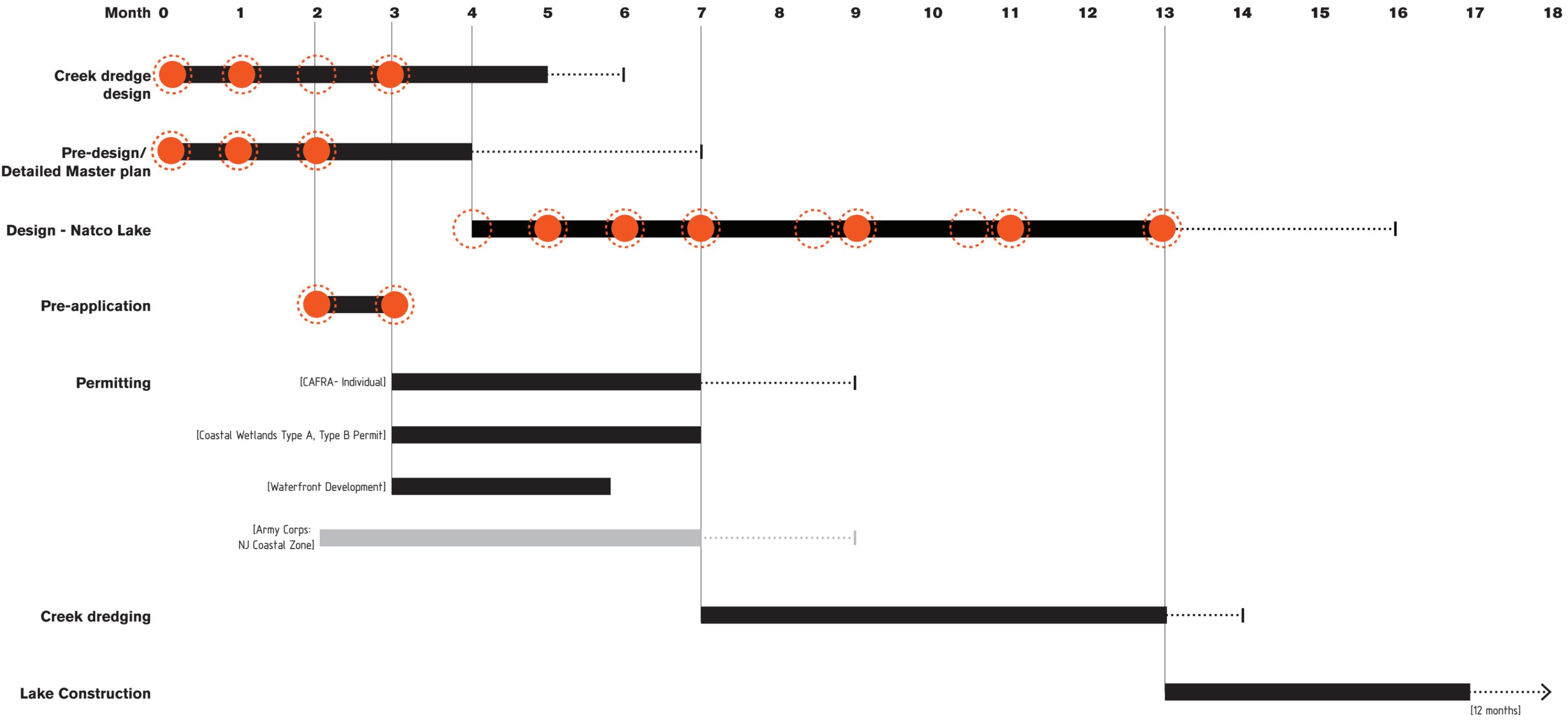
Natco lake inland ecological migration



Inland Bay Proposed Timeline



Natco Lake Coastal Park Pilot Project Timeline



FUNDING REQUEST:
 \$5,000,000
 Funding: HUD CDBG-DR
 Other potential sources: USACE, NJEPA

PHASE 1 SPENDING (12 to 18 mo.)
 DESIGN/ENGINEERING/PERMITTING/MANAGEMENT COST = \$5,000,000

NATCO LAKE

Community Letters of Support

2

RICHARD WORK, CHAIRMAN
DONALD REED, VICE CHAIRMAN
JOSEPH H. VICARI, FREEHOLDER DIRECTOR
GERRY P. LITTLE, FREEHOLDER
FRANK S. SCARANTINO, COUNTY ENGINEER
DONALD P. BERTRAND
JOSEPH BILOTTA
ELAINE McCRYSTAL
JAMES B. RUSSELL
JOHN P. KELLY, FREEHOLDER ALTERNATE
C. ROBERTS MULLOY, ALTERNATE
ALAN W. AVERY, JR., ALTERNATE
EARL F. SUTTON, JR., ALTERNATE



OCEAN COUNTY PLANNING BOARD

P O Box 2191
Toms River, New Jersey 08754-2191
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DAVID J. McKEON
PLANNING DIRECTOR

JOHN C. SAHRADNIK
COUNSEL

ROBIN L. FLORIO
SECRETARY

March 24, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W., Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan::

This office supports the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" which was selected as a finalist in your Rebuild by Design Project.

Ocean County is coordinating a Long Term Community Recovery Plan to improve the resiliency of communities against future hazard events. There is also an ongoing effort to expand and diversify Ocean County's tourism economy.

The Sasaki proposal is consistent with both of these efforts. By establishing and promoting attractions on the mainland areas of Toms River and Berkeley, and improving connections to the traditional seaside attractions of Seaside Heights and Seaside Park, the long term resiliency of our communities is enhanced. While some of the long term concepts may take decades to implement, there are shorter term recommendations which lay the foundation for seasonal and year round activities that will be less vulnerable to future hazards.

I would ask your favorable consideration of the Rebuild by Design application submitted by the Sasaki/Rutgers/ARUP team. Thank you for your consideration.

Sincerely,


David J. McKeon
Planning Director

cc. Brie Hensold - bhensold@sasaki.com

Printed on  Recycled Paper



SPECIAL ASSISTANCE/ACCOMMODATIONS UPON REQUEST.



Borough of Keansburg

Municipal Building

**29 Church Street • Keansburg, NJ 07734
Phone: 732/787-0215 • Fax: 732/787-0778**

March 25, 2014

Secretary Shaun Donovan

U.S. Department of Housing and Urban development

451 7th Street S.W.

Washington, D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency for the Jersey Shore

Dear Secretary Donovan:

The Borough of Keansburg supports the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" that is one of the finalists in your Rebuild by Design Project.

Our community was one of the hardest hit with Super Storm Sandy. A total of 1,777 homes were damaged by this event. Approximately 100 homes will have been demolished due to Super Storm Sandy. The residences in the beachfront area of our community have still not been repaired and/or reoccupied. The economy of our community has suffered dramatically. A great number of our residents in the affected areas have not been able to return to their homes.

The community meeting which was held to present the Rebuild by Design Program to our residents was a tremendous success. The input from our residents was incorporated into the Rebuild by Design application being presented to your department.

If this application is successful, its implementation into our community will greatly benefit our residents and increase the quality of life conditions for our residents and our community as a whole.

I and the other members of our governing body strongly encourage your agency to support the Rebuild by design application submitted by the Saski/Rutgers/ARUP team.

Thank you for your consideration regarding this matter.

Respectfully:

A handwritten signature in cursive script that reads "Thomas Foley". The signature is written in black ink and is positioned to the right of the word "Respectfully:".

Thomas Foley

Councilman

Borough of Keansburg

TOWNSHIP HALL
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OFFICE OF THE MAYOR
Carmen F. Amato, Jr., Mayor
Phone: (732) 244-7400
Fax: (732) 341-8968
www.twp.berkeley.nj.us

BERKELEY



TOWNSHIP

March 21, 2014

Secretary Shaun Donovan Secretary.Donovan@hud.gov
U.S. Department of Housing and Urban Development
451 7th Street, S.W., Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

Berkeley Township supports the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" that is one of the finalists in your Rebuild by Design Project.

Berkeley Township is a very diverse community which enjoys many natural and recreational resources, which we are proud to share with the world. Our community offers a variety of recreation and resource venues such as the Pinelands, NJ State Forest and lands, Cranberry Bogs, Barnegat Bay access, including boating, fishing, kayaking and swimming, as well as beach and ocean front access. A large part of our economy and taxable base is derived from this tourism industry. Following SuperStorm Sandy, much of our coastal communities and the tourism industry was significantly impacted. The damages to our beaches, bay areas, our coastal neighborhoods, our waterfront business and our community at large have been devastating. However, this terrible event has given our community an opportunity to pause and ponder our future and how we can maintain and plan for our future community needs.

I have had a chance to review and participate in the Resilience + the Beach: Resiliency Planning for the Jersey Shore"; Rebuild by Design Project. The ideas and concepts presented help us to better understand the importance of our coastal tourism industry, the impacts on our community and the need to plan for a future in light of the possibility of coastal erosion, sea level rise, future storm damages and more frequent storm damages. We know firsthand our community will be on the forefront of the many changes in the years to come. The ideas and concept presented in this project will help guide our community into the future and we whole support this effort.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Carmen Amato", is written over a horizontal line.

Mayor Carmen Amato
Berkeley Township, Ocean County, New Jersey

cc. Brie Hensold - bhensold@sasaki.com



**DOWNTOWN
TOMS RIVER**

Great Places. Familiar Faces.™

Downtown Toms River
218 Main Street
Toms River, NJ 08753-7438

Phone: 732.341.8738

Fax: 732.341.8748

March 24, 2014

Secretary Shaun Donovan Secretary.Donovan@hud.gov
U.S. Department of Housing and Urban Development
451 7th Street, S.W., Washington D.C. 20410

Re: LETTER of SUPPORT-- Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

The Toms River Business Development Corporation (TRBDC) supports the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" that is one of the finalists in your Rebuild by Design Project.

The TRBDC administers the state-legislated and municipally-ordained Toms River Special (Business) Improvement District. Participation in this Plan is in accord with the proposed TRBDC Redevelopment Plan, and the Area in Need of Redevelopment cited by resolution by the municipal governing body a few years ago. It also encompasses the NJ Natural Gas remediation site. The Township and the TRBDC have mutually discussed increasing access to the Toms River, improving transportation to the Downtown utilizing the river and other methods, all while respecting and accentuating the river's integrity – including a river walk and bike trails to improve the connectivity to Downtown's Huddy Park,

Thus, we strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

Joseph J. Alessandrino, Jr., MGA
Executive Director

www.downtowntomsriver.com



TOWNSHIP OF TOMS RIVER

DEPARTMENT OF ENGINEERING, CONSTRUCTION SERVICES,
CODE ENFORCEMENT AND COMMUNITY DEVELOPMENT

OFFICE OF THE TOWNSHIP PLANNER
JAY LYNCH, PP #19
33 WASHINGTON STREET
P.O. BOX 728
TOMS RIVER, NJ 08754-0728

Telephone 732-341-1000
Ext. 8354
Fax 732-341-0828
E-Mail jlynch@tomsrivertownship.com

March 21, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

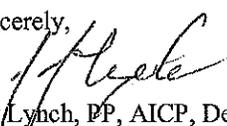
Toms River Township supports the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" that is one of the finalists in your Rebuild by Design Project.

Toms River Township was particularly hard hit by Hurricane Sandy. The North Beach and Ortley Beach sections located on the barrier island were "ground zero" in terms of storm damage, and residents and property owners continue to recover from losses ranging from infrastructure to dwelling damage.

Tourism is vital to Toms River's economy and diversification of the tourism sector is important to ensure that it will remain strong in the future. Toms River supports Sasaki/Rutgers/Arup's idea to develop a Market and Tourist Analysis. Toms River Township has some key areas further inland that have the potential to be developed into tourist destinations. The Brown's Woods Preserve and Winding River Park provide opportunities to further utilize natural sites for public access to the river. Downtown Toms River presents an opportunity to develop an area designated by the Township as an area in need of redevelopment. The redevelopment area in downtown Toms River lies on the Toms River and a portion of the site could be utilized to create a park along the waterfront that would protect future development from floods and provide opportunities to launch kayaks, fish, and otherwise enjoy the park. The kayak launch from downtown Toms River would allow tourists to discover the Toms River further upstream that meanders through open space in Winding River Park and into Pinelands preserved areas in adjoining municipalities. Downtown Toms River is also an ideal site for the addition of water taxis or ferries that could be utilized for recreation and transportation related to other attractions downstream along the Toms River, as well as to bring tourists to the barrier island sections of the Township.

We strongly encourage your department to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,


Jay Lynch, PP, AICP, Department Director

cc. Brie Hensold - bhensold@sasaki.com
Hon. Thomas F. Kelaher, Mayor
Paul Shives, Township Business Administrator



State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

ISLAND BEACH STATE PARK
P.O. Box 37
SEASIDE PARK NJ 08752
TEL (732) 793-0506
FAX (732) 793-4859

BOB MARTIN
Commissioner

March 24, 2014

Secretary Shaun Donovan Secretary.Donovan@hud.gov
U.S. Department of Housing and Urban Development
451 7th Street, S.W., Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

Island Beach State Park supports the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" that is one of the finalists in your Rebuild by Design Project.

Island Beach is one of New Jersey's largest and most visited state parks. The park is located at the southern end of the barrier island between Seaside Park and the Barnegat Inlet. The park sees approximately 1,000,000 visitors annually. The vast majority of visitors frequent the lifeguarded ocean beaches during the peak summer months. While the park is a major asset for the local community and businesses, bringing so many visitors to the area it is also a major contributor to traffic and congestion as visitors literally stop traffic as the park reaches capacity on nice summer days. The proposal and its concepts geared toward traffic reduction, coupled with increased and creative public transportation clearly aligns with the goals of the park to increase our attendance within the constraints of our limited parking area.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

Raymond Bukowski
Manager
New Jersey Department of Environmental Protection
Division of Parks and Forestry
State Park Service
Island Beach State Park

cc. Brie Hensold - bhensold@sasaki.com



11 Hardscrabble Road, Bernardsville, NJ 07924 Phone: (908) 766.5104 Fax: (908) 766.7775

March 21, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W. , Washington D.C. 20410
Secretary.Donovan@hud.gov

Dear Secretary Donovan,

I am writing in strong support of Prof. Joanna Burger and the Sasaki/Rutgers team's "Rebuild by Design" project along the Jersey shore. The team includes designers, planners, ecologists, social scientists, and engineers working to design opportunities and strategies for long-term coastal resiliency. They have developed a project focused on the value of the beach (going from the barrier beaches, over the barrier islands and the bay, to the mainland, and eventually to the Pine Barrens). This design, a Pier-to-Pinelands approach, includes enhancing ecological resiliency, economic stability and culture for the whole region. It is unique in that it is the only team that focuses on putting ecology firmly and prominently in the center of rebuilding, but is also looking at restoring functioning ecological system along the coast as a resiliency measure to protect both ecosystems and human communities.

New Jersey Audubon (NJA) is a privately supported, non-profit, statewide membership organization with more than 20,000 members and 7 staffed nature centers. NJA is committed to the preservation of New Jersey's natural habitats and the protection of its birds, mammals, other animals, and plants, especially threatened and endangered species. NJA carries out its mission of stewardship of the nature of today for the people of tomorrow through activities such as management of natural resources, environmental education programs, research efforts, urban initiatives and advocacy. We frequently work with communities, and engage in citizen science. The purpose of the Sasaki/Rutgers project aligns well with our organizational goals and we would like to see it come to fruition. The three NJ sites that were selected by the team to represent the New Jersey shore (Union Beach/Keansburg, Asbury Park, and the Toms River area) are very relevant in view of the impacts of Superstorm Sandy, and can serve as models for sound rebuilding to ensure ecological, economic, and cultural resiliency. NJA has also actively been pursuing funding for resiliency projects in New Jersey. The team from Rutgers is sensitive to forming partnerships with conservation and ecological groups and we would welcome the potential collaboration and the expertise that they bring to the table. By taking both ecosystems and human communities into consideration the project will be able to deal with changing global conditions, severe storms and flooding, and sea level rise and achieve long-term results.

Dr. Burger has been an invaluable resource for our organization, providing advice on a number of other stakeholder-driven issues and collaborative research. She leads science-based efforts for

conservation, human perceptions, health concerns, and community/ecological resiliency through her extensive body of work. Her body of research is impressive, and she has worked in NJ and adjacent NY harbor estuary for many years. Many on our staff have worked extensively with Dr. Burger in research as students or collaborators, and in committees addressing policy and environmental issues. Her involvement and understanding of coastal and pine barren ecology will ensure that the wildlife is considered in every aspect of the rebuilding design work. Her extensive work on human perceptions of nature and natural events will enable the team to take *into consideration* the needs of the people of New Jersey. Dr. Burger has keen awareness of the needs both of the wildlife and the human element, their interactions, and the need to balance the two. She brings many years of experience and outstanding critical thinking ability to the team and we are confident that any decisions made that directly affect our interests along the Jersey shore and pinelands will be well thought out and appropriate.

We look forward to having our organization collaborate with the Sasaki/Rutgers rebuilding team to make both ecological systems, and human communities resilient to both severe storms and sea level rise. We fully support the project put forth by Sasaki and the Rutgers team. We believe it will greatly benefit New Jersey and will serve as a model for resiliency design in other systems.

Sincerely,



Eric Stiles
President & CEO

cc. cc. Brie Hensold - bhensold@sasaki.com

March 24, 2014

The Honorable Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

Re: ~~LETTER OF SUPPORT~~: **Resilience + the Beach: Resiliency Planning for the Jersey Shore**

Dear Secretary Donovan:

I am writing this letter on behalf of the Monmouth University Urban Coast Institute (UCI) in strong support of the Sasaki/Rutgers/ARUP Rebuild by Design proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore." This proposal is the only proposal which include components along the beachfront, headlands, barrier islands, and back bays of the Jersey shoreline, which was so devastated by Superstorm Sandy and remains vulnerable to future coastal storms. The innovative approach proposed by the Sasaki team can serve as a template for actions by other communities along the Jersey Shore.

The UCI is a multidisciplinary research, academic, and community resource center located in West Long Branch in Monmouth County, New Jersey, less than one mile from the beach. Monmouth University served as the largest shelter after Sandy, and is committed to continue service as a Center for Resilience and to support efforts of the Sasaki team to coordinate with communities and disseminate outcomes and lessons learned in the course of the project. The UCI already works closely with coastal communities in the proposed project area to encourage the adoption of best practices to reduce vulnerability and enhance resilience.

Among other initiatives, UCI has supported development of a "Getting to Resilience" guide, and a G.I.S.-based coastal vulnerability framework coordinated coastal lakes restoration efforts in the region, and is a member of the NJ Department of Environmental Protection's Community Resilience Network along with other academic and NGO partners. UCI draws from expertise across New Jersey, and offers support to projects promoting resilience along our shores. The Resilience + the Beach: Resiliency Planning for the Jersey Shore project uses innovative community-based approaches to develop a more resilient and sustainable shore, back bays and adjacent waterways.

UCI supports the Sasaki/Rutgers/Arup team multi-pronged approach, which recognizes the varied landscapes along the Jersey Shore. The Resilience + the Beach project carefully considers the rich ecological, economic, and cultural conditions which exist in New Jersey. Treating each of these components as part of larger coastal system, including community culture and economic considerations is the on effective approach that will produce long-lasting and potentially transformational change.

We strongly encourage your support and selection of the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration. All the best!

Sincerely,



Tony MacDonald
Director

cc. Brie Hensold - bhensold@sasaki.com

20 March 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W. , Washington D.C. 20410
Secretary.Donovan@hud.gov

Dear Secretary Donovan:

Superstorm Sandy presented the Eastern Seaboard with habitat challenges for humans and wildlife. Now, through the Rebuild By Design competition, there is a unique opportunity to pro-actively address these challenges and prevent their severe impact in the future. To that end, I am writing in support of the The Rebuild By Design proposal submitted by the Sasaki-led Rutgers team. The plan is unique in their approach as it places local ecology firmly and prominently in the center of rebuilding. A lynchpin of their plan is partnerships. Solutions to issues of this magnitude need a multi-disciplinary approach. The Sasaki-led team has been obviously been nurturing key partnerships important for making this project work.

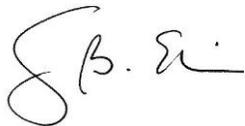
As an urban conservationist in New York City, I routinely face the challenges of balancing development and infrastructure with protecting nature and natural processes in a dwindling natural landscape. That is why the Sasaki-led approach for the Jersey shore is so compelling. They address barrier islands, headlands, and inland bays – areas and challenges that represent not only New Jersey but also communities along the Northeast Atlantic Coast. Their approach includes outreach to stakeholders (public officials, local and regional leaders, and the public) and incorporates their input in the final plan. The plan uses sound ecological principles to produce built “structures” and social strategies that increase ecological and community resilience and serve local needs.

I believe their approach will serve as a model for other communities along the coast: the plan and solutions deal with landscapes and local ecologies to handle storm surges and flooding. It incorporates local amenities and tourism, so important to the Jersey Shore. The Sasaki-led plan for protection against global conditions, severe storms and flooding, and sea level rise is well-conceived and includes the components necessary for a resilient, healthy ecosystem and associated resilient human communities as well.

I enthusiastically support the Sasaki-led plan and recommend that the plan be funded.

Thank you for the opportunity to comment.

Sincerely,

A handwritten signature in black ink, appearing to read 'S.B. Elbin', with a stylized flourish at the end.

Susan B. Elbin, PhD
Director of Conservation and Science, New York City Audubon
71 W. 23rd St., NY, NY 10010
www.nycaudubon.org

Copy: Brie Hensold - bhensold@sasaki.com

March 24, 2014

Shaun Donovan, Secretary
U.S. Department of Housing and Urban Development
451 7th Street, SW, Room 2170B
Washington, DC 20410

Dear Secretary Donovan:

Please accept this letter of support from the Asbury Park Environmental and Shade Tree Commission ("ESTC") on behalf of the Sasaki team's project to enhance the headland areas of the Jersey Shore, specifically Asbury Park. The ESTC has had an opportunity to evaluate the Sasaki design project, offer input and we find that the initiatives outlined would greatly benefit the entire Jersey Shore region.

As a preliminary matter, the Sasaki design project directly addresses environmental issues that correlate to damage wrought by Superstorm Sandy. Fortifying our beaches with natural dunes and vegetation, increasing the capacity of streets and coastal lakes to handle storm water runoff, and increasing the ecological vitality of those coastal lakes are ideas that would benefit all of Asbury Park. We believe that had these measures been in place prior to 2011, there would have been less coastal damage caused by the storm.

In addition to the storm-mitigating benefits, the Sasaki design project delivers a variety of benefits to Asbury Park which complement works already being considered. First, Asbury Park is in the midst of an ongoing redevelopment of its beachfront, presenting an opportunity to create sensible urban designs on a relatively clean slate. The three coastal lakes in Asbury Park are in various states of rehabilitation, making them amenable to ecologically friendly redesigns. By developing city mini parks and streetscapes the design recognizes and addresses the need to bridge the cultural divide between the East and West sides of the city. By working to incorporate a public beachfront park, the Sasaki design project could become key to keeping the north end of the Asbury Park - which is currently threatened by waterfront residential development - natural, environmentally sound and open to all for recreational use.

The Asbury Park Environmental and Shade Tree Commission conducts local initiatives that mitigate the effects of storm water and provide aesthetic and ecological benefits throughout the city. Because the Sasaki design project complements many of these initiatives, which are either planned or underway in Asbury Park, we feel that there is "fertile soil" here for a project of this scope. We believe that it is a logistically feasible time to redesign our city, and these ideas would help it to realize its environmental potential. Furthermore, the Sasaki designs appear to be replicable in many towns that are geographically similar to Asbury Park along the New Jersey coast and eastern seaboard.

The ESTC enthusiastically endorses the design project outlined by the Sasaki team and would be willing to use our intimate knowledge of the city and its people, to support, direct, implement and maintain improvements outlined by Sasaki in their Rebuild by Design design project as it progresses to the next stage.

Sincerely,

Tom Pivinski
Chairman, ESTC

March 23, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

I supports the Sasaki/Rutgers/ARUP proposal entitled “Resilience + the Beach: Resiliency Planning for the Jersey Shore” that is one of the finalists in your Rebuild by Design Project. We have had an opportunity to evaluate the initiatives outlined in that plan would greatly benefit Asbury Park, Jersey Shore, and all headlands areas along the east coast.

I am a resident of Asbury Park and a landscape architect/green building professional. My education, training and experience over the last 20 years have focused on implementing strategies to improve ecological and community health. Asbury Park is a unique place and careful attention to the community’s culture and history is key to the success of any project here. The Sasaki/Rutgers/Arup proposal incorporates strategies that have great potential for improving the natural and built environment while considering the unique qualities of the community.

The Sasaki/Rutgers/Arup design directly addresses environmental issues that correlate to damage wrought by Superstorm Sandy. The plan proposes fortifying our beaches with natural dunes and vegetation, increasing the capacity of streets and coastal lakes to handle storm water runoff, and increasing the ecological vitality of those coastal lakes. All of these measures, had they been in place prior to 2011, would have lessened the coastal damage caused by the storm.

I am also concerned about the north end beach of Asbury Park, which is currently threatened by private waterfront residential development. The “Townhomes at Bradley Cove” will slice through public opens space, encroach on NJ Green Acres land, limit public access to the beach, build in the v-zone (high velocity zone), and compromise this environmental sensitive coastal area. This private development will also undermine Sasaki/Rutgers/Arup’s plan to make this area of our oceanfront more resilient. We highly recommend, that as this project moves forward, the Sasaki/Rutgers/Arup team work in partnership with the City of Asbury Park to obtain the development rights and preserve the Bradley Cove tract. The incorporation a public oceanfront park in this area will complement the plan proposed by Sasaki/Rutgers/Arup.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

Jennifer Souder, MLA, LEED AP BD+C

cc. Brie Hensold - bhensold@sasaki.com



March 24, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

The Jersey Shore Chapter of the Surfrider Foundation supports the Sasaki/Rutgers/ARUP proposal entitled “Resilience + the Beach: Resiliency Planning for the Jersey Shore” that is one of the finalists in your Rebuild by Design Project. We have had an opportunity to evaluate the initiatives outlined in that plan and believe it would greatly benefit Asbury Park, Jersey Shore, and all headlands areas along the east coast.

The [Jersey Shore Chapter of the Surfrider Foundation](#) is a powerful activist network that works to protect our oceans, waves, and beaches. We currently have campaigns fighting for increased beach access, improved water quality, and protecting coastal open space such as the [north end beach](#) of Asbury Park.

The Sasaki/Rutgers/Arup design directly addresses environmental issues that correlate to damage wrought by Superstorm Sandy. The plan proposes fortifying our beaches with natural dunes and vegetation, increasing the capacity of streets and coastal lakes to handle storm water runoff, and increasing the ecological vitality of those coastal lakes. All of these measures, had they been in place prior to 2011, would have lessened the coastal damage caused by the storm.

An issue of concern to the Jersey Shore Chapter is the north end beach of Asbury Park, which is currently threatened by private waterfront residential development. The “Townhomes at Bradley Cove” will slice through public opens space, encroach on NJ Green Acres land, limit public access to the beach, build in the v-zone (high velocity zone), and compromise this environmental sensitive coastal area. This private development will also undermine Sasaki/Rutgers/Arup’s plan to make this area of our oceanfront more resilient. We highly recommend, that as this project moves forward, the Sasaki/Rutgers/Arup team work in partnership with the City of Asbury Park to obtain the development rights and preserve the Bradley Cove tract. The incorporation of a public oceanfront park in this area will complement the plan proposed by Sasaki/Rutgers/Arup.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

Alli Candelmo

Christine Bell

Co-Chairs
Jersey Shore Chapter of the Surfrider Foundation

cc. Brie Hensold - bhensold@sasaki.com



New Jersey Conservation F O U N D A T I O N

14 March 2014

Secretary Shaun Donovan

Secretary.Donovan@hud.gov

U.S. Department of Housing and Urban Development
451 7th Street, S.W., Washington D.C. 20410

LETTER of SUPPORT: *Resilience + the Beach: Resiliency Planning for the Jersey Shore*

Dear Secretary Donovan:

New Jersey Conservation Foundation supports the Sasaki/Rutgers/ARUP proposal entitled “Resilience + the Beach: Resiliency Planning for the Jersey Shore” that is one of the finalists in your Rebuild by Design Project.

In the wake of Hurricane Sandy, New Jersey Conservation Foundation has been advocating for new approaches to develop long-term resiliency at the Jersey Shore. We are hopeful that eventually a Coastal Commission will be established, to conduct regional planning and confront the realities of accelerating sea level rise and increased storm frequency and intensity.

The Sasaki/Rutgers/Arup proposal is unique in our view, in that it will *place ecology and state university ecologists firmly and prominently at the center of developing rebuilding concepts*; these ecological models will best serve a successful and vibrant coastline in the long-term. The team will develop strategies on the 3 major coastal geologies, inland bay, headlands, and barrier island; their goal is to restore and rebuilding strong and functioning ecological systems along the coast as a resiliency measure to protect BOTH ecosystems and human communities.

Even more critical, their goal is to consider the Jersey shore to extend from the coastal beaches, through the bays and estuaries to the Pine Barrens, and to improve ecological, cultural, and economic interests along that continuum.

New Jersey Conservation Foundation has been saving land and ecosystems, especially the Pine Barrens, for over 50 years, and we have worked closely with Rutgers ecologists in developing conservation policy in New Jersey for the last 25 years. We look forward to advising the Sasaki/Rutgers/Arup team based on our experience in creating greenways and nature preserves in both urban and rural settings.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

Emile DeVito, Ph.D.

Manager of Science and Stewardship
New Jersey Conservation Foundation

cc. Brie Hensold - bhensold@sasaki.com



Deal Lake Commission
100 Grassmere Avenue
Interlaken, NJ 07712
Telephone: 732.531.7405

March 18, 2014

The Honorable Shaun Donovan
Secretary, U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

The Deal Lake Commission supports the Sasaki/Rutgers/ARUP proposal entitled “Resilience + the Beach: Resiliency Planning for the Jersey Shore” that is one of the finalists in your Rebuild by Design Project. We have had an opportunity to evaluate the Sasaki/Rutgers/Arup plan, and we find that the initiatives outlined in that plan would greatly benefit Asbury Park, Jersey Shore, and all headlands areas along the east coast.

The Deal Lake Commission is a joint meeting of the seven municipalities (Allenhurst, Asbury Park, Deal, Interlaken, Loch Harbour, Neptune and Ocean) adjoining Deal Lake and its purpose is to monitor the environmental health of the Lake and its watershed and endeavor to restore Deal Lake for the benefit of all stakeholders, including recreational users, fishermen, residents and visitors.

The Sasaki/Rutgers/Arup plan directly addresses environmental issues that correlate to damage wrought by Superstorm Sandy. The plan proposes fortifying our beaches with natural dunes and vegetation, increasing the capacity of streets and coastal lakes to handle storm water runoff, and increasing the ecological vitality of those coastal lakes. All of these measures, had they been in place prior to 2011, would have lessened the coastal damage caused by the storm.

We highly recommend that as this project moves forward, the Sasaki/Rutgers/Arup team work in partnership with the City of Asbury Park to obtain the development rights and preserve the Bradley Cove tract. The incorporation a public oceanfront park in this area will complement the plan proposed by Sasaki/Rutgers/Arup.

We also request full participation in any plans the team has around Deal Lake. We will strongly encourage the team to look into transforming Sunset Lake in a beautiful coastal storm water retention lake which will dramatically help Deal Lake’s flooding / storm resiliency. The DLC is excited about the plans to protect our critical recreational asset in the region.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Very truly yours,

Don Brockel, Chairman
Deal Lake Commission

March 23, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

I fully support the Sasaki/Rutgers/ARUP proposal entitled “Resilience + the Beach: Resiliency Planning for the Jersey Shore” that is one of the finalists in your Rebuild by Design Project. I have had the pleasure of working with this design team and an opportunity to evaluate the initiatives outlined in their design concept. I am confident this team's design would greatly benefit Asbury Park, the Jersey Shore, and all headlands areas along the east coast.

I am a lifelong resident of the NJ shore. I spearfish, surf, SCUBA dive, swim, and visit the beach on a daily basis. If it were not for the wildness the Atlantic Ocean brings to my life, I would not live in NJ. After Sandy we all struggled to balance our love for the ocean without our newfound understanding of its devastating potential. Many of us look to the idea of increased resiliency as the only option other than strategic retreat from the coast. The problem we face as individual citizens is in implementing the grand idea of resiliency. Rebuild by Design and the Sasaki team has empowered us to work toward increased resiliency through them.

It has been my pleasure to work with the Sasaki team. They have reached out to our whole community in an open, thoughtful, and sincere way. I highly recommend their design concept as a way to create a more resilient headlands area in Asbury Park and the Jersey Shore.

Sincerely,

Joe Woerner

Asbury Park Environment and Shade Tree Commission
Jersey Shore Chapter of the Surfrider Foundation, Member and former Chair
Asbury Park Homeowners Association

cc. Brie Hensold - bhensold@sasaki.com

4 Wesley Court
Asbury Park, NJ 07712

March 23, 2014

Secretary Shaun Donovan
Secretary.Donovan@hud.gov
U.S. Department of Housing and Urban Development
451 7th Street, S.W., Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

My family supports the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" that is one of the finalists in your Rebuild by Design Project."

We are New Jersey natives and have been residents of Asbury Park since 2007. We moved to and invested in Asbury Park because we believe that the town offers sensible urban living in a walkable seaside environment. Accordingly, we support any plan that enhances and preserves that environment.

The Sasaki plan directly addresses environmental issues that correlate to damage wrought by Superstorm Sandy. The plan proposes fortifying our beaches with natural dunes and vegetation, increasing the capacity of streets and coastal lakes to handle storm water runoff, and increasing the ecological vitality of those coastal lakes. All of these measures, had they been in place prior to 2011, would have lessened the coastal damage caused by the storm.

In addition to the storm-mitigating benefits, the Sasaki proposal delivers a variety of other benefits to Asbury Park. First, Asbury Park is in the midst of an ongoing redevelopment of its beachfront, presenting an opportunity to create sensible urban designs on a relatively clean slate. Also, the three coastal lakes in Asbury Park are in various states of rehabilitation, making them amenable to ecologically friendly redesigns. Finally, the north end of the Asbury Park beachfront, which is currently threatened by waterfront residential development, could benefit by instead incorporating a public beachfront park that perfectly complements the Sasaki plan.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

/s/ Doug and Cathy McQueen /s/
973-207-0332

cc. Brie Hensold - bhensold@sasaki.com

March 18, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

We support the Sasaki/Rutgers/ARUP proposal entitled “Resilience + the Beach: Resiliency Planning for the Jersey Shore” that is one of the finalists in your Rebuild by Design Project. We have had an opportunity to evaluate the Sasaki/Rutgers/Arup plan, and we find that the initiatives outlined in that plan would greatly benefit Asbury Park, Jersey Shore, and all headlands areas along the east coast.

We have lived in Asbury Park since 2009. It has grown a great deal but has so much more to go. It is a wonderful town with the arts, beach, a strong long term community, businesses trying to grow and more and more tourism. Superstorm Sandy set that town back a couple of years. So many people have worked so hard, and so many community members need so much inspiration to grow stronger. We strongly support this plan as it will encourage the long term development and preservation of Asbury Park.

The Sasaki/Rutgers/Arup plan directly addresses environmental issues that correlate to damage wrought by Superstorm Sandy. The plan proposes fortifying our beaches with natural dunes and vegetation, increasing the capacity of streets and coastal lakes to handle storm water runoff, and increasing the ecological vitality of those coastal lakes. All of these measures, had they been in place prior to 2011, would have lessened the coastal damage caused by the storm.

We highly recommend that as this project moves forward, the Sasaki/Rutgers/Arup team work in partnership with the City of Asbury Park and other community groups.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

Gail Rosewater and Barbara Krzak
3 Grove Court
Asbury Park New Jersey 07712

cc. Brie Hensold - bhensold@sasaki.com

March 24, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

Dear Secretary Donovan:

I am writing to you as a citizen of Asbury Park, New Jersey to encourage your support for the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team.

The team has been very visible in our community for the last several months, investigating and listening and sharing design proposals that would both help to protect our coastal lakes and city from future storms like Sandy while enhancing the local ecology and aesthetics for citizens who live here as well.

Indeed, the immediate ocean front is no place for townhomes and high density development. Rather, by fortifying our beaches with dunes and protecting our coastal lakes with natural vegetation and amenities that everybody can enjoy, a synergy is produced that also acts as a natural protection against future hurricanes and nor'easters.

Specifically, the "Townhomes at Bradley Cove" have been on the drawing board here for several years, but during Sandy that area was underwater. Had the homes been there already they would have been evacuated and probably destroyed, resulting in a burden to taxpayers after the fact. With this project, which could serve as a model for many other New Jersey and Delaware communities as well, there is a great opportunity to demonstrate how good design and planning can serve to avoid future disasters and work in the public's best interest at the same time.

I strongly encourage your agency to support the Sasaki/Rutgers/Arup proposal, and also to work in partnership with the City of Asbury Park to preserve the Bradley Cove tract as a buffer against future storms.

Sincerely,

Jeffrey Seeds
Asbury Park, New Jersey

cc. Brie Hensold - bhensold@sasaki.com



Brie Hensold <bhensold@sasaki.com>

Asbury Park, NJ

1 message

jill potter <awwmama@gmail.com>

Sun, Mar 23, 2014 at 9:39 AM

To: Secretary.Donovan@hud.gov

Cc: bhensold@sasaki.com

March 18, 2014

Secretary Shaun Donovan

U.S. Department of Housing and Urban Development

451 7th Street, S.W.

Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

I support the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" that is one of the finalists in your Rebuild by Design Project. I have had an opportunity to evaluate the initiatives outlined in that plan would greatly benefit Asbury Park, Jersey Shore, and all headlands areas along the east coast.

I am a life long resident of the Monmouth-Ocean County areas and from Nor'Easters to Hurricanes, I have witnessed many times over the impact these storms have on our communities. But as you well know, no one ever expected the impact of Sandy—the time is now to protect our communities and re-invent how we utilize the beach. And an integrated approach with plans for water run off, storm surges and longevity of the community is where future.

The Sasaki/Rutgers/Arup design directly addresses environmental issues that correlate to damage wrought by Superstorm Sandy. The plan proposes fortifying our beaches with natural dunes and vegetation, increasing the capacity of streets and coastal lakes to handle storm water runoff, and increasing the ecological vitality of those coastal lakes. All of these measures, had they been in place prior to 2011, would have lessened the coastal damage caused by the storm.

One issue of concern is the north end beach of Asbury Park, which is currently threatened by private waterfront residential development. The "Townhomes at Bradley Cove" will slice through public opens space, encroach on NJ Green Acres land, limit public access to the beach, build in the v-zone (high velocity zone), and compromise this environmental sensitive coastal area. This private development will also undermine Sasaki/Rutgers/Arup's plan to make this area of our oceanfront more resilient. We highly recommend, that as this project moves forward, the Sasaki/Rutgers/Arup team work in partnership with the City of Asbury Park to obtain the development rights and preserve the Bradley Cove tract. The incorporation a public oceanfront park in this area will complement the plan proposed by Sasaki/Rutgers/Arup.

We strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

Jill Potter

Resident - Asbury Park, NJ

cc. Brie Hensold - bhensold@sasaki.com



Brie Hensold <bhensold@sasaki.com>

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Daniel Baum <danfbaum@gmail.com>

Mon, Mar 24, 2014 at 11:31 AM

To: Secretary.Donovan@hud.gov

Cc: bhensold@sasaki.com

March 23, 2014

Secretary Shaun Donovan
U.S. Department of Housing and Urban Development
451 7th Street, S.W.
Washington D.C. 20410

LETTER of SUPPORT: Resilience + the Beach: Resiliency Planning for the Jersey Shore

Dear Secretary Donovan:

Daniel Baum supports the Sasaki/Rutgers/ARUP proposal entitled "Resilience + the Beach: Resiliency Planning for the Jersey Shore" that is one of the finalists in your Rebuild by Design Project. We have had an opportunity to evaluate the initiatives outlined in that plan would greatly benefit Asbury Park, Jersey Shore, and all headlands areas along the east coast.

I am a resident/business owner in Asbury Park and I am in full support for this project as it reflects forward thinking and planning that needs to take place along our NJ coast.

The Sasaki/Rutgers/Arup design directly addresses environmental issues that correlate to damage wrought by Superstorm Sandy. The plan proposes fortifying our beaches with natural dunes and vegetation, increasing the capacity of streets and coastal lakes to handle storm water runoff, and increasing the ecological vitality of those coastal lakes. All of these measures, had they been in place prior to 2011, would have lessened the coastal damage caused by the storm.

One issue of concern is the north end beach of Asbury Park, which is currently threatened by private waterfront residential development. The "Townhomes at Bradley Cove" will slice through public opens space, encroach on NJ Green Acres land, limit public access to the beach, build in the v-zone (high velocity zone), and compromise this environmental sensitive coastal area. This private development will also undermine Sasaki/Rutgers/Arup's plan to make this area of our oceanfront more resilient. I highly recommend, that as this project moves forward, the Sasaki/Rutgers/Arup team work in partnership with the City of Asbury Park to obtain the development rights and preserve the Bradley Cove tract. The incorporation a public oceanfront park in this area will complement the plan proposed by Sasaki/Rutgers/Arup.

I strongly encourage your agency to support the Rebuild by Design application submitted by the Sasaki/Rutgers/Arup team. Thank you for your consideration.

Sincerely,

Daniel Baum
B2Creative.us
1033 3rd Avenue
Asbury Park, NJ



Brie Hensold <bhensold@sasaki.com>

New Jersey Shore

1 message

Mark Tyler <mark.tyler@hotmail.com>

Mon, Mar 24, 2014 at 9:14 AM

To: "Secretary.Donovan@hud.gov" <secretary.donovan@hud.gov>

Cc: mike muffoletto <mike.muffoletto@nbcuni.com>, "bhensold@sasaki.com" <bhensold@sasaki.com>

Dear Secretary Donovan:

I'd like to thank you and your staff at HUD for the hard work and dedication that has gone into the administration of the CDBG grants allocated in the aftermath of super-storm Sandy. HUD's success depends largely on the working relationship with the affected state and local governments. Directing the funds where they are most needed and ensuring that those affected may continue their lives is a difficult task and one that in many ways is left up to the states. However, HUD may demand that the funds be used in the manner that will be the most effective over time; by preserving the shoreline and limiting the potential expenses when future storms strike.

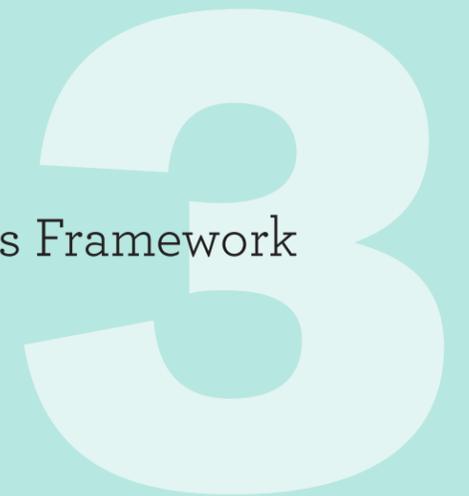
I urge you to speak out and support Rebuild by Design's preservation programs. As Secretary of HUD your voice could have significant impact on the course taken. Should another catastrophic storm strike, and plans for shoreline preservation having never been implemented, the public will certainly ask "why?".

I thank you for your ongoing commitment and urge you to use your voice in support of Rebuild by Design's plans for shoreline protection in New Jersey.

Very truly yours,

Mark Tyler - March 24, 2014
1111 Fifth Ave.
Asbury Park, NJ 07712

Benefit Cost Analysis Framework



REBUILD BY DESIGN

BARRIER ISLAND – TOMS RIVER/BERKELEY TOWNSHIP, NJ
BENEFIT-COST ANALYSIS
FINAL – March 25, 2014

Step	Question	Describe
<p>Step 1 - Problem Analysis</p> <p><i>Key Question:</i></p> <p><i>What is the problem we are trying to solve in our project?</i></p>	<p>What are the existing flood risks (e.g. coastal flooding, fluvial/pluvial flooding, groundwater flooding) in your area (hazard, vulnerability, probability)?</p>	<p>The Toms River-Berkeley area has the highest risk exposure to various forms of flooding of the three sites studied by Sasaki-Rutgers-Arup.</p> <p><i>Flood Hazards</i></p> <ul style="list-style-type: none"> - Storm surge, fluvial and bay flooding, saltwater intrusion of Pine Barrens aquifers - 31.9% of land area of 10 barrier island communities would be inundated in a 500-year flood under 31” of sea level rise (estimated for 2050) - 23.6% of area population and 36.9% of area housing units are within the 2050 500-year flood hazard zone <p><i>Vulnerability</i></p> <ul style="list-style-type: none"> - 25% of land area of 10 barrier island communities with a present value of \$7.72 billion and 16.9% of population are vulnerable to a 100-year flood today - 100% of popular beachside tourist destinations would be inundated in today’s 500-year flood (approx. 100-year flood under 31” of SLR) - 31.9% of land area of 10 barrier island communities with a present value of \$10.39 billion and 23.6% of the population are vulnerable to a 500-year flood with 31” of SLR <p><i>Probability</i></p> <ul style="list-style-type: none"> - Expected annualized losses for Barrier Island communities with 1% annual flood probability (100-year flood) under 31” of SLR total \$85.7 million - Expected annualized losses for Barrier Island communities with 0.2% annual flood probability (500-year flood) under 31” of SLR total \$857.9 million
	<p>What are the existing social conditions (e.g., lack of housing, mobility) in your area?</p>	<p>The Toms River – Berkeley area contains a variety of social conditions, from middle-income suburban communities to seasonal, tourism-oriented communities. Some issues arising from the social profile in the Toms River-Berkeley area include:</p> <p><i>Prevalence of second-home ownership and retiree households</i> – In the 10 study communities, 58% of homes are not primary residences, or used seasonally; 36% of households are headed by someone 62 or older. This greatly affects the availability</p>

Step	Question	Describe
		<p>and character of public services such as mass transit (presently, the system is largely demand-response), as well as the scale and coverage of publicly-financed infrastructure (much infrastructure serving housing subdivisions was privately financed and built, leading to a sprawling and highly differentiated infrastructural landscape).</p> <p><i>Automobile dependence</i> – The single-occupancy automobile modal utilization rate is 98%; this translates into 60% of intersections in the study area experiencing congestion during the morning and evening commute, including key intersections along NJ 37 and US 9.</p> <p><i>Dominance of beach tourism industry in local economies</i> – The economies of Toms River-Berkeley area communities are largely based on leisure and tourism, much of which is focused on the highly vulnerable beaches of the barrier island. This vulnerability can be seen in the utilization statistics on barrier island beaches: Toms River Township saw an 83% reduction in the volume of beach badge sales during the 2013 season</p>
	<p>What are the environmental conditions in your area?</p>	<p>The Toms River-Berkeley area contains a variety of environments with much biodiversity, including sandy beaches, salt marshes, freshwater wetlands, a thin belt of deciduous forest, as well as a portion of the ecologically unique Pine Barrens. Some issues arising from the region’s environmental conditions include:</p> <p><i>Extractive mining</i> – A historically active and extensive sand mining industry has significantly disrupted the geological and ecological form of large tracts of land, including one such site (500 acres) in Berkeley Township. Site disturbances can yield valuable habitats for certain species, notably species benefiting from temporary water bodies (e.g. frogs) with respect to predation.</p> <p><i>Barnegat Bay water quality</i> – Legacy pollution on former industrial sites in the Barnegat Bay, combined with high volumes of phosphorous and nitrogen in stormwater runoff, compromise water quality in Barnegat Bay, the low turbidity of which contributes to an increasing incidence of algal blooms.</p> <p><i>Development encroachment on wetlands</i> – heavy land use restrictions on Pinelands habitat and scarcity of developable land elsewhere have resulted in building of canal-style subdivisions on wetlands, reducing nesting habitat for birds and disrupting fish and amphibian hatching habitats.</p>

Step	Question	Describe
	<p>What are the existing values of the community? How is spatial quality defined? What are the trends in spatial development (rising demand for housing or agriculture; urbanization)?</p>	<p>The Toms River-Berkeley area is a relatively low-density, suburban complex of mostly middle-income residential communities, with strip commercial abutting highway corridors. Spatial analysis and stakeholder and public engagement yielded the following key areas of concern with respect to physical value and spatial quality:</p> <p><i>High value of water access</i> – A noticeable gradient in income and tenure exists in relationship to the beach, with some barrier island communities being comprised almost exclusively of second homes, and value of homes and income of occupants declining with distance from the shore. Few moments of public access exist, but are desired.</p> <p><i>Lack of “town centers”</i> - A couple of modest commercial “town centers” exist in the area, one in Seaside Heights on the Barrier Island, and another centered on the historic core of Toms River. These centers are overshadowed by the classic tourism destinations at the beach. Improved connections between town centers and the beach are desired.</p> <p><i>Desire to diversify economy</i> – County and local planners desire more “career-building” industries in the area’s economy, and have designated areas along Highway 37 west of downtown Toms River to do this. State parks officials as well as some county officials see opportunity for expanded tourist offerings, leveraging the area’s rich ecological assets.</p>
<p>Step 2 - Project Definition</p> <p><i>Key Question:</i></p> <p><i>What is our project about?</i></p>	<p>What are the key objectives?</p>	<p>Our key objectives in the Berkeley-Toms River area are:</p> <ul style="list-style-type: none"> - Diversify the tourist experience to embrace and connect the rich ecological characters of Barnegat Bay and the Pinelands - Integrate ecology with development to meet the needs of residents and tourists alike - Create the conditions for moving development inland, accommodating new or relocating households, while supporting new tourism opportunities - Provide enhanced public access to a variety of water and beach experiences

Step	Question	Describe
	What are the geographical boundaries?	<p>Our project in the Toms River-Berkeley area defined to the west by the Garden State Parkway, to the north by Beachwood Borough, to the south by unincorporated village of Pinewald, and to the east by U.S. Highway 9; as well as:</p> <ul style="list-style-type: none"> - New Jersey Pulverizing sand mine site - The former Beachwood shopping mall and environs, site of the planned “Berkeley Town Center” - Mill Creek watershed (county-owned land), draining via Pine Beach and Ocean Gate to Toms River - Potter Creek watershed, draining to Barnegat Bay - Island Beach State Park, Double Trouble State Park, and Jake’s Branch County Park, via trail and water taxi connections.
	What is the design philosophy?	<p>The barrier islands are the most vulnerable coastal typologies to sea level rise and storm surge; yet they are among the most valuable places in terms of beach tourism. The Sasaki team proposes to diversify the touristic experience of the barrier island communities and open new opportunities for integrated development inland. It accomplishes this by working with natural systems – as opposed to against them – and layering new forms of mobility and programs with recreational and entertainment values on a retiring sand mine in high-and-dry Berkeley Township. The result is a connected experience that captures the many facets of the area and expands ecotourism, while providing space for its continued evolution and inland migration over time.</p>
	<p>What are the main components of the plan? How do the components interact (synergies, reinforcement, conflicting etc.)?</p>	<p><i>Our main components:</i></p> <ul style="list-style-type: none"> - Mixed-use extension of proposed Berkeley Town Center with around 5,000 new housing units for permanent and seasonal residents (at full development capacity) - Ecologically-oriented lodging areas, including an ecolodge, cabins, and areas for camping/ “glamping” - Preserved habitat areas for ecotourism - Relocated northbound offramp/onramp on Garden State Parkway, paired with an “ecobridge” for facilitating human and biotic connectivity - Civic node with resiliency center, public education and entertainment

Step	Question	Describe
		<p>programs</p> <ul style="list-style-type: none"> - Aerial tram connecting civic node with new marina and water taxi hub on Barnegat Bay, at mouth of Potter Creek - Enhanced Mill Creek corridor, dredged to accommodate floodwaters and facilitate wetland migration under sea level rise. <p><i>Interaction of our main components:</i></p> <ul style="list-style-type: none"> - <i>Integrating development with ecology</i> – The design of the Berkeley Town Center extension intersects directly with a layered zone of active recreation and a “funscape” evoking the classic beach experience, giving way to more remote habitat areas with varying levels of accessibility. - <i>Managing risk by transforming access</i> – Improving mobility options for accessing the barrier beach as well as linking in other experiences creates development value on high-and-dry land, which diversifies the risks to life and property posed by sea level rise and increased severity of storm events. - <i>Syncing human and species mobility</i> – the development and mobility concepts take into account the sensitive new ecologies on the disturbed sand mine site, with elements that “bundle” human and species mobility across geographic barriers, such as the land bridge across Garden State Parkway; via shared corridors, such as Mill Creek; or through separated transitways, such as the aerial tram. This restores vital habitat migration corridors long ago severed by development.
	<p>What is the development of the project in 5 years, in 20 years and in 50 years from now?</p>	<p><i>5 Years</i> – Easement or acquisition of New Jersey Pulverizing site. Phase 1 construction of Berkeley Town Center with new retail elements. Completion of Barnegat Branch Trail. Inauguration of water taxi service from Downtown Toms River to Island Beach State Park and Seaside Heights.</p> <p><i>20 Years</i> – Construction of new northbound onramp/offramp pair into site, as well as underpass (for vehicles), and land bridge. Civic and habitat programs developed on site, along with aerial tram. Trail connections completed connecting site to Double Trouble State Park and Pine Barrens trail network. Mill Creek retrofits completed, and marinas with water taxi service constructed at Mill Creek and Potter Creek termini. Regular circulator service between Berkeley Town Center, Downtown Toms River, and the NJ-37 economic corridor.</p> <p><i>50 Years</i> – Full build-out of residential component of Berkeley Town Center.</p>

Step	Question	Describe
		Maintenance of Mill Creek corridor. Construction of barrier landforms in Barnegat Bay providing additional storm surge protection and nesting habitat. Introduction of rapid transit service on Garden State Parkway or via abandoned rail corridor between key Jersey Shore communities.
<p>Step 3 - Reference situation</p> <p><i>Key Question:</i></p> <p><i>What will happen without our project?</i></p> <p><i>See Appendix I for further guidance.</i></p>	<p>What realistically would happen now, in 5 years, in 20 and in 50 years if this specific project would not be implemented?</p> <p>What would individuals, communities, (local/federal) governments do? Is “do-nothing and nothing changes” a realistic development?</p>	<p>The reference scenario assumes a business-as-usual extrapolation of current policy measures and trends, which become less tenable in the near future. Given resource and time constraints, and taking into account the many complexities involved in determining “tipping points” at multiple scales to parameterize a useful quantitative model, the Sasaki team opted to develop a qualitative logic model of probable events to illustrate the reference case. The reference scenario for Berkeley-Toms River follows.</p> <p><i>In 5 years</i>, Berkeley Town Center is built as planned, adding to traffic congestion on US 9. Beachside tourist attractions rebuilt and operational. Property owners unable to rebuild after Hurricane Sandy sell properties to wealthier, more risk-tolerant buyers; larger houses raised to current BFE follow. Toms River completes NJ 37 strategic economic development planning and begins soliciting firms and investment. Downtown Toms River stagnates.</p> <p><i>In 20 years</i>, if hurricanes or severe storm events intensify, one or more storms will likely strike the Toms River-Berkeley area, with potentially greater impacts owing to a potential 1 foot increase in sea level rise. Flooding induces one or more waves of homeowners to sell out, leading to increased economies of scale in local housing markets. With few opportunities to resettle in the area, many households leave entirely, reducing the service and tax base of local municipalities and placing development pressure on other areas in the region or state. Municipalities increasingly sort into “winners” (with a smaller number of wealthier residents), and “losers” (shrinking towns).</p> <p><i>In 50 years</i>, if hurricanes or severe storms intensify along with a 31-inch rise in sea levels, significant flooding will have altered the human and ecological landscape. More households move out with each inundation event, leaving some municipalities</p>

Step	Question	Describe
		<p>to face bankruptcy, while better-off towns are pressured by ever-mounting costs to both protect themselves from flooding and recover from flood events. This condition is more pronounced for some towns by the dynamism of the barrier island itself, which increases exponentially with different rates of sea level rise. The beach tourism industry, faced with high insurance and reinvestment costs related to higher risks of catastrophic loss, collapses. Barnegat Bay wetlands will have lost 50% of their area, lessening natural protection from storm surge and flooding events.</p>
<p>Step 4 - Identify Stakeholders</p> <p><i>Key Question:</i></p> <p><i>Who are the key stakeholders relevant to our project?</i></p>	<p>Who are the key stakeholders in our area and what are their interests in our project?*</p> <p>(*The interests of the stakeholders may either be related to the positive or negative impacts (scores) of the project)</p>	<p><i>Communities:</i></p> <p>The Berkeley-Toms River area encompasses 10 municipalities, containing many neighborhoods with particular identities and varying levels of formal organization. Outreach in this phase of effort was highly generalized, but two particularly important stakeholder communities related to our site proposal emerged:</p> <p><u>Pinewald</u> – Residents of unincorporated Pinewald have been working with Berkeley Township and Ocean County for more than 10 years to formalize a transfer of development rights (TDR) scheme that would enable greater intensities of development on the Berkeley Town Center site, given limitations imposed by CAFRA. They are interested in maintaining their quality of life and sense of quiet remoteness in the midst of the Pines. These stakeholders will likely experience the highest disruption from the proposed development, though the strategies take care to ensure an adequate buffer of low-level programming.</p> <p><u>Downtown Toms River Business District</u> – Merchants in Downtown Toms River are nervous about the prospects of large commercial development in Berkeley, and are chiefly concerned with ensuring that their district remains accessible to tourists, residents, and investors. They are especially interested in enhancing mobility and connectivity elements between the town centers, the barrier island beaches, and the Pine Barrens.</p> <p><i>Municipalities:</i></p> <p><u>Toms River Township</u> – Toms River currently enjoys the principal means of accessing the barrier island complex from the mainland, via the NJ 37 corridor. It is</p>

Step	Question	Describe
		<p>open to and interested in the notion of development in Berkeley, but emphasizes connecting all the features together so it does not experience a “net loss” in tourism or investment dollars.</p> <p><u>Berkeley Township</u> – Very interested in seeing the Berkeley Town Center development concept proceed, but is at odds with local environmental groups on necessary moves to make it happen (e.g. access road). Must mediate between many divergent interests and concerns with much less administrative and technical capacity than Toms River.</p> <p><u>Beachwood Borough</u> – Densely platted residential community adjacent to site, currently has very limited open space and recreation opportunities. Adolescents and children from this community already use the NJ Pulverizing site as a playground, emphasizing the need for additional open space.</p> <p><i>County:</i> <u>Ocean County Planning Department</u> – Limited authority to supersede municipal actions, but an effective mediator and convener, negotiating Toms River and Berkeley’s interests in recent planning initiatives. Ocean County’s interests are in growing and diversifying the county’s economy, and officials are more immediately focused on buyouts and long-term recovery planning.</p> <p><i>PANYNJ:</i> N/A</p> <p><i>State:</i> <u>New Jersey Department of Environmental Protection</u> – Parks and Forestry division is interested in expanding awareness and programmatic range of assets in Toms River-Berkeley area, especially Island Beach and Double Trouble State Parks. They see opportunities and are interested in tapping into a wider, more diverse patronage through the recreational elements proposed by project.</p> <p><i>NGO:</i> <u>American Littoral Society</u> – Very interested in the Barnegat Bay, and integral member of the Barnegat Bay Partnership. ALS has been active in pushing Berkeley</p>

Step	Question	Describe
		<p>Township on impact mitigation from the access road to service the Berkeley Town Center site, citing sensitive emergent ecologies on the NJ Pulverizing site. It is also interested in promoting smart stormwater management practices.</p> <p><i>Private sector:</i></p> <p><u>New Jersey Pulverizing Company</u> – NY-based extractive mining company that operates both a physical mining and processing facility on-site as well as a district administrative center. Mining license is up for renewal in 2019, with no indication of intention to renew. While no contact has yet been made directly with NJ Pulverizing, county and township officials who have dealt with the company in the past indicate that they are a willing partner and are interested in winding down operations at the site in the future, but are of course interested in obtaining maximum price for the land and immunity from responsibility for remediation and cleanup.</p> <p><u>T&M Engineers</u> – Local engineering company that is contracted with Ocean County and Toms River to do long-term recovery planning from Hurricane Sandy. Also provides contract general planning and zoning administration services to Berkeley Township. T&M is interested in sustaining its access to decision-makers, as well as securing additional contract opportunities.</p>

<p>Step 5 - Project Scoring</p> <p><i>Key Question:</i></p>	<p>Score the effect of your project on the basis of the criteria list:</p> <ol style="list-style-type: none"> 1. <u>Monetize</u> <i>life-cycle costs</i> and the effect on <i>flood protection</i>, to the extent you can. 2. <u>Quantify</u> all effects with the most advanced quantitative information possible, to the extent you can. In case no quantitative information is available, use a semi-quantitative scale, such as:
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What are the positive and negative effects of our project, as compared to the reference situation?

- Expected strong negative impact
- Expected negative impact
- 0 Neutral
- + Expected positive impact
- ++ Expected strong positive impact
- ? Impact unknown / cannot be assessed

Notes on scoring:

- Use expert judgments to score.
- Scoring of the project is relative to the reference situation (see step 3).
- Use the criteria list in Appendix II to quantify the effects.
- Provide a qualitative clarification for each score.
- Identify required extra information needed for (improving) the judgment.

3. Qualitatively describe the effects.
4. Assess the certainty of the effect on a scale from 1 (very certain) to 5 (very uncertain)

Criteria List	Sub-criteria	Monetized effect	Quantitative assessment	Qualitative description	Uncertainty
Life cycle costs	Investment costs - <i>Public</i>	<i>Creek Dredging/Islands/Open Space</i> \$264,600,000 (892 acres – contingent on development agreements and use allowances) <i>Aerial Tram</i> \$16,841,861 (3.37 miles) <i>Land Bridge/Highway Interchange</i> \$55,000,000 <i>Trails</i> \$4,928,220 <i>TOTAL INVESTMENT COST:</i> \$341,370,081	--/-	Investment costs are estimated to be high in the aggregate, but with substantial opportunity for multi-sector partnerships leveraging a wide range of financing sources, the costs of investment can be directly or indirectly offset by new development opportunities that are created by the project, and even earn a return on investment over the lifetime of the project. The ultimate investment costs will thus vary with the investment strategy and project phasing.	4
	Operation and maintenance cost - <i>Public</i>	<i>TOTAL ESTIMATED O&M:</i> \$295,999,692 (Based on 5% of all public investment costs)	-/0	Operation and maintenance will be on-par with normal municipal or county maintenance obligations, as new development and infrastructure systems will not require extensive flood protection interventions or carry increased insurance costs.	4
	Re-investment after ... years	<i>Expected reinvestment period:</i> 25 years <i>Expected reinvestment magnitude:</i> \$137,439,597 (assumes light dredging and capital reinvestments in marinas, aerial tram)	-/0	Some elements of the proposed public investment costs will require reinvestment after 25 years in service, within the specified reference time horizon of 2050.	4
Protection of Value	Value of new residential and commercial land created on inland site	<i>NPV of new development</i> \$3,360,004,264 <i>Year 1 new development value</i> \$70,560,090 <i>Year 50 new development value</i> \$1,816,022,424	++	The project provides opportunity for greater than 5000 housing units at modest (27 DU/acre) density, and greater than 8 million square feet of commercial space. This would offset, and potentially recapture, some of the expected leakage of population/households and firms from a	3

				probable increased incidence in flooding on the barrier island and in areas adjacent to the bay.	
	Reduction of expected casualties due to flooding	\$0	0	Same. The project does not affect expected casualties on the barrier island, but in the long run, it may have a positive effect due to its “capture” of households from the endangered barrier island communities.	1
Environmental value	Ecosystem and biodiversity effects	\$4.357 million <i>in annualized ecosystem benefits provided by restored and higher-functioning wetlands and wetland refuges</i> \$1.429 million <i>in annualized ecosystem services benefits provided by preserved emergent pine barrens habitat</i>	++ 426 acres of restored and higher-functioning wetlands 194 acres of preserved emergent Pine Barrens habitat 185 acres of dedicated habitat corridor 261 acres of new island refuges for nesting birds and habitat migration under sea level rise.	Through a mix of preservation and restoration/enhancement measures, the project results in a higher quantity of better-functioning habitat. The redesigned Mill Creek corridor contains habitat envelopes that accommodate migration of species with an expanding salinity gradient, and preserved patches for vernal ponds on the sand mine site provide much-needed hatching habitat for amphibians.	1
	Energy efficiency		0	Same. Not actively accounted for, but the development would not be expected to have a net negative impact on energy efficiency given its form and size.	3
	Ambient (urban) environment / spatial quality		++ 86 acres of new public realm, including plazas and open spaces, civic and institutional centers, and « funscape » elements 71,000 linear feet of new trails	Provision of new public spaces and trails in and around the site provides the area with a needed civic core, as well as numerous opportunities for recreation and socializing.	2
	Noise levels		-/0	Higher ambient noise levels around urban portions of the site can be expected from this project, but likely	4

				would not result in a net disturbance equivalent to periodic noise pollution generated by industrial/extractive activity. Impacts would be felt more on the western side of the project site.	
	Greenhouse gas emissions		+	Mobility elements available through the site would divert trips from automobiles to modes with a lower carbon profile (and potentially powered by renewable sources of energy), contributing to a reduction in carbon levels	3
	Air quality		+	Mobility elements available through the site would divert trips from automobiles to modes with a lower NOx profile (and potentially powered by renewable sources of energy), lowering congestion and air pollution in the area.	3
Social value	Identity & Social cohesion		++	New town center and ecotourism programming would provide the Toms River-Berkeley area with a radically new brand and image, and along with the new mobility and connection elements envisioned, a richer network for communities to take advantage of.	1
	Crime and vandalism		0	Same. Project does not forecast any direct or indirect effects.	3
	Affordable housing		0	Will contribute a supply of housing and retail to a market that will experience increasing scarcity with sea level rise and increasing storm severity, but this effect would likely be offset by price premiums associated with access to site amenities. Affordable housing targets	2

				would need to be specified in development agreements.	
	Recreational value for inhabitants		++ <i>71,000 linear feet</i> of new trails <i>75 acres</i> of parks and recreational “funscape”	Provides recreation and ecotourism opportunities that are open to residents and tourists alike. New trails, parks, and funscape experiences broaden and deepen the range of activities available year-round.	1
	Cultural, historic, archaeological sites and landscapes		++ <i>2 direct connections</i> to historic and culturally significant landscapes.	New trail system connects to site to Double Trouble State Park and the Pine Barrens heritage sites there. Tourism at the site has suffered in recent years, but would likely increase with the programming envisioned by the project. The mobility elements envisioned would also increase tourism to the historic downtown Toms River district.	1
	Human capital and education		+ <i>571,585 square feet</i> of civic and educational program space on site	Environmental education and civic programs are envisioned for the site, adjacent to the Barnegat Branch Trail. This includes a resiliency center, which can serve as a resource for preparedness for and shelter from severe storm events.	2
Economic value	Direct effects on local or regional economy (e.g. tourism, agriculture/fishery, logistics, energy)		++ <i>5,099,196 square feet</i> of new commercial space for retail or office uses	Expands and diversifies tourist offerings and opportunities for firms and enterprises providing related services. Marinas will provide opportunities for ecotours and recreational fishing launches.	3
	Synergies or spin-off effects to other		+	New mobility elements generate revenue for operators that can be captured and reinvested over time;	3

	sectors' revenues (e.g. transportation)			additional revenues expected to be generated for freight transportation sector with servicing retail and entertainment programs.	
	Economic competitiveness (through specialization; agglomeration)		0	Same. No net increase or decrease predicted for economic competitiveness through specialization or agglomeration effects.	3
	Local / regional employment		+	New tourism opportunities and programs and mobility elements envisioned in the project area effectively extend the tourist season and provide longer, more stable employment for part-time or seasonal workers. Also potentially relocates some jobs inland from vulnerable barrier island establishments.	2
	Local / regional employment in construction		++	Project site would represent largest construction opportunity in Berkeley Township in decades. Additional geotechnic work would provide opportunities for both manual and skilled workers.	2
	Value of property other than through enhanced flood protection	See above, "Value of new residential and commercial land created on inland site"	++ \$3,528,004,477	The project provides opportunity for greater than 5000 housing units at modest (27 DU/acre) density, and greater than 8 million square feet of commercial space. This would greatly appreciate the value of the site and surrounding communities, generating value that can be used by more vulnerable mainland communities to bolster flooding defenses.	4

	Mobility / Transportation		++ 71,000 linear feet of new trails 3 new marinas and water taxi hubs 1 new aerial tram line	Mobility elements introduce a range of choices for accessing and navigating the many attractions in the Toms River-Berkeley area, other than the private automobile. New active transportation links and related enterprises, such as bike share, introduce the possibility of a “park-once” experience on the site. Transit options such as circulator vans already in operation, or a new aerial tram line, can extend this range by connecting visitors to waterborne transportation right to popular barrier island destinations, such as Seaside Heights and Island Beach State Park.	2

Step	Question	Describe
<p>Step 6 Robustness and flexibility</p> <p><i>Key question:</i> How future-proof is our project?</p>	<p>What are the key risks and uncertainties that may affect our project and how do these affect the scores in step 5?</p> <p>How well can the project be adapted in case any of the risks materialize? (e.g. through upscaling/ downscaling/ delaying/ speeding up)</p>	<p><i>What are possible changes in governmental / federal subsidies and how do these pose a risk to the project?</i></p> <p>The strength of this project is its potential to leverage private investment to offset investment and possibly operations and maintenance costs, provided the project’s various elements are phased properly. One key element of the project, mobility, would greatly benefit from a special subsidy currently offered by the Federal Highway Administration to water taxi services. These funds, given in the form of grants, could be used to kickstart local water transportation enterprises, or pay for common facilities that existing or new independent operators could utilize. If the subsidies are cut, the financial feasibility of implementing water taxi service would be greatly reduced, and auto dependency would likely increase.</p> <p>Another inherent risk is how flood insurance adjustments will be executed in the</p>

Step	Question	Describe
		<p>future. The feasibility of this project hinges on building in flood-vulnerable areas become more expensive, thus impelling households and developers to look for building opportunities elsewhere.</p> <p><i>How can the project adapt to this risk?</i> Local funding solutions for alternative transportation may need to be considered, i.e. creation of a dedicated trust fund for alternative transportation projects via dedicated tax or user fee, or general fund set-aside. Municipalities may need to explore instituting impact or user fees to pay for necessary infrastructure investments, or to recapture some of the welfare loss imposed on the municipality by an individual homeowner’s decision to build in a flood-vulnerable area.</p> <hr/> <p><i>What are possible changes in the fiscal situation for specific public stakeholders and how do these post a risk to the project?</i> As observed in the written description of the reference case, the biggest potential “disruptor” for various governmental units’ fiscal capacity is the net loss of ratables produced through the attrition of households. It is difficult to predict the exact tipping point for each municipality, because many factors are at play, from individual homeowners’ financial capacity to the financial integrity of the National Flood Insurance Program. It is reasonable to assume, however, that rising sea levels and increasing incidence of severe storms will result in progressively larger numbers of households deciding to “cash out.” Some municipalities will weather this by attracting wealthier, more risk-tolerant homeowners who clear older, flood-damaged or at-risk homes and build elevated larger homes; while others empty out. Either way, municipalities will experience a net loss of tax revenue precisely when their capital needs increase, which pose tremendous risks to the viability of any development in the flood-vulnerable areas. For Berkeley Township and Toms River Township, this risk is an important consideration, but can be offset due to scale economies.</p> <p><i>How can the project adapt to this risk?</i> The project exists precisely because of this risk. By identifying and preparing strategic development areas safe from the flood zones, “high-and-dry” local municipalities and county governments can help to recapture some of the</p>

Step	Question	Describe
		<p>households and economic activity that might be lost through SLR and storm-induced flooding. To compensate “sending” municipalities, local governments may wish to consider instituting single- or even multi-jurisdiction transfer of development rights (TDR) zones, which can help to safeguard economic value by concentrating development in safer locations and incentivizing the return of more vulnerable areas to natural conditions.</p> <p><i>How do climate change scenarios influence the project?</i> The core project site is safe from flooding under the maximum predicted value of sea level rise and storm surge in the future (18’), at least within the time horizon on which financial decisions can be made. Depending on the severity of sea level rise and storm events, demand for housing and land on sites such as this may increase over time, either gradually or suddenly. The pace of sea level rise may also accelerate the delivery horizon for some of the geotechnic work proposed herein, such as the creation of the Barnegat Bay island refuges, to further protect mainland communities and accommodate wetland habitat migration.</p> <p><i>How can the project be adapted with regard to climate change scenarios?</i> Development of the town center and adjacent residential districts should be phased to accommodate and capitalize on uncertainty in the housing market caused by climate change. Depending on the success of this approach, additional sites may need to be considered for “receiving” areas. On geotechnic work, the State may need to collaborate with the US Army Corps of Engineers to establish project funding and delivery strategies based on shared indicators.</p> <p><i>How do demographic and socio-economic trends influence the project?</i> Much of the housing construction boom on the barrier island occurred over the lifetime of the baby boom generation. With many of those households now seeking to downsize financial obligations and divest physical assets, and with many in the “echo boom” Millennial generation either financially unable to afford or otherwise disinterested in single-family housing products, it is unclear how much demand exists for those homes. Indeed, Millennials have shown greater interest in “sharing” housing arrangements, which could mean interesting new models of housing tenure</p>

Step	Question	Describe
		<p>and ownership for areas like the Jersey shore. These trends may align in favor of the project, which will be in a better position to respond to shifts in structural demand patterns than housing markets in built-out, vulnerable coastal communities.</p> <p><i>How can the project be adapted with regard to these scenarios?</i> Phasing of housing product delivery will bear directly on how well the project can adapt to demographic and socioeconomic trends.</p> <hr/> <p><i>How can developments in the real estate market influence the project?</i> Structural demand patterns shaped by the demographic/socioeconomic forces identified above will be major determinants of real estate market conditions in the future, as well as moment in time at which “tipping points” in household attrition occur on barrier island communities. Since many of the housing units at risk on the barrier island are second homes, housing tenure and ownership profile may thus be among the most influential factors in determining the quantity of demand for housing products in the project area, as well as the mix of housing products offered on the project site.</p> <p><i>How can the project be adapted with regard to these developments?</i> Phasing of housing product delivery will bear directly on how well the project can adapt to evolving real estate market trends and developments.</p> <hr/> <p><i>Describe any other risks and uncertainties and how the project can be adapted in order to cope with these risks.</i> N/A</p>
<p>Step 7 - Implementation</p> <p><i>Key question:</i></p>	<p>What are the implementation challenges and opportunities of our project?</p>	<p><i>What are the technical risks?</i></p> <ul style="list-style-type: none"> - Habitat land bridge cost (impacts habitat/ecosystem connectivity and mobility elements) - Aerial tram costs and supporting infrastructure robustness for changing conditions (mobility element) - Marina adaptability to storm surge under uncertain sea level rise future (mobility element)

Step	Question	Describe
<p><i>How difficult is the implementation of our project?</i></p>		<p><i>What are procedural (legal) and process (political, societal) risks?</i></p> <ul style="list-style-type: none"> - <u>Regulatory approval</u> – Approval from a number of state and local entities are required for the project to advance. This may involve securing offsets or additional development rights from elsewhere in order to accommodate additional development and increased density in the project area. - <u>Partnerships and funding</u> – A considerable public-private partnership will have to be assembled involving a complex array of actors and precise sequencing of efforts. This will be challenging to orchestrate and manage.
		<p><i>What are synergies / conflicts with ongoing, planned national/regional developments?</i></p> <p>The project integrally complements many of the intermediate- and long-term planning initiatives of local stakeholders, especially Ocean County and Berkeley Township. Care must be taken to align project goals and phasing with Toms River’s pursuit of economic development in the NJ 37 corridor, as this project and the area as a whole can benefit from increased economic diversification and activity. It potentially conflicts with shorter-term planning initiatives by many of the same actors to finance rebuilding of flood-vulnerable areas.</p>
		<p><i>Are there any political and stakeholder issues?</i></p> <p>Negotiating New Jersey’s tradition of home rule while keeping State and County partners engaged will be critical to the success of this project. All levels of governmental stakeholders consulted in this phase are interested in and enthusiastic about the proposition. Community organization capacity in the area is relatively limited; considerable time and energy should be invested in extensive outreach to ensure adequate engagement and inclusion of civil society in the planning process.</p> <p>Additional stakeholder issues to watch include support for the project in the Governor’s office, the success of regional planning efforts currently under way in</p>

Step	Question	Describe
		Monmouth County, and maintaining an open and forthright dialogue with NJ Pulverizing.

REBUILD BY DESIGN

HEADLANDS – ASBURY PARK, NJ
BENEFIT-COST ANALYSIS
FINAL – March 25,2014

Step	Question	Describe
<p>Step 1 - Problem Analysis</p> <p><i>Key Question:</i></p> <p><i>What is the problem we are trying to solve in our project?</i></p>	<p>What are the existing flood risks (e.g. coastal flooding, fluvial/pluvial flooding, groundwater flooding) in your area (hazard, vulnerability, probability)?</p>	<p>The Asbury Park area has considerable risk exposure to various forms of flooding.</p> <p><i>Flood Hazards</i></p> <ul style="list-style-type: none"> - Storm Surge Flooding, waste treatment facility flooding, coastal lake perimeters - Waterfront tourism industry impacts - 1,730 properties in Asbury Park would be inundated in a 500-year flood under 31” of sea level rise (estimated for 2050) - 21% of current residents and 28% of housing units are within the 2050 500-year flood hazard zone <p><i>Vulnerability</i></p> <ul style="list-style-type: none"> - 29% of land area of Asbury Park with a present value of \$444,300 and 2% of the population is vulnerable to a 100-year flood today - 51% of land area of Asbury Park with a present value of \$41,848,300 and 21% of the population is vulnerable to a 500-year flood with 31” of SLR <p><i>Probability</i></p> <ul style="list-style-type: none"> - Minor Sea level rise risk - Expected annualized loss for Asbury Park for 1% annual flood probability (100-year flood) under 31” of SLR is \$988,664 - Expected annualized losses for Asbury Park with 0.2% annual flood probability (500-year flood) under 31” of SLR is \$1,030,512
	<p>What are the existing social conditions (e.g., lack of housing, mobility) in your area?</p>	<p>Some issues arising from the social profile of Asbury Park include:</p> <p><i>Wealth gap</i> – a significant socioeconomic stress, the separation of large low and moderate income populations have concentrated affordable housing and low-income residents to the west of the North Jersey Coast Line rail – 30% of population living below the poverty level.</p> <p><i>Increasing crime</i> – lack of funds for policing at the municipal level which discourages redevelopment and successful revitalization in downtown and proximate to railroad</p> <p><i>Population diversity</i> - The minority population accounts for 63.5% of the total city population with over 50% of the total population identifying as African American or Black. Asbury Park also maintains a high level of minority run businesses within</p>

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		<p>the city – 33% are owned by minorities and 25% are women-owned businesses. <i>Homeownership rates</i> – Lower than the state average, mostly attributed to affordability. The average income of a shore tourist is \$99,000; the average per capita income of a shore resident is \$39,000.</p>
	<p>What are the environmental conditions in your area?</p>	<p>Asbury Park contains a surprising range of habitats, including sandy beaches and inland lakes. Some issues arising from the area’s environmental conditions include: <i>Lakes and beaches lack ecological health</i> – characterized by hard edge conditions around lake perimeter which minimizes healthy vegetative growth and decreases vital habitats for aquatic life <i>Storm water management</i> - 45% of total land area is covered with impervious surfaces. The east side of the city closest to the beach is characterized by wide streets and vast parking lots to serve summer swell populations, which produces revenues during the summer and reaches capacity but are unsightly and do not absorb potential flooding from rain events or storm surge as seen during Hurricane Sandy. <i>Contamination near/in Deal Lake</i> – although the site of the landfill has been successfully capped and is monitored as per the regulations through the Superfund and CERCLA, contamination into the lake is still a concern both from ground water contamination from the landfill and from debris within lakes from Sandy and regular storm events</p>
	<p>What are the existing values of the community? How is spatial quality defined? What are the trends in spatial development (rising demand for housing or agriculture; urbanization)?</p>	<p>Asbury Park is a relatively high-density suburban community composed of a mix of older single-family homes, a range of multi-family residential buildings, and with a mix of traditional main street retail and boardwalk-oriented retail. Spatial analysis and stakeholder and public engagement yielded the following key areas of concern with respect to physical value and spatial quality: <i>Population growth</i> - Growing young population/small business concentration on the east side of Asbury Park is beginning to gain traction with county and state organizations as an arts destination <i>Diversified business activity</i>- There is a higher than average participation of minority owned businesses (33.3%) and women owned businesses (24%), and the development of a second cultural and arts boom centered around localness <i>Seasonality</i> – The town features a year round, vibrant downtown core that acts as a corridor towards the more seasonal boardwalk and beach Seasonal and year round</p>

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		<p>population balance is a unique quality that increases the community’s attractiveness for development and potential home buyers.</p> <p><i>Elevation</i> - High elevation above ocean vs. other coastal communities, promoting Asbury as a resilient and attractive place to live or to visit year after year</p>
<p>Step 2 - Project Definition</p> <p><i>Key Question:</i></p> <p><i>What is our project about?</i></p>	<p>What are the key objectives?</p>	<p>Our key objectives in Asbury Park are:</p> <ul style="list-style-type: none"> - Reduce storm surge and flood risk to residential and commercial inhabitants closest to the waterfront through the retrofit of existing boardwalks and creation of new boardwalks that aid in natural dune creation - Better protect against storm surge with continuous dunes that are low maintenance and self-formed by the boardwalk structure - Position the boardwalk and dune system to protect the waste water treatment facility and waterfront tourism businesses - Spur redevelopment of key undeveloped sites along and behind the boardwalk through creation of a new protective and recreation amenity - Return the lakes to a healthy ecological state by softening the edges and encouraging renewed interest in recreational activities on the lakes. - Address and reduce watershed flooding through healthier coastal lakes and green streets
	<p>What are the geographical boundaries?</p>	<p>Our project in Asbury Park is centered on the beach and inland lakes, and is specifically defined by:</p> <ul style="list-style-type: none"> - Wesley lake, Deal Lake, the ocean, and the western boundary of Asbury Park - Also includes consideration of neighboring towns like Loch Arbor, Ocean Grove, Neptune Township and the seven municipalities surrounding Deal Lake and under the auspice of the Deal Lake Commission
	<p>What is the design philosophy?</p>	<p>The Headlands are the most exposed portion of the Jersey shore. The boardwalk is an ever present cultural icon – yet it does little for coastal ecology and remains vulnerable to storm surge. The Sasaki team proposes an innovative boardwalk</p>

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		<p>design in pilot community Asbury Park that couples the protective nature of dunes with the cultural attraction of the boardwalk. Segments of the Asbury Park boardwalk will be completely redesigned while others retrofitted. A new boardwalk form and topographic section provides armatures to capture sand and form dunes, creates protection from storm surge, establishes habitat zones for beach wildlife, and attracts visitors. On the flood-prone edge of the area's coastal lakes, new riparian landscapes provide more room for flood absorption and protection, while redesigned streets capture and treat storm water.</p>
	<p>What are the main components of the plan? How do the components interact (synergies, reinforcement, conflicting etc.)?</p>	<p><i>Our main components:</i></p> <ul style="list-style-type: none"> - Asbury Park is on average 13' higher in elevation than most towns on the northern Jersey Shore. Asbury's beach naturally captures sand due to a combination of prevailing winds and tidal flow, making it an ideal location for investment - Due to recent reconstruction of Asbury Park's boardwalk, the segment of boardwalk between the convention center and casino will be retrofitted. The segment of boardwalk north of the convention center and south of the casino will be redesigned to include more experimental dune/habitat creation strategies - The northern boardwalk redesign will protect the wastewater treatment facility and integrate a new park - Asbury Park's beach varies in width. In constrained sections, Sasaki will consider a "compressed dune" typology - A compressed dune typology includes a sacrificial forming dune, tidal pool, and primary dune - The boardwalk will be combined with a sculptural dune fence (aligned with prevailing winds) to capture sand and facilitate dune growth - Dredging the lake increases the water holding capacity of the lake and supports a variety of activities on the lake. - The lake edge will be reconstructed with soft infrastructure and native vegetation to increase habitat for migratory birds, aquatic inhabitants and native species. - Docks and boat launches will be installed to increase accessibility and recreational amenity uses.

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		<ul style="list-style-type: none"> - Storm-absorbent streets will connect neighborhoods divided by income and race, creating a unified sense of place from the beach inland. <p><i>Interaction of our main components:</i></p> <ul style="list-style-type: none"> - The “layered approach” incorporates three edge typologies to increase permeability and resiliency - The timeline is elastic which enables all of the projects to begin simultaneously or one to follow another. Of highest priority for resilience, the boardwalk dune structure would want to take place first.
	<p>What is the development of the project in 5 years, in 20 years and in 50 years from now?</p>	<p><i>5 Years</i> - Acquisition and approval of all necessary permits prior to design completion and construction. Dune creation and boardwalk construction. Private investment spurred in open development sites behind the boardwalk, implementing resilient strategies for development and encouraging mixed-income mixed-use apartments.</p> <p><i>20 Years</i> - Dune maintenance and sand replenishment/ Water treatment facility renovation or potential relocation / elimination</p> <p><i>50 Years</i> - Dune maintenance and sand replenishment/ boardwalk reconstruction/ sewer line replacement (100 years old in 2012)</p>
<p>Step 3 - Reference situation</p> <p><i>Key Question:</i></p> <p><i>What will happen without our project?</i></p>	<p>What realistically would happen now, in 5 years, in 20 and in 50 years if this specific project would not be implemented?</p> <p>What would individuals, communities, (local/federal) governments do? Is “do-nothing and nothing changes” a realistic development?</p>	<p>The reference scenario assumes a business-as-usual extrapolation of current policy measures and trends, which become less tenable in the near future. Given resource and time constraints, and taking into account the many complexities involved in determining “tipping points” at multiple scales to parameterize a useful quantitative model, the Sasaki team opted to develop a qualitative logic model of probable events to illustrate the reference case. The reference scenario for Asbury Park follows.</p> <p><i>In 5 years</i>, Asbury Park continues to execute existing plans for resiliency developed by the town, state of New Jersey, and federal government (USACE). Currently, the city is partnering with the Army Corps to rebuild its boardwalk north of the casino. There are no plans for dune creation, but there will be normal maintenance of the existing bulkheads and sea walls along the shoreline. The first two blocks from the boardwalk are predominately vacant parcels for summer parking. Beach replenishment will continue based on the nourishment standards set by the Army</p>

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<p><i>See Appendix I for further guidance.</i></p>		<p>corps. Asbury Park encourages redevelopment along the east side of the city as the population increases from migration into the city. The wealth gap between two sides of town also increases and through a crowding out scenario both gentrifies the east and west sides of Asbury Park and pushes the minority populations into neighboring, more affordable towns. Revenues from the recreational monoculture continue to benefit the city, but do not add additional revenue streams without investment along the lake and within the downtown center. With the increase in population especially among young professionals and the <i>creative class</i>, new development of mixed use high-end residential begins construction along vacant beachfront parcels.</p> <p><i>In 20 years</i>, if hurricanes or severe storm events intensify, one or more storms will likely strike the new development parcels and demolition and rebuilding will be needed along first 2 to 3 blocks. The rebuilding of boardwalk and beach replenishment will continue and increased strain on aging sewers could cause various collapse points around city. The lack of ecological health along beach and lake persists and the beach recreational monoculture starts to deteriorate, taking with it valuable tourism dollars. Redevelopment after a storm along the waterfront stagnates without renewed boardwalk development interest and unsustainable construction practices or protective measures along beach.</p> <p><i>In 50 years</i>, if hurricanes or severe storms intensify along with a 31-inch rise in sea levels, the water will continue to breach next few blocks, potentially damaging the wastewater treatment facility as well as any new development that occurs within CAFRA extents.</p> <p>Estimated flood damages to the current landscape are as follows:</p> <ul style="list-style-type: none"> - 100 year storm event – \$444,300,000 (195 Acres) - 500 year storm event - \$16,352,600 (223 Acres) <p>Current projects/costs underway include:</p> <ul style="list-style-type: none"> - Constructed boardwalk \$10,000,000

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<p>Step 4 - Identify Stakeholders</p> <p><i>Key Question:</i></p> <p><i>Who are the key stakeholders relevant to our project?</i></p>	<p>Who are the key stakeholders in our area and what are their interests in our project?*</p> <p>(*The interests of the stakeholders may either be related to the positive or negative impacts (scores) of the project)</p>	<p><i>Municipalities:</i></p> <p><u>Asbury Park</u> – The city has renewed interest in small business development along the east west corridors and protection for its tourism industry. Other related interests for the city include population influxes that may generate gentrification in high-population minority neighborhoods. The city appears interested in growing the arts culture that is having a renaissance along the Jersey shore while also dealing with high rates of crime and poverty within city limits with little resources to alleviate those stresses. The city also seeks to protect the vulnerable wastewater treatment facility and realizes that its goals for resiliency coincide with the need to focus on its aging infrastructural systems.</p> <p><u>Loch Arbor</u> – A similar community to Asbury Park, the city has similar issues and is connected into the lake and boardwalk continuation from Asbury Park. This town has the resources to replicate the proposed layered approach for the headlands and further increase resilience for these two towns.</p> <p><i>County:</i></p> <p>Monmouth County Planning Board/Org (potential partner org) – interest in Asbury Park as a potential arts corridor partner; County emergency management, and economic development.</p> <p><i>PANYNJ:</i></p> <p><u>NJ Futures, Together North Jersey</u> – as a high-level planning organization, seeing development around transit centers is an encouraging sign for NJ Future. The organizations both are engaged in the replicability of Asbury Park as sea levels rise</p>

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		<p>and populations continue to need access to safe, affordable housing.</p> <p><u>Army Corps of Engineers (USACE)</u> – All shoreline improvements and beach nourishment projects are dependent on federal funding and USACE approval and involvement in the project, the USACE would greatly benefit from a self-sustaining beachfront pilot that could be replicated in various cities and beachfronts across the eastern seaboard.</p> <hr/> <p><i>State:</i></p> <p><u>New Jersey Department of Environmental Protection</u> - The new living shoreline aligns with NJDEP goals and will increase native vegetation to increase habitat for migratory birds, aquatic inhabitants and native animal species.</p> <p><u>New Jersey Department of State</u> - interests in decreasing cost to nourish beaches – the federal government covers 65% of the cost for beach nourishment while the state and local government split the remainder, a ratio that could increase in the future.</p> <hr/> <p><i>NGO:</i></p> <p><u>Deal Lake Commission</u> - critical partner for implementation of coastal lake improvements and regional coordination. In their management and visioning role for Deal Lake, the Commission brings together members from each of the seven communities that contain a portion of the lake. The DLC and Surfrider, along with many other advocacy groups and municipal governments. Has direct interest in improving the ecological and cultural influence and health of Deal Lake and the surrounding communities while also acting as a networking body for collaboration.</p> <p><u>Asbury Park's Environmental and Shade Tree Commission</u> – partner organization for the resilience network, has been instrumental in coastal lake remediation and will continue to be a major part of the process with the remediation of Deal Lake and other replicable coastal lakes.</p> <p><u>Jersey Shore chapter of the Surfrider Foundation</u> - partner organization within the resiliency network representing the Headlands region. The Foundation is committed to the conservation of ecological coastal conditions and protection of public access to beaches through public awareness, new development ideas could conflict with the foundation's interests in and goals for beach access.</p>

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		<p><i>Private sector:</i> <u>Madison Marquette</u> – real estate developer with over 500,000 square feet of residential and retail properties. The developer has significant interests in continuing to redevelop the vacant and underutilized properties along the boardwalk and serves as an anchoring business in Asbury. <u>iStar</u> – a major commercial real estate investor focused on Asbury Park for its first residential venture. The company is interested in development prospects along the east side of Asbury Park. <u>Local and minority owned business owners</u>– The businesses are concerned about potential damage from over-development and commercialization of the Third Street corridor through improvements in project. Major benefits to the walkability and storefront visibility along the Third street corridor and other east-west commercial corridors. Could benefit from an organized business district development group.</p>

<p>Step 5 - Project Scoring</p> <p><i>Key Question:</i></p> <p><i>What are the positive and negative effects of our project, as</i></p>	<p>Score the effect of your project on the basis of the criteria list:</p> <ol style="list-style-type: none"> <u>Monetize</u> <i>life-cycle costs</i> and the effect on <i>flood protection</i>, to the extent you can. <u>Quantify</u> all effects with the most advanced quantitative information possible, to the extent you can. In case no quantitative information is available, use a semi-quantitative scale, such as: <ul style="list-style-type: none"> -- Expected strong negative impact - Expected negative impact 0 Neutral + Expected positive impact
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<i>compared to the reference situation?</i>		++ Expected strong positive impact ? Impact unknown / cannot be assessed Notes on scoring: <ul style="list-style-type: none"> • Use expert judgments to score. • Scoring of the project is relative to the reference situation (see step 3). • Use the criteria list in Appendix II to quantify the effects. • Provide a qualitative clarification for each score. • Identify required extra information needed for (improving) the judgment. 			
		3. <u>Qualitatively</u> describe the effects.			
		4. Assess the <u>certainty of the effect</u> on a scale from 1 (very certain) to 5 (very uncertain)			
Criteria List	Sub-criteria	Monetized effect	Quantitative assessment	Qualitative description	Uncertainty
Life cycle costs	Investment costs (including preparation and project management)	<i>Boardwalk retrofit/construction (2014)</i> \$27.415 million <i>Dune construction (initial) (2014)</i> \$7.07 million <i>3rd Street bike lanes and swale</i> \$7.857 million <i>Deal Lake dredging</i> \$6.8 million <i>Deal Lake edge reconstruction + planting</i> \$773,632 TOTAL INVESTMENT COST: \$49.920 million	--	Investment cost estimates integrate dune and boardwalk construction costs, rather than accounting for them separately as past approaches have. Non-traditional design elements and public realm improvements contribute to slightly higher costs.	2
	Operation and maintenance cost	<i>Boardwalk retrofit/reconstruction</i> NPV \$12.585 million (25-year) <i>Dune Maintenance</i> NPV \$32,468 (25-year)	0/+	Operation and maintenance would be on par or less expensive in the evaluation period (25 years) than a second iteration of beach nourishment.	3
	Re-investment after	<i>Expected reinvestment period:</i>	0/+	Reinvestment in boardwalk (timber	3

	... years	25 years <i>Expected reinvestment magnitude:</i> \$13.228 million		replacement, structural retrofits) and probability of post-storm dune reconstruction expected within a 25 year time horizon. Reinvestment costs estimated to be 89% of present value of dune replenishment, a figure that will likely grow in magnitude and be required more frequently with sea level rise.	
	...				
Flood protection (coastal, pluvial, fluvial, groundwater)	Reduction of expected property damages due to flooding	<i>NPV of avoided damages:</i> \$9,433,978 <i>2014 avoided damages:</i> \$121,300 <i>2050 avoided damages:</i> \$1,030,512 ¹	++	Make a distinction between measures which reduce probabilities and which reduced consequences - (both would be reduced)	2
	Reduction of expected casualties due to flooding	<i>Persons/year</i>	0	Same. No expected casualties in either scenario.	2
	<i>Add other effects</i>				
Environmental value	Ecosystem and biodiversity effects	\$641,681 in annualized ecosystem benefits provided by healthy dunescape \$32,154 in annualized ecosystem services benefits provided by restored lake edges ²	++ 13.5 acres of restored and planted dunes 8.5 acres of restored, planted lake edge buffer 26,314 linear feet of new habitat area	Dune system will create habitat patches and enhance biodiversity, transforming the “dead beach” character of today’s shore ecology Without protection, the water treatment facility shut downs and sewer backups would create a human and environmental health problems. Lake edge landscaping provides additional absorptive capacity for floodwaters, and	3

¹ Represented as pure assessed value of parcels; market and economic output valuation not included, nor expected increase in value of land from development

² Figures derived from estimates provided in NJDEP *Valuing New Jersey’s Natural Capital* (2007)

				protects adjacent neighborhoods.	
	Energy efficiency		+	Retrofitting the water treatment plant would increase efficiency.	2
	Ambient (urban) environment / spatial quality		++	Integrated dune/boardwalk system will allow protection of waterfront development without impeding views by better integrating the dunes with the boardwalk system and with development as well.	2
	Noise levels		0	Noise quality would not see major change between reference situation and project.	1
	Greenhouse gas emissions		0	No expected major change; TOD effects possible.	2
	Air quality		0	Potential TOD impacts, but secondary effects.	2
	<i>Add other effects</i>				
Social value	Identity & Social cohesion		++	Custom boardwalk experience improves public realm experience. Increased positive spillover effects of resilient projects on development investments. Lakes and streets improve westside connection to the beachfront.	2
	Crime and vandalism		0/+	Indirect benefit of renewed development interest – property tax increase would increase city budget for services like police.	2
	Affordable housing		0	Indirect impact - Could increase property values which will immediately benefit homeowners, but will increase rental rates which will drive down affordability (substitution effect).	2

	Recreational value for inhabitants		++ 3,153 <i>linear feet</i> of new boardwalk 23,161 <i>linear feet</i> of new bike trails	Boardwalk and bike lanes provide additional opportunities for physical activity and active modes of transportation. Landscaped lake edge provides new aquatic recreation opportunities.	1
	Cultural, historic, archaeological sites and landscapes		++	Protects the historic and cultural tourism elements giving identity to Asbury Park: the Paramount Theater and Convention Hall, Casino and Palace Amusement Centers, Wonderbar, Stone Pony, and the 60s-vintage Howard Johnson Hotel. Gives incentive for ongoing reinvestment in these historic sites.	1
	Human capital and education		0		
	<i>Add other effects</i>				
Economic value	Direct effects on local or regional economy (e.g. tourism, agriculture/fishery, logistics, energy)		++	Protects immediate waterfront tourism industry and property owners currently at flood/storm surge risk.	2
	Synergies or spin-off effects to other sectors' revenues (e.g. transportation)		+	Construction industry developments and small business permitting/types increases Potential to incentivize redevelopment of key vacant sites within the vulnerable 2 blocks inland from the waterfront	1
	Economic		+	Protects and grows waterfront	2

	competitiveness (through specialization; agglomeration)			tourism with dunes and unique public space investment As a higher and dryer area along the Shore, it positions Asbury to be a “receiving” community for possible retreat communities in much more vulnerable Shore areas.	
	Local / regional employment			Initial investment boom – maintenance might not be as profitable for construction	3
	Local / regional employment in construction				
	Value of property other than through enhanced flood protection			Property values would see a stable market as opposed to reference future with protection. Asbury Park is a growing market so values may increase independently of this project.	4
	Mobility / Transportation			No change in mobility structure	2
	<i>Substitution effect</i>		--	Could contribute to burgeoning gentrification and cost out low income households	4

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Step 6 Robustness and	What are the key risks and uncertainties that may affect our project and how do	<p><i>What are possible changes in governmental / federal subsidies and how do these post a risk to the project?</i></p> <p>The multifaceted benefits of the project, encompassing shore protection, economic development, and watershed management, mean it is well-positioned to compete for several alternative sources of funding.</p>

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<p>flexibility</p> <p><i>Key question:</i></p> <p><i>How future-proof is our project?</i></p>	<p>these affect the scores in step 5?</p> <p>How well can the project be adapted in case any of the risks materialize? (e.g. through upscaling/ downscaling/ delaying/ speeding up)</p>	<p>Also the speculative increase in reliance on local funds for beach nourishment (project cost becomes unreachable for town) could mean the end to the project or value engineering which might compromise the “layered approach” and reduce the projects resiliency benefits and ecological and water management benefits.</p> <p><i>How can the project adapt to this risk?</i></p> <p>Based on historic federal decisions surrounding share of costs related to beach nourishment, it is unlikely that within the next 50 years reliance on local funds for beach nourishment will change. However, if it does change, the benefits for this innovative method of beach nourishment reduce continual need to replenish dunes due to sand migration. Also, the boardwalk design entails a seawall that protects against storm surge and flooding from a 500 year storm. While reliance on federal funds is important for the project to move forward – ultimately one of the many benefits of the project entail significant initial costs with minor maintenance or recurring costs.</p> <p>However, the multifaceted benefits of the project, encompassing shore protection, economic development, and watershed management, mean it is well-positioned to compete for several alternative sources of funding.</p>
		<p><i>What are possible changes in the fiscal situation for specific public stakeholders and how do these post a risk to the project?</i></p> <p>Project’s main element is entirely in the public realm, so a shifting fiscal situation could put projects on hold. Minor risks based on reliance on tourism industry.</p> <p><i>How can the project adapt to this risk?</i></p> <p>The project is flexible with respect to phasing, and joint ownership and investment models could be explored for several of its elements.</p>
		<p><i>How do climate change scenarios influence the project?</i></p> <p>Headlands communities are less affected by sea level rise than many of their peers along the Shore, so the regional plan for protection in Asbury Park is based on its future opportunity to be a receiving community and to have a safer, more future-</p>

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		<p>proof tourism industry as compared to Barrier Island locations. SLR will still affect the waterfront and inland areas around the lakes; without this project, development would be more vulnerable to storms.</p> <p><i>How can the project be adapted with regard to climate change scenarios?</i> Risk can be mitigated by scaling dune height or thickness with the pace of sea level rise and the cycle of extreme storm events, which the modular design of the boardwalk can accommodate. Additionally, uncertainty should be built into the zoning and land use codes governing development on parcels directly inland from the beach, as a safeguard against failure.</p> <hr/> <p><i>How do demographic and socio-economic trends influence the project?</i> Affordability will remain an issue and gentrification is a concern. The tourism industry provides important local seasonal and year round jobs that need to be protected.</p> <p><i>How can the project be adapted with regard to these scenarios?</i> If affordable housing becomes a more urgent policy priority for the community, future development could offer this although the community might need to incorporate requirements for mixed-income development strategies and employ low-income housing tax credits (LIHTC)</p> <hr/> <p><i>How can developments in the real estate market influence the project?</i> Similar to last the response – development would be a definite revenue generator for the real estate market and could unlock stagnant development parcels behind the boardwalk, however these projects will likely market themselves to a wealthier client and not address affordability. Commercial real estate development and increased leases could price minority owned business’ out of Asbury Park and further lead to gentrification and increase the wealth gap within the city limits.</p> <p><i>How can the project be adapted with regard to these developments?</i> Again, a similar strategy to the affordability issue, there would be significant benefits to encouraging or requiring any new development to meet certain ratios of</p>

Step	Question	Describe
		<p>affordability within residential real estate. The commercial real estate market could also incentivize continued and new minority or woman owned businesses to ensure that those businesses are not priced out of the community.</p> <p><i>Describe any other risks and uncertainties and how the project can be adapted in order to cope with these risks.</i></p> <p>Private property near Deal Lake is vulnerable to watershed flooding and negative externalities associated with the dredging and reconstruction of deal lake edges.</p>
<p>Step 7 - Implementation</p> <p><i>Key question:</i></p> <p><i>How difficult is the implementation of our project?</i></p>	<p>What are the implementation challenges and opportunities of our project?</p>	<p><i>What are the technical risks?</i></p> <ul style="list-style-type: none"> - Custom boardwalk will need to be tested for wind and surge resilience. - Coordination with existing tenants during construction required. One key parcel is held privately and is needed for the boardwalk/lake connection. <p><i>What are procedural (legal) and process (political, societal) risks?</i></p> <ul style="list-style-type: none"> - Easement issues with dune creation, especially for large developments. - Asbury land owners are supporting dunes more after Sandy. - Initial investment costs need community buy-in. - Local developers have been holding land post-Sandy, but not moving forward with proposals. Will this project provide the necessary impetus? <p><i>What are synergies / conflicts with ongoing, planned national/regional developments?</i></p> <ul style="list-style-type: none"> - Synergy with state funding (\$100 million) for boardwalk construction along shore - Synergy with Monmouth County TOD plans for Memorial Station, which could increase density inland in Asbury - Synergy with state investment in Shore tourism - Synergy is quite strong on a regional level, but does not identify crime problems which are becoming a state investment issue - Synergy with philosophy behind Army Corps investment in beach yet requires a change from existing replenishment practices to one that is more ecologically sensitive

Step	Question	Describe
		<p data-bbox="1094 289 1864 349">- Synergy with project locations for \$300 million fund for dune creation and replenishment along shore.</p> <p data-bbox="1045 386 1482 412"><i>Are there any political and stakeholder issues?</i></p> <p data-bbox="1045 418 1858 574">Local political divisions within City Council, and between the east and west sides of town; perception may be that investment is too focused on the beach, not the west side of the City where issues of affordability, income, and education are at most risk. Sensitivity in community about key North Beach development parcel, currently owned by iStar Financial.</p>

REBUILD BY DESIGN

INLAND BAY – KEANSBURG/UNION BEACH/HAZLET, NJ
BENEFIT-COST ANALYSIS
FINAL – March 25, 2014

Step	Question	Describe
<p>Step 1 - Problem Analysis</p> <p><i>Key Question:</i></p> <p><i>What is the problem we are trying to solve in our project?</i></p>	<p>What are the existing flood risks (e.g. coastal flooding, fluvial/pluvial flooding, groundwater flooding) in your area (hazard, vulnerability, probability)?</p>	<p>The Keansburg-Union Beach-Hazlet area has considerable risk exposure to various forms of flooding.</p> <p><i>Flood Hazards</i></p> <ul style="list-style-type: none"> - Normal rainfall flooding (bowl effect), storm surge flooding, water quality concerns - 7,901 properties in Keansburg-Union Beach-Hazlet would be inundated in a 500-year flood under 31” of sea level rise (estimated for 2050) - 57% of current residents and 59% of housing units are within the 2050 500-year flood hazard zone <p><i>Vulnerability</i></p> <ul style="list-style-type: none"> - 53% of land area of Keansburg-Union Beach-Hazlet with a present value of \$1.274 billion and 43% of the population is vulnerable to a 100-year flood today - 59% of land area of Keansburg-Union Beach-Hazlet with a present value of \$1.526 billion and 57% of the population is vulnerable to a 500-year flood with 31” of SLR <p><i>Probability</i></p> <ul style="list-style-type: none"> - Major sea level rise risk to properties - Expected annualized loss for Keansburg-Union Beach-Hazlet for 1% annual flood probability (100-year flood) under 31” of SLR is \$124.5 million - Expected annualized losses for Keansburg-Union Beach-Hazlet with 0.2% annual flood probability (500-year flood) under 31” of SLR is \$138.2 million
	<p>What are the existing social conditions (e.g., lack of housing, mobility) in your area?</p>	<p>The Keansburg-Union Beach-Hazlet area contains predominantly low- to lower middle-income communities, with very few of the touristic amenities associated with other shore communities. Some issues arising from the social profile of the Keansburg-Union Beach-Hazlet areas include:</p> <p><i>Disinvestment and lack of economic development</i> – High vacancy rates hobbled downtown Keansburg’s productivity prior to Hurricane Sand; now over 90% of commercial properties in Keansburg are vacant, leaving a tremendous gap in the</p>

Step	Question	Describe
		<p>availability of goods and services to residents. The socioeconomic profile of Keansburg-Union Beach combined with the towns' relative isolation from major transportation corridors and flooding risks make traditional economic development strategies less likely to succeed.</p> <p><i>High volume of low-income households</i> – Standard measures of housing affordability indicate that 56% of the community experiences financial stress from housing costs, spending 30% or more of their income.</p> <p><i>Higher risk exposure for low-income households</i> – Low-income households in Keansburg and Union Beach are at much higher risk of inundation during storm events; in the future, 63% of households in these communities facing risk of inundation in a future 500-year storm are at or below 80% of area median income.</p>
	<p>What are the environmental conditions in your area?</p>	<p>The Keansburg-Union Beach-Hazlet area contains a range of coastal and riverine habitats, including sandy beaches, salt marshes, freshwater wetlands, upland deciduous forest, and the signature manmade Natco Lake. Some issues arising from the area's environmental conditions include:</p> <p><i>Legacy industrial contamination</i> – Much of the Natco Lake area was used for industry in the past 150 years, ranging from brick production to fragrance and dye manufacturing. The current owner of these properties, International Flavors and Fragrances (IFF), is remediating a large site between Natco Lake and the Raritan Bay, between Keansburg and Union Beach.</p> <p><i>Salt water intrusion and water quality</i> – Storm events are already changing the salinity profile and ecological quality of wetlands in the vicinity of Natco Lake; this intersects with water contamination from upstream runoff in the watershed (52% of the total Natco Lake catchment area is impervious).</p> <p><i>Invasive vegetation and species threats</i> – A monoculture of invasive plant species, including phragmites, has colonized the edge of Natco Lake and is spreading to the larger wetland complex in the area, triggered by the changing salinity gradient.</p> <p><i>Periodic flooding threats</i> – Chronic flooding threatens the households and livelihoods of many in the vicinity of Natco Lake, owing to the topography of the community as well as infrastructure deficiencies (in Keansburg, the storm sewer outlet is below the sea level at high tide, trapping water on land).</p>

Step	Question	Describe
	<p>What are the existing values of the community? How is spatial quality defined? What are the trends in spatial development (rising demand for housing or agriculture; urbanization)?</p>	<p>The Keansburg-Union Beach-Hazlet area is a moderate-density, suburban complex of older single-family homes, with a mix of traditional main street retail and strip commercial abutting major arterial roads. Spatial analysis and stakeholder and public engagement yielded the following key areas of concern with respect to physical value and spatial quality:</p> <p><i>Community open space deficiency</i> – According to standard measures of open space per capita, the three communities have a deficit of 74 acres - only 5.5. acres of open space per 1,000 people.</p> <p><i>Regional trail access but few attractions or amenities</i> – The Henry Hudson Bike Trail is a major regional amenity that runs through Keansburg, Union Beach, and Natco Lake. At present, there are no attractions or even convenience-oriented places in the area for trail users to patronize.</p> <p><i>Views and potential access to New York City</i> – the Manhattan skyline is visible from Keansburg’s beach and pier, representing an opportunity for physical and visual connection with the City. Much of that value is currently blocked by the underperforming Keansburg Amusement Park, which is able to skirt paying taxes to the municipality.</p> <p><i>Strong community pride</i> – Despite the challenges, residents take great pride in their communities. The multigenerational character of households and families creates strong social bonds that are unique to shore communities.</p>
<p>Step 2 - Project Definition</p> <p><i>Key Question:</i></p> <p><i>What is our project about?</i></p>	<p>What are the key objectives?</p>	<p>Our key objectives in the Keansburg-Union Beach-Hazlet area are:</p> <ul style="list-style-type: none"> - Reduce localized flooding from heavy storm events and protect communities from storm surge risks through a combination of built and landscape interventions - Create a regional recreational amenity around Natco Lake and connect residents and visitors to it - Improve community quality of life and access to well-protected, affordable housing - Create a showcase setting for green industry integrated with recreational amenities - Address contaminants in water through natural cleansing systems

Step	Question	Describe
	What are the geographical boundaries?	Our project in the Keansburg-Union Beach-Hazlet area is centered on Natco Lake, its tributary watershed, and its surrounding communities: Keansburg to the east, Union Beach to the west, and Hazlet to the south. The site is bounded on the north by Raritan Bay, and is traversed by the Henry Hudson Regional Trail and NJ 36.
	What is the design philosophy?	The Inland Bay is the most complex region of the New Jersey shore, and its vulnerabilities render a singular solution impossible. The Sasaki team proposes to help bayside communities adapt to sea level rise and increasing frequency of severe storms. It accomplishes this through an innovative suite of ecological and recreational treatments to Natco Lake and its tributary creeks, dredging and cleaning these areas to expand the absorbent wetlands between Keansburg, Union Beach, and Hazlet and provide open space to residents and visitors alike. The result is a regional open space and flood protection system that creates value for communities. This approach should be pursued in tandem with single homeowner-scale efforts to build resilience, and regulations to mitigate exposure to flood risks.
	What are the main components of the plan? How do the components interact (synergies, reinforcement, conflicting etc.)?	<p><i>Our main components:</i></p> <ul style="list-style-type: none"> - Dredging of creeks draining to Natco Lake and Raritan Bay and creation of “habitat terraces,” coupled with removal of invasive, non-native plant species and replanting with a gradient of native species - Superlevee and additional flood gates protecting Union Beach from storm surge to future design levels - New, expanded marina integrated into flood control system for Keansburg, providing additional forms of access to regional amenities - Recreational fields and experiential trails network connecting adjacent communities and Henry Hudson Regional Trail - Industrial redevelopment and campus expansion for IFF facility - Mixed-use housing and retail developments <p><i>Interaction of our main components:</i></p> <ul style="list-style-type: none"> - <i>Integrating ecology, environmental mediation, and flood protection</i> – The design proposed for Natco provides more and higher-functioning wetland area, increasing the floodwater retention capacity of the watershed and

Step	Question	Describe
		<p>providing vectors for habitat migration as sea levels rise. Proposed wetland treatments and dredging complement environmental remediation activities at the former Natco brick facility, owned by IFF. Considerable public-private partnership potential exists for financing this stage of work.</p> <ul style="list-style-type: none"> - <i>Providing new opportunities for community development</i> – The proposed superlevee and marina-floodgate protect communities from flooding as well as provide area and amenities to which new housing and retail development can be oriented. - <i>Activating the bayshore with new recreation amenities</i> – The combination of new experiential trails, recreational fields, and marina/kayak launch greatly diversifies the recreational offerings in the area, appealing to residents, trail users, and adventure tourists alike.
	<p>What is the development of the project in 5 years, in 20 years and in 50 years from now?</p>	<p><i>5 Years</i> – Completion of design for Natco Park and surrounding ecological zones and advancement through CAFRA and other relevant state and municipal review. Partnership and funding agreement(s) negotiated and concluded between State and IFF on master plan elements, land acquisition and/or leasing schedule, and contamination remediation strategy. Completion of work on wetland dredging and re-planting in vicinity of Natco Lake.</p> <p><i>20 Years</i> – Completion of superlevee and marina, catalyzing associated housing and retail development. Transfer of ownership of contaminated land, enabling further remediation and development of the resilience center and recreational park. Completion of habitat terracing and migration corridors along creek system and Natco Lake edge.</p> <p><i>50 Years</i> – First round of maintenance work for Natco Lake and surrounding wetlands (including re-dredging).</p>

Step	Question	Describe
<p>Step 3 - Reference situation</p> <p><i>Key Question:</i></p> <p><i>What will happen without our project?</i></p> <p><i>See Appendix I for further guidance.</i></p>	<p>What realistically would happen now, in 5 years, in 20 and in 50 years if this specific project would not be implemented?</p> <p>What would individuals, communities, (local/federal) governments do? Is “do-nothing and nothing changes” a realistic development?</p>	<p>The reference scenario assumes a business-as-usual extrapolation of current policy measures and trends, which become less tenable in the near future. Given resource and time constraints, and taking into account the many complexities involved in determining “tipping points” at multiple scales to parameterize a useful quantitative model, the Sasaki team opted to develop a qualitative logic model of probable events to illustrate the reference case. The reference scenario for Keansburg-Union Beach-Hazlet follows.</p> <p><i>In 5 years</i>, IFF moves forward with capital plans without investments in enhanced flood protection. Keansburg completes its network of four drainage pumps, and Union Beach seeks funding to rehabilitate its modest floodgate, both protecting only to current flooding hazards. Keansburg and Union Beach secure Federal support to rebuild and/or expand dune systems to pre-storm levels. Property owners unable to rebuild after Hurricane Sandy seek to cash out. Unable to find buyers, owners sell properties at a loss to rental landlords or abandon them altogether, leaving them to be cared for by municipalities. Downtown Keansburg continues to stagnate, though the Keansburg Amusement Park recovers modestly to pre-Sandy levels.</p> <p><i>In 20 years</i>, if hurricanes or severe storm events intensify, one or more storms will likely impact the Keansburg-Union Beach-Hazlet area, with potentially greater impacts owing to a potential 1 foot increase in sea level rise. Catastrophic flooding prompts a large wave of weary property owners to sell out, reducing value of housing stock and leading to widespread abandonment of properties in Keansburg. Low-income households are faced with a drastic choice: stay in a vulnerable, low-service area or leave altogether. Many opt for the latter, leading to reductions in Federal subsidies to affected municipalities and contributing to a statewide crisis in affordable housing from displaced low-income households. Unable to finance or match Federal investments in new protective infrastructure or flood buyouts, Keansburg and Union Beach are faced with bankruptcy. Losses sustained by IFF prompt management and shareholders to seek a new site elsewhere, causing an inter-regional or inter-state bidding war to influence the company’s location decision.</p> <p><i>In 50 years</i>, if hurricanes or severe storms intensify along with a 31-inch rise in sea levels, significant flooding will have altered the human and ecological landscape.</p>

Step	Question	Describe
		<p>Heavy silting and sediment transport combined with scarcer financial resources result in further closure of marinas and maritime transport facilities along Raritan Bay. Bankrupt, Keansburg and Union Beach dissolve or otherwise transfer into state receivership. Faced with the alternatives of investing in heavy fortification or outright retreat, state officials opt for the latter, buying out and demolishing remaining houses and buildings. Squatters take over lands that do not revert to swamp, prompting continuous cycles of demolition and relocation. Ecology of the area will change dramatically into a salt marsh habitat, while freshwater wetland habitat will shrink.</p>
<p>Step 4 - Identify Stakeholders</p> <p><i>Key Question:</i></p> <p><i>Who are the key stakeholders relevant to our project?</i></p>	<p>Who are the key stakeholders in our area and what are their interests in our project?*</p> <p>(*The interests of the stakeholders may either be related to the positive or negative impacts (scores) of the project)</p>	<p><i>Communities:</i></p> <p>The Keansburg-Union Beach-Hazlet area encompasses 3 municipalities, containing several neighborhoods with distinct identities and varying levels of formal organization. These identities largely fall along class (income) lines, with some neighborhoods having higher rates of owner occupancy, and others having a higher proportion of renters. The fact that many of both tenure types are year-round residents aligns their interests in ensuring adequate flood protection, though obviously property owners have a higher perceived financial stake in ensuring adequate flood protection.</p> <p>Communities are also interested in and concerned by the lack of commercial activity and retail options, but there are divergent opinions as to why. Some believe that the prevalence of low-income households deters commercial activity, while others believe that newer and more attractive amenities exist elsewhere. The project seeks to balance these concerns in its proposed program elements.</p> <p><i>Municipalities:</i></p> <p><u>Keansburg and Union Beach</u> – Officials in both communities share interest and concern in maintaining ratables in their community, as well as growing the tax base to the greatest extent possible. More immediate concerns include achieving adequate flood protection and improving housing resilience from Hurricane Sandy flooding. Keansburg has been particularly engaged in the work of the Sasaki</p>

Step	Question	Describe
		<p>team, contributing insights and resources for public outreach.</p> <p><u>Hazlet</u> – Officials in Hazlet are concerned with mitigating flooding impacts, and are thus particularly interested in the viability and workability of proposals for Natco Lake. They are also interested in the recreational amenity and access to Raritan Bay provided by the plan.</p> <p><u>Bayshore Region</u> – entity established by the county that will play an important role in encouraging regional approaches to eco-tourism, open space connectivity, resiliency for the bay shore. Interested in promoting cooperation between municipalities on issues pertaining to resilience and recovery.</p> <p><i>County:</i> <u>Monmouth County Planning Board</u> – Limited authority to supersede municipal actions, but does shape behavior through administration of emergency management and economic development funds. Monmouth County is interested in promoting cooperation between municipalities where possible, and economic development officials are particularly keen to ensure that all projects in the county align with ongoing USACE projects and county transportation planning efforts.</p> <p><i>PANYNJ:</i> N/A</p> <p><i>State:</i> <u>New Jersey Department of Environmental Protection</u> – The DEP administers the contamination and remediation settlement with IFF, and thus will be a critical stakeholder in crafting the legal architecture of any partnership with IFF. DEP is interested in minimizing its liability for cleanup costs, which is the principal challenge of orchestrating a partnership with IFF, whose interest is the same and yet is currently bearing the regulatory burden. Through its other mission elements, DEP is also interested in protecting and enhancing places of recreational and ecological value, which along with revenue-generating offsets may incentivize movement on a deal with IFF.</p> <p><u>New Jersey Department of Travel and Tourism</u> – The DTT is interested in ensuring the survival and growth of the state’s tourism industry, which is largely focused on</p>

Step	Question	Describe
		<p>the shore. It sees ecotourism as a tremendous growth area, as well as intra-state, regional tourism, the scale of which is ideally suited for the Natco Lake area.</p> <p><i>NGO:</i> <u>American Littoral Society</u> – ALS is interested in the health of the state’s bay ecologies, including the Raritan Bay Estuary. It was active in pushing for the Henry Hudson Regional Trail, and advocates for expanding similar opportunities to experience the shore’s natural heritage. While Natco Lake isn’t specifically on the organization’s agenda, it has been very supportive of the Sasaki team’s efforts there. <u>Clean Ocean Action</u> – Clean Ocean Action is interested in reducing anthropogenic pollution of waterways emptying into the Atlantic Ocean. <u>NJ Futures/Together North Jersey</u> – These organizations are regional cooperatives and as such have broad goals, including increasing access to multimodal transportation and building resilient communities.</p> <p><i>Private sector:</i> <u>International Flavors and Fragrances (IFF)</u> – The principal private sector stakeholder, possibly the principal overall stakeholder. IFF is interested in keeping liabilities to a minimum, as the company is already required to remediate its holdings on the former Natco brick plant site. Nonetheless, IFF has been an engaged and open partner, and is deeply committed to sustainability principles. It created an internal committee to advise on the company’s interest in the project, an important demonstration of the degree of seriousness with which the company is considering the ideas produced by the Sasaki team. IFF is willing to divest itself of some land holdings if it can be of benefit to the community and as long as this does not impose additional liability on the firm. Additionally, the company is interested in expanding, integrating, and consolidating its operations and corporate functions on-site. <u>T&M Engineers</u> – Local engineering and planning firm which frequently contracts with the Army Corps and shore communities. As a major contributor to infrastructural projects, T&M is interested in securing additional contracting opportunities.</p>

Step 5 - Project Scoring

Key Question:

What are the positive and negative effects of our project, as compared to the reference situation?

Score the effect of your project on the basis of the criteria list:

1. Monetize life-cycle costs and the effect on *flood protection*, to the extent you can.
2. Quantify all effects with the most advanced quantitative information possible, to the extent you can. In case no quantitative information is available, use a semi-quantitative scale, such as:

--	Expected strong negative impact
-	Expected negative impact
0	Neutral
+	Expected positive impact
++	Expected strong positive impact
?	Impact unknown / cannot be assessed

Notes on scoring:

- Use expert judgments to score.
- Scoring of the project is relative to the reference situation (see step 3).
- Use the criteria list in Appendix II to quantify the effects.
- Provide a qualitative clarification for each score.
- Identify required extra information needed for (improving) the judgment.

3. Qualitatively describe the effects.
4. Assess the certainty of the effect on a scale from 1 (very certain) to 5 (very uncertain)

Criteria List	Sub-criteria	Monetized effect	Quantitative assessment	Qualitative description	Uncertainty
Life cycle costs	Investment costs	<i>Property Acquisition</i> \$5,795,600 <i>Creek Dredging</i> \$608,981 <i>Wetland Construction</i> \$4,762,420 (62 new acres) <i>Flood/Tide Gate (Union Beach)</i> \$1,375,000 <i>Super Levee</i> \$12,070,050 <i>Recreation park</i> \$13,800,000 (excluding cap and fill) <i>Resiliency Center</i> \$3,040,350 (12,000 sq ft center) TOTAL INVESTMENT COST: \$39,652,400	- <i>Property Acquisition</i> Commercial Property \$4,340,100 (Route 36) IFF property \$1,455,500 \$10,473,300 (cap-fill site) not included in investment calculations	Investment costs are relatively low considering the range of amenities provided. Additionally, with substantial opportunities for multi-sector partnerships leveraging a wide range of financing sources, the public costs of the envisioned investments can potentially be directly or indirectly offset. In some cases, major drivers of investment cost magnitude are offset by already planned public investments (such as in the drainage pump), or existing obligations (such as the cost of capping and filling contaminated soil).	4
	Operation and maintenance cost	<i>Recreation park and resilience center</i> NPV \$31,593,538 (50-year) <i>Wetlands maintenance</i> NPV \$23,469,800 (50-year) TOTAL O&M COST: \$55,063,334 (50-year)	-/0	Deflection and absorption of floodwaters into waterways and improved wetlands would reduce costs for communities like Keansburg where flooding is normal and repeatedly deteriorates infrastructural systems. Minor maintenance and operations expenditures are anticipated in recreation areas of the project, and to manage of phragmites infestation.	4
	Re-investment after	<i>Expected reinvestment period:</i> 50 years	-/0	Reinvestment is anticipated to be necessary 50 years following	4

	50 years	<i>Expected reinvestment magnitude:</i> \$18,834,890		completion of all project elements.	
Flood protection (coastal, pluvial, fluvial, groundwater)	Reduction of expected property damages due to flooding	<i>NPV of avoided damages:</i> \$1,238,575,487 <i>2014 avoided damages:</i> \$13,718,196 <i>2050 avoided damages:</i> \$138,162,096	++	Keansburg will continue to face a threat of flooding during heavy rainfall events, but the effects of this will be mitigated by investing in increased pumping station capacity, and existing and proposed measures will protect the community from storm surge and riverine flooding. Union Beach will face a reduced probability of flooding due to storm surge, though there is still a risk of catastrophic loss depending on the design strength of the flood gate and retention capacity of proposed wetlands.	3
	Reduction of expected casualties due to flooding		0/+	We expect a modest reduction in the risk of expected casualties due to flooding, especially if standard practice continues to be evacuating coastal areas during severe storm events.	3
Environmental value	Ecosystem and biodiversity effects	\$4,440,864 <i>in annualized ecosystem services provided by freshwater wetlands and marshes</i> \$1,009,979 <i>in annualized ecosystem services provided by saltwater wetlands and marshes</i>	++ 8 acres of bio remediation on contaminated site 218 acres of wetland – 62 constructed acres, 156 existing New/enhanced habitat: 143 acres of salt marsh habitat	Introduce native vegetation and marine invertebrates to maintain marine persistence and increase ecological diversity in brackish environments while incorporating habitat corridors along creek watersheds with both fresh water	1

			119 acres of lake zone habitats 272 acres of fresh marsh habitat	habitats and salt marsh habitats to accommodate habitat migration impacted by sea level rise.	
	Energy efficiency		0	Same. Not actively accounted for, but new development would not be expected to have a net negative impact on energy efficiency given its form and size.	3
	Ambient (urban) environment / spatial quality		+ 21,600 square feet of new retail within mixed use/ mixed income housing 29,169 linear feet of new trails (7.4 miles)	Provision of habitat for wildlife and much needed access for residents to open space makes Natco a regional amenity for the bashore and north Jersey. Development opportunities improve the spatial quality for residents and visitors alike	2
	Noise levels		0/+	New vegetation provides additional noise buffer between the major thruways and the communities	3
	Greenhouse gas emissions		0/+	Minor reduction in GHG emissions possible due to increased utilization of Henry Hudson Trail and active modes of transportation to access retail and shopping opportunities	2
	Air quality		0/+	Same	2
	<i>Add other effects</i>				
Social value	Identity & Social cohesion		+	Introduction of eco-tourism offers rebranding opportunities for communities otherwise overlooked by visitors.	1
	Crime and vandalism		0	Same. Project does not forecast any direct or indirect effects.	3
	Affordable housing		-/0	No likely effect, other than potential for increased property values which will immediately benefit	2

				homeowners, but could lead to increase in rental rates, decreasing affordability. Care must be taken to abate tax impacts for low-income households.	
	Recreational value for inhabitants		++ 39,000 linear feet of new trails 72.5 acre lake – accessible to boats 20 acres of added sports and recreational amenities	Provides recreation and ecotourism opportunities that are open to residents and tourists alike. New experiential trails connect the Henry Hudson regional trail into Natco Lake and surrounding communities, as well as provide more interface between humans and active coastal habitats; recreation fields provide needed park space to residents.	1
	Cultural, historic, archaeological sites and landscapes		+ 8 acres of bioremediation garden within ruins of Natco brick factory	Bioremediation of the contaminated IFF site through natural processes will highlight the history of industry along the Raritan Bay waterfront and pay homage to the brick industry specific to the Natco Lake area.	1
	Human capital and education		+	Environmental education and civic programs are envisioned for the site, both at the resiliency center (resource for preparedness for and shelter from severe storm events) and the bioremediation site (cleaning contaminated land).	2
Economic value	Direct effects on local or regional economy (e.g.		+	Reduction of losses from heavy storm flooding and storm surge will directly benefit residents and existing business owners. Amenities	3

	tourism, agriculture/fishery, logistics, energy)			attract retail development and visitors, though mostly from within the state, generating a modest multiplier for local economies.	
	Synergies or spin-off effects to other sectors' revenues (e.g. transportation)		+	Contamination clean up and re-introduction of marine invertebrates will increase viability of a fishing industry and improve ecological value for the Natco lake and surrounding watersheds.	3
	Economic competitiveness (through specialization; agglomeration)		0	Same. No net increase or decrease predicted for economic competitiveness through specialization or agglomeration effects.	2
	Local / regional employment		+	Mixed use component of master plan will incorporate retail employment opportunities for lower-income residents; tourism and recreation-oriented jobs for high school and youth. Possibility of new jobs created in "green industry" spillovers from IFF.	2
	Local / regional employment in construction		+	Project site would represent largest construction opportunity in the area in decades. Additional geotechnic work would provide opportunities for both manual and skilled workers.	2
	Value of property other than through enhanced flood protection	<i>Potential investment from new retail and residential development is estimated at approximately \$50,321,310 in value</i>	+	New amenities integrated into flood protection could attract new development, improving public cash flow to municipalities for additional resiliency measures	4

	Mobility / Transportation		++ 9,035 <i>linear feet</i> of new residential roadway 1215 <i>new parking</i> in IFF lots 39,169 <i>linear feet</i> of new trails (7.4 miles) 9,674 <i>linear feet</i> of new pier/boardwalk 1,123 <i>linear feet</i> of new bridge over Natco Lake along Route 36 (4 lanes) 10 micro-marina inlets 5 small craft boat launches 1 water taxi stop	Recreational mobility will increase substantially, connecting several communities into the Henry Hudson Trail, a regional recreational mobility asset.	2

Step	Question	Describe
<p>Step 6 Robustness and flexibility</p> <p><i>Key question:</i></p> <p><i>How future-proof is our project?</i></p>	<p>What are the key risks and uncertainties that may affect our project and how do these affect the scores in step 5?</p> <p>How well can the project be adapted in case any of the risks materialize? (e.g. through upscaling/ downscaling/ delaying/ speeding up)</p>	<p><i>What are possible changes in governmental / federal subsidies and how do these post a risk to the project?</i></p> <p>The strength of this project is its potential to leverage private investment to offset investment costs, which provide much-needed supplement to local communities' capacity to leverage Federal and State grants and subsidies. Potential private direct or in-kind investments are not expected to substitute for Federal and State funding, so the recreational and development programs envisioned by the Natco project are at considerable risk based on the economic and political environment.</p> <p>Once constructed, the park is anticipated to require low maintenance and reinvestment, and will potentially be able to pay for itself through the premium value returned through the property tax generated by new, protected development.</p>

Step	Question	Describe
		<p>Another inherent risk is how flood insurance adjustments will be executed in the future. The feasibility of this project hinges on building in flood-vulnerable areas become more expensive, thus impelling households and developers to look for building opportunities elsewhere.</p> <p><i>How can the project adapt to this risk?</i> Without State and Federal subsidies, some aspects of the development scheme – including the recreational fields and marina – may go on hold indefinitely, which would greatly reduce the expected increases in value to new development opportunities oriented to these amenities.</p> <hr/> <p><i>What are possible changes in the fiscal situation for specific public stakeholders and how do these pose a risk to the project?</i> As observed in the written description of the reference case, the biggest potential “disruptor” for various governmental units’ fiscal capacity is the net loss of ratables produced through the attrition of households. It is difficult to predict the exact tipping point for each municipality, because many factors are at play, from individual homeowners’ financial capacity to the financial integrity of the National Flood Insurance Program. It is reasonable to assume, however, that rising sea levels and increasing incidence of severe storms will result in progressively larger numbers of households deciding to “cash out,” especially in low-lying Keansburg and Union Beach. The socioeconomic profile and physical vulnerability of Keansburg and Union Beach lead us to expect that households leaving the two towns will not be replaced, thus leading to a gradual emptying out. As a result, the municipalities will experience a net loss of tax revenue precisely when their capital needs increase for investment in more robust flood protection structures. This poses tremendous risks to the viability of any development in the flood-vulnerable communities, creating a “wicked” feedback loop of negative effects.</p> <p><i>How can the project adapt to this risk?</i> The project responds directly to this risk by engineering development-generating value into the design, and resolving multiple issues (chronic flooding issues in the Keansburg “bowl,” for instance) in one form. Such value engineering approaches, rather than straightforward utilitarian infrastructure investments, will determine the</p>

Step	Question	Describe
		<p>future of resource-poor municipalities such as Keansburg.</p> <p><i>How do climate change scenarios influence the project?</i> The project site is highly vulnerable to flooding under most sea level rise scenarios, nearly as vulnerable as the barrier island communities. Depending on the pace with which sea level rise continues, and/or storm events escalate, the area’s “tipping point” with respect to households leaving for higher-and-drier communities may precede the pace with which the project’s vital elements can be developed, resulting in either a stopgap infrastructural investment without the value-enhancing features, or a lack of action entirely. Another critically important consideration is the decision calculus of IFF; if the company decides that the investment costs or risks posed by climate change exceed their capacity or willingness to stay on their current site, a critical pillar and investment catalyst will vanish from the project.</p> <p><i>How can the project be adapted with regard to climate change scenarios?</i> The best risk management strategy with regard to various scenarios of climate change is to move quickly in exploring, negotiating, and securing partnerships between the local, State, Federal, and private stakeholders identified above.</p> <p><i>How do demographic and socio-economic trends influence the project?</i> Housing affordability is a major issue for these communities, though largely because of socioeconomic class: the populations in the bay shore region tend to have significantly lower income to invest in rent or home maintenance than neighboring inland communities. This creates a non-Pareto risk distribution, with the populations least capable of bearing the financial costs of relocation exposed to the highest risks of flooding. As sea levels continue to increase, the wealth gap between protected inland communities and exposed waterfront communities will increase in response to household flight, reducing the ability of municipalities like Keansburg and Union Beach to make capital investments in infrastructure as long as the project’s construction is delayed. The loss of population, particularly low-income households, from these communities will place stress on communities elsewhere that have not met their <i>Mount Laurel</i> obligations in affordable housing.</p>

Step	Question	Describe
		<p><i>How can the project be adapted with regard to these scenarios?</i> The risks posed by these scenarios confront state and Federal officials with a moral and legal imperative to resolve the unequal distribution of risk between communities like Keansburg-Union Beach and its upland peers. Risks can be adapted by creating revenue-sharing agreements between these municipalities based on watershed dynamics, tapping into a pooled base of ratables to leverage state and Federal funds. Risks can also be offset by public agencies and departments weighing values to incentivize buy-in from private sector stakeholders, such as providing IFF with relief on some of its remediation obligations to offset transaction costs.</p> <p><i>How can developments in the real estate market influence the project?</i> New standards for building in floor-prone areas will be burdensome to existing homeowners, and it is unlikely that wealthier prospective homeowners will be looking for land in communities lacking key retail and recreational amenities. Real estate market developments and the project are thus in a constitutive relationship, whereby the project's protective value is driven by the value of the land it is protecting, whereas the value of the land it is protecting will be dependent on the degree of new amenity the project brings it. Without these amenities, Keansburg and Union Beach will not be able to attract the quality and volume of new development envisioned.</p> <p><i>How can the project be adapted with regard to these developments?</i> The additional value increment created by amenitized protection features could be recaptured through tax deferral or tax increment financing agreements with developers, or possibly through diversion of development impact fees or special taxes levied on upstream communities' development, if revenue-sharing becomes a reality.</p> <p><i>Describe any other risks and uncertainties and how the project can be adapted in order to cope with these risks.</i> N/A</p>
		<p><i>What are the technical risks?</i></p>

Step	Question	Describe
<p>Step 7 - Implementation</p> <p><i>Key question:</i></p> <p><i>How difficult is the implementation of our project?</i></p>	<p>What are the implementation challenges and opportunities of our project?</p>	<ul style="list-style-type: none"> - Specifying the appropriate trade-off between stormwater and surge absorbency and habitat (ecological) value - Design capacity of floodgate protecting creekside portions of Union Beach - Ability of re-established plants in habitat terraces to successfully migrate or out-compete invasive species depending on pace of sea level rise or increase in storm intensity
		<p><i>What are procedural (legal) and process (political, societal) risks?</i></p> <ul style="list-style-type: none"> - <u>Regulatory oversight and approval</u> – As documented in earlier sections, uncertainty over the willingness and ability of state agencies to provide regulatory relief or abatement of obligations will figure prominently in the viability of the vital partnership with IFF; uncertainty associated with the nature of the contamination of the Natco brick plant site could trigger additional legal and regulatory barriers. - <u>Municipal cooperation</u> – Successful completion of the project will undoubtedly require cooperation between municipalities, including potential revenue-sharing. This is a potentially highly polarizing proposition, and could easily run afoul of any number of political contingencies. Consensus building and community buy-in will be critical to sustaining this. - <u>Financial and legal disposition of IFF</u> – Significant risks exist in IFF’s interests with respect to their property, and could prove a barrier to the process depending on some of the factors described above. If IFF pulls out of the process, this may induce further partners to pull out, or potentially lose interest in structuring the necessary partnership to complete it.
		<p><i>What are synergies / conflicts with ongoing, planned national/regional developments?</i></p> <p>The project integrally complements the long-term planning initiatives of state, county, and local stakeholders. These include Monmouth County’s and Hazlet’s plans to revitalize the Natco Lake area, as well as Monmouth County’s Bayshore regional strategic plan, a prime aim of which is to increase the amount of connected open space along Raritan Bay. Potential conflicts exist in how investments are prioritized and what sacrifices are made by the proposed partners.</p>

Step	Question	Describe
		<p><i>Are there any political and stakeholder issues?</i></p> <p>Negotiating New Jersey’s tradition of home rule while keeping State and County partners engaged will be critical to the success of this project. All levels of governmental stakeholders consulted in this phase are interested in and enthusiastic about the project. Considerable time and energy will need to be invested in further outreach to ensure adequate engagement and inclusion of civil society and the public in the planning process. This is especially important given the socioeconomic vulnerabilities documented in the Keansburg-Union Beach-Hazlet area.</p> <p>Additional stakeholder issues to watch include support for the project in the Governor’s office, the success of regional planning efforts currently under way in Monmouth County, and maintaining an open and forthright dialogue with IFF.</p>