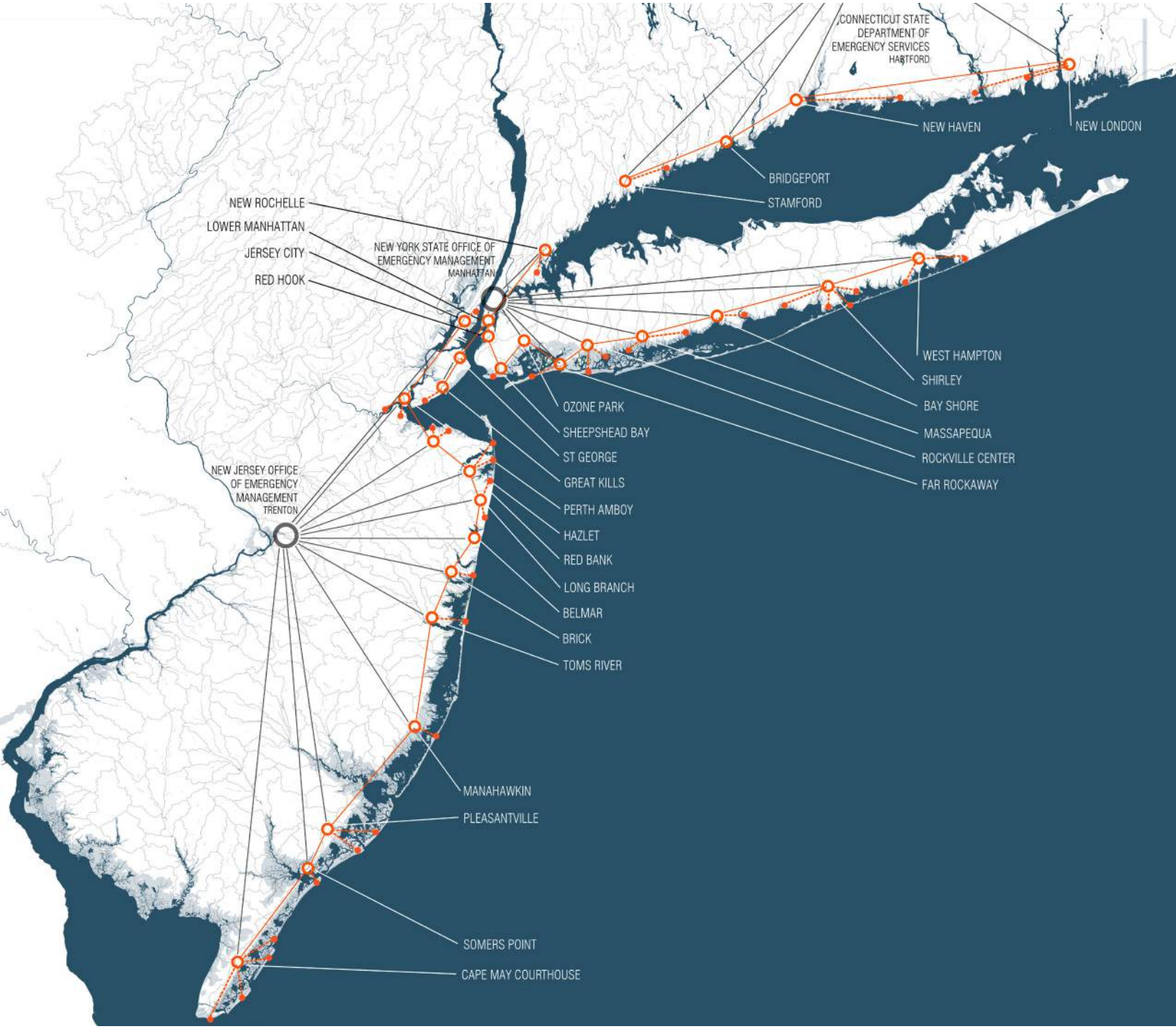

CONNECTICUT STATE DEPARTMENT OF EMERGENCY SERVICES HARTFORD
NEW HAVEN
NEW LONDON
BRIDGEPORT
STAMFORD
NEW ROCHELLE
LOWER MANHATTAN
JERSEY CITY
RED HOOK
NEW YORK STATE OFFICE OF EMERGENCY MANAGEMENT MANHATTAN
WEST HAMPTON
SHIRLEY
BAY SHORE
MASSAPEQUA
ROCKVILLE CENTER
FAR ROCKAWAY
OZONE PARK
SHEEPSHEAD BAY
ST GEORGE
GREAT KILLS
PERTH AMBOY
HAZLET
RED BANK
LONG BRANCH
BELMAR
BRICK
TOMS RIVER
NEW JERSEY OFFICE OF EMERGENCY MANAGEMENT TRENTON
MANAHAWKIN
PLEASANTVILLE
SOMERS POINT
CAPE MAY COURTHOUSE

There are places that are too valuable to abandon, even in the face of climate change. Such places hold our traditions and memories, our past enterprises and dreams for the future. Existing communities have tremendous value, and many of these are found in areas of newly heightened risk due to the changes in the environment, and years of human modification of the context. Places with strong potential for climate adaptation have demonstrated their value over generations of inhabitation, and are worth continued investment to make the people, structures, and systems more resilient.

Resiliency is not a fixed target, but a strategy with both technical solutions such as elevating structures or constructing structural defenses, and adaptive solutions to encourage new behavior. Adaptive resiliency changes human behavior as well as the physical environment. Our design team explored ways to reimagine coastal regions with continuing awareness of the consequences of our decisions about where and what to build in anticipation of increasing climate challenges.Our design opportunities are found at the intersection of Risk and Value, where people are in harm's way, but the existing community investment - in the history of occupation as well as economic capital - is great.

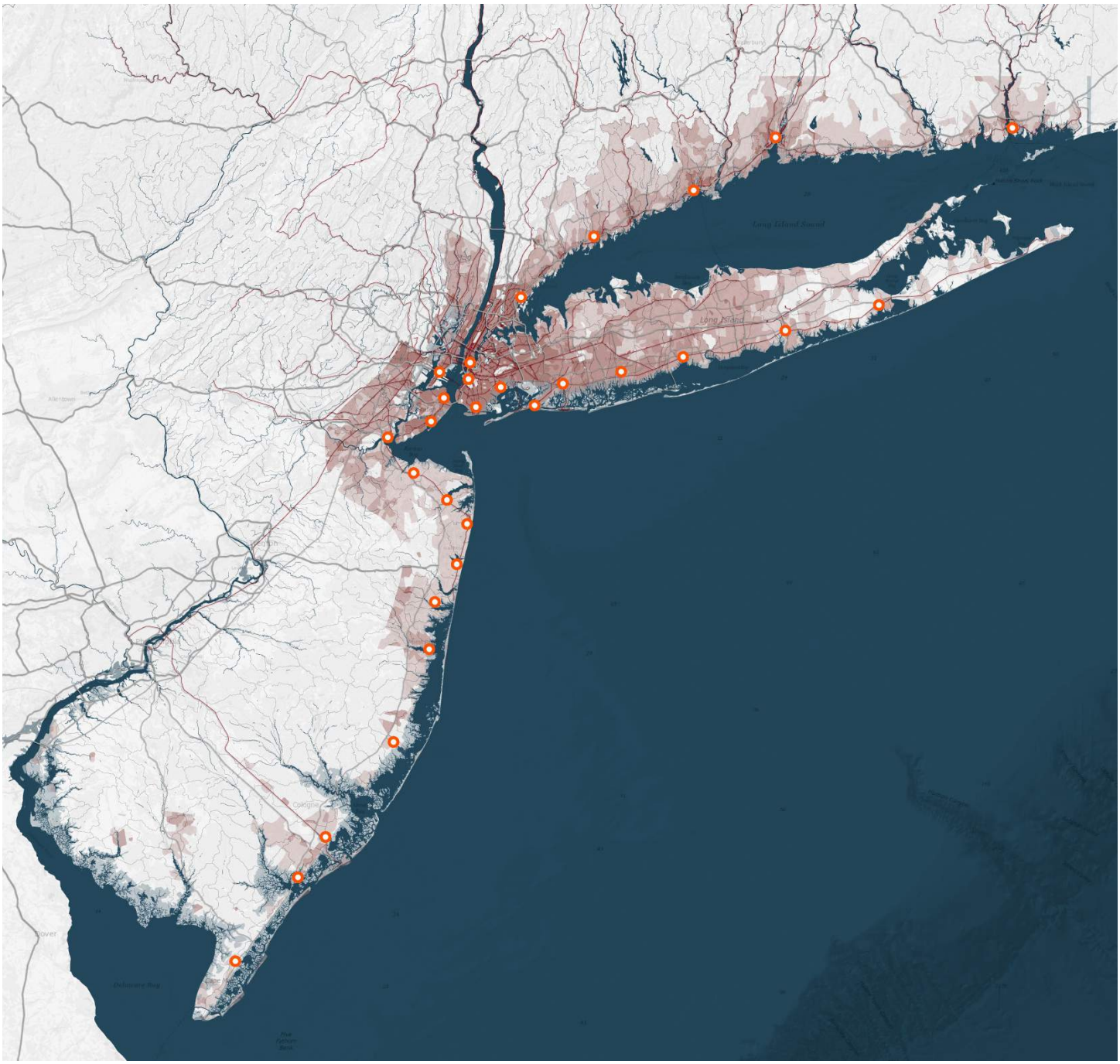
Beyond the baseline risks of every community such as fire and safety, there are elevated risks of flooding. The communities we explored have a new understanding of flooding on an everyday basis, as well as increased storm surge. These are water-centered environments, now subject to greater pressures from water rising. These are also among the most densely populated communities in the nation, which makes solving their problems ever more critical. As we explore these fields of inquiry, we find that each community has its own additional risks: environmental concerns, the evacuation of islands, and the stability of seasonal economies.

The natural unit of resiliency is the watershed. How water travels through a community has a direct effect on its safety and flooding during regular rainfall events, as well as in exceptional storms. Water near a site links people to the environment in tangible ways by promoting exploration of this vital resource. Coastal waterways focus environmental remediation at many of these sites by preventing hazardous materials from entering the waterway, or restoring tidal flow to impounded waterways. Improving impaired waterways at the coastal edges is a strategy for dealing with the front line of risk.

far rockaway

The criteria for choosing where to rebuild compared elevation, density, connectedness, populations at risk, and the adjacency of water. Examining the accelerating rate of change over the last century is instructive to compare previous patterns of development with more recent incursions into wetlands and lowlands. Elevation is necessary to accommodate the future sea level rise, anticipated to be a possible 6' higher by the end of this century, plus anticipated storm surge. Topographic maps indicate the first high ground +15' above sea level or higher, near bodies of water. It may seem contrary to place Resilience Centers adjacent to the very threat they are intended to mitigate, but the close connection ensures that residents do not lose sight of the challenges… and the reasons for settling these lands originally.

With the anticipation of significant sea level rise in the next 20 years, it is critical to transition people to safer ground.

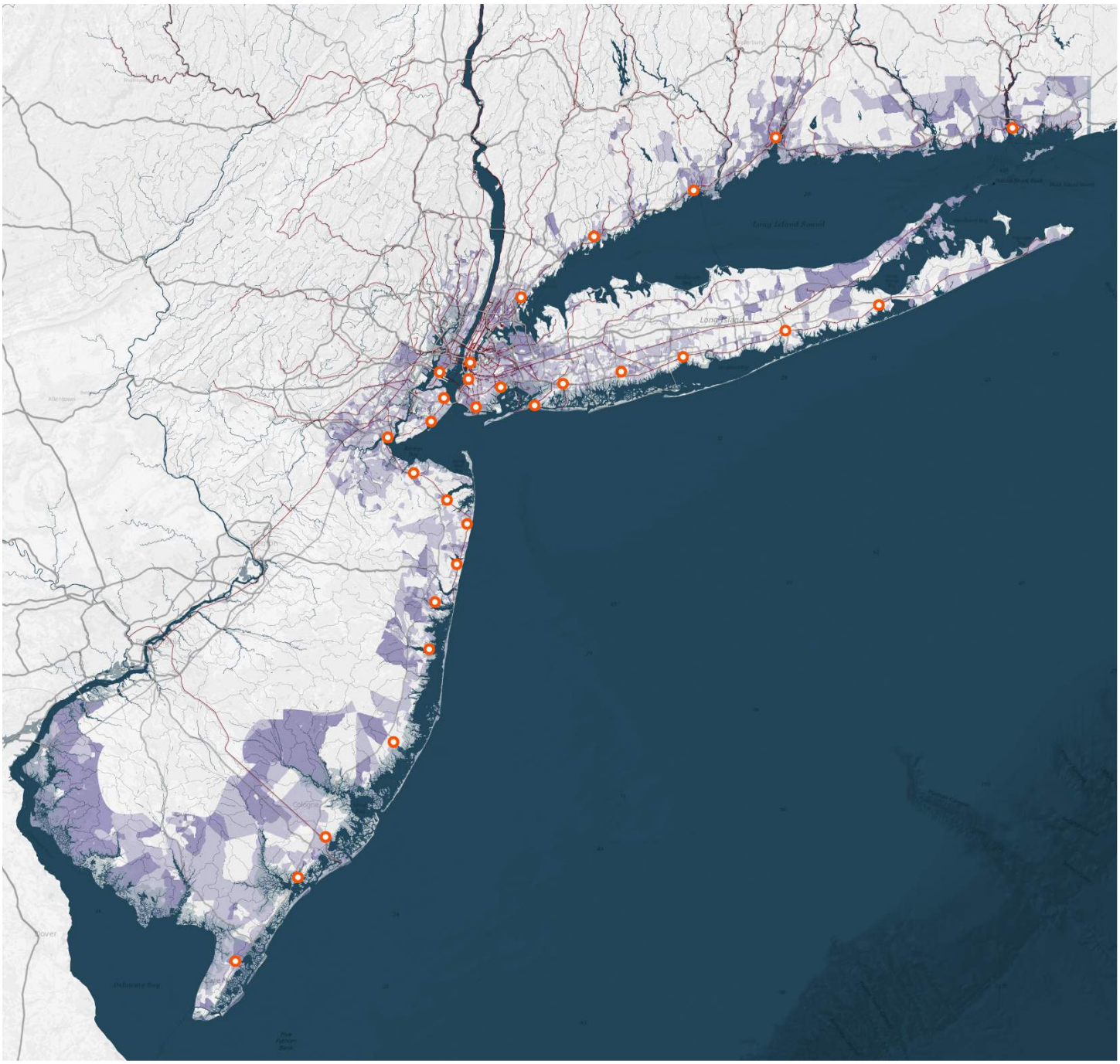


POPULATION DENSITY

Population density indicated the relative desirability of a location, the access to a diversity of housing types, community services, and commercial features nearby. New York City has the highest density in the country at 27,550 people per square mile, with the borough of Brooklyn contributing 36,356 people per square mile. In comparison, Asbury Park, NJ has 11,097 people per square mile, Bridgeport, CT has 8,721, and Red Bank, NJ has 7,019. Population density contributes to community value by creating vibrant mixed-use neighborhoods, supporting multiple transit options, and offering a range of housing types. People choose to live in areas for a variety of reasons including personal history, shorter commuting distances, and amenities within walking distance, all available with higher population density. (Source: 2000 U.S. Census SF3 Data.)

PEOPLE PER SQUARE MILE

- 251 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- 10,001 - 337,713

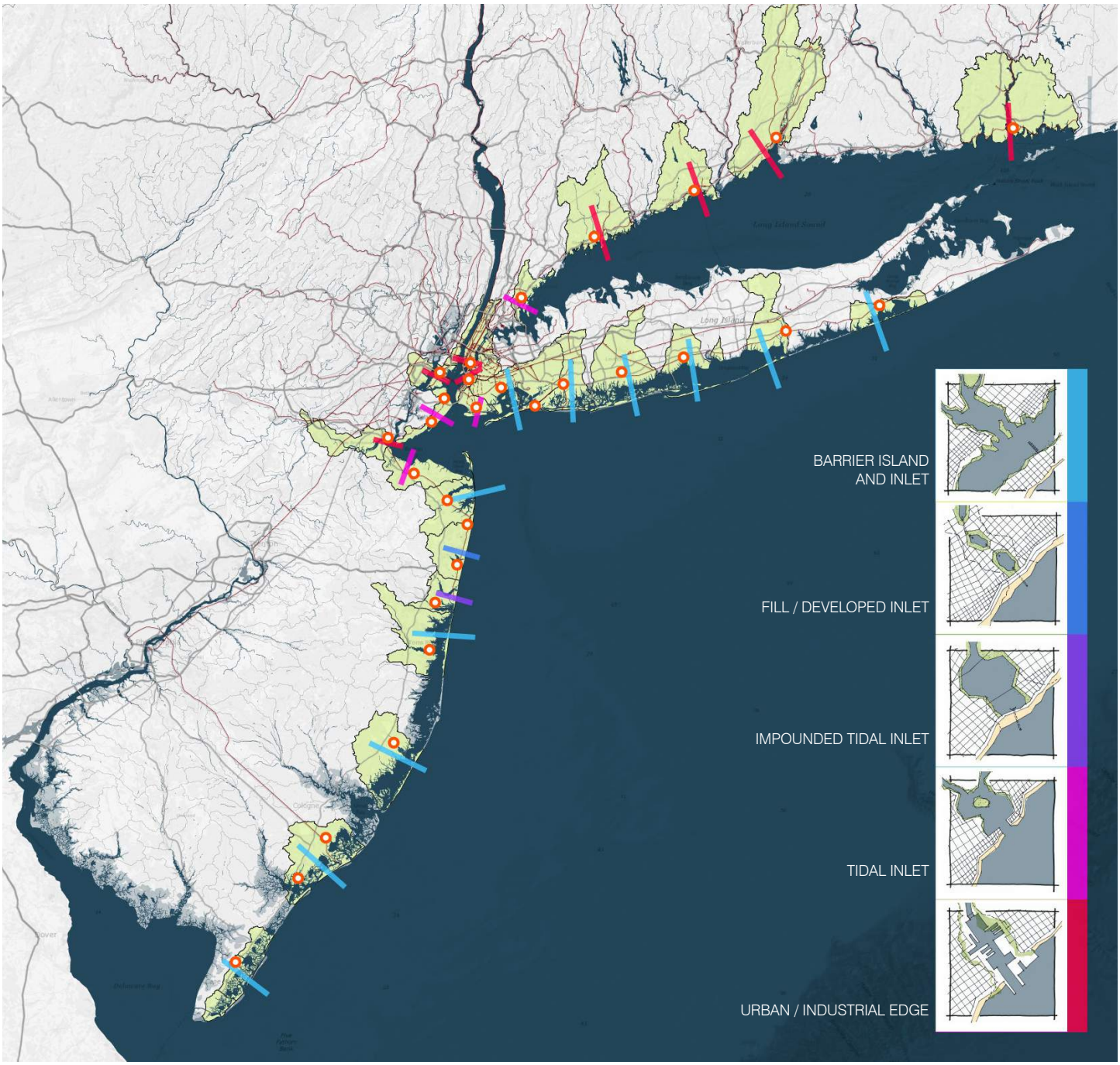


SOCIAL VULNERABILITY INDEX

Population at risk determines social vulnerability by multiplying susceptibility times the coping Capacity times the capacity to adapt to change. Against sea level rise, areas in the expanding flood plains will have to adapt more quickly than areas on high ground, shown here in grey. More intense color indicates greater vulnerability of the residents to increased flooding, temperatures, and other impacts – or the fewer resources they have to adapt. This is a key indicator for places where intervention at the community scale can have tremendous impact. (Source: Social Vulnerability data from the Hazards and Vulnerability Research Institute, plus NOAA Sea Level Rise and Storm Surge Modelling.)

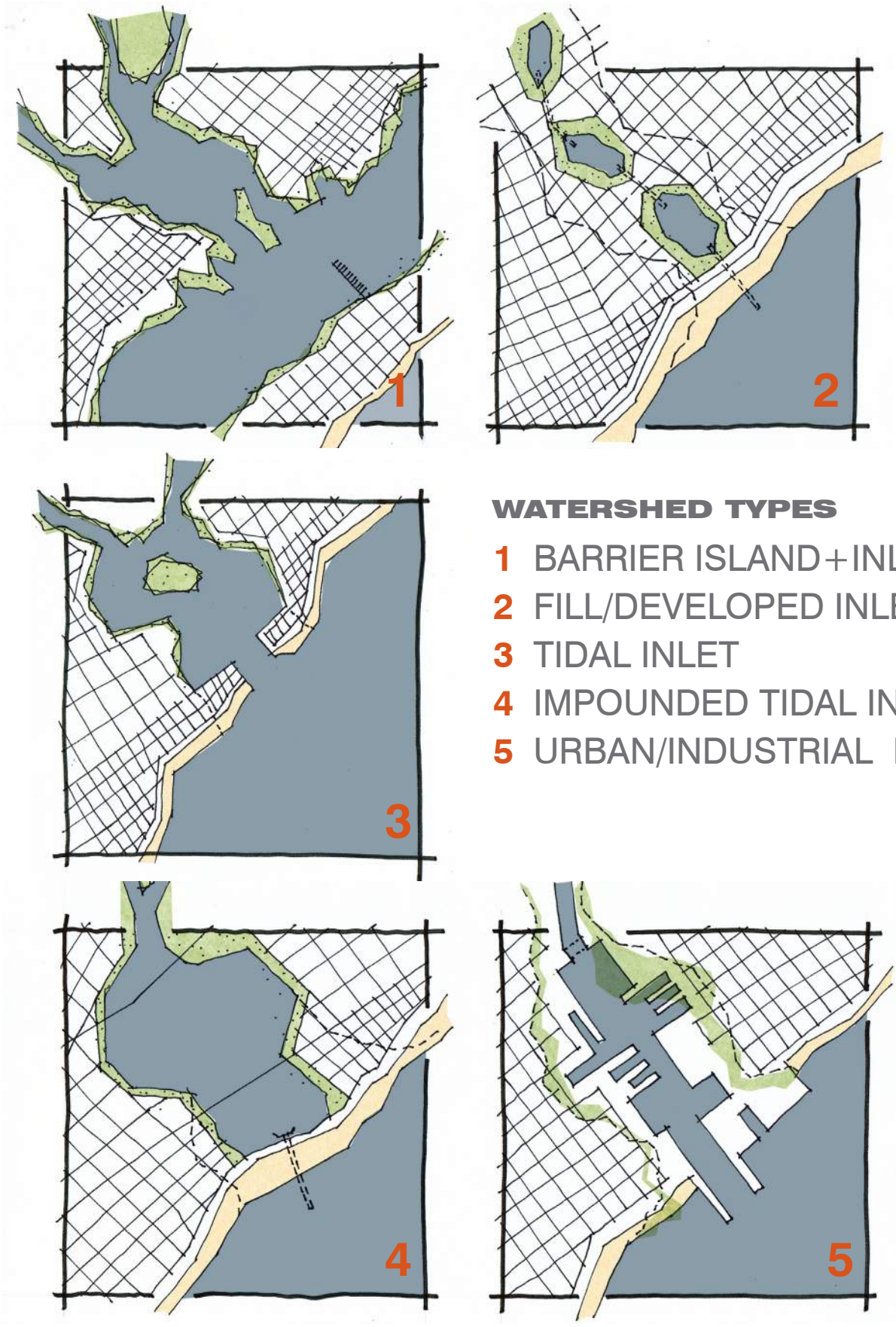
MODERATELY VULNERABLE

HIGHLY VULNERABLE



WATERSHEDS

Watershed are the natural unit of resilience, and the key to understanding how flooding from rainfall events as well as storm surge affects infrastructure, buildings, businesses, and people. A large watershed, such as the Barnegat Bay, may be divided into sub-watersheds such as the Metedeconk River, Kettle Creek, Silver Bay, Potter's Creek, Oyster Creek, Mill Creek, etc. Underlying the poetic place names are the early settlers and historic resources of these places. Watersheds are a useful way to organize the community response to flooding and water quality issues, and create an understandable pattern for locating resilience centers along the coastline. (Source: USGS National Hydrography Dataset, sixth level subwatersheds.)

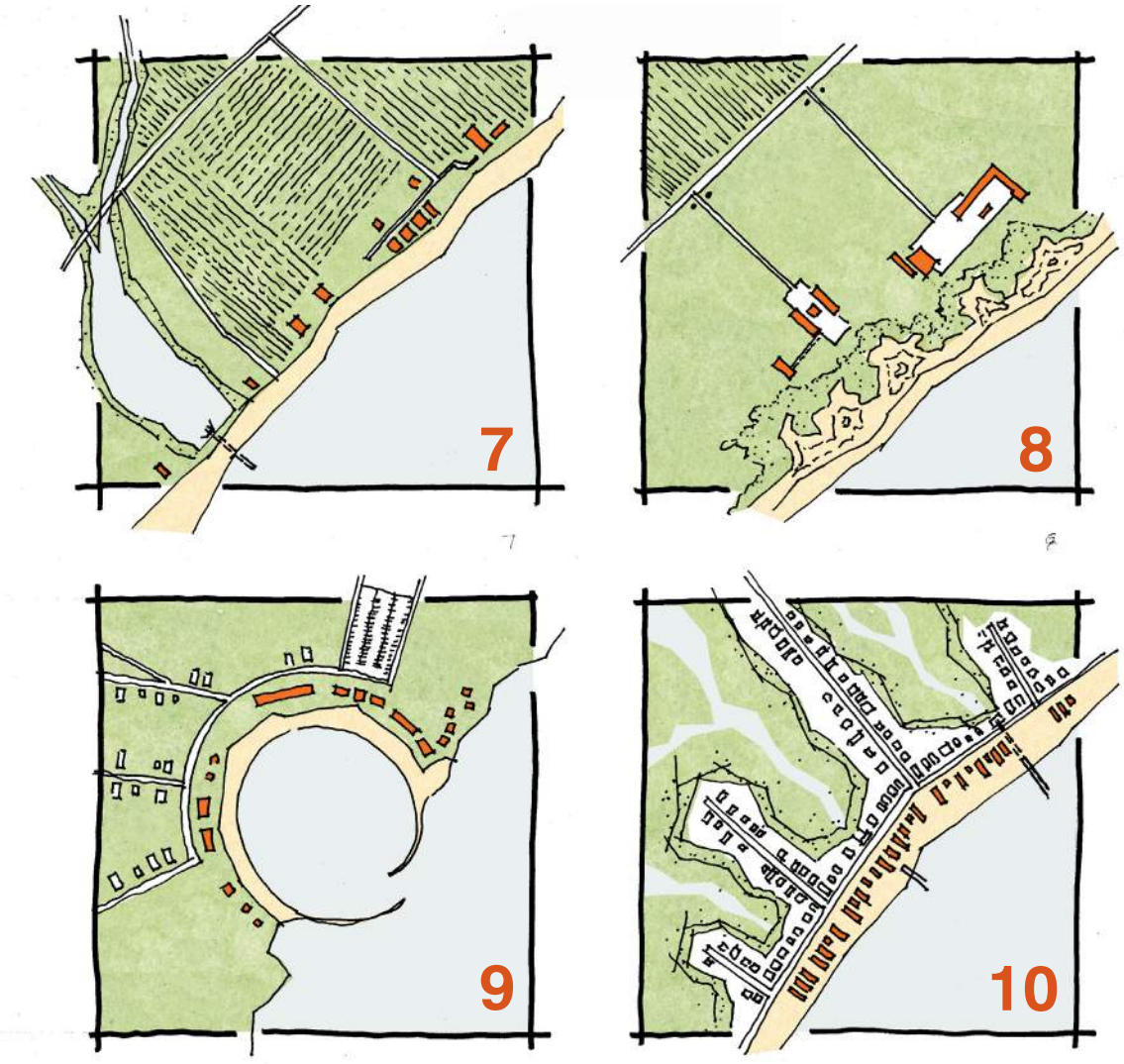


WATERSHED TYPES

1 BARRIER ISLAND+INLET
2 FILL/DEVELOPED INLET
3 TIDAL INLET
4 IMPOUNDED TIDAL INLET
5 URBAN/INDUSTRIAL EDGE

BEACH TYPES

1 PENINSULA
2 BARRIER ISLAND + DEVELOPMENT
3 MAINLAND BEACH + DEVELOPMENT
4 BARRIER ISLAND WILD PRESERVE
5 PENINSULAS BETWEEN ESTUARIES
6 BEACH + DENSE URBAN AREA



BEACH TYPES

7 RURAL MAINLAND + IMPOUNDED ESTUARY
8 WILD DUNE BEACH
9 ENHANCED BEACH + WOOD/MARSH EDGE
10 RAISED HOUSES ON BEACH

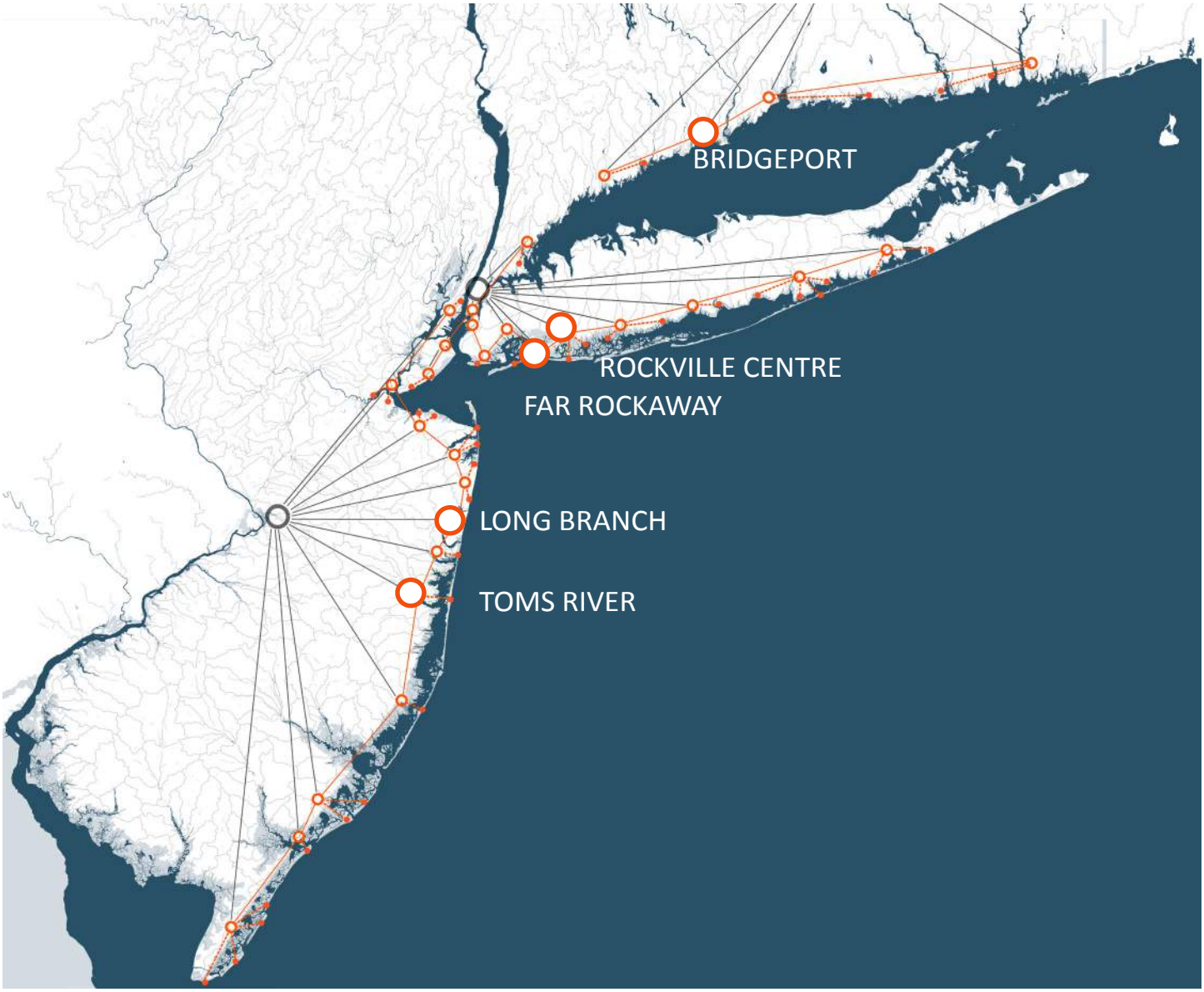
Adaptation depicts a context that changes in response to new challenges. It is the perpetual succession of landscapes, infrastructure, and architecture over time. Adaptive solutions to climate challenges will illustrate models for new development, using didactic and highly visual cues that show people the ways to build that are more prepared for increased flooding, increased storm severity, and increased temperatures - three of the most important changes to the climate that are underway.

In designs for cities, this means that initially, only a few of these exemplary structures will be built, using the right technical solutions and in the right places. Over time, these will spawn more climate-ready models and more infill at higher ground, until finally, the threatened and low-lying areas become interceptors and sponges, natural buffers to sea level rise and storm surge.

The Resilience Centers are placed near transit lines to encourage low-impact transportation, and to promote growth in transit-oriented communities. Many sites propose new methods for mobility around the region: ferryboats, complete streets, and added rail lines. Many of the sites have the potential for isolation and inundation on barrier islands or peninsulas; it is critical to plan alternatives for future occupation and evacuation.

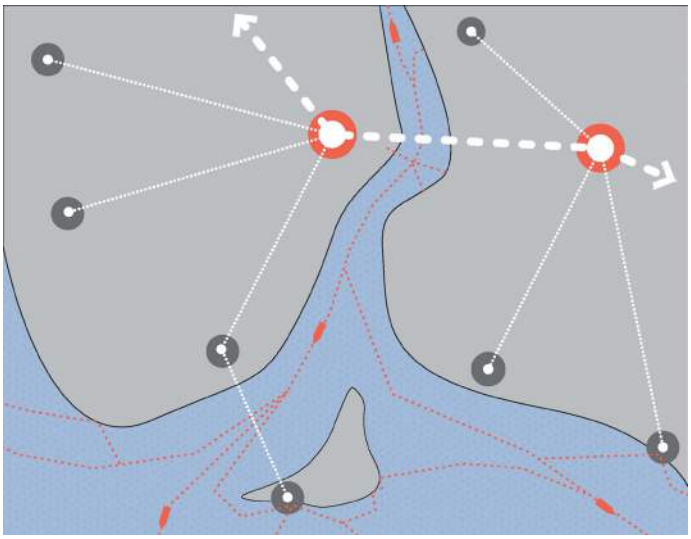
Reducing auto dependence is a critical aspect of resilience, but it also creates more connected, compact, and complete neighborhoods. It contributes to more socially-resilient cities, where there are many points of intersection between people of varied backgrounds and income levels. Transit-oriented developments encourage alternate means of transportation, and mixed uses, with jobs, housing, and commercial uses in the immediate vicinity.

Siting Resilience Centers at the intersection of high ground, density, connection, vulnerability, and in locations where they can effect a positive change in the waterways, defines sites for long-term occupation of 75 years or more. The Resilience Network will create safe places that make visible the role of humans in shaping their responsibility to the future.

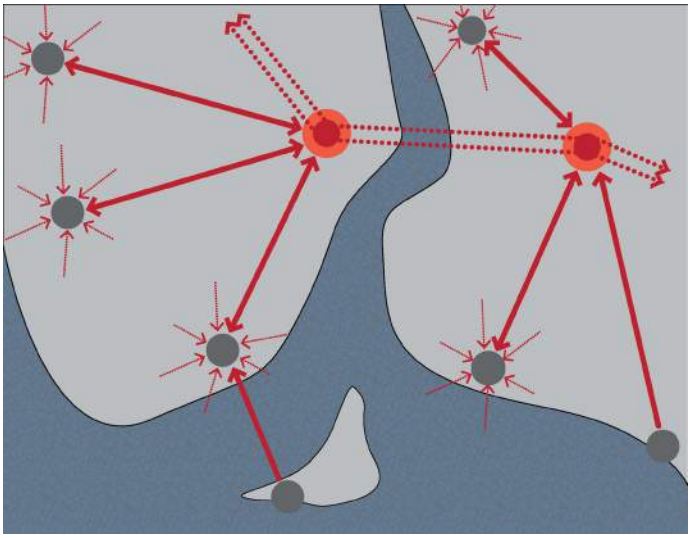


Twenty-nine possibilities were identified in the region, and from these, five sites were selected for further study: Bridgeport, Rockville, Far Rockaway, Long Branch, and Toms River. Each site requires different programming, due to the existing features within the community, resulting in a custom program of resilience features added to the core program elements of security, shelter, transit, self-sufficient infrastructure, enhancement of the estuary, and public outreach.

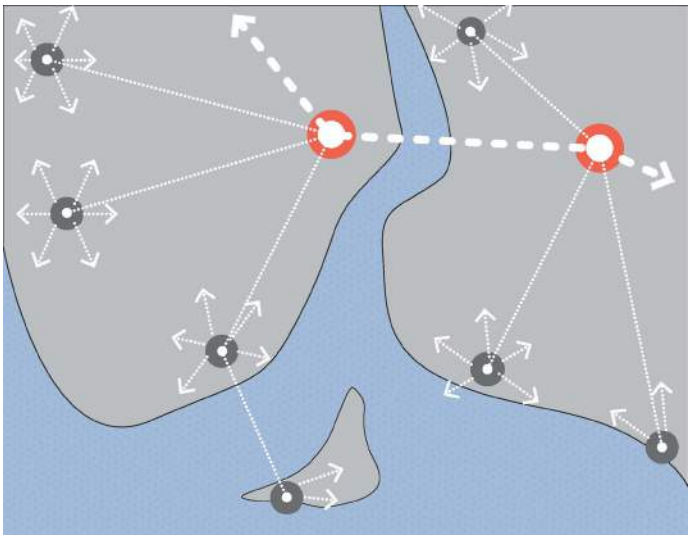
bridgeport	rockville centre	far rockaway	long branch	toms river



The Resilience Center functions daily as a familiar place with regular public use, providing connections to programs to increase community resilience: job training, education and outreach, commercial and civic functions, and housing. Enhancing of the adjacent waterways encourages interaction and recreation, and improves resilience at the base level of the site. The Resilience Center connects to Satellites through strong physical links and shared programs, extending its reach. The Resilience Network makes visible the role of humans in shaping and changing the environment.



During an event, the Resilience Center is recognizable as the first option for safety. Satellites link back to the Center through physical links and communications, transferring goods, services, and people as necessary. Together, these command centers coordinate the distribution of resources and provide continuous services throughout the threat. These are high visibility places to go for shelter, organizing educational spaces for temporary shelter, offices for multiple purposes, and restaurants for food service. Because they provide services daily to the community, the Resilience Centers will be desirable places to go to for safety, instead of potentially scary, unknown destinations.



In the recovery phase, the Resilience Center and Satellites allow rapid mobilisation to meet the needs of the neighborhoods. They are within walking distance of most residents, and provide a sense of stability. They are a place to connect to friends, family, and accurate information. They continue to supply immediate needs – clean water, safe hygiene, and electricity. They extend support and access to government services to coordinate rebuilding, and to commercial services. They coordinate volunteer efforts during the recovery phase.

core program

- OUTREACH
- ESTUARY
- INFRASTRUCTURE
- TRANSIT
- SHELTER
- SECURITY
- PARKING

custom program

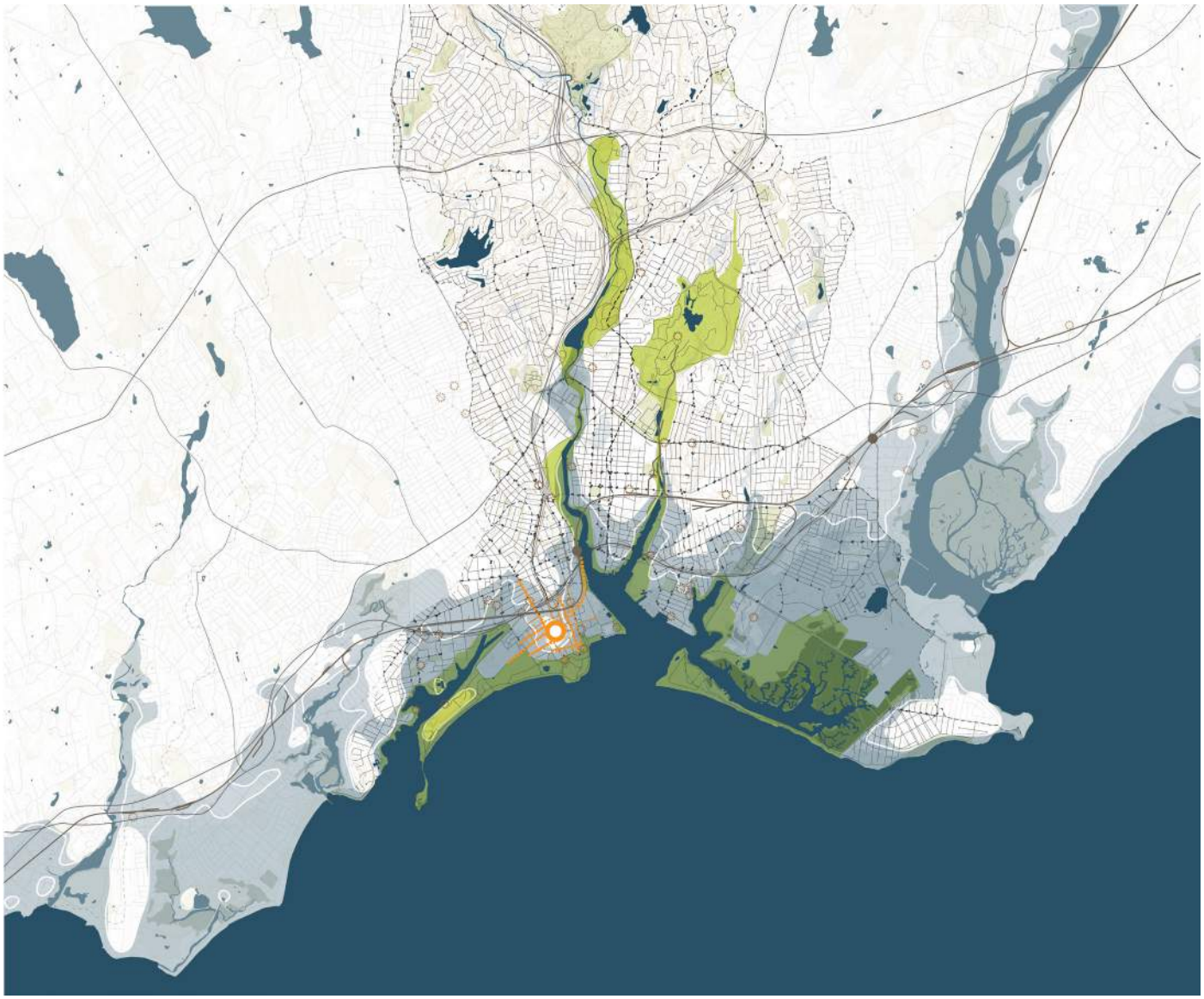
- JOB TRAINING
- EDUCATION
- RECREATION
- REMEDIATION
- HOUSING
- RETAIL
- COMMERCIAL
- CIVIC
- FIRE

combined program

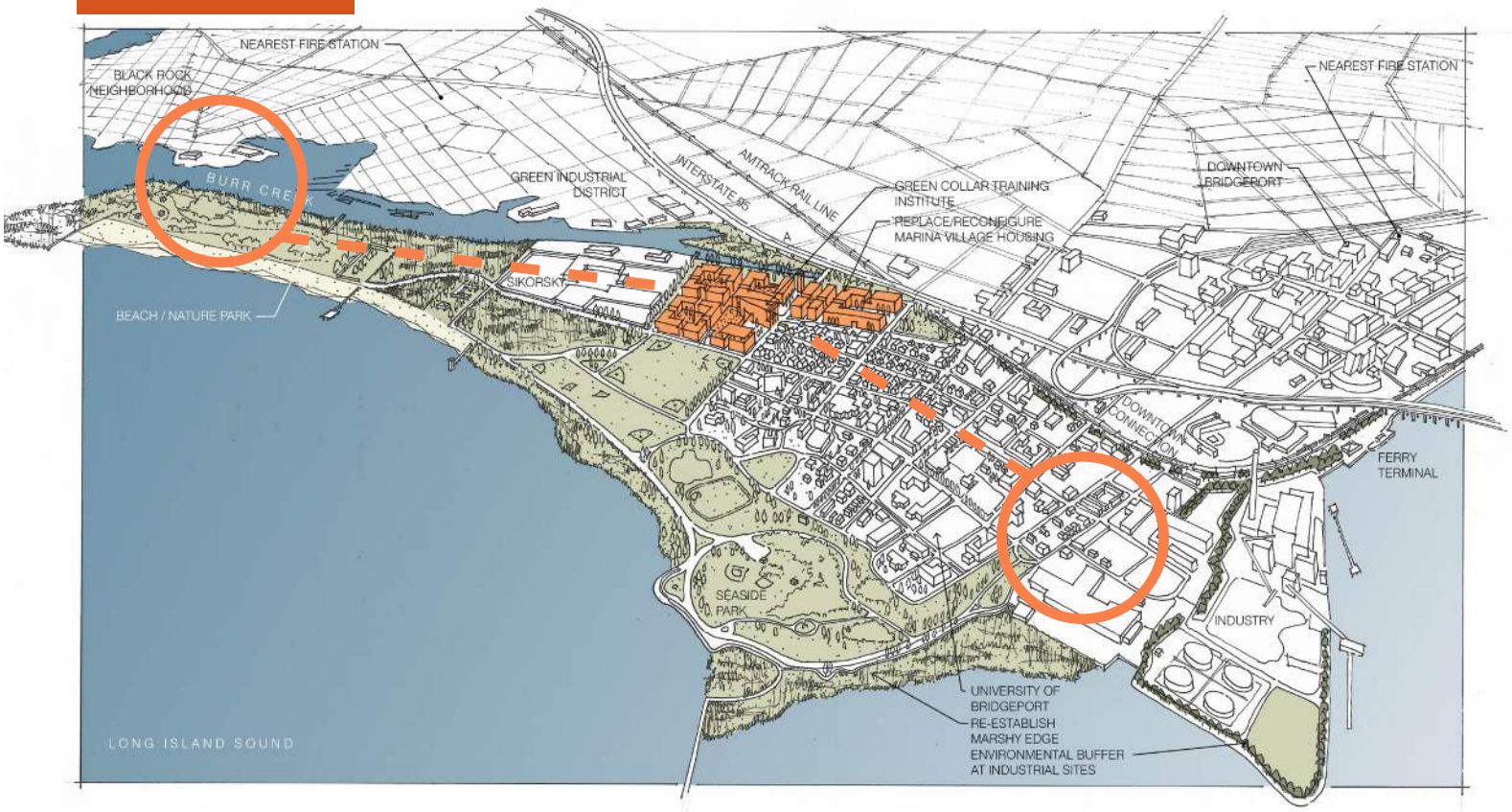
- OUTREACH
- JOB TRAINING
- EDUCATION
- RECREATION
- REMEDIATION
- ESTUARY
- HOUSING
- RETAIL
- COMMERCIAL
- INFRASTRUCTURE
- TRANSIT
- CIVIC
- SHELTER
- SECURITY
- FIRE
- PARKING

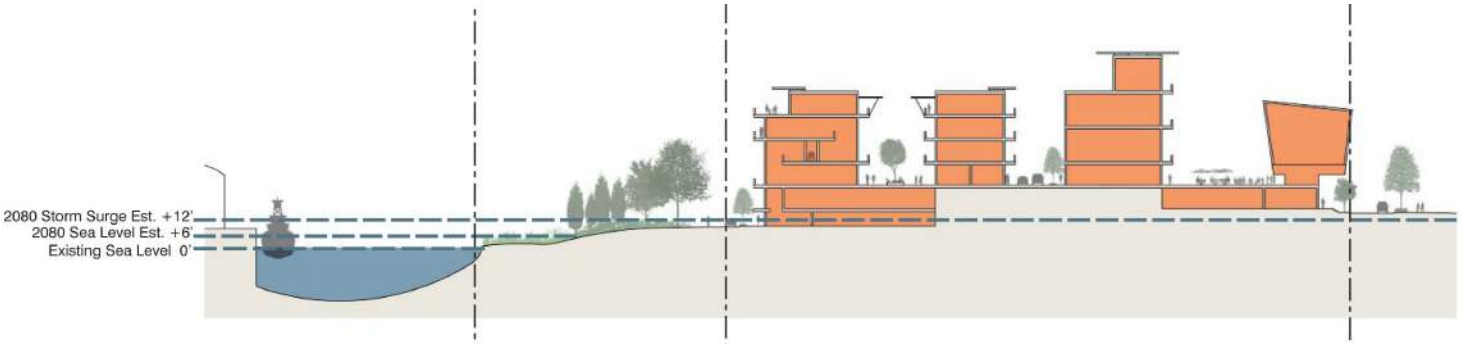
The proposed Resilience Network will build spaces and programs for communities to become more self-sufficient through public safety, education, community activities, and a mix of commercial and housing functions. Resilience centers will become familiar places with regular public use, fostering connections between people. Places where neighbors know one another recover more quickly and remain more cohesive than interrupted communities. Resilience Centers – familiar and welcoming places – will fill gaps in public safety in the most inclusive way, by serving as shelters in times of crisis. Satellite centers expand the possibilities at inundated sites, hasten adaptation by providing infrastructure or services at threatened locations, or intensify a seasonal economy. The central facility and its satellites create the redundancy necessary for strong emergency planning.

bridgeport



bridgeport





Industrial Canal

- Maintains waterfront access to industry
- Provides access out to larger water bodies for marine life.

Restored Tidal Marsh & Upland Forest

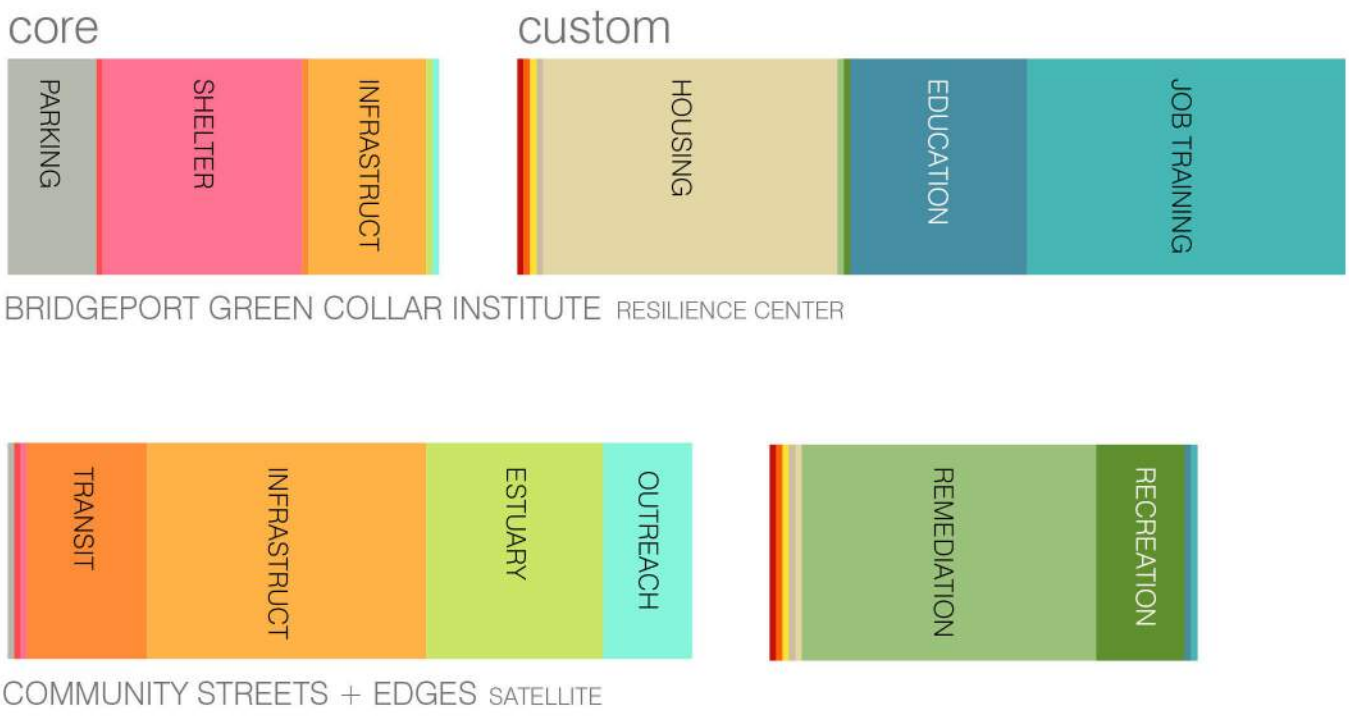
- Space allows for tidal fluctuation
- Supports critical habitat for marine life
- Creates buffer from surge waters / provides wind break
- Nesting/Perching area
- Creation of recreational zone - trail running, walking, biking, birding

Resilience Center

- Elevated above surge level
- Parking at lower levels
- Mixed use
- Public education
- Public plazas

bridgeport

The Resilience Center at Bridgeport will include the City's proposed Green Collar Institute, training people for green industrial processes, building retrofitting, construction disassembly and salvage, landscaping and site remediation. The project includes workforce housing for the industries in this neighborhood; remediation of environmental hazards; neighborhood-scale renewable energy generation + water treatment; and permeable corridors with alternative transit and stormwater infiltration.



bridgeport

Bridgeport's industrial past made it a center of innovation through the 20th century, but left it with a legacy of industrial brownfields and vacant structures.

Bridgeport is the home to the 1867 Seaside Park and Beardsley Park designed by Frederick Law Olmsted for then-Mayor P.T. Barnum.

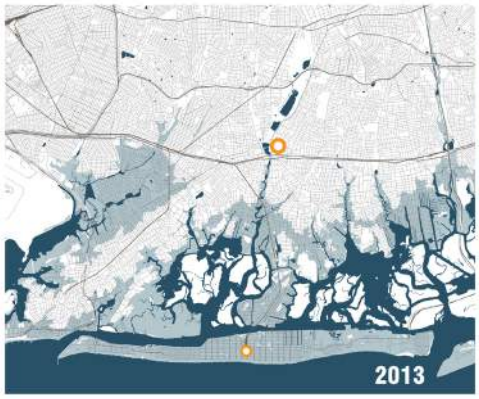
The City's positive rebuilding campaign focuses on green infrastructure and green jobs to light the way to a new future. A waste-to-energy plant, recycling concerns, solar array, and other initiatives will revitalize the waterfront and return the city to its reputation as a Park City once more.

bridgeport

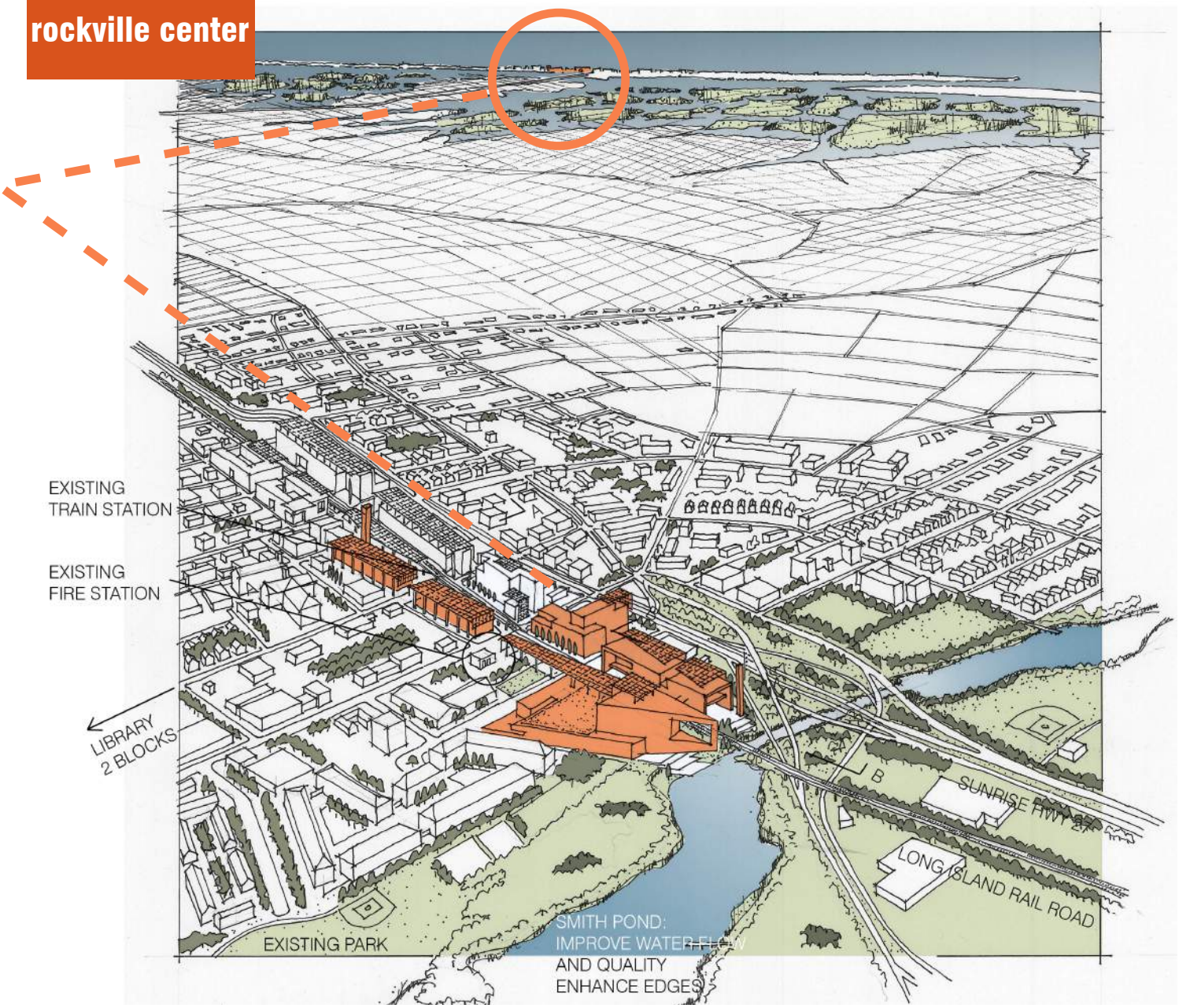
The South End district of Bridgeport is beset by problems at the margins. Edges are low, and fragile, and host to sites of environmental degradation. The center of the community is at elevation +30' with 6,939 people living in 1.25 square miles, including a university, a mix of commercial and industrial uses, and Seaside Park by Frederick Law Olmsted. The Green Collar Institute can leverage University of Bridgeport faculty and resources to kickstart training programs in renewable energy, and materials upcycling research and development.

Satellite resilience projects will build workforce housing for the industries in this neighborhood; remediate environmental hazards and create buffers for industrial sites; establish neighborhood-scale renewable energy generation, water collection, and wastewater treatment; and develop complete street connections to downtown, permeable corridors with alternative transit and stormwater infiltration.

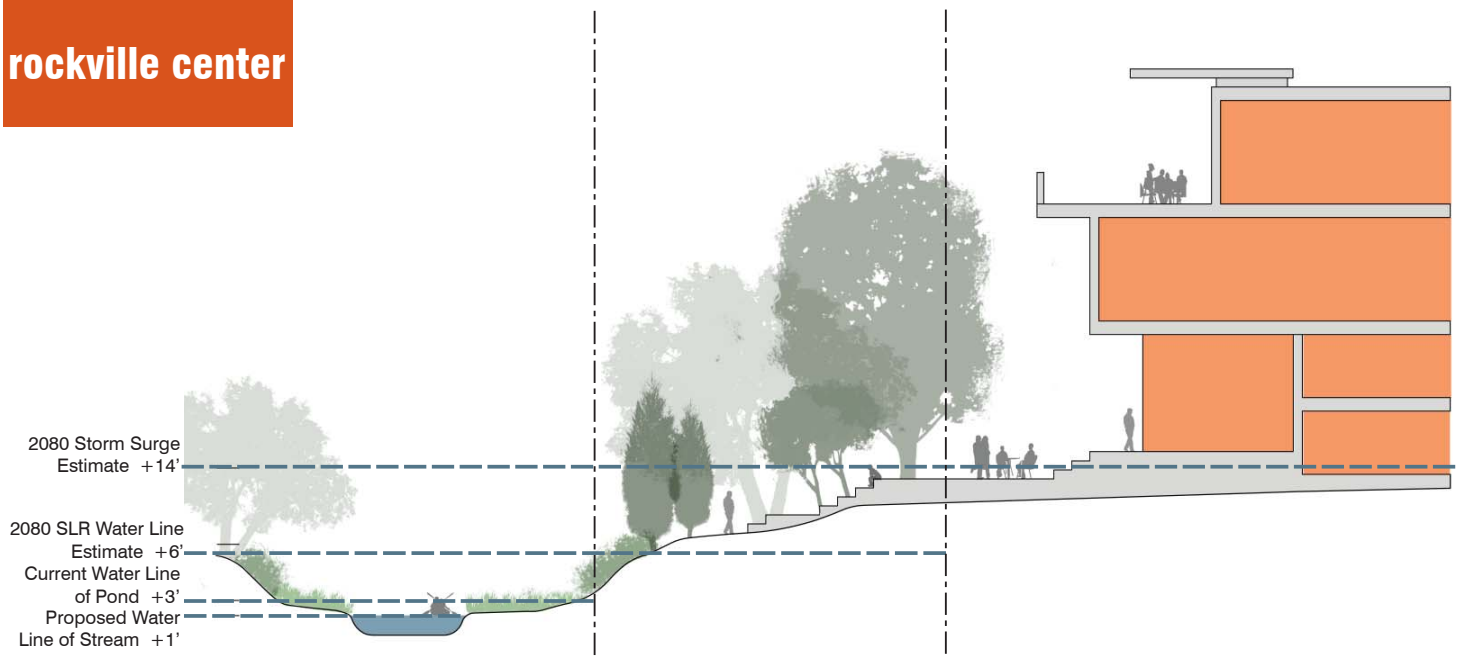
rockville center



rockville center



rockville center



Improved Tidal Stream & Marsh

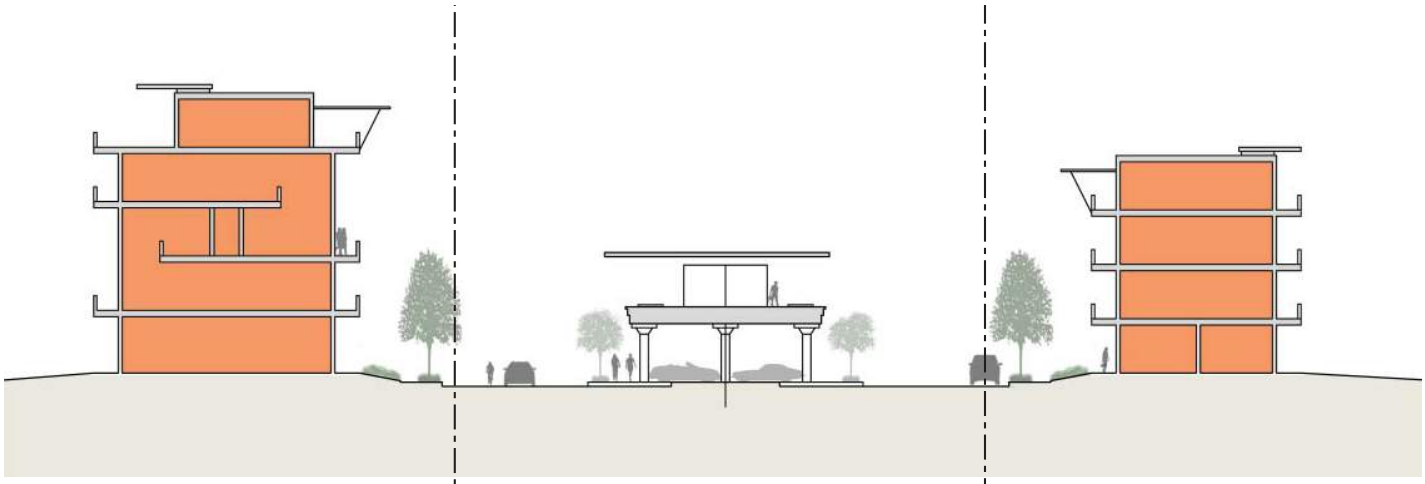
- Space allows for tidal fluctuation
- Supports critical habitat for marine life
- Free flowing water improves water quality & increases species diversity
- Creation of recreational zone - fishing, kayaking & birding

Improved Upland Forest

- Creates buffer from surge waters / provides wind break
- Nesting/Perching area
- Creation of recreational zone - Trail running, walking, biking, birding

Resilience Center

- Elevated above surge
- Parking at lower levels
- Mixed use
- Provides access to water front location



Resilience Center

- Transit oriented
- Mixed use
- Above surge levels
- Improved streetscape

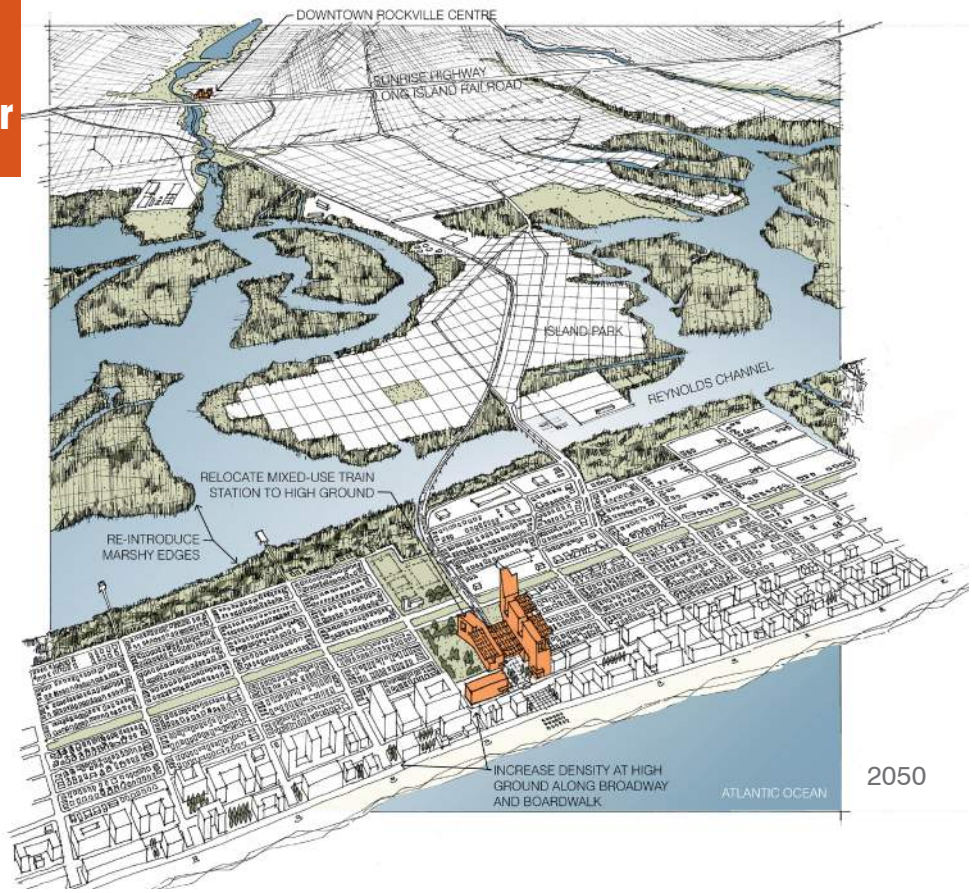
Transit Line

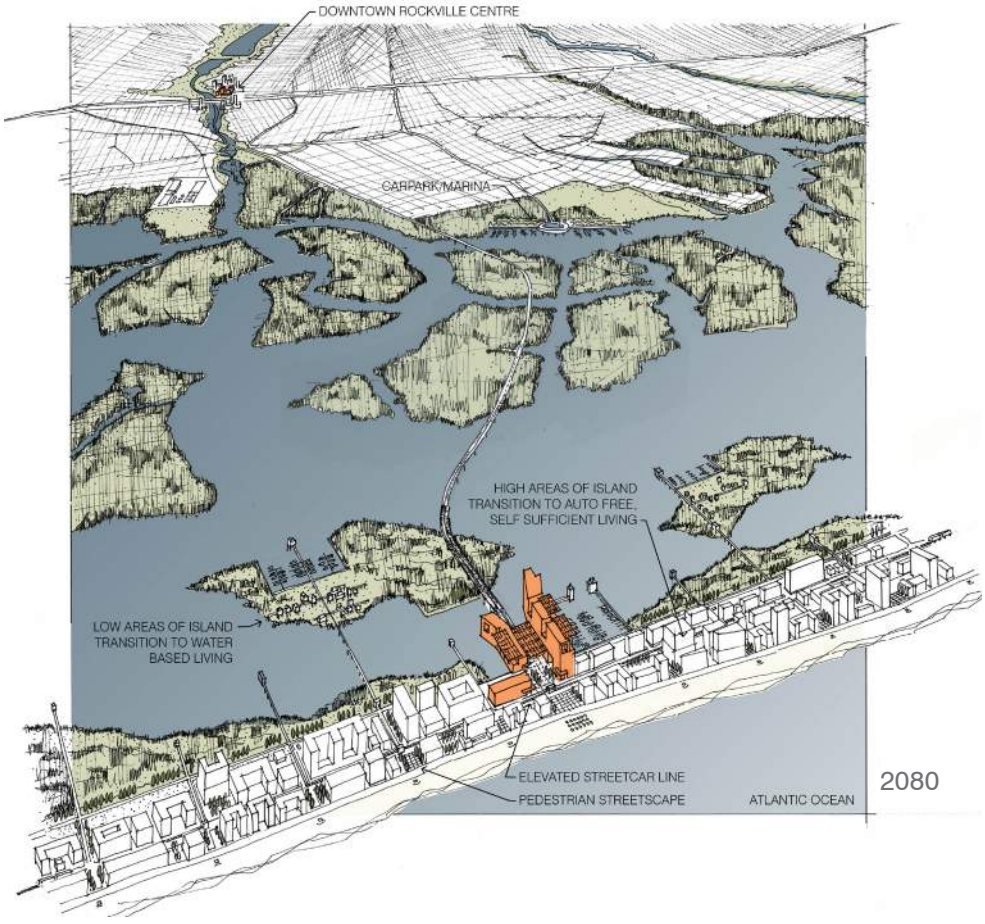
- Existing infrastructure
- Regional service
- Above surge levels

Resilience Center

- Transit oriented
- Mixed use
- Above surge levels
- Improved streetscape

rockville center

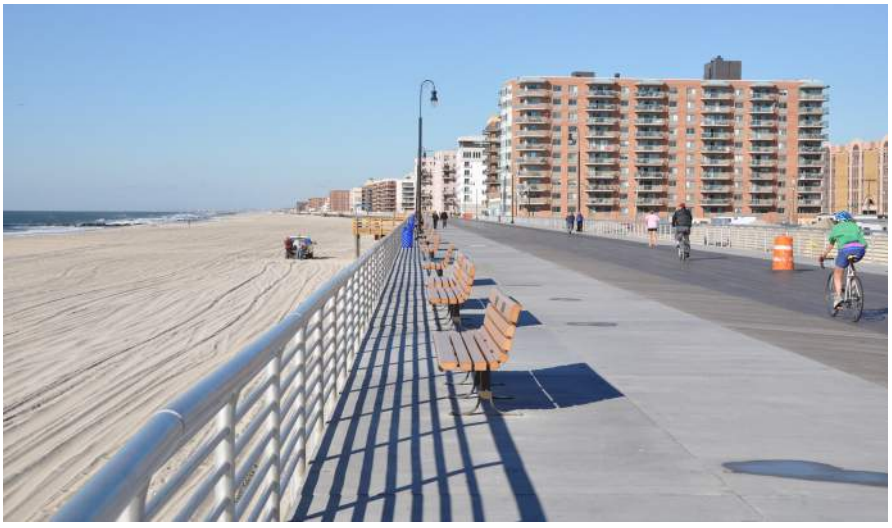




rockville center

Rockville Centre resilience creates intensified housing at a safe elevation, net-zero utility use, mixed commercial uses, restored estuary edges and recreation at the Long Island Rail Road line. On the barrier island, a satellite relocating the transit center will be built at flood-resistant elevation near the east-west corridor of Broadway, including a community activity hall, commercial functions, and senior housing.

rockville center



Rockville Center lies on the Long Island Rail Road line, the busiest corridor for public transit in America with over 335,000 passengers per day. The city center is dense, with a mix of uses downtown, but it needs housing.

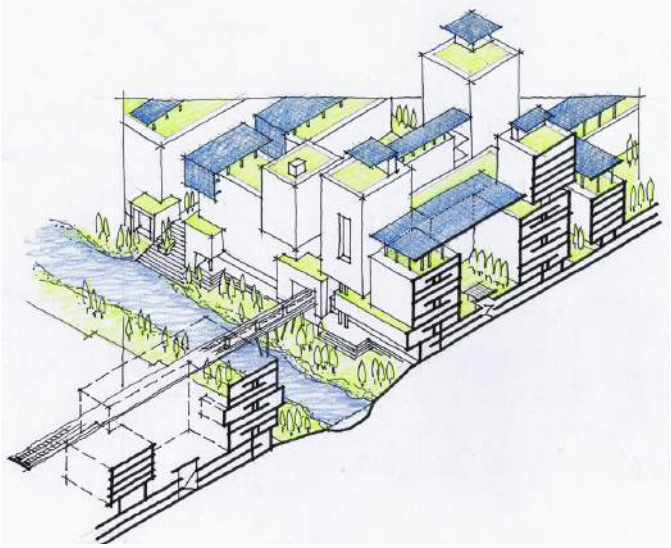
Out on Long Beach Island, waterfront housing is mid-rise in scale, with ten-story towers lining the beach and the high ground beyond the dunes. As the footprint of the island shrinks, the marshy edges will shift unless they are stabilized.

rockville center

Long Island is densely settled by over 2.5 million people, with about 41,000 people residing on Long Beach Barrier Island. Sea level rise and increasing storm surge will require intensification of the high ground in both locations, along with development of strong connections for commuting, trade, and evacuation. In times of crisis, if evacuation from the island is not possible, the transit center and community activity hall become community shelters, and seniors may shelter in place securely at home.

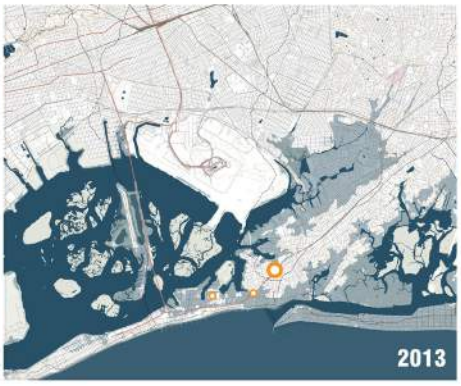
By 2080, much of the barrier island will be underwater. Cars will be left on the mainland, and access will be via water taxi or an elevated rail line. Marshes will reclaim the lower bayside of the island, hosting only independent colonies of stilt houses. An elevated east-west streetcar along Broadway will connect the remaining communities of the 9-mile long island. Ground floor uses will transition to floodproof retail and commercial spaces.

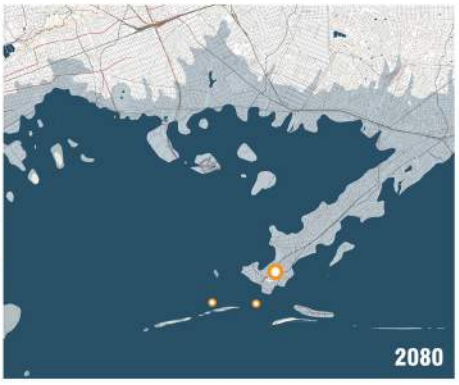
At the inland location, Rockville Center demonstrates safe elevation, net-zero utility use, mixed commercial uses, restored estuary edges and recreation, and intensified housing along the Long Island Rail Road line. It models the self-sufficiency and increased density of transit-oriented development.

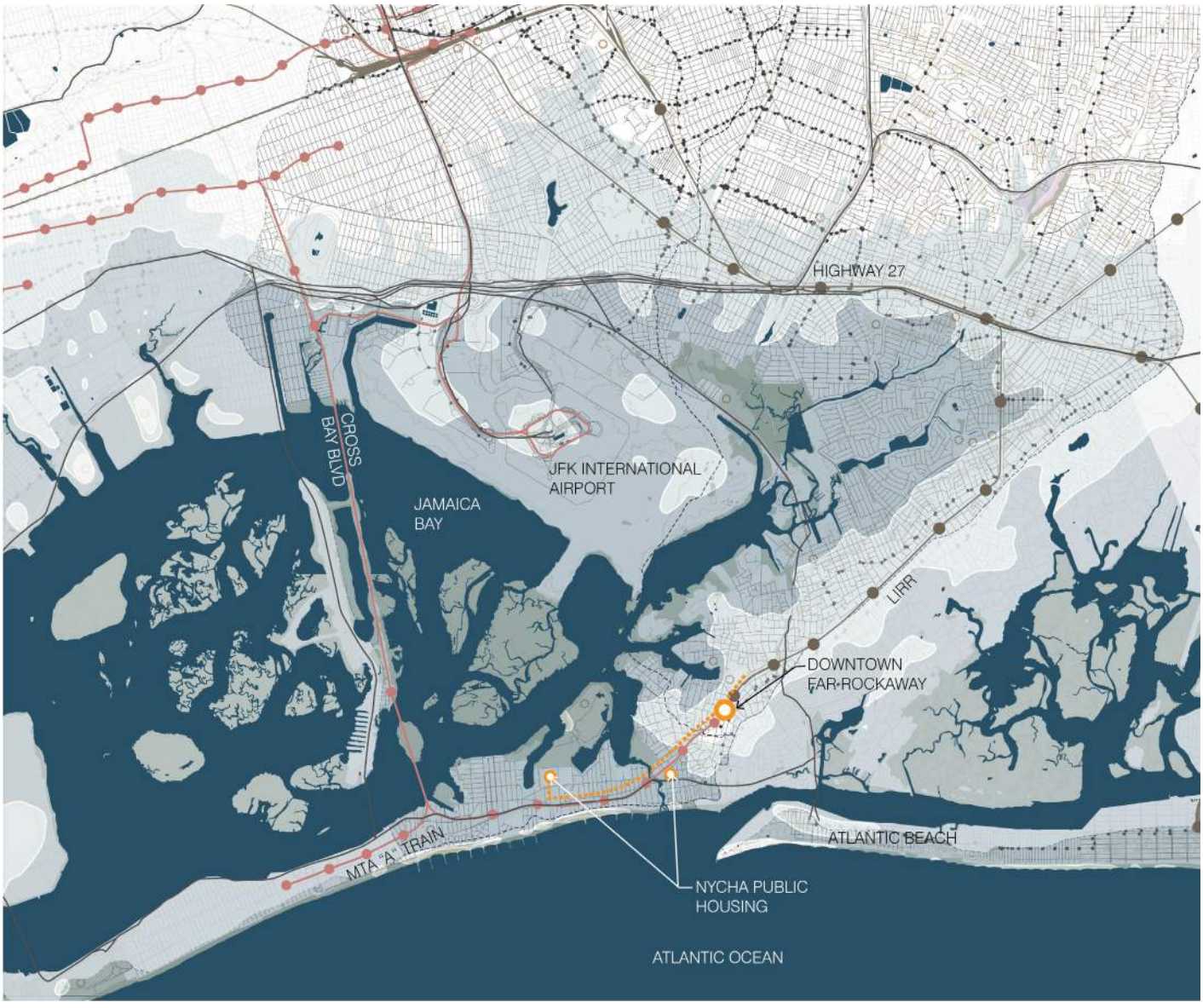


Transit oriented developments can be designed to meet climate challenges through the use of “bathtub” parking decks to raise the first residential floor out of the flood zone, but it is essential to retain commercial functions at the street level to keep street edges lively and occupied. Elevating rail lines and transit corridors out of flood zones is a critical component of resilience.

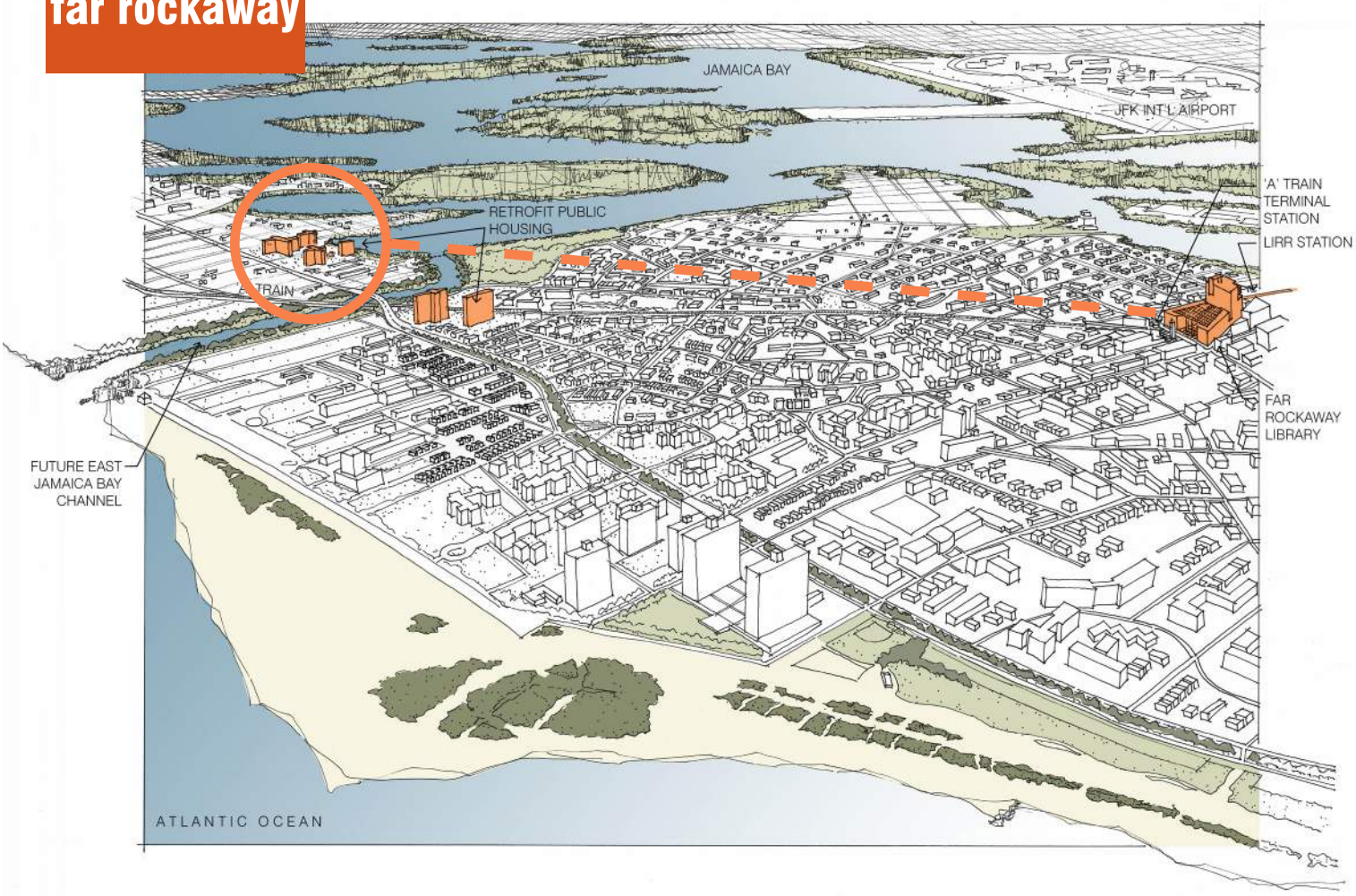
far rockaway







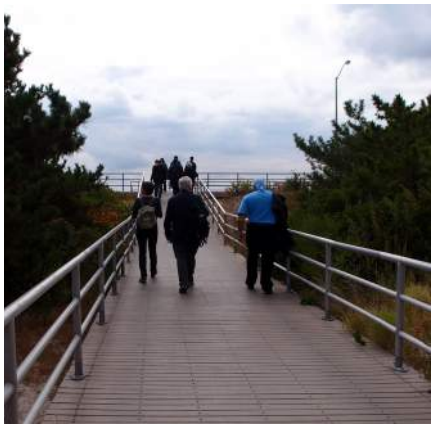
far rockaway



far rockaway

The Resilience Center in downtown Far Rockaway will include an urban grocery and retail shops; commercial uses; a job training center which can become a public safety shelter for residents from nearby low-lying neighborhoods; a mix of housing types; and a link from the A train to the LIRR station. Satellite projects will retrofit public housing so that residents may shelter in place.

far rockaway



Far Rockaway became the vacationland for New Yorkers early in the 20th century, and later, the resettlement place for many city-dwellers displaced by construction during the Robert Moses era. Transit lines link residents to the city, with the LIRR station 1/4 mile from the subway line - and yet the two remain disconnected.

Residents of the Beachside Bungalows began replanting dunes in 1995 with halophytic plants in a washboard-pattern of dune and swale, in angular geometries intended to capture deposits of sand. These measures kept their WWI-era houses from significant damage from the surge.

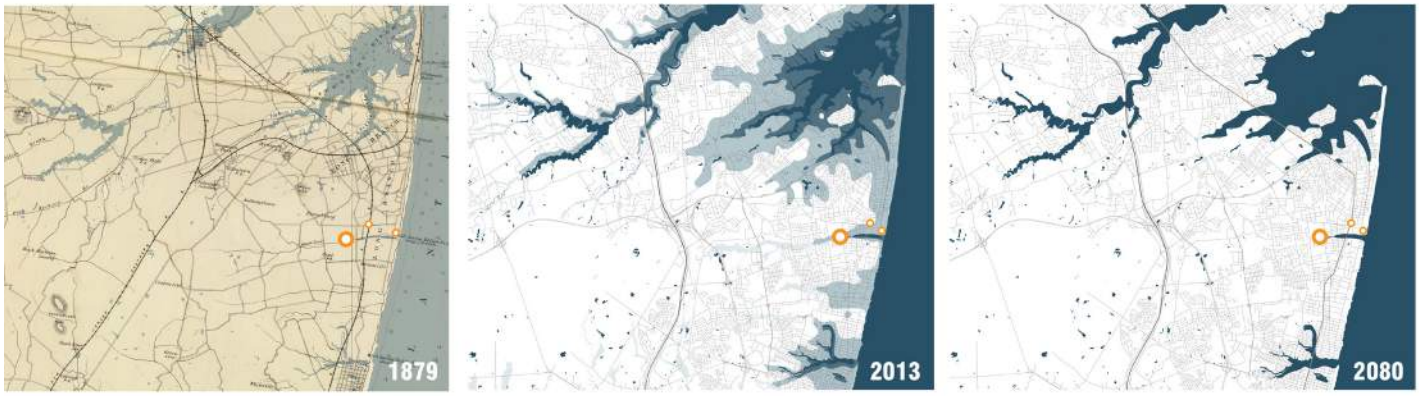
far rockaway

The Rockaways have been an attractive destination for vacationers since the Cross Bay Bridge and the development of the beach and boardwalk in 1930; construction of the elevated train and the first low- and moderate-income projects arrived in 1955. Restoring downtown as a desirable environment for housing and essential services is especially critical when the historic commercial areas are on high ground.

The proposed Resilience Center will be located at the terminal stop of the A train, along the ridge, at elevation +35'. The program will include an urban grocery and retail shops; commercial uses; a job training center which can become a public safety shelter for residents from nearby low-lying neighborhoods; and a mix of housing types. It serves as an important link between the A train to the LIRR station one-quarter mile away, for increased mobility options.

A future cut through the peninsula to restore water circulation to the east side of Jamaica Bay is under study by the Army Corps of Engineers. By the time it is complete, many of the public housing facilities will be at greater risk for flooding and isolation. Satellite projects will retrofit multi-family housing (such as at Beach Channel Drive and Beach 40th Street) so that residents may shelter in place, by removing dwelling units at the grade level and relocating these units on-site, moving sensitive equipment out of the floodplain, providing self-sufficiency features, and providing a resilient community center for resident activities as well as emergency functions.

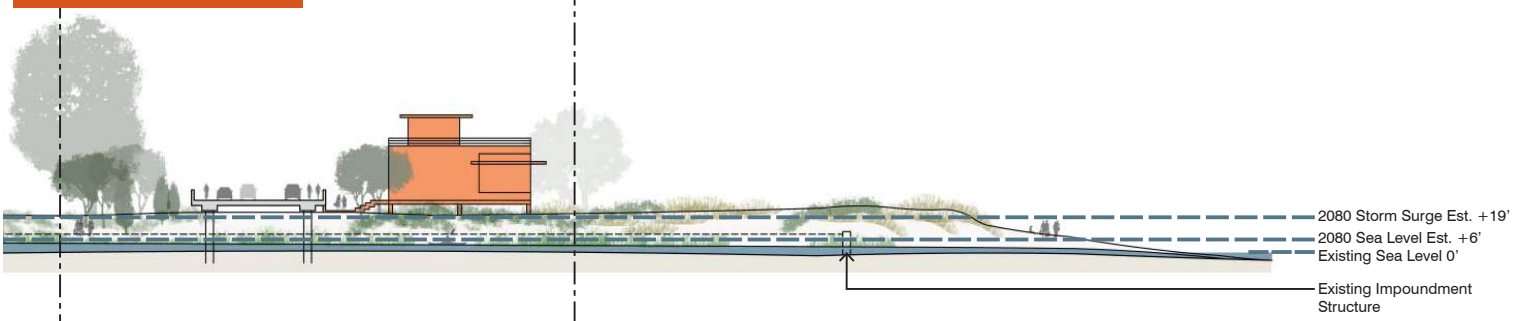
long branch



long branch


LONG BRANCH HIGH SCHOOL
ONMOUTH UNIVERSITY
GUGGENHEIM LIBRARY
NJ TRANSIT STATION W/ RETAIL AND HOUSING
OUTDOOR CENTER
LONG ISLAND RAILROAD
FISHING BRIDGE
RESTORE WATER'S EDGE FOR RECREATION AND STORMWATER MANAGEMENT
OCEAN AVENUE
OPEN AND IMPROVE OUTLET FOR HEALTHY TIDAL EXCHANGE
CREATE HABITAT FOR ENDANGERED PIPING PLOVER
ATLANTIC OCEAN

long branch



Resilience Satellite

- Elevated above surge level
- Public education
- New bridge raised above surge level and to allow for activities such as kayaking, wading and fishing

Whale Pond Brook Restoration

- Remove Impoundments to restore natural flow of Whale Pond Brook to Atlantic Ocean
- Restored natural creek banks and adjacent dunes provide habitat for nesting birds
- Free flowing water improves water quality
- Allows for added recreational beach activities
- Reduces riverine flood risk during storm events

A Resilience Center at Monmouth University links research initiatives for rapid response and urban coasts with a public educational outreach component for research, training, and pilot projects in coastal and estuary restoration. One satellite project is a new rail stop along the New Jersey Transit line to connect the university to public transit, including commercial and housing uses. A second satellite project will replace the lifesaving station at the beach with an outdoor center.

long branch

Monmouth University hosted the largest shelter in New Jersey during Hurricane Sandy, for 1200 people. Ecological connections between lakes and marshes have been interrupted by infrastructure and building along the Atlantic Ocean edge, leading to poor water quality, constant dredging, and poor water quality. Sandy created a breach that demolished the Life Saving Station (left).

long branch

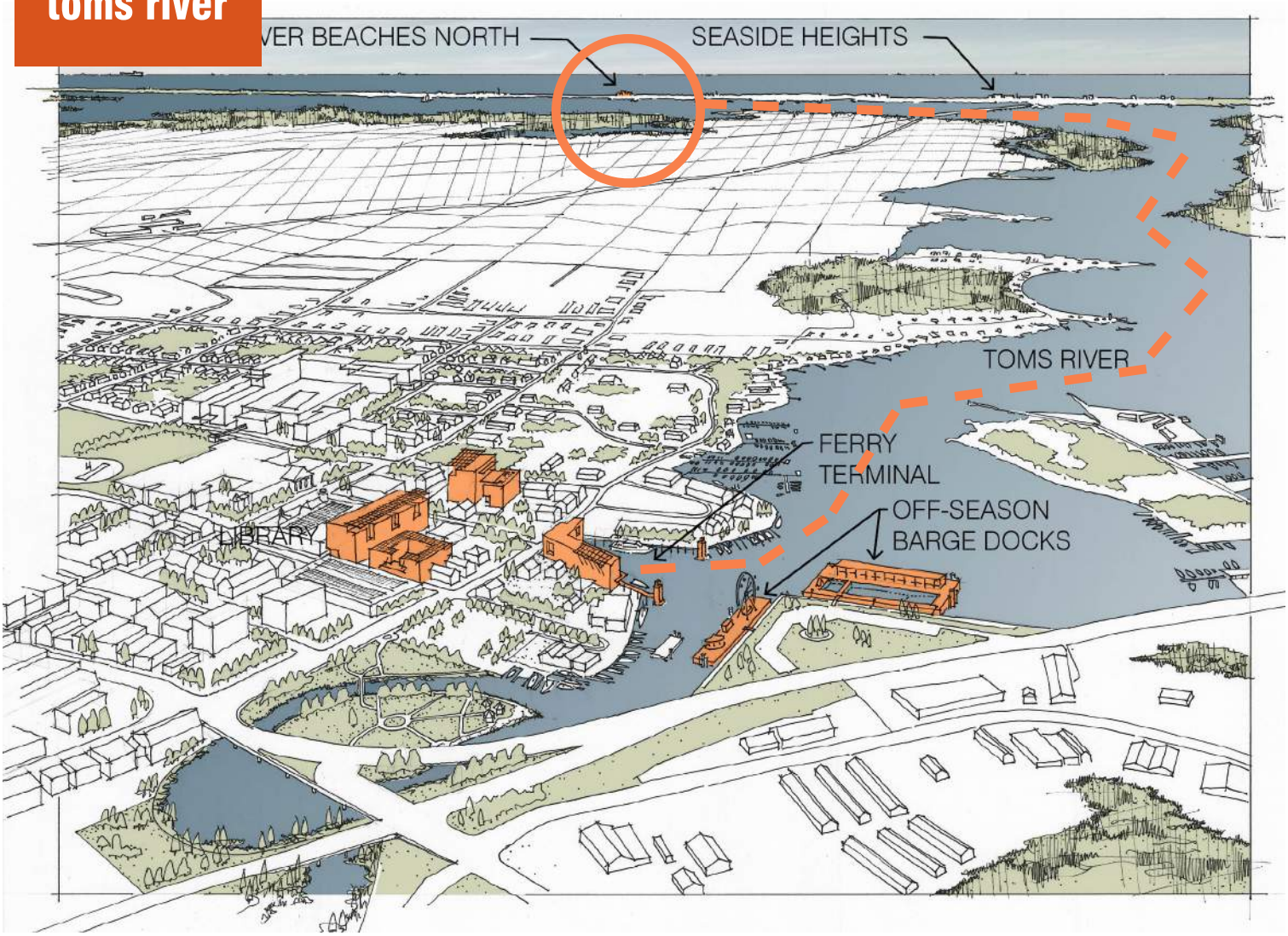
Along the coast are a number of impounded tidal inlets, which have changed from premier home sites to unpleasant landscapes subject to poor water quality and flooding. Restoring tidal flow will re-connect inland locations with the beach through healthy estuaries, recreational zones and green spaces.

The Resilience Center at Monmouth University links to the research initiatives already underway for rapid response and urban coasts. Many necessary elements are already in place: a gymnasium/shelter used during Hurricane Sandy, food service, and classrooms. What is needed is a public educational outreach component to supply the regional need for more research, training, and pilot projects in coastal and estuary restoration. The training center will form the nucleus for recovery of this and other waterways along the shoreline.

One satellite project is a new rail stop along the New Jersey Transit line to serve the 6,500 faculty and students of the university plus a population of 7720 residents within a 10-minute walk. This will include transit-oriented commercial uses and housing units. A second satellite project will be an outdoor center to replace the original lifesaving station at the beach, with public functions including: kayak and bicycle rentals, fishing gear for the restored species in the lake, and a snack bar.

toms river

toms river

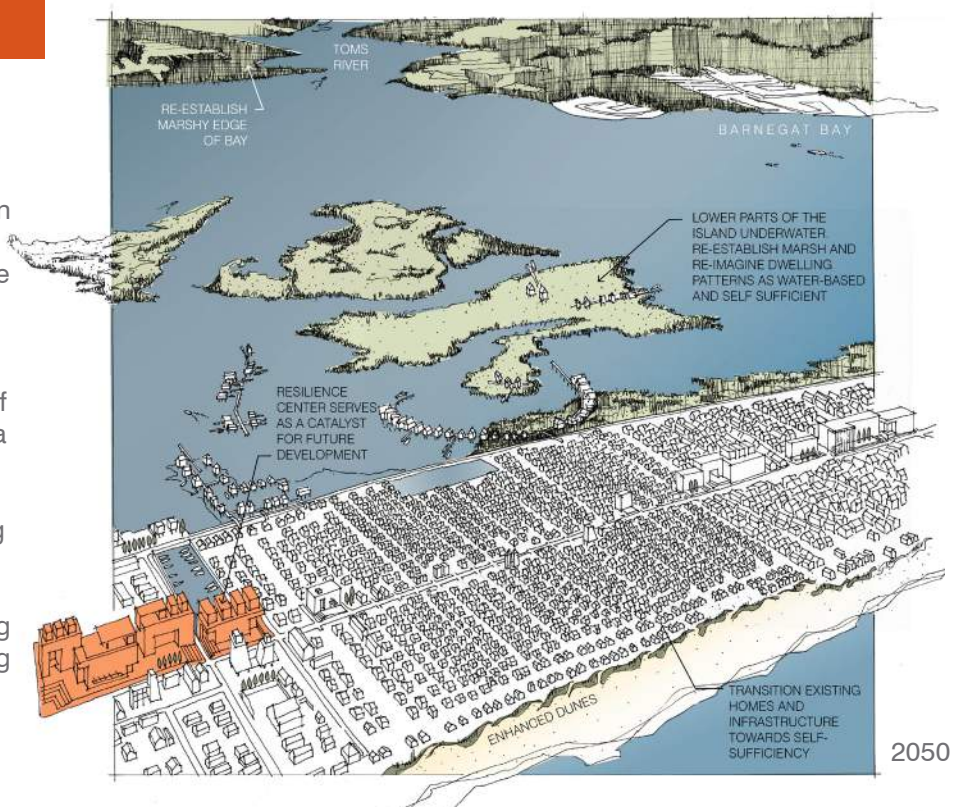


The coastal barrier islands of the Jersey Shore have been traditional summer destinations for over a century. Maintaining this tradition in the face of sea level rise and increasing storms will require occupying a smaller footprint. The original design standard of Dover Beaches is a model to restore permeable streets and reduce infrastructure along the beach island, transitioning property owners to self-sufficiency.

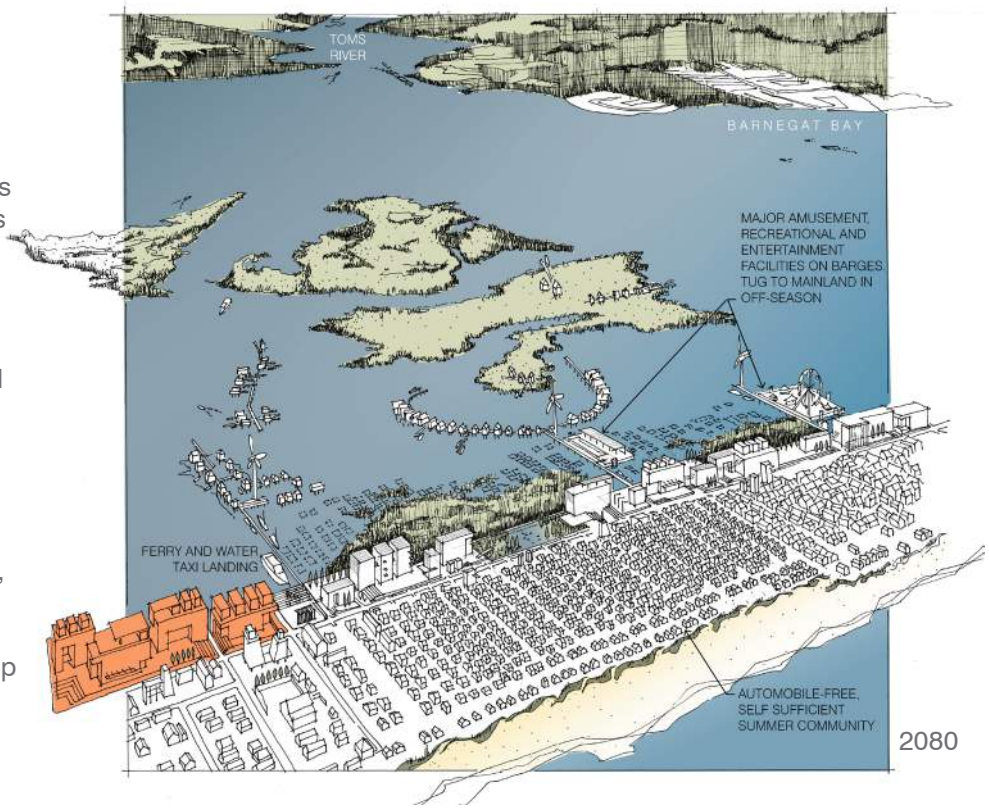
In order to support this type of maritime activity, the mainland community of Toms River will provide safe harbor for these mobile features during the winter months, as well as training for their construction and repair. The resilience center will coalesce around a new ferry terminal enhancing the downtown economy immediately through retail functions; a community gathering space along the waterfront, offering public education, arts, and job training skills; and housing. This is supported by the existing resilient infrastructure of a downtown at roughly +30' elevation: a strong public library, civic complex, high school, police and fire to serve the population of 90,000 people. Over time, the resilience center will become the starting point for water taxis to the beaches, and additional housing and mixed use developments will infill available space in the downtown area.

toms river

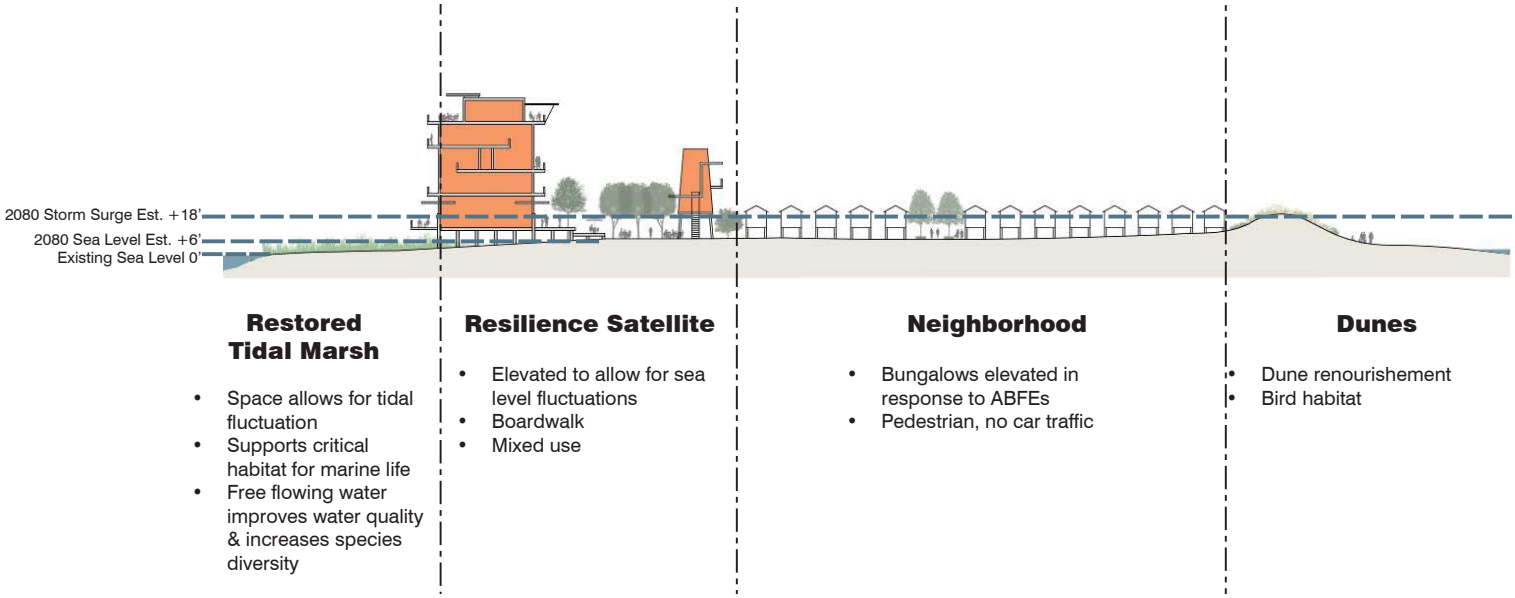
In the interim condition of 2050, a mixed-use satellite on the barrier island will illustrate the new safe elevation by building on a plinth between the commercial routes, at the edge of the anticipated 6' sea level rise. Net-zero commercial uses, a community gathering space, and public safety uses are parts of the program, along with vacation housing units above.



By 2080, there may be no more auto access, and a water taxi service will replace roads and bridges. Boardwalks will link communities along the high ground and provide a spine of hard infrastructure. Ferry stops will be located about a 20 minute walk apart, and interspersed will be public amusements on barges: the natatorium, arcades, restaurants, and rides that were characteristic of a trip to the shore.



toms river



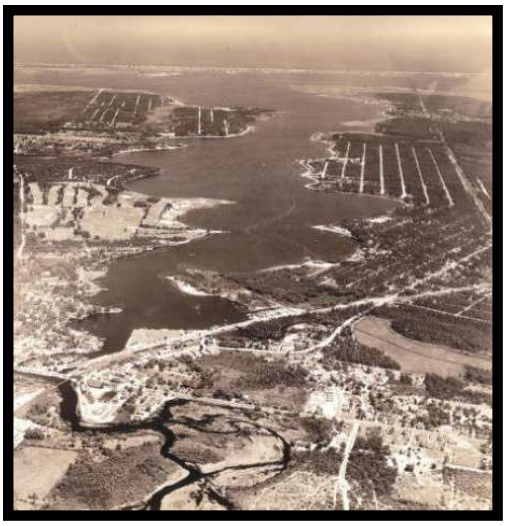
The mainland community of Toms River will provide safe harbor for the Jersey Shore as a result of sea level rise. The hub resilience center will coalesce around a new ferry terminal enhancing the downtown economy immediately through retail functions; a community gathering space along the waterfront, offering public education, arts, and job training skills; and housing. At the shore, the satellite resilience center will highlight the safe elevation by building net-zero commercial uses, gathering space, and public safety uses on a plinth between the commercial routes.

TOMS RIVER RESILIENCE CENTER

DOVER BEACHES NORTH SATELLITE

toms river

Toms River is the steady, permanent, and mainland complement to the excesses of the Jersey Shore. Its boundaries span the barrier island, tidal inlets, and former marshlands filled for development of single family residences. The downtown is rich with civic functions which contribute to resilience: library, courthouse, and public safety complexes.



toms river

How can summer cottages remain viable on coastal barrier islands as sea levels rise? Long Beach Island was first named by the Dutch in 1614, and whaling and freight shipments continued its popularity through the 20th century. The Barnegat Peninsula became a summer colony for the gentility in the 1880's. Summer visitors arrived via rail links from New York and Philadelphia. Over the years, what had once been tiny vacation cottages for holiday occupation became larger and more intensive houses and multi-family structures, with their destination the beach and the boardwalk full of entertainment.

Sandy was not the first severe storm to threaten the area, its buildings and connections. Several hotels were lost in a winter storm in 1920. A storm in 1923 interrupted train service, and in 1935, a bridge washed out, again leaving the island without rail service. The Ash Wednesday storm in 1962 split Long Beach Island into numerous pieces. One example of a resilient condition can be found at Dover Beaches North; unique in the tiny lot sizes of 30' x 50', with even tinier cottages at 20' x 30' single-story, 600 SF cottages. The pattern of sand streets with single story houses, and a driveway for vehicles to each side, alternate on opposite sides of the street to maximize ventilation. A small alleyway behind the houses, approximately 10' wide, forms a corridor for utilities, overhead power, and patios for semi-private activities, such as dining tables, storage of beach gear, and lounge chairs. Low fences allow neighbors to chat over their back fence. Here, the density remains 4,416 units/square mile.

These were built post- WWII, with 1500 gable-roof cottages closely packed on dry gravel lots. They are the most sustainable and least resource-intensive way to occupy this tenuous strip of land. Built with simple wood materials on concrete slabs, they are easy to clean, to rebuild if damaged. They are designed to accept the sands of the beach without failing. Originally ventilated without mechanical means, many have installed room units… and the necessary insulation to keep it in, where before there were simple open-frame cottages with wood-sided exteriors. The typical plan had two bedrooms and 1-1/2 baths, plus a small living area. The real gathering spaces were outside. At the ocean side along Sea View Street, the elevation is +14', equivalent to the advisory FEMA flood elevation. As it slopes toward the Bay, the elevation drops to +2'.

Yet this is a place where dreams have came true, and herein Ocean Beach earns its significance as an American landmark, an icon of its time. "You could have a house at the shore, and it didn't cost a fortune," an Island Beach historian, William Greger, told a Philadelphia reporter in 1982. One could buy the $2,500 houses for as little as $10 down in 1948, when the project was launched by a real estate salesman, Edward J. Patnaude. On an area one-mile long and one-half mile wide, dunes were leveled and flora and fauna cleared. In all, more than 1,500 lots sold, divided into three "units," with each lot having one standardized 20' x 22' home. The cottages were set on concrete pads and came unfinished except for a coat of exterior wood stain. But what they lacked in aesthetic beauty and amenities they made up for in sense of neighborhood, residents reported. And, hidden from view by a ridge at the end of the long east-west streets, lay an amenity valued as much for simply being there, as for being useful—the ocean.

Modest as Ocean Beach was, it had some pretensions. The sense of proprietorship extended to the streets and beach, which were owned in common, declared private, and patrolled to keep intruders out.

In retrospect, Ocean Beach, part of Dover Township on the mainland, can be seen as representing the cutting edge of a new era in American life and culture, worlds apart from the seashore's Victorian history. When rail service ended on Island Beach in the 1940s, it had little negative affect, since cars were already plentiful and preferred, gas was cheap, and roads were free. Elsewhere this marriage would make possible suburbs and suburban strips more substantial than Ocean Beach and a lifestyle that, on varying scales, would exceed Ocean Beach in uniformity. – HABS report No. NJ-1013

toms river

John Dos Passos wrote, “The little square houses in rows, the drugstores, the boardwalks, the gawky angular smiling existence of an American summer resort.” 1918, Bay Head

Property owners are unwilling to rebuild in the same patterns, especially as risks rise. There has already been a significant decline in permanent population from the 2000 to 2010 census, of about 30% (example: Dover Beaches North pop. 1785 to 1239, Seaside Heights pop. 3155 to 2887). Median house prices in Seaside Heights have dropped from nearly $400,000 in 2008 to $150,000 in 2013 – but even before Hurricane Sandy they were close to $315,000. There is more persistent flooding. The boardwalk at Seaside Heights has lost merchants and crowds, even before The median household income is $30,318 in Seaside Heights.

Utilities along the barrier island require up to 5 times the maintenance of normal conditions due to shifting soils and sands. Buried pipes shift and break more often here, with associated releases and interruptions. This indicates the desirability of decentralized, personal energy generation through renewable sources.

solutions

The Design Opportunity retains an equitable and accessible way for people to enjoy the shore, one which incorporates sensible, affordable cottages, where no permanent belongings are subject to loss, where the construction materials are lightweight and sacrificial, where the public supply of infrastructure can be retracted over a period of years, and where the winter storms do not place people in danger (Nor’easters thrive on cold air, and come with snow in the period from October through March, times when beachgoers are not at their peak.)

Immediate Term: Small cottages are very sensible, but are less financially and physically accessible when elevated. Therefore, do not require elevation of cottages, but allow them to be wash-through. Set maximum size limits on all lots and all new structures to retain the small scale and character. As the risk increases, they adapt without losing their character if they remain small, and consistent in their relationship to the ground. The addition of solar panels and rainwater capture systems transitions them to self-sufficiency. Wastewater treatment may still be done at the community level to avoid irregularity, but the infrastructure may be hardened.

Institute a “no-rebuilding” policy if floods damage buildings, beginning in 2025. This no-grandfather clause is critical to enact early, so that property owners may be clear on their rights and responsibilities.

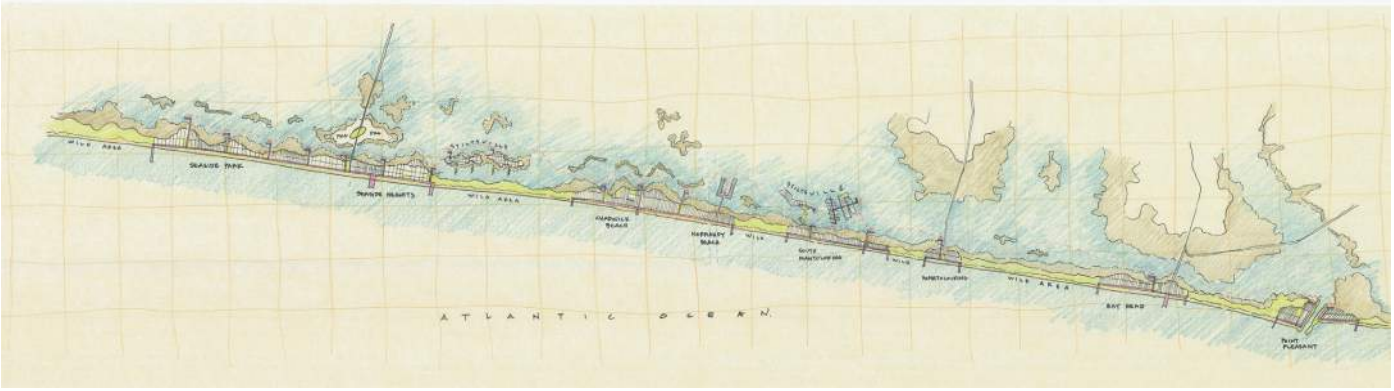
Long Term (50 years): Establishing the footprint of buildable area at the 8’ contour line, build a new flood protection wall along the Bay side, with buildings elevated to this level, and remaining utilities running along the edge. This eliminates motorized vehicles from the neighborhoods, and allows streets to return to sandy, permeable conditions. Ferryboats ply the length of the island, and a few causeways still remain, leading to parking and transit stops at high elevations. A living shoreline on the bay edge retains views and habitat for animals, and so do areas when the island becomes too narrow to occupy, similar to the Island Beach State Park to the south.

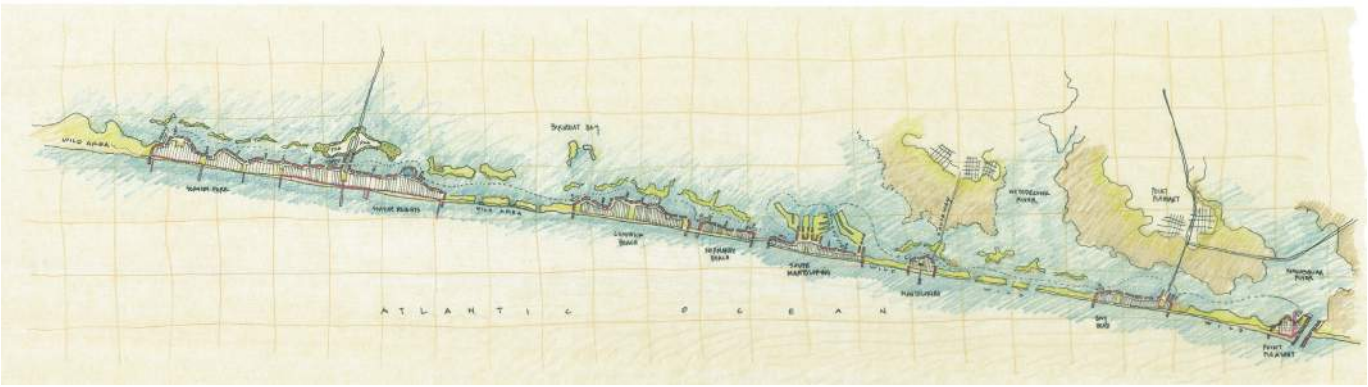
Within residential areas, tiny cottages replace mansions, leading to greater access and equity. These are only occupied for the intensive summer period, when good weather is anticipated. The Boardwalk remains as the center for amusement in places where it has historically been, such as Seaside Heights. Elsewhere, the dunes remain as the flood protection from the Atlantic waves. Temporary moorings along the bayside provide access for boaters, while walking and biking are encouraged between neighborhoods, much like at Sandy Hook.

toms river

Potential geographies: in a location along the Barnegat Peninsula or other coastal barrier islands where there was significant damage, a pilot project incorporating bay-side flood protection, an intensified edge along the 8' contour line, and restoration of pervious streets and tiny cottages is desirable, especially with renewable energy, water collection and filtration.

Impact: For the millions of children who grew up visiting the shore with every expectation that it would be there forever, this ensures that some aspects of its historic character are maintained. For property owners, assurance of continuity may mitigate some losses. For insurance companies reeling after Hurricane Sandy claims, this plan allows the accurate assessment of risks; property owners may elect not to purchase coverage. Infrastructure repair costs will be significantly reduced.





Along the barrier island, fortification of the edge can happen on the Atlantic Ocean side through beach renourishment and a hardened boardwalk structure. Alternately, it can armour the Barnegat Bay side through a sequence of foundations and fill. In both cases, when the footprint of the island is too narrow to support infrastructure, the isle is left wild and marshlands, and ferries ply the waters between the "string of pearls." Autos are left on the mainland, while bikes, pedestrians, and non-motorized vehicles are allowed.

In many ways, resilience is good urban design - making cities for people rather than vehicles. Making places with safety built in, and robust connections between them. Designing for redundancy, so that if one part of the network fails, another part has the capacity to fulfill the demand.

the resilience network is designed to improve community safety:

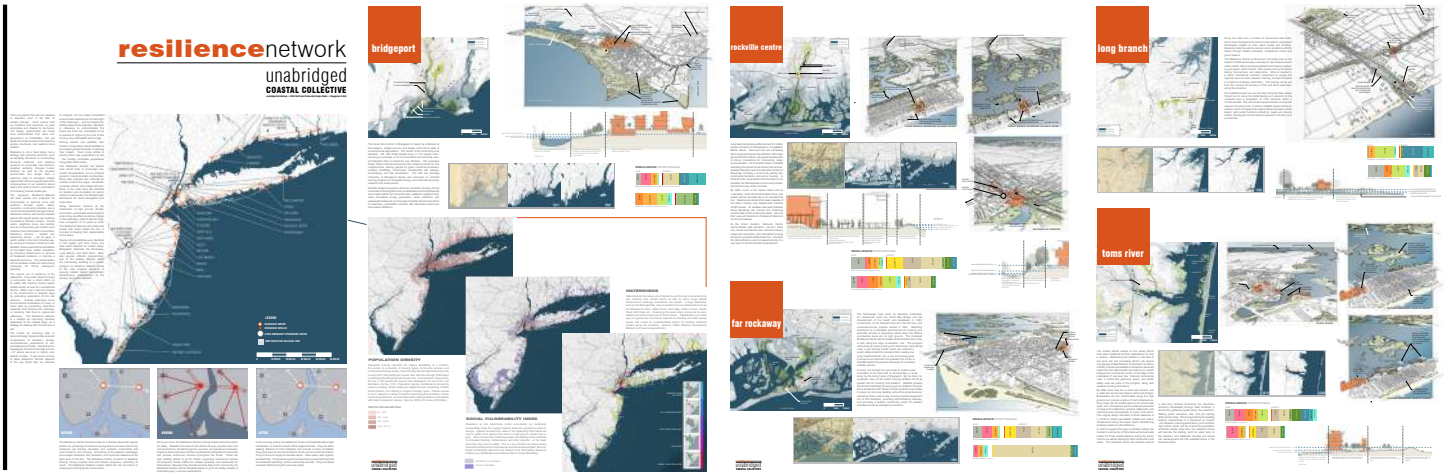
constructed to meet climate challenges,
with uninterrupted infrastructure,
programs + services to assist every day,
shelter + connections to help during a crisis

The other part of resilience is reducing demands on infrastructure... and one of the best ways to do this utilizes renewable resources on-site. The accompanying figure shows the area required to produce one person's wastewater, water, and energy for one year in New York City.

0.5 SF
WASTEWATER TREATMENT

80 SF
WATER HARVEST

584 SF
SOLAR POWER GENERATION


resiliencenetwork
unabridged
COASTAL COLLECTIVE
bridgeport
rockville centre
long branch
toms river
far rockaway

design team

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