

RESILIENT NJ NORTHEASTERN NEW JERSEY

VISION AND PRIORITIES
OCTOBER 2021

Port Newark

RESILIENT
NORTHEASTERN
NEW JERSEY

SHARE YOUR FEEDBACK

Resilient Northeastern NJ is always seeking your feedback to guide the program and ensure it is reflective of perspectives and priorities from across the region. Please continue to share your feedback on the program and get in touch with us through either of the options below:

- BY EMAIL: ResilientNENJ@gmail.com
- BY SOCIAL MEDIA: @ResilientNENJ on Twitter & Facebook, @resilient_nenj on Instagram

Please visit our website at www.resilient.nj.gov/nenj to learn more about the program and what we've done so far.



This information is available in the following languages upon request:

Español • 中文:繁體版 • Việt-ngữ • 한국어 • Tagalog • Português • قیبرعلا • Kreyòl • ગુજ રાદી • Italiano • Polski

www.renewjerseystronger.org

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HGA

Thank you to the many community members,
community-based organizations, agencies, and
regional stakeholders that have contributed to the
Resilient NJ process to date.

Resilient Northeastern New Jersey (Resilient NENJ) is developing a regional action plan to address current and future flood risks and improve quality of life in Jersey City, Newark, Hoboken, and Bayonne. The project is a partnership between the four cities, Hudson County, Ironbound Community Corporation, and HOPES CAP, Inc (the Region Team). Representatives from each sit on a Steering Committee that leads the project. Resilient NENJ is part of the Resilient New Jersey program, administered by the New Jersey Department of Environmental Protection (NJDEP) and funded by the U.S. Department of Housing and Urban Development (HUD).



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ABOUT THIS REPORT

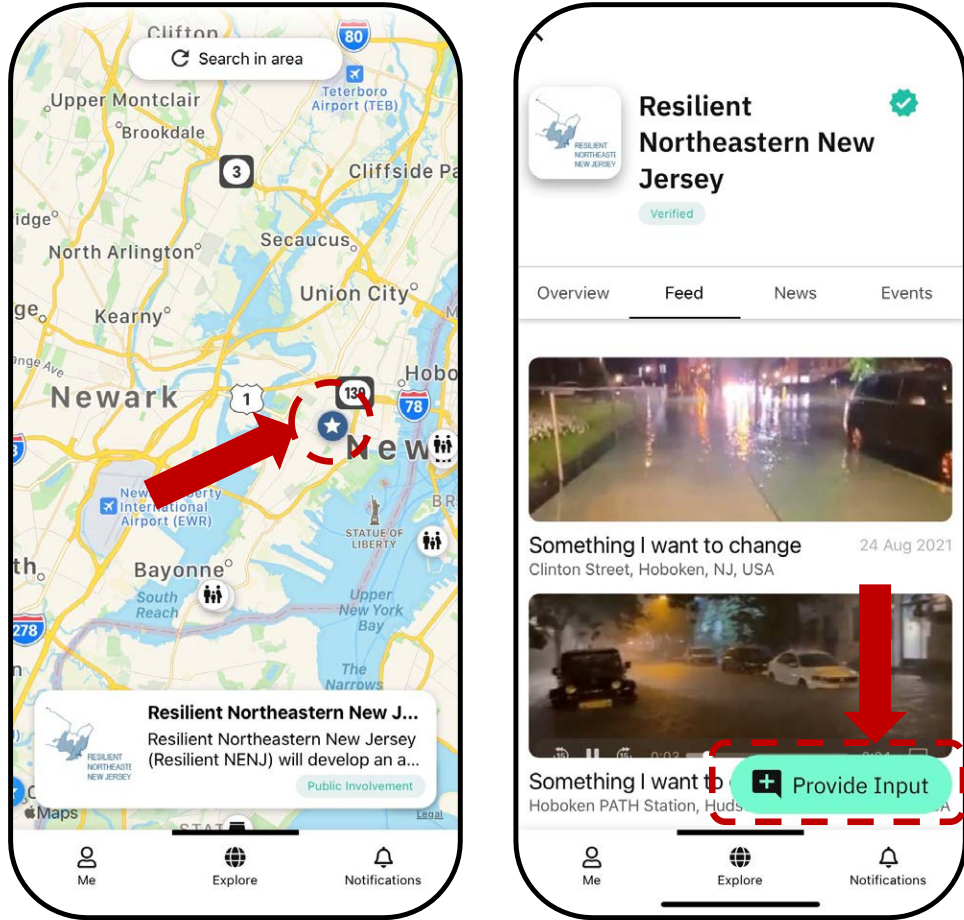
Resilient NENJ must ensure the plan aligns with community vision and priorities. During the spring and summer of 2021, Resilient NENJ asked about the places and things people love and the changes they want to see. Team members also asked about how people experience flooding now. This report summarizes what we have heard so far and what we understand is the region's vision for itself. This feedback will guide the [risk assessment](#), [scenario development](#), and the [action plan](#). Resilient NENJ expects to deliver the final report in late spring of 2022.

Report Structure

The report is structured to share what we heard about the following types of feedback:

- What people love about their community, now (and would like to see preserved)
- Vision for the future
- Flooding experiences and priorities
- Desired outcomes of the plan
- Feedback on specific solutions people would like to see:
 - Emergency response and preparedness solutions
 - Outreach, education, and capacity building related solutions
 - Physical solutions
 - Policy and governance related solutions
 - Service or program development
- Feedback on the planning process

This report incorporates direct anonymized quotes.



PROJECT FEEDBACK

Provide project feedback anytime, from anywhere! Download the lrys app from the [App Store](#) or [Google Play](#) and search for the Resilient Northeastern NJ project.

OUR ENGAGEMENT PROCESS

How Did We Gather Feedback?

To be successful, Resilient NENJ must involve diverse groups of people and listen to voices that may have been unheard in the past. This region is experiencing a pandemic and recurring flood events at the same time. This creates new challenges for people to hear about and take part in the project. We welcome feedback about how we can make it easier and more rewarding to take part.

As part of our efforts to involve diverse groups, we made materials available in English, Spanish, Portuguese, Simplified Chinese, Hindi, Polish, Arabic, Gujarati, Haitian Creole, Korean, and Tagalog.



11&13

ENGAGEMENT PARTNER MEETINGS

Project overview, breakouts by city with community-based organizations

17

CROSS-REGION STAKEHOLDER MEETING

What are priority flood resilience projects for your agency / area? What have been barriers to implementation?

CAC MEETING

Feedback on community meeting #2 structure and outreach planning

28

COMMUNITY MEETING #2

Gaps and opportunities in ongoing projects, solution selection exercise in exploration areas

VIRTUAL BOARD FROM COMMUNITY MEETING #2

MEETINGS WITH INFRASTRUCTURE / CROSS-REGION STAKEHOLDERS (MULTIPLE)

What would beneficial inter-agency coordination look like? What are barriers to coordination?



2021

CAC MEETING 31

Introductions for the 12-member Community Advisory Council (CAC) of community members, project overview, where do you see flooding? What is your community vision? What would success look like for this project? What are the best ways to engage your community?

CAC MEETING 9

Project updates, feedback on community meeting #1 structure, community meeting outreach planning

PARTNER OPEN SESSION 10

COMMUNITY MEETING #1 23

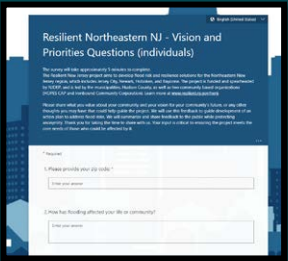
Vision, priorities, flood impacts, community assets, evaluation criteria, draft toolbox

VIRTUAL BOARD FROM COMMUNITY MEETING #1

NEWARK COMMUNITY FORUM: PREPAREDNESS & RESILIENCE AFTER IDA

How were you impacted by Ida? What resources were most helpful, and what additional resources were needed?

17



OTHER ENGAGEMENT MECHANISMS AND OUR KEY QUESTIONS

Vision and Priorities Survey, Irys App, Community Meetings

What do you love about your community, what do you want to see change, how has flooding impacted you, what are the most important factors to consider when choosing between alternatives?

Partner Survey

Survey for community-based organizations. We asked: How can we magnify engagement by partnering with you? How can this project help further your mission?

Interviews and meetings with members of the Region Team / Steering Committee and other stakeholders
What should this project accomplish? What are priorities related to flooding for your area?

Feedback on related initiatives

We reviewed other reports (that are referenced in the About Our Region report) to incorporate relevant feedback

Other input received through email, voicemail, social media, and other channels

We have received additional inquiries and feedback through these channels



WHAT PEOPLE LOVE ABOUT THEIR COMMUNITY NOW

The [action plan](#) will have the potential to shape our communities for generations to come. Because of this, Resilient NENJ asked people from the region to share what they love and value about their communities. This feedback will help the project:

- Identify solutions that reduce flood risk to places people love most
- Where possible, add or improve the things and places that people love
- Align with the values of people who could be affected by its outcomes

General feedback is below, and the map on the opposite page shows feedback about specific places.

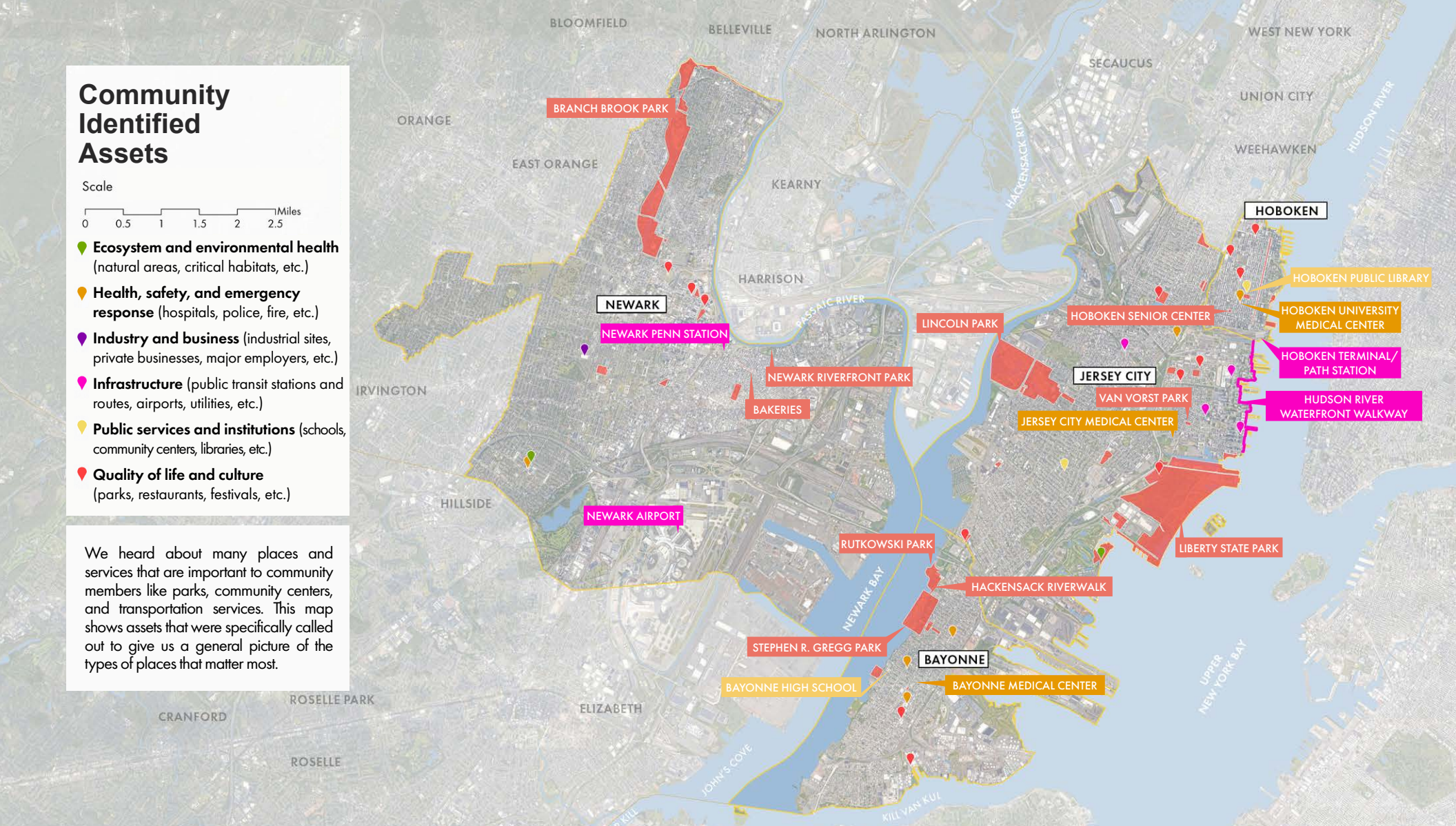
WHAT MAKES OUR COMMUNITIES GREAT?

So far, we have heard the following overarching themes that people value:

- The people and sense of community. People told the team that they value the people, diversity, and sense of home and security in this region. This includes arts, culture, and events that help connect people to one another, and the places they live, work, and play.
- Access to transportation. In this populous region, people value access to major roadway networks and to public transportation systems. Examples include:
 - PATH trains and NJ Transit trains, buses, and light rail for commuting to work, social activities, and nearby New York City.
 - Ease of mobility, such as in the Greenville neighborhood of Jersey City
- Walkability and bike-ability. Many people told us that they value being able to walk to where they need to go, access the waterfront, and the bike. We also heard from many that they would like to see the ability to do these things increase.

People also told us that the following types of places are important:

- Pocket parks, waterfront parks, and natural and green spaces. People told us public waterfront areas are important for fun, relaxation, and views. Examples include the Hackensack Riverwalk and Hudson River Waterfront Walkway. Open spaces have become more important to people in the wake of the pandemic. COVID has raised awareness of the need to have access to flexible community gathering spaces outdoors in all seasons.
- Community facilities and services like hospitals, schools, small grocery stores, and religious institutions
- Recreational and cultural gathering spaces and activities. Examples include playgrounds, waterfront areas, exercise paths and facilities, pedestrian plazas, and restaurants
- Diverse small businesses



We asked: What do you value most about your community?

“It’s both a village and a city” – Hoboken resident

“I see faces like mine” – Jersey City resident

“Diversity of family-owned businesses! I love being able to shop local and support minority-owned businesses” – Newark resident

“Looking out for each other” – Bayonne resident

“Family-friendly feel and inclusivity” – Jersey City resident

VISION FOR THE FUTURE

We asked people about challenges and issues they would like to see addressed. Community members told us they would like to see more green space, better mobility, a diverse economy, green jobs, and more transparency and two-way communication with government.

Regionwide, community members indicated they want to see these changes in the future:

ENVIRONMENT

- Address issues of air quality and urban heat island effect
- Reduce pollution and combined sewer overflows
- Increase use of renewable energy
- Reduce trash in the streets that clogs catch basins and makes its way into public spaces or bodies of water
- Preserve and enhance ecosystems /habitats
- Increase trees and greenspace

ECONOMY

- Create new jobs, including higher quality technological and green jobs
 - Train residents for those jobs
 - Shift away from manufacturing to industries that are healthier and safer for communities
- Promote economic diversity and thriving local economies
 - For example, by promoting artisans and small businesses
 - Explore and implement creative economic structures for improving resilience
- Reduce financial burdens of flooding to residents
- Avoid long-term property value loss and community disinvestment from repeat flood events

SOCIAL (COMMUNITY, EQUITY, AND QUALITY OF LIFE)

- Improve cleanliness, safety, health, food access, and basic quality of life
- Focus on resilience and innovation in the community
- Increase affordable, quality housing and housing that promotes diversity of residents
- Mitigate impacts of flooding to daily life
- Preserve and enhance neighborhood and waterfront parks, waterfront walkways, gathering places, and recreational and cultural activities
 - Promote access to these spaces.
 - Create new and improved recreation centers, spaces for children to play, public health centers, and spaces to cool off from the heat
- Preserve feeling of sense of home / community and cultural diversity.

PHYSICAL INFRASTRUCTURE

- Improve access to regional transportation. While many people value existing access to regional roads and public transit, people also expressed the need for improved public transportation and access. For example:
 - People asked to increase transportation access to MOTBY in Bayonne.
 - People also asked for improved connectivity between the cities of the region.
- Center pedestrian and biker experience. Many community members requested more bike lanes and pedestrian plazas to improve walkability
- Anticipate parking needs. People asked for better parking conditions in some areas. Emerging technological improvements and planning could reduce parking needs in the future. We heard from many people about the desire to reduce car usage and impervious parking areas.

RELATIONSHIP WITH GOVERNMENT

- Communicate more about what actions are being taken to reduce flooding and its impacts
- Increase preparedness and emergency response communication
- Invest in relationship building between government agencies and community members.
- Ensure that community needs are met by listening and responding more frequently to residents

There are five pillars of resilience that also correlate to the five types of infrastructure in every community.

The Resilient NJ team received vision-related feedback across all five pillars of resilience.



A VISION OF TREES AND GREENERY

Again and again, people shared a vision for increased green space and tree canopy. Examples of raw input received on this topic are below:

- “I want to see greater investment in green infrastructure (bioswales, rain gardens, retention tanks, more tree-lined streets)”
- “I’d love more outdoor spaces as that has become more important during the pandemic. I like that the city has created bike lanes and would love to see more.”
- “If nature-based solutions are used, additional risks like public health risk and respiratory risk would be addressed”
- Would like to see increased access to quality green space
- “[Would like to see] increased green infrastructure and reduced CSO events. These are moving forward slowly, however, more public understanding as well as priority from decision makers and in capital budgets is necessary- take ownership and responsibility for expanding.”
- Increasing green spaces and tree cover to improve environmental consciousness and participation, to provide stormwater management, and for mental/physical health and educational benefits for children
- Interest in better green corridors connected to Liberty State Park / extending the park west to the community and reducing impervious areas (including permeable paving)
- Interest in green infrastructure because of the aesthetic co-benefits, wherever it makes sense
- Interest in trees and increasing pervious surfaces. Interest in collaboration between counties on a planting initiative.
- We haven’t had enough opportunities to use nature-based solutions
- “[Would like to see] more green space and trees added to the city.”
- More outdoor, park, and green spaces / trees / green infrastructure / community gardens
- More parks and green spaces in Jersey City and Hudson County, especially in the Bergen Arches, and return of the reservoir in Jersey City Heights to a natural state.
- More resiliency, more green infrastructure
- More tree lined streets
- Most positive contribution to natural feeling of the neighborhood



GREEN INFRASTRUCTURE

Community members come together to plant various flowers in the planters along Oak Street in Jersey City.

Image Source: Jersey City

- Open green space, cleaner soil, cleaner air in each of our neighborhoods.
- Programmed and unprogrammed open space
- Providing nature-based solutions for urban areas with nuisance flooding
- Some green spaces are lost due to increase in parking spaces
- Interest in restoration of marshlands to dampen storm surges
- Tress / greenery to add shade and air quality benefits
- Want to see more green infrastructure in right of way
- “We obviously need more open green space! More absorbent surface and fresh air to go with it!”
- “We should begin to look more like the Garden State!”
- “Yes, more local-level green spaces that are accessible to folks with respiratory issues, mental health.”
- “The fact that we can begin to engage in green infrastructure almost immediately. When thinking about it, when at the very least Conn, NY NJ Del coastal communities, counties work together to purchase trees en masse, the cost should be strongly discounted, allowing trees to be planted along a broad swath of the Mid-Atlantic Coast. To me, that is a very exciting prospect! For storm surge, helping to reduce flooding, saving coastal areas from erosion, and fighting against climate change all while providing beauty that makes life for humans more relaxing. It is a win, win, win, win, win!!!”
- “I think it is important to develop campaigns that inform and encourage people to plant trees in their communities, and to engage people enough so that they volunteer to help plant trees. Like the WPA, this is our time to come together to help save the earth, protect the places where we live, and provide the beauty of nature, in this instance trees from Delaware to Connecticut. I’m excited, I think we can keep going up and down the Atlantic coast. It is the simplest and the most cost effective as a first step towards mitigating and hopefully thwarting the incursion of sea level rise into our communities while having several other benefits.”
- In the South Ironbound neighborhood: need for more trees, green spaces, public parks, and playgrounds that are not made out of concrete. The area has a lot of concrete that makes it unbearable on hot days.
- Interest in increased coordination with agricultural extension office services to help with pests, tree issues, conservation, and water-saving park design, as well as sustainable and resilient design.



TREE PLANTING

A tree being planted on Berry Lane in Jersey City.

Image Source: Jersey City



VIBRANT GREEN SPACE

The tree-lined paths of Collins Park wind through wide open green space along the waterfront in Bayonne.

Image Source: Resilient NENJ

FLOODING EXPERIENCES AND PRIORITIES

Resilient NENJ seeks to reduce current and future flood risk. Flooding is an existing issue within our region and climate change is making it worse. This section shares what we have heard about the region’s experience with flooding: the type of flooding, how often it happens, the consequences of flooding, and the types of actions people are already taking to reduce risk. This information helps Resilient NENJ check technical data on current flood conditions.

A SUMMER OF FLOODING

Several flood events occurred in recent months. Resilient NENJ collected photos and stories from these flood events.

STORM	SUMMARY	RAINFALL*
Tropical Storm Elsa, July 8, 2021	This storm dropped several inches of rain across northeastern New Jersey. Hoboken received a concentration of severe flooding observations.	1.78 inches from 4:45 AM to 11:40 PM
Severe thunderstorms, July 17, 2021	Severe thunderstorms affected all New Jersey. The storms caused significant flash floods and street flooding. Newark received a concentration of reports.	3.76 inches from 1:40 PM on 7/17 to 1:40 AM on 7/18
Tropical Storm Henri, August 22, 2021	Hoboken and Jersey City received concentrations of damage from this storm. Reported impacts included flooded basements, sewer collapse, and sinkholes.	5.3 inches from 7:30 PM on 8/21 to 1:30 AM on 8/22 and 3.12 inches from 7:55 AM on 8/22 to 7:30 AM on 8/23
Remnants of Hurricane Ida, September 1, 2021	These thunderstorms devastated New Jersey and New York. The entire region experienced transportation system impacts and many homes and cars flooded. These events happened over two months and show the urgent need to address flood risk. This summer also exposed vulnerabilities in our infrastructure, communities, and government adaptive capacity. Resilient NENJ has pulled reports of flooding from Ida from many sources, including social media. Sharing experiences with flooding helps Resilient NENJ complete analyses and develop solutions.	7.76 inches from 5:10 PM on 9/1 to 1:00 AM on 9/2

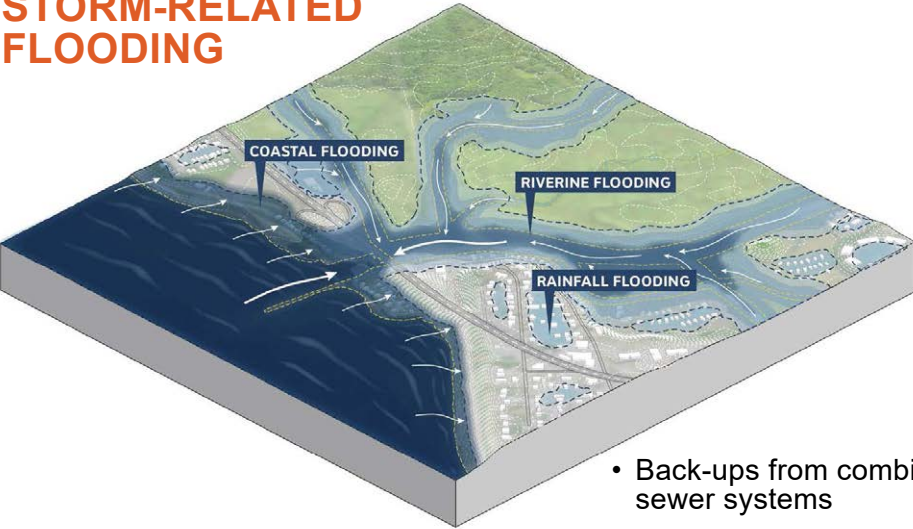
*Rainfall totals are from the [Newark USGS weather station](#).

STORM-RELATED FLOODING can come from major rain events or coastal storms like hurricanes, tropical storms, or nor’easters. Flooding impacts homes, businesses, streets, and other important community assets. The water can come from the sky in the form of rain, from beneath us when the sewer system backs up, or from the sea or rivers from storm surge.

TIDAL FLOODING is when natural fluxes and the force of the moon pulls water higher in certain areas. High tides can overtop bulkheads and other flood protections, or come up through drainage systems.

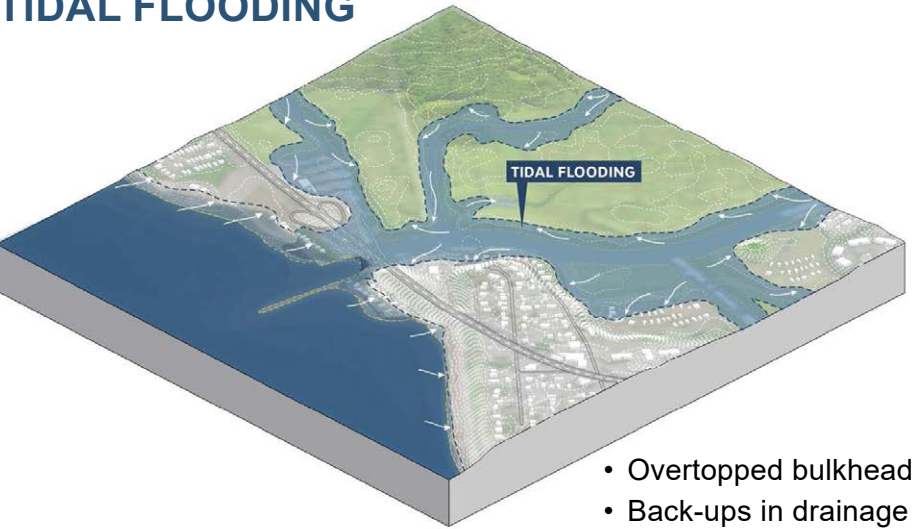
Over time, both storm related flooding and tidal flooding are getting worse due to sea level rise and changes in rainfall amounts. Resilient NENJ is considering all types of flooding in our development of solutions.

STORM-RELATED FLOODING



- Back-ups from combined sewer systems
- Ponding at underpasses or low elevations
- Storm surge

TIDAL FLOODING



- Overtopped bulkheads
- Back-ups in drainage systems

WHAT FLOODING LOOKS LIKE IN NENJ - *SUMMER 2021*



JERSEY CITY DURING HURRICANE IDA
Flooding on Lexington Avenue in Jersey City during Ida
Image Source: @jj_2989 via Twitter



HOBOKEN DURING HURRICANE IDA
Flooded Domino's in Hoboken during Ida
Image Source: @GaryHershorn via Twitter



NEWARK IN THE AFTERMATH OF HURRICANE IDA
Debris in Newark after Ida
Image Source: Mark J. Bonamo via TAPinto Newark



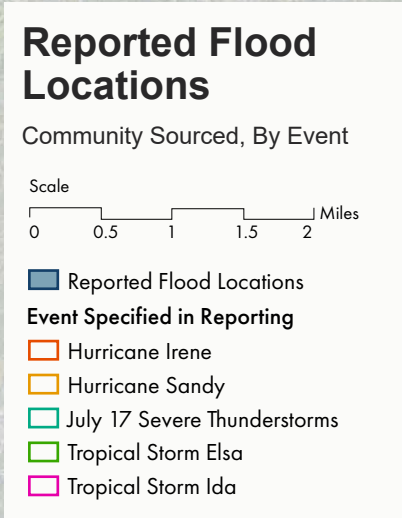
TROPICAL STORM ELSA
Flooding on Clinton Street in Hoboken during Tropical Storm Elsa.
Image Source: @bennythebugman



WADING THROUGH THE IRONBOUND
Waist-deep flooding in the Ironbound neighborhood of Newark during severe thunderstorms on July 17th.
Image Source: Kenny Lin



TROPICAL STORM HENRI
An emergency response team in a flooded Vesey Street in Newark on August 22nd in the aftermath of Tropical Storm Henri.
Image Source: Kenny Lin



Reported flood locations were pulled from community meetings, the Irys app, the survey, other engagement meetings, social media, news reports, official reports of repeat flood locations, and other resident reports.

Always fearful that my belongings in my basement will be ruined. Fear of mold forming. Yesterday it took me 40 minutes to drive less than a mile because so many streets were flooded.

Flooding robbed me of treasured things I stored in my basement. Flooding has given me PTSD that is aggravated every time it rains.

My home has flooded frequently in the 41 years I have lived in Hoboken. It has cost me thousands of dollars in repairs and renovations over the years.

I have already had 3 feet of water in my basement. I live in fear each time that there's a storm that it will happen again.

It has disrupted our lives, affected our health, and increased our stress levels. It also makes us feel anxious and worried about if we will ever be able to sell our house or if flooding will get worse with climate change.

FEEDBACK ON HOW FLOODING HAS AFFECTED PEOPLE'S LIVES AND THE COMMUNITY



“Rainxiety” Many participants reported having anxiety every time it rains. Some reported not leaving their homes or going to specific parts of town when it rains. One participant said they have PTSD from flooding and shared that each rain event takes a toll on their mental health and well-being. People also expressed concern about the potential for future food shortages due to transportation disruption from flooding (in and out of the city).



Health impacts. Many people expressed concern about possible health impacts of flooding in the region. People reported smelling sewage and seeing brown floodwater. Some reported experiencing skin conditions from being in floodwaters. People also reported sewers backing up into homes and mold issues in their homes after a flood. Some worried about the possible release of toxins from rising groundwater at brownfield sites and polluted floodwaters from industrial land uses.



“The situation is getting worse.” Many participants said the flooding seems to be getting worse and is showing up in new places. Some reported that this year's flooding in July was worse at their home than under Irene, and that Ida (in August) was the worst they'd seen. Many participants reported they experience disruptive flooding more than once a year.



Insurance. Some people said insurance is not covering all losses and, at the same time, insurance rates are going up



Investment. Some people shared that they have spent a lot of money protecting their homes and are still flooding. Some also struggled to understand what the building code and permitting process allows.



Direct physical damage. Several participants said they have spent thousands of dollars repairing flood damage. They reported mold and structural damage to basements and homes, personal belongings, cars, electrical and mechanical assets, and businesses. We also heard about a fire resulting from a flood that caused further damage.



Disruption of public services. People reported power and water outages, mobility disruptions, street closures, storm drains and drainage not functioning, and even that incinerator functionality suffers when exposed to wetter trash from flooding. People also worried that emergency response and evacuation might fail if roads flood.



Daily life. Many people reported significant impacts to daily life when it rains. Examples include:

- Cannot walk across streets when it rains
- Wedding damage and disruption
- Trash strewn about after a flood
- Cannot get out of driveway when floods from rain events
- Vehicular crashes
- Getting trapped by flooding from heavy rainfall
- Having to park car far away in case it rains and will flood
- Commute disruptions
- The impacts of “rainxiety” on daily life



Environmental impacts. People expressed concern over erosion, toxins in environment, water quality, and death of trees from salinity, for example.

EXAMPLE TESTIMONY OF EXPERIENCES WITH FLOODING

- I have already had 3 feet of water in my basement. I live in fear each time that there’s a storm that it will happen again*
- In Ironbound neighborhood: flash flood in July 2021 that was worse than Irene flooding. Flooded garage and ground floor, needed to spend Saturday night and Sunday cleaning it up.*
- We spent nearly \$10,000 on a French drain and sump pumps but even that has difficulty keeping up and we have had tens of thousands of dollars in damages - multiple water heaters, furnaces, washing machine & dryer and more. It’s one thing when hurricane Sandy hit and it was the exception but having to worry about rainstorms causing flooding is horrible. We have multiple water sensors and cameras in our basement so that we can see whether we’re home or not.*
- Flooding robbed me of treasured things I stored in my basement. Flooding has given me PTSD that is aggravated every time it rains.*
- Hurricanes Irene and Sandy devastated my home and the whole neighborhood. I have flood insurance and it barely covered anything. It cost me tens of thousands of dollars to rebuild.*
- In basement, appliances all have to be on CMUs (concrete masonry units) because of flooding at least twice a year. In order to access the top loading washing machine, I need to use a step stool. Flooding even affects how we do our laundry.*
- This is the third time in the past three months that we have experienced flooding, which is flooding our basement and affecting the hot water in my building. I’m not sure as a new resident to Jersey City what resources are available and who to contact to help with this issue.*
- My entire basement, garage and home office got flooded. The water came from [drains in] the street so quick that I didn’t have a chance to save anything. I got 1ft of water, I lost almost everything I had in the basement including a computer that I use for work. My boiler got damaged and I [am] currently dealing with mold issues. This was a [disaster]!*
- We have [in the Route 440 area] an expensive sump pump to help with flooding, [but even though the City knew Hurricane Ida storms were coming], it took 1.5 hours for someone to come start it up. Once that was working the water went down quickly.*
- We were literally stranded inside our apartment building for three days and eventually waded out into the toxic sludge to go find somewhere to charge our electronics. We survived everyday storms only by being vigilant - watching the tides and radar, always having a go-bag ready, and actually using fishing waders to walk down a city street! I’m so thankful to no longer live with that anxiety.*
- Henri and Ida each flooded my entire basement. We lost carpeting, furniture, personal items, pictures, the list continues. Walls have been cut away to mitigate mold. Ida was very frightening. We used sandbags to secure the doors facing the Service Road and the water was simply too high. I’m facing 10,000 dollars in repairs or replacements. I cannot do that each time it storms.*
- My wife and I live in a basement apartment of a large building. Storm water and sewage flooded with high pressure out of our bathtub, toilet, and sink while the walkway outside the building’s basement where we live flooded with storm water up to our knees as we evacuated: it is on two declines bringing water in from the street to the building. We’ve lost over \$500 of possessions and our renter’s insurance does not cover flooding. The unit is not safe, the building and landlord are not making repairs necessary to keep the apartment habitable nor are they engaging in any repairs of the floor and walls.*

FEEDBACK ON FLOOD PATHWAYS AND CONTRIBUTORS

As part of the technical evaluation process, the technical team is looking further into the reported flood pathways and possible contributors to flooding shared below.

Flood pathways reported (storm surge pathways during Hurricane Sandy)

- Flooding came into Hoboken through Weehawken Harbor
- Long Slip - major inundation point leading to Hoboken and Jersey City
- Morris Canal – flood pathway to Communipaw / Bergen-Lafayette neighborhoods

Types of flooding experienced and contributors

TYPE OF FLOODING	POSSIBLE CONTRIBUTORS TO FLOODING THAT COMMUNITY MEMBERS SHARED
Rainfall flooding / flash floods Blocking streets and trapping people in buildings	<ul style="list-style-type: none">Excess impervious surfaceLimited sewer system capacityOutdated / failing sewer systems, perceived impacts to sewer systems and capacity from new developmentHigh tides blocking combined sewer overflows and backing-up systems
Basement flooding Many residents experience basement flooding of their homes	<ul style="list-style-type: none">Sewer system back-upsInconsistency among neighbors – less effective to install a sump pump if your attached neighbor does notRunoff from gutters from adjacent homes
Coastal flooding In recent years, the most significant storm surge flooding event in the region was Hurricane Sandy in 2012	<ul style="list-style-type: none">Water getting in through flood pathways (see reported flood pathways above)

“I volunteer in Pershing Field and Leonard Gordon parks. We do not have any way to retain water. It flows to sewers because its all concrete in parks. Some goes into basements on Liberty Ave.”

“Residents in the North Ward [of Newark] are now starting to experience the effects of flooding in their community that is believed to be the result of capacity constraints of the City’s stormwater conveyance system during precipitation events as it relates to development.”

PLAN GOALS AND VALUES

The engagement process helped to clarify plan goals – what the plan should do (or not do) – and advance evaluation criteria, which we will use to make decisions that will help achieve those goals.

WHAT WOULD WILD SUCCESS LOOK LIKE?



CALL TO ACTION

Many people said that flooding has become so frequent that it impacts their quality of life. They asked Resilient NENJ to identify solutions that could help as soon as possible. They said that the typical planning timescale is too long to wait and that they need relief now.

HOW FEEDBACK AFFECTS RESILIENT NORTHEASTERN NJ'S MISSION

The Steering Committee developed a working mission statement to evolve through the project. A key theme of input has been the need to prevent gentrification and displacement of people. Resilient NENJ adjusted the mission statement to better articulate this need. Changes are in bold.

WORKING PROJECT MISSION STATEMENT

Resilient Northeastern NJ will provide a clear vision and roadmap for reducing flood risk through deep collaboration between local and state governments and community-based organizations, along with valuable input from the public and other stakeholders. The plan will leave a legacy of regional investment and information and resource sharing to help our people and places thrive in the decades to come. The plan will be driven by best available data, technical evaluation, and inclusive and equitable engagement. It will leverage best practices to create social, environmental, and economic benefits and bring value to **those who live in the region, now, and** all who will share in the region's future.

FEEDBACK ON GOALS

Resilient NENJ's main goal is to reduce current and future flood risk. Actions that reduce flood risk can also include other benefits to the community. People shared feedback on both flood-related goals and community goals.

FEEDBACK ON PRIORITIES AND KEY CONSIDERATIONS FOR THE PLAN:

- Address current flood risks. People are already experiencing impacts from flooding today
- Address risk from all flood hazards that impact the region. This includes rainfall flooding, tidal flooding, and coastal storms, and specifically the impacts of basement flooding
- Ensure solutions consider climate change impacts. This includes sea level rise and increasing intensity of rain and storm events.
- Ensure that flood risk reduction solutions protect the most vulnerable populations
- Aim for a “dig-once” approach. Identify solutions that could advance multiple goals or projects at the same time. This could maximize efficiency and reduce negative effects of construction.
- Ensure that solutions are long-lasting / effective in the long-term

FEEDBACK ON THE GOALS OF PLAN IMPLEMENTATION

We organized feedback on goals by pillar of resilience:

SOCIAL

- **Adaptive capacity**
 - Provide effective education on vulnerability and tools / resources available to reduce risk at the individual and community level

Achieving this goal will require providing multiple ways of getting information out to different groups of people at multiple scales

- Improve information and access to resources for preparedness and recovery from disasters
- **Community and social fabric**
 - Keep communities intact
 - Prevent gentrification of communities

Some participants specifically stated that overdevelopment leads to increased impervious surface, stresses infrastructure, and makes them feel that their sense of community is eroding

- **Livability and quality of life**
 - Protect human life
 - Reduce impacts of flooding on daily life
 - Preserve and enhance neighborhood and waterfront parks, waterfront walkways, gathering places, and recreational and cultural activities, and improve access to these spaces
 - Preserve views from the waterfront
 - Include creative use of vacant lots / buildings



INSTITUTIONAL / GOVERNANCE

- **Improve transparency and communication between community members and government related to flooding and flood resilience**

ECONOMIC

- **Economic vitality**
 - Create new jobs, including higher quality and green jobs, and training to prepare residents for those jobs.
 - Reduce economic burdens to residents
- **Funding**
 - Identify funding sources and tie solutions to funding opportunities to ensure implementation occurs.

Acquiring funding was identified by stakeholders as a major roadblock for completing implementation of resilience-related projects

ENVIRONMENT

- **Address issues of air quality and urban heat island effect**
- **Protect and increase tree canopy and green / open space**
 - Prevent trees from falling as a result of flooding or dying

PHYSICAL

- **Solutions should include:**
 - Emergency response and preparedness
 - Critical assets and infrastructure flood mitigation and improvements
 - Power continuity
 - Transportation and mobility preservation and enhancement



REPEAT FLOODING
Residents along Vesey St in Newark have documented several flood events since 2003. Pictured are flood events from July 2003 (left) and August 2011 (right).
Image Source: Bernard McNamee

EVALUATION CRITERIA

This project will produce three alternatives for flood risk reduction called **scenarios**. Each scenario will include actions to address current and future flood risks. Each scenario must align with the community vision. We need a process to make sure that happens. Resilient NENJ must compare actions and scenarios to each other and select a **preferred scenario** for the final [action plan](#).

Evaluation criteria are community priorities and desired outcomes from flood risk reduction solutions. Evaluation criteria guide engineers and planners toward actions to use in the scenarios. They also help us understand how actions measure against one another.



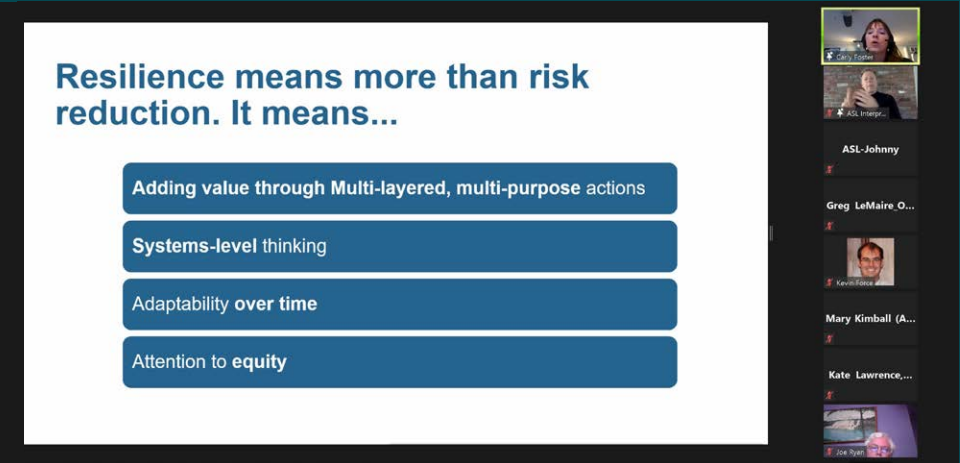
EVALUATING MEASURES

Resilient NENJ meeting with Newark officials and stakeholders to discuss and evaluate potential measures.
Image Source: Resilient NENJ

WHAT IS THE DIFFERENCE BETWEEN THRESHOLD AND ALTERNATIVES EVALUATION CRITERIA?

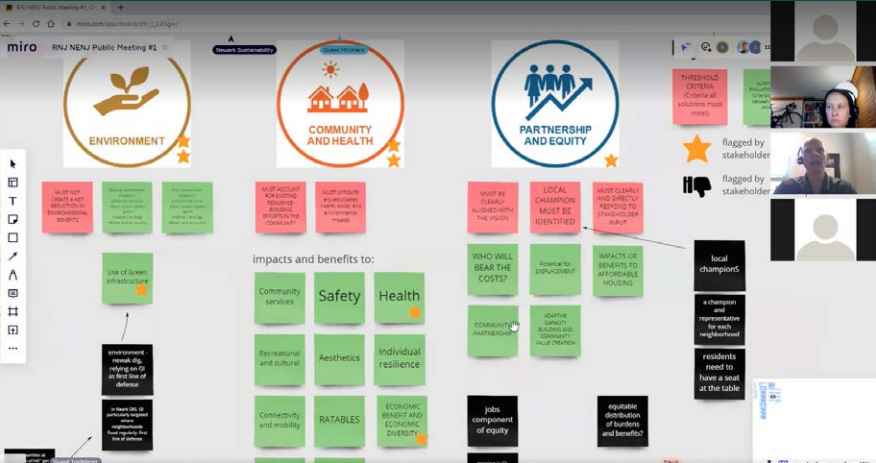
Our evaluation criteria list includes both “threshold” criteria and “alternatives evaluation” criteria.

- **Threshold criteria represent requirements for the preferred scenario.**
- **Alternatives Evaluation Criteria help us evaluate scenarios (that pass the threshold test) against one another.**



THE MEANING OF RESILIENCE

Our discussion about what resilience means during Community Meeting #1.



EVALUATION CRITERIA

Our discussion about draft evaluation criteria during Community Meeting #1. To view the full draft evaluation criteria, please see [Appendix A](#).

WE ASKED: WHAT SHOULD BE THE PRIMARY DECIDING FACTOR WHEN CHOOSING BETWEEN ACTIONS THAT COULD REDUCE FLOOD RISK IN YOUR COMMUNITY? WE HEARD:

“Equity. Poorer neighborhoods deserve good infrastructure investments. Poorer neighborhoods deserve access to safe alternative transportation and better public transportation.” – Jersey City resident

“I would use a prioritization system that balances protecting the critical nature of key infrastructure (public transit like PATH and Light rail, hospitals, and emergency services) and protecting property values so the city can continue to fund that infrastructure through property taxes.” – Jersey City resident

A HYPOTHESIS TO TEST

Resilient NENJ developed a preliminary draft of evaluation criteria based on:

- Guidance from NJDEP
- Our early understanding of the planning context in which this project is set
- Early input from the region team and community members
- Precedent examples from resilience planning initiatives in the region and other regions

Technical analysis and community feedback help update and refine the evaluation criteria. Resilient NENJ presented the draft criteria in the June community meeting. The draft criteria are included in [Appendix A](#). Participants provided feedback on priorities, added new criteria, and suggested changes to categories. This and other feedback resulted in updated criteria presented on the following pages. Resilient NENJ will update these criteria again using feedback through this fall and winter.



EVALUATION CRITERIA CATEGORIES

Categories for our evaluation criteria. Equity is integrated into each of these categories.

- 

**Design
Life and
Adaptability**
- 

**Cost and
Feasibility**
- 

**Risk
Reduction and
Effectiveness**
- 

**Environmental
Benefits and
Impacts**
- 

**Community
and Health
Benefits and
Impacts**
- 

**Partnership,
Community
Involvement,
and Education**

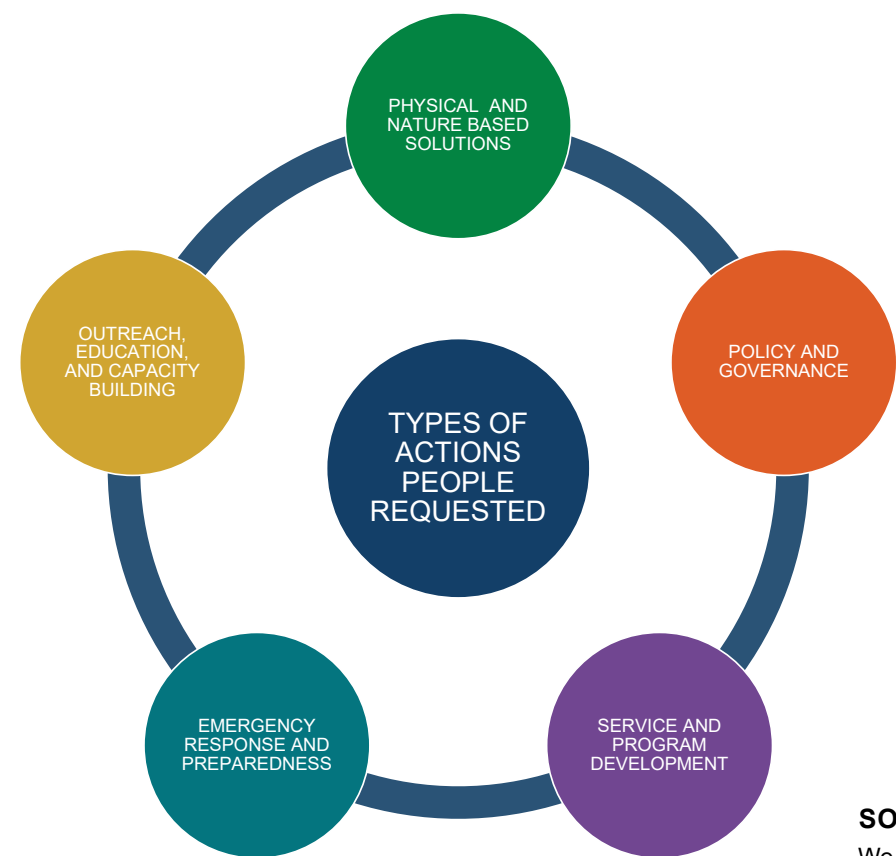
THRESHOLD CRITERIA		ALTERNATIVES EVALUATION CRITERIA	
What a scenario <u>must</u> do		How we will weigh scenarios against each other	
EQUITY	<ul style="list-style-type: none">• The project / scenario should have high probability of long-term effectiveness and be able to adapt to future conditions*	<ul style="list-style-type: none">• Design life / useful life• Performance horizon• Phase-ability and time to implementation*• Adaptability / flexibility*• Replicability	
	<ul style="list-style-type: none">• Benefits outweigh costs• Legal / permitting requirements considered and engagement has occurred• Stakeholder support*	<ul style="list-style-type: none">• Funding strategy• Cost: benefit / cost ratio*, overall cost*, maintenance cost*, equitable distribution of cost impacts, distribution of cost burdens to residents (limit impacts to taxes and service fees)*• Existing implementation and maintenance capacity*• Stakeholder preference*• Constructability / how easy it is to complete• Maintenance requirements• Permitting and regulatory considerations	
	<ul style="list-style-type: none">• Must reduce risk of current and future flooding*• Must not increase flooding / risk in other parts of the community*	<ul style="list-style-type: none">• Risk reduction (avoided damage and loss) to: critical assets (including transportation systems and power continuity for facilities)*, community-based assets*, residential property*, human life*, socially vulnerable / low-income communities*, business and economic assets• Equitable distribution of risk reduction benefits* (benefits those harmed the most, maximize number of residents that benefit)• Effectiveness: level of protection, reduction in flood extent, ease of implementation during an emergency	
	<ul style="list-style-type: none">• Must not create a net reduction in environmental benefits	<ul style="list-style-type: none">• During and post-construction impacts / enhancements to*:<ul style="list-style-type: none">• Open space / green space / natural feeling / tree canopy• Habitat / ecology• Water quality (e.g. by addressing combined sewer overflows)• Air quality and urban heat island effect• Use of green infrastructure*• Accomplishing remediation of soils, sediments, etc.	
	<ul style="list-style-type: none">• Must account for existing resilience-building efforts in the community• Must mitigate any anticipated health and social impacts	<p>Impacts and benefits to communities during and after construction, including:</p> <ul style="list-style-type: none">• Livability and quality of life: community services, safety (of children, in particular)*, health*, happiness, recreational and cultural / historical spaces, aesthetics (preserve views of Manhattan), public access to the waterfront*• Community and social fabric: keeping communities intact / potential for displacement*• Individual resilience• Economic: ratables, economic benefit and economic diversity / job creation / investment*, flood insurance rates, affordable housing• Connectivity and mobility*• Transportation systems / traffic / commutes*• Parking• Future construction• Density / development trends <p>Equitable distribution of these impacts and benefits*</p>	
	<ul style="list-style-type: none">• Must be clearly aligned with the vision• Local champion must be identified*• Must clearly and directly respond to stakeholder input / community-driven plan	<ul style="list-style-type: none">• Community partnership*• Adaptive capacity building and community value creation• Youth engagement & education*• A champion and representative partner are identified for each neighborhood involved	

* Priority criterion flagged by community members

FEEDBACK ON SOLUTIONS PEOPLE WOULD LIKE TO SEE

AN EVOLVING TOOLBOX OF POTENTIAL FLOOD RISK REDUCTION SOLUTIONS

As part of the engagement process, Resilient NENJ developed a toolbox of common flood risk reduction solutions that fall into three categories. This initial toolbox, which was presented during community meetings in June and July, is located in [Appendix C](#). Through feedback, people shared specific solutions they would like to see to address flooding. Resilient NENJ organized this feedback into five categories of actions.



SOLUTIONS

We heard about solutions people would like to see in these five categories.

EXISTING RESILIENCE-RELATED EFFORTS

Resilient Northeastern NJ is not taking place in a vacuum. A lot of work is complete or underway that will advance flood resilience in the region. As such, Resilient NENJ created an **inventory of proposed and ongoing actions**. Resilient NENJ continues to update this inventory and the current version is available on our website and in [Appendix D](#). Engineers and planners are evaluating potential gaps, opportunities to advance potential projects, and best practices. Feedback summarized in this section is being incorporated into that analysis.

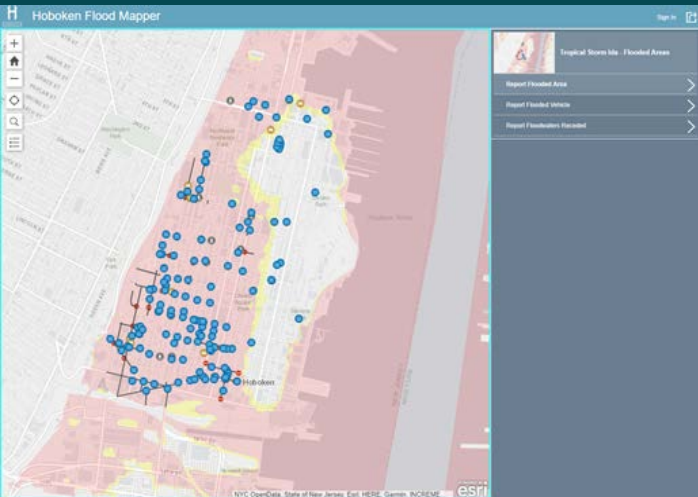
LESSONS LEARNED IN IMPLEMENTATION

Resilient NENJ asked agencies and other stakeholders to share **lessons learned** in implementation. These lessons learned can result in recommendations to address challenges and duplicate successes. For example, we heard that a significant challenge for large infrastructure projects (such as for the Passaic River Tidal project) is obtaining real estate easements. We heard it is particularly challenging to get easements from railroad companies.

A SINGLE SOURCE OF TRUTH

Community members and stakeholders often asked for centralized information related to flooding. This includes information related to:

- **Flood risks**
 - A single location or repository to report flooding experienced. This repository should provide clear instructions for how to input reports. The information provided could support flood models and technical analyses of flooding. Preliminary feedback is that this information is best provided by city and then compiled for use at other scales.
 - An example of a way for people to provide flood reports is the **Hoboken Flood Mapper**. Hoboken made this to add reports of flooding during Hurricane Ida in September 2021. Newark and Jersey City followed suit in October, and Bayonne is exploring a similar tool.
 - Clear guidance on the climate change projections, flood risk data, and models that should be used in decision-making.
 - Information for existing and new residents to understand the flood risks they face.
- **Resources in the aftermath of flood events**
 - A single source for who to contact for help during and after a flood event and support for affected community members, including assistance through the application process for financial support



HOBOKEN FLOOD MAPPER

The City of Hoboken created a website where residents can report locations of flooding.

OUTREACH, EDUCATION, AND CAPACITY BUILDING RELATED SOLUTIONS

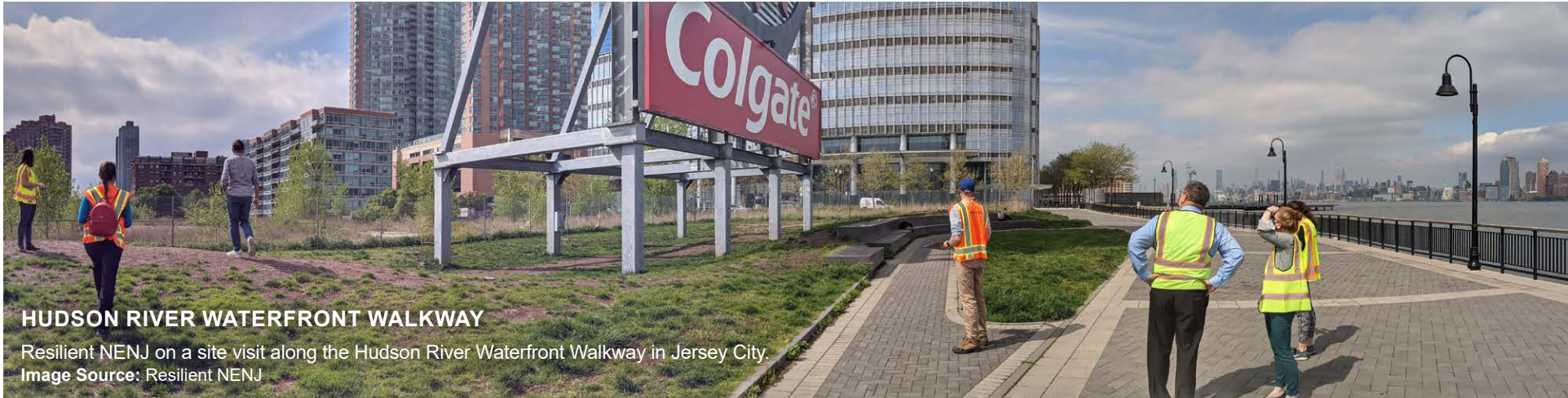
People provided many ideas for actions related to outreach, education, and capacity building. These actions could build flood risk awareness, capacity to increase resilience, and improve community preparedness. A summary of these ideas is below:

1.Capacity building in local governments, including ability to conduct policy enforcement

- Participants cited:
 - Concern about meeting the needs of underserved communities
 - Concern about whether cities have the capacity to fully enforce flood damage prevention regulations
 - Concern about whether all cities have the capacity to manage complicated flood projects over the short or long term
 - 1.Related to this, some participants cited concern that some municipal staff may be dealing with planning or project fatigue
- Participants asked for solutions that improve access to training, increase numbers of staff to support policy enforcement, and encourage elected official support and willpower to enforce land use, land development, and floodplain management regulations.

2.Develop solutions that increase residents’ awareness of risk, tools, resources for flood preparedness, and what to do during and after flood events.

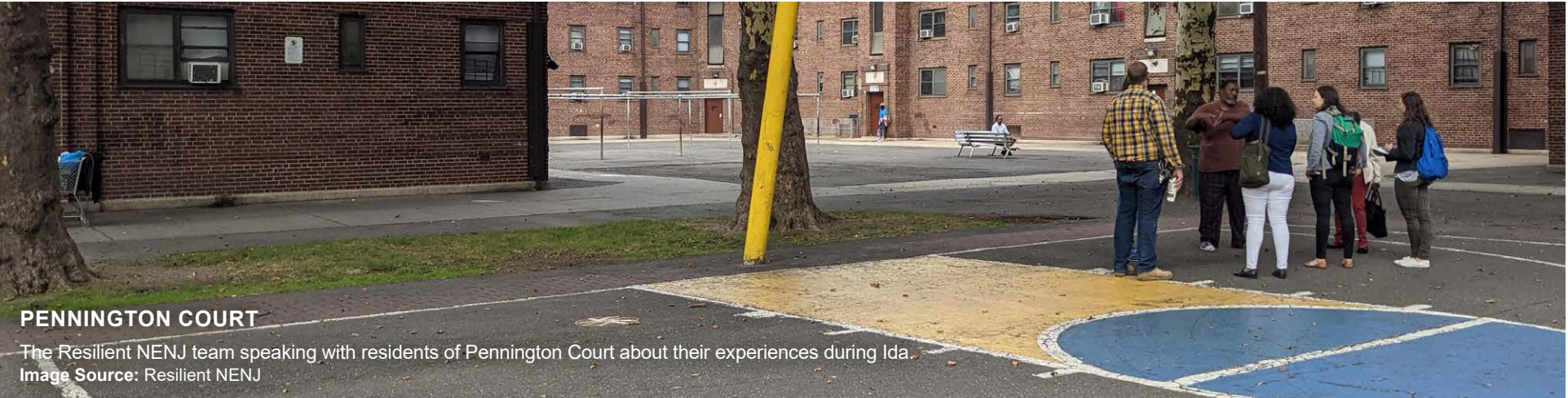
- Develop a program / training for Flood Management 101 for seniors/public housing residents
- Develop a flood-related information campaign and “handbook” for residents, tenants, and landlords. The campaign should adjust communications depending on population, including using multiple languages and a variety of digital and non-digital outreach channels.
 - Example populations identified: youth and children, elderly, non-English speaking, deaf and hard of hearing community, people without smartphones or internet
 - Information should include:
 - 1. How the National Flood Insurance Program works
 - 2. Guidance on what to do for common types of flood damage. For example, many people cited concern about what to do when their basement floods
 - 3. Resources and funding available in the immediate aftermath of an emergency and to support resilience actions
 - 4. Who should folks call to help get basic needs met during flood events
 - 5. What safety hazards might be present and how to avoid them



- Publish guidance and information about which tools and data decision makers and planners should use for resilience. Promote consistent adoption or use of the guidance. This will help avoid confusion with the many sources available:
 - One participant cited “portal proliferation syndrome.” There are too many tools and sources available and people need a single source of truth/ place to go. For example, there are several portals that exist related to flood risk data. These portals (below) inform planning and in many instances have overlapping data sources:
 - 1. [NJ Floodmapper](#)
 - 2. [New Jersey Water Risk and Equity Map](#)
 - 3. [NJ Map](#)
 - 4. [CERAP Issues of Concern Data Explorer](#)
 - 5. [MyCoast NJ](#)
- Develop a program to help people identify flood risk solutions for their own homes. An example model might be energy efficiency programs.
 - The consultant team received a lot of supportive feedback for such a program. Many participants shared actions that they have already taken to mitigate flooding. Examples include installing sump pumps, elevating equipment, and placing sandbags before storms.
- Develop training and materials for people to learn more about risk and resilience in general. Examples include:
 - Community resilience planning processes
 - Green infrastructure
 - The economic case for resilience

3.Develop a system for citizen science about flood experiences. This system should provide many information sharing options. Examples include social media, text messaging, websites, apps, and hotlines.

4.Conduct direct outreach to people in areas that flood or might be subject to CSOs



PHYSICAL AND NATURE-BASED SOLUTIONS

Physical and nature-based solutions involve design and construction to reduce flood risks. People shared types of physical solutions they would like to see. Some also shared specific recommendations.

General feedback on solutions:

Community members provided input on the types of solutions they would like to see:

1. Multi-purpose waterfront parks and pocket parks that incorporate flood protection. Example flood protection might include stormwater storage or surge barriers. Parks should provide access to the waterfront or open space.

- Examples of completed or ongoing projects include the resiliency parks in Hoboken (Southwest Park, Northwest Park, 7th and Jackson Street Park) and Fitzpatrick Park in Bayonne.

2. Improved combined sewer systems and drainage to increase capacity and prevent sewer backups. Overwhelmed sewer systems cause flash floods, street flooding, and sewer backups into homes during rainfall. Solutions that could improve combined sewer systems have been proposed in the separate but related Long-Term Control Plan (LTCP) program. The program requires sewer system operators to take actions to reduce combined sewer overflows.

- Sewer upgrades should consider the role of high tides and rising sea level
 - Upgrades could include system expansion, improvement, or replacement to keep old infrastructure up to date, including improvements to catch basins
 - Consider separated storm sewer system installation and expansion
 - Incorporate green infrastructure into combined sewer system improvements
3. Green infrastructure, nature-based solutions, and planting of trees
- There was a lot of interest from community members in green infrastructure and nature-based solutions for flood risk reduction. These solutions benefit quality of life.
4. Solutions that reduce impervious surfaces to minimize runoff and flooding
- Example solutions cited included: limiting warehouse construction, constructing permeable pavement, and evaluating runoff from paved vacant lots
5. Solutions that address basement flooding. Basement flooding is a persistent concern for residents, including in higher elevation areas such as the Jersey City Heights
- The Long-Term Control Plan (LTCP) program is mainly focused on reducing combined sewer overflows to improve water quality in receiving waterbodies. However, some of the proposed solutions could also mitigate flooding. Our team is evaluating the LTCPs for the sewer systems in this region to determine how the plans will impact flood conditions. We're developing recommendations for improving resilience through the proposed projects.
- REDUCE IMPERVIOUS SURFACE
- Many community members think is important for new development to limit impervious surfaces. They have asked that the project identify ways that existing impervious surface can be reduced. Some residents are exasperated and increasingly worried about what they perceive to be an overabundance of pavement across the region, for example: “...(my community) is almost **TOTALLY PAVED OVER... As streets become rivers, nature is saying ‘No More.’**”
6. Solutions that reduce flooding from neighboring properties.
- Multiple participants cited issues with sump pumps, roof runoff, and runoff from neighboring properties leading to flooding on their property
7. Resilience and green infrastructure measures incorporated into new infrastructure and infrastructure upgrade projects, such as NJDOT roadways, NJ Turnpike Authority highway exits, and PANYNJ infrastructure
8. Community members were interested in seeing reuse of abandoned lots and structures, such as:
- Restoring abandoned lots along the coast to wetland areas
 - Turning them into public parks and gardens
9. Physical solutions related to transportation and mobility:
- Consider using bump outs and traffic calming to improve pedestrian experience and help provide green infrastructure for stormwater and urban heat.
 - Resiliently designed right of way spaces that capture stormwater
 - Increase bus lanes and emergency lanes to assist school buses during flood events
- Community members also provided input on the types of solutions they would like to avoid, if possible:
1. Some participants expressed a preference to avoid use of flood walls as solutions
- They expressed concerns about flood walls impacting views of Manhattan and disrupting communities
 - One participant expressed satisfaction that the Newark Riverfront Park project used berms instead of floodwalls
2. The waterfront in the region is heavily developed. As such, some participants asked for strategic retreat to be part of the solution.
- A photograph showing a construction site behind a chain-link fence. In the background, there are yellow excavators and other heavy machinery working on a dirt area. Trees and a building are visible in the distance under an overcast sky.
- A photograph showing a construction site with a large pile of reddish-brown dirt in the foreground, separated from the viewer by a chain-link fence. In the background, there are trees and some construction equipment.
- FITZPATRICK PARK
Fitzpatrick Park renovations include upgrades to the neighborhood's stormwater system, which will reduce stormwater runoff.
Image Source: Resilient NENJ
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- RESILIENT NORTHEASTERN NJ / VISION AND PRIORITIES
- RESILIENT NORTHEASTERN NJ / VISION AND PRIORITIES
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RISING TO THE CHALLENGE – WHAT WE’VE HEARD

“Stormwater retention is part of the solution but will not be the full solution”

- Resilient NENJ Community member

“We need serious protective and preventative measures and massive infrastructure changes like canals and dikes to accommodate the rising seas, which will destroy us with or without green initiatives.”

- Jersey City resident

*“...we need multiple, layered solutions, so let’s not get hung up on any given one as *the* one. Failsafe systems have layers of protection to fall back on. We need to afford multiple layers.”*

- Jersey City resident

Opportunities for co-benefits:

Participants would like to see solutions that advance multiple goals at once. Participants communicated the types of additional value add they would like to see flood risk reduction solutions provide. These are some benefits that community members indicated they would like to see come out of potential projects:

- Outdoor recreational spaces for running and exercise, especially waterfront spaces
- Enhanced waterfront walkways, public gathering spaces, and cultural activities
- Improved mobility, including added bike lanes
- Increased access to green space
- Reduction of air quality issues and urban heat island effect, such as through tree canopy expansion, which also provides shade
- Mitigation of public health risks
- Water quality improvements from CSO reduction
- Ecological services / wildlife and habitat preservation
 - Ecosystems at MOTBY and Liberty State Park were called out specifically

Specific solutions:

Some community members suggested physical solutions for specific areas. These requests are summarized below. Our planners and engineers are considering whether these solutions make sense.

• Jersey City

- Green infrastructure and pedestrian access along the Jersey City embankments
- Interest in green infrastructure in Journal Square
- Interest in having green space at the County Administration building once it is torn down
- Would like to see more greenery along Communipaw Avenue
- Would like to see more greenery along I-78 corridor. Add green infrastructure connections beneath the roadway and provide access to the Liberty State Park light rail station
- Consider developing the big grassy lot with bricks between Bay St & 1st St and Washington St and Warren St in Jersey City into a public park
- Interest in becoming “the Venice of New Jersey” and incorporating physical solutions such as canals and dikes to prepare for sea level rise

• Newark

- Dredge the Passaic River and add flood walls / shoreline stabilization of the Lower Passaic River
- Interest in green schoolyards in the South Ironbound neighborhood due to the concentration of schools in the area

• Hoboken

- Consider draining and pumping water to the west (Meadowlands) instead of the Hudson River (e.g. pump along rail lines)
- Interest in seeing an oyster bed restoration project
- Opportunity to incorporate resilience into Hoboken Housing Authority rehabilitation project
- Bulkhead improvements to protect pier / maritime assets

• Bayonne

- Install tide gates on sewer system outfalls
- Interest in coastal wetland restoration projects around the peninsula

Some participants linked flooding with quality of life factors such as air quality, mobility, traffic congestion, and health concerns with their concerns about flooding.

“My husband and I bought a home here in 1998, after renting for 20 years... We have watched our taxes double, along with our water bill. My quality of life as a pedestrian is a nightmare. The public transportation here is ---- as well. I do not feel safe here anymore, and have watched many neighbors on my block die of cancer.”

- Community member

POLICY AND GOVERNANCE RELATED SOLUTIONS

Participants put forward a significant number of policy and governance related resilience solutions. These solutions fell into 5 categories, summarized below.

CATEGORIES OF POLICY AND GOVERNANCE RELATED SOLUTIONS

Communicated as desirable by stakeholders during wave 1 engagement:

- Land use, development, and infrastructure
- Funding
- Inter-governmental coordination and systemic integration of resilience considerations
- Government transparency and decision making
- Public access and equity

Land use, development, and infrastructure requirements

Community members expressed their desire to see resilience in land use planning and development. Solutions should prevent new development from increasing flood risks to other areas. New development and redevelopment areas should, themselves, be resilient to flooding.

1. Create processes to understand how new development may increase flooding to other areas. Mitigate this risk or do not allow the development to proceed
- Ensure that development does not add impervious surface. If it does, mitigate new impervious surface (low-impact development, lower lot coverage)
2. Assess flood risk to new development / redevelopment and require that resilience and flood mitigation measures are integrated into new development / redevelopment
- Community members expressed concerns about ongoing development in flood-prone areas
 - Expand on-site stormwater management requirements for all new development and redevelopment
 - Combine incentives with stronger building code regulations for on-site retention and improved drainage
 - Require new developments to demonstrate consideration of future conditions
 - Require any waterfront development to include public open space and access to the water
3. Integrate resilience and flood mitigation into design of public spaces and infrastructure
- For example, require “integration of resilience and stormwater management / green infrastructure / nature based solutions / biomimicry into design of parks, waterfront open spaces, and public right of ways.”
4. Promote higher density development in areas of lower risk or where risk will not be increased by that development (to help reduce sprawl)
5. Require management of garbage and refuse, particularly from industrial uses
6. Apply a “dig once” policy to integrate infrastructure improvements with development projects. For example, there are some requirements to separate storm sewers in new developments.
7. Participants spoke of their perception of the need for an assessment process to balance the infrastructure and public service needs of new development against maintenance and upgrade needs of existing development.

POLICY REVIEW

State, regional, and local policies already exist that relate to flood resilience. For example, all development within FEMA-designated floodplains must meet federal standards for floodplain construction. Additionally, NJDEP is developing updated land use regulations that consider climate change (learn more about NJ PACT [here](#)). Resilient NENJ is conducting reviews of regulations and policies and meeting with land use and policy leaders to identify possible changes that could increase resilience.

Funding

Solutions should ensure that the region is prepared to maximize support from external funding sources, such as federal grants, as well as ensure that parties that benefit from resilience contribute resources to implementation (while balancing their ability to contribute).

1. Structure planning for studies and assessments to maximize funding and drive implementation
2. Implement processes to capitalize post-disaster funding opportunities.
- Example input: “Things were missed during Sandy recovery that we’re paying for now. It was a missed opportunity to assess flood risks right after Sandy.”
 - Potential actions based on this input that have been put in place by other communities:
 - Policies and procedures to log infrastructure and asset condition regularly and store for post-disaster reporting
 - Procedures for post-disaster damage and mitigation opportunity assessment
 - Post-disaster redevelopment plan to help guide expenditures
 - Standing post-disaster funding support contract
3. Provide incentives for residents, businesses, and landowners to adopt more resilience practices
- Example ongoing initiative: Lower Passaic River Urban Waters Federal Partnership (LPR UWFP) is encouraging landowners on the Lower Passaic to enhance shoreline structures, including nature-based solutions, to prepare for the upcoming dredging of the lower 8.3 miles of the Passaic River. A challenge has been that there are not funds or incentives in place to support landowners in making physical improvements.
4. Pre-allocate a portion of the capital improvements budgets toward resilience-building. For example, participants asked that funding for GI and CSO reduction be integrated in the regular capital budgeting process



AVENUE A REDEVELOPMENT SITE, BAYONNE

Image Source: Resilient NENJ



MORRIS CANAL BASIN, JERSEY CITY

Image Source: Resilient NENJ

Inter-governmental coordination and systemic integration of resilience

We heard that solutions should improve coordination at local, regional, state, and federal levels on resilience building and information sharing. Greater consistency is needed in planning processes across different agencies and levels. Some specific solutions we heard about are:

- 1. **Create a program for coordination between municipalities/county/states and transportation agencies on capital projects.**
 - o Examples of partnerships include regional infrastructure partners (such as NJDOT, Port Authority, PSE&G, NJ Transit, and others), between the cities and counties, and also with neighboring cities that are not part of Resilient NENJ.
 - o Possible mechanism to be explored: Infrastructure Coordination Council
 - o “What kinds of plans for cooperation among the various towns and cities are being organized in the event of a storm surge? These are the kinds of questions that need to be asked, and strategies developed in the event of such a disaster. When we plan now and cooperate now, we can avoid the overwhelming devastating impact of such possibilities. Cooperation among cities and towns is key.”
- 2. **Update Green Acres program rules to allow for subsurface stormwater storage at parks.**
- 3. **Require that emergency and other plans involve communication with businesses and industrial users in the area about risks**

Government transparency and decision-making

- 1. **Publish information that increases transparency about how decisions are made, as well as the impacts of those decisions. Examples requested included:**
 - o Education about flood zone mapping process
 - o Clear communication of environmental conditions and risk to the public
 - o A system or portal to inform the private and public sector on all municipal activities that could affect resilience
 - One participant stated that there is a lot going on related to resilience but the typical resident does not get information about what is going on.
 - Some participants asked for clear communication of expected benefits and value of projects. This would minimize unrealistic expectations of all flooding being solved.
 - o Clarification on funding priorities from decision makers
- 2. **Establish clear roles and responsibilities for resilience-building, with associated authorities, accountabilities, and enforcement**
 - o Local leadership and governance systems dedicated to resilience.
 - Example feedback: “Creation of Chief Resilience Officer role in all the municipalities involved in the project – so far Hoboken is the only city with a designated office (Caleb Stratton) that mainstreams resilience across all the aspects of the City of Hoboken”
 - o Clear guidance for developers. Developers must deal with many regulatory bodies and it can be difficult for them to understand requirements.
- 3. **Create webpages that list block associations and contact information at the city level**
- 4. **Develop criteria to guide decision making around when retreat might be the appropriate solution**

BUILDING TRUST

We heard from several community members that solutions should strengthen trust, access, and relationships between community members and government. To build trust, we heard that Resilient NENJ must:

- Identify and implement quick wins that meet community needs
- Identify ways to improve pre- and post-disaster communications and clarity about what to do and where to go for help
- Help increase reliability of post-disaster services. Cities send staff or officials to neighborhoods affected by flooding to learn about their needs.

We also heard that resilience planning processes should engage social work professionals in teams with engineers, planners, designers, and other technical professionals.

Public access and equity

- 1. Take action to prevent flood insurance rates from becoming unbearably high
- 2. Explore mandatory requirements for landlords and sellers to disclose risk information and flood history to tenants and buyers
- 3. Require public access and mobility at all sites along the waterfront

SERVICE OR PROGRAM DEVELOPMENT

Some participants requested the development of community and municipal programs to increase green infrastructure and support sustainable waste management throughout the region. Several participants tied waste management concerns to concerns about flood risk and health.

WASTE MANAGEMENT, FLOOD RISK, AND HEALTH

- Many participants have seen garbage clogging rainwater storage and management systems. They perceived that this was leading to increased urban flooding during heavy rain events
- Some participants expressed concern about possible health impacts from trash during flooding
- In Newark, some participants expressed that, during heavy rainfall or flooding, wet trash is much more difficult to manage
- Some residents expressed that a municipal composting program could help reduce food waste for the waste management system.
 - o One participant suggested partnering with large apartment buildings or housing complexes to have compost drop sites.

Solutions we heard about:

1. Create green programs for individual residents / groups like composting, rain barrels, and community gardens.

- Resilient NENJ heard desires to set up community-led programs to increase stormwater management through green infrastructure. In Hoboken, for example, some neighbors installed rain barrels to reduce basement flooding from adjacent roof run-off and water gardens during hot days. The Community Church of Hoboken uses water that its sump pump removes from the basement to water the local community garden. Resilient NENJ visited the Community Church of Hoboken in July of 2021 to learn about their community garden (see photos on opposite page).
- Participants shared the following feedback about possible green programs:
 - Outreach
 - 1. Scheduled events that people could partake in
 - 2. Presentations and trainings at libraries, community organization meetings
 - Partnerships: Some participants expressed a desire to see an inter-municipal partnership in which communities purchase trees and supplies to provide green infrastructure. A partnership might reduce costs. Participants suggested partnering with community-based organizations for implementation
 - Scope: Participants identified cleanups, invasive species removal, tree plantings, rain garden creation, rain barrel installation, and community gardens as possible focus areas for a program

“There was previously a program that gave out free trees, could something similar be done with rain barrels?”

- Possible locations and applications: right of way, new bump outs, existing sidewalk space, private property, complexes
- Participants shared co-benefits they believe such a program could help achieve, such as:
 - Reduced erosion
 - Reduced urban heat island effect
 - Climate mitigation
 - Water quality improvement
 - Community connectivity and engagement
 - Improved quality of life through increased access to nature and green space
 - Improved access to water for maintenance of green infrastructure during hot days
 - For community garden and educational elements of the program that promote growing fruits and vegetables in an urban setting: free access to fresh fruits and vegetables, and education (raised beds, aquaponics)
 - Reduction of food deserts / improved connection of community gardens, farmable land, and resources to make fresh food available

2. Waste reduction program to promote cleaner streets and prevent clogging of drainage systems.

- Participants cited concerns about visible and disruptive amounts of garbage in waterways, storm drains, and on street corners in certain areas. Some participants brainstormed potential solutions:
 - Municipal composting program
 - Increased number of trash cans
 - Increased garbage / trash patrols and removal
 - Trash management requirements for private property (see policy and governance solutions above)

“Recently, residents have been doing their own street cleaning to prevent blockages.”



COMMUNITY GARDEN

The Community Church of Hoboken incorporates a garden for community members to tend and enjoy.

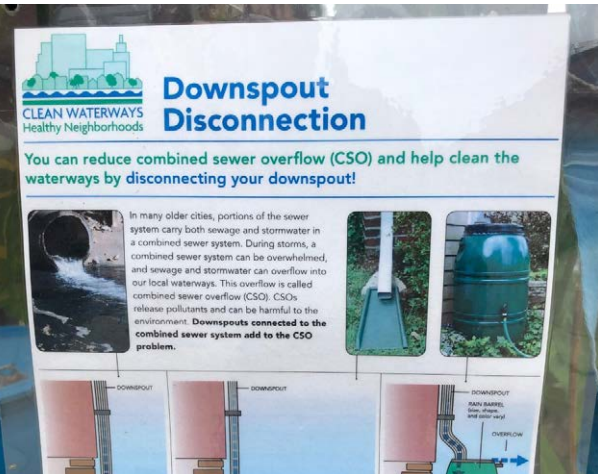
Image Source: Resilient NENJ



RAIN BARRELS

Rain barrels mitigate neighboring runoff, collect water from sump pumps, water gardens and overflow to other receptacles.

Image Source: Resilient NENJ



COMMUNITY EDUCATION

Placing rain barrels in public areas creates an opportunity to educate the community on the benefits they provide.

Image Source: Resilient NENJ



COMPOSTING

Composting is another lesson in reuse and resilience at the Community Church of Hoboken’s community garden.

Image Source: Resilient NENJ



TRASH AND DEBRIS

Trash sits gathered atop a drain in Newark.

Image Source: Violeta Duenas



COMMUNITY CLEANUP

Volunteers take part in The Great Jersey City Cleanup.

Image Source: City of Jersey City

FEEDBACK IN THE AFTERMATH OF HURRICANE IDA

As we noted in the Flooding Experiences and Priorities section, several flood events affected the region during the summer of 2021. The most recent and – for many – the most severe was the remnants of Hurricane Ida on the night of September 1, 2021. As a result, we received many recommendations after the storm centered on emergency response and preparedness. Examples are as follows:

- 1.Incorporate citizens data from past events into warnings about flood locations leading up to a storm
- 2.Provide easy access ways for citizens to report flood locations and impacts
- 3.Provide a “one-stop” place for information where people can learn about their risk and what they can do pre- and post-disaster, as well as what resources might be available to them and who they can call
 - o Related, consider creating a regional network of neighborhood-based “resilience hubs” that can serve this purpose
- 4.Send representatives of local government and agencies to visit affected community members after a flood event and provide support
- 5.Survey locations of debris to inform data on locations of flooding. This could be done using drones or helicopters
- 6.Improve debris removal after flood events to eliminate health and safety hazards from lingering trash
- 7.Block off roads known to flood ahead of the event to mitigate risk to drivers and pedestrians or immediately after flooding
- 8.Improve communications about hazards such as boil water notices to ensure all residents are informed. Improve communication about actions being taken to address these hazards.
- 9.We also heard about the need for direct financial assistance after flood events to property owners, landlords, and tenants, who may not have flood insurance and may need to move out of uninhabitable homes

I have been a volunteer EMT for 20 years in Weehawken. We had to evacuate hospitals during Sandy. Palisade Medical Center (NB) is often underwater in “normal” storm conditions. Flooding puts patients, workers, and first responders at risk. Along the waterfront below the Palisades (Weehawken, WNY, NB, Edgewater, etc), there is one single road, trapped between the rising Hudson River and the cliffs. When the situation gets dangerous, people on the waterfront are on their own. They will be no way to evacuate, and responders will have no way to rescue.

- Testimony from community member



IDA FLOOD LEVELS

Resilient NENJ speaking with a Newark community member as he points out the height of the floodwaters during inundation from Hurricane Ida.

Image Source: Resilient NENJ

EMERGENCY RESPONSE AND PREPAREDNESS RELATED SOLUTIONS

Participants expressed the need for improved emergency response and preparedness to protect life during flood events. Proposed solutions included:

- 1. **Address the lack of capacity of emergency evacuation routes. This could be through improved shelter in place, improved warning systems, or increased roadway capacity / redundant roadways**
- 2. **Implement improved flood warning systems to reach vulnerable populations.**
 - o Examples people provided for ways this could manifest:
 - Coordinated ITS (intelligent transportation systems) efforts to warn of flooding, including which streets will be flooded
 - Provide an alert system for seniors to inform about street flooding and where it is OK to drive
 - Provide a multi-hazard early warning system – especially when it comes to air quality and heat index risk
 - Provide text notifications for peoples with disabilities
 - Install sensors to collect real-time data. This could improve accuracy of flood information.
- 3. **Provide emergency sheltering that is inclusive of pets, for either co-sheltering or drop-off**
- 4. **Barricade streets known to flood in advance of the storm to mitigate drowning risk. Barricade flooded streets immediately following a storm to ensure that cars do not create additional wake and increase damage to homes and businesses**
- 5. **Create a regional network of neighborhood-based resilience hubs where people can go for pre- and post-disaster support and information**

REFLECTION: DISASTERS ARE LOCAL, ALL DECISIONS ARE FELT BY PEOPLE, AND NETWORKS ARE CRITICAL

A common theme in feedback was that resilience and risk are felt hyperlocally but must be addressed through effective regional, inter-agency, public-private, and inter-sector coordination. All resilience is about people, and people need relationships. People need to know and trust their neighbors and their local government officials. Neighbors and local government officials need to know that they have support from interdependent entities.

State agencies and major infrastructure providers that operate at a large-scale impact people’s daily life. The impacts of their decisions are felt locally and individually. Decisions can build upon one another over time to affect quality of life. People are asking Resilient NENJ to help ensure that decisions at all levels consider the impacts to daily lives. They *expect and want* these considerations in all services they receive and pay for as taxpayers. It seems that when community members perceive this coordination, communication, and consideration to not be taking place, they lose their faith and trust in the systems intended to serve them.

Many of the comments and recommendations that Resilient NENJ has received so far, and are reflected in this document, center on this theme. This theme was amplified in feedback we received post-Ida.

CONCLUSION AND NEXT STEPS

This report is the summary of our initial wave of engagement for the project. Feedback we received helped us understand flooding in the region, what contributes to it, and how it impacts people. Feedback is also helping us focus our attention on priorities for solutions. Through this process, we have identified several short-term needs and low-hanging fruit solutions. Some examples are creating centralized information about flooding and sharing actions that individual residents can take.

While we have been reviewing feedback, we have also been completing evaluations and conversations. This work will lead us towards recommendations for solutions and includes:

- Conducting a risk assessment to estimate damages and losses from current and future flood conditions
- Analyzing policies related to land use and stormwater management. We are identifying ways that the cities can address flooding through policy changes
- Reviewing the Long-Term Control Plans of the stormwater utilities in the region. We are looking at ways that the plans can address flooding and incorporate resilience considerations
- Classifying contaminated sites and brownfields in the region to help determine sites that are most at risk of flooding. We are developing recommendations to increase resilience of such sites
- Contacting infrastructure stakeholders to see their interest in forming an Infrastructure Coordination Council. The council would collaborate on resilience and other topics
- Compiling data and stories from the remnants of Hurricane Ida to create an Ida After Action report. The report will include recommendations for improving emergency response & preparedness
- Developing solutions in the five categories that we identified, including technical evaluations
- Identifying funding opportunities for Resilient NENJ initiatives

Stay Tuned!

We will share the results of our work, described above, in future reports and meetings. We hope you will continue to stay engaged in this project to make sure your voice is heard in shaping a resilient Northeastern NJ!



PROJECT SCHEDULE

The project is broken down into 5 phases from developing the project vision and priorities to creating a final plan for implementation.



CATEGORY OF FEEDBACK



WHAT WE HEARD



HOW WE ARE USING IT

What people love about their community now

Waterfront parks, community parks, the people and diversity, access to public transportation, views of Manhattan, and cultural and recreational activities are some of the features that make the region great.

We are using feedback to prioritize assets in our risk assessment. In general, this feedback helps us focus our attention on reducing flooding and preserving the places and things people love most.

Vision for the future

In addition to flood reduction being a priority, community members would like to see, among others:

- More green space
- Improved air quality and reduced urban heat island effect
- New green jobs and economic diversity
- More affordable and higher quality housing
- Improved mobility and connectivity
- Greater government transparency

We are using the vision as a guide for our scenarios, answering the question ***How can we help this vision become a reality as we work to reduce flooding?*** Including co-benefits and improvements to daily quality of life.

Flooding experiences and priorities

Many community members experienced flooding several times in 2021 and perceive that flooding issues have been getting worse in recent years. In general, flooding is a health, economic, and lifestyle concern for community members.

We have created a database of reported flood locations that we are using to ground truth the flood models that will be used in the technical analyses for this project. Stories about the impacts of flooding have helped us expand or shift our thinking in various ways, for example:

- Making us aware that basement flooding is a major issue and that residents are interested in learning about actions they can take to protect from flooding.
- Concerns about the health impacts of flooding contributed to us initiating a technical evaluation on contaminated sites and flooding.
- Stories have also led us to develop an Ida After Action report that will include recommendations for improving emergency preparedness and response.

Plan goals and values

We heard that community members would like to see the plan address both immediate flood risks and long-term flood risks, that the plan should work to equitably reduce flood risks and benefit communities, and that protecting life and reducing economic burdens are important goals.

We've incorporated feedback on goals and values into the project mission. Later in the project, we will be using evaluation criteria to compare multiple scenarios to each other and to select a preferred scenario. We're using feedback on goals to help us shape the evaluation criteria, to ensure the criteria help us choose a preferred scenario that is most reflective of what people want to see.

Solutions

We received a lot of feedback about types of solutions and specific solutions that community members would like to see implemented to reduce flooding. Some physical solutions we heard about most included resiliency parks (parks with stormwater storage), green infrastructure, expanded drainage capacity, and reuse of vacant or under-utilized lots. We also heard about the desire for resilience considerations to be incorporated into land use planning and redevelopment, for increased coordination between local, regional, state, and federal agencies and organizations, and for a creation of a single hub for flood-related information, among others.

Our team is currently working on developing draft recommendations for solutions, which will later be grouped into scenarios, and we are directly incorporating what we heard about solutions into our evaluations. Resilient NENJ will be engaging with community members, agencies, and other stakeholders around possible solutions through the fall and winter.



NEWARK BAY
A view from the Bayonne Bayfront
across to Port Newark
Image Source: Resilient NENJ

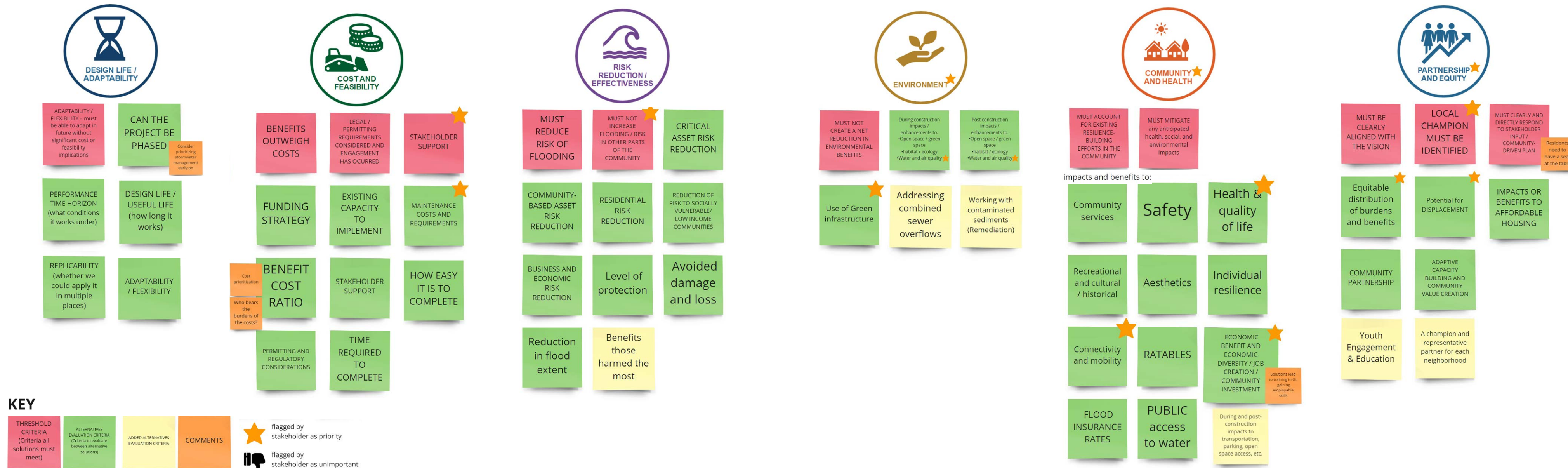
APPENDICES

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APPENDIX A: DRAFT EVALUATION CRITERIA

FROM JUNE 2021

This is the initial draft evaluation criteria shared for community feedback in the summer of 2021 and revised to become criteria shared on pages 28-31 of this report.



APPENDIX B: ADDITIONAL FEEDBACK

Through our outreach processes, we received some feedback about the region that is not directly applicable to Resilient Northeastern NJ and flood resilience. We have documented this feedback below and have shared this with municipalities for integration into other initiatives:

- Services to address public health impacts of mosquitos. “The old mosquito board was a first-rate service. Even through the West Nile virus it kept our illnesses down. I think it was reorganized into some other department.”
- Interest in innovative technology like playgrounds that generate electricity

Additionally, some participants asked that neighboring municipalities like Weehawken, Kearny, Harrison, and others be included within the scope of Resilient NENJ. While the geographic scope for the current project is set, the Resilient NJ team will be engaging these municipalities, as needed, based on potential interdependencies in flooding or solution implementation, and there may be opportunities to expand the program in future iterations. Hudson County, as a project partner, will continue to work with these municipalities, share any public feedback as it relates to them, and provide technical assistance to them.



FEEDBACK ON THE PLANNING PROCESS

ASSESSMENTS / STUDIES PEOPLE ASKED TO BE COMPLETED AS PART OF THE PLANNING PROCESS:

- Assess the preparedness of utilities to respond to emergencies
- Assess emergency response capability for vulnerable populations & evacuation plans
 - Answer the questions: Who has access to cars? Who is informed about the plans?
- Understanding the causes of rainfall flooding so that it can be properly addressed
- Assess impacts of flooding to water quality
- Inventory of vacant buildings to acquire and repurpose for public use

Community members also provided the following feedback that is informing the planning process moving forward:

Feedback on approach to resilience planning

- Need for holistic approach to resilience, not just considering flood risk alone but also other issues such as heat, air quality, etc. (note: this is being considered in solution development and as compounding risk)
- Importance of community- or neighborhood-based strategies for resilience, therefore indicating the need for locally-focused engagement
- Set clear expectations and do not make promises that cannot be upheld
- Begin with identification and implementation of low-hanging fruit solutions
- We heard about different preferred strategies for advancing resilience: some feel the best approach is to embrace water and adapt to its presence, while others focused on the need to move away from the water and limit new development in flood areas, and still others cited the need for hardening infrastructure and protecting against water
- Greater focus on emergency response and preparedness needed because of the frequency of flood events.
 - Related asks:
 - Importance of engaging first responders
 - Include members of the municipal emergency management so that they can share what their plans are during urban flooding events and the community can provide feedback on the effectiveness of these plans and the actions we’ve experienced in the past.

Feedback on integration of Resilient Northeastern NJ with other initiatives

We heard about the need to build off ongoing resilience work, avoid duplication of efforts, and find synergies so that multiple goals can be advanced at the same time.

- Coordinate the recommendations of this project with the proposed projects for the LTCPs and ensure that a resilience lens is applied to the LTCPs
- Apply a “dig once” framework to solution planning to coordinate proposed solutions with other planned capital projects
- Build on and leverage priorities identified by community-based plans and neighborhood organizations
- There is already a lot of work related to resilience and stormwater management in the region. Need to find opportunities to integrate work because of people’s limited bandwidth

Feedback on the engagement process

- **Goals of engagement**
 - Ensure that the voices, opinions, and ideas of the diverse residents in the region are reflected in the plans and inform decision-making
 - Acknowledge that residents might be able to identify issues and opportunities that people in government may not be aware of
 - Ensure that community engagement is inclusive and equitable
 - Ensure that the plan reflects input from those most affected by flooding and socially vulnerable populations
 - Achieve consensus and buy-in from residents and stakeholders on solutions, as well as mutual acceptance of the path forward in a coherent and cohesive plan
- **Groups and stakeholders to engage**
 - Environmental justice communities / socially vulnerable populations / historically underrepresented groups, including: limited-English proficiency individuals, low income households, public housing residents, senior citizens, people of color, physically disabled, visually impaired, those without internet access, carless households, incarcerated individuals, immigrants / foreign-born
 - Developers through neighborhood associations
 - Industry stakeholders, because of the cascading impacts of flooding to industrial sites
 - Consider smaller scale landlords
 - Targeted outreach to flood victims to ensure their representation
 - Residents in low-lying areas and tenants of ground floor or basement (garden level) apartments
 - Residents that live near ongoing and planned resilience projects
 - Youth / students. We heard a lot of interest in engaging youth through schools and other programs
- **The engagement strategy should be focused on partnerships with local organizations because of their existing local knowledge and relationships so that recommendations are representative of diverse ideas and solutions have equitable outcomes.**
 - Engage partners and local ambassadors
 - Gather feedback on considerations for how to design our engagement strategy
 - Share messaging through their existing outreach platforms
 - Leverage existing meetings of partners to achieve inclusive outreach events (i.e. share project information / gather feedback at these existing meetings)
 - Example partners: school-based partnerships to reach youth, neighborhood and block associations, public housing authorities
 - Conduct outreach through existing networks such as libraries, community hubs / emergency cooling centers, and COVID testing sites / vaccine clinics and other health infrastructure (among others)
 - Libraries valuable because of free unlimited WiFi

We have already begun engaging partners to involve them in the outreach process for the project. We held Engagement Partner Meetings on May 11 and May 13, 2021 to gather feedback on our engagement strategy and to identify opportunities for partnering in engagement. If you are a local organization working with people and would like to get involved in our project, please email us at resilientNENJ@dep.nj.gov.

- **Engagement mechanisms: structure to include use of a variety of digital and non-digital outreach channels with multiple touchpoints, provide materials in languages other than English, and conduct outreach to youth / children. Specific suggestions include:**
 - Provide options for dates and times of meetings to work around busy schedules
 - For in-person meetings, choose locations that are accessible to the people most impacted by flooding
 - Eliminate costs and other barriers associated with in-person meetings, such as food and childcare services.
 - Use a balance of digital and non-digital engagement channels
 - Digital is valuable for reaching many people at once, but is more challenging to deeply engage people and reach certain people
 - Make information easily accessible online
 - Low-tech / non-digital mechanisms needed for those with limited access
 - Flyering, in-person engagement, radio broadcasting (e.g. 1710 AM Hudson County radio station)
 - Provide materials in multiple languages and have translation services available at events
 - Other ideas include: Focus groups, interactive kiosks, livebroadcast meetings on Facebook Live/Youtube/Instagram, phone banking, SMS texting/ WhatsApp, interest in a bike tour that looks at infrastructure related to resilience (through Bike Hoboken)

Feedback on our project communications and deliverables

These are some considerations to ensure that effective conversations take place for the project:

- Communicate how people will benefit from the plan (e.g. through connection to workforce, job creation, and economic growth) and how it is relevant so that they feel a vested interest in the plan’s success
- Create visually appealing and simple project materials
- Show projected flood conditions at incremental levels into the future, rather than just current and 2070
- We heard from a participant that the term “flood wall” is problematic with the community, which serves as a reminder that communications for our project should use language that resonates with the community and leads to productive conversations

APPENDIX C: RESILIENCE TOOLBOX

There are many possible solutions that can be implemented to address flooding. Resilient NENJ developed a toolbox that included physical and nature-based solutions, policy and governance solutions, and individual and community-based actions. Physical and nature-based solutions include infrastructure projects and things that change the built environment. Policy and governance related solutions are solutions that affect what decisions related to flooding are made, how, and by whom. Individual and community-based solutions are solutions that increase the social resilience of a community. The goal of the toolbox is to identify potential tools that we will draw on for the development of the scenarios. The toolbox summarizes key information about each solution including:

- Types of hazards the solution addresses
- The types of areas in which the solution could be applied
- Scale of the intervention (individual site, multiple sites, etc.)
- Possible co-benefits (benefits other than reduced flooding)
- Level of potential disruption from construction or implementation
- Other constraints and considerations

The toolbox also groups solutions into three approaches to resilience: **Protecting** from the water, **Adapting** to the water, and **Moving** away from the water. These approaches are described further in the following pages.



PROTECT FROM WATER



ADAPT TO PRESENCE OF WATER



MOVE AWAY FROM WATER

(RESILIENCE GOALS INFORM ADAPTATION STRATEGIES)

The toolbox is not intended to be inclusive of all possible solutions but was a helpful starting point to identify solutions and outline the decision-making process for selecting a specific solution for an area. The decision tree on this page outlines an example process that could be used to select flood risk reduction solutions. This appendix presents our draft toolbox. Note that based on feedback, we have identified five types of solution categories (as described in the Solutions section) rather than three. The goals of the toolbox are to:

- Communicate the types and range of solutions possible, as well as when they might be appropriate and their limitations
- Provide a framing tool for both the technical team and stakeholders, to help us begin from similar places of understanding, about the technical considerations that often guide these types of decisions

DECISION TREE

WHAT TYPE OF FLOOD HAZARD(S) IS THE SITE EXPOSED TO?



COASTAL STORMS



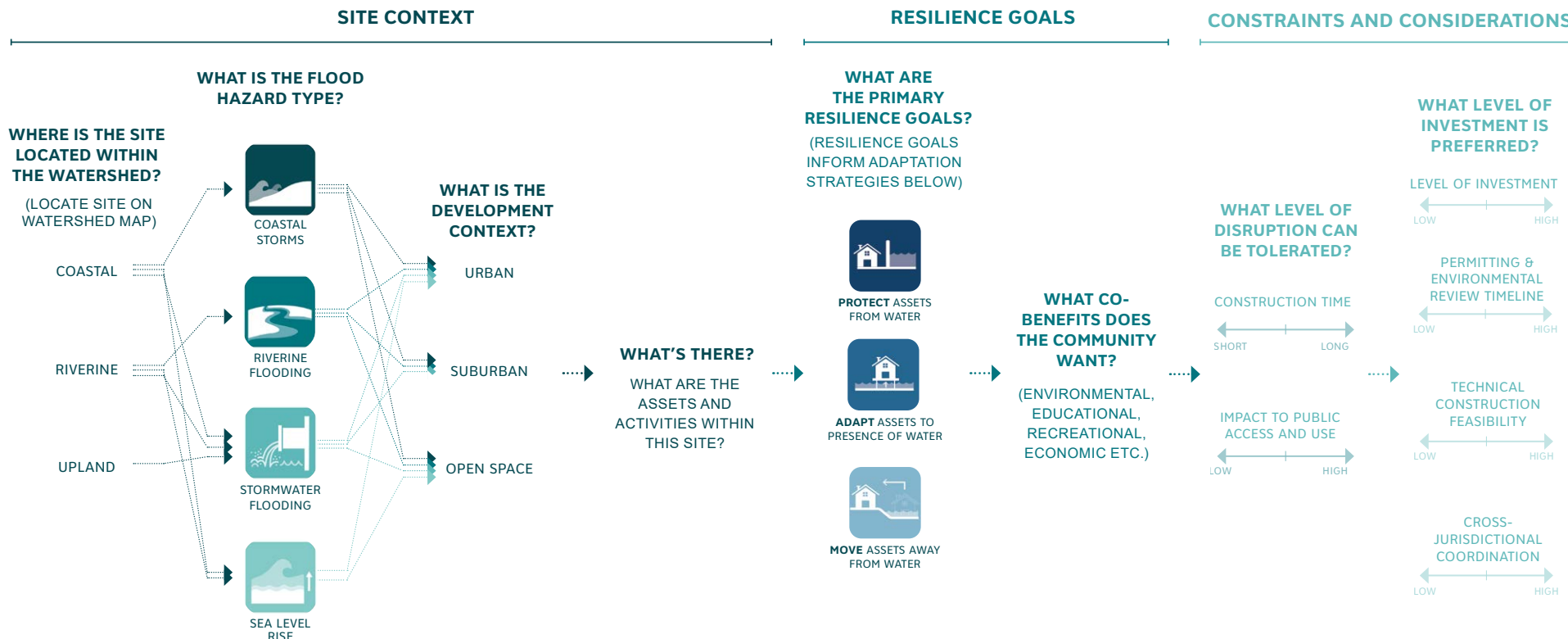
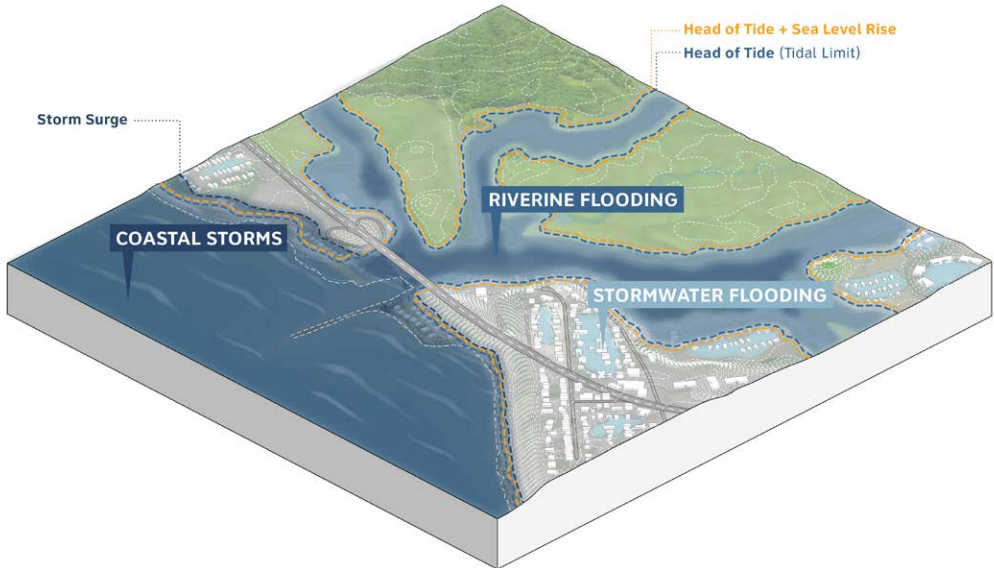
RIVERINE FLOODING



STORMWATER FLOODING



SEA LEVEL RISE





PROTECT FROM WATER

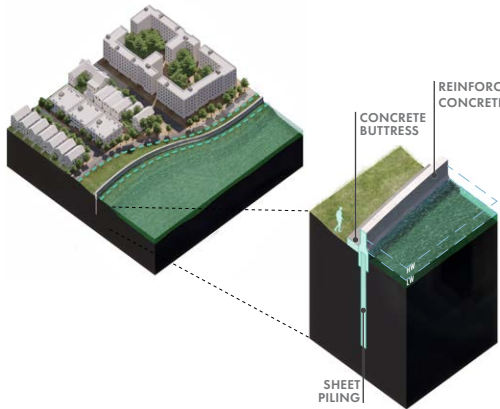
Solutions that protect from water keep flood waters out. They prevent water from flooding our neighborhoods with physical barriers. These solutions can be permanent, like a berm or levee, or can be deployed for specific flood events.

FLOODWALLS

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Floodwalls are concrete structures designed to keep water out by physically blocking storm surges and floodwaters. Various types of floodwalls may be applicable to different areas and regions.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

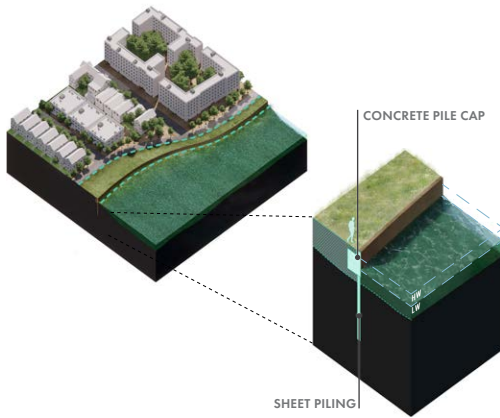


BULKHEADS

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Bulkheads are concrete structures along shorelines of large bodies of water that protect from flooding, wave action and erosion. They can be integrated into recreational greenways and provide waterfront access to users.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

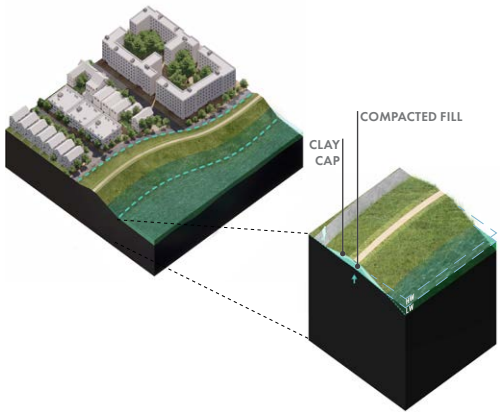


BERMS & LEVEES

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Berms and levees are raised earthen structures erected to protect from flooding. They can be integrated with recreational boardwalks, walkways and bike paths. Their natural sloped sides can be populated with recreational features.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

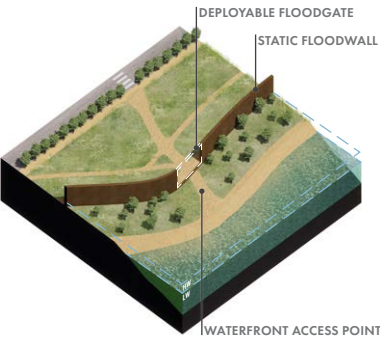


DEPLOYABLE FLOODGATES

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Deployable floodgates are mobile elements, integrated into static flood barriers, that are closed during flood events to fill gaps in protective barriers and prevent floodwater intrusion.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

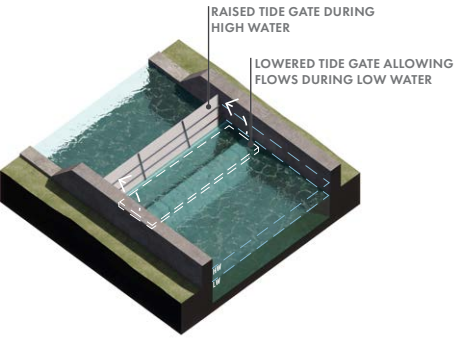


DEPLOYABLE TIDE GATES

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Tide gates are deployed along drainage and waterways to keep out floodwaters during high tides. They control water levels within urban systems and areas, come in several forms and are usually self-regulating.

CO-BENEFITS



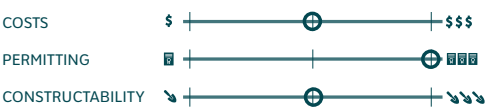
LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS





PROTECT FROM WATER

BERM / DUNE SYSTEM

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Dunes are landforms that occur with the sufficient transportation of sand or sediment and rely on the presence of a healthy and extensive root system from dune grasses and other vegetation to maintain their shape and help reduce flood risk associated with coastal storms. Dunes can act as a buffer, attenuating storm waves and reducing damage to communities.

CO-BENEFITS



EDUCATIONAL



ECOLOGICAL

LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



COASTAL



OPEN SPACE

CONSTRAINTS AND CONSIDERATIONS

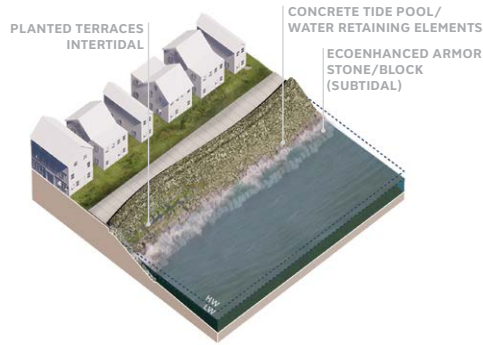


REVETMENTS

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Revetments are hard sloping structures, typically constructed using natural stone, or concrete blocks designed to reduce shoreline erosion by absorbing wave energy and minimizing wave run-up.

CO-BENEFITS



ECONOMIC

LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



COASTAL

CONSTRAINTS AND CONSIDERATIONS

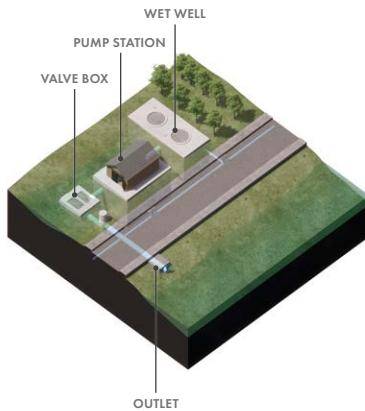


CONSTRUCT PUMPING STATIONS

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Pumping is a crucial method to convey water out of areas vulnerable to inundation, where natural and gravity fed drainage is insufficient or not possible.

CO-BENEFITS



ECONOMIC

LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



COASTAL



RIVERINE



URBAN



SUBURBAN

CONSTRAINTS AND CONSIDERATIONS



ADAPT TO PRESENCE OF WATER

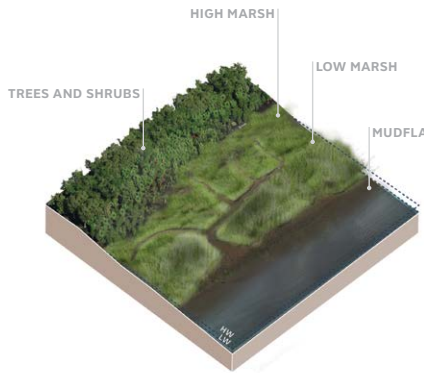
Solutions that adapt to the presence of water manage water or reduce the impacts of flooding to people and infrastructure. This can be through physical solutions such as floodproofing or through individual or community-based actions that improve capacity of people to deal with flooding.

COASTAL WETLAND PRESERVATION/ RESTORATION/ EXPANSION

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Low-lying tidal wetland ecosystems are among the most vulnerable environments to sea level rise. The resilience of tidal wetlands to sea level rise depends on the potential for horizontal migration to upland areas and the vertical accretion rate of the wetland, which can be supported through restoration and expansion.

CO-BENEFITS



EDUCATIONAL



RECREATIONAL



ECOLOGICAL

LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



COASTAL



OPEN SPACE

CONSTRAINTS AND CONSIDERATIONS

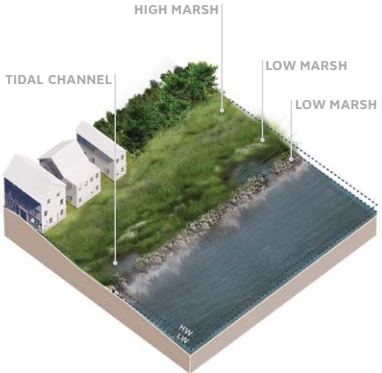


LIVING SHORELINE

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Shoreline stabilization approaches along estuarine coasts, bays, sheltered coastlines, and tributaries incorporate natural features, including vegetation or submerged aquatic vegetation alone, or hybrid systems in combination with harder shoreline structures for added stability such as stone, sand fill, rock sills and other structural and organic materials.

CO-BENEFITS



EDUCATIONAL



ECOLOGICAL

LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



COASTAL



OPEN SPACE

CONSTRAINTS AND CONSIDERATIONS

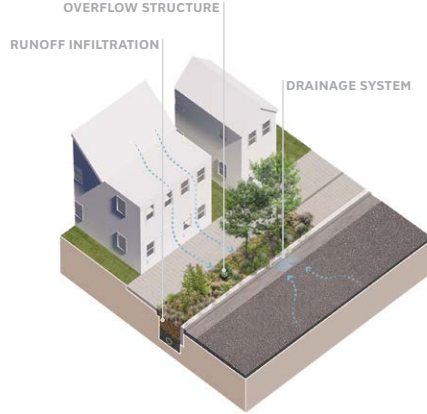


RIGHT-OF-WAY BIOSWALE (URBAN)

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Right-of-way bioswales are vegetated drainage courses located in sidewalks to capture, detain, and infiltrate runoff from streets, allowing any excess rain water to enter the piped stormwater system.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

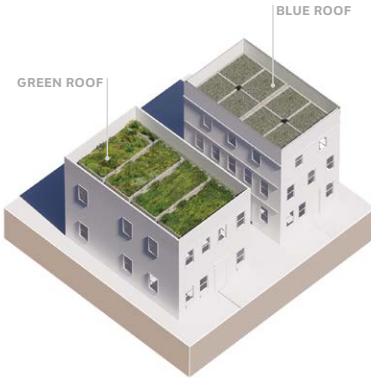


GREEN ROOF & BLUE ROOF

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



A green roof is a layer of growing medium for vegetation installed over a waterproofing system, slowing down runoff by retaining rainwater and gradually releasing it back into the atmosphere through condensation and transpiration. Blue roofs provide temporary water storage systems that allow for the gradual release or evaporation of stored water.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

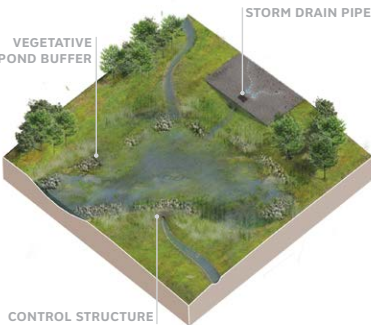


RETENTION/WET PONDS (STORMWATER BASINS)

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Retention ponds are artificial basins used to manage stormwater runoff and promote infiltration. Capturing runoff, they can reduce downstream or localized flooding and enable groundwater recharge.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

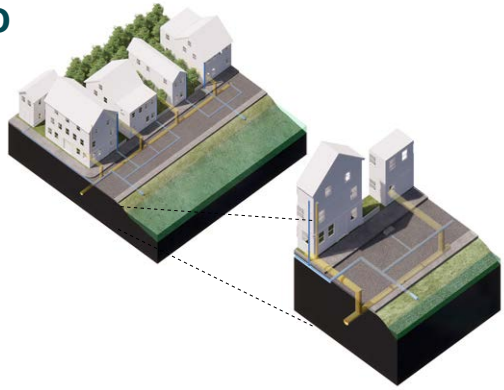


IMPROVE & EXPAND DRAINAGE SYSTEM

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Overwhelmed drainage systems are frequently the root cause of rainfall flooding. Combined sewer and stormwater systems also lead to environmental pollutants being released into waterways during rainfall events at CSO points. By separating and expanding the drainage capacity of these systems we can mitigate both stormwater flooding and CSO pollution.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

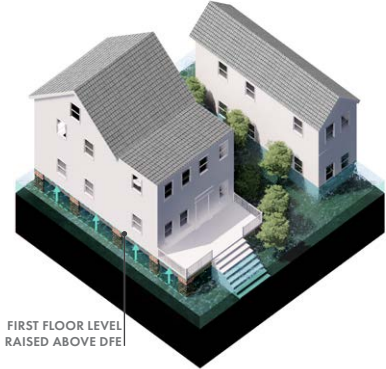


ELEVATE STRUCTURES ABOVE DFE

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Physically raising structures above flood levels protects these structures during flood events. Structures can be kept relatively intact during the raising process. Ground level can be used for storage, parking and other temporary uses.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS



RAISE CRITICAL SYSTEMS

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Relocating critical systems to higher floors within structures reduces the impacts of flooding on critical services and reduces recovery times. This tool increases the resilience of essential services to homes and businesses.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

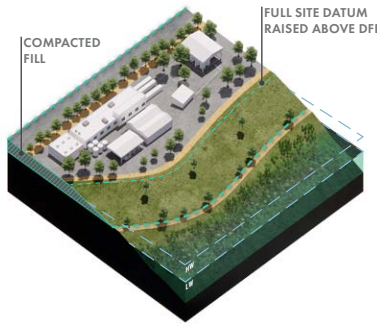


RAISE LAND

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



By physically raising land above flood levels a whole site can be protected from regular flooding. Raising land protects the full footprint of important sites like utilities and other public assets. This tool does displace risk to surrounding areas and is susceptible to subsidence. This should be applied only when there is enough space and risks to surrounding areas are considered.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

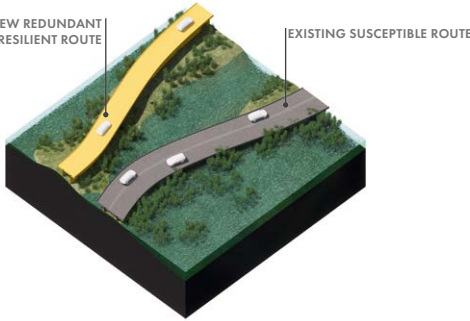


CREATE REDUNDANT EMERGENCY ROUTES

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



By creating redundant routes, residents and emergency services can have mobility options when other, more susceptible routes are impassible. This tool applies to instances where critical emergency routes are often compromised by floodwaters.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

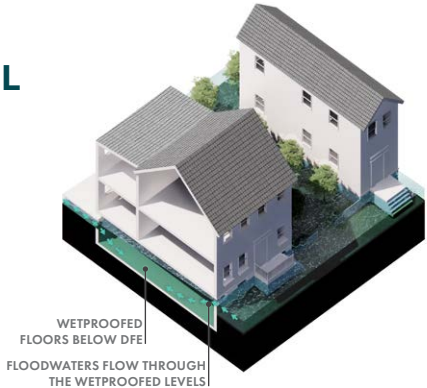


WETPROOF LEVELS BELOW FLOOD LEVEL

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Wetproofing of floors below grade involves sealing susceptible levels to water infiltration. This allows for flood water to move into and through these levels while limiting infiltration to the rest of the structure.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

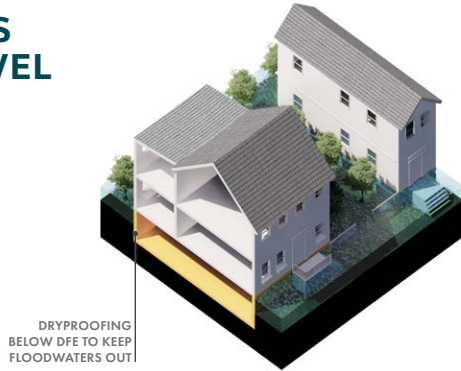


DRYPROOF LEVELS BELOW FLOOD LEVEL

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Dryproofing below flood levels involves fully blocking out floodwaters with both permanent and deployable structures. This tool retains usability of floors below grade for permanent and temporary uses. Allows for assets and utilities to remain below DFE with a lessened chance of flooding.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

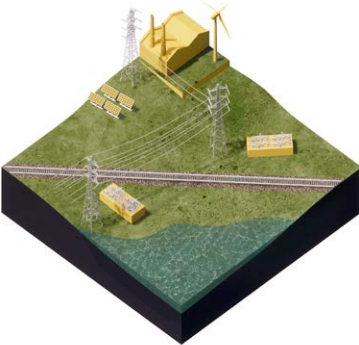


CREATE REDUNDANT SYSTEMS

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



Creating redundant systems is an essential element of resilience. For example, the reliable delivery of electricity is crucial for daily life and to post-disaster recovery. By creating decentralized and redundant energy generators and developing micro-grid systems we ensure the functioning and recovery of critical systems in case of failure within the wider network.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



CONSTRAINTS AND CONSIDERATIONS

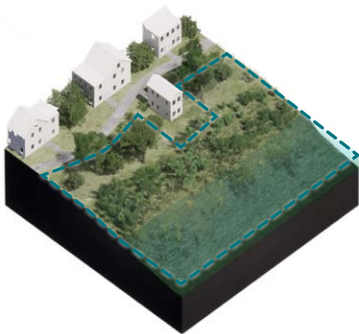


ACQUIRE LAND FOR PRESERVATION

HAZARDS ADDRESSED



SCALE OF IMPLEMENTATION



By acquiring and consolidating land, particularly along coasts and shorelines, for preservation, natural edges can be restored and enhanced in order to add inundation and erosion protection as well as sea level rise and wave mitigation.

CO-BENEFITS



LEVEL OF POTENTIAL DISRUPTION



APPLICABLE AREAS



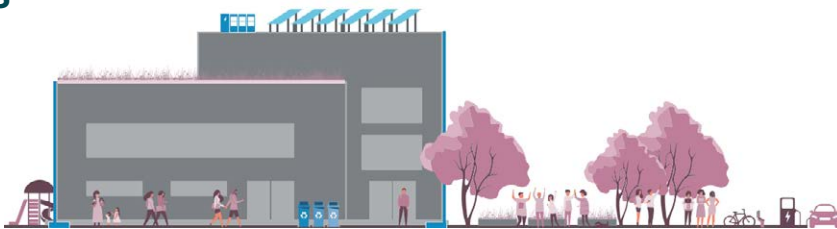
CONSTRAINTS AND CONSIDERATIONS





ADAPT TO PRESENCE OF WATER

RESILIENCE HUBS



Resilience Hubs are community serving facilities that support residents through coordination resource distribution and services before, during, and/or after a natural hazard event.

Hubs can be used year-round as neighborhood centers and are intended to be supported by local government by led and managed by community members, community-based organization and/or faith-based groups

EMERGENCY PREPAREDNESS



Prepare and Maintain an Emergency Kit
Prepare y mantenga al día Equipo para Emergencias



Emergency preparedness efforts include the dissemination of emergency alerts and guidance to residents and community leaders and supporting community-based emergency preparedness programs through partnerships with community organizations and faith-based institutions.

Outreach in multiple languages and through trusted local leaders is key.

More info from the New Jersey Department of Health's Office of Disaster Resilience
<https://www.state.nj.us/health/er/>

BUSINESS & INDUSTRY EMERGENCY PREPAREDNESS



THE EASY WAY TO PREPARE YOUR BUSINESS FOR THE UNEXPECTED.

Outreach and technical assistance to businesses and industries is another key element of emergency preparedness. This includes providing resources and guidance on developing emergency plans and how to navigate recovery programs.

More info from the New Jersey Office of Emergency Management
<http://ready.nj.gov/plan-prepare/business-industry.shtml>

COMMUNITY PLANNING



One way to build adaptive capacity is to work in close collaboration with neighborhood residents and community-based organizations to identify community needs and develop strategies for improving access to necessary resources. This could include improving access to open space, improving community mobility and connectivity, or addressing food deserts—all things that help a community adapt to changing climate hazards and thrive every day.

COMMUNITY STEWARDSHIP OF GREEN SPACES



Community co-creation and stewardship of green spaces is a way to partner with community-based organizations to maintain green spaces that support community resilience while supporting education, job training, and providing volunteer opportunities.

Ex. United Parks for One in Newark

WORKFORCE DEVELOPMENT



Job training programs focused on green infrastructure or other resiliency projects help direct investment in infrastructure projects to community and develop the necessary workforce to implement planned projects.

Example: Newark Green Works.

More info from New Jersey Water Works: <https://www.jerseywaterworks.org/wp-content/uploads/2020/11/Newark-Local-Hire-Report-November-2020.pdf>

PUBLIC-PRIVATE PARTNERSHIPS FOR RESILIENCY INFRASTRUCTURE

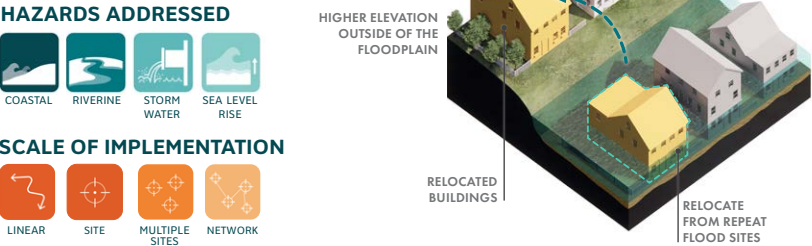


Partnerships with developers can be used to incorporate resiliency improvements, such as barriers like berms or floodwalls, or on-site stormwater improvements, into redevelopment plans.

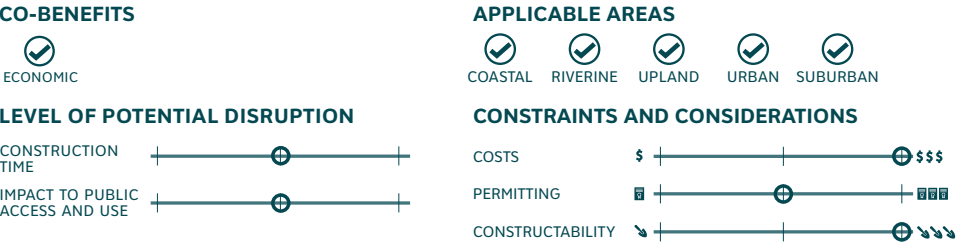
Ex. Crescent Park Redevelopment in Jersey City

Moving away from the water includes relocation or setting back from flood areas. This approach keeps people and infrastructure out of areas of high flood risk. The NJDEP Blue Acres program is an example program that allows communities to buyout homes in high risk areas. Discussions about moving away from water can be challenging because of how this can disrupt communities. Resilient NENJ has heard from residents that they value keeping their communities intact.

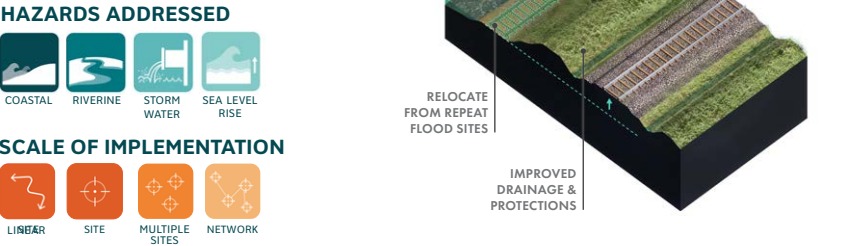
RELOCATE STRUCTURES



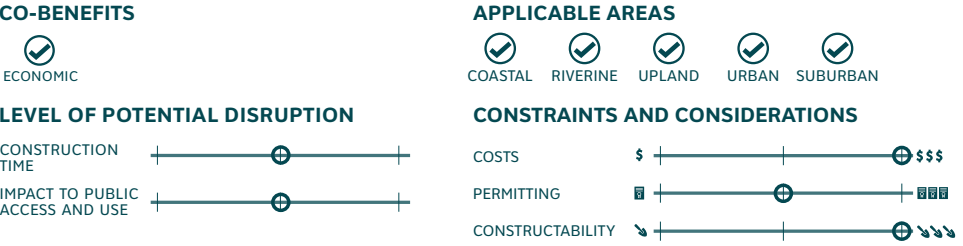
Relocating structures, homes, or businesses may be the best solution for properties that have experienced increased and/or repeat flooding.



RELOCATE CRITICAL ASSETS & INFRASTRUCTURE



Relocating critical assets such as key infrastructure, community and emergency services, and parks and walkways, will lessen destruction and disruptions from extreme weather events.



FEDERAL AGENCIES & PROGRAMS

FEMA	<ul style="list-style-type: none">Creates maps of current flood risk and sets national floodplain construction standardsAdministers the National Flood Insurance Program (NFIP), through which people in participating municipalities can purchase flood insurance. Reduced rates are available for municipalities that adopt higher construction standards through the Community Rating System (CRS).Provides hazard mitigation and disaster recovery funding to governments, businesses, and individuals. To be eligible for hazard mitigation funds, states and local entities must have developed a Hazard Mitigation Plan (HMP).
US Army Corps of Engineers	<ul style="list-style-type: none">Conducts flood risk reduction studiesImplements flood risk reduction projectsCoordinates with NJ Department of Environmental Protection (NJDEP) on hazard mitigation and disaster recovery funding efforts
NOAA	<ul style="list-style-type: none">Manages the federal Coastal Zone Management Program

STATE AGENCIES & PROGRAMS

NJDEP	<ul style="list-style-type: none">Coordinates federal, state and local floodplain management programs. These include statewide floodplain management standards and model local ordinancesLeading developing of statement climate resilience planning initiatives, including NJPACT and Resilient NJ.Relatedly, oversees the Site Remediation Program and sets requirements for combined sewer systems / LTCPs.
NJDCA	<ul style="list-style-type: none">Enforces construction codesAdministers CBDG funds received by the State for Superstorm Sandy assistance
NJBPU	<ul style="list-style-type: none">Regulates utilities, including water supply and wastewater management
NJOEM	<ul style="list-style-type: none">Coordinates with FEMA on hazard mitigation, preparedness, response, and disaster recovery funding

COUNTY, REGIONAL, AND LOCAL AGENCIES & PROGRAMS

Hudson County, Essex County	<ul style="list-style-type: none">Responsible for managing county roads, infrastructure, parksCan adopt site plan and subdivision standards as development impacts their assetsMaintain County Hazard Mitigation Plans
LTCP stakeholders (JCMUA, PVSC etc.)	<ul style="list-style-type: none">Responsible for wastewater conveyance and treatment and development of Long-Term Control Plans to mitigate impacts on water qualityAdvanced internal planning for climate risks and implementation of flood mitigation projects
Jersey City, Newark, Hoboken, Bayonne	<ul style="list-style-type: none">As a home rule state, land use, zoning, development regulation rest in local decision makersRequired to have Flood Damage Prevention Ordinances and Municipal Separate Storm System (MS4) “Stormwater Management” plansMust adopt a Master Plan that meets statewide requirementsDevelop hazard mitigation plans and capital improvement programs to address infrastructure and flood protection needsSubmit grant applications to support fundingRaise funding through property taxes, municipal bonds, and improvements associated with redevelopment projects

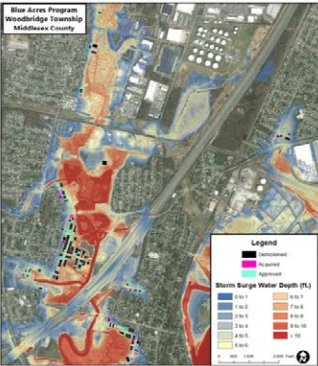
POTENTIAL ACTIONS

Strategy	Examples	Hazards Addressed	Co-Benefits
Increasing floodplain construction standards	<ul style="list-style-type: none">Higher freeboardDisclosure laws for sale of land in the floodplainRequire dry accessNon-conversion agreementsProhibit new critical facilities in high hazard areas	All	<ul style="list-style-type: none">Flood insurance savings
Increasing standards for on-site stormwater management	<ul style="list-style-type: none">Maximum lot coverage standardsProhibit encroachments on drainage ways	Stormwater	<ul style="list-style-type: none">Water quality improvementsCreation of community green space
Land use planning and zoning	<ul style="list-style-type: none">Plan for growth in areas of lower risk and reduce growth in high hazard areasImprove access to resources and necessitiesRemove zoning barriers to resilient designSet elevation requirements of buildings, yards, and esplanadesErosion prevention requirementsSetbacks	All	<ul style="list-style-type: none">Economic developmentQuality of lifeEnvironmental benefits
Incorporating resiliency in Capital Infrastructure Planning	<ul style="list-style-type: none">Align Capital Infrastructure Plan with land use plans and hazard mitigation plansCreate resiliency design standardsPrioritize investments based on risk reduction	All	<ul style="list-style-type: none">Improved efficiency of capital spending
Adapting governance structures to advance resiliency	<ul style="list-style-type: none">Resilience District to fund, implement, and maintain community-scale resiliency infrastructureTask forces and working groups across agencies and jurisdictions to advance	All	<ul style="list-style-type: none">Improved governance and accountability

CASE STUDY: WATSON-CRAMPTON NEIGHBORHOOD (WOODBIDGE, NJ)



Approx. 150 homes have been bought out so far through this program.



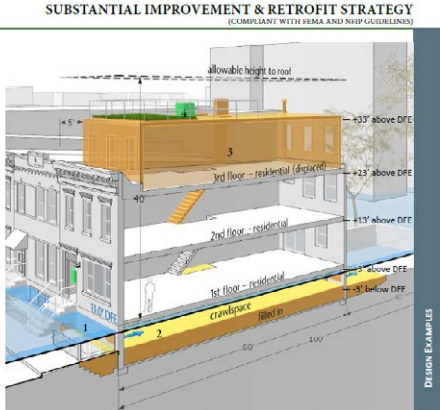
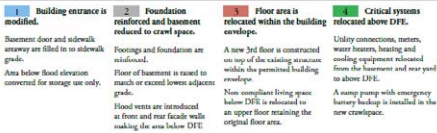
CASE STUDY: FLOOD OVERLAY ZONE (JERSEY CITY)



- After Hurricane Sandy, Woodbridge worked with the New Jersey Blue Acres Program (managed by NJDEP) for funding for voluntary buy-outs of homes severely damaged by Sandy.
- Woodbridge rezoned the area to an Open Space Conservation / Resiliency zone, which:
 - Prohibits new development
 - Renovation, reconstruction, sale, or change in tenancy require properties to be elevated one foot above federal requirements
- Woodbridge is working with Rutgers University to plan for the restoration of bought-out properties to serve as a flood buffer.
- Due to these efforts, Woodbridge has been designated a class 6 community through the Community Rating System, which allows residents to earn discount on flood insurance premiums.
- Woodbridge worked closely with residents and the Land Conservancy of New Jersey to educate residents about the program.

- The **Jersey City Flood Overlay Zone Ordinance** applies to all properties located in the current 1% annual chance floodplain.
- Includes requirements for **green infrastructure** and resilient site design depending on location in the AE or VE zone (VE zone is portion of floodplain where there are wave hazards).
- Strategies such as vegetated walls, green roof, permeable pavement, bioretention, WaterSense fixtures, etc., can be used to meet these requirements.

CASE STUDY: RESILIENT BUILDING DESIGN GUIDELINES (HOBOKEN)



- Provides an overview of the laws and regulations that apply to construction in the floodplain.
- Provides guidance on strategies to reduce flood insurance premiums.
- Recommendation for how to design buildings to be resilient as well enhance the character of a dense, urban city with pedestrian-friendly streets.



A split stoop allows matches frontage, while allowing access to dwelling above DFE.

APPENDIX D: RELATED PROJECTS

ONGOING AND PLANNED RESILIENCE PROJECTS

There are already many ongoing or proposed projects in the region that address flooding or have the potential to address flooding. Resilient NENJ has created an inventory of these physical projects, as shown on this map. The inventory is being updated continuously as we learn more information. The map here is a snapshot of the inventory that we shared during Community Meeting #2.

The goals of the inventory of projects include identifying projects that:

- Are already addressing flooding so that we can understand how they will reduce flood risks
- Have been proposed but have not advanced so that we can propose measures to implement them
- Set good examples for types of projects that can be replicated in other parts of the region

We’ve developed our inventory through conversations with Steering Committee members, conversations with stakeholders, and research. In our inventory we are tracking project status, stakeholders involved, and the project scope. If you see any information missing or inaccurate, we encourage you to email us at ResilientNENJ@dep.nj.gov to let us know.



REDEVELOPMENT AREAS

Redevelopment areas are neighborhoods that are being rebuilt with new buildings and infrastructure. Redevelopment can be initiated by local governments or private entities. Land use, zoning, and other considerations are detailed in the redevelopment plan for the area, which is reviewed by a planning board and adopted by the local governing body.

Resilient NENJ is looking at redevelopment areas in the region to understand how development patterns may change flood risks in the future and to understand how climate change is being factored into decision making. The redevelopment areas that we are looking at are highlighted on this map.

