

Implementation Roadmap

“After learning about how climate change will impact Lower Manhattan, I am most concerned about the rate at which action will be taken versus the rate at which climate change is acting.”
- Participant from the first open house



Construction of Belt Parkway Bridge in Gerritsen Beach, Brooklyn (Photo Credit: Arcadis)

Overview

Acting with Urgency

The *Financial District and Seaport Climate Resilience Master Plan* sets forth a bold vision for a 21st-century resilient waterfront that will protect the Financial District and Seaport neighborhoods and the functions they provide for the entire city and region. To realize this master plan, the City needs to advance an extensive regulatory and permitting process with multiple local, state, and federal agencies, secure funding, and construct a project of monumental scale and complexity.

This master plan will take 15 to 20 years to design, secure approvals, and build; the time to act is now. With full funding and alignment with key regulatory agencies, the flood defense could be in place by 2035. With frequent tidal flooding expected as soon as the 2040s, this leaves little room for delay. Without action, infrastructure that serves all New Yorkers will be at risk. Businesses and residents may begin to question the viability of remaining in Lower Manhattan under worsening climate change impacts.

Permitting and Approvals

Securing the required regulatory permits and approvals is a critical milestone for implementing the master plan. After undergoing an environmental impact review, which assesses potential significant environmental impacts and possible alternatives, the master plan will require permits and approvals from local, state, and federal regulatory agencies. Notably, extensions of the shoreline into the East River will require permits from the US Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (NYSDEC).

Constructing the Master Plan

Fully building the proposed flood defense infrastructure will involve a complex design, permitting, and construction process. Balancing costs, executing timely construction, and ensuring continuity of critical maritime operations along the waterfront will be essential to implementing the master plan. The plan will also have to remain flexible to different streams of funding which could advance portions of the master plan.

Funding and Financing

Funding the master plan will require significant government investment. As part of the master plan process, the project team looked at a wide range of funding solutions and found that no single source will be sufficient to cover the estimated five to seven billion dollars in capital costs. In addition to considering established sources for resilience projects, such as federal grants and City capital, the project team studied potential new funding opportunities from federal infrastructure legislation to city- or state-level surcharges or fees, and other local sources of funding. Introducing new funding streams could help catalyze citywide resilience investments, but each new opportunity also has unique constraints that could affect its viability.

The City will also need to identify additional sources to cover ongoing operations and maintenance (O&M) costs for the new infrastructure over the long-term—currently estimated as an additional \$30 million a year.

Governance

Governance, or the manner in which the new infrastructure will be managed, operated, and maintained, can take many forms depending on specific needs. The master plan could be implemented by existing government agencies or by a new entity.

The entity or entities responsible for implementing the master plan will need to be flexible in responding to changing needs over time. They will have to shepherd the master plan through design, permitting, and construction; identify and secure funding; manage financing; and oversee long-term maintenance and operations. Given the challenges of both obtaining approvals and covering the substantial costs, the entity may also need to advocate for new policies or legislation to facilitate implementation.

Permitting and Approvals

Overview

As the master plan progresses toward implementation, it will undergo several local, state, and federal reviews and approvals. This understanding is based on the current design proposal, existing historic resources, and likely potential environmental impacts. Throughout the review and approvals processes, there will be multiple opportunities for the public to participate, offer feedback, and stay informed.

Technical Analysis

To better understand the regulatory approvals needed to construct the master plan, the project team studied the anticipated approval processes and is coordinating closely with local, state, and federal agencies. The list of actions studied is not exhaustive and further consideration will be needed as the master plan advances towards implementation.

Environmental Review

The proposed master plan will undergo an environmental impact review pursuant to the National Environmental Policy Act (NEPA), State Environmental Quality Review Act (SEQRA), and City Environmental Quality Review (CEQR). The environmental review process will involve analyses of potential environmental impacts, alternatives, and options to mitigate any identified significant adverse impacts.

State and Federal Approvals

As conceived, implementation of the master plan will require several state and federal permits. This includes from USACE, pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act; from New York State Department of Environmental Conservation (NYSDEC), pursuant to the State's Tidal Wetlands and Protection of Waters Act; and a federal consistency determination in accordance with the federal Coastal Zone Management Act from the New York State Department of State (NYS DOS) Coastal Management Program.

What is the Aquatic Resources Advisory Committee?

Given the complexity associated with implementing a plan of this scale, the City took a proactive approach to permitting and protection of aquatic resources starting early in the master plan process. The USACE, as a key regulator overseeing in-water construction, recognized the importance of the master plan and agreed to convene a series of working sessions with relevant regulatory agencies to advise the project team on permitting considerations for any work proposed in the East River. The USACE Regulatory Branch of the New York District convened and chaired the Aquatic Resources Advisory Committee (ARAC) for the master plan process. The ARAC includes NYSDEC, the NYS DOS, the National Marine Fisheries Service, and the United States Coast Guard.

How did Regulatory Feedback Shape the Master Plan?

By engaging with regulators early and often, the project team worked to ensure that feedback from state and federal agencies helped to shape the master plan.

The City met with the ARAC seven times beginning in 2020 to present various iterations of the master plan conceptual design, incorporating the ARAC's feedback as the design progressed. Topics discussed included:

- Overview of Master Plan Goals ("Purpose & Need")
- Essential Fish Habitat - Sampling & Testing Plan
- Development and Refinement of the Master Plan
- Proposed Conceptual Design

Early in the master plan process, the ARAC recommended that the City embark on one year of sampling and testing in the East River to understand current ecological conditions. This will inform the future assessment of potential adverse environmental impacts of the master plan. Completing this year of sampling and testing was important because there is limited existing information characterizing the species and habitats in the East River and the little information available is dated.

The findings from the sampling and testing program were shared with the ARAC and informed the development of the master plan. The findings will also inform the future assessment of potential adverse environmental impacts of the master plan.

Over the course of multiple meetings, the ARAC emphasized the regulatory obligation of avoiding fill in the East River to the maximum extent practicable, minimizing fill when avoidance cannot be achieved, and mitigating any impacts from such fill. The ARAC also provided additional feedback to help refine the approach and design. **After extensive presentation of materials, the ARAC heard the challenge of constructing the flood defense infrastructure on land and the possible need to extend the shoreline into the East River to construct flood defense infrastructure.** However, the ARAC simultaneously continues to stress the need to reduce fill and over water structures. This challenged the City to think creatively about how to balance the master plan's goals of simultaneously providing flood defense, maintaining maritime and water-dependent uses, and ensuring universal waterfront accessibility, all while minimizing impacts to aquatic ecosystems and navigation of ferries and vessels in the East River. The City is continuing to work collaboratively with ARAC members to further advance and refine the design and develop appropriate mitigation strategies.

City and State Approvals

Numerous City and state agency approvals relating to safety, access, construction, and land use will be required. Throughout the planning process, the City met with agency partners to understand how existing regulations and policies will influence implementation of the plan.

What City and State Approvals need to be Considered as a Part of the Master Plan?

- The study area is subject to the Waterfront Revitalization Program administered by NYC Department of City Planning, which establishes the City's policies for development and use of the waterfront and provides a framework for evaluating activities proposed in the coastal zone.
- Changes to the waterfront will necessitate permits from NYC Department of Small Business Services, which has jurisdiction over all city-owned waterfront property and all structures on private waterfront property dedicated to maritime uses.
- Permits will be required from NYC Department of Sanitation to conduct any fill material operations on underwater land.
- Any changes or impacts to the historic resources in the study area, including the Battery Maritime Building, the South Street Seaport Historic District, and The Battery, will require review and approval by NYC Landmarks Preservation Commission and the State Historic Preservation Office.
- As the City's design review agency, NYC Public Design Commission has jurisdiction over permanent structures, landscape architecture, and art proposed on or over City-owned property. It will therefore review and approve the design of the master plan.
- Several elements of the proposed design may trigger public land use review. These include alterations to the City Map due to changes in street grade, site selection for a pump station, acquisition, landfill, and waterfront zoning.
- There are also complex and interrelated jurisdictional considerations for the properties along this waterfront, which will require ongoing coordination across City, state, and federal agencies.

Recommendation and Next Steps

Ongoing Coordination

Projects that build significantly into the water are rare within the current regulatory environment but are likely to become more common with the increasing threats posed by climate change. Given the complexity associated with implementing a master plan of this scale, the City has been engaging and meeting with key regulatory agencies to identify a viable path for permitting. The City will continue to consult with local, state, and federal agencies on the design, funding, phasing, and permitting of the master plan. Additionally, there will be ongoing jurisdictional coordination between federal, state, and City entities.

Additional Sampling and Testing

To better understand existing aquatic resources within the study area, and to complete the baseline aquatic sampling and testing that will be required for future permit applications, the City recently commenced a second year of aquatic sampling at the time of writing. Two to three years of sampling and testing will be required to develop a baseline understanding of the aquatic environment, ahead of obtaining any necessary permits.

Identification of Mitigation Opportunities

Mitigating potential adverse environmental impacts associated with creating a new resilient waterfront will be an important consideration as the implementation of the master plan moves forward. A mitigation strategy will need to be developed to compensate for impacts on habitat caused by the proposed new landfill and over-water structures in the East River. This will involve looking for opportunities to create or improve habitat in locations around New York Harbor (e.g., restoring tidal wetlands) or removing overwater platforms or fill. The City will collaborate with the relevant regulatory agencies and key stakeholders to identify mitigation opportunities.



A member of the project team rinses a sample collected from the bottom of the East River to look for aquatic invertebrates (Photo Credit: Normandeau Associates)



A sample of sediment from the bottom of the East River (Photo Credit: Normandeau Associates)



A member of the project team looking for fish as part of the sampling program (Photo Credit: Normandeau Associates)



Members of the project team use a beach seine to sample fish along the shoreline (Photo Credit: Normandeau Associates)



A member of the project team preparing fish traps to be set in the East River as part of the sampling program (Photo Credit: Normandeau Associates)

Constructing the Master Plan

Overview

Successfully constructing the proposed infrastructure requires the City to balance construction timelines and obstacles that could slow down implementation with the increasing impacts of climate change. The construction timeline is driven by the core infrastructure components of the master plan, accounting for continuity of critical maritime operations, especially passenger ferry service. The project team also considered how the project may be divided into smaller phases to respond to funding opportunities.

Technical Analysis

To develop a strategy around construction and phasing, the project team asked the following questions:

1. When will climate change impact different parts of the study area?
2. What are the core engineering considerations for construction?
3. How could the master plan be implemented in phases?

When will Climate Change Impact Different Parts of the Study Area?

The pace of climate change requires the City to act now to ensure that flood defense infrastructure is in place before impacts become more frequent. The primary impacts of climate change that the City needs to address include:

- **Sea level rise:** By the 2040s, high tides will begin to frequently flood the waterfront due to sea level rise. By the 2050s tidal flooding will be monthly and, by the 2080s, daily. Passive flood defense will need to be in place by the 2040s to keep this area functional, operational, and safe for New Yorkers.
- **Coastal storms:** Coastal storms are already impacting the waterfront. The sooner the flood defense system is built, the less damage the city and community will incur. By the 2050s, the cost of inaction from coastal flooding combined with sea level rise is estimated to be over one billion dollars per year.ⁱ
- **Extreme precipitation:** Recent storms, like Tropical Storm Henri and Hurricane Ida, illustrated the potential damage of heavy rainfall. With a larger percentage of precipitation coming in the form of intense single-day events, constructing drainage improvements in earlier phases of the master plan could help minimize flooding and damage.

What are the Core Engineering and Operational Considerations for Construction?

The construction timeline will need to balance the speed of construction with some level of continuity of operations along the waterfront. This includes:

Some parts of the infrastructure need to be built in a particular order. First, the base flood defense infrastructure needs to be built before anything can be built on top. This includes enclosing a portion of the East River with concrete caissons, filling behind the new structures with clean fill, and carefully placing bridging structures over subway tunnels, where necessary. Once the caissons and clean fill are in place, the new ground can be prepared to build floodwalls and floodgates on top. Then new open space, landscaping, seating, and other features can be integrated.

Some materials will take a long time to get to the study area. Given the large quantity of materials needed, like clean fill, and the custom nature of some of the project elements, like the caissons and floodgates, material availability and delivery timelines need to be considered. This may include multiple barge deliveries per week. An off-site staging area will also be needed for materials and equipment, and workers may need to access the study area from the water.

Critical services along the waterfront need to remain viable during construction. Maintaining access to the services offered by the ferry terminals in the area will drive the construction schedule. To minimize disruption to commuters, all ferry terminals cannot be reconstructed and out of service at the same time. This means taking a phased approach to the maritime facilities, including Whitehall Ferry Terminal, Battery Maritime Building, and Pier 11. Either new or temporary facilities need to be constructed before work begins on the Battery Maritime Building and Whitehall Ferry Terminal to ensure some level of continuity of ferry service.

How Can the Proposed Infrastructure be Constructed Sustainably?



Construction is a resource-intensive activity that generates greenhouse gas emissions. The building and construction sectors account for nearly 40-percent of global emissions¹ while construction and demolition debris accounts for over twice as much solid waste created in the U.S. as waste from households and businesses.² By prioritizing sustainable construction methodologies, the master plan has the opportunity to set a precedent for how New York City can meet the dual goals of mitigating the causes of climate change while protecting against its impacts. One way of doing this is to assess the greenhouse gases that are emitted during the entire “life-cycle” of the project—including those from materials as well as in construction itself. Construction impacts can be minimized through a variety of strategies:

- Using recycled materials, including post-consumer recycled content and post-industrial recycled content
- Minimizing waste through construction best practices, including guidelines from the NYC Department of Design & Construction
- Using materials that meet standards for life-cycle assessment (or an assessment of the carbon footprint of the production and use of material) from the Leadership in Energy and Environmental Design (LEED) program for structures in the project and from the Envision certification for infrastructure components

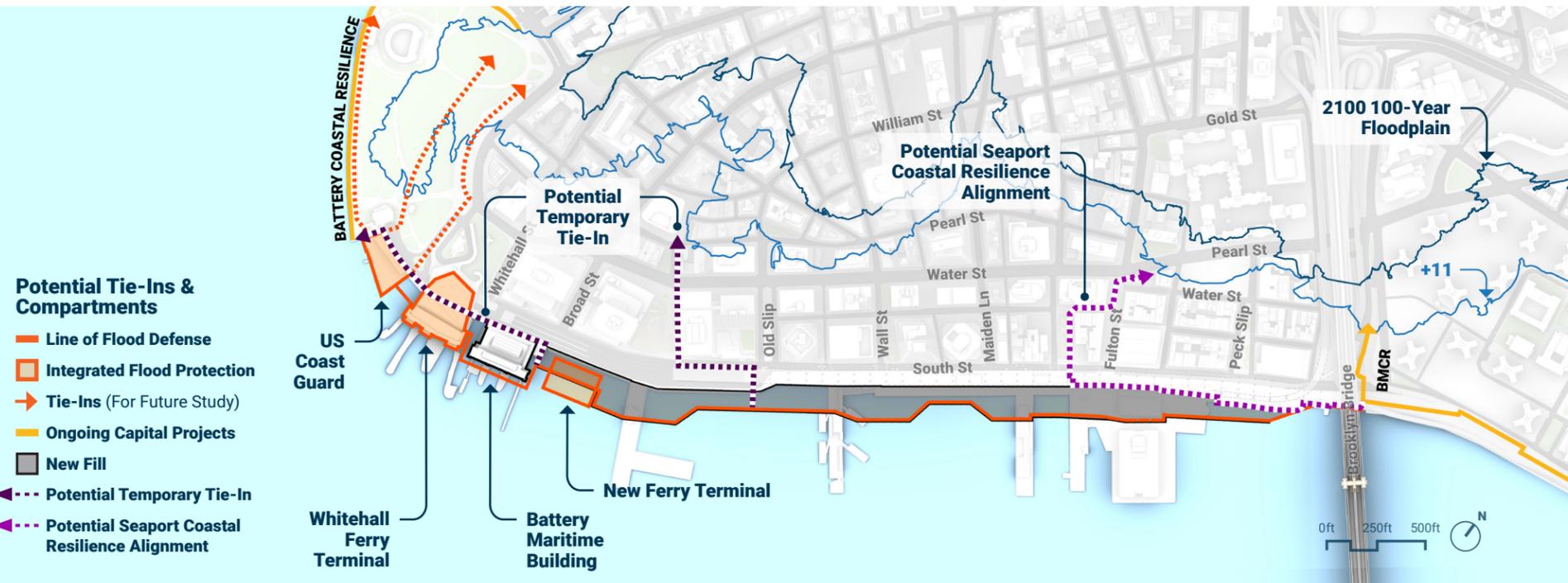
How Could the Master Plan be Implemented in Phases?

When considering how to divide the master plan into phases for implementation, it was imperative that each phase identified provides some level of protection without relying on another unfinished component. This is known as independent utility.

A key component of independent utility for a flood defense system is constructing tie-ins to high ground, ensuring that flooding does not go around the flood defense system. The overall master plan proposes to tie-in to high ground through The Battery to the south and BMCR to the north. However, with a phased approach to construction, additional temporary tie-ins would be needed to provide independent utility. Since the ground in this area is very low-lying, tying into high ground will be challenging and will require careful consideration of how to integrate this new infrastructure into the existing urban fabric, including streets, plazas, parks, and underground utilities over many blocks.

Although constructing tie-ins is challenging, it could enable the master plan to be realized in phases rather than all at once. For example, if the base infrastructure—the caissons and clean fill—is constructed from the Battery Maritime Building to Pier 17, temporary tie-ins could protect the full study area from future tidal flooding before the complete defense against coastal storms is built out.

Constructing the base infrastructure first would also provide greater flexibility for continuity of maritime operations. For example, a new ferry terminal is proposed just north of the Battery Maritime Building; if the caissons and fill are built earlier in this area, then the new terminal could be constructed and serve as a temporary location for ferry service while other terminals are under construction.



Construction of the Domino waterfront park in Williamsburg, Brooklyn (Photo Credit: Arcadis)

Recommendations and Next Steps

The critical next step is advancing the design of the master plan to a level sufficient to begin the environmental review and permitting processes. As the master plan advances toward implementation, additional engineering, design, and analysis will be required to develop a phasing and construction plan that balances the speed of construction with continuity of operations along the waterfront. Throughout the process, there will be multiple opportunities for the public to participate, offer feedback, and stay informed.

How Quickly Could the Master Plan Infrastructure Be Built?

Assuming full funding and prioritization by key regulatory agencies, the master plan could be completed in 15 to 20 years. This includes the time it takes to complete the final design and environmental review, as well as permitting and construction. To implement the master plan within this timeframe, much of the Financial District and Seaport waterfront would need to be under construction at the same time, and some services will need to be temporarily relocated within the study area. With funding limitations and/or regulatory hurdles, construction could take longer to complete in its entirety.

Funding and Financing

Overview

Implementing this master plan to protect Lower Manhattan will require significant funding to pay for both the upfront capital cost of construction and the ongoing cost of operations and maintenance (O&M). **A combination of multiple funding sources will be needed, including potential new funding approaches and substantial investment of public funds.**

The project team estimated that the capital costs for construction will range from approximately five to seven billion dollars.ⁱⁱ The flood defense infrastructure as well as new public amenities, such as increased open space and promenades, will also have new O&M requirements and costs. O&M costs will vary over time as phases of the master plan are built, as elements age and require additional maintenance, and as the increasing frequency of extreme storms requires deployment of floodgates. Today's O&M costs also need to be considered as maintaining existing piers and bulkheads is already factored into the City's budget and will only continue to increase over time with sea level rise and aging infrastructure costs. With this understanding, O&M costs are estimated to be, on average, an additional \$30 million annually (in 2021 dollars) above existing waterfront maintenance costs. Cost ranges – for both capital and O&M – are estimated using a combination of information from precedent projects and bottom-up estimating based on quantities of specific master plan elements. This high level of cost estimating provides a useful snapshot to help plan for implementation, but can vary considerably given the early stage of design.ⁱⁱⁱ

The magnitude of the master plan calls for a funding strategy that considers a broad mix of local, state, and federal sources. While the City can contribute capital and expense funding, the project team analyzed funding strategies that would limit the need for direct contribution from the City's general fund and identified sources that could make a sizable contribution to the capital and/or O&M costs. The City is actively advocating for new federal funding to support resilience projects across New York City and will continue to explore and pursue additional sources of funding.

What Drives the Costs of the Master Plan?



Implementing this master plan requires construction of large, new infrastructure systems in locations that are challenging for construction. The costs are primarily driven by the core infrastructure needed to construct the flood defense system, including clean fill and structural elements such as caissons, floodwalls, and floodgates. New drainage infrastructure will also be needed, including a pump station, additional sewer pipes and green infrastructure. Another main cost driver is the partial or full reconstruction of multiple maritime facilities across the shoreline to ensure their resiliency and provide integrated flood protection to complete the line of defense.

The project team estimated capital costs using a combination of approaches based on precedents from around the region. For some project elements, such as a new ferry terminal, where the size and design are less certain, the estimates were more approximate than for other elements, such as pier reconstruction, where more detailed cost per square foot estimates were used. *While it will be expensive to implement the master plan, the cost of doing nothing is far greater.*

Technical Analysis

What Are the Potential Funding Sources for the Master Plan?

The project team undertook a four-step process, detailed below, to analyze and identify potential funding sources.

1. Broad survey of potential funding sources
2. Screening of potential sources
3. Shortlist of sources for additional analysis and community outreach
4. Refinement of analysis

The first step was a broad survey of potential funding sources based on national and international precedents for projects of a similar type and scale. This informed a set of key evaluation criteria (see Table 1) that provided a framework for screening potential funding sources.

Table 1. Evaluation Criteria for Potential Funding Sources

Category	Criterion	Questions for Evaluation
Financial Feasibility	Viability	How likely is the City to receive funding from this source if it is pursued?
	Size	Is the amount of funds sufficiently large to justify the associated effort?
	Timing	Would the funds be available when needed?
Implementation Feasibility	Predictability	Are funding streams from this source likely to be stable or volatile over time?
	Legal	Does this source require new processes and/or legislation to establish?
Equity	Other	Will this source be difficult to implement for additional technical reasons?
	Fairness	Does this source avoid placing disproportionate burden on low-income or disadvantaged populations?
	Project Nexus	Is there alignment between those who benefit and those who bear the costs?

Based on the screening exercise, the project team created a shortlist of the most viable funding sources for further analysis (see Table 2) and conducted outreach, which included meetings, workshops, and a panel discussion with community members, as well as thought leaders to solicit feedback. The final part of the process was refining the analysis by testing preliminary scenarios to understand the amount each source could potentially contribute to the proposed master plan.

What Can Each Funding Source Contribute?

Given the scale of the proposed master plan and the investment needed, a broad mix of funding sources will likely be required, each presenting its own opportunities and challenges. For example, state and federal grants may only be applicable to specific elements of the project, such as flood defense or transportation facilities, and some sources can only be used to pay for capital costs, not ongoing O&M.

Furthermore, different funding sources may become available at different times. For example, federal grants will not be immediately available due to the extensive requirements of application processes, which generally necessitate design at the schematic level to perform the required benefit-cost analyses. Similarly, potential new funding sources, such as a resilience assessment, would require legislative action prior to implementation. Where there is a mismatch between when funds are available and when the relevant costs will be incurred, the City may also consider financing a portion of the project based on future streams of revenue. For example, where a funding source provides an annual revenue stream over many years, the City or a governance entity could issue bonds against the expected revenue to produce a larger upfront amount that could be used to pay for capital costs. However, issuing bonds would increase the overall project costs due to interest payments and other financing considerations.

Table 2. Funding Sources Analyzed^{iv}

Funding Source	Opportunities	Challenges	Potential \$ Amount ^v	Eligible Costs	
Existing Funding Sources	US Army Corps of Engineers (USACE) Civil Works Program	Represents one of the largest sources of funding, with potential to fund up to 65% of the flood defense infrastructure.	Requires an extensive process, including congressional approval and appropriations. Will impact local control over design and timing.	Up to \$3 billion	Capital
	Federal Emergency Management Agency (FEMA) Programs	There are several grant programs including the Building Resilient Infrastructure Communities (BRIC) and the Hazard Mitigation Grants Program (HMGP).	Grants are highly competitive and have funding caps that are small for a project of this scale.	Typically up to \$50 million per grant	Capital
	Capital Investment Grant	Federal Transit Administration grant program that could fund up to 60 - 80% of eligible transportation costs related to ferry infrastructure.	Program is highly competitive, with limited precedents for ferry projects.	Up to \$200 million	Capital
	Infrastructure for Rebuilding America and Rebuilding American Infrastructure with Sustainability and Equity Grants	Long-standing federal surface transportation grant programs, with a new focus in 2021 to address climate risk and environmental justice.	Both programs are highly competitive. Funding contributions are limited to transportation work.	Up to \$160 million	Capital
New Funding Sources Studied	New York State Environmental Bond Act	The Bond Act would introduce a potential new source of funding for resilience-focused projects.	Pending voter approval in 2022.	TBD	Capital
	Insurance Surcharge	Size of contribution dependent on the insurance surcharge rate and assessed lines of insurance policies.	A state-level implementation and allocation mechanism needed.	Estimated \$31 million annual revenue in 2021 dollars	Capital or O&M
	Resilience Assessment	Size of contribution dependent on the resilience assessment structure and the geographic area in which it is applied.	Many Lower Manhattan commercial property owners already pay special assessments to the local business improvement district; need to consider impact on businesses, particularly locally owned small businesses. Requires state legislation to establish and is untested in U.S.	Estimated \$30 million annual revenue in 2021 dollars	Capital or O&M
	Revenue from new development (residential, office)	Not included in the master plan due to public feedback, space constraints, and permitting challenges	Revenue estimates are highly dependent on multiple assumptions, including size and use of buildings, timing, and market demand.	Variable	Capital or O&M

Recommendation and Next Steps

This master plan requires a broad mix of local, state, and federal sources to enable a stream of funds that can cover costs of construction and long-term O&M. As project planning and design advance, the City will continue to monitor and explore new funding sources and further develop the overall funding strategy.

The federal government is a potential major source of funding for the master plan and the City will continue to pursue all avenues to federal funding, including:

- Continuing to engage with USACE regarding potential opportunities through ongoing studies in the region
- Pursuing FEMA grants to provide additional funding for project planning and construction of initial projects
- Continuing to evaluate federal transportation grants as revenue sources for ferry-, bike-, and highway-related project elements with input from state and City transportation agencies
- Advocating for additional federal resilience infrastructure investments to increase the overall funding pool for city- and state-wide resilience needs
- Advocating to increase funding caps for federal and state project awards

Analyzing the Potential Role of Real Estate Development



The width of the proposed shoreline extension is solely driven by the space needed for flood defense infrastructure. Regulatory restrictions on extending the shoreline into the East River, combined with the master plan's goal of maximizing universal accessibility, limit the options for locating buildings on the shoreline extension. In addition, public feedback during the engagement process indicated a desire to limit large-scale development, especially around the South Street Seaport Historic District.

In response, the City is not proposing any residential or large-scale commercial development as a part of the master plan. However, for comprehensiveness, the project team studied whether the inclusion of mid- and high-rise buildings could provide a significant source of funding. Based on preliminary analysis, the project team found that development revenue is unlikely to contribute significantly towards the capital costs but could provide a significant share of annual O&M costs.

Governance

Overview

The master plan requires complex large-scale infrastructure planning over many years to meet different needs across flood resilience planning and engineering, maritime engineering and operations, emergency operations and more. To implement a project of the magnitude proposed, a governance entity needs to be able to manage a capital construction project across these multiple disciplines; secure funding and financing; and shepherd the proposed project through complicated federal, state, and City permitting and approvals. The entity that manages the construction of the project will also need the capacity to plan for and take on long-term operations and maintenance, which could include managing maritime facilities, open space and programming, and emergency operations of flood defense systems.

Existing government agency structures may not be ideally suited to manage a project of this scale and cross-disciplinary nature. Instead, a special-purpose entity could bring these disparate functions together under one roof with specialized staff and a clear mandate.

Technical Analysis

To understand the types of potential governance entities and which ones may be best suited to carry out the master plan, the project team asked the following questions:

1. What would a new governance entity need to do?
2. What types of governance entities may be applicable?
3. What are examples of existing governance entities that achieve similar functions?

What Would a new Governance Entity need to do?

The master plan is unique compared to other infrastructure or construction projects in a few important ways. First, the area in which the proposed project will be built is currently overseen by many different entities. For example, the land near the shoreline and underwater is owned by the City, but the waters are also subject to state and federal regulations. **The entity will need to navigate complex permitting and approval processes over many years to receive the necessary permission to construct the project.** Where challenges arise, the entity may need to advocate for changes to existing regulations or policies, as well as new funding sources.

The entity will need to be able to access a variety of funding and financing sources—particularly those that have the greatest potential to cover the costs of the master plan. For example, the entity should be able to receive City capital and expense funding as well as apply for state and federal grants. The entity should also be able to receive allocations from new revenue streams, such as an insurance surcharge or resilience assessment, that may be used to fund different projects across the city or state. In addition, it may be advantageous for the entity to issue bonds that could provide upfront capital financing. In some cases, securing funding may require significant coordination with government entities like the USACE, which the entity should have the capacity to manage.

The entity may also play a role in managing capital construction and day-to-day operations and maintenance once construction is complete, including emergency activation of the flood defense infrastructure in advance of coastal storms. Staff responsible for overseeing capital construction should have the appropriate engineering and project management expertise. As the proposed project is constructed, staff may need to maintain and operate the specialized flood infrastructure and could be responsible for maintaining the public realm.

Finally, because it will take close to two decades to realize the master plan and it will be built to protect the area into the next century, the master plan needs to be a sustained priority for the entity ultimately charged with realizing the plan. Implementation will call for significant communication and coordination with many different types of entities including local, state, and federal government agencies as well as continued engagement with the community. The entity should have the capacity and authority to conduct this engagement and outreach.

What Types of Governance Entities may be Applicable?

All types of governance entities the project team evaluated would be publicly controlled, either by the City or the state. The first option the project team explored would be governance by a City agency or combination of City agencies. This would not require a new entity to be established, but may call for a non-binding agreement, such as a Memorandum of Understanding (MOU), to define the roles and responsibilities of each agency involved. If roles assigned to a given agency go beyond its typical purview, additional authorization may be required.

Beyond direct City agency management, the project team explored creating a public authority. A public benefit corporation is a public authority chartered through state legislation to support public interests, notably the development and maintenance of infrastructure. The powers and limitations of the authority are set forth in the authorizing legislation and by-laws. A board of directors would oversee a public authority, with the required composition of that board established in the legislation. Other entities, such as local development corporations, do not require special state legislation to establish but may be deemed public authorities and be subject to reporting requirements outlined in the Public Authorities Accounting Act (PAAA).

The entities that the project team explored are detailed in Table 3.

Table 3. Types of Public Authorities Evaluated

Entity Type	Description	Advancing Design & Permitting	Advocacy	Funding & Financing	Capital Construction	Operations & Maintenance
City Agency	Existing City-agency management	Moderate Alignment Can procure and contract a design team. Can conduct community engagement. Has the expertise and ability to coordinate and advance pre-construction processes.	High Alignment Can advocate for legislation / policy.	Moderate Alignment Can access city capital and channel federal or state funding.	Moderate Alignment Have staff with expertise to oversee capital construction, but capacity may be limited for a project of this scale.	Moderate Alignment No existing agency dedicated to managing resilience infrastructure. Organizational capacity would need to be created and could require an amendment of the City Charter for authorization.
Public Benefit Corporation or other public authorities	State-controlled public authorities, with one or more board members appointed by the Governor.	High Alignment Can procure and contract a design team. Can hire staff to coordinate and advance pre-construction processes.	Moderate Alignment Have restrictions around advocacy for legislation / policy.	High Alignment Has bonding authority and can raise private funds. Can also access City capital and channel federal or state funding.	High Alignment Can hire dedicated staff to oversee capital construction.	High Alignment Can hire appropriate personnel for O&M.
Local Development Corporations (LDC)	A nonprofit corporation that is created or sponsored by a local government.	High Alignment Can procure and contract a design team. Can hire staff to coordinate and advance pre-construction processes.	Low Alignment LDCs cannot advocate for legislation / policy.	High Alignment Has bonding authority and can raise private funds. Can access City capital and channel federal or state funding.	High Alignment Can hire dedicated staff with expertise to oversee capital construction.	High Alignment Can hire appropriate personnel for O&M.

What are Examples of Existing Governance Entities that Achieve Similar Functions?

Table 3 above shows that different types of entities can do similar things. Notably, local development corporations, public benefit corporations, and other public authorities, have similar capabilities. To help understand why one type of entity might be selected over another, the project team looked at examples of existing governance entities and how they typically operate. Examples evaluated include:

Hudson River Park Trust (Public Benefit Corporation)

Hudson River Park Trust was created by the Hudson River Park Act of 1998 to design, build, operate, and maintain a public park and estuarine sanctuary along several miles of the western Manhattan shoreline. Some of this land is owned by the State and some by the City, but it is all jointly leased to the Trust. The Trust is subject to state oversight by board members, a majority of whom are appointed by the Governor. The mayor and borough president of Manhattan also place appointees on the 13-member board of directors. Because the Hudson River Park Act requires the Trust to be financially self-sufficient, the entity needs to channel funding through a variety of sources. O&M for the park and Trust are primarily funded by income generated through park concessions, rents, and donations. Capital projects have historically been funded by various city, state, and federal allocations or grants, but private fundraising, as well as revenue from development rights, are currently playing a larger role. The Trust has staff with diverse expertise to oversee its many responsibilities, from design and construction to operations, programming, and environmental stewardship.

Battery Park City Authority (Public Benefit Corporation)

The Hugh L. Carey Battery Park City Authority (BPCA) was created in 1968 to oversee development of new land that would become the Battery Park City neighborhood. Over much of the following decades, the Authority has focused on creating and maintaining the mixed-use, 92-acre community of commercial, residential, retail, and open space, including 36 acres of public parks, on Manhattan’s Lower West Side. BPCA generally operates independently, though it coordinates with City agencies where appropriate. In pursuit of its strategic goal of adapting to a changing climate, it is currently undertaking significant resilience infrastructure projects in concert with the City’s efforts and is responsible for securing funding, designing, building, operating, and maintaining, these flood protection systems. Unlike other entities described in this chapter, BPCA owns the land it manages, and most of its current funding comes through revenue from ground leases to residential and commercial developments and, more significantly, payments in lieu of taxes. Because these sources generate surplus revenue, a majority of those funds are given back to the City and used for other public priorities.

Lower Manhattan Development Corporation (Public Authority)

Lower Manhattan Development Corporation (LMDC) was created in December 2001 as a subsidiary of Empire State Development to administer federal funds granted by the US Department of Housing and Urban Development (HUD) to redevelop and revitalize Lower Manhattan after the September 11 attacks. The central effort of this entity is a redevelopment plan for the World Trade Center site, including the September 11 Memorial and new towers, and other programs supporting residential growth, public realm and street life, and waterfront access. LMDC oversees the development and construction of these projects and programs, while other entities handle ongoing O&M.

Brooklyn Navy Yard Development Corporation

(Local Development Corporation)

Brooklyn Navy Yard Development Corporation (BNYDC) is a not-for-profit corporation created by the City of New York as a local development corporation. BNYDC develops, manages, and operates the Brooklyn Navy Yard on behalf of the City. The City retains control of the Brooklyn Navy Yard site through the terms of a long-term lease, the annual City Contract, and the by-laws, which provides that most of the Board of Directors are appointed by the mayor.

Recommendations and Next Steps

The City, working with local, state, and federal partners, will continue to assess the potential options for governance and establish a mechanism to oversee implementation of the master plan design, environmental review, and permitting. Questions that still need to be answered include:

- Who will control the new land created by the shoreline extension?
- What sources of funding will be utilized?
- What role will the state and federal governments play in realizing the proposed project?
- Who will operate and maintain the flood defense infrastructure, public open space, and transportation infrastructure?

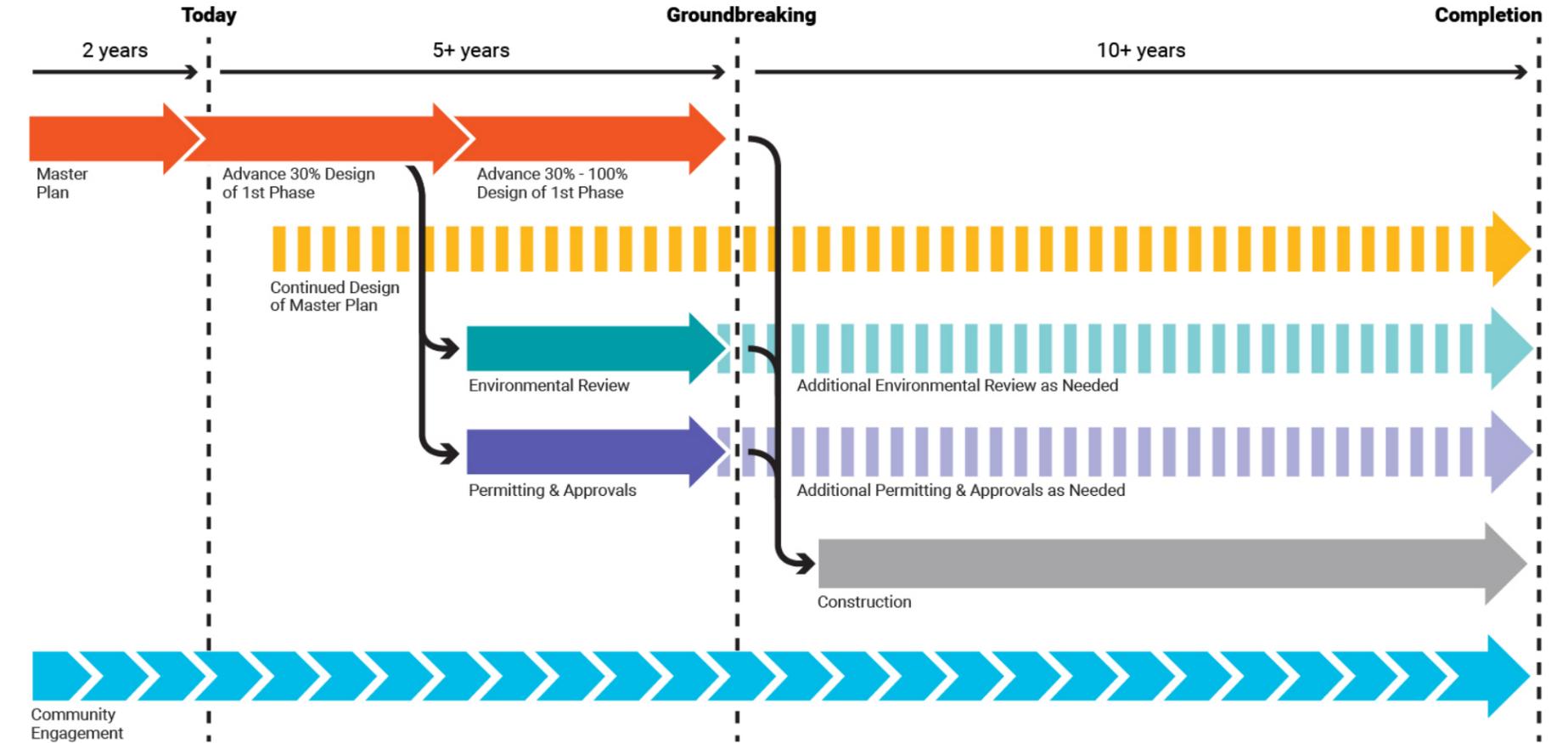
Timeline

To make this master plan into a reality, the City will need to advance an extensive regulatory approval and permitting process with multiple state and federal agencies, secure funding, and construct a project of monumental scale and complexity.

The City will continue to work closely with the community, advocates, and elected officials to identify a construction phasing strategy for the master plan, including the identification of a first phase project. First, the design must be developed to a level sufficient to begin environmental review. Environmental impact review and permitting processes can then commence and advance in parallel as the design continues towards 100 percent. This process, from design through obtaining all necessary approvals, will take a minimum of five years.

Construction of the first phase may begin only after environmental impact review is completed and necessary permits and approvals are obtained. Other phases of the master plan may continue to be designed as the first phase project advances depending on availability of funding. Additional environmental impact review, as well as approvals, may be needed as future phases advance.

Just as the master plan was informed by extensive community feedback, the City will continue to engage with stakeholders to ensure that the refined design and construction process aligns with neighborhood and citywide goals.



Illustrative timeline of master plan implementation

Sources

1. IEA. "Global Status Report for Buildings and Construction 2019 – Analysis." Accessed December 7, 2021. <https://www.iea.org/reports/global-status-report-for-buildings-and-construction-2019>.
2. US EPA, OLEM. "Sustainable Management of Construction and Demolition Materials." Overviews and Factsheets, March 8, 2016. <https://www.epa.gov/smm/sustainable-management-construction-and-demolition-materials>.

Notes

- i. Cost of inaction is presented in 2021 dollars and not discounted over time.
- ii. The low end represents the value in 2021 dollars and the high end accounts for the impacts of inflation over a representative construction schedule.
- iii. The current estimates are between Association for the Advancement of Cost Engineering International Class 4 (Concept Screening) and Class 5 (Study or Feasibility) estimates and do not include, for example, financing costs. Appropriate unit costs were selected by examining recent bids for similar projects, referencing published or industry accepted unit costs or costs for similar project elements, or estimating costs as a percentage of construction. Markups are based on generally accepted industry practice or derived from recent project experience.
- iv. The estimated size of each potential source is based on the facts and circumstances present at the time of this master plan and may change over time as this project, funding programs, and financial markets evolve.
- v. Amounts here are escalated to take into account an estimate of the effect of inflation over the duration of the project unless stated otherwise.