

WEDG

The Blue Movement to Design Better Waterfronts

*National planning achievement award for a best practice — Gold
2019*



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Summary

Theory of Change

Stories & Narratives

- Each section is color-coded to aid navigation.
- Assignment question prompt 1 is addressed in the [Summary](#) section.
- Assignment question prompt 2 (including sub-prompts *a* & *b*) is addressed in the [Theory of Change](#) section.
- Assignment question prompts 3 and 4 are addressed in the [Stories & Narratives](#) section.

Background

New York City

The most populous city in the United States of America, New York City, or colloquially NYC, is also one of the most densely populated urban centers of the world. However, this metropolis faces a unique challenge – sea-level rise. With a large concentration of urban infrastructure situated on the coast, the city stands to lose a lot to rising sea levels and subsequent flooding in terms of the economy, infrastructure – and lives. The *Five Boroughs*, in essence, represent New York City's inherent diversity. The culturally rich and socially diverse borough of Brooklyn is a site very unlike Manhattan, the financial center. The boroughs not only contend with issues of varied interests but also distinct municipal jurisdictions – each fighting their own battle.



Climate Change & Urban Coastal Infrastructure

Climate variability and change is currently one of the most prominent areas of exploration in academic and institutional research. Over the past several decades, international research communities have endeavored to produce a clear picture of the mechanism and reasons for climate change. Now that considerable headway has been made into climate change research, it can be conclusively stated that climate change will impact a wide range of human and environmental systems, changing the way they interact with each other.

Prediction of future climatic conditions, as well as an ability to appreciate the gravity of their impacts, is essential knowledge for the construction industry, and involved stakeholders to manage the effects of climate change for both existing and future infrastructure. Coastal infrastructure is likely to be significantly affected by the changes, including extreme events such as storms, flooding, and sea-level rise.

Resilience for the urban coastal infrastructure would depict their ability to mitigate the effects of climate-induced hazards and to maintain function in the face of climate-driven changes. It would ideally enable the urban infrastructure to adapt, reorganize, and evolve into more desirable configurations to adapt to future challenges.

Recommended adaptation strategies to facilitate climate change resilience in infrastructure are:

1. Prioritization of critical infrastructure and risk evaluation
2. Define climate change problems in lucid terms to assist decision-makers
3. Develop better tools and models for performing risk assessment
4. Assess the cost of impacts to crucial infrastructure components
5. Improve communication among stakeholders

Introduction

The decennial update of the New York City Comprehensive Waterfront Plan (2011) identified the need for guidance to achieve an excellent waterfront design – the lack of which is a constant frustration for public and private entities alike. Following this recommendation, with an increasing sense of urgency brought on by Hurricane Sandy in 2012, the Waterfront Alliance worked with more than a hundred experts to launch the first version of WEDG in 2015. The Rockefeller Foundation, New York Community Trust, and Doris Duke Charitable Foundation provided philanthropic support to the Waterfront Alliance to develop the new version of WEDG, released in 2018.

Waterfront Edge Design Guidelines (WEDG), a project piloted by Waterfront Alliance, aims to promote resilience, ecology, and access to improve NYC's waterfront.

Waterfront design is intricate, requiring maneuvering of land-use policies and overlapping jurisdictions — the fragile ecosystems and the changing climate compound the problem. Flooding due to sea-level rise has transformed urban coastal areas into increasingly vulnerable zones, making the task for waterfront design daunting, even for seasoned planners and technical experts. This calls for city planners and practitioners to assiduously hammer out an action plan capable of combating this challenge.

The WEDG plan endeavors to develop mechanisms and guidelines to lead city planning at every scale: national, regional, local, and site. To this end, the Waterfront Alliance has developed WEDG, involving experts from every discipline of urban development and city planning – design, engineering, applied sciences, community development, and insurance. WEDG is a set of guidelines to address these challenges at the project scale, augmented by a voluntary rating system.

“Through influencing real projects with sound guidance, educating professionals, and engaging and supporting community groups, WEDG aims to not only influence those individual decisions but to shift the field of practice for waterfront design toward balancing resilience, ecology, and access for all” (Waterfront Alliance, 2019).

WEDG incorporates an evidence-based approach, focusing on three pillars for an exemplary design of waterfronts:

- **Resilience:** Mitigate effects or be adaptable to the effects of sea-level rise and increased coastal flooding, through risk reduction – structural protection, setbacks, and other integrative landscaping measures.
- **Ecology:** Endeavor to conform to local and regional ecological goals, and strive to protect existing aquatic habitats by incorporating designs and shoreline configurations that improve and possibly enhance the ecological function of the coastal zone.
- **Access:** Be equitable and informed by the community, enhancing public access, supporting a diversity of uses, from maritime, recreation, and commerce where appropriate, thereby maximizing the diversity of the harbor and waterfront (Waterfront Alliance, 2019).

Why It Matters

The United States of America is an increasingly urbanized coastal nation. In 2010, 123.3 million people, or 39 percent of the nation's population lived in counties directly on the shoreline. This number is expected to increase by 8% from 2010 to 2020, adding another 10 million (NOAA, 2018). Furthermore, environmental degradation and vulnerability to climate change are increasing. In the United States alone:

- Since 1978, more than \$47 billion have been spent in claims through the National Flood Insurance Program – 40% of which, in the last ten years alone.
- Almost 80,000 acres of coastal wetlands are lost per year due to development and sea-level rise.
- Approximately 30% of the US population lives on the coast, though many people are disconnected from their waterfronts. NYC – a city vulnerable to sea-level rise – is home to 8.5 million people.

At the same time, harbors and waterways have been rediscovered as tremendous assets—places for recreation, education, transportation, and employment. The waterfront has never been more critical. How, where, and what is designed at the water's edge are open questions with profound consequences for the world's denizens in the present and future generations. *“WEDG, developed by the Waterfront Alliance, is a powerful tool for communities and landowners alike to find common ground and language to promote ecology, access, and resiliency”* (Waterfront Alliance, 2019).

How It Works

WEDG is a tool aimed towards stakeholders from all strata of city development - from practicing professionals, public officials, and elected representatives to local communities and landowners. WEDG acknowledges the diversity of waterfront uses, from industrial, maritime activity to recreation. WEDG leads users through a series of planning and design considerations that enable design teams to tailor context-specific solutions suitable for their project. *“In this way, it helps translate complex science into a digestible format, facilitating not only better decisions but serving as a communication tool between landowners, design teams, regulators, and communities”* (Waterfront Alliance, 2019). WEDG addresses the first complex challenge to climate resilience, which is making scientific data palatable for the public, and comprehensible by practitioners from different fields of study.

The multi-pronged approach of WEDG incorporates:

- Exemplary waterfront design for the long term through guidelines based on sound science, engineering, and community input.
- Communication between diverse stakeholders through common and accessible language and images.
- Education of professionals and community members alike, raising the base knowledge of available options for resilient, accessible, and ecologically-sound waterfronts.

WEDG is for the edge—urban and suburban projects along the coastal waterfront. While it may guide projects that do not have a waterfront edge, it is intended for properties directly touching a body of water along the coast. This includes projects varying in scale and capacity across a broad range of uses—including, but not limited to, maritime, residential, industrial, mixed-use, and parks (Waterfront Alliance, 2019).

WEDG Design Manual & Guidelines

WEDG, as a set of guidelines, provides a diverse palate of design options for an extensive range of projects. As a credit-based rating system, it establishes an elaborate process and definitive threshold for certification to review a project's performance relative to resilience, access, and ecology (Waterfront Alliance, 2019).

For projects to achieve WEDG certification, they must achieve 115/215 credits. The new 215-point credit system is divided into six categories, each encompassing a separate sphere of resilience, ecology, and access, to assist the design process, from conceptualization to operations:

- Category 0: Site Assessment & Planning (28 points)
- Category 1: Responsible Siting & Coastal Risk Reduction (40 points)
- Category 2: Community Access & Connections (52 points)
- Category 3: Edge Resilience (18 points)
- Category 4: Natural Resources (61 points)
- Category 5: Innovation (16 points)

For Whom

WEDG is for communities—from big cities to small neighborhoods—to give them ideas and also to advocate for achievable changes in waterfront projects. The below presentation, an introduction to WEDG principles and guidelines, helps residents, small landowners, businesses, community organizations, elected leaders, and other groups take action to improve access, resiliency, and environmental health as they work to improve real waterfront projects and decision-making.

WEDG is primarily aimed towards, but not limited to three diverse yet interconnected groups of people:

- Community members
- Design professionals
- Government representatives

Moving Forward

The plan to transform New York City's waterfronts into climate-resilient and more accessible spaces, executes a comprehensive [theory of change](#)¹, which will be discussed further in the next section. The theory of change section also discusses the actions leading to outputs and the impact of local policies on these actions.

Stories showcasing the success of WEDG are exhibited in the subsequent section. These include projects such as the Brooklyn Bridge Park and the Sandy Hooks Pilot Association, whose previous headquarters were devastated by Hurricane Sandy. [Stories & Narratives](#)² assess the persuasive power of the plan, and also analyze the applicability of the plan, by looking at its strengths and possible shortcomings.

Following the success of the first version of the plan and guidelines applied to these varied projects, post-2015, received significant philanthropic support from many New York-based financial titans. Waterfront Alliance has then on, striven to create a set of comprehensive and universally-applicable guidelines, and launched the revised version of WEDG in 2018. WEDG won the APA's *National planning achievement award for a best practice — Gold (2019)*.

¹ Assignment question prompt 2 (including sub-prompts *a* & *b*) is addressed in this section

² Assignment question prompts 3 and 4 are addressed in this section

Theory of Change

A ‘theory of change’ explains how activities are understood to produce a series of results that contribute to achieving the final intended impacts. To transform New York City’s waterfronts into climate-resilient and more accessible spaces, the theory of change encompasses engineering, design, community engagement, and urban planning – but not public policy.

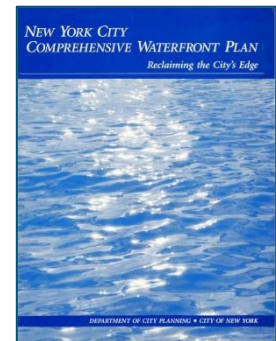
A theory of change can be developed to intervene in the following:

- Objectives and activities can be identified and effectively planned
- Adaptations in response to emerging issues and decisions made by partners and other stakeholders (UNICEF, 2014).

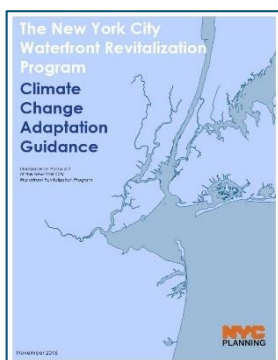
New York City has always been at the forefront of planning, which has kept the sprawling metropolis afloat and prevent it from drowning in its own urban complexities. Towards this end, the city planning department (NYC Planning), with the aid of the private sector and other public agencies, has continuously updated the plans for New York City.

“New York City’s waterfront is a valuable but still untapped resource. Decades of declining maritime activity have left much of the city’s waterfront dormant. Today, after years of neglect and revitalization attempts stalled by the clash of competing interests, New Yorkers are coming together to fulfill the public’s claim to productive use and increased enjoyment of this resource.”

– New York City Comprehensive Waterfront Plan (1992)



Conceptualized in the 1990s, the New York City Comprehensive Waterfront Plan (CWP) proposed by the Department of City Planning sought to respond to this extraordinary planning opportunity. For the first time in the city's history, it provided a comprehensive framework to guide land-use along the city's considerably long 578-mile shoreline in a way that appreciates its value as a natural resource and celebrates its diversity. The CWP presented a long-term vision that sought to balance the needs of ecologically sensitive areas and the functioning port – the catalyst for the city’s growth – with opportunities for public access, recreational open spaces, seafront residences, and commercial activity.



New York City’s Waterfront Revitalization Program (WRP), initially adopted in 1982, updated in 2002, with the latest revision in 2018, is the city's principal Coastal Zone management tool. The plan has a set of ten policies for development along the boundaries and on the waterfront of the delineated Coastal Zones. The 2018 revision of the WRP contains guidance on climate change adaptation.

The long-standing existence of forward-looking plans for New York City augments efforts aimed towards climate resilience. The regulatory provisions laid out in these plans provide for an excellent legitimate framework to guide the development process on the waterfront. WEDG can be utilized within this framework in complete compliance with regulations and zoning ordinances – with public policy and WEDG working in sync towards sustainable waterfronts in NYC.

The theory of change diagram for the transformation process of NYC’s waterfronts through the application of WEDG is shown in the next section.

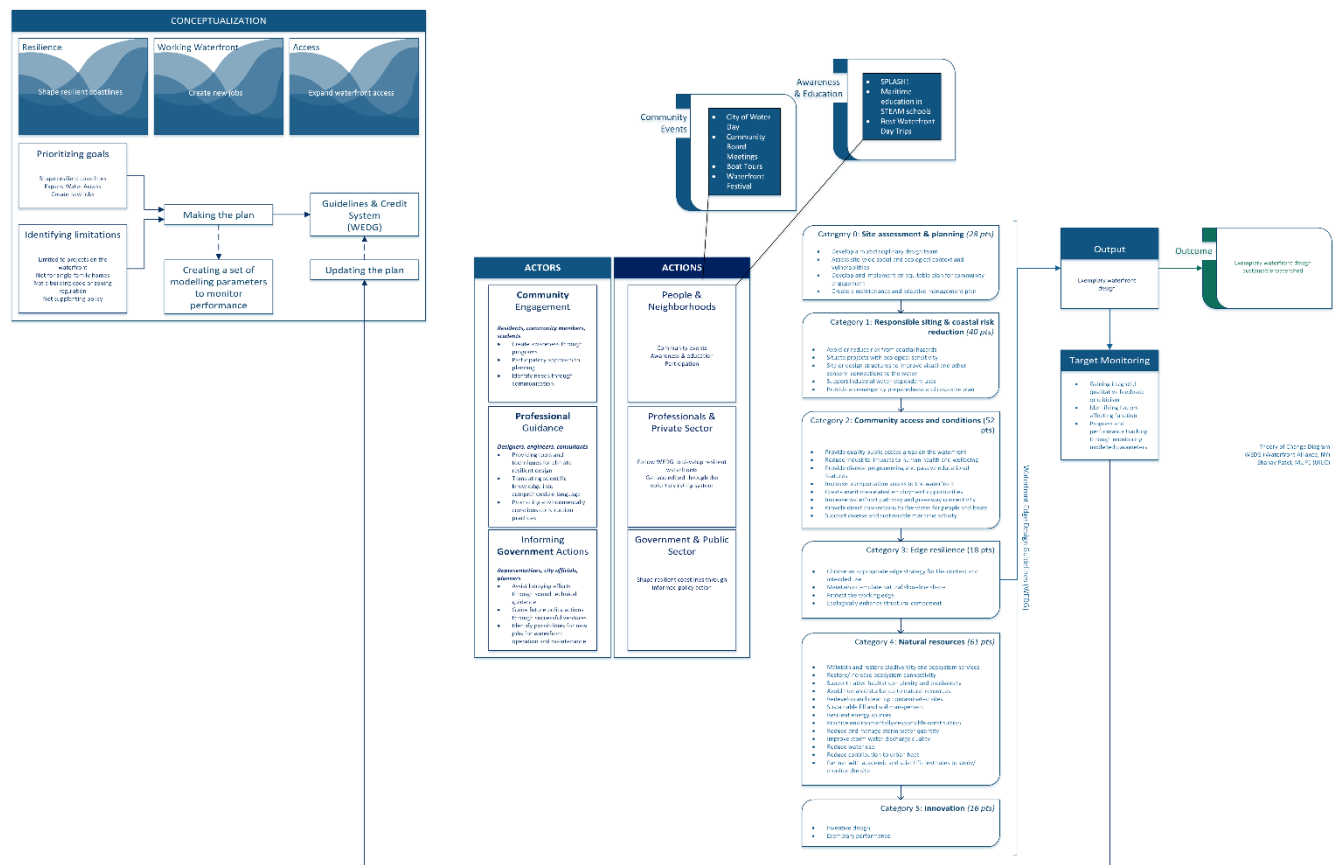
Theory of Change Diagram (WEDG)

WEDG uses a three-pronged approach:

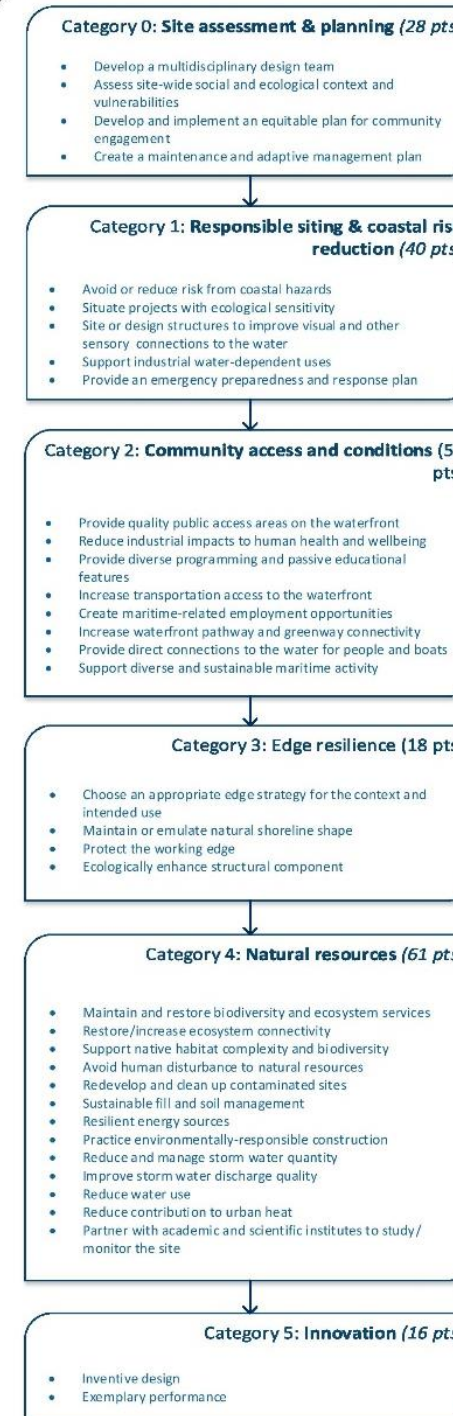
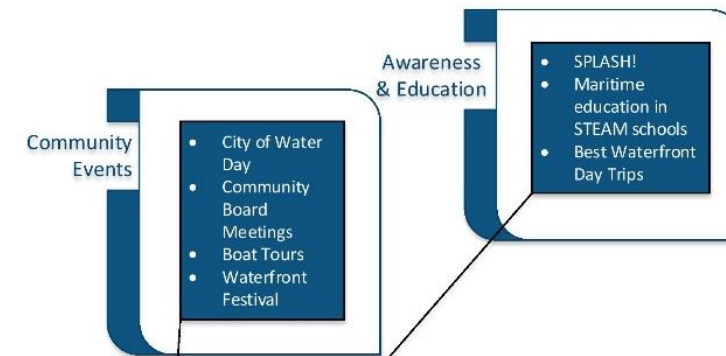
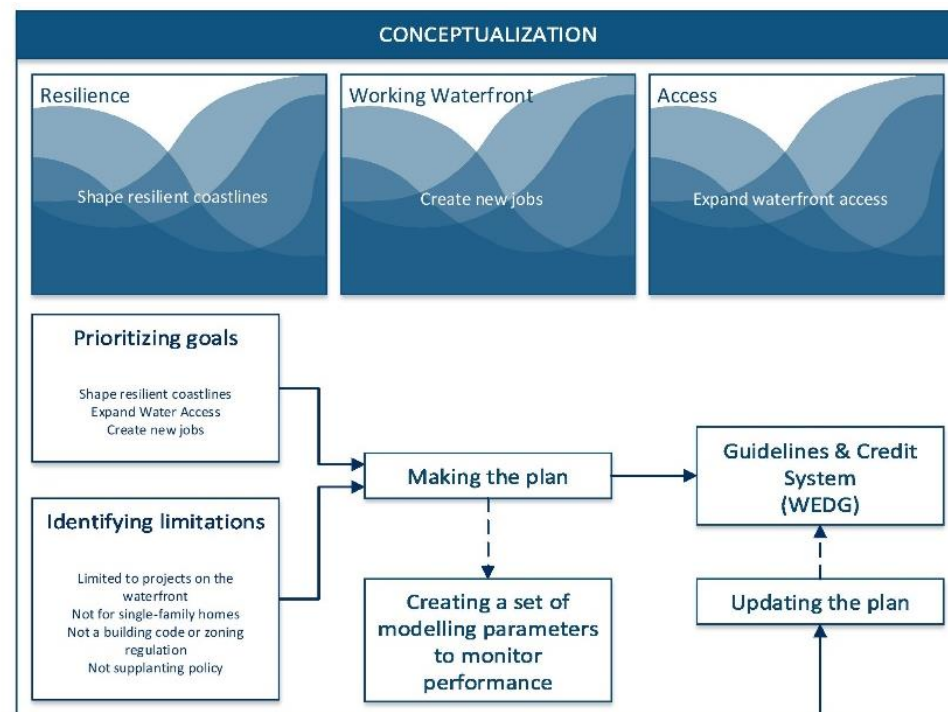
1. A credit-based rating system to review and improve the quality of projects through a lens of resiliency, access, and ecology;
2. Education programming, volunteerism, and a planned WEDG accreditation program that expands the Waterfront Alliance's network of professionals who engage best practices;
3. Community outreach through WEDG Neighborhoods and a platform to empower advocates to demand better waterfronts.

The theory of change diagram is divided into:

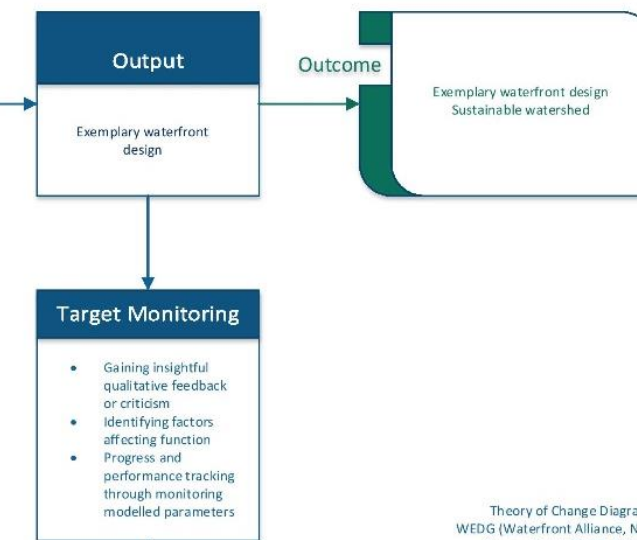
Conceptualization – Actors and Actions – Output and Outcomes



Events like the City of Water Day, see a large turnout and have been actively communicating awareness for climate resilience.



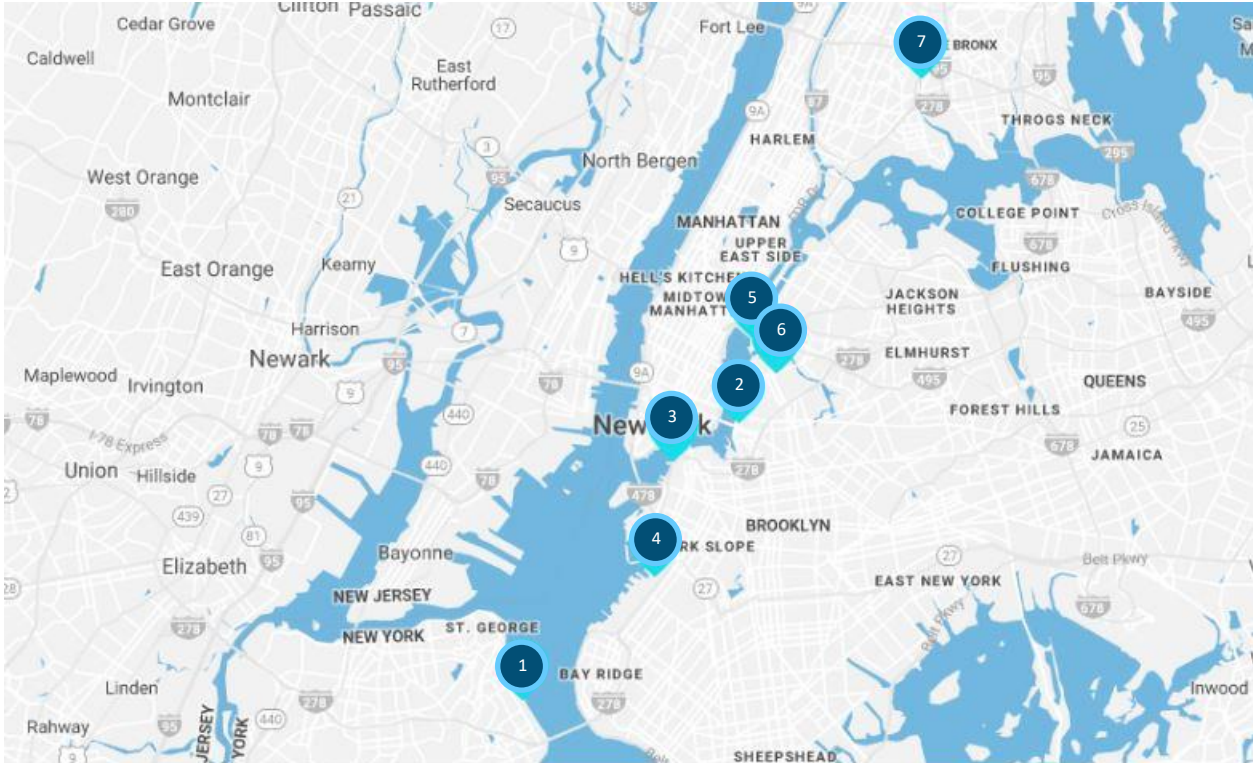
Waterfront Edge Design Guidelines (WEDG)



Theory of Change Diagram
WEDG (Waterfront Alliance, NY)
Shanay Patel, MUP1 (UIUC)

Stories

The stories of exemplary waterfront design through sound technical guidance and stakeholder engagement throughout the process, are a testament to the success of WEDG through the years. Some of the narratives used to paint the picture of successful action towards sustainable waterfront development are as follows:



Map Point	Project	Type	WEDG Points (older versions of WEDG) ³
1	Sandy Hooks Pilots Association	Industrial, Maritime	132/317 (at 100+)
2	Domino Sugar	Residential, Mixed-use, Commercial	194/401 (at 130+)
3	Brooklyn Bridge	Park	244/357 (at 130+)
4	Sunset Park Materials Recovery Facility	Industrial, Maritime	175/317 (at 100+)
5	Hunter's Point South	Residential, Mixed-use	217/401 (at 130+)
6	Greenpoint Landing	Residential, Mixed-use, Park	199/401 (at 130+)
7	Starlight Park	Park	197/357 (at 130+)
NA	Oak Point	Neighborhood Community	Participatory process to develop Waterfront Action Plan
NA	Soundview	Neighborhood Community	

The stories shown in this section tell a successful account of the past, in order to create credibility for application to future projects.

³ Previous versions of WEDG had varied scoring systems ranging from total scores of 401/130+ certification threshold (Domino Sugar) to total scores of 317/100+ certification threshold (Sandy Hooks Pilots Association). The latest version of WEDG (2018) has a total score of 215/115+ certification threshold.

Sandy Hooks Pilots Association

The Sandy Hook Pilots Association has a rich history of piloting large vessels in and around New York Harbor since the 17th century. A crucial maritime institution, the SHPA pilots more than 10,000 ships annually and has responded to numerous emergencies throughout the region over the years. The SHPA's former headquarters at Staten Island was destroyed by Hurricane Sandy in 2012, which prompted the association to rebuild stronger and resilient. The new state-of-art facility, built from scratch, overlays resiliency in all aspects of its design while also being a good neighbor to the local community.

Domino Sugar

Two Trees' Domino Sugar Site reconnects South Williamsburg to its waterfront and incorporates elements of the historic Domino Sugar factory. The project focuses on unique conditions along the East River, concentrating on providing better public access to the waterfront and resilient strategies to mitigate the effects of climate change-induced hazards.

Brooklyn Bridge Park

Brooklyn Bridge Park exemplifies the principles of the WEDG program to balance and support access, resiliency, and ecology, and its high score reflects the attention to sustainability given to it by its designers and operators. This award-winning, regional park serves more than 4 million visitors each summer with robust programming and events for all types of uses and interests (Waterfront Alliance, 2019).

The Sunset Park Materials Recovery Facility

The Sunset Park Materials Recovery Facility (MRF) was the first recipient of the "WEDG-certified" designation. The Sunset Park MRF handles a majority of the city's recyclables and is thus the anchor to NYC's curbside recycling program. The facility exemplifies the principles of the WEDG program by providing lasting resiliency, sustainable ecology, and engaging public access, all within an industrial/maritime use.

Hunter's Point South

Emphasizing sustainable design and equitable development, the project achieved an exemplary WEDG score, garnering more than 200 out of 401 possible points. Situated on 30 acres of prime waterfront property, Hunter's Point South will eventually provide up to 5,000 housing units, 60% of which will be affordable for low/moderate-income families. The New York City Economic Development Corporation is responsible for the design and construction of the project's infrastructure, roads, and an 11-acre waterfront park. The site's resilient design features performed well during Hurricane Sandy, which struck during construction of Phase 1 (Waterfront Alliance, 2019).



FIGURE 1 POINT TALLY FOR SHPA (PREVIOUS VERSION OF WEDG)

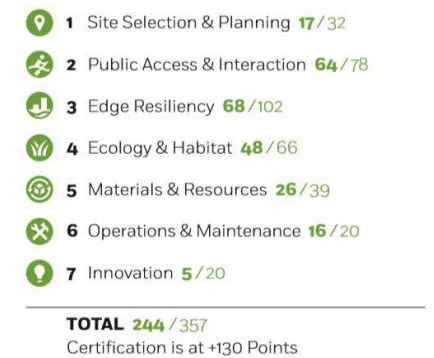


FIGURE 2 POINT TALLY FOR BROOKLYN BRIDGE PARK



Greenpoint Landing

Greenpoint Landing's waterfront open space derived from the need for a resilient edge—one that is performative in the face of potential flooding and that at the same time helps protect the upland neighborhood. The 20-acre mixed-use development will transform this formerly industrial waterfront to 5,500 residential units, a new public school, and approximately four acres of public open space. Phase 1 has been assessed by the WEDG program and comprises 7.5 total acres.

Greenpoint Landing sought to integrate resilient structural design with publicly accessible amenities by having the waterfront lined by a unique terraced esplanade. The lower terraces are designed to sustain periodic flooding, and upper terraces are elevated above the 100-year flood zone, providing further protection.



Starlight Park

Starlight Park, a 25-acre park on previously inaccessible brownfield sites, is the result of a decades-long community-driven planning effort. The park closes a significant gap in the 25-mile Bronx River Greenway, connecting local communities to a restored waterfront with active and passive recreational features, including the state-of-the-art Bronx River House.

Power of Persuasion

This section assesses the persuasive power of this plan – to be universally applicable with the identical results to past projects, in terms of ecology enhancement, climate resilience and accessibility of waterfronts. The assessment assumes the audience to be the public representatives for the City of Los Angeles.

Los Angeles, the cultural, commercial, and financial center of Southern California – is the second-most populous city in the United States, with approximately 4 million residents. San Francisco is similar to New York City, in terms of regional status, economic significance, coastal location, demographics, and political leanings.

Infrastructure

Critical infrastructure like the Port of Los Angeles and Port of Long Beach (together making up the Los Angeles/Long Beach Harbor), is the most at-risk element in the city's coastal infrastructure, in terms of economic loss. Flooding due to sea-level rise not only damages structures but also disrupts operation and routine functions, translating into a tremendous economic loss.

People

Over 22% of the LA population is living below the poverty line and thus is most vulnerable to climate change-induced hazards like sea-level rise. WEDG offers a solution this problem by engaging the local government and private sector in creating climate-resilient waterfronts.

Politics

California has a reputation for being a stable democratic state and thus has many environmentally progressive representatives in the House. The local politics in LA County is also liberal-leaning. Proponents of environmental sustainability may be effectively swayed by the plan's promise of sustainable waterfronts. Since this assessment audience is considered to be representatives of the City of Los Angeles, politically the climate action may be favored.

Assessment & Conclusion

The stories of NYC's waterfront projects paint a vivid and diverse picture of success. The variability in the projects to which WEDG has been applied, adds credence to its target for universal applicability. WEDG has been applied to communities (Bronx CB9), parks (Brooklyn Bridge Park & Starlight Park), residential and mixed-use buildings (Domino Sugar & Greenpoint Landing), and industrial/maritime facilities (SHPA & Sunset Parks MRF) – encompassing almost every facet of coastal infrastructure.

The inclusive process of WEDG has incorporated in NYC can be seen as evidence of successful community action towards effective planning solutions, and may serve to dispel the notion of planning being an elitist and esoteric profession that can only be practiced by a select few. The Bronx CB9 project, one of the participatory processes undertaken by Waterfront Alliance – and a successful endeavor – arrived at a final estimate for the project in three ranges;

- Large: \$1-1.5 million (major capital investment)
- Medium: \$100,000-\$1 million (grant funding)
- Small: \$5000-\$100,000

The detailed approach outlined above also helps in making fiscally conservative city officials be in favor of community betterment projects such as the Bronx CB9 undertaking. City officials stand to earn approval bumps at a flexible financial cost. The project sought to increase greenway connections, restore habitats, and enhance facilities. The city stands to gain in terms of increase in aesthetic value, improvement in the quality of living and increasing property values – all of which can be translated into economic growth in the long run.

The “Heroes of the Harbor” program, hosted by Waterfront Alliance celebrates exceptional leaders of the waterfront community for their unique contributions to making the New York Harbor more resilient, revitalized, and accessible for all communities (Waterfront Alliance, 2019). Public perception and recognition of their actions can be an excellent incentive for politicians and local representatives to espouse the plan. As Waterfront Alliance's signature annual fundraising event, “Heroes of the Harbor” is a networking event that raises funds to support their continued work to protect, transform, and revitalize the New York and New Jersey harbor and waterfront. Past “Heroes of the Harbor” have included mayors, city planners, coast guard personnel, and business owners, among others. The legitimacy and credence of WEDG are inherently due to the credibility of Waterfront Alliance, as a reputable and proficient organization of professionals and advocates for climate action.

The narrative of public participation can also be effectively aimed towards the vast and diverse youth demographic of Los Angeles, who may already be inclined towards preserving the environment but do not possess the tools or the knowledge to execute meaningful action. The idea of being able to make a difference serves to be a catalyst to inspire action among youth.

The comprehensive guidelines provided in the WEDG manual range from site selection to post-construction maintenance and end-phase risk management. The design guidelines are an invaluable resource for design professionals and construction engineers, and could prove to be a boon to city planners as well – provided the city's ordinances and policies serve to augment the plan and not supplant its guidelines. Prudently designed guidelines and consciously executed development in the case of WEDG prove to be its greatest asset. The success stories of sustainable waterfronts are WEDG's primary power of persuasion, which is complemented by the comprehensiveness of the design guidelines.

In closing, the plan could include visible translations in economic terms, for example green corridors making stress free travel possible, and thus enabling for a more productive workday – translating into dollars earned against time spent productively. Overall, the sustainable development of the city's waterfront can enhance many essential aspects of urban living and life itself – personal wellbeing, holistic development, economic prosperity, at the same time, being in sync with the environment.