BROOKLYN
WATERFRONT GREENWAY

design principles
Fall 2008

Brooklyn Greenway Initiative

Regional Plan Association
NY • NJ • CT

Credits

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This report was prepared for the New Yor State Department of State Division of Coastal Resources with funds provided under Title 11 of the Environmental Protection Fund. The project was sponsored by Brooklyn Borough President Marty Markowitz.

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Introduction

THE BROOKLYN WATERFRONT GREENWAY

When complete, the Brooklyn Waterfront Greenway will be a 14-mile safe, landscaped separated route connecting neighbors and neighborhoods to four major parks and over a dozen local open spaces on Brooklyn's historic waterfront. Separate paths for bicycles and pedestrians will allow cyclists and walkers to commute, exercise, explore, and relax from Newtown Creek to the Shore Parkway. This Brooklyn Waterfront Greenway will also serve as one of the intricate links of New York City's vastly growing greenway network - linking the Queens Greenway to the Shore Parkway Greenway and Staten Island.

Regional Plan Association (RPA) and Brooklyn Greenway Initiative (BGI) have collaborated on the planning and advocacy for this waterfront amenity over two phases funded by the State's Environmental Protection Fund/Local Waterfront Revitalization Program and sponsored by the Office of the Brooklyn Borough President. Working together with local communities through public planning workshops and other events, RPA and BGI have developed concept plans for the greenway's route and design through Community Boards 1, 2, and 6 - from Greenpoint to Red Hook. We have also prepared a distinct stewardship plan to anticipate maintenance costs and responsibilities for the greenway and its amenities. With on-going funding, the next phase of this project will involve the completion and implementation of a business plan for stewardship of the greenway and will facilitiate the growth of partnerships necessary to connect the Brooklyn Waterfront Greenway to the City's growing network of greenways.

DESIGN PRINCIPLES PURPOSE

As planning for the Greenway continues to progress, design and construction plans are becoming iminent. With this in mind, RPA and BGI - in cooperation with Office of the Brooklyn Borough President - set out to identify a number of best practice design principles and solutions to common design challenges that can be applied to the entire Brooklyn Waterfront Greenway. The goal of this exercise is not to simply restate current City and AASHTO standards, or to provide prescriptive solutions for all greenway conditions. It is, instead, a first step in creating an identifiable, user-friendly Greenway from Newtown Creek to Sunset Park. Our intent is to develop a handbook that will help guide and inform future greenway designers and engineers as to the Brooklyn Waterfront Greenway design intent and philosophy. As site specific plans emerge from different processes, this document will grow along with the plans incorporating the latest designs. All of these steps will involve and be shaped by the community input that has always driven this process.

Drawing upon the immense knowledge and talent of many of the City's agencies, design professionals and other Greenway stakeholders, RPA and BGI convened a workgroup to decipher the common elements that should be present along the Greenway and the latest solutions to many of the challenges encountered in creating a Greenway. While we benefitted greatly from their expertise, any error or omissions are our own.

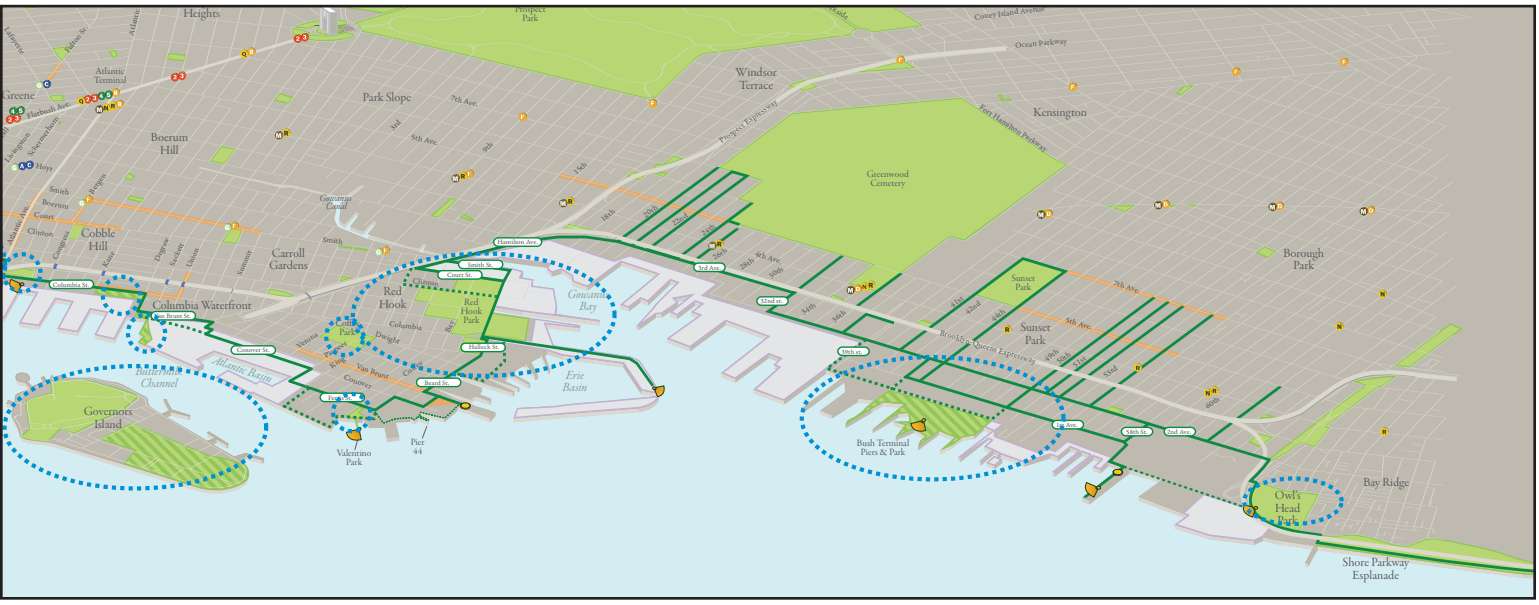

Figure 1.0.1 Map of the entire Brooklyn Waterfront Greenway, highlighting the local and regional parks that it connects

1.0 Overall Design Goals: Planning Principles

BROOKLYN'S WATERFRONT

The Brooklyn Waterfront Greenway should be more than a simple sidewalk or bicycling route. It should provide the means to connect, celebrate, restore and explore Brooklyn's diverse waterfront - its neighborhoods and residents, recreational and industrial users and its unique environment.

The following principles - generated by the participants at our 2004 Public Workshop - are a framework for how the Greenway can accomplish this. They underlie the physical and programming recommendations that follow:

Create a healthy green edge on the Brooklyn Waterfront. Establish public access to the Harbor waterfront and waters. Improve public health in communities that line this historically industrial waterfront by providing improved recreational amenities and programs. Restore and enhance ecological functions in the shoreline environment.

Connect the waterfront neighborhoods with each other, the rest of Brooklyn and neighboring bikeways in Queens, south Brooklyn and Manhattan. Knit together regional and community parks, unique neighborhood attractions and the transit system.

Explore the complex and rich urban landscape along the Brooklyn waterfront and its neighborhoods. Respect the needs of Brooklyn's successful maritime industries while increasing the public's understanding. Provide a variety of experiences that reflect this dynamic and changing landscape.

Celebrate the diversity of Brooklyn. Showcase neighborhoods, natural environments, culture, art and industry. Accomodate the needs of a wide variety of people from local residents to destination-oriented visitors.

1.1 Overall Design Goals: Design Objectives

DESIGNING A SAFE, CONTINUOUS GREENWAY

To ensure continuity and the safety of its users, the Greenway should meet certain consistent parameters throughout its route. These can be accomplished in a variety of ways that also meet the objectives and standards of individual landowners and implementing agencies.

Off-street **so it is family-friendly, safe and inviting.**

Separated **bike and pedestrian paths to accomodate a diversity of users.**

Green **so that it provides relief from paved, hard surfaces and reveals and restores ecological functions.**

Amply-built **to handle the volumes of users that will result from the development of the Brooklyn waterfront and from full connection to the wider network of bike and pedestrian facilities. The right-of-way needs to be 30 feet wide to safely and enjoyably accomodate the diversity of users; a minimum of 20 feet at pinch points for very short distances.**

Continuous **so that users can reach waterfront destinations and attractions in a single, connected experience.**

2.0 Recurring Elements that Build Identity

OVERVIEW

Upon completion, the Brooklyn Waterfront Greenway will extend for 14-miles along Brooklyn's waterfront - passing through a variety of neighborhoods, weaving in and out of different parks and covering a number of assorted terrains. Although the Brooklyn Waterfront Greenway is referred to as one greenway, it will actually be comprised of a a patchwork of the many different types of greenways that exist, including: Class 1 lanes that are wholly separated from traffic via planted buffers; in-park Class 1 routes at parks such as Red Hook Park, and Brooklyn Bridge Park; waterfront esplanades like those being constructed in Greenpoint and Williamsburg or the IKEA esplanade; and in some cases, Class 2 lanes that are part of the road but separated by pavement markings.

As described in the previous pages, it is one of the foremost goals for the Greenway to provide a continuous experience that serves to connect Brooklyn's diverse destinations. To accomplish this, there need to be certain identifiable elements that recur along the entire stretch of the Greenway. These elements should signify to any user that 1) they are on a greenway and importantly 2) they are on the Brooklyn Waterfront Greenway.

The following section highlights common elements that would provide a continuous identity for Greenway users. Except where noted, most of the elements described include the standard structures and materials installed and maintained by New York City's agencies - particularly the Department of Transportation (NYC DOT), Department of Parks & Recreation (DPR) and in some cases the New York City Economic Development Corporation (NYC EDC) or other agencies.

Typical Greenway Cross Section

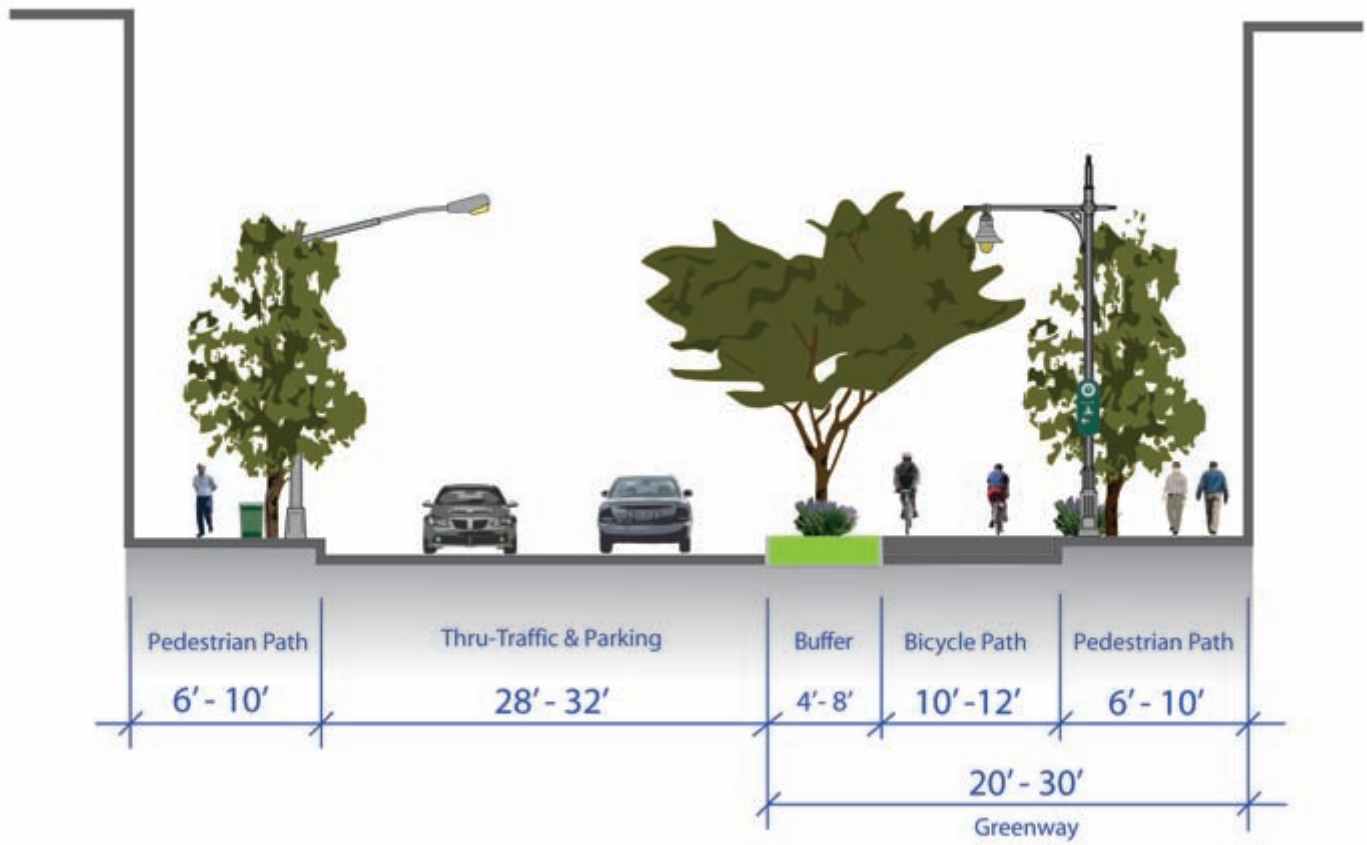

Figure 2.0.1 This typical cross section demonstrates the ideal design for the Brooklyn Waterfront Greenway, recognizing that the Greenway will take many forms including Class 1 and 2 lanes and sidewalks, in-park routes and waterfront esplanades. In general, the 20-30′ greenway path includes a separated path for bicyclists and pedestrians that is further separated from the street by a 4-8′ vegetated buffer. Along the path of the greenway, clearly identifiable lighting and signage mark the way and help to provide visible, continuous elements that let the user know they are on the Brooklyn Waterfront Greenway.

2.1 Signage

Signage is an important visible element that, when used properly, establishes an identity to the Greenway and provides assistance to users.

STANDARD CITY GREENWAY SIGN

Description: Signage used by the City to identify its greenways developed by NYC Department of City Planning, and approved for use for all agenices by the NYC Art Commission. Types include lozenge-shaped signs with arrows, medallions and in some cases signs that address safety or connection to associated paths or structures. 600 signs were ordered and are being installed for the Brooklyn Waterfront Greenway's preliminary route by NYC DOT.

Responsibility: Signage is provided by and maintained by the owner of the property on which the greenway runs. Brooklyn Waterfront Greenway, city-owned property owners include NYC DOT, DPR and EDC amongst others.

Examples: Used on greenways throughout the City, including the Bronx River Greenway, South Bronx Greenway, Manhattan Waterfront Greenway, Flushing Bay Esplanade and Shore Parkway Bicycle Path, amongst others.

Recommendation: The Brooklyn Waterfront Greenway shall use standard NYC Greenway signs for the majority of the route on city-owned property and at the standard frequency. Lozenges are preferred over medallions.

Figure 2.1.3 Standard NYC Greenway lozenge specifying pedestrian and bike routes as seen along the preliminary route of the Brooklyn Waterfront Greenway in Red Hook

Figure 2.1.1 Standard NYC Greenway "lozenge"

Figure 2.1.2 Standard NYC Greenway "medallion" as seen along the preliminary route of the Brooklyn Waterfront Greenway in Red Hook

Figure 2.1.4 Rendering of a potential custom designed sign for the Brooklyn Waterfront Greenway

Figure 2.1.5 An embedded street sign near the Manhattan side of the Brooklyn Bridge

Figure 2.1.6 Manhattan Greenway informational kiosk at Riverside Park

CUSTOM GREENWAY SIGN

Description: Custom designed sign with elements unique to a particular greenway. Opportunities range from wholly unique signs (logo, material, etc.) to use of city greenway signs with unique elements (see Figure 2.1.4).

Responsibility: Custom signs cannot be placed on NYCDOT property and shall be paid for and maintained by non-NYCDOT entities or property owners.

Examples: East River Greenway signage (EDC property), greenways on Parks & Recreation property, Westchester River Walk signage.

Recommendation: Working with interested private property owners at appropriate points of interest, the Brooklyn Waterfront Greenway shall feature custom Greenway signage (using city signage as a template) identifying significant attractions.

EMBEDDED GREENWAY SIGN

Description: Signage that is placed directly into the paving material of the greenway through etching or insertion of other materials. May include an emblem in the embedded sign that captures the character of the greenway.

Responsibility: NYC DOT has installed bike-safe embedded signage at various points throughout the City.

Examples: Entrance/exit of the bikeway on the Manhattan side of the Brooklyn Bridge.

Recommendation: The Brooklyn Waterfront Greenway shall feature standard city embedded signage at Gateways to the Greenway.

INFORMATION KIOSKS

Description: A small, freestanding -usually wooden- structure that allows opportunities to present different sources of information.

Responsibility: Most kiosks in the City are provided by and maintained by the State or City Parks Departments or associated conservancies.

Examples: Located at parks and trailheads throughout the region including Riverside Park, Central Park, Battery Park and Prospect Park.

Recommendation: Install informational kiosks with maps and historical information where the Brooklyn Waterfront Greenway intersects with NYC Parks.

2.2 Paving Surfaces and Lanes

While most greenway paving surfaces will be asphalt or concrete, opportunities exist for other materials. Where the bike lane is not physically separated, markings and striping on the surface can help to establish identity and provide safety, particularly for bikers.

STANDARD CITY GREENWAY STRIPING & MARKINGS

Description: NYC uses three classes of paths delineated by standard striping, markings and in some cases planted buffers. CLASS 1: Multi-Use/Dual Carriageway Trail is separated from the roadway and delineated by planted buffers, other pathwyas or highway-type pavement markings. CLASS 2: On-Street Bicycle Lane is part of the roadway and delineated by highway-type pavement markings. Some CLASS 2 lanes where the bike lane is located at the curb are now being delineated by green paint. CLASS 3: Signed or Bicycle Route is a shared roadbed with no delineated markings. ENHANCED CLASS 3 uses a large painted bike symbol and chevron to alert autos of the shared path. Paving materials are typically asphalt or concrete.

Responsibility: NYC DOT is primarily responsible for striping, markings and other delineations on city roadways; State DOT for those on state roadways.

Examples: Class 1: Hudson River Park, Harlem River Speedway, East River Greenway; Class 2: Bike lanes throughout the City; Painted Class 2: Henry St. in Brooklyn and a few other bike lanes at the curb; Class 3: Riverside Drive, Dyckman Street and numerous streets throughout the City; Enhanced Class 3: 5th Ave., Park Slope and other NYC Streets.

Recommendation: The Brooklyn Waterfront Greenway shall utilize standard city greenway stripings and markings, and where appropriate, painted green bike lanes. The goal is for a bikeway and pedestrian path separated from traffic (Class I or hybrid) and from each other.

Figure 2.2.4 Painted Class 2 bike lane on Henry Street in Brooklyn

Figure 2.2.1 Class 1 pathway with separate trails for pedestrians and bikes in Inwood

Figure 2.2.2 Buffered Class 2 bike lane in Park Slope, Brooklyn

Figure 2.2.3 Enhanced Class 3 bike lane in Park Slope, Brooklyn

Figure 2.2.5 9th Ave Hybrid bike lane and auto turning lane

Figure 2.2.6 9th Ave Hybrid lane intersection markings

Figure 2.2.7 Crushed stone surface used at Hudson River Park

"HYBRID" PHYSICALLY SEPARATED BIKE LANE

Description: NYC DOT recently installed a newly designed physically-separated bike lane that shifts parking to the outside of the bike lane and is separated from the road via buffered areas that will be planted. A turning lane runs alongside the bike lane at the point of intersection. More of these lanes are expected to be installed at points throughout the City.

Responsibility: NYC DOT is responsible for the design, installation and maintenance of these lanes; DPR maintains the planted buffers.

Examples: 9th Ave. between 16th and 23rd Streets in Manhattan.

Recommendation: The Brooklyn Waterfront Greenway shall incorporate elements of the NYC DOT design where appropriate.

Figure 2.2.8 9th Ave Manhattan Hybrid lane painted buffer with bollards which will become planted buffers.

STONE SURFACE

Description: Semi-permeable surface composed of smooth or crushed stone such as granite or basalt. Ideal for pedestrian pathways.

Responsibility: Crushed stone or stone dust pedestrian paths are primarily installed and maintained by DPR or by State Parks.

Examples: Hudson River Park, Manhattan.

Recommendation: The Brooklyn Waterfront Greenway shall incorporate stone dust on pedestrian paths where a paved surface is not necessary and/or in cooperating parks.

2.3 Lighting

Clearly identifiable, signature lighting - appropriately spaced - along the route of a greenway can significantly distinguish the route from the road and other paths.

STANDARD CITY LIGHTING

Description: NYC utilizes a number of different styles of standard lighting, which are approved by the NYC Arts Commission and included in a 2004 Street Lighting Catalogue issued by NYC DOT.

Responsibility: Installed and maintained by NYC DOT.

Examples: On streets and in parks throughout the City.

Recommendation: The Brooklyn Waterfront Greenway shall use the NYC DOT approved "Triborough Bridge and Tunnel Authority" lampost with the "Knickerbocker" luminaire to establish an identity separate from the street and align it with other waterfront Greenways, including Hudson River Park and the South Bronx Greenway.

Figure 2.3.3 "Triborough Bridge and Tunnel Authority" lampost with "Knickerbocker" luminaire.

Figure 2.3.1 Standard city lighting, as seen in Hudson River Park

Figure 2.3.2 Standard lighting adequately spaced along the Hudson River Park Greenway

2.4 Associated Structures

From standard bike racks to the splendor of public art, there are a variety of associated greenway structures that - if used consistently and in appropriate locations - can help to create a consistent greenway experience.

STANDARD CITY BIKE RACKS

Description: Standard City bike racks accommodate all types of bicycles and locks. The racks are continuous curve square tubing pipe made of black coated polyester finish steel.

Responsibility: Through NYC DOT's CITYRACKS program, racks are installed on NYC DOT property in two sizes: an upside-down "U" rack for two bikes and a double loop for five bikes.

Examples: Located in public parks and on city streets and greenways throughout the city.

Recommendation: The Brooklyn Waterfront Greenway shall utilize standard city bike racks along the route. In particular, racks should be installed at Gateways, parks and near streets that connect to a waterfront esplanade. Installation should follow the parameters set by the CITYRACKS program.

CUSTOM BIKE RACKS

Description: Customized bike racks may be designed and installed on non-City property.

Responsibility: Installed and maintained by property owner.

Examples: Brooklyn Navy Yard

Recommendation: Custom bike racks shall be used along stretches of the Greenway that are not owned by the City and where the owner is willing to pay for the design, installation and maintenance of the racks.

SHELTERED BIKE PARKING

Description: NYC DOT maintains a list of garages that charge a fee for indoor bike parking. Currently, there are no garages participating in Brooklyn.

Responsibility: Installed and maintained by property owner or sponsor.

Examples: There are a select number of sheltered bike parking structures associated with the City's new bus shelters and newsstands. Parking garages throughout the city offer bike parking. Millenium Park, Chicago, offers a dedicated bike parking facility paid for by corporate sponsorship.

Recommendation: Opportunites to install the new bike parking structures shall be pursued for the Greenway. Parking garages shall be engaged in providing bike parking and then listed on NYC DOT's website. Dedicated bike parking facilities with corporate sponsorship should be pursued alongthe greenway.

Figure 2.4.1 Standard city bike rack

Figure 2.4.2 Custom recycled rail bike rack designed by Artist Michelle Greene and installed at the Brooklyn Navy Yard

Figure 2.4.3 Sheltered bike parking structure at 17th Street near Union Square

Figure 2.4.4 Standard City Park Bench

Figure 2.4.5 City bench at intersection of approach to Brooklyn Bridge

Figure 2.4.5 Custom designed bench in Gantry Plaza State Park

STANDARD BENCHES

Description: Standard benches from guidelines by Parks & Recreation.

Responsibility: Installed and maintained by NYC DOT or Parks & Recreation depending on property owner. Pedestrian plazas could be maintained by local stewardship entity.

Examples: Located in nearly all NYC parks and some pedestrian plazas throughout the city.

Recommendation: Standard city benches shall be used where the Greenway enters parks. Opportunities for pedestrian plazas shall be identified along the route of the Greenway so that benches may be installed for Greenway users.

CUSTOM BENCHES

Description: Benches and seating that have been designed for a specific, non-city-owned location and are not from the Parks & Recreation guidelines.

Responsibility: Installed and maintained by property owner.

Examples: Gantry Plaza State Park; EDC East River Greenway; Planned Brooklyn Navy Yard Bench.

Recommendation: Customized benches shall be used along stretches of the Greenway that are not owned by the City and where the owner is willing to pay for the design, installation and maintenance of the bench.

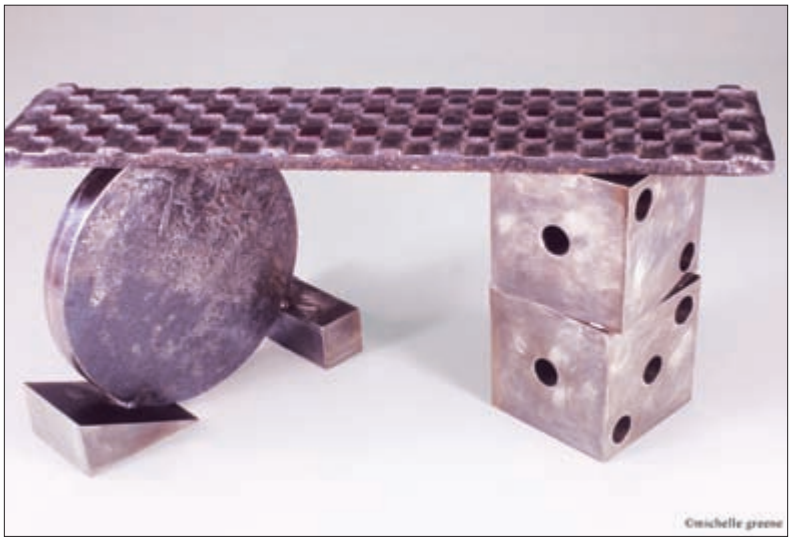

Figure 2.4.6 Custom bench designed for the Brooklyn Navy Yard by Artist Michelle Greene

Figure 2.4.7 Side wall in street median of Union Square East in Manhattan

SIDE WALLS/PLANTED BUFFERS

Description: Walls used to contain planted areas and separate pathways from roadways in median or on the side of the road.

Responsibility: Typically installed and maintained by NYC or State DOT, depending on ownership of the roadway.

Examples: Present at waterfront parks throughout the City, including Hudson River Park and Battery Park. Also found in various NYC median Street Tree and Greenstreets plantings.

Recommendation: The Brooklyn Waterfront Greenway shall utilize standard city side walls and planted buffers along the route of the Greenway. The wall will serve as a buffer between lanes and will hold in the vegetated areas.

Figure 2.4.8 Side wall alongside the Greenway at Hudson River Park

Figure 2.4.9 Public art in Hudson River Park

Figure 2.4.10 Public art on the Vancouver greenway

Figure 2.4.11 Standard plantings along Manhattan's Hudson River Park Greenway

PUBLIC ART

Description: Commissioned art located in parks and along greenways to enhance aesthetics and the user's experience. Temporary exhibits on NYC property do not need to undergo NYC Art Commission approval process.

Responsibility: Property owner where art is installed. Could be supported by a local stewardship entity.

Examples: Hudson River Park; Battery Park City Parks; Socrates Sculpture Park; Vancouver Greenway; Millennium Park, Chicago, IL.

Recommendation: Appropriate locations for public art shall be identified along the Brooklyn Waterfront Greenway.

Figure 2.4.12 Public art along a pathway in Battery Park City Park

STANDARD PLANTINGS

Description: Trees or other vegetation planted alongside greenways (street trees or Greenstreets) and in parks, provide aesthetic value, shade relief, cooling and enhance the ecology of the greenway.

Responsibility: DPR installs and maintains street trees, Greenstreets (with NYC DOT) and park trees.

Examples: Riverside Park; Hudson River Park; Battery Park City Parks; Battery Park; East River Park.

Recommendation: The Brooklyn Waterfront Greenway shall serve as a continuous green edge, incorporating plantings of trees for shade and other aesthetic vegetation along the Greenway. Greenway planners will work with NYC Parks Street Trees and Greenstreets programs to identify other locations where their plantings can enhance the Greenway.

3.0 Design Solutions for Common Greenway Challenges

OVERVIEW

From the planning stages through to construction and maintenance, greenways offer a number of challenges that require careful consideration before being designed and built. In this section, a variety of some of the most common greenway challenges are addressed by highlighting solutions that have been implemented in New York City and beyond.

Some of the challenges presented - like cobblestones - are found only at specific sites along the greenway, while others - like creating an ecologically sustainable greenway - represent challenges with solutions that can be applied across the entire greenway.

3.1 Shared roadway bicycle conflicts

SOLUTION: SEPARATED BIKEWAY

Description: Separation of the pathway from motor vehicle traffic by installation of constructed buffer structure or bollards removes conflicts between cars and bikes. Can be one- or two-way depending on width.

Examples: Tillary Street in Brooklyn; Montreal, Canada.

Figure 3.1.1 Tiilary Street, Brooklyn

Figure 3.1.2 Separated bike lane in Montreal, Canada

Figure 3.1.3 Moving parking over, to let in a bikelane in Melbourne, Australia

SOLUTION: SHIFTED PARKING LANE

Description: Moving the parking lane to the outside of the bike lane creates an added buffer between bikes and moving vehicles.

Examples: 9th Av.e hybrid bike lane, Manhattan; Melbourne, Australia.

Figure 3.1.4 NYC DOT's 9th Ave. hybrid bike lane shifts parking to the outside of the bike lane.

Figure 3.1.5 Class 2 painted bike lane on Henry St. in Brooklyn.

SOLUTION: COLORED PAVEMENT

Description: Path surface material that is colored to differentiate it from the adjoining roadway creates greater awareness of bike lanes. Could be a painted coating on typical pavement or actual colored pavement.

Examples: Tillary and Henry Streets in Brooklyn, NY.

Figure 3.1.6 An Enhanced Class 3 bike lane in Brooklyn

SOLUTION: STENCILED CLASS 3 (SHARED) LANES

Description: Class 3 lanes with highly visible bike logo and chevron stenciled in the middle of the street to indicate shared usage with bikes.

Examples: 5th Ave., Park Slope, Brooklyn; Clinton Street, Lower East Side, Manhattan.

3.2 Intersections

SOLUTION: SIGNAGE

Description: Various signage can be used to alert greenway users and/or vehicles of an intersection.

Examples: Stop signs; warning signage.

SOLUTION: PAVEMENT MARKINGS

Description: Whether it be simple crosswalk markings or more sophisticated bike chevrons, pavement markings also alert greenway users and autos of intersections.

Examples: Standard crosswalk markings; bike logos and chevrons.

SOLUTION: COLORED PAVEMENT

Description: Path surface material that is colored to differentiate it from the adjoining roadway could be extended into the intersection to reinforce that there is a greenway crossing.

Examples: Adams and Tillary Streets in Brooklyn.

Figure 3.2.1 Pedestrian and bike stop sign at intersection in lower Manhattan

Figure 3.2.2 Chevrons, bike logos and crosswalks mark this intersection of 9th Ave in Manhattan

Figure 3.2.3 Class 2 bike lane painted green at Henry St in Brooklyn

Figure 3.2.4 Speed table used to slow traffic in Inwood, Manhattan

Figure 3.2.5 Textured pavement at an intersection of the Hudson River Greenway

Figure 3.2.6 Bike stoplight at an intersection of the Hudson River Greenway

Figure 3.2.7 Providing sightlines at an intersection of the 9th Ave separated bike lane in Manhattan

SOLUTION: SPEED TABLES

Description: A modified speed bump where a normally flat surface is raised to reduce motor speed at an intersection.

Examples: Entrance to Pier 40 along the Hudson River Greenway.

SOLUTION: TEXTURED PAVING SURFACE

Description: The texture of the surface pavement can be textured to become less smooth and even as a greenway or roadway approaches an intersection.

Examples: Cobblestones; hex pavers; rumblestrips.

SOLUTION: STOP LIGHTS

Description: Greenway stop lights can be used in conjunction with traffic lights to organize flow at intersections.

Examples: Hudson River Park; Amsterdam, The Netherlands.

SOLUTION: SIGHTLINES & CURB EXTENSIONS

Description: Ensuring sightlines at intersections helps cars to see bikers and pedestrians and vice versa. Curb extensions provide crossing pedestrians with shorter crossing distances and better views of oncoming traffic.

Examples: 9th Ave. hybrid bike lane, Manhattan.

3.3 Pedestrian-Bicycle Conflicts

SOLUTION: CLEARLY DEFINED BIKE PATHS AND WALKWAYS

Description: Adjacent bikeways and walkways that are either physically separated or clearly delineated as to the path's purpose.

Examples: Hudson River Park; East River Bikeway.

Figure 3.3.1 Clearly defined bike and pedestrian paths in Inwood, Manhattan

SOLUTION: SHIFT PEDESTRIAN PATH TO THE STREET SIDE OF BIKEWAY

Description: Typically, greenways position bike lanes closest to traffic and pedestrian paths on the inside. Shifting the pedestrian path out to the street can reduce pedestrian/biker conflicts, as pedestrians can enter and exit the pedestrian path (to cross the street, catch a bus) without crossing the bike lane.

Examples: Columbia Street, Brooklyn; Battery Park, Manhattan; Vancouver Greenway, Canada.

Figure 3.3.2 Shifted sidewalk on interim Greenway at Columbia Street, Brooklyn

SOLUTION: ALTER PAVEMENT TYPE

Description: Different types of pavement can be used to delineate pedestrian paths from bike lanes. Textured pavement between two smooth lanes of asphalt or concrete serves as an at grade barrier.

Examples: Hudson River Park, Manhattan; Vancouver Greenway, Canada.

Figure 3.3.3 Belgian Blocks separate a bike lane from a pedestrian path

Figure 3.3.6 Three levels of grade separation

SOLUTION: GRADE SEPARATION

Description: Raising either the bike lane or pedestrian pathway can help to eliminate conflicts that arise from one user "creeping" into the other's lane.

Examples: Pedestrian warning sign; bike warning sign.

Figure 3.3.4 A speed limit sign in Vancouver

SOLUTION: BIKE SPEED LIMITS

Description: Posting bike speed limits or lowering them at biker/pedestrian conflict zones could reduce threat of conflict.

Examples: Vancouver Greenway, Canada.

Figure 3.3.5 Yield to pedestrian sign on the Hudson river Greenway

SOLUTION: WARNING SIGNAGE

Description: Notifying bikers or pedestrians of each others presence at conflict zones could reduce threat of conflict. Signs that warn of consequences for reckless cycling can slow down bikes as well.

Examples: Pedestrian warning sign; bike warning sign.

3.4 Cobblestones

SOLUTION: THERMAL FINISH SMOOTH COBBLE

Description: Replacement of a portion of split stone cobblestones with a smoother, thermal finish cobble makes pathways more bike-friendly while preserving the integrity of the street. Commonly carried out for ADA compliance.

Examples: City Hall, Manhattan.

Figure 3.4.1 Split stone cobbles partially replaced by thermal finish smooth stones at City Hall in Manhattan

SOLUTION: LAY DOWN NEW COBBLE AND MORTAR

Description: Laying down cobble that is more level and filling in the space between the stones with adequate mortar can help to make cobblestone streets more bike-friendly.

Examples: Crosby Street, Manhattan.

Figure 3.4.2 A biker rides on smoothed cobblestones at Crosby St in Manhattan

SOLUTION: PAVED STRIP

Description: Incorporation of asphalt or concrete into a section of cobblestones that allows for a limited smooth surface across remaining cobblestones.

Examples: Barcelona, Spain.

Figure 3.4.3 A paved strip to accomodate wheelchairs in Barcelona, Spain

3.5 Creating an Ecologically Sustainable Greenway

SOLUTION: NATIVE, TOLERANT PLANTINGS

Description: Trees and vegetation that are native to the region and require low inputs of fertilizer, pesticides and water than standard plantings. Species must be non-Asian longhorned beetle host species and should be salt-and drought-tolerant. Managing these plantings in environmentally friendly ways (Integrated Pest Management, etc) enhances sustainability.

Examples: Riverside Park South, Stuyvesant Cove, Hudson River Park, Battery Park City Park, Brooklyn Bridge Park, Planned Bronx River and South Bronx Greenway.

Figure 3.5.1 Native, tolerant plantings at Riverside Park South

SOLUTION: STORMWATER MANAGEMENT

Description: A range of options to prevent and manage stormwater runoff and its resultant non-point source pollution exist for the Greenway, including: planting trees with improved pit design; incorporating vegetated ditches (swales) into the redesign of roadways; plant vegetated areas in nearby parking lots; use detention structures, infiltration structures, bioretention and constructed wetlands, where feasible.

Examples: Boulder, CO bikeway; Planned Bronx River and South Bronx Greenway; Riverdale Country School, Bronx, NY; vegetated buffer at Gantry Plaza State Park.

Figure 3.5.2 Vegetated buffer at Gantry State Park

SOLUTION: ENVIRONMENTALLY-SENSITIVE LIGHTING

Description: There are a number of environmentally sensitive lighting choices that can be made. Dark sky lighting involves choosing lighting fixtures that do not emit large amounts of light pollution into the night sky. Additionally, the type of lamp used in fixtures can range from those with low energy efficiency to those with high energy efficiency.

Examples: The Triborough Bridge post with the Knickerbocker luminaire has dark sky lighting characterstics. Lamp types include LED's, Metal Halide and High-Pressure Sodium.

Figure 3.5.3 Triborough lamp post with Knickerbocker luminaire ensures a "Dark Sky"

Figure 3.5.4 Mill River Greenway in Stamford, CT

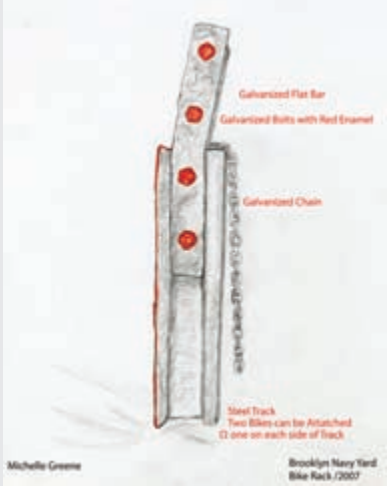

Figure 3.5.5 Concept for bike rack made from reclaimed Brooklyn Navy Yard materials, installed below (Michelle Greene)

SOLUTION: PERMEABLE PATHWAYS

Description: Those pathways not paved with impermeable materials like concrete or asphalt. Permeable pathways allow the infiltration of rainwater. Materials could include stone or technologically advanced paving material. NYC DOT and DPR are currently looking into various permeable pathway materials.

Examples: Planned Bronx River and South Bronx greenway; Portland, ME waterfront; Mill River Greenway, Stamford, CT.

SOLUTION: SUSTAINABLY-SOURCED MATERIALS

Description: Use of materials that have a low environmental impact, including sustainably harvested wood and recycled or reclaimed materials like rail track.

Examples: Benches, boardwalks, bike racks.

3.6 Connecting & Celebrating Brooklyn's Diverse Neighborhoods

SOLUTION: DIRECTIONAL SIGNAGE

Description: Use of signage to direct greenway users to attractions and neighborhoods adjacent to the Greenway.

Examples: Signage denoting historic areas; signage indicating recreational areas; signage indicating neighborhoods of significance.

Figure 3.6.1 Rendering of signage indicating neighborhood attractions

SOLUTION: INCORPORATION OF HISTORICAL HERITAGE

Description: Historical significance of Brooklyn's neighborhoods could be celebrated at various points along the Greenway, establishing an identity to different neighborhoods.

Examples: "It happened here" signage; pieces of Brooklyn's history could be incorporated into or around the greenway.

Figure 3.6.2 "It happened here" signage at Riverside Park South

3.7 Encouraging and Improving Public Health

SOLUTION: MILE MARKERS

Description: Special markers along the Greenway that indicate mileage amounts or distances to locations and let users know how far they have proceeded.

Examples: Presnt in many NYC in-park routes in the form of painting or markings along the route; Portland Trails, Portland, Maine.

Figure 3.7.1 Way-finding/mile marker signage in Portland, Maine

SOLUTION: UNINTERRUPTED SEGMENTS

Description: Maximizing the distance between intersections on pathways allows for extended cardiovascular exercise.

Examples: Sections of Greenways around the City including Hudson River Greenway, Battery Park City Park Greenway in Manhattan; Shoreline Parkway Greenway in Brooklyn; and Bronx River Greenway in the Bronx.

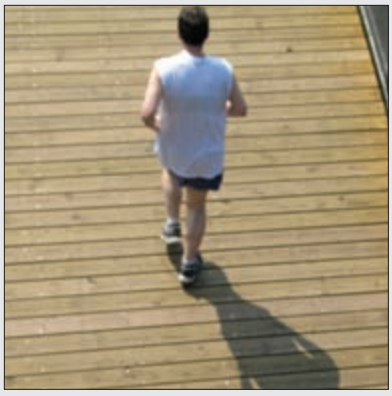

Figure 3.7.2 Runner

SOLUTION: ASSOCIATED GREENWAY STRUCTURES

Description: Associated structures such as drinking fountains and benches provide rejuvination to greenway users and encourage activity.

Examples: Hudson River Greenway and many other New York City in-park greenways.

Figure 3.7.3 Drinking fountain in along the Hudson River Greenway

3.8 Maintaining a Sense of Maritime & Industrial Heritage

SOLUTION: MARITIME-THEMED GREENWAY STRUCTURES

Description: Use of greenway associated structures that reflect a maritime theme.

Examples: Lighting, bollards, railings, art pieces.

Figure 3.8.1 Maritime structures can serve as a railing or barrier

SOLUTION: RECLAIMING INDUSTRIAL MATERIALS

Description: Incorporating industrial materials into the Greenway or its associated structures directly reminds users of Brooklyn's industrial history.

Examples: Bike racks and benches designed for the Brooklyn Navy Yard.

Figure 3.8.2 Brooklyn Navy Yard bike rack designed by Michelle Greene

SOLUTION: OBSERVATIONAL AND EDUCATIONAL COMPONENTS

Description: Design the Greenway in ways that allow for safe observation of working waterfront facilities. Can incorporate educational signage.

Examples: Passing through safe working waterfront areas; observation of working waterfront; preserve retired maritime structures for observation (Riverside Park South, Gantry plaza State Park, Long Island City, Queens).

Figure 3.8.3 A preserved maritime structure in Long Island City, Queens

3.9 Ensuring Connections to Parks

SOLUTION: CREATE GATEWAYS AT PARKS

Description: Safe, well-defined pathways that change as they intersect with parks, welcome visitors and are marked by signage and kiosks. Also, consider highlighting areas where the Greenway intersects other NYC greenways.

Examples: Entryways to many of New York City's parks including the planned sections of the future Brooklyn Bridge Park.

Figure 3.9.1 Gateways from around the City

SOLUTION: EMBEDDED SIGNAGE

Description: Signage placed directly into the paving material of the greenway through etching or insertion of other materials.

Examples: Hunts Point Riverside Park, Bronx.

Figure 3.9.2 Embedded signage in the pavement outside of Hunts Point Riverside Park in the Bronx

SOLUTION: ASSOCIATED GREENWAY STRUCTURES

Description: Bike racks, water fountains and benches are just a few structures often found at parks that if placed near the Greenway will facilitate connections between them.

Examples: Found at parks throughout New York City.

Figure 3.9.3 Seating area near bike path at Hudson River Park

3.10 Ensuring Connections to the Waterfront

SOLUTION: NON-VEHICULAR STREETS BETWEEN BIKEWAY AND WATERFRONT ESPLANADE

Description: Opportuniites exist in the redeveloping sections of Brooklyn's waterfront to install a number of non-vehicular street ends that connect the street Greenway to the waterfront esplanade.

Examples: Potential in Greenpoint and Williamsburg waterfronts.

Figure 3.10.1 Brooklyn Waterfront Greenway community planning workshop map illustrating participants' suggestion

SOLUTION: OBSERVATIONAL AND EDUCATIONAL COMPONENTS

Description: At various points along the Greenway, there are opportunities to connect the Greenway directly to the waterfront at piers. These can be used to observe the waterfront and also educate users of the waterfront's history.

Examples: Louis Valentino Jr. Park and Pier, Brooklyn; Riverside Park South, Manhattan.

Figure 3.10.2 Louis Valentino Park and Pier overlook

3.11 Design for Community

SOLUTION: PEDESTRIAN PLAZAS

Description: Well-spaced pedestrian plazas along the route of the Greenway - with benches, tables and greenery - encourage community use of the Greenway.

Examples: Pedestrian plazas can be found throughout the City including in DUMBO, Brooklyn; Meatpacking District, Manhattan; Entrance to Brooklyn Bridge, Manhattan.

Figure 3.11.1 A public pedestrian plaza in the Meatpacking District of Manhattan

SOLUTION: ENGAGE VOLUNTEERS

Description: Greenways can offer opportunities to engage volunteers through clean-ups, maintenance efforts and events such as bike tours.

Examples: Annual BGI Bike Tour; BGI Adopt-A-Highway efforts.

Figure 3.11.2 Brooklyn Greenway Initiative's beautification site

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This report was prepared for the New Yor State Department of State Division of Coastal Resources with funds provided under Title 11 of the Environmental Protection Fund. The project was sponsored by Brooklyn Borough President Marty Markowitz.