Shore Parkway Greenway Connector



Master Plan

Department of City Planning
City of New York

TRANSPORTATION DIVISION

Member of New York Metropolitan Transportation Council

Shore Parkway Greenway Connector Master Plan

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Executive Summary

Greenways are multi-use pathways for non-motorized transportation along natural and constructed linear spaces.



Dreier-Offerman Park represents an incredible opportunity to build an outstanding waterfront greenway facility in Brooklyn for walkers, joggers, and bicyclists.



The Shore Parkway Greenway in Brooklyn travels along the waterfront.



The shared-use pathway along the Hudson River waterfront in Manhattan.

Executive Summary

The Shore Parkway Greenway Connector would complete the missing inland section of one of the City's premier waterfront greenways, a legacy of the Robert Moses era of parkway construction in the 1930s. The master plan proposes recommendations to link the two separate sections of the Shore Parkway Greenway that parallels New York Bay and Jamaica Bay. Completing this five-mile gap would provide a continuous 23-mile greenway for bicyclists, pedestrians, joggers, rollerbladers and others to travel safely and continuously along or near the waterfront through many of Brooklyn's finest parks, open spaces and neighborhoods.

The recommended greenway route follows the Shore Parkway South Service Road (Shore Road South) adjacent to waterfront parcels until Cropsey Avenue. The project initially examined and rejected the feasibility of a greenway within the Shore Parkway right-of-way east of the Cropsey Avenue Bridge. Such a route is not possible through the elevated section of the parkway that continues inland through manufacturing and transit yards north of the Coney Island Creek and the multiple on- and off-ramps. Instead, the route continues south on-street into Coney Island, and then traverses the Coney Island peninsula on Neptune and Emmons avenues.

This plan examines existing conditions, highlights opportunities, and presents recommendations, supported by technical analysis, to guide the implementation of new or improved bicycle facilities on this five-mile connector. The master plan emphasizes the continuity and bi-directionality of the route, compatibility between links, proximity to the waterfront, and the safety of all users. The plan outlines both short- and long-term options. Its primary goal is to upgrade the existing Class 3 (signed only) route. Wherever possible, the preferred action is to plan, design, and build a Class 1 separated off-street path that is consistent with the existing Shore Parkway Greenway. Where on-street, the proposed Class 2 striped bicycle lanes keep all eastbound and westbound users together on the same route.

Planning Framework

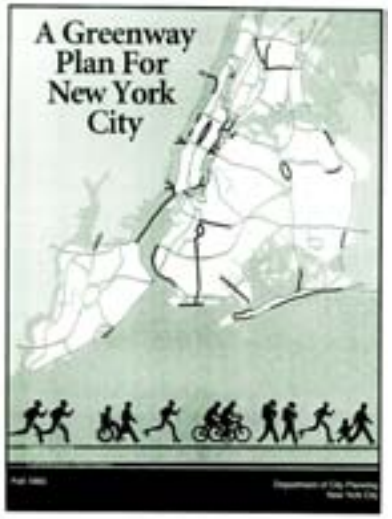
Map 1



Planning Framework

A Greenway Plan for New York City

In 1993 the New York City Department of City Planning (DCP) released *A Greenway Plan for New York City* which established a framework for building an ambitious 350-mile greenway system in the city [Map 1]. A greenway is defined as a multi-use pathway for non-motorized transportation along natural and built linear spaces, such as rail and highway rights-of-way, parklands, waterfront esplanades, and, where necessary, city streets. Greenways serve as open space connectors linking origins and destinations such as parks, cultural areas, historic sites, employment centers, retail stores, and schools. A successful greenway offers easy accessibility, connects to the existing bicycle network, and is direct, continuous, and safe for pedestrians, joggers, cyclists, in-line skaters, and wheelchair users.



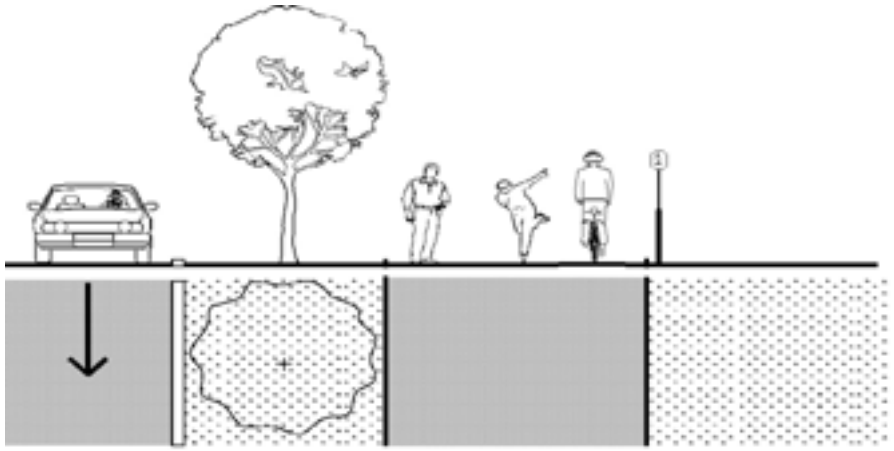
The Shore Parkway Greenway is one of the City's finest waterfront greenways, a legacy of the Robert Moses era of parkway construction. In *A Greenway Plan for New York City*, the existing Shore Parkway Greenway west of Bensonhurst Park is identified as a "priority greenway" in "good and usable condition," the city's "best traffic-free multi-use path." The "marginally usable" greenway east of Knapp Street has recently been renovated in some sections and leads users on a beautiful waterfront pathway through Marine Park and Gateway National Recreation Area, ending in Howard Beach, Queens. The five-mile gap is identified as a "proposed greenway" while the entire greenway is a "priority route."

The New York City Bicycle Master Plan

In 1997, DCP and the New York City Department of Transportation (NYCDOT) released *The New York City Bicycle Master Plan*, which identified a 909-mile city-wide bicycling and greenway network of existing and recommended routes. The Shore Parkway Greenway Connector is identified as a "priority link." Under the Bicycle Network Development program, DCP, NYCDOT and the New York City Department of Parks & Recreation (DPR) have prepared area-specific master plans such as this one to advance the implementation of the proposed actions, particularly along the City's 578-mile waterfront.

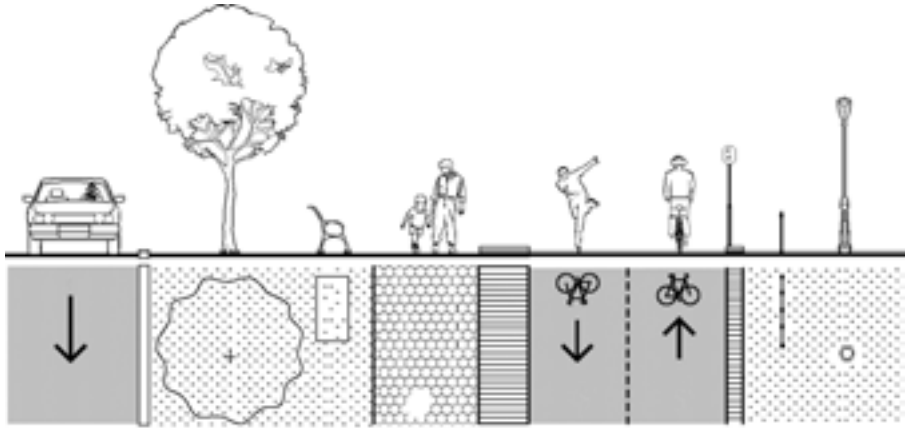
Greenways and Bicycle Facilities

Figure 1



Class 1 Shared-Use Pathway

Figure 2



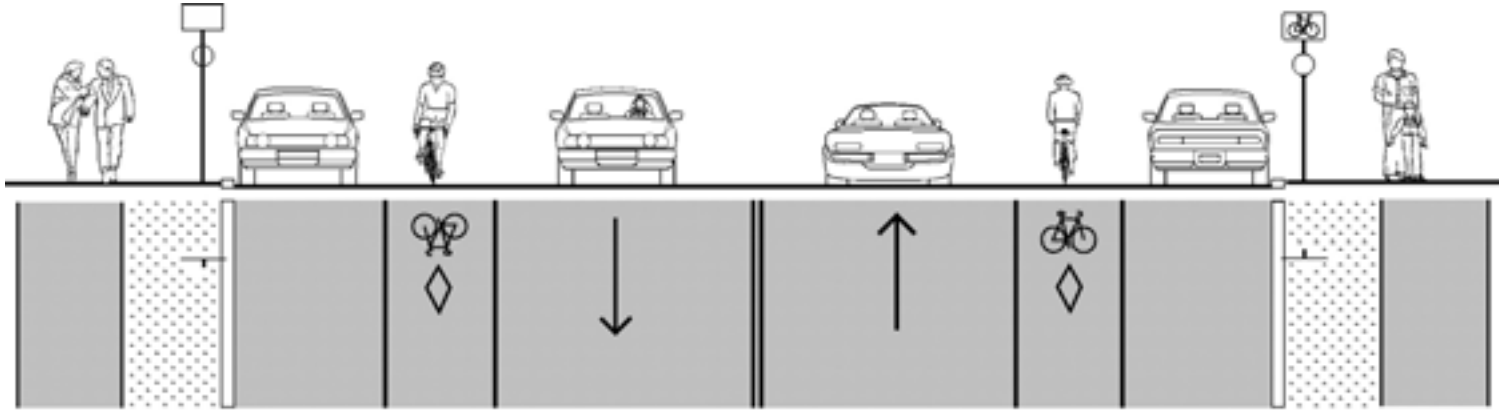
Class 1 Dual Carriageway

There are three general classifications of bicycle facilities. Class 1 facilities are off-street multi-use paths, either shared-use paths or dual carriageways, separated from the roadway and delineated by pavement markings and regulatory signage [Figure 1 and Figure 2]. Class 2 facilities are on-street bicycle lanes delineated by pavement markings and signage [Figure 3]. Class 3 facilities are on-street routes distinguished only by signage [Figure 4].

The existing Shore Parkway Greenway is a Class 1 dual carriageway from Bay Ridge Avenue to the Verrazano-Narrows Bridge, and a Class 1 multi-use pathway for the rest of the off-street greenway. The entire five-mile gap in the greenway is designated as a Class 3 bike route (regulatory signage only).

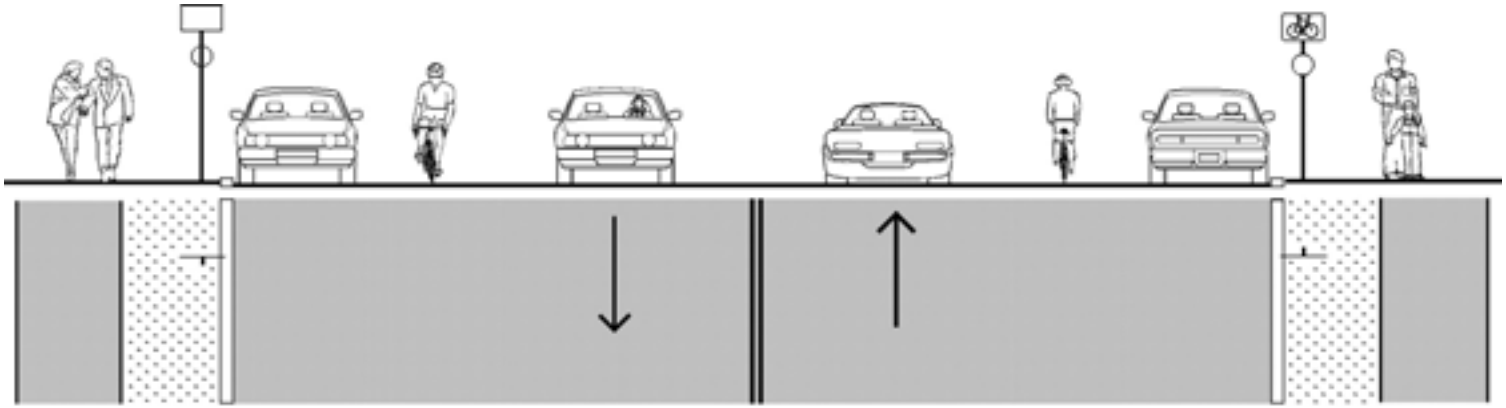
Greenways and Bicycle Facilities

Figure 3



Class 2 On-Street Bicycle Lane

Figure 4



Class 3 Signed Bicycle Route

Introduction

Waterfront Pathway in Leon S. Kaiser Park



GOALS AND OBJECTIVES

- Create Open and Green Space
- Expand Waterfront Opportunities
- Enhance Recreational Opportunities
- Link to Existing Greenways and Bicycle Routes
- Upgrade Existing Bicycle Facilities within Study Area
- Develop Safe and Direct Non-Motorized Transportation Facilities

Introduction

The Shore Parkway Greenway Connector would complete the missing inland section of one of the City's best waterfront greenways. By linking the western and eastern sections of the greenway, the project would allow users to ride safely and continuously through many of Brooklyn's finest parks, open spaces and neighborhoods. The project seeks to:

- Provide for safe and direct non-motorized transportation facilities;
- Improve existing bicycle facilities;
- Link existing greenways and bicycle routes;
- Enhance recreational and waterfront opportunities; and
- Create and preserve open spaces.

The project initially examined the feasibility of locating the greenway within the Shore Parkway right-of-way as it continues inland north of the Coney Island peninsula. Though this is not a waterfront route, it would be direct, continuous, and consistent with the design of the existing greenway. However, the lack of available space, the multiple bridges, on-ramps, off-ramps, and the elevated sections of the parkway make such a route impossible except in the most westerly section of the study area. The resulting route follows the Shore Parkway South Service Road (Shore Road South), and then traverses the Coney Island peninsula.

The plan emphasizes the continuity of the route, compatibility between links, proximity to the waterfront and keeping bi-directionality. Wherever possible, the preferred action is to plan, design, and build a Class 1 off-street path that is consistent with the existing Shore Parkway Greenway. Proposed on-street bicycle facilities keep all eastbound and westbound pathway users together on the same route.

Introduction

Links and Connections [Map 2]

The completion of the pedestrian and bicycle connector would improve non-motorized vehicle access to:

Neighborhoods

Bay Ridge, Fort Hamilton, Bath Beach, Coney Island, Brighton Beach, Manhattan Beach, Sheepshead Bay, Mill Basin, Starrett City, Spring Creek, Howard Beach, and the Rockaways

Waterfront Parks and Open Spaces

Owl's Head Park, the 69th Street Pier, Dyker Beach Park, Bensonhurst Park, Dreier-Offerman Park, Six Diamonds Park, Leon S. Kaiser Playground, the Coney Island Boardwalk, Brighton Beach, Manhattan Beach, Plumb Beach, the Canarsie Pier, and the National Park Service's Gateway National Recreation Area, including Floyd Bennett Field, Fort Tilden, and Jacob Riis Park

Greenways and Bicycle Lanes

The Ocean Parkway Greenway, the Rockaway-Gateway Greenway, the Sunset Park connector, the Cross Bay Boulevard bicycle lanes, and the Bedford Avenue bicycle lanes



The Ocean Parkway Greenway links Coney Island with Prospect Park in Brooklyn.

Recreation, Amusement, and Sports Facilities

Fort Hamilton, Dyker Beach Golf Course, Marine Park Nature Center and Golf Course, Ryan Center Historic Hangar Row, Keyspan Stadium, the New York Aquarium, Astroland Amusements, and Aqueduct Race Track

Colleges

Kingsborough Community College and Brooklyn College

Transportation

NYC Transit stations at Stillwell Avenue, West 8th Street, Brighton Beach Avenue, Neptune Avenue, Ocean Parkway and John F. Kennedy International Airport.

Introduction

Map 2











Project Scope

This federally-funded project seeks to enhance and develop better bicycling, pedestrian, and universal access facilities on this greenway. This report evaluates existing conditions for motorists and pathway users, identifies issues and opportunities, and makes a series of recommendations in order to achieve the goals of a redesigned route, primarily off-street where possible, that is safe for all users.

Data on existing conditions was collected for the length of the study area. Fieldwork and documents/records produced an inventory of roadway geometries and striping, sidewalk and bridge conditions, vehicular volumes, movements, and classifications; bus, pedestrian, and pathway user movements; on- and off-street parking regulations, capacity, and utilization, and accident data. Peak hour vehicle, bicycle, and pedestrian counts were taken and vehicular levels-of-service and parking capacity analyses were conducted using the standard accepted methodology, including the Highway Capacity Manual and Software (2000).

Technical Advisory Committee

This master plan was developed in consultation with a Technical Advisory Committee (TAC) consisting of representatives from local community boards, neighborhood groups and associations, city officials, and transportation advocates. The names and affiliations of members are included in Appendix 5.

Funding

This project is funded by a federal matching grant from the metropolitan planning organization for the region, the New York Metropolitan Transit Council (NYMTC), through the Unified Planning Work Program. The New York City Department of Transportation (DOT) previously received funding to implement improvements through the Transportation Enhancements program under the Intermodal Surface Transportation Efficiency Act (ISTEA). Additional capital funds to build the plan's recommended actions will be sought through federal programs, the city budget, or discretionary funds available through local and state elected officials.

Study Area

The Shore Parkway

The Shore Parkway, part of the Belt Parkway, begins at the Gowanus Expressway in Bay Ridge and continues south and east along the New York Bay waterfront from Bay Ridge to Bensonhurst and from Sheepshead Bay to Howard Beach, Queens. The parkway skirts the Coney Island peninsula, where it travels inland and is elevated. The parkway connects 26 parks or open spaces with over 3,500 acres.

The parkway is a six-lane limited-access highway that connects to the Verrazano-Narrows Bridge, providing vehicular access to Staten Island and New Jersey, and to the Southern, Laurelton, and Cross Island parkways, linking drivers to Queens and Nassau County, Long Island. The Shore Parkway is heavily used by cars, with annual average daily traffic (AADT) of more than 140,000 vehicles. Trucks are not allowed on the parkway.

The Belt Parkway was first proposed by Robert Moses in 1930. Construction of the parkway along the southern Brooklyn and Queens waterfront began in 1934 and was completed in 1940. The 36.5-mile highway was designed with a dark-colored main road and light-colored entrance and exit ramps and sodium-vapor lights on traditional timber lampposts. As originally constructed, the parkway had four travel lanes, two in each direction, separated by a wide grassy median. In the late 1940s the road was widened to six lanes. In more recent years, the Shore Parkway has been reconstructed and new signs and lights have been installed.

The Shore Parkway Greenway

The existing Class 1 greenway, built as part of the original design, is split into two sections that are connected by a Class 3 signed on-street route. The western section of the Shore Parkway Greenway begins at the 69th Street Pier in Bay Ridge and continues south for seven miles along the Brooklyn waterfront past the Verrazano-Narrows Bridge, Fort Hamilton and Dyker Beach Park. The greenway from Bay Ridge to the Verrazano is an excellent example of an off-street, dual carriageway, with an often expansive divider between wheeled and non-wheeled users. The greenway, with scenic waterfront views of the New York Bay, ends at Bensonhurst Park at the intersection of Bay Parkway, a Shore Parkway off-ramp and the Shore Parkway South Service Road (Shore Road South).

The existing eastern section of the greenway begins at Brigham Street and Emmons Avenue in Plumb Beach, Sheepshead Bay. This Class 1, off-street, shared-use path continues eastward for 11 miles along the waterfront through green spaces and parks including Marine Park, Floyd Bennett Field, Bergen Beach Park, Canarsie Beach Park and Pier, and Spring Creek Park. Ending in Howard Beach, Queens, this section of the greenway along the parkway features an ecologically-diverse wildlife habitat with wetlands and passive open space.

Study Area

The five-mile gap in the Shore Parkway Greenway is a Class 3, signed bike route, divided into two paired routes for eastbound and westbound riders. Eastbound riders travel on-street along Shore Road South, turn south onto Cropsey Avenue, then cross the Cropsey Avenue Bridge to Neptune Avenue. Bicyclists continue south on West 17th Street to Surf Avenue, then travel east to Ocean Parkway and north to Neptune Avenue and Emmons Avenue. The connection to the existing greenway is at the unsignalized intersection of Brigham Street and Emmons Avenue and not the signalized intersection at Knapp Street one block farther east, which is often cited in documents as the entrance to the eastern section of the greenway.

Westbound bicyclists leaving the greenway at Brigham Street also travel on-street along Emmons and Neptune avenues, south on Ocean Parkway, west on Surf Avenue, then north on West 17th Street and Cropsey Avenue. Riders then travel west on the Shore Parkway North Service Road, north onto Bay 35th Street, west onto Bath Avenue, south onto Bay Parkway, and finally ride under the Shore Parkway to access the western section of the greenway.

Greenway and Bicycle Connections [Map 3]

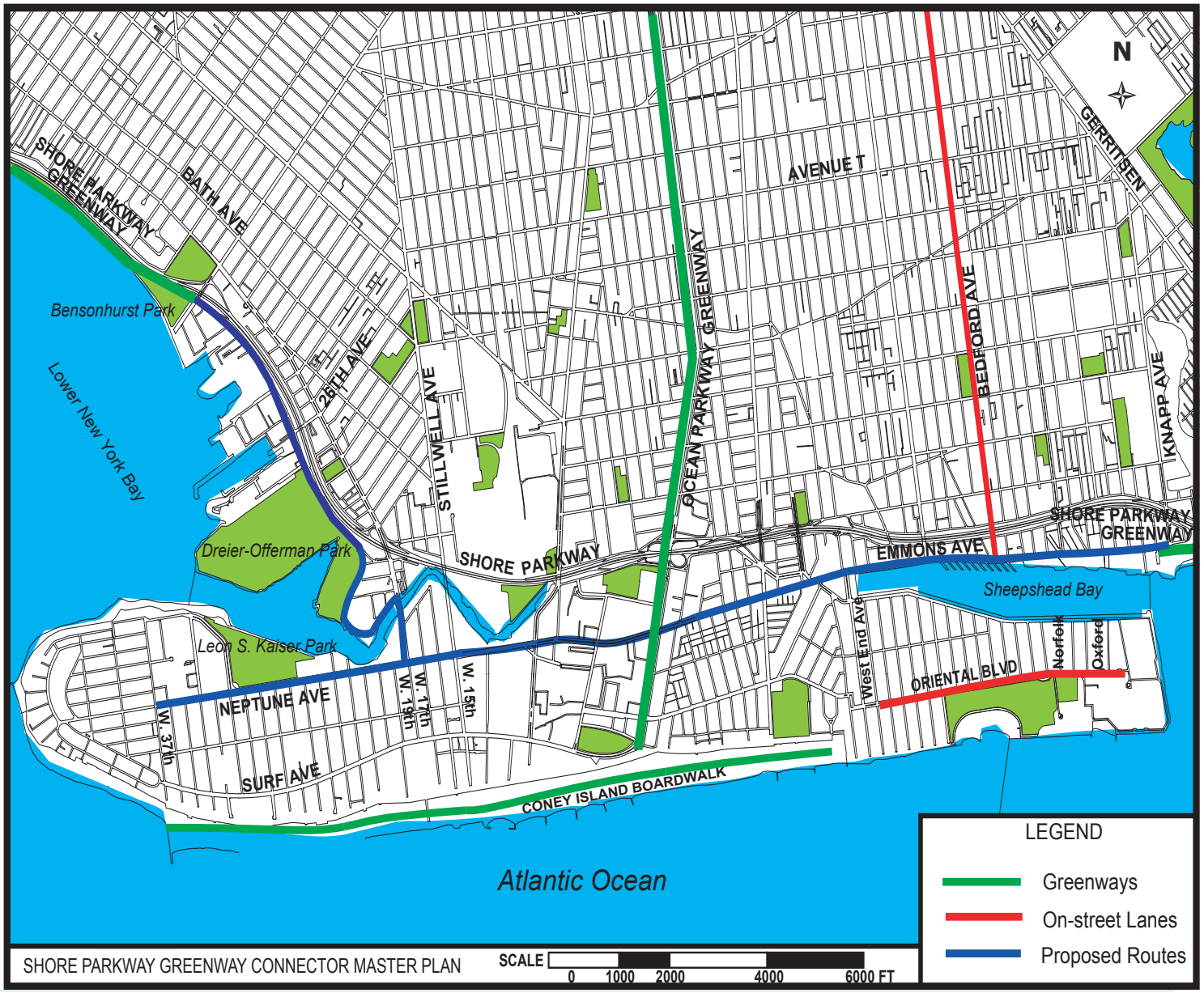
The western end of the Shore Parkway Greenway leads to the Sunset Park Connector, on- and off-street bicycle paths and lanes that link Owl's Head Park, the Greenwood Cemetery, and Prospect Park. The eastern section of the greenway connects to two existing north-south bicycle facilities. The Rockaway-Gateway Greenway on Flatbush Avenue and the Marine Parkway Bridge leads to Fort Tilden and Jacob Riis Park. The Cross Bay Boulevard bicycle lane runs from Howard Beach through Broad Channel to the boardwalk along the Atlantic Ocean in the Rockaways.

With the completion of the Shore Parkway Greenway Connector, four other existing bicycle facilities would have improved connections: the Ocean Parkway Greenway, the nation's first dedicated bicycle lane and greenway, which extends from Coney Island to Prospect Park; the Bedford Avenue Class 2 bicycle lane that links the Sheepshead Bay waterfront to Crown Heights through Brooklyn College; the Oriental Avenue bicycle lane in Manhattan Beach connecting to Kingsborough Community College; and the Coney Island (a.k.a Riegelmann) Boardwalk, currently open to bicyclists from 5:00 to 10:00 a.m. only.

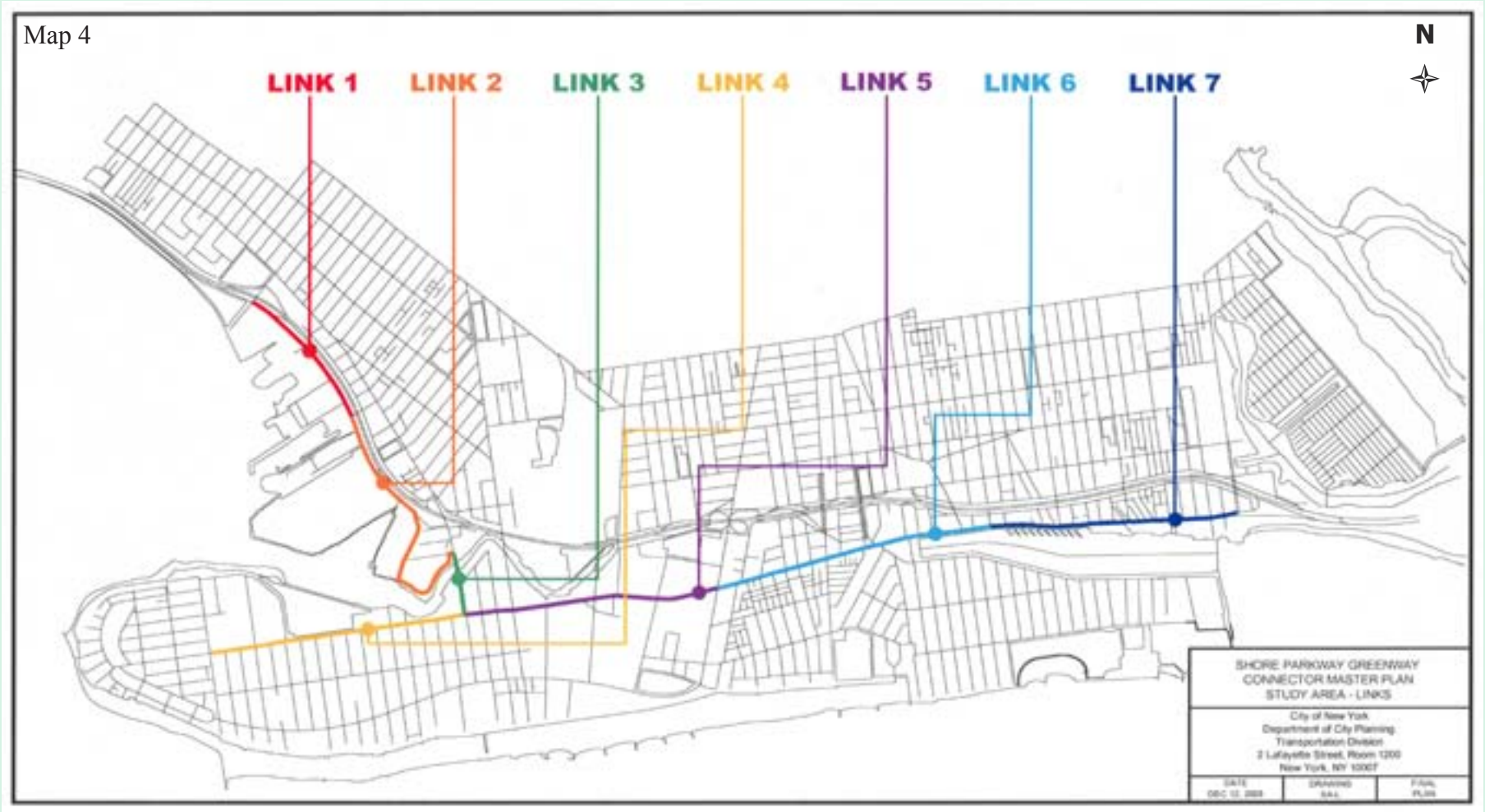
The New York City Department of Parks & Recreation recently received $1 million in multi-model funds from New York State Assemblywoman Adele Cohen (46th District), as well as an additional $175,000 to build a new waterfront greenway with related amenities along the Coney Island Boardwalk. These funds will be used to implement the first phase of a new pathway dedicated to bicyclists, in-line skaters, people using wheelchairs, etc., that is parallel to the existing boardwalk, and to install historic boardwalk lights and provide decorative enhancements (see page 57). This new greenway will help minimize conflicts between pedestrians and wheeled users by permitting separate facilities for each user group. U.S. Congressman Jerry Nadler (NY 8th District) has earmarked an additional $3.2 million in TEA-3 funds to construct future phases of the waterfront greenway.

Study Area

Map 3



Study Area Links



Study Area Links

The study area has been divided into seven separate segments or links [Map 4], due to the study area's length of over five miles, and the variety in its physical characteristics, road conditions, and landscapes. The seven links are:

Link 1:	Shore Road South from Bay Parkway to 26th Avenue;
Link 2:	Shore Road South from 26th Avenue to Cropsey Avenue, including Dreier-Offerman Park, Six Diamonds Park and the Home Depot path;
Link 3:	Cropsey Avenue/West 17th Street from the Home Depot to Neptune Avenue;
Link 4:	Neptune Avenue from West 37th Street to West 17th Street;
Link 5:	Neptune Avenue from West 17th Street to Ocean Parkway;
Link 6:	Neptune Avenue and Emmons Avenue from Ocean Parkway to Ocean Avenue; and
Link 7:	Emmons Avenue from Ocean Avenue to Knapp Street.

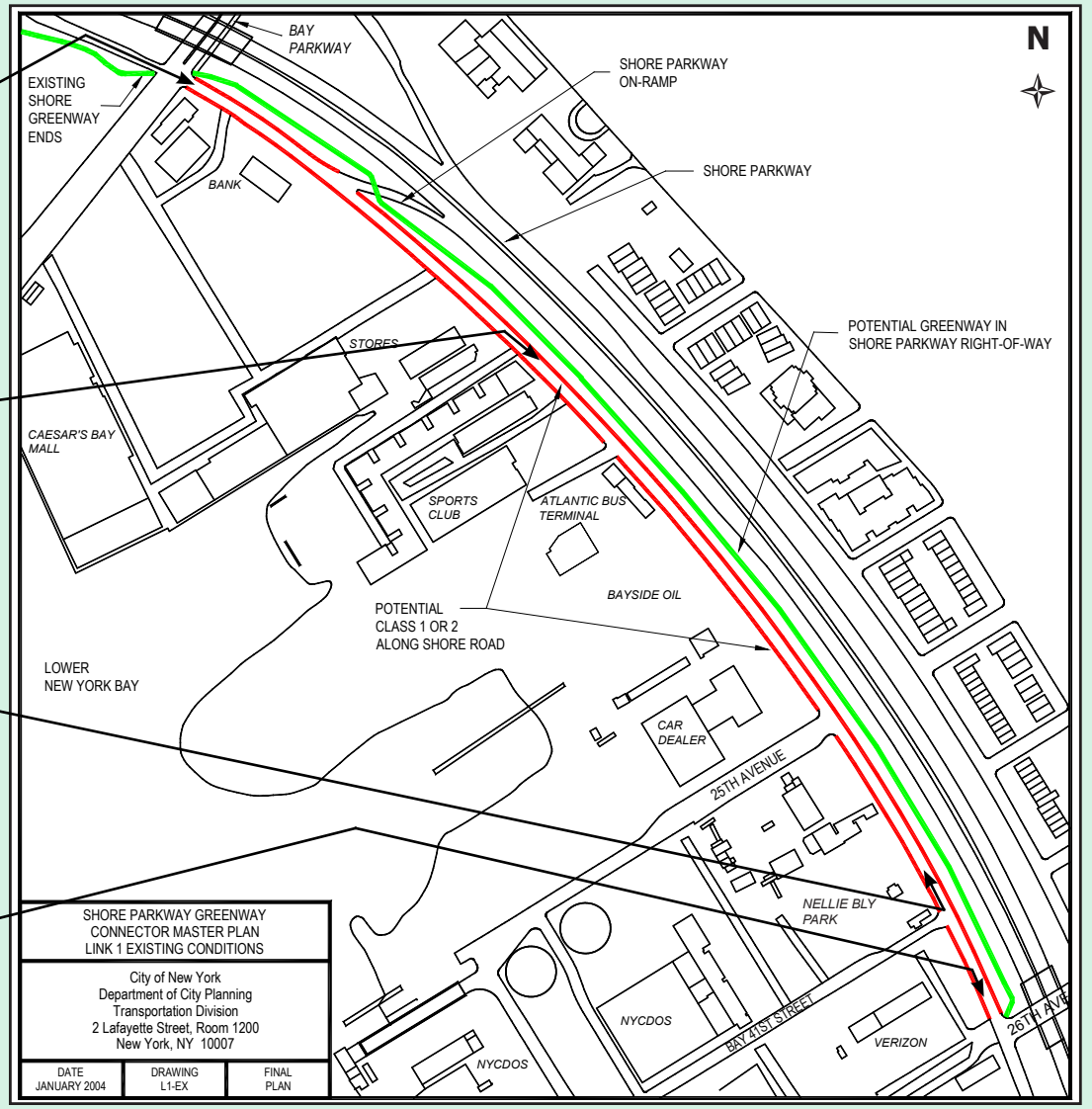
For each link, existing conditions are described, findings are highlighted, and recommendations are proposed. Most links list the preferred action and additional and alternative options considered for this project. These options have been developed to provide a range of possible solutions, both short- and long-term, on-street and off-street, and to assess the viability of each proposal. In some instances, a recommendation may require funding and commitments that are not currently available.

Link 1: Shore Road South from Bay Parkway to 26th Avenue

Proposed Route

Map 5





Link 1: Shore Road South from Bay Parkway to 26th Avenue

Existing Conditions

Shore Parkway, as mentioned, is a six-lane limited-access highway with service roads located within an expansive right-of-way, under the jurisdiction of the NYCDOT. The parkway hugs the waterfront until Bensonhurst Park, then turns inland, where eastbound Shore Road South begins. Shore Road South parallels the parkway and provides access to and egress from it with on- and off-ramps.

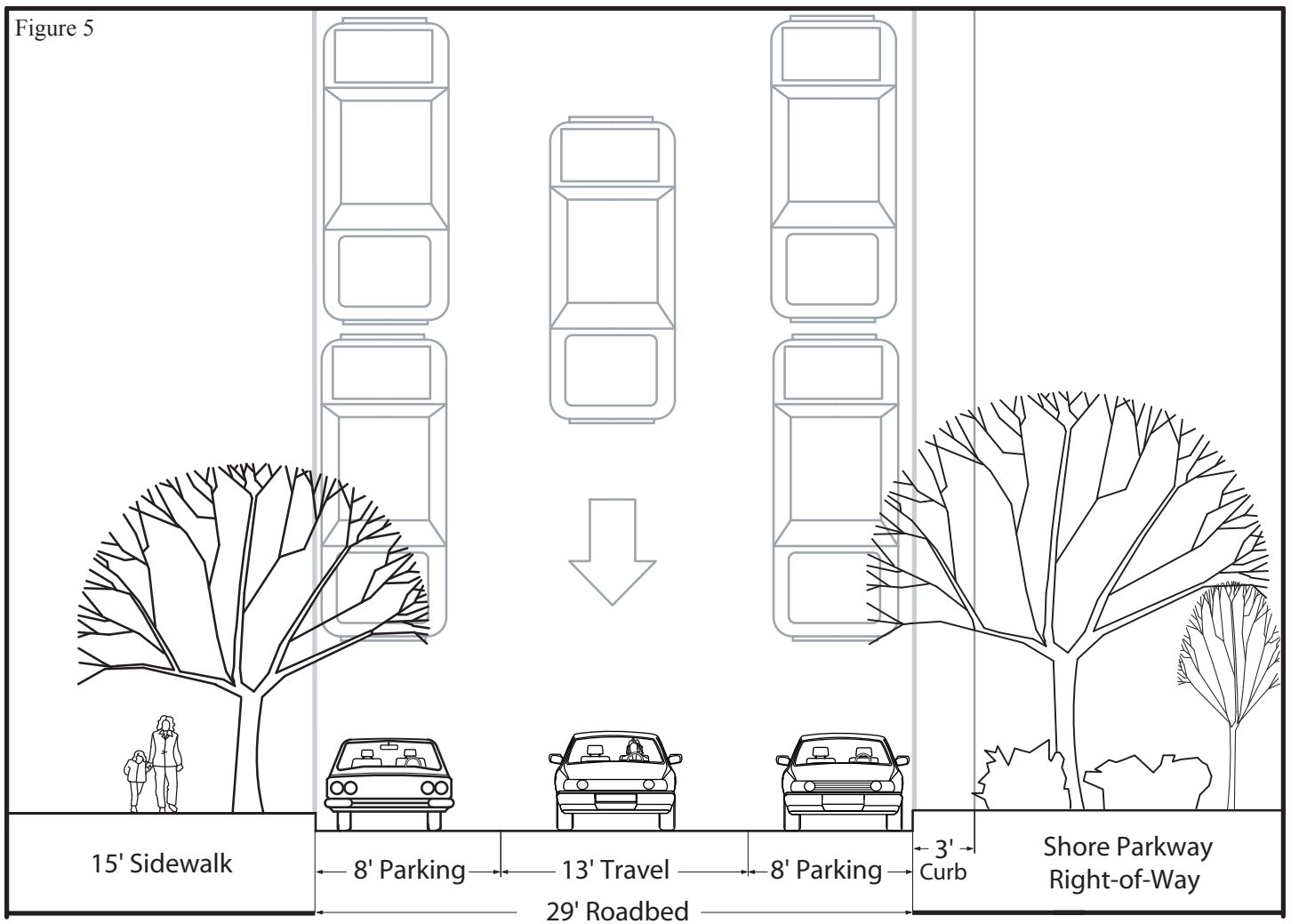
While residential buildings front the north side of Shore Parkway, a concentrated mix of manufacturing and commercial uses line Shore Road South from Bay Parkway to 26th Avenue [Map 5]. At Bay Parkway, where the existing greenway ends, is Ceasar's Bay Shopping Center, a large retail mall with anchor tenants that include Kohl's, Toys 'R' US, Modell's, Strauss Auto, Best Buy, and a parking lot with 1,200 spaces. Continuing east the businesses are a Stop & Stor, Moda Furniture, Harbor Motor Inn, New York Sports Club, Atlantic Express Bus, Bayside Oil, and a Mercedes Benz dealership. Each business has its own parking lot for customers and/or employees. Nellie Bly Amusement Park, with old-fashioned kiddie thrill-rides, and a Verizon vehicle parking facility are located between 25th Avenue and 26th Avenue. Along the waterfront behind Nellie Bly Amusement Park and Verizon are a marina and a Department of Sanitation (DSNY) 23-acre lot that includes a garage facility, a self-help site, the Southwest Brooklyn Marine Transfer Station (MTS) that has not operated since 1997 and the inactive old Southwest Brooklyn Incinerator that is scheduled for demolition. The City's Solid Waste Management Plan for long-term export and disposal of solid waste includes the conversion of eight existing MTS's, including the Southwest Brooklyn MTS, to containerized waste for export by barge.

Shore Road South is 29 feet wide and has one travel lane and variable curbside parking [Figure 5]. It begins at the intersection of Bay Parkway, a major street providing vehicular access to the mall and the parkway. Two left-turn lanes on Bay Parkway permit southbound traffic to access Shore Road South which carries 900 to 1,000 vehicles in each of the typical peak hour periods. A substantial number of trips are generated by the mall and the exit and entry ramps to the parkway. There is also notable truck traffic at the Atlantic Bus Depot, Bayside Oil and the DSNY site. Most vehicles - 500 to 600 per hour - exit Shore Road South at the Shore Parkway on-ramp approximately 300 feet east of Bay Parkway. This is the only intersection along the north side of Shore Road South until 26th Avenue which is at the end of this link. Most of the remaining 300 to 500 vehicles on Shore Road South turn north onto 26th Avenue, which is controlled by a two-way stop sign. Twenty-Sixth Avenue is 50 feet wide with a single travel lane in each direction, 10-foot sidewalks, curbside parking, and a B6 bus layover.

Link 1: Shore Road South from Bay Parkway to 26th Avenue

Existing Conditions

Figure 5



Existing Conditions

Link 1: Shore Road South from Bay Parkway to 26th Avenue

- Available Right-of-Way
- 29-Foot Roadbed
- One Southbound Travel Lane
- Variable Parking Conditions
  - Including 17 Meters on Southside
- Sidewalk on Southside Only
- Commercial and Manufacturing

Existing Conditions



Link 1: Shore Road South from Bay Parkway to 26th Avenue

Existing Conditions

The sidewalk on the south side of Shore Road South is 15 to 18 feet wide, but varies from fully paved sidewalks to sidewalks with five feet of concrete pavement and five feet of dirt, grass, rocks and/or tree pits on each side at Nellie Bly. Along the north side of Shore Road South is a three-foot wide curb that provides people a place to stand when they exit a parked vehicle. A chain-link fence at the northerly edge of the curb separates Shore Road South from the Shore Parkway right-of-way with approximately 40 feet of green space between them.

Uses along the south curb of Shore Road South include four B6 bus stops, two in front of the mall within close proximity of each other (375 feet), one at Bayside Oil and one at the Verizon site at 26th Avenue. Only the first bus stop at the mall has a shelter. According to New York City Transit, the B6 daily average total was 749 boardings and alightings combined for the four bus stops. The first mall stop had the majority of boardings and alightings at 479 (64 percent); the second mall stop had 75 (10 percent); the Bayside Oil stop had 78 (10 percent); and 26th Avenue had 117 (16 percent).

Saturday morning street sweeping regulations are in effect from 9:30AM to 10AM on the north side and 8:30AM to 9AM on the south side. On-street parking on Shore Road South is inconsistent, with few posted parking signs, and parking varies, occurring at times only on the north side, only on the south side, sometimes on both sides, and sometimes on neither side. The north side of the street has the majority of on-street parking.

Parking is not permitted on either side of the street between Bay Parkway and the Shore Parkway on-ramp that is located 300 feet east of Bay Parkway. Seventeen metered spaces permitting up to three-hour parking are interspersed along the south side of Shore Road South from the Stop & Stor to the Atlantic Express Bus Depot. Parking is not permitted on either side of Shore Road South by the Bayside Oil facility, so that the large oil trucks may easily maneuver around the entrance/exit. Neither is parking permitted on the south side of Shore Road South between 25th Avenue and Bay 41st Street fronting Nellie Bly Park, where during summer hours of operation vehicles tend to park illegally. Nellie Bly Park has a large parking lot behind the site that is unused. Bay 41st Street and 25th Avenue have back-in angled parking.

Link 1: Shore Road South from Bay Parkway to 26th Avenue



Aerial photo of a section of Link 1 including Ceasar's Bay Shopping Center and the Atlantic Bus Depot. The continuation of the Shore Parkway Greenway along the waterfront is blocked by Ceasar's Bay.

Link 1: Shore Road South from Bay Parkway to 26th Avenue

Recommendations

These are the four options proposed for this link.

Option 1: Build a Class 1 Off-Street Greenway in the Shore Parkway Right-of-Way

The preferred option is to extend the existing greenway east by building a 12- to 15-foot Class 1, off-street multi-use path in the Shore Parkway right-of-way [Figure 6], where there is approximately 40 feet of available space between the service road and the parkway. This option separates path users from vehicles on Shore Road South, ensuring fewer conflicts, and it would not require changes to the roadway or on-street parking. This option creates a more attractive riding experience, keeps bi-directional pathway users on the same facility close to the waterfront south of the parkway, and maintains the same type of facility as the existing greenway,

Path users would reach the new route by crossing to the north side of Shore Road at the signalized intersection at Bay Parkway, where the crosswalk design would be improved. Option 1 would require path users to cross a Shore Parkway on-ramp approximately 300 feet east of Bay Parkway, thereby necessitating the redesign of the interface between the on-ramp and the path to ensure the safety of greenway users. A New York City precedent already exists in the Bronx where the Pelham Greenway crosses a Pelham Parkway off-ramp.

The redesigned at-grade crossing might include physical barriers, stop signs, and other regulatory signs and markings to control the movements of path users. The greenway would also be designed to meet the on-ramp at a right angle to ensure proper sightlines. New warning signs and markings for vehicles would also be installed. Shore Road South could also be re-striped to provide a dedicated left turn bay for ramp-bound traffic; the road is sufficiently wide and there is no curbside parking approaching the ramp. Another possible but costly variant of this option is to relocate the vehicle on-ramp closer to the Bay Parkway intersection. All traffic movements and user conflicts would be regulated at a typical signalized intersection. Vehicles entering the on-ramp would have a longer dedicated merge lane to facilitate their entry into the Shore Parkway traffic flow. The NYCDOT does not support a greenway crossing of a parkway ramp nor the reconstruction of the on-ramp.

A costly variable to this option would be to build a pedestrian and bicycle bridge over the parkway entrance ramp; this would eliminate any conflict between vehicles and pedestrians and cyclists. The Americans with Disabilities Act (ADA) permits a maximum grade of 4.8 percent and an ADA-compliant bridge with sufficient clearance over the parkway ramp would require approaches of about 200 feet in either direction.

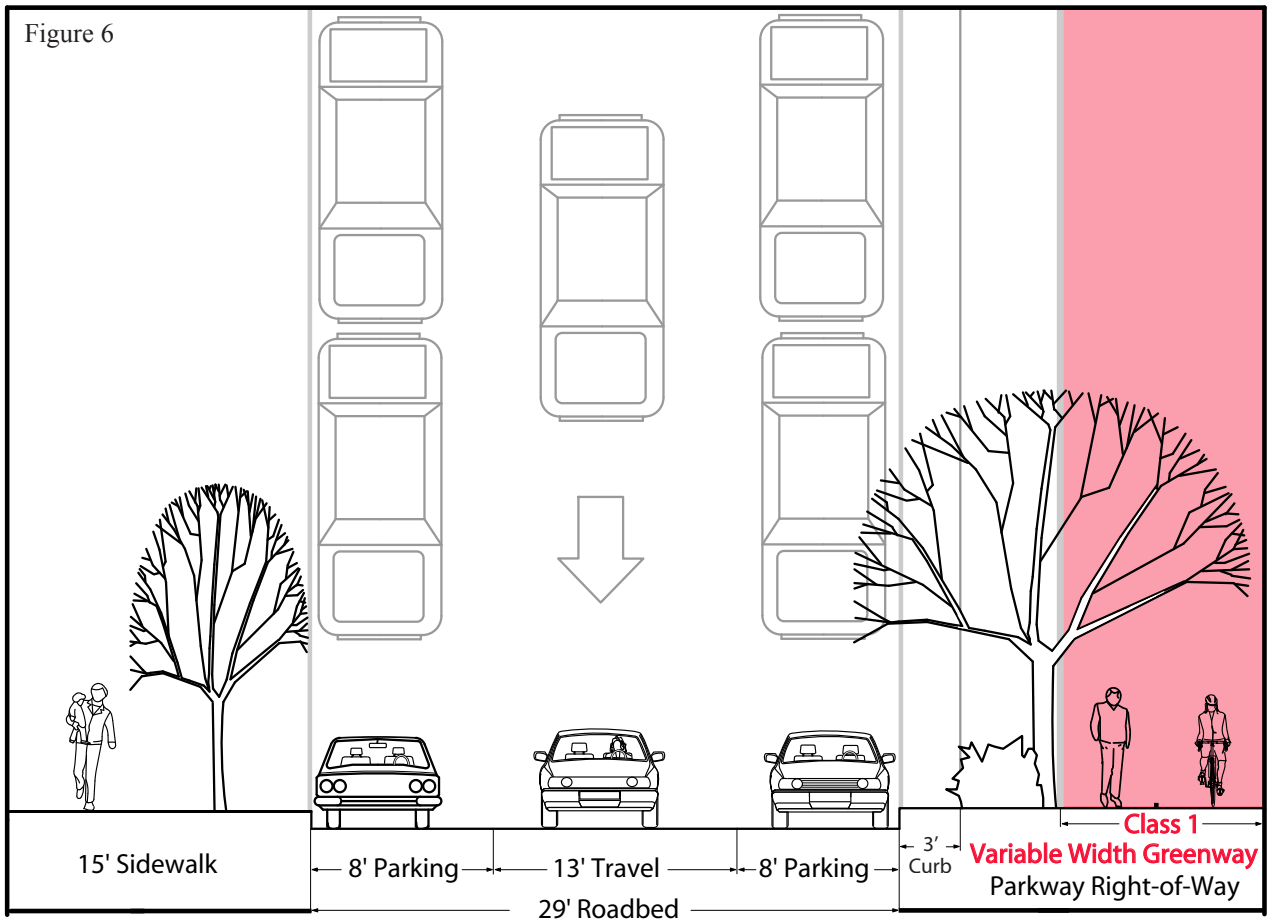
Link 1: Shore Road South from Bay Parkway to 26th Avenue

Recommendations

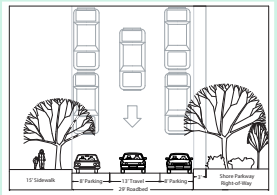
Option 1: Class 1 Off-Street Greenway

Within Shore Parkway Right-of-Way

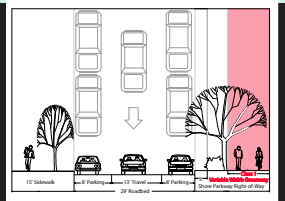
Figure 6



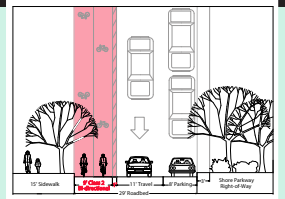
Option 1



Existing Conditions



Option 1



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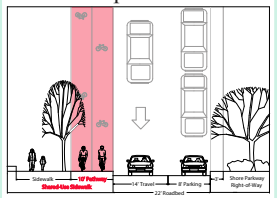


Option 3

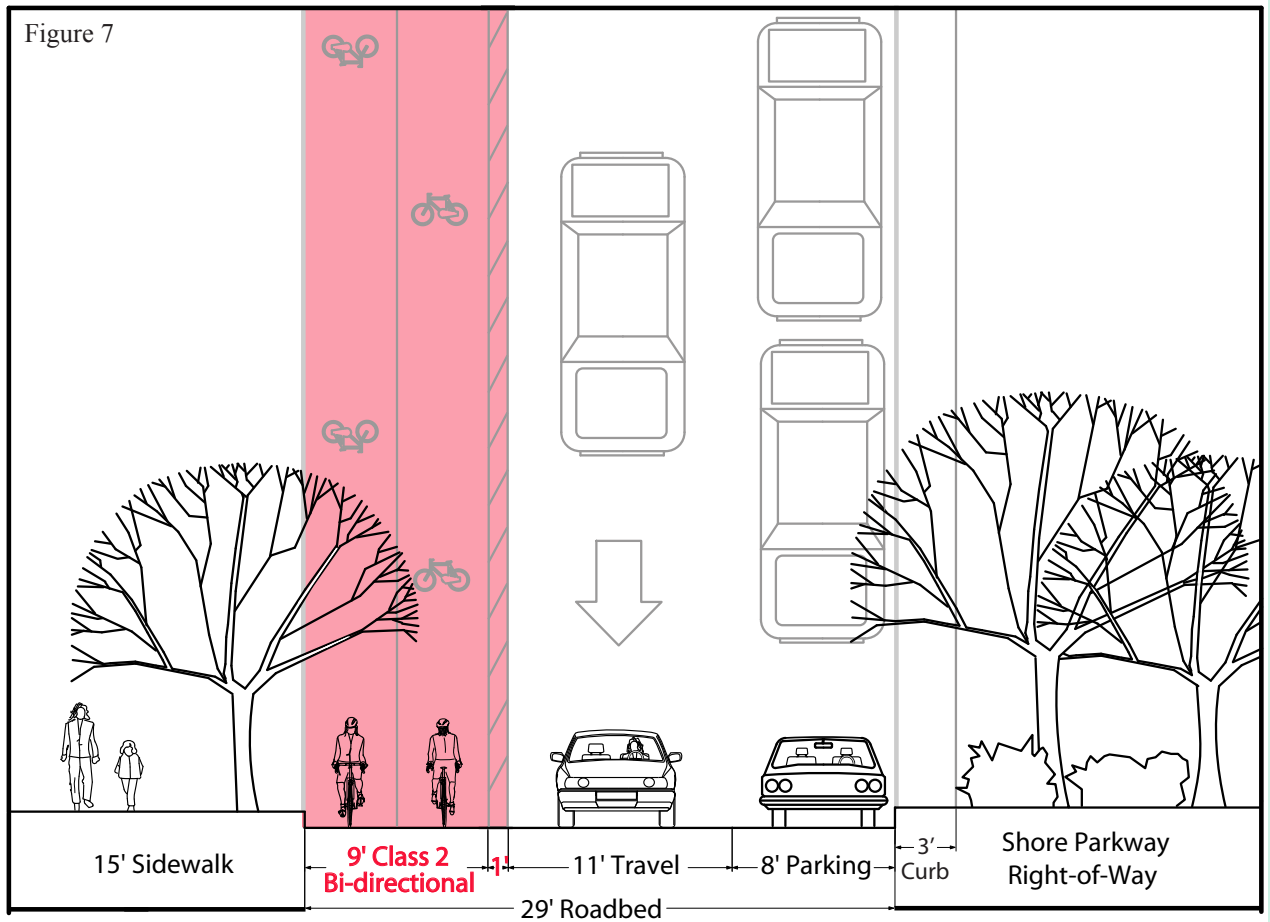
Link 1: Shore Road South from Bay Parkway to 26th Avenue

Recommendations

Option 2: Class 2 Bicycle Lane

Bi-directional with Buffer/Barrier within Existing Roadbed

Figure 7



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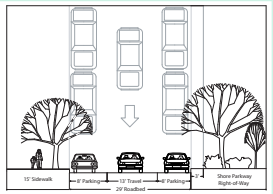

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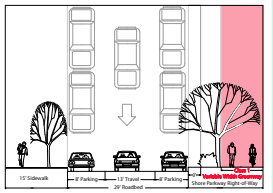
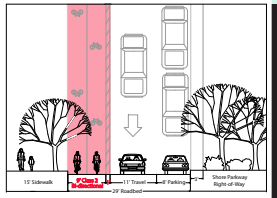


Option 1



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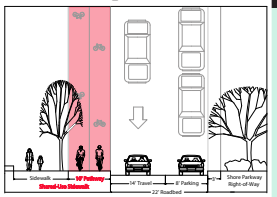


Option 3

Link 1: Shore Road South from Bay Parkway to 26th Avenue

Recommendations

Option 2: Stripe Class 2 On-Street Bi-Directional Bicycle Lane with Buffer/Barrier

This option [Figure 7] proposes to build a Class 2 bi-directional bicycle lane along Shore Road South by recapturing excess roadbed unnecessary for vehicular use. The existing 29-foot roadway would be reconfigured to remove a parking lane and add a nine-foot two-way bike lane with a one-foot barrier, leaving one 11-foot eastbound travel lane and one eight-foot parallel parking lane. This option would be cost-effective because the roadway geometry remains the same, but it would require an adequate barrier between bicyclists and the motor vehicle lane. The pathway should be raised, graded, or made of a tinted pavement (typically a brick color) in order for it to be discernible and delineated from the regular roadway.

While typically bike lanes are located on the left side of a one-way street to minimize potential conflicts with driver-side doors opening into bicyclists, this facility could be placed on either side of Shore Road South. The south side is more appropriate because there is no conflict with the Shore Parkway on-ramp, and there are fewer parking spaces on the south side to remove or relocate. Pedestrians and joggers would use the adjacent existing south sidewalk. Option 2 requires the removal of 17 metered parking spaces from the south side of Shore Road South, which is supported by a parking capacity and utilization study (See Appendix 3: Parking Analysis). This action would normalize and better regulate parking conditions on the service road and permit the installation of the pathway. As stated earlier, all of the businesses along the south side of Shore Road South provide off-street parking lots or parking along Bay 41st Street and 25th Avenue, as well as regular curbside parking along the north side of Shore Road South. Traffic exiting from the driveways of the businesses should be controlled by stop signs, and regulatory signs should caution drivers to be alert to the presence of bicyclists from both directions. We will work with property owners as necessary to address concerns about regulatory signs and safety.

However, there are issues with this option: DSNY needs at least 10-feet of right-of-way to sweep the streets or remove snow; the Federal Highway Administration (FHA) does not recommend bi-directional pathways on one-way streets; and the B6 bus would have to cross over the pathway at each bus stop. This option is achievable in conjunction with a roadway widening and a sufficient barrier between the bicyclists and vehicles. The pathway and barrier would end and start again with each bus stop with dotted lines to indicate the continuation of the pathway (AASHTO standard). While the FHA does not recommend bi-directional pathways on one-way streets, there are numerous example of this configuration with a barrier throughout the nation and the world. There is also a precedent in the city where the NYCDOT implemented a reverse flow bicycle lane on the one-way northbound FDR service road in Manhattan from the Water Club restaurant to East 24th Street.

Link 1: Shore Road South from Bay Parkway to 26th Avenue

Recommendations

Option 3: Build a Class 1 Shared-Use Sidewalk (Combined South Sidewalk & Bi-Directional Bicycle Lane)

This option proposes to redesign the south sidewalk as a shared-use sidewalk, whereby pedestrians and bicyclists would be separated from the street and moving traffic by a raised curb. The existing sidewalk is 15 to 18 feet wide which meets AASHTO guidelines for the width of a shared-use path. There are some sections in this link, such as in front of Nellie Bly Park and the Atlantic Bus site, that do not have a completely paved sidewalk. Appendix 1 has a detailed discussion of the shared-use sidewalk in Links 1 and 2. An alternative to this option is to add five to seven feet of roadbed to the sidewalk, and reconfigure the sidewalk as a dual carriageway with a 12-foot pedestrian path separated from a 10-foot wide bi-directional bicycle path paved in asphalt and appropriately striped [Figure 8]. The roadbed would be reduced to 22 feet. This would require the elimination of the parking lane along the south curb (see Appendix 3: Parking Analysis). The city would assume jurisdiction, maintenance, and legal responsibility of the shared-use sidewalk. The MTA has expressed its preference for the shared-use sidewalk in Links 1 and 2 because bus movements would be less affected than in Option 2 in Links 1 and 2. Additionally, the roadbed could be widened using the parkway right-of-way to build a substantial Class 1 facility as well as to accommodate parallel parking on both sides of the street.

Option 3a: Build a Class 1 Shared-Use Sidewalk, Crossing Intersection & Class 1 Off-Street Greenway in the Shore Parkway Right-of-Way

This option (not shown) would build a new signalized or stop-controlled intersection east of the parkway on-ramp and continue on an off-street greenway in the right-of-way. This option enables greenway users to forgo crossing the parkway on-ramp and continue in the parkway right-of-way through Link 2.

Additional Improvements

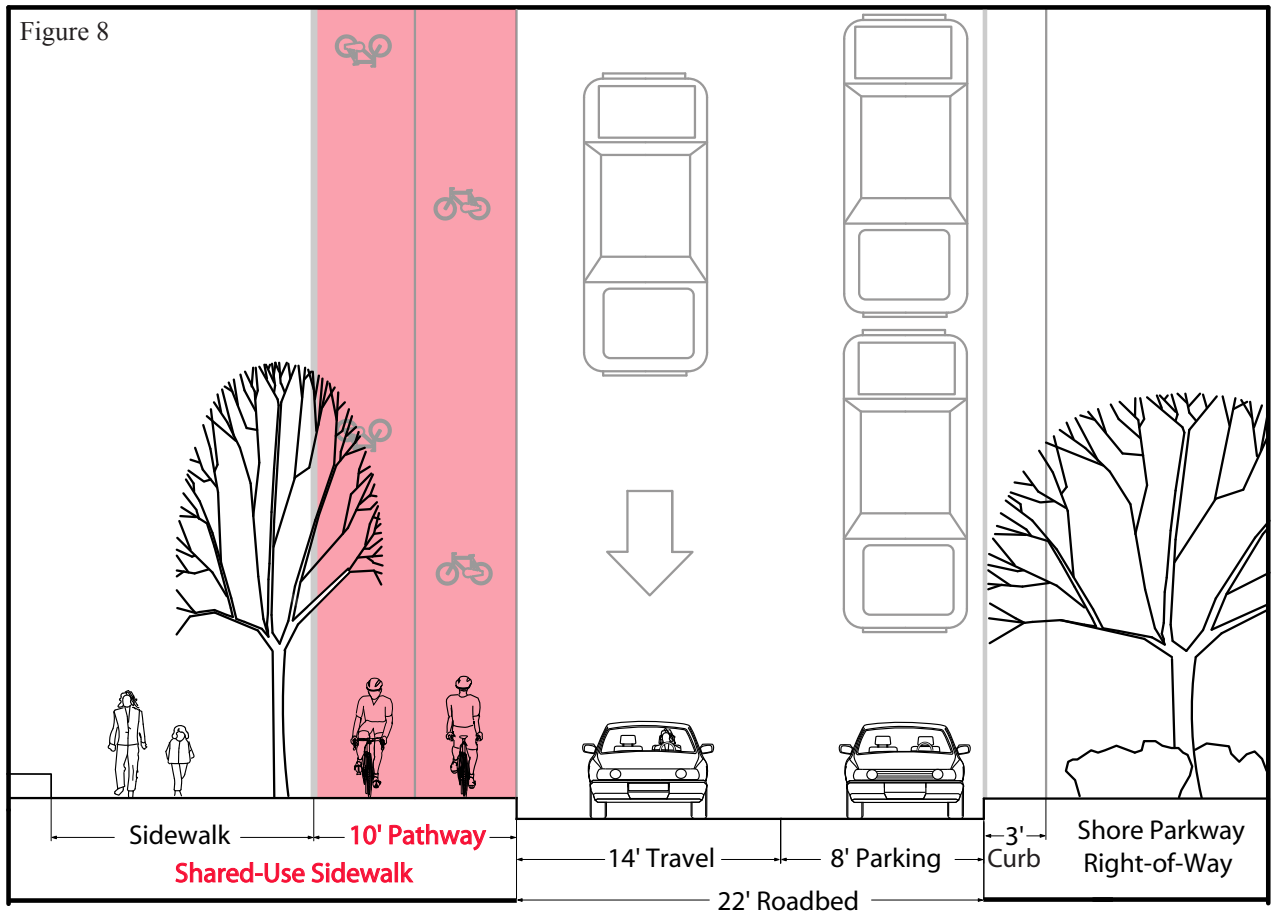
In Options 2 and 3, additional regulatory signage should be posted to minimize conflict between greenway users and drivers entering or exiting off-street parking lots, 25th Avenue, or Bay 41st Street. In all options signal timing changes are proposed at Bay Parkway and Shore Road South to improve traffic operations (See Appendix 2: Traffic Analysis). Improving bus stop facilities is also recommended in concert with any of the above options. The two B6 bus stops in front of the mall (375 feet apart) should be incorporated into one more centrally located bus stop equipped with an improved shelter and benches. A daily average of only 75 boardings and alightings used the second mall bus stop. It is also worthwhile to consider combining the other two bus stops into one improved stop especially considering that there were only 78 boardings and alightings at the Bayside Oil stop daily. While bus routes and bus stops do not prevent the creation of bicycle facilities, combining these two bus stops would make it a less complicated route for greenway users. Conflicts between bicyclists and waiting bus patrons should be minimized by highlighting conflict areas with signage, colored pavement, or other sidewalk treatments.

Link 1: Shore Road South from Bay Parkway to 26th Avenue

Option 3: Class 1 Shared-Use Sidewalk

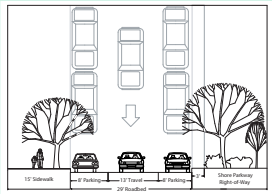
Bi-directional and Off-Street

Figure 8

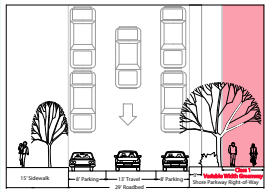


Option 3

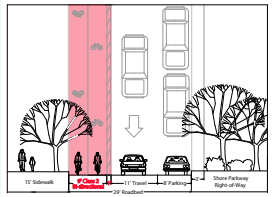
Recommendations



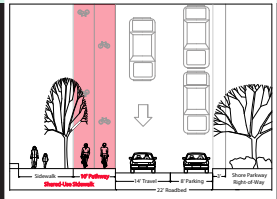
Existing Conditions



Option 1



Option 2

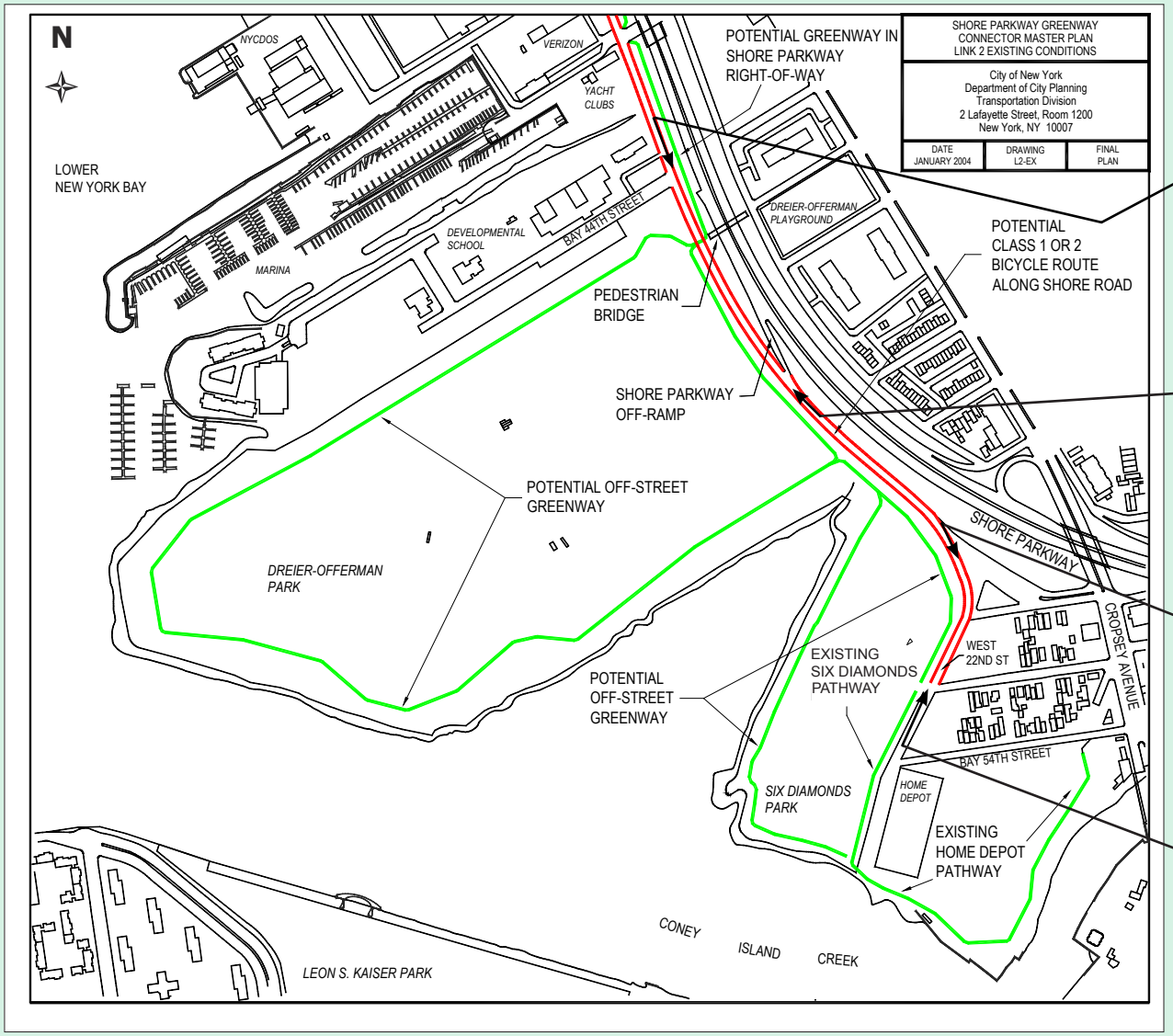


Option 3

Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Proposed Route

Map 6





Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Existing Conditions

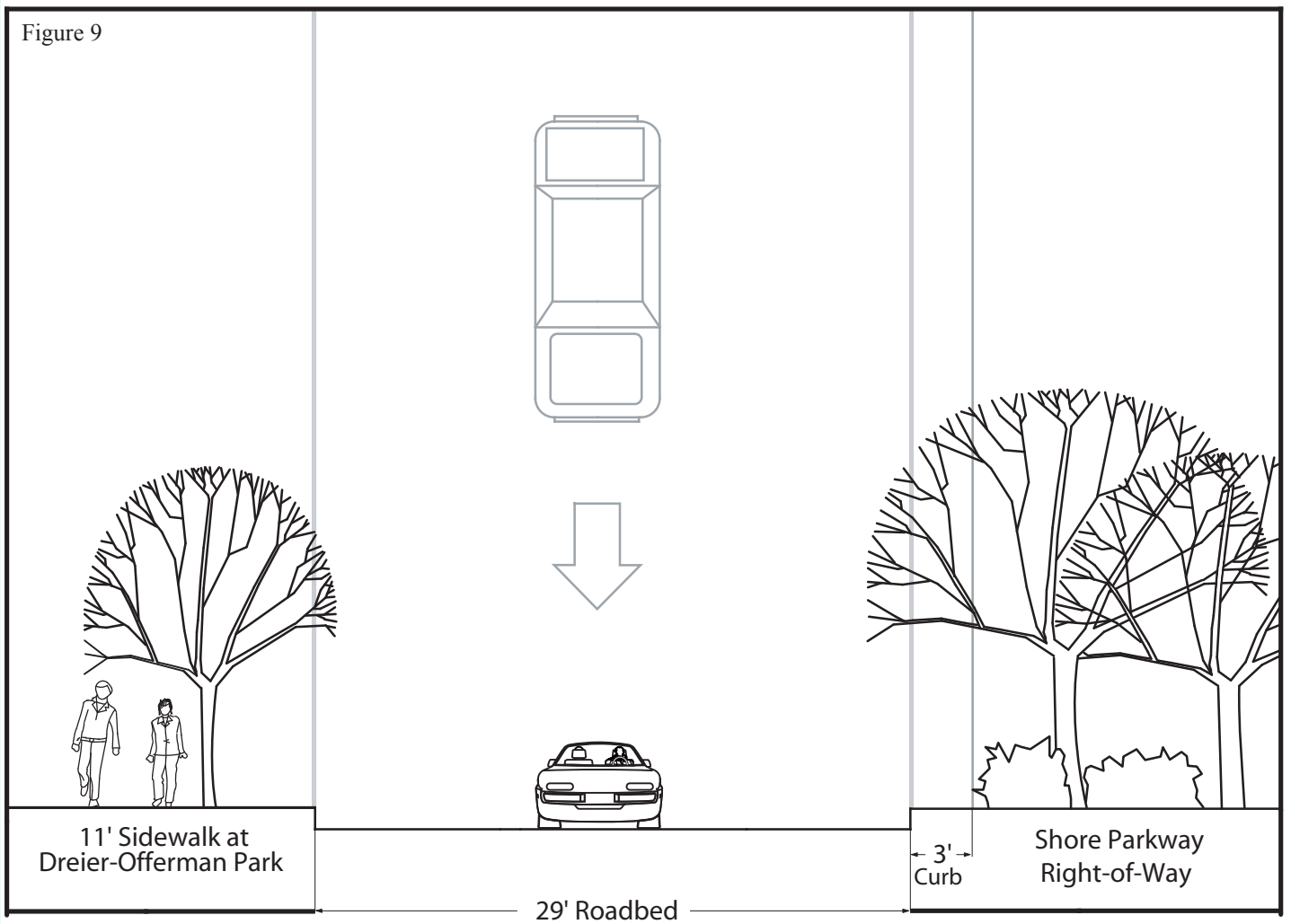
Shore Parkway continues inland along waterfront parcels until Cropsey Avenue [Map 6], where it skirts the Coney Island peninsula. Land uses in this link are predominantly waterfront open spaces to the west and large retailers to the east. On the south side of Shore Road South, east of 26th Avenue, are the Excelsior Yacht Club and Ben Ma Chree Yacht Club with a waterfront marina. The Brooklyn School for Special Children is located at the corner of Bay 44th Street; its parking lot fronts Shore Road South. Further south is Dreier-Offerman Park, bounded by Bay 44th Street, Shore Road South and Coney Island Creek. While the 70-acre waterfront park has baseball and soccer fields (and parking), the park is largely unprogrammed. Across an inlet from Dreier-Offerman Park is Six Diamonds Park, 36 acres of green space with baseball fields. Both parks are underutilized. The sidewalk in front of Dreier-Offerman Park is 11 feet wide with a minimum of five feet of paved sidewalk and sandwiched by grass, dirt and tree pits, and is under the jurisdiction of NYC Parks & Recreation. East of Six Diamonds Park are small homes and the recently-developed Home Depot, with nearly 150,000 square feet of retail space and over 500 parking spaces. Other big-box retail stores - a large Pathmark grocery store and a now-closed Topps Appliance - are also located between West 22nd Street and Cropsey Avenue.

Shore Road South remains 29 feet wide but functions as a single eastbound travel lane [Figure 9]. There are no posted parking regulations, no cars parked on either side of the street during the weekday or weekends, and no bus routes. At the first Technical Advisory Committee meeting for this project, participants reported that during special events at Dreier-Offerman Park, vehicles tend to park along the street. Vehicular traffic on Shore Road South decreases to 225 to 350 vph as vehicles turn onto 26th Avenue (from 300 to 500 vph in Link 1), then increases again to 800 to 1,000 vph as high-speed traffic exiting the parkway merges onto Shore Road South. East of the off-ramp, Shore Road South remains 29 feet wide but becomes two travel lanes as it nears West 22nd Street, which diverges southward from the service road along the eastern edge of Six Diamonds Park. West 22nd Street was redesigned to allow vehicles to enter the Home Depot from the parkway and service road (the main entry/exit is on Cropsey Avenue at Bay 54th Street). It carries light two-way traffic, is 44 feet wide, and has no posted parking regulations.

Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Existing Conditions

Figure 9



Existing Conditions

Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

— Available Right-of-Way
— 29-Foot Roadbed
— One Southbound Travel Lane
— No Parking
— Sidewalk on Southside Only
— Open Space and Green Space
  - Dreier-Offerman Park
  - Six Diamonds Park
  - Home Depot Pathway

Existing Conditions



Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Existing Conditions

On the north side of the Shore Parkway and Dreier-Offerman Park is Dreier-Offerman Playground (also known as Little Dreier-Offerman Park), a two-acre neighborhood park that was reconstructed in 2000. A pedestrian bridge crosses Shore Parkway southeast of Bay 44th Street, connecting Shore Road South and Shore Road North, and Dreier-Offerman Park and Dreier-Offerman Playground. The bridge is non-ADA compliant, and it does not span the parkway service roads, leaving people to cross Shore Road South or Shore Road North midblock without a stop sign or crosswalk.

Mitigation for the development of the Home Depot included the construction of two pathways around the site and a 36-foot wide easement with fencing and trees between Home Depot and Six Diamonds Park. The 14-foot wide Six Diamonds gravel and dirt pathway begins at Bay 53rd Street and West 22nd Street and runs west of the Home Depot for about 700 feet. The path connects to other dirt pathways in the park and to the 10-foot wide Home Depot pathway, which parallels the Coney Island Creek waterfront for approximately 1,400 feet. This path, also made of loose gravel, closes each day from dusk to dawn. Both pathways are gated and are often locked, even during official operating hours. Neither path is designated as a bicycle facility or a greenway.



The pedestrian bridge over the Shore Parkway to Dreier-Offerman Playground.



The Home Depot pathway and posted signage at the entrance.

Link 2: Shore Road South from 26th Avenue to Cropsey Avenue



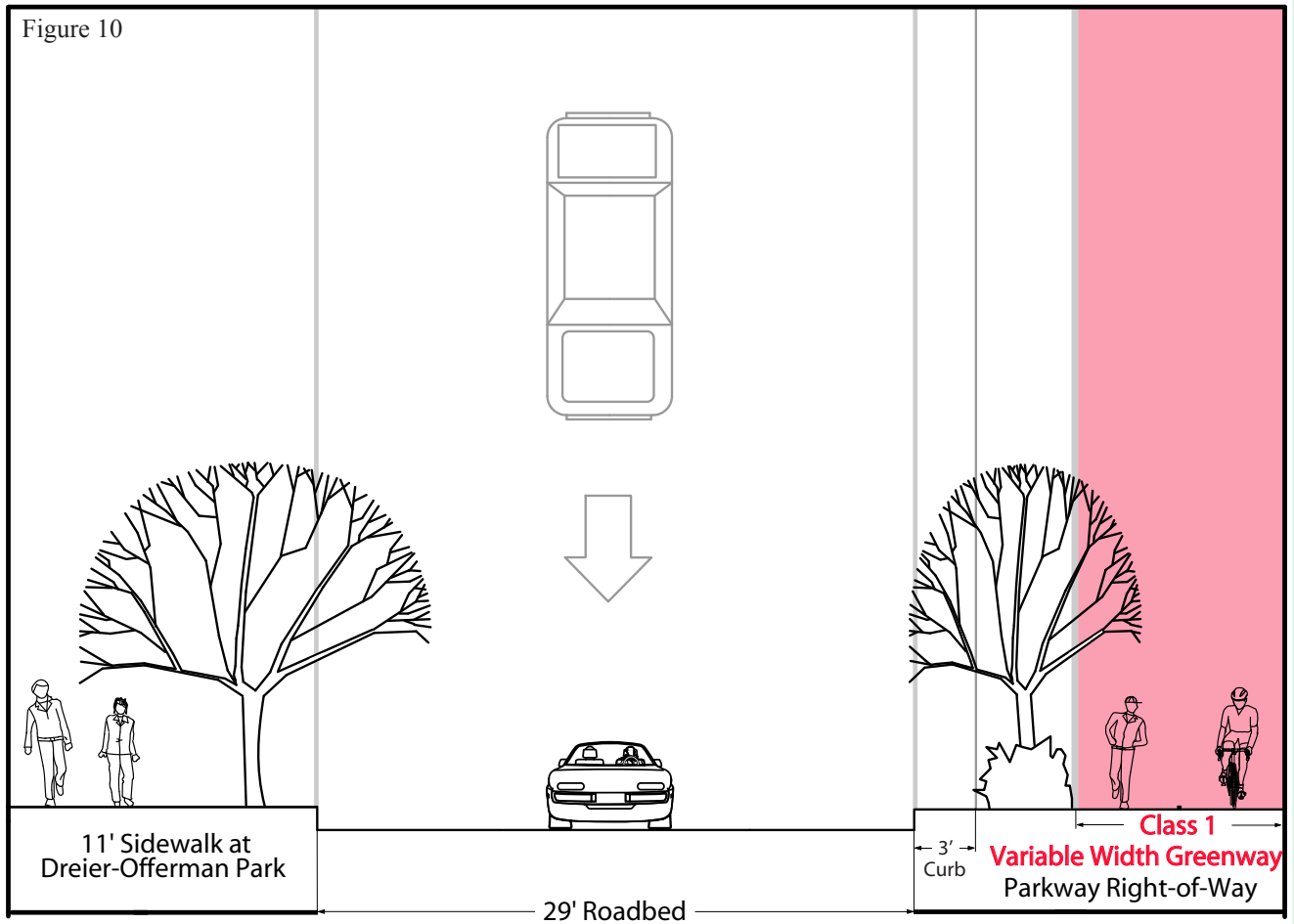
Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Recommendations

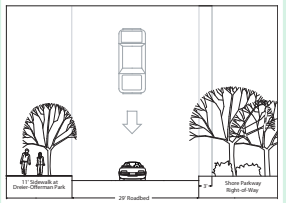
Option 1: Class 1 Off-Street Greenway

Within Shore Parkway Right-of-Way

Figure 10



Option 1



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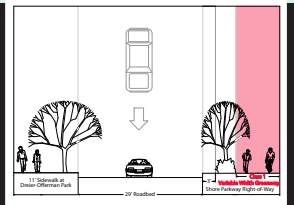
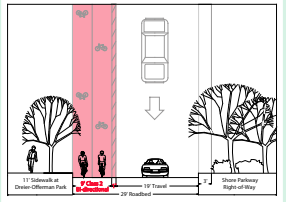
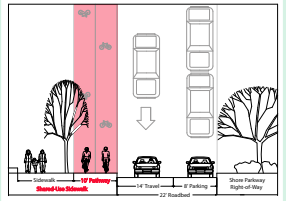


Option 1



Option 2



Option 3

Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Recommendations

There are three options proposed in this link.

Option 1: Build a Class 1 Off-Street Greenway in the Shore Parkway Right-of-Way

The preferred option [Figure 10] is to extend the 12-to-15 foot Class 1 greenway in the Shore Parkway right-of-way (as proposed in Link 1, Option 1) from 26th Avenue to the pedestrian bridge that spans the Shore Parkway and connects Dreier-Offerman Playground and Dreier-Offerman Park. Greenway users would use a newly-marked bicycle and pedestrian crosswalk to cross 26th Avenue at an existing stop-controlled intersection. The pedestrian bridge should be redesigned to provide universal access (ADA compliant), permitting wheeled users to cross the bridge, as well as being extended so that it spans Shore Road South and Shore Road North, landing directly adjacent to or in Dreier-Offerman Park and Dreier-Offerman Playground. Connecting the future greenway to the existing waterfront in Six Diamonds Park and Dreier-Offerman Park is crucial. The NYCDOT has jurisdiction of the right-of-way and of the pedestrian bridge and are planning to rehabilitate the bridge and make it ADA compliant in the near future. This action would provide greenway users a safe connection between the proposed on- and off-street paths and would alleviate the need for local residents using the bridge to cross against moving traffic at an uncontrolled mid-block location.

The off-street greenway could continue east to Cropsey Avenue if means to safely cross the parkway off-ramp were implemented. As stated earlier, there is a precedent for this option where the Pelham Greenway crosses a Pelham Parkway exit. Vehicles exiting the parkway onto Shore Road South could be controlled by a stop sign, thereby permitting the installation of a crosswalk for greenway users. The redesigned crossing might include physical barriers, stop signs, and other regulatory signs and markings to control the movements of path users. Controlling exiting parkway traffic could cause unacceptable spill backs and congestion, although a traffic control device actuated by greenway users would minimize impacts on traffic flow. However, NYCDOT does not support a greenway that crosses a parkway ramp.

Another option is to build a pedestrian and bicycle bridge over the parkway exit ramp. This would eliminate any conflict between vehicles and pedestrians and cyclists. As stated earlier, ADA-mandated design standards would require lengthy approaches to the bridge, making this a costly variable to this option. A further drawback is that, in either case, motorists would be required to stop again for greenway users crossing from the north to the south side of the service road.

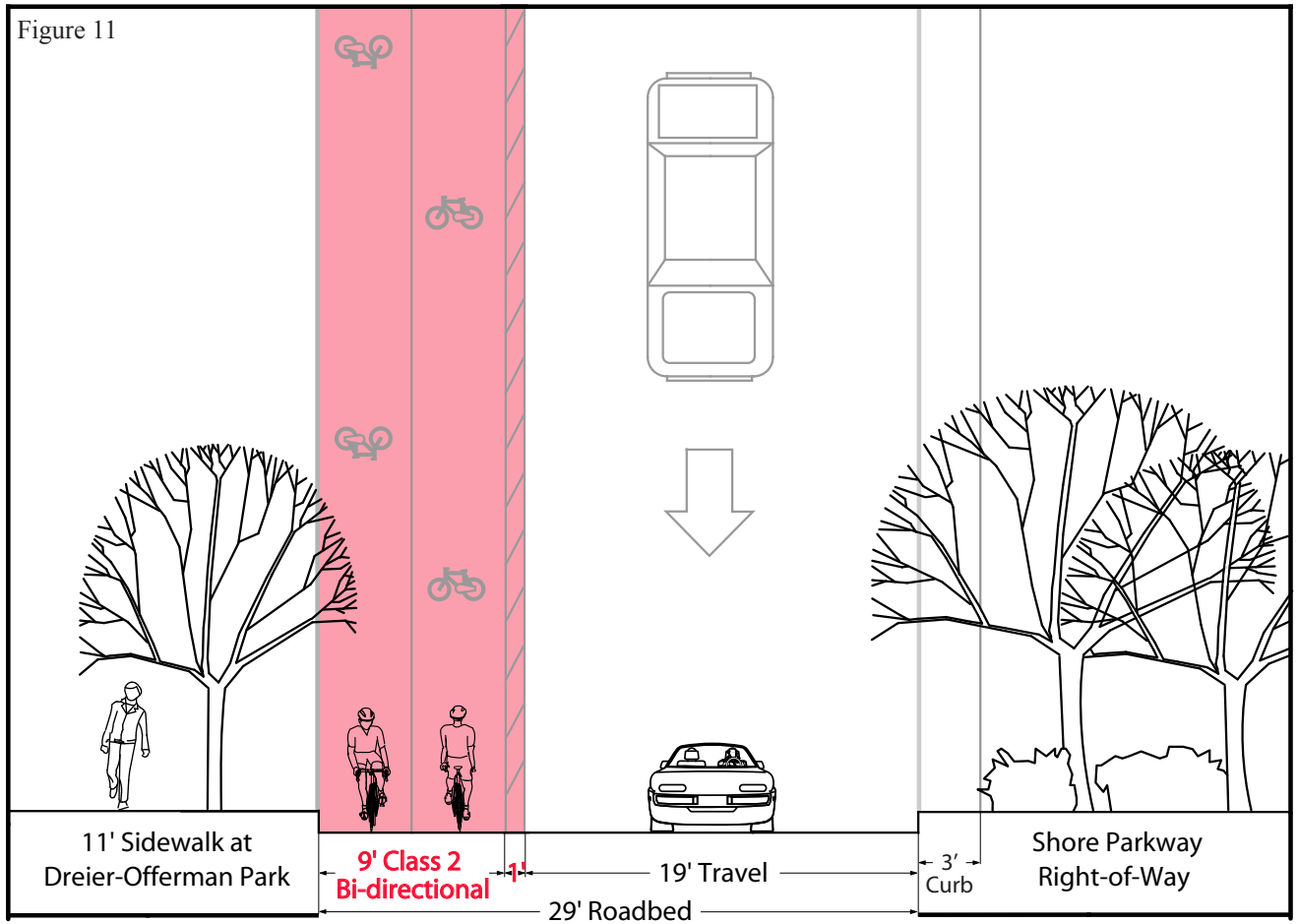
Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Recommendations

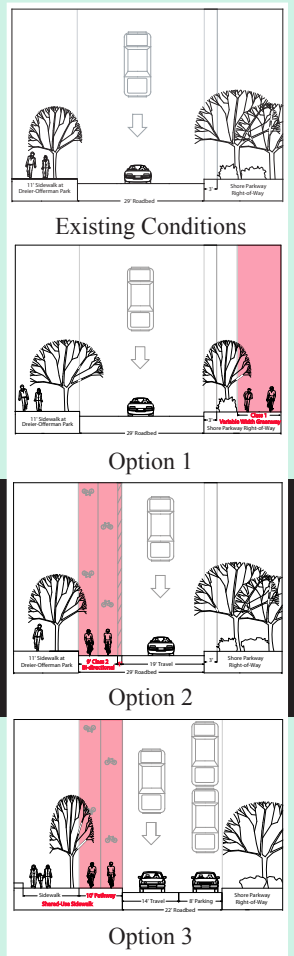
Option 2: Class 2 On-Street Greenway

Bi-directional with Buffer/Barrier within Existing Roadbed

Figure 11



Option 2



Existing Conditions

Option 1

Option 2

Option 3

Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

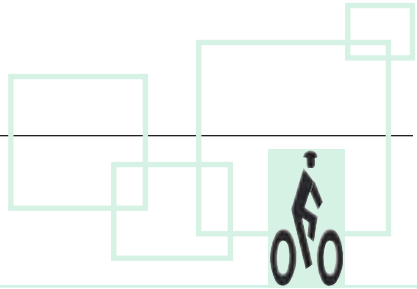
Recommendations

Option 2: Stripe Class 2 On-Street Bi-Directional Bicycle Lane with Buffer/Barrier

This option [Figure 11] proposes an on-street, bi-directional Class 2 lane that is nine feet wide with a one-foot barrier (as in Option 2, Link 1), leaving a 19-foot roadbed. Unlike Link 1, parking would not have to be removed since there are no vehicles parked on Shore Road South in this link. The pathway would parallel Dreier-Offerman Park and Six Diamonds Park along the south curb of Shore Road South and then continue south on West 22nd Street to the Home Depot Pathway and/or Bay 54th Street. The pathway should be raised, graded, or made of a tinted pavement (typically a brick color) in order for it to be discernible and delineated from the regular roadway.

The on-street bi-directional bicycle lane proposed in this option would continue the same facility proposed in Option 2 in the previous link. It would connect with the off-street path (Option 1, Link 1) at 26th Avenue, where pathway users would cross Shore Road South at an existing stop-controlled intersection marked by a crosswalk. As in Link 1, Option 2a, additional space may be taken from the Shore Parkway right-of-way to widen the roadway and/or pathway.

However, there are issues with this option: DSNY needs at least 10-feet of right-of-way to sweep the streets or remove snow and the Federal Highway Administration (FHA) does not recommend bi-directional pathways on one-way streets. This option is achievable in conjunction with a roadway widening and a sufficient barrier between the bicyclists and vehicles. While the FHA does not recommend bi-directional pathways on one-way streets, there are numerous example of this configuration throughout the nation and the world. There is also a precedent in the city where the NYCDOT implemented a reverse flow bicycle lane on the one-way northbound FDR service road in Manhattan from the Water Club restaurant to East 24th Street.



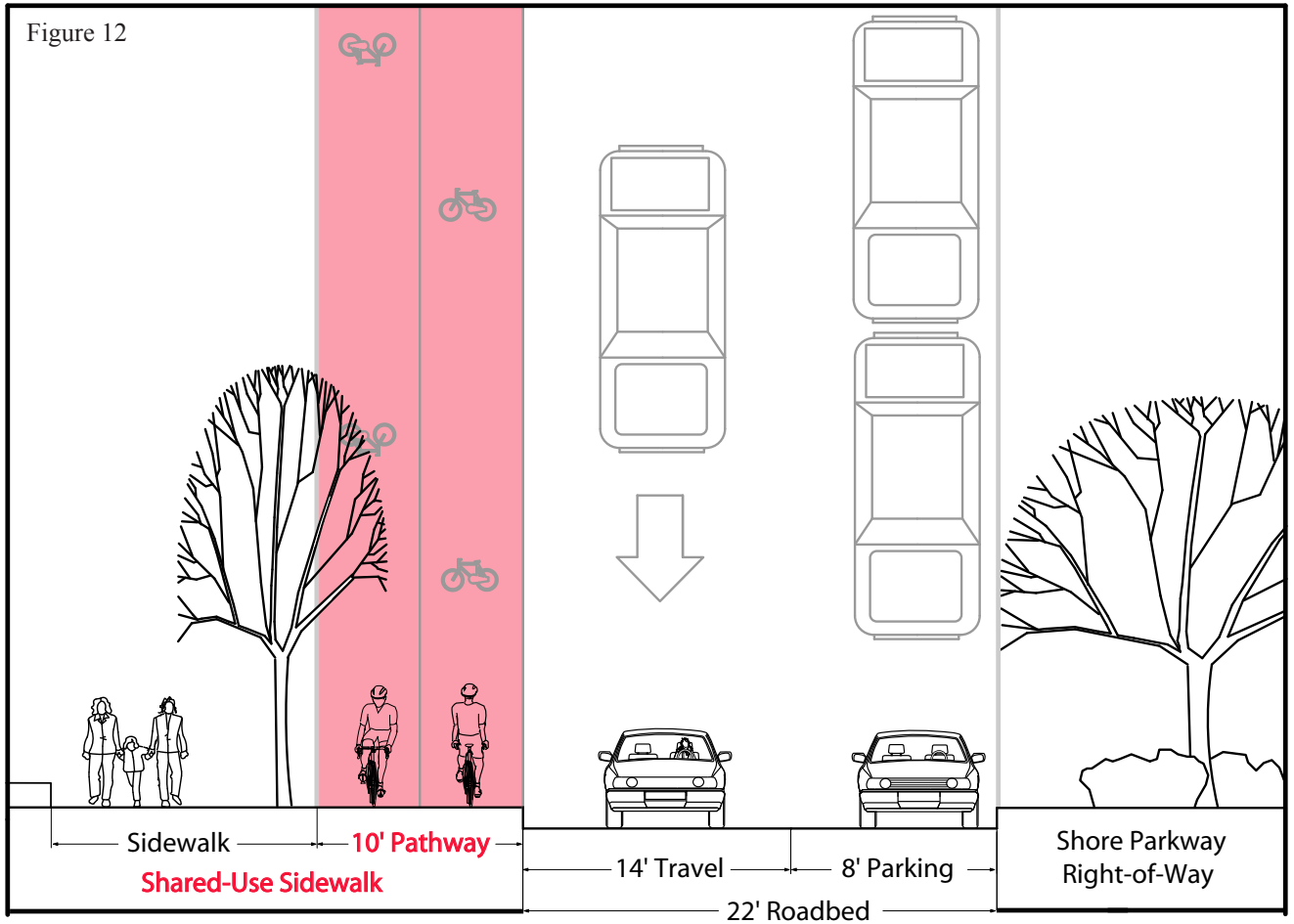
Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Recommendations

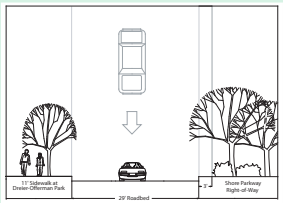
Option 3: Class 1 Shared-Use Sidewalk

Bi-Directional and Off-Street

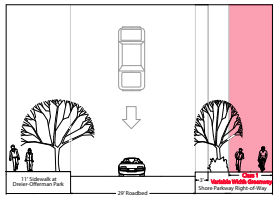
Figure 12



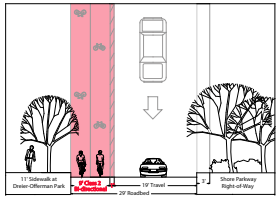
Option 3



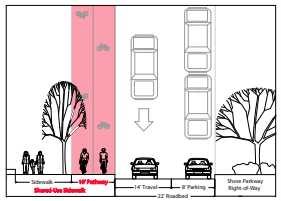
Existing Conditions



Option 1



Option 2



Option 3

Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Recommendations

Option 3: Build a Class 1 Shared-Use Sidewalk (Combined South Sidewalk & Bi-Directional Bicycle Lane)

As in Link 1 Option 3, this option [Figure 12] proposes to redesign the south sidewalk as a shared-use sidewalk, whereby pedestrians and bicyclists would be separated from the street and moving traffic by a raised curb. AASHTO guidelines state that shared-use pathways should be a minimum of 10 feet. The sidewalk in front of Dreier-Offerman is 11 feet wide with a minimum of five feet of asphalt and six feet of grass, dirt and tree pits. The unpaved areas would have to be redesigned and paved as part of the shared-use sidewalk. Appendix 1 has a detailed discussion of the shared-use sidewalk in Links 1 and 2.

Excess roadbed could also be added to provide a wider pathway and more design features and amenities. By adding five to seven feet of roadbed to the shared-use pathway, it can be reconfigured to create an eight-foot pedestrian path separated from a ten-foot wide bi-directional bicycle path paved in colored asphalt and appropriately striped. The single travel lane along Shore Road South would be reduced to 22 or 24 feet. Redesigning the roadway and adding additional width from the Shore Parkway right-of-way can also be used to design a more spacious facility while maintaining the existing street geometry.

This option does not require the elimination of any on-street parking. NYC Parks & Recreation has jurisdiction over the sidewalk fronting the park and have shown a willingness to the concept of a shared-use sidewalk where appropriate. The MTA has expressed its preference for the shared-use sidewalk in Links 1 and 2 because bus movements would not be affected. In Options 2 and 3, additional regulatory signage should be posted to minimize conflict between greenway users and drivers entering or exiting off-street parking lots.

The Bi-Directional Bike Lane along Shore Road South (Option 2 in Links 1 and 2) and the Shared-Use Sidewalk (Option 3 in Links 1 and 2) have an advantage over the Greenway in the Shore Parkway right-of-way (Option 1 in Links 1 and 2) in that they are more direct routes with no parkway ramp crossings.

Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

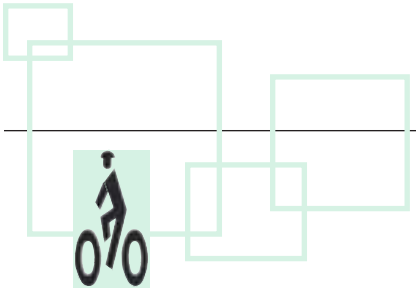
Recommendations

Additional Improvements

The dirt and gravel pathways in Dreier-Offerman Park, Six Diamonds Park and Home Depot should be paved, signed, and officially designated as Class 1 greenways. These pathways could be either dual carriageway, shared-use facilities or a combination of both.

The Home Depot Pathway, while small and inadequately designed, could be improved and widened from 10 feet to a minimum of 12 feet and should have the same operating hours as Dreier-Offerman Park. If Home Depot is unwilling to improve the pathway and have it officially designated as a greenway, Bay 54th Street should be designated as a Class 3 bicycle route to link Six Diamonds Pathway to Cropsey Avenue. Bay 54th Street is a signalized intersection and connects to Cropsey Avenue Bridge and the sidewalks on both sides of the bridge (see Link 3).

The existing (and proposed) pathways inside Dreier-Offerman Park and Six Diamonds Park should be paved, signed, and designated as Class 1 greenways, consistent with Parks Department policies. Dreier-Offerman Park has some unconnected paved portions of a pathway (see photo on page 41) that need to be expanded to Shore Road South. Environmental concerns raised by the paving of asphalt paths and runoff in the parks could be addressed by building the pathways with a porous material that allows rain and snow to permeate its surface and therefore reduce runoff. However, pathways made of porous materials require more maintenance.



Link 2: Shore Road South from 26th Avenue to Cropsey Avenue

Recommendations

Additional Improvements

Designation of Greenway Facilities



Dreier-Offerman Park



Six Diamonds Park

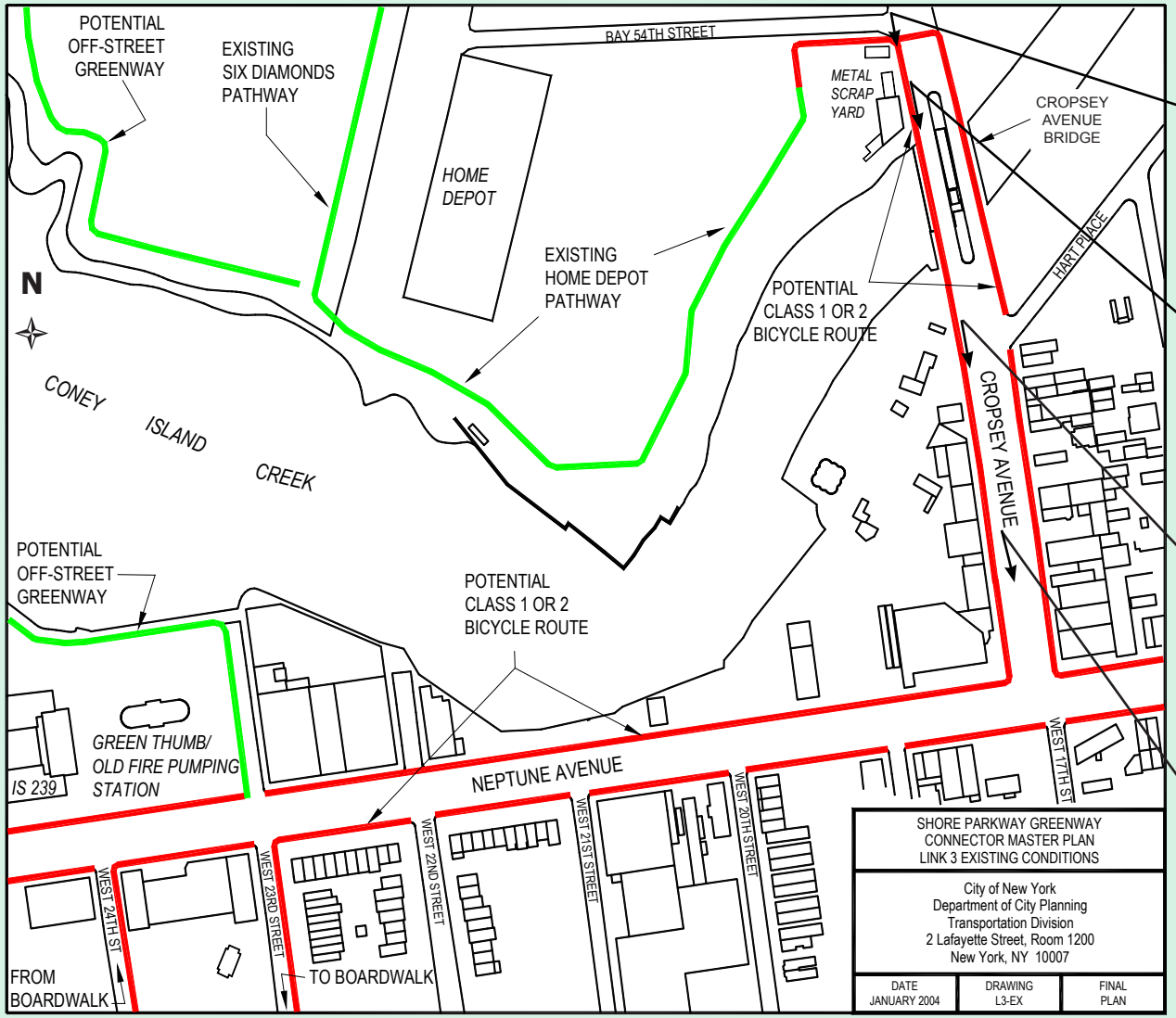


Home Depot Pathway

Link 3: Cropsey Avenue from the Home Depot to Neptune Avenue

Proposed Route

Map 7





Link 3: Cropsey Avenue from the Home Depot to Neptune Avenue

Existing Conditions

Link 3 is the shortest study section, but also one of the most difficult to plan. The project initially examined the feasibility of locating the greenway within the Shore Parkway right-of-way as it continues inland east of Cropsey Avenue; though this is not a waterfront route, it would be direct, continuous, and consistent with the design of the existing greenway. However, the lack of available space, the multiple on- and off-ramps and bridges, and the elevated section of the parkway traversing industries and transit storage yards make such a route infeasible.

Instead, the route returns to the street network from the parkland in Link 2 and traverses the Coney Island Creek [Map 7]. Cropsey Avenue, the Cropsey Avenue Bridge, and West 17th Street form one of only two vehicular routes (the other being Stillwell Avenue) into the Coney Island peninsula from the west. Ramps to and from the Shore Parkway connect directly with Cropsey Avenue, creating significant traffic congestion, which is further exacerbated by traffic generated by big-box retail stores north of Coney Island Creek, by automotive garages south of the bridge, and further south by the attractions on the Coney Island Boardwalk along the Atlantic Ocean waterfront (see Link 4).

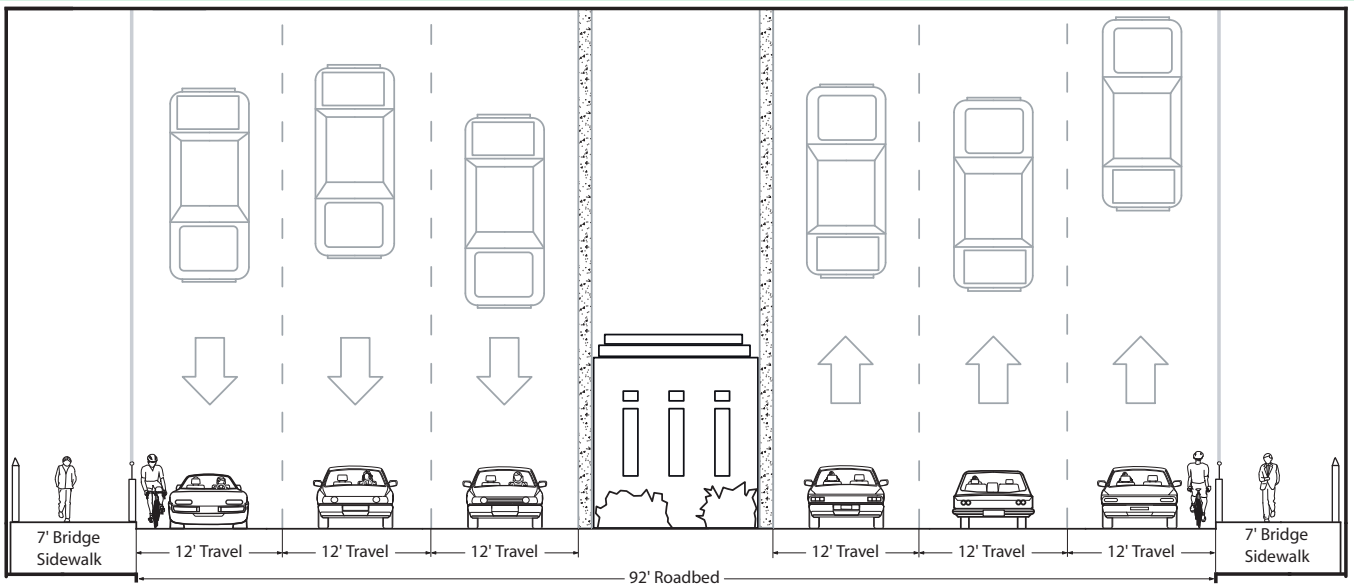
The Home Depot pathway terminates approximately 20 feet from Bay 54th Street on a 10-foot sidewalk about 100 feet west of Cropsey Avenue, where a three-phase traffic signal controls the main entrance to the store. The Cropsey Avenue Bridge, spanning the Coney Island Creek, has three 12-foot travel lanes and a narrow seven-foot sidewalk in each direction [Figure 13]. The bridge carries over 2,000 vehicles in the peak hours. While Cropsey Avenue and the bridge are signed Class 3 bike routes, the heavy traffic and concentration of auto repair shops south of the creek makes this link of the greenway tenuous, with cars illegally parked on the sidewalk, illegally or double-parked on the street, or entering/exiting the garages lining the street. Once over the bridge, Cropsey Avenue intersects Neptune Avenue, the major east-west street traversing Coney Island. The intersection operates poorly, particularly southbound left turns. Cropsey Avenue turns into West 17th Street.

Stillwell Avenue was considered and rejected as an alternative route to Cropsey Avenue. Fieldwork indicated that while Stillwell Avenue carries fewer vehicles than Cropsey Avenue, it has many of the same problems as Cropsey Avenue such as industrial uses, truck traffic, auto repair and service shops, and illegally parked vehicles. Additionally, there is not enough roadbed on Stillwell Avenue or Harway Avenue for a Class 1 or 2 facility without eliminating a travel or parking lane. This route would also lead bicyclists and greenway users inland and away from the waterfront and from Dreier-Offerman Park and Six Diamonds Park.

Link 3: Cropsey Avenue from the Home Depot to Neptune Avenue

Existing Conditions

Cropsey Avenue Bridge



Existing Conditions

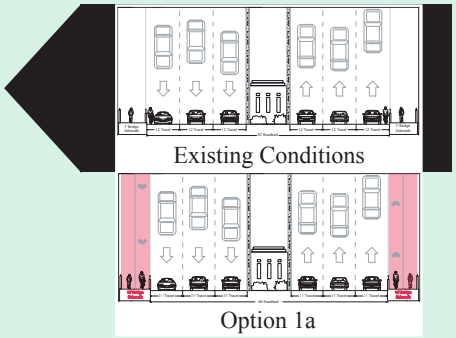


Figure 13

Link 3: Cropsey Avenue from the Home Depot to Neptune Avenue

— Cropsey Avenue Bridge
  - Traffic Congestion
  - No Roadway Available for Bicycles

— Variable Parking Conditions
  - Illegal Parking

— Industrial and Commercial
  - Auto Repair Agglomeration

Existing Conditions



Link 3: Cropsey Avenue from the Home Depot to Neptune Avenue

Recommendations

Two recommendations, one short-term and one long-term, are proposed. In either case, the sidewalk from the Home Depot path to Cropsey Avenue should be widened, striped and designated as a Class 1 shared-use facility. Bay 54th Street should be signed as a short Class 3 link from West 22nd Street and Six Diamonds Park to Cropsey Avenue. Pathway users would cross at the existing signalized intersection at Bay 54th Street to travel over the Cropsey Avenue Bridge.

Option 1: Upgrade the Class 3 Bike Route to a Shared Lane Facility with Markings, Signage & Traffic Calming

There are few options available to improve the Class 3 signed bike route on this link. An on-street striped bike lane is infeasible: given traffic congestion in the area, it is not possible to remove a travel or parking lane for non-motorized use. However, each of the six travel lanes on the bridge could be reduced from 12 feet to 11 feet and the additional three feet in each direction could be used to create a Shared Lane Facility along the curb with pavement markings and signage [not shown]. A Shared Lane Facility is used when there is not enough space to create a Class 1 or 2 facility. The NYCDOT has already successfully tested the shared lane bicycle route marking on University Avenue in the Bronx. A shared lane facility will increase motorist awareness of bicyclists.

Option 1a: Improve the Bridge Pathway and Route with Markings, Signage & Traffic Calming

Three feet could be added to each of the bridge sidewalks using the same approach as above, thereby creating a 10-foot shared-use pathway which will enable bicyclists to ride over the bridge off-street [Figure 14]. "Bikes Yield to Pedestrians" and other warning signs should be posted on both sides of the pathway to warn of possible conflict between greenway users.

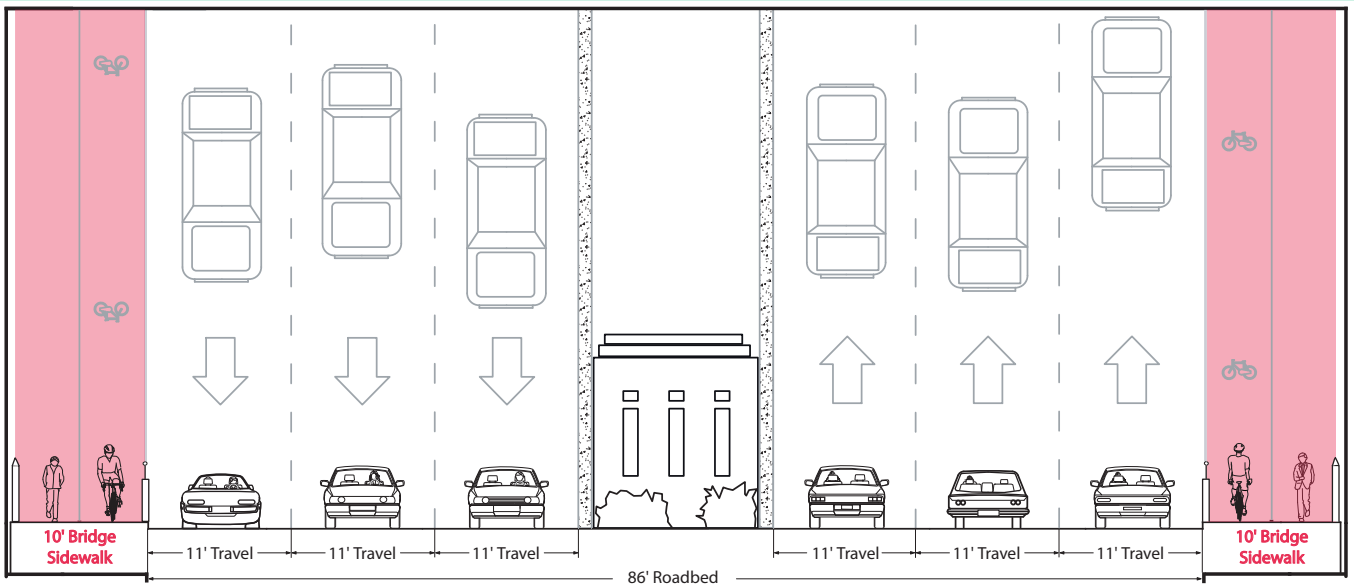
In both Option 1 and Option 1a, traffic calming measures, such as curbside bollards or metal railings, could be installed in an attempt to make the sidewalks passable for pedestrians and alleviate some congestion by minimizing illegal parking and thereby improving safety for bicyclists and pedestrians. However, the local auto repair shops are unlikely to change their operating practices, so physical improvements, even supported by enforcement, may not greatly improve the on-street route.

Once over the bridge in Coney Island, greenway users would employ the existing crosswalks at Neptune Avenue, a signalized but busy intersection, to continue east or west. Bicyclists would then have to negotiate entering back onto Cropsey Avenue through appropriate signage and markings. Signal timing changes are proposed at the intersection of Neptune and Cropsey avenues to improve traffic operations (See Appendix 2: Traffic Analysis).

Link 3: Cropsey Avenue from the Home Depot to Neptune Avenue

Recommendations

Option 1a: Class 1 Shared-Use Sidewalk



Option 1a

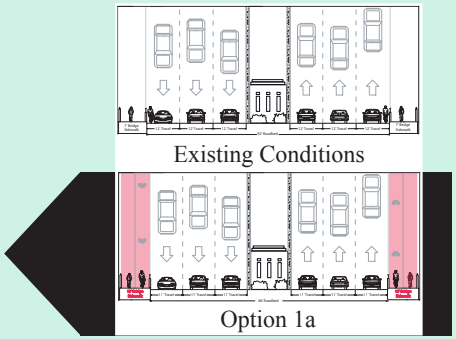


Figure 14

Link 3: Cropsey Avenue from the Home Depot to Neptune Avenue

Recommendations

Option 2: Build a New Pedestrian-Bicycle Bridge over Coney Island Creek

This option proposes to construct a prefabricated bridge for non-motorized users over the Coney Island Creek [Figure 15]. This long-term improvement would circumvent Cropsey Avenue and West 17th Street, eliminating all conflict between pathway users, park users, and motorized vehicles. This action would link the existing waterfront parks and paths on either side of the water. Dreier-Offerman Park, Six Diamonds Park and the Home Depot path would be directly connected with Leon S. Kaiser Park.

The National Oceanic Atmospheric Administration (NOAA) navigation maps, which show water depth and navigation channels, indicate that the Coney Island Creek is only 10 feet deep. The creek is not navigable by commercial craft, given the eight-foot vertical clearance of the Cropsey Avenue Bridge and the numerous derelict wooden boats and barges in the creek. Therefore, the approach ramps and grade for the bridge would not be unusually long or high. The bridge must be ADA complaint.

This new pedestrian and bicycle bridge could span the creek at a number of places. The shortest span for such a bridge - approximately 130 feet - is from the Home Depot path to the old wooden pier at West 21st Street in Coney Island. As stated earlier, the Home Depot path is only open during certain hours. A bridge landing in city-owned parklands would ensure public control of the infrastructure and its operating hours under the jurisdiction of the Department of Parks & Recreation, but would increase the length and the cost of the bridge.

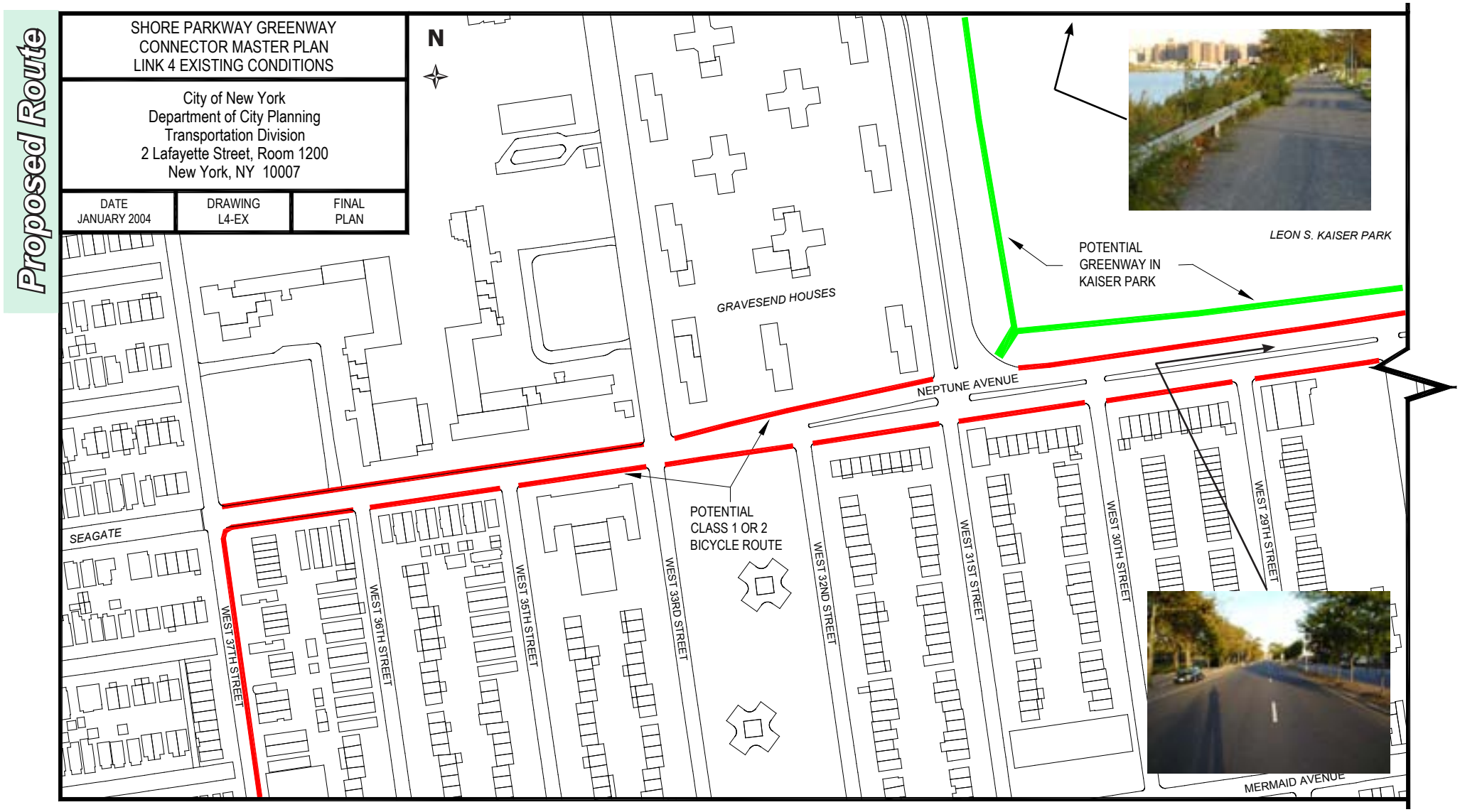
The most cost-effective bridge would be a modular or prefabricated, clear span bridge. The clear span eliminates the need for costly pier construction in the water and minimizes any adverse environmental impact. Prefabricated pedestrian bridges are manufactured by a number of firms and in a number of styles, materials, finishes and treatments. Bridge designs include the bow truss, modified bow truss, pratt truss, x-brace truss, and cable-stayed structures. The standard design for the bow truss, in the shape of a parabolic curve, is 120 foot clear span. The modified bow truss is a long span bridge up to 250 feet. The cable-stayed bridge is an economical approach to a long clear span of from 180 to 400 feet. Bridge structures may be made of steel, aluminum, or timber, and decks may be of wood or concrete. Treatments for steel bridges include galvanizing, weathering, and painting. The design and construction of any necessary bridge abutments and the erection of the bridge would be the responsibility of the City.

Link 3: Cropsey Avenue from the Home Depot to Cropsey Avenue



Figure 15

Link 4: Neptune Avenue – W17th Street to W37th Street



Link 4: Neptune Avenue – W17th Street to W37th Street



Proposed Route

Map 8

Link 4: Neptune Avenue – W17th Street to W37th Street

Existing Conditions

Land uses in this link west of the Cropsey Avenue Bridge are a mix of manufacturing, residential uses, and open space along Coney Island Creek, and residential uses south and west of Neptune Avenue [Map 8]. Auto-oriented businesses are located north of Neptune Avenue from West 17th Street to West 23rd Street. Next to the Mark Twain Intermediate School 239 on Neptune Avenue, between West 23rd and West 24th Streets, is a city-owned Green Thumb garden under the jurisdiction of Parks & Recreation. Within the garden is the former Coney Island Fire Service Pumping Station, designed by Irwin S. Chanin in the Art Moderne style. Listed on the National Register of Historic Places, this vacant but beautiful bunker retains some of its past glory despite the decay and graffiti. Leon S. Kaiser Park is next to I.S. 239 and extends from behind the school around West 24th/West 25th Street to West 31st Street and from Neptune Avenue to the waterfront. Kaiser Park is 26 acres with pathways, tennis courts, handball courts, basketball courts, a pier, open fields and a small beach and fishing area.

High-rise public houses - Coney Island Houses, Gravesend Houses, Surfside Gardens, Carey Gardens, Bernard Haber Houses - and housing for the elderly are concentrated south of Neptune Avenue and north of Neptune Avenue between West 31st Street and West 37th Street. There are a significant number of one- and two-family homes. The gated and private Sea Gate residential community occupies the rest of the peninsula west of West 37th Street. Further south of Neptune Avenue is the world-famous Coney Island Beach and 2.6-mile Riegelmann boardwalk along the Atlantic Ocean waterfront.

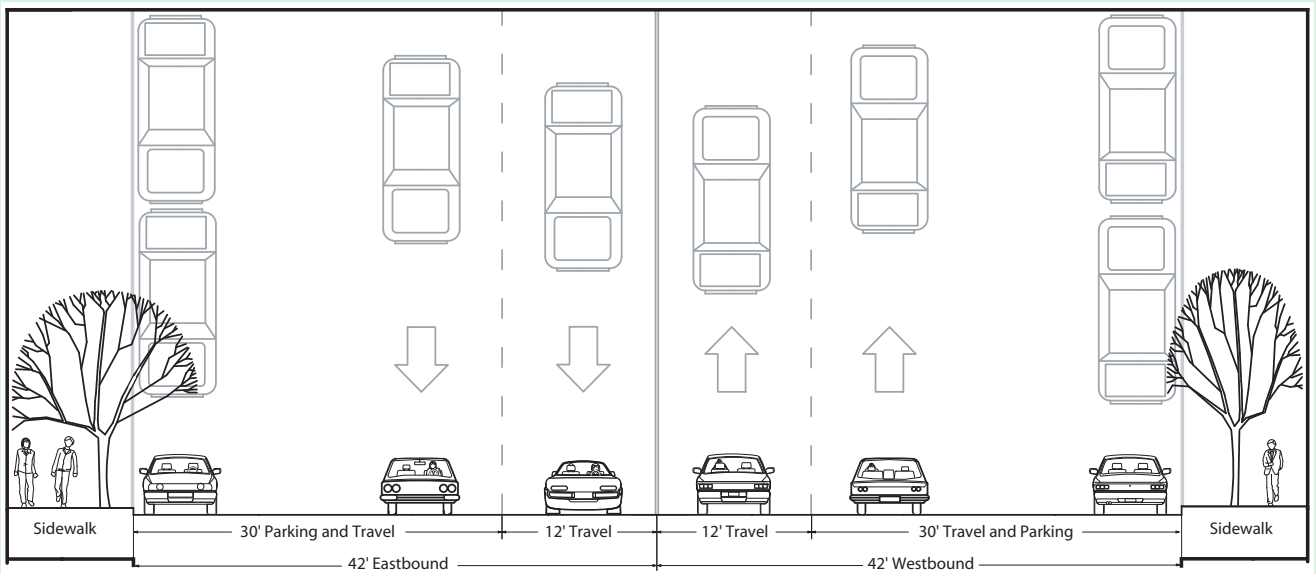
Neptune Avenue from West 17th Street to West 31st Street is at least 80 feet, and, in some cases, up to 90 feet wide, with a raised or painted center median separating two travel lanes and one parallel parking lane in each direction [Figure 16 and Figure 17]. Neptune Avenue narrows from West 31st Street to West 33rd Street; at West 33rd Street the roadbed is 44 feet wide [Figure 18]; at West 37th Street the street continues as a private roadway. Traffic west of West 17th Street/Cropsey Bridge is significantly lighter than to the north or east. One-way north-south residential streets link Neptune Avenue, Surf Avenue, and the Coney Island Boardwalk. These streets, some of which end short of the waterfront or are blocked by modern high-rise buildings, are approximately 30-34 feet wide with a single travel lane and two lanes of parallel parking. There is little mass transit in this link with no subway stops and no bus service along Neptune Avenue. School buses shuttle students to and from I.S. 239.

Link 4: Neptune Avenue – W17th Street to W37th Street

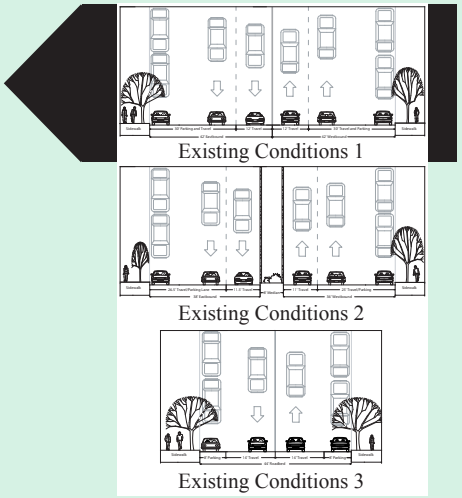
Existing Conditions

Existing Conditions 1

West 17th Street to West 25th Street - No Median



Existing Conditions 1



Existing Conditions 1

Existing Conditions 2

Existing Conditions 3

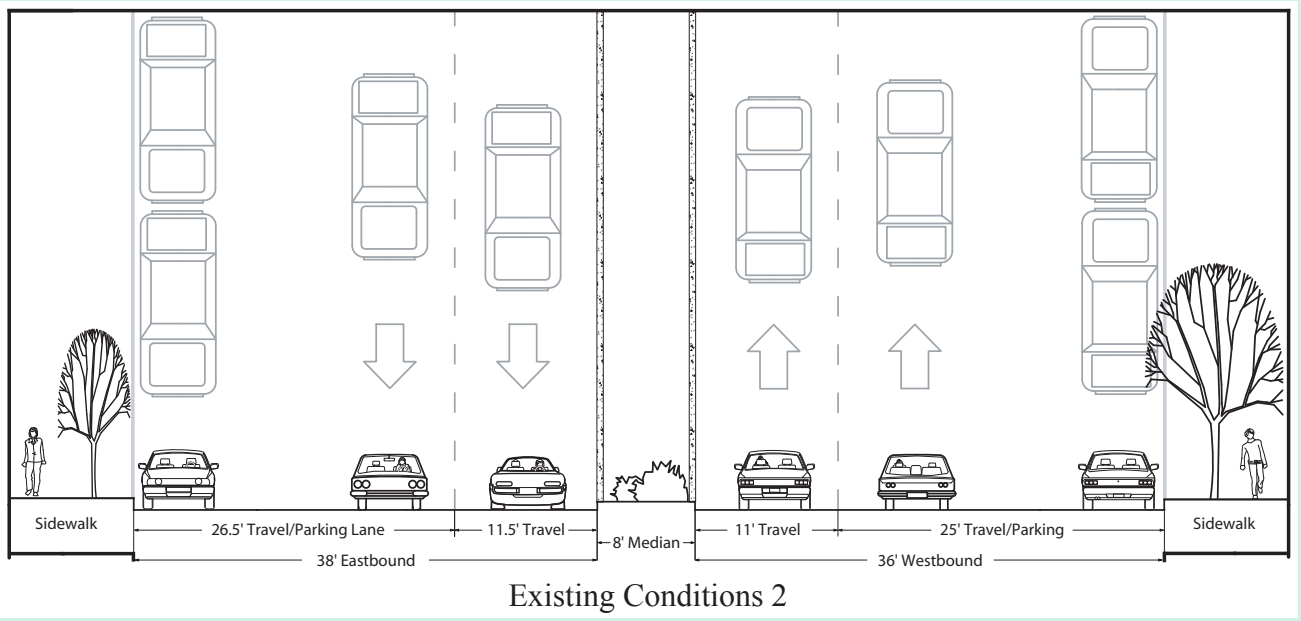
Figure 16

Link 4: Neptune Avenue – W17th Street to W37th Street

Existing Conditions

Existing Conditions 2

West 25th Street to West 31st Street - Median



Existing Conditions 2

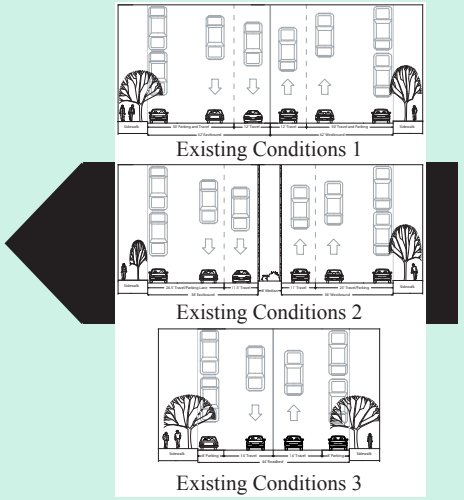


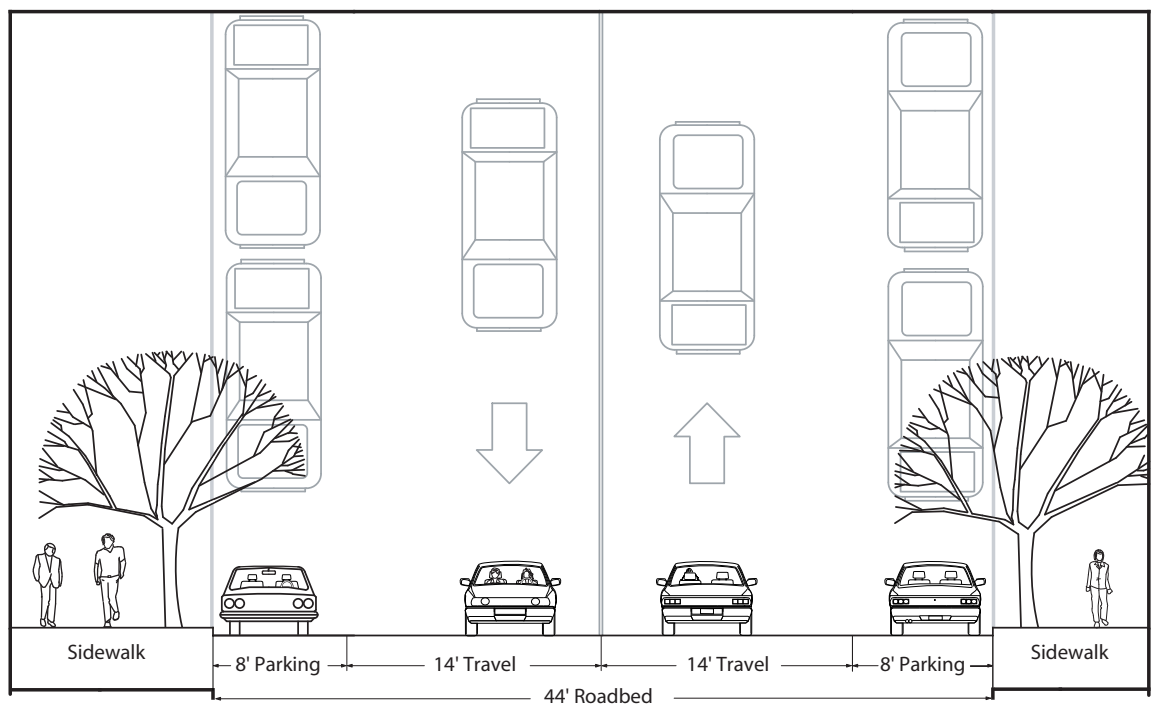
Figure 17

Link 4: Neptune Avenue – W17th Street to W37th Street

Existing Conditions

Existing Conditions 3

West 33rd Street to West 37th Street - No Median



Existing Conditions 3

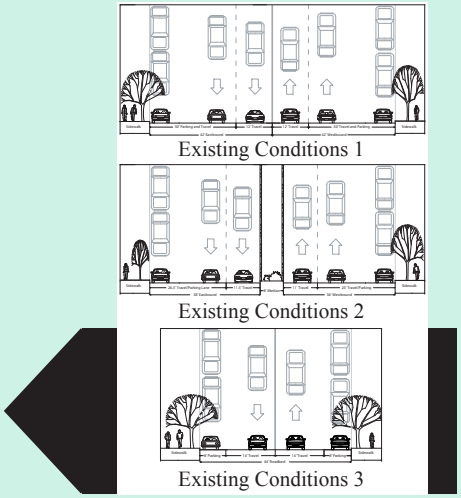


Figure 18

Link 4: Neptune Avenue – W17th Street to W37th Street

Existing Conditions



— 80+ foot Roadbed
  • West 17th Street to West 31st Street
— 44-foot Roadbed
  • West 33rd Street to West 37th Street
— On-Street Parking
— Mixed Density Residential

Link 4: Neptune Avenue – W17th Street to W37th Street

Future Conditions

The New York City Department of Parks & Recreation recently received $1 million in multi-model funds from New York State Assemblywoman Adele Cohen (46th District) as well as an additional $175,000 to build a new waterfront greenway with related amenities along the Coney Island Boardwalk. These funds will be used to implement the first phase of a new pathway for bicyclists, in-line skaters, people using wheelchairs, etc., that is parallel to the existing boardwalk, to install historic boardwalk lights and provide decorative enhancements. This new greenway will help minimize conflicts between pedestrians and wheeled users on the boardwalk by providing a dedicated facility for use at all times for wheeled users (previously bicyclists could only ride on the boardwalk from 5am to 10am each day). Several smaller paths will be spaced throughout the length of the beach that will be perpendicular to the boardwalk and greenway to allow easier beach access for people on the boardwalk or using the greenway. Between the boardwalk and the curves of the greenway will be “program coves”.

Future improvements along the waterfront of Coney Island will include new palm tree spray showers, beach playgrounds, volleyball courts and the creation of new beach activity areas including fitness stations, event areas and possibly concessions. U.S. Congressman Jerry Nadler (NY 8th District) has earmarked an additional $3.2 million in TEA-3 funds to enable future phases of the greenway and amenities project to be constructed.

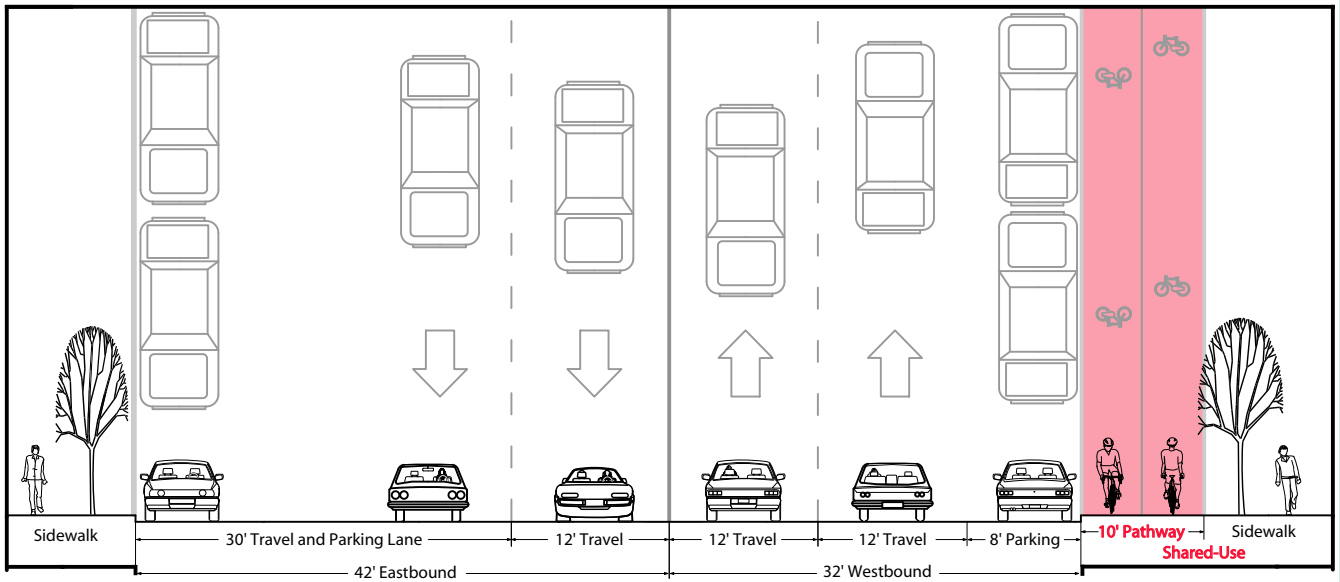


Link 4: Neptune Avenue – W17th Street to W37th Street

Recommendations

Option 1: Shared-Use Sidewalk

Bi-Directional



Option 1

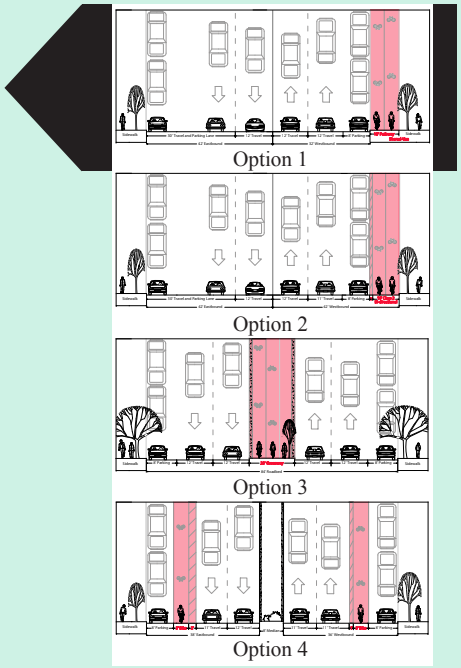


Figure 19

Link 4: Neptune Avenue – W17th Street to W37th Street

Recommendations

Between West 17th Street and West 31st Street four options are possible. Only a single option is presented for the segment between West 31st and West 37th streets.

Option 1: Build a Class 1 Shared-Use Sidewalk (Combined North Sidewalk & Bi-Directional Bicycle Lane)

This option [Figure 19] is to build a 20-foot Class 1 shared-use sidewalk along the north sidewalk of Neptune Avenue from West 17th Street to West 31st (and eventually the Ocean Parkway Greenway) by using 10 feet of excess and unnecessary roadbed or by recapturing the space currently used as medians. A separated off-street facility is consistent with the existing Shore Parkway Greenway. The route is safe and direct, and there is sufficient space for vehicular and non-motorized traffic on Neptune Avenue. No travel or parking lanes would be removed and pedestrian space would not be encroached. The path would link the Cropsey Avenue Bridge and Kaiser Park, and would provide a necessary connection to the proposed pedestrian bridge over the Coney Island Creek.

Bicyclists would use the new off-street path, while pedestrians would use the existing sidewalk. Where the sidewalk is fully paved, the greenway would be a Class 1 shared-use path. Where there is a five-foot sidewalk and a five-foot amenity strip, the existing landscaping and/or trees would serve as a physical barrier between bicyclists and pedestrians to make a Class 1 dual carriageway. More space may be incorporated into the greenway wherever there is a painted median or the westbound roadbed is over 40 feet wide (the westbound roadbed would maintain a minimum width of 38 feet—two 11-foot travel lanes and one 7-foot parking lane). Only West 22nd Street and West 23rd Street interrupt the north side of Neptune Avenue; both are very short, dead end streets with no traffic, making a Class 1 facility on the north side of Neptune Avenue ideal. Vehicle-pedestrian-bicycle conflict would be further minimized by installing crosswalks typically used at bridge approaches and regulatory signs to caution motorists and greenway users to share the road.

The city would have to assume jurisdiction and legal responsibility of the shared-use sidewalk. NYC Parks & Recreation has jurisdiction over the sidewalk fronting Leon S. Kaiser Park and the agency has indicated its support of the concept of a shared-use sidewalk where appropriate.

Link 4: Neptune Avenue – W17th Street to W37th Street

Recommendations

Option 2: Stripe Class 2 On-Street Bi-Directional Bicycle Lane with Buffer/Barrier

This option [Figure 20] proposes to build Class 2 bi-directional bicycle lanes along the north side of Neptune Avenue by recapturing excess roadbed unnecessary for vehicular use. The existing roadway would be reconfigured to add a ten-foot two-way bike lane with a one-foot buffer or barrier. Pedestrians and joggers would use the adjacent existing north sidewalk. This option would be cost-effective because the roadway geometry remains the same, but it would require an adequate barrier between bicyclists and the motor vehicle lane. As discussed in Option 2 in Link 1 and Link 2, the pathway should be raised, graded, or made of a tinted pavement (typically a brick color) in order for it to be discernible and delineated from the regular roadway. However, there are issues with this option: DSNY needs at least 10-feet of right-of-way to sweep the streets or remove snow; the Federal Highway Administration (FHA) does not recommend bi-directional pathways on one-way streets; and school buses at I.S. 239 must still be able to drop-off and pick-up students.

Option 3: Convert the Center Median to Class 1 Off-Street Greenway

This option [Figure 21] proposes to convert the painted/raised center medians from West 17th Street to West 31st Street into a 20-foot Class 1 off-street greenway. The facility would be separated from motorized vehicles which is consistent with the existing Shore Parkway Greenway and would be a direct route between existing sections of the greenway. The existing passive green space in the median would be retained for more active community use as a greenway with trees and benches.

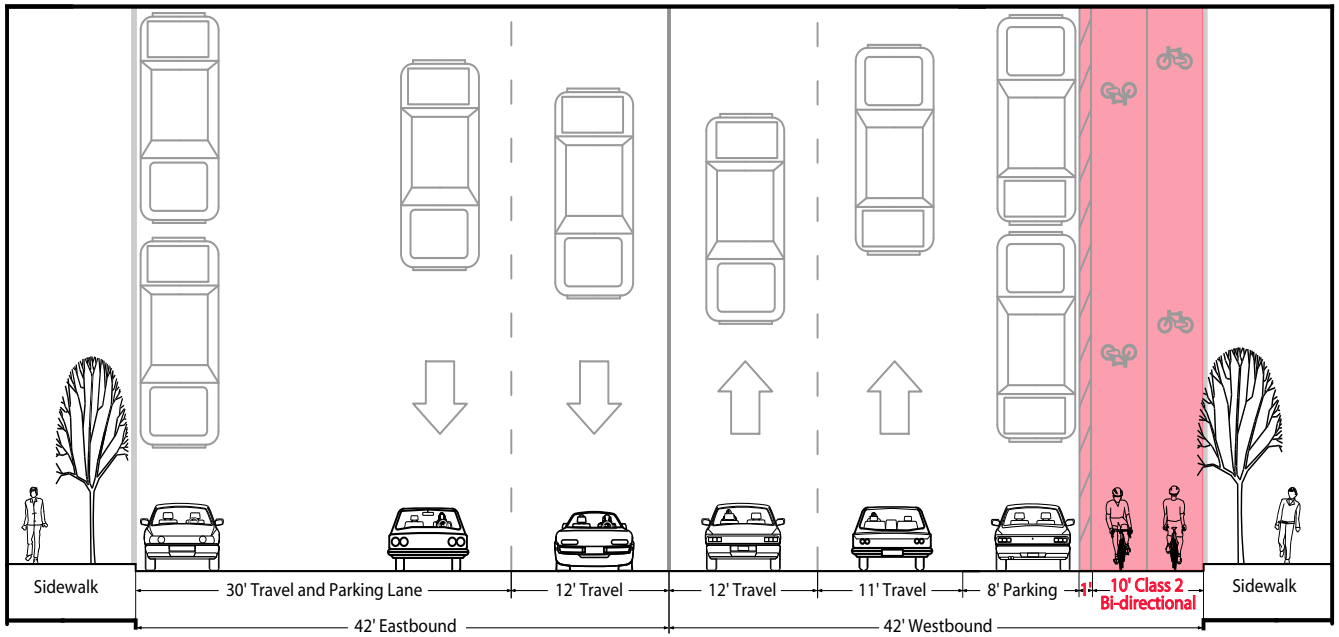
A median path would require all users to cross against westbound vehicles making left turns from Neptune Avenue and northbound vehicles traveling on the numbered cross streets making left turns onto Neptune Avenue. However, crossing against traffic may be a daunting task for pathway users and the elderly, who make up a substantial segment of the local population. With a significant number of vehicles on Neptune Avenue, crossing streets in the middle of busy intersections may be too difficult. Required extra safety measures should include crosswalks marked between the medians, as on Ocean Parkway with the Ocean Parkway Greenway, and extending medians into intersections to shorten the crossing distance for pathway users. Also, the Cropsey Avenue/West 17th Street intersection with Neptune Avenue would have to be redesigned because of the double northbound left turn lanes. At signalized intersections, a leading pedestrian and bicycle interval could be incorporated into the signal phasing to permit an early entry into the intersection.

Link 4: Neptune Avenue – W17th Street to W37th Street

Recommendations

Option 2: Class 2 On-Street

Bi-Directional with Buffer/Barrier within Existing Roadbed



Option 2

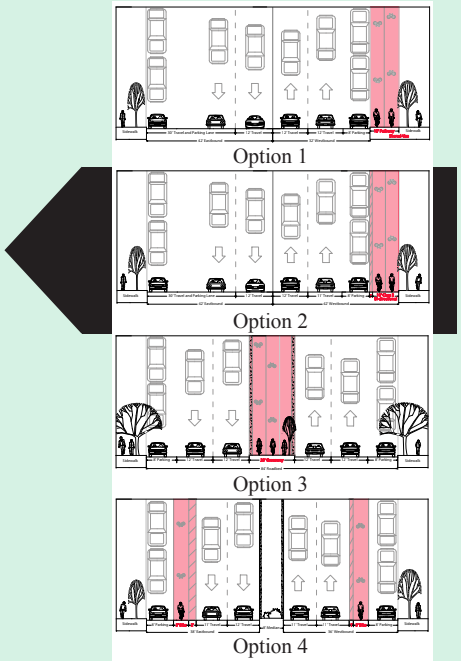
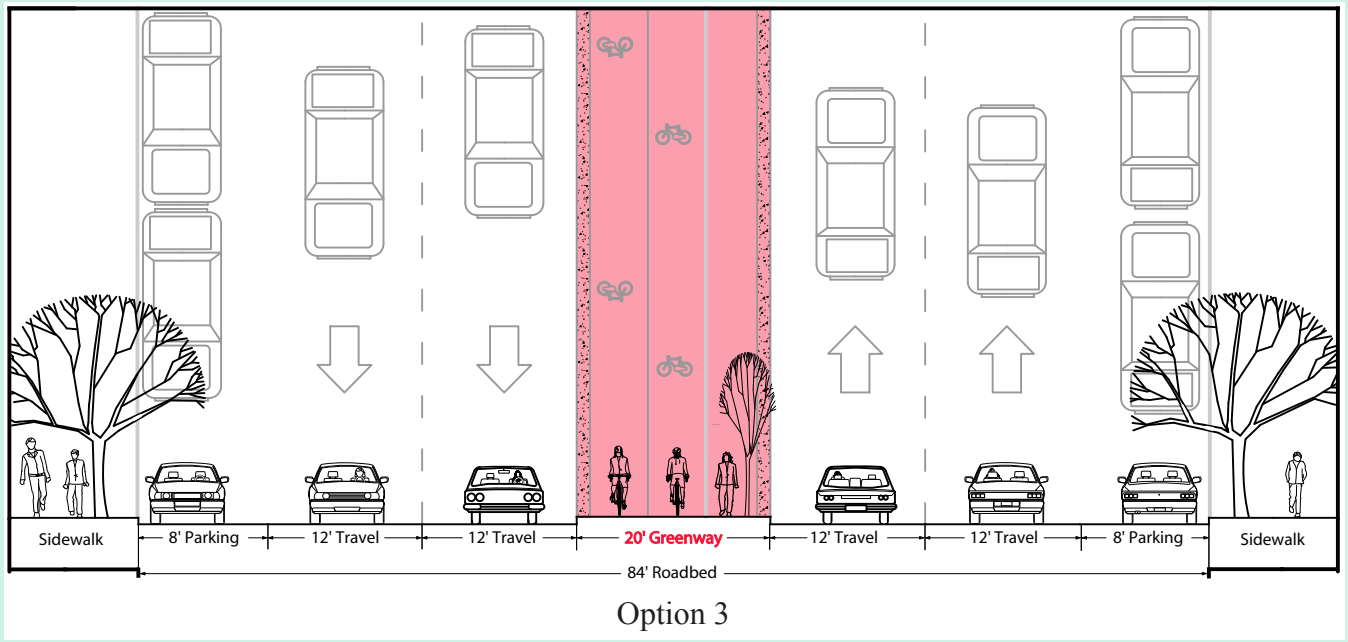


Figure 21

Link 4: Neptune Avenue – W17th Street to W37th Street

Recommendations

Option 3: Class 1 Center Median Greenway



Option 3

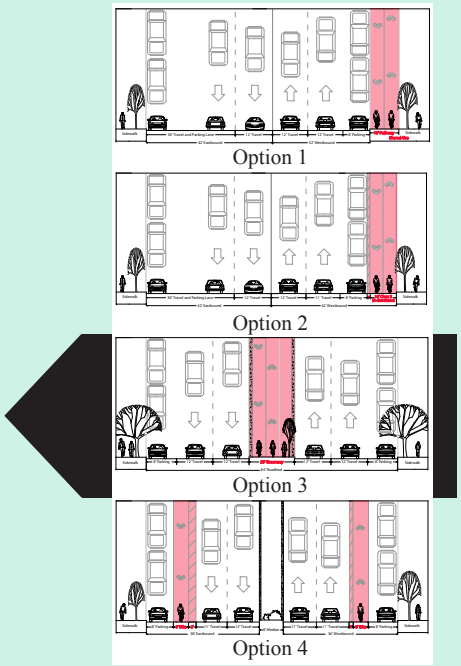
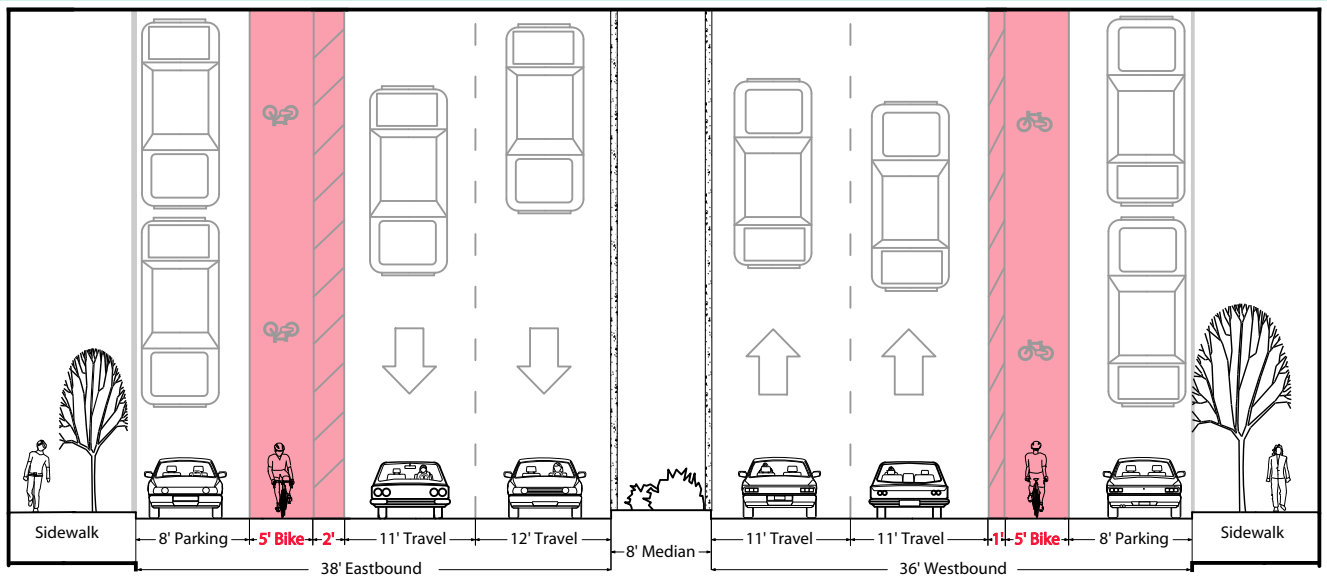


Figure 18

Link 4: Neptune Avenue – W17th Street to W37th Street

Recommendations

Option 4: Class 2 On-Street Bicycle Lanes
with Buffer



Option 4

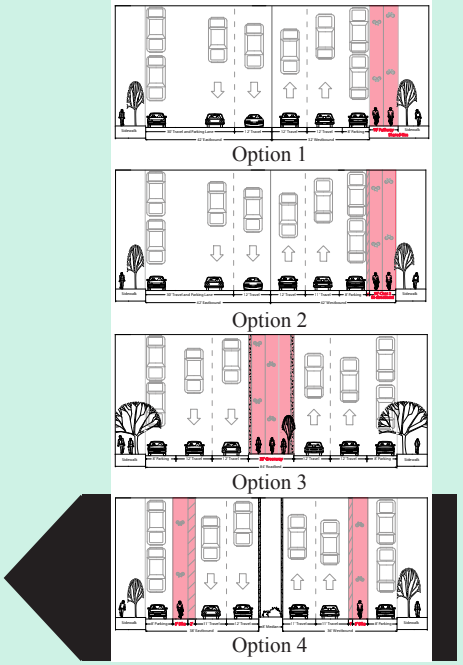


Figure 22

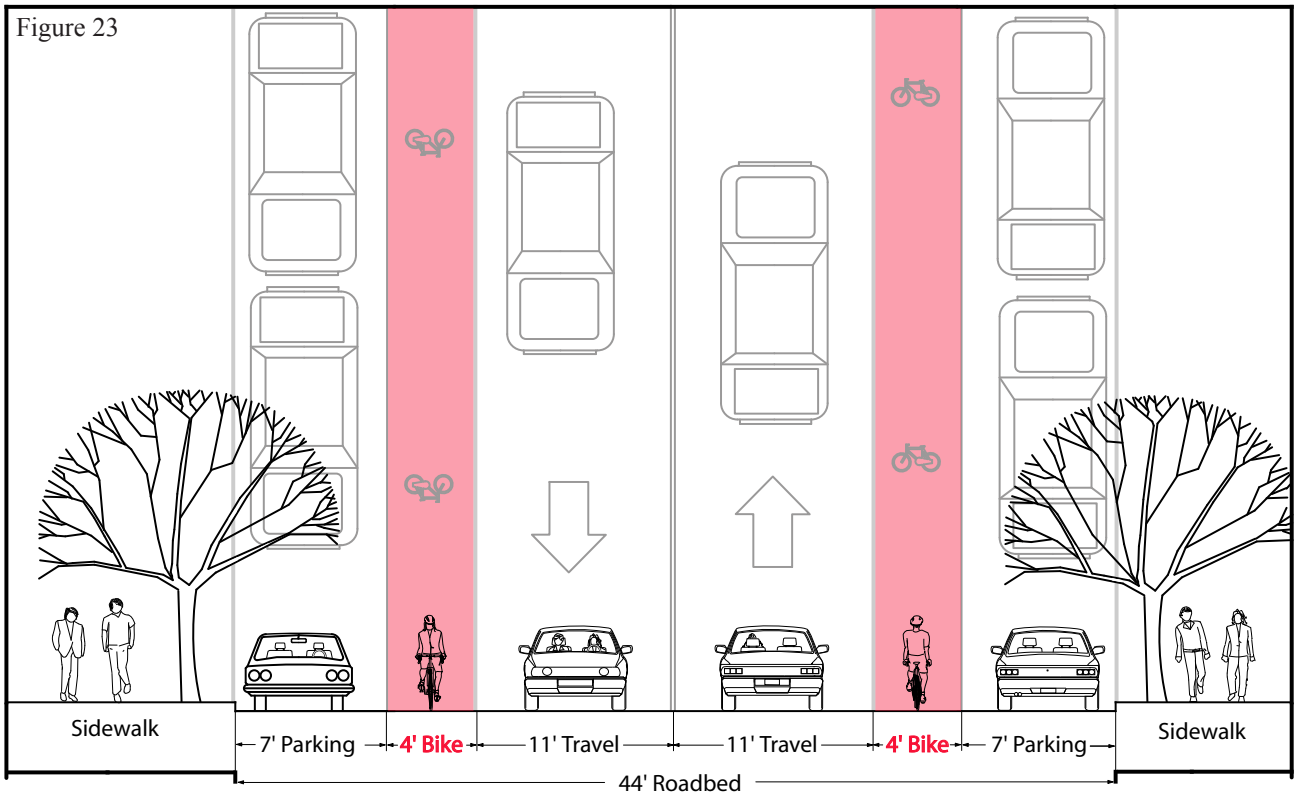
Link 4: Neptune Avenue – W17th Street to W37th Street

Recommendations

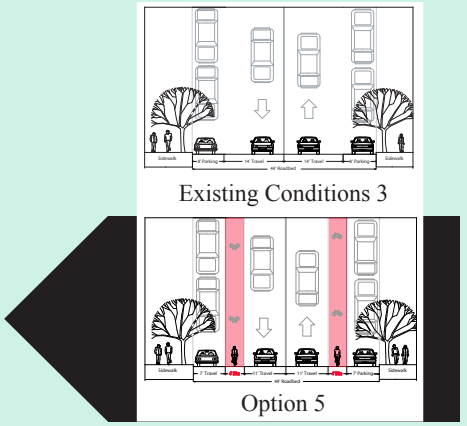
Option 5: On-Street Class 2 Bike Lane

West 31st Street to West 37th Street

Figure 23



Option 5



Link 4: Neptune Avenue – W17th Street to W37th Street

Recommendations

Option 4: Stripe Class 2 On-Street Bicycle Lanes with Buffers

This option [Figure 22] would stripe an on-street bike lane five feet wide with a three- to five-foot buffer in each direction on Neptune Avenue. With a minimum of 40 feet of roadbed in each direction, 10 feet or more of roadbed may be recaptured for greenway use without affecting traffic. The NYCDOT prefers this option.

Option 5: Stripe Class 2 On-Street Bicycle Lanes

From West 31st Street to West 37th Street where Neptune Avenue narrows to 44 feet, create a four-foot Class 2 bicycle lane [Figure 23]. A four-foot bicycle lane is substandard, but few options are available due to the narrow roadbed and because a travel lane and/or parking lane cannot be removed. The NYCDOT no longer stripes four-foot bicycle lanes.

Option 5a: Mark a Shared Lane Facility with Signage

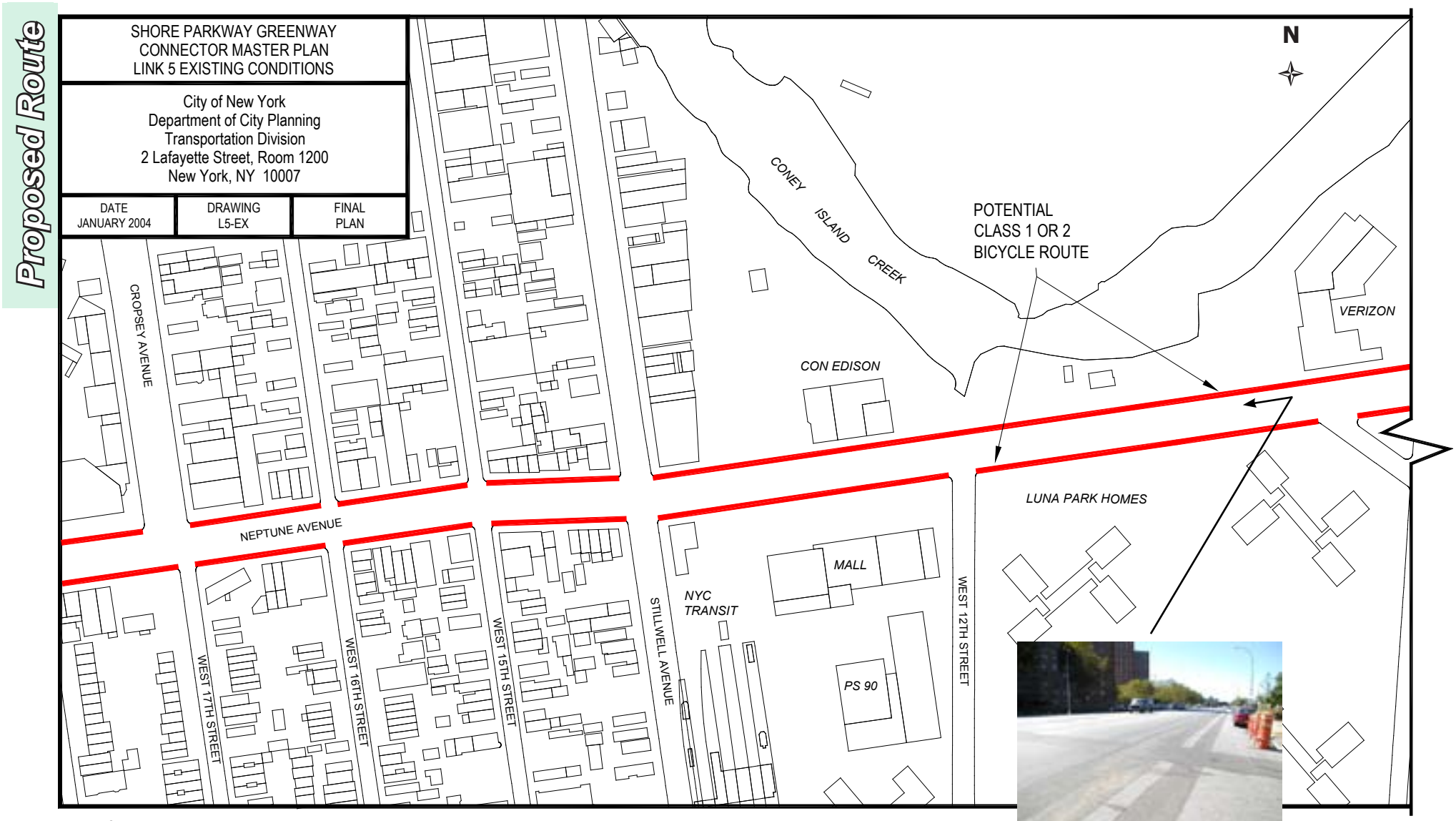
From West 31st Street to West 37th Street, create a shared lane facility along the curb with pavement markings and signage [not shown]. The shared lane facility is used when there is not enough space to create a Class 1 or 2 facility. A shared lane facility would increase motorist awareness of bicyclists. The NYCDOT has already successfully tested the shared lane bicycle route marking on University Avenue in the Bronx. Either Option 5 or Option 5a should be implemented in concert with the option chosen east of West 31st Street.

Additional Improvements

The revitalization of the Coney Island Creek could be advanced through improved access to the waterfront and its open spaces and the re-use of neglected facilities. The existing waterfront pathway in Kaiser Park should be extended as far east as the Cropsey Avenue Bridge. The former Coney Island Fire Service Pumping Station building within the Green Thumb garden between West 23rd Street and West 24th Street should be renovated, either for use by the community gardeners or as some other facility, such as a waterfront café.

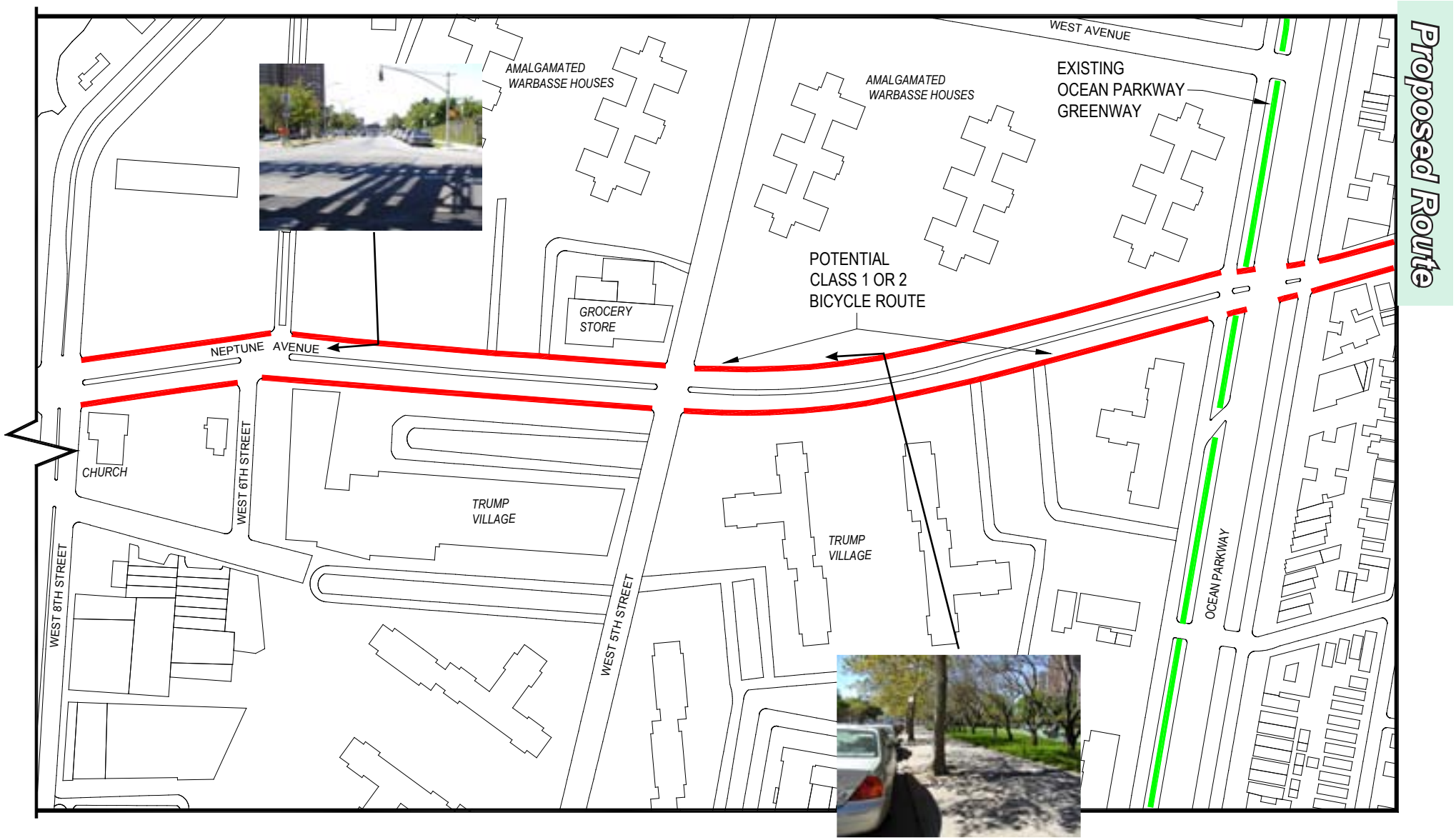
A signed (or striped) route on southbound West 23rd Street and northbound West 24th Street would provide improved connections from Neptune Avenue to the pedestrian and waterfront pathways in Kaiser Park, particularly should the proposed pedestrian bridge be built, and to the Coney Island waterfront. Crosswalks traverse Neptune Avenue at both intersections, allowing users to safely cross the street. At the west end of Coney Island riders would use West 36th and West 37th streets as one-way pairs between Neptune Avenue and the boardwalk.

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway



Map 9

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway



Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

Existing Conditions

The north side of Neptune Avenue from West 17th Street to West 6th Street is dominated by manufacturers, auto-oriented businesses, and utilities. Between Stillwell Avenue and Ocean Parkway along both sides of Neptune Avenue are blocks of high-rise residential apartment complexes, including Amalgamated/Peter Warbasse Houses, Luna Park Houses, and Trump Village, with almost 8,000 dwelling units and ample off-street parking [Map 9]. These massive complexes occupy super blocks, thereby limiting the number of streets that cross Neptune Avenue. To the south along the world-renowned Coney Island boardwalk are a host of summer and year-round attractions along the Atlantic Ocean: sandy beaches, Astroland amusement park and the fabled Cyclone roller coaster, the 150-foot high Wonderwheel, and the original Nathan's Famous. Other attractions include the New York Aquarium and Keyspan Stadium, the home of a minor league affiliate of the New York Mets baseball team. Unlike much of the study area, Coney Island is well-served by mass transit, including subway stations at Ocean Parkway, Stillwell Avenue (which recently underwent a major reconstruction), West 8th Street, and Neptune Avenue and the B82, B68, B64, B36 and the X29 buses. Ocean Parkway features a Class 1 off-street greenway that connects to Prospect Park.

Neptune Avenue from West 17th Street to Ocean Parkway remains a very wide street. The roadbed is 84 to 90 feet wide with two travel lanes and a parallel parking lane in each direction. From West 8th Street to Ocean Parkway, the street is separated by a 10-foot raised median with light poles, landscaping and trees [Figures 24 and 25]. Two-way traffic is heavy on Neptune Avenue, with up to 1,300 vehicles per hour at Stillwell Avenue, and on the major north-south arterial streets at either end of the link, Cropsey Avenue/West 17th Street and Ocean Parkway. Curbside parallel parking is constant along the north side of Neptune Avenue. The south side has a variety of on-street parking regulations: head-in 90° angled parking in front of a strip mall from Stillwell Avenue to West 12th Street, parking meters from West 8th Street to West 6th Street, head-in 60° angled parking in front of Trump Village from West 6th Street to west of Ocean Parkway, and eight parallel parking spaces near Ocean Parkway.

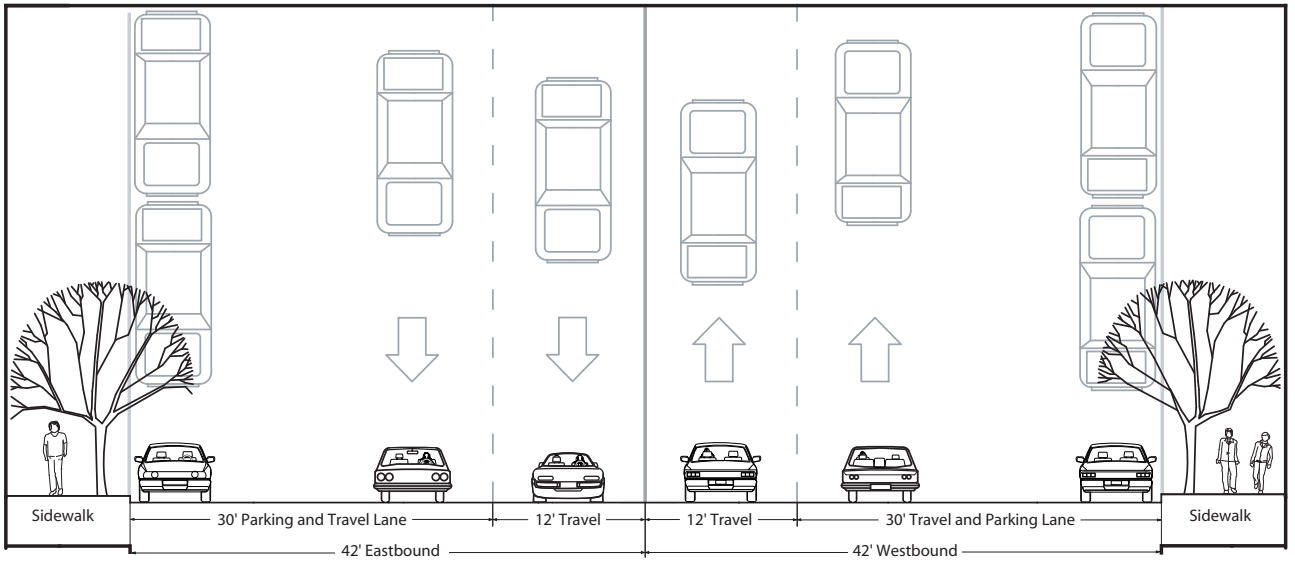
Both sidewalks on Neptune Avenue are generally wide, varying from 10 to 18 feet, with occasional stretches with trees and tree pits.

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

Existing Conditions

Existing Conditions 1

West 17th Street to West 8th Street



Existing Conditions 1

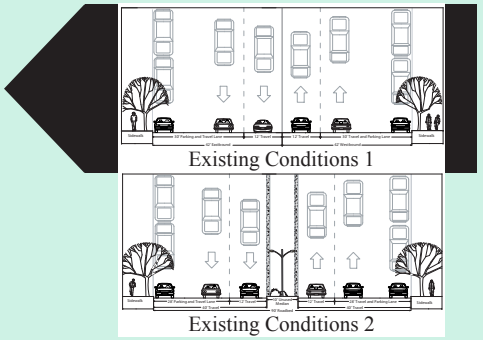


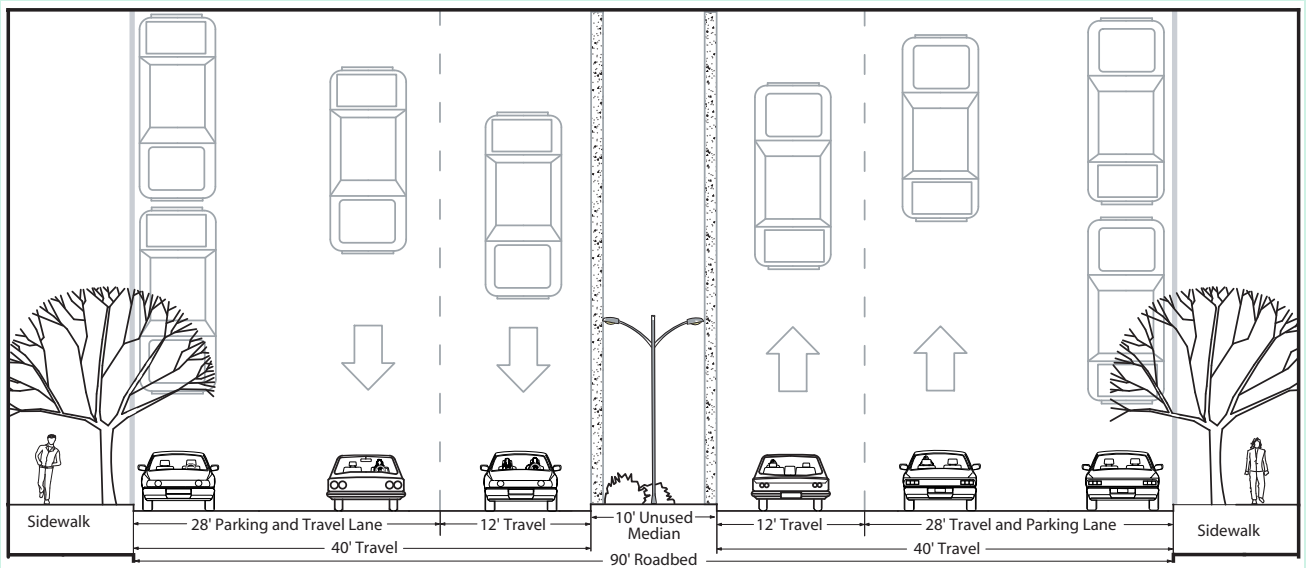
Figure 24

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

Existing Conditions

Existing Conditions 2

West 8th Street to Ocean Parkway



Existing Conditions 2



Figure 25

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

- 80+foot Roadbed
- Raised and Painted Medians
- Parking
  - Meters
  - Angled Parking
- Land Use
  - Residential Towers
  - Some Commercial on North Side

Existing Conditions



Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

Recommendations

Four options have been developed for this segment of the route.

Option 1: Build a Class 1 Shared-Use Sidewalk (Combined North Sidewalk & Bi-Directional Bicycle Lane)

As in Link 4, this option [Figure 26] would build a 20-foot shared-use sidewalk along the north side of Neptune Avenue from West 17th Street to Ocean Parkway by using 10 feet of excess and unnecessary roadbed or by recapturing the median. Bicyclists would use the new off-street path, while pedestrians would use the existing sidewalk. Where the sidewalk is fully paved, the greenway would be a Class 1 shared-use pathway. Where there is a five-foot sidewalk and a five-foot amenity strip, the existing landscaping would serve as a barrier between bicyclists and pedestrians to make a Class 1 dual carriageway. The greenway may be wider wherever there is a painted median or the westbound roadbed is over 40 feet wide. Amenities such as benches and trees could be added to the design.

Greenway users on Neptune Avenue would have to negotiate cross traffic at the intersecting north-south streets. However, only six cross streets continue north of Neptune Avenue due to the super blocks occupied by high-rise housing (West 16th Street, West 15th Street, Stillwell Avenue, Shell Road, West 6th Street and West 5th Street — and only Stillwell Avenue has significant traffic). Vehicle-pedestrian-bicycle conflict could be further minimized by installing crosswalks typically used at bridge approaches, and regulatory signs to caution motorists and greenway users to share the road. The city would have to design the shared-use sidewalk and assume jurisdiction, legal responsibility and maintenance for it.

Option 2: Stripe Class 2 On-Street Bi-Directional Bicycle Lane with Buffer

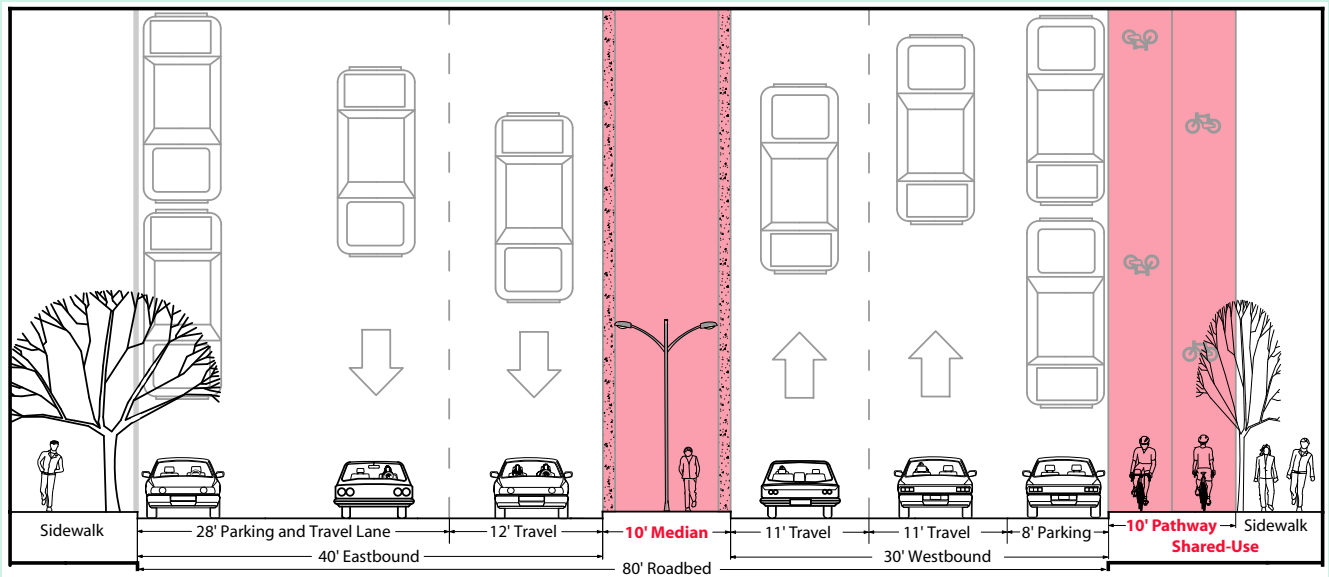
This option [Figure 27] proposes to build a Class 2 bi-directional bicycle lane along the north side of Neptune Avenue by recapturing excess roadbed unnecessary for vehicular use. The existing roadway would be reconfigured to add a nine-foot two-way bike lane with a one-foot barrier. Pedestrians and joggers would use the adjacent existing north sidewalk. Pedestrians and joggers would use the adjacent existing north sidewalk. This option would be cost-effective because the roadway geometry remains the same, but it would require an adequate buffer between bicyclists and the motor vehicle lane. The buffer could be a raised, graded, tinted pavement or something more substantial to offset the pathway. There are issues with this option: first, DSNY would still have to be able to maintain 10 feet of right-of-way for street sweeping and snow removal and the Federal Highway Administration does not approve of bi-directional pathways against one-way traffic.

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

Recommendations

Option 1: Class 1 Shared-Use Sidewalk

Bi-Directional, Greening of the Center Median



Option 1

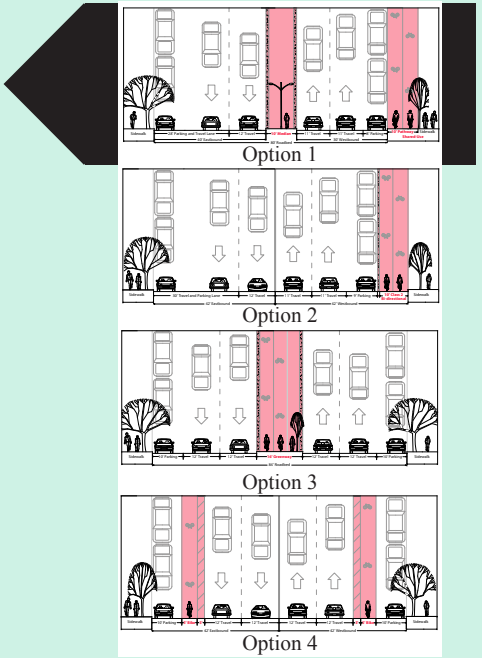


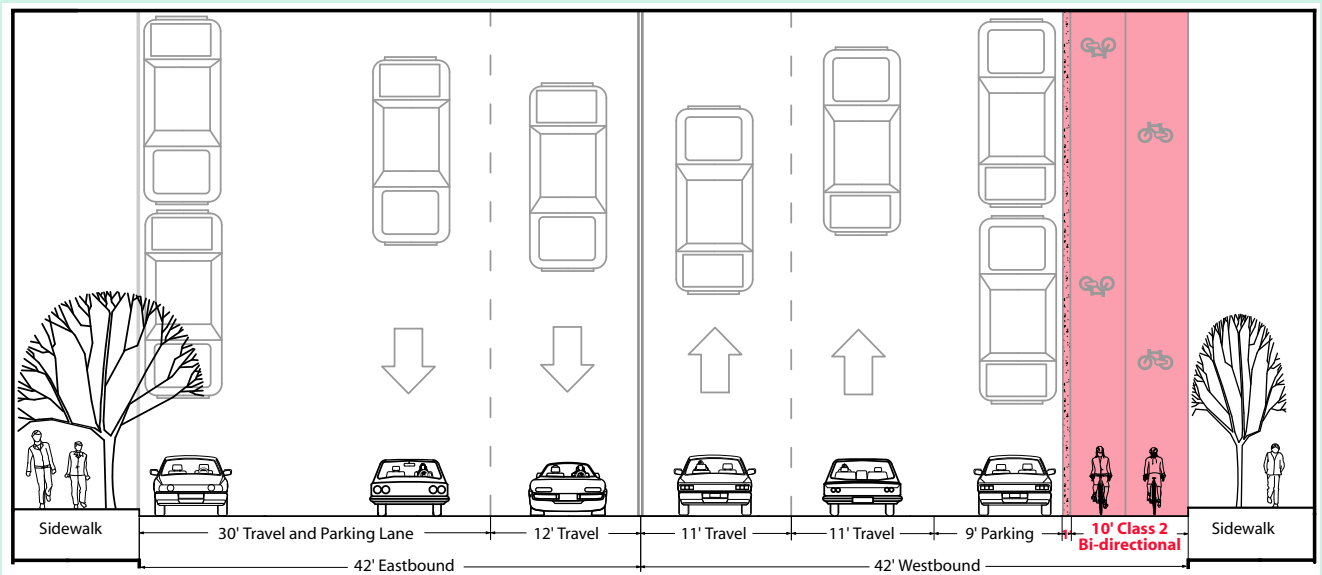
Figure 26

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

Recommendations

Option 2: Class 2 On-Street

Bi-Directional with Buffer



Option 2

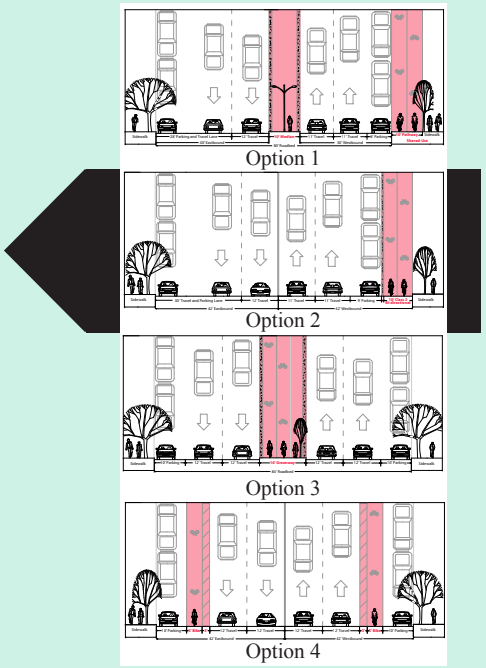


Figure 27

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

Recommendations

Option 3: Convert Center Median to Class 1 Off-Street Greenway

This option [Figure 28] proposes to convert the painted/raised center medians from West 17th Street to Ocean Parkway into a minimum 16-foot Class 1 off-street greenway. The facility would be separated from motorized vehicles which is consistent with the existing Shore Parkway Greenway and would be a direct route between the existing sections of the Shore Parkway Greenway. The existing passive green space in the median would be used for more active community use as a greenway with trees and benches.

As previously stated, a median path would require all users to cross against westbound vehicles making left turns from Neptune Avenue. However, crossing against traffic may be a daunting task for some people, so extra safety measures should be incorporated into the facility such as crosswalks marked between the medians, as on Ocean Parkway with the Ocean Parkway Greenway, and extending medians into the intersection to shorten the crossing distance for pathway users. At signalized intersections, a leading pedestrian and bicycle interval could be incorporated into the signal phasing to permit an early entry into the intersection.

Option 4: Stripe Class 2 On-Street Bicycle Lanes with Buffer

This option [Figure 29], which NYCDOT prefers, would stripe on-street bike lanes five feet wide with a three- to five-foot buffer in each direction on Neptune Avenue. With a minimum of 40 feet of roadbed in each direction, 10 feet or more of roadbed may be recaptured for greenway use without affecting traffic. The four-foot painted median separating eastbound moving traffic from angled parking adjacent to Trump Village could be incorporated into the striped lane, which should be dashed or painted blue to highlight potential conflict between vehicles and bicyclists. Regulatory signs alerting drivers to the presence of bicyclists should also be installed.

Additional Improvements

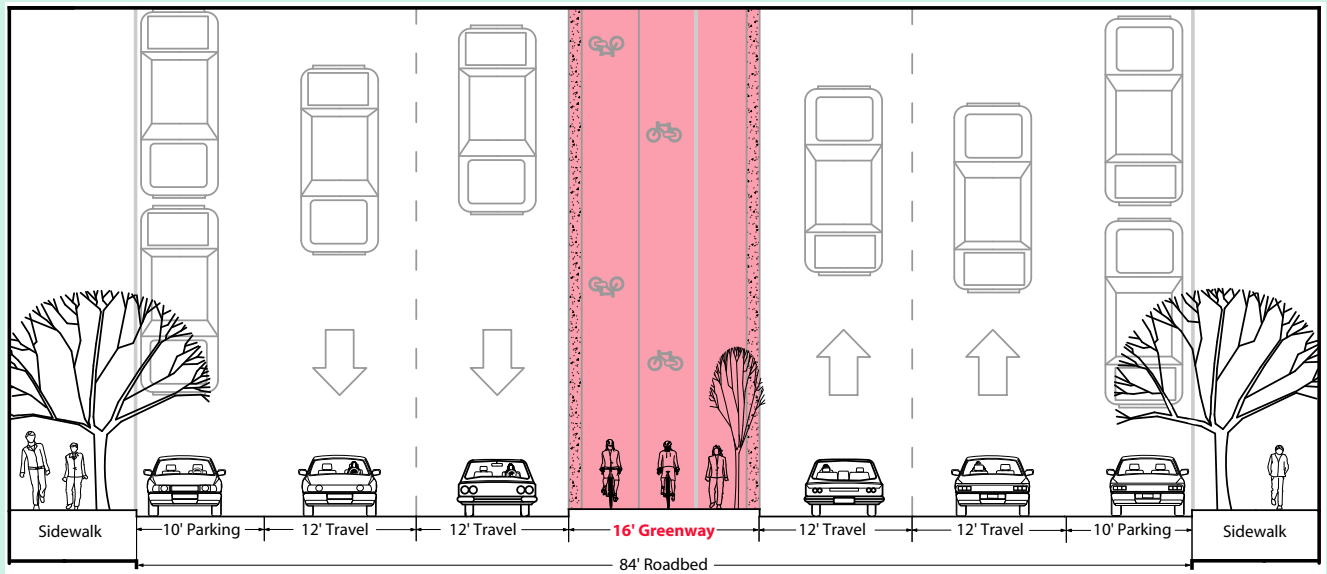
In all options, signal timing changes are proposed at the intersection of Neptune Avenue and Ocean Parkway to improve traffic operations (see Appendix 2: Traffic Analysis). In Options 1, 2 and 4, the center median should be improved and greened to serve as passive open space.

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

Recommendations

Option 3: Class 1 Center Median Greenway

Bi-Directional, Off-Street



Option 3

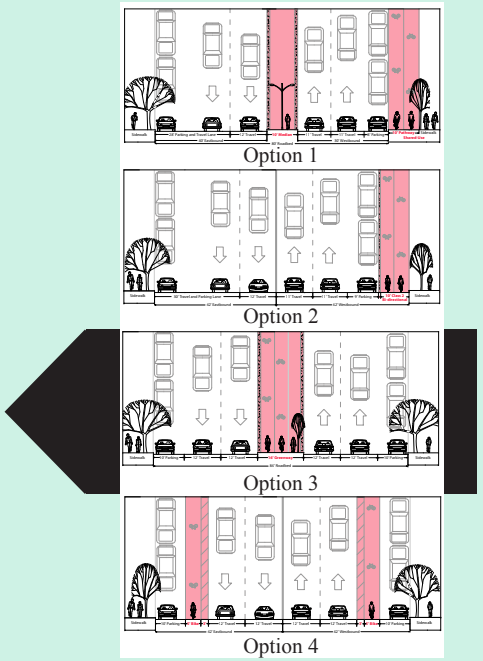
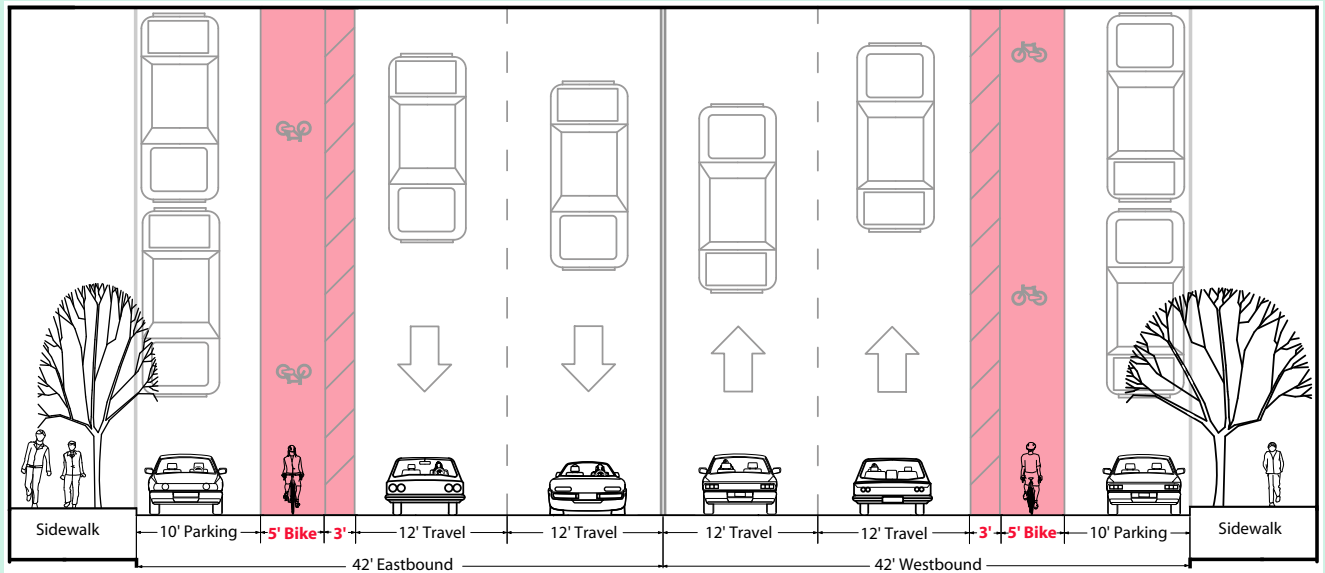


Figure 28

Link 5: Neptune Avenue – West 17th Street to Ocean Parkway

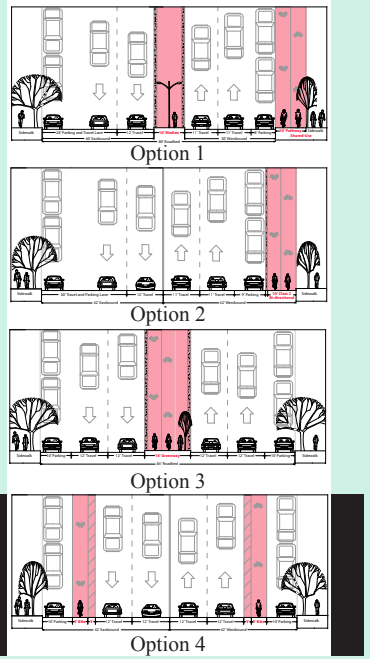
Recommendations

Option 4: Class 2 On-Street Bicycle Lanes
with Buffer



Option 4

Figure 29



Link 6: Neptune Avenue – Ocean Parkway to Ocean Avenue

Proposed Route



Map 10

Link 6: Neptune Avenue – Ocean Parkway to Ocean Avenue



Link 6: Neptune Avenue – Ocean Parkway to Ocean Avenue

Existing Conditions

Neptune Avenue changes considerably in Link 6 from the previous link. The land use changes from manufacturing and residential towers to one-to-five story residential buildings, single family homes, and commercial storefronts [Map 10]. Between Ocean Parkway and Coney Island Avenue, the width of the Neptune Avenue roadbed narrows from 80 feet to 50 feet, there is no longer a center median, and there is one travel lane and one parallel parking lane in each direction [Figure 30]. At the intersection with Coney Island Avenue, Neptune Avenue in each direction has a narrow left turn lane and a wide shared through/right turn lane. There is no parking for eastbound traffic along the south curb; and for westbound traffic may park against the north curb causing.

Neptune Avenue widens back to 80 feet east of Coney Island Avenue at East 12th Street where the roadway passes underneath the elevated subway train lines at East 12th Street. Neptune Avenue becomes Emmons Avenue where it parallels the bay east of West End Avenue. From Cass Place/Brighton Street to Ocean Avenue, Emmons Avenue has a painted center median with left turn lanes. "No parking" signs are posted at those intersections with demarcated left turns.

The narrower roadbed, center lane turn lanes, and commercial activity contributes to the overall traffic congestion in this link. Traffic volumes are high, although lighter than to the west, with about 900 to 1,000 total vehicles in the peak hours. Shore Parkway on- and off-ramps provide a direct connection to the busy Coney Island and Sheepshead Bay waterfront and Emmons Avenue. Kingsborough Community College also generates significant traffic. In addition, West End Avenue and Shore Boulevard are important streets for cars entering or leaving Coney Island from Sheepshead Bay. The Oriental Boulevard bicycle lane connects the college to West End Avenue. The area has two subway stations at Brighton Beach Avenue and Sheepshead Bay Road and the B4, B49, and X29 bus routes serve the area.

Link 6: Neptune Avenue – Ocean Parkway to Ocean Avenue



Aerial photo of Neptune Avenue as it becomes Emmons Avenue in Sheepshead Bay.

Link 6: Neptune Avenue – Ocean Parkway to Ocean Avenue

Existing Conditions



— 50-foot Roadbed
  - Widens to 80 feet
  - Traffic Congestion

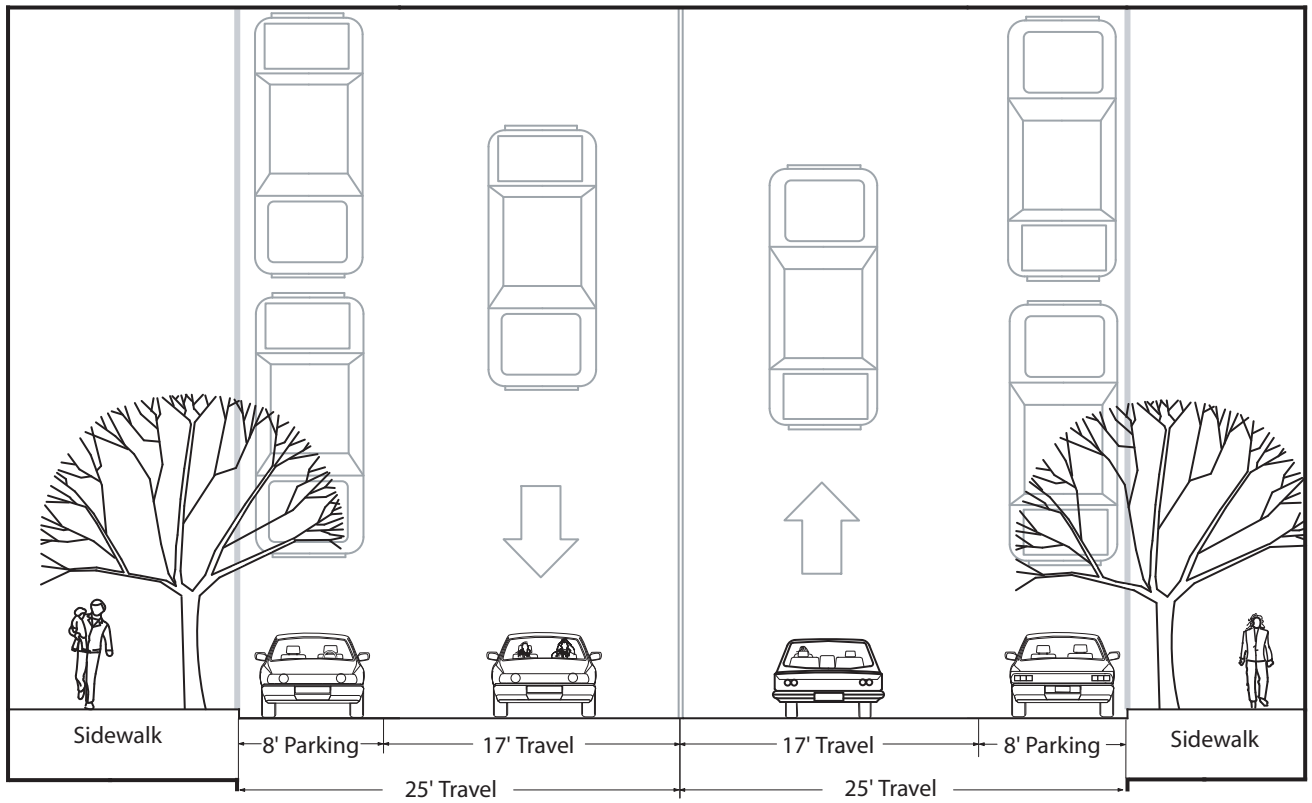
— On-Street Parking

— Land Use
  - Residential and Commercial
  - Two-to-six Stories

Link 6: Neptune Avenue – Ocean Parkway to Ocean Avenue

Existing Conditions

Ocean Parkway to East 12th Street



Existing Conditions

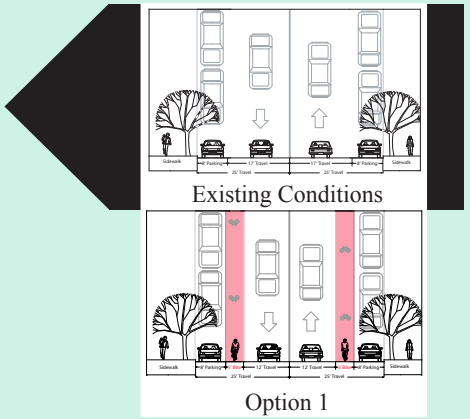


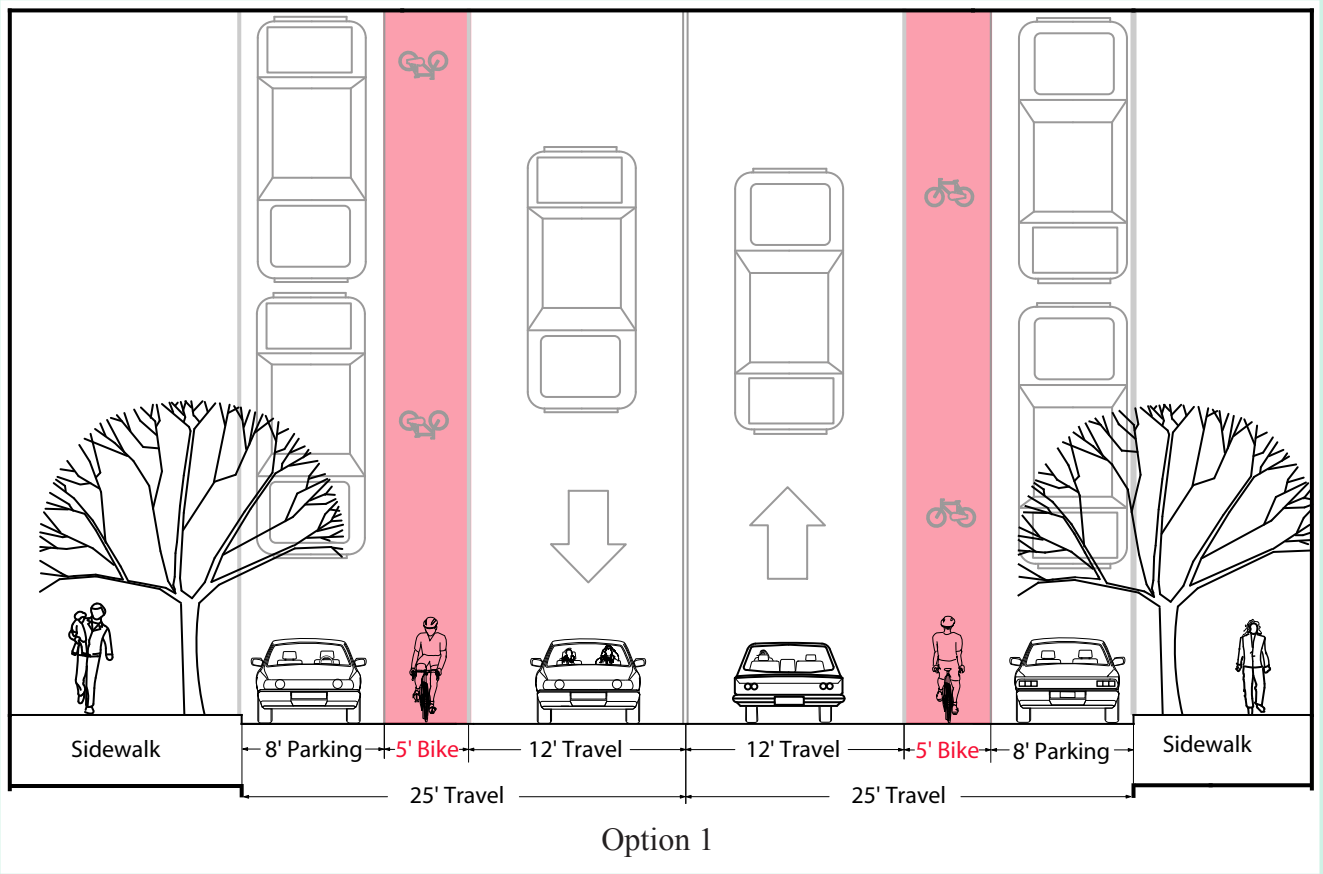
Figure 30

Link 6: Neptune Avenue – Ocean Parkway to Ocean Avenue

Recommendations

Option 1: Class 2 On-Street Bicycle Lanes

Add Buffer East of East 12th Street



Option 1

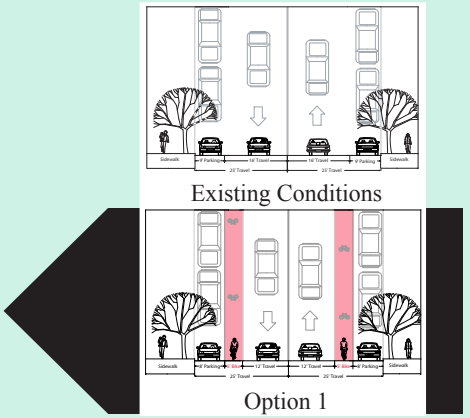


Figure 31

Link 6: Neptune Avenue – Ocean Parkway to Ocean Avenue

Recommendations

There is only a single option for this link.

Option 1: Stripe Class 2 On-Street Bicycle Lanes

Due to space limitations, the only improvement option in this link is an on-street Class 2 bicycle lane five feet wide in each travel direction [Figure 31]. A five-foot wide buffer would be added to the bike lane where Neptune Avenue widens back to 80 feet at East 12th Street. A striped bike lane would make motorists drive more consistently in their travel lane and heighten their awareness of people riding bicycles on the street.

Additional Improvements

Signal timing changes are proposed to improve traffic operations at Neptune Avenue and Coney Island Avenue (see Appendix 2: Traffic Analysis).

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

Proposed Route

SHORE PARKWAY GREENWAY
CONNECTOR MASTER PLAN
LINK 7 EXISTING CONDITIONS

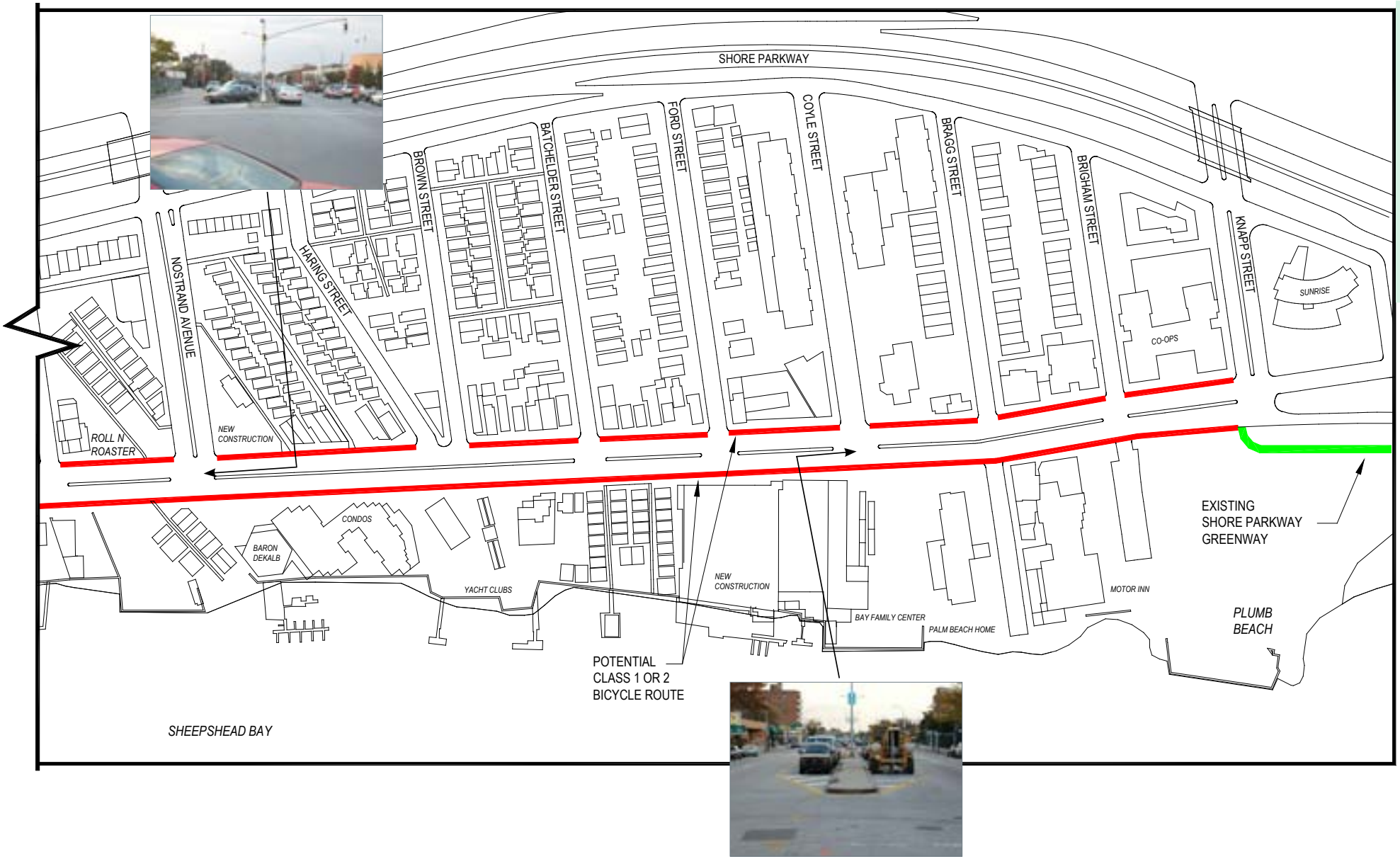
City of New York
Department of City Planning
Transportation Division
2 Lafayette Street, Room 1200
New York, NY 10007

DATE	DRAWING	FINAL
JANUARY 2004	L7-EX	PLAN



Map 11

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street



Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

Existing Conditions

Link 7 (along with Link 3) is the most problematic within the study area. The Shore Parkway runs east-west one block north and parallel to Emmons Avenue. Directly to the south of Emmons Avenue is Sheepshead Bay. The side streets north of Emmons Avenue [Map 11] are bound by the bay and the parkway and are a concentrated mix of residences, bungalows, houses, apartments, condominiums, and seniors homes. Land uses on the north side of Emmons Avenue are a mix of residential buildings and ground-floor commercial uses, including some of the city's most famous seafood restaurants. On the south side of Emmons Avenue, from East 21st Street to East 27th Street, is the commercially-active Sheepshead Bay waterfront, where 10 piers built by the City in 1936 offer fishing and party excursions on eighteen boats. Pier activity often results in vehicles illegally parking along the curb. Further east on the south of Emmons Avenue are a few restaurants, yacht clubs, small bungalows, housing complexes and a number of new condominium developments in the area. The vibrant waterfront activity and attractions along Emmons Avenue often results in traffic congestion, particularly during the summer months and on weekends when bicycle use is at its greatest. A lack of adequate on- or off-street parking contributes to the congestion.

The City widened Emmons Avenue to 80 feet in 1931. A five and one-half foot raised concrete center median divides eastbound and westbound traffic [Figures 32 and 33]. Westbound conditions are consistent for the length of this link — two moving and two parallel parking lanes configured within 37-39 feet of roadbed. The roadway in the eastbound direction is less consistently configured. To accommodate activity associated with the piers, eastbound Emmons Avenue for the 10 blocks from Ocean Avenue to Nostrand Avenue has back-in angled parking adjacent to the center median and a 21-foot travel lane. Parking is not permitted on the south side of the street though the regulations are frequently ignored. East of Nostrand Avenue, the eastbound direction has two moving and two parking lanes.

North-south streets begin or terminate at Emmons Avenue. Bus routes on Emmons Avenue include the B4 and the B44. The sidewalk along the bay from East 12th Street to East 27th Street at Tucker Place Park is a minimum of 10-15 feet wide. Further east the sidewalk varies in width from being fully paved at 10 feet clear to 5 feet clear with a 5-foot tree pit.

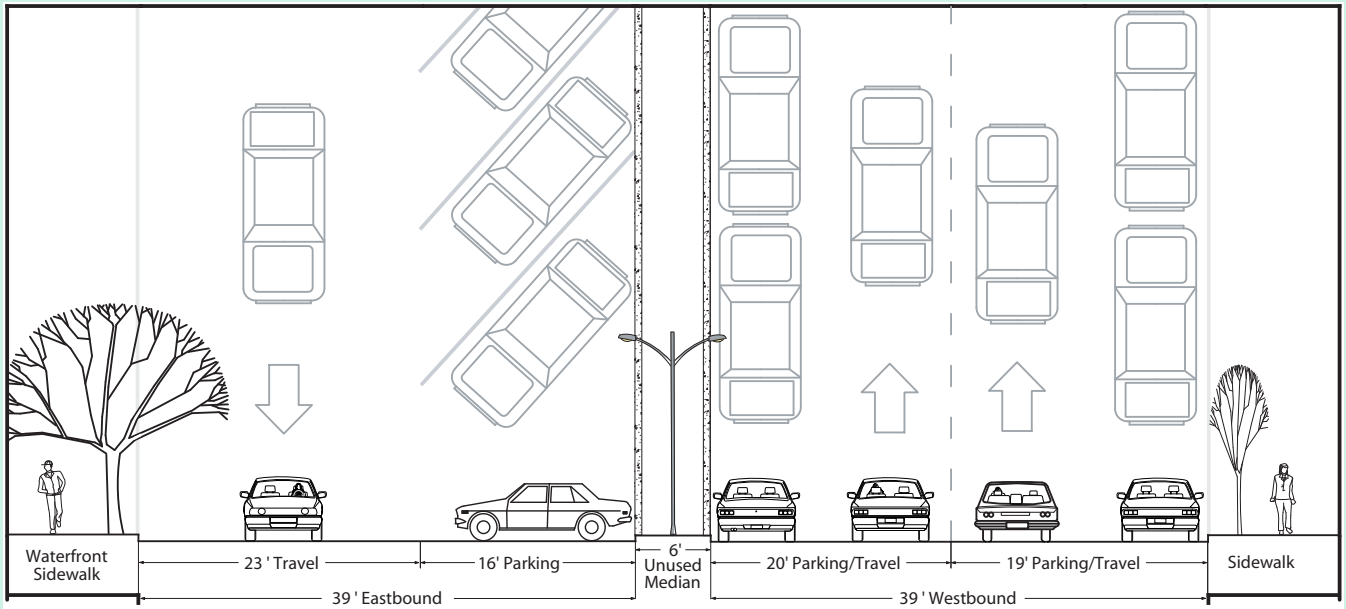
The eastern section of the Shore Parkway Greenway begins south of Brigham Street in a narrow paved parking lot next to a fenced empty lot. The entrance is not well-marked and easily missed. Brigham Street is controlled by stop signs, and crosswalks are marked along but not across Emmons Avenue. From Brigham Street to Knapp Street, one short block, Emmons Avenue widens to 47 feet eastbound and 39 feet westbound. Knapp Street is a signalized intersection with crosswalks.

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

Existing Conditions

Existing Conditions 1

Ocean Avenue to Nostrand Avenue - Raised Median and Angled Parking



Existing Conditions 1



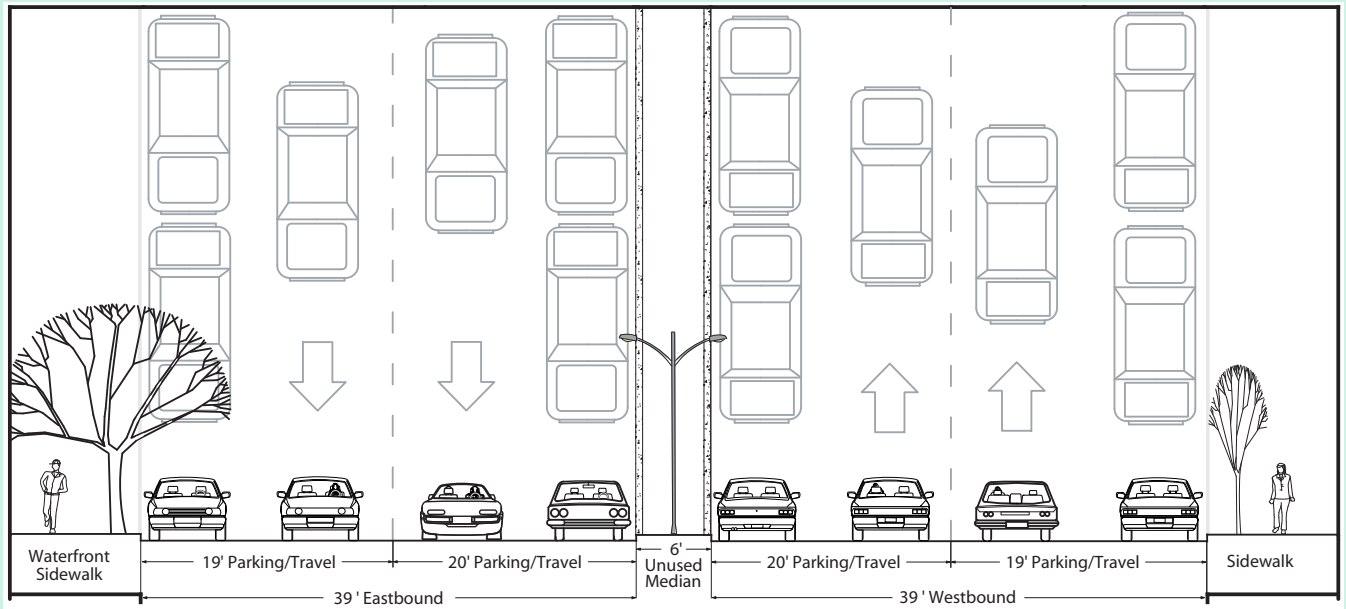
Figure 32

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

Existing Conditions

Existing Conditions 2

Nostrand Avenue to Brigham Street - Raised Median



Existing Conditions 2

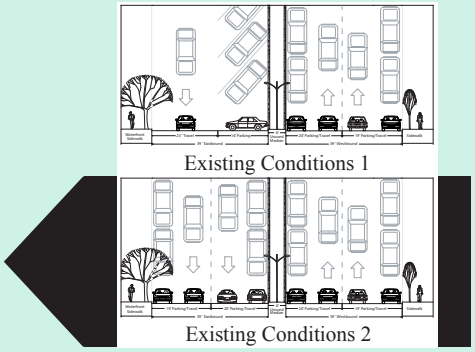


Figure 33

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

— 80+ foot Roadbed
— Raised Median
— Parking
  • Meters
  • Angled Parking
  • Double Parallel Parking
— Land Use
  • Commercial - Piers, Restaurants
  • Bungalows
  • Senior Residential
  • Two-to-six Story Buildings

Existing Conditions

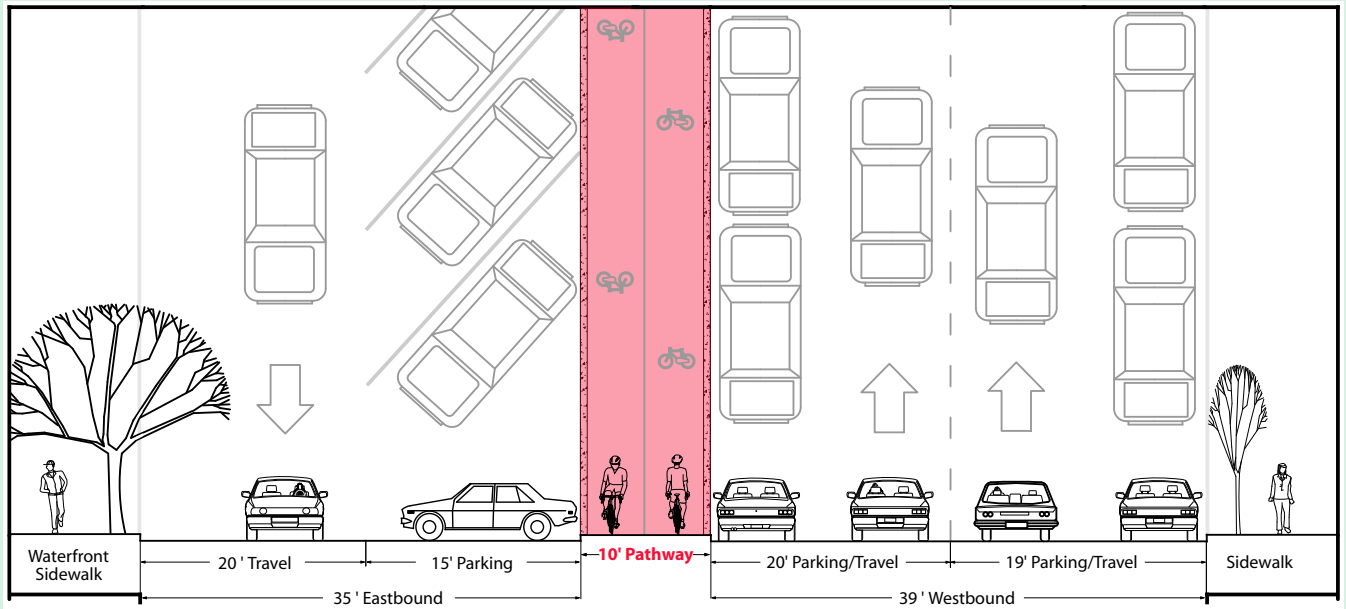


Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

Recommendations

Option 1: Class 1 Off-Street Facility

Bicycles Only



Option 1

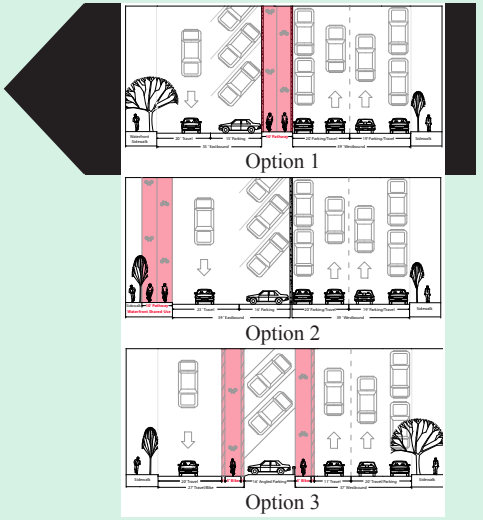


Figure 34

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

Recommendations

While five options have been developed for Link 7, the feasibility of recommendations for the greenway connector in this segment is compromised by a lack of adequate on- and off-street parking, a longstanding community issue, and the unusual street design. Although outside the project scope, the addition of off-street parking facilities would alleviate some of the vehicular congestion, permit the redesign of Emmons Avenue as a more pedestrian and bicycle-friendly avenue with two travel lanes and one parking lane in each direction. Options 1, 2, 3 and 4 require the redesign and/or redevelopment of Emmons Avenue and the waterfront. Similar to the proposed new pedestrian and bicycle bridge across Coney Island Creek that we believe can be a catalyst to the development of an improved creek waterfront area, we see Emmons Avenue as an opportunity to improve a working waterfront while addressing community concerns in regard to automobile congestion.

Option 1: Convert the Center Median to a Class 1 Bicycle-only Facility

This option [Figure 34] proposes to convert the existing five-to-six-foot raised median into a 10- to 12-foot greenway by recapturing available space from the Emmons Avenue roadbed. The center median greenway could be even wider from Ocean Avenue to Nostrand Avenue, where only angled parking is permitted in the eastbound direction, and at the greenway entry point at Knapp Street. This option provides an off-street, Class 1 facility that is direct, consistent with the existing greenway, and takes advantage of unused roadbed.

As in earlier links, safety improvements - extending the medians to limit the intersection crossing distance, marking crosswalks between medians - would be required to make this option work. In Link 7 additional issues are associated with the median greenway. While the existing light poles and traffic signals would serve to separate directional travel on the center medians, a physical barrier to prevent cars parked at an angle from hanging over the median curb would need to be installed.

Option 2: Build a Waterfront Class 1 Greenway or Shared-Use Sidewalk

This option envisions the redevelopment and redesign of the Emmons Avenue waterfront in conjunction with the development of a new off-street parking facility. Using the Hudson River Greenway along Manhattan's redeveloped west side waterfront as a guide, the combination of active piers with green space, open space, and recreational opportunities can be achieved with appropriate funds and community imput. This redevelopement must tap into the unique history, qualities, and attributes of the Sheepshead Bay waterfront and community. The greenway could begin at East 15th Street, where the bay begins, or continue south around the entire bay and connect to Manhattan Beach and Kingsborough Community College.

A shared-use sidewalk [Figure 35], a smaller and more affordable variant then the redevelopment of the entire waterfront, could be built along the south side of Emmons Avenue from Ocean Avenue (or East 15th Street) to Nostrand Avenue by eliminating excess roadbed or by recapturing space from the median. The 15-foot wide sidewalk from East 15th Street to East 27th Street is sufficiently wide; sidewalks east of East 27th Street vary in width and would have to be repaved.

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

Recommendations

Option 3: Convert the Center Median to Angled Parking and Stripe Adjacent Bicycle Lanes

This option [Figure 36] would consolidate the adjacent median curbside parallel and angled parking lanes into a single lane of angled parking located on the median. Class 2 bicycle lanes would be striped in the roadway adjacent to the median, or could be incorporated into the raised parking median along its edges. This option would impact on-street parking by eliminating approximately 150 parking spaces, making the option impractical given the current configuration of Emmons Avenue (See Appendix 3: Parking Analysis).

Option 4: Stripe Class 2 On-Street Bicycle Lanes

Class 2 bicycle lanes [not shown] could be striped in each direction adjacent to the outer curb on Emmons Avenue, but would necessitate the removal of the westbound parking lane and the eastbound parking lane between Nostrand and Knapp avenues, making the option impractical given the current configuration of Emmons Avenue.

Option 5: Stripe an Eastbound Class 2 On-Street Bicycle Lane (combined with Existing Class 3 Route)

Given a lack of viable options and available space, this option [not shown] would stripe a bicycle lane on eastbound Emmons Avenue between Ocean Avenue and Nostrand Avenue. Eastbound Emmons Avenue east of Nostrand Avenue and westbound Emmons Avenue for the length of Link 7 would remain a signed Class 3 route. This option does not require the removal of a parking or travel lane and requires minimal investment. The NYCDOT prefers this option.

Additional Improvements

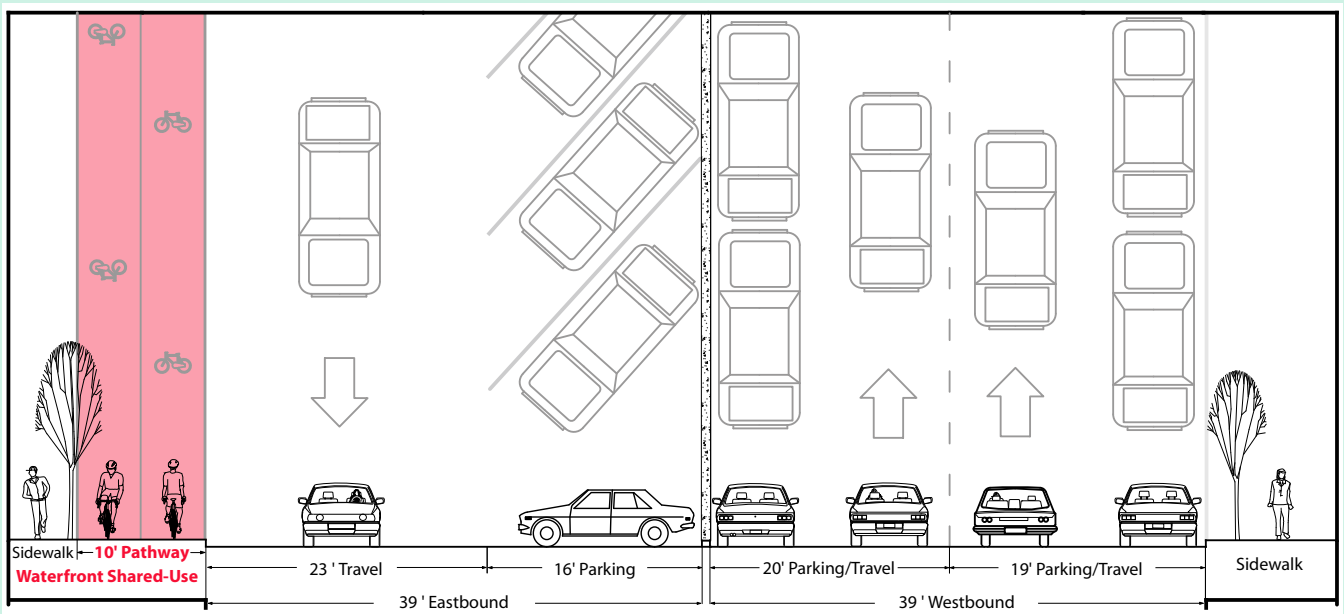
In all options, signal timing changes are proposed to improve traffic operations at Emmons Avenue and Nostrand Avenue (see Appendix 2: Traffic Analysis). Knapp Avenue, which is signalized and marked with crosswalks, should be designated and redesigned as the official gateway and access point to the existing greenway instead of the informal access point at Brigham Street which is not controlled or marked with crosswalks.

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

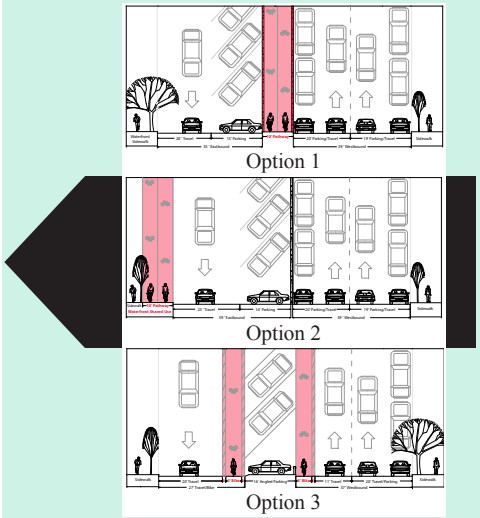
Recommendations

Option 2: Class 1 Shared-Use Sidewalk

Waterfront Greenway



Option 2



Option 1

Option 2

Option 3

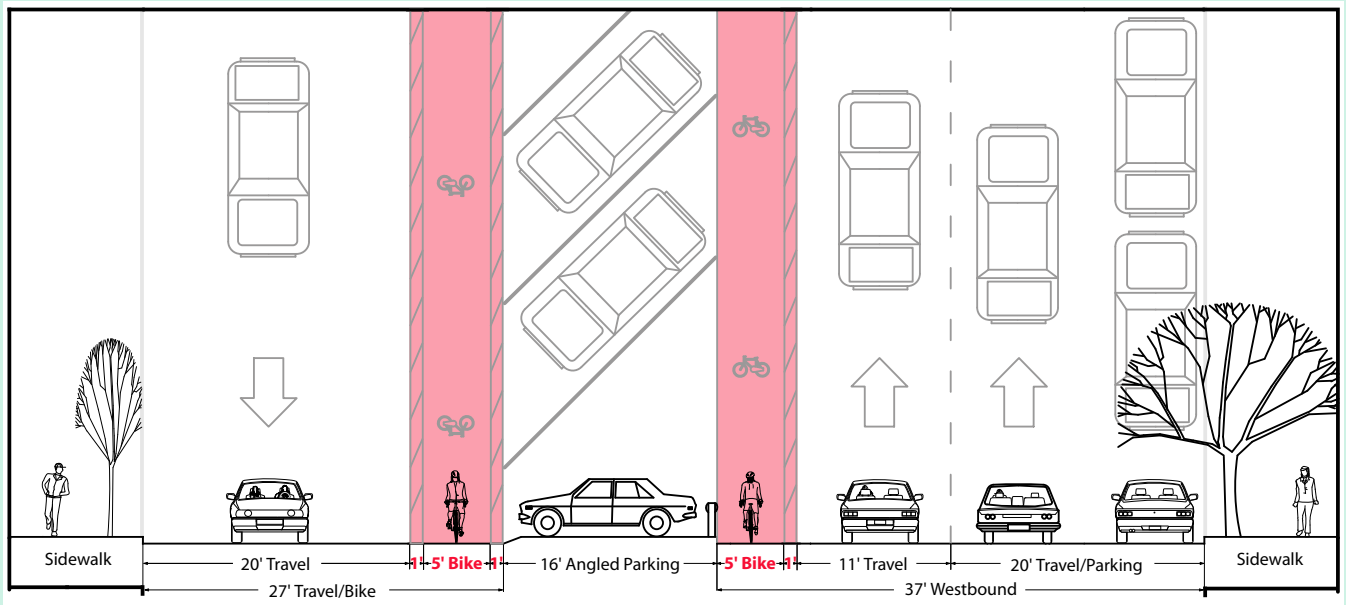
Figure 35

Link 7: Emmons Avenue – Ocean Avenue to Knapp Street

Recommendations

Option 3: Class 2 Bicycle Lanes Next to Converted Center Median

Center Median Converted to Angled Parking



Option 3

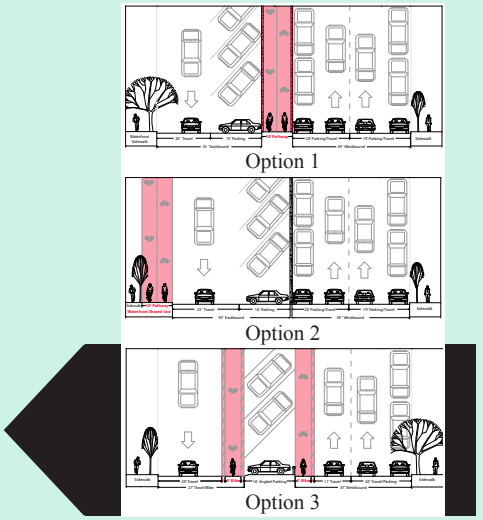


Figure 36

Long-Term Preferred Route



Link 1 - Class 1 Greenway in Parkway right-of-way, or Class 1 Greenway along Shore Road South

Link 2 - Class 1 Greenway in Parkway right-of-way, or Class 1 Greenway along Shore Road South

Link 3 - New Pedestrian and Bicycle Bridge over Coney Island Creek

Link 4 - Class 1 Greenway along north side of Neptune Avenue

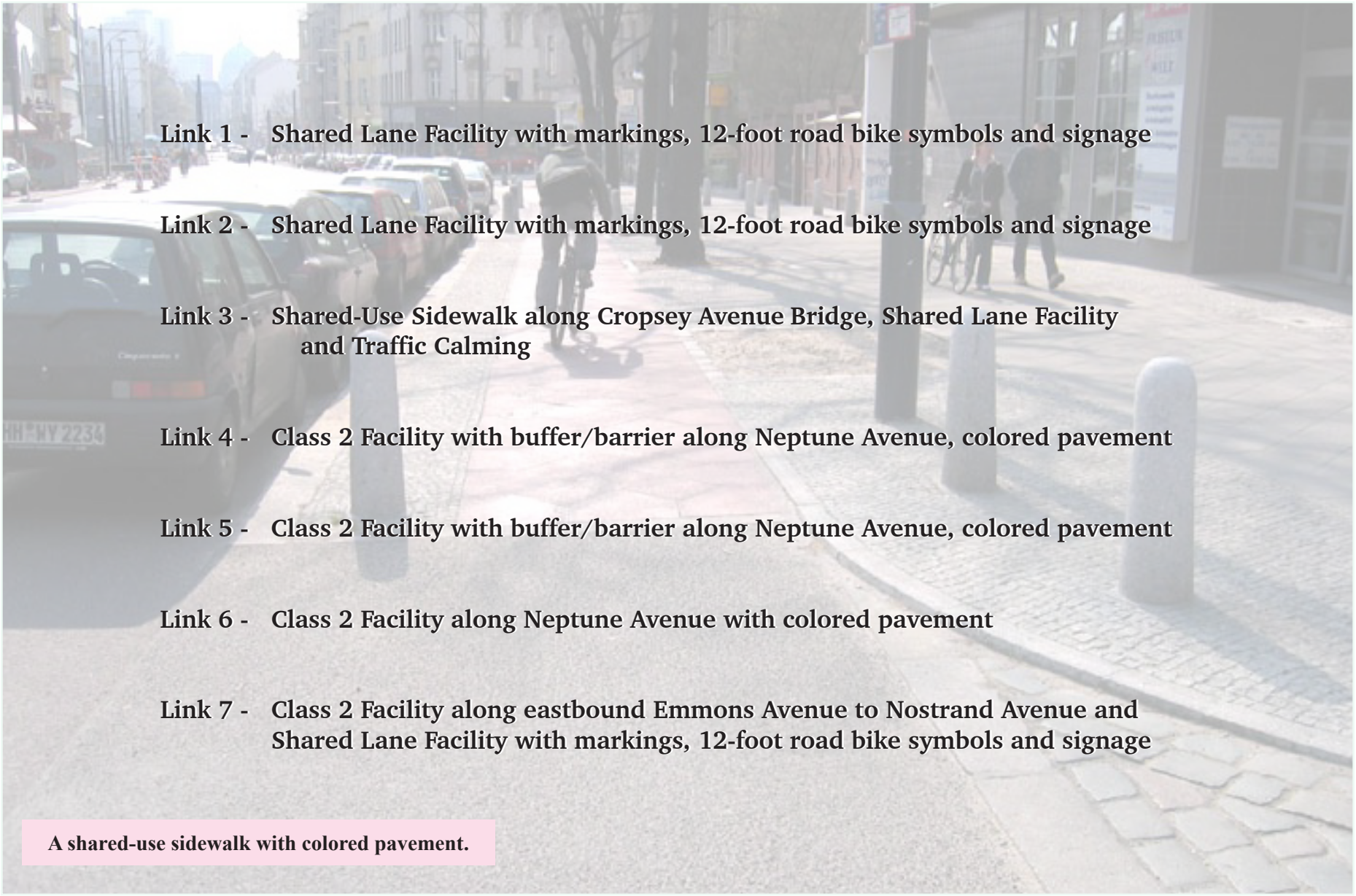
Link 5 - Class 1 Greenway along north side of Neptune Avenue

Link 6 - Class 2 Facility along Neptune Avenue

Link 7 - Class 1 Greenway along redesigned waterfront on Emmons Avenue

A separated, on-street, bi-directional bike facility.

Short-Term Preferred Route



Link 1 - Shared Lane Facility with markings, 12-foot road bike symbols and signage

Link 2 - Shared Lane Facility with markings, 12-foot road bike symbols and signage

Link 3 - Shared-Use Sidewalk along Cropsey Avenue Bridge, Shared Lane Facility and Traffic Calming

Link 4 - Class 2 Facility with buffer/barrier along Neptune Avenue, colored pavement

Link 5 - Class 2 Facility with buffer/barrier along Neptune Avenue, colored pavement

Link 6 - Class 2 Facility along Neptune Avenue with colored pavement

Link 7 - Class 2 Facility along eastbound Emmons Avenue to Nostrand Avenue and Shared Lane Facility with markings, 12-foot road bike symbols and signage

A shared-use sidewalk with colored pavement.

Appendix 1: Shared-Use Sidewalk

Introduction

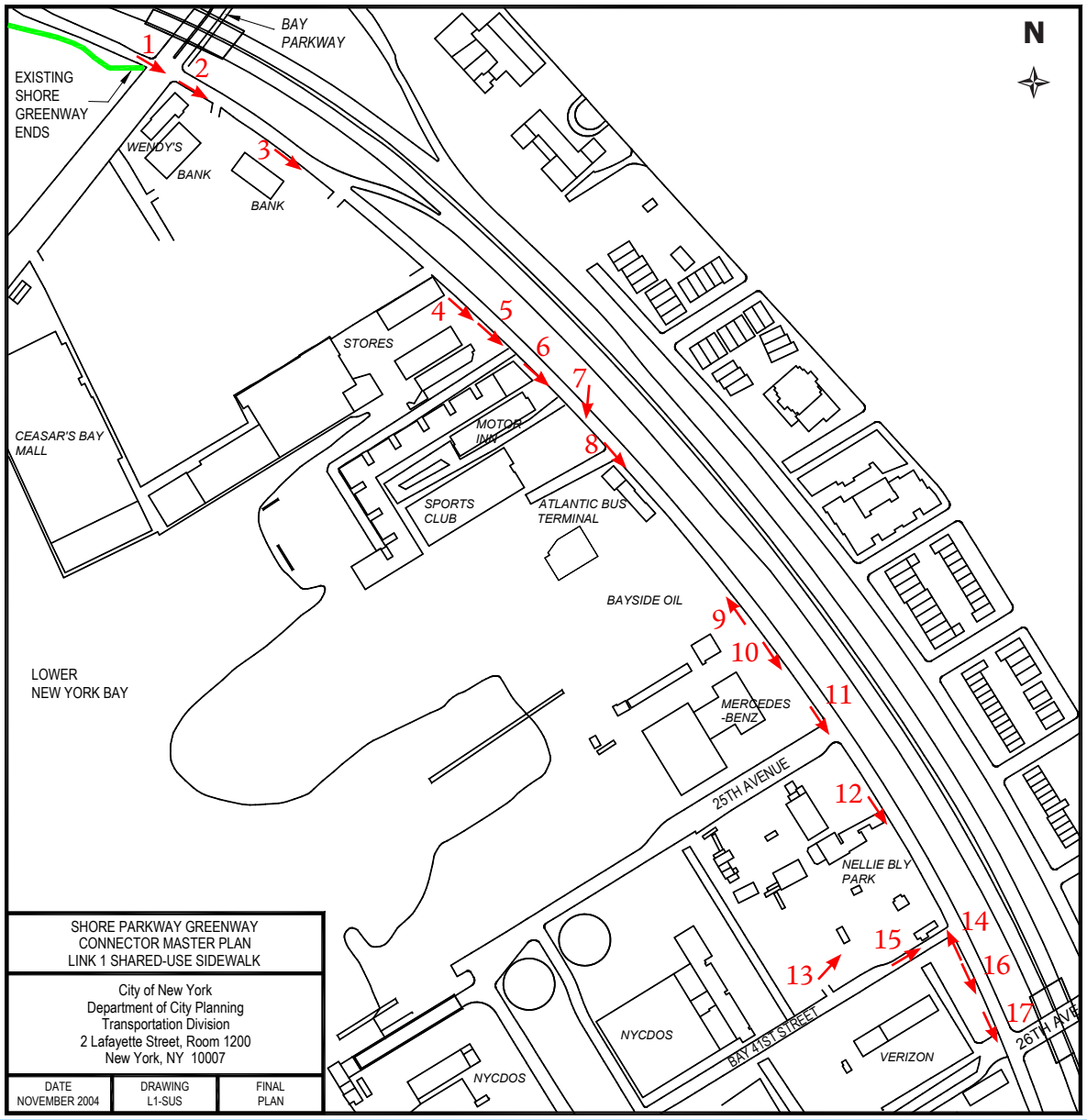
Appendix 1 examines the recommendation to build a shared-use sidewalk along Shore Road South in Link 1 and Link 2 by converting an existing sidewalk that is underutilized and has sufficient width. Wide sidewalks afford the opportunity to install off-street bicycle facilities without affecting traffic operations or the removal of a travel or parking lane. Other options recommended in Link 1 and Link 2 either take away a travel or parking lane or build an off-street greenway in the parkway right-of-way. Sidewalk conditions and width, land use, potential conflict with driveways and/or cross streets, and other issues were assessed in order to understand route conditions for bicyclists and pedestrians.

Link 1 and Link 2 are ideal locations for a shared-use sidewalk because of the low pedestrian volume, the proximity of vast tracts of parkland, the paucity of businesses in the area, the absence of residences, and the overall importance of a viable off-street bicycle link to further connect and extend the Shore Parkway Greenway. The proposed shared-use sidewalk would be 11 to 18 feet wide with a striped centerline to separate wheeled- and non-wheeled users. Appropriate signage and markings would be installed to direct pathway users, identify the route, and to alert motorized vehicles who might cross over the pathway. This type of shared-use facility has already been successfully applied to portions of the Hudson River Greenway in Manhattan which is heavily-used and has numerous crossing conflicts with facilities, businesses, tourist destinations and other attractions along the piers and waterfront.

Map 1 and Map 2 on the following two pages shows the locations where the photos of each segment were taken and the direction of the photo.

The city would assume jurisdiction, maintenance, and legal responsibility of the shared-use sidewalk. The Department of Parks & Recreation would have control over the pathway in front of Dreier-Offerman Park (Link 2), Six Diamonds Park (Link 2), and Nellie Bly Park (Link 1) and the NYCDOT would have responsibility over all the other areas.

Appendix 1: Shared-Use Sidewalk



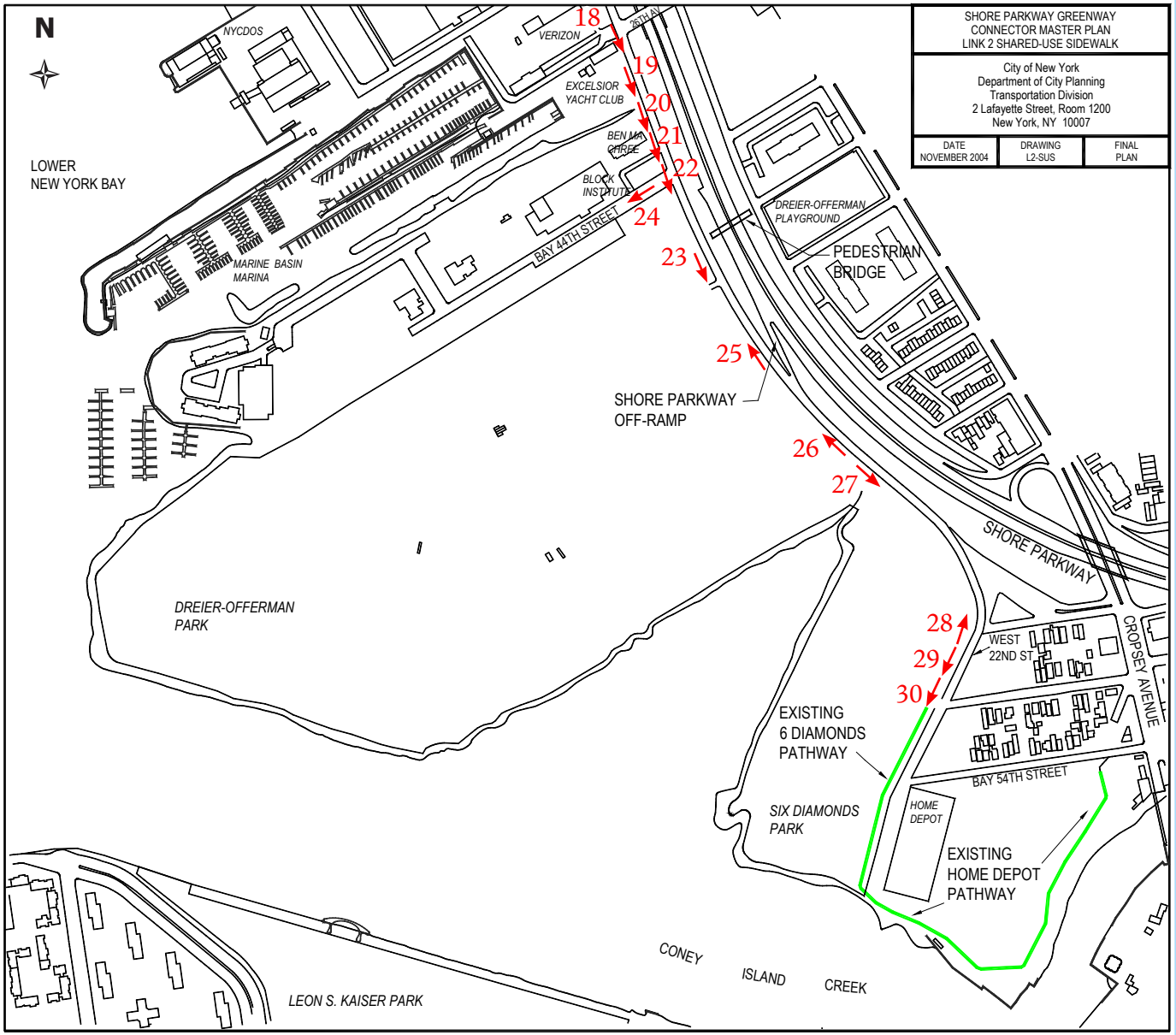
Map 1

1. *Corner of Ceasar's Bay Mall*
2. *Bus shelter*
3. *Ceasar's Bay sidewalk*
4. *Stop & Stor*
5. *Moda Furniture*
6. *Harbor Motor Inn*
7. *New York Sports Club*
8. *Atlantic Bus Terminal*
9. *Bayside Oil*
10. *Mercedes-Benz*
11. *Nellie Bly Amusement Park*
12. *Nellie Bly sidewalk*
13. *Nellie Bly parking lot*
14. *Nellie Bly at Bay 41st Street*
15. *Bay 41st Street*
16. *Verizon*
17. *Verizon entrance at 26th Avenue*

Red arrows indicate the direction of photo.

Appendix 1: Shared-Use Sidewalk

Map 2



18. Excelsior Yacht Club
19. Defunct development
20. Ben Ma Chree Boat Club
21. Block Institute
22. Dreier-Offerman Park I
23. Dreier-Offerman entrance
24. Bay 44th Street
25. Dreier-Offerman Park II
26. Bicycle riding against traffic
27. Pinch point between parks
28. Six Diamonds Park
29. West 22nd Street
30. Closed gateway

Red arrows indicate the direction of photo.

Appendix 1: Shared-Use Sidewalk







1. Corner of Ceasar's Bay

Segment Length: 20 feet
Pavement Condition: Good
Sidewalk Width: 11-15 feet
Driveways: 0
Cross Streets: 0
Photo: Looking south

Issues: Sidewalk narrows at corner from 10 feet at the traffic signal metal pole, 13 feet at the corner of Wendy's outdoor seating, to 15 feet heading east. Bay Parkway is the street in the foreground and serves as the main entrance to the mall.

2. Bus Shelter

Segment Length: 220 feet
Pavement Condition: Good
Sidewalk Width: 15 feet
Driveways: 1
Cross Streets: 0
Photo: Looking south

Issues: Sidewalk clearance at bus shelter is only 7 feet. The driveway is a one-way entrance only for the banks. Note bicyclist walking bike.

3. Ceasar's Bay Sidewalk

Segment Length: 660 feet
Pavement Condition: Good
Sidewalk Width: 16-17 feet
Driveways: 2
Cross Streets: 0
Photo: Looking south

Issues: There are 2 exit/entrances to the mall along Shore Road South. A Shore Parkway on-ramp is on the left of the photo. The majority of vehicles on Shore Road South exit onto the Parkway at this on-ramp. Note the clear sightlines on the sidewalk.

Appendix 1: Shared-Use Sidewalk







4. Stop & Stor

Segment Length: 105 feet
Pavement Condition: Good
Sidewalk Width: 17-18 feet
Driveways: 1
Cross Streets: 0
Photo: Looking south
Issues: The driveway has an electric gate that all vehicles must enter and exit through ensuring that vehicles are traveling at slow speeds. Currently people on the sidewalk do not have 100 percent visibility around the corner of the building.

5. Moda Furniture

Segment Length: 65 feet
Pavement Condition: Good
Sidewalk Width: 18 feet
Driveways: 0
Cross Streets: 0
Photo: Looking south
Issues: Visibility around the corner of the building.

6. Harbor Motor Inn

Segment Length: 100 feet
Pavement Condition: Good
Sidewalk Width: 18 feet
Driveways: 1
Cross Streets: 0
Photo: Looking south
Issues: Tree/pit located on sidewalk.

Appendix 1: Shared-Use Sidewalk







7. New York Sports Club

Segment Length: 125 feet
Pavement Condition: Fair
Sidewalk Width: 17-18 feet
Driveways: 1
Cross Streets: 0
Photo: Looking south

Issues: Sidewalk conditions start to degenerate heading east. Note bicyclist riding on the sidewalk.

8. Atlantic Bus Terminal

Segment Length: 300 feet
Pavement Condition: Poor
Sidewalk Width: 15 feet (5 paved)
Driveways: 2
Cross Streets: 0
Photo: Looking south

Issues: Sidewalk is in poor condition with cracked and uneven pavement. There are unpaved portions of the sidewalk consisting of trash, dirt and weeds. The first driveway is an entrance only that might be an unmapped street. The second driveway is an exit only with a electric sliding gate.

9. Bayside Oil

Segment Length: 270 feet
Pavement Condition: Poor
Sidewalk Width: 16 feet
Driveways: 2
Cross Streets: 0
Photo: Looking north

Issues: Sidewalk is in poor condition with cracked and uneven pavement. There are unpaved portions of the sidewalk consisting of trash, dirt and weeds and portions paved of different material. Chain-link fencing separates the property from the sidewalk.

Appendix 1: Shared-Use Sidewalk







10. Mercedes-Benz

Segment Length: 250 feet
Pavement Condition: Fair
Sidewalk Width: 17½ feet
Driveways: 0
Cross Streets: 25th Avenue
Photo: Looking south

Issues: The car dealership has slatted wrought iron fencing the length of their property. Twenty-fifth Avenue and Shore Road South create a "T" intersection.

11. Nellie Bly Amusement Park

Segment Length: 510 feet
Pavement Condition: Fair/Good
Sidewalk Width: 15 feet (5 paved)
Driveways: 0
Cross Streets: 25th Avenue
Photo: Looking south

Issues: The sidewalk in front of the park typically has 5 feet of pavement sandwiched by a 5-foot amenity strip with 7 small trees and a 5-foot strip of grass along the the fence fronting the park. Twenty-fifth Street creates a "T" intersection with Shore Road South.

12. & 13. Additional Photos - Nellie Bly

Above photo (***12***) shows the sidewalk in front of the park entrance along Shore Road South. Cars tend to park illegally on the curb at this entrance when the park is open. Photo below (***13***) shows a section of the available but unused parking lot behind the park.



Appendix 1: Shared-Use Sidewalk







14. & 15. Additional Photos
Looking at the corner of Nellie Bly Park and Bay 41st Street above (***14.***) and the Bay 41st Street intersection with Shore Road South (***15.***).



16. Verizon

Segment Length:	250 feet
Pavement Condition:	Fair
Sidewalk Width:	18 feet
Driveways:	0
Cross Streets:	0
Photo:	Looking south

Issues: Note mother and child riding their bicycles on the sidewalk.

17. Verizon entrance at 26th Avenue

Segment Length:	50 feet
Pavement Condition:	Fair
Sidewalk Width:	20+ feet
Driveways:	1
Cross Streets:	26th Avenue
Photo:	Looking south

Issues: Two-way 26th Avenue crosses under the parkway and forms a "T" intersection to the north with Shore Road South. The width of the driveway is virtually the entire width of 26th Avenue. Note bicyclist riding on the sidewalk.

Appendix 1: Shared-Use Sidewalk







18. Excelsior Yacht Club

Segment Length: 225 feet
Pavement Condition: Fair
Sidewalk Width: 11-15 feet
Driveways: 1
Cross Streets: 0
Photo: Looking south

Issues: The slanting iron gate of the yacht club creates a pinch point along the sidewalk. The driveway to the yacht club has an electric gate to access their large parking area.

19. Defunct King's Bay Development

Segment Length: 65 feet
Pavement Condition: Poor
Sidewalk Width: 15 feet (5 paved)
Driveways: 0
Cross Streets: 0
Photo: Looking south

Issues: Site is overgrown and littered with debris. There is only 5 feet of paved sidewalk but there is sufficient space to widen the sidewalk by paving over the dirt and weeds.

20. Ben Ma Chree Boat Club

Segment Length: 65 feet
Pavement Condition: Poor
Sidewalk Width: 15 feet
Driveways: 1
Cross Streets: 0
Photo: Looking south

Issues: The yacht club has a 15-foot wide driveway.

Appendix 1: Shared-Use Sidewalk







21. Block Institute

Segment Length: 170 feet
Pavement Condition: Good
Sidewalk Width: 18 feet
Driveways: 1
Cross Streets: Bay 44th Street
Photo: Looking south

Issues: The institute has an unused entrance to their parking lot behind an electric gate on Shore Road South. All vehicles enter and exit from a different gate on Bay 44th Street.

22. Dreier-Offerman Park 1

Segment Length: 450 feet
Pavement Condition: Good
Sidewalk Width: 11 feet
Driveways: 1
Cross Streets: 0
Photo: Looking south

Issues: The sidewalk along the park is 11 feet wide with 5 feet paved. There are trees and utilities along the unpaved parts of the sidewalk. Currently, there is one access point to the park (see photo ***23***). The roadbed is still 29 feet wide and functions as a single motorized vehicle travel lane.

23. & 24. Additional Photos

Above photo ***(23.)*** shows bicyclist riding against traffic in front of park entrance. Bay 44th Street ***(24.)*** has 90-degree angled parking and is the main entrance for the Block Institute.



Appendix 1: Shared-Use Sidewalk







25. Dreier-Offerman Park II
Segment Length: 955 feet
Pavement Condition: Good
Sidewalk Width: 11 feet
Driveways: 0
Cross Streets: 0
Photo: Looking north
Issues: The paved sidewalk is 5 feet wide. Note bicyclist riding on sidewalk and the blue pedestrian bridge spanning the parkway.

26. Additional Photo - Bicycle
Looking north on Shore Road South at bicyclist riding against traffic. The park is underutilized and usually vacant, but there are occasions when the park is active.

27. Additional Photo - Pinch point
Looking south where the shared-use sidewalk diverges from Shore Road South and continues on West 22nd Street. The sidewalk is paved at 11 feet wide, but there is a pinch point at the corner stanchion between Dreier-Offerman Park and Six Diamonds Park where the sidewalk is 7 feet wide.

Appendix 1: Shared-Use Sidewalk



28. Six Diamonds Park
Segment Length: 1,000 feet
Pavement Condition: Good
Sidewalk Width: 11 feet
Driveways: 0
Cross Streets: 0
Photo: Looking north
Issues: The park and the surrounding area is usually vacant, but there are occasions when the fields are in use.



29. Additional Photo - West 22nd Street
Looking south at the sidewalk along Six Diamonds Park and the back entrance to Home Depot at West 22nd Street.



30. Additional Photo - Closed Gateway
The shared-use sidewalk connects to the existing pathway behind this locked gate. Similar to the Home Depot Pathway, this path is often gated and locked.

Appendix 2: Traffic Analysis

Introduction

Recommendations to reuse excess roadbed for new bicycle lanes along the five-mile study corridor do not remove travel lanes. Excessively wide streets afford the opportunity to install on-street bicycle facilities without affecting traffic operations, and no traffic impact analysis is required. However, existing and future traffic conditions were assessed and vehicular levels-of-service (LOS) were calculated in order to better understand route conditions for cyclists and pedestrians. Data was collected and analyzed at seven major intersections along the study corridor:

Link 1: Shore Parkway Off-ramp/Shore Road South and Bay Parkway;
Link 3: Neptune Avenue and Cropsey Avenue/West 17th Street;
Link 4: Neptune Avenue and West 31st Street;
Link 5: Neptune Avenue and Stillwell Avenue;
Link 5: Neptune Avenue and Ocean Parkway;
Link 6: Neptune Avenue and Coney Island Avenue; and
Link 7: Emmons Avenue and Nostrand Avenue.

Future no-build and build traffic conditions were then identified and analyzed based on a build year of 2005 for the striping of Class 2 bicycle lanes on-street.

Appendix 2: Traffic Analysis

Highway Capacity Manual and Software

The operation of signalized intersections within the study area was analyzed applying the methodologies presented in the 2000 Highway Capacity Manual (HCM2000). These procedures evaluate signalized intersections for average delay per vehicle and level of service (LOS). The capacity analysis methodology separates an intersection approach into lane groups on the basis of the movements occurring during each signal phase. The lane groups are then analyzed to determine the specific vehicular capacity and LOS. This analysis requires the following input parameters: intersection geometry, lane utilization, number and width of travel lanes, on-street parking conditions, locations of bus stops, number of buses stopping per hour, vehicle turning movements, vehicle classification, conflicting pedestrian movements, traffic signal cycle length, and allocation of green time.

The operating characteristics of signalized intersections can be estimated and evaluated by analyzing capacity and performance. The capacity of an intersection represents the throughput of a facility (i.e., the maximum number of vehicles that can be processed in one hour). Capacity analysis results in the volume-to-capacity ratio (v/c ratio) which presents the proportion of capacity (supply) utilized by the existing traffic volume (demand). High v/c ratios (>0.85) indicate some traffic congestion, and low v/c ratios (<0.60) indicate a smooth traffic flow.

The performance of an intersection is based on the estimated average delay time (i.e., the average stopped time per vehicle) for each vehicle utilizing a roadway segment. Delay time is determined by the capacity of a lane group, the amount of green time allotted to a lane group, and the signal cycle length. Delay time is the factor which determines the LOS for a lane group. Short delays correspond to a good LOS while long delays correspond to a poor LOS. For example, an average delay of up to ten seconds per vehicle is categorized as LOS A, and 80 seconds delay is categorized as LOS F. In New York City, an LOS of mid-D, corresponding to average delay of 45 second, is considered acceptable. Table 1 describes the LOS definitions for signalized intersections.

Appendix 2: Traffic Analysis

Table 1: Level of Service Definitions for Signalized Intersections

Flow Quality	Description
Level A	Describes operation with very low delay, i.e., less than or equal to 10 seconds per vehicle. This occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
Level B	Describes operation with delay in the range of >10-20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
Level C	Describes operation with delay in the range of >20-35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although some may still pass through the intersection without stopping.
Level D	Describes operation with delay in the range of >35-55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, longer cycle lengths, or high v/c ratios. Many vehicles stop and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
Level E	Describes operation with delay in the range of >55-80 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
Level F	Describes operation with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.
Source:	*Highway Capacity Manual,* Transportation Research Board, National Research Council, Washington, D.C., 2000

Appendix 2: Traffic Analysis

Data Collection

As mentioned, a traffic analysis was performed to assure the feasibility of recommendations to narrow the roadway on Shore Parkway South and on Neptune and Emmons avenues to accommodate new pedestrian and bicycle facilities. The studies involved extensive field work, route reconnaissance, and data collection, including automatic and manual traffic volume and vehicle classification counts.

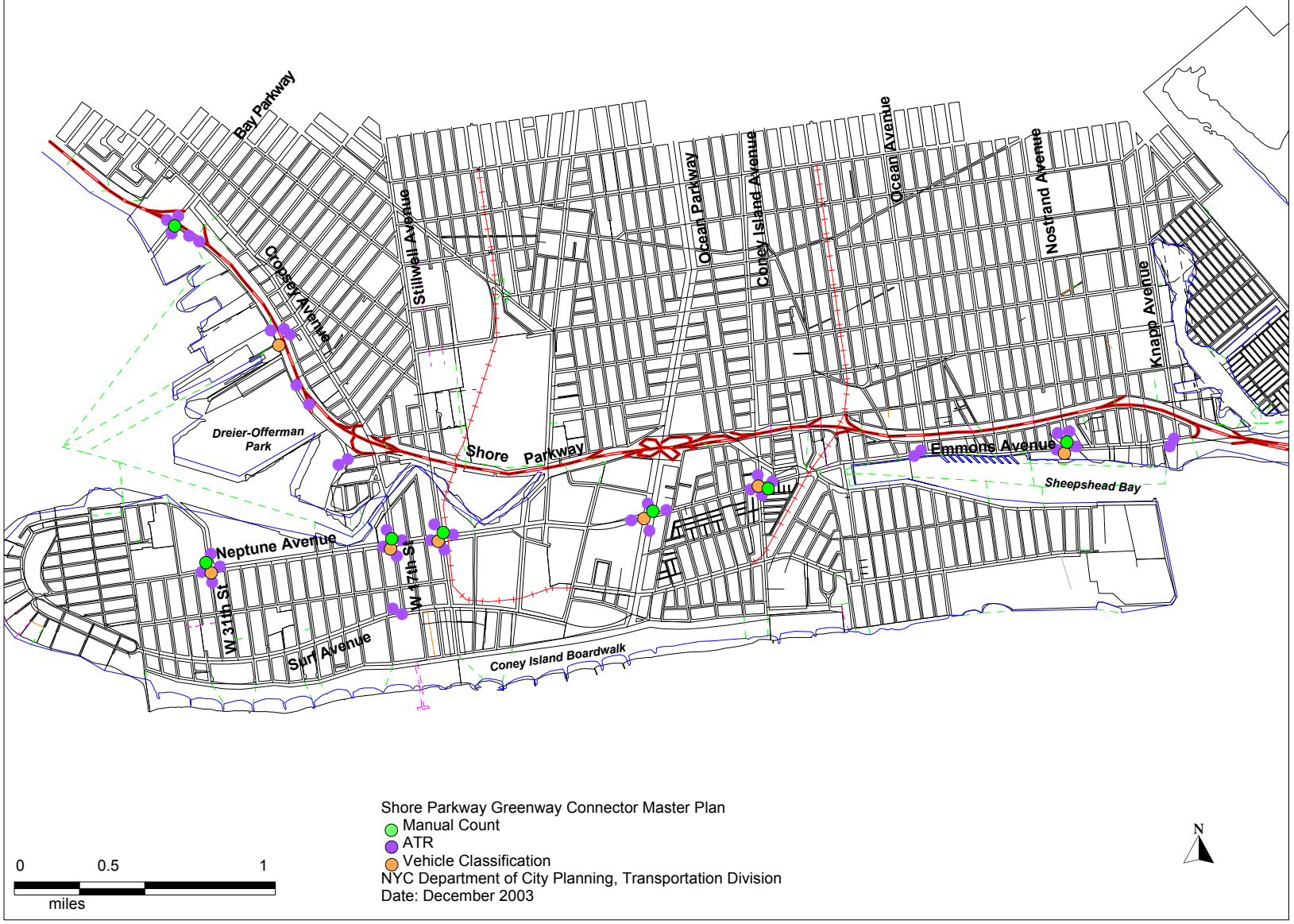
Vehicular Traffic

Forty-two automatic traffic recorders (ATRs) were setup at various locations along the corridor for a two-week period in July 2003. Data was collected in the summer, a period typically considered abnormal for traffic studies, in order to capture the peak seasonal traffic generated by activities on the Coney Island waterfront.

A preliminary AM, MD, PM and weekend peak hour in the corridor was identified using available study area ATRs from the past three years. Then two-hour manual counts were conducted at the seven selected intersections for the AM (7:30-9:30 am), MD (12:00-2:00 pm), PM (4:30-6:30 pm), and weekend (12:00-2:00 pm) peak period during the same period in July when ATR data was collected. Twenty-minute (or one-hundred-vehicle minimum) vehicle classification counts were also conducted at these seven intersections. Map 1 shows automatic and manual count and vehicle classification locations. (Vehicles entering or exiting the mall to/from Shore Road South were counted at three parking lot driveways.)

Appendix 2: Traffic Analysis

Map 1. ATR, Manual Count and Vehicle Classification Count Locations, August 2003



Appendix 2: Traffic Analysis

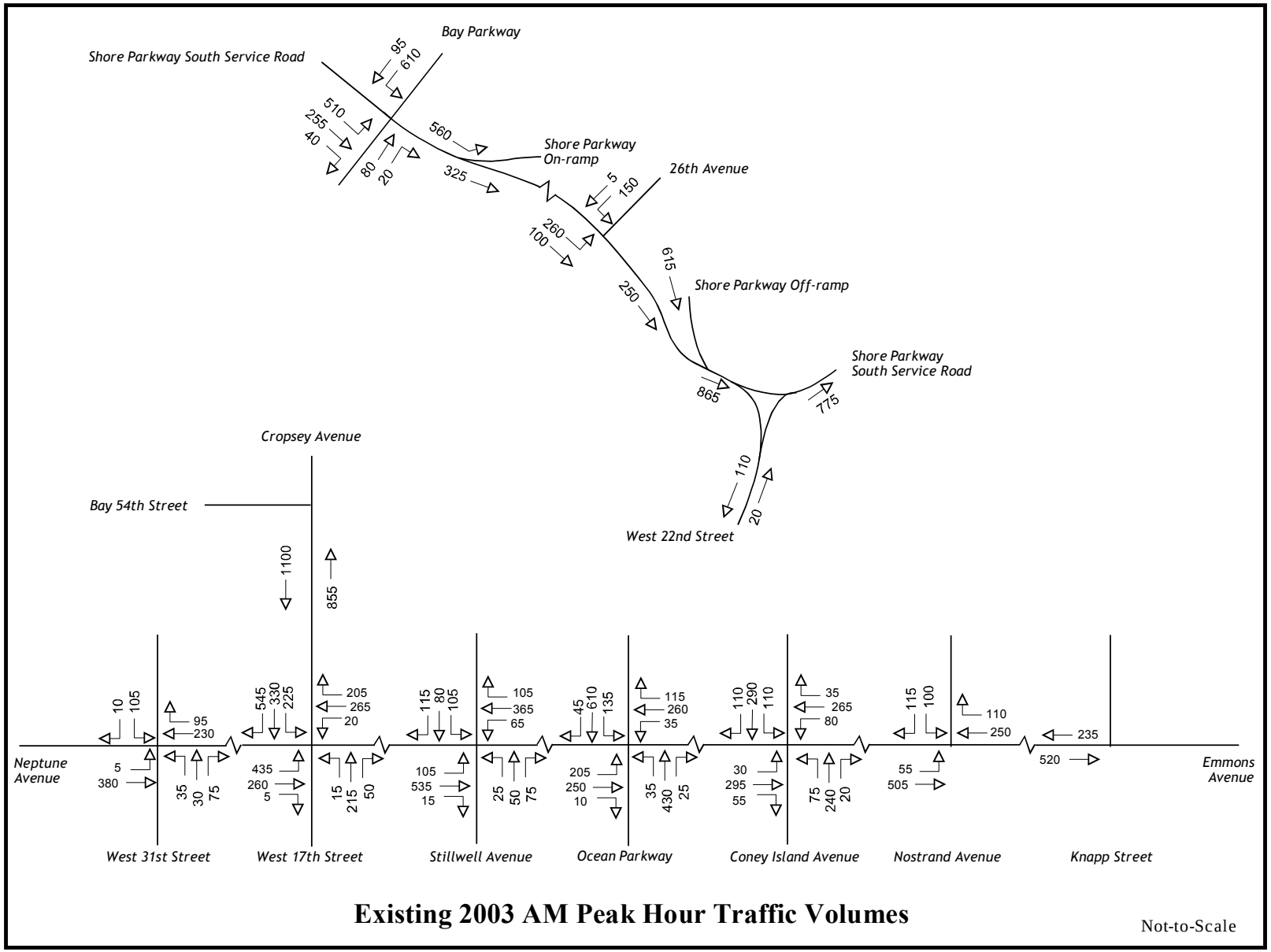
Existing Conditions

Typical weekday and weekend peak hour traffic volumes were compiled for the AM (8:15-9:15 am), MD (1:00-2:00 pm), PM (5:00-6:00 pm), and weekend (Saturday 1:00-2:00 pm) from old and new ATRs, manual counts, and axle factor data. The balanced existing traffic volumes for each period are shown in Figures 1, 2, 3 and 4, respectively. Traffic signal phasing and timing was requested from the City DOT, verified in the field, and reconfirmed with DOT. Bus and parking movements were studied and recorded, and, at key intersections, pedestrians and bicyclists were counted.

Table 2 presents a summary of the existing LOS at the seven intersections. Cropsey and Neptune avenues experience the worst overall traffic conditions, especially the southbound left turn movement. East- west traffic on Neptune Avenue at Stillwell Avenue has a low level of service, perhaps due to the allocation of more green time (76 seconds) to the north- south traffic at the expense of signal time (34 seconds) for the east-west traffic. Eastbound left turns on Neptune Avenue at Ocean Parkway operate poorly at LOS E. During the morning peak hour, the eastbound left and through movements on Emmons and Neptune avenues operate at LOS E due to traffic bound for the Shore Parkway.

Appendix 2: Traffic Analysis

Figure 1

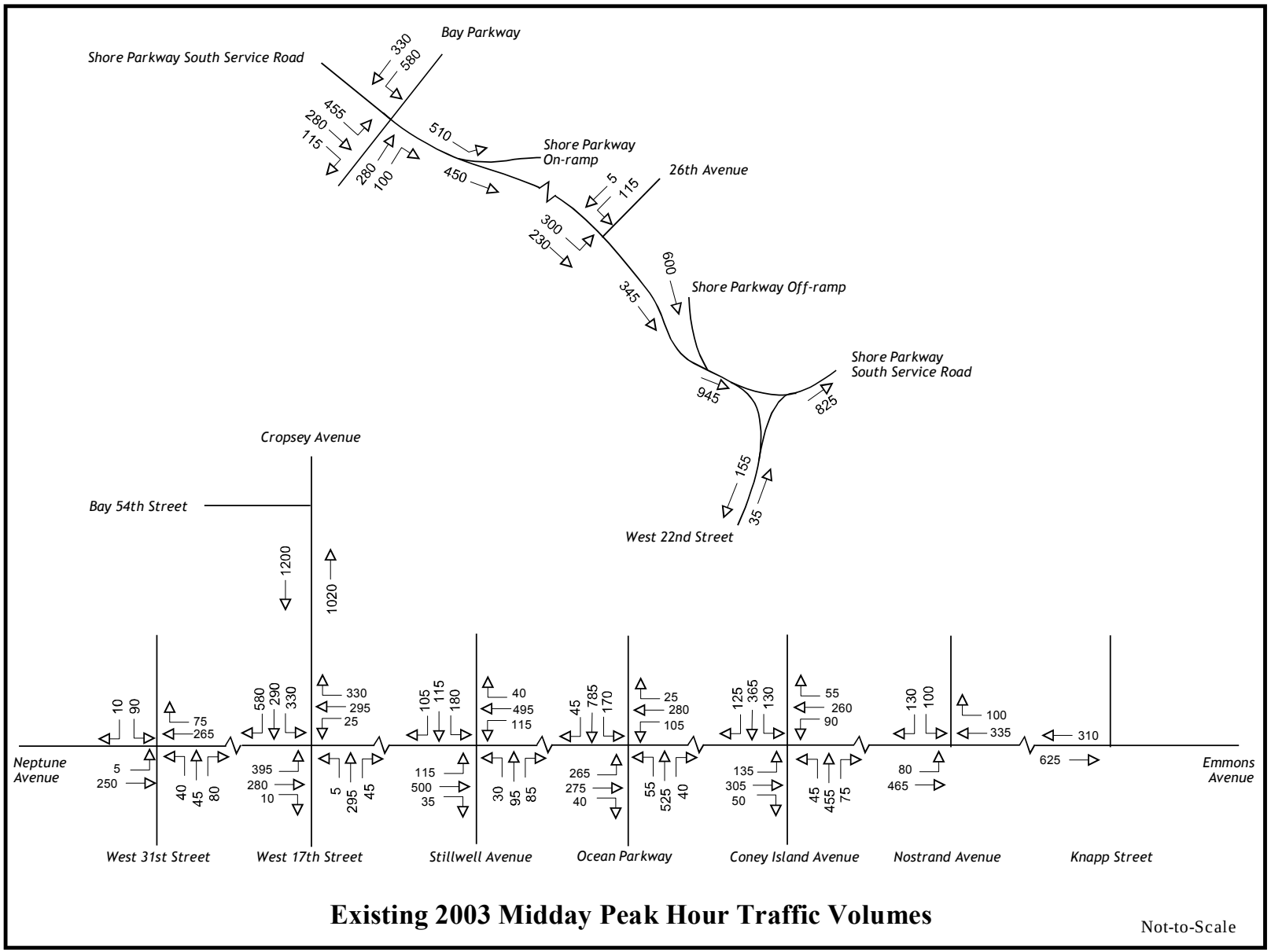


Existing 2003 AM Peak Hour Traffic Volumes

Not-to-Scale

Appendix 2: Traffic Analysis

Figure 2

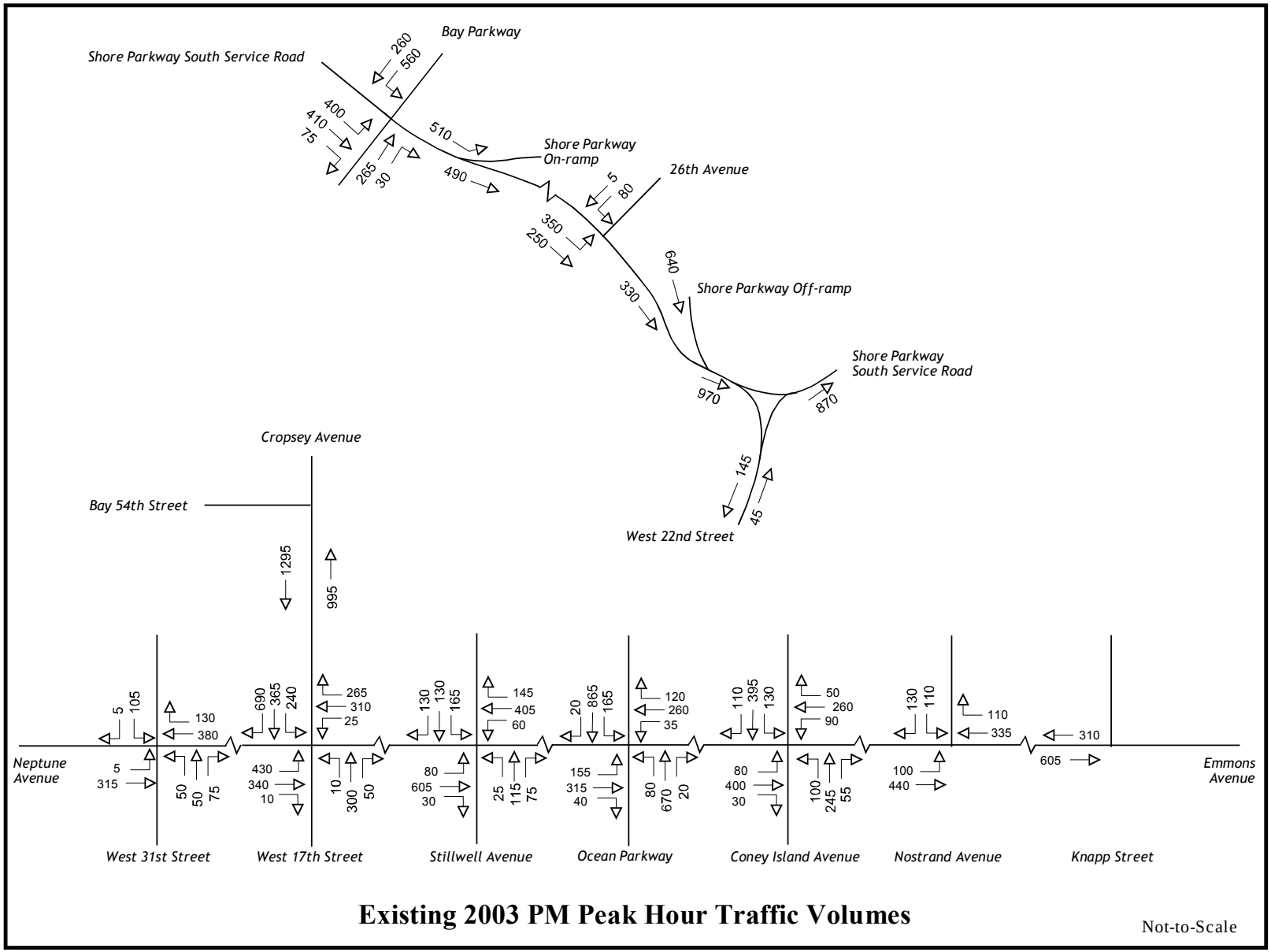


Existing 2003 Midday Peak Hour Traffic Volumes

Not-to-Scale

Appendix 2: Traffic Analysis

Figure 3

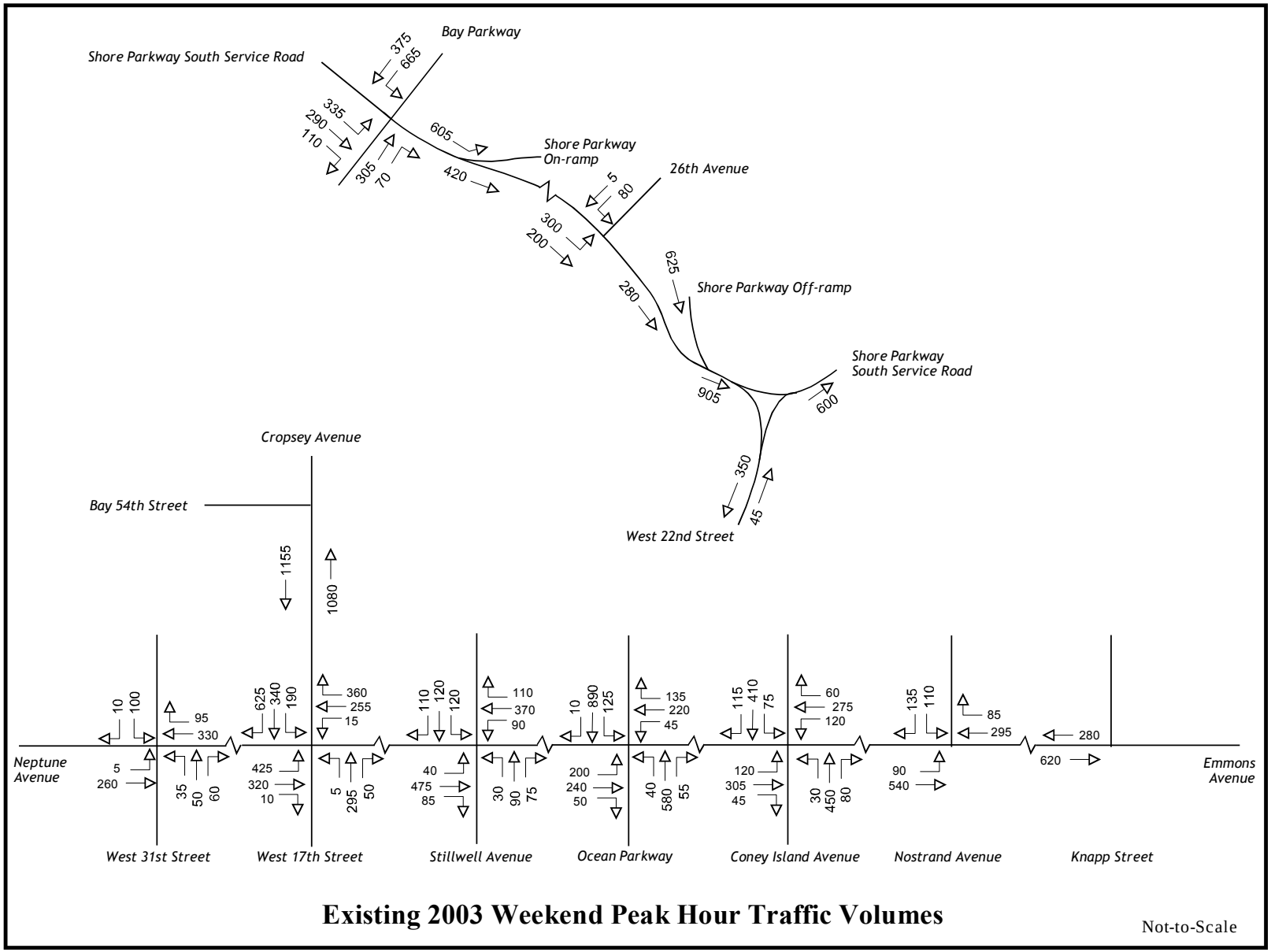


Existing 2003 PM Peak Hour Traffic Volumes

Not-to-Scale

Appendix 2: Traffic Analysis

Figure 4



Existing 2003 Weekend Peak Hour Traffic Volumes

Not-to-Scale

Appendix 2: Traffic Analysis

Table 2

2003 Existing Traffic Conditions

		Weekday									Weekend		
Signalized	Lane	AM (7:15am-8:15am)			MD (1:00pm-2:00pm)			PM (5:00pm-6:00pm)			MD (1:00pm-2:00pm)		
Intersections	Group	V/C Ratio	Delay (sec/veh)	LOS	V/C Ratio	Delay (sec/veh)	LOS	V/C Ratio	Delay (sec/veh)	LOS	V/C Ratio	Delay (sec/veh)	LOS
Shore Pkwy Service Rd (E)	**EB-L**	1.00	79.9	E	0.88	46.6	D	0.80	49.5	D	0.63	31.3	C
Bay Parkway (N-S)	**EB-TR**	0.59	39.2	D	0.80	39.9	D	0.99	77.9	E	0.78	38.7	D
	NB-T	0.13	32.2	C	0.37	28.1	C	0.33	35.1	D	0.40	28.6	C
	NB-R	0.07	31.9	C	0.33	29.2	C	0.09	32.2	C	0.23	27.5	C
	SB-L	0.26	23.6	C	0.33	23.8	C	0.23	24.1	C	0.43	27.2	C
	SB-LT	0.40	38.4	D	0.84	45.2	D	0.60	42.5	D	0.90	52.0	D
Neptune Avenue (E-W)	**EB-LT**	0.29	11.7	B	0.17	10.8	B	0.23	11.2	B	0.19	10.9	B
West 31 Street (N-S)	**WB-TR**	0.17	10.7	B	0.19	10.9	B	0.27	11.6	B	0.23	11.3	B
	NB-LTR	0.37	24.7	C	0.42	25.7	C	0.4	25.3	C	0.34	24.2	C
	SB-L	0.31	24.1	C	0.32	24.4	C	0.34	24.6	C	0.26	23	C
	SB-R	0.03	19.9	B	0.03	19.9	B	0.01	19.8	B	0.02	19.8	B
Neptune Avenue (E-W)	**EB-L**	0.61	15.5	B	0.51	14.5	B	0.61	15.8	B	0.53	14.9	B
Cropsey Avenue (N-S)	**EB-TR**	0.17	10.2	B	0.18	10.3	B	0.23	10.8	B	0.20	10.5	B
	WB-L	0.09	22.2	C	0.12	22.7	C	0.13	23.0	C	0.07	21.9	C
	WB-TR	0.50	26.6	C	0.68	30.5	C	0.62	28.7	C	0.66	29.7	C
	NB-LTR	0.74	38.5	D	0.94	61.4	E	1.00	75.1	E	0.85	45.8	D
	SB-L	0.91	66.8	E	0.98	73.1	E	0.97	78.1	E	0.92	72.9	E
	SB-T	0.61	30.1	C	0.56	28.9	C	0.68	32.5	C	0.61	30.2	C
	SB-R	0.44	12.6	B	0.49	13.4	B	0.56	14.4	B	0.49	13.3	B
Neptune Avenue (E-W)	**EB-LTR(DEF L)**	0.52	19.8	B	0.54	27.6	C	0.54	20	C	0.39	17.8	B
Stillwell Avenue (N-S)	**(EB-TR)**				0.47	19.0	B						
	WB-LTR	0.66	23.8	C	0.83	32.0	C	0.73	26.1	C	0.67	24.2	C
	NB-LTR	0.18	15.8	B	0.22	16.1	B	0.25	16.5	B	0.19	15.8	B
	SB-LTR(DEF L)	0.43	19.1	B	0.44	20.9	C	0.53	20.9	C	0.43	18.9	B
	(SB-TR)				0.46	20.8	C						
Neptune Avenue (E-W)	**EB-L**	0.84	62.3	E	0.93	76.8	E	0.53	31.2	C	0.67	42.8	D
Ocean Parkway (N-S)	**EB-T**	0.45	28.8	C	0.43	27.0	C	0.50	29.5	C	0.37	25.7	C
	EB-R	0.02	21.9	C	0.08	21.4	C	0.08	22.6	C	0.09	21.6	C
	WB-LTR	0.57	39.6	D	0.61	39.2	D	0.55	39.3	D	0.50	36.0	D
	NB-L	0.10	21.1	C	0.17	26.5	C	0.27	31.8	C	0.13	26.8	C
	NB-TR	0.34	29.5	C	0.44	32.3	C	0.56	34.5	C	0.49	33.1	C
	SB-L	0.34	23.1	C	0.45	30.3	C	0.51	36.5	D	0.34	27.5	C
	SB-TR	0.54	32.8	C	0.66	36.8	D	0.77	40.5	D	0.71	38.1	D
Neptune Avenue (E-W)	**EB-L**	0.23	36.6	D	0.48	25.2	C	0.61	55.6	E	0.46	24.7	C
Coney Island Avenue (N-S)	**EB-TR**	0.93	71.2	E	0.62	25.8	C	0.98	77.9	E	0.62	25.6	C
	WB-L	0.76	76.9	E	0.37	22.5	C	0.79	77.3	E	0.48	25.4	C
	WB-TR	0.78	52.7	D	0.56	24.3	C	0.83	57.2	E	0.57	24.1	C
	NB-LTR	0.26	10.1	B	0.49	17.5	B	0.34	11.0	B	0.45	16.8	B
	SB-LTR	0.39	11.5	B	0.68	22.1	C	0.46	12.5	B	0.55	18.6	B
Emmons Avenue (E-W)	**EB-LT**	1.00	69.4	E	0.51	19.6	B	0.57	26.1	C	0.56	20.5	C
Nostrand Avenue (N-S)	**WB-TR**	0.29	20.9	C	0.34	17.1	B	0.35	21.6	C	0.32	16.8	B
	SB-L	0.19	19.9	B	0.16	15.4	B	0.16	19.5	B	0.16	15.4	B
	SB-R	0.25	21.0	C	0.24	16.5	B	0.23	20.5	C	0.23	16.3	B

Shaded area indicates "E" level-of-service.

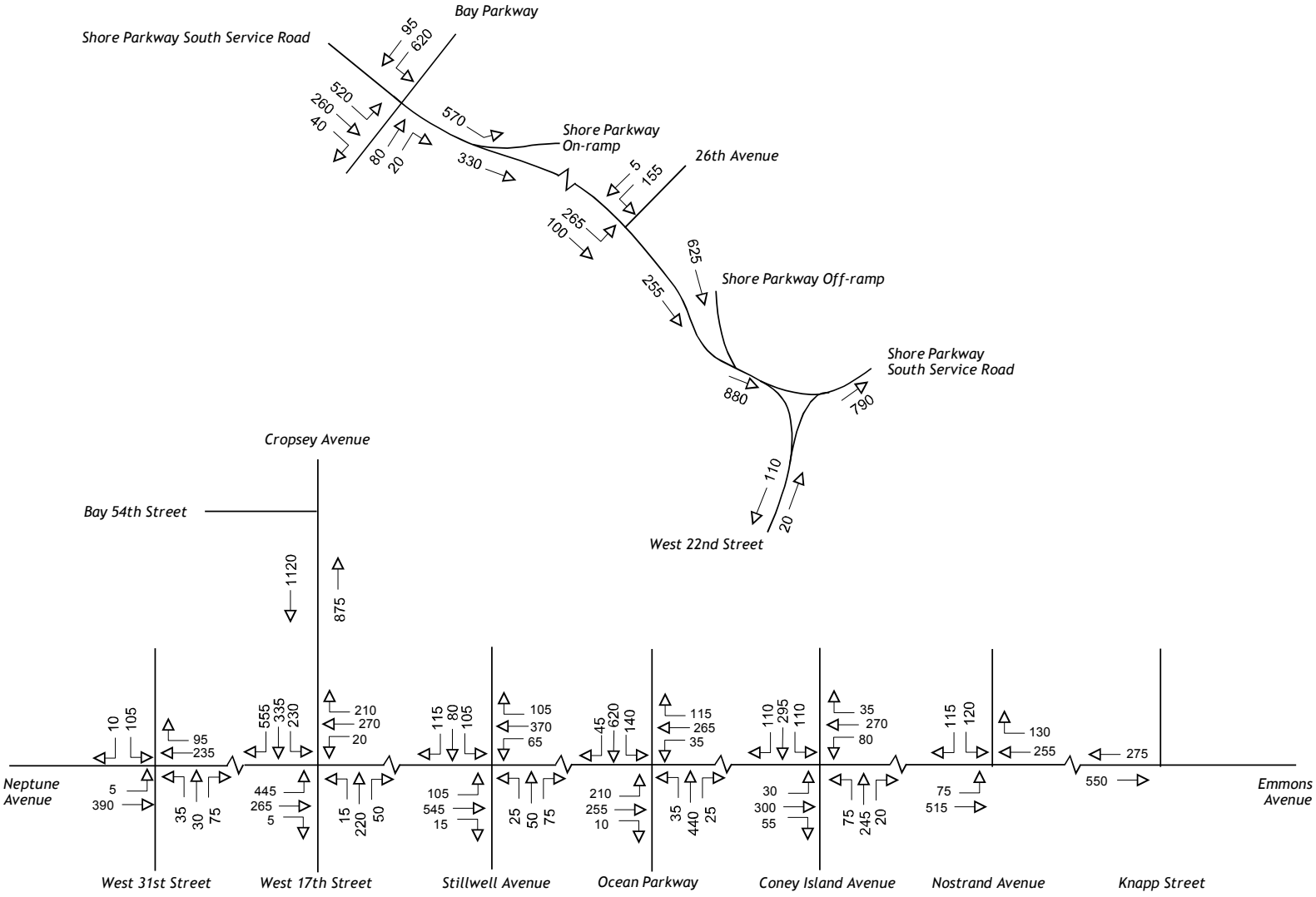
Appendix 2: Traffic Analysis

Future No-Build Conditions

Based on the existing traffic volumes, 2005 future no-build traffic volumes were constructed. A background one percent annual growth rate, as specified for Brooklyn in the updated City Environmental Quality Review (CEQR) Technical Manual, was applied to the existing traffic volume from 2003 to 2004. At year 2004, a 125-unit residential development on Emmons Avenue is planned. Using standard trip generation and assignment methodologies, the number of project-generated trips was calculated and added to the street network. Then another one percent annual growth rate was applied to the 2004 network with development to determine 2005 future traffic volumes for each intersection for each peak hour at as shown in Figures 5, 6, 7, and 8, respectively.

Appendix 2: Traffic Analysis

Figure 5

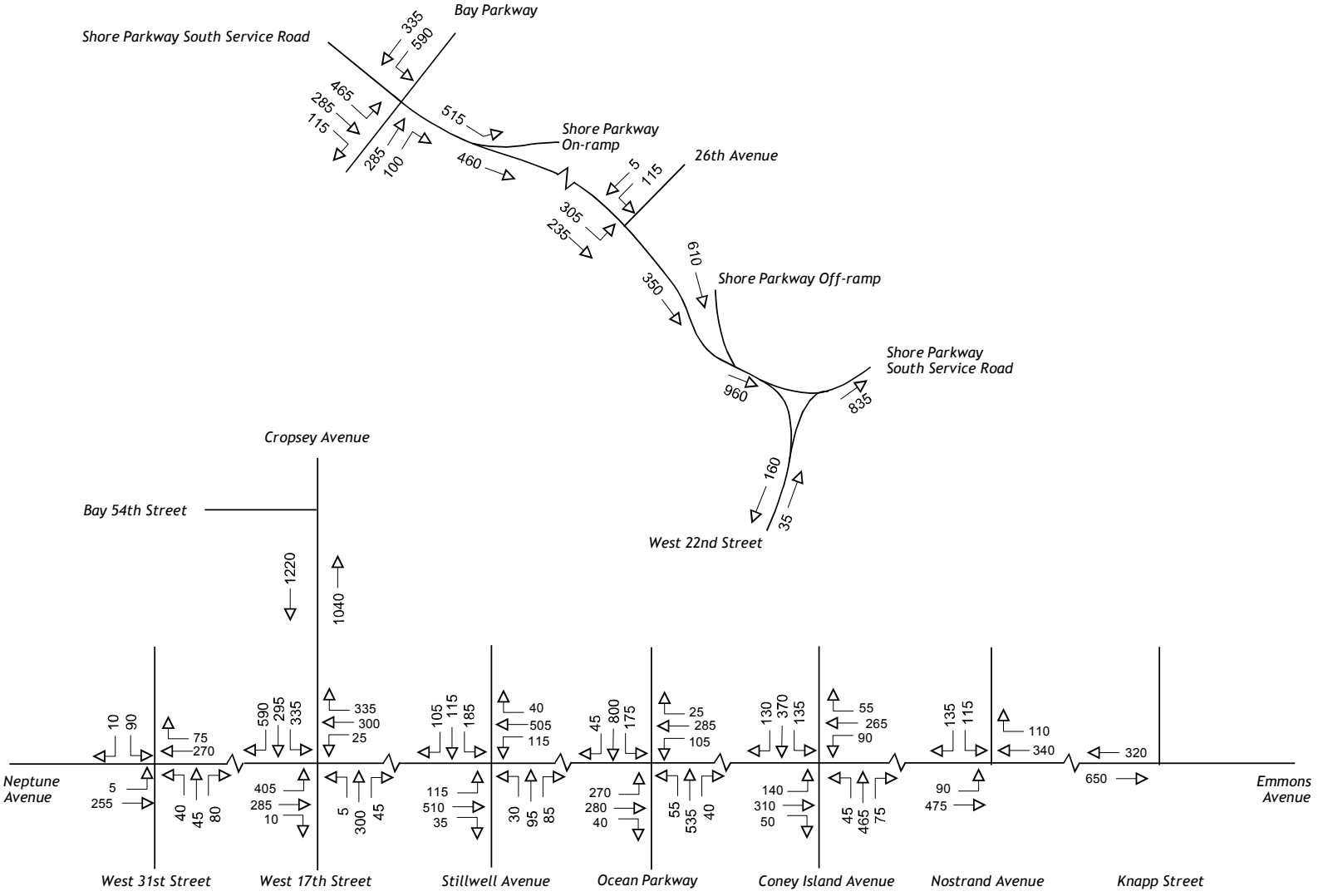


Future No-Build 2005 AM Peak Traffic Volumes

Not-to-Scale

Appendix 2: Traffic Analysis

Figure 6

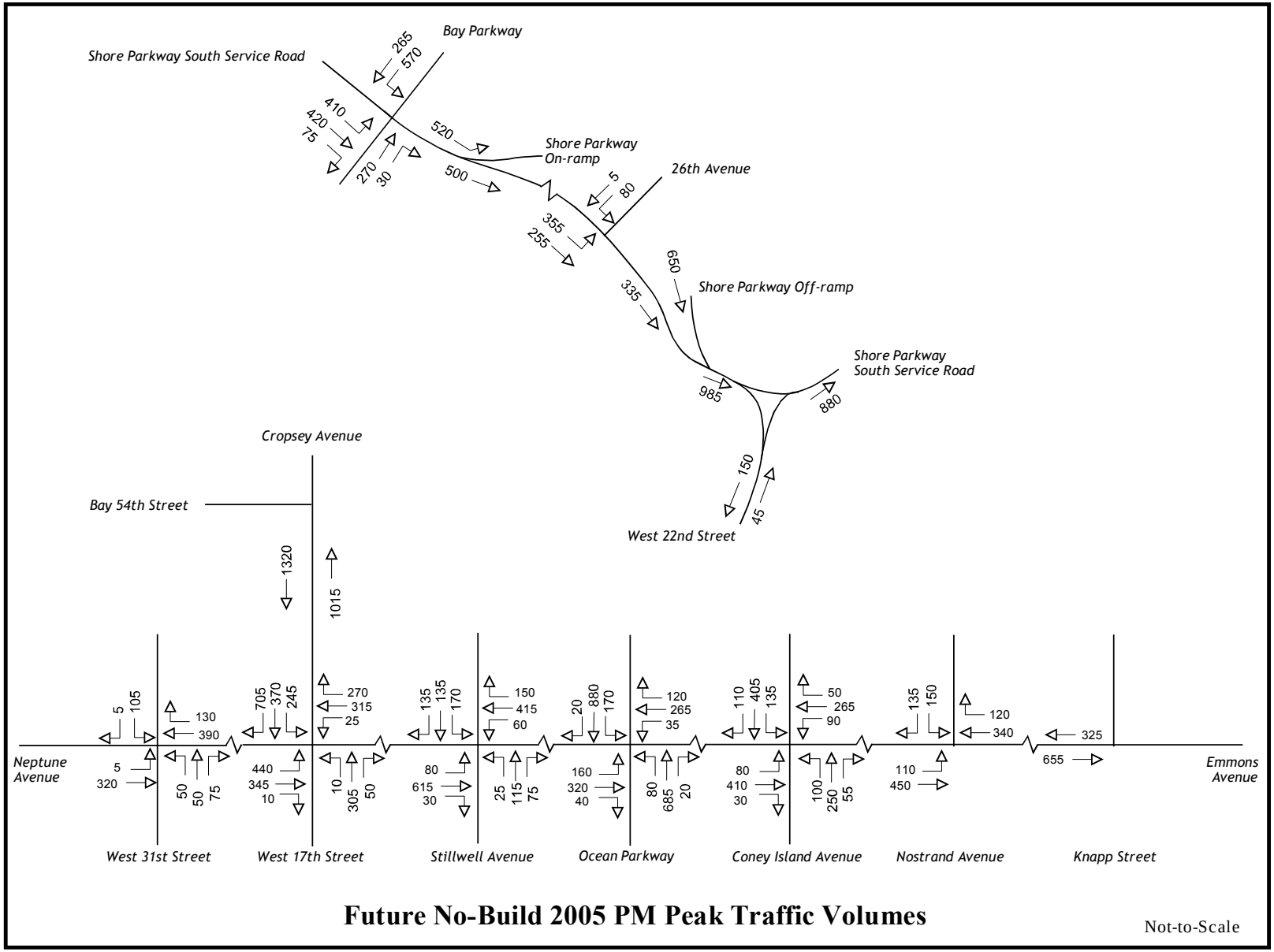


Future No-Build 2005 MD Peak Traffic Volumes

Not-to-Scale

Appendix 2: Traffic Analysis

Figure 7

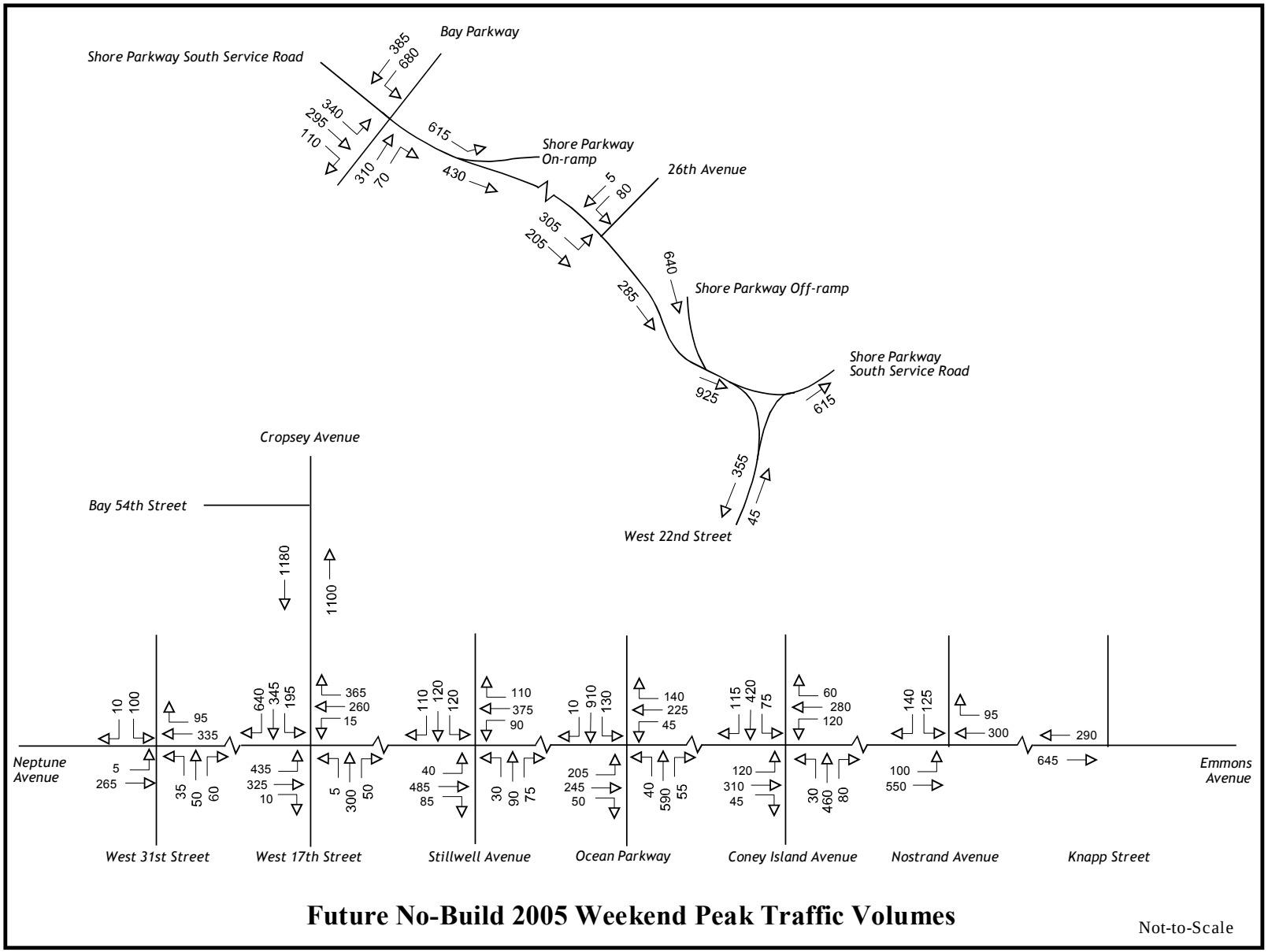


Future No-Build 2005 PM Peak Traffic Volumes

Not-to-Scale

Appendix 2: Traffic Analysis

Figure 8



Future No-Build 2005 Weekend Peak Traffic Volumes

Not-to-Scale

Appendix 2: Traffic Analysis

Table 3

2005 Future No-Build Conditions

		Weekday									Weekend		
Signalized	**Lane**	**AM (7:15am-8:15am)**			**MD (1:00pm-2:00pm)**			**PM (5:00pm-6:00pm)**			**MD (1:00pm-2:00pm)**		
Intersections	**Group**	**V/C Ratio**	**Delay (sec/veh)**	**LOS**	**V/C Ratio**	**Delay (sec/veh)**	**LOS**	**V/C Ratio**	**Delay (sec/veh)**	**LOS**	**V/C Ratio**	**Delay (sec/veh)**	**LOS**
Shore Pkwy Service Rd (E)	**EB-L**	1.02	84.9	F	0.90	49.1	D	0.82	51.2	D	0.64	31.6	C
Bay Parkway (N-S)	**EB-TR**	0.60	39.6	E	0.81	40.6	D	1.01	83.0	F	0.79	39.3	D
	NB-T	0.13	32.2	C	0.37	28.2	C	0.34	35.2	D	0.41	28.6	C
	NB-R	0.08	31.9	C	0.33	29.2	C	0.09	32.2	C	0.23	27.5	C
	SB-L	0.28	24.1	C	0.36	24.4	C	0.25	24.7	C	0.51	28.2	C
	SB-LT	0.41	38.5	D	0.85	46.3	D	0.61	42.8	D	0.93	55.2	E
Neptune Avenue (E-W)	**EB-LT**	0.3	11.8	B	0.18	10.8	B	0.23	11.2	B	0.19	10.9	B
West 31 Street (N-S)	**WB-TR**	0.17	10.8	B	0.2	10.9	B	0.28	11.7	B	0.24	11.3	B
	NB-LTR	0.37	24.7	C	0.42	25.7	C	0.4	25.3	C	0.34	24.2	C
	SB-L	0.31	24.1	C	0.32	24.4	C	0.34	24.6	C	0.26	23	C
	SB-R	0.03	19.9	B	0.03	19.9	B	0.01	19.8	B	0.02	19.8	B
Neptune Avenue (E-W)	**EB-L**	0.62	15.7	B	0.52	14.7	B	0.62	16.1	B	0.54	15.1	B
Cropsey Avenue (N-S)	**EB-TR**	0.17	10.3	B	0.18	10.3	B	0.23	10.8	B	0.20	10.5	B
	WB-L	0.09	22.2	C	0.12	22.7	C	0.13	23.0	C	0.07	21.9	C
	WB-TR	0.51	26.8	C	0.69	30.8	C	0.63	29.0	C	0.67	30.0	C
	NB-LTR	0.75	39.4	D	0.96	64.4	E	1.02	78.8	E	0.86	47.1	D
	SB-L	0.93	70.7	E	0.99	76.7	E	0.99	82.8	F	0.94	77.9	E
	SB-T	0.61	30.3	C	0.57	29.2	C	0.69	32.8	C	0.62	30.5	C
	SB-R	0.44	12.7	B	0.50	13.5	B	0.57	14.6	B	0.50	13.5	B
Neptune Avenue (E-W)	**EB-LTR(DEF L)**	0.53	19.9	B	0.55	28.1	C	0.55	20.2	C	0.4	17.9	B
Stillwell Avenue (N-S)	**(EB-TR)**				0.48	19.2	B						
	WB-LTR	0.67	24	C	0.85	33.1	C	0.75	26.8	C	0.68	24.4	C
	NB-LTR	0.18	15.8	B	0.22	16.1	B	0.25	16.5	B	0.19	15.8	B
	SB-LTR(DEF L)	0.43	19.1	B	0.45	21.1	C	0.55	21.3	C	0.43	18.9	B
	(SB-TR)				0.46	20.8	C						
Neptune Avenue (E-W)	**EB-L**	0.86	66.2	E	0.96	82.3	F	0.55	31.8	C	0.69	44.9	D
Ocean Parkway (N-S)	**EB-T**	0.46	29.0	C	0.44	27.2	C	0.50	29.7	C	0.38	25.8	C
	EB-R	0.02	21.9	C	0.08	21.4	C	0.08	22.6	C	0.09	21.6	C
	WB-LTR	0.57	39.8	D	0.62	39.4	D	0.56	39.5	D	0.51	36.3	D
	NB-L	0.10	21.3	C	0.17	26.9	C	0.27	32.3	C	0.13	27.2	C
	NB-TR	0.35	29.6	C	0.45	32.4	C	0.58	34.7	C	0.50	33.3	C
	SB-L	0.36	23.7	C	0.47	31.1	C	0.53	37.7	D	0.36	28.2	C
	SB-TR	0.55	33.0	C	0.67	37.1	D	0.79	41.0	D	0.73	38.6	D
Neptune Avenue (E-W)	**EB-L**	0.23	36.8	D	0.51	26.0	C	0.61	55.6	E	0.47	25.0	C
Coney Island Avenue (N-S)	**EB-TR**	0.94	74.0	E	0.63	26.0	C	1.00	83.8	F	0.63	25.9	C
	WB-L	0.79	82.3	F	0.37	22.6	C	0.79	77.3	E	0.48	25.7	C
	WB-TR	0.79	53.6	D	0.57	24.5	C	0.84	58.5	E	0.58	24.3	C
	NB-LTR	0.27	10.2	B	0.50	17.6	B	0.34	11.1	B	0.46	16.9	B
	SB-LTR	0.39	11.5	B	0.71	23.0	C	0.48	12.8	B	0.56	18.8	B
Emmons Avenue (E-W)	**EB-LT**	1.16	123	F	0.54	20.2	C	0.61	27.2	C	0.6	21.2	C
Nostrand Avenue (N-S)	**WB-TR**	0.31	21.2	C	0.36	17.2	B	0.36	21.8	C	0.33	16.9	B
	SB-L	0.23	20.5	C	0.18	15.7	B	0.22	20.3	C	0.18	15.7	B
	SB-R	0.25	21	C	0.24	16.6	B	0.23	20.6	C	0.23	16.4	B

Shaded area indicates an "E" or "F" level of service.

Appendix 2: Traffic Analysis

Future Build Conditions

HCS LOS analysis was conducted using the 2005 future no-build traffic volumes, as summarized in Table 3. LOS deteriorated during some or all peak periods, requiring mitigation at five intersections:

1. Shore Parkway Off-ramp/South Service Road and Bay Parkway in the AM, PM, and weekend peak;
2. Neptune Avenue and Cropsey avenues during all peak periods;
3. Neptune Avenue and Ocean Parkway in the AM and Midday peak;
4. Neptune Avenue and Coney Island Avenue in the AM and PM peak; and
5. Emmons and Nostrand avenues in the AM peak period.

Signal timing changes, recommended to address the poor vehicular LOS, improve the performance of each analyzed intersection as summarized in Table 4. Improved traffic conditions would benefit bicyclists and pedestrians by reducing vehicular congestion and facilitating turning movements. Table 5 shows a comparison of the existing and proposed signal timing at each of the five intersections.

Appendix 2: Traffic Analysis

Table 4

2005 Future No-Build Conditions with Recommended Signal Timing Changes

		Weekday									Weekend		
Signalized Intersections	Lane Group	AM (7:15am-8:15am) V/C Ratio	AM (7:15am-8:15am) Delay (sec/veh)	AM (7:15am-8:15am) LOS	MD (1:00pm-2:00pm) V/C Ratio	MD (1:00pm-2:00pm) Delay (sec/veh)	MD (1:00pm-2:00pm) LOS	PM (5:00pm-6:00pm) V/C Ratio	PM (5:00pm-6:00pm) Delay (sec/veh)	PM (5:00pm-6:00pm) LOS	MD (1:00pm-2:00pm) V/C Ratio	MD (1:00pm-2:00pm) Delay (sec/veh)	MD (1:00pm-2:00pm) LOS
Shore Pkwy Service Rd (E)	**EB-L**	0.90	55.5	E	0.90	49.1	D	0.73	40.8	D	0.64	31.6	C
Bay Parkway (N-S)	**EB-TR**	0.53	33.8	C	0.81	40.6	D	0.89	54.6	D	0.79	39.3	D
	NB-T	0.14	34.6	C	0.37	28.2	C	0.37	37.9	D	0.44	30.8	C
	NB-R	0.09	34.2	C	0.33	29.2	C	0.10	34.6	C	0.25	29.5	C
	SB-L	0.38	29.2	C	0.36	24.4	C	0.35	29.9	C	0.54	28.0	C
	SB-LT	0.44	40.5	D	0.85	46.3	D	0.66	45.6	D	0.84	43.7	D
Neptune Avenue (E-W)	**EB-LT**	0.3	11.8	B	0.18	10.8	B	0.23	11.2	B	0.19	10.9	B
West 31 Street (N-S)	**WB-TR**	0.17	10.8	B	0.2	10.9	B	0.28	11.7	B	0.24	11.3	B
	NB-LTR	0.37	24.7	C	0.42	25.7	C	0.4	25.3	C	0.34	24.2	C
	SB-L	0.31	24.1	C	0.32	24.4	C	0.34	24.6	C	0.26	23	C
	SB-R	0.03	19.9	B	0.03	19.9	B	0.01	19.8	B	0.02	19.8	B
Neptune Avenue (E-W)	**EB-L**	0.62	17.9	B	0.51	16.8	B	0.61	18.2	B	0.53	17.3	B
Cropsey Avenue (N-S)	**EB-TR**	0.18	12.4	B	0.20	12.5	B	0.26	13.0	B	0.22	12.7	B
	WB-L	0.11	25.4	C	0.14	26.0	C	0.15	26.4	C	0.08	25.0	C
	WB-TR	0.59	31.3	C	0.80	38.4	D	0.73	34.9	C	0.78	36.9	D
	NB-LTR	0.66	30.9	C	0.84	42.7	D	0.90	48.8	D	0.76	34.8	C
	SB-L	0.82	48.1	D	0.88	49.0	D	0.87	54.0	D	0.83	53.1	D
	SB-T	0.54	25.4	C	0.50	24.6	C	0.60	27.0	C	0.55	25.5	C
	SB-R	0.41	10.3	B	0.46	10.9	B	0.53	11.8	B	0.47	10.9	B
Neptune Avenue (E-W)	**EB-LTR(DEF L)**	0.53	19.9	B	0.55	28.1	C	0.55	20.2	C	0.4	17.9	B
Stillwell Avenue (N-S)	**(EB-TR)**				0.48	19.2	B						
	WB-LTR	0.67	24	C	0.85	33.1	C	0.75	26.8	C	0.68	24.4	C
	NB-LTR	0.18	15.8	B	0.22	16.1	B	0.25	16.5	B	0.19	15.8	B
	SB-LTR(DEF L)	0.43	19.1	B	0.45	21.1	C	0.55	21.3	C	0.43	18.9	B
	(SB-TR)				0.46	20.8	C						
Neptune Avenue (E-W)	**EB-L**	0.79	53.6	D	0.82	53.3	D	0.55	31.8	C	0.69	44.9	D
Ocean Parkway (N-S)	**EB-T**	0.44	27.3	C	0.42	24.8	C	0.50	29.7	C	0.38	25.8	C
	EB-R	0.02	20.7	C	0.08	19.6	B	0.08	22.6	C	0.09	21.6	C
	WB-LTR	0.57	39.8	D	0.65	42.0	D	0.56	39.5	D	0.51	36.3	D
	NB-L	0.10	22.8	C	0.19	29.4	C	0.27	32.3	C	0.13	27.2	C
	NB-TR	0.37	31.2	C	0.45	32.4	C	0.58	34.7	C	0.50	33.3	C
	SB-L	0.37	25.4	C	0.51	34.9	C	0.53	37.7	D	0.36	28.2	C
	SB-TR	0.58	34.9	C	0.67	37.1	D	0.79	41.0	D	0.73	38.6	D
Neptune Avenue (E-W)	**EB-L**	0.15	28.3	C	0.51	26.0	C	0.49	40.6	D	0.47	25.0	C
Coney Island Avenue (N-S)	**EB-TR**	0.76	45.0	D	0.63	26.0	C	0.82	46.8	D	0.63	25.9	C
	WB-L	0.48	39.3	D	0.37	22.6	C	0.63	50.6	D	0.48	25.7	C
	WB-TR	0.64	38.5	D	0.57	24.5	C	0.68	40.3	D	0.58	24.3	C
	NB-LTR	0.30	14.2	B	0.50	17.6	B	0.39	15.5	B	0.46	16.9	B
	SB-LTR	0.44	16.1	B	0.71	23.0	C	0.54	18.0	B	0.56	18.8	B
Emmons Avenue (E-W)	**EB-LT**	0.96	53.2	D	0.54	20.2	C	0.61	27.2	C	0.6	21.2	C
Nostrand Avenue (N-S)	**WB-TR**	0.27	16.3	B	0.36	17.2	B	0.36	21.8	C	0.33	16.9	B
	SB-L	0.27	25.9	C	0.18	15.7	B	0.22	20.3	C	0.18	15.7	B
	SB-R	0.3	26.7	C	0.24	16.6	B	0.23	20.6	C	0.23	16.4	B

*Shaded is where changes applied.

Appendix 2: Traffic Analysis

Table 5

2003 Existing and Recommended Signal Timing Changes

INTERSECTION AND APPROACH	AM				MD/SAT				PM			
	Phase	Existing Green	Recommended Green	Y/R	Phase	Phase	Recommended Green	Y/R	Phase	Phase	Recommended Green	Y/R
Shore Pkwy South Service Rd/Bay Pkwy												
EB LTR/	1	37	42	5	1	28	28	5	1	37	42	5
NB Ped/	2	8	8	~	2	8	8	~	2	8	8	~
NB TR /SB LT	3	34	31	5	3	24	22	5	3	34	31	5
SB LT	4	26	24	5	4	15	17	5	4	26	24	5
Cycle Length		*120*				*90*				*120*		
Neptune Avenue/West 31st Street												
EB LT /WB T	1	48.6	63	5.4	1	48.6	48.6	5.4	1	48.6	48.6	5.4
NB LTR /SB LR	2	30.6	47	5.4	2	30.6	30.6	5.4	2	30.6	30.6	5.4
Cycle Length		*90*				*90*				*90*		
Neptune Avenue/Cropsey Avenue												
EB LTR/SB R	1	15.3	15.3	5.4	1	15.3	15.3	5.4	1	15.3	15.3	5.4
EB LTR /WB LTR	2	28.8	24.8	5.4	2	28.8	24.8	5.4	2	28.8	24.8	5.4
NB LTR /SB LTR	3	29.7	33.7	5.4	3	29.7	33.7	5.4	3	29.7	33.7	5.4
Cycle Length		*90*				*90*				*90*		
Neptune Avenue/Ocean Parkway												
EB LTR/	1	9	11	5	1	8	13	5	1	9	9	5
EB LTR /WB LTR	2	34	34	6	2	37	35	6	2	34	34	6
NB LTR /SB LTR	3	42	40	5	3	40	40	5	3	40	40	5
NB L /SB L	4	14	14	5	4	14	11	5	4	16	16	5
Cycle Length		*120*				*120*				*120*		
Neptune Avenue/Coney Island Avenue												
EB LTR /WB LTR	1	34	42	5	1	37	37	5	1	34	42	5
NB LTR /SB LTR	2	76	68	5	2	43	43	5	2	76	68	5
Cycle Length		*120*				*90*				*120*		

Shaded areas indicate change in signal timing.

Appendix 3: Parking Analysis

Introduction

Recommendations developed in Links 1 and 7 propose to eliminate on-street parking and reassign road space as Class 2 bicycle lanes. In Link 1 recommended options to stripe a bi-directional bicycle facility on-street or build a shared-use sidewalk eliminate parking on the south side of Shore Road South. In Link 7 proposed options to stripe bicycle lanes along either the curb or the median remove a lane of parking on Emmons Avenue. Parking capacity and utilization studies were conducted to assess the potential impacts of the recommended actions.

Data Collection

On-street parking conditions were examined on Shore Road South between Bay Parkway and 26th Street, and on Emmons Avenue between Ocean Avenue and Knapp Street. Extensive field work, route reconnaissance, and data collection was completed over the course of several days in Summer 2003 in order to capture the peak seasonal traffic generated by activities on the Coney Island waterfront. For both street segments the study compiled data on curbside parking regulations, the number of available parking spaces, including metered spaces, on each side of the street, and the number of cars parked legally or illegally during the weekday AM, MD, and PM peak hour.

Appendix 3: Parking Analysis

On-Street Parking

Link 1: Existing Conditions
Off-street parking lots at the mall adjacent to the Shore Parkway South Service Road and Bay Parkway provide over 1,200 parking spaces, thereby satisfying most of the parking demand in the area. Shore Road South between Bay Parkway and 26th Street has a total of 118 on-street parallel parking spaces, 101 spaces along the north curb and 17 metered spaces along the south curb. During the AM, MD, and PM peak periods, the occupancy rates along the north curb were 65, 63, and 58 percent, respectively. Combining the17 metered parking spaces and illegal parking on the south curb, the occupancy rates were 68, 70, and 61 percent during the morning, midday, and evening peak periods, respectively. The capacity and utilization rates are shown in Table 1.

Link 1: Future Conditions
The elimination of the 17 parking spaces from the south curb would result in occupancy rates along the north curb of 80, 83, and 72 percent in the AM, Midday, and PM peak hours, respectively. The 101 north-side parking spaces would be sufficient to meet the existing demand, although the removal of metered spaces would result in a loss of revenue.

Link 7: Existing Conditions
Emmons Avenue between Ocean Avenue and Knapp Street provides on-street parking along both the north and south curbs and along either side of the raised/painted median. On eastbound Emmons Avenue there are 26 parallel parking spaces along the south curb and 221 angled parking spaces along the center median; on westbound Emmons Avenue there are 86 parallel parking spaces along the north curb and 150 parallel parking spaces along the median. The total utilization rates during the AM, MD, and PM peak periods (Tables 2 and 3) are 75, 93, and 63 percent, respectively.

Link 7: Future Conditions
The proposed removal of the parallel parking lane along the westbound center median for approximately 10 blocks would result in a loss of 150 spaces, reducing the overall on-street parking supply from 483 to 333 spaces. During the AM peak, 29 spaces, or 9 percent of the existing demand, would not be met. During the MD peak, 118 spaces, or 35 percent of the demand, would not be met. During the PM peak, 92 percent of the available spaces would be occupied, resulting in an excess supply of 28 spaces. The elimination of a parking lane to provide on-street bicycle lanes is not supported by the analysis.

Appendix 3: Parking Analysis

Table 1

Link 1: Existing Parking Capacity and Utilization

Northside - Curbside									Southside - Curbside									
			Number of Spaces Occupied									Number of Spaces Occupied						
			AM		MD		PM					AM		MD		PM		
	Signage*	Available Parking Spaces	Legal	Illegal	Legal	Illegal	Legal	Illegal		Signage*	Available Parking Spaces	Legal	Illegal	Legal	Illegal	Legal	Illegal
Bay Parkway									**Bay Parkway**									
between	3	0	0	0	0	0	0	0	*between*	2, 3, 4	0	0	0	0	0	0	0	0
Shore Parkway On Ramp									**Shore Parkway On Ramp**									
between	8	22	19	0	16	0	9	0	*between*	2	0	0	0	0	0	0	0	0
East end of Mall									**East End of Mall**									
between	8	20	20	0	16	0	18	0	*between*	4, 6, 7	9 Meters	2	3	5	3	8	0	
After New York Sport Club									**Atlantic Express**									
between	8	22	18	0	21	0	20	0	*between*	4, 6, 7	8 Meters	1	0	4	0	4	1	
Bayside Oil									**Bayside Oil**									
between	3, 8	10	6	0	3	0	7	0	*between*	2	0	0	0	0	0	0	0	
25th Avenue									**25th Avenue**									
between	8	27	3	0	8	0	5	0	*between*	1	0	0	1	0	0	0	0	
Bay 41st Street									**Bay 41st Street**									
between	3	0	0	0	0	0	0	0	*between*	4, 5	0	0	7	0	7	0	0	
26th Avenue									**26th Avenue**									

* Posted Signs Chart

1 = No Signage
2 = No Parking Anytime
3 = No Standing Anytime
4 = Bus Stop
5 = Bus No Parking Sign
6 = No Parking 8:30-9am Sat
7 = 3 Hour Parking 9am-9pm
8 = No Parking 9-10:30am Sat

Appendix 3: Parking Analysis

Table 2

Link 7 Existing Parking Capacity and Utilization ~ Eastbound

Eastbound																		
Northside - Median									Southside - Curbside									
Street	Signage*	Available Parking Spaces	Number of Spaces Occupied						Street	Signage*	Available Parking Spaces	Number of Spaces Occupied						
			AM		MD		PM					AM		MD		PM		
			Legal	Illegal	Legal	Illegal	Legal	Illegal				Legal	Illegal	Legal	Illegal	Legal	Illegal	
Ocean Avenue									**Ocean Avenue**									
between	N	19**	1	0	14	0	5	0	*between*	N	0	0	0	0	0	0	0	0
E 21 Street									**E 21 Street**									
between	N	54	39	0	54	2	23	0	*between*	N	0	0	0	0	0	0	0	0
Dooley Street									**Dooley Street**									
between	N	17	17	0	17	1	0	0	*between*	N	0	0	0	0	0	0	0	0
E. 23 Street									**E. 23 Street**									
between	N	2	2	0	2	0	0	0	*between*	N	0	0	0	0	0	0	0	0
Bedford Avenue									**Bedford Avenue**									
between	N	18	18	0	18	0	3	0	*between*	N	0	0	0	0	0	0	0	0
E. 26 Street									**E. 26 Street**									
between	N	20	16	0	17	0	4	0	*between*	N	0	0	2	0	0	0	0	0
E. 27 Street									**E. 27 Street**									
between	N	13	9	0	12	0	12	0	*between*	N	0	0	1	0	0	0	0	0
E. 28 Street									**E. 28 Street**									
between	N	18	3	0	9	0	6	0	*between*	N	0	0	0	0	0	0	0	0
E. 29 Street									**E. 29 Street**									
between	N	18	6	0	9	0	8	0	*between*	N	0	0	0	0	1	0	0	0
Nostrand Avenue									**Nostrand Avenue**									
between	N	30	21	0	26	0	27	0	*between*	N	20	15	1	20	1	18	0	0
Batchelder Street									**Batchelder Street**									
between	N	6	3	0	1	0	2	0	*between*	N	5	4	1	5	2	4	0	0
Ford Street									**Ford Street**									
between	N	6	6	0	3	0	2	0	*between*	N	0	0	0	0	0	0	0	0
Coyle Street									**Coyle Street**									
between	N	8	6	0	5	0	4	0	*between*	N	1	1	2	0	2	0	2	0
Bragg Street									**Bragg Street**									
between	N	11	11	0	7	0	9	0	*between*	N	0	0	0	0	0	0	0	0
Brigham Street									**Brigham Street**									
between	N	0	0	0	0	0	0	0	*between*	N	0	0	0	0	0	0	0	0
Knapp Street									**Knapp Street**									

* N = No Signage
** Parking Meter Spaces

Appendix 3: Parking Analysis

Table 3

Link 7 Existing Parking Capacity and Utilization ~ Westbound

Westbound																		
Southside - Median									Northside - Curbside									
Street	Signage*	Available Parking Spaces	Number of Spaces Occupied						Street	Signage*	Available Parking Spaces	Number of Spaces Occupied						
			AM		MD		PM					AM		MD		PM		
			Legal	Illegal	Legal	Illegal	Legal	Illegal				Legal	Illegal	Legal	Illegal	Legal	Illegal	
Knapp Street									**Knapp Street**									
between	N	9	7	0	7	0	9	0	*between*	N	7	5	0	6	0	7	1	
Brigham Street									**Brigham Street**									
between	N	10	9	0	8	0	9	0	*between*	N	6	4	0	4	0	5	0	
Bragg Street									**Bragg Street**									
between	N	9	9	0	7	0	5	0	*between*	N	6	4	0	6	0	3	0	
Coyle Street									**Coyle Street**									
between	N	7	7	0	6	0	5	0	*between*	N	3	3	0	3	0	1	0	
Ford Street									**Ford Street**									
between	N	6	5	0	4	0	1	0	*between*	N	5	2	1	2	0	2	0	
Batchelder Street									**Batchelder Street**									
between	N	14	10	0	13	1	9	0	*between*	N	5	4	0	4	1	4	0	
Brown Street									**Brown Street**									
between	N	0	0	0	0	0	0	0	*between*	N	1	0	0	0	0	1	0	
Haring Street									**Haring Street**									
between	N	13	10	0	11	0	11	0	*between*	N	12	6	0	8	0	9	1	
Nostrand Avenue									**Nostrand Avenue**									
between	N	8	4	0	5	0	8	0	*between*	N	8	1	0	3	0	5	0	
E. 29 Street									**E. 29 Street**									
between	N	8	5	0	5	0	7	0	*between*	N	8	0	0	4	0	0	0	
E. 28 Street									**E. 28 Street**									
between	N	7	6	1	6	0	4	0	*between*	N	0	0	0	0	1	0	1	
E. 27 Street									**E. 27 Street**									
between	N	13	7	0	9	0	2	0	*between*	N	12	4	0	8	0	6	0	
E. 26 Street									**E. 26 Street**									
between	N	10	8	0	8	0	6	0	*between*	N	4	1	0	3	0	3	0	
Bedford Street									**Bedford Street**									
between	N	1	1	1	1	0	0	0	*between*	N	2	2	0	2	0	1	0	
E. 23 Street									**E. 23 Street**									
between	N	8	8	0	8	0	7	0	*between*	N	7	5	0	7	1	4	0	
Dooley Street									**Dooley Street**									
between	N	27	26	0	27	1	18	0	*between*	N	21**	6	0	20	2	10	0	
E. 21 Street									**E. 21 Street**									
between	N	10**	1	0	4	0	4	0	*between*	N	8**	4	0	5	2	7	0	
Ocean Street									**Ocean Street**									

* N = No Signage
** Parking Meter Spaces

Appendix 4: Accident Analysis

Introduction

An analysis of study area accident data for the last three available years (1998-2000) was conducted at selected intersections to further understand existing conditions along the proposed route. All data was obtained from the New York State Department of Motor Vehicles (NYSDMV) accident database, which summarizes information from local New York City Police Department (NYPD) accident reports. The data includes both reportable and non-reportable accidents. The NYSDMV designates motor vehicle accidents as reportable if they result in physical damages of $1,000 or more or if there is an injury or fatality. Accidents resulting in less monetary damage or no injuries are designated as non-reportable (which does not mean that a police report was not filed.) Pedestrian and bicycle accidents are reportable by their very nature.

Accidents

Total, reportable, and pedestrian/bicycle accidents were examined at the same seven intersections subject to traffic analysis, as shown in Table 9. Overall, there were not high numbers of accidents along the corridor. The total accidents at all seven intersections averaged less than 25 per year; total reportable accidents averaged less than 13 per year. Neptune Avenue at Ocean Parkway, at Coney Island Avenue, and at Cropsey Avenue/West 17th Street had the highest numbers of total and reportable accidents along the route, but even these three intersections had on average fewer than 22 reportable accidents per year. Neptune Avenue and West 31st Street had the fewest reportable accidents of the seven intersections analyzed, but also had the only fatality recorded during the three-year period.

Table 1

Intersection	Total	Reportable	Fatalities	Pedestrians	Cyclists
Bay Parkway and Shore Road South	59	21	0	6	1
Neptune Avenue and West 31th Street	23	15	1	2	2
Neptune Avenue and Cropsey Avenue/West 17th Street	85	42	0	3	0
Neptune Avenue and Stillwell Avenue	43	19	0	5	0
Neptune Avenue and Coney Island Avenue	112	58	0	7	4
Neptune Avenue and Ocean Parkway	169	95	0	7	0
Emmons Avenue and Nostrand Avenue	30	13	0	0	1

Between 1998 and 2000 there were only 30 total pedestrian accidents, or an average of 10 per year, at all seven intersections combined. Neptune Avenue at Ocean Parkway (seven) and Coney Island Avenue (seven), and Shore Road South at Bay Parkway (six), had the most pedestrian accidents over three years.

Appendix 5: Technical Advisory Committee

The following is a list of individuals and organizations that participated or were invited to participate in this project.

Elected Officials
The Honorable Marty Markowitz, President of the Borough of Brooklyn
The Honorable Lewis A. Fidler, City Council Member, District 46
The Honorable Domenic Recchia, City Council Member, District 47
The Honorable Michael Nelson, City Council Member, District 48
The Honorable Carl Kruger, State Senator, District 21
The Honorable Seymour Lachman, State Senator, District 22
The Honorable Helene E. Weinstein, State Assembly, District 41
The Honorable Steven Cymbrowitz, State Assembly, District 45
The Honorable Adele Cohen, State Assembly, District 46
The Honorable William Colton, State Assembly, District 47

Elizabeth Ernish, Borough President Markowitz's Office
Rodney Knight, Councilmen Recchia's Office
Marc Rivlin, State Senator Lachman's Office
Roslyn Sokol, State Assembly Cymbrowitz's Office
Michael Treybich, State Assembly Cohen's Office

New York City and State Agencies
Jennifer Hoppa, New York City Department of Parks and Recreation
Joshua Laird, New York City Department of Parks and Recreation
Tweeps Phillips, New York City Department of Parks and Recreation
Julius Spiegel, New York City Department of Parks and Recreation
Lori Ardito, New York City Department of Transportation
Holly Haff, New York City Department of Transportation
Dalila Hall, New York City Department of Transportation
Dan Orlando, New York City Department of Transportation
Michael Primeggia, New York City Department of Transportation
Naim Rasheed, New York City Department of Transportation
Carren Simpson, New York City Department of Transportation
Anne Marie Turner, New York City Department of Transportation
Milorad Ubiparip, New York City Department of Transportation
Andrew Vesselinovitch, New York City Department of Transportation
Aizaz Ahmed, New York Metropolitan Transportation Council
Gerard J. Bogacz, New York Metropolitan Transportation Council
Guy La Monaca, New York State Department of Transportation
Roger Weld, New York State Department of Transportation
Community Affairs, Brooklyn South Precinct, NYC Police Dept. Precinct 60
Community Affairs, Brooklyn South Precinct, NYC Police Dept. Precinct 61
Community Affairs, Brooklyn South Precinct, NYC Police Dept. Precinct 62

Community Boards
Howard Feuer, Brooklyn Community Board 11
William R. Guarinello, Brooklyn Community Board 11
Corrado Manfredi, Brooklyn Community Board 11
Brian Gotlieb, Brooklyn Community Board 13
Jeannette LoSciuto, Brooklyn Community Board 13
Chuck Reichenthal, Brooklyn Community Board 13
Ida Sanoff, Brooklyn Community Board 13
Barbara Teitelbaum, Brooklyn Community Board 13
Paula Lupka, Brooklyn Community Board 15
John E. Nikas, Brooklyn Community Board 15

Civic Groups, Associations, Organizations and Citizens
Maggie Bowman, Transportation Alternatives
Noah Budnick, Transportation Alternatives
John Comer, Community School District 22
Edward DeFreitas, Five Borough Bike Club
Diana Gavales, Transportation Alternatives
Heather Jacksy, Transportation Alternatives
Gary Katz, Bicyclist
Dave Lutz, Neighborhood Open Space Coalition
Byron McClenney, Kingsborough Community College
New York Cycle Club
Al Normandia, Sizzling Bicycles
Nostrand Avenue Merchants' Association
Mario Novello, Bath Beach Cycles
Brian Palmer, Coney Island Hospital
Ed Pino, Five Borough Bike Club
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