Southern Brooklyn Transportation Investment Study
Kings County, New York
P.I.N. X804.00; D007406

Technical Memorandum #4
Development & Evaluation of Scenarios

Southern Brooklyn
TRANSPORTATION
INVESTMENT
STUDY

DRAFT

July 2006

Submitted to:
New York Metropolitan Transportation Council

Submitted by:
Parsons Brinckerhoff

In association with:
Cambridge Systematics, Inc.
SIMCO Engineering, P.C.
Urbitran Associates, Inc.
Zetlin Strategic Communications

Table of Contents

List of Tables

List of Figures

Executive Summary

The Southern Brooklyn Transportation Investment Study (SBTIS) is a multimodal transportation planning study being undertaken by the New York Metropolitan Transportation Council (NYMTC). The purpose of the study is to assess current and future travel conditions and deficiencies, and develop multimodal transportation improvement solutions that address the movement of people and goods within and through the southern half of the Borough of Brooklyn, New York City.

This Technical Memorandum presents the results of the study tasks pertaining to the development and evaluation of improvement scenarios. The purposes of these tasks are to develop and evaluate multimodal scenarios encompassing all modes of travel (bus and rail transit, rail freight, walk, bike, auto, truck, and ferry) to address the existing and future transportation deficiencies of the study area.

SCENARIO DEVELOPMENT

Scenario development began with obtaining suggestions for transportation improvements from the community. The SBTIS featured a proactive public and community involvement program. Community involvement efforts included visioning sessions with the general public, transportation agencies, local and elected officials, business organizations and other stakeholders. Input obtained at the sessions, along with comments received at resident and business focus groups and through the SBTIS website, e-mails and letters, have helped to define the study area's transportation problems and to obtain suggestions for short, medium and long-term improvements.

The Study's Technical Advisory Committee (TAC) and Community Liaison Committee (CLC) provide agency and public input to the SBTIS. Four subcommittees were formed from the memberships of the TAC and CLC to process the public input and organize the improvement suggestions to assist in the development of multimodal scenarios. The four Joint TAC/CLC Subcommittees are Goods Movement, Transit, Local Circulation/ Parking/ Bicycle & Pedestrian, and Travel Management. The TAC, CLC and subcommittees developed a consensus list of potential improvement scenarios for evaluation.

Most of the transportation scenarios relate to transit improvements, including implementation of bus priority measures, improvements to the subway system, initiation of passenger ferry services and establishment of a regional bus terminal. There are also scenarios that relate to roadway and freight improvements. Additionally, an Alternative Land Use scenario was developed for testing the transportation scenarios with a greater amount of development in and around the Downtown Brooklyn area than included in the 2025 future baseline scenario.

The transportation scenarios are:

- Bus Priority Measures – priority measures to improve existing bus service along four corridors

- Passenger Ferry Service – express and local service with five new landings to access Downtown Brooklyn and Manhattan
- Grade Separation at Flatbush Avenue and Avenue U – roadway grade separation for Flatbush Avenue through traffic to avoid the congested intersection
- JFKIA Truck Freight Ferry – freight ferry service to the Bronx, Manhattan, northern New Jersey and Connecticut
- Subway Improvements – improved service, service extensions, pedestrian connections and subway construction
- Downtown Brooklyn Regional Bus Terminal – terminal for regional and, possibly, intercity routes
- Bus Rapid Transit (BRT) – BRT services along six corridors, including the four corridors proposed for bus priority measures

There are also recommendations covering non-motorized modes of travel (bicycling and walking).

EVALUATION OF SCENARIOS AND RESULTS

The consensus list of multimodal improvements were evaluated on the basis of how well they meet study goals and objectives. Goals and objectives provide the basis for undertaking transportation improvements. Performance measures provide the quantitative basis for estimating the effectiveness of the improvements. The goals, objectives and performance measures were developed early in the study to reflect an area-wide approach. Many of the transit improvement suggestions reflect this areawide approach. These suggestions, such as expansion of subway service, new bus rapid transit services and implementation of bus priority measures would be expected to meet study goals to make more efficient use of the region's transportation systems, expand or extend existing transit systems to promote more efficient movement of people, improve existing transportation systems to encourage more efficient movement of people, manage system-wide congestion and improve quality of life.

Testing and evaluation of the transit suggestions, except for bus priority measures and passenger ferry services, were not performed in this study. Transit improvement suggestions were forwarded to the MTA and NYCT for further consideration.

Roadway improvement suggestions received from the public covered all of the major arterials and numerous intersections throughout Southern Brooklyn. However, most of the suggestions were for short term improvements and increased enforcement of traffic and parking regulations. The suggestions would be expected to meet the goals and objectives relating to transportation system efficiency, management of congestion and quality of life (safety) issues.

The improvement scenarios that were tested in this study include Bus Priority Measures, Passenger Ferry Service, Grade Separation at Flatbush Avenue and Avenue U, and JFKIA Truck Freight Ferry. The first three scenarios were tested using NYMTC's Best Practice Model, while the JFKIA Truck Freight Ferry scenario was tested using another method. The BPM also was

used to compare the future 2025 Baseline to the 2002 Base Year and to compare the Alternative Land Use Scenario to the 2025 Baseline Scenario.

2025 Baseline Compared to 2002 Base Year

Most measures, such as Vehicle Miles of Travel (VMT) and Vehicle Hours of Travel (VHT) increased in both Brooklyn and the SBTIS study area, with truck traffic showing greater percentage increases compared to all vehicular traffic. For example, AM peak period truck VMT within the study area increased by 24%, compared to an increase of 7.5% for total vehicular traffic.

Alternative Land Use Scenario Compared to 2025 Baseline

The results for the Alternative Land Use Scenario were similar to the 2025 Baseline with only very slight decreases in total vehicle trips, VMT and VHT, and a slight increase in the transit share of total person trips. The slight decreases in vehicular travel and increase in transit share under the Alternative Land Use Scenario are a result of additional concentrations of activities and development in and around the Downtown Brooklyn area.

Bus Priority Measures

The BPM was used to test priority measures for existing bus services along the following four corridors:

- Flatbush Avenue (Bus Route B41);
- Nostrand Avenue (Bus Route B44);
- Utica Avenue (Bus Route B46); and
- Cross-town South (Bus Route B82).

The BPM results for the Bus Priority Measures and Bus Priority Measures-Alternative Land Use were compared to the future Baseline Scenario, with the measures of Vehicle Trips, Share of Person Trips by Transit, Vehicle Miles of Travel and Vehicle Hours of Travel. The results were that both scenarios (i.e., Bus Priority Measures under future baseline conditions and under Alternative Lane Use conditions) showed very little change from the future baseline. However, when reviewing results of bus ridership on the specific bus routes, there were significant increases under both scenarios with the priority measures. In the 4-hour AM peak period, there were increases in ridership on the B41, B46 and B82 bus routes between 8% and 12%, while the B44 route showed increases of about 20%.

Passenger Ferry Service

The Passenger Ferry Service scenario includes express service to Manhattan Pier 11 and Downtown Brooklyn from JFKIA, Jacob Riis Park, Floyd Bennett Field, Sheepshead Bay, Coney Island and Brooklyn Army Terminal, along with local service among all six Brooklyn and Queens locations. BPM results show that the ferry service does not attract sufficient ridership to be a viable option. Contributing issues to the lack of attraction include high fares and low frequencies of service compared to existing bus and subway service, lengthy travel times, and the need for transfers at one or both ends of the ferry trip.

Grade Separation Scenario (Flatbush Avenue and Avenue U)

Since the grade separation is a spot improvement, changes in travel conditions are limited to the immediate area of the improvement. Model results show little to no effect on study area performance measures. However, there would be some re-distribution of traffic demand on the roadways in the immediate area of the improvement as motorists would take advantage of the grade separation.

JFKIA Truck Freight Ferry

An off-line analysis of JFKIA truck freight ferry service was performed; the BPM model is not capable of modeling this option. The hypothetical service locations include:

- Bronx (Hunts Point) and Manhattan
- Newark Airport & northern New Jersey locations.
- Bridgeport, Connecticut, potential connecting service to New Haven or New London.

The results indicated that ferry service is not competitive with trucking. The analysis was made as attractive as possible for ferry service. For example, capital costs related to terminal construction and purchase of vessels were not included in the analysis, nor were berthing fees or administrative costs for the ferry service. Additionally, there are several other issues, such as the limited vertical bridge clearances in Jamaica Bay and environmental suitability of Jamaica Bay and Bergen Basin as factors that would also need to be addressed.

Transit Recommendations

Transit suggestions identified in the study include subway improvements and regional bus Terminal. The subway improvements were transmitted to the Metropolitan Transportation Authority (MTA) to be considered in their next 20-year capital needs assessment program.

Bike and Pedestrian Recommendations

Bike and pedestrian recommendations include improved pedestrian access to transit and recreational facilities, safety and mobility for pedestrians and bicyclists, bicycle parking at transit and connections for bike routes.

Scenario Viability Matrix (Table ES-1)

The Bus Priority Measures Scenario and the Grade Separation at Flatbush Avenue and Avenue U are viable in terms BPM testing. Although the Grade Separation is viable, there are many issues that would need to be explored, including community and right-of-way impacts. While the freight and passenger ferry service did not appear viable at this point, it is the policy of the PANY&NJ and other transportation agencies to keep exploring options to look into feasible freight and passenger ferry service. Additionally, pedestrian and bicycle improvements are viable.

TABLE ES-1: SBTIS VIABILITY MATRIX - MEDIUM AND LONG TERM TRANSPORTATION IMPROVEMENTS

Viability of Transportation Scenarios (Viability Based on BPM or Off-Line Testing)		
Transportation Improvement	**Viability**	**Remarks**
Pedestrian & Bicycle: Access to Transit & Recreation Network Gaps	Viable	System safety and connectivity
Transit: Bus Priority Measures (Impact on existing service)	Viable	Significant potential to increase ridership
Roadway: Grade Separation at Avenue U and Flatbush Avenue	Viable	Re-distribution of traffic to Flatbush Avenue
Transit: Passenger Ferry Service	Not Viable	Note: It is the policy of agencies to keep exploring options to look into feasible ferry services
Freight: JFKIA Truck Freight Ferry	Not Viable	

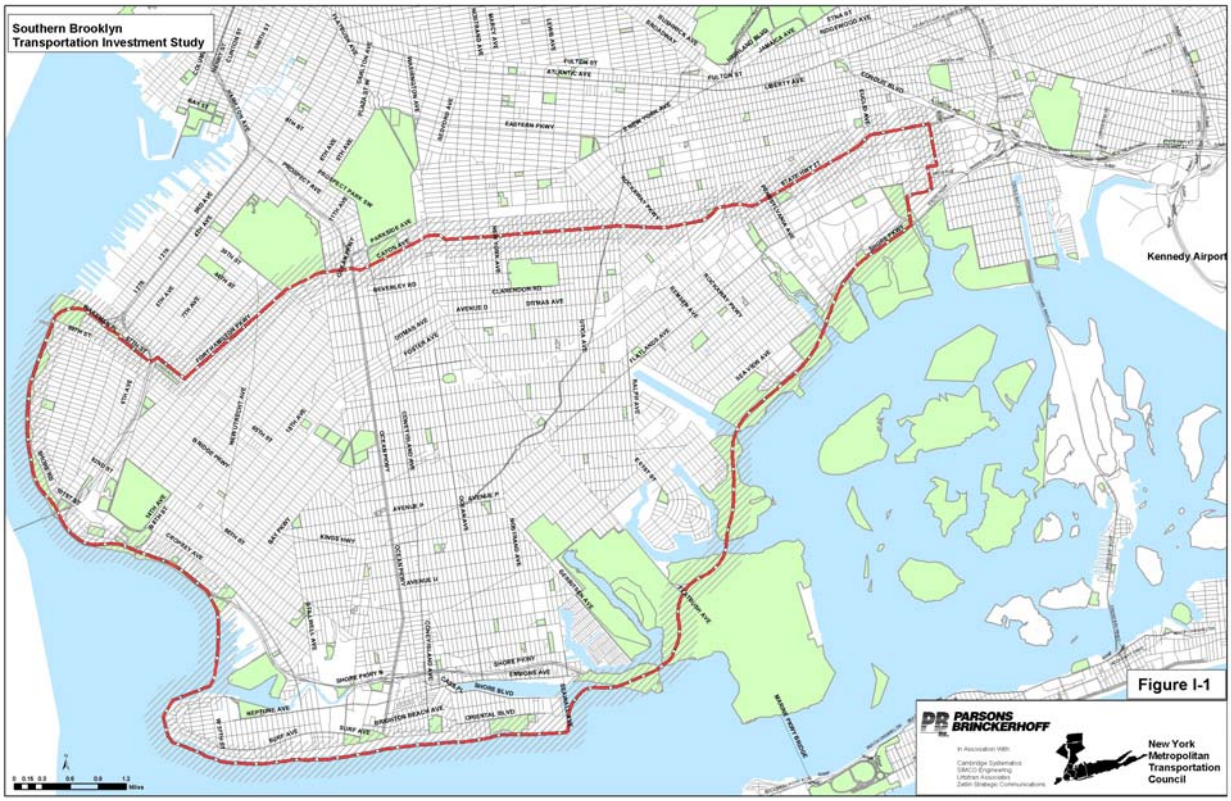
Introduction

This Technical Memorandum presents the results of the study tasks pertaining to the development and evaluation of transportation improvement scenarios. The purposes of these tasks are to develop and evaluate multimodal scenarios encompassing all modes of travel (bus and rail transit, rail freight, walk, bike, auto, truck, and ferry) to address the existing and future transportation deficiencies of the study area.

PROJECT OVERVIEW

The Southern Brooklyn Transportation Investment Study (SBTIS) is a multimodal transportation planning study being undertaken by the New York Metropolitan Transportation Council (NYMTC). The purpose of the study is to assess current and future travel conditions and deficiencies and develop multimodal transportation improvement scenarios that address the movement of people and goods within and through the study area. The study area boundaries are Linden Boulevard, Caton Avenue, Fort Hamilton Parkway, and 66th Street at Owls Head Park on the north; Belt Parkway/Coney Island on the west and south; and the Brooklyn/Queens Line on the east (see Figure 1). All or portions of Brooklyn Community Boards 5, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18 are included in the study area.

FIGURE 1: STUDY AREA



Scenario Development

Multimodal scenarios were developed to encompass all modes of travel (bus and rail transit, rail freight, walk, bike, auto, truck, and ferry) to address the existing and future transportation deficiencies of the study area. The study area is heavily populated and densely developed and also includes large tracts of parkland. Most of the residents depend on the transit system to commute to work. Travelers are affected by deficiencies in the transportation system. For example, truckers have no through routes to traverse or serve the study area, transit users must transfer between buses and subway stations in the eastern portion of the study area, and many arterial streets are congested.

IDENTIFICATION OF ALTERNATIVE IMPROVEMENTS

Scenario development began with obtaining suggestions for transportation improvements from the community. The SBTIS featured a proactive public and community involvement program. Community involvement efforts included visioning sessions with the general public, transportation agencies, local and elected officials, business organizations and other stakeholders. Input obtained at the sessions, along with comments received at resident and business focus groups and through the SBTIS website, e-mails and letters, have helped to define the study area's transportation problems and to obtain suggestions for short, medium and long-term improvements.

JOINT TAC/CLC SUBCOMMITTEES

The Study's Technical Advisory Committee (TAC) and Community Liaison Committee (CLC) provide agency and public input to the SBTIS. Four subcommittees were formed from the memberships of the TAC and CLC to process the public input and organize the improvement suggestions to assist in the development of multimodal scenarios. The four Joint TAC/CLC Subcommittees are:

- **Goods Movement** - Long haul trucking and local deliveries, truck routing, waterborne freight, rail freight, JFKIA air cargo access.
- **Transit** - Local and express bus services, rail rapid transit, vanpools/carpools, jitney/dollar vans, ferries.
- **Local Circulation / Parking / Bicycle & Pedestrian** - Traffic and pedestrian safety, bicycle traffic, intersections.
- **Travel Management** - Travel Demand Management (TDM) to increase the number of passengers per vehicle, Transportation Management Systems (TMS) to increase the efficiency of existing transportation systems, Intelligent Transportation Systems (ITS) consisting of technology-based measures to increase the efficiency of existing roads, High Occupancy Vehicle (HOV) lanes to encourage carpooling.

TRANSPORTATION SCENARIO DEVELOPMENT

To organize the improvement suggestions and manage the process of developing multimodal scenarios, subcommittee members undertook the following tasks: 1) grouping of suggested improvements; 2) organizing the groups into potential improvement scenarios; and 3) developing a consensus list of potential improvement scenarios for evaluation.

Improvement suggestions were summarized on index cards. Each Subcommittee grouped the cards to find patterns or commonalities. This technique, used to organize large amounts of information, is called the "affinity diagram" method. Once the cards were placed into consensus groups that captured the central idea of the cards, the group was named on a "header" card. The header cards represented the functional objectives of the subcommittees. The functional objectives developed by each of the subcommittees are listed below.

Goods Movement

- Improve transfer station options
- Reduce air and noise pollution
- Improve regional freight access and goods movement
- Improve truck access to commercial sites and freight terminals
- Resolve truck routing issues
- Enforce truck height, weight and width regulations
- Mitigate truck-car parking conflicts
- Rationalize truck parking regulations
- Improve truck signage

Transit

- Develop and promote existing and new ferry services
- Address operational issues with local and limited stop buses to improve service
- Reduce service gaps by restructuring bus routes and by serving new corridors where warranted by demand
- Increase service levels of existing Brooklyn to Manhattan express bus routes
- Address deficiencies and take advantage of opportunities of the existing subway network
- Move forward with subway infrastructure improvements that increase track capacity and improve service
- Improve physical access to and physical connections between subway stations
- Create and improve transit connections between the study area and regional airports
- Modify LIRR Atlantic Avenue Branch service to enable study area residents to make better use of it to access other parts of the region
- Create a Brooklyn bus terminal to accommodate regional and intercity routes

Local Circulation / Parking / Bicycle & Pedestrian

- Improve bicycle facilities to encourage bicycle use
  - Connect existing facilities, fill in gaps and improve access to existing bicycle paths
  - Improve access to transit
- Improve safety for pedestrians, cyclists and motorists
  - Address speeding on arterials
  - Address speeding and through traffic on neighborhood streets
  - Correct unsafe roadway conditions
  - Address truck impacts
  - Improve traffic safety at Belt Parkway entrances and exits
  - Improve pedestrian safety and mobility
- Improve traffic signals and signs
  - Review signal synchronization and timing, with consideration for pedestrians and bicyclists
  - Study turning movement conflicts
  - Add, remove or move traffic signals and signs
- Correct inappropriate parking
  - Enforce parking and double parking rules; especially on bus routes
  - Encourage curb parking turnover
- Desire for additional parking
  - Use underutilized municipal lots more effectively
  - Increase number of curb spaces
- Reduce traffic congestion
  - Identify congested corridors and locations

Travel Management

- Rationalize and manage freight movement
- Reduce single-occupant vehicle travel
- Improve travel in the Gowanus Expressway corridor
- Provide parity in pricing for Brooklyn residents on the Verrazano-Narrows Bridge
- Increase and improve ferry service
- Coordinate traffic devices to improve flow
- Improve travel along the Belt Parkway
- Encourage and support bicycle usage
- Improve area-wide transit connections

The process of organizing the groups into potential improvement scenarios began by categorizing the transportation issues and suggestions for improvements as being either of short-

term or medium/long-term concern. The medium and long-term items were then reviewed for possible evaluation as part of a multimodal scenario, while the short-term issues were removed from the groups for separate consideration.

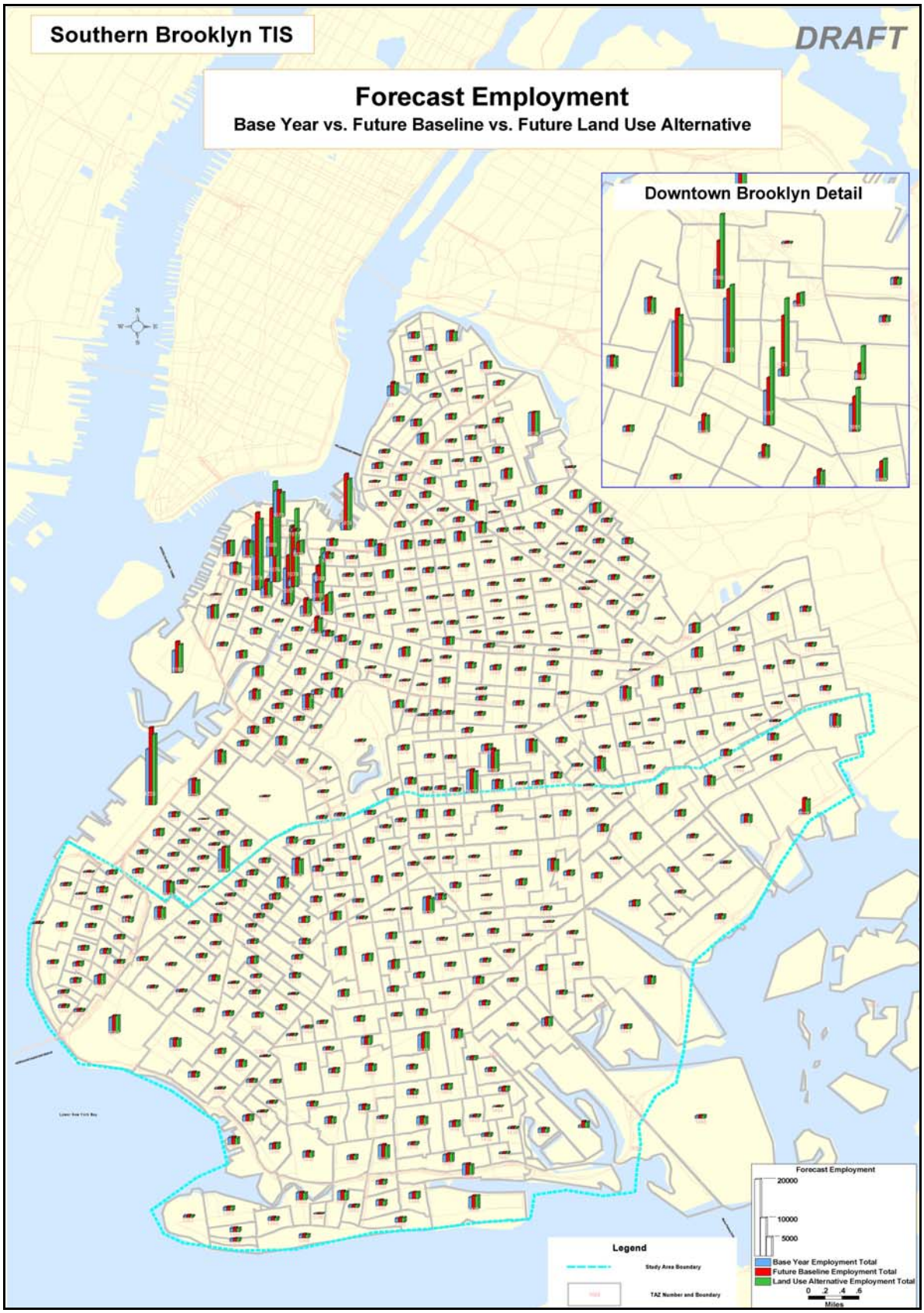
ALTERNATIVE LAND USE SCENARIO

In addition to transportation improvement scenarios, an alternative land use scenario was developed. The alternative land use scenario assumed a greater amount of development and redevelopment in and around the Downtown Brooklyn area compared to the future baseline land use scenario. The purpose of such an alternative was to test the baseline transportation scenario and appropriate transportation improvement scenarios twice using NYMTC's Best Practice Model (BPM) – once with the baseline land use scenario and again with the alternative land use scenario.

The baseline land use scenario was developed by comparing programmed and planned developments in Brooklyn to NYMTC 2025 socio-economic forecasts for the Brooklyn Transportation Analysis Zones (TAZs). Where the developments resulted in population and employment figures that fall within the NYMTC forecasts for the TAZs, no changes were made. Where the developments resulted in figures that exceeded the NYMTC TAZ forecasts, the population and employment figures were re-allocated among the zones to maintain the approved 2025 total for the borough.

The alternative land use scenario was suggested for testing by a CLC member to recognize the additional development potential for the Downtown Brooklyn area. For the alternative scenario (i.e., potential developments in and around the Downtown Brooklyn area beyond the programmed and planned developments), population and employment figures were re-allocated among the zones to maintain the approved 2025 total for the borough. Maintaining the approved 2025 borough total recognizes that additional developments in particular zones attract activities that otherwise would have occurred in other zones.

The graphics on the two following pages show the distribution of employment and households in the TAZs for the 2002 Base Year and the 2025 future Baseline and Alternative Land Use scenarios. Table 1 summarizes the commercial and residential components of the two land use scenarios. Specific land use developments are listed in Appendix A.


Southern Brooklyn TIS
DRAFT
Forecast Employment
Base Year vs. Future Baseline vs. Future Land Use Alternative
Downtown Brooklyn Detail
Legend
Study Area Boundary
TAZ Number and Boundary
Forecast Employment
20000
10000
5000
Base Year Employment Total
Future Baseline Employment Total
Land Use Alternative Employment Total
0 .2 .4 .6
Miles

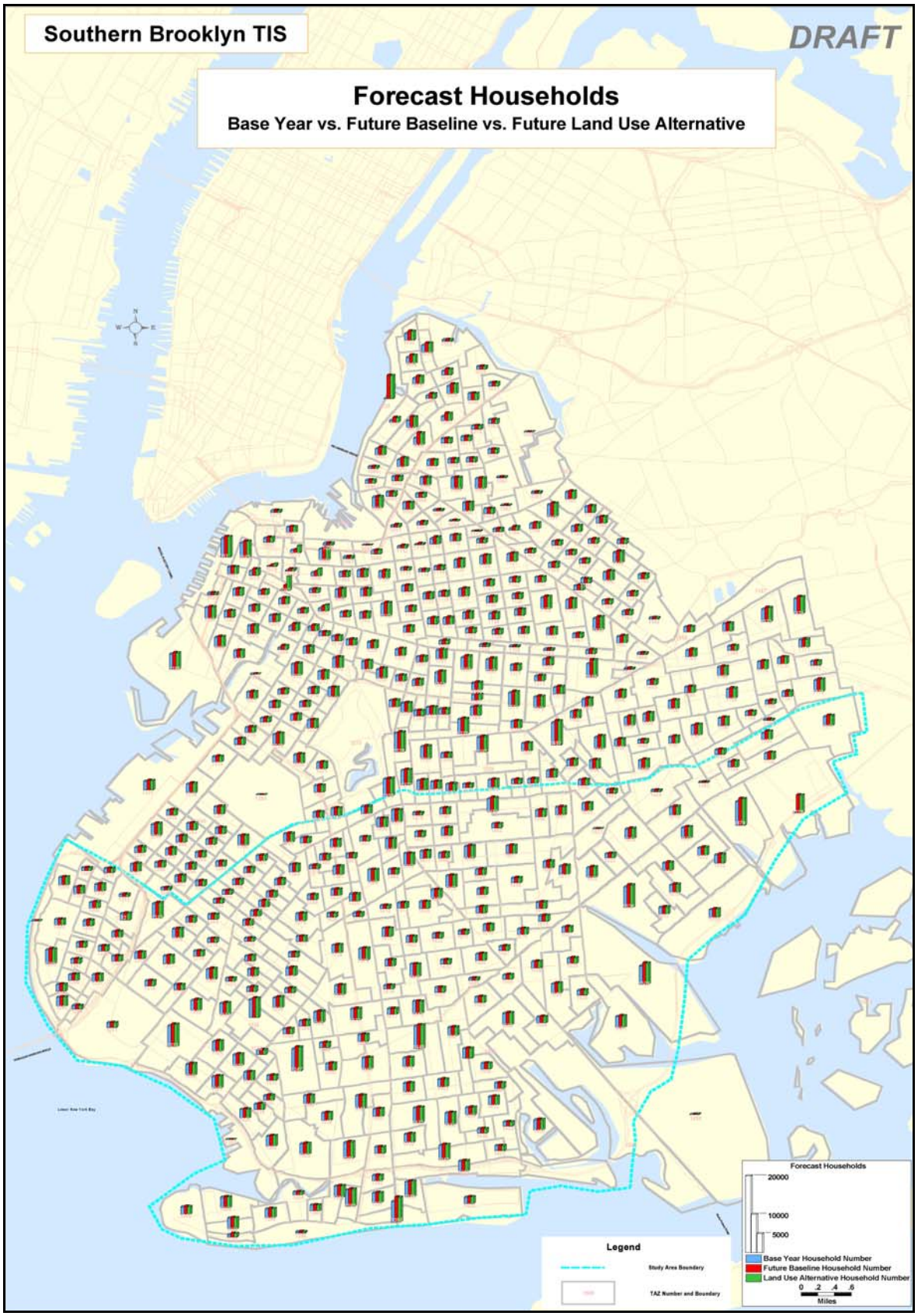

Southern Brooklyn TIS
DRAFT
Forecast Households
Base Year vs. Future Baseline vs. Future Land Use Alternative
Forecast Households
20000
10000
5000
Base Year Household Number
Future Baseline Household Number
Land Use Alternative Household Number
0 2 4 6
Miles
Legend
Study Area Boundary
TAZ Number and Boundary

TABLE 1: LAND USE SCENARIOS

Downtown Brooklyn Scenario	Land Use Commercial Office Area (sq. ft.)	 Residential Units Number of units
Existing Development	**11,000,000**	**500**
Baseline (2025) Scenario		
New Development		
DCP Downtown Brooklyn Plan	4,500,000	1,000
Other Potential Development	2,318,500	
Brooklyn Bridge Park	191,400	
Subtotal - New Development	*7,009,900*	*1,000*
Total Baseline (Existing Plus New Development)	**18,009,900**	**1,500**
Alternative Land Use Scenario (2025)		
Additional Development		
Up zoning (to 2013)	4,611,000	979
Up zoning (2013 to 2020)	2,047,000	2,994
Subtotal - Additional Development	*6,658,000*	*3,973*
Total Alternative Land Use Scenario (Baseline Plus Additional Development)	**24,667,900**	**5,473**

Notes:

1. Information obtained in 2003 and 2004 from the Brooklyn Office of the New York City Department of City Planning (DCP), New York City Economic Development Corporation, New York City Department of Housing Preservation & Development, Brooklyn Borough President's Office and Community Consulting Services, Inc.
2. If the Nets basketball team relocates to Brooklyn, 2.1M square feet of commercial office space and 4,500 residential dwelling units could be added to the above totals.

CONSENSUS LIST OF IMPROVEMENTS

The medium and long-term items were reviewed by committee members as the basis for developing a consensus list of transportation improvements. SBTIS committees operated on the basis of consensus. Consensus meant that all TAC, CLC and subcommittee members were able to accept the items as part of the transportation improvement scenarios.

The consensus list of transportation improvements have been categorized as to how they were considered in the study (see Table 2 *SBTIS Scenario Matrix*). Some improvements were tested using NYMTC's Best Practice Model (BPM), while others were not tested in this study or were tested by another method.

TABLE 2: SBTIS SCENARIO MATRIX - MEDIUM AND LONG TERM TRANSPORTATION IMPROVEMENTS

Scenarios Tested by NYMTC's Best Practice Model (BPM)		
Transportation Improvement	**2025 Baseline Land Use Scenario**	**2025 Alternative Land Use Scenario**
2025 Baseline Transportation Scenario	**X**	**X**
Transit Bus Priority Measures (Impact on existing service)	**X**	**X**
Transit Passenger Ferry Service	**X**	**X**
Roadway Grade Separation at Flatbush Avenue and Avenue U	**X**	**N/A**
Transportation Improvement Tested Off-Line		
Freight JFKIA Truck Freight Ferry		
Improvements forwarded to MTA and Other Agencies for their Consideration (These improvements were not tested in the SBTIS)		
Transit Subway Improvements Downtown Brooklyn Regional Bus Terminal Bus Rapid Transit Services		

TRANSPORTATION SCENARIO DESCRIPTIONS

Most of the transportation scenarios relate to transit improvements, including implementation of bus priority measures, improvements to the subway system, initiation of passenger ferry services and establishment of a regional bus terminal. There are also scenarios that relate to roadway and freight improvements. Descriptions of the transportation improvement scenarios, along with the baseline transportation scenario, follow.

Baseline Transportation Scenario

The 2025 baseline transportation scenario represents projects within or affecting the SBTIS study area that impact the transit and highway networks. Table 3 lists the projects comprising the 2025 baseline scenario.

TABLE 3: 2025 TRANSPORTATION ASSUMPTIONS

County	Project	Agency	Comments
Roadway Projects			
Brooklyn	Gowanus Expressway Corridor EIS	NYSDOT	V-N Br to BBT, same capacity as present, access changes at 38th/39th St.
Brooklyn	Computerized Traffic Signal Program	NYCDOT	See note 1
Brooklyn	Belt Pkwy Interchange at Ocean Parkway	NYCDOT	Interchange rehabilitation
Brooklyn, Queens, SI	ITS Program – BQE, Gowanus, Van Wyck, GCP & SIE	NYSDOT	VMS, CCTV, HAR, ramp meters
Queens	Kew Gardens Interchange	NYSDOT	One-lane SB addition (aux. lane) VWE to Queens Blvd.

TABLE 3: 2025 TRANSPORTATION ASSUMPTIONS (CONTINUED)

County	Project	Agency	Comments
Richmond	Goethals Bridge EIS	PANYNJ	One lane addition in each direction
Richmond	West Shore Expressway Corridor/Service Road Improvement	NYSDOT	Small scale improvements
Transit Projects			
Brooklyn	Coney Island – Southern Brooklyn Ferry Service	NYCDOT	
Richmond	Staten Island Expressway Bus Lane Construction	NYSDOT	2-mile EB & WB busway, Slosson Ave. to V-N Br., completion 2005
Richmond	Staten Island Expressway Median Bus Lane	NYSDOT	EB & WB busway, Goethals Br. to Slosson Ave.
Richmond	North Shore Rail Road	NYSDOT	
New York	Second Avenue Subway	NYCT	125th St. to Hanover Sq., see note 2
Goods Movement Projects			
Brooklyn	Cross Harbor Freight EIS	NYCEDC	2-tube rail freight tunnel
Brooklyn	Bay Ridge Branch	NYCEDC	Rail freight

Notes:

1. The following arterials identified by the public as congested are included in NYCDOT's Topics IV computerized traffic signal program scheduled for implementation in 2005: Flatlands Ave., Remsen Ave., 13th Ave., Utica Ave., Ralph Ave., Rogers Ave., Foster Ave., Avenue J, and Mc Donald Ave. The following arterials identified as congested by the public are already included in the program: Linden Blvd., Conduit Ave., Pennsylvania Ave., Flatbush Ave., Rockaway Pkwy, Church Ave., Nostrand Ave., Caton Ave., Fort Hamilton Pkwy, Bedford Ave., Kings Hwy, 86th St., Atlantic Ave., and Eastern Pkwy. Fountain Avenue, identified as congested, is not in the program and is not scheduled for inclusion in the program at this time.
2. Stations: 125, 116, 106, 96, 86, 72, 57, 42, 34, 23, 14, Houston & Grand Streets; Chatham Square; Seaport; and Hanover Square.

Bus Priority Measures and Bus Rapid Transit Services

Bus priority measures are suggested for implementation along four corridors in Southern Brooklyn – Flatbush Avenue; Nostrand Avenue; Utica Avenue; and a Cross-town South corridor that includes Flatlands Avenue, Kings Highway and 86th Street, see Figure 2. Table 4 presents current conditions and potential priority measures for the corridors. Following the table are descriptions of the priority measures.

Bus priority lanes refer to lane treatments that give buses priority through exclusive use of the lane or shared use with carpools. They can operate throughout the day or during peak periods only.

Signal priority reduces or eliminates bus delay at traffic signals. This is accomplished through re-timing of traffic signals to favor bus flow, programming that extends the green phase or shortens the red phase when a signal detects an approaching bus, or dedicated bus green light phase to allow buses to bypass general traffic (usually used in conjunction with queue bypasses).

Queue bypasses are short lanes at the near and far side of an intersection restricted to buses and in many cases right-turning general traffic (near side). This allows buses to bypass general traffic queuing at the near side of the intersection, and to merge into the general traffic lanes on the far side of the intersection ahead of the traffic.

FIGURE 2: BUS PRIORITY CORRIDORS

TABLE 4: POTENTIAL BUS PRIORITY MEASURES

Corridor	Current Bus Priority Measures	Current Conditions	Potential Priority Measures
Flatbush Avenue	• Limited stop bus service • Peak period bus priority lanes on Livingston St.	• Very high bus ridership • Illegal jitney activity • Long bus travel times • Traffic congestion	• Extension of Livingston St. bus lanes to Grand Army Plaza • Queue bypasses and signal priority where appropriate at major intersections
Nostrand Avenue	• Limited stop bus service	• Very high bus ridership • Traffic congestion	• Queue bypasses and signal priority where appropriate at major intersections
Utica Avenue	• Limited stop bus service	• Very high bus ridership • Traffic congestion • Auto repair shops store and double-park cars on the street	• Strict enforcement of parking regulations • Queue bypasses and signal priority where appropriate at major intersections
Cross-town South (Flatlands Ave., Kings Hwy, 86th St.)	• None	• Very high bus ridership • Slow bus speeds • No continuous route	• Interior bus priority lane along 86th St. from Ft. Hamilton Pkwy to 4th Ave. (parking lane maintained) • Signal priority for left turning buses on 86th St. at 4th Ave. • Queue bypasses and signal priority along Flatlands Ave. from Ralph Ave. to Rockaway Pkwy

Limited stop bus service is a common treatment already in use in New York City. Buses operate along local bus routes, but they only serve major stops, skipping the stops with less riders.

Priority measures offer the following transit benefits:

- Reduced bus travel times and improved schedule reliability
- Ability to bypass general traffic queues and congested locations
- Improved customer convenience
- Incentive for increased bus ridership

Along with the benefits, the following impacts and issues must be addressed:

- Some measures require conversion of a general traffic lane to bus use only
- Queue bypasses may eliminate some curb parking spaces at intersections
- Traffic signal priority may increase vehicle delay on side streets
- Effectiveness of queue bypasses may be diminished by conflicts with right-turning vehicles and pedestrians
- Increased enforcement is required for some of the measures to be effective

Priority measures along the four potential corridors were modeled in the BPM to determine impacts on existing bus service and general traffic.

The potential for bus rapid transit services on the above four corridors along with two additional east-west corridors were evaluated as part of the SBTIS (*Unserved Corridors Analysis*, Draft,

July 2004). Evaluation results were submitted for further consideration through the *New York City Bus Rapid Transit (BRT) Study* at the Study's public workshop held at Brooklyn Borough Hall on January 5, 2005.

Subway Improvements

Suggested improvements to the subway system include more frequent service, express and skip stop service, extension of service on existing trackage, longer trains, new signals, additional trackage, pedestrian connections between stations and new subway construction. The improvements were not evaluated in the SBTIS. Instead, the suggestions for subway improvements (Table 5 and Figure 3) and subway construction (Table 6 and Figure 4) were forwarded to the MTA for their consideration.

TABLE 5: POTENTIAL SUBWAY IMPROVEMENTS

Improvement	Description
Service Improvements	
Improve signaling on subway lines	Provide Communications Based Train Control (CBTC) signaling. (Note: MTA-NYCT is implementing a major signal upgrade to CBTC. The L Line is currently undergoing a pilot CBTC signal project. This program will be expanded to other subway lines over many years. The Culver Line is slated to receive CBTC in the 2010s.)
Provide more frequent and skip stop service on the L Line during weekday peak periods	Signal upgrade to CBTC will provide an opportunity to consider an increase train frequency and skip stop service on the L Line.
Available Montague Tunnel capacity may permit more frequent service on the 4th Avenue, Sea Beach and West End Lines	• Increase R train weekday and weekend service. • Extend W train into Brooklyn, possibly as an express train.
Lengthen C trains to 10 cars from current 8-car operation	Platform lengths permit additional capacity. 10-car trains could be operated when ridership grows and subway cars become available.
Improve Culver Line express and local service	• Use the Culver Line express tracks to run peak period F train express service. Culver Line express could operate in two directions north of Church Avenue and in the peak direction only south of Church Avenue. Some F trains could be retained as locals, or local service could be provided on V or G train extensions (see below). • V train could provide local service in Brooklyn if extended from its terminus at Houston Street in Manhattan through the Rutgers Street tunnel, as recommended by Community Consulting Services in its *Brooklyn Transit Agenda*. • G train could provide local service along the Culver Line if service is extended south of its current terminal at Smith/9th Street to Kings Highway. • Extension of V service or implementation of F express service are not feasible until the Bergen Street interlocking, which was destroyed by fire, is replaced and additional subway cars are delivered.
Extend V train service over the Jamaica Line to Broadway Junction and then over to the Canarsie Line to Canarsie	• Track connections exist to run the V train over the Williamsburg Bridge on the J, M, Z Line to Broadway Junction and then to Canarsie. J, M, Z track capacity also exists. • V trains would need to be shortened to 8 cars; the maximum that the Jamaica Line platforms can accommodate. Also, increased layover capacity at the Rockaway Parkway terminal would be necessary to accommodate turnarounds for both the V and L trains.

TABLE 5: POTENTIAL SUBWAY IMPROVEMENTS (CONTINUED)

Improvement	Description
Reconfigure Rogers Junction (Nostrand Ave / Eastern Pkwy)	Reconfiguring Rogers Junction is a major capital project and would need a source of funding. It would increase reliability and reduce delays for all Brooklyn IRT lines (2/3/4/5). Construction impacts to existing service, Eastern Parkway and the surrounding community would be significant. NYCT believes that any changes at Nostrand Avenue must also include an improvement of the terminal configuration at Flatbush Avenue to achieve measurable benefits.
Station Improvements	
Create a safe and convenient pedestrian connection between the Junius (3) and Livonia (L) subway stations	The MTA has noted that a platform to platform connection between these two stations is a long-term option.
Create new pedestrian connections among Downtown Brooklyn subway stations	• Connect the Jay Street and Lawrence Street Stations. (Note: A connection between these stations is part of the recently adopted MTA Capital Program.) • Create additional connections to the Borough Hall Station.

Note: This table represents subway improvements that were suggested by the SBTIS Transit Subcommittee. The table was transmitted to the MTA to be considered by MTA during development of their 2009 Twenty-Year Needs Assessment.

FIGURE 3: POTENTIAL SUBWAY IMPROVEMENTS

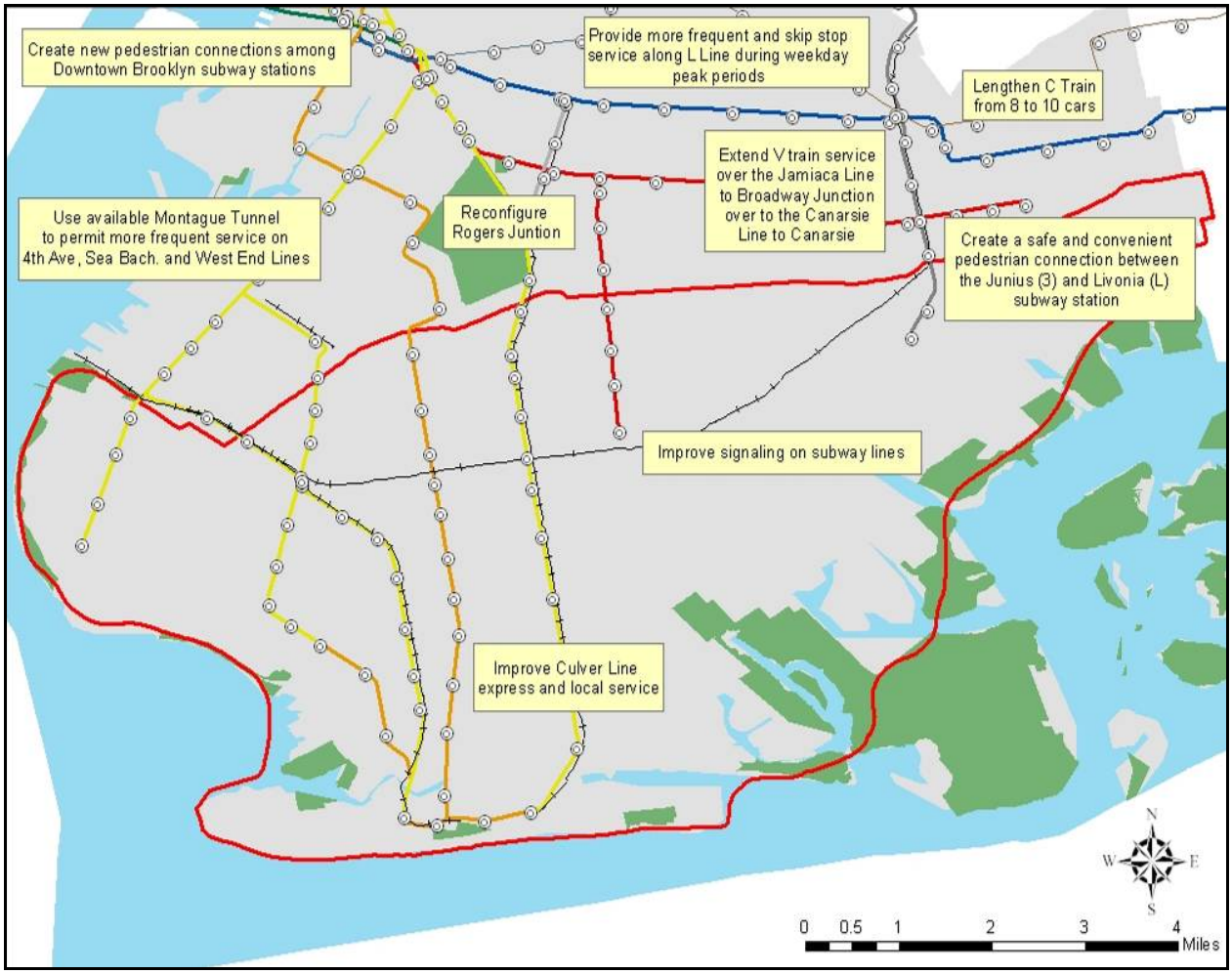
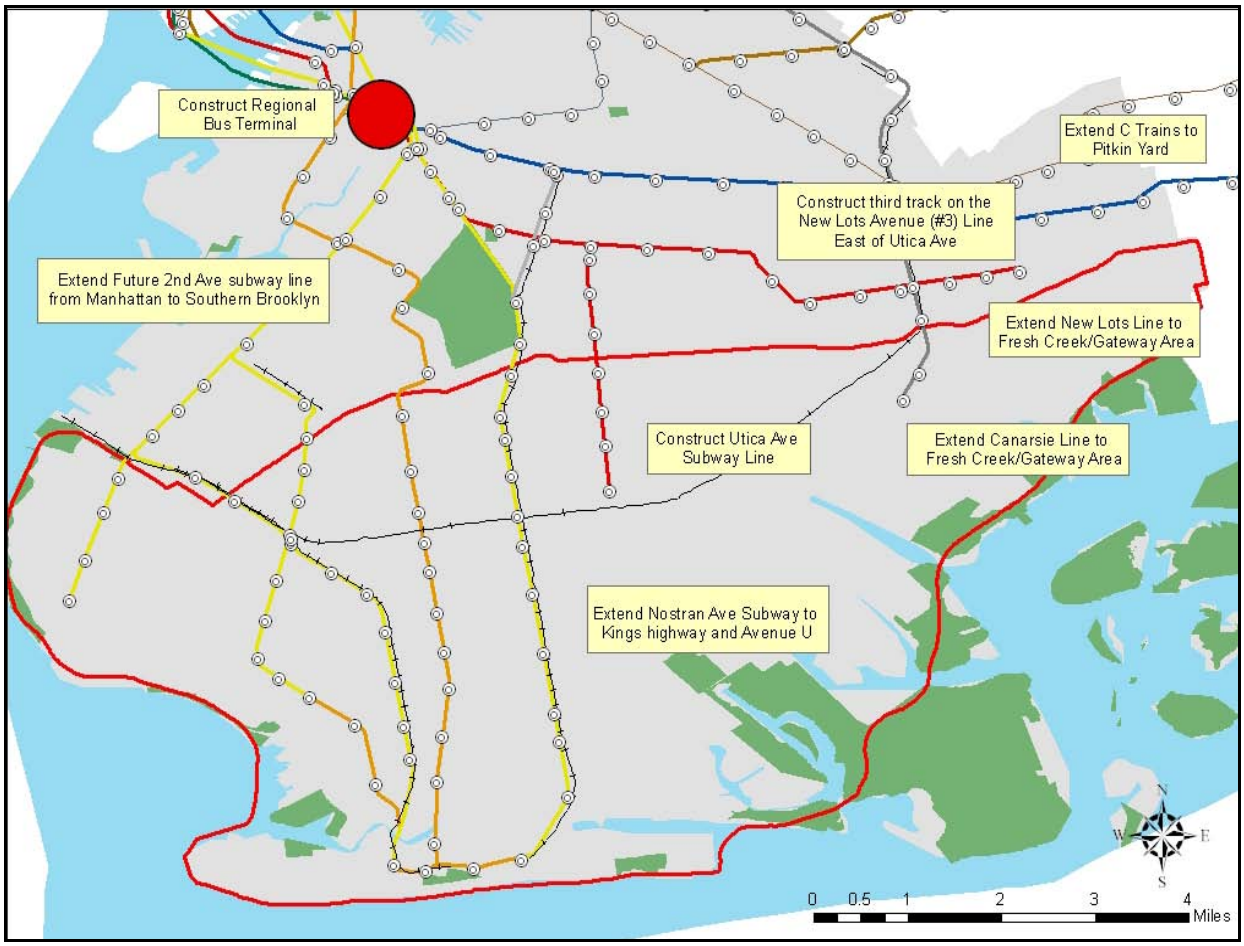


TABLE 6: POTENTIAL SUBWAY CONSTRUCTION

Improvement	Description
Extend C trains to Pitkin Yards station	A platform could be constructed on one of the yard tracks terminating near Linden Boulevard with access from Linden Boulevard separated from maintenance operations. C trains could be extended from the present terminus at Euclid Avenue to the new platform. The area has high density residential development and is a quick bus trip to rapidly developing areas in Spring Creek. Existing bus lines would serve the station without significant rerouting.
Construct third track on the New Lots #3 Line east of Utica Avenue	Elevated structure is wide enough for the additional track. Third track would increase track capacity and allow for improved reliability, especially during track maintenance.
Subway line construction	• Extend New Lots Avenue Line to Fresh Creek/Gateway area • Extend future 2nd Avenue subway line from Manhattan to Southern Brooklyn • Extend Nostrand Avenue subway line (stage 1 to Kings Highway, stage 2 to Avenue U) • Construct Utica Avenue subway line • Extend Canarsie Line to Fresh Creek/Gateway Area

Note: This table represents major capital cost subway improvement suggestions. The table was transmitted to the MTA to be considered by MTA during development of their 2009 Twenty-Year Needs Assessment.

FIGURE 4: POTENTIAL SUBWAY CONSTRUCTION



Regional Bus Terminal

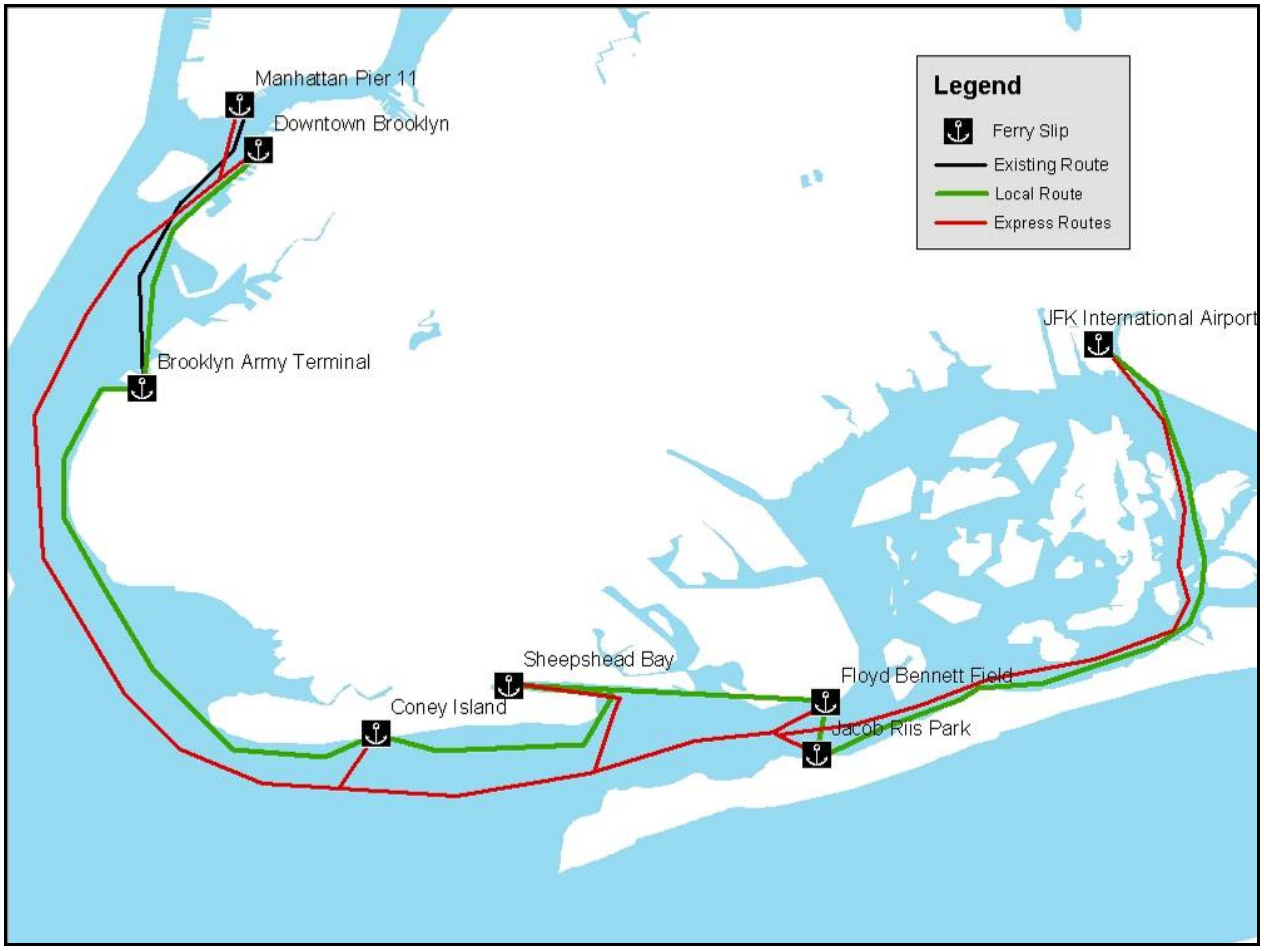
A centralized bus terminal was suggested to serve regional routes (i.e., to other boroughs and counties), access the area's airports and, possibly, intercity routes. The terminal would include bus bays and indoor waiting area with ticket sales counter. Although a specific location was not identified, the terminal could be located in the vicinity of the Atlantic Yards redevelopment, Figure 4. This location would be close to the LIRR Atlantic Branch Terminal, existing subway stations and existing local bus routes. The bus terminal was not modeled in the SBTIS. The suggestion was forwarded to the MTA and other agencies for their consideration.

Passenger Ferry Service

The suggestions for Southern Brooklyn ferry services build on existing services at the Brooklyn Army Terminal and proposes new services, including stops at Coney Island, Sheepshead Bay, Floyd Bennett Field, Jacob Riis Park and JFK International Airport. Ferry landings would be constructed at Coney Island, Sheepshead Bay, Floyd Bennett Field and JFK International Airport; a ferry slip already exists at Jacob Riis Park. Two types of service are proposed – express routes from Southern Brooklyn to Manhattan and Downtown Brooklyn, and local routes. Intermodal connections would be provided via bus route modifications, parking, and bicycle and pedestrian improvements. Potential services are listed below and shown in Figure 5; assumed service characteristics are presented in Appendix B. These services were modeled in the BPM.

- Coney Island (at the New York Aquarium), serving:
  - Manhattan Pier 11
  - Downtown Brooklyn/Atlantic Avenue Pier
- Sheepshead Bay (intersection of Emmons Avenue and Nostrand Avenue), serving:
  - Manhattan Pier 11
  - Downtown Brooklyn/Atlantic Avenue Pier
- Floyd Bennett Field (Floyd Bennet Blvd & Gil Hodges Bridge), serving:
  - Manhattan Pier 11
  - Downtown Brooklyn/Atlantic Avenue Pier
- Jacob Riis Park (at Coast Guard facility at State Road just east of Gil Hodges Bridge), serving:
  - Manhattan Pier 11
  - Downtown Brooklyn/Atlantic Avenue Pier
- JFK International Airport (near the Lefferts Boulevard Airtrain station), serving:
  - Manhattan Pier 11
  - Downtown Brooklyn/Atlantic Avenue Pier
- Local Service (no stops in Downtown Brooklyn or Lower Manhattan), serving:
  - JFK International Airport
  - Floyd Bennet Field
  - Jacob Riis Park
  - Sheepshead Bay
  - Coney Island
  - Brooklyn Army Terminal

FIGURE 5: PASSENGER FERRY SERVICE



JFKIA Truck Freight Ferry

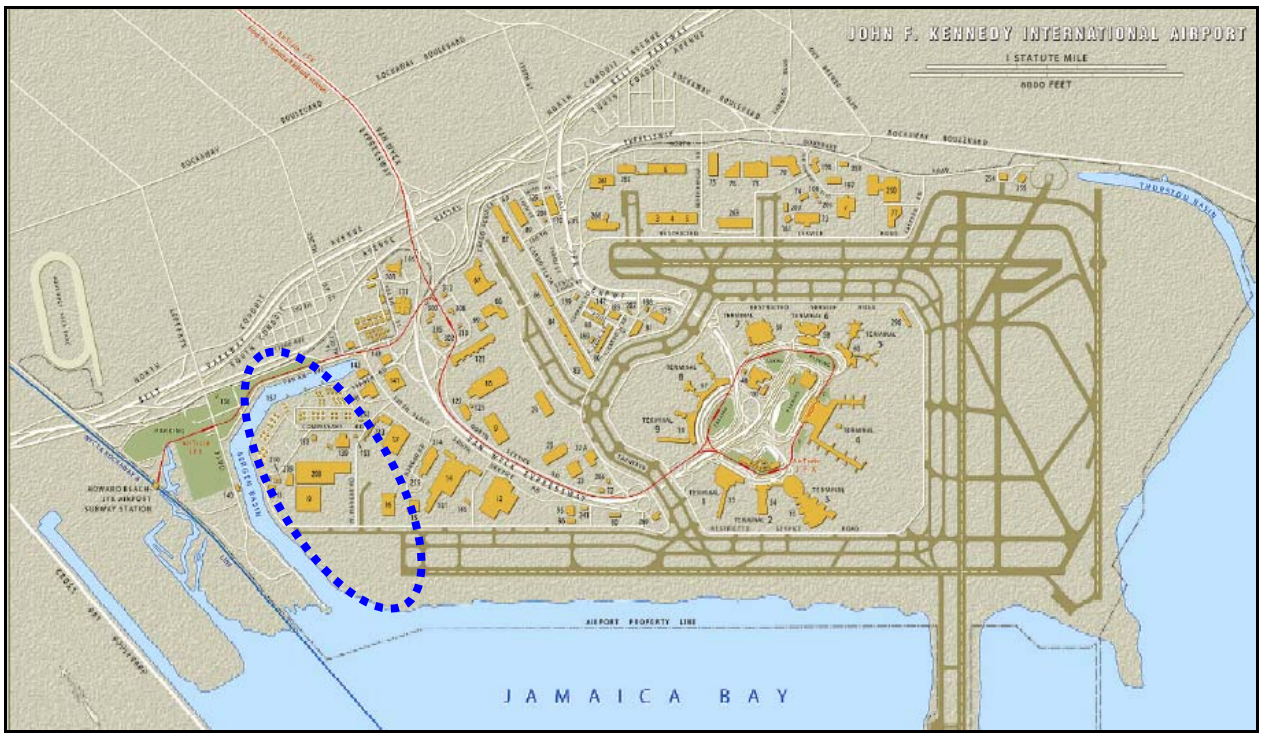
This suggestion is based on operating freight ferries from JFKIA to New England, Manhattan, Newark Airport and North Jersey during traffic peak hours. If successful, such services could reduce the level of future demand and need for improvement of existing landside access corridors. Several other studies have identified this possibility, including NYMTC's *Regional Freight Plan* and NYMTC's *Hunts Point Waterborne Freight Assessment.* Ferry landing site suitability at JFKIA and hypothetical freight ferry service corridors are discussed below.

Site Suitability at JFKIA - Regardless of route or vessel type, the issue of ferry service to JFKIA depends on whether or not a suitable site at JFKIA can be found. Based on initial investigations, a suitable piece of land is available – but the ability to operate a vessel in Jamaica Bay to get to this piece of land has not been determined.

JFKIA is located on Jamaica Bay, and there is an existing Federal navigation channel accessing the airport property at Bergen Basin, off Lefferts Boulevard. The navigation channel is not currently used for freight, but is intended to allow fuel barges to access the airport in the event of

a problem with the airport's fuel pipelines. Trash-skimming boats currently moor there. Over 30 air cargo buildings are widely scattered over the airport property, as shown in Figure 6.

FIGURE 6: JFKIA AND BERGEN BASIN



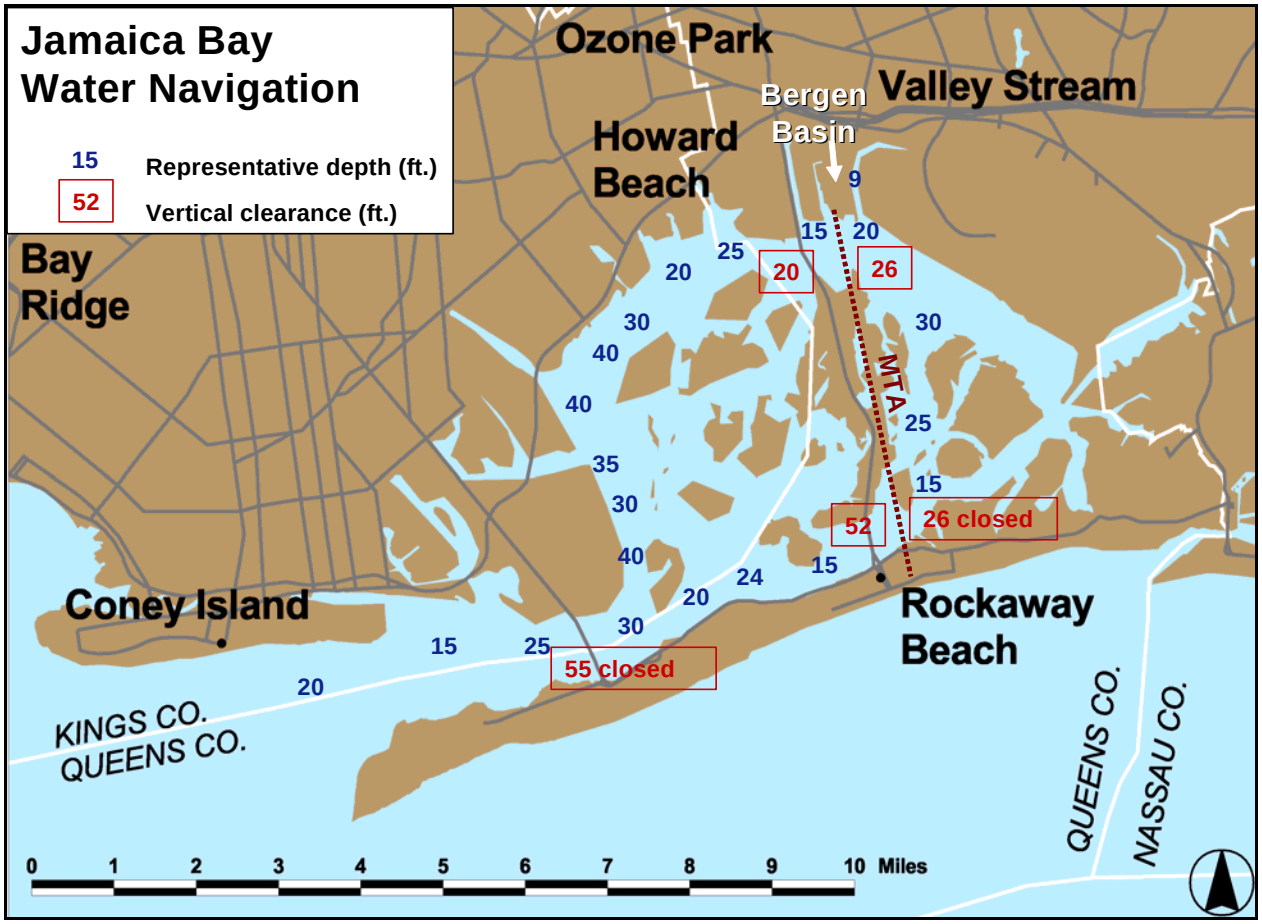
Source: PANYNJ

PANYNJ staff has indicated that a freight ferry could potentially be sited on the west side of Bergen Basin (circled in Figure 6). Bergen Basin is accessed by a channel with a minimum depth of 15 feet. There are, however, significant navigational constraints associated with using Bergen Basin for regular freight ferry operations (Figure 7).

- First, at 9 feet in depth, Bergen Basin does not offer optimal depths to accommodate a truck barge (15 to 24-foot depth required) or a medium or high-speed truck ferry (10-foot minimum depth required). Either channel dredging or a custom shallow-draft freight vessel would be needed; both approaches add substantial cost and time to service implementation.
- Second, the two channels that access Bergen Basin are crossed by low bridges on the MTA NYCT rail line to Rockaway Beach. The "air draft" (i.e., vertical clearance or height above the waterline) is limited to 26 feet at the bridges. This would require that the MTA bridge be opened on every trip, or very low profile vessel designs must be utilized that could fit under the MTA bridges. Vessel width (i.e., horizontal clearance) under bridges may also be an issue.
- Third, Jamaica Bay is the largest national wildlife refuge in the country, and is part of the Gateway National Recreation Area. The Bay is environmentally sensitive and freight vessel operations will be correspondingly restricted, if permitted at all. Extensive regulatory and

environmental reviews would be required. Maximum allowable speeds would probably not be in excess of 9 knots, and might even be as low as 5 knots.

FIGURE 7: NAVIGATION CONSTRAINTS IN JAMAICA BAY

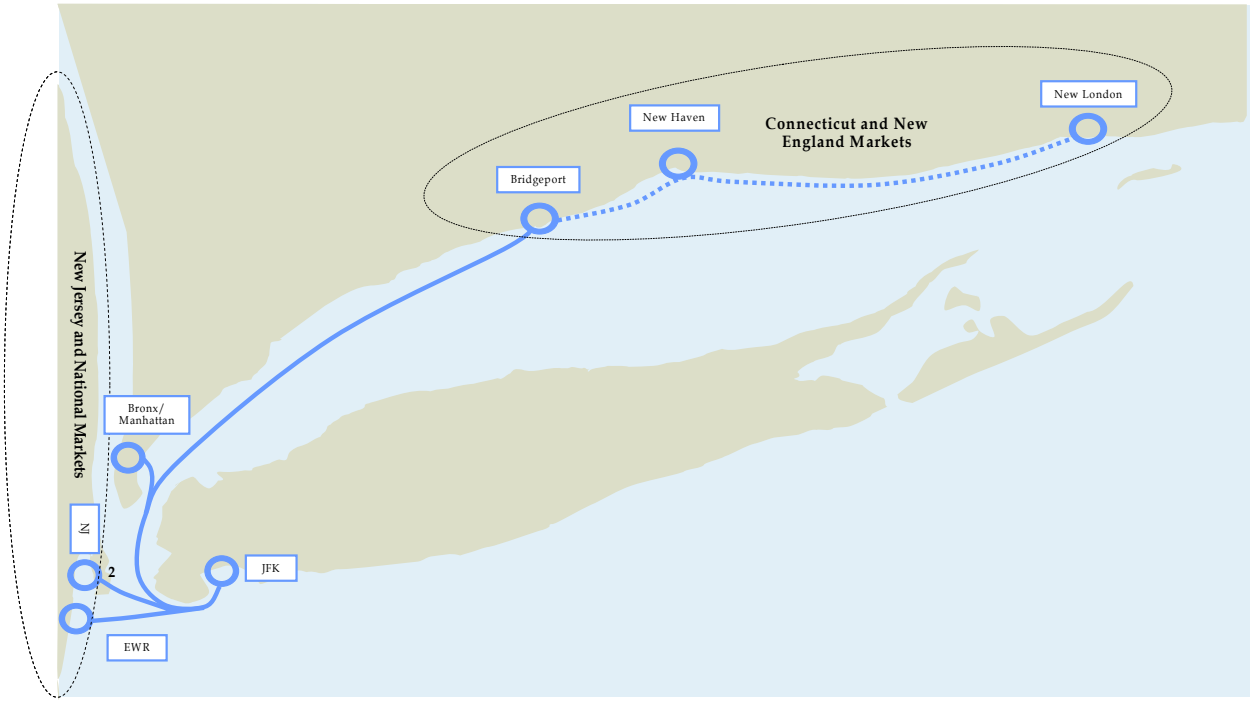


Clearly, there are significant unanswered questions about the suitability of Jamaica Bay and Bergen Basin to accommodate freight ferry service to JFKIA, and this issue would require significant additional attention if this suggestion is pursued.

Hypothetical service corridors – Under the provisional assumption that some sort of freight ferry service might prove possible, the following hypothetical service corridors have been identified (Figure 8):

- Bronx (evaluated in the Hunts Point Waterborne Freight Assessment) and Manhattan
- Newark Liberty International Airport and other northern New Jersey locations
- Bridgeport, Connecticut, with potential connecting service to New Haven or New London

FIGURE 8: HYPOTHETICAL JFKIA FREIGHT FERRY SERVICE CORRIDORS

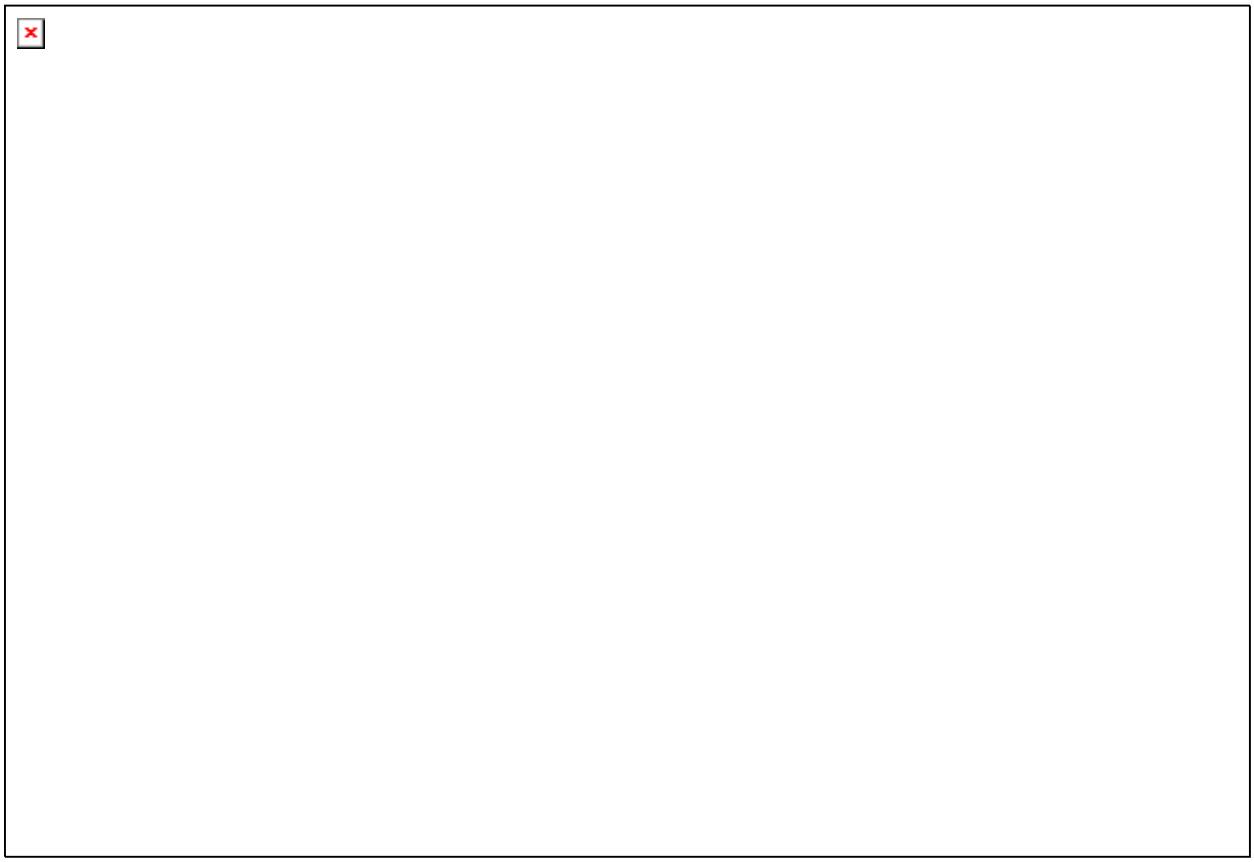


Roadway Improvement – Grade Separation at Flatbush Avenue and Avenue U

The intersection of Flatbush Avenue and Avenue U (Figure 9) is congested. To relieve the congestion, a grade separation was suggested to remove some of the through traffic from the intersection. In response, a 2-way, 4-lane overpass for Flatbush Avenue through traffic was modeled in the BPM.

There were many other items concerning local streets and intersections. However, these were items of short-term concern or enforcement issues that could not be modeled in the BPM. Additionally, there were suggestions concerning the Belt Parkway. These suggestions included widening the roadway, allowing commercial vans on the parkway during off-peak periods, or both widening the roadway along with elimination of commercial vehicle restrictions. None of the Belt Parkway suggestions received consensus for testing and evaluation.

FIGURE 9: ROADWAY GRADE SEPARATION - FLATBUSH AVENUE AND AVENUE U



SHORT-TERM IMPROVEMENTS AND ENFORCEMENT ISSUES

During 2002, community meetings were held throughout the SBTIS study area. A great many of the comments received from the public at these meetings were suggestions for short-term street and bus service improvements and better enforcement of traffic and parking regulations. Short-term improvement suggestions included, for example, increasing the frequency of bus service on heavily used routes, coordinating traffic signals along specific arterials, installing crosswalks at various intersections, and repairing streets and potholes. Some of the public's suggestions for better enforcement concerned speed limits, parking regulations, double-parking and parking in bus stops. The suggestions for short-term improvements and better enforcement were forwarded to the agencies on the SBTIS Technical Advisory Committee that are responsible for operating and maintaining the transportation systems. Some of the suggested short-term improvements have since been implemented. The list of short-term issues, along with agency responses and actions, is included in Appendix C.

Evaluation of Scenarios

The consensus list of multimodal improvements were evaluated on the basis of how well they meet study goals and objectives. Three scenarios were tested using NYMTC's Best Practice Model (Passenger Ferry Service, Bus Priority Measures, and Grade Separation at Flatbush Avenue and Avenue U) and one scenario (JFKIA Truck Freight Ferry) was tested using another method.

GOALS, OBJECTIVES & PERFORMANCE MEASURES

Goals and objectives provide the basis for undertaking transportation improvements. Performance measures provide the quantitative basis for estimating the effectiveness of the improvements. *Technical Memorandum #1* presented the study's goals, objectives and performance measures. The goals, objectives and performance measures were developed early in the study to reflect an area-wide approach.

Many of the transit improvement suggestions reflect this areawide approach. These suggestions, both short-term and long-term, for expansion of subway service, new bus rapid transit services, implementation of bus priority measures, modification to the local bus route network, and increase in frequency of service over weekends and during peak and off-peak periods would be expected to meet study goals to make more efficient use of the region's transportation systems, expand or extend existing transit systems to promote more efficient movement of people, improve existing transportation systems to encourage more efficient movement of people, manage system-wide congestion and improve quality of life.

Testing and evaluation of the transit suggestions, except for bus priority measures and passenger ferry services, were not performed in this study. Transit improvement suggestions were forwarded to the MTA and NYCT for further consideration. The transit suggestions and NYCT responses are presented in Appendix D.

Roadway improvement suggestions received from the public covered all of the major arterials and numerous intersections throughout Southern Brooklyn. However, most of the suggestions were for short term improvements and increased enforcement of traffic and parking regulations. The suggestions would be expected to meet the goals and objectives relating to transportation system efficiency, management of congestion and quality of life (safety) issues.

The improvement scenarios that were tested in this study include Bus Priority Measures for existing transit routes along four corridors, Passenger Ferry Service with five new landings to serve Downtown Brooklyn and Manhattan, a Grade Separation at Flatbush Avenue and Avenue U, and JFKIA Truck Freight Ferry serving Connecticut, Manhattan and New Jersey. The list below categorizes their types of impacts on the Southern Brooklyn study area.

- Areawide impacts
  - Passenger Ferry Service
  - JFKIA Truck Freight Ferry

- Corridor impacts
  - Bus Priority Measures
- Local impacts
  - Grade Separation at Flatbush Avenue and Avenue U

The evaluation of these scenarios were based on the results of testing Bus Priority Measures, Passenger Ferry Service and Grade Separation at Flatbush Avenue and Avenue U with the Best Practice Model, and an off-line analysis of JFKIA Truck Freight Ferry service.

BEST PRACTICE MODEL (BPM)

NYMTC's BPM is a regional travel demand model. The modeling process uses computer simulations to evaluate mathematical representations of regional travel demand (existing and future person, vehicle and truck trips) and supply (transportation services). The modeling procedure first involves developing and calibrating the Base Year (2002) model to represent existing conditions, and then developing the future Baseline (2025) model. Model input is derived from the transportation and land use assumptions tabulated in the previous chapter. Future travel demand predictions are based on socio-economic characteristics such as employment and number of households for the transportation analysis zones (i.e., Census tracts and Census block groups) that comprise the Southern Brooklyn study area and the New York metropolitan region. Following development of the future baseline, the transportation and alternative land use scenarios were modeled. Scenario predictions were based on changes to land use and the transportation systems. The computer simulations of future travel demand (model output) are expressed in the following performance measures:

- Vehicle trips
- Share of total person trips by transit
- Vehicle miles of travel (VMT)
- Vehicle hours of travel (VHT)
- Travel speed

BASE YEAR AND FUTURE BASELINE SCENARIO

The BPM model was first used to run the Future 2025 Baseline Scenario to predict the growth in travel demand between 2002 and 2025. As expected, the model predicts increases in travel and increases in congestion. Table 7 shows the percentage increases and decreases for the performance measures.

While the number of peak period vehicle trips is predicted to increase by about 7% and the vehicle miles of travel is predicted to increase by 6.4% to 9.4% (depending on peak period and area), truck vehicle miles of travel is predicted to increase by 22.4% to 29.1% (depending on peak period and area). Congestion, as measured by vehicle hours of travel, is predicted to increase by 15.9% to 26.9% for all vehicles, and by 33.7% to 40.6% for trucks. Congestion, as measured by average speed over the entire modeled highway network (parkways, expressways and local streets and arterials), is predicted to decrease in the SBTIS study area and in the entire borough. The increase in congestion may encourage greater transit use. The transit share of total

person trips is predicted to increase by 4.8% in the AM peak period and 5.6% in the PM peak period.

TABLE 7: BPM RESULTS - FUTURE BASELINE SCENARIO COMPARED TO 2002 BASE YEAR

Performance Measure	Percentage Change from Base Year to Future (2025) Baseline	
	Brooklyn	**SBTIS Study Area**
Weekday 6 to 10 AM		
Vehicle Trips	+7.6%	--
Share of Total Person Trips by Transit	+4.8%	--
Vehicle Miles of Travel (All Vehicles)	+9.4%	+7.5%
Vehicle Miles of Travel (Trucks)	+22.4%	+23.9%
Vehicle Hours of Travel (All Vehicles)	+26.9%	+20.0%
Vehicle Hours of Travel (Trucks)	+36.3%	+33.7%
Average Speed	-13.8%	-10.4%
Weekday 4 to 8 PM		
Vehicle Trips	+6.4%	--
Share of Total Person Trips by Transit	+5.6%	--
Vehicle Miles of Travel (All Vehicles)	+8.4%	+6.4%
Vehicle Miles of Travel (Trucks)	+26.9%	+29.1%
Vehicle Hours of Travel (All Vehicles)	+23.9%	+15.9%
Vehicle Hours of Travel (Trucks)	+40.6%	+36.7%
Average Speed	-12.5%	-8.2%

ALTERNATIVE LAND USE SCENARIO

The BPM was used to test the Alternative Land Use Scenario. The Alternative Land Use Scenario assumed a greater amount of development and redevelopment in and around the Downtown Brooklyn area compared to the Future 2025 Baseline Scenario. Table 8 shows the percentage increases and decreases for the comparison of performance measures.

Additional concentrations of activities and development in and around Downtown Brooklyn will certainly have significant impacts on transportation services in Downtown Brooklyn. However, most of the performance measures show less than a 1% change. The small changes indicate that although transportation services within the Downtown Brooklyn area will be impacted, overall impacts on a borough-wide basis and within the SBTIS study area are not significantly impacted. The concentration of activities in Downtown Brooklyn may result in some decrease in vehicle miles of travel. The shift in development also may result in additional congestion borough-wide due to Downtown Brooklyn congestion, but in less congestion within the study area. The concentration of activities in a location with robust subway and bus services also may result in an increase in the share of total person trips by transit.

TABLE 8: BPM RESULTS - ALTERNATIVE LAND USE SCENARIO COMPARED TO FUTURE BASELINE SCENARIO

Performance Measure	Percentage Change from Future Baseline to Alternative Land Use Scenario	
	Brooklyn	SBTIS Study Area
Weekday 6 to 10 AM		
Vehicle Trips	-0.1%	--
Share of Total Person Trips by Transit	+0.3%	--
Vehicle Miles of Travel (All Vehicles)	-0.1%	-0.5%
Vehicle Miles of Travel (Trucks)	-0.3%	-0.9%
Vehicle Hours of Travel (All Vehicles)	+1.3%	-0.6%
Vehicle Hours of Travel (Trucks)	+0.3%	-1.2%
Average Speed	-1.3%	+0.1%
Weekday 4 to 8 PM		
Vehicle Trips	-0.1%	--
Share of Total Person Trips by Transit	+0.3%	--
Vehicle Miles of Travel (All Vehicles)	-0.1%	-0.3%
Vehicle Miles of Travel (Trucks)	-1.9%	-1.9%
Vehicle Hours of Travel (All Vehicles)	+0.9%	-0.5%
Vehicle Hours of Travel (Trucks)	-1.1%	-1.6%
Average Speed	-1.0%	+0.2%

PASSENGER FERRY SERVICE

The passenger ferry services modeled in the BPM showed that the services would not attract sufficient ridership to be viable. In all cases, the local ferry routes and express routes to Lower Manhattan and Downtown Brooklyn attracted less that 20 passengers over the 4-hour peak period. The combination of high fares and low frequencies of service compared to existing bus and subway services, lengthy travel times, and need for transfers at one or both ends of the ferry trip make ferry service not competitive to existing mass transit services. This conclusion is supported by recent attempts to provide ferry service to the Southern Brooklyn Study area.

Attempts to provide ferry services within the past few years have not been successful. While serving a niche market, they have not able to draw high volumes of regular commuters, or leisure commuters as many of the previous services were geared to events and weekend-only recreation trips. The following list summarizes the experiences of recent ferry services to the Southern Brooklyn area.

- Brooklyn Army Terminal to Manhattan – This service still exists. However, it has suffered from low ridership, with service discontinued and reinstated from time to time. Service has been provided by a variety of operators throughout the years and is now provided by New York Water Taxi utilizing smaller watercraft and operating only a few trips during commuting periods. This service started in 1989 from the 69th Street Pier and moved over to the Brooklyn Army Terminal when the pier was condemned.
- Brooklyn Cyclones baseball games – Coney Island ferry service was initiated for weekend games. Service has since been discontinued. This was a demonstration service in the

summer of 2001 run by the Staten Island Ferry for a few games. However, the service did not draw many passengers.

- Weekend service to Rockaway Park – New York Waterway provided weekend-only service to Jacob Riis Park at a landing constructed at Riis Landing. The service was provided in conjunction with the National Park Service. Service has since been discontinued due to lack of interest.
- Service to Sheepshead Bay – In the 1980s, there was a stop at Sheepshead Bay on a ferry route going from Inwood in Nassau County to Manhattan. This service was discontinued when the Inwood service no longer was drawing passengers and the company providing the service went bankrupt.

The reasons that the above ferry services have not drawn many passengers are as follows:

- The trip can be very long and indirect due to the geography of the borough.
- Very few of the ferry slip locations are close to large population centers. Thus, ferry patrons cannot walk to ferry slips, but are required to access them via other modes.
- On the Manhattan and Downtown Brooklyn ends of the trip, passengers may still have to transfer to bus and subway services.
- Ferry services, even when subsidized, typically have higher fares per passenger than existing buses and subways.
- The frequencies of service make land based commuter services (bus and subway) much more attractive even when transfers have to occur.

BPM performance measures for the Passenger Ferry Service scenario are identical to the performance measures for the Future Baseline scenario, and the performance measures for the Passenger Ferry Service scenario under alternative land use conditions are identical to the performance measures for the Alternative Land Use scenario (Appendix E).

BUS PRIORITY MEASURES

Priority measures along the four potential corridors were modeled in the BPM to determine impacts on existing bus service and general traffic. Improved bus operation would reduce bus travel times and improve schedule reliability, and thereby provide an incentive for increased bus ridership. The results of modeling bus priority measures along four corridors are shown in Tables 9 and 10. Compared to both the Future Baseline and Alternative Land Use scenarios, improved bus service results in fewer vehicle trips, less vehicle miles of travel and greater share of total person trips by transit. Thus, bus priority measures provide an incentive for increased ridership on the affected bus routes, and attract riders from automobiles. Vehicle hours of congestion also decrease, except during the AM peak period under the Bus Priority Measures-Alternative Land Use Scenario where increased congestion in Downtown Brooklyn offsets reduced vehicle trips.

TABLE 9: BPM RESULTS - BUS PRIORITY MEASURES COMPARED TO FUTURE BASELINE SCENARIO

Performance Measure	Percentage Change from Future Baseline to Bus Priority Measures Scenario (Borough of Brooklyn)	
	AM Peak Period	PM Peak Period
Vehicle Trips	-0.2%	-0.2%
Share of Total Person trips by Transit	+0.3%	+0.1%
Vehicle Miles of Travel	-0.4%	-0.5%
Vehicle Hours of Travel	-1.2%	-1.1%

TABLE 10: BPM RESULTS - BUS PRIORITY MEASURES-ALTERNATIVE LAND USE SCENARIO COMPARED TO FUTURE BASELINE SCENARIO

Performance Measure	Percentage Change from Future Baseline to Bus Priority Measures-Alt. Land Use Scenario (Borough of Brooklyn)	
	AM Peak Period	PM Peak Period
Vehicle Trips	-0.5%	-0.1%
Share of Total Person trips by Transit	+0.4%	+0.2%
Vehicle Miles of Travel	-0.5%	-0.1%
Vehicle Hours of Travel	+0.5%	-0.6%

The major bus routes affected by the priority measures includes the B41 on the Flatbush Avenue corridor, B44 on the Nostrand Avenue corridor, B46 on the Utica Avenue corridor and B82 on the Cross-town South corridor. Table 11 shows the projected increases in ridership on these four bus routes under both the Bus Priority Measures scenario and the Bus Priority Measures-Alternative Land Use scenario compared to the Future Baseline scenario.

TABLE 11: BPM RESULTS - BUS PRIORITY MEASURES AND BUS PRIORITY MEASURES-ALTERNATIVE LAND USE SCENARIOS COMPARED TO FUTURE BASELINE SCENARIO

Bus Priority Corridor & Bus Route	Percentage Change in Ridership from Future Baseline (6 to 10 AM Peak Period)	
	Bus Priority Measures	Bus Priority Measures - Alt. Land Use Scenario
Flatbush Avenue, B41	+12.4%	+13.5%
Nostrand Avenue, B44	+20.1%	+20.6%
Utica Avenue, B46	+8.4%	+8.2%
Cross-town South, B82	+10.0%	+9.7%

Bus ridership is sensitive to travel time. The savings in bus travel times with implementation of priority measures along the four corridors could result in significant increases in ridership on the affected bus routes.

GRADE SEPARATION AT FLATBUSH AVENUE AND AVENUE U

A grade separation at an intersection represents a spot improvement with only local impacts. Table 12 shows almost no change in the number of predicted trips, but does show increases in vehicle miles of travel and vehicle hours of travel. The changes most likely represent traffic diversions to Flatbush Avenue to access the Belt Parkway.

TABLE 12: BPM RESULTS - GRADE SEPARATION SCENARIO COMPARED TO FUTURE BASELINE SCENARIO

Performance Measure	Percentage Change from Future Baseline to Grade Separation Scenario (SBTIS Study Area)	
	AM Peak Period	PM Peak Period
Vehicle Trips	+0.1%	0.0%
Vehicle Miles of Travel	+2.6%	+2.7%
Vehicle Hours of Travel	+1.2%	+1.7%

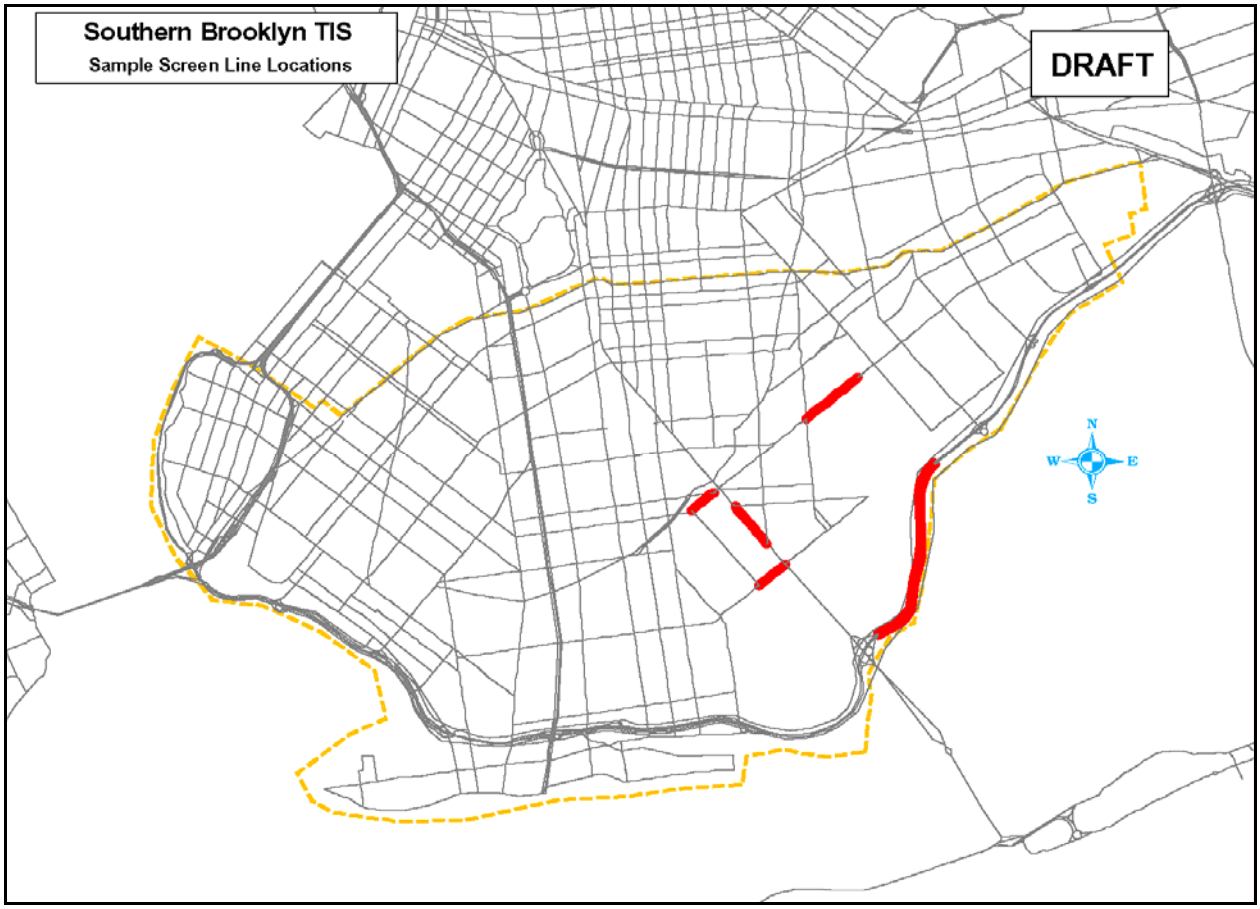
Note: Results for the Future Baseline and Alternative Land Use Scenarios are identical

Changes in traffic demand on the Belt Parkway and selected local streets are shown in Table 13 and Figure 10. Traffic demands for Flatbush Avenue and Avenue U show an increase. Flatlands Avenue, presently used by some motorists to avoid the congested Flatbush Avenue-Avenue U intersection, shows a decrease in traffic demand. The increase in demand for the Belt Parkway and Flatbush Avenue indicates that some traffic may shift to Flatbush Avenue, taking advantage of the overpass at Avenue U to divert to the Belt Parkway interchange at Flatbush Avenue from other parkway interchanges downstream of Flatbush Avenue.

TABLE 13: BPM RESULTS - GRADE SEPARATION SCENARIO COMPARED TO FUTURE BASELINE SCENARIO (NET CHANGE IN TRAVEL DEMAND ON SELECTED ROADWAY LINKS)

Roadway	Percentage Change from Future Baseline to Grade Separation Scenario	
	AM Peak Period	PM Peak Period
Flatbush Avenue	+9.4%	+21.2%
Avenue U	+1.3%	+1.9%
Belt Parkway	+2.7%	+3.8%
Flatlands Avenue (East of Ralph Avenue)	-4.7%	-4.2%
Flatlands Avenue (West of Ralph Avenue)	-3.3%	-1.9%

FIGURE 10: LOCATIONS OF SELECTED ROADWAY LINKS



JFKIA TRUCK FREIGHT FERRY

NYMTC's BPM does not include the types of data required for determining air cargo truck origins and destinations and other types of information required for model analysis of JFKIA freight ferry services. However, it was determined that an "off-line" or "off-model" analysis would provide useful input to this study. Key data and "off-line" analysis findings regarding: 1) key assumptions regarding potential services; 2) regional travel demand data; 3) the sketch planning analysis model; and 4) service corridor analyses are presented in Appendix F. The analysis conclusions are presented below.

This analysis examined potential ferry services from JFKIA to Hunts Point, Manhattan, Connecticut and New Jersey. None of the services were found to be competitive with trucking on the basis of travel speed or cost to the trucker, assuming that the services were priced to cover their daily vessel operating costs.

Travel speed restrictions in Jamaica Bay (assumed at five knots) were a critical factor in this finding, If these restrictions were relaxed so that the self-powered ferry can operate at full speed in Jamaica Bay, services to Manhattan's West Side and to New Jersey become potentially

competitive with trucking on the basis of time and cost. Services to Hunts Point and Connecticut remain uncompetitive regardless of Jamaica Bay operating speeds. Further investigation is recommended to establish, with some degree of confidence, the maximum operating speeds that would be permitted in Jamaica Bay, so that these analyses can be refined accordingly.

Beyond the issue of operating speed restrictions, five issues – environmental suitability of Jamaica Bay and Bergin Basin, vertical clearances ("air draft") in Jamaica Bay, the locations of ferry terminals at "the other end" of the JFKIA trip, improved estimates of market demand by travel corridor, and the practical prospects for operations that might seek to move cargo instead of trucks – would require substantial further investigation to establish the practicality and feasibility of potential ferry services.

In addition to freight ferry service, there were questions about providing rail freight service to JFKIA. The possibility of rail freight service at JFKIA is unrealistic given the nature of air cargo. Rail freight is too slow and infrequent for the time-sensitive air cargo market. Considerable time is required to assemble and move rail cars. Because of the large volume required to fill a railcar (rail carries high weight/volume commodities), rail does not economically transport the small quantities of air cargo, nor does it provide point-to-point groundside service.

In the case of JFKIA, the prospect of rail transport of air cargo is particularly problematic because of the lack of direct or efficient rail connections between Long Island and West-of-Hudson locations.

The groundside movement of air cargo commodities is typically handled by trucks, which provide more cost effective and timely transportation than rail. Truck transportation is cost effective because of the small quantities of air cargo goods carried, intermodal transfers are minimized, and point-to-point service is provided between the airport and the shipper or receiver.

SCENARIO VIABILITY

BPM results for the Bus Priority Measures, Grade Separation and Passenger Ferry service scenarios are tabulated in Appendix E, and JFKIA Truck Freight Ferry analysis results are presented in Appendix F. The Bus Priority Measures Scenario and the Grade Separation at Flatbush Avenue and Avenue U are viable in terms BPM testing. Although the Grade Separation is viable, there are many issues that would need to be explored, including community and right-of-way impacts. The Passenger Ferry Service and JFKIA Truck Freight Ferry Scenarios are not viable, but it is the policy of agencies to continue to explore ferry options. Additionally, pedestrian and bicycle improvements are viable.

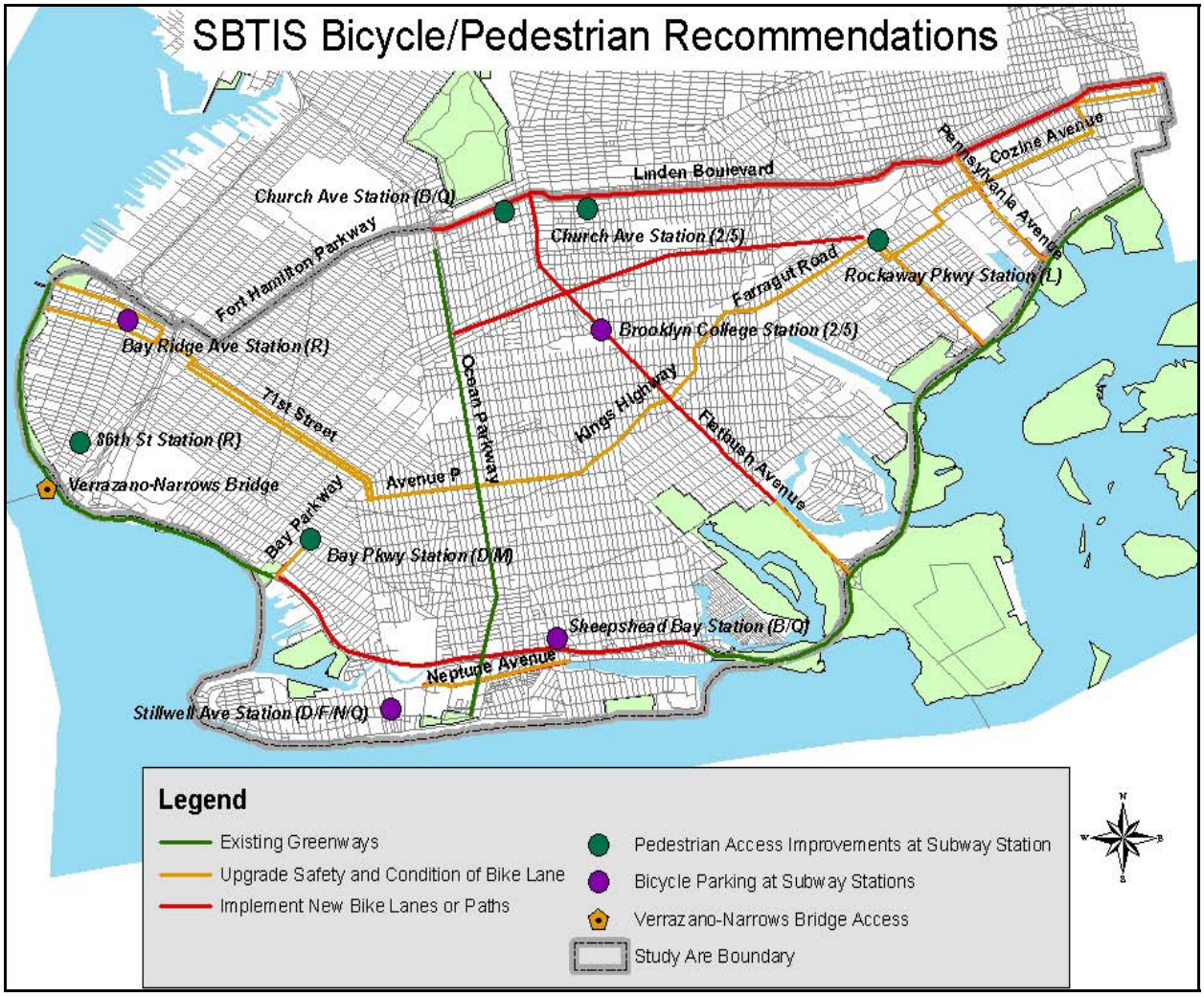
TABLE 14: SBTIS VIABILITY MATRIX – MEDIUM- AND LONG-TERM TRANSPORTATION IMPROVEMENTS

Viability of Transportation Scenarios (Viability Based on BPM or Off-Line Testing)		
Transportation Improvement	**Viability**	**Remarks**
Pedestrian & Bicycle: Access to Transit & Recreation Network Gaps	Viable	System safety and connectivity
Transit: Bus Priority Measures (Impact on existing service)	Viable	Significant potential to increase ridership
Roadway: Grade Separation at Avenue U and Flatbush Avenue	Viable	Re-distribution of traffic to Flatbush Avenue
Transit: Passenger Ferry Service	Not Viable	**Note:** It is the policy of agencies to keep exploring options to look into feasible ferry services
Freight: JFKIA Truck Freight Ferry	Not Viable	

Pedestrian and Bicycle Issues

Issues and concerns relating to pedestrian and bicycle mobility and safety were raised by the public and by members of the study's Local Circulation / Parking / Bicycle & Pedestrian Subcommittee. Non-motorized transportation modes cannot be easily modeled and their benefits cannot be easily quantified. However, these modes represent important components of the transportation system and provide for increased mobility to Southern Brooklyn's residents and employees. The recommendations of the subcommittee for improving mobility and safety for non-motorized modes are summarized in Figure 11 and the following sections. Implementation of the recommendations would meet study objectives to encourage non-motorized travel, to encourage the shift from single-occupant vehicles to more efficient modes of transportation such as bicycling and walking, and to improve pedestrian safety.

FIGURE 11: BICYCLE & PEDESTRIAN RECOMMENDATIONS



BICYCLE AND PEDESTRIAN IMPROVEMENTS

Pedestrian Access to Transit

There is a need for safer conditions for pedestrians near bus stops and subway stations in the study area. In particular, elevated subway lines present obstacles to pedestrians. Based on a review of pedestrian accidents near subway stations in the study area (see Technical Memorandum #3), the following subway stations and intermodal hubs should be considered priority locations for improvement:

- Church Avenue on the Q Line
- Canarsie on the L line
- Bay Parkway on the M, D Lines
- Church Avenue on the 2, 5 Lines
- 86th Street on the R Line

The issue of subway access is being addressed by the joint NYCDOT/NYCDCP Subway/Sidewalk Interface project at two subway stations within the study area on the Brighton Line – the Sheepshead Bay and Kings Highway stations. The study should be expanded to include additional Southern Brooklyn subway stations and to include major bus stops, reflecting much of the area's dependency on bus travel. Access to transit should consider wider sidewalks and medians, bus neckdowns under elevated stations, changes to street directions or curbside parking regulations, signal timing adjustments, lighting, streetscape enhancements, and improved wayfinding markers and signs.

Safety & Mobility for Pedestrians and Bicyclists On Major Arterials

Pedestrian and bicycle accidents are concentrated along Southern Brooklyn's arterial streets and major collectors. To reduce accident frequency, a number of measures could be employed. Where possible, signal progression could be used to manage the speed of traffic. Expanding the red light camera program on arterials would also address pedestrian safety, though it would require state authorizing legislation. Where excessive street width encourages speeding or presents a barrier to pedestrians, medians could be considered. Other measures to increase pedestrian safety include turn prohibitions, neckdowns at intersections, and Leading Pedestrian Intervals following green traffic signals. Finally, streetscape improvements to areas of pedestrian concentration enhance pedestrian environment and signal to drivers that they are sharing the area with pedestrians.

Safety Issues Relating to Speeding and Through Traffic on Neighborhood Streets

At community meetings, concerns were expressed about speeding and through traffic in residential neighborhoods, especially in the vicinity of schools. The establishment of pilot traffic calming programs and reviewing and updating Safe Routes to School programs in Southern Brooklyn neighborhoods could be investigated to address these concerns.

A first step would be to identify neighborhoods where traffic is a concern and traffic calming would be welcome. In those areas, one needs to apply a neighborhood-wide approach to reduce speeds and mitigate negative impacts of traffic and reduce spillover from street to street. Residents should participate in developing and evaluating their options to achieve consensus on benefits and trade offs.

The Safe Routes to School program applies a neighborhood traffic calming approach to improve the safety of the streets along walking routes to school. Specifically, schools may be prioritized for treatments depending on crash history, existing deficiencies and community concerns. Parents and teachers should participate in developing and evaluating options to achieve consensus on benefits and trade offs.

Truck Impacts on Residents Living on and off of Truck Routes

Southern Brooklyn residents living along or close to designated truck routes report elevated levels of noise, pollution, vibration and traffic safety concerns. Residents living on streets that are not designated by truck routes, but whose streets are routinely used by trucks as short cuts, share these concerns. This is a city-wide issue, and partly to address this, the New York City Department of Transportation is currently studying its truck route network throughout the city. See Appendix G for excerpts from the City's study pertaining to the Southern Brooklyn TIS study area.

Bicycle Parking at Transit

Linking cycling and transit can improve the utility and accessibility of both modes, especially as much of Southern Brooklyn is too far from New York City's major centers of employment for most potential cyclists. NYC Transit allows bicycles aboard subway cars as long as the cars are not too crowded. However, there appears to a demand for secure bicycle parking at transit stations in Southern Brooklyn. It is easier for many cyclists to ride to the station and park than it is to bring bikes on a crowded train. Bicyclists are uncomfortable leaving their bikes unattended at transit stations because the bikes may be stolen.

This issue could be addressed by providing secure bicycle parking near transit. The following locations for bicycle facilities were suggested at community and subcommittee meetings:

- Flatbush Avenue/Brooklyn College station on the 2, 5 Lines
- Sheepshead Bay station on the B, Q Lines
- Coney Island/Stillwell Avenue station on the D, F, N, Q Lines
- Bay Ridge Avenue on the R Line

Bicycle & Pedestrian Access to Shore Parkway Path and Other Recreational Facilities

Residents of many neighborhoods adjacent to the Shore Parkway have a hard time accessing the path and beaches by transit, foot or bicycle because conditions along the way are unsafe or inhospitable or because the access points are too far apart.

A possible solution to address these gaps and safety concerns would be to connect local streets in neighborhoods such as Canarsie, Bergen Beach and East New York to the Shore Parkway Greenway and its amenities with short connector paths on Parkway land adjacent to inlets. On-street connections to the Shore Parkway Path could also be improved by addressing route and intersection safety for cyclists and pedestrians. These include areas where the following streets approach the greenway: Rockaway Parkway, Pennsylvania Avenue, Bay Parkway, Ocean Parkway south, Neptune Avenue and Flatbush Avenue.

Another issue is the inadequacy of on-street connections between the east and west segments of the Shore Parkway Path and between Ocean Parkway and Shore Parkway. A permanent off street or low traffic connector between the east and west segments of Shore Parkway Path could address this issue.

East-West Connections for Cyclists

There are some excellent on-street and off-street bicycle facilities in the study area. However, there is a deficit of east-west routes for cyclists in the middle of study area, and the eastern portion of study area is generally underserved by the bicycle network. A potential alternative is to upgrade existing recommended bicycle routes, such as the Farragut Road and Cozine Avenue corridors, by striping bike lanes or wide curb lanes. Additional bike routes in eastern portion of study area may need to be identified for possible inclusion in the NYC Cycling map and subsequent implementation.

Gaps in the Pedestrian and Bicycle Network

Southern Brooklyn has a number of excellent dual use recreation/transportation facilities. However, their utility is limited by their lack of connectivity. Large gaps exist between Southern Brooklyn's off-street bicycle and pedestrian networks, and transitions between paths and streets are confusing and can be dangerous.

Several major gaps were identified at community and subcommittee meetings. The east and west segments of Shore Parkway Path are disconnected from each other, the beaches and other recreational destinations. Ocean Parkway Paths are disconnected from Shore Parkway Path. Finally, there is no access for cyclists and pedestrians between Brooklyn and Staten Island. The Verrazano-Narrows Bridge lacks access for pedestrians and bicyclists.

A short term measure to address gaps is to improve wayfinding and pavement markings for bike routes, including wayfinding markers for major Southern Brooklyn destinations such as Keyspan Park, beaches, Cyclone, boardwalk and Brighton Beach shopping district. The NYC Department of Transportation has begun to improve pavement markings for Class III on-street bike routes. In the longer term, the gaps discussed above could be addressed as follows:

- Connect east and west segments of Shore Parkway Paths with upgraded facilities. Wherever possible, find off-street accommodation for pedestrians and bicyclists.
- Reconstruct the southern end of Ocean Parkway and minimize conflict with Shore Parkway ramps. [*During the course of this study, this improvement was incorporated into the reconstruction of the Belt Parkway overpass at Ocean Parkway. The reconstruction was completed in November 2004*.]
- Consider plans for bicycle and pedestrian access to and across the Verrazano-Narrows Bridge in future major rehabilitation work.

Appendix A:
Land Use Development Activity

RECENT AND PLANNED LAND USE DEVELOPMENT ACTIVITY WITHIN THE STUDY AREA ANTICIPATED BY 2025

PROJECT	LOCATION	TYPE	BUILD YEAR	UNITS	SIZE (Sq. Ft.)
RETAIL					
Home Depot	Bay, 53rd St, Cropsey Ave.	Big Box Retail	2001		170,000
Flatbush Junction	Avenue H, Flatbush Ave, Nostrand Ave.	Shopping Center	NA		457,000 (may be scaled back)
Gateway Estates	Flatlands Ave, Fountain Ave, Shore Pkwy	Mixed Use (see residential below)	2002		640,000
Kings Plaza Expansion	Avenue U and 55th St.	Lowe's Hardware, Restaurant, Movie, Theater	2004		117,000 518 parking spaces
Sun Oil Site	Avenue U and Pearson St.	Lowe's Hardware Expansion	NA		50,000 to 100,000
Venice Marina Redevelopment	Sheepshead Bay, Knapp Street, Emmons Ave, Shell Bank Ave.	Retail/Marina with Waterfront promenade	2006		400,000+
Kings Highway Development	East 14th Street and East 15th Street, north of Kings Highway	Retail and Parking Garage	2006		87,000
Sheepshead Bay United Artists Theaters	Sheepshead Bay	Movie Theater	2003		NA
RESIDENTIAL					
New Construction	1426C Loring Street	2-3 Family Townhouse	2002	63	
New Construction	1426 Loring Ave.	2-3 Family Townhouse	2002	65	
Oceana	Brighton Beach Ave.	Condominiums	2002 – 2006	850	
Council Towers II, III, IV	99 Vandalia Ave, Penn. Ave, Louisiana Ave.	Senior 202	2000	366	
Mill Basin	Flatbush, Avenue U, 64th, Mill, Strickland Ave.	Senior 202 Assisted Living	2001 – 2002	98	
Gateway Estates	Flatlands Ave, Fountain Ave, Shore Pkwy	UDAAP Mixed Use Nehemiah Homes	2009	2,385	
East New York New Foundations	Various CD 5 Sites	Moderate, Middle Income	2005	327	
Partnership or New Foundations	South of New Lots Ave.	Townhouse Homeownership	2006	162	
Partnership Housing	Various CD 5 Sites	Homeownership	NA	52	
Bergen Beach/Georgetown New Residential	Bergen Beach/Georgetown 66th-Royce Street	2-Family	2004	300	
Ocean Dreams	Surf Ave, W. 35th-W. 37th St.	Residential Rezoning	2005	273	

RECENT AND PLANNED LAND USE DEVELOPMENT ACTIVITY WITHIN THE STUDY AREA ANTICIPATED BY 2025 (CONTINUED)

PROJECT	LOCATION	TYPE	BUILD YEAR	UNITS	SIZE (Sq. Ft.)
OTHER					
Keyspan Stadium & Park	Surf Ave, W17 & W19 St.	7,500 Seat Stadium 1,200 parking spaces	2001		
P.S. 69	9th Ave., 63rd - 64th St.	650-seat Public School	2002		
Yeshiva	McDonald Ave, Avenue Y	1,000-seat Religious School	NA		
Southwest Brooklyn Marine Transfer Station	Shore Parkway at Bay 41st St.	DSNY Marine Transfer Station	2006		

MAJOR PLANNED AND ANTICIPATED LAND USE DEVELOPMENTS ELSEWHERE IN BROOKLYN ANTICIPATED BY 2025

PROJECT	LOCATION	TYPE	BUILD YEAR	UNITS	SIZE (Sq. Ft.)
OFFICE					
9 MetroTech Center South	Downtown Brooklyn (Flatbush Ave. and Myrtle Ave.)	Office	2003		670,000 272 space garage
Downtown Brooklyn Rezoning (See note 2)	Bounded by Tillary St, Ashland Ave & Atlantic Ave.	Commercial, Residential & Community Facility	2014		4,700,000 (see resid. below)
Empire State Dev. Corp.	Schermerhorn between Hoyt & Smith St.	Mixed Use/Mixed Income Residential	2004		40,000 office or community facility or hotel (see below)
New State Courthouse	Tillary Street and Cadman Plaza East (330 Jay St.)	Family and Supreme Court (6,000 daily users)	2005		170,000 (see other components below)
Atlantic Court	Atlantic Avenue and Court Street	Mixed Use Office, Retail, Community Facility (CF)	2004	327	509,000 office 22,000 retail 43,000 CF
Atlantic Terminal Mall	Atlantic Ave, Fourth Ave and Flatbush Ave.	Bank of New York Office	2004		500,000 LIRR station rehab.
RETAIL					
Atlantic Terminal Mall	Atlantic Ave, Fourth Ave and Flatbush Ave.	Retail	2004		470,000 LIRR station rehab.
Empire State Dev. Corp.	Schermerhorn between Hoyt & Smith St.	Mixed Use/Mixed Income Residential	2004		65,000 retail (see resid. below)
IKEA	Columbia and Halleck Streets	Retail	2006		346,000 furniture store; 25,000 retail & 1,440 parking spaces
Greenpoint Williamsburg Rezoning	Newtown Creek (n), Williamsburg Bridge (s) McGuiness Blvd (e) East River (w)	Residential & Commercial	2014	See resid. above	200,000 commercial
BAM/LDC North	Ashland and Rockwell Place and Lafayette and Fulton Streets	Residential/Other	2013		10,000 retail and 451 space garage
Brooklyn Bridge Park	Piers 1-5 Brooklyn Heights	Mixed Use (Overall 1,500,000 Sq. Ft.)	2010		NA hotel restaurant, marketplace (see other componentsbelow)
Lowe's Gowanus Post Office Site	2nd Avenue between 10th and 12th St.	Hardware Store	2004		157,000 as-of-right hardware store
Renaissance Plaza	Jay Street	Office/282-room Hotel Expansion	2004		200,000 commercial and 282 rooms
Arverne URA (Queens)	Beach 84th Street to Beach 32nd Street	Mixed-Use Residential with Retail and Hotel	2009	3,900	770,000 commercial (mostly retail) 200,000 Hotel

MAJOR PLANNED AND ANTICIPATED LAND USE DEVELOPMENTS ELSEWHERE IN BROOKLYN ANTICIPATED BY 2025 (CONTINUED)

PROJECT	LOCATION	TYPE	BUILD YEAR	UNITS	SIZE (Sq. Ft.)
RESIDENTIAL					
Atlantic Terminal	Atlantic Ave, Fourth Ave and Flatbush Ave.	Affordable Housing	1997-2004	417	
Downtown Brooklyn Rezoning (See note 3)	Bounded by Tillary St, Ashland Ave & Atlantic Ave.	Commercial, Residential & Community Facility	2014	1,000	
Greenpoint Williamsburg Rezoning	Newtown Creek (n), Williamsburg Bridge (s) McGuiness Blvd. (e) East River (w)	Residential & Commercial	2014	7,000	
Empire State Dev. Corp.	Schermerhorn between Hoyt & Smith St.	Mixed Use/Mixed Income Residential	2004	440	See above for commercial and retail components
110 Livingston Street	Downtown Brooklyn	Market Rate Residential	2005	245	
Flushing Bedford Rezoning	Rutledge, Lynch, Middleton Lorimer, Marcy, Spencer, Flushing, Myrtle, Wallabout, Franklin & Kent Ave.	Residential/Mixed-use rezoning	2010	1,224	
West Bushwick URA	Flushing Ave, Evergreen Ave, Jefferson St, Bushwick Ave and Beaver St.	Townhouses and Mid-rise Affordable Housing	2007	460	
Kedem Winery Rezoning	Kent Ave. & S.8th St.	Residential rezoning	NA	410	
Pacific Street Rezoning	Carlton, Bergin, Vanderbilt & Pacific St.	Residential rezoning		400	
Kent Avenue Rezoning	Kent & Wythe Ave bet. South 8th & 11th St.	Residential rezoning		540	
CD 6 Rezoning/Park Slope	Warren, Union Sts, 3rd, 4th Aves, Prospect Park W.	Residential rezoning	2012	1,135	
Edgemere URA (Queens)	Beach 35th Street to Beach 51st Street	Townhouses	2009	700	
OTHER					
Downtown Brooklyn Rezoning (See note 4)	Bounded by Tillary St., Ashland Ave. & Atlantic Ave.	Commercial, Residential & Community Facility	2014		300,000 community facility
New Federal Courthouses	Tillary Street and Cadman Plaza East (25 Cadman Plaza East)	Courthouse	2003		700,000
New State Courthouse	Tillary Street and Cadman Plaza East (330 Jay Street)	Family and Supreme Court (6,000 daily users)	2005		780,000 with 150-space garage

MAJOR PLANNED AND ANTICIPATED LAND USE DEVELOPMENTS ELSEWHERE IN BROOKLYN ANTICIPATED BY 2025 (CONTINUED)

PROJECT	LOCATION	TYPE	BUILD YEAR	UNITS	SIZE (Sq. Ft.)
New Brooklyn Polytech Dormitory	Downtown Brooklyn	400-bed Dormitory	2002		
Brooklyn Law School Dormitory	Downtown Brooklyn State St. & Boerum Place	371-bed Dormitory	2004		With 212 space garage
New York Marriott Expansion	Adams St, north of Willoughby St.	Hotel rooms	2005	280	Hotel and additional 8,500 retail
Brooklyn Bridge Park	Piers 1-5 Brooklyn Heights	Mixed Use	2010		70-acre park including 1,500,000 of cultural & educational facilities, hotel, marketplace, restaurant, open and recreational spaces.
BAM/LDC North	Ashland and Rockwell Place and Lafayette and Fulton Streets	Residential/Other	2013		160,000 museum and gallery; 50,000 theater; 43,000 dance center
Navy Yard	East River waterfront, Williamsburg/Fort Greene/Vinegar Hill	Movie Production Studio with office space	2004		275,000 with later undetermined phases
Brooklyn Army Terminal	58th St. and 1st Ave.	Back Office/Light Industrial reuse	NA		1,000,000
Greenpoint Marine Transfer Station (DSNY)	N. Henry and Kingsland Ave.	DSNY Marine Transfer Station	2006		
Hamilton Avenue Marine Transfer Station (DSNY)	Second Ave./Gowanus Canal	DSNY Marine Transfer Station	2006		

Notes:

1. Information was obtained in 2003 and is preliminary. Sources include Brooklyn Office of the New York City Department of City Planning, New York City Economic Development Corporation, New York City Department of Housing Preservation & Development, and Brooklyn Borough President's Office.
2. Total additional commercial development could range from 9M to 11M square feet (including the identified 4.7M square feet). If the Nets basketball team relocates to Brooklyn, another 2M square feet could be added to the total.
3. If the Nets basketball team relocates to Brooklyn, up to another 4,500 residential dwelling units are anticipated.
4. If the Nets basketball team relocates to Brooklyn, the arena would seat 19,000.

Appendix B
Passenger Ferry Services

Passenger Ferry Services
Assumed Operation Characteristics

Vessel Capacity: Assume 100 passengers based on the types of ferries in existing service by various companies

Fares: Range represents single ticket (high) and monthly commuter (low) cost per trip

Coney Island (at the New York Aquarium, there are connecting bus routes)

1. To Manhattan Pier 11
    - 20 Minute Frequency
    - Travel Time – 30 minutes
    - Fares - $5.00 low and $10.00 high

2. To Downtown Brooklyn/Atlantic Avenue Pier
    - 30 Minute Frequency
    - Travel Time – 25 minutes
    - Fares - $4.00 low and $8.00 high

Sheepshead Bay (at the intersection of Emmons Avenue and Nostrand Avenue, there are connecting bus routes)

1. To Manhattan Pier 11
    - 20 Minute Frequency
    - Travel Time – 35 minutes
    - Fares - $5.00 low and $10.00 high

2. To Downtown Brooklyn/Atlantic Avenue Pier
    - 30 Minute Frequency
    - Travel Time – 30 minutes
    - Fares - $4.00 low and $8.00 high

Floyd Bennett Field (at Floyd Bennet Blvd and Gil Hodges Bridge, $5.00 daily parking fee, assume 100 spaces available for ferry passengers)

1. To Manhattan Pier 11
    - 20 Minute Frequency
    - Travel Time – 40 minutes
    - Fares - $5.00 low and $10.00 high

2. To Downtown Brooklyn/Atlantic Avenue Pier
    - 30 Minute Frequency
    - Travel Time – 35 minutes
    - Fares - $4.00 low and $8.00 high

Jacob Riis Park (at Coast Guard facility at State Road just east of Gil Hodges Bridge, $5.00 daily parking fee, assume 350 spaces available for ferry passengers, extend Green/MTA Bus Lines Rte Q22 to site)

1. To Manhattan Pier 11
   - 20 Minute Frequency
   - Travel Time – 40 minutes
   - Fares - $5.00 low and $10.00 high

2. To Downtown Brooklyn/Atlantic Avenue Pier
   - 30 Minute Frequency
   - Travel Time – 35 minutes
   - Fares - $4.00 low and $8.00 high

JFK International Airport (near the Lefferts Boulevard Airtrain station, free transfer to Airtrain, no commuter parking)

1. To Manhattan Pier 11
   - 20 Minute Frequency
   - Travel Time – 50 minutes
   - Fares - $15.00 low and $20.00 high

2. To Downtown Brooklyn/Atlantic Avenue Pier
   - 30 Minute Frequency
   - Travel Time – 45 minutes
   - Fares - $12.00 low and $15.00 high

Local Service – stops at each stop in Southern Brooklyn in both directions, no stops in Downtown Brooklyn or Lower Manhattan.

- 30 minute frequency
- Travel time varies by stop – dwell time at each stop will be 2 minutes

  Westbound
  1. JFK International Airport to Jacob Riis Park – 16 minutes
  2. Jacob Riis Park to Floyd Bennet Field – 3 minutes
  3. Floyd Bennet Field to Sheepshead Bay – 10 minutes
  4. Sheepshead Bay to Coney Island – 10 minutes
  5. Coney Island to Brooklyn Army Terminal – 15 minutes

  Eastbound
  1. Brooklyn Army Terminal to Coney Island – 15 minutes
  2. Coney Island to Sheepshead Bay – 10 minutes
  3. Sheepshead Bay to Floyd Bennet Field – 10 minutes
  4. Floyd Bennet Field to Jacob Riis Park – 3 minutes
  5. Jacob Riis Park to JFK International Airport – 16 minutes

- Fares $3.00 low and $6.00 high

Appendix C
Short-Term Issues

Short-Term Issues

January 2006

INTRODUCTION

A significant number of transportation issues have been identified by the public over the course of the Southern Brooklyn Transportation Investment Study (SBTIS). These issues were gathered at a series of Local Area Visioning workshops held throughout 2002 in the communities comprising the study area; as well as from letters and e-mails from the public and members of community, civic and business interests.

Transportation issues have been categorized as being either of short-term or medium/long-term concern. The medium and long-term issues have been reviewed for possible evaluation as part of the multi-modal scenario development. However, many of the issues fall into the short-term category. Short-term issues include, for example, frequency of bus service on specific routes, traffic signals improvements, and need for crosswalks at various intersections.

The short-term issues have been forwarded to the agencies on the Technical Advisory Committee that are responsible for operating and maintaining the transportation systems. Listed below are the short-term issues along with agency responses (in brackets) received to date.

SHORT-TERM ISSUES

NEW YORK CITY DEPARTMENT OF TRANSPORTATION

1. Incident management should be improved along the Belt Parkway. [Variable message signing and other measures are underway to improve incident management.]
2. DOT maintenance vehicles use Belt Parkway, in conflict with weight restrictions. [DOT trucks must travel on the parkway to maintain the roadway.]
3. Signs prohibiting commercial vehicles are needed at Belt Parkway entrances at Rockaway Parkway. [Missing signage was replaced in May 2003. Signs include "No Vehicles Over 5 Tons" and "Passenger Cars Only" at the Rockaway Parkway location.]
4. There is incorrect directional signing for the Belt Parkway at the North Service Road and Voorhies Avenue. [Repairs were made at this location in May 2004.]
5. A Belt Parkway trailblazer sign is too close to the corner at Sheepshead Bay Road (it blocks a street sign).
6. Overpasses over the Q line have graffiti. [NYCDOT Bridges intends to rehabilitate the bridges over the Brighton Line. These projects are in the initial planning stages.]
7. The pedestrian crossing at Poly Place from the B70 bus stop to the VA Hospital is a problem. [The signal cycle length in front of the hospital – Poly Place/Cropsey Avenue – was increased to 90 seconds from 60 seconds in summer 2003.]

8. Synchronize traffic signals along 18th Avenue between Ocean Parkway and 45th Street. [Signal timing is already computerized. Occasionally, when a connection is lost, the timings are off-line and result in delays. This condition is usually spotted quickly and corrected immediately.]
9. Adjust traffic signal synchronization to smooth traffic flow on Linden Boulevard, 57th Street, Remsen Avenue and Kings Highway. [Signal timing was upgraded in the vicinity of Linden Boulevard, 57th Street and, Remsen Avenue.]
10. Coordinate traffic signals along 4th Avenue from 101st Street to 83rd Street. [Signal timing is already computerized. Occasionally, when a connection is lost, the timings are off-line and result in delays. This condition is usually spotted quickly and corrected immediately.]
11. Improve traffic signal timing along Flatlands Avenue to alleviate back-ups. [Improvements were undertaken in 2003.]
12. The intersection of 65th Street and the 6th Avenue exit of the Gowanus Expressway presents conflicts between pedestrians and vehicles. Traffic builds up at 65th Street. Improved roadway markings/signage is needed (e.g., a turn arrow). [Signal adjustments were made in summer 2004. New pavement markings and signage are planned by the NYSDOT for 2005.]
13. Provide a traffic light at 103rd Street and Glenwood Road to address the problem of frequent accidents.
14. The intersection of Emmons Avenue and Sheepshead Bay Road needs a left-turn signal phase. Sometimes a bus has to wait at least 4 signal cycles before the driver can make the turn. [A left-turn phase was installed in March 2003.]
15. Pedestrian-vehicular conflict and insufficient pedestrian crossing time at Avenue Z and Nostrand Avenue. Turn signals are needed at this intersection.
16. On Bedford Avenue there is traffic congestion at two intersections in the vicinity of Brooklyn College. These congested intersections could be alleviated by the elimination of parking meters to allow through traffic to bypass vehicles queuing for left turns. [It is not feasible to install a bypass lane due to the present configuration of the roadway consisting of a parking lane, bike lane and travel lane.]
17. A turn signal is needed at Canal Avenue and Cropsey Avenue near The Home Depot. [The "No Left Turn" prohibition was placed at this location as a safety initiative; a left turn is an unsafe maneuver. A traffic signal was installed at the supermarket exit in November 2003. The signal provides for safe pedestrian crossings.]
18. A left-turn signal is needed at 86th Street and McDonald Avenue, where there are conflicts with southbound traffic on McDonald Avenue. [A left turn signal phase was installed for northbound Shell Road to westbound 86th Street on October 22, 2002.]
19. Turn lanes should be added to the intersection of Coney Island Avenue and Avenue J which is very congested and carries heavy truck traffic. [In August 2003, the Department studied the location for left-turn signals and determined that additional controls were not warranted. Department policy permits re-examination of the same location after 18 months have elapsed.]

20. A traffic signal should replace the stop sign at the intersection of East 13th Street and Avenue I. A school is present at this location. [In December 2003, the Department studied the location and determined that signals were not warranted. Department policy permits re-examination of the same location after 18 months have elapsed.]
21. The traffic signals at the Kings Highway intersections with Linden Boulevard and with 56th Street are out of synchronization with each other. [A new timing system was installed and fine-tuned in 2002.]
22. Permit the left turn from Emmons Avenue to East 16th Street.
23. Install a traffic light at 66th Street and 7th Street/Bay Parkway because of the left turn condition.
24. Lengthen the timing of the dedicated left-turn signal for the turn onto Atlantic Avenue from northbound Pennsylvania Avenue. [Intersection improvements are being made as part of the improvements related to the Gateway Estates development.]
25. Provide left-turn signals from Pennsylvania Avenue to Flatlands Avenue, and from Flatlands Avenue to Pennsylvania Avenue. [Left-turn signals are installed in all directions at this location.]
26. Coordinate traffic signals along Bedford Avenue. [Signal timing is already computerized. Occasionally, when a connection is lost, the timings are off-line and result in delays. This condition is usually spotted quickly and corrected immediately.]
27. Lack of traffic lights/pedestrian crossings on 17th Avenue from 75th Street to 79th Street. Replace the stop sign at 17th Avenue and 77th Street with a traffic light. [A traffic signal was installed at 17th Avenue and 77th Street in winter 2004.]
28. Repair the inoperative traffic signal pedestrian button at the corner of Nostrand Avenue and Avenue Z. [The push button was re-installed on November 14, 2002.]
29. Pedestrian crossings along Ocean Parkway are a problem. In particular, pedestrians are unable to cross at the intersection at Avenue Z and there is a dangerous crossing at Bay Parkway. [Pedestrian crossing times have been increased at a number of intersections and protected left turns have been installed along Ocean Parkway.]
30. Crosswalk needed on easterly side of Bay Parkway at West 10th Street. [This location does not have a stop control device; i.e., stop signs or signals. Crosswalks are only installed at intersections with stop control devices as per Department policy.]
31. Need crosswalks across Foster Avenue and Farragut Road at East 23rd Street. [These locations have a stop control device for the minor street – East 23rd Street. Crosswalks are marked across East 23rd Street at the Foster Avenue and Farragut Road intersections.]
32. Install parking meters at Bay Parkway and W. 7th Street (65th Street). [Parking on the east side of Bay Parkway between West 7th Street and 65th Street is restricted to allow curb access for the right turn from West 7th Street onto Bay Parkway.]
33. Replace parking prohibition signs with parking meters on Bay Parkway between West 11th Street and Avenue O. [The existing "No Parking Anytime" signs were installed to discourage the car wash on the next block from double parking and causing traffic spillback along Bay Parkway.]

34. Tractor trailers get stuck at the elevated Brighton Beach (Q Line) transit structure crossing Avenue J at East 16th Street. [There are advance height warning signs at this location.]
35. Trucks get stuck beneath the overpass at 86th Street and 20th Avenue. [There are advance height warning signs at this location.]
36. Trucks get stuck under low overpasses at Kings Highway, Ocean Avenue and Rockaway Parkway. Advance warning signs are needed. [There are advance height warning signs at these locations.]
37. Truck signage is needed on Linden Blvd. East of Utica Avenue to the Queens border. [The Department met with the Linden Boulevard Block Association in October 2002 and has addressed these concerns.]
38. Signs need to be re-installed prohibiting through trucks on Linden Boulevard, and redirected to the Atlantic Avenue through truck route to the Gowanus Expressway. [The signs were re-installed in spring 2003.]
39. Expedite reconstruction of the "jewel" streets in Community District 5. [Reconstruction of the streets is in the City's FY2006 program.]
40. Better sidewalk maintenance is needed on Coney Island Avenue and Ocean Parkway. [Adjacent property owners are responsible for sidewalk maintenance and repair.]
41. A bus shelter should be provided on Flatbush Avenue at Church Avenue (B41 route). [The public can make a direct request for a shelter via the NYCDOT website www.nyc.gov/html/dot/html/permits/franinfo.html#busstopshelter.]
42. A bus shelter and benches should be provided at the B13 stop at the Gateway mall. [The public can make a direct request for a shelter via the NYCDOT website www.nyc.gov/html/dot/html/permits/franinfo.html#busstopshelter.]
43. Bicycle parking facilities are needed in Sheepshead Bay; at Brooklyn Community College; at Kingsborough Community College; at larger subway stations such as Coney Island, Rockaway Parkway, Kings Highway (both the Q and N lines), Eastern Parkway and New Utrecht (where space is available at an old bus turnaround); at Keyspan Stadium; at Newkirk Plaza around the station house; at various locations on Kings Highway; and at Kings Plaza.

New York City Truck Management and Community Impact Reduction Study

The concerns expressed by the public in SBTIS community meetings were forwarded to the New York City Department of Transportation to help inform their *Truck Route Management and Community Impact Reduction Study*. The primary purpose of the study is to improve the overall truck route management framework which regulates truck movements in New York City. In doing so, the Department intends to minimize the negative impacts of trucks in residential areas, while providing drivers with the necessary resources to safely and efficiently traverse city streets. This will be accomplished through a combination of education, information and enforcement.

1. Improve signing along truck routes. Signs are too small and only Linden Boulevard is marked. 65th Street is used by trucks, but it is not clearly marked.
2. Trucks have difficulty turning at 18th Avenue to and from 86th Street and Cropsey Avenue.

3. Brooklyn Terminal Market-bound trucks on Clarendon Road, Zachary Street, Dean Street pose safety threat to school children.
4. Trucks leave the designated route on Coney Island Avenue and turn onto Newkirk Avenue to cut over to the McDonald Avenue truck route.

Coney Island/Gravesend Transportation Study

The New York City Department of Transportation is presently conducting a study to improve transportation in the Coney Island and Gravesend sections of Brooklyn. The following comments received as part of the SBTIS public outreach efforts have been forwarded to the NYCDOT Coney Island/Gravesend study team:

1. A left-turn signal is needed at Brighton Beach and Coney Island Avenue (eastbound onto Coney Island Avenue under the elevated subway).
2. Increase the green signal time for traffic on West 5th Street at Neptune Avenue. [Signal improvements are being looked at as part of the Coney Island Study.]
3. Unsafe intersection (traffic and pedestrian safety) at Bay Parkway and Cropsey Avenue.

NEW YORK CITY DEPARTMENT OF PARKS & RECREATION

1. Bench repairs are needed on Ocean Parkway. [The Department will repair the benches.]

MTA AND NEW YORK CITY TRANSIT

1. Maintain City Ticket Program (a pilot program which provides a $3.00 one-way fare for travel on MTA commuter rail within the city during weekends) and extend it to weekday service.
2. Consider reduced fares for reverse LIRR commute trips from Brooklyn to suburban workplaces on Long Island.
3. Better signing to the subway is needed at the East New York LIRR Station.
4. A maintenance problem is the accumulation of water in the Brighton Beach Station.
5. The 18th Avenue Station is not adequately cleaned.
6. Install new tiles and provide better maintenance at the 86th Street R train station.
7. The B36 and B44 routes should extend to the front of Sheepshead Bay High School (Avenue X).
8. Connection headways between the B63 and B11 bus lines are poor. [NYCT agrees that bus bunching is a problem in many parts of the City. However, bus bunching is largely the result of traffic congestion. NYCT is studying automatic vehicle location (AVL) technology which could help improve bus reliability and performance.]
9. A bus dispatcher is needed at Nostrand Avenue and Avenue U to prevent bunching on the B3 and B44 bus routes (a dispatcher used to be assigned to that location). [NYCT agrees that bus bunching is a problem in many parts of the City. However, bus bunching is largely the result of traffic congestion. NYCT is studying automatic vehicle location (AVL) technology which could help improve bus reliability and performance.]

10. Re-route the B49 route around the Sheepshead Bay Q line station instead of crowding Sheepshead Bay Road. Sheepshead Bay Road is narrow.
11. Buses from Staten Island that terminate at 4th Avenue and 86th Street create traffic congestion.
12. There is congestion and vehicular-pedestrian conflicts near a McDonald's restaurant on Flatlands Avenue at 78th Street (adjacent to a high school). This is due to the proximity of the bus stop to the MacDonald's drive-through take-out window.

Appendix D
Transit Suggestions and NYCT Responses

NYCT Responses to Transit Suggestions
June 2006

SUMMARY TABLE

Transit Suggestion	NYCT Comment
Address Operational Issues with Local/Limited Bus Routes • Improve Infrequent and/or Unreliable Bus Service and/or Bus Bunching On Multiple Routes • Double-Length or Articulated Buses, Could Be Used to Increase Bus Capacity • Provide Dedicated Bus Lanes on Major Corridors and Applicable Routes • Improve Service Levels on Existing Routes	• NYCT agrees that bus bunching is a problem. Bus bunching is largely the result of traffic congestion, which is beyond NYCT's control. Potential solutions, such as transit signal prioritization and improved traffic enforcement, are very complex and expensive and require the dedicated and vigorous participation by NYCDOT and NYPD. However, some initiatives are possible to advance. • NYCT is implementing a pilot Service Management Customer Information System that if successful, will be expanded to selected routes. In addition, the B44 and B82 are candidates for a BRT corridor, which might include bus lanes and traffic signal priority. • NYCT is in the process of updating the Bus Fleet Plan. Some of the routes mentioned will be considered for articulated buses.
Reduce Service Gaps by Restructuring/ Extending Bus Routes and Serving New Corridors • Provide Better East-West Connections • Improve Bus Routing or Connections between Bus Routes to Better Connect Neighborhoods • Extend Routes to Eliminate Gaps in Service Area • Improve Access to the New Gateway Mall • Extend Routes to Serve Important Generators • Restructure Routes to Provide Improved Service • Improve Bus Service to Kingsborough Community College (KCC) • Increase Bus Service from Staten Island	• In most of the cases cited, NYCT believes that current bus service is adequate, demand for the proposed changes is insufficient and/or other nearby service is available. Re-routings and extensions would be either counter productive or reduce reliability or access for other riders. • The B13 has been extended to the Gateway Mall. Extension of an additional route or routes is under study. • NYCT is currently investigating implementing AM limited stop B49 service to KCC.

Transit Suggestion	NYCT Comment
Increase Levels of Existing Service from Southern Brooklyn to Manhattan • Increase Span of Service and introduce weekend service on X29 • Shorten weekday N and R headways. • Shorten all headways for the W. • Provide more frequent and skip stop service on the L line. • Provide more frequent evening service on the 2 line. • Skip stop service to New Lots could be introduced. • Keep all trains on the Nostrand line to the West Side. Continue express trains from Utica on the express tracks to the East Side. • Re-establish F express service in Brooklyn. Extend V service to Brooklyn via Rutgers Street. • Extend the V via the Williamsburg Bridge. • C trains should be lengthened to 10 cars. • To increase service levels on the IRT, keep cars in service, rather than scrap them	• NYCT ridership counts indicate that there is insufficient demand for X29 weekend service or an increased service span. • N and R rush hour service frequencies were increased following the restoration of full service to the Manhattan Bridge and the completion of the Stillwell reconstruction program. • The W was replaced by the D following the restoration of full Manhattan Bridge service. Rush hour frequencies were increased in 2004. • Increasing L service will be examined once Communications Based Train Control on the Canarsie Line is completed. • During peak periods, service on the 2 is constrained by the track capacity at Nostrand Junction and the terminal at Flatbush Avenue. • NYCT does not believe that an extension of skip stop service to New Lots Ave. is warranted at this time. • NYCT believes that reconfiguring Nostrand line service would increase transfers and inconvenience riders. • NYCT intends to examine F express and V options for possible implementation after the completion of the viaduct rehabilitation. • Extending the V via the Williamsburg Bridge is a feasible alternative that could be examined. • Increasing C train length is not warranted by current ridership levels. In addition, there is not a sufficient number of available cars • The redbird fleet has already been retired.
Move forward with Subway Infrastructure Improvements that Increase Track Capacity and Improve Service • Reconfigure Nostrand Jct. • Create a new station in Pitkin Yard. • Provide faster service through improved signaling.	These proposals will be considered during the next update of MTA's 20 Year Need Assessment in 2008.
Improve Physical Access to and Physical Connections between Subway Stations • Livonia/Junius transfer. • Franklin Avenue connection to Nostrand Avenue Station. • Jay Street to Lawrence Street transfer. • 62 St/New Utrecht Avenue transfer. • Elevators at 86 Street/4 Avenue, Brighton Beach, and Sheepshead Bay.	These proposals will be considered during the next update of MTA's 20 Year Need Assessment in 2008.

Transit Suggestion	NYCT Comment
Create and Improve Transit Connections between the Study Area and Regional Airports for Airport Users and Employees • Increase B15 service and implement limited-stop service. • Extend either B6 or B82 to JFKIA via Linden and Conduit Boulevards. • Implement Limited stop route B22.	NYCT believes that these proposals either do not satisfy the MTA Board's guidelines for limited service, decrease reliability and increase running times.
Develop and Promote Existing and New Ferry Service • Provide Intermodal Connections to Ferry	NYCT believes that demand for the proposed services is inadequate, better alternatives exist for ferry connections; some of the proposed routes would not be reliable or cost effective.

NYCT Responses to Transit Suggestions
June 2006

COMPLETE TABLE

Transit Suggestion	NYCT Comment
Address Operational Issues with Local/Limited Bus Routes to Improve Service	
Improve Infrequent and/or Unreliable Bus Service and/or Bus Bunching On Multiple Routes	NYCT agrees that bus bunching is a problem in many parts of the City. However, bus bunching is largely the result of traffic congestion, which is beyond NYCT's control. Potential solutions, such as transit signal prioritization and improved traffic enforcement, are very complex and expensive and require the dedicated and vigorous participation by NYCDOT and NYPD.
Bunching was identified through the public outreach process as a problem on the B37, B9, B63 and B44. Improvements to these routes could include transit signal prioritization, street supervision, improved traffic enforcement, and the application of AVL technology.	NYCT is implementing a pilot Service Management Customer Information System that if successful, will be expanded to selected routes. In addition, the B44 is a candidate for a BRT corridor, which might include bus lanes and traffic signal priority.
The B2 operates as a primary feeder route and is often late resulting in infrequent and or unreliable subway connections. Efforts should be made to mitigate this situation by implementing traffic enforcement signal prioritization, and/or AVL technology. In addition, traffic enforcement and street supervision may be necessary on certain segments of this route.	NYCT is implementing a pilot Service Management Customer Information System that if successful, will be expanded to selected routes. In addition, the B44 is a candidate for a BRT corridor, which might include bus lanes and traffic signal priority.
The following routes have infrequent and or unreliable bus service: the B8, B11, B70, B71, B75, Q35, B82 and B7. Appropriate mitigation efforts should be implemented. These include those mentioned above, as well as looking at shortening all headways and increase peak service levels.	NYCT's bus surveys do not indicate that the service on these routes is infrequent or unreliable. Frequency and running times will be changed if the results of future surveys indicate that modifications are needed. However, NYCT is implementing a pilot Service Management Customer Information System that if successful, will be expanded to other routes. The B82 is a candidate for a BRT corridor, which might include bus lanes and traffic signal priority.
Double-Length or Articulated Buses, Could Be Used to Increase Bus Capacity	
Articulated buses should be added where capacity increases are needed and decreasing headways would be difficult. The routes with the highest ridership are the prime candidates (B44, B46, B41, B35 and B6).	NYCT is in the process of updating the Bus Fleet Plan. The routes mentioned above will be considered for articulated buses.
Provide Dedicated Bus Lanes on Major Corridors and Applicable Routes	
Dedicated bus lanes should be considered for the following corridors: 86th St. between 4th Ave and Ft Hamilton Parkway; Kings Highway between Ocean Ave and Coney Island Ave; Utica Avenue between Eastern Parkway and Empire Boulevard (southbound);	NYCT agrees that dedicated bus lanes would help decrease travel time and increase reliability. There currently are peak hour bus lanes on Livingston Street between Boreum Place and Flatbush Avenue, on Utica Avenue between Eastern Parkway and Crown Street.

Transit Suggestion	NYCT Comment
Flatbush Ave between Grand Army Plaza and Livingston St; and possibly for the B44. Design lanes to minimize violations (e.g., contraflow lanes) and accompanied by rigorous enforcement. Bus Lanes will be more effective if accompanied by other BRT-type treatments such as signal prioritization, queue jumpers, etc,	These and other BRT type treatments are under consideration in the NYCT/NYC BRT study, including the B41 between Grand Army Plaza and Smith Street and the B44 on Rogers Avenue/Nostrand Avenue between Flushing Flatbush Avenues.
Increase Service on Relevant Routes During School Hours	
Monitor service provided to schools to see if more service is needed.	All NYCT bus routes, including bus routes that have a high volume of students, are checked regularly. Frequency and running time modifications are made if ridership levels exceed MTA Board guidelines.
Improve Service Levels on Existing Routes	
Increase frequency on the B4, which now operates with a maximum frequency of 15 minutes.	All NYCT bus routes, including the B4, are checked regularly. Frequency and running time modifications are made if ridership levels exceed MTA Board guidelines. At this time, NYCT's surveys do not indicate that increased service is warranted on the B4.
Provide additional bus service to Kings Plaza on Ralph Avenue by shortening B47 headways during the weekend and evening periods.	At this time, NYCT's surveys do not indicate that increased weekend and evening service is needed on the B47. All NYCT bus routes, including the B47, are checked regularly on weekends (the B47 operates 24 hours a day, seven days a week). Please note that prior to September 2002, the B47's predecessor, the B78, did not provide all night service.
Increase service on the B103.	This comment has been forwarded to MTA Bus for review.
Reduce Service Gaps by Restructuring and Extending Bus Routes and Serving New corridors	
Provide Better East-West Connections	
A new east-west bus route along Avenue X or W and U that would connect Coney Island, Sheepshead Bay Marine Park, Kings Plaza and Mill Basin.	NYCT believes that the Avenue U corridor between Bensonhurst and Bergen Beach is well served by the B3 route. Customers from Coney Island may take the N, F, Q, W, B36, B44, B49 or B68 to Avenue U and transfer to the B3 to travel to Kings Plaza. In addition, the present spacing of service on Avenue U Avenue Z conforms to NYCT guidelines of a ½ mile between routes. Avenue W and Avenue X are both residential streets, where the residents might object to bus service.
A new east-west route that would connect Bay Ridge, Dyker Heights, Bensonhurst, Midwood, Marine Park and Bergen Beach. Alignment: Shore Road, Bay Ridge Avenue, 13th Avenue to 62nd Street, 65th Street, Avenue P, Mc Donald Avenue, Avenue R, Flatbush Avenue, Avenue U, East 74th Street to Avenue X.	The reliability of the B2, which is a feeder route to the Kings Highway Station, would suffer if it were incorporated into a very long route. In addition, the present spacing of service on 60th Street (B9) conforms to NYCT guidelines of a ½ mile between routes. 65th Street is a ¼ mile from 60th Street.
Improve Bus Routing or Connections between Bus Routes to Better Connect Neighborhoods	
Reduce the number of routes on 86th Street to one to simplify travel and reduce indirect travel. The 86th	NYCT has studied initiating a bus route running the length of the 86th Street corridor. However, budget

Transit Suggestion	NYCT Comment
Street route would run from Shore Road/99th St, Shore Rd, 86th St, Avenue X, Ocean Parkway, Brighton Beach Ave, Oriental Blvd to Kingsborough Community College.	constraints preclude establishing this service at this time. In addition, if this route were implemented, students from the 86th Street corridor who attend Xavarian High School would lose direct access to the school.
Restructure the B16 from 13th/14th Avenue to Fort Hamilton Parkway and replace southern end of the route with new 86th Street route. In addition, create a new route that will operate from 86th Street and 4th Avenue via 86th Street, 13th/14th Avenue, 39th Street, Cortelyou Road, Nostrand Avenue to Avenue D. Extend B67 along 16th Avenue to 62nd Street/New Utrecht Avenue Station.	There is significant demand for the present route structure. NYCT is concerned that the implementation of this recommendation would reduce the access of customers on the 13th/14th Avenue corridor to the 86th Street shopping corridor, Prospect Park or the Brooklyn Botanic Garden. In addition, other than Maimonides Hospital, there are few traffic generators along Fort Hamilton Parkway between 36th Street and 56th Street. This alignment would also require students who travel from the 13th/14th Avenue corridor to schools in Dyker Heights and Bay Ridge to walk approximately half a mile to Fort Hamilton Parkway. Extending the B67 along 16th Avenue would reduce reliability due to congestion on 16th Avenue. This would duplicate B23 service on 16th Avenue.
Extend Routes to Eliminate Gaps in Service Area or To Better Serve Neighborhoods	
Extend the B11 south and east via Flatbush Avenue, and Avenue J/Avenue K to Ralph Avenue.	Extending the B11 to Georgetown would reduce reliability due to serious traffic congestion in Borough Park and Avenue J. Currently, customers from Avenue J and Avenue K who want to access Brooklyn College or the Nostrand Avenue Station can walk two or three blocks to access the B6 on Avenue H. In addition, residents of Flatlands have bus service on Flatlands Avenue (B82) and Veterans Avenue (B41).
Improve Access to the New Gateway Mall	
Extend the B13 from the Brooklyn Development Center at Erskine Street and Gateway Drive to a new terminus at Starrett City via Gateway Drive, Vandalia Avenue, Flatlands Avenue, Van Siclen Avenue, then follow the B83 into Starrett City.	The B13 has been extended to the Gateway Mall
Restructure the B6 and/or the B103 in order to provide access to the Gateway Center. Extend the short trips to Rockaway Parkway.	Extending the B6, which is already a very long route, would reduce its reliability. This proposal has been forwarded to MTA Bus for review.
Extend Routes to Serve Important Generators	
Extend the B16 north to provide access to then Lefferts Homestead, the Prospect Park Zoo, the Brooklyn Public Library and Botanic Garden.	The Prospect Park Zoo, the Botanic Garden and the Lefferts Homestead are currently served by the B16. All three destinations have an entrance at or near Empire Boulevard terminal of the B16. In addition, B16 customers who want to travel to the Brooklyn Public Library may transfer to the B41 at Flatbush Avenue and Empire Boulevard.
Restructure Routes to Provide Improved Service	
Combine the B64 and B70 into a new route, as proposed by the Committee for Better Transit. Extend the route to Keyspan Park.	NYCT does not believe that the B64 and B70 should be combined. The two routes serve different markets and have different service frequencies. In addition, customers from Bath Beach who want to travel to Sunset Park or Borough Park may take the W Line and walk or take the B9, B11 or B35 to their destinations. Further, customers from Bath Beach who want to access the 86th Street

Transit Suggestion	NYCT Comment
	Shopping District would not have direct access to the area and would have to transfer to an 86th Street bus. Finally, Keyspan Park is a three block walk from the B64 terminus; there is little demand for an extension, other at the beginning and end of the approximately 45 Cyclones home games.
Establish a rush hour branch of the B42 along Seaview Avenue to 108th Street in Canarsie as presented by the Committee for Better Transit.	NYCT does not believe that a rush hour branch of the B42 should be established. Currently, B42 customers may transfer to the B17 at Seaview Avenue to travel to East 108th Street. In addition, adding a branch to the B42 would reduce rush hour bus service by half to the Bay View Houses, a major traffic generator.
Improve Bus Service to Kingsborough College	
Establish B49 limited-stop service to Kingsborough Community College during school hours. Extend the B74 to KCC.	NYCT is currently investigating implementing B49 AM limited stop service to KCC. In addition, the primary purpose of the B74 is to connect the Coney Island and Sea Gate communities with the Stillwell Avenue Station. Extending the route could make the B74 less reliable. Finally, customers from Sea Gate and the Coney Island peninsula may use and B36 and transfer to the B1 at Ocean Parkway to travel to KCC.
Increase Bus Service from Staten Island	
Establish a bus route from St. George Terminal to J.F.K. via Brooklyn. Express routes to Downtown Brooklyn from Staten Island.	Employee origin/destination surveys from the Port Authority indicate that there is insufficient employee demand for a bus route from Saint George Ferry Terminal to JFK Airport. Airport employees are the primary market on all NYCT bus routes serving JFK and LaGuardia Airports. The route would very long, very costly and would be subject to traffic congestion related delays in all three boroughs.
Additional route from the S.I. Mall via a more direct routing in Staten Island, providing service to areas of Staten Island that have none.	The S79, which operates between Bay Ridge and the S.I. Mall, serves the mall and other traffic generators along Hylan Boulevard. There is no indication that there is sufficient demand for an additional bus route from Brooklyn to the Staten Island Mall.
Express routes to Downtown Brooklyn from Staten Island.	A Staten Island–Downtown Brooklyn express service was eliminated in 1990 due to lack of ridership. In addition, Staten Island residents may take the S53 or the S79 to 86th Street and 4th Avenue in Bay Ridge and transfer to the R Line to Downtown Brooklyn. They may also take express buses from Staten Island to Manhattan and transfer to the subway to Downtown Brooklyn at no additional cost. S93 peak limited stop service to Brooklyn will start in September. S.I. customers may take the S93 to 86th Street and take the R to Downtown Brooklyn.
Increase Levels of Existing NYCT Express Bus Service from Southern Brooklyn to Manhattan	
Increase Span of Service and introduce weekend service on X29	
Consider establishing X29 weekend service, as well as increasing weekday span of service to roughly 5 A.M. to 12 A.M.	NYCT ridership counts indicate that there is insufficient demand for X29 weekend service. In addition, the X29 parallels both the F and Q subway routes, which provide 24-hour service, seven days a week.

Transit Suggestion	NYCT Comment
Increase off peak Command Bus express service to Manhattan.	This proposal has been forwarded to MTA Bus for review.
Increase Levels of Existing NYCT Express Rail Service from Southern Brooklyn to Manhattan	
Shorten weekday N and R headways.	N and R rush hour service frequencies were increased following the restoration of full service to the Manhattan Bridge and the completion of the Stillwell reconstruction program.
Shorten all headways for the W.	W service was replaced by D service following the restoration of full Manhattan Bridge service. Rush hour frequencies were increased in 2004.
Provide more frequent and skip stop service on the L line.	This recommendation will be examined further once MTA NYCT completes its ongoing installation of Communications-Based Train Control along the Canarsie Line. NYCT's ability to add more service to the L and operate skip stop is currently constrained by the antiquated and limited signal system on this line, which is currently being replaced by a modern CBTC system. Until the new signal system is in place, we will not be able to add service. After CBTC is operating, NYCT would be able to continue to increase service as L ridership grows (service has increased significantly in the past few years). However, the route will still be capacity constrained at the Eighth Avenue and Rockaway Parkway terminals, although there should be sufficient capacity along the line to serve anticipated ridership levels for many years. Several communities along the line had requested that NYCT implement skip stop service on this line. NYCT is open to exploring this concept; however, it should be noted that ridership has increased at most L line stations during the past few years, making it less clear which stations should be "skip" stations. Also, many L line riders travel relatively short distances along the line, reducing the potential benefits of skip stop. Finally, NYCT disagrees with the statement that the L service of 12-15 trains per hour is "far below the 24 trains per hour MTA-NYCT guideline for local trains." In fact, NYCT guidelines provide for at least 6 trains per hour per route (10-minute headway) on weekdays, regardless of whether it is a local or express. L service far exceeds this level (due to relatively high ridership), operating every 4 minutes during peak hours.
Provide more frequent evening service on the 2 line.	Service is scheduled, where feasible, according to loading and frequency guidelines established by the MTA Board. During peak periods, service on the 2 is constrained by the track capacity at Nostrand Junction and the terminal at Flatbush Avenue.
Skip stop service to New Lots could be introduced.	Express service is provided west of Utica Avenue on the New Lots line. NYCT does not believe that an extension of skip stop service is warranted at this time.
Keep all trains on the Nostrand line to the West Side. Continue express trains from Utica on the express tracks to the East Side.	While this proposed service plan would, in theory, eliminate the constraints at Nostrand Junction, it is not recommended for a number of reasons. This service change would almost certainly be strongly opposed by

Transit Suggestion	NYCT Comment
	residents along the Nostrand Avenue line. In addition, this service change would dramatically increase the number of transferring passengers at Franklin Avenue, which has relatively constrained platforms. Finally, the service as proposed would only send 2 service to Flatbush Ave, which does not, by itself, provide sufficient capacity for Nostrand Avenue line ridership levels, and would lead to significant overcrowding on this line.
Re-establish F express service in Brooklyn. Extend V service to Brooklyn via Rutgers Street.	This recommendation will be explored further once the Bergen St. interlocking is replaced. NYC Transit intends to examine F express and V options for possible implementation after the completion of the viaduct rehabilitation.
Extend the V via the Williamsburg Bridge.	This is a feasible alternative that could be examined. It should be noted that the platforms along the J, M and L lines can only support 8 car, 60' trains, so an extension of the V along these routes would require that these trains be shortened, which may impact Queens service. An extension of the V to Canarsie would also require cars compatible with Communications-Based Train Control (CBTC) signaling currently being installed on the L. Such cars are not currently available for the V, nor are they on order. In addition, there would not be enough capacity to terminate both L and V service there at current frequencies and there would be insufficient train recovery time to ensure reliable operations.
C trains should be lengthened to 10 cars.	This change is not warranted by current ridership levels. In addition, there is not a sufficient number of cars to provide 10 car C trains.
To increase service levels on the IRT, keep cars in service, rather than scrap them.	The redbird fleet, which has already been retired and scrapped, was at the end of its useful service life, and it would not have been feasible to retain them. Beyond the 230 cars added to the IRT fleet since 1999 for service expansion, there are no plans to replace the rest of the IRT fleet for many years. The current fleet size is appropriate for the foreseeable future given projected ridership levels and system capacity constraints.
Move forward with Subway Infrastructure Improvements that Increase Track Capacity and Improve Service	These proposals will be considered during the next update of MTA's 20 Year Needs Assessment in 2008
Reconfigure Nostrand Jct.	NYC Transit supports the concept of reconfiguring Nostrand Junction. However the construction impacts to existing service, Eastern Parkway and the surrounding community would be significant. In addition, NYC Transit believes that any changes at Nostrand must also include an improvement of the terminal configuration at Flatbush Avenue to achieve measurable benefits. In light of this, the terminal improvement, which is far less disruptive and expensive than the Nostrand Junction project, and has independent utility, should be pursued first.
Create a new station in Pitkin Yard.	This alternative warrants further examination due to of the number of high-density residential buildings nearby.

Transit Suggestion	NYCT Comment
	NYCT would not consider operating A service from this station, because NYCT would have to cut A service to Lefferts Blvd or the Rockaways. NYCT would need to examine the impacts to yard operations and capacity and safety and security as a result of this proposal. In addition, it should be noted that the existence of a platform, even if originally intended to serve passengers, does not mean that it can be easily or efficiently converted to a station, due to changes in building and construction codes. Further, the current uses of this platform would need to be relocated. However, this alternative warrants further examination due to of the number of high-density residential buildings nearby.
Provide faster service through improved signaling.	CBTC may result in faster service and improved signaling, and will be rolled out throughout the system, including in the study area, over many years. It should be noted, that most subway lines in the study area have had their signals upgraded with conventional wayside signals over the past 20 years, and would not be due for upgrades to CBTC for several decades. The Culver Line is slated to receive CBTC in the 2010's.
Improve Physical Access to and Physical Connections between Subway Stations	These proposals will be considered during the next update of MTA's 20 Year Needs Assessment in 2008
Livonia/Junius transfer.	NYCT has studied this concept and has determined that it would not be cost effective due to low anticipated ridership.
Franklin Avenue connection to Nostrand Avenue Station.	This appears to propose that the existing local station be moved east to be combined with the existing express station. This would provide little benefit (the express stop would still be the same distance from the Franklin Shuttle) at great cost and disruption. New construction and building codes would almost certainly require that a significant amount of property along Fulton Street be acquired to fit these platforms in.
Jay Street to Lawrence Street transfer.	This recommendation is included in the MTA Capital Program. Construction is scheduled to begin in the spring of 2007.
62 St/New Utrecht Avenue transfer.	It is not clear what is being recommended for the transfer at 62 Street/New Utrecht Avenue. Specific shortcomings are not cited with this transfer, nor are any improvements suggested.
Elevators at 86 Street/4 Avenue, Brighton Beach, and Sheepshead Bay.	These stations are not part of NYCT's ADA key stations plan and therefore are not slated to receive elevators. However, NYCT is currently conducting a feasibility study to determine if 86th Street should be the key station in Bay Ridge as opposed to 95th Street.
Create and Improve Transit Connections between the Study Area and Regional Airports for Airport Users and Employees	
Increase B15 bus service and implement limited-stop service. Limited-stop service would provide a faster, more convenient trip to/from JFKIA.	Based on past experience, NYCT has determined that a bus route must operate 12 buses per hour for a five-minute frequency for three consecutive hours to implement a successful limited-stop service. This service plan provides a 10-minute frequency for both the limited

Transit Suggestion	NYCT Comment
	and locals buses. The B15 does not meet these criteria at this time. However B15 service span to JFKIA was recently increased to 24 hours a day, seven days a week.
Extend the B6 or B82 to JFKIA via Linden and Conduit Boulevards to provide airport access airport from the southern part of the study area.	Extending either route to JFKIA would increase operating costs significantly and decrease reliability, due to the length of the current routes. However, there is a direct connection from the B6 to the B15.
New Limited stop route B22. Provides rapid ease/west bus service throughout the entire service area, as well as providing a new connection to JFKIA via the Belt Parkway.	NYCT believes that traffic congestion on the Belt Parkway would result in severe reliability problems for such a service. Due to the projected high cost of this proposed route, a significant market research effort would need to be undertaken to determine if such a service is needed. In addition, the bus would have to get on and off the highway, which would add running time, to access bus stops. Finally, buses are not permitted on the Belt without a waiver from NYCDOT.
Develop and Promote Existing and New Ferry Service	
Intermodal Connections to Ferry	
Most landings are near existing bus routes. Minor modifications could be made to provide direct connections. Route B11 could be extended west of 1st Avenue to turn around at the Brooklyn Army Ferry Landing.	Few of the ferry's customers come from the area served by the B11 (Flatbush, Borough Park and Sunset Park); most of the ferry's customers come from Bay Ridge. In addition, B11 customers have good transit access to Lower Manhattan via subway connections. Finally, the B11 terminal on First Avenue and 58th Street is already within walking distance of the ferry landing.
Route B9 should be operated into the Brooklyn Army Ferry Landing and extended along Shore Road from its current terminus near Owls Head Park to the intersection of Shore Road and 3rd Avenue to provide service along the route where the discontinued bus operated.	The B9 is a long route and the two proposed extensions would make the route longer and therefore less reliable. The proposal would generate few new B9 customers, who can currently connect with several subway routes for access to both Lower and Midtown Manhattan. Finally, both the proposed extension to and from the Brooklyn Army Terminal, and the extension to Shore Road, would not be cost effective.

Appendix E
Best Practice Model (BPM) Results

TABLE E-1
BPM RESULTS - PERFORMANCE MEASURES
BASE YEAR (2002) & FUTURE YEAR (2025) SCENARIOS
BOROUGH OF BROOKLYN
VEHICLE TRIPS & SHARE OF TOTAL PERSON TRIPS BY TRANSIT

Scenario	Vehicle Trips	Percent Change	Share of Person Trips by Total Transit	Percent Change
AM Peak Period (6 to 10 AM)				
Base Year	474,099	--	51.1%	--
Future Baseline	510,253	7.6	53.6%	4.8
Alternative Land Use	509,749	-0.1	53.7%	0.3
Passenger Ferry	510,253	0.0	53.6%	0.0
Passenger Ferry-Alt. Land Use	509,749	-0.1	53.7%	0.3
Bus Priority Measures	509,108	-0.2	53.7%	0.3
Bus Priority-Alt. Land Use	507,732	-0.5	53.8%	0.4
Grade Separation	510,753	0.1	53.6%	0.0
PM Peak Period (4 to 8 PM)				
Base Year	656,955	--	40.8%	--
Future Baseline	698,773	6.4	43.1%	5.6
Alternative Land Use	697,959	-0.1	43.2%	0.3
Passenger Ferry	698,773	0.0	43.1%	0.0
Passenger Ferry-Alt. Land Use	697,959	-0.1	43.2%	0.3
Bus Priority Measures	697,644	-0.2	43.1%	0.1
Bus Priority-Alt. Land Use	697,811	-0.1	43.1%	0.2
Grade Separation	698,773	0.0	43.1%	0.0

BPM – NYMTC Best Practice Model

Percent change Future Baseline compared to Base Year

Percent change Future scenarios compared to Future Baseline

TABLE E-2
BPM RESULTS - PERFORMANCE MEASURES
BASE YEAR (2002) & FUTURE YEAR (2025) SCENARIOS
BOROUGH OF BROOKLYN
AM PEAK PERIOD (6 TO 10 AM)

Scenario	VMT	Percent Change	VHT	Percent Change	Average Speed	Percent Change
Autos						
Base Year	2,347,287	--	168,729	--	13.9	--
Future Baseline	2,552,000	8.7	213,311	26.4	12.0	-14.0
Alternative Land Use	2,550,746	0.0	216,097	1.3	11.8	-1.3
Passenger Ferry	2,552,000	0.0	213,311	0.0	12.0	0.0
Pass. Ferry-Alt. LU	2,550,746	0.0	216,097	1.3	11.8	-1.3
Bus Priority Measures	2,541,065	-0.4	210,660	-1.2	12.1	0.8
Bus Priority-Alt. LU	2,540,929	-0.4	214,446	0.5	11.8	-1.0
Grade Separation	2,585,403	1.3	213,190	-0.1	12.1	1.4
Trucks						
Base Year	122,113	--	8,740	--	14.0	--
Future Baseline	149,411	22.4	11,909	36.3	12.5	-10.2
Alternative Land Use	149,029	-0.3	11,946	0.3	12.5	-0.6
Passenger Ferry	149,411	0.0	11,909	0.0	12.5	0.0
Pass. Ferry-Alt. LU	149,029	-0.3	11,946	0.3	12.5	-0.6
Bus Priority Measures	149,297	-0.1	11,870	-0.3	12.6	0.2
Bus Priority-Alt. LU	147,518	-1.3	11,791	-1.0	12.5	-0.3
Grade Separation	149,452	0.0	11,841	-0.6	12.6	0.6
Total All Vehicles						
Base Year	2,469,400	--	177,469	--	13.9	--
Future Baseline	2,701,410	9.4	225,219	26.9	12.0	-13.8
Alternative Land Use	2,699,775	-0.1	228,043	1.3	11.8	-1.3
Passenger Ferry	2,701,410	0.0	225,219	0.0	12.0	0.0
Pass. Ferry-Alt. LU	2,699,775	-0.1	228,043	1.3	11.8	-1.3
Bus Priority Measures	2,690,362	-0.4	222,530	-1.2	12.1	0.8
Bus Priority-Alt. LU	2,688,448	-0.5	226,237	0.5	11.9	-0.9
Grade Separation	2,734,855	1.2	225,030	-0.1	12.2	1.3

BPM – NYMTC Best Practice Model
VMT – Vehicle Miles of Travel
VHT – Vehicle Hours of Travel
Average Speed – Miles per Hour
Percent change Future Baseline compared to Base Year
Percent change Future scenarios compared to Future Baseline
Alt. LU – Alternative Land Use Scenario

TABLE E-3
BPM RESULTS - PERFORMANCE MEASURES
BASE YEAR (2002) & FUTURE YEAR (2025) SCENARIOS
BOROUGH OF BROOKLYN
PM PEAK PERIOD (4 TO 8 PM)

Scenario	VMT	Percent Change	VHT	Percent Change	Average Speed	Percent Change
Autos						
Base Year	3,274,783	--	260,197	--	12.6	--
Future Baseline	3,542,964	8.2	321,712	23.6	11.0	-12.5
Alternative Land Use	3,539,263	-0.1	324,584	0.9	10.9	-1.0
Passenger Ferry	3,542,964	0.0	321,712	0.0	11.0	0.0
Pass. Ferry-Alt. LU	3,539,263	-0.1	324,584	0.9	10.9	-1.0
Bus Priority Measures	3,526,078	-0.5	318,024	-1.1	11.1	0.7
Bus Priority-Alt. LU	3,533,333	-0.3	322,576	0.3	11.0	-0.5
Grade Separation	3,586,533	1.2	322,598	0.3	11.1	1.0
Trucks						
Base Year	45,132	--	3,558	--	12.7	--
Future Baseline	57,270	26.9	5,001	40.6	11.5	-9.7
Alternative Land Use	56,177	-1.9	4,949	-1.1	11.4	-0.9
Passenger Ferry	57,270	0.0	5,001	0.0	11.5	0.0
Pass. Ferry-Alt. LU	56,177	-1.9	4,949	-1.1	11.4	-0.9
Bus Priority Measures	57,768	0.9	4,994	-0.1	11.6	1.0
Bus Priority-Alt. LU	57,177	-0.2	5,015	0.3	11.4	-0.4
Grade Separation	57,213	-0.1	4,965	-0.7	11.5	0.6
Total All Vehicles						
Base Year	3,319,915	--	263,755	--	12.6	--
Future Baseline	3,600,234	8.4	326,713	23.9	11.0	-12.5
Alternative Land Use	3,595,440	-0.1	329,533	0.9	10.9	-1.0
Passenger Ferry	3,600,234	0.0	326,713	0.0	11.0	0.0
Pass. Ferry-Alt. LU	3,595,440	-0.1	329,533	0.9	10.9	-1.0
Bus Priority Measures	3,583,846	-0.5	323,018	-1.1	11.1	0.7
Bus Priority-Alt. LU	3,590,511	-0.1	327,591	-0.6	11.0	0.5
Grade Separation	3,643,747	1.2	327,563	0.3	11.1	0.9

BPM – NYMTC Best Practice Model
VMT – Vehicle Miles of Travel
VHT – Vehicle Hours of Travel
Average Speed – Miles per Hour
Percent change Future Baseline compared to Base Year
Percent change Future scenarios compared to Future Baseline
Alt. LU – Alternative Land Use Scenario

TABLE E-4
BPM RESULTS - PERFORMANCE MEASURES
BASE YEAR (2002) & FUTURE YEAR (2025) SCENARIOS
SOUTHERN BROOKLYN STUDY AREA
AM PEAK PERIOD (6 TO 10 AM)

Scenario	VMT	Percent Change	VHT	Percent Change	Average Speed	Percent Change
Autos						
Base Year	1,184,204	--	64,951	--	18.2	--
Future Baseline	1,262,832	6.6	77,409	19.2	16.3	-10.5
Alternative Land Use	1,256,785	-0.5	77,012	-0.5	16.3	0.0
Passenger Ferry	1,262,832	0.0	77,409	0.0	16.3	0.0
Pass. Ferry-Alt. LU	1,256,785	-0.5	77,012	-0.5	16.3	0.0
Bus Priority Measures	1,257,666	-0.4	76,317	-1.4	16.5	1.0
Bus Priority-Alt. LU	1,252,204	-0.8	75,773	-2.1	16.5	1.3
Grade Separation	1,298,396	2.8	78,428	1.3	16.6	1.5
Trucks						
Base Year	59,673	--	3,691	--	16.2	--
Future Baseline	73,953	23.9	4,934	33.7	15.0	-7.3
Alternative Land Use	73,284	-0.9	4,876	-1.2	15.0	0.3
Passenger Ferry	73,953	0.0	4,934	0.0	15.0	0.0
Pass. Ferry-Alt. LU	73,284	-0.9	4,876	-1.2	15.0	0.3
Bus Priority Measures	73,017	-1.3	4,851	-1.7	15.1	0.4
Bus Priority-Alt. LU	71,734	-3.0	4,727	-4.2	15.2	1.3
Grade Separation	73,681	-0.4	4,881	-1.1	15.1	0.7
Total All Vehicles						
Base Year	1,243,877	--	68,642	--	18.1	--
Future Baseline	1,336,785	7.5	82,343	20.0	16.2	-10.4
Alternative Land Use	1,330,068	-0.5	81,887	-0.6	16.2	0.1
Passenger Ferry	1,336,785	0.0	82,343	0.0	16.2	0.0
Pass. Ferry-Alt. LU	1,330,068	-0.5	81,887	-0.6	16.2	0.1
Bus Priority Measures	1,330,683	-0.5	81,168	-1.4	16.4	1.0
Bus Priority-Alt. LU	1,323,938	-1.0	80,499	-2.2	16.4	1.3
Grade Separation	1,372,076	2.6	83,310	1.2	16.5	1.4

BPM – NYMTC Best Practice Model
VMT – Vehicle Miles of Travel
VHT – Vehicle Hours of Travel
Average Speed – Miles per Hour
Percent change Future Baseline compared to Base Year
Percent change Future scenarios compared to Future Baseline
Alt. LU – Alternative Land Use Scenario

TABLE E-5
BPM RESULTS - PERFORMANCE MEASURES
BASE YEAR (2002) & FUTURE YEAR (2025) SCENARIOS
SOUTHERN BROOKLYN STUDY AREA
PM PEAK PERIOD (4 TO 8 PM)

Scenario	VMT	Percent Change	VHT	Percent Change	Average Speed	Percent Change
Autos						
Base Year	1,668,988	--	101,969	--	16.4	--
Future Baseline	1,770,814	6.1	117,900	15.6	15.0	-8.2
Alternative Land Use	1,765,966	-0.3	117,391	-0.4	15.0	0.2
Passenger Ferry	1,770,814	0.0	117,900	0.0	15.0	0.0
Pass. Ferry-Alt. LU	1,765,966	-0.3	117,391	-0.4	15.0	0.2
Bus Priority Measures	1,762,008	-0.5	116,390	-1.3	15.1	0.8
Bus Priority-Alt. LU	1,761,173	-0.5	116,214	-1.4	15.2	0.9
Grade Separation	1,818,806	2.7	119,979	1.8	15.2	0.9
Trucks						
Base Year	22,093	--	1,465	--	15.1	--
Future Baseline	28,514	29.1	2,002	36.7	14.2	-5.6
Alternative Land Use	27,976	-1.9	1,970	-1.6	14.2	-0.3
Passenger Ferry	28,514	0.0	2,002	0.0	14.2	0.0
Pass. Ferry-Alt. LU	27,976	-1.9	1,970	-1.6	14.2	-0.3
Bus Priority Measures	29,326	2.8	2,049	2.3	14.3	0.5
Bus Priority-Alt. LU	28,258	-0.9	1,971	-1.5	14.3	0.7
Grade Separation	28,462	-0.2	1,981	-1.0	14.4	0.9
Total All Vehicles						
Base Year	1,691,081	--	103,434	--	16.3	--
Future Baseline	1,799,328	6.4	119,902	15.9	15.0	-8.2
Alternative Land Use	1,793,942	-0.3	119,361	-0.5	15.0	0.2
Passenger Ferry	1,799,328	0.0	119,902	0.0	15.0	0.0
Pass. Ferry-Alt. LU	1,793,942	-0.3	119,361	-0.5	15.0	0.2
Bus Priority Measures	1,791,335	-0.4	118,439	-1.2	15.1	0.8
Bus Priority-Alt. LU	1,789,431	-0.3	118,186	-1.0	15.1	0.7
Grade Separation	1,847,268	2.7	121,960	1.7	15.1	0.9

BPM – NYMTC Best Practice Model
VMT – Vehicle Miles of Travel
VHT – Vehicle Hours of Travel
Average Speed – Miles per Hour
Percent change Future Baseline compared to Base Year
Percent change Future scenarios compared to Future Baseline
Alt. LU – Alternative Land Use Scenario

Appendix F
JFKIA Truck Freight Ferry Analysis

JFKIA Truck Freight Ferry Analysis

INTRODUCTION

NYMTC's Best Practice Model (BPM) does not include the types of data required for determining air cargo truck origins and destinations and other types of information required for model analysis of JFKIA freight ferry services. However, it was determined that an "off-line" or "off-model" analysis would provide useful input to this study. Key data and "off-line" analysis findings regarding: 1) key assumptions regarding potential services; 2) regional travel demand data; 3) the sketch planning analysis model; and 4) service corridor analyses are presented below, followed by analysis conclusions.

KEY ASSUMPTIONS REGARDING POTENTIAL FREIGHT FERRY SERVICES

MOVING THE TRUCK VERSUS MOVING THE CARGO

The *Hunts Point Waterborne Freight Assessment* involved a series of interviews with key air cargo customers at the Hunts Point Meat, Produce, and Fish Markets regarding the performance standards for a successful and attractive (from a business operator's standpoint) freight ferry service. Key interview findings were:

- The operation must meet an identifiable demand. There has to be a minimum base level of potential traffic to support the service. Preferably, this demand is based on current travel patterns and volumes, although some services may be warranted based on their ability to create and serve new travel demand patterns that were not previously feasible.
- The operation must be physically and operationally feasible. There has to be a suitable location for an appropriately-sized terminal with adequate navigation channels and effective connections to ferry users and the regional transportation network.
- The operation must provide economic, transportation, and environmental benefits at a reasonable cost, with a high likelihood of being stable and sustainable as a business proposition. Many ferry services require public subsidies, especially in the form of start-up capital assistance. Such investments may be warranted – provided the investment generates clear public benefits in return, and that the operation remains in place to ensure that the public continues to receive these benefits over the long-term.
- The operation must provide an attractive level of performance. Air cargo customers want what they already have; i.e., fast, on-demand, reliable, door-to-door trucking service for time-sensitive shipments, and the availability of rail for cost-sensitive shipments. Market businesses do not want to be involved in consolidating loads for shipment, or loading or unloading barges. They certainly are not interested in spending more for slower, less frequent, less reliable, more logistically complex services. One interviewee may have said it best: "This is a hard enough business already! Don't make us less competitive, we'll have to move to Jersey!" This argues against a service that has to consolidate cargo from various points, load a ferry, unload a ferry, and then distribute the cargo to multiple points at the

other end. The process takes time, and there is a certain amount of risk. Who is responsible for the goods at any given time? Who guarantees overall performance? What happens to your shipment if there is a problem with someone else's shipment? The idea of losing control of the cargo trip seems to be one of the primary concerns. A service that seems more consistent with the Markets' needs would use the water as a "floating highway," with marine transportation substituting for part of the highway trip. The "floating highway" operation could move trucks (drive-on/drive-off), or trailers and containers (roll-on/roll-off). There would be no need to consolidate or redistribute loads, and no need to surrender control over the cargo to a third party.

The Market findings are also applicable to many other types of air cargo customers. The majority of customers would strongly prefer not to have their cargo packed onto a truck, then offloaded to a ferry (and mixed with cargo from other customers), then reloaded to another truck, and then finally delivered.

There might be cases where air cargo customers or carriers would accept some type of "unload/consolidate/reload" operation. However, there is no empirical evidence – in the form of studies, interviews, industry presentations, or even offhand conversations with industry representatives – that industry would endorse this practice.

For purposes of this analysis, the service model assumed the ferry acts as a "floating highway" – a mobile piece of pavement that moves under the trucker, with no other changes in the end-to-end freight transportation logistics chain.

VESSEL TYPES

Waterborne vessels come in a variety of shapes, sizes, functions, and performance characteristics. Start-up services sometimes use existing vessels or "off the shelf" designs for new vessels, but many start-up services will custom-design and purpose-build a vessel for that specific service. Some key variables include:

- Dimensions and draft (water depth required) of the vessel. Cargo barges generally require 9 to 19 feet of draft, while containerships draw up to 50 feet. Vessels also have "air draft" and can be restricted by low bridges.
- Propulsion system. Vessels can be self-powered, or pulled or pushed by a tugboat; slow-speed (around 9 knots) or high-speed (35 to 45 knots or more); conventional diesel or gas turbine, waterjet, or hovercraft. Noise impact and air emissions are also propulsion system considerations.
- Current and wave-handling ability. Vessels must have enough power to deal with currents, waves, inclement weather and other navigational impediments. This is particularly important for operations in the East River, as currents through Hell Gate (between Hunts Point and New York Harbor) are extremely strong.
- Hull design. Designs include monohull or catamaran, may rely on "surface effects" (lifting itself out of the water to reduce drag), and must consider how much wake the hull produces.
- Safety and security. The vessel must meet all applicable standards.

- Cost and cost recoverability. Cost considerations include capital acquisition and operating costs, requirements for a specialized terminal or operating system, and need for public subsidy to cover capital or operating costs.

For purposes of this analysis, two vessel types were considered, using information from the *Hunts Point Waterborne Freight Assessment* (Figure F-1):

- Tug/barge truck ferry. Up to 30 tractor-trailer trucks are driven onto a modified barge, which is pulled or pushed by a tugboat. Service speed is a maximum of 9 knots. Based on a current service between Detroit and Windsor, vessel capital costs for a modified barge were estimated at between $3 and $4 million. The barge draft is approximately 15 feet, which can be accommodated by the channels leading to Bergen Basin, but not by the existing berths (which are 9 feet). It was assumed for this analysis that low-profile designs capable of operating in Jamaica Bay can be obtained at similar cost.
- Self-powered truck ferry. Approximately 30 tractor-trailer trucks are driven onto a self-powered vessel. Service speed is a maximum of 22 knots. Based on a modified version of a European design, vessel capital costs were estimated at $18 million. The vessel draft is approximately 10 feet, which can be accommodated by the channels leading to Bergen Basin, but not by the existing berths (which are 9 feet). It was assumed for this analysis that low-profile designs capable of operating in Jamaica Bay can be obtained at similar cost.

The analysis did not consider workboats (too little capacity), very large drive-on/drive-off vessels (too large for Jamaica Bay), or very fast vessels (much of the trip will be at reduced speed).

Figure F-1: Representative Vessel Types

FERRY SPEED RESTRICTIONS

It was assumed that Jamaica Bay speeds are restricted to 5 knots, as are speeds on approach to docks. It is possible that faster vessel speeds (up to 9 knots) may be achievable using low-wake designs, but this would require further investigation, and for present purposes 5 knots is considered the most appropriate planning assumption.

REGIONAL TRAVEL DEMAND DATA

The number of air cargo-related truck trips in key corridors that could be served by freight ferry were estimated assuming the two potential vessel types that are designed to accommodate trucks and the cargo contained therein, rather than the cargo itself. To estimate this demand, two main sources were examined:

- *JFKIA Air Cargo Truck Movement Study* (by URS Corporation for the PANYNJ, 2002)
- *NYMTC Regional Freight Plan* Transearch database (Reebie Associates, 2000)

The *JFKIA Air Cargo Truck Movement Study* presents estimates of daily cargo related trips to and from JFKIA, along with very generalized breakdowns of origin-destination and routing patterns. The origin-destination and routing data were not reported at a level specific enough to make estimates of trucking demand in key ferry service corridors. However, the available information was useful in quantifying the number of truck moves in 2002, and in estimating the average load factor (tons per truck) associated with these moves (see Table F-1). The average load factor is extremely small, reflecting the important role of smaller vehicles.

TABLE F-1
JFKIA AIR CARGO-RELATED VEHICLE TRIPS PER DAY, 2002

Cargo-Related Trips to JFKIA and Associated Air Cargo Tonnage

	Percent of Trips	Number of Trips	Tons/Day	Tons/Load*
5 and 6 Axle	6%	777		
Other Truck	29%	3,939		
Truck Subtotal	35%	4,716		1.2
Pickup/Van	25%	3,339		<< 1
Auto	40%	5,394		<< 1
Total	**100%**	**13,449**	**5,753**	

Source: *JFKIA Air Cargo Truck Movement Study*, PANYNJ, and Cambridge Systematics.

* This factor represents the number of tons per loaded truck move.

The Transearch database provides a detailed breakdown of landside origins and destinations for year 2000 air-cargo related truck tonnage associated with domestic air cargo moving through JFKIA, as shown in Table F-2. Most of these origins and destinations are focused on New York, New Jersey, Pennsylvania and Connecticut. The distribution of tonnage provided by Transearch is somewhat different from the distribution of vehicles provided by the *JFKIA Air Cargo Truck Movement Study*.

TABLE F-2
TRANSEARCH ESTIMATE OF JFKIA DOMESTIC AIR CARGO DRAYAGE TO/FROM QUEENS, 2000
(TONS)

	Outbound	Inbound	Total
Truck-Only Markets			
Queens County	55,688	55,688	111,376
Kings County	20,134	11,231	31,365
Suffolk County	12,252	6,838	19,090
Nassau County	11,577	6,457	18,034
Bronx County	10,631	5,930	16,561
Westchester County	8,005	4,466	12,471
Orange County	5,273	1,759	7,032
Rockland County	2,516	1,403	3,919
Dutchess County	2,370	1,321	3,691
Ulster County	1,476	823	2,299
Putnam County	839	468	1,307
Sullivan County	611	340	951
Subtotal	131,372	96,724	228,096
Potential Ferry Markets -- NY			
New York County	13,850	7,726	21,576
Richmond County	3,651	2,037	5,688
Subtotal	17,501	9,763	27,264
Potential Ferry Markets -- CT/RI/MA			
Eastern CT/RI/MA	13,756	7,414	21,170
Fairfield County	7,478	4,171	11,649
New Haven County	7,048	3,931	10,979
Litchfield County	1,616	902	2,518
Subtotal	29,898	16,418	46,316
Potential Ferry Markets -- West via GWB			
Essex County	53,244	25,714	78,958
Eastern Pennsylvania	8,594	4,516	13,110
Bergen County	7,673	4,280	11,953
Passaic County	4,335	2,418	6,753
Morris County	4,133	2,305	6,438
Sussex County	1,280	714	1,994
Warren County	882	492	1,374
Subtotal	80,141	40,439	120,580
Potential Ferry Markets -- West via VNB			
Delaware Valley - PA	67,164	44,681	111,845
Delaware Valley - NJ	13,412	7,481	20,893
Middlesex County	6,420	3,581	10,001
Monmouth County	5,434	3,031	8,465
Hudson County	4,979	2,777	7,756
Union County	4,461	2,489	6,950
Ocean County	4,417	2,464	6,881
Somerset County	2,571	1,434	4,005
Hunterdon County	1,105	617	1,722
Subtotal	109,963	68,555	178,518
Grand Total	**368,875**	**231,899**	**600,774**

The majority of JFKIA air cargo tonnage is international, not domestic. Transearch does not provide landside origin-destination data for this international tonnage. To account for the missing tonnage, the Transearch data was proportionally inflated, as shown in Table F-3. In doing so, it is recognized that the origin-destination pairs for international cargo trips are likely to be different from domestic trips. Shippers in Boston, Philadelphia and Baltimore can rely on their local airports for domestic service, but will move international cargo through JFKIA because of its superior service. Therefore, based on available data, it is more appropriate to look at generalized geographic distribution categories (New York County, Richmond County, Connecticut and New England, West via George Washington Bridge and West via Verrazano-Narrows Bridge) than specific origin-destination pairs. The inflation process provides a reasonable approximation of overall travel patterns, suitable for present purposes, but further study would be needed to develop more accurate estimates. Accordingly, the methodology used to compare truck and ferry performance emphasizes travel time and per unit cost, so it becomes less important to have absolutely precise demand estimates.

TABLE F-3
TRANSEARCH ESTIMATE OF JFKIA DOMESTIC AIR CARGO DRAYAGE TO/FROM QUEENS, 2000, INFLATED TO REFLECT INTERNATIONAL AIR CARGO (TONS)

	Outbound	Inbound	Total
Truck-Only Markets	407,728	300,194	707,922
Potential Ferry Markets -- NY County	42,985	23,979	66,964
Potential Ferry Markets -- Richmond County	11,331	6,322	17,653
Potential Ferry Markets -- CT/RI/MA	92,792	50,955	143,747
Potential Ferry Markets -- West via GWB	248,727	125,507	374,234
Potential Ferry Markets -- West via VNB	341,283	212,768	554,051
Grand Total	**1,144,846**	**719,725**	**1,864,571**

The load factor developed in Table F-1 was used to convert these annualized tonnage estimates to daily truck trip estimates, as shown in Table F-4.

TABLE F-4
ESTIMATED JFKIA AIR CARGO TRUCK MOVES PER DAY TO/FROM QUEENS, 2000

	Outbound	Inbound	Total
Truck-Only Markets	1,089	802	1,891
Potential Ferry Markets -- NY County	115	64	179
Potential Ferry Markets -- Richmond County	30	17	47
Potential Ferry Markets -- CT/RI/MA	248	136	384
Potential Ferry Markets -- West via GWB	664	335	1,000
Potential Ferry Markets -- West via VNB	912	568	1,480
Grand Total	**3,058**	**1,922**	**4,980**

The total trucks in Table F-4 represent year 2000 conditions, and are slightly higher than the total trucks in Table F-1, which represents year 2002 conditions. Air cargo tonnage was down slightly in year 2002.

TRUCK/FERRY SKETCH PLANNING ANALYSIS MODEL

Building on analyses from the *Hunts Point Waterborne Freight Assessment*, a simple spreadsheet-based Truck/Ferry Sketch Planning Analysis Model (T/F SPM) was developed that could be used to evaluate a variety of potential services and corridors using consistent criteria.

The T/F SPM was designed to compare truck and ferry options on two key dimensions: total travel time for the trucker, and cost incurred by the trucker. If the ferry offers the trucker an unattractive travel time or cost, he/she is unlikely to use it. Additionally, if the ferry offers a price equal to or less than trucking, but loses money in the process, the service would not be sustainable from a business standpoint without public subsidy. The cost comparisons were based on ferry and truck operational costs. The analysis did not consider capital costs for vessels, ferry terminals, channel dredging, access roads, and safety and security equipment. Nor did the analysis include costs for administration and marketing of the ferry service, berthing and permit fees, and terminal and channel maintenance.

There are multiple variables embedded in the model. For purposes of analysis, values consistent with reasonable and likely operating practices were selected. The major truck variables in the T/F SPM include:

- Statue Miles: number of miles from a specific decision point (a location where the trucker must decide whether to drive directly to JFKIA, or drive to a ferry terminal), as calculated by the Street Atlas USA 2006 mapping software package.
- Truck Travel Time Unconstrained: free flow travel time for the route between the decision point and JFKIA, as calculated by Street Atlas USA 2006.
- Truck Travel Time Highly Constrained: Three times the unconstrained travel time, representing traffic congestion conditions.

- Per-mile Cost Factor: estimated at $0.75 per mile to reflect fuel, maintenance and similar operating costs – significantly inflated from the value used in the *Hunts Point Waterborne Freight Assessment*, to reflect the recent surge in diesel fuel prices.
- Per-mile Cost: the per mile cost factor times number of miles.
- Toll Cost: average truck tolls in both directions (one-way tolls are assessed 50% in each direction) using E-ZPass rates in peak periods for 4-axle vehicles.
- Estimated Number of Loaded Trips per Day: taken from Table F-4.
- Percent of Truck Moves Not Loaded: used to reflect the fact that some share of trucks are moving without loads.
- Total Loaded and Unloaded Trips per Day: loaded trips inflated to account for non-loaded moves, representing the total truck traffic per day.
- Per Unit Trucker Costs per Day: this is the cost to an individual trucker to drive between the decision point and JFKIA, and is the driver's benchmark for determining whether the ferry offers a better value or a worse value.

The T/F SPM considers two ferry types – a 9-knot tug and barge, and a 22-knot self-powered vessel. Key variables for each vessel type, and truck/ferry times and costs include:

- Nautical Miles: the on-water distance between on-airport and off-airport ferry terminals.
- Nautical Miles @ 5 knots: the number of miles traversed in protected Jamaica Bay waters, where highly restricted speeds are likely to apply, or on immediate approach to the terminal.
- Nautical Miles @ max speed: the number of miles that can be traversed at the maximum vessel speed.
- Vessel Trip Time: end-to-end travel time, reflecting operations at both maximum and restricted speeds.
- Vessel Loading Wait Time: the average time a trucker will wait at the terminal before boarding the vessel.
- Vessel Unloading Wait Time: the average time a trucker will wait on the vessel during unloading operations.
- Additional Statute Miles to Access Ferry Terminal: the trucker's driving distance from the decision point to the ferry terminal; these are miles that the trucker is going "out of his/her way" in order to use a ferry.
- Out of Way Truck Travel Unconstrained: the free flow drive time from the decision point to the ferry terminal.
- Out of Way Truck Travel Highly Constrained: 2.0 times the free flow drive time.
- Multimodal Travel Time Unconstrained: a trucker's total elapsed time driving from the decision point to the ferry terminal, waiting to load the ferry, in transit on the water, and waiting to unload from the ferry, with unconstrained highway conditions.

- Multimodal Travel Time Highly Constrained: a trucker's total elapsed time driving from the decision point to the ferry terminal, waiting to load the ferry, in transit on the water, and waiting to unload from the ferry, with congested highway conditions.
- Vessel Capacity: the maximum number of vehicles per trip; both the barge and the self-powered ferry would be capable of handling around 30 trucks of various sizes.
- Average Vessel Utilization: a factor to represent average vessel utilization since vessels do not operate at 100% loads all the time.
- Maximum Ferry Market Size: the total number of JFKIA related truck trips; assuming that all could potentially be attracted by a ferry service.
- "Ballpark" Ferry Market Share Based on Time: a simple utility calculation to estimate how much traffic might be diverted to a ferry based purely on time differences. Where truck and ferry times are the same the market shares are the same (50%), and where they are not equal the faster mode has a market share advantage. This is not a precise market estimate; its purpose is to reflect the fact that ferry will never capture 100% of any market. In this calculation, the highly constrained truck travel time is compared to the ferry travel time, which is highly advantageous to the ferry.
- Minimum Required Ferry Market Share: to address cases where the travel time-based algorithm shows a very low market share for the ferry, the model calculates the minimum market share necessary to support two vessel trips per day.
- "Ballpark" Ferry Market Size: the maximum market size times the larger of: a) the ballpark ferry market share; or b) the minimum required ferry market share. This is a highly advantageous assumption for the ferry, because it allows for some ridership even when the ferry performs poorly on the basis of time.
- Calculated Number of Vessel Moves Supported: the ballpark ferry market size divided by the vessel capacity utilized.
- Vessel Moves per Day: the calculated number of vessel moves, rounded off to the closest number of round trips, then multiplied by two to get the number of one-way trips that would be offered in this service.
- Trucks Accommodated: the lower of (a) vessel trips times vessel capacity times vessel utilization, or (b) the ballpark ferry market size.
- Vessel In-Transit Hours: number of vessel moves multiplied by vessel in-transit time.
- Vessel Berth Hours: additional time spent waiting at berth for vehicles to load and unload (assumed 30 minutes per trip, reflecting 15 minutes loading at the origin and 15 minutes unloading at the destination).
- Non-Fuel Cost per Hour: pro-rated hourly cost for non-fuel vessel operations. In practice, some of these costs are incurred hourly, some on a labor shift basis, some daily, and some yearly. However, in this model, these costs have been rolled into a generalized per-hour estimate. This accomplishes two things -- it simplifies the model, and it presents a "best case" (minimum cost) scenario for the ferry. For example, if the ferry only has enough anticipated demand to operate for four hours, the model charges non-fuel costs only for those

four hours – even if they would, in reality, accrue over eight or more hours per day. With this assumption, the need for precise demand estimates becomes less important, since costs are more or less linearly scaled according to demand. This is a highly favorable analytical assumption for the ferry service -- if a ferry operation fails to show a profit under these conditions, its prospects in the "real world" should not be viewed positively. For this analysis, cost factors from the *Hunts Point Waterborne Freight Assessment* were used.

- Fuel Cost per Hour: fuel cost factors from the *Hunts Point Waterborne Freight Assessment*, inflated at the same rate that was applied to truck fuel costs to reflect the recent dramatic increase in fuel prices. Fuel costs are applied only to time spent in transit, even though the vessel engines are generally operating (albeit at reduced RPMs) at berth; this is another cost assumption in the ferry's favor.
- Total Vessel Operating Cost per Day: non-fuel hourly cost times vessel in-transit plus vessel berth hours, plus fuel hourly cost times vessel in-transit hours. This does not capture terminal development, vessel acquisition, or other capital costs that would be associated with a ferry service.
- "Operating Break Even" Fare for Ferry: vessel operating cost per day divided by trucks accommodated per day. This is the price that the ferry would have to charge a trucker in order to cover its daily fuel and non-fuel operating costs. This excludes any capital cost recovery from fares.
- Out of Way Trucker Cost: per mile costs incurred by a trucker in driving "out of the way" miles to get to a ferry terminal.
- Out of Way Trucker Toll Cost: toll costs incurred by a trucker in driving "out of the way" miles to get to a ferry terminal (one-way tolls are averaged over both directions).
- Trucker's Cost of Additional Travel Time: if the ferry route takes longer than the driving route, the trucker incurs a time penalty in the form of lost productivity. Estimates of the dollar value of lost productivity vary. For this analysis, a factor of $20 per hour was used, which is considered to be on the low side.
- Actual Cost to Trucker to Use Ferry: the break even ferry fare, plus any additional per mile costs, toll costs, or travel time costs incurred by the trucker to use the ferry.

SERVICE CORRIDOR ANALYSES

Analysis #1 – Hunts Point and Manhattan

The Hunts Point to JFKIA market was evaluated as part of the *Hunts Point Waterborne Freight Assessment*, which determined:

> *"While there is clearly demand for truck movements from JFK and Hunts Point, there are significant challenges – navigation channel depths, bridge clearances, and environmental sensitivity – to establishing a ferry service. Ferry service would be substantially slower than trucking, and if priced competitively with trucking would not come close to covering operating costs, let alone capital costs."*

This finding was reevaluated using T/F SPM and the updated assumptions. The origin point was Bergen Basin and the destination was the Hunts Point waterfront. As shown in Table F-5 on the following page, the results confirm the previous finding that a JFKIA-Hunts Point ferry service appears very unattractive. Truck time is just 31 minutes under unconstrained conditions (the Hunts Point trucks are generally running after midnight) and 93 minutes under highly constrained conditions, versus 308 minutes (more than five hours) for the barge and 202 minutes (more than three hours) for the ferry. Because of this disadvantage, the ballpark market share estimate is just 3% for the barge and 9% for the ferry. Even if this time disadvantage were ignored and a minimum market share of 34% for a waterborne service was assumed, the barge would have to charge $122.69 to cover daily operating costs, and the ferry would have to charge $75.12 – versus the trucker's current estimated driving cost of $33.18. Moreover, factoring in the value of time, the trucker's actual cost to use a waterborne service would be $194.35 for the barge and $111.33 for the ferry – a very unattractive offer compared to driving.

TABLE F-5. JFKIA-HUNTS POINT (VIA VAN WYCK/WHITESTONE/BRUCKNER)

Time Comparisons

		Truck		
Statute Miles		18.9		
Truck Travel Time Unconstrained (min)		31		
Truck Travel Time Highly Constrained (min)		93		
		Barge (9 knots)		**Ferry (22 knots)**
Nautical Miles		36.0		36.0
Nautical Miles @ 5 knots		9.0		9.0
Nautical Miles @ max speed		27.0		27.0
Vessel Trip Time		288		182
Vessel Loading Wait Time		15		15
Vessel Unloading Wait Time		5		5
Additional Statute Miles to Access Ferry Terminal		0		0
Out of Way Truck Travel Unconstrained (min)		0		0
Out of Way Truck Travel Highly Constrained (min)		0		0
Multimodal Travel Time Unconstrained (min)		308		202
Multimodal Travel Time Highly Constrained (min)		308		202

Cost Comparisons

		Truck		
Per Mile Cost Factor	$	0.75		
Per Mile Cost	$	14.18		
Average Tolls	$	19.00		
Estimated Number of Loaded Trips/Day		80		
% of Truck Moves Not Loaded		50%		
Total Loaded and Unloaded Trips/Day		160		
Per Unit Trucker Costs/Day	$	33.18		
		Barge (9 knots)		**Ferry (22 knots)**
Vessel Capacity		30		30
Average Vessel Utilization		90%		90%
Maximum Ferry Market Size		160		160
"Ballpark" Ferry Market Share Based on Time		3%		9%
Minimum Required Ferry Market Share		34%		34%
"Ballpark" Ferry Market Size		54		54
Calculated Number of Vessel Moves Supported		2.0		2.0
Vessel Moves per Day		2		2
Trucks Accommodated		54		54
Vessel In-Transit Hours		9.6		6.1
Vessel Berth Hours		1.0		1.0
Non-Fuel Cost/Hour		400		500
Fuel Cost/Hour		625		575
Total Vessel Operating Cost per Day	$	6,625	$	4,056
"Operating Break Even" Fare for Ferry	$	122.69	$	75.12
Out of Way Trucker Per Mile Cost	$	-	$	-
Out of Way Trucker Toll Cost	$	-	$	-
Trucker's Cost of Additional Travel Time	$	71.67	$	36.21
Actual Cost to Trucker to Use Ferry	$	194.35	$	111.33

Manhattan-based services were also examined. Landings in the vicinity of Wall Street and West 38th Street were tested. The results are shown in Tables F-6 and F-7 on the following pages, and indicate that neither offers good prospects for success.

For Wall Street (Table F-6), a truck move from the intersection of Wall and Water Streets in Lower Manhattan to Lefferts Boulevard, adjoining Bergen Basin was assumed. Three possible routings identified in the *JFKIA Air Cargo Truck Movement Study* were considered*:* Manhattan Bridge-Atlantic-Conduit, Manhattan Bridge-BQE-LIE-Woodhaven, and Manhattan Bridge-BQE-LIE-Van Wyck. The service parameters for all three routes were similar, and Manhattan Bridge-BQE-LIE-Van Wyck was selected for modeling. Truck travel time is estimated between 28 and 84 minutes, versus 229 minutes (almost four hours) for the barge and 169 minutes (almost three hours) for the ferry. Because of this disadvantage, the ballpark market share estimate is just 5% for the barge and 11% for the ferry. Even if this time disadvantage were ignored and a minimum market share of 15% for a waterborne service was assumed, the barge would have to charge $92.34 to cover daily operating costs, and the ferry would have to charge $63.70 – versus the trucker's current estimated cost of $12.75. Factoring in the value of time, the trucker's estimated cost is $140.78 for the barge and $92.18 for the ferry.

For West 38th Street (Table F-7), a truck move from the intersection of 38th and the West Side Highway to Lefferts Boulevard, adjoining Bergen Basin was assumed. Two possible routings identified in the *JFKIA Air Cargo Truck Movement Study* were considered: Queens Midtown Tunnel -LIE-Woodhaven, and Queens Midtown Tunnel-LIE-Van Wyck. Again, the service parameters for both routes were similar, and Queens Midtown Tunnel-LIE-Van Wyck for modeling was selected. Truck travel time is estimated between 29 and 87 minutes, versus 249 minutes (over four hours) for the barge and 178 minutes (three hours) for the ferry. Because of this disadvantage, the ballpark market share estimate is just 4% for the barge and 11% for the ferry. Even if this time disadvantage were ignored and a minimum market share of 15% for a waterborne service was assumed, the barge would have to charge $100.05 to cover daily operating costs, and the ferry would have to charge $66.60 – versus the trucker's current estimated cost of $33.40. Factoring in the value of time, the trucker's estimated cost is $154.16 for the barge and $96.81 for the ferry.

The total demand estimate for JFKIA-Manhattan (179 loaded trips per day) may be low. Therefore, a much higher figure (500 loaded trips per day) was tested. However, the model results were nearly identical, because trucking is still faster and cheaper than the ferry on a per-unit basis, independent of the size of the market.

The key factor is speed. If the nine nautical miles in Jamaica Bay could be traversed at full speed instead of five knots, the self-powered ferry would offer truckers a travel time of 86 minutes and an actual cost of $34.74 to Wall Street -- much better, although still not competitive with the trucker's estimated cost of $12.75. However, at full speed, the self-powered ferry would offer a travel time of 94 minutes and an actual cost of $40.31 to West 38th Street – potentially competitive with trucking time (87 minutes under highly constrained conditions) and cost ($33.40 including time and tolls). The conclusion is that vessel speeds would have to be unrestricted in Jamaica Bay to offer potentially competitive service from JFKIA to Manhattan.

TABLE F-6. T/F SPM RESULTS, JFKIA-WALL STREET (VIA MANHATTAN BR/BQE/LIE)

Time Comparisons

		Truck		
Statute Miles		17.0		
Truck Travel Time Unconstrained (min)		28		
Truck Travel Time Highly Constrained (min)		84		
		Barge (9 knots)		**Ferry (22 knots)**
Nautical Miles		24.2		24.2
Nautical Miles @ 5 knots		9.0		9.0
Nautical Miles @ max speed		15.2		15.2
Vessel Trip Time		209		149
Vessel Loading Wait Time		15		15
Vessel Unloading Wait Time		5		5
Additional Statute Miles to Access Ferry Terminal		0		0
Out of Way Truck Travel Unconstrained (min)		0		0
Out of Way Truck Travel Highly Constrained (min)		0		0
Multimodal Travel Time Unconstrained (min)		229		169
Multimodal Travel Time Highly Constrained (min)		229		169

Cost Comparisons

		Truck		
Per Mile Cost Factor	$	0.75		
Per Mile Cost	$	12.75		
Average Tolls	$	-		
Estimated Number of Loaded Trips/Day		179		
% of Truck Moves Not Loaded		50%		
Total Loaded and Unloaded Trips/Day		358		
Per Unit Trucker Costs/Day	$	12.75		
		Barge (9 knots)		**Ferry (22 knots)**
Vessel Capacity		30		30
Average Vessel Utilization		90%		90%
Maximum Ferry Market Size		358		358
"Ballpark" Ferry Market Share Based on Time		5%		11%
Minimum Required Ferry Market Share		15%		15%
"Ballpark" Ferry Market Size		54		54
Calculated Number of Vessel Moves Supported		2.0		2.0
Vessel Moves per Day		2		2
Trucks Accommodated		54		54
Vessel In-Transit Hours		7.0		5.0
Vessel Berth Hours		1.0		1.0
Non-Fuel Cost/Hour		400		500
Fuel Cost/Hour		625		575
Total Vessel Operating Cost per Day	$	4,986	$	3,440
"Operating Break Even" Fare for Ferry	$	92.34	$	63.70
Out of Way Trucker Per Mile Cost	$	-	$	-
Out of Way Trucker Toll Cost	$	-	$	-
Trucker's Cost of Additional Travel Time	$	48.44	$	28.48
Actual Cost to Trucker to Use Ferry	$	140.78	$	92.18

TABLE F-7. T/F SPM RESULTS, JFKIA-WEST 38TH ST. (VIA QUEENS MIDTOWN/BQE/LIE)

Time Comparisons

		Truck		
Statute Miles		19.2		
Truck Travel Time Unconstrained (min)		29		
Truck Travel Time Highly Constrained (min)		87		
		Barge (9 knots)		**Ferry (22 knots)**
Nautical Miles		27.2		27.2
Nautical Miles @ 5 knots		9.0		9.0
Nautical Miles @ max speed		18.2		18.2
Vessel Trip Time		229		158
Vessel Loading Wait Time		15		15
Vessel Unloading Wait Time		5		5
Additional Statute Miles to Access Ferry Terminal		0		0
Out of Way Truck Travel Unconstrained (min)		0		0
Out of Way Truck Travel Highly Constrained (min)		0		0
Multimodal Travel Time Unconstrained (min)		249		178
Multimodal Travel Time Highly Constrained (min)		249		178

Cost Comparisons

		Truck		
Per Mile Cost Factor	$	0.75		
Per Mile Cost	$	14.40		
Average Tolls	$	19.00		
Estimated Number of Loaded Trips/Day		179		
% of Truck Moves Not Loaded		50%		
Total Loaded and Unloaded Trips/Day		358		
Per Unit Trucker Costs/Day	$	33.40		
		Barge (9 knots)		**Ferry (22 knots)**
Vessel Capacity		30		30
Average Vessel Utilization		90%		90%
Maximum Ferry Market Size		358		358
"Ballpark" Ferry Market Share Based on Time		4%		11%
Minimum Required Ferry Market Share		15%		15%
"Ballpark" Ferry Market Size		54		54
Calculated Number of Vessel Moves Supported		2.0		2.0
Vessel Moves per Day		2		2
Trucks Accommodated		54		54
Vessel In-Transit Hours		7.6		5.3
Vessel Berth Hours		1.0		1.0
Non-Fuel Cost/Hour		400		500
Fuel Cost/Hour		625		575
Total Vessel Operating Cost per Day	$	5,403	$	3,596
"Operating Break Even" Fare for Ferry	$	100.05	$	66.60
Out of Way Trucker Per Mile Cost	$	-	$	-
Out of Way Trucker Toll Cost	$	-	$	-
Trucker's Cost of Additional Travel Time	$	54.11	$	30.21
Actual Cost to Trucker to Use Ferry	$	154.16	$	96.81

Analysis #2 – Bridgeport

A container barge service is being implemented between the PANYNJ and the Port of Bridgeport, Connecticut. This service will carry containers – not trucks and their drivers – and help reduce truck trips on a highly congested segment of I-95. Many have asked whether a similar service might be offered for trucks and drivers, and if feasible as far as Bridgeport, whether it might be extended further east to New Haven or New London. This analysis suggests that a JFKIA-Bridgeport ferry service would not be competitive on the basis of time or cost.

A truck move between the Bridgeport waterfront and Bergen Basin (via the Van Wyck, Whitestone, and I-95), and a ferry move between the same points were analyzed (Table F-8). Truck travel time is estimated between 72 (best case) and 216 (worst case) minutes, versus 555 minutes (almost ten hours) for the barge and 303 minutes (just over five hours) for the ferry. The ballpark market share estimate is 6% for the barge and 27% for the ferry – not bad, although as previously noted this is based on comparing the longest drive time against the ferry, not the shortest. Even so, the barge would have to charge $217.85 to cover daily operating costs, and the ferry would have to charge $116.89 – versus the trucker's current estimated cost of $77.73. Factoring in the value of time, the actual cost to the trucker would be $330.74 for the barge and $145.74 for the ferry.

The waterborne option is clearly not attractive to Bridgeport. Given that its disadvantages increase as the travel distance increases, the analysis was not performed to quantify the time and cost associated with extending the service to New Haven or New London.

If, however, the analysis assumed non-limited vessel speeds in Jamaica Bay, the self-powered ferry can make the trip in 219 minutes, which is very close to the trucker's worst-case drive time of 216 minutes. The actual cost to the trucker would be $82.78, versus an estimated driving cost of $77.73. Under these conditions, the ferry represents a potentially attractive option. But again, this is only if the highways perform at their worst, and if the ferry can run at full speed for the entire trip.

As for the tug and barge, allowing it to go faster in Jamaica Bay has little impact – the slow 9-knot service would still take more than eight hours, making it hopelessly non-competitive in terms of attracting truckers.

TABLE F-8. T/F SPM RESULTS, JFKIA-BRIDGEPORT CT (VIA VAN WYCK/WHITESTONE/I-95)

Time Comparisons

		Truck		
Statute Miles		58.3		
Truck Travel Time Unconstrained (min)		72		
Truck Travel Time Highly Constrained (min)		216		
		Barge (9 knots)		**Ferry (22 knots)**
Nautical Miles		73.0		73.0
Nautical Miles @ 5 knots		9.0		9.0
Nautical Miles @ max speed		64.0		64.0
Vessel Trip Time		535		283
Vessel Loading Wait Time		15		15
Vessel Unloading Wait Time		5		5
Additional Statute Miles to Access Ferry Terminal		0		0
Out of Way Truck Travel Unconstrained (min)		0		0
Out of Way Truck Travel Highly Constrained (min)		0		0
Multimodal Travel Time Unconstrained (min)		555		303
Multimodal Travel Time Highly Constrained (min)		555		303

Cost Comparisons

		Truck		
Per Mile Cost Factor	$	0.75		
Per Mile Cost	$	43.73		
Average Tolls	$	34.00		
Estimated Number of Loaded Trips/Day		384		
% of Truck Moves Not Loaded		50%		
Total Loaded and Unloaded Trips/Day		768		
Per Unit Trucker Costs/Day	$	77.73		
		Barge (9 knots)		**Ferry (22 knots)**
Vessel Capacity		30		30
Average Vessel Utilization		90%		90%
Maximum Ferry Market Size		768		768
"Ballpark" Ferry Market Share Based on Time		6%		27%
Minimum Required Ferry Market Share		7%		7%
"Ballpark" Ferry Market Size		54		205
Calculated Number of Vessel Moves Supported		2.0		7.6
Vessel Moves per Day		2		8
Trucks Accommodated		54		205
Vessel In-Transit Hours		17.8		37.7
Vessel Berth Hours		1.0		4.0
Non-Fuel Cost/Hour		400		500
Fuel Cost/Hour		625		575
Total Vessel Operating Cost per Day	$	11,764	$	23,962
"Operating Break Even" Fare for Ferry	$	217.85	$	116.89
Out of Way Trucker Per Mile Cost	$	-	$	-
Out of Way Trucker Toll Cost	$	-	$	-
Trucker's Cost of Additional Travel Time	$	112.89	$	28.85
Actual Cost to Trucker to Use Ferry	$	330.74	$	145.74

Analysis #3 – New Jersey and Points West

The majority of JFKIA trucks that are not associated with on-airport or local moves are moving to and from the West of Hudson. This includes Newark Liberty International Airport, New Jersey, and other states to the west, southwest, and south. The *JFKIA Air Cargo Truck Movement Study* identified several major travel corridors for this traffic, and the analysis focused on the two main truck routes:

- George Washington Bridge/Cross Bronx/Whitestone/Van Wyck Expressway
- Goethals Bridge/Narrows Bridge/BQE/LIE/Van Wyck Expressway

Truck origins and destinations are scattered throughout many states, but they tend to end up on the same key highway corridors – I-80, I-78, NJ Turnpike. This analysis considers what happens when truckers on these routes get to key decision points -- where they have the choice of exiting and driving to a ferry terminal, or continuing over the road to their destination. For the GWB corridor, the analysis considered a truck move from the I-80/NJ Turnpike intersection to JFKIA, versus a truck move to the Greenville Yard in New Jersey (one possible truck ferry location). Also considered was a truck move from the I-78/NJ Turnpike intersection to JFKIA, versus a truck move to Greenville Yard. For the Goethals/VNB corridor, a truck move from the Goethals Bridge to JFKIA was considered, versus a truck move from the Goethals Bridge to Greenville Yard. Although there are several other ferry locations that could be analyzed, Greenville Yard was selected because it is an existing industrial property with excellent highway access, on deep water and with no speed restricted channels on approach.

From Table F-4, the travel demand to/from JFKIA via GWB was estimated at 1,000 trucks per day. From the I-80/NJ Turnpike intersection, truck travel time to JFKIA is estimated between 32 and 96 minutes, versus 248 to 296 minutes for the barge and 191 to 239 minutes for the ferry (Table F-9). The fact that Greenville is 18 miles from the I-80/NJ Turnpike intersection adds substantially to the end-to-end multimodal travel time. Because of this disadvantage, the ballpark market share estimate is just 3% for the barge and 6% for the ferry. The barge would have to charge $90.28 to cover daily operating costs, and the ferry would have to charge $62.92 – versus the trucker's current estimated cost of $41.85. Factoring in the value of time, the trucker's estimated cost is $177.89 for the barge and $131.63 for the ferry.

Conditions are somewhat better from the I-78 approach (Table F-10). From the I-78/NJ Turnpike intersection, truck travel time to JFKIA via GWB is estimated at 48 to 144 minutes, versus 233 to 251 minutes for the barge and 176 to 194 minutes for the ferry. The ferry terminal is only 5 miles from the decision point, so the amount of "out of way" trucking time is low. The ballpark market share estimate is 5% for the barge and 11% for the ferry. The barge would have to charge $91.98 to cover daily operating costs, and the ferry would have to charge $63.21 – versus the trucker's current estimated cost of $56.70. Factoring in the value of time, the trucker's estimated cost is $133.85 for the barge and $86.17 for the ferry. So while the ferry performs reasonably well for trucks approaching on I-78, it still offers slower service at a higher cost than trucking. If, however, unrestricted vessel speeds in Jamaica Bay were assumed, the picture changes dramatically – the self-powered ferry can actually offer faster service than trucking under highly constrained highway travel conditions (93 to 111 minutes for the ferry, versus 144 minutes over the road), at a substantially lower cost (a break-even fare of $34.23).

TABLE F-9. T/F SPM RESULTS, I-80/GWB TO JFKIA VERSUS GREENVILLE FERRY

Time Comparisons

		Truck		
Statute Miles		23.8		
Truck Travel Time Unconstrained (min)		32		
Truck Travel Time Highly Constrained (min)		96		
		Barge (9 knots)		**Ferry (22 knots)**
Nautical Miles		23.4		23.4
Nautical Miles @ 5 knots		9.0		9.0
Nautical Miles @ max speed		14.4		14.4
Vessel Trip Time		204		147
Vessel Loading Wait Time		15		15
Vessel Unloading Wait Time		5		5
Additional Statute Miles to Access Ferry Terminal		18.4		18
Out of Way Truck Travel Unconstrained (min)		24		24
Out of Way Truck Travel Highly Constrained (min)		72		72
Multimodal Travel Time Unconstrained (min)		248		191
Multimodal Travel Time Highly Constrained (min)		296		239

Cost Comparisons

		Truck		
Per Mile Cost Factor	$	0.75		
Per Mile Cost	$	17.85		
Average Tolls	$	24.00		
Estimated Number of Loaded Trips/Day		1000		
% of Truck Moves Not Loaded		50%		
Total Loaded and Unloaded Trips/Day		2000		
Per Unit Trucker Costs/Day	$	41.85		
		Barge (9 knots)		**Ferry (22 knots)**
Vessel Capacity		30		30
Average Vessel Utilization		90%		90%
Maximum Ferry Market Size		2000		2000
"Ballpark" Ferry Market Share Based on Time		3%		6%
Minimum Required Ferry Market Share		3%		3%
"Ballpark" Ferry Market Size		66		121
Calculated Number of Vessel Moves Supported		2.4		4.5
Vessel Moves per Day		2		4
Trucks Accommodated		54		108
Vessel In-Transit Hours		6.8		9.8
Vessel Berth Hours		1.0		2.0
Non-Fuel Cost/Hour		400		500
Fuel Cost/Hour		625		575
Total Vessel Operating Cost per Day	$	4,875	$	6,795
"Operating Break Even" Fare for Ferry	$	90.28	$	62.92
Out of Way Trucker Per Mile Cost	$	13.80	$	13.80
Out of Way Trucker Toll Cost	$	7.15	$	7.15
Trucker's Cost of Additional Travel Time	$	66.67	$	47.76
Actual Cost to Trucker to Use Ferry	$	177.89	$	131.63

TABLE F-10. T/F SPM RESULTS, I-78/GWB TO JFKIA VERSUS GREENVILLE FERRY

Time Comparisons

		Truck		
Statute Miles		36.8		
Truck Travel Time Unconstrained (min)		48		
Truck Travel Time Highly Constrained (min)		144		
		Barge (9 knots)		**Ferry (22 knots)**
Nautical Miles		23.4		23.4
Nautical Miles @ 5 knots		9.0		9.0
Nautical Miles @ max speed		14.4		14.4
Vessel Trip Time		204		147
Vessel Loading Wait Time		15		15
Vessel Unloading Wait Time		5		5
Additional Statute Miles to Access Ferry Terminal		5.0		5
Out of Way Truck Travel Unconstrained (min)		9		9
Out of Way Truck Travel Highly Constrained (min)		27		27
Multimodal Travel Time Unconstrained (min)		233		176
Multimodal Travel Time Highly Constrained (min)		251		194

Cost Comparisons

		Truck		
Per Mile Cost Factor	$	0.75		
Per Mile Cost	$	27.60		
Average Tolls	$	29.10		
Estimated Number of Loaded Trips/Day		1000		
% of Truck Moves Not Loaded		50%		
Total Loaded and Unloaded Trips/Day		2000		
Per Unit Trucker Costs/Day	$	56.70		
		Barge (9 knots)		**Ferry (22 knots)**
Vessel Capacity		30		30
Average Vessel Utilization		90%		90%
Maximum Ferry Market Size		2000		2000
"Ballpark" Ferry Market Share Based on Time		5%		11%
Minimum Required Ferry Market Share		3%		3%
"Ballpark" Ferry Market Size		106		215
Calculated Number of Vessel Moves Supported		3.9		8.0
Vessel Moves per Day		4		8
Trucks Accommodated		106		215
Vessel In-Transit Hours		13.6		19.6
Vessel Berth Hours		2.0		4.0
Non-Fuel Cost/Hour		400		500
Fuel Cost/Hour		625		575
Total Vessel Operating Cost per Day	$	9,750	$	13,591
"Operating Break Even" Fare for Ferry	$	91.98	$	63.21
Out of Way Trucker Per Mile Cost	$	3.75	$	3.75
Out of Way Trucker Toll Cost	$	2.45	$	2.45
Trucker's Cost of Additional Travel Time	$	35.67	$	16.76
Actual Cost to Trucker to Use Ferry	$	133.85	$	86.17

TABLE F-11. T/F SPM RESULTS, I-278/GOETHALS TO JFKIA VERSUS GREENVILLE FERRY

Time Comparisons

		Truck		
Statute Miles		34.1		
Truck Travel Time Unconstrained (min)		46		
Truck Travel Time Highly Constrained (min)		138		
		Barge (9 knots)		**Ferry (22 knots)**
Nautical Miles		23.4		23.4
Nautical Miles @ 5 knots		9.0		9.0
Nautical Miles @ max speed		14.4		14.4
Vessel Trip Time		204		147
Vessel Loading Wait Time		15		15
Vessel Unloading Wait Time		5		5
Additional Statute Miles to Access Ferry Terminal		11		11
Out of Way Truck Travel Unconstrained (min)		19		19
Out of Way Truck Travel Highly Constrained (min)		57		57
Multimodal Travel Time Unconstrained (min)		243		186
Multimodal Travel Time Highly Constrained (min)		281		224

Cost Comparisons

		Truck		
Per Mile Cost Factor	$	0.75		
Per Mile Cost	$	25.58		
Average Tolls	$	43.00		
Estimated Number of Loaded Trips/Day		1480		
% of Truck Moves Not Loaded		50%		
Total Loaded and Unloaded Trips/Day		2960		
Per Unit Trucker Costs/Day	$	68.58		
		Barge (9 knots)		**Ferry (22 knots)**
Vessel Capacity		30		30
Average Vessel Utilization		90%		90%
Maximum Ferry Market Size		2960		2960
"Ballpark" Ferry Market Share Based on Time		3%		7%
Minimum Required Ferry Market Share		2%		2%
"Ballpark" Ferry Market Size		104		197
Calculated Number of Vessel Moves Supported		3.8		7.3
Vessel Moves per Day		4		8
Trucks Accommodated		104		197
Vessel In-Transit Hours		13.6		19.6
Vessel Berth Hours		2.0		4.0
Non-Fuel Cost/Hour		400		500
Fuel Cost/Hour		625		575
Total Vessel Operating Cost per Day	$	9,750	$	13,591
"Operating Break Even" Fare for Ferry	$	93.75	$	68.99
Out of Way Trucker Per Mile Cost	$	8.25	$	8.25
Out of Way Trucker Toll Cost	$	-	$	-
Trucker's Cost of Additional Travel Time	$	47.67	$	28.76
Actual Cost to Trucker to Use Ferry	$	149.67	$	106.00

From the I-278/NJ Turnpike intersection, truck travel time to JFKIA via the Goethals and Narrows bridges is estimated at 46 to 138 minutes, versus 243 to 281 minutes for the barge and 186 to 224 minutes for the ferry (Table F-11). The ferry terminal is 11 miles from the decision point, so the amount of "out of way" trucking time is significant. The ballpark market share estimate is just 3% for the barge and 7% for the ferry. The barge would have to charge $93.75 to cover daily operating costs, and the ferry would have to charge $68.99 – versus the trucker's current estimated cost of $68.58. The driving cost is high because the trucker has to pay two bridge tolls. Factoring in the value of time, the trucker's estimated cost is $149.67 for the barge and $106.00 for the ferry. So although the trucker's driving cost and the break even fare for the self powered ferry are approximately equal, the trucker's actual cost to use the ferry is substantially higher than simply driving.

Allowing unrestricted speeds in Jamaica Bay, the performance of the self-powered ferry improves substantially. Ferry travel times improve to 103 to 141 minutes, which are competitive with driving under highly constrained conditions; the trucker's actual cost to use the ferry improves to $42.49, which is significantly better than the trucker's driving cost of $68.99.

The effect of 9 knot speeds in Jamaica Bay was also tested. It was found that the self-powered ferry would be virtually identical in terms of cost to the trucker, but would not offer competitive travel times (138 to 176 minutes).

CONCLUSIONS

This analysis examined potential ferry services from JFKIA to Hunts Point, Manhattan, Connecticut and New Jersey. None of the services were found to be competitive with trucking on the basis of travel speed or cost to the trucker, assuming that the services were priced to cover their daily vessel operating costs.

Travel speed restrictions in Jamaica Bay (assumed at five knots) were a critical factor in this finding, If these restrictions were relaxed so that the self-powered ferry can operate at full speed in Jamaica Bay, services to Manhattan's West Side and to New Jersey become potentially competitive with trucking on the basis of time and cost. Services to Hunts Point and Connecticut remain uncompetitive regardless of Jamaica Bay operating speeds. Further investigation is recommended to establish, with some degree of confidence, the maximum operating speeds that would be permitted in Jamaica Bay, so that these analyses can be refined accordingly.

Beyond the issue of operating speed restrictions, five issues -- environmental suitability of Jamaica Bay and Bergin Basin, vertical clearances ("air draft") in Jamaica Bay, the locations of ferry terminals at "the other end" of the JFKIA trip, improved estimates of market demand by travel corridor, and the practical prospects for operations that might seek to move cargo instead of trucks -- would require substantial further investigation to establish the practicality and feasibility of potential ferry services.

Appendix G
NYCDOT Truck Route Management Study Recommendations

Truck Route Management & Community Impact Reduction Study
Brooklyn Truck Route Network Analysis

Recommendations for the Southern Brooklyn TIS Study Area

(Excerpted from Final Draft Technical Memorandum 2
Truck Routing Analysis)

Prepared for:
New York City Department of Transportation

Prepared by:
Edwards and Kelcey Engineers, Inc.

May 2006

For further information:
New York City Department of Transportation
Room 1105
Attn: Truck Study
40 Worth Street
New York, NY 10013

THROUGH TRUCK ROUTE

It is recommended that NYCDOT consider establishing a Through Truck Route by changing the following streets in Brooklyn from Local to Through Routes:

Street	Type	Limits
Linden Boulevard	Through	North & South Conduit Avenues to Caton Avenue
Caton Avenue	Through	Linden Boulevard to Coney Island Avenue
Coney Island Avenue	Through	Caton Avenue to Church Avenue
Church Avenue	Through	Coney Island Avenue to Fort Hamilton Parkway
Fort Hamilton Parkway	Through	Church Avenue to Prospect Expressway
Prospect Expressway	Through	Fort Hamilton Parkway to Gowanus Expressway

The New York State Department of Transportation and the New York Metropolitan Transportation Council have completed studies that identified the need for additional east-west truck route capacity through Brooklyn. Feedback from businesses and the trucking community in this study also mentioned the need for improved truck access through Brooklyn. However, residents have expressed concerns about existing levels of truck traffic on these streets --and the impacts of such a designation change along this route should be taken into consideration.

An additional option would be to change Linden Boulevard to a Through Truck Route from the Queens County line to Rockaway Avenue; and change Rockaway Avenue to a Through Truck Route from Linden Boulevard to the Bay Ridge rail line, constructing an express truck route from Rockaway Avenue to 4th Avenue with access ramps at either end; and changing 4th Avenue to a Through Truck Route between 68th Street and the Gowanus Expressway. This would also require improving ramp access to the Gowanus Expressway. This route should also be designated as Route 27 for trucks through trucks. This option would eliminate the intrusion of tractor trailers into the residential areas on Linden Boulevard west of Rockaway Avenue.

TRUCK PROHIBITION

Consider prohibiting trucks from using the following Local Truck Route streets between 10 PM and 6 AM.

Street	Type	Limits
Church Avenue	Local	Linden Boulevard to Flatbush Avenue
Metropolitan Avenue	Local	Kent Avenue to Grand Street
Empire Boulevard	Local	Flatbush Avenue to Utica Avenue

These streets are located in areas with parallel Local Truck Route streets can accommodate anticipated truck route activity.

TRAFFIC MITIGATION

Possible investigation for development of traffic mitigation measures, focusing on truck movements at locations where there have been 15 or more truck accidents over a thirty-six month time period. Several of these locations correspond to intersections where NYCDOT has already undertaken measures to improve conditions for all street users.

The following intersections met this criterion over a thirty-six month period from 1999 to 2001:

Location	Truck Accidents
Flatbush Ave. Ext. and Tillary St.	33
Metropolitan Ave. and Meeker Ave.	24
Flushing Ave. and Classon Ave.	22
Flatbush Ave. and Nevins St.	21
Flatbush Ave. and Caton Ave.	19
Hamilton Ave. and Clinton St.	17
Linden Blvd. and Pennsylvania Ave.	17
Metropolitan Ave. and Grand St.	17
Metropolitan Ave. and Stewart Ave.	17
Hamilton Ave. and 14th St.	16
Hamilton Ave. and Smith St.	16
Flatbush Ave. and Church Ave.	15
Jay St. and Sands St.	15
Meeker Ave. and Vandervoort Ave.	15

Possible short-term improvements include establishing wide-turn zones, modifying traffic signal timing, and providing additional signage to address localized intersection issues.

BAY RIDGE AREA

Improved negative signage and directional “To Truck Route” signage would be appropriate on some northbound streets to keep the trucks on the wider Avenues to 86th Street rather than navigating through residential areas. One such area for negative signage should be at the intersection of 86th Street and 4th Avenue, which is the end of the truck route.

There are some major generators in the Bay Ridge area (i.e. Walgreens, Supermarkets) that frequently get deliveries by large trucks. The Department should pursue further outreach initiatives with the area businesses to explore better routing options.

Another problem is commercial traffic traveling between Staten Island and southern Queens via the Verrazano Narrows Bridge. With no Through Truck Routes in southern Brooklyn, truckers must take a long circuitous route along the western edge of Brooklyn into northern Queens. This routing is problematic for truck traffic, especially air freight, to/from JFK International Airport. This routing adds approximately 22 miles to each truck trip between JFK Airport and the Verrazano Narrows Bridge. Trucks that are less than 55 feet in length can also use Conduit Avenue to Atlantic Avenue to the Brooklyn Queens Expressway as a Through Truck Route.

Local Borough deliveries also experience problems. Some trucks coming from Staten Island and making deliveries within southern Brooklyn or to other points east utilize the Local Truck Routes and illegal routes to access the east-west corridors in the southern part of the Borough.

Similarly, the lack of the north-south designated routes encourages trucks to utilize various streets to reach their destinations. The preferred roadways are typically those streets identified as principal arterials on typical commercially purchased maps. However, many of these arterials are not part of the City’s truck route network.

Negative signage exists in several areas, however their effectiveness is unclear. The presence of signs in some locations only reinforces the point to truckers that they can use streets that do

not have negative signs. A policy that depends on the installation of negative signs can jeopardize the enforcement of a positive sign program advocated in *Technical Memorandum 3, Truck Signage Program*.

LINDEN BOULEVARD, CATON AVENUE AND CHURCH AVENUE

Confusion occurs due to the state highway designation and truck access on Linden Boulevard. Nearly the entire length of Church Avenue is designated as a Local Truck Route, but the section between McDonald and Flatbush Avenues is a Through Truck Route in the area. One recommendation should be at the Prospect Expressway; Local and Through Truck Route signage should be prominently placed. For example, signage indicating that "THROUGH TRUCKS USE CHURCH AVENUE" should be placed on eastbound approaches (i.e. on Prospect Expressway) to advise trucks of the routes.

EAST NEW YORK

There currently exists a minimal amount of truck route designation signs within the East New York study area. Field observations noted that the only truck route designation signage exists on Linden Boulevard eastbound at Pennsylvania Avenue and Pennsylvania Avenue southbound at Atlantic Avenue. Truck route designation signage should be placed at all four approaches of the noted two intersections. Two signs indicating truck route designation should be placed at each approach; one sign before the intersection and one sign beyond the intersection. The signage should also indicate Local Truck Route or Through Truck Route, which in the case of Pennsylvania Avenue and Linden Boulevard, should indicate Through Truck Route while Local Truck Route designation should be indicated for Atlantic Avenue.

Pitkin Avenue should be designated as the primary access street from Pennsylvania Avenue to the East New York Industrial Complex. Pitkin Avenue is a two-way roadway with a signalized intersection at Pennsylvania Avenue. Truck route designation signage should be placed at the Pitkin Avenue eastbound approach as well as both Pennsylvania Avenue approaches. Curb parking along Pitkin Avenue should also be prohibited during weekday daytime hours to allow enhanced mobility for truckers using Pitkin Avenue to industrial sites within the East New York complex.

DITMAS AVENUE

The residents of the Parkville section are concerned about trucks on Ditmas Avenue, which runs from McDonald Avenue to Ocean Avenue. There is no advantage for trucks to use Ditmas Avenue rather than McDonald Avenue or Bay Parkway, which are Local Truck Routes. To address the community concern, the following measures are recommended:

- The placement of Local Truck Route signs at the intersections of Ditmas Avenue with McDonald Avenue, Coney Island Avenue, and 65th Street.
- Placement of Local Truck Route wayfinding signs along Ditmas Avenue

Negative signing is not recommended for this situation because the presence of trucks does not appear to be attributed to trucks avoiding a bottleneck, using the street as a short-cut but rather an absence of understanding of the truck route network in the Borough.

SCHENECTADY AVENUE

Schenectady Avenue is a north-south street that runs between Fulton Street and Winthrop Street. It is parallel to Utica Avenue, which is a Local Truck Route. Curb parking lines both sides of the street and hospitals are located at each end of the street. At the north end is the Interfaith Hospital and Medical Center and at the south end is Kingsbrook Jewish Medical Center and Kingsboro Psychiatric Center. Inappropriate truck use of this street can be addressed by the following measures:

- The placement of Local Truck Route signs at the intersections of Schenectady Avenue with Atlantic Avenue, Empire Boulevard, Linden Boulevard, and Church Avenue.
- Placement of Local Truck Route wayfinding signs along Schenectady Avenue.
- Post Local Truck Route signs on Utica Avenue and Empire Boulevard.