Unified Planning Work Program

South Williamsburg Area Wide Multimodal Traffic Congestion Study

NYCDOT

Sept 2016

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SOUTH WILLIAMSBURG TRANSPORTATION STUDY

Draft Final Report

August 2016

NYC
Bill de Blasio
Mayor

NEW YORK CITY DOT

NYMTC
NEW YORK METROPOLITAN TRANSPORTATION COUNCIL

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South Williamsburg Area Wide Multimodal Traffic Congestion Study

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S EXECUTIVE SUMMARY

S.1 Introduction

The South Williamsburg Transportation Study was initiated at the request of elected officials in response to community concerns of safety, mobility and congestion due to recent population increases and new developments that are being built in the South Williamsburg area. The purpose of the study is to assess the existing and future transportation conditions, to address the community concerns and to improve the transportation conditions for all street users. The study area, located in Brooklyn just south of the Williamsburg Bridge, is bounded by Broadway in the north, Park Avenue in the south and Kent Avenue in the west. It is traversed by the BQE which provides access to the Williamsburg Bridge.

S.2 Demographics

The area experienced significant population growth between 2000 and 2010 increasing 21% to 59,204 in 2010 while NYC population increased by three percent. Population density in the area is 65,059 persons per square mile which is nearly twice that of Brooklyn and similar to Manhattan. By 2020 the study area is projected to grow approximately 21% to 71,630.

Average household size is 3.8 which is much larger than the average NYC household while medium household income, $24,600, was much lower than the average NYC household. Vehicle ownership is relatively low with only 28% of the households having at least one vehicle. The 2010 Census Journey to Work data shows that walking mode share of 35% which was three times higher than that of NYC. Subway mode share was 23% which is about half the average of NYC.

S.3 Zoning and Land Use

A review of the existing land use and zoning districts in the study area reveals that the area is predominately residential with mostly 3-5 story apartment buildings and several high density, high-rise residential buildings distributed throughout the area. Commercial uses are prevalent along both Broadway and Lee Avenue with ground floor retail, restaurants and stores. Manufacturing uses, such as warehouses and building supply stores are found along Flushing Avenue and between Throop and Harrison Avenue. There are approximately 53 primary schools with approximately 33,000 enrollment in the area. Woodhull Hospital, a major trip generator, is located in the southeast corner of the study area.

There have been three rezonings in the last 10 years near the study area; The Greenpoint/Williamsburg 2005 rezoning, the Greenpoint/Williamsburg Contextual 2009 rezoning and the Bedford Stuyvesant North 2012 rezoning.

Major developments expected to come online by 2025 include several commercial and industrial developments in the Brooklyn Navy Yard, the Domino Sugar residential development (2800+ Dwelling Units) and the Pfizer Rezoning residential development (1100+ Dwelling Units).

S.4 Traffic and Transportation

Major east-west corridors in the study area are Broadway, Division Avenue, Flushing Avenue and Park Avenue. Major north-south corridors are Kent Avenue, Wythe Avenue, Bedford Avenue, Lee Avenue, Union Avenue, Marcy Avenue and Harrison Avenue. The Brooklyn/Queens Expressway extends through the study area with entrance/exit ramps at Wythe Avenue. The Williamsburg Bridge, located just north of the study area, provides a major connection between Brooklyn and Manhattan.

The 2014 traffic data was collected at 35 intersections and analyzed using the Highway Capacity Software (HCS). There are fifteen intersections in the AM and thirteen in the PM with LOS D or

worse on some approaches. Many of these intersections were grouped along Flushing Avenue near the BQE and on Flushing Avenue near Broadway. Corridor travel speed runs along all major corridors averaged 8.8 mph in the AM and 7.6 mph in the PM with the slowest speeds on Flushing Avenue westbound with 3.6 mph and 5.5 mph in the AM and PM respectively.

S.5 Public Transportation

An examination of the public transportation system shows that there are four subway lines (J/Z, M, G), six subway stations (Marcy Avenue, Flushing Avenue, Hewes Street, Lorimer Street, Broadway and Flushing) and fourteen bus lines in the study area. The B46, B44 and B15 are the 3rd, 5th and 23rd busiest buses respectively of 238 local lines in the MTA system. The Williamsburg Bridge Bus Terminal at Broadway and Havemeyer Street serves six bus routes. The East River Ferry has a stop at the South 10th Street pier.

S.6 Parking

There are seven off-street parking facilities with approximately 1,160 spaces. Four are grouped in the northwest corner of the study area near new residential developments and commercial activities along the west segment of Broadway. Woodhull hospital, on Flushing Avenue west of Broadway, has the largest parking facility with 617 spaces. The average off-street occupancy was 71% and 77% in the AM and PM, respectively.

Legal on-street parking supply fluctuates during peak periods based upon parking regulation. There are approximately 2,750 and 2,830 on-street parking spaces in the area with 92% and 80% capacity in the AM and PM peak periods respectively. Metered parking exists on Broadway between Park and Flushing Avenues and between Roebling and Rodney Streets and along Lee Avenue between Taylor and Heyward Streets. A large number of school buses are usually parked throughout the study area. While some were parked legally within the boundary of their associated schools or in the school bus layover area on Williamsburg Street E

between Bedford Avenue and Lee Avenue, school buses were parked illegally on the streets in non-designated areas.

S.7 Pedestrians and Bicycles

Thirteen locations were selected for pedestrian analysis based on field reconnaissance, proximity to intense pedestrian activity such as transit stations and schools as well as community input. The highest pedestrian volumes were observed along Broadway, on Division Avenue and along Lee Avenue near transit facilities, community facilities and commercial establishments. Of the thirteen locations analyzed the pedestrian level of service (LOS) was B or better at every crosswalk. Future projected pedestrian volumes had little effect on the LOS.

There are several bike lanes in the study area. Wythe Avenue (SB), Throop Avenue (NB) and Tompkins Avenue (SB) both have one-way bike lanes. Kent Avenue, which has a two way bike lane, is part of the Brooklyn Greenway initiative which connects 14 miles of bike routes along the waterway.

S.8 Crash/Safety

The detailed crash analysis (2012 to 2014) focused on intersections with 23 or more vehicle accidents or 5 or more pedestrian/bike accidents in one year. One intersection was identified as a high crash location; Flushing Avenue/Broadway. There were sixteen fatalities between 2010 and 2015 in the study area with six motorist, nine pedestrian and one cyclist. Six fatalities occurred on Broadway while four took place on Flushing Avenue.

S.9 Goods Movement

The study area is traversed by many local truck routes which facilitate deliveries and access to the BQE, a major through truck route. Kent Avenue, Bedford Avenue, Lee Avenue, Union Avenue, Broadway, Williamsburg Street and Flushing Avenue are local truck routes. Trucks

made up 6.5% and 5.0% of the total traffic in the AM and PM peak periods. Truck traffic is heavy on Kent Avenue and Flushing Avenue near the BQE access ramps.

S.10 Public Outreach and Community Input

Three Technical Advisory Committee (TAC) meetings, five public meetings and a presentation to the Community Board 1 reflect the public participation during the course of the study that undertook an existing and future conditions analysis and the development of recommendations.

S.11 Issues and Recommendations

Based upon the analysis and community input, recommendations were developed to improve traffic operations and pedestrian safety. Recommendations involve street geometric changes and parking regulation changes. The following indicates the type of changes and associated locations

Geometric Changes

- Division Avenue and Berry Street
- Division Avenue and Marcy Avenue
- Wallabout Street and Heyward Street
- Wallabout Street and Lynch Street
- Wallabout Street and Middleton Street
- Wallabout Street and Lee Avenue
- Flushing Avenue and Gerry Street
- Union Street/Harrison Avenue/Lorimer Street
- Kent Avenue and Classon Avenue
- Bedford Avenue @ Park Avenue and Flushing Avenue

Parking Regulation Changes

- Lee Avenue from Taylor Street to Flushing Avenue

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1 INTRODUCTION

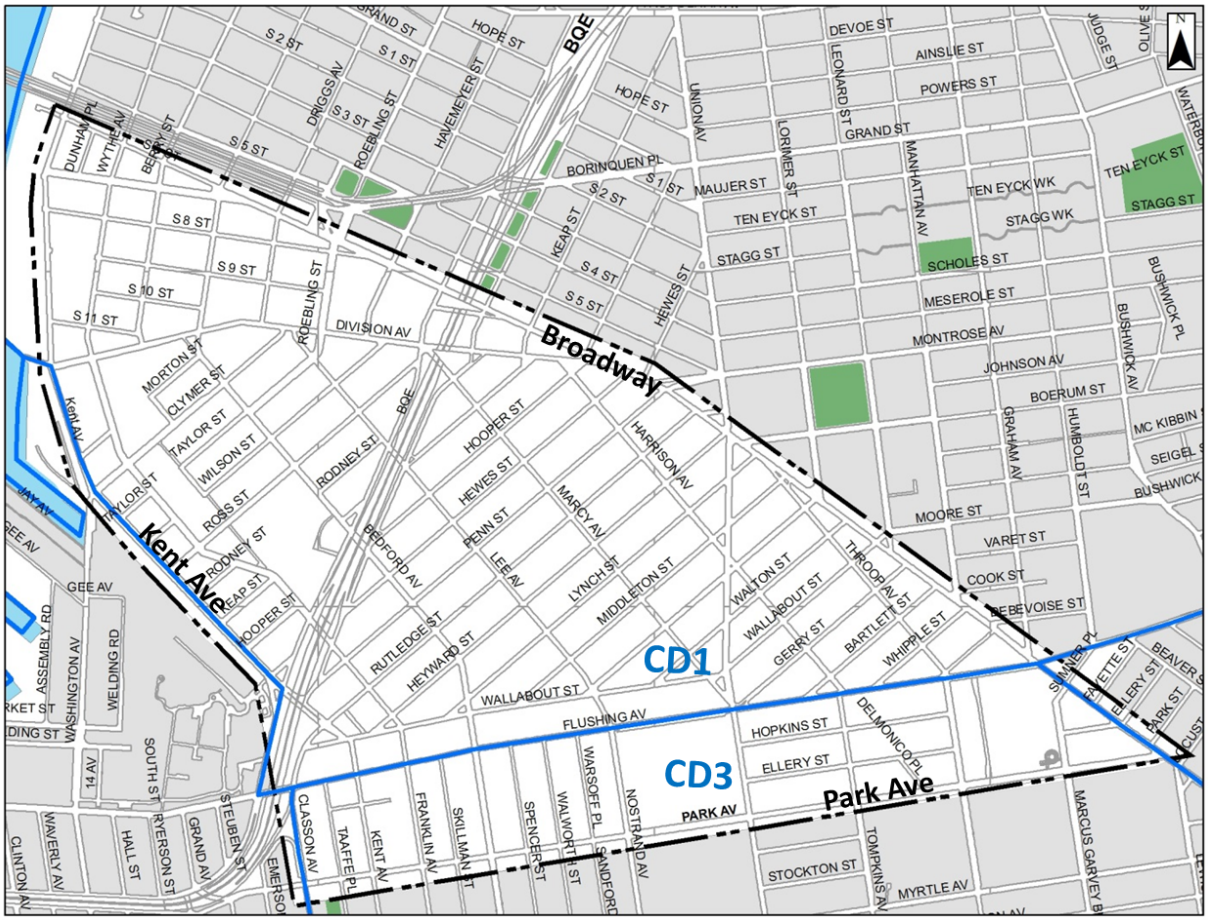
1.1 Background

The South Williamsburg Transportation Study is being conducted in response to growing congestion resulting from increase development as well as requests from community members and elected officials to address congestion in the South Williamsburg area. The study aims to relieve congestion, expand travel choices and enhance safety for all road users. The study focuses on an area that is experiencing significant growth as a result of major re-zonings. The BQE, a major regional corridor, provides access to the Williamsburg Bridge which is a significant portal to the Lower Manhattan CBD. The BQE passes through the middle of the study area with on and off ramps in close proximity. Truck traffic in the area is also very high not only due to the presence of the Williamsburg Bridge, which accommodates truck traffic, but as a result of the land uses along the water front and on Kent and Flushing Avenues. Because of the area's travel needs resulting from the various land uses the study will adopt a multimodal approach (transit, trucks, auto, bikes and pedestrians) in its analysis and recommendations. The level of congestion during the peak periods on the BQE and the ramps connecting the local streets is very high. The study will provide input to the regional planning effort and seeks to develop measures to improve travel condition in the area. It will coordinate with and build upon the recently completed Broadway Congested Corridor Study that extends from Myrtle Avenue to Driggs Avenue.

1.2 Study Area

The proposed study area, located in Brooklyn, is bounded by Broadway to the north, Park Avenue to the south and Kent Avenue to the west (Figure 1-1). The study area lies south of the Williamsburg Bridge and its approach, with approximately ¾ of the study area falling in Brooklyn Community District #1 and the remaining in Brooklyn Community Districts #3.

Figure 1-1: Study Area Boundaries



1.3 Goals and Objectives

The goal of the study is to evaluate traffic congestion in the study area, develop recommendations to relieve traffic congestion and enhance mobility and safety for all road users.

The study's main objectives are:

- To document existing traffic conditions, analyze the traffic characteristics, and asses the area's travel demand and needs.

- To build upon other initiatives in the area such as the Broadway Congested Corridor Study
- To assess future traffic conditions by taking account of area demographics, land use, socio-economic factors, and transportation infrastructure.
- To develop measures that improve traffic operations and safety for all road users.

1.4 Project Organization and Methodology

The study was organized as a series of tasks as follows:

Task 1: Project Organization and Management – Create a detailed work program which includes project scope, tasks, subtasks, and deliverables.

Task 2: Literature Search – Conduct a literature search to obtain relevant studies from DOT's Environmental Impact Statement/Planning Study library and from other agencies. NYCEDC, NYCDCP, NYSDOT and NYMTC will be consulted to attain any relevant studies or reports.

Task 3: Public Outreach - Establish Technical Advisory Committee (TAC) and host TAC and public meetings to facilitate public participation with the community members, community board, elected officials and other stakeholders.

Task 4 – Data Collection and Identification of Issues – Collect data on vehicular traffic, parking, pedestrians, bikes, transit, accidents/safety and goods movement at critical intersections and corridors. Create an inventory of all data which along with other information and community input would facilitate the identification of issues and potential improvements.

Task 5 – Analysis of Existing Conditions – Conduct a comprehensive analysis of existing conditions utilizing all collected data and draft "Technical Memorandum No. 1 – Analysis of Existing Conditions". Hold a TAC and public meeting to present findings.

Task 6 – Analysis of Future Conditions and Development of Recommendations – Conduct a comprehensive analysis of future conditions using estimates and forecasts to project data to the future date. Develop recommendations to address issues and problems that arise from the existing and future conditions analysis. Hold a TAC and public meeting to present findings.

Task 7 – Development and Evaluation of Improvement Packages – Develop improvement alternatives and evaluate same for effectiveness, community support, costs and consistency with the study's goals and objectives.

Task 8 – Draft and Final Report – Prepare draft and final report. The report will include short- and long-term recommendations for improvements within the study area and will address any operational issues resulting from the proposed changes.

Task 9 – Develop Implementation Plan – Prepare detailed design drawings, host implementation meetings with appropriate agency divisions and develop construction schedules to be used in the implementation process.

2 DEMOGRAPHIC ANALYSIS

2.1 Introduction

The demographic analysis of the study area examines population changes and socioeconomic characteristics such as household size, income, car ownership and journey to work by mode to identify trends and help determine future travel needs. The analysis relies on data from New York Metropolitan Transportation Council (NYMTC), New York City Department of City Planning (NYCDCP) and data compiled by the United States Department of Commerce – Bureau of Census. Data was collected and analyzed for 2000 and 2010 and projected through 2025. To better assess the population dynamics of the study area, comparisons were made with the Borough of Brooklyn and New York City, where applicable.

The study area consists of 17 Census Tracts of which eleven are located entirely and six partially in the study area. The analysis of the partial census tracts assumes the population and other related variables are evenly distributed geographically. Table 2-1 shows the population by census tracts for 2000 and 2010. Figure 2-1 shows the census tracts and population change.

Table 2-1: Population 2000 and 2010

CT (2000)	%	2000 Pop	CT (2010)	%	2010 Pop	Change	Change%
191	0.1	282	191	0.1	233	(49)	-17%
*237	0.5	711					
*239	0.5	209					
			*1237	0.5	3,004	2,084	227%
255	0.5	2,539	255	0.5	2,551	12	0%
257	0.7	1,418	257	0.7	1,492	74	5%
285.01	1	1,422	285.01	1	428	(994)	-70%
507	1	728	507	1	2,288	1,560	214%
509	1	1,838	509	1	3,694	1,856	101%
525	0.7	2,476	525	0.7	2,449	(27)	-1%
529	1	4,295	529	1	3,979	(316)	-7%
531	1	2,582	531	1	7,027	4,445	172%
533	1	7,560	533	1	6,566	(994)	-13%
535	1	4,880	535	1	4,348	(532)	-11%
537	1	1,963	537	1	3,575	1,612	82%
539	1	3,992	539	1	2,756	(1,236)	-31%
545	1	7,741	545	1	8,008	267	3%
547	1	3,364	**547	1	5,245	1,881	56%
549	0.5	744	**549	0.5	1,561	817	110%
**577	0.5	95				(95)	-100%
Study Area		**48,839**			**59,204**	**10,365**	**21%**

* 237 and 239 combined to make 1237 in 2010

**577 was the area west of Kent Ave. It was subsumed into 549and 547 in 2010

2.2 Population Trends

The study area population grew by 10,365 (21%) over the last decade from 48,839 in 2000 to 59,204 in 2010. Of the 17 census tracts, 11 had population increased while six population decreased. As shown in Figure 2-1, three adjacent tracts in the middle of the study area lost significant population (combined 1,800 persons) from 2000 to 2010. Surrounding those tracts are eight census tracts which each gained more than 800 residents with the largest population gain occurring in tract 531 (+4,445). Tract 285.01 in the southeast corner of the study area had a population loss of nearly 1,000.

Figure 2-1: Population Change 1990-2000

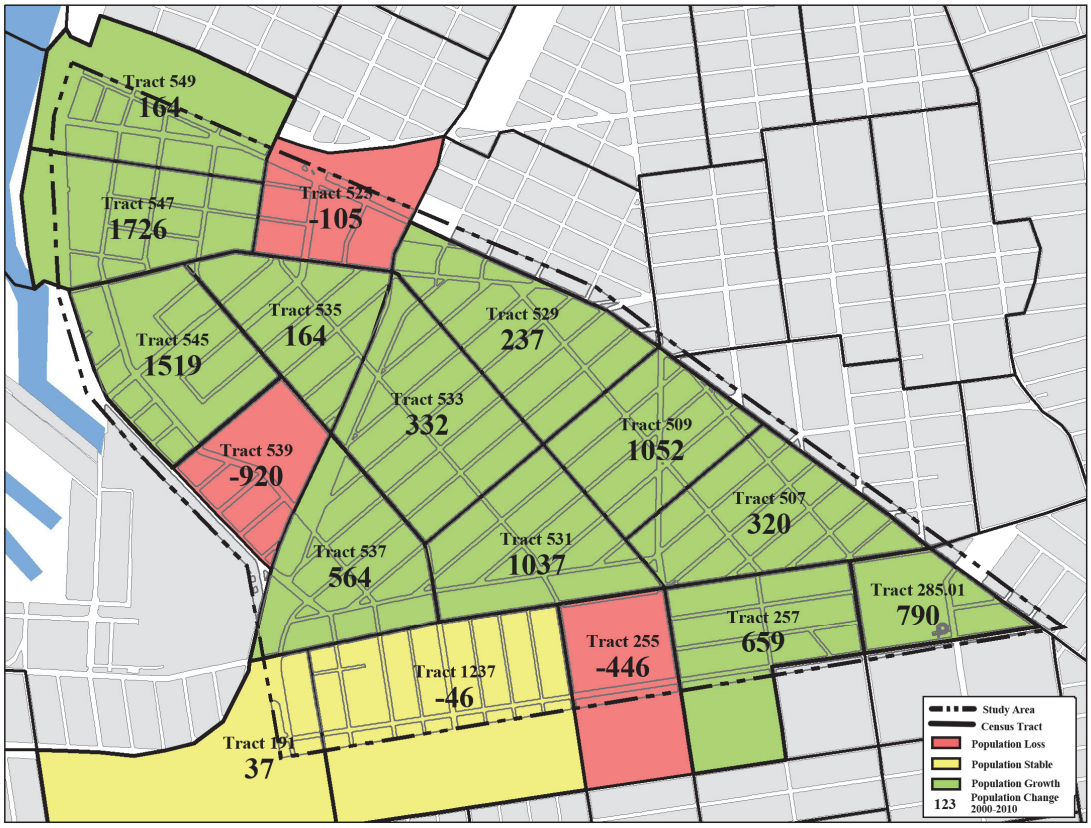
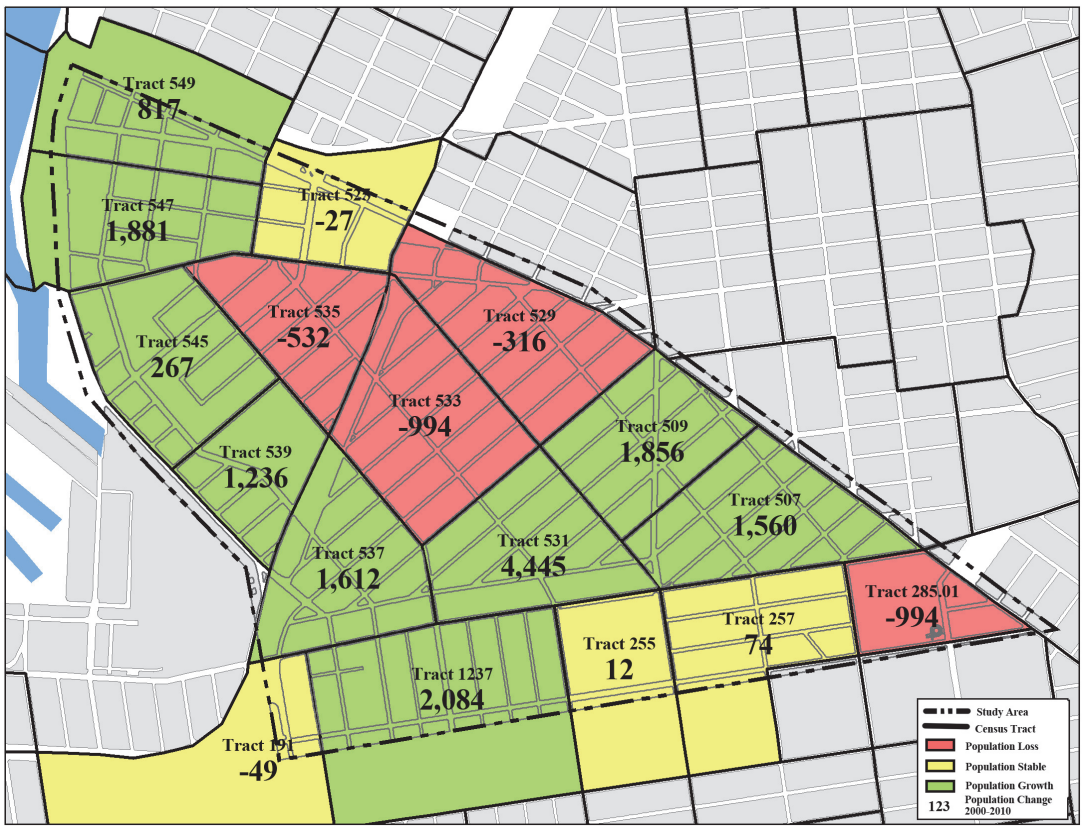


Figure 2-2: `Population Change 2000-2010



Study area population density (65,059 persons/sq. mi) is almost double that of Brooklyn (35,472 persons/sq. mi). Several factors contributed to a projected growth rate twice that of NYMTC's projected Brooklyn growth rate:

- The development that has resulted from the nearby 2005 Williamsburg/Greenpoint rezoning initiative which contributed to significant population growth from 2000 to 2010
- Several large residential developments slated to be constructed in the near future

Table 2-2 shows the study area population change from 2000 to 2010 and the projected population for 2020 and 2025.

Table 2-2: Population Change

Characteristic	Year	Study Area		Brooklyn		NYC	
		Total	% Change	Total	% Change	Total	% Change
Population	***2000***	48,837		2,465,300		8,008,278	
	2010	59,204	21%	2,552,911	4%	8,242,624	3%
	****2020***	71,630	21%	2,648,452	4%	8,550,972	4%
	****2025***	74,687	4%	2,706,246	2%	8,699,966	2%

* projected

2.1 Socio-Economic Trends

Household Size and Income

In 2010 there were approximately 15,330 households in the study area with an average household size of 3.83 and a median household income of $24,600. The median household size in the study area is much higher than in Brooklyn (2.7) and NYC (2.6). Over the last decade household size decreased 4%. The median household income is significantly lower than Brooklyn and NYC (see Table 2-4) but grew at a faster rate (56%) than Brooklyn (39%) and NYC (34%) between 2000 and 2010.

Table 2-3: Household Size

Characteristic	Year	Study Area		Brooklyn		NYC	
		Total	% Change	Total	% Change	Total	% Change
Household Size	*2000*	3.99		2.75		2.59	
	2010	3.83	-4%	2.74	0%	2.57	-1%
	*2020	3.78	-1%	2.69	-2%	2.57	0%
	*2025	3.75	-1%	2.69	0%	2.57	0%

*projected

Table 2-4: Median Household Income

Characteristic	Year	Study Area		Brooklyn		NYC	
		Total	% Change	Total	% Change	Total	% Change
Median Household Income	*2000*	$ 15,817		$ 32,135		$ 38,293	
	2010	$ 24,600	56%	$ 44,593	39%	$ 51,270	34%
	2020	$ 38,260	56%	$ 61,895	39%	$ 68,702	34%
	*2025	$ 48,883	28%	$ 73,903	19%	$ 80,381	17%

*projected

Vehicle Ownership

In 2010 25.2% owned one vehicle, 2.9% owned two vehicles and .4% owned three or more vehicles. Household vehicle ownership in the study area is low compared to Brooklyn and NYC. See table 2-5.

Table 2-5: Household Vehicles

Area	Year	No Vehicle	1 Vehicle	2 Vehicles	3+ Vehicles
Study Area	**2000**	74.6%	22.7%	1.8%	0.9%
	2010	71.5%	25.2%	2.9%	0.4%
	***2020**	68.6%	27.0%	4.0%	0.4%
	***2025**	66.5%	28.5%	4.5%	0.5%
Brooklyn	**2000**	57.0%	33.1%	8.2%	1.8%
	2010	57.1%	32.6%	8.5%	1.8%
	***2020**	57.5%	32.0%	8.7%	1.8%
	***2025**	57.9%	31.6%	8.8%	1.7%
NYC	**2000**	55.7%	31.6%	10.1%	2.6%
	2010	55.1%	31.3%	10.7%	3.0%
	***2020**	55.2%	31.1%	10.9%	2.8%
	***2025**	55.0%	31.0%	11.0%	3.0%

*projected

Journey to Work by Mode

Car and public transportation mode share in the study area decreased between 2000 and 2010, while walking and working from home increased. In 2010, 22% of the work trips were automobiles while 35% were public transit. The subway mode share (23%) was notably lower than both Brooklyn (48%) and NYC (41%) while the walk mode share (35%) was more than three times that of Brooklyn (9%) and NYC (10%). See Tables 2-6.

Table 2-6: Journey to Work by Mode

Travel Mode	Study Area				Brooklyn				NYC			
	2000	2010	*2020	*2025	2000	2010	*2020	*2025	2000	2010	*2020	*2025
Car	24%	22%	21%	20%	30%	24%	22%	22%	33%	28%	27%	26%
Drove Alone	16%	14%	14%	15%	22%	19%	18%	18%	25%	23%	22%	22%
Carpool	9%	7%	6%	5%	8%	5%	4%	3%	8%	5%	5%	5%
Public Transportation	40%	35%	36%	37%	57%	61%	62%	62%	53%	55%	56%	57%
Bus	14%	11%	13%	14%	10%	11%	12%	12%	11%	12%	12%	13%
Subway	25%	23%	23%	24%	45%	48%	49%	49%	38%	41%	42%	42%
Railroad	0%	1%	0%	0%	1%	1%	1%	1%	2%	2%	2%	2%
Taxi	1%	0%	1%	1%	1%	0%	1%	1%	2%	1%	1%	1%
Motorcycle	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bike	1%	2%	2%	2%	1%	1%	2%	2%	0%	1%	1%	1%
Walk	33%	35%	35%	35%	9%	9%	9%	9%	10%	10%	10%	11%
Other	0%	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%	1%
Worked at Home	2%	5%	5%	5%	2%	4%	4%	4%	3%	4%	4%	4%

***Projected**

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3 ZONING AND LAND USE

3.1 Introduction

The study area's existing zoning and land use help explain travel characteristics, and traffic congestion. Different land uses have different trip generating characteristics with travel being a function of the spatial distribution of the land uses. Field surveys were conducted to document the existing land uses and secondary data sources from Department of City Planning (DCP) reports and the NYC Zoning Resolution were also used to complement the process.

3.2 Zoning

The three basic zoning designations in New York City, residential (R), commercial (C) and manufacturing (M), are further subdivided into low, medium and high density developments governed by permitted coverage and floor area ratios.

Three recent rezonings have occurred nearby; the Greenpoint-Williamsburg Rezoning (2005), Greenpoint-Williamsburg Contextual Rezoning (2009) and the Bedford Stuyvesant North Rezoning (2012). Figure 3-1 shows the rezonings in context with the South Williamsburg study area.

The Greenpoint-Williamsburg Rezoning (2005) affected 184 blocks in Brooklyn Community District 1 north of Broadway along the waterfront. The stated objective was to change the "*existing manufacturing zoning and special mixed-use district designations would be changed to permit residential use on the waterfront, residential and mixed use on most of the upland area, and to restrict certain areas currently zoned M3 to light industrial uses.*" As a result Community District 1 has seen an increase of approximately 9,000 dwelling units and 40,000 residents as higher density residential buildings have been constructed in this area.

At the request of Community Board 1 and local elected officials, the Department of City Planning in 2009 rezoned approximately 175 blocks east of the 2005 rezoning. The objective was to "*protect the existing character of residential areas east of the 2005 rezoning area.*

The rezoning aims to preserve neighborhood character and scale by limiting the height of new development, to create opportunities and incentives for affordable housing through inclusionary zoning, and to support local retail corridors while protecting the residential character of nearby side streets".

While neither the 2005 Greenpoint-Williamsburg Rezoning nor the 2009 Greenpoint-Williamsburg Contextual Rezoning directly affected the zoning districts within the South Williamsburg study area, the changes in allowable land uses and densities have had an indirect affect upon the population, and transportation demand within the study area.

Unlike the 2005 and 2009 rezoning actions, the 2012 Bedford Stuyvesant North Rezoning directly affects the study area. The objective was to "*Preserve existing character and building patterns in the residential core of the neighborhood while allowing modest enlargements of existing homes; direct new residential and mixed-use growth to commercial/transit corridors; promote vibrant, active, pedestrian-friendly streets with regulations to reinforce commercial character; incentivize affordable housing creation in major corridors*". This rezoning of approximately seven blocks in the southeast corner of the South Williamsburg study area is shown in Figures 3-2 and 3-3.

Figure 3-1: South Williamsburg Rezoning Context

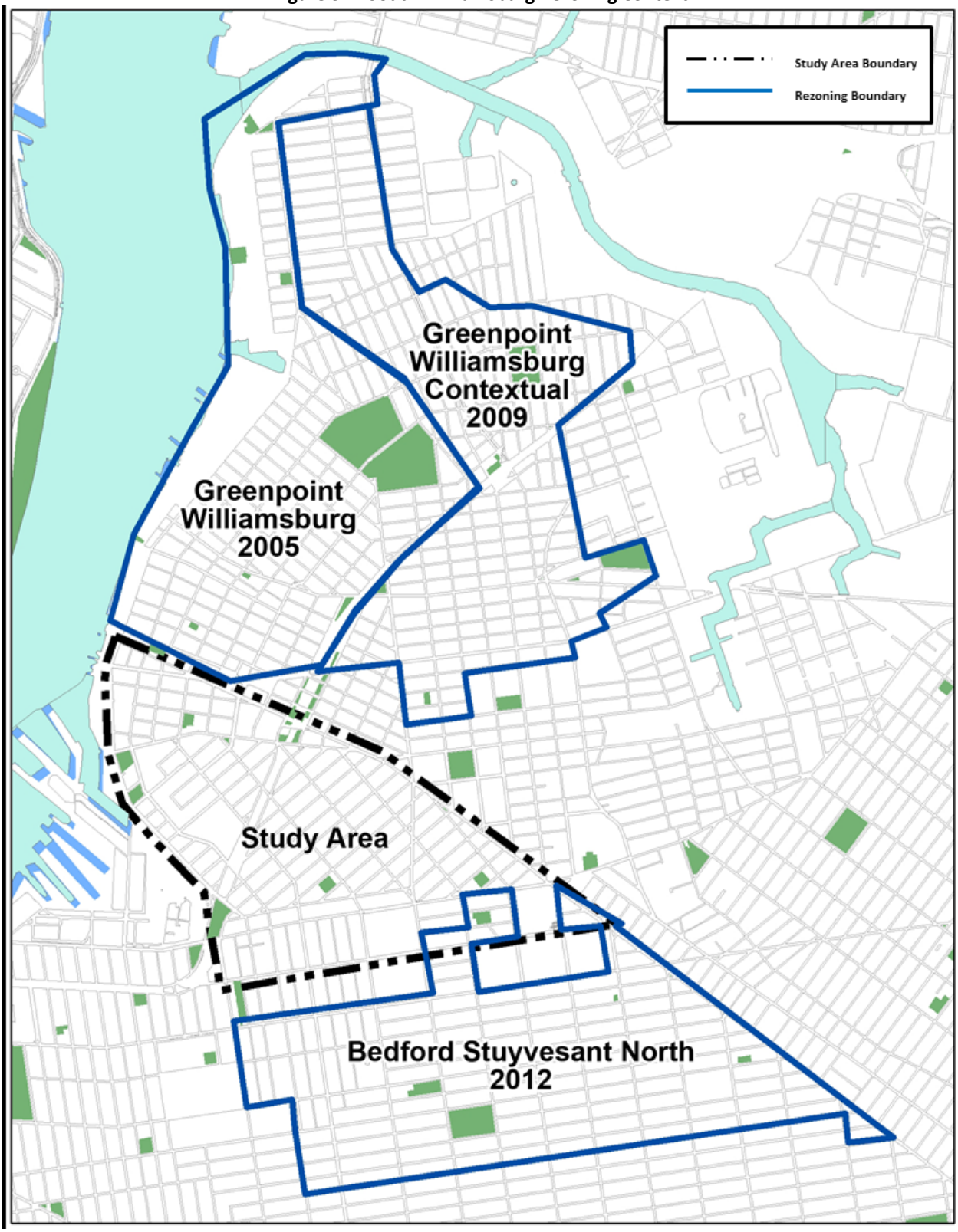


Figure 3-2: Bedford Stuyvesant North Rezoning - Existing

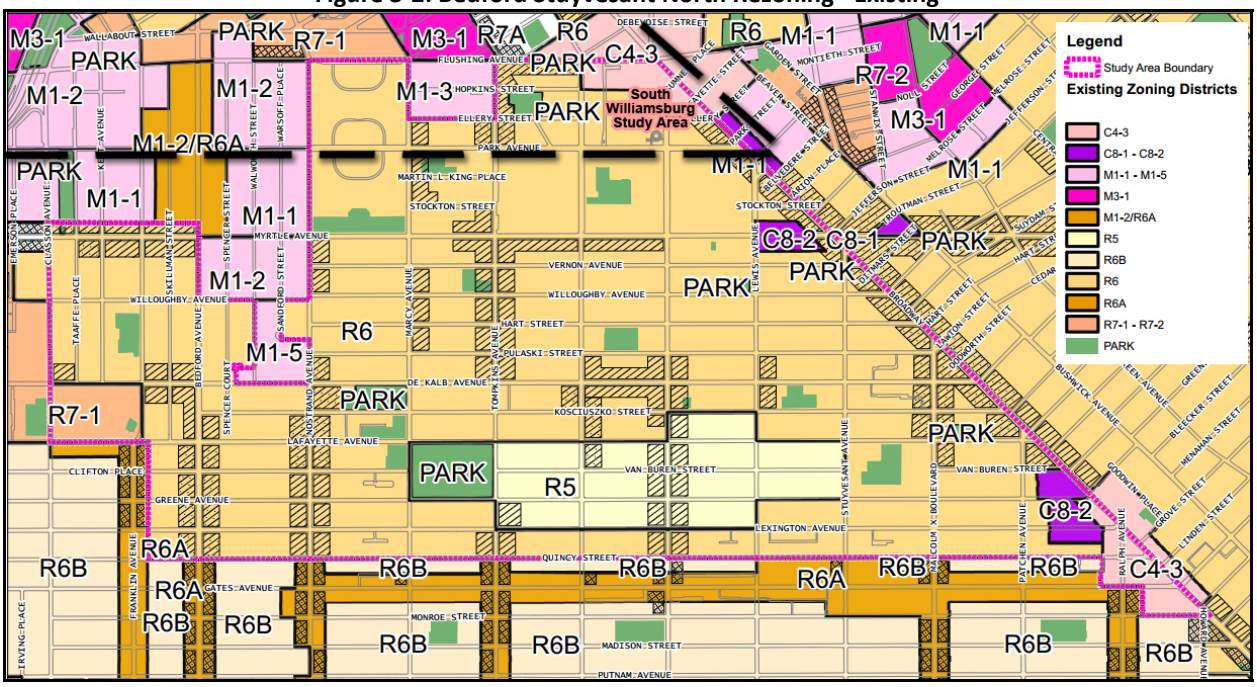
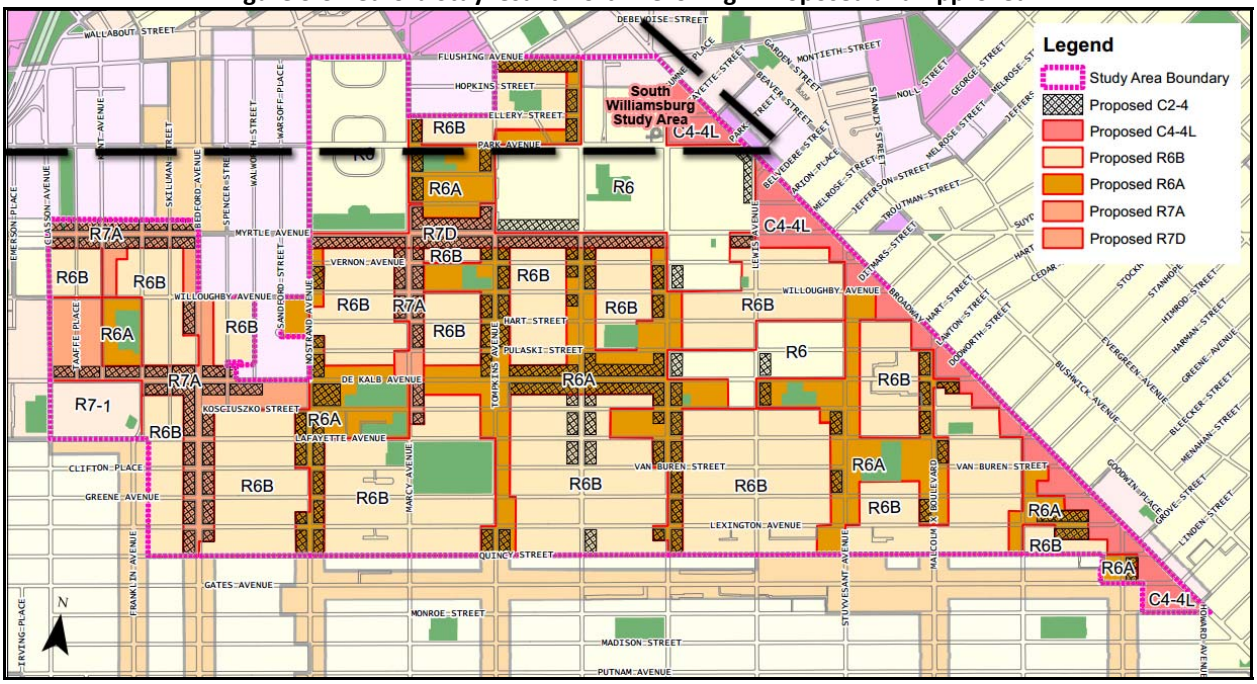


Figure 3-3 Bedford Stuyvesant North Rezoning – Proposed and Approved



There are two types of residential (R6, R7), commercial (C4, C8) and manufacturing (M1, M3) zoning districts within the study area. The residential zoning districts account for approximately 80% of the study area, while the commercial and industrial districts represent approximately 10% each. C1 and C2 Commercial overlays exist along Lee Avenue, Union Avenue, Throop Street and Flushing Avenue. Table 3-1 shows zoning designations and the percentage distribution in the study area while Figures 3-4 shows the zoning districts within the study area.

Table 3-1: Zoning Districts within the Study Area

Zone Type	Zone Type	FAR	Percentage
Residential	R6	2.4	60%
	R7	3.4	20%
Commercial	C4-3	3.0	7%
	C8-2	2.0	3%
Manufacturing	M1-2	2.0	7%
	M3-1	2.0	3%

As shown in Figure 3-4, approximately 60% of the area is zoned R6 including a large district in the middle of the study area and along Park Avenue in the southeast corner. R6 zoning allows for medium density residential uses ranging from row house developments to tower in the park style developments. R7 zones exist along Kent Avenue and Wythe Avenue and along Wallabout Street. There is also an R7 zone in the southeast section of the study area between Throop Street and Harrison Avenue. R7 districts are for medium density apartment buildings.

There are two C4 commercial districts in the area. One is located along Broadway from Kent Avenue to the BQE. The other is located along Broadway from Walton Street to Park Avenue. C4 districts allow department stores, theaters and other commercial/office uses that generate more traffic than neighborhood shopping areas. There is a C8 district along Broadway from Hooper Street to Lynch Street. C8 districts provide for automotive and other heavy commercial services.

Commercial overlays are mapped along streets that serve the local retail needs of the surrounding residential neighborhood and include grocery stores, restaurants and other retail stores. In mixed use buildings, the commercial activity is located on the ground floor under the

residential use. A C1 overlay is located along Lee Avenue between Broadway and Heyward Street. Kent Avenue, Union Avenue, Marcy Avenue, Harrison Avenue and Throop Street all have a C2 commercial overlay along certain segments.

M1 districts can be found in the southern section of the study area between Flushing Avenue and Myrtle Avenue. M1 districts allow for light industrial uses such as woodworking shops, auto storage and repair shops, wholesale services and storage facilities. There is an M3 district between Union Street and Harrison Avenue north of Flushing Avenue as well as in the northwestern corner of the study area above Broadway on the waterfront. M3 districts are for heavy industries that generate noise, traffic or pollutants. Typical uses include waste transfer stations, power stations and other public utilities.

Figure 3-4: Current Zoning Map

3.3 Land Use

The South Williamsburg study area is a high population density area with several large residential complexes located on superblocks. There are several local/regional retail corridors in the area as well as many public and parochial schools distributed throughout the area and a major hospital facility, Woodhull Medical Center located in the southeast corner of the study area. Figure 3-5 shows the land uses and major residential complexes in the study area.

The predominant land use in the study area is residential. The middle of the study area between Division Avenue Union Avenue, Wallabout Street and Bedford Avenue is medium density residential composed of 3-4 story townhouses and 4-7 story apartment complexes and condos. There is a group of high density high-rise residential buildings between Wythe Avenue and Bedford Avenue south of Division Avenue including Bedford Gardens (640 dwelling dwelling units), the NYCHA Taylor Wythe Houses (525 dwelling dwelling units), the NYCHA Independence Towers (744 dwelling units) and 60 Division Avenue (190 dwelling units). Just outside the study area are several high density residential buildings including the NYCHA Marcy Houses (1,705 dwelling units), Tompkin Houses (1,048 dwelling units) and Sumner Houses (1,098 dwelling units) located just south of Flushing Avenue, and the Mitchel Lama Lindsay Park complex (2,700 dwelling units) and the NYCHA Borinquen Plaza Houses (934 dwelling units) located North of Broadway and East of Union Street.

Broadway east of Havemeyer Street runs under the elevated subway and is densely packed with local and regional retail such as barbershops, bodegas, restaurants and home furnishing stores. Graham Avenue is another major commercial corridor which is outside the study area but connects to Broadway near the Woodhull Medical Center. The convergence along with many bus and subway stops in the area contribute to heavy pedestrian traffic at this location.

Lee and Division Avenue are local retail corridors with two to four story residential apartments over ground floor commercial uses which include groceries, print shops, laundry mats, clothing shops, bakeries and restaurants.

There are approximately 10 blocks south of Wallabout Street between Classon Avenue and Nostrand Avenue which have a variety of commercial and industrial uses including building material warehouses, storage facilities, automotive repair shops and food distribution centers. The Broadway Triangle section of the study area, bounded by Broadway, Union Avenue and Flushing Avenue has several manufacturing uses as well as parking lots and vacant lots. Additionally, the former Pfizer manufacturing plant is now used for local manufacturing and food production.

Public Facilities

There are four FDNY firehouses located on Hooper Street between Wythe Avenue and Kent Avenue (1), on Park Avenue between Tompkins Avenue and Marcy Avenue (2), on Bedford Avenue between Park and Myrtle Avenue (3) and on Union Avenue between Johnson and Montrose Avenues (4). The facility on Union Avenue also houses an NYPD precinct house and another NYPD precinct house located on Sutter Avenue and Essex.

There are 36 private/parochial schools and 17 public schools in the study area with an enrollment of nearly 33,000 children. See Figure 3-6.

Figure 3-5: Existing Land Use

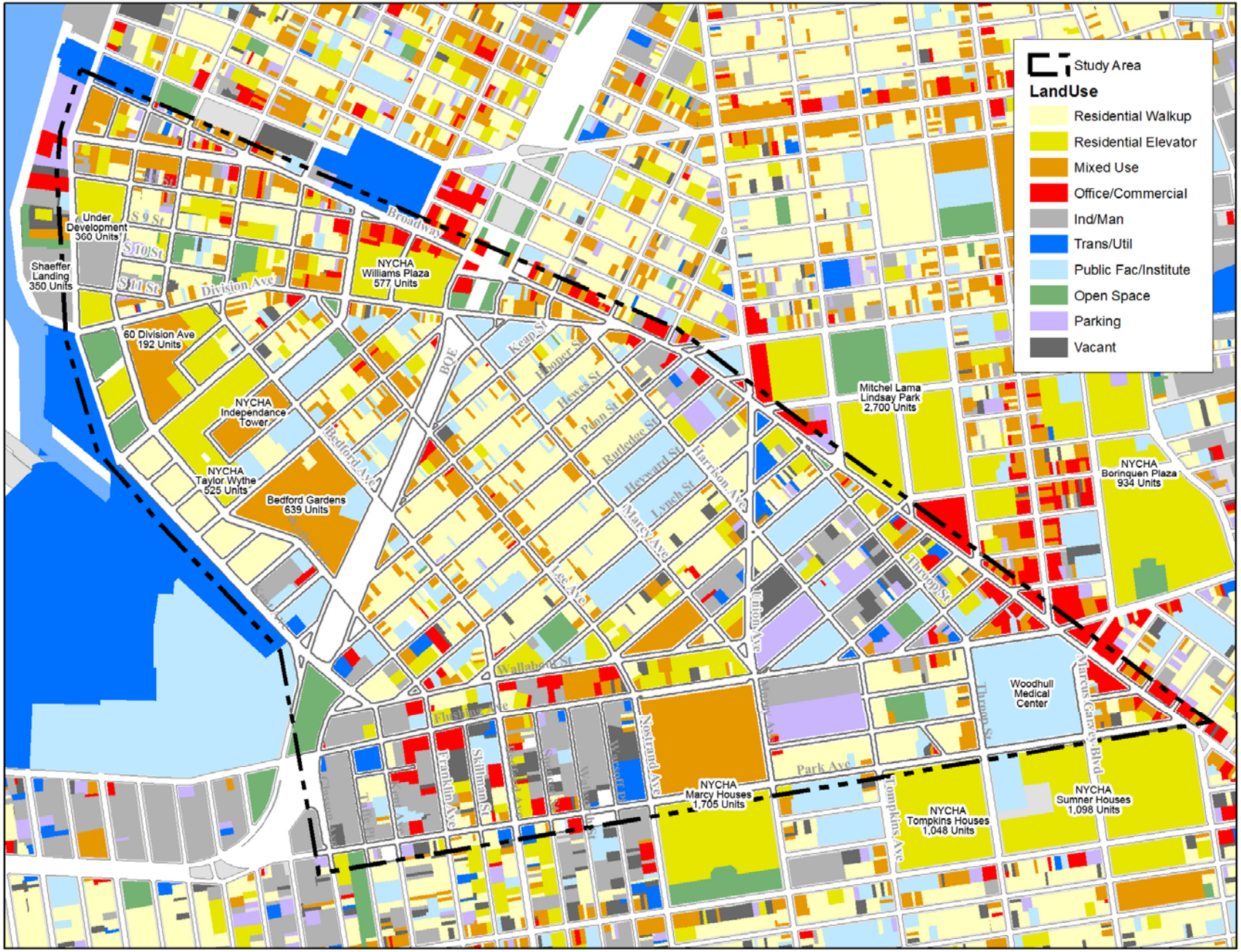
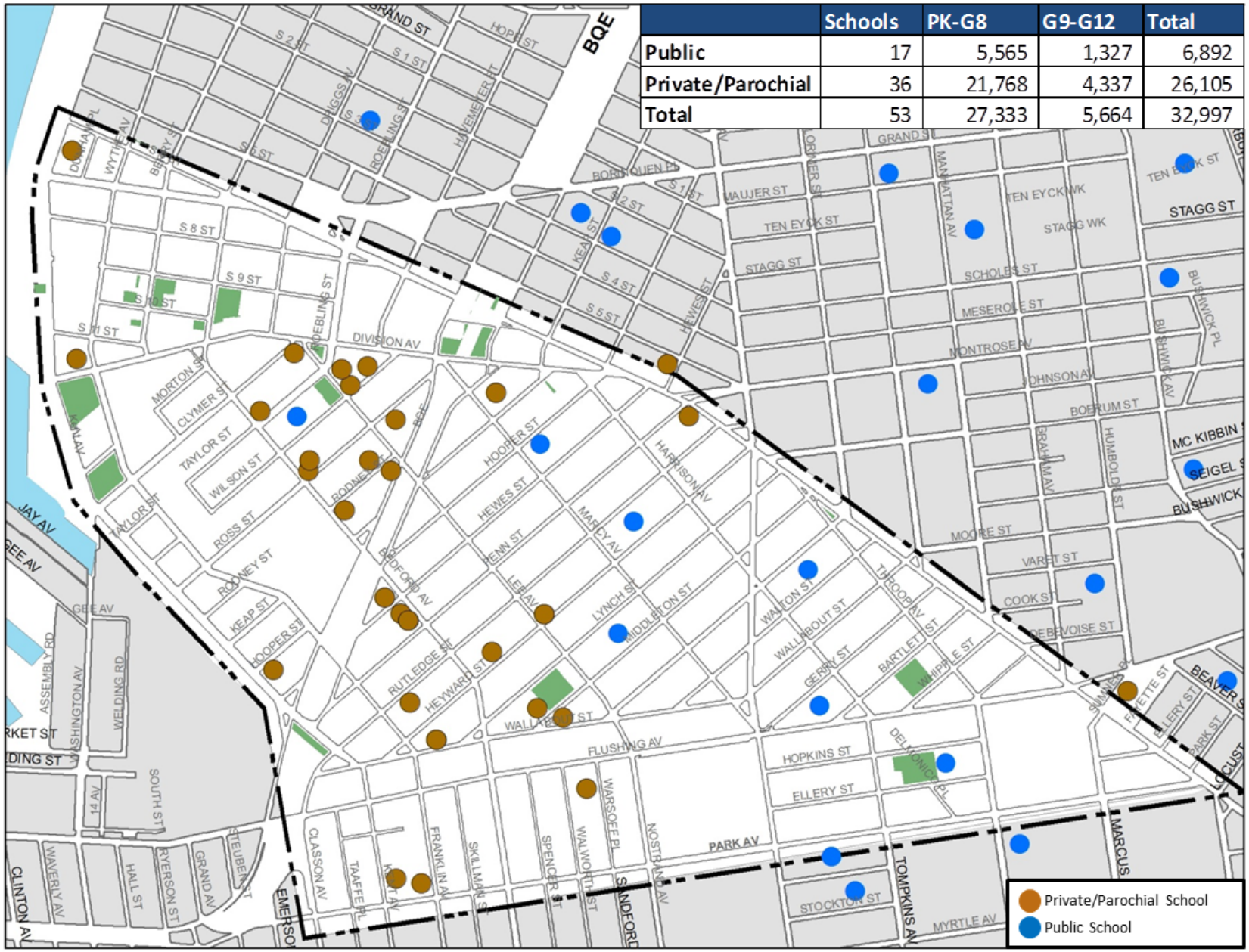


Figure 3-6: Schools

	Schools	PK-G8	G9-G12	Total
Public	17	5,565	1,327	6,892
Private/Parochial	36	21,768	4,337	26,105
Total	53	27,333	5,664	32,997



3.4 Future Planned Developments

There are a number of planned developments that are currently underway or likely to occur in the near future including several large residential developments along the waterfront and extensive commercial development inside the Brooklyn Navy Yard development. The known future developments are listed below and shown in Figure 3-7.

1. **Brooklyn Navy Yard Developments**
    - Steiner Media Campus expansion – Adding an additional 420K sq. ft. of studio space
    - Building 77 - 960K sq. ft. of light industrial and office space to open in 2017
    - Dock 72 - 675K sq. ft. of office space
    - Admirals Row - 150K sq. ft. Ft retail shopping expected to open in 2018
2. **Domino Sugar: 264-350 Kent Avenue** - An approved project to allow 2,822 residential units with 700 affordable units, and 733,584 square feet of commercial space and 1,050 parking spaces.
3. **390 Kent Avenue -** EDC is preparing an RFP to develop a city-owned waterfront site at the end of Broadway just south of the Williamsburg Bridge. The proposal for the site is approximately 400 dwelling units and 40,000 square feet of commercial space. The projected built year is 2020.
4. **Kedem: 420 Kent Avenue -** A 2.89 acre site is under construction to allow two as-of-right residential buildings with ground floor commercial uses, with approximately 856 dwelling units of which 172 would be affordable. There would be 18,922 square feet of retail space, with 428 accessory parking spaces.
5. **Domsey: 44 South 8th Street –** This project involves the development of a large city block between Kent and Wythe Avenues and South 8 and South 11 streets which was rezoned from manufacturing to R7A in 2002. The site is split into two as-of-right residential developments, Xinyuan consisting of 216 market rate dwelling units with 108 parking

spaces. The remaining portion of the site (Block 2135, Lots 1 and 6) between South 9 and South 11 streets is developed by Wythe Gardens LLC with approximately 300 dwelling units with a 50% parking requirement. The Xinyuan portion of the site is near completion, while the Wythe Garden portion has not commenced.

6. **Kolel Damsek: 712 Wythe Avenue -** A filed rezoning application of a block front on Wythe Avenue between Keap and Hooper streets from M1-2 to R7-1. The applicant proposes community facility use consisting of a synagogue and yeshiva with 20 dwelling units in a 7- to 8-story building with underground parking. The project is on hold and may get CPC approval by the end of 2016.

7. **Pfizer Rezoning** (east of Union Avenue between Walton and Gerry Street) - The action proposes to rezone from M3-1 to R8A, R7D and R7A to facilitate the development of eight residential and ground floor commercial buildings with approximately 862 market rate dwelling units and 287 affordable units, and 70,000 square feet of retail space. The accessory parking for 417 cars would be provided underground. CPC approval is expected by the end of 2016.

8. **Rose Castle: 378 Flushing Avenue -** An application to rezone property on two blocks along Flushing Avenue and Franklin Street from M1-2 to an MX$ mixed use district with R7A/C2-4. The applicant is proposing to build 340 dwelling units including 69 affordable units. The required accessory parking would be around 140 parking spaces, provided in an underground parking garage. The project is expected to be certified by the CPC by the middle of summer 2016.

9. **723-733 Myrtle Avenue -** The property is located three blocks south of Flushing Avenue at the intersection of Sanford Avenue. The proposed mixed use development consists of approximately 70 units of housing, with approximately 25 parking spaces.

Figure 3-7: Future Planned Developments

4 TRAFFIC AND TRANSPORTATION

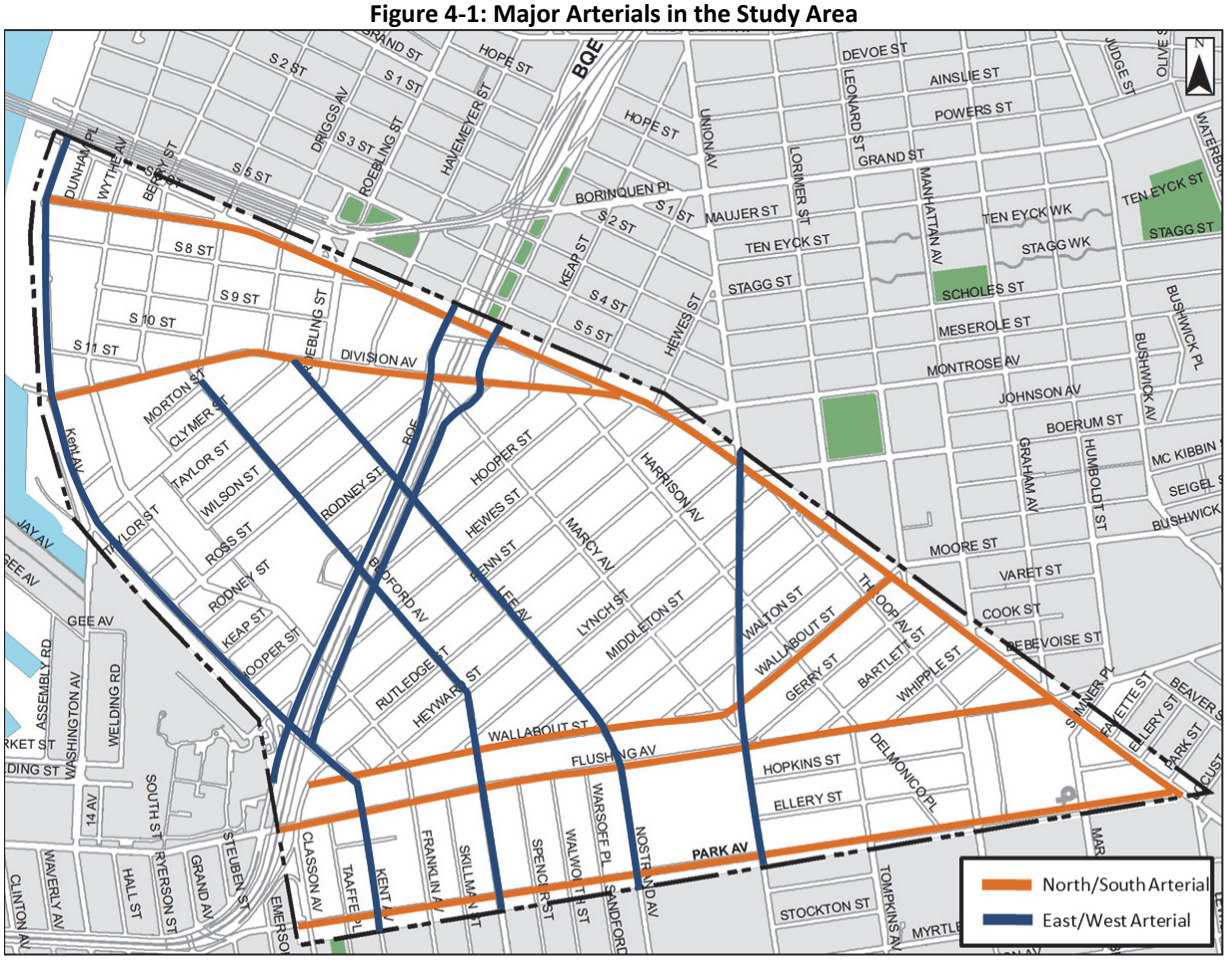
4.1 Introduction

The street network in the study area approximates to a grid-like pattern and is divided into two parts by the Brooklyn-Queens Expressway (BQE). The eastern half is generally located between Broadway and Williamsburg Street East, and the western half is between Kent Avenue and Williamsburg Street West.

Street System and Roadway Characteristics

The major regional facility in the study area is the Brooklyn-Queens Expressway (BQE) which is located in the center of the study area and can be accessed via the entrance/exit at Flushing and Wythe Avenue. Another major connector just north of the study area is the Williamsburg Bridge which runs between Brooklyn and Manhattan. Almost 90 percent of the roadways in the study area operate as one-way streets. This creates significant constraints for internal traffic circulation. The main east/west arterials in the study area are Broadway, Division Avenue, Wallabout Street, Flushing Avenue, and Park Avenue. The main north/south arterials in the study area are Kent Avenue, Bedford Avenue, Williamsburg Street E & W, Lee Avenue, and Union Avenue. Figure 4-1 shows the main arterials in the study area. The characteristics of the main arterials are described below.

Figure 4-1: Major Arterials in the Study Area



Broadway, the northern/eastern boundaries of the study area is a major east/west arterial runs between Kent Avenue and Park Avenue. The section between Havemeyer Street and Park Avenue is underneath the elevated MTA subway track (J, M & Z lines) with stops at Marcy Avenue, Hewes Street, Lorimer Street, and Flushing Avenue. It is also the major connector to the Williamsburg Bridge. It is a 42 feet wide two-way arterial with one effective travel lane and parking on both approaches and is a designated local truck route. The entire arterial is dominated by commercial uses.

Division Avenue, the major east/west arterial runs between Kent Avenue and Broadway/Hooper Street. It has a mix of commercial and residential uses, and a public library located between Marcy Avenue and Rodney Street. A typical cross-section of the arterial is 39 feet wide and operates as a two-way street with one effective travel lane and parking in both

directions.

Wallabout Street, one block north of Flushing Avenue is another major east/west arterial that runs between Classon Avenue and Broadway. It is mainly residential with some commercial uses between Bedford Avenue and Lee Avenue. The directional operation separates the arterial into four segments; from Kent Avenue and Lee Avenue it is a two-way street, from Lee Avenue and Union Avenue it operates one-way eastbound, from Union Avenue to Harrison Avenue it operated as two-way street, and from Harrison Avenue to Broadway it operates one-way westbound. Typical cross-section of the two-way segments is 36 feet wide with one effective travel lane and parking in each direction, while the one-way segments are 33 feet wide with one effective travel lane and parking on both sides of the street.

Flushing Avenue is *a m*ajor east/west arterial that runs between Williamsburg Street West and Broadway. It is also the major connector to the BQE and is a designated local truck route. It consists of residential, commercial and manufacturing uses and is one of the most congested arterials in the study area. Typical cross-section of the arterial is 44 feet wide and is operated as a two-way street with one effective travel lane and parking in both directions.

Park Avenue is located one block south of Flushing Avenue is another congested east/west arterial between Classon Avenue and Broadway. It has a mix of residential and industrial uses and operates as a two-way street with one effective travel lane and parking in both directions. The segment between Classon Avenue and Nostrand Avenue is 39 feet wide, and between Nostrand Avenue and Broadway is 53 feet wide.

Kent Avenue is the western boundary of the study area and is a major north/south arterial that runs between Broadway and Park Avenue. It is also the major connector to the BQE and a designated local truck route. It has a mix of residential and commercial uses. The directional operation separate the arterial into three segments; south of Flushing Avenue operates as one-way southbound, between Flushing Avenue and Clymer Street it is two-way, and north of Clymer Street it is one-way northbound. Typical southbound segment is 30 feet wide with one effective travel lane and parking on both sides of the street. A typical two-way segment is

60 feet wide with one travel lane and parking in both directions on the northbound approach, one effective travel lane, 5 feet buffer area, and two 5 feet bike lanes on the southbound approach. Thus 8 feet wide concrete raise median separate the northbound and southbound traffic. Typical northbound segment is 38 feet wide with one effective travel lane, parking on both sides, a 5 feet buffer area, and two 5 feet bike lanes.

Bedford Avenue is a major north/south arterial that connect southern Brooklyn and the study area. It is a designated local truck route with predominantly residential uses. It operated as one-way northbound in the study area. A typical cross-section of the arterial is 47 feet wide with one bus only lane, two effective travel lanes, a 3 feet buffer area, one bike lane, and parking on both sides of the street.

Williamsburg Street East & West are the major north/south arterial that connect to BQE. They run parallel to the BQE and operate as the service roads; with Williamsburg Street E running northbound and Williamsburg Street W running southbound. They are also designated local truck routes in the study area. A typical cross-section of the arterial is 33 feet wide with one effective travel lane and parking on both sides of the street.

Lee Avenue is a major north/south arterial that connects southern Brooklyn and the study area. It is a designated local truck route that runs one-way southbound between Division Avenue and Flushing Avenue, and becomes Nostrand Avenue south of Flushing Avenue. It has a mix residential and commercial uses. A typical cross-section of the arterial is 34 feet wide with one effective travel lane and parking on both sides of the street.

Union Avenue is another major north/south arterial and connector to the Williamsburg Bridge in the study area. The section between Wallabout Street and Broadway is a designated local truck route and is predominantly residential uses. It operates as a two-way street between Broadway and Wallabout Street, and becomes Marcy Avenue running one-way northbound south of Flushing Avenue. A typical northbound segment is 40 feet wide with two effective travel lanes and parking on both sides. A typical two-way segment is 49 feet wide with one

travel lane and parking on both sides.

4.2 Traffic Data Collection

Existing traffic conditions were defined through field surveys conducted in 2014. Traffic volume counts include vehicle classification and turning movement for one midweek day (Tuesday, Wednesday, or Thursday) during the AM and PM peak hours. Automatic Traffic Recorder (ATR), vehicle classification and turning movement counts, pedestrian crosswalks counts, and major corridor's speed and delay runs were conducted for the various peak hours. Figure 4-2 shows the traffic count locations in the study area.

Automatic Traffic Recorder (ATR) machines were placed at the following 9 locations for the duration of seven days:

1. Bedford Avenue between Heyward Street and Lynch Street (NB)
2. Wallabout Street between Franklin Avenue/Wythe Avenue and Lynch Street (EB/WB)
3. Roebling Street between S 9th Street and Division Avenue (NB/SB)
4. Lee Avenue between Wilson Street and Ross Street (SB)
5. Division Avenue between Roebling Street and Lee Avenue (EB/WB)
6. Division Avenue between Keap Street and Rodney Street (EB/WB)
7. Williamsburg Street W between 278 W Exit Ramp and Wythe Street (SB)
8. Park Avenue between Thompson Avenue and Delmonico Place (EB/WB)
9. Park Avenue between Emerson Avenue and Classon Avenue (EB/WB)

Vehicle classification and turning movement counts were conducted for the AM and PM peak periods at the following 35 intersections:

1. Division Avenue and Clymer Street
2. Division Avenue and Lee Avenue
3. Division Avenue and Roebling Street
4. Bedford Avenue and Taylor Street

5. Lee Avenue and Taylor Street
6. Lee Avenue and Wilson Street
7. Division Avenue and Hooper Street
8. Harrison Avenue and Hooper Street
9. Division Avenue and Marcy Avenue
10. Division Avenue and Keap Street
11. Wythe Street and Williamsburg Street W
12. Wythe Street and Williamsburg Street E
13. Flushing Avenue and Classon Street
14. Flushing Avenue and Williamsburg Street W
15. Flushing Avenue and Kent Avenue
16. Flushing Avenue and Franklin Avenue
17. Flushing Avenue and Bedford Avenue
18. Wallabout Street and Lee Avenue
19. Wallabout Street and Bedford Avenue
20. Wallabout Street and Lynch Street
21. Bedford Avenue and Lynch Street
22. Park Avenue and Classon Avenue
23. Park Avenue and Taaffe Place
24. Park Avenue and Kent Avenue
25. Park Avenue and Bedford Avenue
26. Park Avenue and Union Avenue
27. Park Avenue and Tompkins Avenue
28. Park Avenue and Marcus Garvey Boulevard

29. Kent Avenue and Williamsburg Street W
30. Kent Avenue and Williamsburg Street E
31. Kent Avenue and Classon Avenue/Rutledge Street
32. Kent Avenue and Wallabout Street
33. Wallabout Street and Bedford Avenue
34. Wallabout Street and Lee Avenue/Lorimer Street
35. Wallabout Street and Marcy Avenue

Pedestrian crosswalks counts were conducted at the following locations for one weekday (Tuesday, Wednesday, or Thursday) during the 7-9 AM and 4-6 PM peak periods in 15-minutes intervals:

1. Division Avenue and Clymer Street
2. Division Avenue and Lee Avenue
3. Division Avenue and Roebling Street
4. Bedford Avenue and Taylor Street
5. Lee Avenue and Taylor Street
6. Lee Avenue and Wilson Street
7. Hooper Street and Division Avenue
8. Franklin Avenue and Flushing Avenue
9. Wallabout Street and Lee Avenue
10. Park Avenue and Bedford Avenue
11. Park Avenue and Kent Avenue
12. Park Avenue and Taaffe Place
13. Park Avenue and Tompkins Avenue
14. Park Avenue and Throop Avenue

15. Park Avenue and Marcus Garvey Boulevard

16. Kent Avenue and Williamsburg Street E

17. Kent Avenue and Classon Avenue/Rutledge Street

Figure 4-2: Traffic Count Locations

4.3 Network Traffic Volumes

Balanced traffic networks for the AM (7:30 – 8:30), and PM (4:30 – 5:30) peak hours were prepared using the ATRs and manual turning movement counts collected. Figure 4-3 and 4-4 show the 2014 existing conditions AM and PM peak hour traffic volumes. In addition to the 35 manual turning movement counts locations, eight locations with data from previous projects and studies along Flushing Avenue, Parking Avenue, and Broadway are also shown in the traffic volumes maps. The traffic data collected show that Williamsburg Street E between Kent Avenue and BQE entrance carries the highest volumes, ranged from 1,000 to 1,100 vehicles during AM and PM peak hours. All other locations/intersections carried moderate traffic ranging from 10 to 650 vehicles in each direction during AM and PM peak hours. Even though the traffic volumes were not significantly high in most of the locations studied, the percentage of trucks, school buses, and the physical constraints on the roadway system cause heavy delay and long queues on major commercial corridors such as Flushing Avenue and Park Avenue.

Figure 4-3: Existing Traffic Volumes –AM Peak

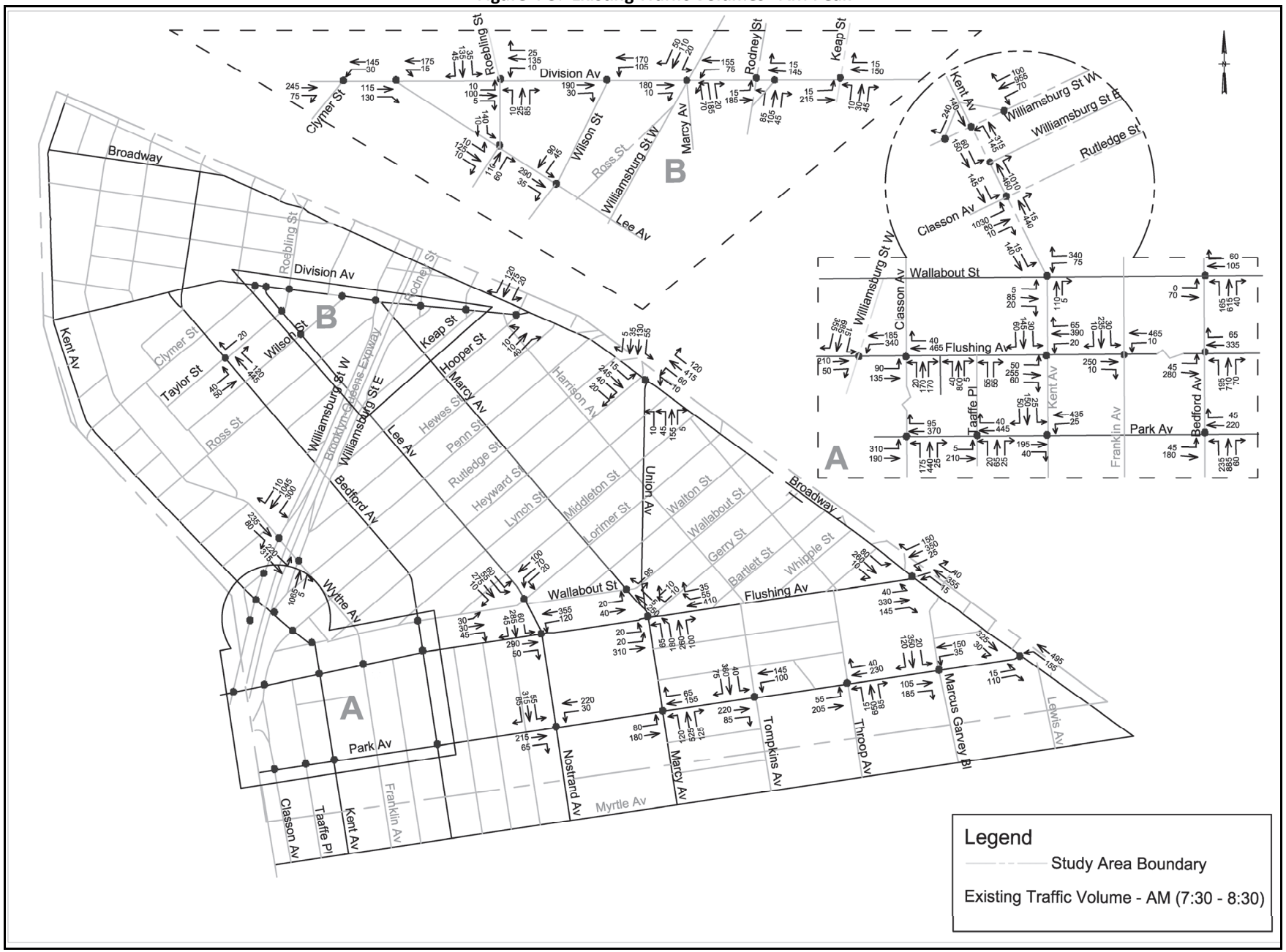
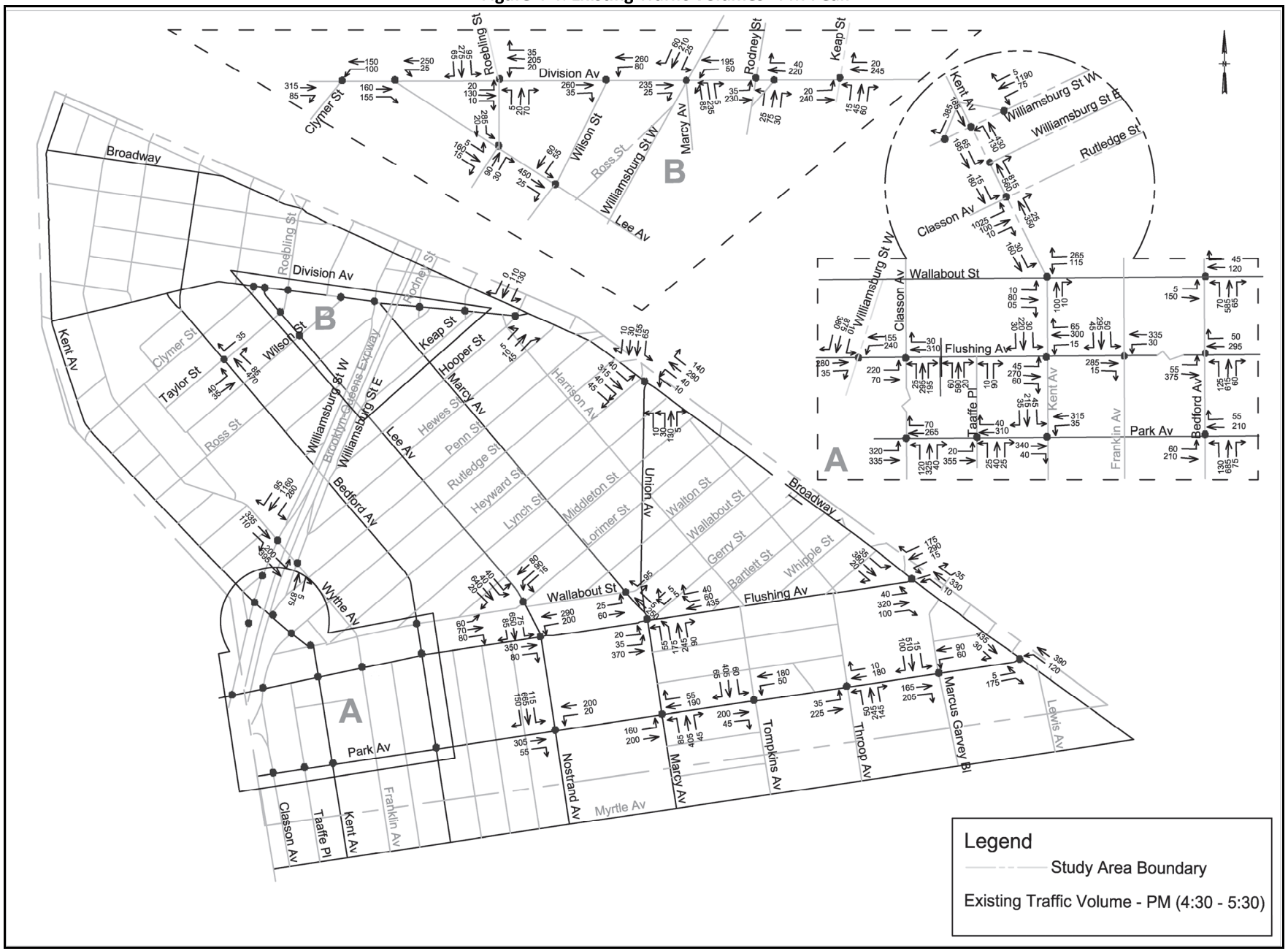


Figure 4-4: Existing Traffic Volumes –PM Peak



4.4 Street Capacity and Level of Service (LOS)

The capacity of the roadways is the maximum rate of flow which may pass through a section of roadway under prevailing traffic, roadway and signalization conditions. It is determined by several factors including turning movements, signal timing, geometric design of the intersection, pedestrian movements, type of vehicle, illegal and/or double parking, grade, roadway conditions, and weather. In determining street capacity within the study area, the 2000 Highway Capacity Manual (HCM) methodology was used. The methodology requires the use of official signal timings, street geometry, and other relevant information for performing capacity and LOS analysis. The study area contains 32 signalized intersections. Field inventories were conducted to gather the prevailing conditions of the intersection.

The traffic flow characteristics are measured in terms of the volume-to-capacity (v/c) ratios and delays. The quality of the flow is expressed in terms of LOS, which is based on an average delay experienced by a vehicle. When the v/c ratio exceeds 1.0, a facility or intersection operates at or over capacity. In this situation, severe congestion occurs in traffic with stop-and-start conditions with extensive vehicle queuing and delays. Volume-to-capacity ratios of less than 0.85 are considered to be reflective of acceptable traffic conditions, with average delays of 45 seconds or less. Table 4-1 shows the level of service criteria as specified in the 2000 HCM Methodology. The intersections studied were analyzed for roadway capacity, volume-to-capacity (v/c) ratios, vehicular delay, and level of service (LOS) for the weekday AM and PM peak hours.

Table 4-1: Signalized Intersection Level of Service (LOS) Criteria

Level of Service	Control Delay per Vehicle	Description of Traffic Condition
A	≤ 10.0	LOS A describes operations with low control delay, up to 10 sec/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all.
B	> 10 to 20	LOS B describes operations with control delay greater than 10 and up to 20 sec/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	> 20 to 35	LOS C describes operations with control delay greater than 20 and up to 35 sec/veh. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	>35 to 55	LOS D describes operations with control delay greater than 35 and up to 55 sec/veh. The influence of congestion becomes more noticeable at this level. Longer delays may result from a combination of unfavorable progression, long cycle lengths, and/or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	>55 to 80	LOS E describes operations with control delay greater than 55 and up to 80 sec/veh. These higher delay values generally indicate poor progression, long cycle length, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	LOS F describes operations with delay in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.
Sources:	Highway Capacity Manual, Transportation Research Board;	
Note: Control delay is measured in terms of seconds per vehicle (sec/veh).		

The results of the HCS analysis for the 2014 Existing Conditions including v/c ratios, delays, and level of service (LOS) are shown on Table 4-2. The analysis showed that most of the analyzed intersections operated at an acceptable level-of-service with LOS B or better during the AM and PM peak periods. However, most of the intersections analyzed along busy commercial corridors such as Flushing Avenue and Parking Avenue experienced LOS D, E and F at particular movement or all lane groups during the peak hours.

The overall intersection LOS is shown in Figure 4-5 and 4-6. Intersections with approaches or lane groups with LOS E or worse are listed below and illustrated in Figure 4-7 and 4-8.

1. Division Avenue & Marcy Avenue (PM)
2. Wallabout Street & Lorimer Street/Lee Avenue (PM)
3. Flushing Avenue & Classon Avenue/BQE Exit (AM & PM)
4. Flushing Avenue & Williamsburg Street W (AM & PM)
5. Flushing Avenue & Kent Avenue (AM & PM)
6. Flushing Avenue & Franklin Avenue (AM)
7. Flushing Avenue & Bedford Avenue (AM & PM)
8. Flushing Avenue & Lee Avenue/Nostrand Avenue (AM & PM)
9. Park Avenue & Classon Avenue (AM)
10. Park Avenue & Bedford Avenue (AM & PM)
11. Park Avenue & Tompkins Avenue (AM)

Table 4-2 Traffic Capacity Analysis for Signalized Intersections - 2014 Existing Conditions

Intersection	EXISTING : Weekday AM							EXISTING : Weekday PM					
	Approach	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Lee Av & Roebling/ Taylor St													
	NB	T	110	TR	0.31	34.4	C	T	90	TR	0.23	33.2	C
		R	60					R	30				
	SB	L	140	LT	0.26	33.4	C	L	285	LT	0.51	37.6	D
		T	10					T	20				
	EB	L	10	LTR	0.53	41.1	D	L	5	LTR	0.58	42.6	D
		T	125					T	160				
		R	10					R	15				
	Overall					36.3	D					38.2	D
Lee Av & Wilson St													
	SB	L	45	LT	0.34	30.1	C	L	55	LT	0.33	30.0	C
		T	90					T	60				
	EB	T	290	TR	0.52	19.4	B	T	450	TR	0.71	25.2	C
		R	35					R	25				
	Overall					22.6	C					26.3	C
Bedford Av & Taylor St													
	NB	T	445	TR	0.38	10.1	B	L	470	TR	0.38	10.0	A
		R	120					T	85				
	EB	L	40	LT	0.42	41.7	D	L	40	LT	0.35	39.8	D
		T	50					T	35				
	WB	R	20	R	0.11	35.1	D	L	35	R	0.28	38.3	D
	Overall					15.7	B					16.4	B
Division Av & Roebling/ Taylor													
	NB	L	10	LTR	0.16	12.7	B	L	5	LTR	0.13	12.5	B
		T	25					T	20				
		R	85					R	70				
	SB	L	35	LTR	0.24	13.6	B	L	95	LTR	0.44	16.3	B
		T	135					T	275				
		R	45					R	65				
	EB	L	10	LTR	0.38	32.1	C	L	20	LTR	0.55	37.0	D
		T	100					T	130				
		R	5					R	10				
	WB	L	10	LTR	0.58	38.0	D	L	20	LTR	0.76	46.8	D
		T	135					T	205				
		R	25					R	35				
	Overall					23.8	C					27.8	C
Division Av & Marcy Av													
	NB	L - Williamsburg St	70	L	0.41	31.8	C	L - Williamsburg St	85	L	0.57	34.9	C
		L - Division Av	185	LR	0.07	27.5	C	L - Division Av	235	LR	0.05	27.2	C
		R	20					R	5				
	SB	L	20	LTR	0.68	42.2	D	L	25	LTR	1.00	82.5	F
		T	110					T	210				
		R	50					R	60				
	EB	T	180	TR	0.69	42.2	D	T	235	TR	0.95	70.4	E
		R	10					R	25				
	WB	L	75	L	0.63	49.5	D	L	50	L	0.52	47.9	D
		T	155	T	0.49	34.2	C	T	195	T	0.72	43.6	D
	Overall					38.4	D					57.5	E
Division Av & Keap St													
	NB	L	10	LT	0.09	14.8	B	L	15	LT	0.19	15.7	B
		T	30	R	0.20	16.3	B	T	45	R	0.20	16.1	B
		R	45					R	60				
	EB	L	15	LT	0.47	12.1	B	L	20	LT	0.53	13.1	B
		T	215					T	240				
	WB	T	150	TR	0.32	9.8	A	T	245	TR	0.54	13.2	B
		R	15					R	20				
	Overall					12.0	B					13.7	B
Williamsburg St W & Wythe St													
	SB	L	300	LTR	0.68	17.4	B	L	260	LTR	0.71	17.9	B
		T	1045					T	1160				
		R	110					R	95				
	EB	T	235	TR	0.44	34.8	C	T	335	TR	0.61	38.6	D
		R	80					R	110				
	Overall					20.7	C					22.9	C
Williamsburg St E & Wythe St													
	NB	T	1065	TR	0.73	29.2	C	T	875	TR	0.57	25.1	C
		R	5					R	5				
	EB	L	220	L	0.45	24.6	C	L	200	L	0.33	22.2	C
		T	315	T	0.51	25.7	C	T	395	T	0.63	29.2	C
	Overall					27.9	C					25.8	C
Wallabout St & Bedford Av													
	NB	L	165	L	0.32	22.0	C	L	70	L	0.15	19.4	B
		T	615	TR	0.70	29.6	C	T	585	TR	0.63	27.5	C
		R	40					R	65				
	EB	L	0	LT	0.18	19.9	B	L	5	LT	0.38	23.3	C
		T	70					T	150				
	WB	T	105	TR	0.56	29.0	C	T	120	TR	0.43	24.9	C
		R	60					R	45				
	Overall					27.7	C					25.7	C
Wallabout St & Lorimer St/ Lee Av													
	SB	L	115	L	0.28	15.2	B	L	80	L	0.23	14.8	B
		T	275	TR	0.50	18.8	B	T	640	TR	1.04	69.9	E
		R	10					R	20				
	EB	T - to Lorimer St	30	TR	0.44	33.9	C	T - to Lorimer St	60	TR	0.83	56.7	E
		T - to Wallabout St	30					T - to Wallabout St	70				
		R	45					R	80				
	WB	L	90	LT	0.76	52.6	D	L	105	LT	1.03	111.6	F
		T	100					T	80				
	Overall					28.9	C					69.9	E
Wallabout St & Marcy Av													
	NB	T	250	TR	0.25	17.6	B	T	250	TR	0.25	17.6	B
		R	5					R	5				
	EB	L	20	LT	0.19	17.4	B	L	25	LT	0.18	17.1	B
		T	40					T	60				
	WB	R	95	R	0.29	19.3	B	R	95	R	0.24	18.3	B
	Overall					18.0	B					17.7	B

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2014 Existing Conditions (Cont'd)

Intersection	EXISTING : Weekday AM							EXISTING : Weekday PM					
	Approach	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Flushing Av & Classon St/ BQE Exit													
	NB	L	20	LTR	0.63	44.7	D	L	25	LTR	0.74	44.8	D
		T	170					T	295				
		R	170					R	195				
	EB	L	90	L	0.75	68.3	E	L	220	L	1.05	118.1	F
		T	135	T	0.42	33.8	C	T	70	T	0.18	29.3	C
	WB	T	465	TR	0.87	58.6	E	T	310	TR	0.58	43.8	D
		R	40					R	30				
	Overall					51.2	D					57.3	E
Flushing Av & Classon St													
	NB	L	40	LTR	1.05	87.6	F	L	60	LTR	1.03	86.8	F
		T	800					T	590				
		R	5					R	20				
	EB	L	90	L	0.75	68.3	E	L	220	L	1.05	118.1	F
		T	135	T	0.42	33.8	C	T	70	T	0.18	29.3	C
	WB	T	465	TR	0.87	58.6	E	T	310	TR	0.58	43.8	D
		R	40					R	30				
	Overall					71.6	E					77.2	E
Flushing Av & Williamsburg St W													
	SB	L	15	LTR	1.05	73.1	E	L	10	LTR	1.04	65.5	E
		T	685					T	875				
		R	355					R	380				
	EB	T	210	TR	0.81	55.8	E	T	280	TR	1.02	96.5	F
		R	50					R	35				
	WB	L	340	L	1.05	104.6	F	L	240	L	1.02	105.5	F
		T	185	T	0.30	21.6	C	T	155	T	0.29	24.4	C
	Overall					71.1	E					72.3	E
Flushing Av & Kent Av													
	SB	L	30	LTR	0.84	54.6	D	L	30	LTR	0.91	64.4	E
		T	145					T	220				
		R	60					R	30				
	EB	L	50	LTR	0.89	71.9	E	L	45	LTR	0.72	46.9	D
		T	255					T	270				
		R	60					R	60				
	WB	L	20	LTR	0.92	71.8	E	L	15	LTR	0.70	41.9	D
		T	390					T	300				
		R	65					R	65				
	Overall					67.7	E					50.2	D
Flushing Av & Franklin Av													
	SB	L	30	L	0.10	26.1	C	L	50	L	0.11	18.9	B
		T	235	TR	0.61	37.2	D	T	295	TR	0.63	29.2	C
		R	10					R	45				
	EB	T	250	TR	0.59	42.9	D	T	285	TR	0.66	42.1	D
		R	10					R	15				
	WB	L	10	LT	0.82	58.4	E	L	30	LT	0.83	54.9	D
		T	465					T	335				
	Overall					48.0	D					41.0	D
Flushing Av & Bedford Av													
	NB	L	195	LT	1.05	84.0	F	L	125	LT	0.74	31.0	C
		T	710	R	0.25	29.0	C	T	615	R	0.20	20.4	C
		R	70					R	60				
	EB	L	45	LT	0.71	26.7	C	L	55	LT	1.05	90.0	F
		T	280					T	375				
	WB	T	335	TR	0.73	26.3	C	T	295	TR	0.69	32.5	C
		R	65					R	50				
	Overall					55.0	D					46.5	D
Flushing Av & Lee Av/ Nostrand Av													
	SB	L	60	LTR	0.53	25.1	C	L	75	LTR	0.83	35.6	D
		T	285					T	650				
		R	45					R	85				
	EB	T	290	TR	0.77	36.6	D	T	350	TR	0.86	44.7	D
		R	50					R	80				
	WB	L	120	LT	1.29	180.6	F	L	200	LT	1.34	202.2	F
		T	355					T	290				
	Overall					81.2	F					80.8	F
Flushing Av & Marcy Av/ Union Av													
	NB	L	245	LT	0.71	41.7	D	L	230	LT	0.62	38.4	D
		T	260	R	0.44	37.8	D	T	245	R	0.34	34.7	C
		R	100					R	90				
	EB	L	40	LT	0.56	17.4	B	L	55	LT	0.64	19.8	B
		T	310					T	370				
	WB	T	410	T	0.58	17.9	B	T	435	T	0.59	17.8	B
		R	90	R	0.16	11.2	B	R	100	R	0.20	11.6	B
	Overall					26.8	C					24.9	C
Park Av & Classon Av													
	NB	L	175	LTR	0.78	41.0	D	L	120	LTR	0.57	33.7	C
		T	440					T	325				
		R	25					R	40				
	EB	L	310	L	0.97	82.1	F	L	320	L	0.87	54.8	D
		T	190	T	0.26	14.5	B	T	335	T	0.47	17.6	B
	WB	T	370	TR	1.05	87.9	F	T	265	TR	0.68	36.8	D
		R	95					R	70				
	Overall					59.6	E					34.8	C
Park Av & Taaffe Pl													
	NB	L	20	LTR	0.45	25.5	C	L	25	LTR	0.39	32.0	C
		T	65					T	40				
		R	25					R	25				
	EB	L	5	LT	0.42	24.1	C	L	20	LT	0.58	20.5	C
		T	210					T	355				
	WB	T	445	TR	0.93	53.6	D	T	310	TR	0.53	19.4	B
		R	40					R	40				
	Overall					41.2	D					21.8	C

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2014 Existing Conditions (Cont'd)

Intersection	EXISTING : Weekday AM							EXISTING : Weekday PM					
	Approach	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Park Av & Kent Av													
	SB	L	25	LTR	0.60	29.3	C	L	45	LTR	0.57	28.2	C
		T	150					T	215				
		R	50					R	35				
	EB	T	195	TR	0.49	25.9	C	T	340	TR	0.69	31.8	C
		R	40					R	40				
	WB	L	25	LT	0.89	48.0	D	L	35	LT	0.73	34.2	C
		T	435					T	315				
	Overall					37.5	D					31.7	C
Park Av & Bedford Av													
	NB	L	235	LTR	0.80	24.6	C	L	130	LTR	0.47	16.6	B
		T	885					T	685				
		R	60					R	75				
	EB	L	45	LT	0.95	80.3	F	L	60	LT	1.04	101.8	F
		T	180					T	210				
	WB	T	220	TR	0.80	48.0	D	T	210	TR	0.65	39.4	D
		R	45					R	55				
	Overall					35.2	D					38.2	D
Park Av & Nostrand Av													
	SB	L	55	LTR	0.51	24.8	C	L	115	LTR	0.97	53.5	D
		T	315					T	665				
		R	85					R	150				
	EB	T	215	T	0.38	23.0	C	T	305	T	0.53	26.5	C
		R	65	R	0.14	19.4	B	R	55	R	0.12	19.1	B
	WB	L	30	L	0.09	18.9	B	L	20	L	0.07	18.7	B
		T	220	T	0.41	23.7	C	T	200	T	0.38	23.2	C
	Overall				0.46	23.6	C				0.75	42.3	D
Park Av & Marcy Av													
	NB	L	120	LTR	0.84	30.1	C	L	85	LTR	0.56	20.4	C
		T	525					T	405				
		R	125					R	45				
	EB	L	80	DefL				L	160	DefL	0.65	30.1	C
		T	180	LT	0.34	17.4	B	T	200	LT			
				T						T	0.40	19.1	B
	WB	T	155	TR	0.51	21.4	C	T	190	TR	0.52	21.7	C
		R	65					R	55				
	Overall					26.0	C					21.8	C
Park Av & Tompkins Av													
	SB	L	40	L	0.06	9.8	A	L	60	L	0.10	10.1	B
		T	360	TR	0.76	23.9	C	T	405	TR	0.74	22.4	C
		R	75					R	65				
	EB	T	220	TR	0.98	68.1	E	T	200	TR	0.63	31.1	C
		R	85					R	45				
	WB	L	100	DefL	1.03	114.4	F	L	50	DefL			
		T	145	LT				T	180	LT	0.35	23.2	C
				T	0.44	26.2	C			T			
	Overall					47.8	D					23.8	C
Park Av & Throop Av													
	NB	L	15	LT	0.51	19.2	B	L	50	LT	0.23	15.9	B
		T	650	R	0.18	15.8	B	T	245	R	0.28	17.1	B
		R	85					R	145				
	EB	L	55	L	0.17	16.1	B	L	35	L	0.10	15.1	B
		T	205	T	0.40	18.9	B	T	225	T	0.44	19.7	B
	WB	T	230	TR	0.27	16.4	B	T	180	TR	0.18	15.4	B
		R	40					R	10				
	Overall					18.2	B					16.9	B
Park Av & Marcus Garvey Blvd													
	SB	L	20	LTR	0.37	17.3	B	L	15	LTR	0.39	17.5	B
		T	350					T	510				
		R	120					R	100				
	EB	T	105	TR	0.36	17.5	B	T	165	TR	0.38	17.8	B
		R	185					R	205				
	WB	L	35	LT	0.24	16.2	B	L	60	LT	0.21	15.9	B
		T	150					T	90				
	Overall					17.2	B					17.4	B
Kent Av & Williamsburg St W													
	SB	L	70	LT	0.55	21.2	C	L	75	LT	0.64	23.1	C
		T	955					T	1190				
	EB	T	140	T	0.16	22.8	C	T	185	T	0.20	23.3	C
	WB	L	145	LT	0.60	30.8	C	L	130	LT	0.78	37.6	D
		T	315					T	430				
	Overall					24.1	C					27.6	C
Kent Av & Classon Av													
	NB	L	1030	L	0.93	44.1	D	L	1025	L	0.91	40.9	D
		T	60	LTR	0.10	18.7	B	T	100	LTR	0.18	19.8	B
		R	10					R	10				
	EB	L	5	L	0.02	18.0	B	L	15	L	0.10	19.1	B
		T	145	T	0.14	19.1	B	T	180	T	0.18	19.6	B
	WB	T	440	TR	0.34	21.5	C	T	350	TR	0.32	21.2	C
		R	15					R	25				
	Overall					34.8	C					32.2	C
Kent Av & Wallabout St													
	NB	L	5	LTR	0.15	13.1	B	L	10	LTR	0.15	13.1	B
		T	85					T	80				
		R	20					R	5				
	SB	L	75	LR	0.61	21.3	C	L	115	LR	0.57	20.4	C
		R	340					R	265				
	EB	L	15	LT	0.23	27.5	C	L	30	LT	0.26	27.9	C
		T	140					T	160				
	WB	T	110	TR	0.22	27.7	C	T	100	TR	0.24	27.9	C
		R	5					R	10				
	Overall					22.5	C					22.4	C

Figure 4-5: Existing Intersection LOS –AM Peak

Figure 4-6: Existing Intersection LOS –PM Peak

Figure 4-7: Existing Intersection Lane Group with LOS E or F –AM Peak

Figure 4-8: Existing Intersection Lane Group with LOS E or F –PM Peak

4.5 Vehicular Speeds

Congestion occurs along several high commercial concentration corridors during the peak hours. The conditions are attributed to several factors including buses, school buses, cars, trucks, and pedestrian conflicts, as well as illegal curbside and double parking and standing which reduce roadway capacity and travel speeds.

To measure peak hour travel time and vehicular speeds in the study area and to identify locations where traffic delay exists, speed and travel time runs were conducted along selected corridors. The "floating car" method (a technique whereby a field vehicle travels at speeds under prevailing traffic conditions) was used to measure travel time and speed. Travel time and speed runs were conducted along the following corridors:

East-West

1. Broadway between Driggs Avenue and Park Avenue (EB & WB)
2. Division Avenue between Kent Avenue and Broadway (EB & WB)
3. Wallabout Street between Kent Avenue and Union Avenue (EB & WB)
4. Flushing Avenue between Classon Avenue and Broadway (EB & WB)
5. Park Avenue between Classon Avenue and Broadway (EB & WB)

North-South

6. Kent Avenue between Broadway and Park Avenue (NB & SB)
7. Bedford Avenue between Division Avenue and Park Avenue (NB)
8. Lee Avenue between Division Avenue and Park Avenue (SB)
9. Marcy Avenue between Division Avenue and Park Avenue (NB)
10. Union Avenue/Marcy Avenue between Broadway and Flushing Avenue (NB & SB)

The travel time runs were conducted for each peak period for one weekday concurrently with traffic volume data collection. Three travel runs were conducted for each corridor during each peak period. Figure 4-9 and 4-10 show the corridors where travel time runs were conducted with the average travel speed by direction for the AM and PM peak hours. Table 4-3 and 4-4 summarize the average travel speeds for each corridor by direction and peak hours.

Average travel speed throughout the study area ranged from 3 mph to 12 mph, and from 4 mph to 13 mph during the AM and PM peak hour respectively. It is noticed that travel speed along major corridors in the study area such as Flushing Avenue, Park Avenue, Division Avenue, Lee Avenue, Marcy Avenue, and Williamsburg Street W are impacted significantly during the AM and PM peak periods.

1. Flushing Avenue EB between Classon Avenue and Broadway (range from 4 – 8 mph)
2. Flushing Avenue WB between Classon Avenue and Broadway (range from 3 – 5 mph)
3. Park Avenue EB between Classon Avenue and Broadway (range from 6 – 9 mph)
4. Park Avenue WB between Classon Avenue and Broadway (range from 6 – 8 mph)
5. Division Avenue EB between Kent Avenue and Broadway (range from 7 – 9 mph)
6. Division Avenue WB between Kent Avenue and Broadway (range from 6 – 7 mph)
7. Lee Avenue SB between Division Avenue and Park Avenue (range from 6 – 9 mph)
8. Marcy Avenue NB between Park Avenue and Division Avenue (range from 7 – 8 mph)
9. Williamsburg Street W SB between Division Avenue and Kent Avenue (range from 5 – 12 mph)

Figure 4-9: Existing Corridor Travel Speed (mph) –AM peak

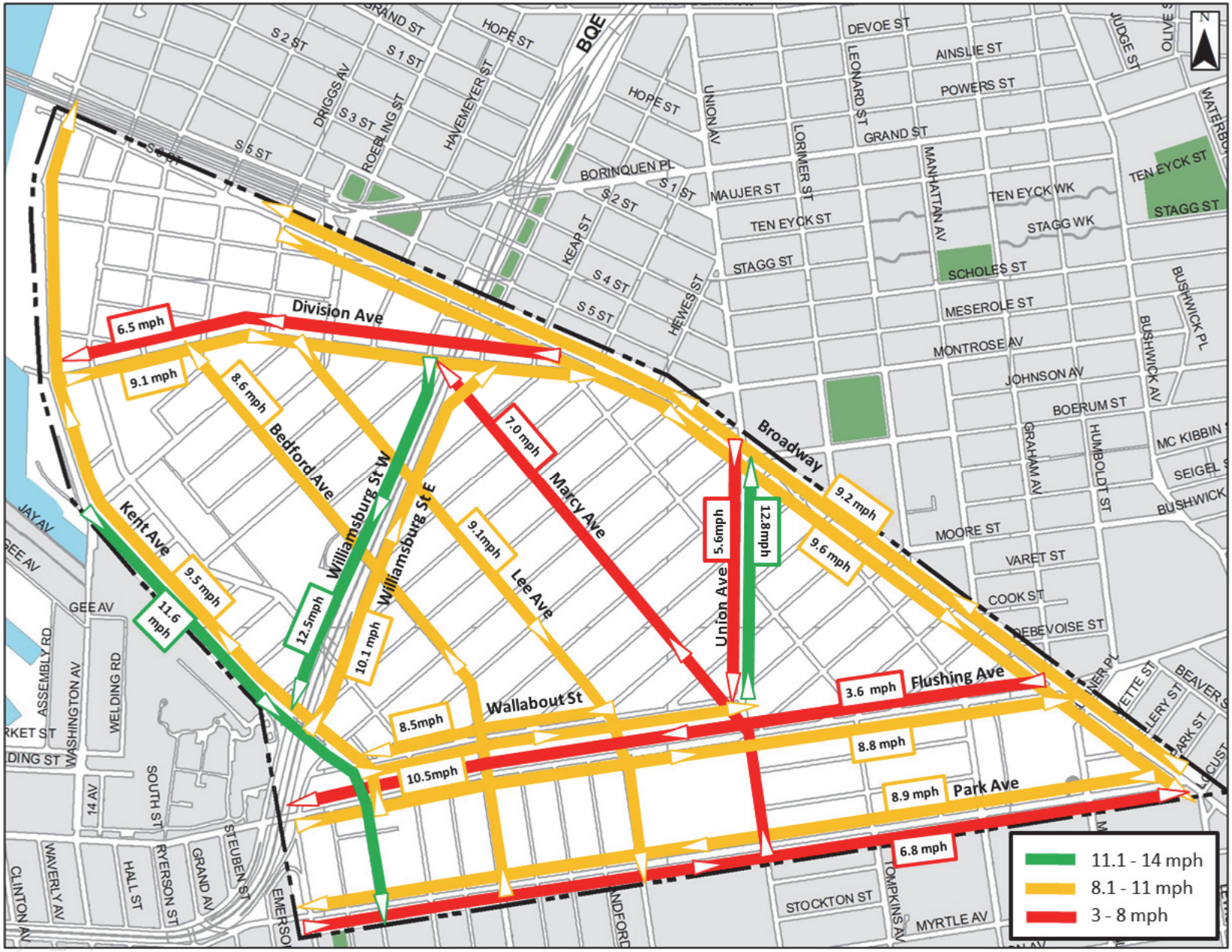


Figure 4-10: Existing Corridor Travel Speed (mph) –PM peak

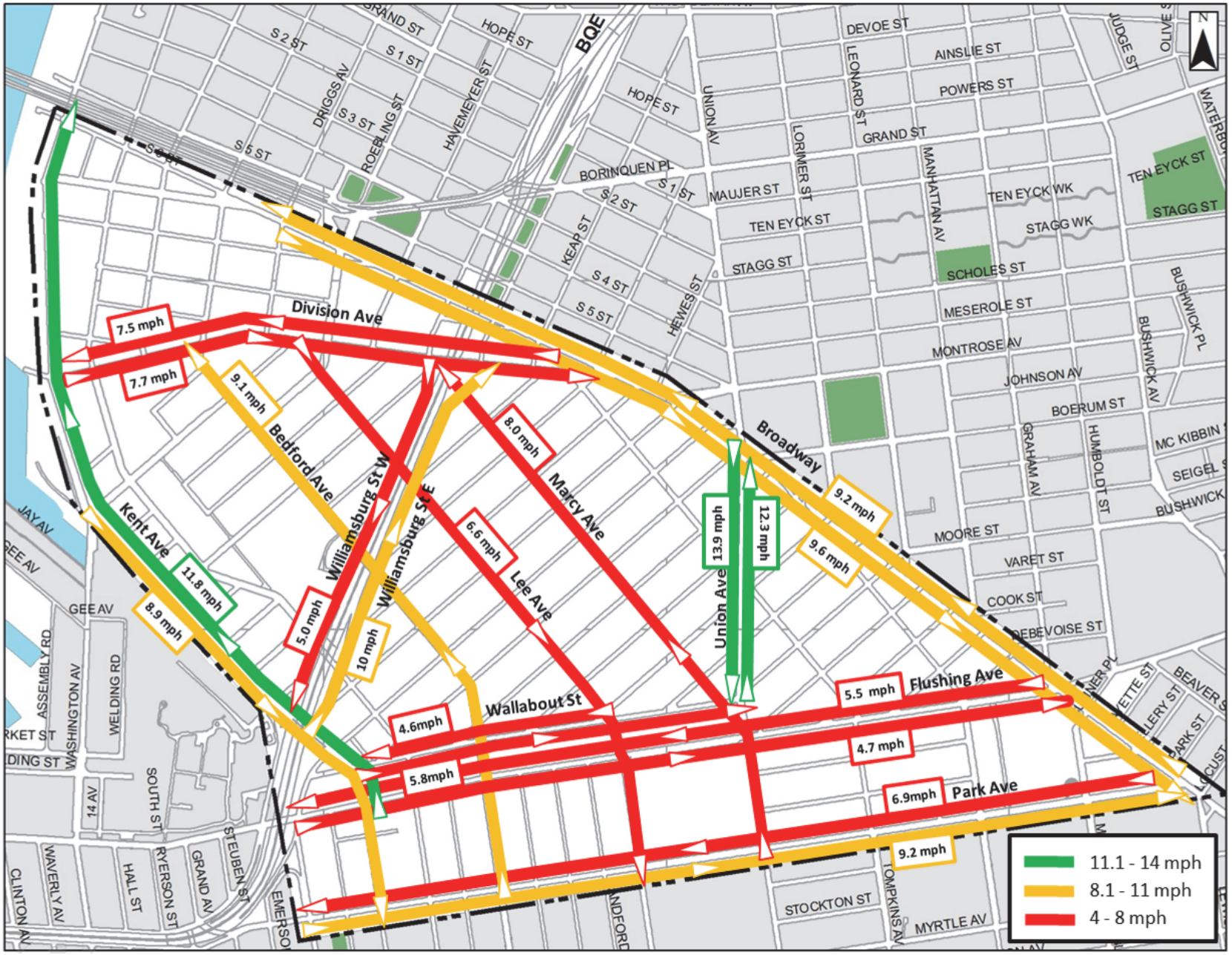


Table 4-3: Existing Travel Speeds Summary - AM Peak

Corridor	Direction	Between	Average Travel Time (sec)	Average Travel Speed (mph)
Division Ave	EB	Kent Avenue and Hooper Street/Harrison Avenue	297.7	9.1
Division Ave	WB	Kent Avenue and Hooper Street/Harrison Avenue	415.7	6.5
Flushing Ave	EB	Classon Avenue and Broadway	431.3	8.8
Flushing Ave	WB	Classon Avenue and Broadway	1070.3	3.6
Park Ave	EB	Classon Avenue and Broadway	575.3	6.8
Park Ave	WB	Classon Avenue and Broadway	489.3	8.9
Kent Ave	NB	Flushing Avenue and Broadway	377.7	9.5
Kent Ave	SB	Flushing Avenue and Broadway	210.7	11.6
Bedford Ave	NB	Park Avenue and Broadway	368.3	8.6
Lee Ave	SB	Park Avenue and Division Avenue	341.0	9.1
Marcy Ave	NB	Park Avenue and Division Avenue	426.3	7.0
Union Ave	NB	Wallabout Street and Broadway	91.7	12.8
Union Ave	SB	Wallabout Street and Broadway	204.0	5.6
Williamsburg St E	NB	Kent Avenue and Division Avenue	199.3	10.1
Williamsburg St W	SB	Flushing Avenue and Division Avenue	146.7	12.5
Wallabout St	EB	Classon Avenue and Marcy Ave	241	8.5
Wallabout St	WB	Lee Ave and Kent Ave	121.3	10.5

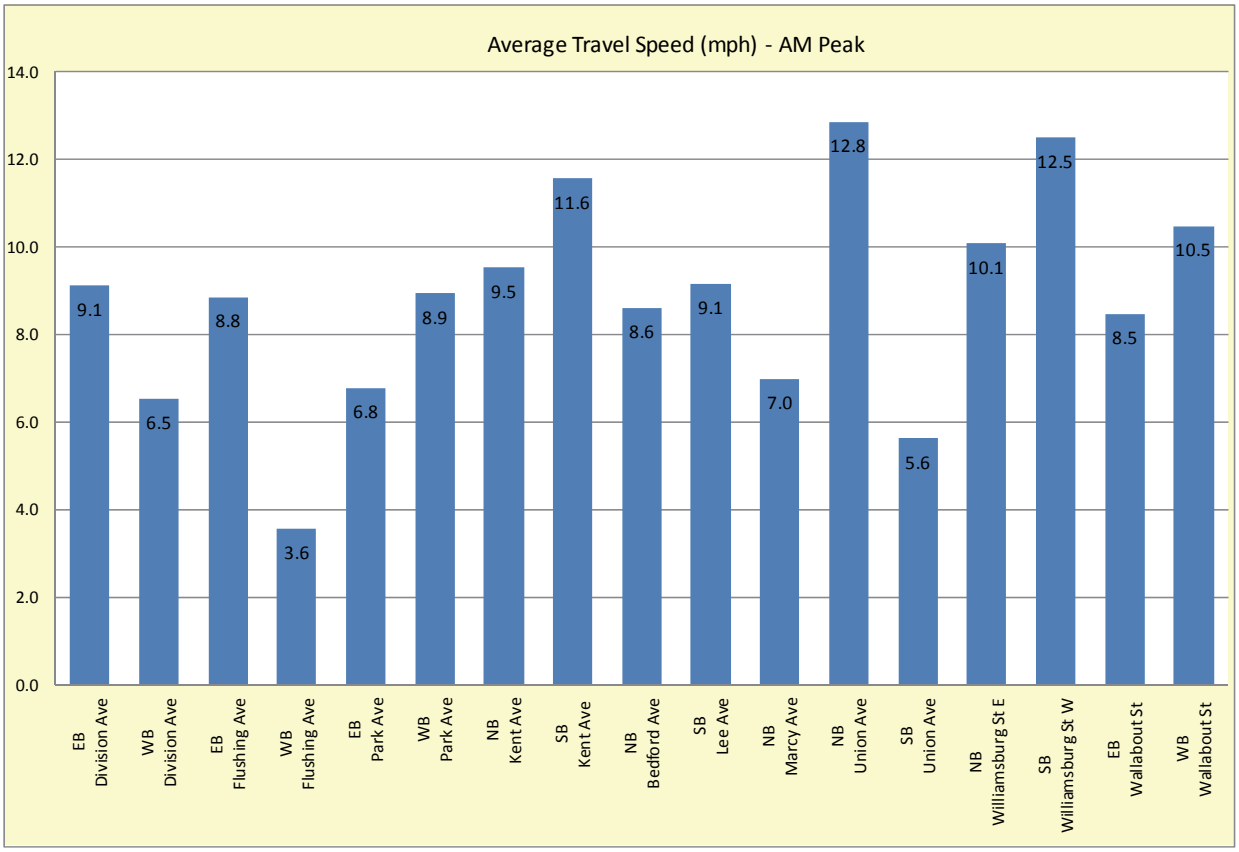
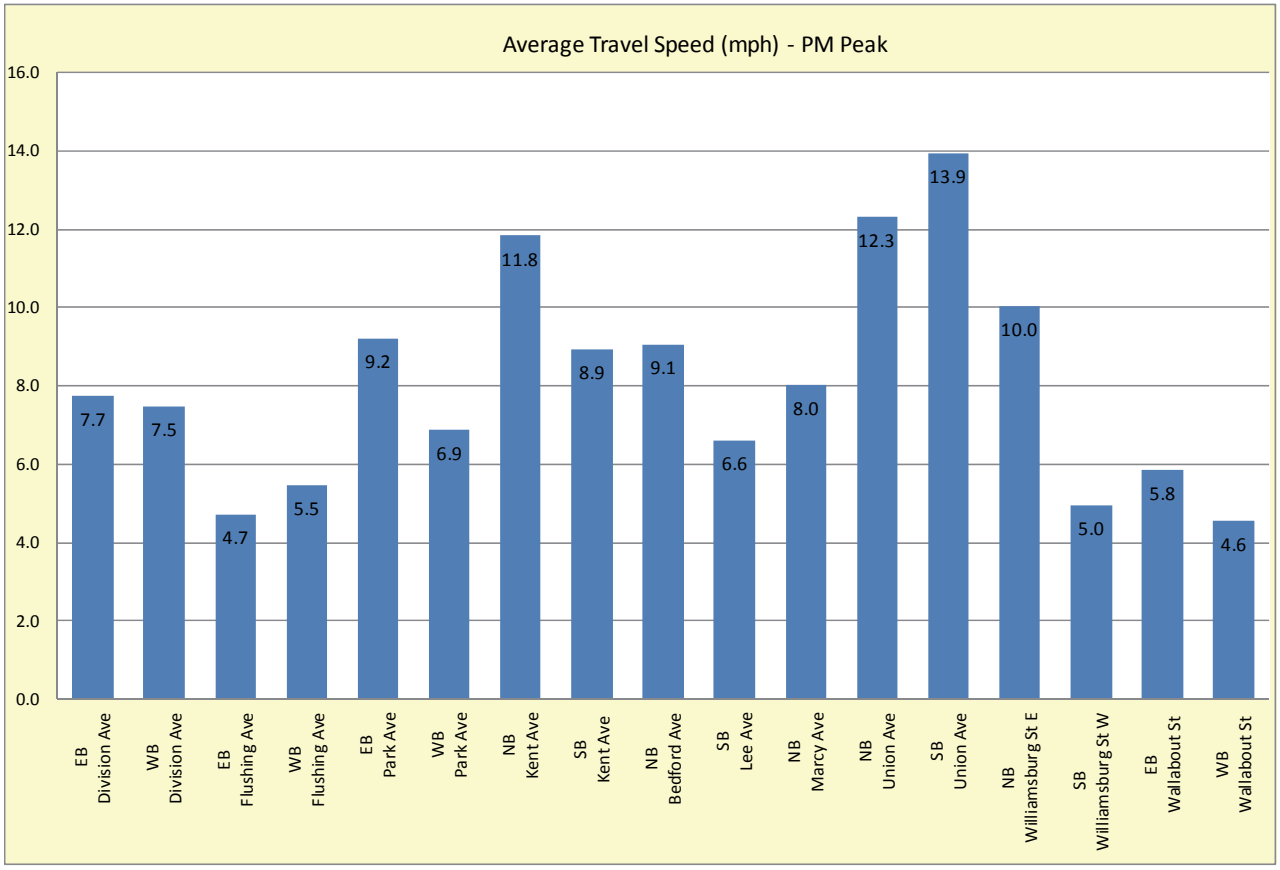


Table 4-4: Existing Travel Speeds Summary PM Peak

Corridor	Direction	Between	Average Travel Time (sec)	Average Travel Speed (mph)
Division Ave	EB	Kent Avenue and Hooper Street/Harrison Avenue	350.7	7.7
Division Ave	WB	Kent Avenue and Hooper Street/Harrison Avenue	362.0	7.5
Flushing Ave	EB	Classon Avenue and Broadway	807.0	4.7
Flushing Ave	WB	Classon Avenue and Broadway	695.0	5.5
Park Ave	EB	Classon Avenue and Broadway	475.0	9.2
Park Ave	WB	Classon Avenue and Broadway	636.3	6.9
Kent Ave	NB	Flushing Avenue and Broadway	303.7	11.8
Kent Ave	SB	Flushing Avenue and Broadway	272.3	8.9
Bedford Ave	NB	Park Avenue and Broadway	350.0	9.1
Lee Ave	SB	Park Avenue and Division Avenue	471.0	6.6
Marcy Ave	NB	Park Avenue and Division Avenue	371.3	8.0
Union Ave	NB	Wallabout Street and Broadway	95.7	12.3
Union Ave	SB	Wallabout Street and Broadway	90.0	13.9
Williamsburg St E	NB	Kent Avenue and Division Avenue	199.7	10.0
Williamsburg St W	SB	Flushing Avenue and Division Avenue	368.7	5.0
Wallabout St	EB	Classon Avenue and Marcy Ave	349	5.8
Wallabout St	WB	Lee Ave and Kent Ave	278.3	4.6



4.6 2024 Future Traffic Conditions

The 2024 future conditions traffic volume was derived by increasing the 2014 existing traffic volume by 0.5% per year for the first five years and 0.25% per year for the next five years (0.38 percent per year over ten years). Additionally, trips generated from other known planned developments completed and partially completed by 2024 are added to the volume.

Significant developments affecting future traffic performance include several commercial developments in the Brooklyn Navy Yard and the completion of the Domino Sugar Factory residential development. Projected vehicle volume from these developments has been included in the future projections.

Figures 4-12 and 4-13 show the 2024 future traffic network volume during the AM and PM peak hours Level of Service (LOS) analysis was conducted using 2000 Highway Capacity Manual methodology following the same LOS criteria as the existing conditions. Table 4-5 shows the volume/capacity ratios, delays and LOS for the signalized intersections during the AM and PM peak periods.

In addition to the eleven intersections with at least one approach LOS E or worse in the existing conditions, the future conditions analysis identifies an additional eight intersections with such criteria. These include

1. Williamsburg Street W @ Wythe Street
2. Williamsburg Street W @ Wythe Street
3. Wallabout Street @ Bedford Avenue
4. Flushing Avenue @ Marcy Avenue
5. Park Avenue @ Taaffe Place
6. Park Avenue @ Kent Avenue
7. Kent Avenue @ Williamsburg Street W
8. Kent Avenue @ Classon Avenue

Figure 4-11: Future (2024) Traffic Volumes –AM Peak

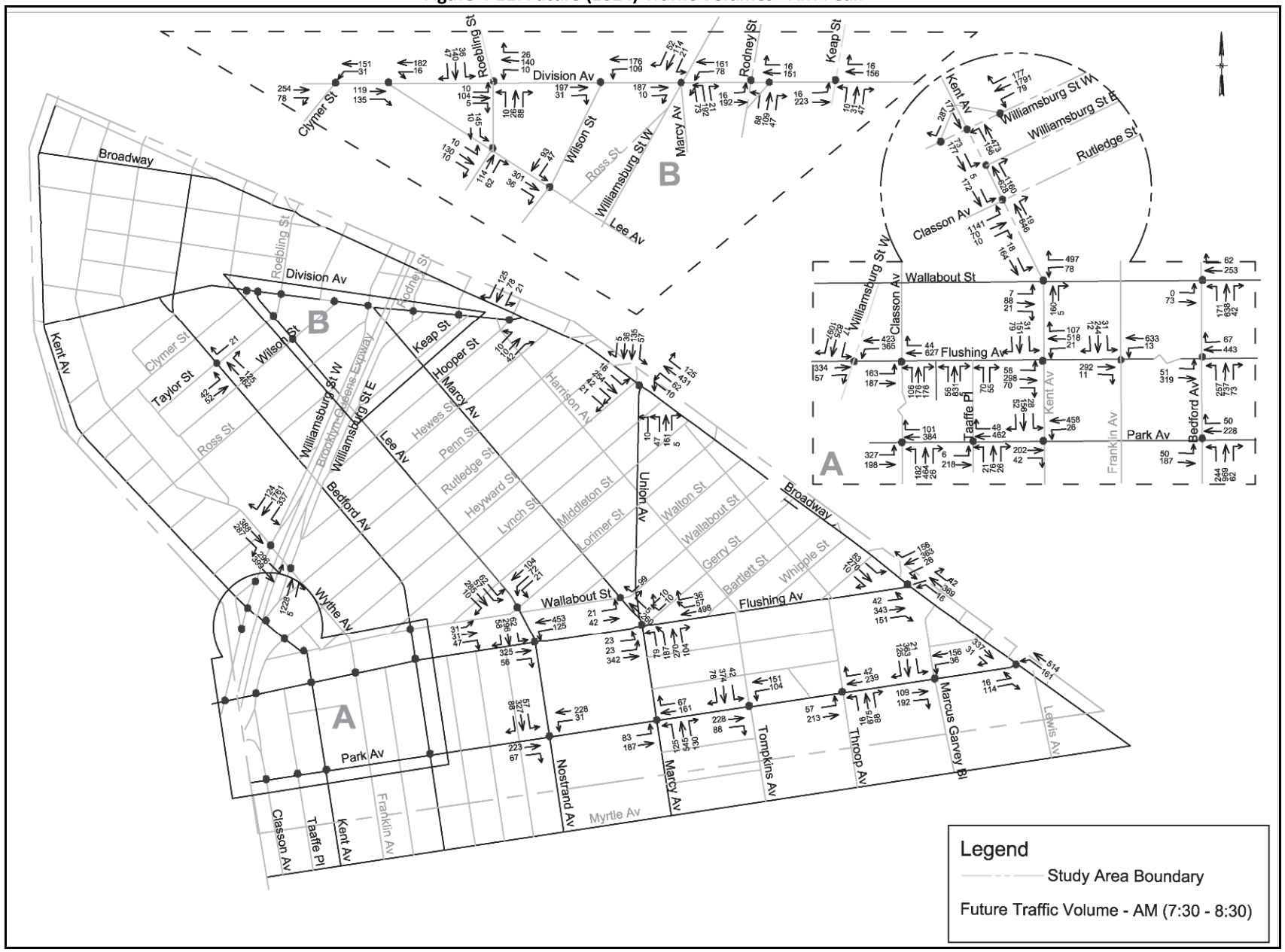


Figure 12: Future (2024) Traffic Volumes –PM Peak

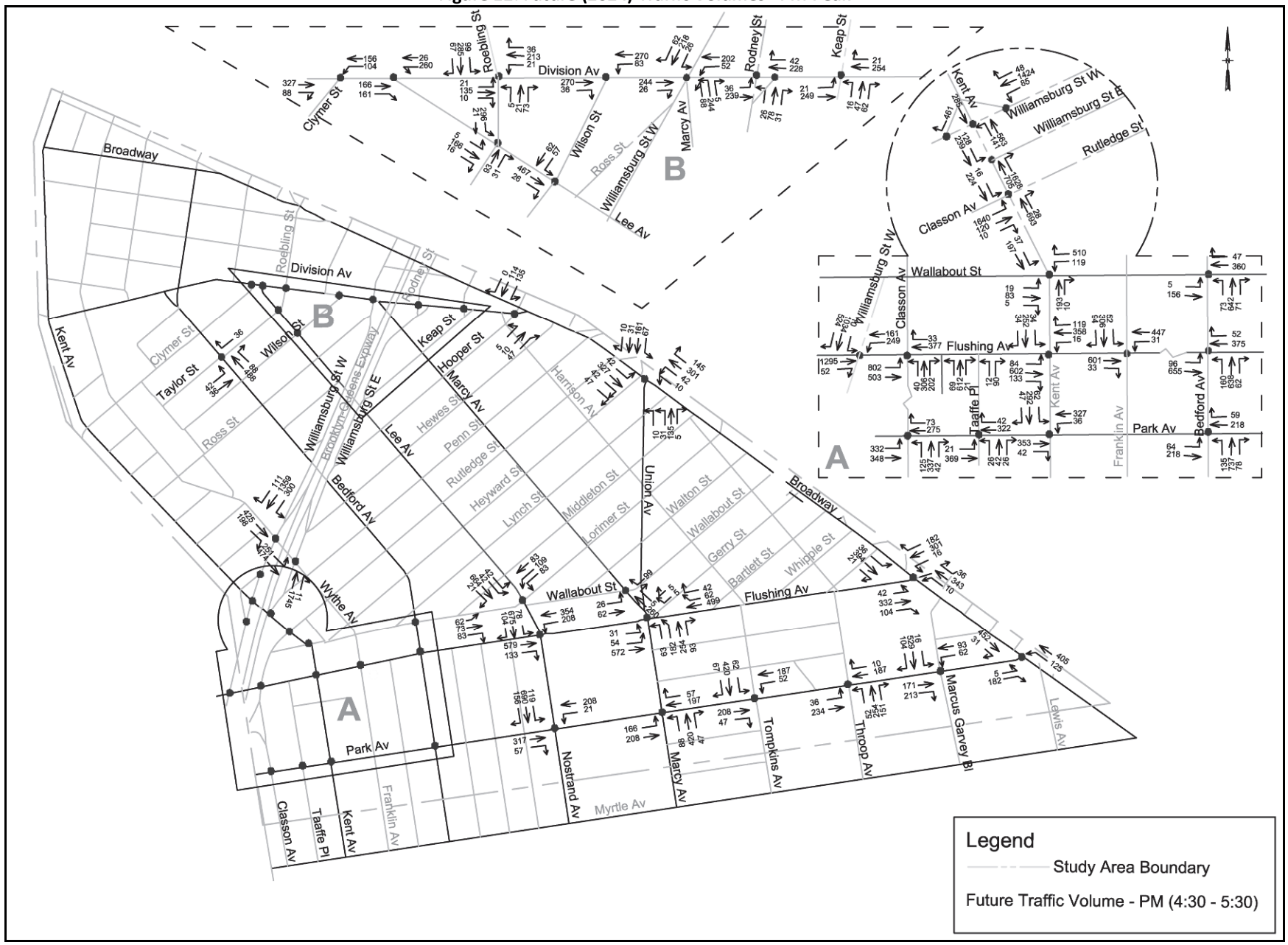


Table 4-5: Traffic LOS Summary – 2024 Future Conditions

Intersection	FUTURE : Weekday AM							FUTURE : Weekday PM					
	Approach	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Lee Av & Roebling/ Taylor St													
	NB	T	114	TR	0.33	34.7	C	T	93	TR	0.24	33.3	C
		R	62					R	31				
	SB	L	145	LT	0.27	33.5	C	L	296	LT	0.53	38.0	D
		T	10					T	21				
	EB	L	10	LTR	0.55	41.7	D	L	5	LTR	0.60	43.4	D
		T	130					T	166				
		R	10					R	16				
	Overall					36.6	D					38.6	D
Lee Av & Wilson St													
	SB	L	47	LT	0.35	30.4	C	L	57	LT	0.35	30.3	C
		T	93					T	62				
	EB	T	301	TR	0.54	19.9	B	T	467	TR	0.74	26.4	C
		R	36					R	26				
	Overall					23.0	C					27.3	C
Bedford Av & Taylor St													
	NB	T	462	TR	0.40	10.2	B	T	488	TR	0.39	10.1	B
		R	125					R	88				
	EB	L	42	LT	0.44	42.3	D	L	42	LT	0.37	40.3	D
		T	52					T	36				
	WB	R	21	R	0.12	35.2	D	R	36	R	0.30	38.6	D
	Overall					15.9	B					16.7	B
Division Av & Roebling/ Taylor													
	NB	L	10	LTR	0.16	12.8	B	L	5	LTR	0.14	12.5	B
		T	26					T	21				
		R	88					R	73				
	SB	L	36	LTR	0.25	13.7	B	L	99	LTR	0.46	16.6	B
		T	140					T	285				
		R	47					R	67				
	EB	L	10	LTR	0.40	32.5	C	L	21	LTR	0.57	38.0	D
		T	104					T	135				
		R	5					R	10				
	WB	L	10	LTR	0.60	38.7	D	L	21	LTR	0.79	49.5	D
		T	140					T	213				
		R	26					R	36				
	Overall					24.1	C					28.8	C
Division Av & Marcy Av													
	NB	L - Williamsburg St	73	L	0.43	32.0	C	L - Williamsburg St	88	L	0.59	35.3	D
		L - Division Av	192	LR	0.07	27.6	C	L - Division Av	244	LR	0.05	27.2	C
		R	21					R	5				
	SB	L	21	LTR	0.71	43.5	D	L	26	LTR	1.03	90.4	F
		T	114					T	218				
		R	52					R	62				
	EB	T	187	TR	0.72	43.8	D	T	244	TR	0.98	78.5	E
		R	10					R	26				
	WB	L	78	L	0.67	54.1	D	L	52	L	0.57	52.0	D
		T	161	T	0.51	34.8	C	T	202	T	0.75	45.2	D
	Overall					39.6	D					62.1	E
Division Av & Keap St													
	NB	L	10	LT	0.09	14.8	B	L	16	LT	0.20	15.8	B
		T	31	R	0.21	16.5	B	T	47	R	0.21	16.2	B
		R	47					R	62				
	EB	L	16	LT	0.49	12.5	B	L	21	LT	0.55	13.5	B
		T	223					T	249				
	WB	T	156	TR	0.33	9.9	A	T	254	TR	0.56	13.6	B
		R	16					R	21				
	Overall					12.3	B					14.1	B
Williamsburg St W & Wythe St													
	SB	L	337	LTR	1.04	52.7	D	L	300	LTR	0.83	22.0	C
		T	1761					T	1359				
		R	124					R	111				
	EB	T	388	TR	1.00	72.4	E	T	425	TR	0.88	51.9	D
		R	287					R	198				
	Overall					57.6	E					30.3	C
Williamsburg St E & Wythe St													
	NB	T	1228	TR	0.84	33.8	C	T	1745	TR	1.14	101.5	F
		R	5					R	11				
	EB	L	296	L	0.61	28.8	C	L	251	L	0.42	23.8	C
		T	399	T	0.65	29.8	C	T	474	T	0.76	34.7	C
	Overall					32.2	C					81.9	F
Wallabout St & Bedford Av													
	NB	L	171	L	0.33	22.1	C	L	73	L	0.15	19.4	B
		T	638	TR	0.73	30.6	C	T	642	TR	0.69	29.3	C
		R	42					R	71				
	EB	L	0	LT	0.19	20.0	B	L	5	LT	0.39	23.6	C
		T	73					T	156				
	WB	T	253	TR	0.97	66.5	E	T	360	TR	1.01	74.4	E
		R	62					R	47				
	Overall					38.9	D					42.3	D
Wallabout St & Lorimer St/ Lee Av													
	SB	L	119	L	0.29	15.3	B	L	84	L	0.24	15.0	B
		T	285	TR	0.52	19.2	B	T	664	TR	1.08	83.2	F
		R	10					R	21				
	EB	T - to Lorimer St	31	TR	0.45	34.4	C	T - to Lorimer St	62	TR	0.86	60.9	E
		T - to Wallabout St	31					T - to Wallabout St	73				
		R	47					R	83				
	WB	L	93	LT	0.80	56.9	E	L	192	LT	1.82	430.9	F
		T	104					T	83				
	Overall					30.2	C					144.5	F
Wallabout St & Marcy Av													
	NB	T	260	TR	0.26	17.8	B	T	260	TR	0.26	17.7	B
		R	5					R	5				
	EB	L	21	LT	0.20	17.6	B	L	26	LT	0.18	17.2	B
		T	42					T	62				
	WB	R	99	R	0.30	19.5	B	R	99	R	0.25	18.5	B
	Overall					18.1	B					17.8	B

Table 4-5: Traffic LOS Summary – 2024 Future Conditions (Cont)

Intersection	FUTURE : Weekday AM							FUTURE : Weekday PM					
	Approach	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Flushing Av & Classon St/ BQE Exit													
	NB	L	106	LTR	0.90	62.3	E	L	40	LTR	0.80	47.8	D
		T	176					T	306				
		R	176					R	202				
	EB	L	163	L	1.59	347.5	F	L	802	L	3.80	1314.0	F
		T	187	T	0.58	38.4	D	T	503	T	1.32	198.6	F
	WB	T	627	TR	1.14	125.9	F	T	377	TR	0.70	47.5	D
		R	44					R	33				
	Overall					118.4	F					517.7	F
Flushing Av & Classon St													
	NB	L	56	LTR	1.11	109.4	F	L	69	LTR	1.08	102.9	F
		T	831					T	612				
		R	5					R	21				
	EB	L	163	L	1.59	347.5	F	L	802	L	3.80	1314.0	F
		T	187	T	0.58	38.4	D	T	503	T	1.32	198.6	F
	WB	T	627	TR	1.14	125.9	F	T	377	TR	0.70	47.5	D
		R	44					R	33				
	Overall					128.4	F					506.6	F
Flushing Av&Williamsburg St W													
	SB	L	17	LTR	2.03	497.3	F	L	10	LTR	1.30	170.1	F
		T	825					T	1034				
		R	1097					R	524				
	EB	T	334	TR	1.21	157.8	F	T	1295	TR	4.22	1499.0	F
		R	57					R	52				
	WB	L	365	L	1.34	220.5	F	L	249	L	1.02	106.0	F
		T	423	T	0.69	31.4	C	T	161	T	0.30	24.6	C
	Overall					364.6	F					712.4	F
Flushing Av & Kent Av													
	SB	L	31	LTR	0.94	70.4	E	L	34	LTR	1.04	95.2	F
		T	151					T	252				
		R	79					R	34				
	EB	L	58	LTR	1.16	196.4	F	L	84	LTR	1.66	428.3	F
		T	298					T	602				
		R	70					R	133				
	WB	L	21	LTR	1.26	216.6	F	L	16	LTR	0.97	135.1	F
		T	518					T	358				
		R	107					R	119				
	Overall					178.7	F					268.4	F
Flushing Av & Franklin Av													
	SB	L	31	L	0.10	26.2	C	L	52	L	0.11	19.0	B
		T	244	TR	0.64	38.4	D	T	306	TR	0.75	34.9	C
		R	12					R	94				
	EB	T	292	TR	0.69	52.5	D	T	601	TR	1.41	298.6	F
		R	11					R	33				
	WB	L	13	LT	1.12	184.8	F	L	31	LT	1.43	317.0	F
		T	633					T	447				
	Overall					116.1	F					224.8	F
Flushing Av & Bedford Av													
	NB	L	257	LT	1.18	131.5	F	L	160	LT	0.81	34.3	C
		T	737	R	0.26	29.2	C	T	638	R	0.20	20.5	C
		R	73					R	62				
	EB	L	51	LT	0.91	47.7	D	L	96	LT	2.37	659.1	F
		T	319					T	655				
	WB	T	443	TR	0.92	43.6	D	T	375	TR	0.85	43.4	D
		R	67					R	52				
	Overall					85.2	F					260.6	F
Flushing Av & Lee/ Nostrand													
	SB	L	62	LTR	0.56	25.9	C	L	78	LTR	0.89	40.0	D
		T	296					T	675				
		R	58					R	104				
	EB	T	325	TR	0.86	44.4	D	T	579	TR	1.43	235.9	F
		R	56					R	133				
	WB	L	125	LT	1.57	299.2	F	L	208	LT	1.52	280.1	F
		T	453					T	354				
	Overall					131.1	F					164.5	F
Flushing Av & Marcy/ Union													
	NB	L	266	LT	0.77	44.2	D	L	245	LT	0.65	39.4	D
		T	270	R	0.45	38.3	D	T	254	R	0.35	35.0	C
		R	104					R	93				
	EB	L	46	LT	0.64	20.0	B	L	85	LT	1.17	114.9	F
		T	342					T	572				
	WB	T	498	T	0.70	21.9	C	T	499	T	0.68	20.3	C
		R	93	R	0.20	11.7	B	R	104	R	0.23	12.0	B
	Overall					28.9	C					58.3	E
Park Av & Classon Av													
	NB	L	182	LTR	0.82	43.2	D	L	125	LTR	0.60	34.3	C
		T	464					T	337				
		R	26					R	42				
	EB	L	327	L	1.05	103.1	F	L	332	L	0.91	62.2	E
		T	198	T	0.27	14.6	B	T	348	T	0.49	17.9	B
	WB	T	384	TR	1.10	104.1	F	T	275	TR	0.71	38.2	D
		R	101					R	73				
	Overall					69.3	E					37.0	D
Park Av & Taaffe Pl													
	NB	L	21	LTR	0.50	27.0	C	L	26	LTR	0.41	32.4	C
		T	76					T	42				
		R	26					R	26				
	EB	L	6	LT	0.44	24.5	C	L	21	LT	0.60	21.1	C
		T	218					T	369				
	WB	T	462	TR	0.98	63.7	E	T	322	TR	0.56	20.0	B
		R	48					R	42				
	Overall					47.1	D					22.4	C

Table 4-5: Traffic LOS Summary – 2024 Future Conditions (Cont)

Intersection	FUTURE : Weekday AM							FUTURE : Weekday PM					
	Approach	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Park Av & Kent Av													
	SB	L	28	LTR	0.63	30.6	C	L	62	LTR	0.78	37.9	D
		T	156					T	292				
		R	52					R	47				
	EB	T	202	TR	0.51	26.4	C	T	353	TR	0.71	33.1	C
		R	42					R	42				
	WB	L	26	LT	0.94	55.5	E	L	36	LT	0.76	36.2	D
		T	458					T	327				
	Overall					41.6	D					35.7	D
Park Av & Bedford Av													
	NB	L	244	LTR	0.86	27.9	C	L	135	LTR	0.50	17.1	B
		T	969					T	737				
		R	62					R	78				
	EB	L	50	LT	1.09	120.1	F	L	64	LT	1.13	132.4	F
		T	187					T	218				
	WB	T	228	TR	0.84	51.9	D	T	218	TR	0.68	40.8	D
		R	50					R	59				
	Overall					42.9	D					44.7	D
Park Av & Nostrand Av													
	SB	L	57	LTR	0.53	25.2	C	L	119	LTR	1.01	62.2	E
		T	327					T	690				
		R	88					R	156				
	EB	T	223	T	0.39	23.2	C	T	317	T	0.55	27.0	C
		R	67	R	0.14	19.4	B	R	57	R	0.12	19.1	B
	WB	L	31	L	0.09	18.9	B	L	21	L	0.08	18.8	B
		T	228	T	0.42	24.1	C	T	208	T	0.39	23.5	C
	Overall					24.0	C					47.8	D
Park Av & Marcy Av													
	NB	L	125	LTR	0.88	32.5	C	L	88	LTR	0.58	20.8	C
		T	545					T	420				
		R	130					R	47				
	EB	L	83	DefL				L	166	DefL	0.69	32.3	C
		T	187	LT	0.36	17.6	B	T	208	LT			
				T						T	0.42	19.3	
	WB	T	161	TR	0.53	21.8	C	T	197	TR	0.54	22.1	C
		R	67					R	57				
	Overall					27.6	C					22.5	C
Park Av & Tompkins Av													
	SB	L	42	L	0.06	9.8	A	L	62	L	0.11	10.2	B
		T	374	TR	0.79	25.6	C	T	420	TR	0.77	23.7	C
		R	78					R	67				
	EB	T	228	TR	1.01	77.1	E	T	208	TR	0.66	32.1	C
		R	88					R	47				
	WB	L	104	DefL	1.11	142.2	F	L	52	DefL			
		T	151	LT				T	187	LT	0.36	23.5	C
				T	0.46	26.6	C			T			
	Overall					54.4	D					24.7	C
Park Av & Throop Av													
	NB	L	16	LT	0.53	19.5	B	L	52	LT	0.24	15.9	B
		T	675	R	0.18	15.9	B	T	254	R	0.29	17.3	B
		R	88					R	151				
	EB	L	57	L	0.18	16.3	B	L	36	L	0.11	15.1	B
		T	213	T	0.41	19.2	B	T	234	T	0.46	20.1	C
	WB	T	239	TR	0.28	16.6	B	T	187	TR	0.19	15.5	B
		R	42					R	10				
	Overall					18.4	B					17.1	B
Park Av & Marcus Garvey Blvd													
	SB	L	21	LTR	0.39	17.5	B	L	16	LTR	0.41	17.7	B
		T	363					T	529				
		R	125					R	104				
	EB	T	109	TR	0.38	17.7	B	T	171	TR	0.40	18.0	B
		R	192					R	213				
	WB	L	36	LT	0.26	16.3	B	L	62	LT	0.22	16.0	B
		T	156					T	93				
	Overall					17.3	B					17.5	B
Kent Av & Williamsburg St W													
	SB	L	79	LT	0.99	46.8	D	L	85	LT	0.77	26.5	C
		T	1791					T	1424				
	EB	T	171	T	0.19	23.2	C	T	285	T	0.30	24.7	C
	WB	L	156	LT	0.80	38.4	D	L	141	LT	1.03	74.5	E
		T	473					T	563				
	Overall					43.2	D					41.6	D
Kent Av & Classon Av													
	NB	L	1141	L	1.03	65.9	E	L	1640	L	1.45	239.2	F
		T	70	LTR	0.12	18.9	B	T	120	LTR	0.21	20.2	C
		R	10					R	10				
	EB	L	5	L	0.04	18.3	B	L	16	L	0.22	23.3	C
		T	172	T	0.17	19.4	B	T	224	T	0.23	20.1	C
	WB	T	646	TR	0.50	24.0	C	T	693	TR	0.61	26.2	C
		R	19					R	28				
	Overall					46.6	D					147.5	F
Kent Av & Wallabout St													
	NB	L	7	LTR	0.15	13.2	B	L	19	LTR	0.16	13.3	B
		T	88					T	83				
		R	21					R	5				
	SB	L	78	LR	0.82	31.2	C	L	119	LR	0.91	41.2	D
		R	497					R	510				
	EB	L	18	LT	0.27	28.1	C	L	37	LT	0.34	29.2	C
		T	164					T	197				
	WB	T	160	TR	0.31	29.1	C	T	193	TR	0.42	31.2	C
		R	5					R	10				
	Overall					28.3	C					33.7	C

4.7 Future Vehicular Speeds

Corridor speed is a indicator of congestion. To identify future travel speeds, the differential of approach delay from the existing to future condition LOS was added to travel times along each corridor. Intersections with no analysis used the average of corridor delays omitting any major outliers (particularly those near the BQE exit and entrances).

Tables 4-6 and 4-7 show the comparison of existing and future travel speeds along the studied corridors during the AM and PM peak periods, respectively.

Table 4-6: Existing and Future Travel Speeds Summary AM Peak

Corridor	Direction	Between	Average Travel Time (sec)		Average Running Speed (mph)	
			2013 Existing	2023 Projected Future	2013 Existing	2023 Projected Future
Division Ave	EB	Kent Avenue and Hooper Street/Harrison Avenue	298	305	9.1	8.9
Division Ave	WB	Kent Avenue and Hooper Street/Harrison Avenue	416	432	6.5	6.3
Flushing Ave	EB	Classon Avenue and Broadway	431	774	8.8	4.9
Flushing Ave	WB	Classon Avenue and Broadway	1070	1946	3.6	2.0
Park Ave	EB	Classon Avenue and Broadway	575	661	6.8	5.9
Park Ave	WB	Classon Avenue and Broadway	489	591	8.9	7.4
Kent Ave	NB	Flushing Avenue and Broadway	378	408	9.5	8.8
Kent Ave	SB	Flushing Avenue and Broadway	211	249	11.6	9.8
Bedford Ave	NB	Park Avenue and Broadway	368	410	8.6	7.7
Lee Ave	SB	Park Avenue and Division Avenue	341	347	9.1	9.0
Marcy Ave	NB	Park Avenue and Division Avenue	426	450	7.0	6.6
Union Ave	NB	Wallabout Street and Broadway	164	164	7.2	7.2
Union Ave	SB	Wallabout Street and Broadway	204	204	5.6	5.6
Williamsburg St E	NB	Kent Avenue and Division Avenue	247	270	8.1	7.4
Williamsburg St W	SB	Flushing Avenue and Division Avenue	147	268	12.5	6.8

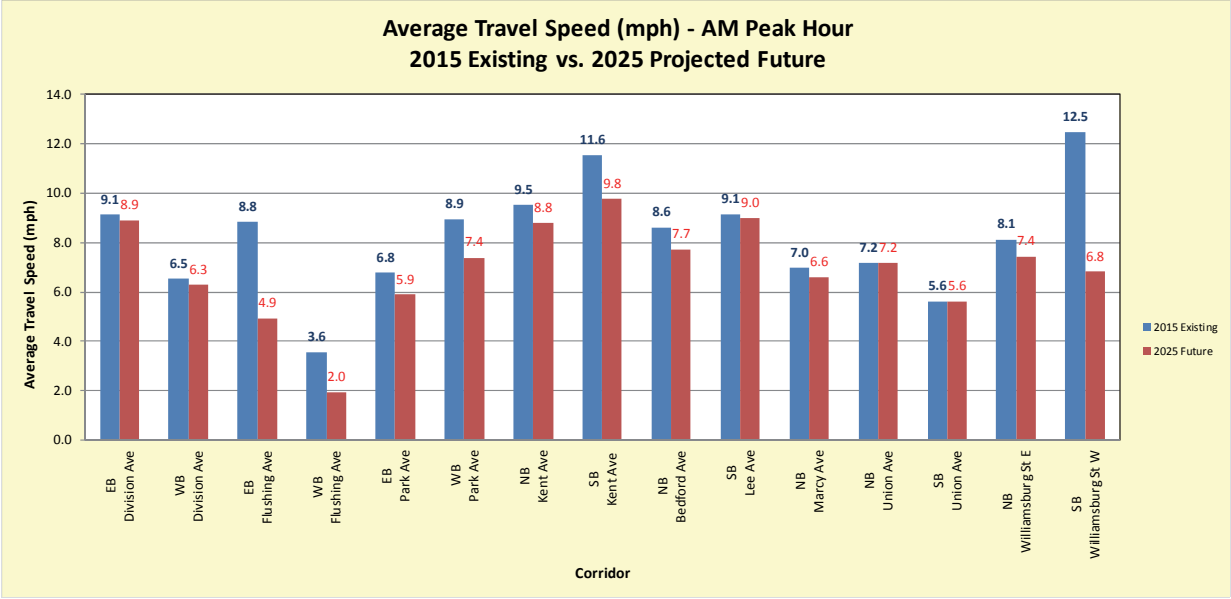
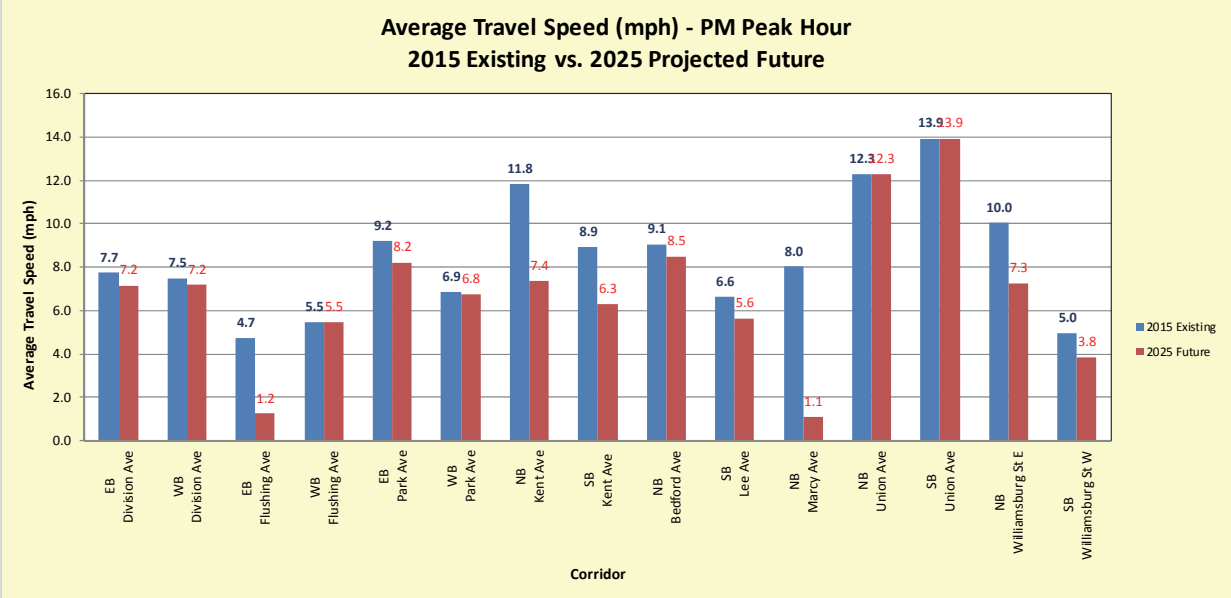


Table 4-7: Existing and Future Travel Speeds Summary PM Peak

Corridor	Direction	Between	Average Travel Time (sec)		Average Running Speed (mph)	
			2013 Existing	2023 Projected Future	2013 Existing	2023 Projected Future
Division Ave	EB	Kent Avenue and Hooper Street/Harrison Avenue	351	379	7.7	7.2
Division Ave	WB	Kent Avenue and Hooper Street/Harrison Avenue	362	378	7.5	7.2
Flushing Ave	EB	Classon Avenue and Broadway	807	3067	4.7	1.2
Flushing Ave	WB	Classon Avenue and Broadway	695	695	5.5	5.5
Park Ave	EB	Classon Avenue and Broadway	475	533	9.2	8.2
Park Ave	WB	Classon Avenue and Broadway	636	646	6.9	6.8
Kent Ave	NB	Flushing Avenue and Broadway	304	489	11.8	7.4
Kent Ave	SB	Flushing Avenue and Broadway	272	386	8.9	6.3
Bedford Ave	NB	Park Avenue and Broadway	350	373	9.1	8.5
Lee Ave	SB	Park Avenue and Division Avenue	471	553	6.6	5.6
Marcy Ave	NB	Park Avenue and Division Avenue	371	378	8.0	1.1
Union Ave	NB	Wallabout Street and Broadway	96	96	12.3	12.3
Union Ave	SB	Wallabout Street and Broadway	90	90	13.9	13.9
Williamsburg St E	NB	Kent Avenue and Division Avenue	200	276	10.0	7.3
Williamsburg St W	SB	Flushing Avenue and Division Avenue	369	477	5.0	3.8



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5 PUBLIC TRANSPORTATION

5.1 Introduction

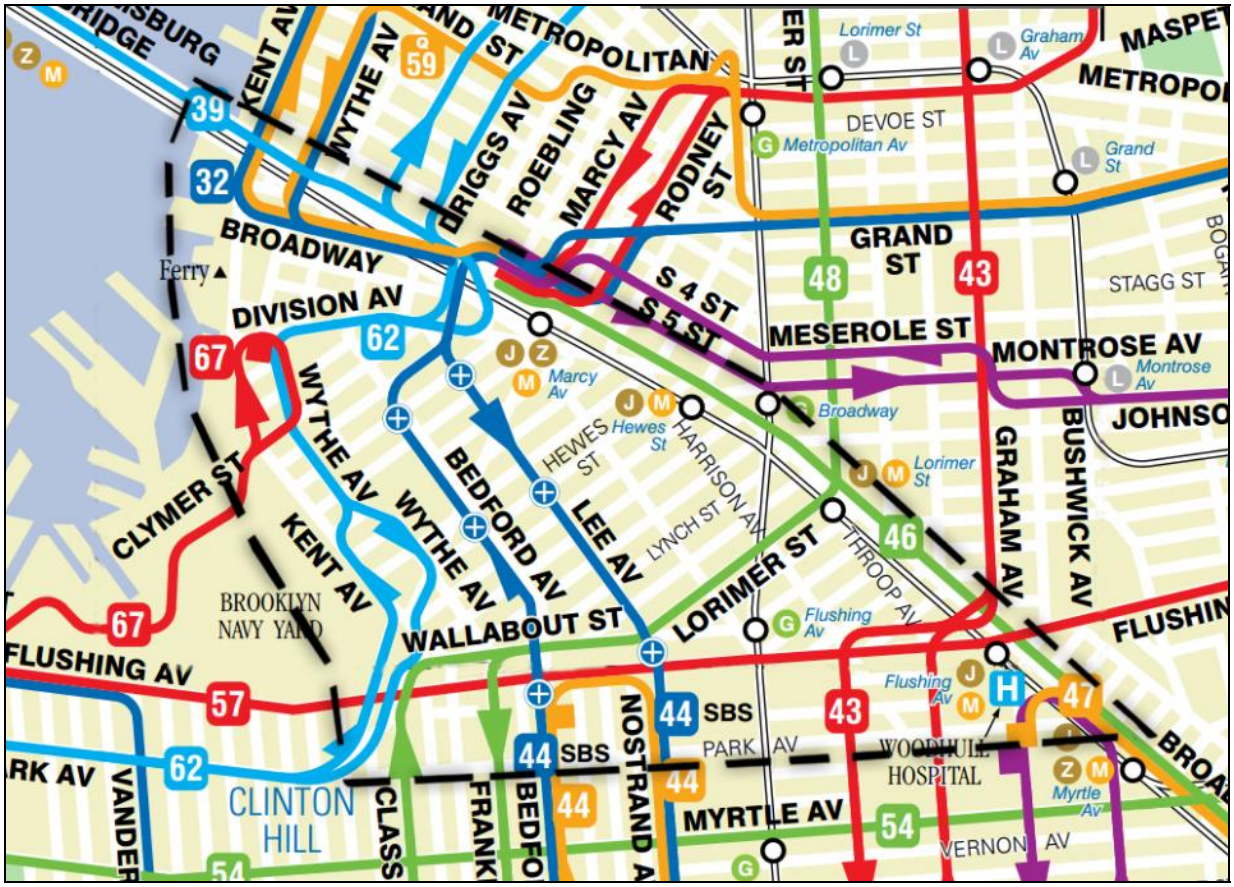
Public transportation plays an important role in the transportation system including reducing vehicular congestion and roadway emissions. The study area has two subway lines, six subway stations and fourteen bus lines with stops throughout the study area. There are bus services on most major east-west corridor (Broadway, Flushing Avenue, Wallabout Street and Lorimer Street) as well as major north-south corridor (Bedford Avenue, Lee Avenue, Kent Avenue, Wythe Avenue, Marcus Garvey Boulevard, Throop Avenue and Tompkins Avenue).

5.2 Buses

Thirteen New York City Transit MTA (NYCT-MTA) bus routes and one private franchised route provide surface transit services within the study area as indicated in the Figure 5-1 and described below. The frequency of bus service varies greatly, reflecting different user patterns within the area. Table 5-1 below provides headway information for each route.

The Williamsburg Bridge Bus Terminal is the terminal point for the B24, B39, B44, B46, B60 and Q54 bus routes and is located along Broadway between the Williamsburg Bridge eastbound exit and Havemeyer Street. The bus terminal is currently being renovated to include restrooms, improved urban design elements, street geometry and traffic signal changes.

Figure 5-1: Bus Routes and Transit Stations



B15: The B15 bus provides service between Broadway/Marcus Garvey Boulevard and JFK airport daily. Within the study area, the Q15 bus operates along Broadway between Lewis Avenue and Marcus Garvey Avenue. The major transfer point along this route in the study area is Broadway and Park Street with access to the Q46 and Q47 buses.

B24: The B24 bus operates between Greenpoint Avenue/Manhattan Avenue and Williamsburg Bridge Plaza, daily. Within the study area, the B24 bus operates along Broadway from Williamsburg Bridge Plaza to Rodney Street. The major transfer point in the study area along this route is Broadway and Marcy Avenue with access to the J,M, Z trains and B46 buses.

B32: The B32 bus provides service between Williamsburg Bridge Plaza and 44th Drive, Long Island City, daily at all times. Within the study area, the B32 bus operates along Broadway from Williamsburg Bridge Plaza to Kent Avenue. The major transfer point along this route are Court Square 23 Street subway station (E, M, G, 7 trains) and Marcy Avenue subway station (J, M, Z trains).

B39: The B39 bus provides service between Williamsburg Bridge Plaza, Brooklyn and Delancey Street/ Allen Street, Manhattan, daily. The major transfer point along this route are Marcy Avenue subway station (J, M, Z trains) and the Williamsburg Bridge Plaza (B24, B32, B44, B46, B60, Q54 buses).

B43: The B43 bus provides service between Box Street/ Manhattan Av and Lincoln Road/Flatbush Avenue (Prospect Park), daily at all times. Within the study area, the B43 bus operates along Flushing Avenue, Tompkins Avenue and Throop Avenue. The major transfer point in the study area along this route are Flushing Avenue Station (J, Z, G trains) and the Broadway and Flushing Avenue Intersection (B15, B46 Ltd, B47, B57 buses).

B44: The B44 bus provides service between Flushing Avenue/Lee Avenue and Avenue U/Nostrand Avenue, daily at all times. Late night service operates between Williamsburg Bridge Plaza and Knapp Street, daily. Within the study area, the B44 bus operates along Bedford Avenue, Lee Avenue/Nostrand Avenue and Roebling Street. The major transfer point in the study area along this route are Marcy Avenue Station (J, M, Z trains) and the Williamsburg Bridge Plaza (B24, B32, B46, Q54, B60 buses). The B44 has the sixth highest annual ridership in the MTA bus system.

B44 SBS: The B44 SBS bus provides daily service between South Williamsburg Bridge Plaza and Knapp Street/Emmons Avenue. Every other trip operates between Avenue U and Flushing Avenue. Within the study area, the B44 bus operates along Bedford Avenue, Lee Avenue/Nostrand Avenue and Roebling Street. The major transfer point in the study area

along this route are Marcy Avenue Station (J, M, Z trains) and the Williamsburg Bridge Plaza (and B24, B32, B46, Q54, B60 buses).

B46: The B46 bus operates between DeKalb Avenue/Malcolm X Blvd and Kings Plaza and/or Avenue H/Utica Avenue daily at all times. Late nights B46 buses also operate between Williamsburg Bridge Plaza and Kings Plaza. Within the study area, the B46 bus operates along Broadway. The major transfer point in the study area along this route are Marcy Avenue Station (J, M, Z trains) and the Williamsburg Bridge Plaza (B24, B32, B46, Q54, B60 Buses). The B46 has the third highest annual ridership in the MTA bus system.

B46 (Limited): The B46 (Limited) bus operates between Williamsburg Bridge Plaza and Kings Plaza daily at all times. Additional Limited stop service operates between DeKalb Avenue/Malcolm X Blvd and Kings Plaza during the weekday morning. Within the study area, the B46 (Ltd) bus operates along Broadway. The major transfer point in the study area along this route are Marcy Avenue Station (J, M, Z trains) and the Williamsburg Bridge Plaza (B24, B32, B46, Q54, B60 buses).

B47: The B47 bus provides service between Broadway/Marcy Garvey and Kings Plaza, daily at all times. Within the study area, the bus operates along Broadway and Marcus Garvey Blvd. The major transfer point in the study area along this route are Myrtle Avenue Station (J, M, Z trains), Flushing Avenue Station (J, M train) and at the Broadway and Flushing Avenue intersection (B43, B46, B46 LTD, Q57 buses).

B48: The B48 bus provides service between Meeker Street/Gardner Avenue and Flatbush Avenue/Lincoln Road Prospect Park subway station(B,Q,S train) daily at all times. Within the study area, the bus operates along Lorimer Street, Franklin Avenue. The major transfer points in the study area along this route are Flushing Avenue Station (J, M train) and at the intersection of Broadway and Flushing Avenue (B43, B46, B46 LTD, Q57 buses).

B57: The B57 bus provides service between Fresh Pond Rd/Flushing Avenue, Queens and IKEA terminal, Otsego/Beard Street, Brooklyn, daily. Within the study area, the bus operates along Flushing Avenue. The major transfer points in the study area along this route are Flushing Avenue Station (J, M trains) and at the Broadway and Flushing Avenue intersection (B43, B46, B46 LTD buses).

B60: The B60 bus provides service between Williams Street/Flatlands Avenue and Williamsburg Bridge Plaza, daily at all times. Within the study area, the bus operates along Broadway and Marcy Avenue. The major transfer points in the study area along this route are Marcy Avenue Station (J, M,Z trains) and at the Williamsburg Bridge Plaza (B24, B32, B39, B44, B46, B46 LTD, B62, Q54, Q59 buses).

B62: The B62 bus provides service between Borum Place/Livingston Street and Jackson Avenue/ Queens Plaza south, daily at all times. Within the study area, the bus operates along Broadway, Division Avenue, Kent Avenue and Wythe Avenue. The major transfer points in the study area along this route are Marcy Avenue Station (J, M,Z trains) and at the Williamsburg Bridge Plaza (B24, B32, B39, B44, B46, B46 LTD, B62, Q54, Q59 buses).

B67: The B67 bus provides service between Cortelyou Road/ McDonald Avenue and Wythe Avenue/ Division Street, on weekdays from 4:20am to 1:30am, operates between Cortelyou Road/McDonald Avenue and Sands Street/Jay Street, on weekends from 4:30am to 1:30am. Within the study area, the bus operates along Division Avenue, Kent Avenue and Wythe Avenue and Clymer Street. The major transfer point in the study area along this route is at Division Avenue and Wythe Avenue (B62 bus).

Q54: The Q54 bus provides service between Williamsburg Bridge Plaza in Brooklyn and 171 Street/Jamaica Avenue in Jamaica daily at all times. Some buses operate from either Williamsburg Bridge Plaza or the Metropolitan Avenue M subway station to Metropolitan Avenue and Jamaica Avenue during rush hour. Within the study area, the bus operates along Broadway. The major transfer points in the study area along this route are Marcy Avenue

Station (J, M,Z trains) and at the Williamsburg Bridge Plaza (B24, B32, B39, B44, B46, B46 LTD, B62, Q59 buses).

Q59: The Q59 bus provides service between Williamsburg Bridge Plaza, and 63 Drive - Rego Park M, R subway station, daily at all times. Within the study area, the bus operates along Broadway. The major transfer point in the study area along this route are Marcy Avenue Station (J, M,Z trains) and at the Williamsburg Bridge Plaza (B24, B32, B39, B44, B46, B46 LTD, B62, Q59 buses).

The **B110** bus line is a private franchised bus route that runs express between Borough Park and South Williamsburg. It makes local stops in South Williamsburg along Bedford Avenue and Lee Avenue between Division Avenue and Wallabout Street and in Borough Park along 49th and 50th Streets between Fort Hamilton Parkway and 18th Avenue. Ridership data and headway times for the B110 were not available.

Table 5-1: Average Frequency of NYCT Bus Service (in minutes)

Route	Weekday					Saturday					Sunday				
	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night
B15	11	7	15	10	60	20	15	15	15	45	12	8	16	15	45
B24	20	30	20	30	-	30	30	30	30	-	30	30	30	30	-
B32	30	30	30	30	--	30	30	30	30	-	30	30	30	30	-
B39	30	30	30	30	-	30	30	30	30	-	30	30	30	30	-
B43	12	15	12	12	45	15	15	12	15	45	20	20	20	20	45
B44	4	12	8	9	60	10	9	10	10	60	9	8	10	10	60
B44(SBS)	5	8	6	10	-	8	8	10	14	-	13	10	12	14	-
B46	8	9	8	8	60	9	8	7	8	60	7	8	9	10	60
B46(Ltd)	7	10	6	6	-	7	5	6	6	-	-	7	8	9	-
B47	8	15	11	12	60	15	9	9	10	60	20	15	15	15	60
B48	12	20	15	20	48	30	20	20	20	45	30	20	20	30	45
B54	8	10	7	9	60	15	16	12	12	60	24	12	13	15	60
B57	15	20	15	20	-	20	20	20	20	-	20	20	20	30	-
B60	8	12	11	15	48	15	11	14	15	60	17	15	15	20	60
B62	9	17	11	16	50	15	12	12	15	50	20	20	15	20	50
B67	15	30	18	30	-	30	30	30	30	-	30	30	30	30	-
Q54	12	15	11	15	60	17	15	13	17	60	20	20	18	20	60
Q59	13	17	14	17	40	20	15	11	13	40	30	15	15	24	40

Notes: Time Periods: AM= 7-9 AM, Noon= 11 AM-1 PM, PM= 4-7 PM, Eve= 7-9 PM and Night= Midnight - 4 AM

"-" denotes no service during this period

Headway in minutes

5.3 2015 Bus Ridership

Bus ridership includes all passengers who board buses using a valid Metro Card, cash, transfer, SBS ticket, or pass. Ridership does not include employees, non-revenue passengers (e.g., children under 44" tall traveling with an adult). Average weekday, Saturday, and Sunday ridership includes every weekday, Saturday, and Sunday in the year, except major holidays. Average weekend ridership is the two day sum of average Saturday plus average Sunday ridership. Ridership on major holidays (New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas) is included only in the annual total.

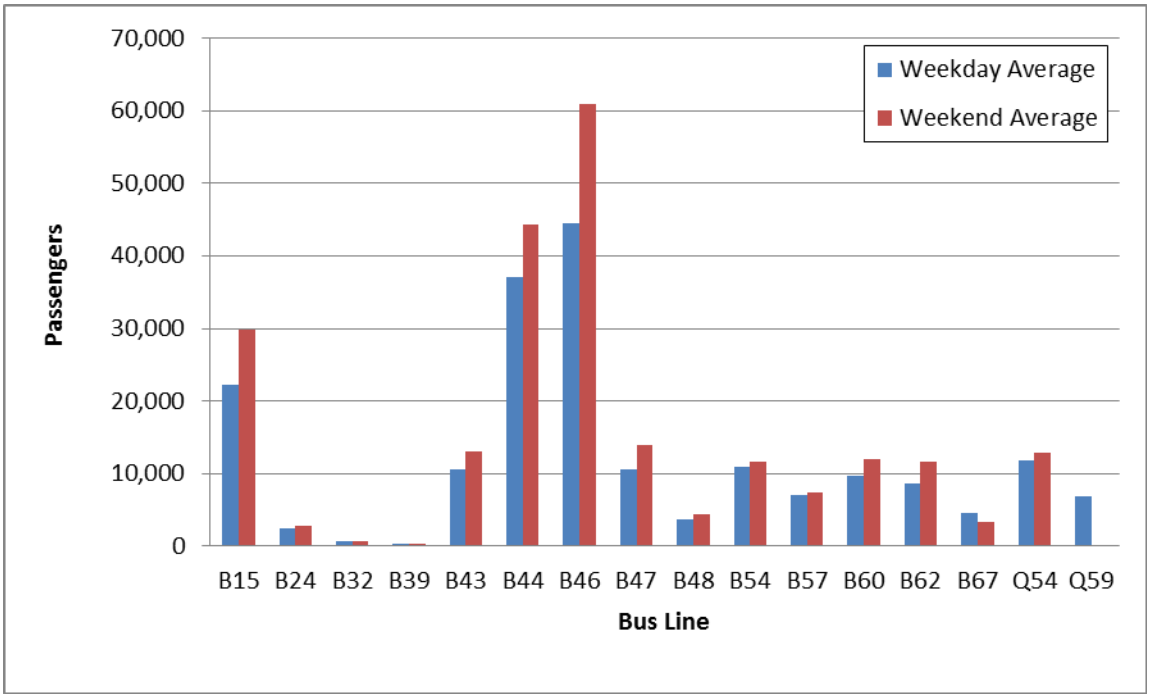
At the end of 2015, the MTA and New York City Transit bus had 238 local, seven Select Bus Service and 62 express routes. The B46 had the third highest annual ridership (14,471,998) while the B44 was ranked fifth (11,869,056 passengers) and the B15 was ranked 23rd in annual ridership (7,267,716 passengers). Bus ridership within the study area is shown in the Table 5-2.

Table 5-2: 2015 Bus Ridership

Bus Route	Bus	*Rank	Annual Total	Weekday Average	Weekend Average
MTA NYCT BUS	B15	23	7,267,716	22,153	29,813
	B24	159	746,676	2,379	2,721
	B32	174	221,464	725	637
	B39	182	81,627	258	407
	B43	75	3,339,920	10,530	13,106
	B44	5	11,869,056	37,021	44,385
	B46	3	14,471,998	44,431	60,838
	B47	70	3,422,406	10,611	13,880
	B48	146	1,188,482	3,759	4,451
	B54	72	3,392,392	10,946	11,705
	B57	111	2,215,467	7,072	7,338
	B60	87	3,107,982	9,753	11,936
	B62	97	2,757,493	8,652	11,625
	B67	141	1,315,946	4,521	3,367
	Q54	61	3,652,154	11,761	12,951
	Q59	112	2,184,498	6,844	

- Source : MTA
- Ranking out of 238 Local bus line , 62 express and 7 select bus service

Figure 5-2: Average Weekday and Weekend Bus Ridership



5.4 Subway Service

The Metropolitan Transportation Authority – New York City Transit (MTA-NYCT) operates four subway routes (G, J, M, Z) making stops at five stations within the study area: Marcy Avenue (J, M, Z), Hewes Street (J, M), Lorimer Street (J,M), Flushing Avenue (J, M), Flushing Avenue (G) and Broadway (G). Table 5-3 lists the subway lines, stations and station ridership.

The "J/ Z" train operates from Jamaica Centre in the Jamaica to Broad street in Manhattan. The Z train makes only skip stop during the peak hours on weekdays. On Weekdays the "J/Z" train makes skip stop Manhattan bound from 7:15am to 8:18 am and from 4:55pm to 5:45pm Jamaica bound while running local in Manhattan at all times. In the study area it stops at the Marcy Avenue (J, M, Z), Hewes Street (J, M), Lorimer Street (J,M) and Flushing Avenue (J, M) station.

The "M" train provides service from Forest Hills-71st Avenue-Queens Boulevard in the Queens to Middle Village-Metropolitan Avenue in Queens. During late night and weekends the "M"

train runs only from Forrest Hills/71st Avenue to Myrtle Avenue. In the study area it stops at the Marcy Avenue (J, M, Z), Hewes Street (J, M), Lorimer Street (J,M) and Flushing Avenue (J, M) station.

The "G" train provides service from Court Square/45 Road in the Queens to Church Avenue-McDonald Avenue in Brooklyn. In the study area it stops at the Flushing Avenue and Broadway stations.

5.5 Subway Ridership

Subway ridership consists of all passengers (other than NYC Transit employees) who enter the subway system, including passengers who transfer from buses. Ridership does not include passengers who exit the subway or passengers who transfer from other subway lines. The Marcy Avenue station has the highest ridership in the study area. It is ranked 117 out of 421 stations with over 13,276 average weekday riders. The Flushing (G) station has the lowest ridership in the study area and ranks 376 with approximately 2,819 average weekday riders. Subway station ridership within the study area is shown in Table 5-3.

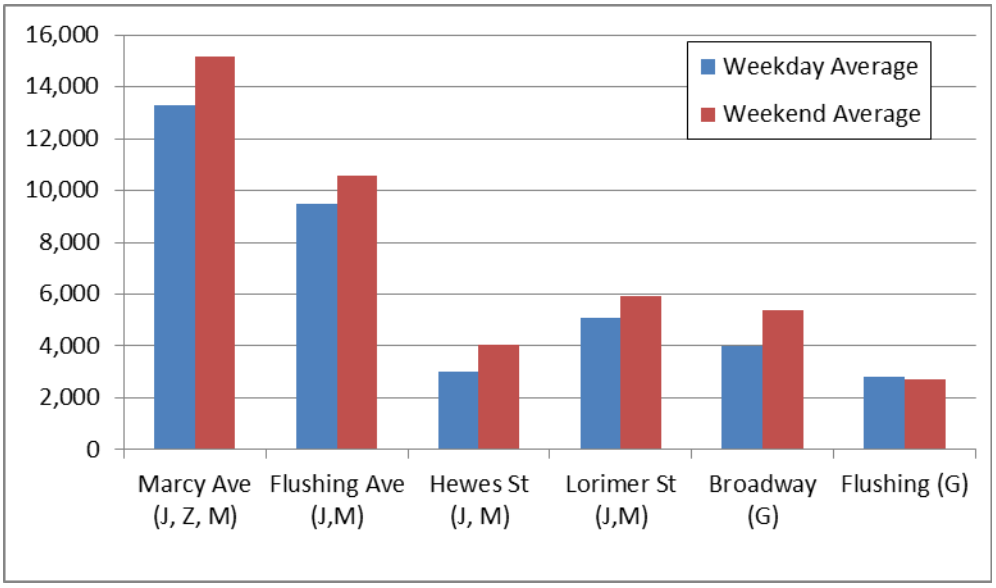
Table 5-3: Study Area Subway Ridership

Subway Station	*Rank	Annual Total	Weekday Average	Weekend Average
Marcy Ave (J, Z, M)	117	4,204,877	13,276	15,165
Flushing Ave (J,M)	172	2,991,074	9,483	10,573
Hewes St (J, M)	367	981,379	2,992	4,042
Lorimer St (J,M)	296	1,614,154	5,070	5,920
Broadway (G)	326	1,313,362	4,011	5,368
Flushing (G)	376	866,803	2,819	2,716

***Rankings out of 421 subway stations**

***Source: MTA**

Figure 5-3: Subway Ridership Average Weekday/Weekend

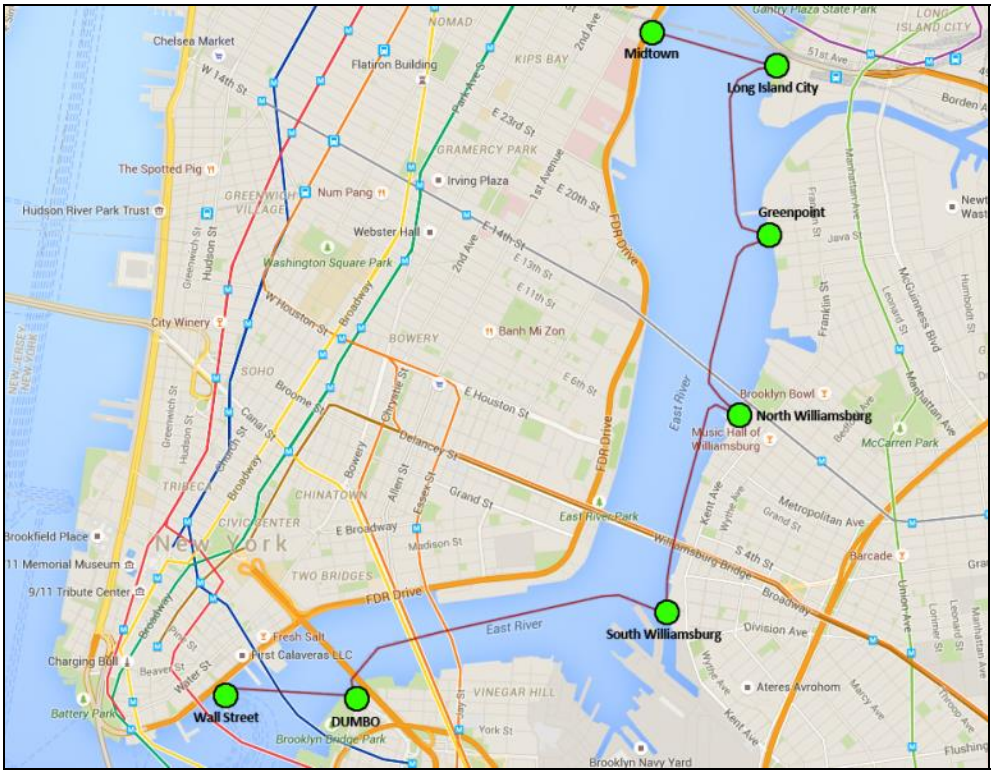


5.6 Ferry Service

Ferry service is available from the pier at South 10th Street and Kent Avenue. The East River Ferry is run by NY Waterway and runs between Midtown and Wall Street with stops in Brooklyn in Long Island City, Greenpoint, North and South Williamsburg and Dumbo. The ferry route map is shown in Figure 5-5. The ferry begins operation at 6:45a.m. and concludes service at 8:15p.m. It has 20 minute headways during the AM and PM peak hour.

Figure 5-4: East River Ferry at S 10th Street Pier

Figure 5-5: East River Ferry Route Map



6 PARKING

6.1 Introduction

Parking is an essential part of the transportation system. The on-street parking maneuvers and in/out movements to off-street facilities can have significant impacts on the traffic flow. Inadequate parking can cause unnecessary circulation as drivers search for parking. Also they may park illegally or double park, reducing roadway capacity.

An extensive parking survey was conducted during the weekday peak periods (7:30a.m. – 9:30a.m., 4:00p.m. – 6:00p.m.) of both on-street and off-street facilities. The survey documented existing on and off-street parking supply and demand through a combination of field observation and interviews. It also documented the location and number of metered parking spaces and commercial truck loading/unloading zones in the study area.

6.2 Off-Street Parking

An inventory of publicly accessible parking lots and garages in the study area was conducted. The inventory shows there are seven off-street parking facilities in the study area with a combined capacity of 1,161 spaces. Figure 6-1 below shows the location of off-street parking facilities while Table 6-1 provides the number of spaces and utilization by peak hour for each facility.

The largest lot, with 617 spaces, is located in the southeast corner of the study and is associated with Woodhull Hospital. There are four parking lots located in the northwest section of the study area and two lots located just outside of the study area; one at on Nostrand Avenue south of Park Avenue and the other on Cook Street between Graham and Manhattan Avenues. These garages provide monthly parking to the residential uses and hourly parking for the commercial business in their proximity.

The average cost for parking is $5.44 for the first hour, which is usually more expensive than

subsequent hours. The average daily and monthly parking cost was approximately $15.24 and $221.86, respectively.

Off-street parking data was collected through observations and parking attendant and manager interviews. The survey indicates that off-street parking facilities are on average approximately 71% and 77% utilized during the AM and PM peak hours, respectively. The following notes were collected from parking attendant interviews.

- The majority of demand at all of the garages except 752 Broadway is monthly parking for large residential buildings in the area. 752 Broadway primarily serves the employees, visitors, and patients of Woodhull Hospital.
- The garage at 11 Broadway shares approximately 30% of its space with a U-Haul vehicle rental company.
- The 444 Kent Avenue garage serves as a park and ride facility for the East River Ferry.
- The garages on Broadway near Kent Ave all noted a spike at midday due to the lunch crowd.

Table 6-1: Off-Street Parking Facilities

ID	License	Name	Address	Price/Hr	Price/Day	Price/Month	Cap	AM	PM
1	2001021	Sherman Parking Management	11 Broadway	$ 5.00	$ 15.00	$ 275.00	144	79	122
2	2010314	4 Square Management LLC	53 Broadway	$ 6.80	$ 14.50	$ 210.00	60	48	48
3	1389587	GM & M Park Inc	110 Broadway	N/A	$ 13.00	$ 209.00	50	30	30
4	1244304	Kent Garage Corp	444 Kent Ave	$ 3.62	$ 14.50	$ 300.00	146	110	110
5	1245513	MP Woodhull LLC	752 Broadway	$ 9.06	$ 27.18	$ 203.85	617	463	463
6	1335541	Propark America New York LLC	21 Cook St	$ 2.72	$ 14.50	$ 181.20	94	47	75
7	1371377	GM & M Park Inc	116 Nostrand Ave	N/A	$ 8.00	$ 175.00	50	50	43

Figure 6-1: Off-Street Parking Facilities

6.3 On-Street Parking

On-street parking capacity varies by time of day due to parking regulations. Figure 6-2 shows parking restrictions on the major corridors within the study area. These restrictions include alternate side parking regulations, rush hour restrictions, school day restrictions, school bus layover areas, metered parking and truck loading and unloading zones.

Within the study area most streets have alternate side parking restrictions in effect twice a week with either Monday and Thursday or Tuesday and Friday having street cleaning provisions. Parking surveys were conducted on Wednesdays as there was no alternate side parking restrictions on that day.

Metered parking can be found along Lee Avenue and Broadway which both have substantial ground floor retail uses and need higher parking turnover for customers. There are also a few blocks with metered parking along Park Avenue, Roebling Street and Division Avenue.

Bedford Avenue south of Division Street does not allow parking on the west curb from 7 a.m. to 10 a.m. while Lee Avenue south of Division Street does not allow parking on either curb from 4 p.m. to 7 p.m.

There is a school bus parking layover area located on the west curb of Williamsburg Street E between Bedford Avenue and Lee Avenue. However, buses were observed on both curbs of Williamsburg Street E between Bedford Avenue and Marcy Avenue. School buses are allowed to park on the street within the property line of schools. However many buses were observed parked throughout the study area outside the limits of school property lines.

Truck loading/unloading zones are located on Park Avenue at Walworth St; on Flushing Av at Walworth Street; at Whipple Street and at Taffe Place; on Broadway at Wallabout Street and Bedford Avenue; and on Wythe Avenue at Division Avenue.

Figure 6-2: Parking Restrictions

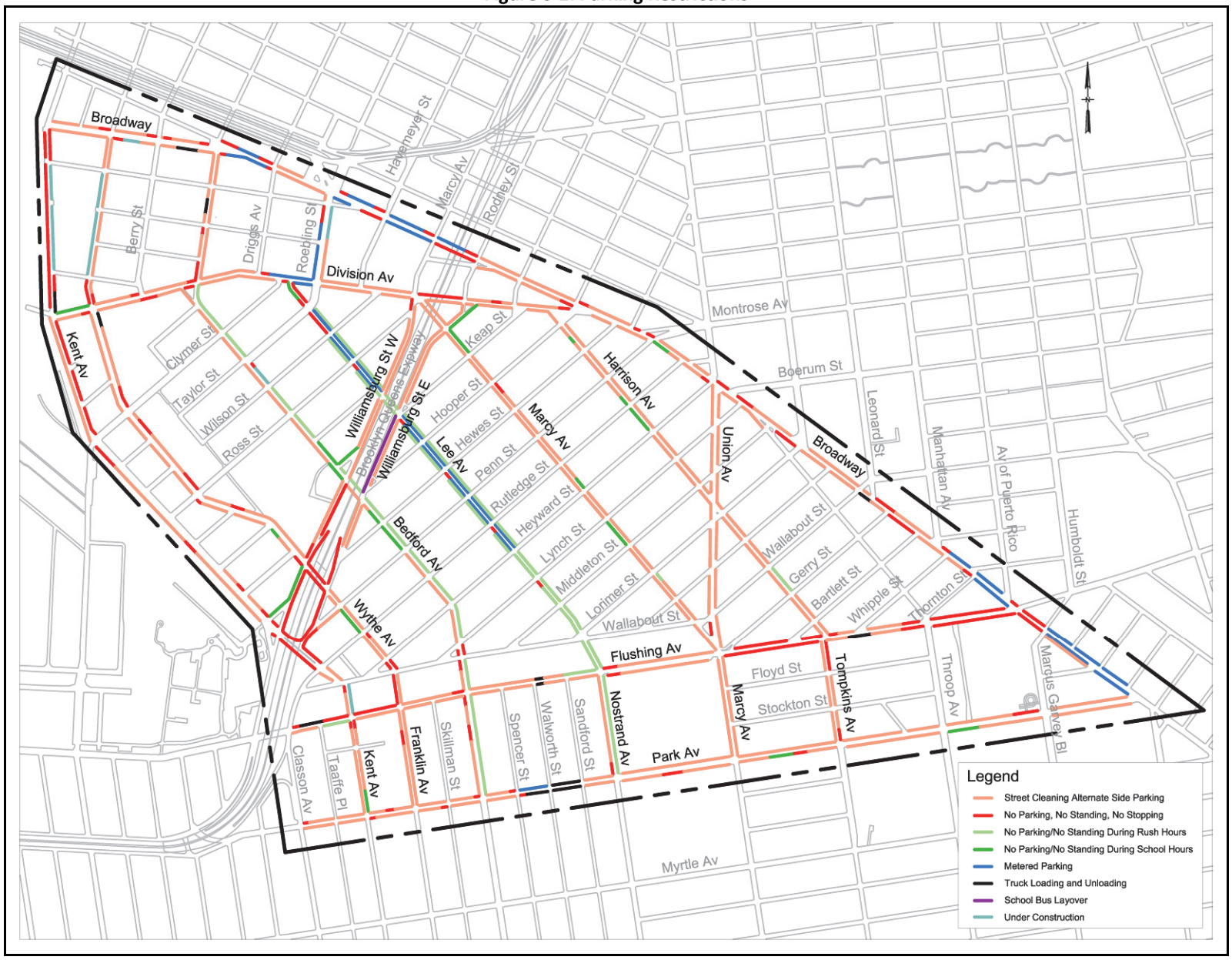


Table 6-2 shows the parking capacity and demand, metered parking spaces as well as the observed standing, double parking, permitted vehicles and school buses parked along the major corridors.

There are approximately 2,746 and 2,829 on-street parking spaces in the study area available in the AM and PM peak hours, respectively, of which 250 are metered spaces. The average parking utilization for the entire study area is approximately 92% and 80% during the AM and PM peak hours, respectively.

The parking survey showed that Bedford Avenue was over capacity in the AM when parking was restricted on the west curb while Lee Avenue was over capacity in the PM peak hour when parking is largely restricted on both curbs.

Illegal parking was observed on Kent Avenue in the AM peak period, likely due to construction vehicles parked in construction areas in the northern segments of Kent Avenue.

Figures 6-3 and 6-4 show the utilization of each street segment on the major corridors during the AM and PM peak periods, respectively. Segments designated as “over capacity” were 95% of the spaces filled or one less than capacity. Segments identified as under capacity had less than 80% of the spaces filled.

Table 6-2: Parking Capacity and Demand by Corridor

Corridor	Meters	AM								PM							
		Cap	Dem	UTZ	DP	Illegal	Standing	Bus	Permit	Cap	Dem	UTZ	DP	Illegal	Standing	Bus	Permit
Kent Ave	-	179	172	96.1%	-	25	2	1	1	179	127	70.9%	1	7	2	2	-
Wythe Ave	-	333	273	82.0%	-	1	6	1	-	333	205	61.6%	-	6	3	11	-
Bedford Ave	-	211	231	109.5%	3	4	-	7	5	319	249	78.1%	4	6	-	7	-
Lee Ave	117	222	176	79.3%	1	-	1	12	-	64	78	121.9%	2	4	12	4	-
Marcy Ave	-	238	238	100.0%	-	2	2	9	-	253	172	68.0%	1	-	-	5	-
Harrison Ave	-	183	168	91.8%	-	3	2	2	-	189	143	75.7%	7	2	-	3	2
Union Ave	-	115	95	82.6%	-	1	-	1	-	115	63	54.8%	1	-	-	1	-
Broadway	104	259	232	89.6%	1	5	4	-	-	343	281	81.9%	-	8	1	-	-
Williamsburg W	-	114	116	101.8%	-	-	4	7	-	123	111	90.2%	1	1	1	6	-
Williamsburg E	-	139	120	86.3%	-	1	2	31	-	139	125	89.9%	-	2	-	48	-
Division Ave	11	209	194	92.8%	1	3	1	5	3	209	184	88.0%	2	5	2	3	5
Flushing Ave	9	196	184	93.9%	-	3	7	-	-	201	187	93.0%	5	10	3	1	6
Park Ave	9	348	323	92.8%	5	2	2	2	9	362	348	96.1%	12	9	7	1	4
Total	**250**	**2,746**	**2,522**	91.8%	**11**	**50**	**33**	**78**	**18**	**2,829**	**2,273**	80.3%	**36**	**60**	**31**	**92**	**17**

Figure 6-3: On-Street Parking; AM Utilization

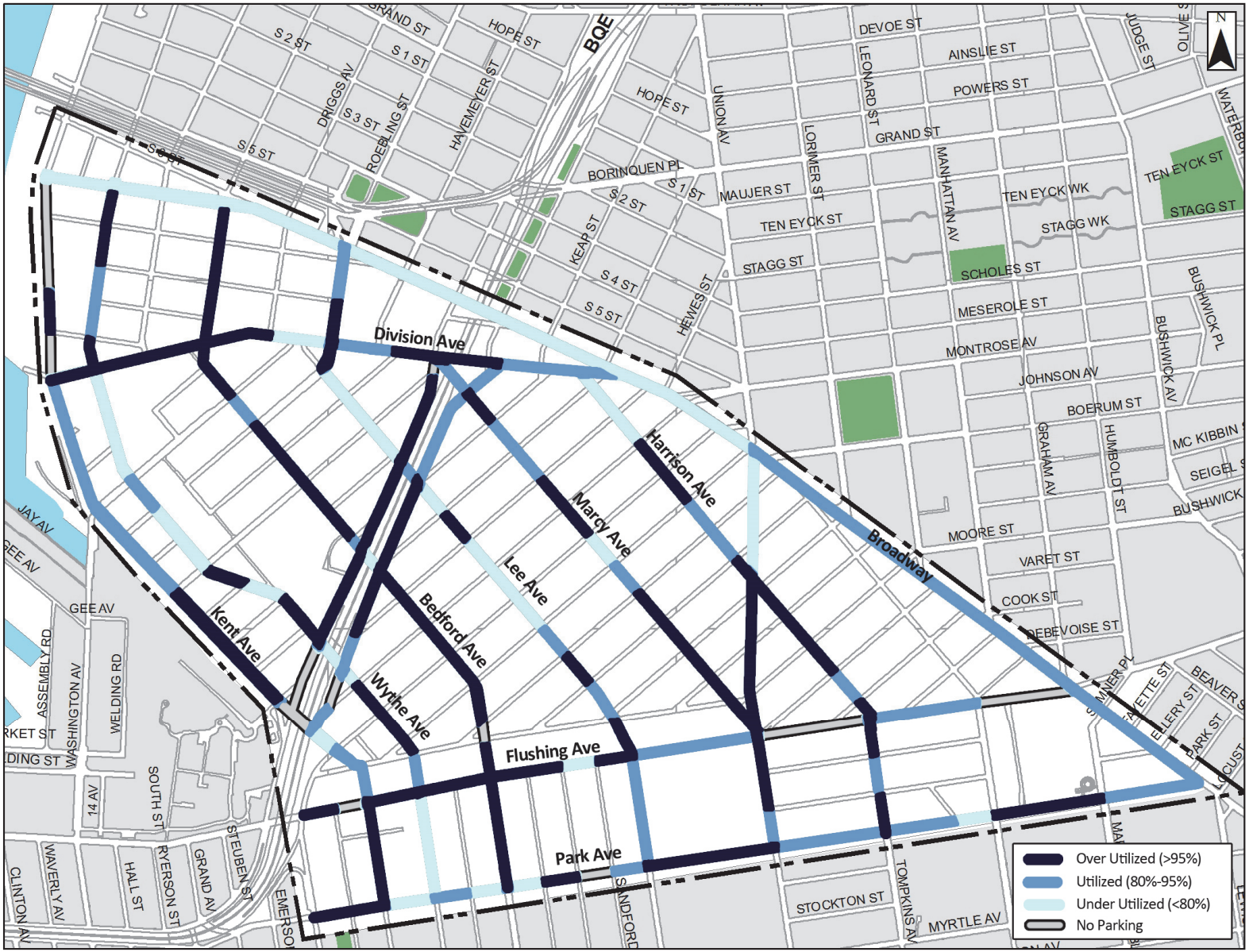
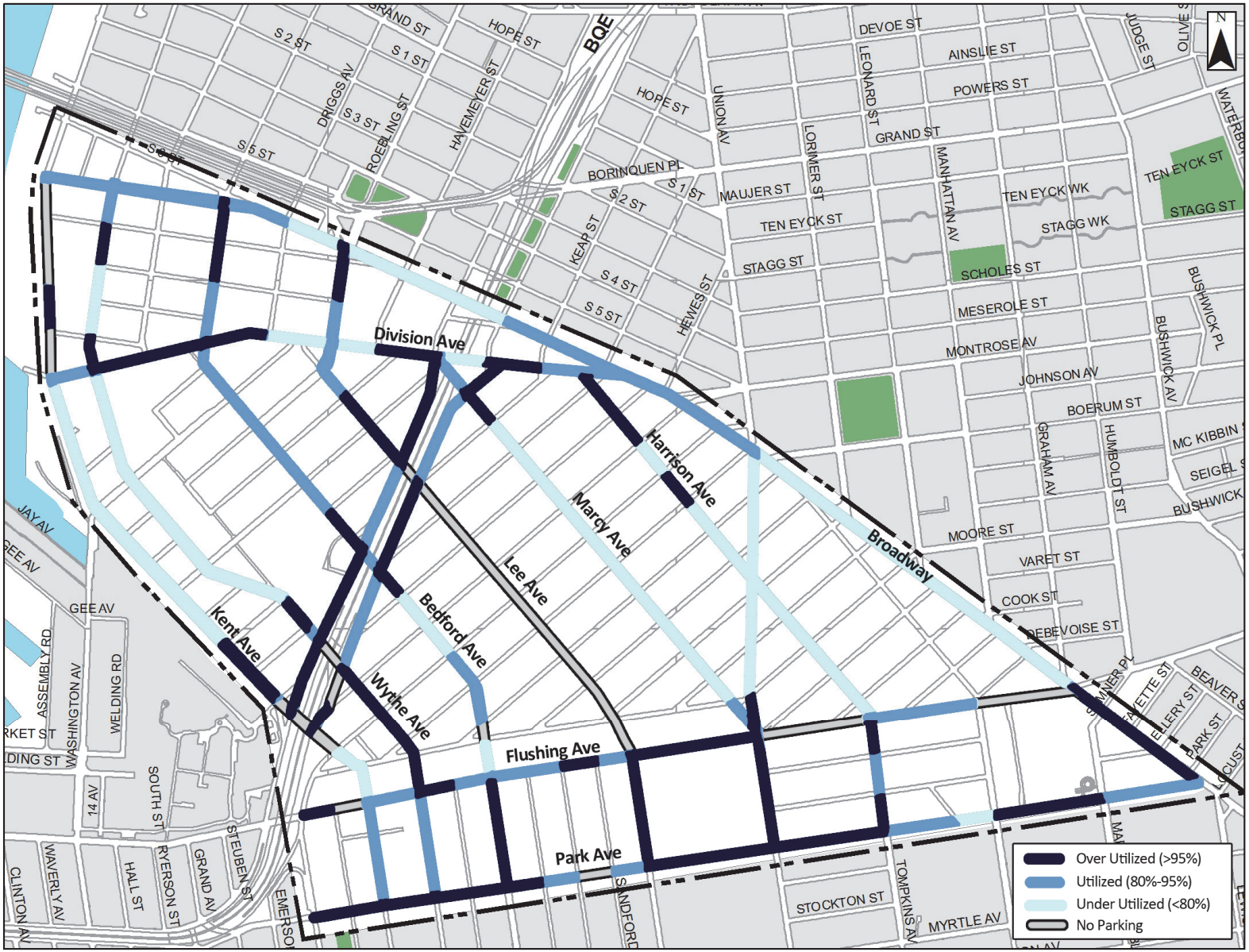


Figure 6-4: On-Street Parking; PM Utilization



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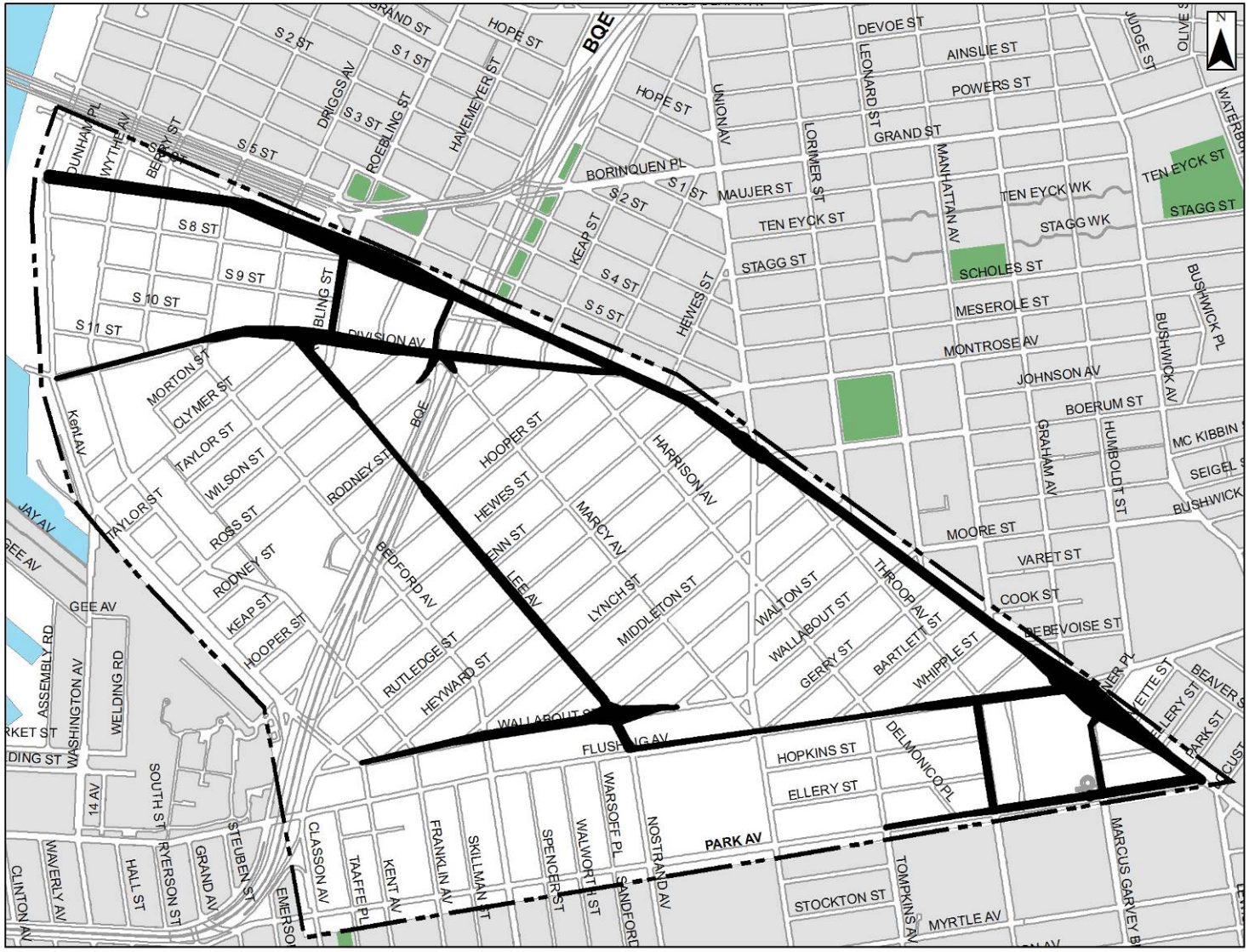
7 PEDESTRIAN AND BICYCLE

7.1 Introduction

When considering various modes of travel, walking and bicycle share can be significant and play a vital role in managing congestion. NYC has one of the highest 'walk' mode shares of all major cities in the United States for journey to work. Also as seen in the demographics chapter, nearly 30% of the area residents walk to work compared to 10% on average in New York City. Trips associated with residential, commercial, and institutional uses account for a majority of the pedestrian traffic within the study area. Each pedestrian trip contributes to the pedestrian traffic seen in crosswalks, corners, and sidewalks.

Figure 7-1 shows basic pedestrian flows within the study area. The highest pedestrian volumes were observed along Broadway which has a large amount of commercial uses as well as several subway stations and bus stops. The bus depot at Broadway and Havemeyer Street was a major pedestrian trip generator with approximately 1,100 pedestrians in the crosswalk in the AM peak hour while Woodhull Hospital and the Flushing Avenue subway station also drew pedestrian trips at Flushing Avenue and Broadway which had approximately 950 pedestrians in the crosswalk in the AM peak hour. Commercial uses, schools and places of worship attract pedestrians along Division Avenue near Roebling Street and along Wallabout Street and Lee Avenue.

Figure 7-1: Pedestrian Flow



7.2 Existing Conditions Pedestrian Analysis

The pedestrian analysis focused on the crosswalks at select intersections (major corridors, adjacent to schools, subway, or transfer points and potential safety improvement locations). Pedestrian counts were conducted at 18 intersections along major corridors during the weekday AM and PM peak hours. The intersections are listed below and the AM and PM crosswalk volumes are shown in Figures 7-2 and 7-3.

- Division Avenue and Clymer Street
- Division Avenue and Lee Avenue
- Division Avenue and Roebling Street
- Division Avenue and Marcy Avenue
- Division Avenue and Hooper Street
- Lee Avenue and Wilson Street
- Lee Avenue and Taylor Street
- Lee Avenue and Wallabout Street
- Bedford Avenue and Taylor Street
- Flushing Avenue and Wythe Avenue/ Franklin Avenue
- Kent Avenue and Classon Avenue
- Kent Avenue and Williamsburg Street E
- Park Avenue and Taaffe Place
- Park Avenue and Kent Avenue
- Park Avenue and Bedford Avenue
- Park Avenue and Tompkins Avenue
- Park Avenue and Throop Avenue
- Park Avenue and Marcus Garvey Boulevard

Figure 7-2: 2015 Pedestrian Volume AM

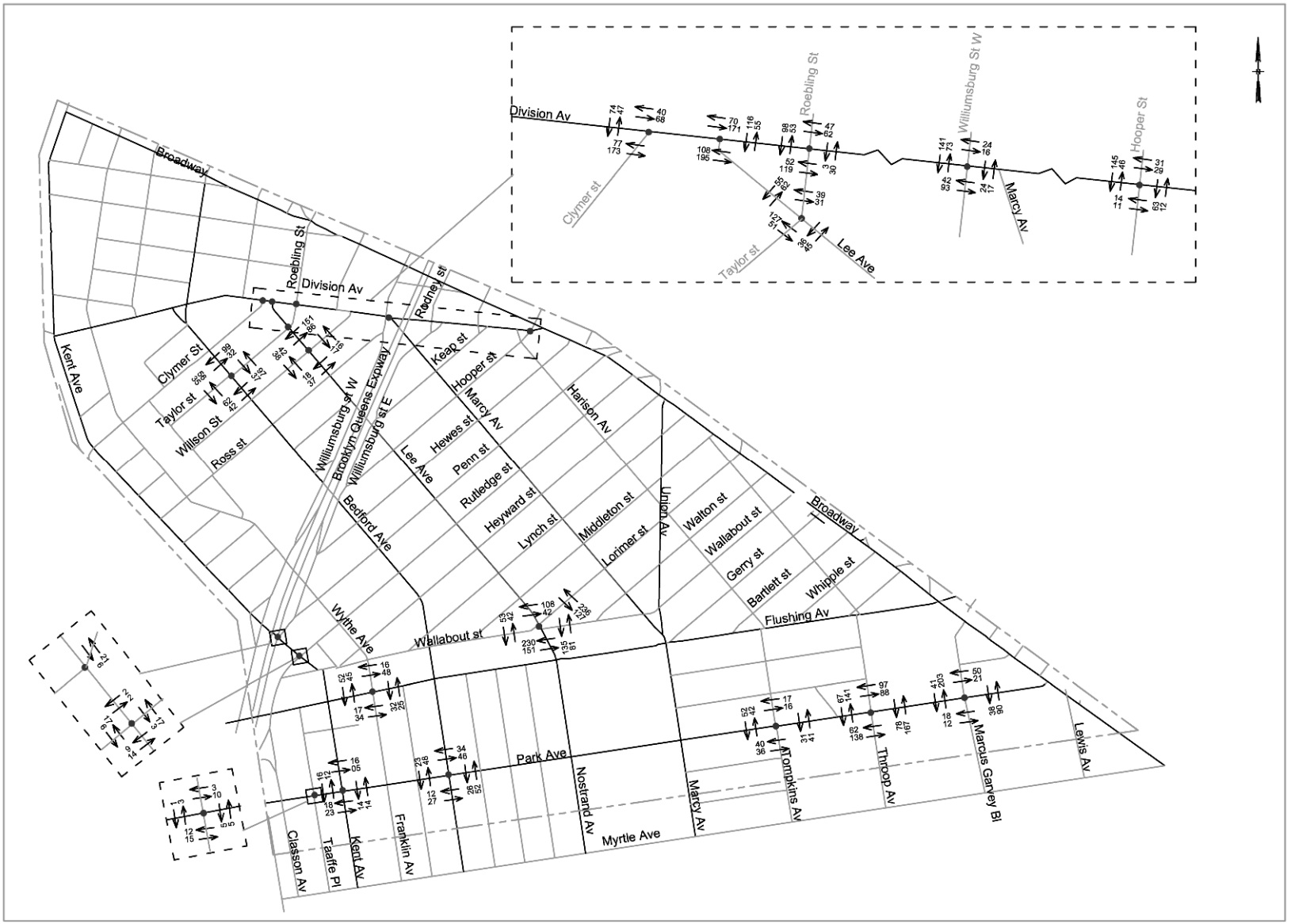
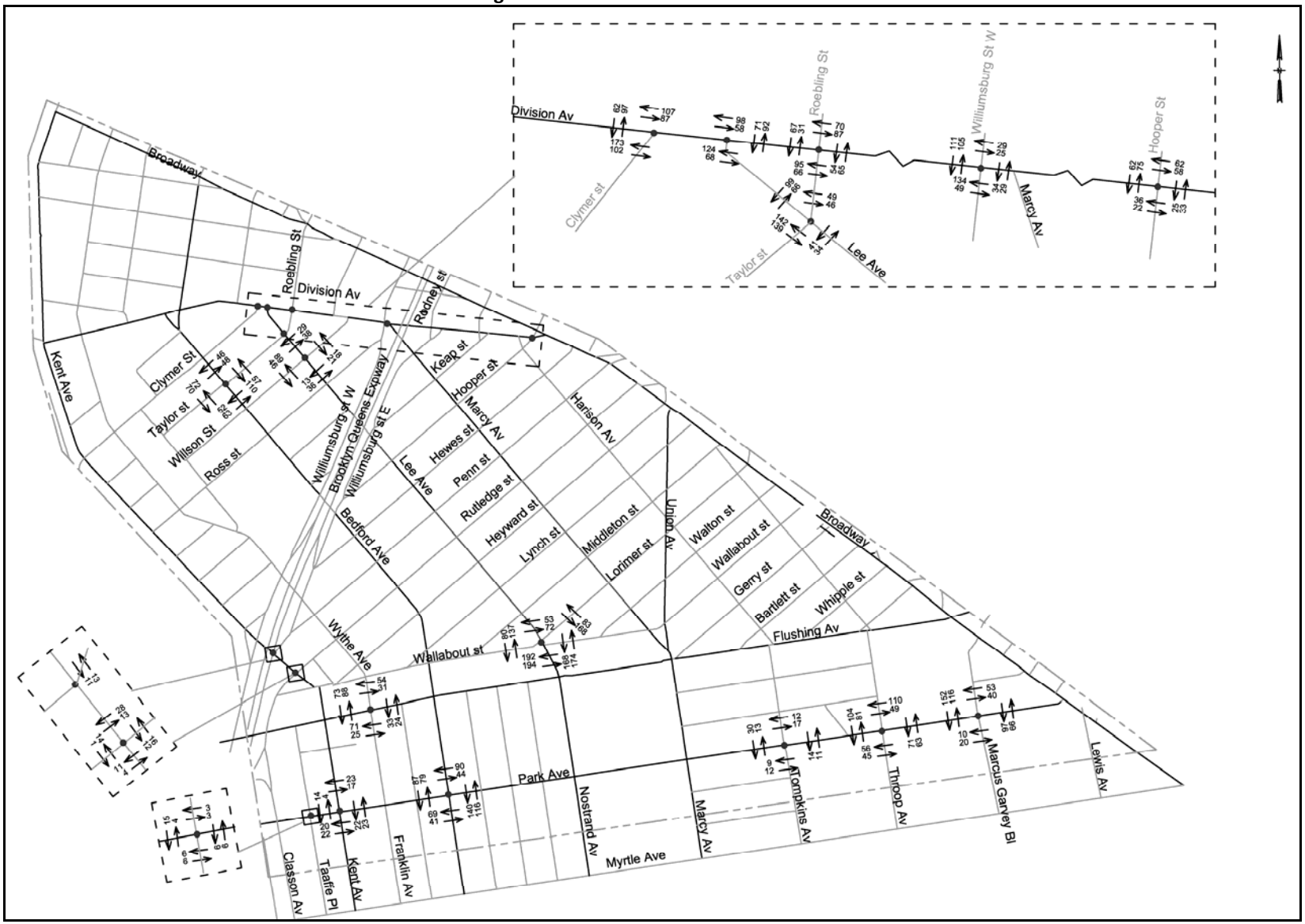


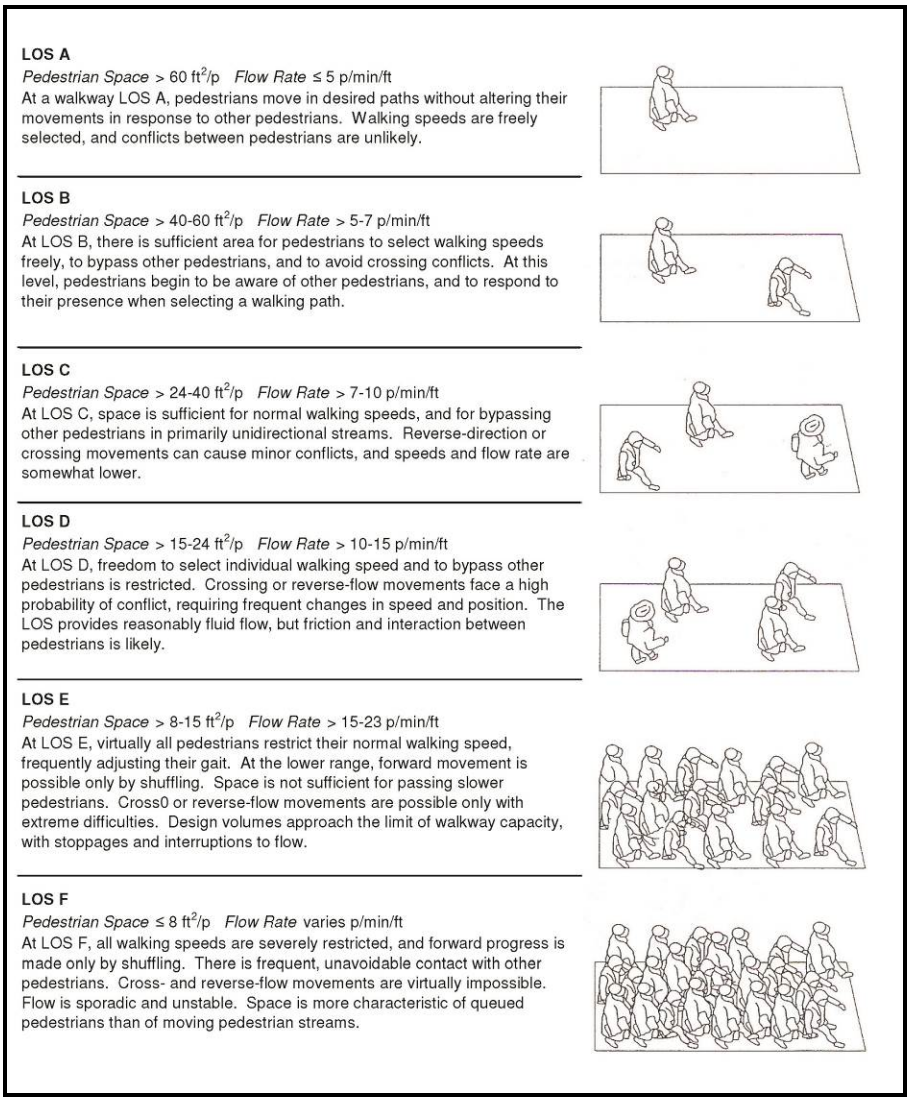
Figure 7-3: 2015 Pedestrian Volume PM



Level of Service Analysis & Methodology

The Highway Capacity Manual methodology was used to determine pedestrian level of service at the crosswalks and corners for the sixteen intersections selected. The analysis examined the crosswalk level of service (LOS) for the AM and PM peak hours. The pedestrian LOS is measured in terms of square feet of space per pedestrian (SF/P), as indicated in Figure 7-4. This indicates the quality of pedestrian movement and comfort, and is defined in a density-comfort relationship. Pedestrian volumes were collected in 15-minute increments during the weekday peak hours – 7:30 a.m.-8:30 a.m. and 4:30 p.m.-5:30 p.m.

Figure 7-4: Pedestrian Level of Service (LOS) Criteria



Although counts were conducted at 18 intersections, only signalized intersections were analyzed. The analysis showed all the crosswalks analyzed have LOS A exept the south crosswalk at the intersection of Wallabout Street and Lee Avenue and the west crosswalk at the intersection of Lee Avenue and Taylor Street that have LOS B during one of the peak periods. Table 7-1 shows the results of the crosswalk LOS analysis.

Table 7-1: Existing Crosswalk Level of Service

Location	Intersection	Crosswalk	AM		PM	
			SF/P	LOS	SF/P	LOS
1	Park Ave and Marcus Garvey Blvd	North	296.3	A	241.0	A
		South	768.0	A	804.8	A
		East	237.8	A	232.9	A
		West	113.2	A	122.0	A
2	Park Ave and Throop Ave	North	134.5	A	162.5	A
		South	150.3	A	268.6	A
		East	95.0	A	189.6	A
		West	132.3	A	188.8	A
3	Park Ave and Tompkin Ave	North	412.6	A	759.5	A
		South	194.9	A	598.3	A
		East	561.3	A	1082.6	A
		West	315.4	A	1053.8	A
4	Park Ave and Bedford Ave	North	301.1	A	158.5	A
		South	374.9	A	219.8	A
		East	280.3	A	113.3	A
		West	356.6	A	187.1	A
5	Park Ave and Kent Ave	North	1574.9	A	894.2	A
		South	697.9	A	620.3	A
		East	728.9	A	678.9	A
		West	717.3	A	1764.5	A
6	Park Ave and Taaffe PL	North	1325.5	A	3674.9	A
		South	803.2	A	1861.9	A
		East	2602.0	A	1950.5	A
		West	1859.3	A	550.5	A
7	Flushing Ave and Franklin Ave	North	539.6	A	299.8	A
		South	540.2	A	216.8	A
		East	352.1	A	449.0	A
		West	202.2	A	188.7	A
8	Bedford Ave and Taylor St	North	271.8	A	542.1	A
		South	639.1	A	601.9	A
		East	136.2	A	87.8	A
		West	178.4	A	104.4	A
9	Lee Ave and Wallabout St	North	150.3	A	151	A
		South	55.4	B	58.4	B
		East	241.7	A	145.2	A
		West	342.9	A	146.9	A
10	Lee Ave and Wallabout St/Lorimer St	North	150.3	A	151	A
		South	55.4	B	52.0	B
		East	133.1	A	210.5	A
		West	342.9	A	146.9	A
10	Lee Ave and Taylor St/Roebling St	North	230.1	A	143.9	A
		South	309.7	A	320.4	A
		East	182.5	A	76.7	A
		West	93.1	A	56.0	B
11	Lee Ave and Wilson St	North	151.1	A	422.6	A
		South	431.2	A	588.1	A
		East	1189.4	A	1110.0	A
		West	476.0	A	356.5	A
13	Division Ave and Robling st	North	156.3	A	212.9	A
		South	679.4	A	179.6	A
		East	329.7	A	242.8	A
		West	287.7	A	438.6	A

7.3 Future Conditions Pedestrian Analysis

Pedestrian volumes are expected to increase in the area resulting from new developments and economic growth. The 2024 future pedestrian volumes were projected using .5% per year for the first five years and .25% per year for the next five years as recommended in the CEQR Technical Manual. 2024 pedestrian volumes are shown in Figures 3-5 and 3-6 and the projected crosswalk LOS is shown in Table 7-2.

Figure 7-5: 2025 Pedestrian Volume AM

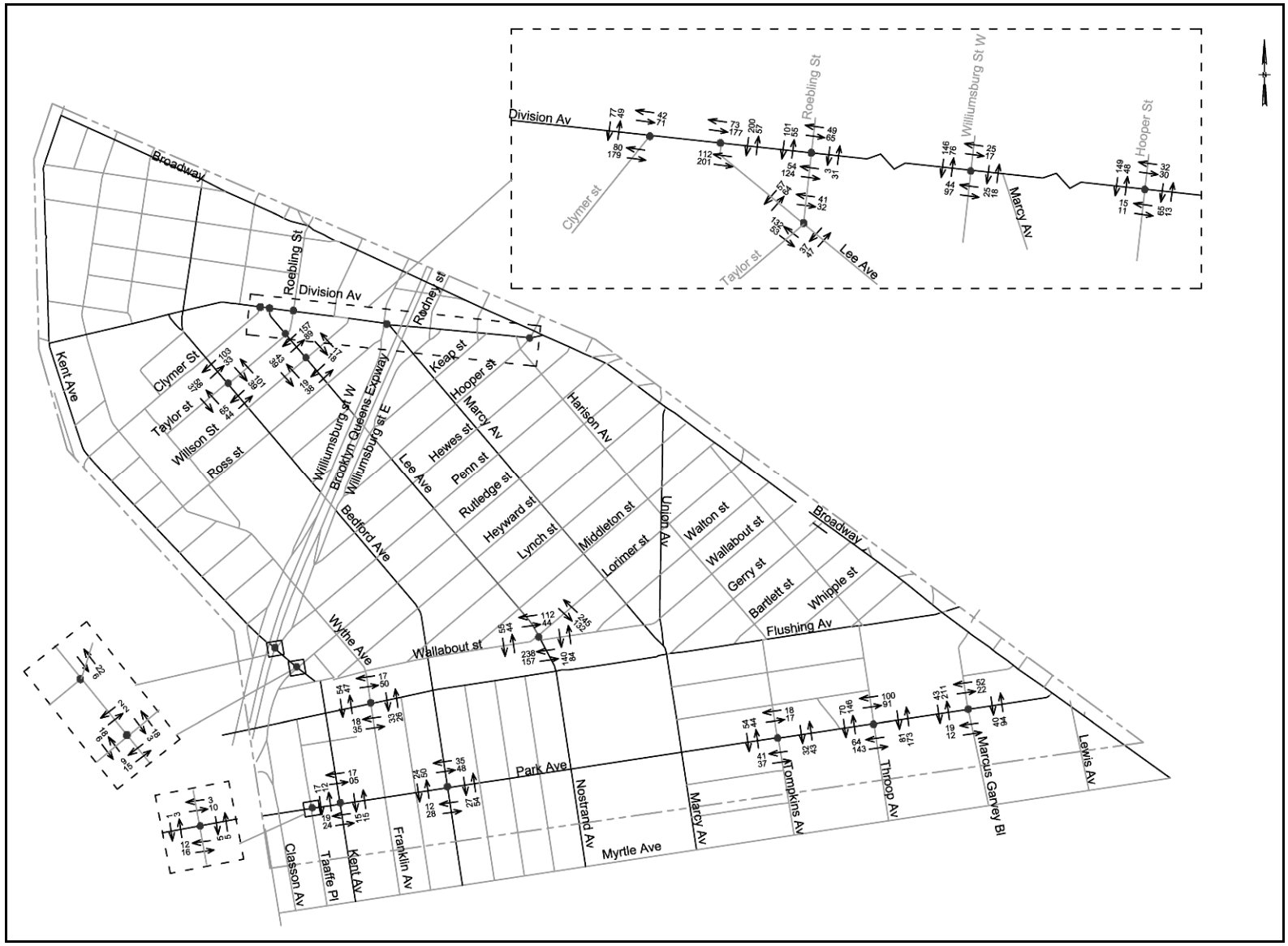


Figure 7-6: 2025 Pedestrian Volume PM

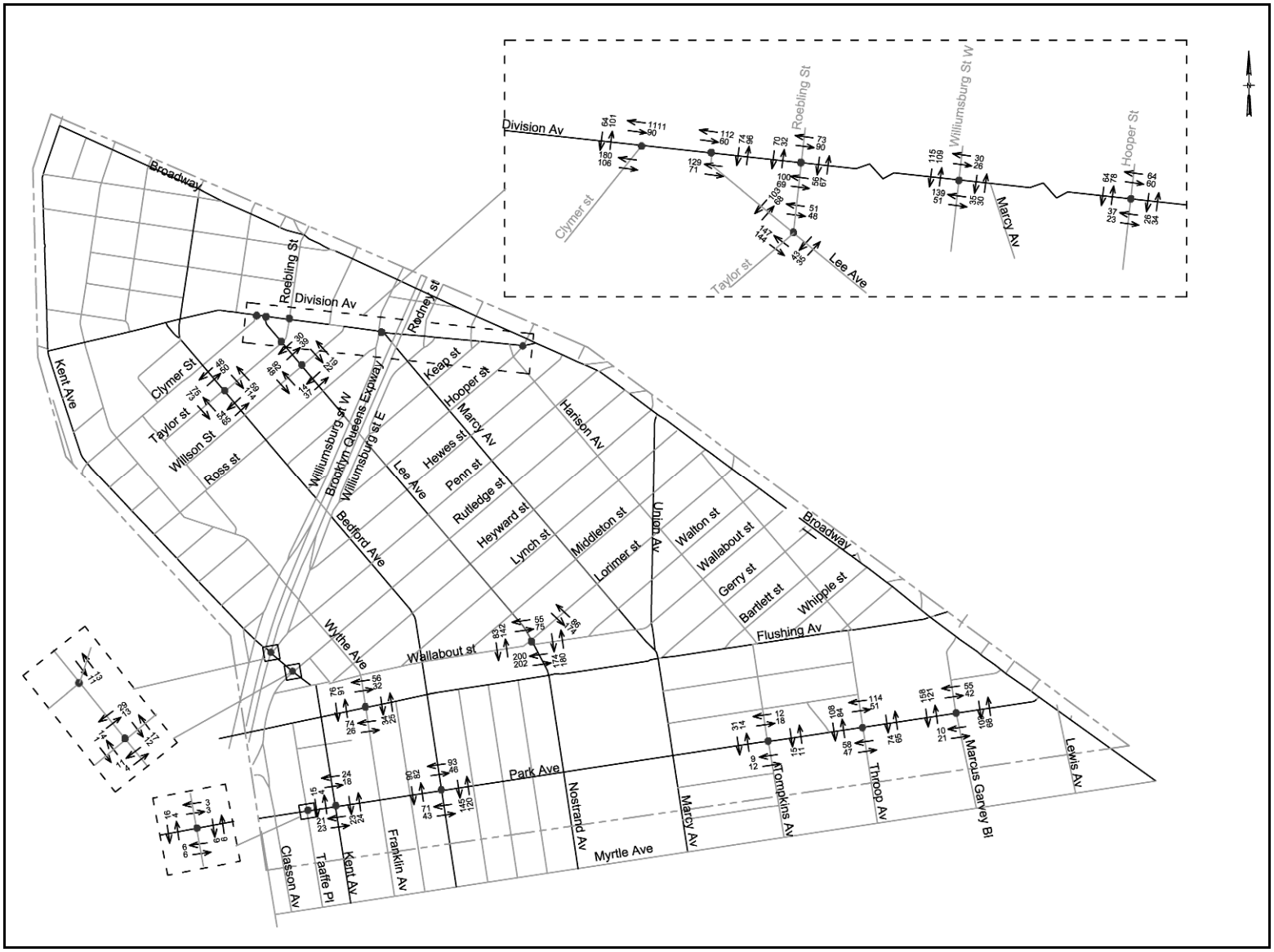


Table 7-2: 2025 Projected Crosswalk Level of Service

Location	Intersection	Crosswalk	AM		PM	
			SF/P	LOS	SF/P	LOS
1	Park Ave and Marcus Garvey Blvd	North	284.1	A	231.1	A
		South	739.4	A	781.9	A
		East	227.0	A	221.9	A
		West	108.6	A	117.0	A
2	Park Ave and Throop Ave	North	130.3	A	156.5	A
		South	145.0	A	258.2	A
		East	91.5	A	182.7	A
		West	127.2	A	181.8	A
3	Park Ave and Tompkin Ave	North	388.9	A	737.7	A
		South	189.8	A	598.3	A
		East	539.5	A	1040.0	A
		West	302.4	A	1004.5	A
4	Park Ave and Bedford Ave	North	290.0	A	152.6	A
		South	364.4	A	212.4	A
		East	269.6	A	109.2	A
		West	341.9	A	192.1	A
5	Park Ave and Kent Ave	North	1503.8	A	850.3	A
		South	665.5	A	592.1	A
		East	679.9	A	649.8	A
		West	693.9	A	1695.5	A
6	Park Ave and Taaffe PL	North	1325.5	A	3674.9	A
		South	803.7	A	1861.9	A
		East	2602.0	A	1950.5	A
		West	2790.3	A	522.2	A
7	Flushing Ave and Franklin Ave	North	1123.9	A	289.4	A
		South	663.5	A	207.9	A
		East	666.2	A	433.6	A
		West	693.8	A	181.8	A
8	Bedford Ave and Taylor St	North	261.7	A	519.8	A
		South	609.5	A	581.3	A
		East	130.1	A	84.6	A
		West	170.9	A	100.1	A
9	Lee Ave and Wallabout St	North	144.3	A	145	A
		South	53.3	B	55.9	B
		East	232.9	A	140.1	A
		West	328.5	A	141.4	A
10	Lee Ave and Wallabout St/Lorimer St	North	144.3	A	145	A
		South	53.3	B	49.8	B
		East	227.0	A	145.3	A
		West	328.5	A	141.4	A
10	Lee Ave and Taylor St/Roebling St	North	370.3	A	237	A
		South	127.9	A	80.8	A
		East	151.6	A	95.0	A
		West	128.6	A	93.9	A
11	Lee Ave and Wilson St	North	110.6	A	410.1	A
		South	416.1	A	562.1	A
		East	1121.3	A	1055.4	A
		West	464.3	A	343.3	A
13	Division Ave and Robling st	North	205.6	A	115.4	A
		South	106.5	A	117.9	A
		East	1208.8	A	314.7	A
		West	324.7	A	699.8	A

7.4 Bicycle Lanes and Paths

The study area has several bike lanes and bike routes and Kent Avenue is part of the Brooklyn Greenway Initiative which is a planned 14 mile pedestrian and bicycle route connecting communities along the Brooklyn waterfront. The existing bike lanes and routes are listed below and shown in Figure 7-4.

- Kent Avenue has a two-way bike lane which is buffered by a parking lane north of Clymer Street.
- Wythe Avenue has a southbound bike lane which turns into a shared bike route between Division Avenue and Ross Street.
- Above Division Ave, Berry Street and Driggs Avenue have 5'0" northbound and southbound bike lanes, respectively.
- Throop Avenue has a northbound bike lane that connects to Manhattan Avenue north of the study area.
- Lorimer Street has a 5'-0" striped southbound bike lane that connects to Thompkins Avenue within the study area.
- Flushing Avenue is a shared westbound bike route between Bedford Avenue and Classon Avenue.
- Bedford Avenue has a northbound bike lane that begins south of the study area and ends at Flushing Avenue.

Figure 7-7: Existing Bike Facilities

8 CRASH/SAFETY ANALYSIS

8.1 Introduction

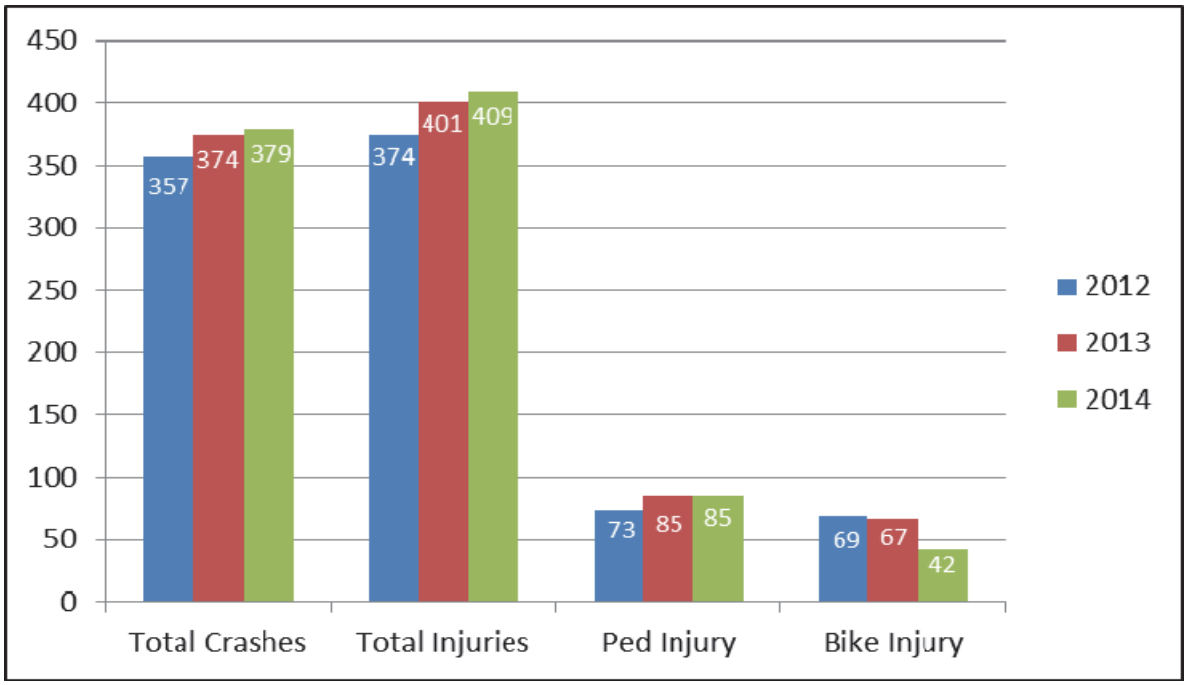
The analysis of crashes and safety is an important component in traffic and transportation planning studies, as transportation related crashes can lead to loss of life and/or property damage. The purpose of this analysis is to identify safety issues and if necessary recommend measures to address any potential deficiencies.

In order to identify locations with accident and safety issues in the study area, it was necessary to examine the crash history for patterns. Crash data for the most recent three years (2012 to 2014) was assembled and analyzed. These records were collected from the New York City Department of Transportation (NYCDOT) accident database, which includes data from the New York State Department of Motor Vehicle (NYSDMV) and New York City Police Department (NYPD). The data provides information on location, severity, collision type, time of crash, and other pertinent factors such as weather conditions.

8.2 Crashes 2012-2014

Crash records were examined for 182 intersections within the study area for the period 2012-2014. There were 1,110 crashes resulting in 1,184 injuries to the driver or vehicle passenger, 243 pedestrian injuries and 178 bicyclist injuries. The data shows that total reportable crashes increased 5% from 2012 to 2013 and by 1% from 2013 to 2014. A similar pattern can be seen with respect to injuries and pedestrian crashes. However, bicycle injuries decreased 37% from 2013 to 2014. Figure 8-1 shows the total reportable crashes that occurred at the 182 analyzed intersections from 2012 to 2014.

Figure 8-1: Accidents by Year (2012-2014)



Pedestrians were involved in 21% of all crashes in the study area while bicyclists were involved in 15% between 2012 and 2014. Six percent of all injuries were severe Type A injuries (involved a bleeding wound or the person was carried away from the scene), 14% were Type B injuries (bruises), 80% were Type C severity (no visible injuries), while 257 accidents involved property damage only ($1,000 damage or more). The three most common collision types were rear end accidents (15%), right angle accidents (10%) and overtaking (9%).

Table 8-1: Study Area Injury Severity (2011 – 2013)

Type A	Type B	Type C
6%	14%	80%

8.3 High Crash Locations

After reviewing all intersections in the study area for the most recent three years (2012-2014), one intersection was identified as a "High Crash Locations"; which is characterized as five or more pedestrian or bike crashes or 23 or more reportable crashes in any one year between 2012 and 2014. Flushing Avenue and Broadway had five pedestrian crashes in 2013 and eight

pedestrian crashes in 2014. Table 8-3 shows the total crashes, injuries and bike and pedestrian injuries at the High Crash Location.

Table 8-2: High Crash Location (2012-2014)

Intersection	Crashes			Injury			Ped Injuries			Bike Injuries		
	2012	2013	2014	2012	2013	2014	2012	2013	2014	2012	2013	2014
Flushing Ave & Broadway	14	16	20	13	17	23	3	5	8	4	2	2

Table 8-3 shows injury severity, collision type and time of day data for the High Crash Location while figure 8-2 shows the location of the High Crash Locations in addition to locations with fatalities from 2010 – 2015.

Table 8-3: High Crash Location Statistics (2012-2014)

Intersection	Injury Type				Collision Type			Time of Day			
	Fatal	A	B	C	Rear	Overtaking	Left	AM	Midday	PM	Night
Flushing Ave & Broadway	1	4	4	44	5	7	4	11	14	11	13

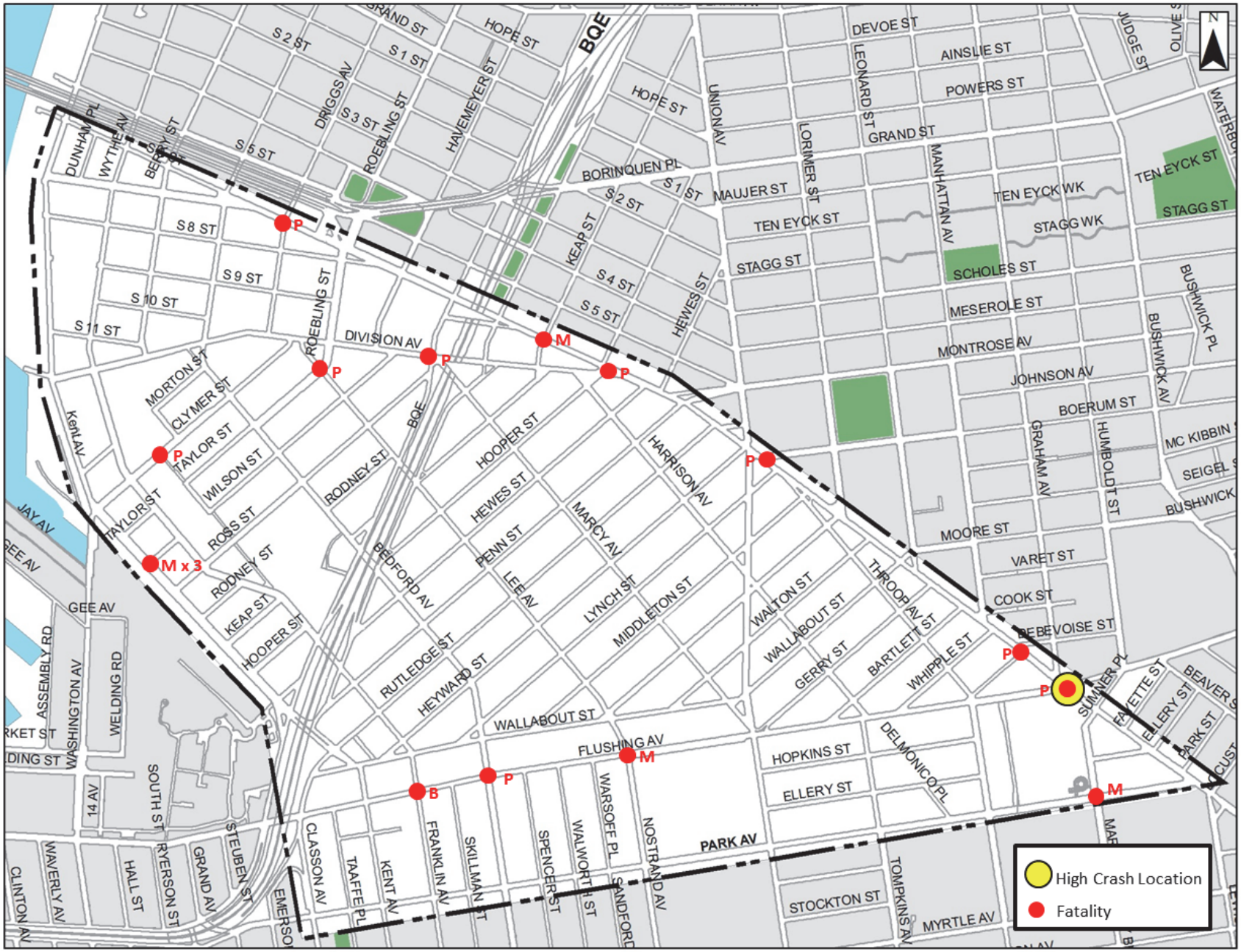
8.4 Fatalities & Injuries

Between 2011 and 2015 (May), there were 16 fatalities including six motorists, nine pedestrians and one bicyclist. Nine fatalities occurred along Broadway and Flushing Avenue including 5 on Broadway, three on Flushing Avenue and one at the intersection of Broadway and Flushing Ave. Three vehicle occupants died in a single crash on Kent Avenue and Wilson Street in 2013. Table 8-4 provides additional crash statistics at the fatality locations, while figure 8-2 identifies both High Crash Locations and fatality locations.

Table 8-4: Crash Statistics at Fatality Locations

Location	Fatality					2012-2014				
						Crash	Injury Type			PDO
	2011	2012	2013	2014	2015		A	B	C	
Broadway and Driggs Av	1 (Ped)	0	0	0	0	5	0	0	3	2
Broadway and Keap Ave	0	0	1 (Veh)	0	0	13	1	2	15	1
Broadway and Hooper St	0	0	1 (Ped)	0	0	13	1	2	5	4
Broadway and Lynch St	0	0	1 (Ped)	0	0	2	0	1	2	0
Broadway and Thornton St	0	1 (Ped)	0	0	0	12	0	1	13	1
Broadway and Flushing Ave	0	0	0	1 (Ped)	0	50	4	4	44	8
Roebling St and Lee Ave	1 (Ped)	0	0	0	0	3	0	1	2	0
Division and Marcy Ave	0	0	1 (Ped)	0	0	14	2	5	4	3
Clymer St @Independance Tower Walkway	0	1 (Ped)	0	0	0	2	0	0	2	1
Kent Ave and Wilson St	0	0	3 (Veh)	0	0	1	1	0	0	0
Flushing Ave and Franklin Ave	0	1 (Bike)	0	0	0	12	1	1	8	1
Flushing Ave and Bedford Ave	1 (Ped)	0	0	0	0	18	3	4	12	2
Flushing Ave and Lee Ave	0	0	0	0	1 (Veh)	24	2	3	19	4
Park Ave and Marcus Garvey Blvd	0	1 (Veh)	0	0	0	9	0	0	9	2

Figure 8-2: High Crash Locations (2012-2014) and Fatalities (2010-2015)



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9 GOODS MOVEMENT

9.1 Introduction

New York City is heavily dependent on trucks to supply the city with goods and services. This makes truck traffic and associated terminals especially important in transportation analyses. Their presence in the traffic network impacts traffic conditions and contributes to congestion, affecting traffic flows. Adequate space for truck loading and unloading is necessary, and there are numerous quality of life issues created by truck traffic, including noise and air pollution.

9.2 Truck Routes

There are several local and through truck routes distributed on both north-south and east-west corridors. Figure 9-1 shows the truck routes in the study area which are:

North-South through Truck Routes:

- Brooklyn Queens Expressway between Kent Avenue to Broadway.

North-South Local Truck Routes:

- Kent Avenue between Broadway and Park Avenue;
- Bedford Avenue between Taylor Street and Park Avenue;
- Lee Avenue between Taylor Street and Park Avenue;
- Harrison Avenue between Union Avenue and Flushing Avenue;
- Union Avenue between Broadway and Flushing Avenue;
- Roebling Street/Taylor Street between Broadway and Bedford Avenue;
- Williamsburg Street W between Broadway and Kent Avenue
- Williamsburg Street E/ Rodney Street between Broadway and Kent Avenue

East-West Local Truck Routes:

- Flushing Avenue between Williamsburg Street W and Broadway ;
- Broadway between Kent Avenue and Park Avenue

9.3 Truck Traffic

The study area's proximity to regional access points such as the Williamsburg Bridge and the convergence of through and local truck routes along the Williamsburg Street W and Williamsburg Street E, Flushing Avenue, Kent Avenue, Lee Avenue, Broadway and Bedford Avenue lead to a significant amount of truck traffic on the study area's streets. Truck volume counts were conducted at 32 locations during the various peak periods (7:30AM-8:30AM and 4:30PM-5:30PM weekdays). Trucks made up 6.5% and 5.0% of the total traffic during the AM and PM peak hours, respectively. See Table 9-1.

Table 9-1: Truck Volumes by Peak Period

	AM	PM
Total Traffic	32,028	35,041
Trucks	2,097	1,735
% Trucks	6.5%	5.0%

Corridors in the study area that received the highest number of trucks are the Flushing Avenue, Kent Avenue and Wythe Avenue. Figures 9-2 and 9-3 show truck volumes as a percentage of total traffic volume by corridors during the AM and PM peak hours, while Figures 9-4 and 9-5 show truck volumes at observed intersections during the AM and PM peak hours. Both intersection and corridor analysis show that truck volumes were higher in the AM peak hour and observed truck volumes were highest around the Flushing Avenue/Kent Avenue BQE exit/entrance ramps.

Commercial establishments requiring daily delivery of goods are primarily located along Broadway, Lee Avenue and Division Avenue. These deliveries often involve trucks double parking or standing at curbside and the goods being transferred via handtruck to the stores.

Beside deliveries to commercial establishments, many truck trips in the study area are made to manufacturing uses. Manufacturing zones exist between Flushing Avenue and Park Avenue from Nostrand Avenue and extending westward beyond the study area. Another concentration of manufacturing is located in the Broadway Triangle between Union Avenue and Broadway. Manufacturing uses often require the delivery and pickup of larger and heavier goods which require the use of forklift to transfer the goods.

The Brooklyn Navy Yard is a major truck generator. It has an entrance/exit at Kent Avenue and Clymer Street which generates significant truck trips heading to and from the BQE. Additionally the Williamsburg Bridge which lies just north of South Williamsburg accommodates approximately 3,400 daily truck trips into Manhattan and 2,700 daily truck trips into Brooklyn (NYCDOT 2013). Some of these trips travel to and from the Williamsburg Bridge using the local truck routes on Bedford and Lee Avenues.

Figure 9-1: Truck Routes in Study Area

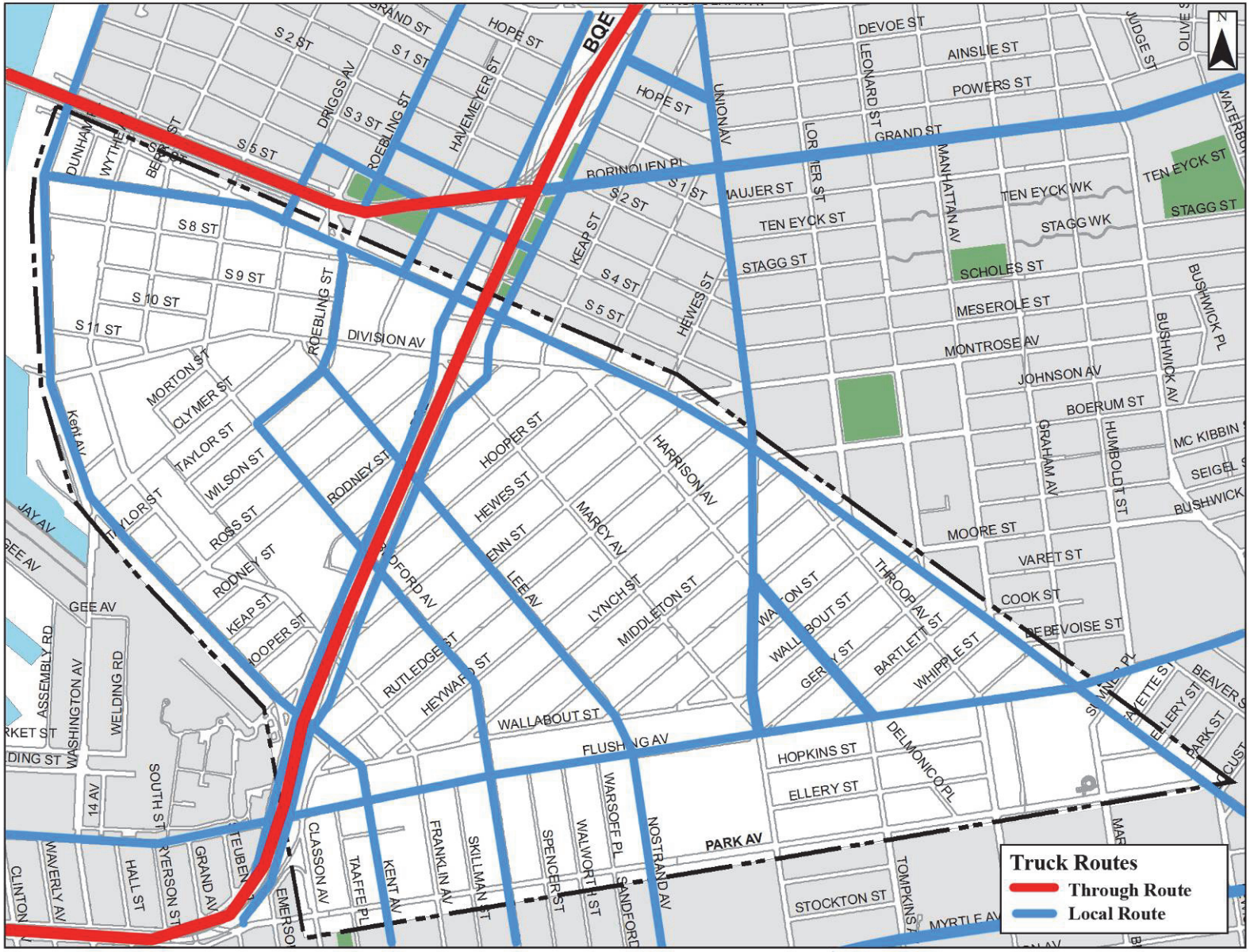

Figure 9-2: Trucks as Percentage of Corridor Traffic - AM

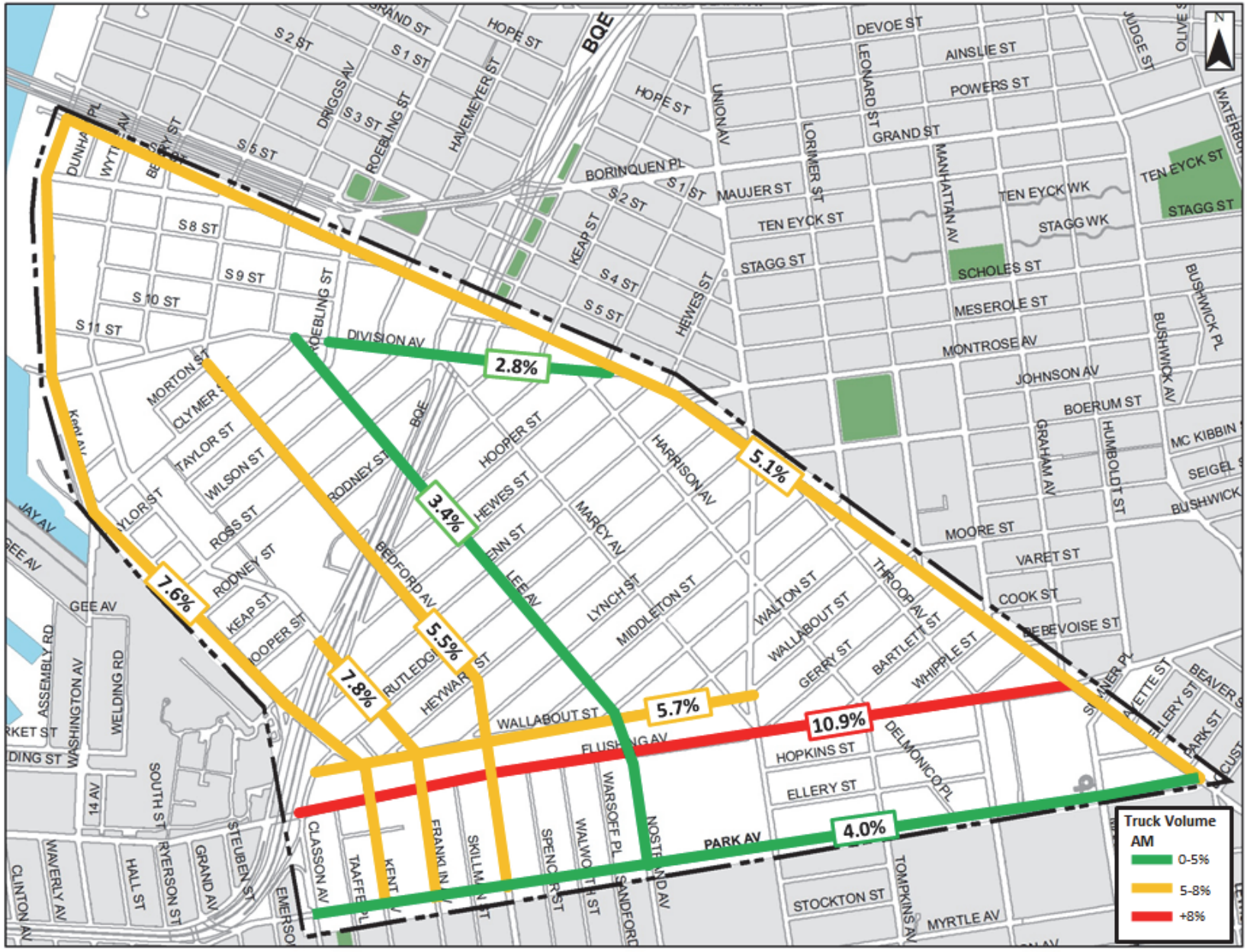

Figure 9-3: Trucks as Percentage of Corridor Traffic - PM

Figure 9-4: Intersection Trucks Volume - AM

Figure 9-5: Intersection Truck Volume - PM

The pictures below show examples of truck traffic and loading & unloading activities in the study area.

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10 PUBLIC OUTREACH AND COMMUNITY INPUT

10.1 Introduction

To ensure ample public participation that addresses community concerns and facilitate community input, NYCDOT, as part of the planning process, hosted a series of technical advisory committee (TAC) meetings and public meetings. Three TAC and four public meetings were held and brief presentation was made to Community Board #1. To kick off the study a TAC meeting was held September 24, 2014 and the first public meeting took place January 2015. The existing conditions were presented to the TAC in October 2015 and to the public in two public meetings held near the end of 2015. The study recommendations were then presented to the TAC and to the public in June 2016 with a second public meeting occurring in September 2016. Following are the notes of meeting for the respective TAC and public meetings.

10.2 Notes of Meeting

- TAC Meeting #1 (Kickoff) – September 24, 2014
- Public Meeting #1 (Kickoff) – January 20, 2015
- TAC Meeting #2 (Existing Conditions) – October 20, 2015
- Public Meeting #2 (Existing Conditions) – November 5, 2015
- Public Meeting #2 (Existing Conditions) – December 17, 2015
- TAC Meeting #3 (Recommendations) – June 9, 2016
- Public Meeting #3 (Recommendations) – June 23, 2016
- Public Meeting #3 (Recommendations) – September 20, 2016

South Williamsburg Transportation Study

Notes of Technical Advisory Committee (TAC) Meeting #1

September 24, 2014 10:00 AM

NYCDOT Traffic Engineering and Planning Unit conducted the first Technical Advisory Committee (TAC) meeting for the South Williamsburg Transportation Study at the Brooklyn Borough Commissioner's Office, 16 Court Street, 16 Fl – Brooklyn, NY. The purpose of the meeting was to introduce the study to the TAC members, present the draft scope of work and receive input from the members of the TAC. The meeting was attended by representatives from Brooklyn Community Board #1, Assemblyman Joseph Lentol's office, NYCDCP, NYSDOT, NYMTC, and NYC Transit and various NYCDOT units.

Following introductions, NYCDOT representative Michael Griffith provided a brief background and context to the study by explaining how studies are generated. His summary was followed by a PowerPoint presentation by Harvey LaReau, the project manager.

The presentation summarized the scope of the study, highlighting the goal and objectives, study area boundaries, subjects of analysis (demographics, zoning and land use, traffic, parking, pedestrians and bicyclists, crashes, transit, and goods movement), data collection plan, other initiatives in the area, and the next steps (study schedule) in the study.

After the presentation which provided the context for an open discussion, attendees were invited to comment or ask questions. Following are pertinent comments and questions.

- A member of Community Board 1 said that school buses are a major contributor to congestion and parking woes in the study area. He asked if the study

would focus on school buses. DOT explained that the presence of school buses in the travel stream and their parking demand would be a part of the study. Other attendees noted that there are many more schools in the study area than were identified in the presentation and that additional information could be obtained from the Department of Education**.**

- In regards to the planned public meeting during the month of October, it was noted that there are Jewish Holidays in October and that any data collection should be avoided during that time.

- The representative from Assemblyman Lentol's office asked whether the data collection is on-going and if the public will have an opportunity to make suggestions. DOT responded in the affirmative stating that data will be collected after hearing from both the TAC and public.

- DOT Borough Commissioner stated that a street directional change may occur on Wallabout Street.

- DCP informed that the area north of the study area was recently rezoned and during the rezoning process they observed as well as heard from developers that there was a lack of connectivity between North and South Williamsburg. They suggested that consideration should be given to potential corridors for north-south connectivity. B/C Bray noted that a bus line was added on Kent Avenue for north-south connectivity. NYCT mentioned that B32/B67 was also added to Kent Avenue. While the B32 has a 30-minute headway (common with new routes), the B67 is a bit more frequent as it was an extension of an existing route. DCP stated that they are considering a feasibility study for north-south connectivity in the area. Funds are being sought through the UPWP. It was noted that the community has its own bus (B110); and that there is informal transit.

- It was mentioned that because Sanitation trucks and school buses operate around the same time in the morning, they create bottlenecks and congestion. DOT stated that Sanitation will be added to the TAC list.

- DCP noted that truck loading/unloading is a problem on north-south streets. The representative also asked whether there were Safe Routes to School initiatives in the study area.

- DCP stated that they were considering corridors for SBS in the area and that DOT was also discussing SBS for the area.

- It was recommended that DOT reach out the Brooklyn Navy Yard regarding any new or upcoming developments southwest of the study area.

- A NYMTC representative asked about the findings from the Broadway Congested Corridor project. DOT responded that the study would be released soon.

- A NYCDCP representative said that there are a large number of children riding bikes to school unsupervised.

- It was noted that the skewed intersections that exist on Broadway make for irregular street geometries with tight turning radius, short storage areas and complex pedestrian crossings.

- A State DOT representative stated that the narrow street widths were a big contributor to the traffic issues in the area and wondered if street direction changes could be applied as a solution.

- CB1 Chairman noted that the Brooklyn Borough President was conducting a study concerning decking on the BQE between South 4th and South 5th Street which would contain a public park.

Notes of Public Meeting for South Williamsburg Transportation Study

Held on January 20, 2015 @ 6:00PM

Williamsburgh Library, 240 Division Avenue, Bk NY, 11211

NYCDOT conducted the first public meeting for the South Williamsburg Transportation Study at the Williamsburgh Library at 240 Division Avenue. The purpose of the meeting was to present the scope of work to the community an give the opportunity to provide as well identify transportation issues within the study area.

The meeting was attended by community members, elected officials, city/state agency representatives and community organizations including DCP, NYCT, State Assemblyman Joseph Lentol and staff, representatives from Brooklyn Community Boards #1 and #3, Senator Martin Dilan's office, City Councilman Stephen Levin's office, Transportation Alternatives, the United Jewish Organization (UJO), and ODA Community Development. A representative from the Greenpoint Gazette also attended the meeting.

After the Borough Commissioner (B/C) representative Ronda Messer welcomed the attendees and opened the meeting State Assemblyman Joseph Lentol addressed the audience. He hoped the study would result in improved traffic flow in the area through the use of several techniques including one-way street conversions, alternate commercial delivery hours and sanitation pick up times that do not coincide with school bus pick-ups.

A representative of City Councilman Levin's office stated that the study was important due to recent population growth and while she was happy to see the study underway she wished the study incorporated all of CB1.

A representative of Senator Martin Dilan's office stated that community members could contact her office with any issues or comments regarding the study.

Following the elected officials/representatives, Rabbi Neiderman (UJO) spoke of new residential developments in the area indicated that there is approximate 5-7%

annual population growth rate in the community. He stated that there were approximately 24,000 children in private schools of which approximately 18,000 being transported by 130 private buses. While the school arrival/departure times range from 8 a.m. to 10 a.m. and 2:30 p.m. – 5:30 p.m. respectively some buses start as early as 5:30 a.m. Because school bus pickups conflict with Sanitation pickup times school buses are often delayed causing students to arrive late for school. Rabbi Neiderman stated that DOT should be judicious in handling parking as many families have more than one vehicle. He then identified 11 prioritized corridors in the study area where pedestrian crossing was problematic even during off-peak hours.

NYCDOT's Michael Griffith then thanked Assemblyman Lentol for initiating the request for this study and to NYMTC and FHWA for funding the study. After a brief introduction Harvey LaReau gave the scope of work presentation. The presentation, which provided the proposed study area, goals, objectives and areas of analysis, provided the context for an open discussion.

During the questions and comments period many questions were asked and issues discussed.

- Assemblyman Lentol asked if private transit services would be included in the analysis.

- DOT responded that all street traffic will be included in the analysis including private transit vehicles.

- Assemblyman Lentol stated that a familiarity with how school buses operate is important.

- A community member pointed out that at times the streets are blocked off because of school buses parking diagonally across oncoming traffic lanes to allow the children to enter and exit the buses.

- CB3 Transportation Chair Nelson Stoute stated that there is a need to include Sanitation in the TAC group. He then stated that the community boards might have a problem attending a meeting in July/August when they are out of session.

- DOT agreed that Sanitation needs to be included in the discussion and within the Technical Advisory Committee. Additionally all public meetings would be scheduled to work with the community boards and with the community.

- Mr. Stoute stated that cattycorner school bus pickup maneuvers creates a hazard and is an illegal procedure and should be addressed/enforced by NYPD. He agreed that children's safety was paramount but stated that this vehicle maneuver was not the solution.

- Mr Stoute also stated that any changes to the Bedford Ave/Nostrand Avenue SBS route should have careful consideration as the bus serves areas outside Williamsburg.

- Rabbi Neiderman responded that the cattycorner bus maneuver was to ensure the safety of children.

- Mr Stoute stated that a recent Bed-Stuy rezoning affects the area and should be considered.

- A representative of the ODA said that DOT should involve more community groups in the TAC.

- DOT responded that this is the purpose of the public meeting as the TAC is used for intergovernmental discussion

- Assemblyman Lentol asked if all of the local schools had been identified as the presentation map seemed to be missing some. Additionally he stated that DOT should find out how NYCT buses will operate while the Williamsburg Bridge Bus

Terminal is under construction.

- DOT responded that a comprehensive list of schools had not yet been created but would be done during the analysis process.

- A community member asked if the size/enrollment of the school would also be taken into account.

- A community member asked if pedestrian counts/are done 24 hours similar to the Automatic Traffic Recorder counts.

- DOT responded that the school size would be determined and that pedestrian counts are conducted over the peak periods or during school start and end times.

- A representative of CB1 asked if DOT would be speaking with individual schools or hold individual charrettes. She stated that DOT should make sure school principals know about the study and can comment on their safety issues.

- She also asked if DOT had considered using online apps for letting the public voice their concerns over specific location based issues.

- DOT responded that contact with the individual schools was an option that may be used and that DOT has been looking into an online application for public comments.

- A member of the community stated that the community had predicted congestion from the new Select Bus Service lane and that MTA did not listen. He also stated that the SBS on Bedford and Nostrand Avenue was causing backup and that the bus layover on Lee Street and Wallabout Street contributed to the problem. He concluded that many city agencies do not listen and are not responsive to the community.

- Community members stated that MTA needs to be a part of the study.

- CB3 Transportation Chair Nelson Stoute stated that many Yeshivas exist in manufacturing zones in the southern section of the study area and the mix of uses could be potentially dangerous.

- Community Members stated that school bus parking on the street is a problem especially after 6pm. They asked about the rules for school bus parking on local streets. Because school buses are parked on the street residents can't find parking in the evening.

- Another community member stated that the BQE is inadequate for the increasing amount of traffic particularly in the SB/WB direction. He stated that the BQE loses a lane to the exit ramp at Park Avenue which exasperates the congestion on the corridor.

- A representative of of Senator Dilan's office asked why the study would not be looking at on/off ramps into the study area.

- DOT responded that traffic volumes coming off the BQE would be included in the analysis.

- A community member stated that there was a lot of vehicle circulation in the area due to alternate side parking in effect twice a week on many streets.

- Nelson Stoute stated that a bike lane on Flushing Avenue would be better served on a smaller residential street. CB3 will not approve of a bike lane there.

- Mr. Stoute also said that the Sanitation garage in CB1 serves both CB1 and CB3. There is a proposed garage in CB3 which would ease some Sanitation circulation issues in CB1.

- A community member stated that Kent Avenue is congested southbound as it approaches the BQE

- A community member stated that trucks coming in from Bedford Avenue cause congestion along Flushing Avenue. Taking away parking will not help.

- A community member passed in notes regarding a proposed Wallabout Street. one way conversion. In it he states that the one way conversion should extend from Bedford Avenue to Union Street instead of from Kent Avenue. He reasoned that Middleton Street needs westbound access to Bedford Avenue and Heyward Street needs westbound access to Kent Avenue and that daytime parking restrictions can be used to ease congestion between Kent Avenue and Bedford Avenue.

South Williamsburg Transportation Study

Notes of Technical Advisory Committee (TAC) Meeting #2

October 20, 2015 10:30 AM

NYCDOT Traffic Engineering & Planning conducted the second Technical Advisory Committee (TAC) meeting for the South Williamsburg Transportation Study at the Brooklyn Borough Commissioner's Office. The purpose of the meeting was to present the Existing Conditions findings and receive feedback from the members. In attendance were representatives from NYCDOT's Borough Commissioner's office, NYCDOT Traffic Engineering and Planning, NYC Transit, NYMTC and Assemblyman Joseph Lentol's office.

Following introductions, Harvey LaReau gave a PowerPoint presentation on the Existing Conditions analysis which summarized the goals and objectives and then highlighted the findings with respect to demographics, zoning and land use, traffic, parking, pedestrians and bicyclists, crashes, transit, and goods movements. The presentation concluded by identifying several specific traffic and transportation problems in the study area.

After the presentation attendees were invited to comment or ask questions. Following are pertinent comments and questions.

- NYC TCC asked if there was any consideration for residential parking permits in the area and stated that this technique works well in Jersey City.
- NYCDOT responded that the city does not support such a policy.
- Borough Commissioner's Office pointed out that low travel speeds along Wallabout Street are not represented on the slide that identified the issues.
- DCP (Transportation) asked if bike counts were conducted in the area and stated that there are few routes that connect to the Greenway on Kent Avenue

within the study area. Additionally she stated that a map showing Citibike stations could help inform the community of the opportunities for additional bike facilities in the area.

- NYCTCC asked if NYCDOT was considering off-peak truck delivery along the main commercial corridors in the area.

- Following up, the MTA representative stated that bus stops become the defacto standing areas for vehicles unloading goods which affects people with disabilities (ADA).

- Assemblyman Lentol's office asked if school buses were one of the main causes of the area's congestion and also asked if the public disagreed with the existing conditions findings if DOT would go back and check the results again.

- DOT stated there was no need to recheck the results as a comprehensive data collection plan was executed the results of which is the basis for the existing conditions analysis.

- Borough Commissioner's Office stated that before the public meeting NYCDOT should be very clear about the study timeline, what is being presented, where and when recommendations would be presented.

- Assemblyman Lentol's office asked if there were any community issues that were not reflected by the existing conditions analysis. DOT responded that the community concerns were largely supported by the analysis.

- The meeting concluded at 11:30am

Notes of Public Meeting for South Williamsburg Transportation Study

Held on November 5, 2015 @ 6:00PM

Williamsburgh Library, 240 Division Avenue, Bk NY, 11211

NYCDOT conducted a public meeting for the South Williamsburg Transportation Study at the Williamsburgh Library, 240 Division Avenue. The purpose of the meeting was to present the existing conditions analysis and get feedback from the community.

The meeting was attended by members of the public, elected officials and representatives of city agencies and community organizations (City Council Member Stephen Levin, Assemblyman Joseph Lentol, NYCDOT, Brooklyn Community Board #1, Riders Alliance and the Unified Jewish Organization of Williamsburg).

Following a brief introduction by NYCDOT's Ronda Messer and Michael Griffith, Harvey LaReau proceeded to present the existing conditions analysis which identified several traffic operation challenges in the study area. The presentation provided the context for an open discussion. During the questions and comments period many issues were discussed. Following are some of the main points that were discussed:

- Assemblyman Lentol's representative acknowledged that approximately 90% of the community concerns were identified in the existing conditions presentation.

- It was suggested that Wallabout Street. be converted to one-way eastbound while Flushing Avenue be converted to one-way westbound, an issue that was discussed several times related to another effort DOT was involved in.

- Another community member suggested that Union Avenue and Marcy Avenue be converted to two way streets near Flushing Avenue. This would allow trucks to

access Flushing Avenue without traveling on Wallabout Street.

- A community member spoke of a new school that was opened on Harrison Avenue at Gerry Street that has increased pedestrian traffic where hundreds of girls crossing Flushing Avenue.

- A community member suggested that traffic signals, crosswalks and medians should be installed on Wallabout Street between Lee Avenue and Bedford Avenue to improve pedestrian safety.

- A CB1 transportation committee member stated that some of the congestion in the study area was created by previous DOT actions such as bike lanes, traffic lights and the SBS bus lane. He suggested that the traffic signal at Skillman Street and Flushing Avenue is not properly synchronized and is creating congestion. He also suggested that the sidewalk be extended at Lynch Street and Wallabout and that DOT should look into truck loading zones and metered parking along Wallabout Street as a way of reducing double parking.

- Another member stated that this area has similar congestion levels as Manhattan and that DOT should use "Don't Block the Box" treatments at several intersections.

- A Riders Alliance member stated that the bus terminal at Havemyer Street is heavily used with significant congestion on Havemyer Street approaching the Williamsburg Bridge. He also stated that the population is growing and existing transit services should be increased to serve the future demand.

- City Council Member Stephen Levin stated that the community should build consensus amongst themselves and actively work with DOT to find solutions to the traffic problems.

Notes of Public Meeting for South Williamsburg Transportation Study

Held on Dec 17, 2015 @ 6:00PM

P.S 59 Auditorium, 211 Throop Avenue, Bk NY, 11206

NYCDOT conducted a public meeting for the South Williamsburg Transportation Study at the P.S. 59 auditorium, 21 Throop Avenue. The purpose of the meeting was to present the existing conditions analysis and get feedback from the community.

The meeting was attended by members of the public, elected officials and representatives of city agencies and community organizations (Senator Daniel Squadron, Assemblywoman Maritza Davila, Assemblyman Joseph Lentol, NYSDOT, NYCDOT, NYPD, DSNY, the Lindsay Park Housing Corporation).

Following a brief introduction by NYCDOT's Leroy Branch, Harvey LaReau proceeded to present the existing conditions analysis which identified several traffic operation challenges in the study area. The presentation provided the context for an open discussion. During the questions and comments period many issues were discussed. Some of the main points that were discussed are listed below:

- A community member asked if the recommendations would involve concrete construction or use paint and bollards.

- DOT responded that it was too early in the process to discuss the recommendations.

- A community member asked if Flushing Avenue was converted to a one way street if the B57 bus would be re-routed.

- Michael Griffith of the DOT responded that converting Flushing Avenue was not a

proposal but that all suggestions and comments would be evaluated during the development of the recommendations.

- An NYPD representative stated that Flushing Avenue and Broadway has major pedestrian safety issues with bad lighting, faded pavement markings and insufficient signage. He also stated that Wythe Avenue and Williamsburg Street W is a problematic location with heavy congestion and multiple recent accidents.

- Another community member stated that Flushing Avenue was the only direct route to downtown Brooklyn and there would be little benefit to changing the street to one way.

- Community members stated that the large amount of construction on Myrtle Avenue between Tompkins and Nostrand Avenue often creates obstacles for pedestrians and causes people to walk in the street.

- Community members felt that the school buses maneuvering their vehicles 45 degrees across the roadway to stop traffic in both directions was inconvenient and in some cases unsafe.

- A community member stated that Classon Avenue south of Flushing Avenue has many problems with bad drivers, bike riders and pedestrians who don't pay attention. She believes that cameras may help fix the problem.

- A community member suggested that Lorimer Street is narrow and buses stopping to pick up school kids create a lot of congestion.

South Williamsburg Transportation Study

Notes of Technical Advisory Committee (TAC) Meeting #3

June 9, 2016 10:00 AM

NYCDOT Traffic Engineering & Planning conducted the third Technical Advisory Committee (TAC) meeting for the South Williamsburg Transportation Study at the Brooklyn Borough Commissioner's Office. The purpose of the meeting was to present the study recommendations and receive feedback from the members. In attendance were representatives of Senator Daniel Squadron, Congresswoman Nydia Velazquez, Brooklyn Community Board 1, NYMTC, NYCDCP, NYSDOT, NYCDOT's Brooklyn Borough Commissioner's office and from NYCDOT's Traffic Engineering and Planning, School Safety, and Traffic Operations units.

Following introductions, Harvey LaReau gave a presentation on the recommendations which include geometric change proposals for approximately 13 intersections, parking changes along 12 blocks of Lee Avenue and street direction change proposals for three streets in the Broadway Triangle area. After the presentation attendees were invited to comment or ask questions. Following are pertinent comments and questions.

The Representative of CB1 had several comments on the recommendations including:

- DOT should consider expanding the proposed crosswalk at Wallabout Street & Middleton Street to both the east and west side of the intersection with a possible median included in the street.

- The existing daylighting treatment on Park Avenue eastbound approaching Bedford Avenue should be increased to allow cars to get around turning vehicles

- Traffic signal at Skillman Street and Flushing Avenue creates increased congestion

and queuing

- DOT should consider removing the parking on the north curb of Flushing Avenue between Bedford Avenue and Skillman Street during AM & PM peak periods to provide additional capacity

- MTA bus idling on Bedford Avenue approaching Flushing Avenue causes traffic capacity reduction

- The new truck loading/unloading zone on Wallabout Street works well. DOT should consider the same treatment further east near Lee Avenue.

- Adding the striped bike lane to Harrison Avenue shrank the capacity to one lane and creates congestion on this corridor

- There is heavy congestion as traffic exits the BQE at Wythe Avenue. DOT should consider widening Wythe Avenue east of Williamsburg Street W and consider a split signal phase at Wythe Avenue and Williamsburg Street W similar to the one operated at Flushing Avenue and Classon Avenue

- DOT should consider changing the actuated traffic signal on Flushing Avenue at Warsoff Place and Taffee Place to a pedestrian push button in order to relieve the traffic congestion.

The NYSDOT representative asked if DOT had considered an off peak truck loading and unloading campaign along Wallabout Street to help the double parking issues.

NYCDCP identified a potential new development with 1,000 dwelling units and 64,000 sq. ft. of commercial space at Wallabout Street between Union Ave and Harrison. The project is in the scoping process. The scope is expected to be complete in July/August 2016. NYCDOT needs to ensure coordination with the developer regarding the one way street conversions on Gerry Street, Bartlett Street and Whipple Street.

The representative of Senator Squadron asked if the bike lane on Bedford Avenue could be relocated to the east curb along the bus lane to avoid all the double parking that exists on the west curb. Alternately truck loading/unloading areas should be considered along Bedford Avenue to get the trucks onto the curb and not double parked in the bike lane.

The representative of Congresswoman Velazquez enquired about the total change in parking spaces based upon the proposed changes.

South Williamsburg Public Meeting #3

June 23, 2016 at Williamsburg Public Library

Notes of Meeting

NYCDOT Traffic Engineering & Planning conducted the third public meeting for the South Williamsburg Transportation Study at the Williamsburgh Library, 240 Division Avenue. The purpose of the meeting was to present the study recommendations and get feedback from the community.

The meeting was attended by members of the public, representatives of Assemblyman Joseph Lentol, NYCDOT, Brooklyn Community Board #1 and the Unified Jewish Organization of Williamsburg. Following introductions, Harvey LaReau gave a presentation on the recommendations which included geometric change proposals for approximately 13 intersections, parking changes along 12 blocks of Lee Avenue and street direction change proposals for three streets in the Broadway Triangle area. After the presentation attendees were invited to comment or ask questions. Following are pertinent comments and questions.

- A community member asked if the curb extension at Middleton and Wallabout could be extended further in to the street and perhaps moved to the east side where more pedestrians cross
- Some felt that DOT should provide more truck loading/unloading space near the supermarket on Wallabout Street at Bedford Avenue as the current space is difficult for trucks to maneuver into
- A community member asked if it is possible to restrict truck deliveries on Wallabout Street to certain hours similar to examples in Manhattan?
- A community member stated that DOT should consider using metered parking along Wallabout Street.
- In response, another community member stated that residents need parking on Wallabout between Bedford Avenue and Lee Avenue as well.

- Flushing Avenue and Park Avenue at Walworth Street need daylighting to accommodate truck turns.
- The truck repair shop at Flushing Avenue and Wallworth Street has moved.
- There is a Milk company on Walworth Street between Flushing and Park uses much of the curb for loading and unloading and the trucks create congestion.
- North curb of Wallabout Street between Bedford Avenue and Lee Avenue needs parking removed to accommodate heavy vehicles.
- There is a grocery store on Bedford Avenue between Park Avenue and Flushing Avenue that contributes to double parking and needs a loading zone.
- A community member asked if DOT is proposing a left turn signal at Bedford and Flushing.
- A community member asked if the proposal at Division Avenue and Marcy Avenue has sufficient turning radius for buses and large vehicles.
- A community member felt that Penn Street should be one-way north to Broadway. Rutledge Street should be one way southbound to Kent Avenue for easier access to the BQE.
- Flushing Avenue between Bedford Avenue and Skillman Street has heaviest congestion from 6 p.m.-8 p.m. Much of this created by Catering Hall weddings on Flushing Avenue.
- Left turn restriction signs on from Bedford Avenue at Wallabout Street is confusing .
- A community member stated that the pedestrian triangle at Wallabout Street and Lynch Street is very narrow and needs to be redesigned.
- Lorimer Street needs its own traffic signal phase at the Lee Avenue/Wallabout Street/Lorimer Street intersection
- There is bad synchronization between the signals on Lee Avenue at Wallabout Street and Flushing Avenue
- Vehicles often drive the wrong way down Wallabout Street after making right turn from Union Avenue SB
- The signal at Union Street and Lorimer Street has 4-5 seconds delay where no green signal.

- Many felt that the overnight sanitation regulations on Flushing Avenue between Franklin Avenue and Kent Avenue are too restrictive. Community members asked who is in charge of sanitation schedule.
- DOT should consider prioritizing pedestrian safety recommendation first (Lynch Street and Wallabout Street)
- Several community members stated that the sidewalks on Wallabout Street are too wide while the street is too narrow. They asked if some of the existing space could be switched.
- A community member pointed out that Lee Avenue between Wilson Street and Ross Street (south curb) does not have No Standing 4 p.m.-7 p.m. restrictions as shown in the presentation
- Lee Avenue between Wallabout Street and Flushing Avenue should be No Standing Anytime to alleviate the existing bottleneck

South Williamsburg Public Meeting Phase 3, Second Meeting

September 20, 2016 at Beth Chana Klausenburg School

Notes of Meeting

NYCDOT Traffic Engineering & Planning conducted the second meeting in the third phase of public outreach for the South Williamsburg Transportation Study at the Beth Chana Klausenburg School, 712 Bedford Avenue. The purpose of the meeting was to present the study recommendations and get feedback from the community.

The meeting was attended by members of the public, representatives of City Council member Steven Levin, Senator Daniel Squadron, Assemblyman Joseph Lentol, NYCDOT, Brooklyn Community Board #1 and the Unified Jewish Organization of Williamsburg. Following introductions, Harvey LaReau gave a presentation on the recommendations which include geometric change proposals for approximately 13 intersections, parking changes along 12 blocks of Lee Avenue and street direction change proposals for 3 streets in the Broadway Triangle area. After the presentation attendees were invited to comment or ask questions. Following are pertinent comments and questions.

- A community member requested a direction change on Sumner Ave between Flushing Ave and Broadway
- Some attendees felt that parking restrictions should be eased or removed on Fridays along the commercial corridors due to a lack of commercial activity after the midday.
- A resident of the area felt that Whipple St should be converted to one-way SB
- In regards to the proposal at Marcy Ave and Division Ave a resident stated that pedestrians crossing Williamsburg St W from Ross Street would have decreased visibility of cars turning onto Williamsburg St W using the proposed cutout
- Many attendees felt that the signal at Wilson Street and Division Ave is not coordinated with the one at Marcy Avenue and Division Avenue creating spillback and congestion.
- A resident felt that parking regulations on the north curb of Division Ave between Marcy and Rodney St should be no Standing 8-6 M-F
- Some community members suggested “Don’t Block the Box” treatments should be used on Kent Ave and Penn St to allow the vehicles traveling south on Kent to turn left onto Penn St.

- It was noted that it is difficult for trucks to make the turn from Kent Ave (SB) onto Penn St because of the existing concrete median.
- A resident suggested that DOT should reverse the direction of Ross St.
- Residents stated that the westbound movement at Lorimer Ave and Lee Avenue needs its own signal phase.
- Residents suggested that DOT add a westbound left turn phase on Division Ave at Williamsburg St W
- An attendee noted that there are signal timing coordination issues between the Union Avenue/Harrison Avenue/Lorimer Street Triangle
- Residents felt that a flashing arrow signal treatment for westbound traffic at Wallabout Street and Marcy Avenue is needed as too many vehicles continue the wrong way on Wallabout Street
- Some attendees felt that “Don’t Block the Box” treatment and enforcement is needed at Flushing Ave and Classon Ave
- A resident was concerned that adding parking to the east curb of Lee Ave during the pm hours would add congestion to one of the few Southbound routes in the area
- Residents noted that Franklin Ave needs ”No Standing Anytime” parking regulations on the east curb between Wallabout and Flushing Ave because of the narrow width of the street.
- In regards to the proposed recommendation at Middleton St and Wallabout St a resident said that DOT should restrict the left turn and increase the existing truck loading zone space from 80’ to 100’ possibly moving it close to the intersection.
- Several attendees said that trucks coming from Atlantic Ave turn onto Bedford Ave and then progress along Williamsburg St E (20+ blocks) trying to access the BQE while the entrance to the BQE is one block behind Bedford Ave (the issue is also due to GPS device instructions).
- A resident noted that a Loading/Unloading zone needed in front of a grocery store on the east curb of Bedford Ave between Park Ave and Flushing Ave

11 ISSUES AND RECOMMENDATIONS

11.1 Existing Issues

The study area exhibited significant population growth between 2000 and 2010 and a large amount of new residential buildings are currently under construction leading to a further increase in population as noted in the demographics chapter. The land use analysis showed a large amount of schools distributed in the area. These schools generate both pedestrian trips and school bus loading and unloading issues during the beginning and end of the school day. The study area also has a large amount of school buses parked on the streets.

Truck volumes were highest in the southwest corner of the study area where trucks entering and exiting the BQE, use local truck routes such as Flushing Avenue, Kent Avenue, Bedford Avenue and Lee Avenue. Trucks serving the manufacturing uses along Flushing Avenue often double park and their loading and unloading activities take capacity from an already congested corridor.

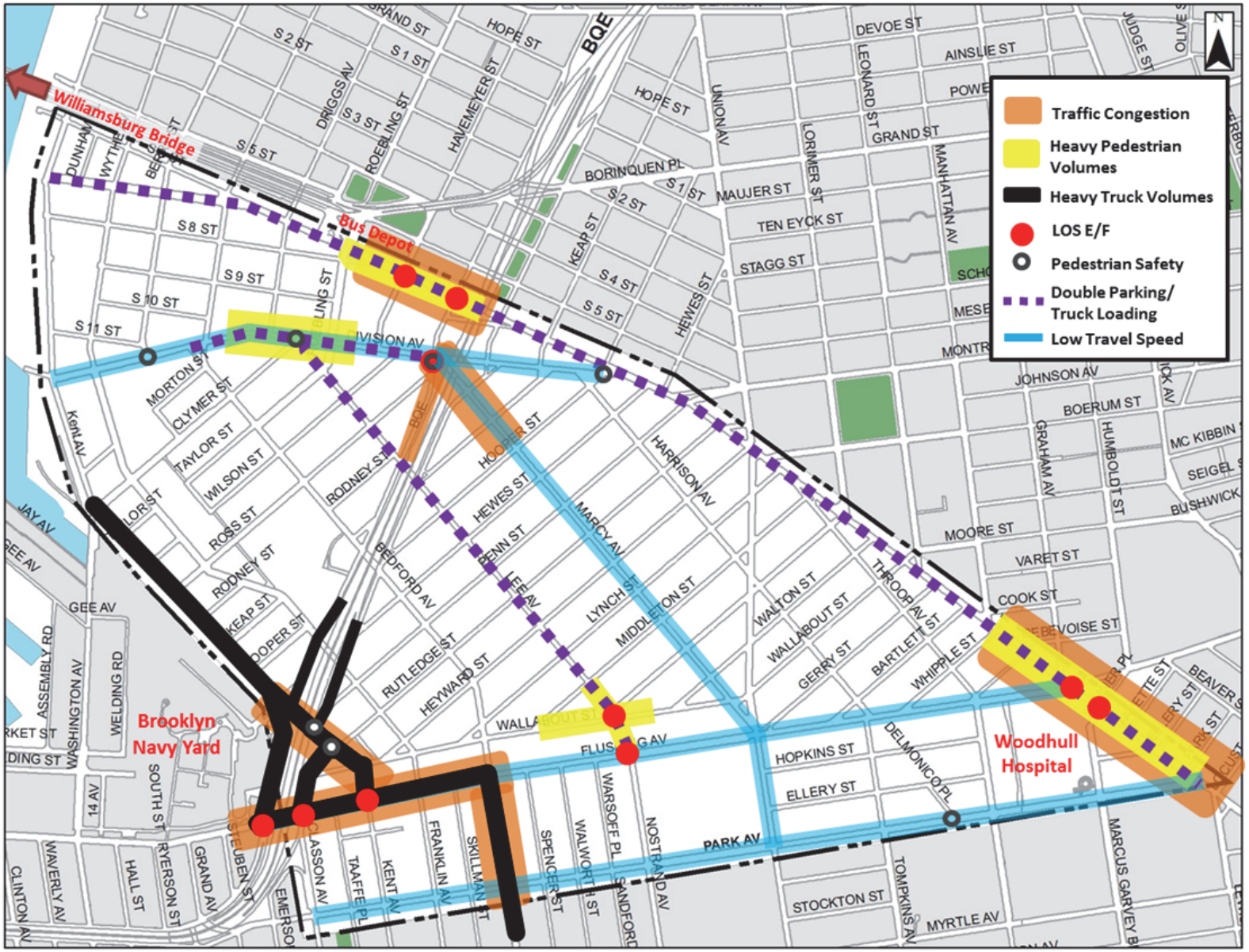
Speeds were low throughout the study area but the slowest speeds were observed along Flushing Avenue, Park Avenue, Marcy Avenue and Division Avenue.

The highest observed pedestrian volumes occur along Broadway where several transit stations and commercial uses attract significant pedestrian trips. High pedestrian volumes were also observed on Wallabout Street at Lee Avenue and on Division Avenue near Roebling and Lee Avenues.

Congested levels of service generally were found along Flushing Avenue and Broadway.

Figure 11-1 provides a composite view of the activities and issues in the area in conjunction with commercial corridors and major trip generators such as the Williamsburg Bridge, Woodhull Hospital and the Brooklyn Navy Yard.

Figure 11-1: Study Area Issues



11.2 Recommended Improvements

The set of recommended improvements seek to reduce congestion and increase pedestrian safety and are made up of geometric changes and parking regulation changes as shown in Figure 11-2.

Figure 11-2: Proposed Recommendation Locations

Division Avenue @ Berry Street

Issue:

- Significant pedestrian crossings at unsignalized intersection located midblock between pedestrian crossings which are 750' apart. The south curb is used by passengers awaiting both the B67 bus and by school children awaiting school bus pickup and drop-off. The existing Head Start program generates U-turns and double parking at this location as parents seek to drop off their children.

Recommendation:

- Install traffic signal, pedestrian crosswalks and pedestrian signals.

Figures 11-3 and 11-4 illustrate the existing and proposed conditions.

Figure 11-3: Division Avenue and Berry St- Existing

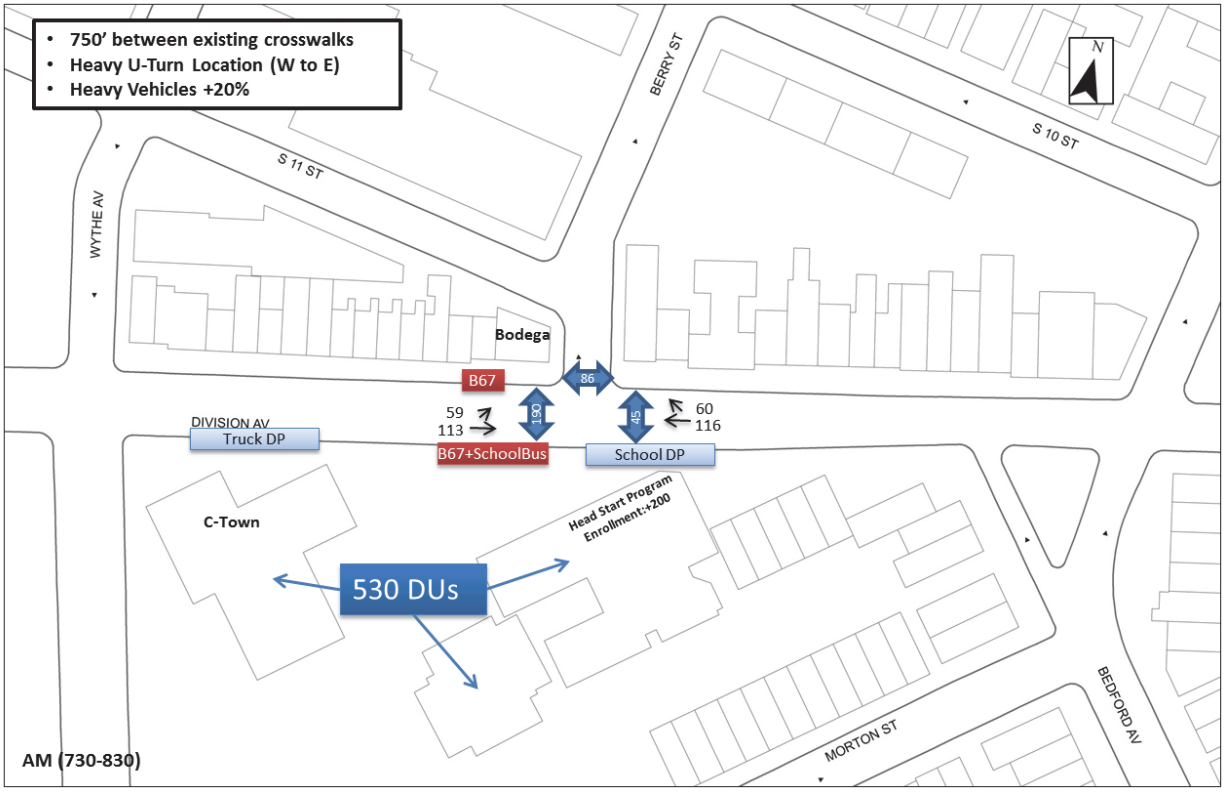
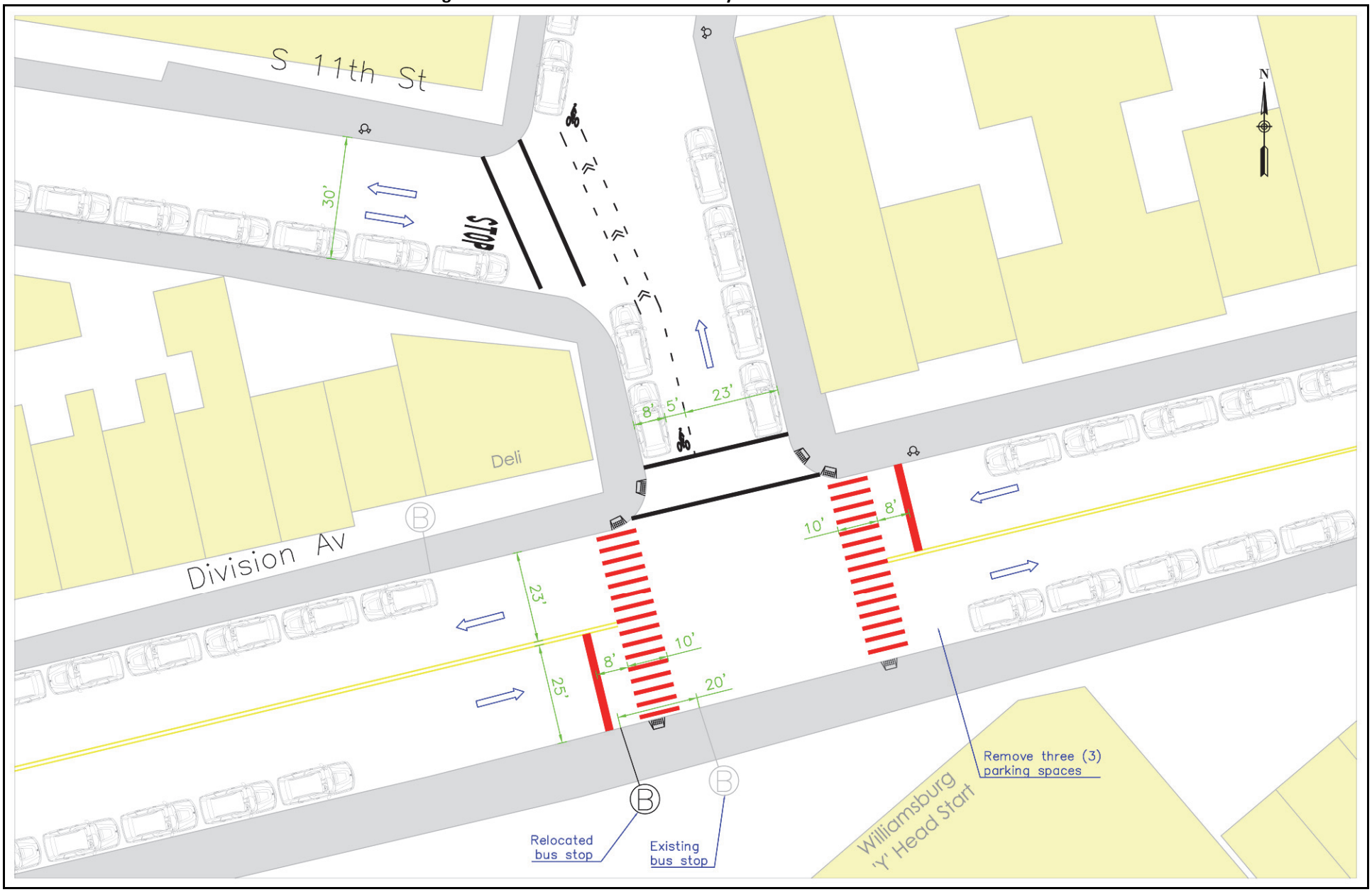


Figure 11-4: Division Avenue and Berry Street - Recommendation



Division Avenue @ Marcy Avenue

Issue:

- Concrete barrier obstructs pedestrians in the southern crosswalk where large queues of schoolchildren are often forced into the street.
- Vehicles often fail to stop at the stop bar on the WB approach and impede northbound vehicles
- Pedestrians walk outside existing crosswalk on the WB approach.

Recommendation:

- Open NB left turn channel to be operated on the existing signal with tough curb to prevent WB approach from turning into channel.
- Expand existing pedestrian refuge island in south crosswalk
- Realign east crosswalk to satisfy pedestrian desire lines and to keep wb traffic at stop bar.

Figures 11-5 and 11-6 show the existing and proposed conditions.

Figure 11-5: Division Avenue and Marcy Avenue - Existing

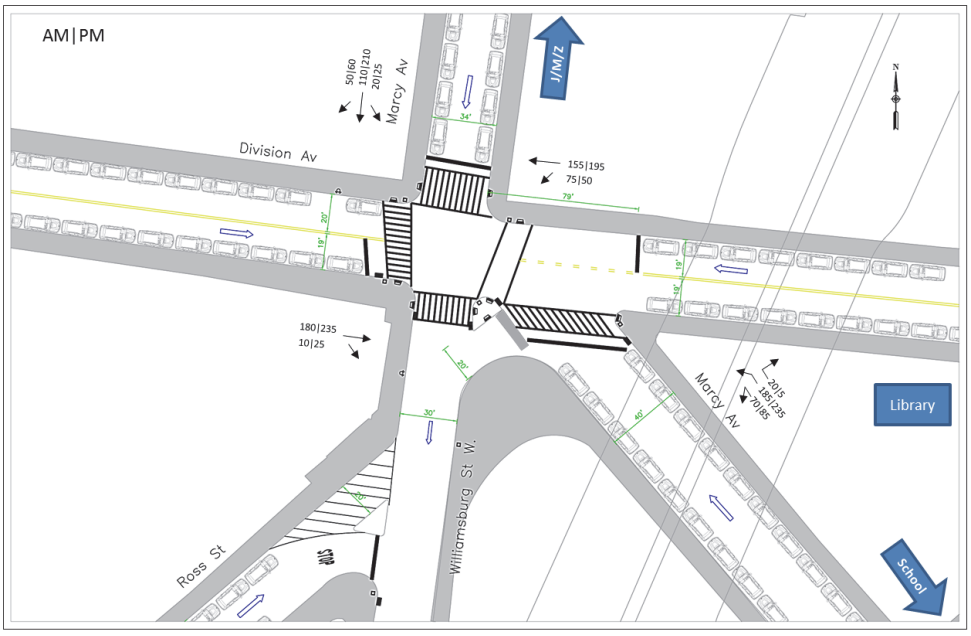
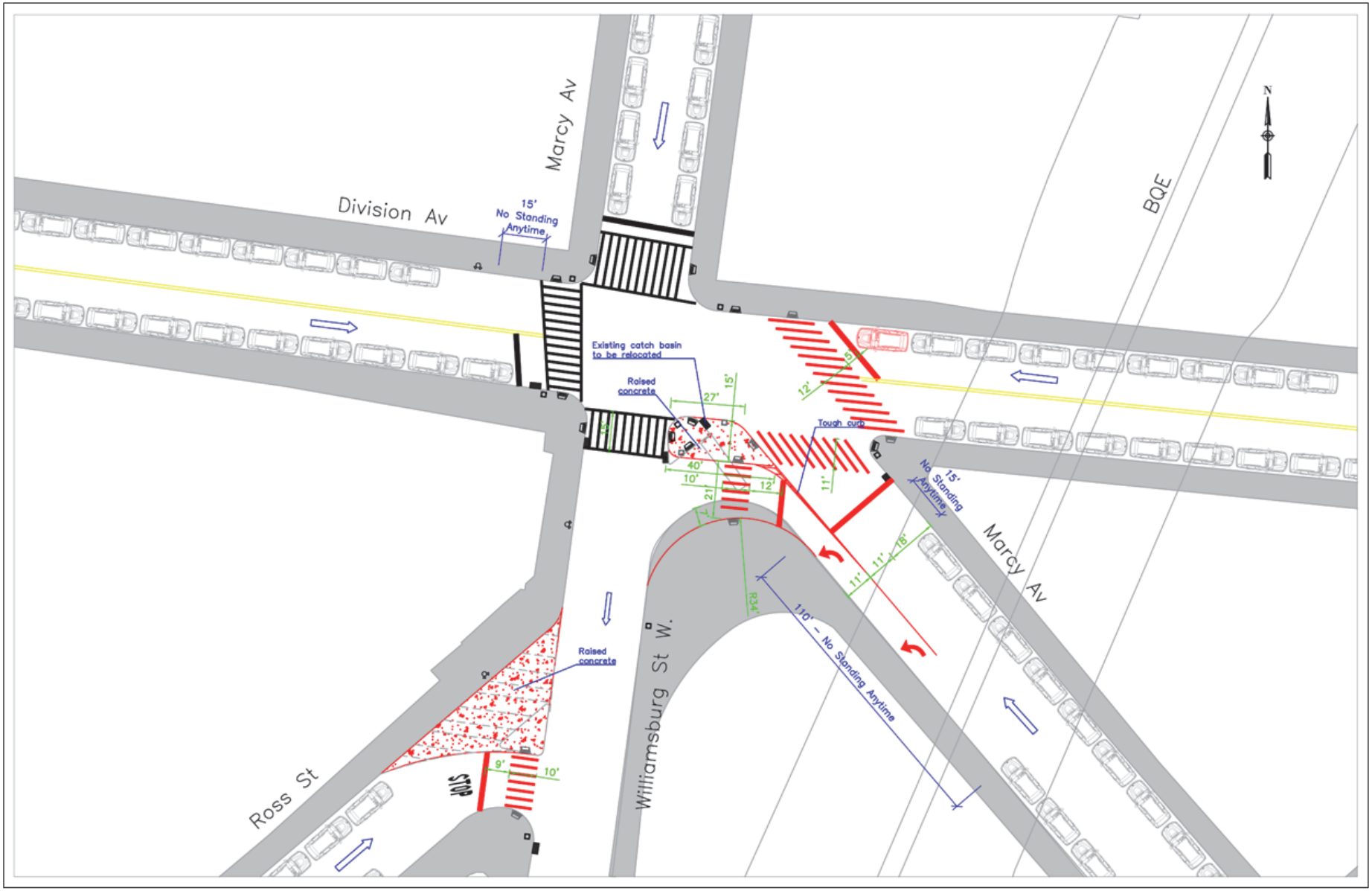


Figure 11-6: Division Avenue and Marcy Avenue - Proposed



Lee Avenue between Taylor Street and Flushing Avenue

Issue:

- Parking is restricted on the north curb of Lee Avenue between Taylor Street and Williamsburg Street W and both sides of Lee Avenue between Williamsburg Street W and Flushing Avenue from 4 p.m. to 7 p.m. The community has cited concerns of speeding on the three moving lanes and limited parking in the area.
- Trucks making deliveries are double parked during the midday hours

Recommendation:

- Change the parking restrictions on the north curb between Taylor Street and Wallabout Street to allow metered parking from 8 a.m. to 7 p.m.
- Add truck loading/unloading zones along the corridor

Figure 11-7: Lee Avenue Parking Regulations - Existing

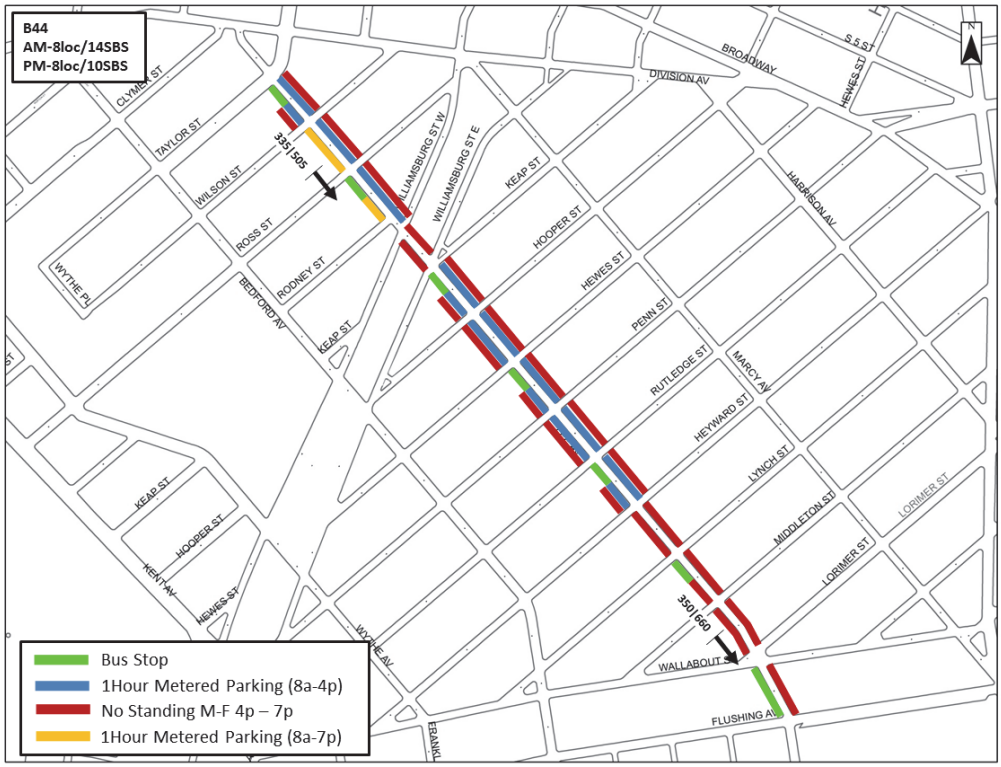
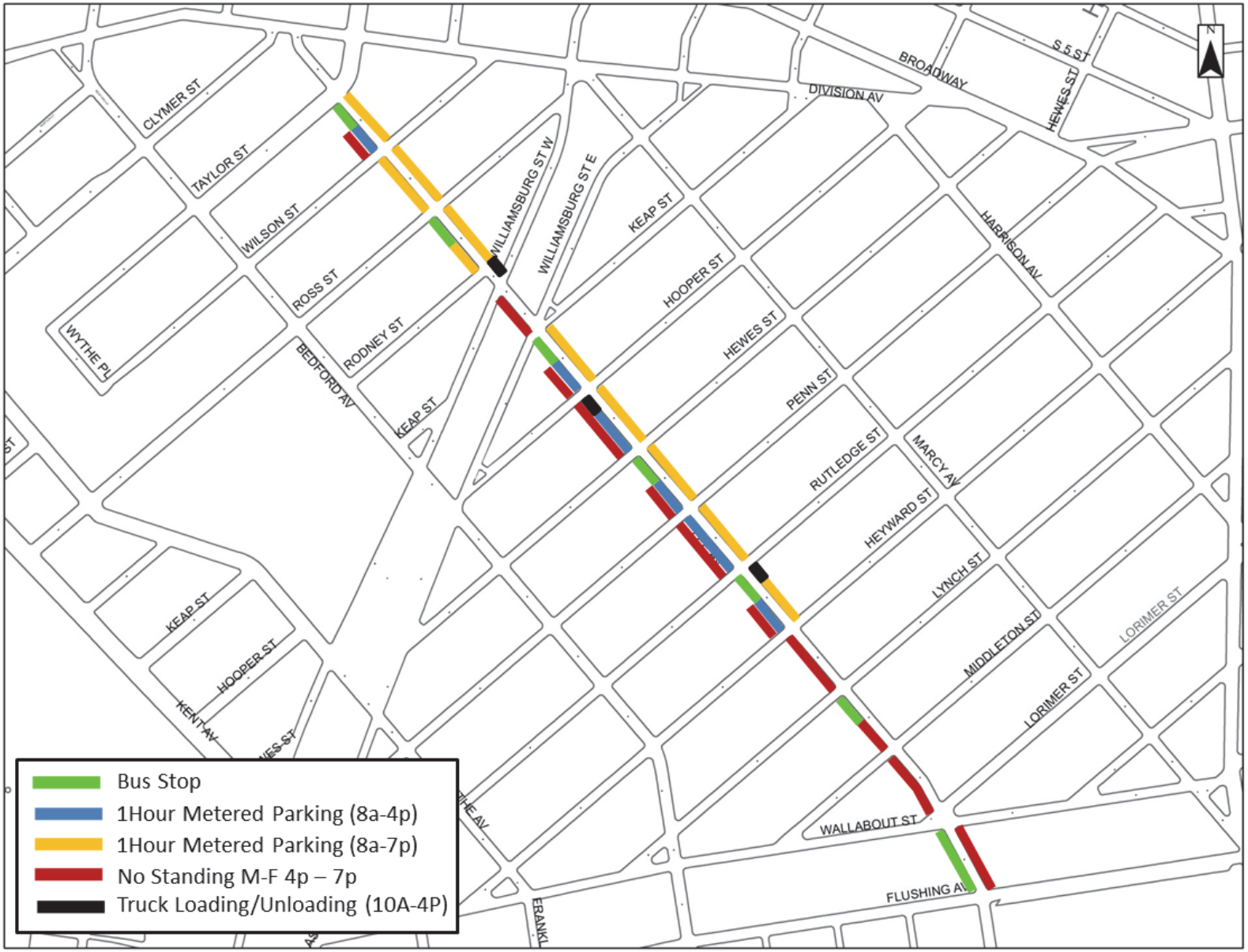


Figure 11-8: Lee Avenue Parking Regulations - Proposed



Wallabout Street @ Heyward Street

Issue:

- There is no marked pedestrian crossing on Heyward Street at Wallabout Street and the configuration of the refuge island creates a long crossing distance.

Recommendation:

- Stripe a crosswalk across the north side of Wallabout Street and extend the western point of the refuge island to shorten the crossing distance

Figures 11-9 and 11-10 show the existing and proposed conditions.

Figure 11-9: Wallabout Street and Heyward Street - Existing

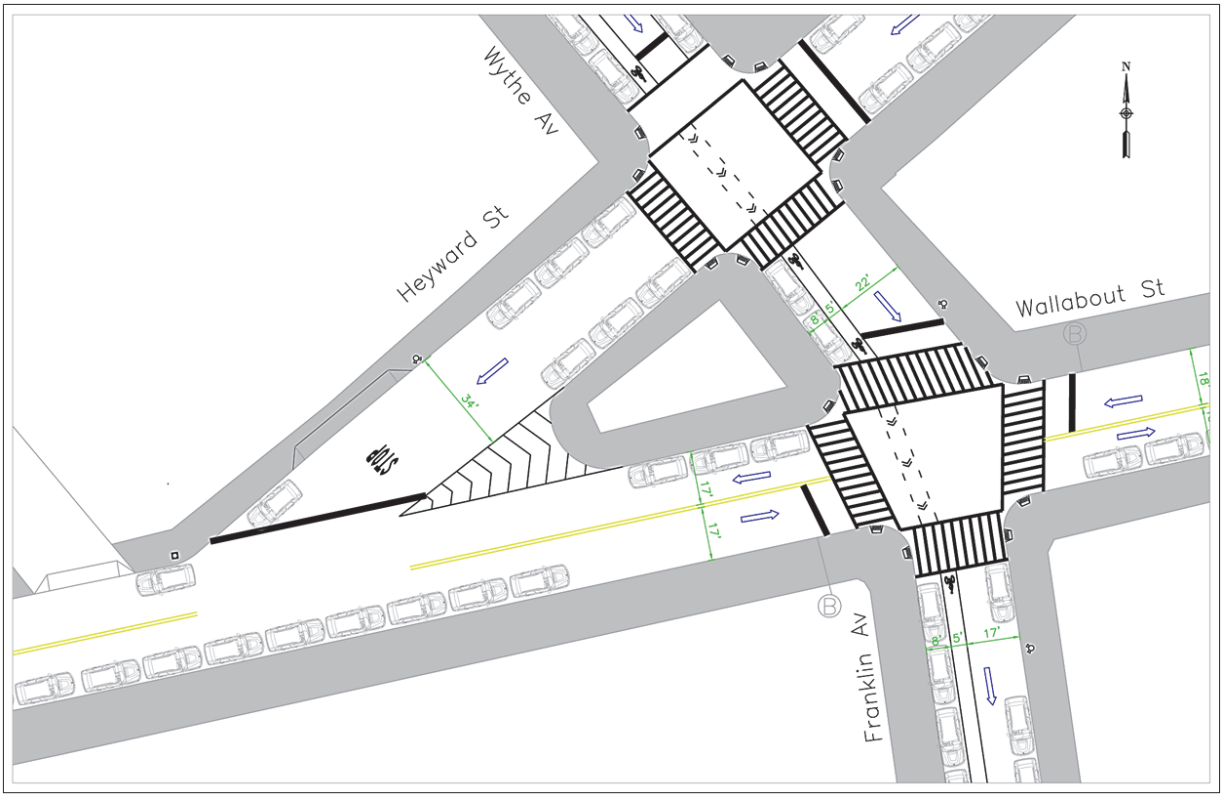
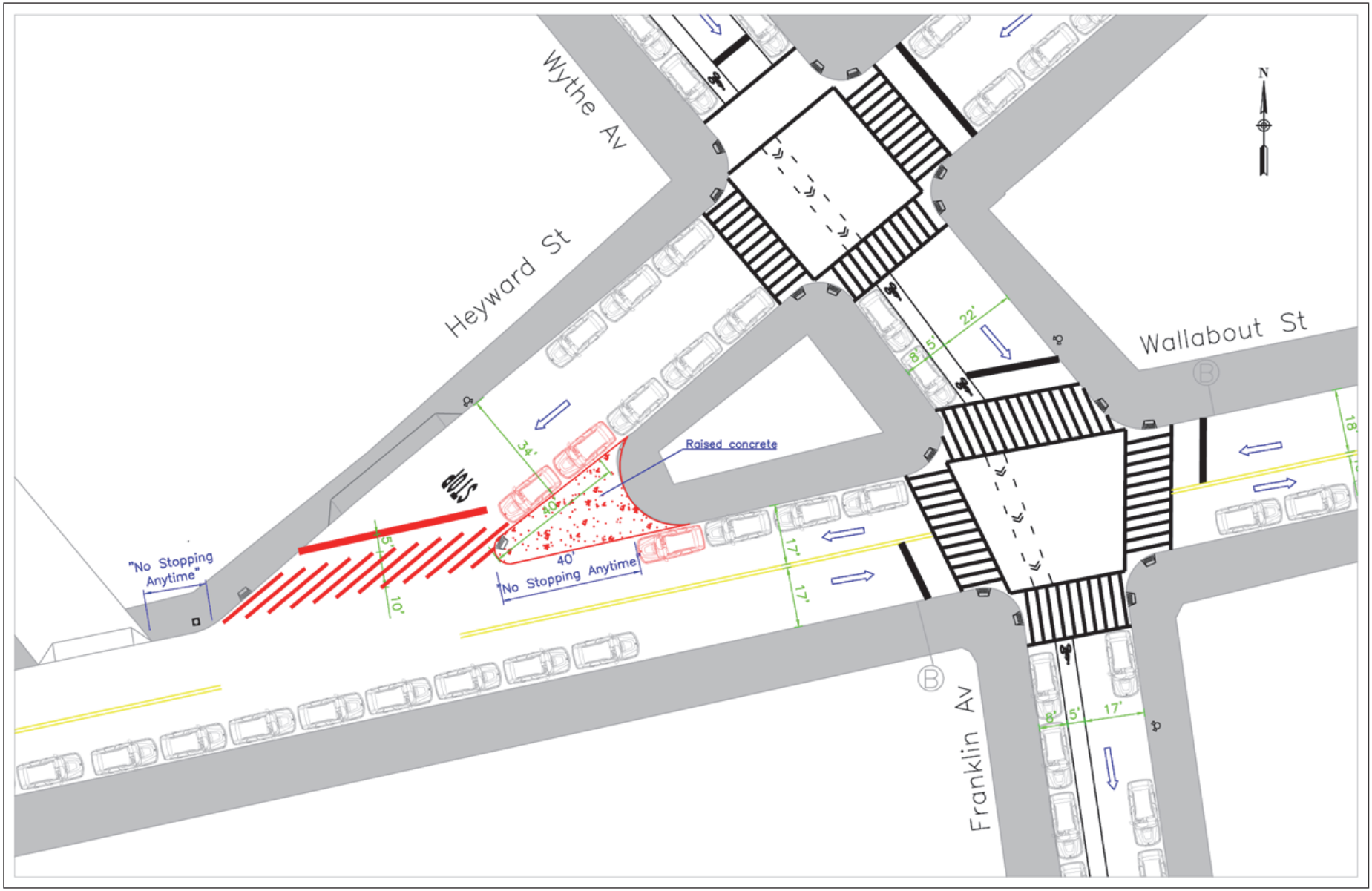


Figure 11-10: Wallabout Street and Heyward Street - Proposed



Wallabout Street @ Lynch Street

Issue:

- There is no marked pedestrian crossing on Lynch Street at Wallabout Street and on the north leg of Bedford Avenue at Wallabout Street and the configuration of the refuge island creates a long crossing distance at Lynch Street.

Recommendation:

- Stripe a crosswalk across Lynch Street at Wallabout Street and extend the western point of the refuge island to shorten the crossing distance. Stripe a crosswalk on the north leg of Bedford Avenue at Wallabout Street.

Figures 11-11 and 11-12 show the existing and proposed conditions.

Figure 11-11: Wallabout Street and Lynch Street - Existing

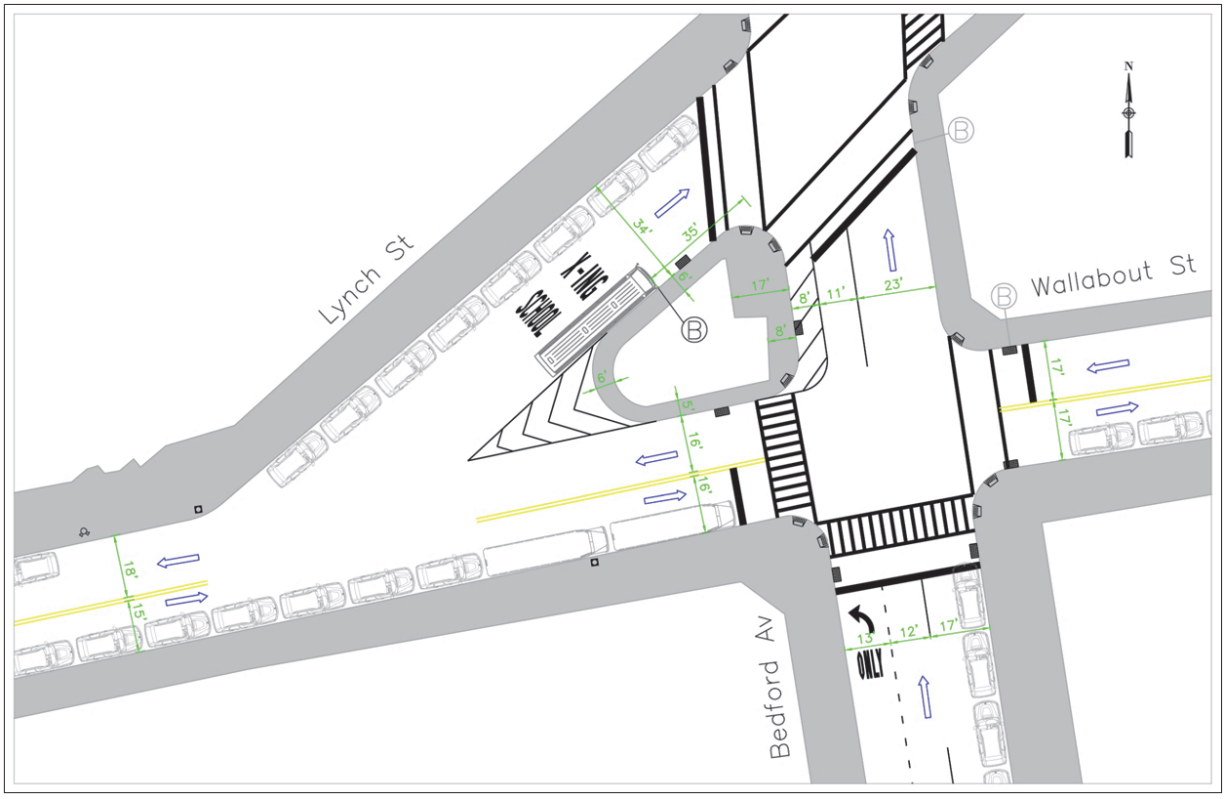
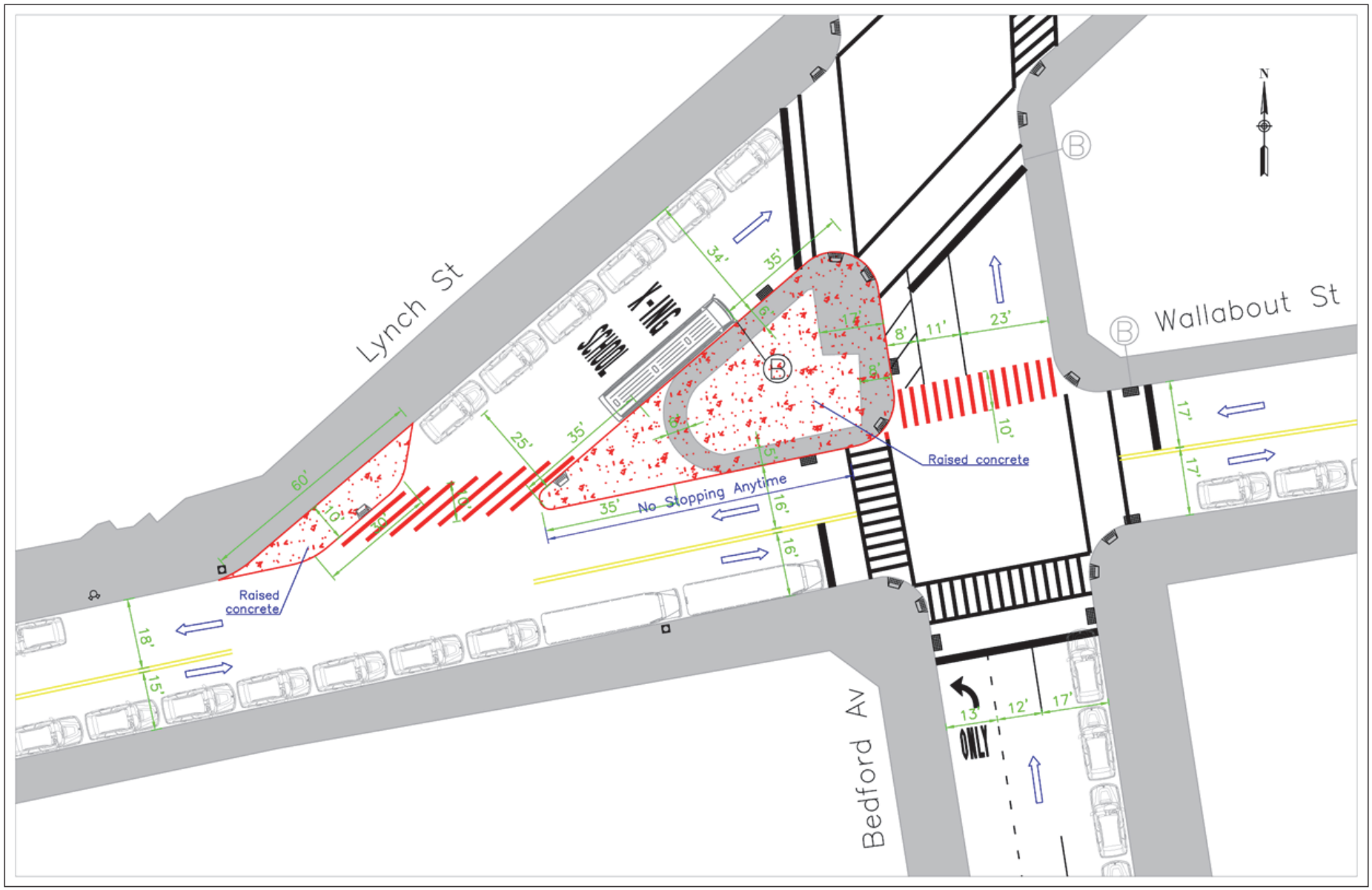


Figure 11-12: Wallabout Street and Lynch Street - Proposed



Wallabout Street @ Middleton Street

Issue:

- There are no marked pedestrian crossings on Wallabout Street between Bedford Avenue and Lee Avenue (approximately 850')
- Pedestrian crossing at Middleton Street/Wallabout Street is wide (approximately 90')

Recommendation:

- Add a curb extension to the north curb of Wallabout Street west of Middleton Avenue to shorten the crossing distance.
- Create an enhanced crosswalk across Wallabout Street to bring better visibility to pedestrians

Figures 11-13 and 11-14 show the existing and proposed conditions.

Figure 11-13: Wallabout Street and Middleton Street - Existing

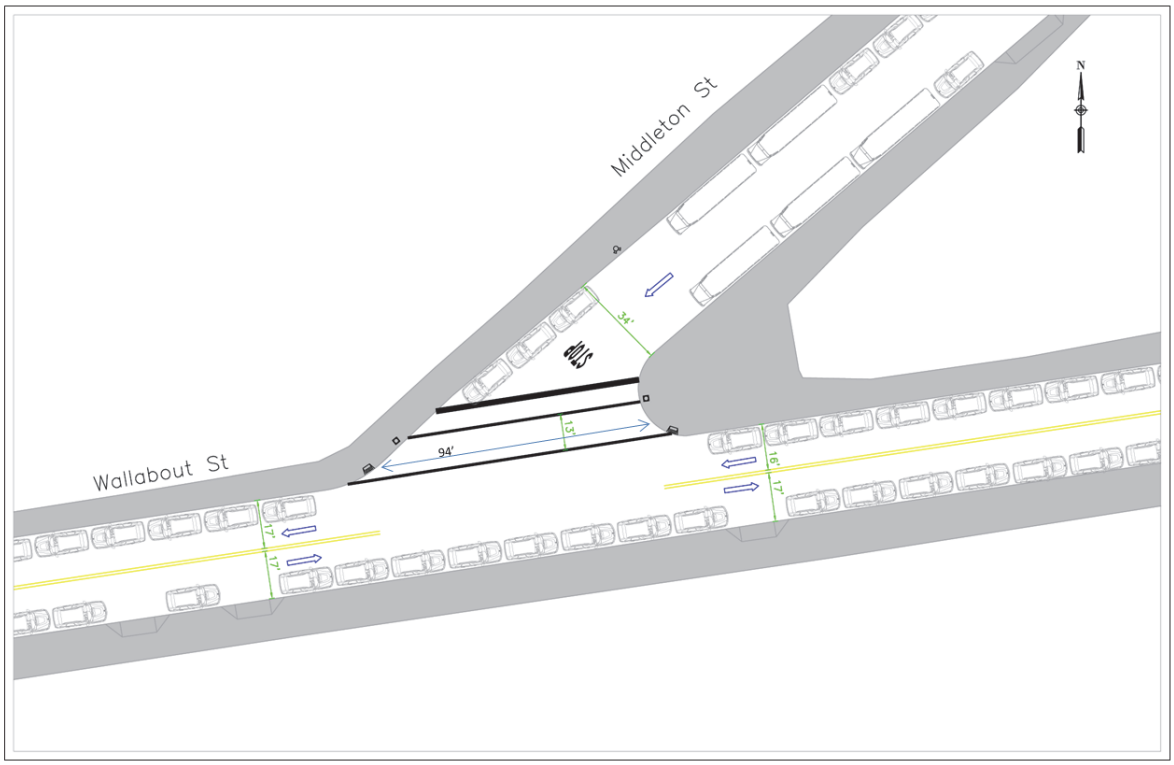
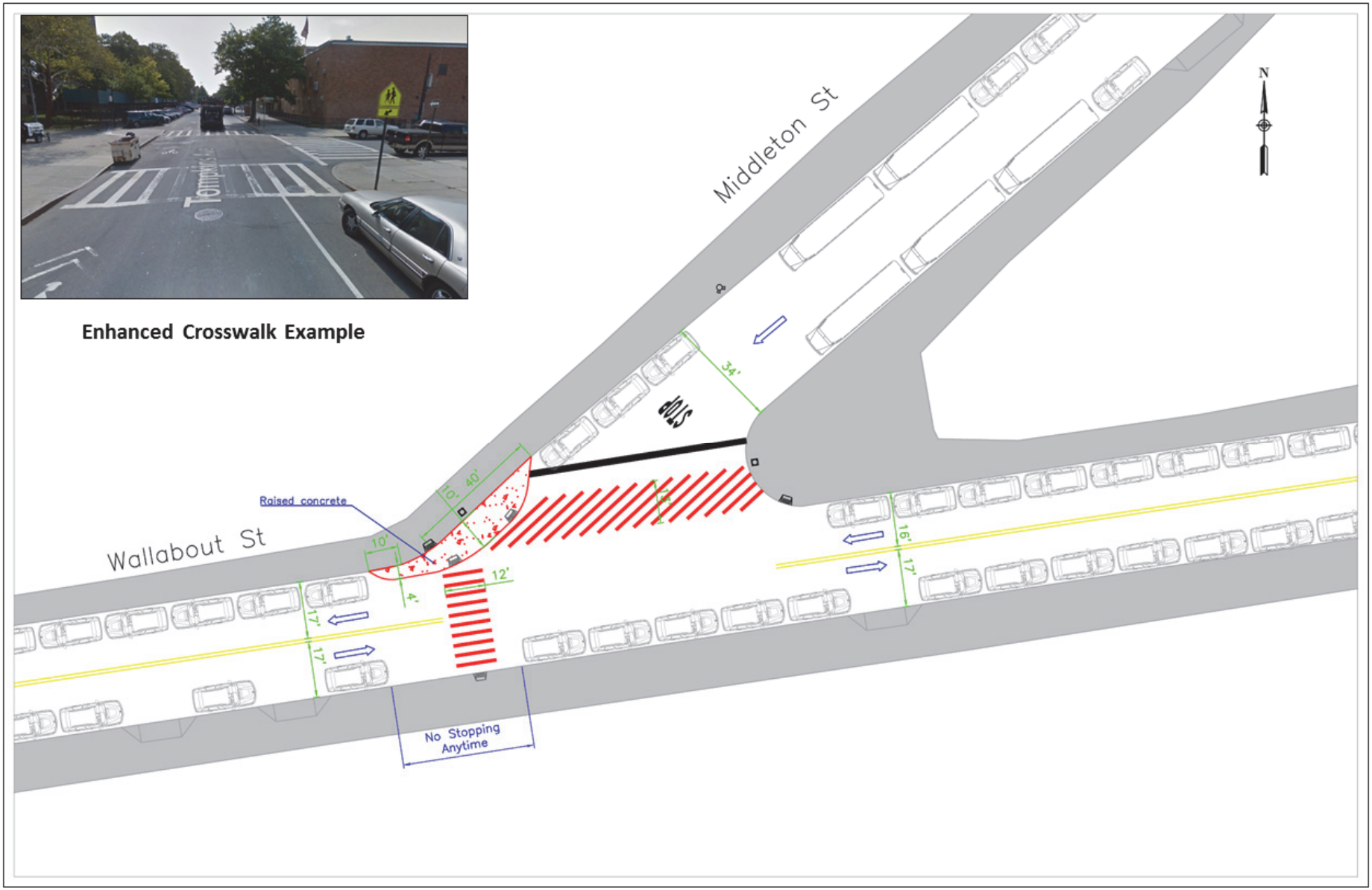


Figure 11-14: Wallabout Street and Middleton Street - Proposed



Wallabout Street @ Lee Avenue

Issue:

- Heavy pedestrian volume at complex and congested intersection with little pedestrian protection.
- Vehicles turning from Lorimer Street to Wallabout Street EB often travel through striped area across the crosswalk.

Recommendation:

- Install concrete pedestrian refuge island in the west crosswalk and extend the concrete curb between Lorimer Street and Wallabout Street

Figures 11-15 and 11-16 show the existing and proposed conditions.

Figure 11-15: Wallabout Street and Lee Avenue - Existing

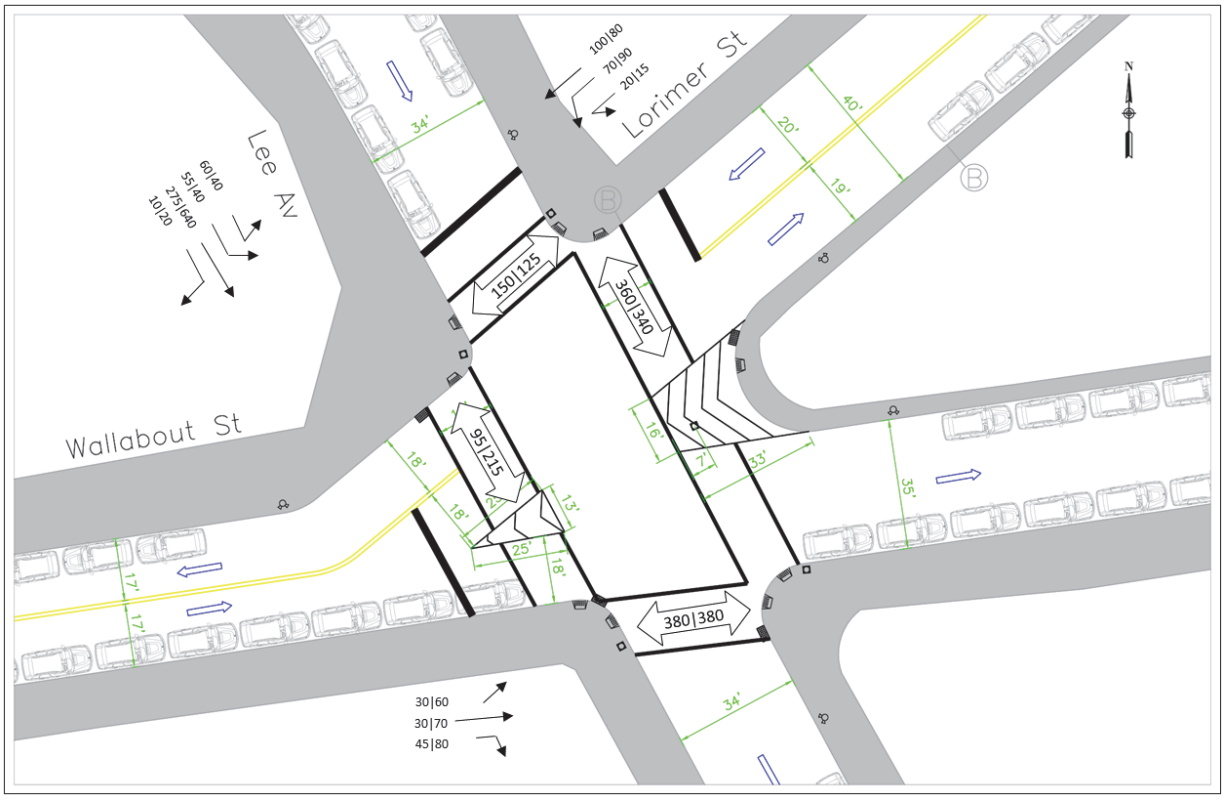
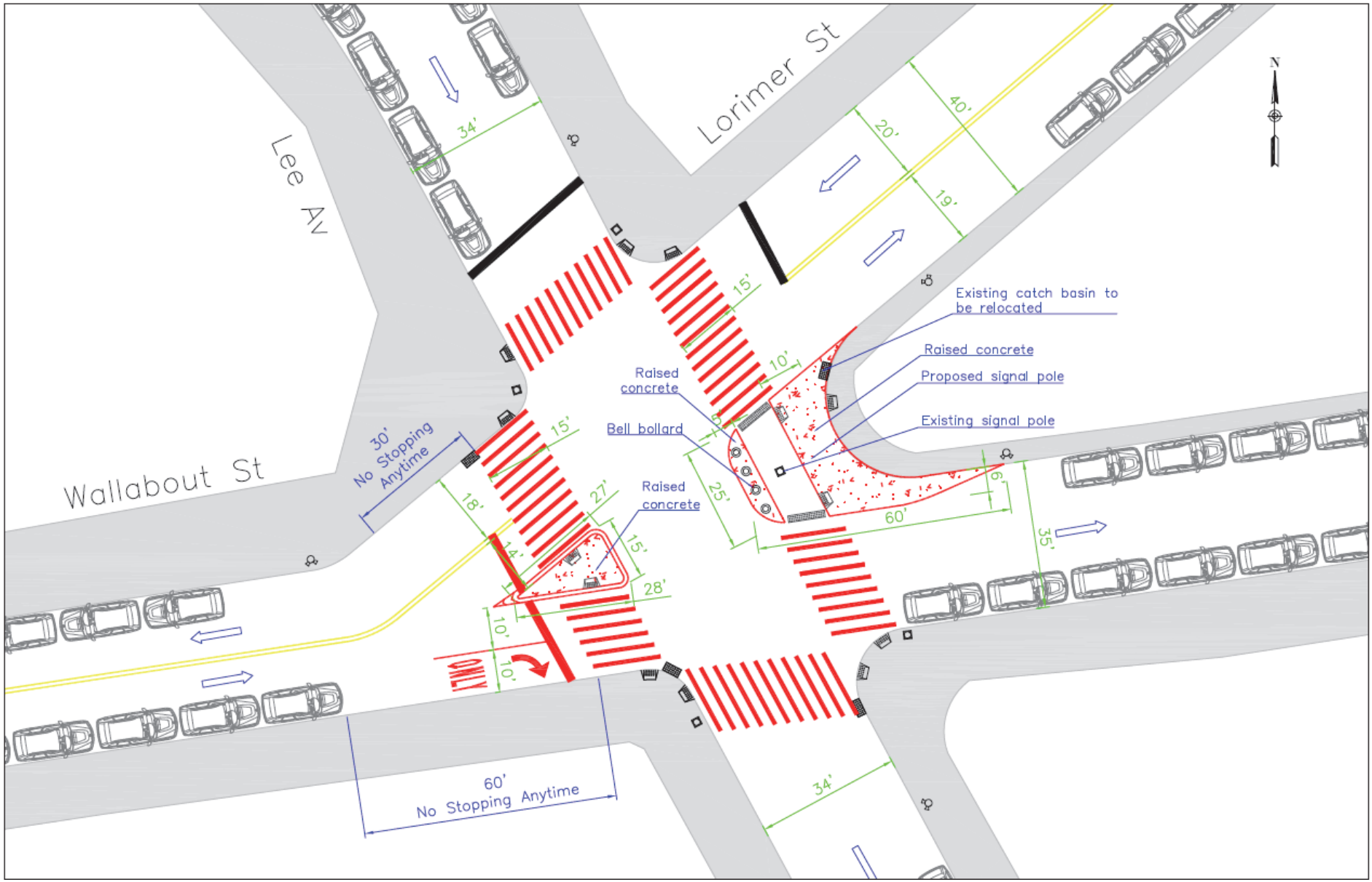


Figure 11-16: Wallabout Street and Lee Avenue – Proposed



Flushing Avenue and Gerry Street

Issue:

- The North sidewalk of Flushing Avenue is interrupted at Gerry Street where a planted island forces pedestrians into the street

Recommendation:

- With the directional change of Gerry Street discussed in the previous recommendation the intersection is reconfigured to allow regular pedestrian crossings with striped crosswalks

Figures 11-19 and 11-20 show the existing and proposed conditions.

Figure 11-17: Flushing Avenue and Gerry Street - Existing

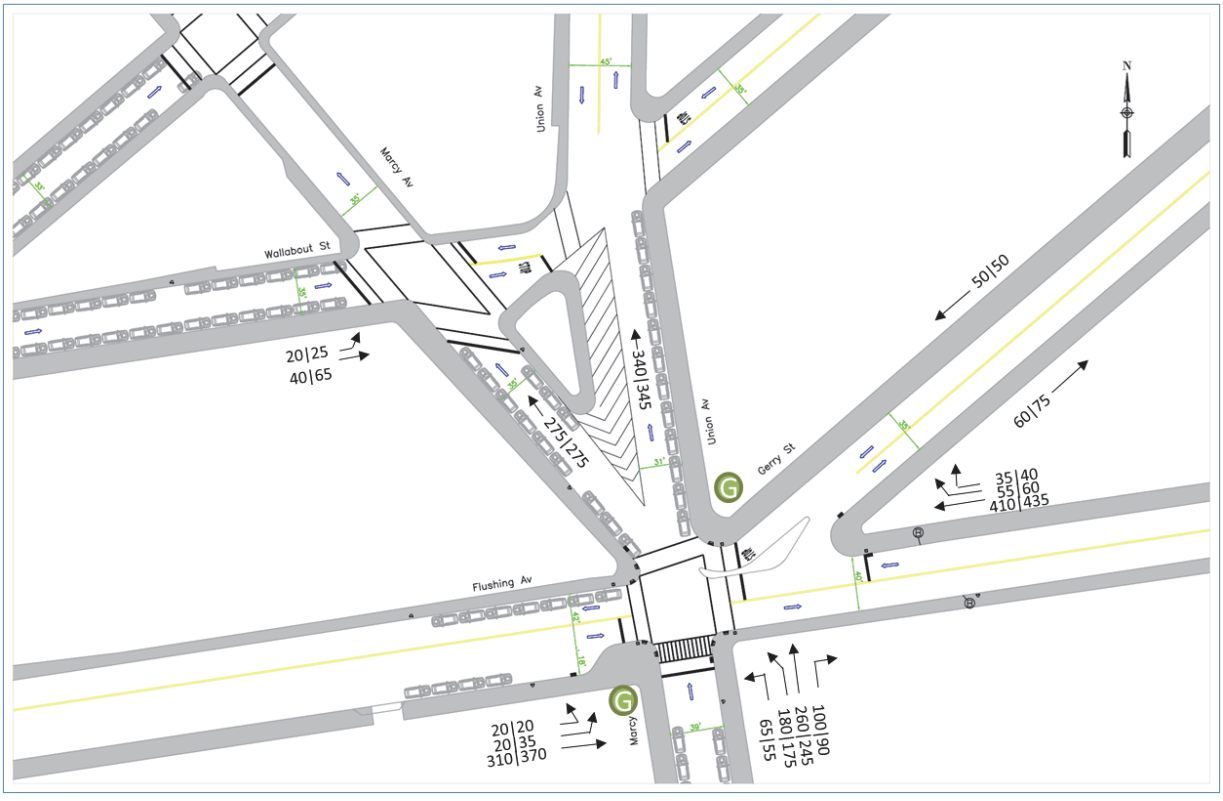
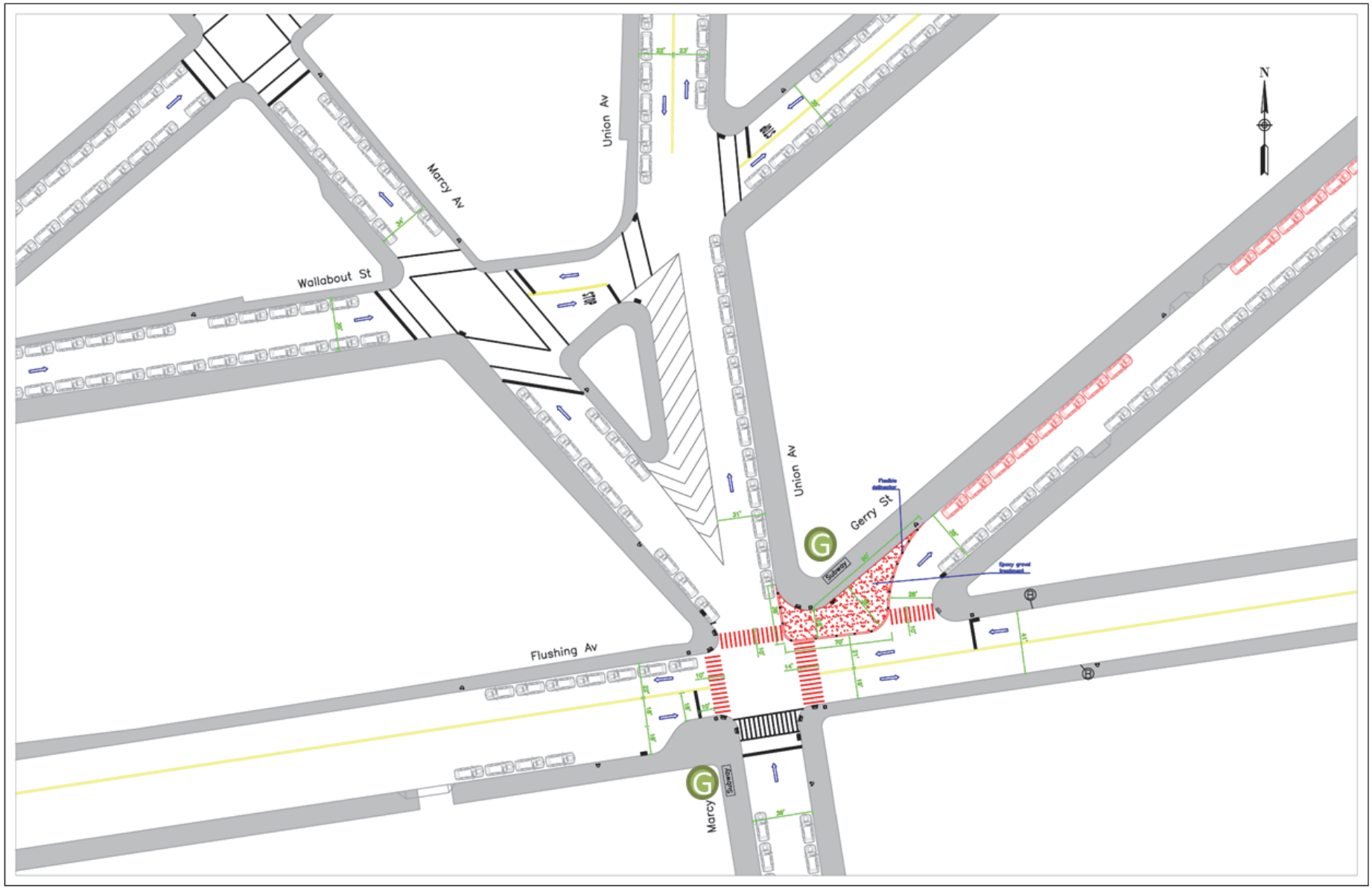


Figure 11-18: Flushing Avenue and Gerry Street - Proposed



Union Street and Harrison Avenue and Lorimer Street

Issue:

- Pedestrians travel through a large intersection of three streets in unmarked crossing paths with little refuge.

Recommendation:

- Create concrete pedestrian refuge island and add marked crossings and pedestrian signals for the southwest curb of Harrison Avenue and northwest curb of Lorimer Street

Figures 11-21 and 11-22 show the existing and proposed conditions.

Figure11- 19: Union Street and Harrison Avenue - Existing

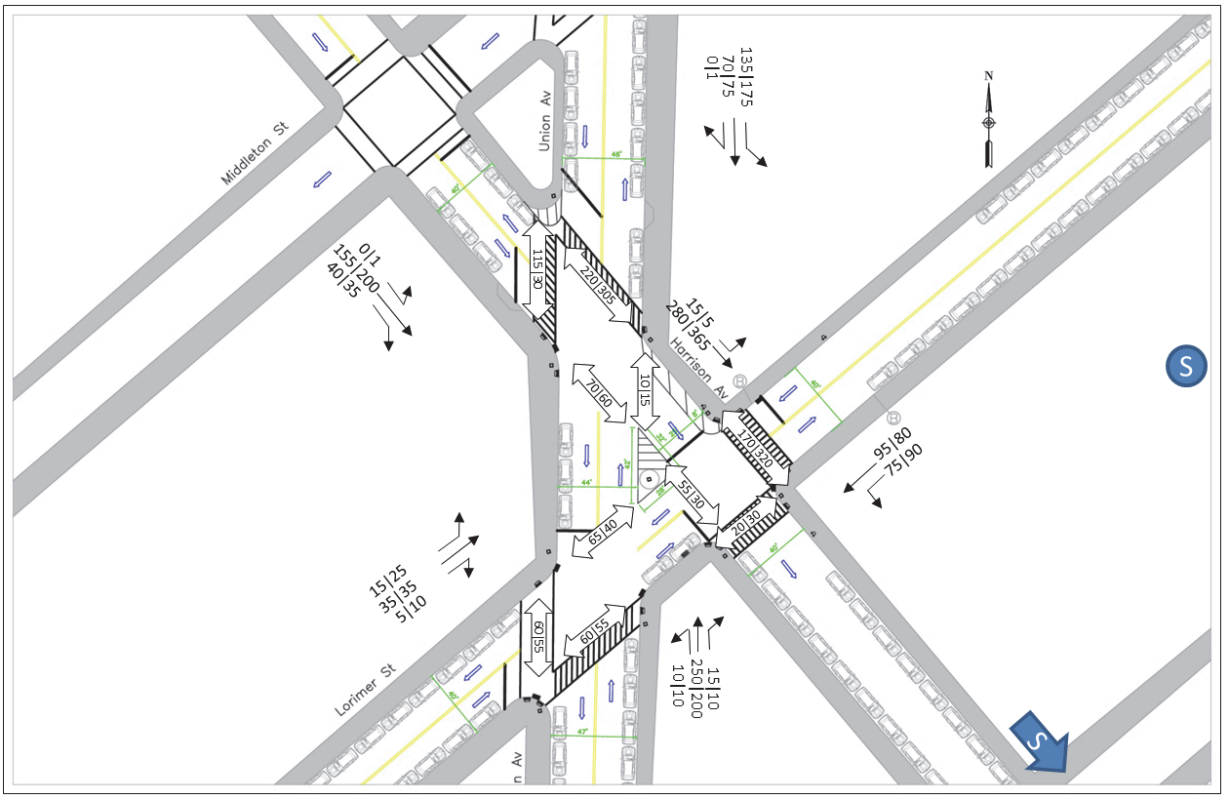
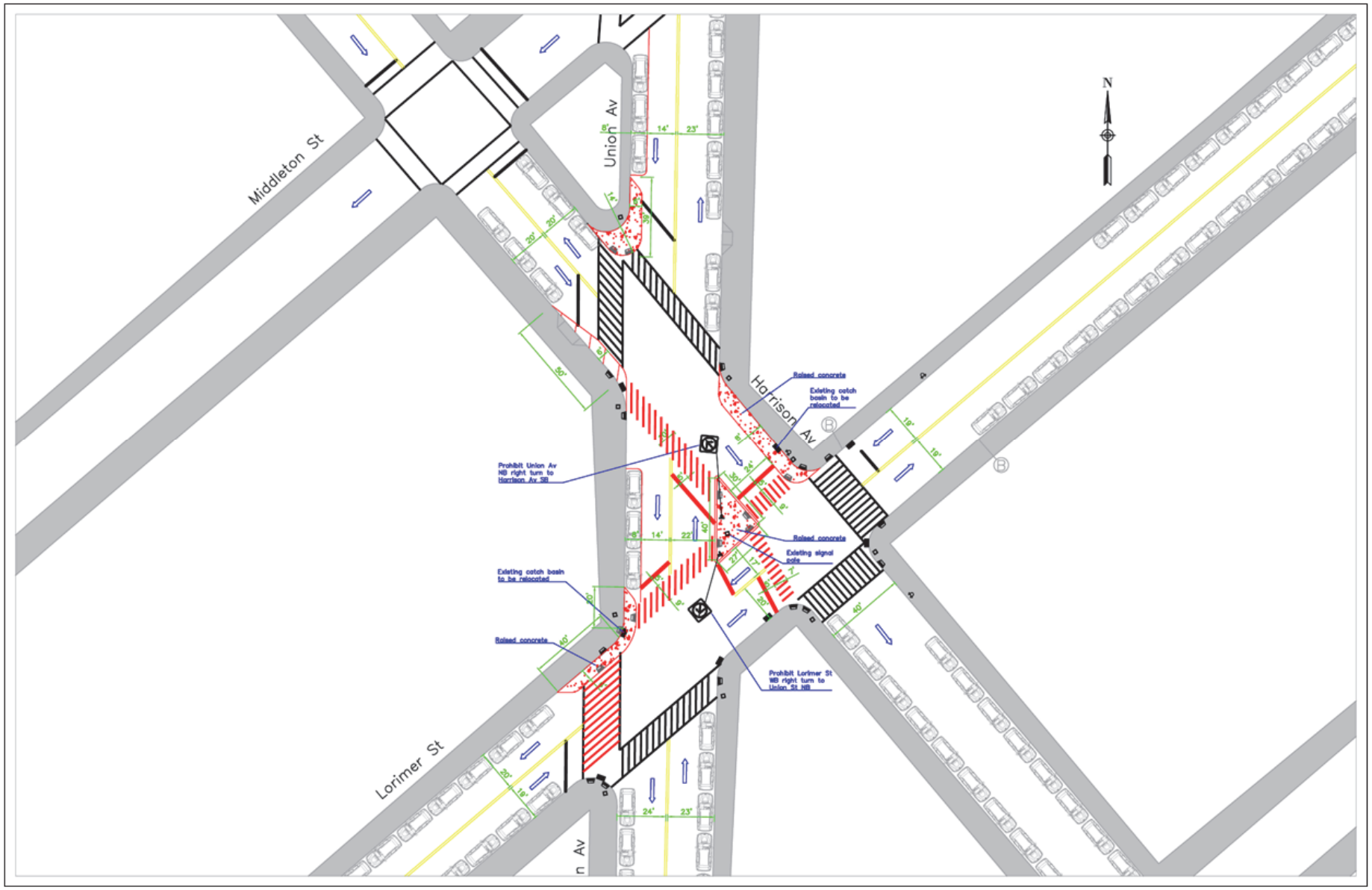


Figure 11-20: Union Street and Harrison Avenue - Proposed



Kent Avenue and Classon Ave/Williamsburg Street East

Issue:

- Heavy vehicle volume traveling to the BQE turns across an unmarked pedestrian crossing at Williamsburg Street E.

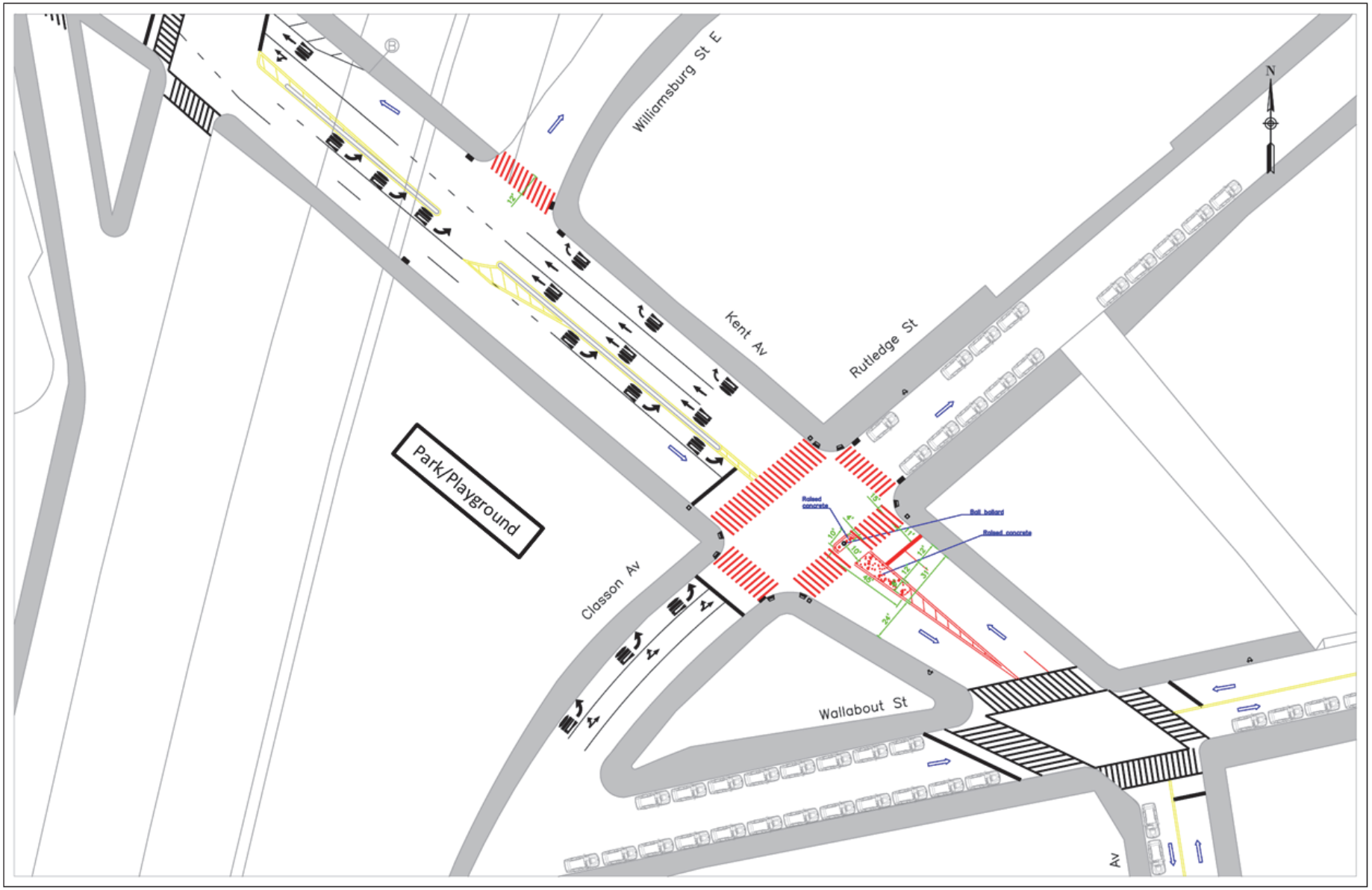
Recommendation:

- Stripe the pedestrian crossing at Williamsburg Street E and add a pedestrian refuge island on the north leg of Kent Avenue and Classon Avenue to better align traffic

Figures 11-23 and 11-24 show the existing and proposed conditions.

Figure 11-21: Kent Avenue and Williamsburg Street E - Existing

Figure 11-22: Figure 11-23: Kent Avenue and Williamsburg Street E - Proposed



Bedford Avenue @ Park Avenue and Flushing Avenue

Issue:

- Heavy left turns from Bedford Avenue onto Park Avenue and Flushing Avenue causes congestion

Recommendation:

- Add curbside left turn lanes on Bedford Avenue to add capacity at these locations.

Figures 11-26 shows the proposed conditions.

Figure 11-24: Bedford Avenue @ Flushing Avenue and Park Avenue - Proposed