Northern Brownsville Transportation Study

EXISTING AND FUTURE CONDITIONS WITH RECOMMENDATIONS

FINAL REPORT

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A Member of the New York
Metropolitan Transportation Council

Northern Brownsville Transportation Study

Existing and Future Conditions

with Recommendations

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1.0 Introduction

The Northern Brownsville Transportation Study was initiated at the request of Brooklyn Community Board 16 to improve traffic operations, relieve congestion, address parking, and improve safety for all street users (motorists, cyclists, pedestrian, and transit). The purpose of the study was to assess the existing and future traffic conditions, identify issues and develop effective solutions to address these issues. The study area is located in the northeast section of Brooklyn, bounded by Atlantic Avenue to the north, Mother Gaston Avenue to the east, Pitkin Avenue to the south, and Howard Avenue to the west. The assessment of existing conditions includes an analysis of demographics, land use and zoning, vehicular traffic, pedestrians and bicycles, accidents and safety, on- and off-street parking, and public transportation.

2.0 Demographic Analysis

Completely within Community District 16, the study area overlaps the neighborhoods of northern Brownsville and southern Ocean Hill, and includes nine census tracts. The demographic analysis of the study area examined population trends from 1990 and 2000 Census data. During this time, the population in the study area increased 5% from 16,728 to 17,589; household size decreased slightly from 2.02 to 1.88 (person/household); and household income increased 18% from $15,837 to $18,765. In 1990, for journey to work, 62% of the study area population used public transit (41% subway, 19% buses and 2% railroad/ferry/taxi) and 30% used private automobiles, while 8% used other modes. In 2000, 66% of the study area population used public transit for journey to work (44% subway, 18% buses and 4% railroad/ferry/taxi). Private automobile was used by 27%, while 7% used other modes for journey to work.

3.0 Zoning and Land Use

A review of existing land use and zoning reveals that the predominant land use in the study area is residential (R6). There are small pockets of commercial uses (C8-2, C4-3) in the southern portion, and manufacturing uses (M1-1) in the northwest and eastern portions of the

study area. Pitkin Avenue serves as the main commercial corridor in the study area. Recently implemented and planned residential developments may contribute to increase traffic in the study area, although there are limited vacant lots that would attract future developments.

4.0 Traffic

To analyze the existing traffic conditions in the study area, basic roadway characteristics were surveyed along with traffic controls, traffic volumes, parking, transit, and pedestrian activity. The traffic data collection plan included Automatic traffic recorders (ATRs), manual turning movement counts, vehicle classification counts (i.e. auto, bikes, trucks, and buses), and pedestrian counts for specified peak periods (AM, midday, PM, and Saturday midday). The highest volumes were observed along the Atlantic Avenue and Eastern Parkway corridors, especially during the AM and PM peak hours; Pitkin Avenue, a commercial corridor, was congested during the midday, PM and Saturday midday peak hours. Level of service (LOS) analyses were conducted at 22 intersections; the existing conditions analyses reveal that most intersections operate at an acceptable LOS A, B, C, and up to mid-level D. However, there were eight intersections along major corridors that experienced LOS above mid-level D, E or F at some or more lane groups during one or more peak period. Future conditions analyses indicate that most intersections are expected to operate at acceptable LOS, but some complex intersections and those along major corridors are expected to operate at poorer levels of service during some peak periods. There are three designated truck routes in the study area, although heavy truck activities were observed along commercial corridors associated with deliveries to local stores.

5.0 Pedestrians and Bicycles

Pedestrian and bicycle activities were examined in the study area. Areas with high pedestrian concentrations associated with bus transfer points, retail/commercial centers, and high density residential areas along major corridors were given special attention. The pedestrian analysis focused on crosswalks and corners. The majority of crosswalks analyzed operated at an acceptable LOS C or better. However, there was one intersection where one crosswalk operated at LOD E or worse during each of the peak periods analyzed.

The existing conditions corner analysis showed that all corners operated at LOS A with the exception of one corner which operated at LOS B during one peak period. There are three on-street Class 2 bike lanes in the study area; a new on-street bike route is proposed for East New York Avenue.

6.0 Accidents and Safety

A detailed accident analysis was conducted for the entire study area during the period from 2007-2009. After reviewing all the intersections in the study area for the most recent three years, only one interaction (Eastern Parkway Extension and Mother Gaston Boulevard/Stone Avenue qualifies as a "High Accident Location having five pedestrian accidents in 2007. Only two locations had an average of ten or more accidents during the three year period: Rockaway Avenue and Atlantic Avenue (14), and Rockaway Avenue and Mother Gaston Blvd/Stone Avenue (11). During the three-year period there were 88 accidents involving pedestrians and 21 cyclists of the total accidents in the study area; there were a total of 659 injuries as a result of 489 crashes in the study area.

7.0 Parking

A parking survey/inventory of on and off-street facilities was conducted during the AM, midday, and PM peak hours to evaluate existing parking capacity and utilization. There are 32 off-street parking facilities within the study area providing a total of 1,557 parking spaces. On weekdays, the total utilization during the midday peak ranges from 75% to 90%. The number of on-street parking spaces is dictated by existing parking regulations; as a result, the total number of on-street parking spaces varies by time of day. Overall the on-street parking utilization in the study area was approximately 59% during the average weekday.

8.0 Public Transportation

The study area is served by four local bus lines (B7, B12, B14, and B60). There are no subway stations within the study area. The A and C subway lines run two blocks north of the study area, and the J, Z, and L trains stop at nearby Broadway Junction. The Long Island Railroad (LIRR) passes through the study area below grade along Atlantic Avenue, but does not stop within the study area; the nearest stop is at Broadway Junction.

9.0 Recommendations

The analyses of the existing and future traffic conditions reveal that there are several locations that can be improved by roadway and intersection restriping, signal timing changes, provision of truck loading/unloading zones, parking restrictions and bus stop relocation. Other actions to enhance pedestrian safety are also recommended. There is also a proposal to create pedestrian plaza. Fourteen intersections have been identified for improvements, one location for streetscape enhancement, one block where bus stops will be consolidated, and truck loading and unloading zones are identified for six locations.

1.0 INTRODUCTION

1.1. Background

The New York City Department of Transportation is conducting the Northern Brownsville Transportation Study at the request of Brooklyn Community Board 16. The study also complements the Utica/Weeksville Transportation Study that was completed in 2005. It builds upon the Utica/Weeksville Transportation Study in advancing transportation solutions to improve traffic operations, relieve congestion, and addresses parking shortfall and improve safety of all street users (motorists, cyclists, pedestrians, and transit riders).

The study area is predominantly low rise multi-family dwellings with a few high rise buildings scattered throughout the study area. There are some commercial (local retail) and institutional uses (schools and transit facilities) located in the study area. The area has seen some development in housing (Hope IV) that has brought new residents and increased demand for additional parking.

1.2 The Study Area

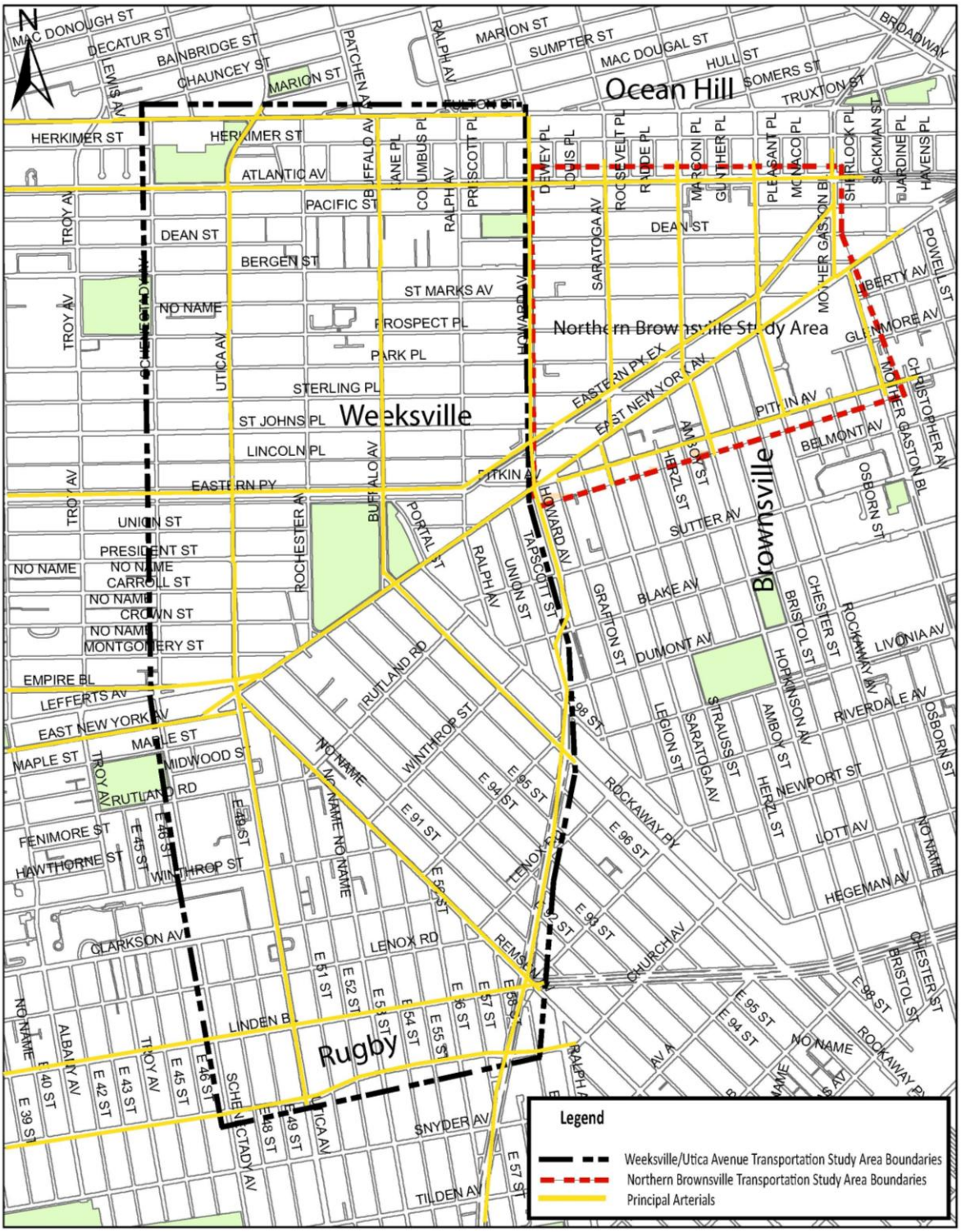
The study area is located in the northeast section of Brooklyn and comprises approximately 42 blocks. It is bounded by Atlantic Avenue to the north, Pitkin Avenue to the south, Mother Gaston Boulevard to the east, and Howard Avenue to the west. There are two neighborhoods - Brownsville (northern) and Ocean Hill (southern) - in the study area. Figure 1-1 shows the boundaries of the study area and the Utica/Weeksville Transportation Study.

The study area street network is a regular grid with the two major diagonal corridors, Eastern Parkway and East New York Avenue, creating a few complex multi-legged intersections. Other major corridors in the study area are: Atlantic Avenue, Rockaway Avenue, Saratoga Avenue, Thomas Boyland Avenue/Hopkinson Avenue, Howard Avenue and Pitkin Avenue. Traffic congestion was observed on most of these corridors. The multi-leg intersections in the study area are:

a) East New York/Pitkin and Howard Avenues;
b) East New York/Rockaway Avenues and Prospect Place;

Figure 1-1

Northern Brownsville and Utica/Weeksville Transportation Study Areas



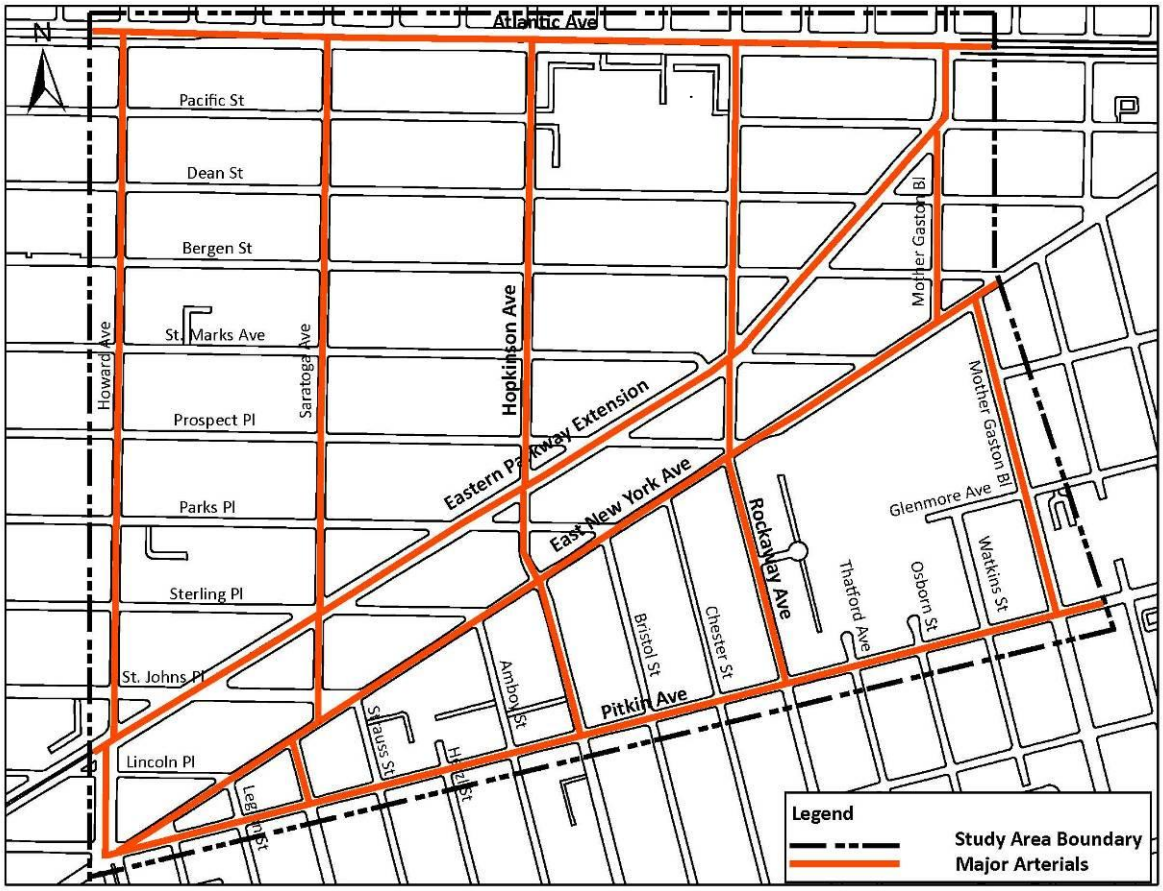
c) Eastern Parkway/Rockaway Avenue/St. Marks Place and Reverend D. Brown Place;

d) Eastern Parkway/Mother Gaston Blvd and Pacific Street; and

e) Eastern Parkway/Saratoga Avenue and Sterling Place.

Figure 1-2 shows the study area boundaries and major arterials in the study area.

Figure 1-2
The Study Area Boundaries and Major Arterials



1.3 Goals of the Study

The goals of the study are to improve traffic operations and enhance safety for all street users (motorists, bicyclists, pedestrians), while facilitating public participation in the planning process.

1.4 Objectives of the Study

The objectives of the study are:

1) To examine the existing and future traffic conditions and identify issues;

2) To develop improvement measures to address issues and problems and enhance the safety of all street users;

3) To facilitate public participation throughout the process.

1.5 Project Organization and Methodology

The study examined the following subjects to help identify and define problems and develop effective traffic/safety solutions: Demographics, Land Use and Zoning, Vehicular Traffic, Goods Movement, Pedestrians and Bicycles, Accident and Safety, On- and Off-Street Parking, and Public Transportation. The process involved an analysis of existing and future conditions, and the development of improvement measures with active public participation.

2.0 DEMOGRAPHIC ANALYSIS

The demographic/socioeconomic characteristics of the study area provide some insight into the population travel demand and needs. The 1990 and 2000 Census data were used to examine the study area demographics and to draw comparisons with the Borough of Brooklyn and New York City as a whole.

There are nine census tracts that fall wholly or partially in the study area. Between 1990 and 2000 the study area's population grew from 16,728 to 17,589. Table 2-1, Population by Age Group and Area, presents the population for the study area, Brooklyn, and New York City.

Table 2-1
Population by Area and Age Group

	Study Area Population				Brooklyn Population				New York City Population			
Age	**1990**	**%**	**2000**	**%**	**1990**	**%**	**2000**	**%**	**1990**	**%**	**2000**	**%**
0-16	9,945	35	10,753	37	571,229	25	622,012	25	1,593,581	22	1,827,857	23
17-64	16,297	58	16,735	57	1,442,524	63	1,560,032	64	4,776,252	65	5,241,051	65
65+	1,930	7	1,968	6	286,911	12	283,282	11	952,731	13	939,370	12
Total	**28,172**	**100**	**29,456**	**100**	**2,300,664**	**100**	**2,465,326**	**100**	**7,322,564**	**100**	**8,008,278**	**100**

Between 1990 and 2000, the median household income in the study area, Brooklyn and New York City experienced double-digit growth: 18%, 25%, and 29%, respectively. Table 2-2 shows the median income in the study area, Brooklyn, and New York City.

Table 2-2
Median Household Income by Area

Census Year	Study Area	% Change	Brooklyn	% Change	New York City	% Change
1990	$15,837		$25,684		$31,587	
2000	$18,765	18	$32,135	25	$40,851	29

The 1990 journey to work data shows public transportation as the predominant travel mode with 62% of the study area population using public transit - 41% used subway, 19% buses, and 2% railroad/ferry/taxi. In Brooklyn and New York City the public transportation share is 59% and 55%, respectively; the subway share being 45% and 38%, respectively; the bus

share 12% and 13%, respectively; and the railroad/ferry/taxi share 3% and 5%, respectively. Cars, trucks and vans were used by 30% of the study area population, and 32% and 33% in Brooklyn and New York City, respectively. Other modes were used by 8% of the study area, and 9% and 12% in Brooklyn and New York City, respectively.

The 2000 journey to work mode share is very similar to 1990 with 66% transit use (44% subway and 18% buses) in the study area and in Brooklyn and New York City 59% and 54%, respectively (subway 46% and 39%; bus 11% and 12%). Cars, trucks and vans were used by 27% of the study area population, and 31% and 34% in Brooklyn and New York City, respectively. Table 2-3 shows Journey to Work by Mode share for years 1990 and 2000.

Table 2-3
1990 and 2000 Journey to Work by Mode

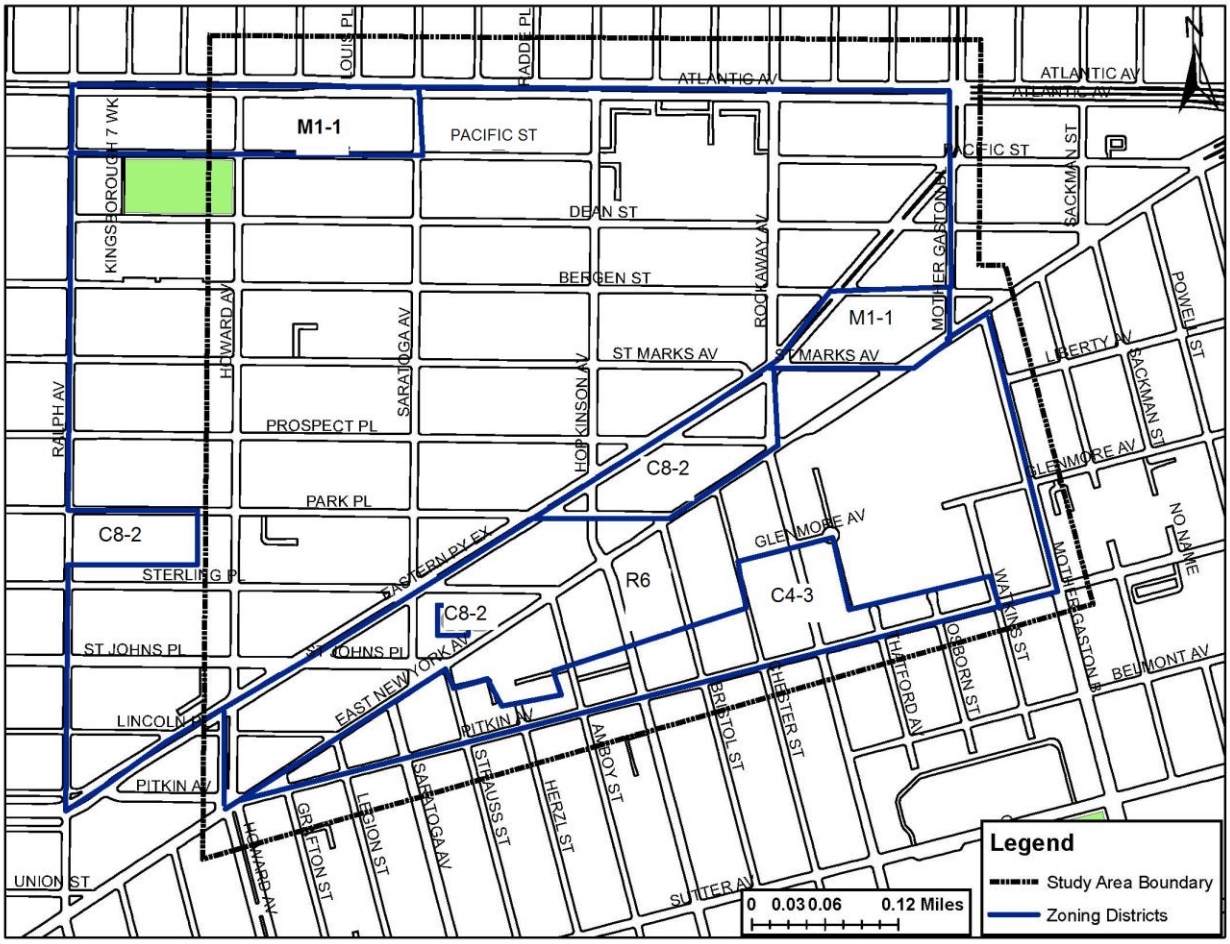
	Number of persons using various modes					
1990	**New York City**	**Mode Share (%)**	**Brooklyn**	**Mode Share (%)**	**Study Area**	**Mode Share (%)**
Car, Truck or Van	**1,036,654**	**33**	**283,765**	**32**	**1,224**	**30**
Public Transportation	**1,693,254**	**55**	**523,258**	**59**	**2,529**	**62**
Bus	403,477	13	104,298	12	779	19
Subway	1,168,346	38	399,067	45	1,688	41
Railroad/Ferry/Taxi	121,431	5	19,893	3.05	62	2
Other modes	**368,423**	**12**	**82,432**	**9**	**323**	**8**
Total Trips	**3,098,331**	**100**	**889,455**	**100**	**4,076**	**100**
2000						
Car, Truck or Van	**1,049,396**	**34**	**274,301**	**31**	**1,117**	**27**
Public Transportation	**1,679,749**	**54**	**515,836**	**59**	**2,659**	**66**
Bus	364,408	12	93,767	11	711	18
Subway	1,199,226	39	403,327	46	1,799	44
Railroad/Ferry/Taxi	116,115	3	18,742	2	150	4
Other modes	**365,673**	**12**	**88,428**	**10**	**278**	**7**
Total Trips	**3,094,818**	**100**	**878,565**	**100**	**4,055**	**100**

3.0 ZONING AND LAND USE

3.1 Zoning

The existing zoning and land use in the study area are shown in Figures 3.1 and 3.2. The predominant zoning district in the study area is residential (R6) with small sections of commercial (C8-2, C4-3) in the southern part and manufacturing (M1-1) in the northwestern and eastern parts of the study area.

Figure 3-1
Existing Zoning



3.2 Land Use

The existing land uses in the study area include residential, commercial, institutional, industrial, recreational facilities and vacant land. Figure 3-2 shows the existing land use in the study area.

Residential

In conformity with zoning, the predominant land use is residential, comprising mainly of one and two-family dwellings and multi-family walk-ups, with some ground floor retail.

A few high density multi-family buildings can be found mainly along Mother Gaston Boulevard, Atlantic Avenue, and Thomas Boyland Avenue. The pictures below show examples of residential development.

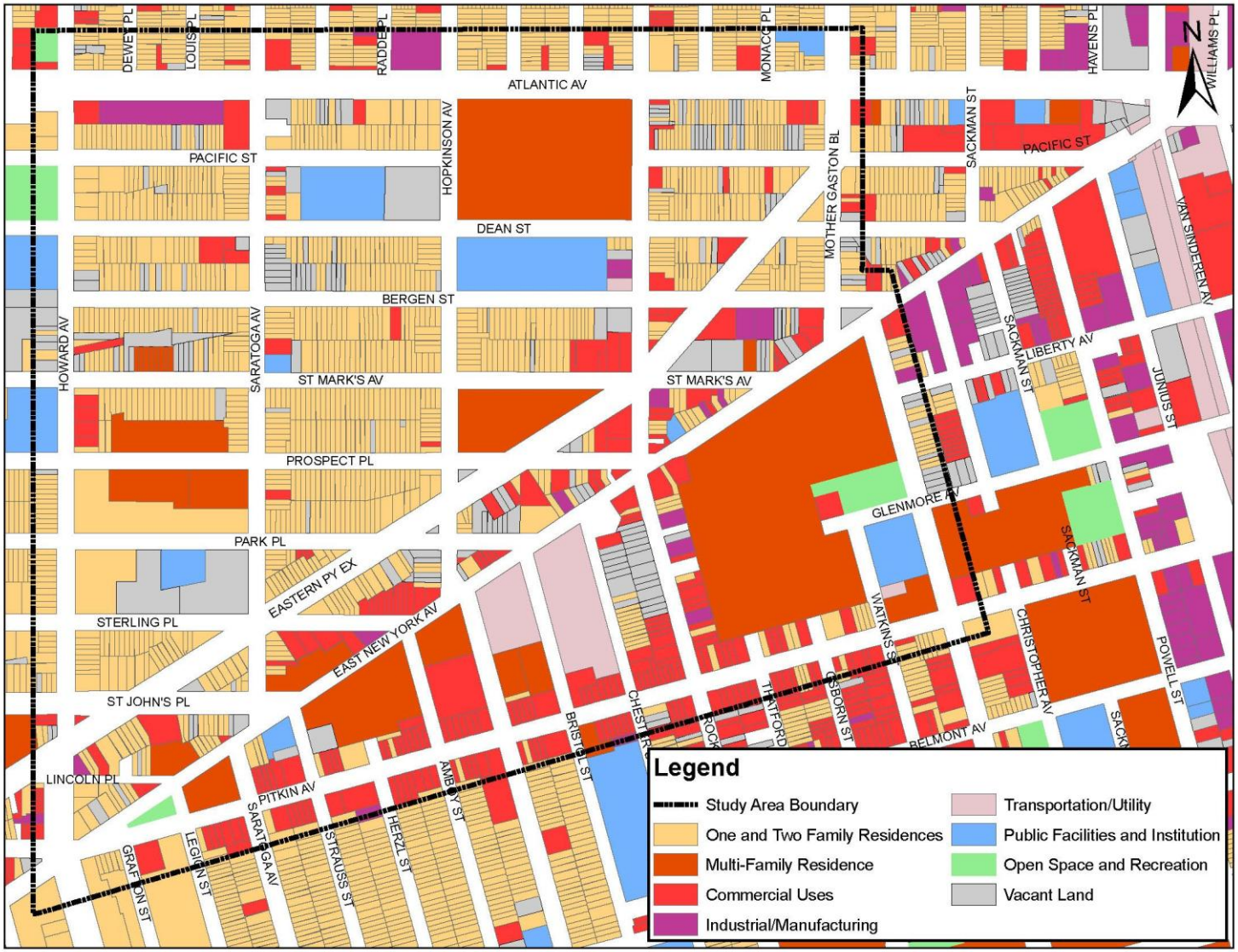
New two-family row housing

Medium density residential

High density residential

Traditional two-family residential

Figure 3-2
Existing Land Use



Commercial Activity

A majority of the commercial activity is concentrated along Pitkin Avenue and pockets along Sterling Place, Eastern Parkway and East New York Avenue. Pitkin Avenue serves as the main commercial retail corridor in the study area. Commercial uses along these corridors include supermarkets, discount stores, banks, furniture stores, restaurants, clothing stores, and dental/medical offices (see pictures below).

Manufacturing Activity

The manufacturing/industrial activity is located in very small pockets along Atlantic Avenue, East New York Avenue, Eastern Parkway, St. Marks Avenue, and Mother Gaston Boulevard. The manufacturing activity is confined mainly to auto-related uses (gas station and garages).

Community/Institutional Facilities

The community and institutional facilities in the study area include churches, six public/private elementary and secondary schools, and one public library (located on Watkins and Glenmore Avenues).

Recreational Facilities - Parks and Open Space

There are limited recreational facilities in the study area; those that exist are primarily associated with schools or large multifamily complexes. Vacant lots accounts for approximately 1% of the total land area. There is one small park on the western boundary of the study area between Pacific and Dean Streets.

Recent Residential Developments

A midblock site on Hopkinson Avenue and Bristol Street, between Pitkin Avenue and East New York Avenue that previously functioned as a parking lot (101 spaces) was recently converted to residential use with 162 dwelling units and 25 parking spaces. The pictures below show the previous use (parking lot) on the site and the newly constructed residential complex.

A new development "Prospect Plaza" with 25 residential units was recently constructed on vacant land situated on Park Place, between Saratoga Avenue and Howard Avenue.

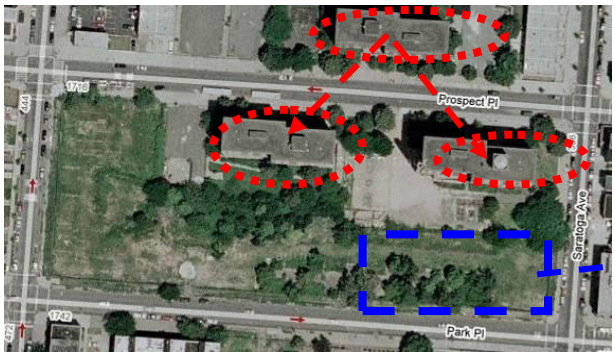
Previous use - parking lot

Newly constructed residential building

Planned Residential Development - Sterling Plaza

There are three existing high-rise residential buildings on Prospect Place between Saratoga and Howard Avenues that are prepared for renovation which will accommodate commercial space on the ground floor and luxury residential units above.

The pictures below show the aerial view of the existing three vacant structures to be renovated and the previous land use at the site where "Prospect Plaza" was built.



Vacant Land for Potential Development

There is a large vacant lot located on Rockaway Avenue and Chester Street, between Pitkin and East New York Avenues that is prime for development.

4.0 TRAFFIC AND TRANSPORTATION

4.1 Introduction

To analyze the existing traffic conditions in the study area, basic roadway characteristics were surveyed along with traffic controls, traffic volumes, parking, transit, and pedestrian activity. The traffic data collection plan included Automatic Traffic Recorders (ATRs), manual turning movement counts, vehicle classification counts (i.e., auto, bikes, trucks, and buses), and pedestrian counts for specified peak periods (AM, midday, PM, and Saturday midday). ATRs were installed at 17 locations for one week (24/7), while manual turning movement and vehicle classification counts were collected for 22 locations for one mid-week day (Tuesday or Wednesday or Thursday) during the same week. Figure 4-1 shows the data collection plan.

The study also inventoried street geometry, including block lengths, sidewalk and crosswalks widths, traffic flow directions, traffic controls, travel time runs along the major corridors, truck loading/unloading stations, bus routes and layovers, parking regulation and utilization.

Based on traffic data, the following peak hours were selected for level-of-service (LOS) analysis: AM peak hour 8:00-9:00, midday peak hour 1:00-2:00, PM peak hour 5:00-6:00, and Saturday midday peak hour 1:00-2:00.

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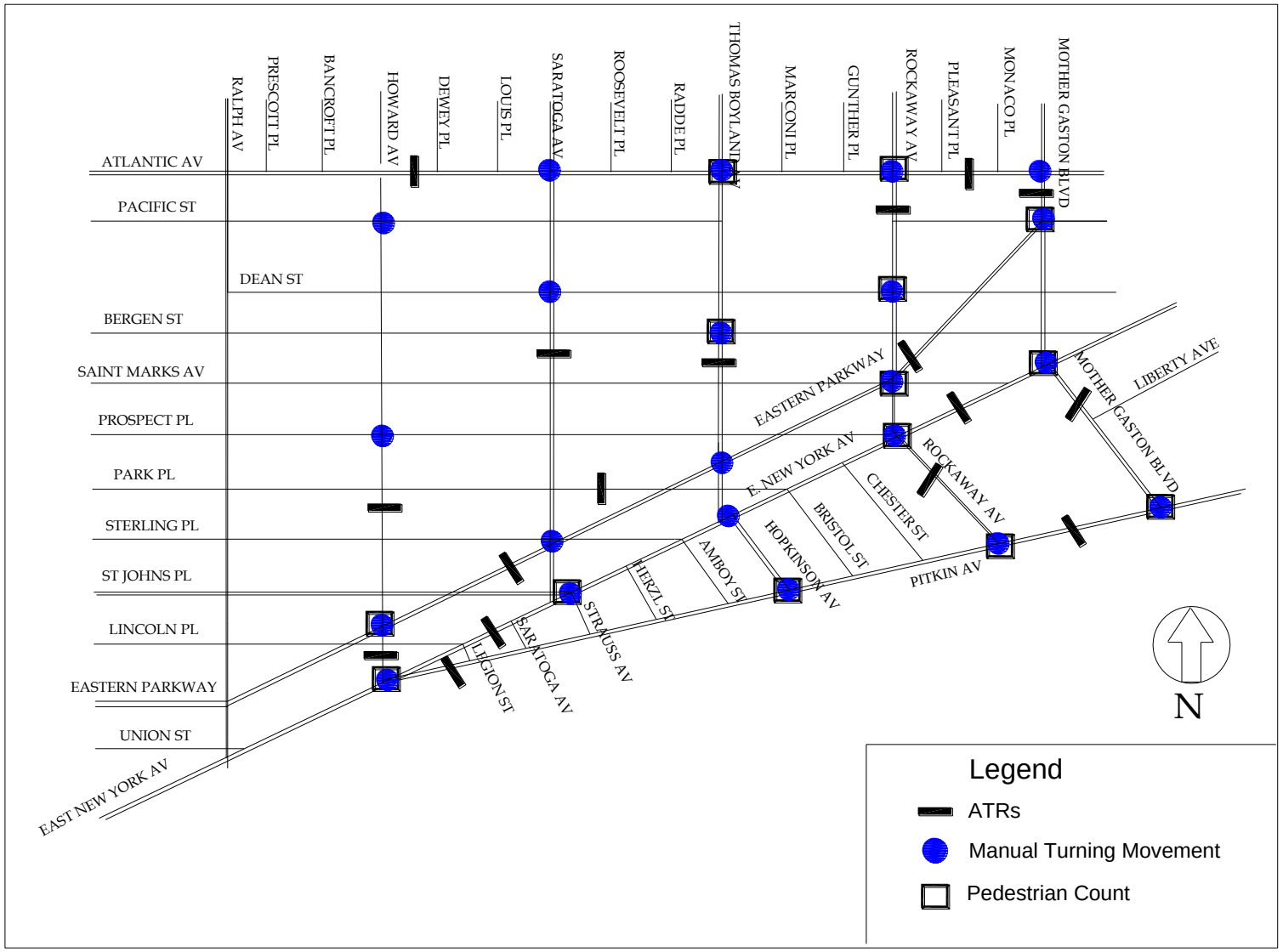
Figure 4-1
Traffic Count Locations



4.2 Traffic Network Volumes

The traffic network volume was prepared using the ATRs and manual turning movement counts to create a balanced traffic network for each peak hour. Figures 4-2, 4-3, 4-4, and 4-5 show the traffic network volumes for the AM, midday, PM, and Saturday midday peak hours, respectively.

The highest volumes were observed along the following corridors: Atlantic Avenue and Eastern Parkway, especially during the AM and PM peak hours. Pitkin Avenue, a commercial corridor, is most congested during the Saturday midday peak hours, as well as during the midday and evening hours of the weekday.

Figure 4-2
2008 Existing Traffic Volumes – AM Peak Hour

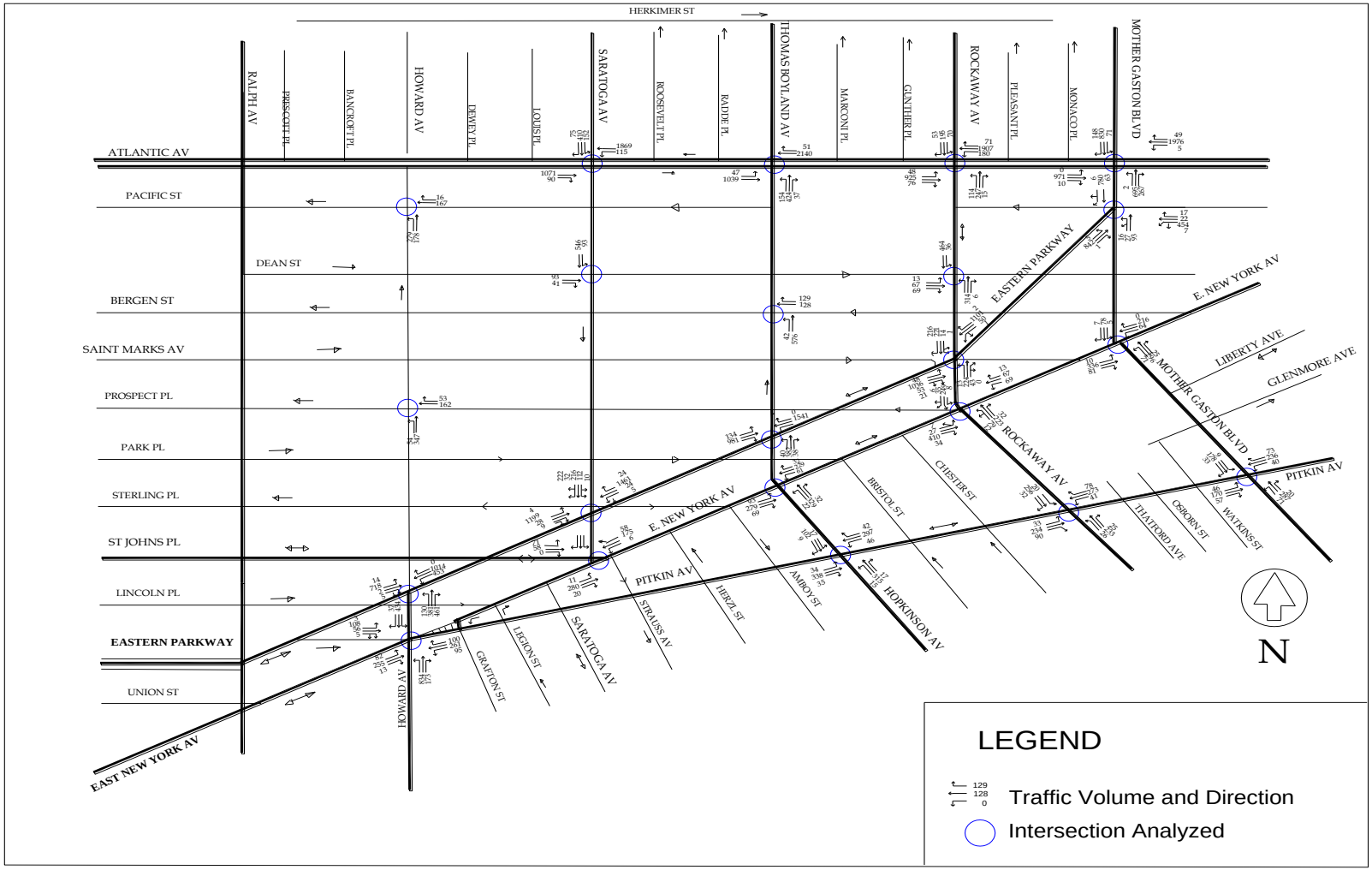


Figure 4-3
2008 Existing Traffic Volumes – Midday Peak Hour

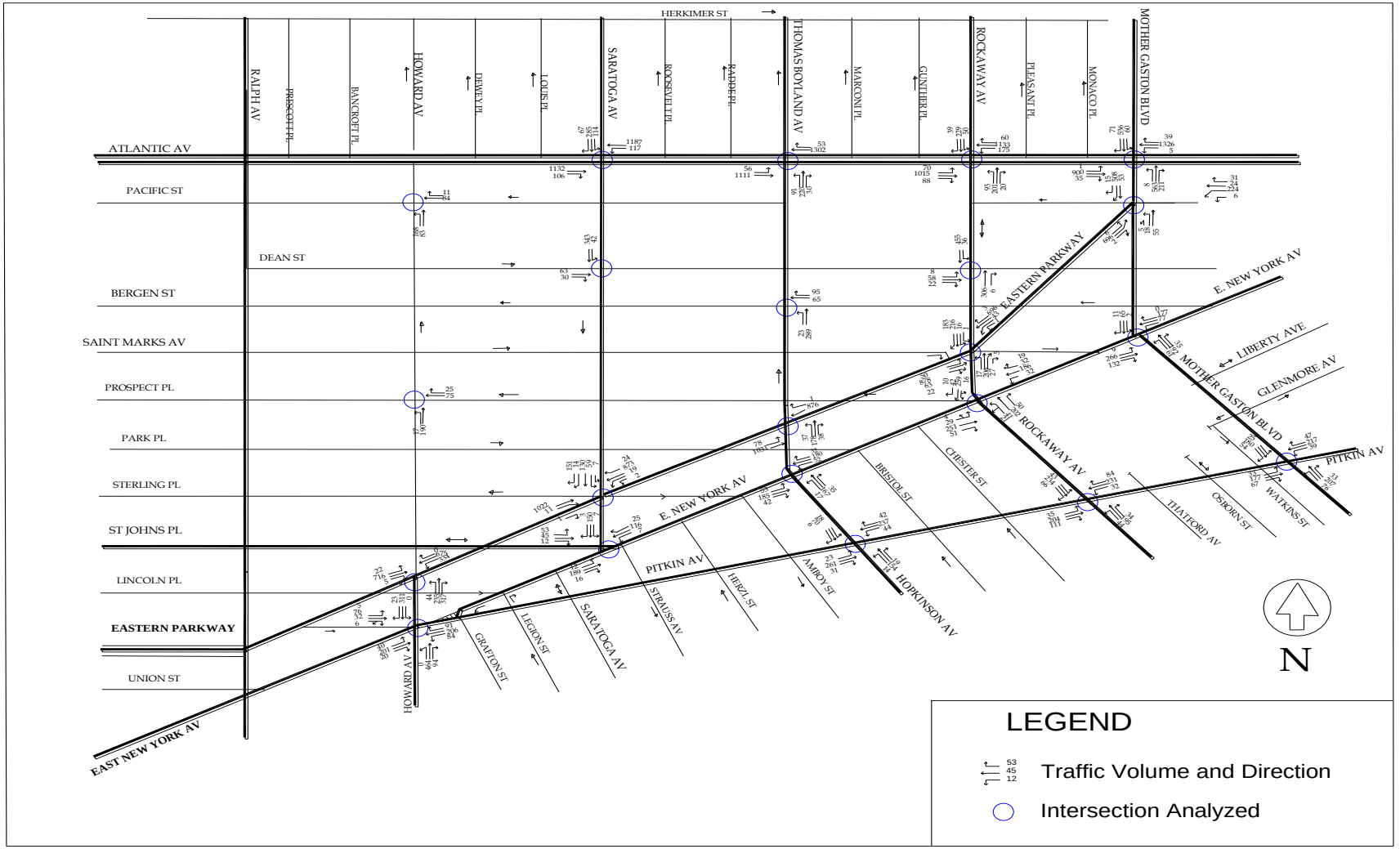


Figure 4-4
2008 Existing Traffic Volumes – PM Peak Hour

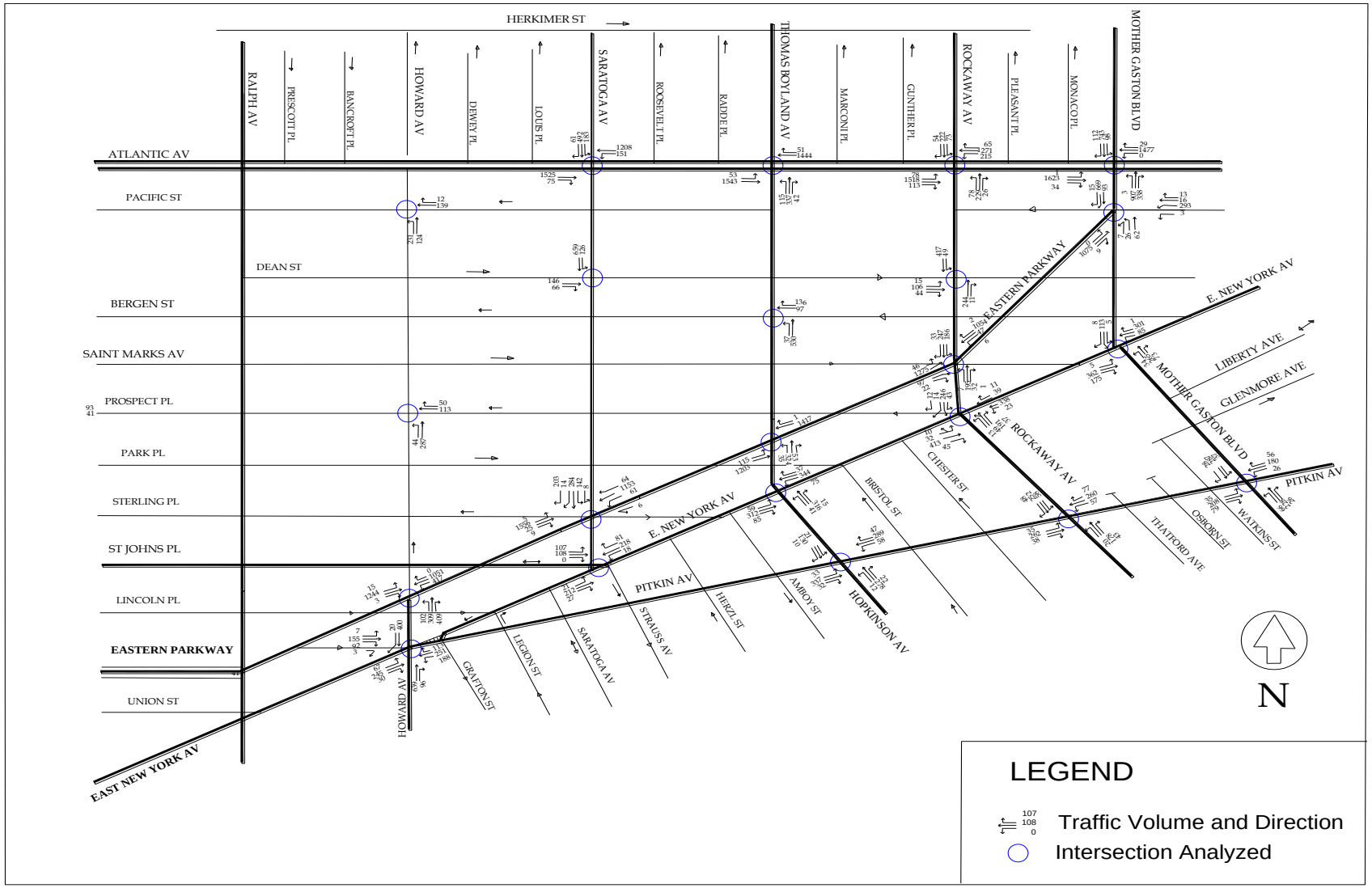
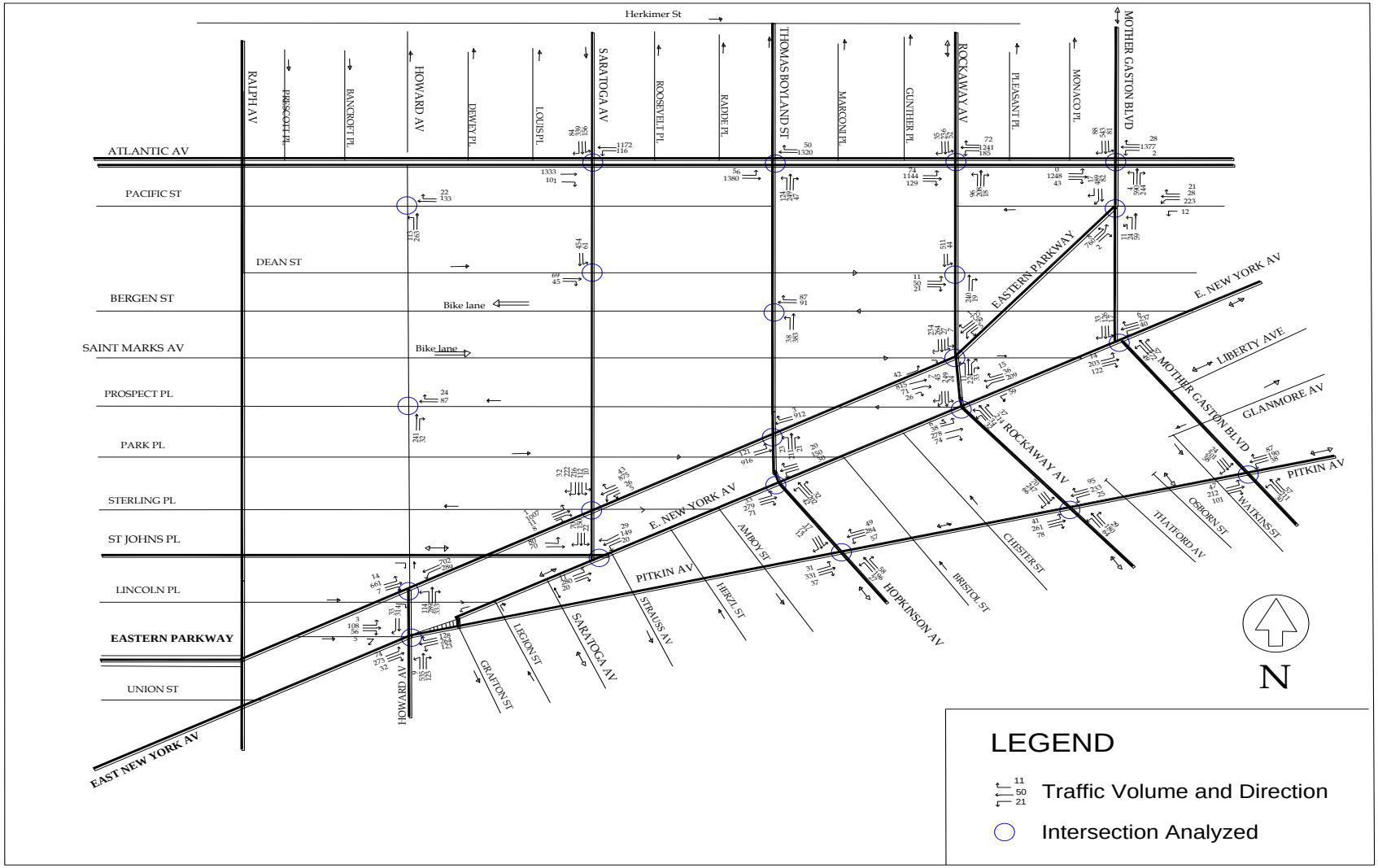


Figure 4-5
2008 Existing Traffic Volumes – Saturday Midday Peak Hour



4.3 Level of Service (LOS) Analysis

The vehicular delay and level of service (LOS) analyses were conducted utilizing the Highway Capacity Manual (HCM 2000) methodology for signalized intersections. Table 4-1 shows the level of service criteria for signalized intersections. Traffic flow characteristics are measured in terms of volume-to-capacity (v/c) ratios and delays. The quality of traffic flow is described in terms of level-of-service. LOS range from A (ideal condition) to F (congested condition). Levels of service for signalized intersections are defined in terms of average delay per vehicle. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

Table 4-1
Level of Service Criteria for Signalized Intersections

Level of Service (LOS)	Control Delay Per Vehicle	Description of Traffic Condition
A	**≤ 10.0**	Describes operations with very low control delay, up to 10 seconds per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	**10.1 to 20.0**	Describes operations with control delay greater than 10 and up to 20 sec. per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
C	**20.1 to 35.0**	Describes operations with control delay greater than 20 and up to 35 sec. per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	**35.1 to 55.0**	Describes operations with control delay greater than 35 and up to 55 sec. per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	**55.1 to 80.0**	Describes operations with control delay greater than 55 and up to 80 sec. per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	**> 80**	Describes operations with control delay in excess of 80 sec. per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factor to such delay levels.

Sources: Highway Capacity Manual 2000, Transportation Research Board,
National Research Council, Washington, D.C. 2000.

4.4 Existing Traffic Condition

Capacity and level of service analysis were conducted at 22 intersections in the study area. Table 4-2 shows the existing condition LOS, delays, and volume-to-capacity ratios for the AM, midday, PM, and Saturday peak hours for the 22 intersections analyzed and listed below:

1. Atlantic and Saratoga Avenues
2. Atlantic and Thomas Boyland Avenues
3. Atlantic and Rockaway Avenues
4. Atlantic Avenue and Mother Gaston Boulevard
5. Howard Avenue and Pacific Street
6. Mother Gaston Boulevard and Pacific Street
7. Saratoga Avenue and Dean Street
8. Rockaway Avenue and Dean Street
9. Thomas Boyland Avenue and Bergen Street
10. Eastern Parkway and Rockaway Avenue
11. Prospect Place and Howard Avenue
12. Prospect Place and East New York/Rockaway Avenues
13. Eastern Parkway and Sterling Place
14. East New York Avenue and Strauss Avenue/St Johns Place
15. Eastern Parkway and Howard Avenue
16. Eastern Parkway and Thomas Boyland Avenue
17. East New York and Howard/Pitkin Avenues
18. East New York and Thomas Boyland Avenues
19. East New York Avenue and Mother Gaston Boulevard
20. Pitkin and Hopkinson Avenues
21. Pitkin and Rockaway Avenues
22. Pitkin Avenue and Mother Gaston Boulevard

TABLE 4-2 (Page 1 of 2)
LOS ANALYSIS FOR SIGNALIZED INTERSECTIONS
EXISTING CONDITIONS

INTERSECTION	Lane Group		AM V/C	AM DELAY	AM LOS	MID V/C	MID DELAY	MID LOS	PM V/C	PM DELAY	PM LOS	MID SAT V/C	MID SAT DELAY	MID SAT LOS
East New York Avenue @ Mother Gaston Blvd	EB	LTR	0.19	6.10	A	0.19	6.10	A	0.25	6.40	A	0.17	5.90	A
	WB	LTR	0.24	6.50	A	0.22	6.40	A	0.35	7.40	A	0.22	6.40	A
	NB	LTR	0.76	53.20	D	0.68	50.10	D	0.74	52.20	D	0.75	53.70	D
	SB	LTR	0.25	40.80	D	0.24	40.70	D	0.27	41.00	D	0.61	49.20	D
East New York Avenue @ Rockaway Avenue	EB	LTR	0.40	23.10	C	0.28	21.30	C	0.44	23.70	C	0.35	22.40	C
	WB	LTR	0.78	38.70	D	0.61	30.00	C	0.87	46.10	D	0.87	49.40	D
	NB	LTR	0.75	35.10	D	0.62	28.70	C	0.57	27.00	C	0.63	29.00	C
	SB	LTR	0.47	23.80	C	0.52	25.20	C	0.52	25.30	C	0.53	25.30	C
East New York Avenue @ Thomas Boyland Avenue	EB	LTR	0.91	51.80	D	0.56	24.10	C	1.00	63.70	E	0.72	29.40	C
	WB	LTR	0.45	21.30	C	0.50	22.50	C	0.88	43.20	D	0.34	19.40	B
	NB	L	0.05	22.20	C	0.06	22.40	C	0.07	22.50	C	0.07	22.50	C
		TR	0.67	34.90	C	0.38	27.10	C	0.61	32.80	C	0.44	28.30	C
East New York Ave @ Saratoga Ave./Strauss Street	EB	LTR	0.45	17.80	B	0.32	15.70	B	0.41	17.30	B	0.45	17.80	B
	WB	LTR	0.37	16.60	B	0.23	14.50	B	0.53	19.60	B	0.33	16.10	B
	SB	LTR	0.22	23.50	C	0.13	22.30	C	0.31	24.70	C	0.21	23.30	C
Pitkin Avenue @ Mother Gaston Blvd	EB	LTR	0.52	22.30	C	0.48	22.00	C	0.53	23.30	C	0.62	25.90	C
	WB	LTR	0.68	22.90	C	0.54	23.50	C	0.45	21.50	C	0.58	24.60	C
	NB	L	0.35	27.50	C	0.32	27.30	C	0.31	27.70	C	0.13	23.70	C
		TR	0.62	31.50	C	0.43	28.20	C	0.47	29.10	C	0.52	30.30	C
	SB	L	0.05	22.50	C	0.12	23.60	C	0.19	25.00	C	0.13	23.80	C
		TR	0.36	26.60	C	0.37	26.80	C	0.47	28.60	C	0.43	27.90	C
Pitkin Avenue @ Rockaway Avenue	EB	LTR	0.79	36.30	D	0.77	35.00	C	0.72	31.60	C	0.84	40.40	D
	WB	LTR	0.73	31.00	C	0.72	30.60	C	0.80	35.50	D	0.67	27.90	C
	NB	LTR	0.76	42.40	D	0.86	51.30	D	0.65	36.50	D	0.84	52.00	D
	SB	LTR	0.84	48.60	D	0.87	58.80	E	0.94	64.90	E	0.87	51.90	D
Pitkin Avenue @ Hopkinson Avenue/ Thomas Boyland Avenue	EB	LTR	0.76	33.00	C	0.58	25.00	C	0.75	32.20	C	0.74	31.80	C
	WB	LTR	0.68	28.60	C	0.57	24.80	C	0.75	32.40	C	0.74	31.90	C
	NB	LTR	0.87	52.80	D	0.49	30.30	C	0.84	47.80	D	0.75	41.70	D
	SB	LTR	0.33	26.80	C	0.25	25.20	C	0.42	28.60	C	0.27	25.70	C
Pitkin Avenue / E.N.Y Avenue @ Howard Avenue	EB	LTR	0.64	52.60	D	0.41	46.70	D	0.63	46.10	D	0.41	41.00	D
	EB	L	0.33	40.30	D	0.13	33.20	C	0.24	37.80	D	0.28	39.40	D
		TR	0.78	57.10	E	0.69	51.50	D	0.72	53.00	D	0.76	54.60	D
	WB	L	0.44	46.60	D	0.36	41.40	D	0.77	65.50	E	0.48	49.20	D
		T	0.68	51.20	D	0.54	45.50	D	0.66	50.00	D	0.69	51.60	D
		R	0.36	41.40	D	0.31	40.40	D	0.38	42.00	D	0.44	43.30	D
	NB	TR	0.82	41.30	D	0.43	30.40	C	0.60	33.60	C	0.50	31.60	C
		R	0.48	33.50	C	0.26	28.70	C	0.27	28.80	C	0.34	30.20	C
	SB	T	0.47	31.10	C	0.31	28.50	C	0.40	29.80	C	0.31	28.50	C
		R	0.12	26.30	C	0.07	25.60	C	0.06	25.50	C	0.10	26.00	C
Howard Avenue @ Pacific Street	WB	TR	0.17	11.30	B	0.09	10.70	B	0.14	11.10	B	0.15	11.10	B
	NB	LT	0.31	12.20	B	0.17	11.20	B	0.24	11.70	B	0.26	11.80	B
Howard Avenue @ Prospect Place	WB	TR	0.31	15.60	B	0.16	14.20	B	0.24	14.90	B	0.16	14.20	B
	NB	LT	0.38	8.80	A	0.18	7.30	A	0.32	8.20	A	0.26	7.80	A
Rockaway Avenue @ Dean Street	EB	LTR	0.25	15.40	B	0.16	14.60	B	0.29	15.70	B	0.14	14.50	B
	NB	TR	0.58	11.40	B	0.51	11.20	B	0.42	9.90	A	0.46	10.10	B
	SB	LT	0.72	16.50	B	0.71	16.10	B	0.70	15.80	B	0.81	20.60	C
Saratoga Avenue @ Dean Street	EB	TR	0.12	7.00	A	0.09	6.80	A	0.19	7.40	A	0.10	6.90	A
	SB	LT	0.83	26.60	C	0.46	17.20	B	0.98	44.90	D	0.66	20.70	C
Thomas Boyland Avenue @ Bergen Street	WB	TR	0.86	39.00	D	0.30	8.70	A	0.80	33.30	C	0.59	22.60	C
	NB	LT	0.47	9.60	A	0.39	16.30	B	0.44	9.20	A	0.32	8.30	A
Eastern Parkway @ Howard Avenue	EB	LTR	0.34	18.00	B	0.46	21.80	C	0.60	22.10	C	0.36	18.20	B
	WB	DefL	0.91	52.20	D	0.88	48.20	D	0.87	52.40	D	0.60	26.10	C
		TR	0.53	11.60	B	0.38	10.90	B	0.49	11.10	B	0.37	9.70	A
	NB	LTR	0.89	51.10	D	0.54	30.80	C	0.82	48.60	D	0.74	44.90	D
Eastern Parkway @ Saratoga Avenue	EB	LTR	0.53	13.30	B	0.39	8.60	A	0.66	15.70	B	0.43	12.00	B
	WB	LTR	0.66	15.70	B	0.37	8.50	A	0.70	17.10	B	0.42	12.00	B
	SB	LTR	0.96	65.60	E	0.72	41.10	D	0.94	62.60	E	0.87	53.60	D
Eastern Parkway @ Thomas Boyland Avenue	EB	LT	0.79	44.20	D	0.54	13.70	B	0.95	34.90	C	0.59	14.70	B
	WB	TR	0.55	13.50	B	0.32	10.90	B	0.51	13.00	B	0.34	11.00	B
	NB	LTR	0.45	35.70	D	0.25	33.00	C	0.61	40.00	D	0.25	32.90	C
Eastern Parkway @ Rockaway Avenue	EB	LTR	0.67	17.90	B	0.19	10.20	B	0.81	22.10	C	0.52	14.90	B
	WB	LTR	0.65	17.20	B	0.15	10.10	B	0.66	17.70	B	0.47	14.10	B
	NB	LTR	0.49	36.80	D	0.72	45.10	D	0.36	34.20	C	0.44	35.80	D
	SB	LTR	0.83	50.00	D	0.47	36.30	D	0.86	54.90	D	0.84	51.10	D
Pacific Street @ Mother Gaston Blvd/ Eastern Parkway	WB	LTR	0.56	48.40	D	0.56	48.30	D	0.69	52.40	D	0.67	51.20	D
	NB	LTR	0.28	5.60	A	0.24	5.30	A	0.38	8.30	A	0.21	5.10	A
	NB	LT	0.23	5.90	A	0.20	5.70	A	0.33	5.90	A	0.22	5.70	A
	SB	TR	0.31	5.80	A	0.25	5.40	A	0.30	5.70	A	0.22	5.20	A

TABLE 4-2 (Page 2 of 2)
LOS ANALYSIS FOR SIGNALIZED INTERSECTIONS
EXISTING CONDITIONS

INTERSECTION	Lane Group		AM V/C	AM DELAY	AM LOS	MID V/C	MID DELAY	MID LOS	PM V/C	PM DELAY	PM LOS	MID SAT V/C	MID SAT DELAY	MID SAT LOS
Atlantic Avenue @ Saratoga Avenue	EB	TR	0.56	23.00	C	0.61	19.10	B	0.76	27.90	C	0.69	25.90	C
	WB	L	0.87	97.60	F	0.85	81.80	F	1.02	133.00	F	0.82	90.50	F
		T	0.47	13.30	B	0.33	8.70	A	0.31	11.50	B	0.30	11.40	B
	SB	LTR	0.78	44.30	D	0.73	34.80	C	0.88	51.20	D	0.72	41.60	D
Atlantic Avenue @ Thomas Boyland Avenue	EB	L	0.76	70.70	E	0.75	62.20	E	0.81	76.10	E	0.64	43.80	D
		T	0.42	12.90	B	0.49	13.40	B	0.63	16.10	B	0.56	14.90	B
	WB	TR	0.77	19.30	B	0.87	22.00	C	0.53	14.20	B	0.48	13.60	B
	NB	LTR	0.83	46.10	D	0.44	24.10	C	0.68	40.50	D	0.61	38.60	D
Atlantic Avenue @ Rockaway Avenue	EB	L	0.39	59.70	E	0.55	54.60	D	0.67	75.30	E	0.54	65.80	E
		TR	0.73	31.40	C	0.72	25.30	C	0.98	51.70	D	0.98	50.00	D
	WB	L	1.02	125.50	F	0.93	88.60	F	1.04	125.20	F	1.04	132.00	F
		TR	0.82	33.30	C	0.55	21.70	C	0.55	26.80	C	0.56	26.90	C
	NB	LTR	0.96	71.10	E	0.89	48.80	D	0.89	57.50	E	0.81	49.60	D
	SB	LTR	0.98	87.30	F	0.96	71.00	E	0.98	85.20	F	0.88	65.50	E
Atlantic Avenue @ Eastern Parkway	EB	TR	0.69	32.00	C	0.66	31.40	C	0.99	54.50	D	0.91	43.00	D
	WB	TR	1.02	61.60	E	0.73	33.00	C	0.81	36.00	D	0.76	33.90	C
		R	0.11	22.90	C	0.08	22.60	C	0.06	21.60	C	0.06	22.30	C
	NB	TR	0.47	20.80	C	0.38	19.50	B	0.61	23.40	C	0.41	20.00	B
	SB	LTR	0.76	28.10	C	0.46	20.90	C	0.60	23.60	C	0.52	22.00	C

LOS E or F

The existing conditions analysis revealed that most intersections operate at an acceptable levels of service (LOS A, B, C, and up to mid-level of D), while other intersections along major corridors (Atlantic Avenue, Eastern Parkway, Pitkin Avenue, and East New York Avenue) operate at poorer levels of service (above mid-level D, E, or F).

4.5 Future Traffic Conditions

The existing conditions traffic volumes were projected to year 2018 by adding 0.5 percent per year.

The 2018 future conditions analysis revealed that most intersections would operate similar to the existing conditions with acceptable levels of service (LOS) A, B, C, and up to mid-level of D). The complex intersections and those along major corridors (Atlantic Avenue, Eastern Parkway, Pitkin Avenue, and East New York Avenue) would operate at poorer levels of service (above mid-level D, E, or F) during some peak periods.

Table 4-3 shows the future conditions LOS, delays and volume-to-capacity ratio for the AM, midday, PM, and Saturday midday peak hours. Figures 4-6, 4-7, 4-8, and 4-9 show the 2018 future traffic volumes for the AM, midday, PM, and Saturday midday peak hours, respectively.

Figure 4-6
2018 Future Traffic Volumes – AM Peak Hour

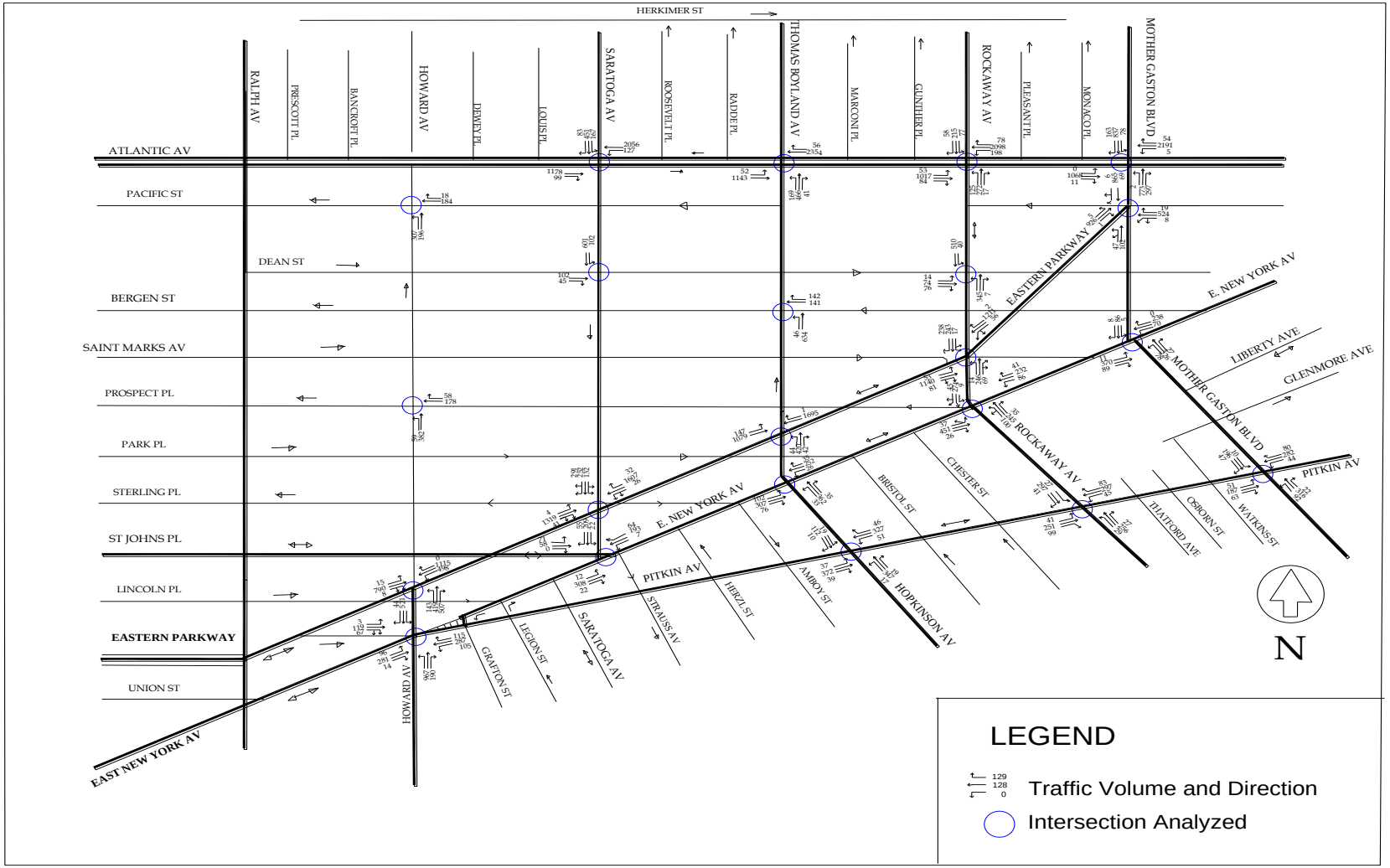


Figure 4-7
2018 Future Traffic Volumes – Midday Peak Hour

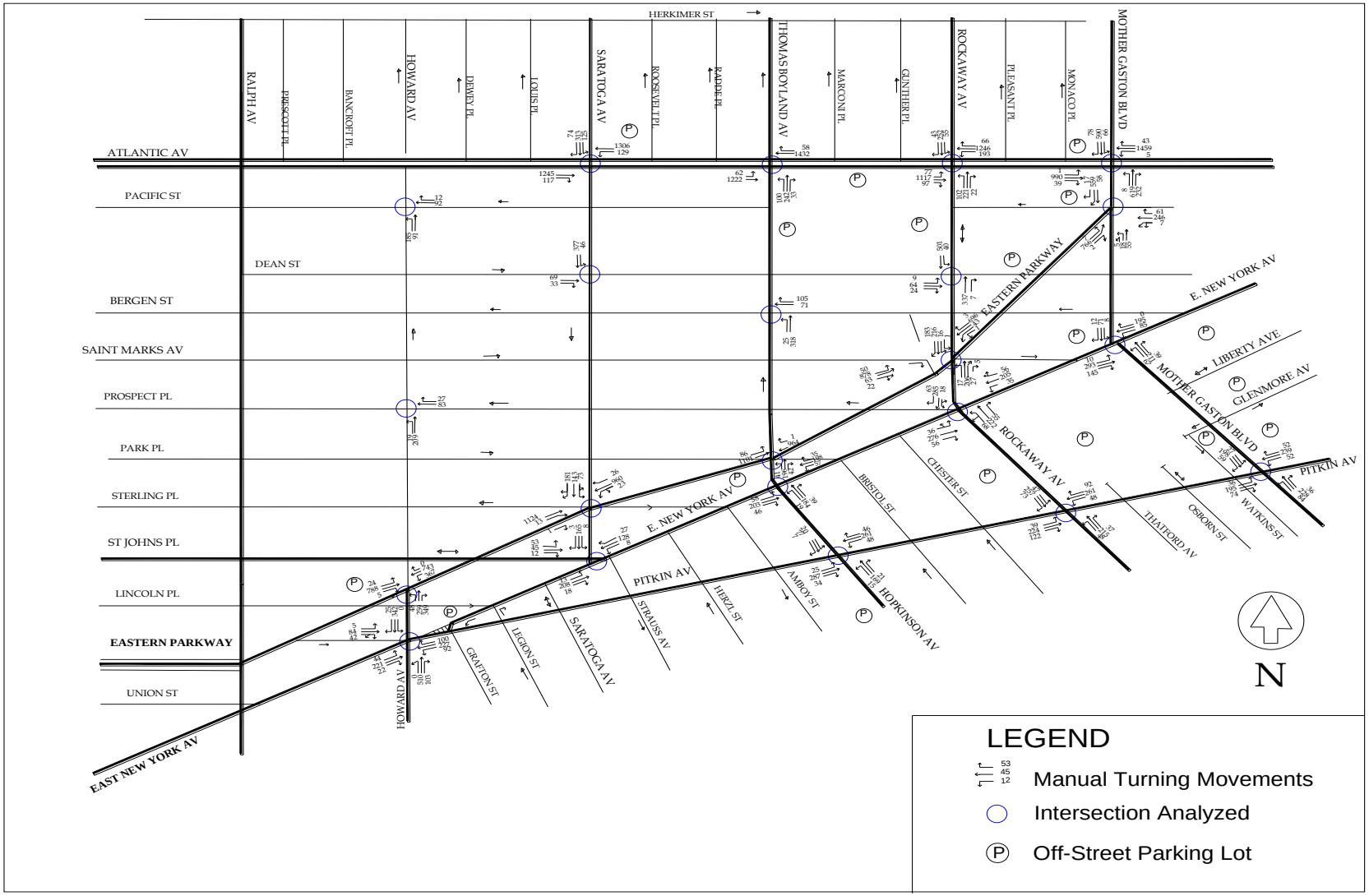


Figure 4-8
2018 Future Traffic Volumes – PM Peak Hour

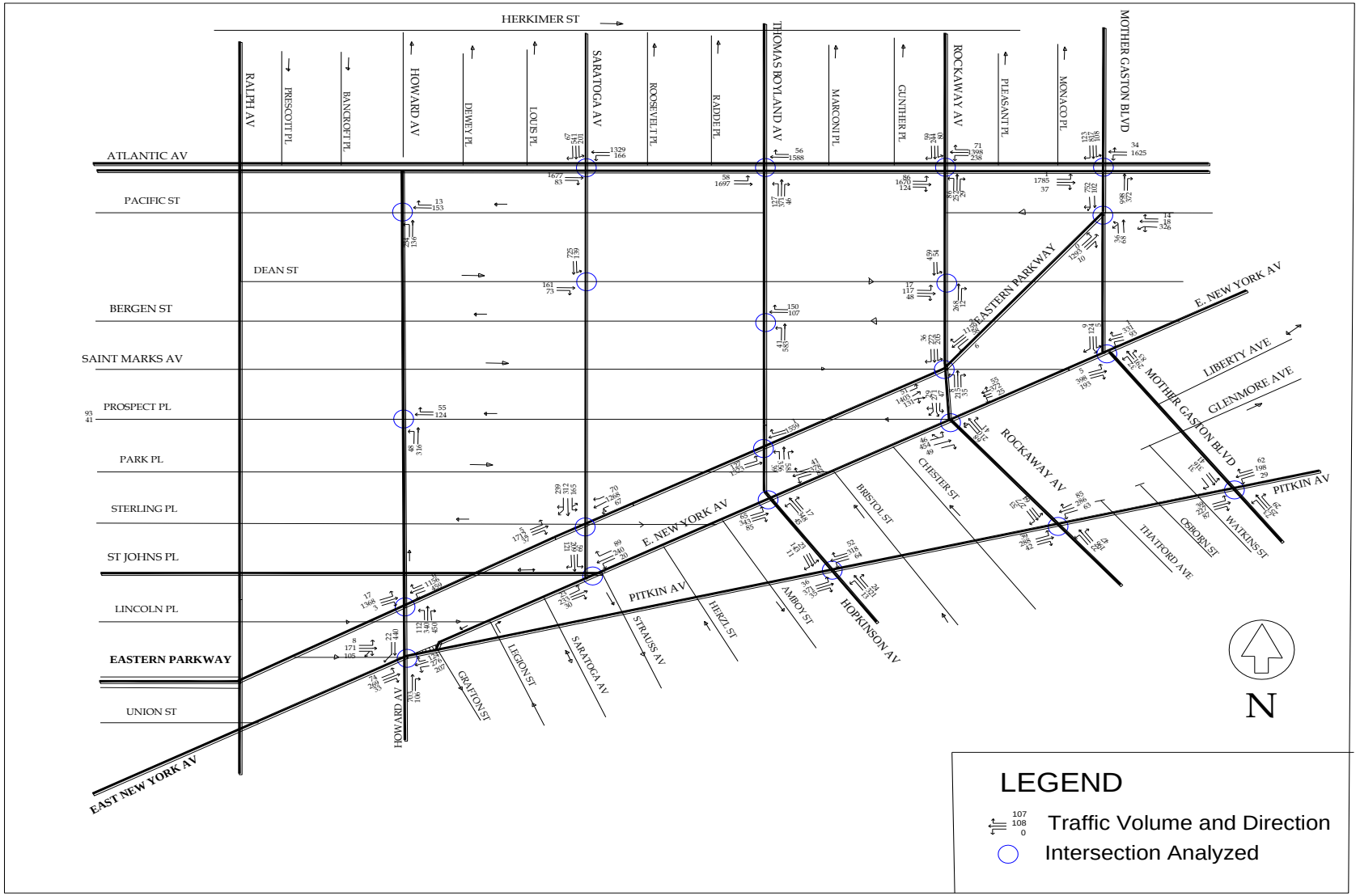


Figure 4-9

2018 Future Traffic Volumes – Saturday Midday Peak Hour

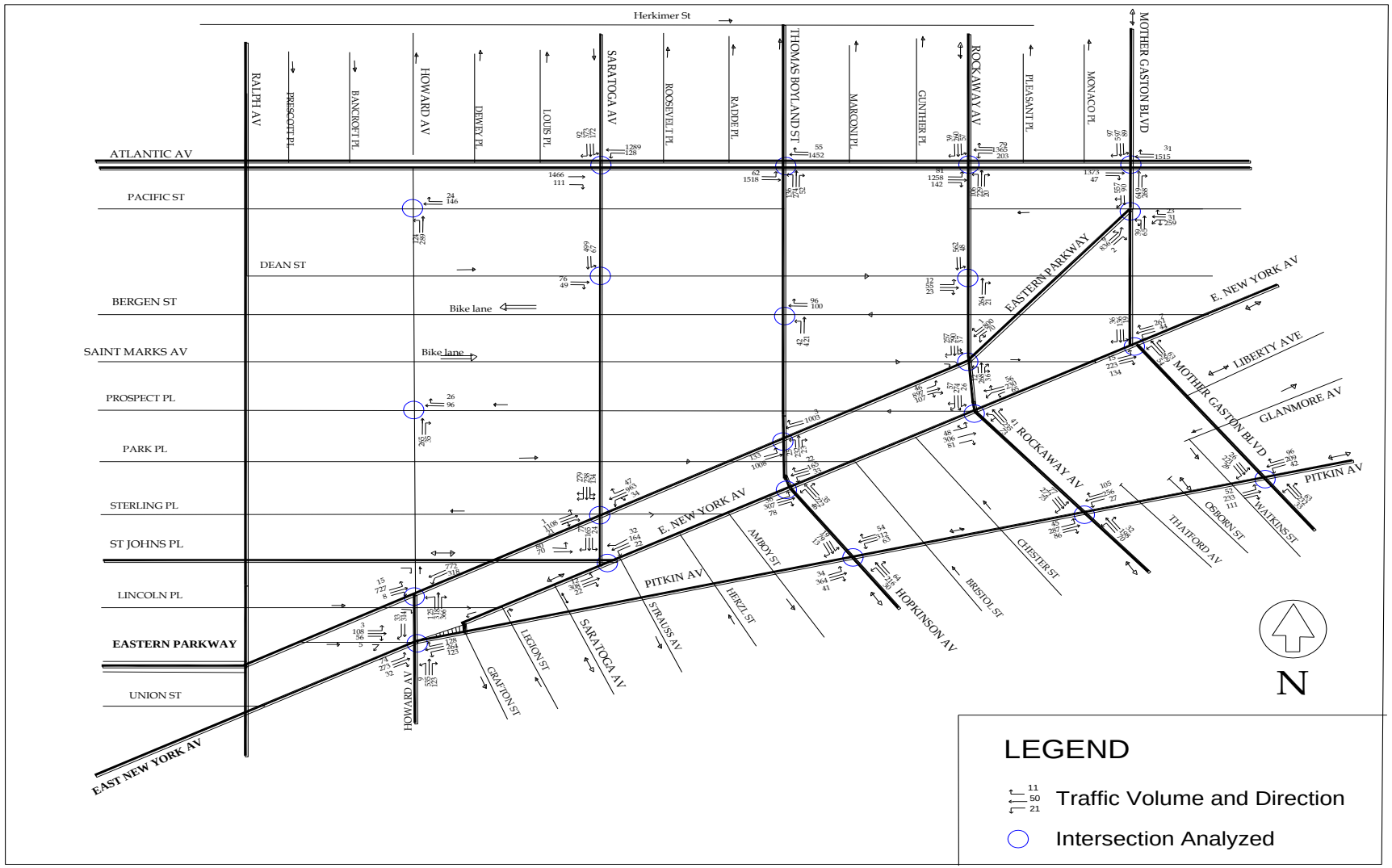


TABLE 4-3 (Page 1 of 2)
LOS ANALYSIS FOR SIGNALIZED INTERSECTIONS
2018 FUTURE CONDITIONS

INTERSECTION	Lane Group		AM V/C	AM DELAY	AM LOS	MID V/C	MID DELAY	MID LOS	PM V/C	PM DELAY	PM LOS	MD SAT V/C	MD SAT DELAY	MD SAT LOS
East New York Avenue @ Mother Gaston Blvd	EB	LTR	0.21	6.20	A	0.21	6.20	A	0.27	6.60	A	0.18	6.00	A
	WB	LTR	0.26	6.70	A	0.25	6.60	A	0.39	7.90	A	0.24	6.50	A
	NB	LTR	0.78	54.70	D	0.75	53.20	D	0.79	54.80	D	0.78	54.80	D
	SB	LTR	0.29	41.40	D	0.27	41.10	D	0.29	41.10	D	0.73	54.80	D
East New York Avenue @ Rockaway Avenue	EB	LTR	0.44	23.70	C	0.30	21.70	C	0.48	24.60	C	0.39	23.00	C
	WB	LTR	0.91	54.20	D	0.68	32.90	C	0.93	54.10	D	0.91	54.70	D
	NB	LTR	0.86	45.30	D	0.71	32.70	C	0.65	29.80	C	0.72	33.30	C
	SB	LTR	0.52	25.00	C	0.58	26.60	C	0.58	26.70	C	0.59	26.90	C
East New York Avenue @ Thomas Boyland Avenue	EB	LTR	0.95	54.00	D	0.66	27.20	C	1.01	68.30	E	0.80	33.60	C
	WB	LTR	0.50	22.40	C	0.52	23.20	C	0.94	53.90	D	0.38	20.10	C
	NB	L	0.06	22.30	C	0.03	22.00	C	0.08	22.50	C	0.08	22.60	C
		TR	0.74	37.90	D	0.42	27.90	C	0.67	35.00	C	0.48	29.20	C
East New York Ave @ Saratoga Ave./Strauss Street	EB	LTR	0.50	18.70	B	0.35	16.20	B	0.46	18.10	B	0.50	18.70	B
	WB	LTR	0.41	17.30	B	0.25	14.80	B	0.58	21.00	C	0.37	16.70	B
	SB	LTR	0.24	23.70	C	0.14	22.50	C	0.35	25.10	C	0.23	23.60	C
Pitkin Avenue @ Mother Gaston Blvd	EB	LTR	0.54	23.80	C	0.53	23.30	C	0.60	24.90	C	0.69	28.40	C
	WB	LTR	0.71	29.30	C	0.60	25.30	C	0.51	22.70	C	0.64	26.70	C
	NB	L	0.37	28.90	C	0.37	28.90	C	0.38	30.00	C	0.15	24.20	C
		TR	0.62	33.30	C	0.47	29.10	C	0.52	30.40	C	0.57	31.70	C
	SB	L	0.06	22.80	C	0.14	23.90	C	0.23	26.00	C	0.15	24.40	C
		TR	0.39	27.20	C	0.41	27.50	C	0.52	29.70	C	0.47	28.90	C
Pitkin Avenue @ Rockaway Avenue	EB	LTR	0.89	46.80	D	0.87	44.70	D	0.82	38.50	D	0.94	54.80	D
	WB	LTR	0.82	36.70	D	0.80	35.90	D	0.90	47.30	D	0.74	31.10	C
	NB	LTR	0.85	50.70	D	0.89	53.00	D	0.72	40.00	D	0.86	54.30	D
	SB	LTR	0.89	54.70	D	0.89	62.00	E	0.98	74.30	E	0.90	54.70	D
Pitkin Avenue @ Hopkinson Avenue/ Thomas Boyland Avenue	EB	LTR	0.84	39.40	D	0.63	26.80	C	0.83	38.10	D	0.82	37.40	D
	WB	LTR	0.77	33.70	C	0.63	26.90	C	0.85	41.40	D	0.84	40.30	D
	NB	LTR	0.89	53.80	D	0.54	31.70	C	0.87	51.40	D	0.83	48.30	D
	SB	LTR	0.37	27.50	C	0.28	25.70	C	0.46	29.70	C	0.30	26.20	C
Pitkin Avenue / E.N.Y Avenue @ Howard Avenue	EB	LTR	0.69	54.80	D	0.47	48.00	D	0.70	48.50	D	0.46	41.80	D
	EB	L	0.39	43.50	D	0.15	34.70	C	0.28	40.20	D	0.33	42.20	D
		TR	0.86	64.60	E	0.75	54.80	D	0.79	57.20	E	0.83	60.80	E
	WB	L	0.52	51.70	D	0.41	44.60	D	0.82	71.10	E	0.55	53.70	D
		T	0.74	54.00	D	0.59	47.40	D	0.72	53.40	D	0.75	54.90	D
		R	0.39	42.20	D	0.34	41.00	D	0.42	42.90	D	0.48	44.60	D
	NB	TR	0.90	47.40	D	0.48	31.10	C	0.65	35.10	D	0.55	32.60	C
		R	0.52	34.90	C	0.28	29.10	C	0.29	29.30	C	0.37	30.90	C
	SB	T	0.52	32.00	C	0.34	28.90	C	0.44	30.50	C	0.34	29.00	C
		R	0.13	26.50	C	0.07	25.70	C	0.06	25.60	C	0.11	26.10	C
Howard Avenue @ Pacific Street	WB	TR	0.19	11.40	B	0.10	10.80	B	0.16	11.20	B	0.16	11.20	B
	NB	LT	0.34	12.40	B	0.19	11.30	B	0.26	11.80	B	0.29	12.00	B
Howard Avenue @ Prospect Place	WB	TR	0.34	15.90	B	0.18	14.30	B	0.27	15.10	B	0.18	14.30	B
	NB	LT	0.42	9.10	A	0.19	7.40	A	0.35	8.50	A	0.28	8.00	A
Rockaway Avenue @ Dean Street	EB	LTR	0.28	15.60	B	0.17	14.70	B	0.32	16.00	B	0.16	14.60	B
	NB	TR	0.57	12.40	B	0.56	12.10	B	0.46	10.50	B	0.47	10.70	B
	SB	LT	0.80	20.40	C	0.79	19.60	B	0.77	18.90	B	0.89	27.80	C
Saratoga Avenue @ Dean Street	EB	TR	0.13	7.00	A	0.10	6.80	A	0.21	7.50	A	0.11	6.90	A
	SB	LT	0.91	33.50	C	0.51	17.80	B	0.99	54.10	D	0.73	22.50	C
Thomas Boyland Avenue @ Bergen Street	WB	TR	0.95	52.30	D	0.33	9.10	A	0.88	42.10	D	0.65	24.70	C
	NB	LT	0.52	10.20	B	0.43	16.70	B	0.48	9.70	A	0.36	8.50	A
Eastern Parkway @ Howard Avenue	EB	LTR	0.35	18.10	B	0.52	22.50	C	0.67	23.60	C	0.40	18.70	B
	WB	DefL	0.93	53.90	D	0.90	53.60	D	0.90	54.20	D	0.70	34.30	C
		TR	0.56	12.40	B	0.42	11.30	B	0.54	11.70	B	0.40	10.10	B
	NB	LTR	0.91	53.20	D	0.59	31.70	C	0.90	54.70	D	0.81	47.90	D
Eastern Parkway @ Saratoga Avenue	EB	LTR	0.58	14.20	B	0.43	9.00	A	0.73	17.30	B	0.47	12.50	B
	WB	LTR	0.74	17.80	B	0.41	8.90	A	0.80	20.20	C	0.48	12.70	B
	SB	LTR	1.01	77.10	E	0.79	44.80	D	1.00	75.40	E	0.96	65.90	E
Eastern Parkway @ Thomas Boyland Avenue	EB	LT	0.86	54.60	D	0.62	15.00	B	0.99	42.30	D	0.66	16.00	B
	WB	TR	0.60	14.40	B	0.36	11.20	B	0.56	13.70	B	0.37	11.40	B
	NB	LTR	0.49	36.40	D	0.28	33.30	C	0.67	41.70	D	0.27	33.20	C
Eastern Parkway @ Rockaway Avenue	EB	LTR	0.77	20.80	C	0.20	11.10	B	0.93	30.60	C	0.59	16.00	B
	WB	LTR	0.74	19.70	B	0.16	10.70	B	0.75	20.20	C	0.53	15.10	B
	NB	LTR	0.54	38.00	D	0.77	47.90	D	0.39	34.80	C	0.49	36.70	D
	SB	LTR	0.88	54.40	D	0.63	40.50	D	0.86	70.20	E	0.88	54.60	D
Pacific Street @ Mother Gaston Blvd/ Eastern Parkway	WB	LTR	0.74	54.30	D	0.62	49.70	D	0.75	54.60	D	0.73	53.70	D
	NB	LTR	0.31	5.80	A	0.26	5.50	A	0.45	10.00	A	0.33	5.90	A
	NB	LT	0.26	6.30	A	0.22	6.00	A	0.37	6.10	A	0.16	5.30	A
	SB	TR	0.35	6.00	A	0.28	5.60	A	0.33	5.90	A	0.24	5.30	A

TABLE 4-3 (Page 2 of 2)
LOS ANALYSIS FOR SIGNALIZED INTERSECTIONS
2018 FUTURE CONDITIONS

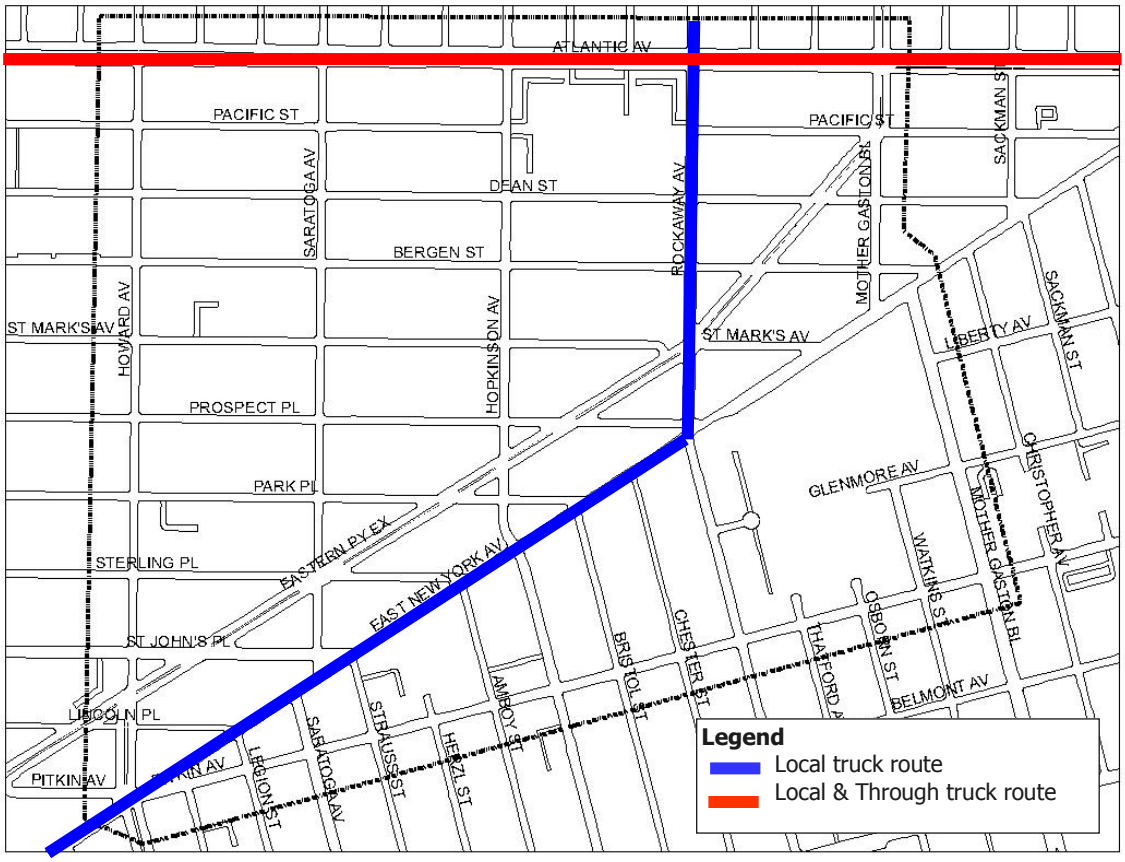
INTERSECTION	Lane Group		AM V/C	AM DELAY	AM LOS	MID V/C	MID DELAY	MID LOS	PM V/C	PM DELAY	PM LOS	MID SAT V/C	MID SAT DELAY	MID SAT LOS
Atlantic Avenue @ Saratoga Avenue	EB	TR	0.62	24.20	C	0.67	20.20	C	0.84	30.90	C	0.76	27.90	C
	WB	L	0.99	108.20	F	0.93	98.30	F	1.06	141.20	F	0.90	105.00	F
		T	0.52	14.00	B	0.35	8.90	A	0.34	11.80	B	0.33	11.70	B
	SB	LTR	0.86	49.30	D	0.80	37.90	D	0.92	54.60	D	0.79	44.60	D
Atlantic Avenue @ Thomas Boyland Avenue	EB	L	0.78	71.10	E	0.78	65.60	E	0.88	93.30	F	0.71	53.20	D
		T	0.52	13.50	B	0.54	14.10	B	0.69	17.50	B	0.62	15.90	B
	WB	TR	0.84	22.10	C	0.96	29.60	C	0.58	15.10	B	0.53	14.30	B
	NB	LTR	0.91	54.70	D	0.48	24.80	C	0.75	43.10	D	0.67	40.40	D
Atlantic Avenue @ Rockaway Avenue	EB	L	0.51	65.30	E	0.61	57.90	E	0.70	78.40	E	0.59	68.90	E
		TR	0.90	39.30	D	0.79	27.50	C	1.04	65.90	E	0.99	52.00	D
	WB	L	1.13	159.30	F	1.10	135.60	F	1.14	159.30	F	1.13	160.00	F
		TR	0.92	38.90	D	0.59	22.20	C	0.61	27.80	C	0.62	28.00	C
	NB	LTR	1.00	78.60	E	1.02	77.60	E	0.97	73.00	E	0.86	54.00	D
	SB	LTR	1.00	90.50	F	0.99	79.20	E	1.04	99.00	F	0.94	74.00	E
Atlantic Avenue @ Eastern Parkway	EB	TR	0.76	34.10	C	0.73	33.30	C	0.95	54.50	D	0.98	53.40	D
	WB	TR	1.03	64.30	E	0.80	35.60	D	0.90	40.70	D	0.83	36.90	D
		R	0.12	23.00	C	0.09	22.70	C	0.07	21.60	C	0.07	22.40	C
	NB	TR	0.51	21.60	C	0.42	20.10	C	0.75	53.70	D	0.45	20.60	C
	SB	LTR	0.86	33.50	C	0.52	22.00	C	0.66	25.00	C	0.59	23.50	C

LOS E or F

4.6 Goods Movement

There are three designated truck routes in the study area; a through truck route along Atlantic Avenue and a local truck route (trucks with local origins and destinations) along East New York Avenue and Rockaway Avenue. Exhibit 4-10 shows the truck routes in the study area. However, heavy truck activities were observed along other corridors such as Pitkin Avenue, Thomas Boyland Avenue, and Mother Gaston Boulevard. Trucks sometimes are observed loading and unloading in bus stops causing buses to block an effective moving lane to pick-up and drop-off passengers.

Exhibit 4-10
Local and Through Truck Routes



5.0 PEDESTRIAN AND BICYCLE

5.1 Introduction

The pedestrian analysis focused on crosswalks and corners as well as general pedestrian flow patterns. To assess pedestrian activity in the study area, pedestrian level of service (LOS) analysis was conducted using the existing pedestrian counts.

5.2 Pedestrian Analysis

Heavy pedestrian volumes in the area can generally be associated with bus transfer points, retail/commercial centers and high density residential areas. The corridors with the heaviest pedestrian traffic were Pitkin Avenue, Thomas Boyland Avenue, Rockaway Avenue, and Mother Gaston Boulevard.

Below are the locations with highest crosswalk pedestrian volumes during the weekday AM, midday, and PM and the Saturday midday peak hours, respectively:

1. Pitkin Avenue & Thomas Boyland Avenue (443, 826, 878, 1,496)
2. Rockaway Avenue & Pitkin Avenue (523, 1,113, 968, 1,803)
3. Rockaway Avenue & East New York Avenue (44, 347, 429, 542)
4. Mother Gaston Boulevard & Pitkin Avenue (498, 374, 594, 659)
5. Atlantic Avenue & Thomas Boyland Avenue (528, 175, 466, 217)

The crosswalk and corner pedestrian volumes for the weekday and Saturday peak hours are shown in Table 5-1 and Figures 5-1 to 5-4.

Table 5-1
Existing Pedestrian Volumes: - Crosswalk and Corner

Intersection	AM		MD		PM		SAT	
	Cross Walk (Ped/Hr)	Corner (Ped/Hr)	Cross Walk (Ped/Hr)	Corner (Ped/Hr)	Cross Walk (Ped/Hr)	Corner (Ped/Hr)	Cross Walk (Ped/Hr)	Corner (Ped/Hr)
Atlantic Avenue & Rockaway Avenue	270	73	196	32	340	53	251	58
Atlantic Avenue & Thomas Boyland Avenue	528	58	175	42	466	46	217	66
Mother Gaston Blvd/Eastern Parkway/Pacific Street	176	241	180	188	199	226	198	255
Rockaway Avenue & Dean Street	192	61	118	16	177	41	206	36
Thomas Boyland Avenue & Bergen Street	364	168	93	57	232	85	134	35
Eastern Parkway/St. Marks Avenue/Rockaway Avenue	209	37	175	33	186	21	269	125
Mother Gaston Boulevard & East New York Avenue	146	67	95	61	159	73	115	101
Mother Gaston Boulevard & Pitkin Avenue	498	110	374	173	594	208	659	443
Rockaway Avenue & East New York Avenue	442	133	347	101	429	108	542	91
Rockaway Avenue & Pitkin Avenue	523	214	1113	473	968	473	1803	477
Pitkin Avenue & Thomas Boyland Avenue	443	87	826	67	878	73	1496	59
E. New York Avenue & St. John's Pl./Strauss Avenue	270	73	196	32	340	53	132	114
E. New York Avenue/Pitkin Avenue/Howard Avenue	220	69	215	86	381	184	388	82
Eastern Parkway & Howard Avenue	81	50	108	43	102	34	139	33

Figure 5-1
Existing Pedestrian Volumes - AM Peak Hour

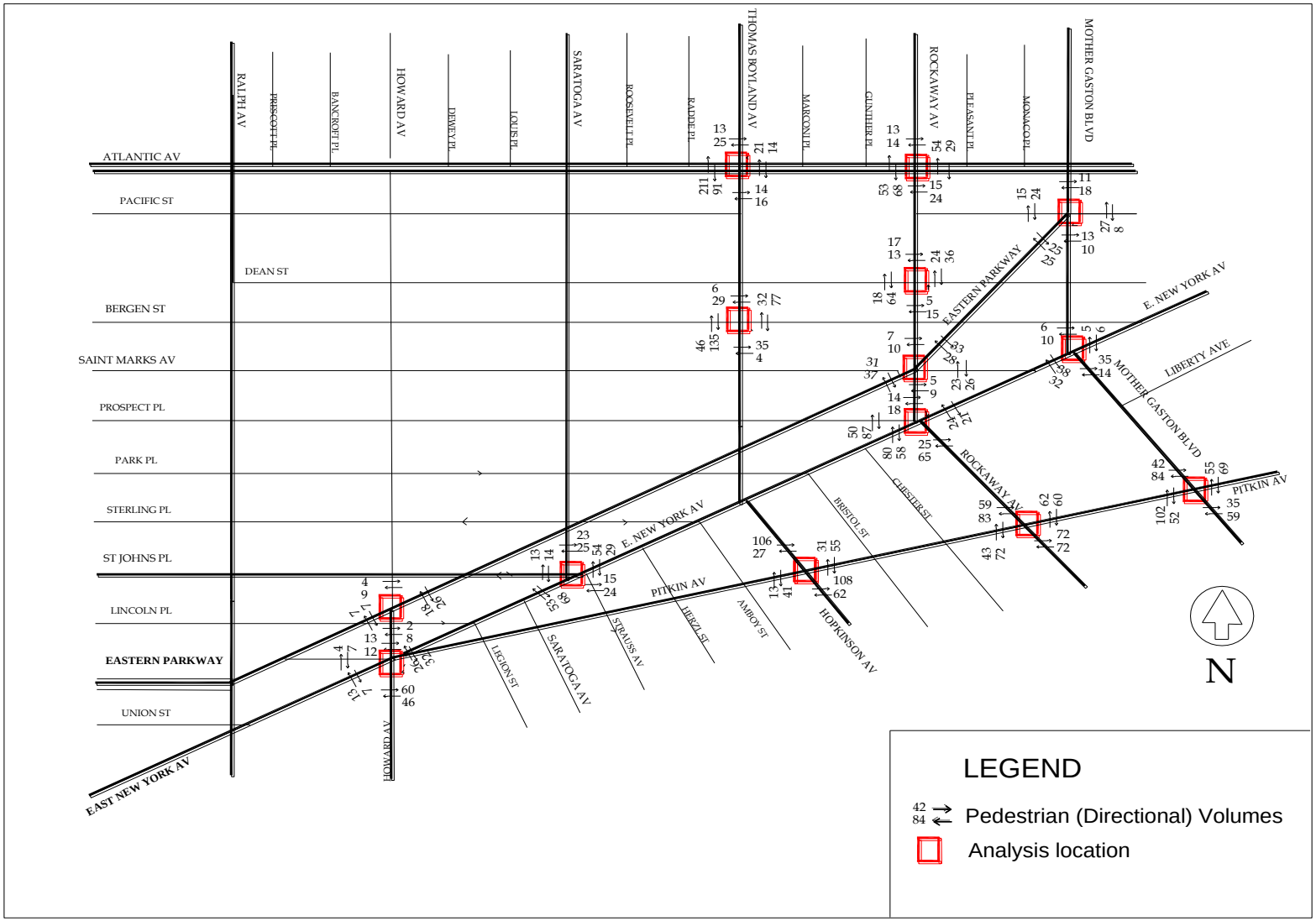


Figure 5-2
Existing Pedestrian Volumes - Midday Peak Hour

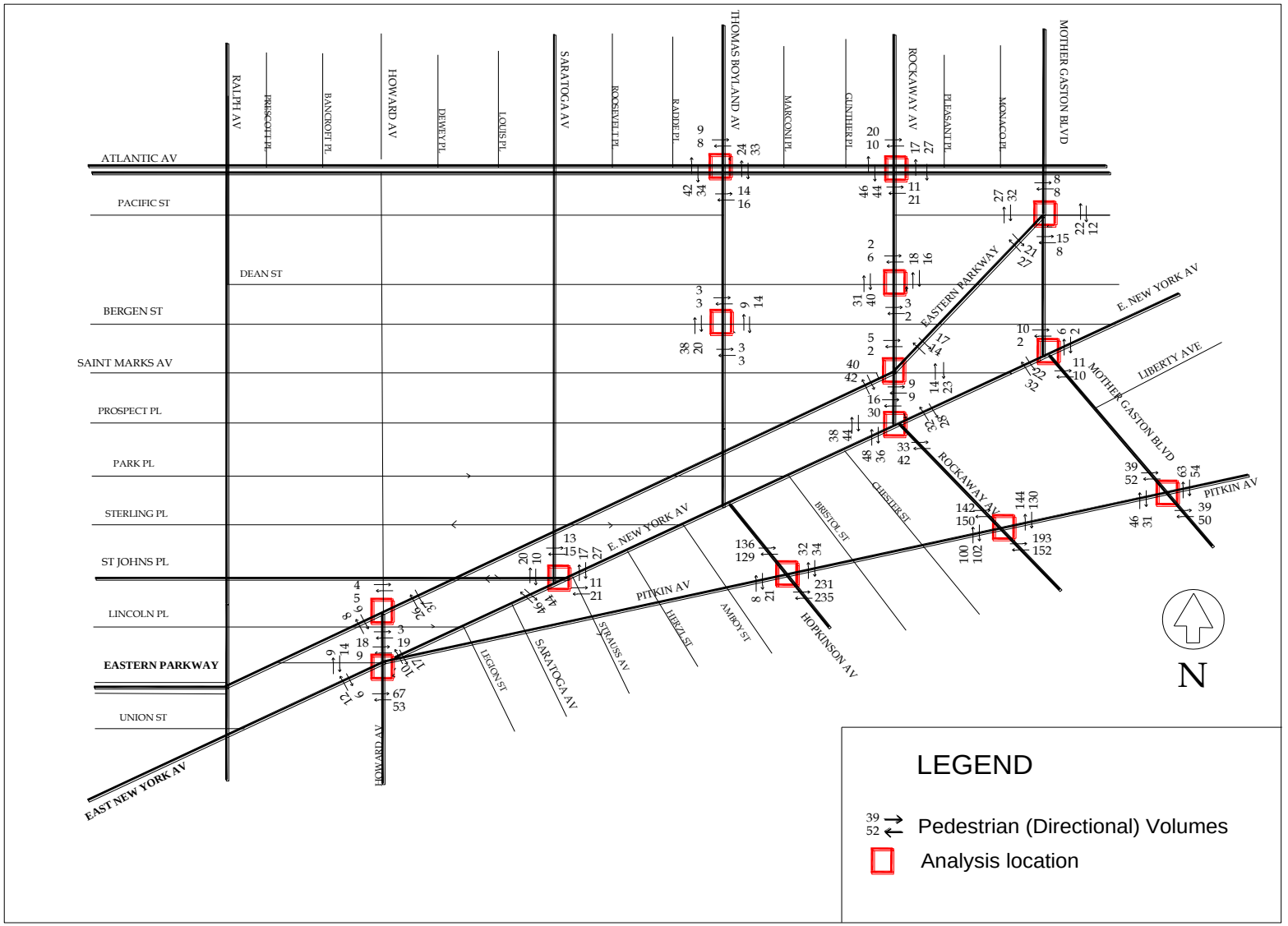


Figure 5-3
Existing Pedestrian Volumes - PM Peak Hour

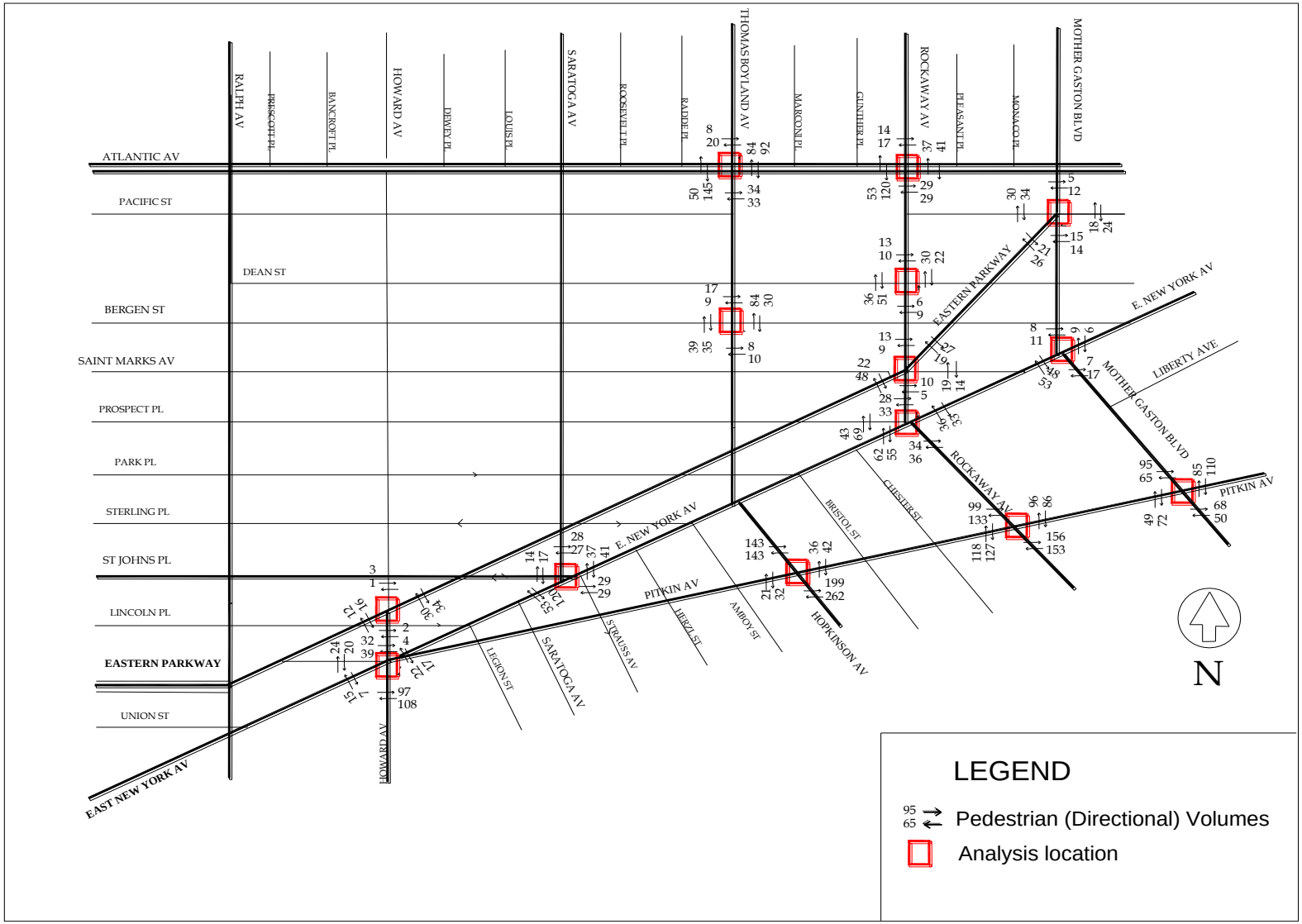
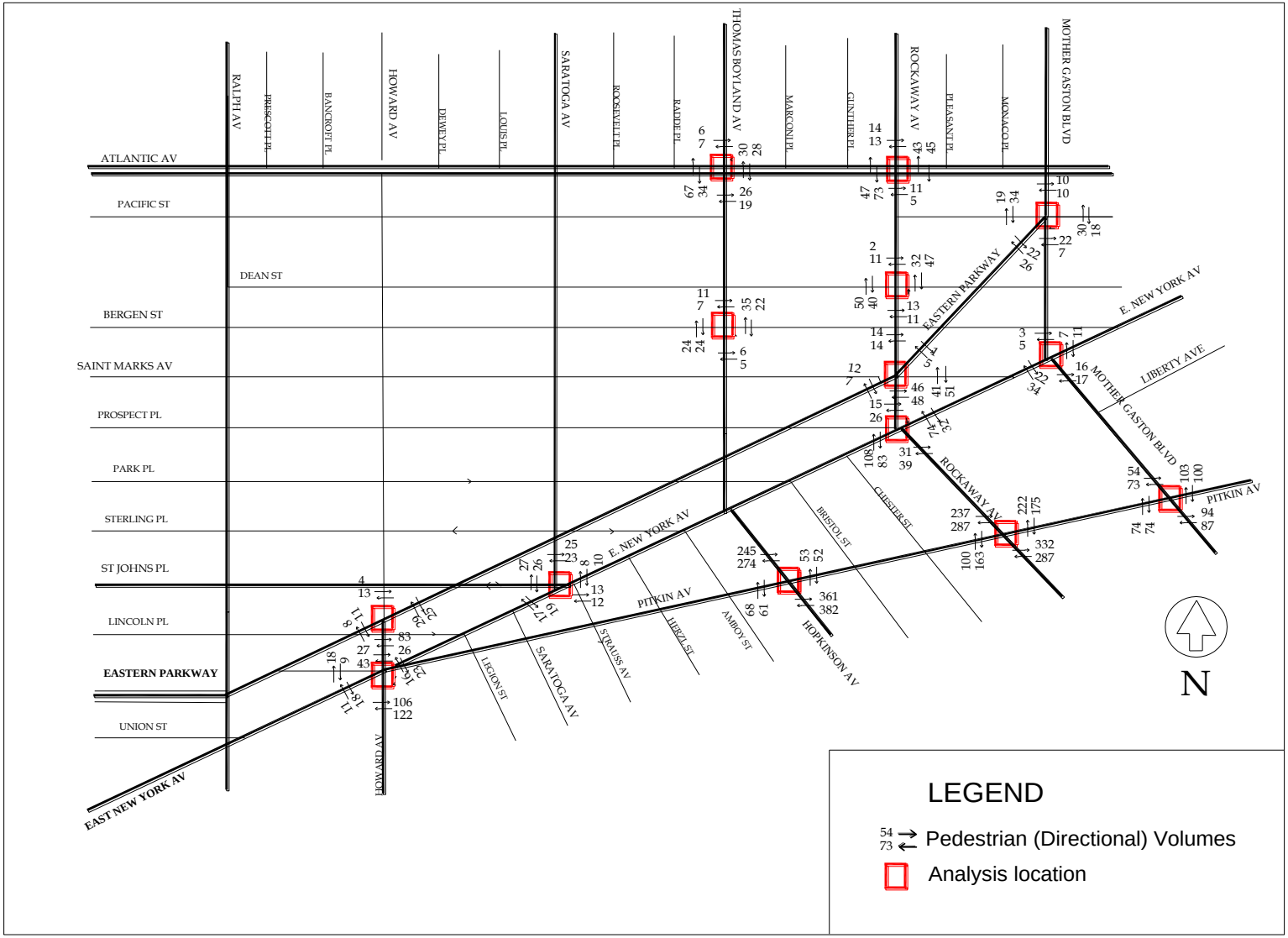


Figure 5-4
Existing Pedestrian Volumes - Saturday Midday Peak Hour



The pedestrian level of service (LOS) analysis was conducted using the methodologies of the Highway Capacity Manual Software "HiCAP 2000 – US Customary Unit Version". Pedestrian level of service measures the space that pedestrians have to maneuver in corners, crosswalks, stairwells, and walkways. Table 5-2 shows the level of service criteria for crosswalks and street corners which is measured in terms of square feet of space per pedestrian.

Table 5-2
Pedestrian Level of Service Criteria for Crosswalks and Corners

LOS	Space (ft^2/p)	Flow Rate (p/min/ft)	Speed (ft/s)	v/c Ratio
A	>60	< or = 5	>4.25	< or = 0.21
B	>40 - 60	>5 – 7	>4.17 – 4.25	>0.21 – 0.31
C	>24 - 40	>7 – 10	>4.00 – 4.17	>0.31 – 0.44
D	>15 – 24	>10 – 15	>3.75 – 4.00	>0.44 – 0.65
E	>8 - 15	>15 – 23	>2.50 – 3.75	>0.65 – 1.0
F	< or = 8	Variable	< or = 2.50	variable

Crosswalk Analysis

The analysis of existing conditions for crosswalks showed that a majority of the crosswalks in the study area operated at acceptable level of service – C or better. However, there was one intersection that had one crosswalk operating at LOS E or worse in one or more peak periods. The intersection of East New York Avenue and St. John's Street/Strauss Avenue had more than one crosswalk operating at LOS D or worse in each of the peak periods analyzed. The crosswalk analysis results are shown in Table 5-3.

Corner Analysis

The existing conditions corner analysis showed that a majority of the locations operated at acceptable LOS – B or better. The corner analysis results are shown in Table 5-4.

Table 5-3: Existing Crosswalk Level of Service Analysis

Intersection	Crosswalk	AM		MD		PM		SAT MD	
		Crosswalk Space		Crosswalk Space		Crosswalk Space		Crosswalk Space	
		SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
Atlantic Avenue & Rockaway Avenue	North	1277.4	A	895.2	A	1275.9	A	1168.2	A
	East	199.1	A	224.7	A	255.1	A	219.3	A
	South	768.2	A	650.3	A	586.8	A	1757.6	A
	West	158.5	A	145.9	A	132.7	A	188.5	A
Atlantic Avenue & Thomas Boyland Avenue	North	1640.4	A	3108.2	A	2978.4	A	3904.8	A
	East	156.6	A	481.7	A	135.5	A	517.1	A
	South	1352.2	A	2721.4	A	842.8	A	1091	A
	West	72.9	A	491.1	A	164.8	A	227.4	A
Rockaway Avenue & Dean Street	North	817.0	A	2458.0	A	1023.0	A	3209.2	A
	East	429.4	A	1061.6	A	550.8	A	502.6	A
	South	1007.3	A	2769.9	A	921.0	A	962.2	A
	West	486.4	A	634.0	A	560.1	A	597.3	A
Thomas Boyland Avenue & Bergen Street	North	649.4	A	3576.2	A	1298.9	A	1298.9	A
	East	503.3	A	2077.2	A	476.8	A	665.1	A
	South	681.2	A	4771.2	A	1787.0	A	3576.2	A
	West	230.7	A	909.3	A	638.8	A	750.7	A
Eastern Parkway/St. Marks Avenue/Rockaway Avenue	North	2588.7	A	6097.2	A	1726.8	A	1301.7	A
	East	421.3	A	730.5	A	649.2	A	245.9	A
	South	2846.7	A	1308.4	A	2434.1	A	1379.8	A
	West	400.5	A	449.4	A	330.7	A	375.5	A
Mother Gaston Boulevard & East New York Avenue	North	4107.3	A	2518.9	A	2565.8	A	3523.1	A
	East	1117.7	A	2983.4	A	1341.3	A	1425.4	A
	South	870.1	A	2134.3	A	1747.2	A	1531.3	A
	West	309.5	A	459.8	A	205.4	A	405.3	A
Mother Gaston Boulevard & Pitkin Avenue	North	377.7	A	532.3	A	383.9	A	354	A
	East	297.3	A	333.4	A	240.8	A	249.5	A
	South	622.4	A	657.7	A	496.3	A	464.1	A
	West	212.2	A	566.8	A	324.3	A	301.4	A
Rockaway Avenue/ East New York Avenue/ Prospect Pl	North	1612.3	A	909.4	A	550.3	A	1186.4	A
	East	828.3	A	656.5	A	522.4	A	415.7	A
	South	415.1	A	565.2	A	544.1	A	414.2	A
	Southwest	316.9	A	359.6	A	409.5	A	203.9	A
	West	327.8	A	505.1	A	310.9	A	272.7	A
East New York Avenue & St. John's Place/Strauss Avenue	North	**6.6**	**F**	**9.7**	**E**	**5.4**	**F**	**12.9**	**E**
	East	969.7	A	1013.8	A	737.8	A	1272.5	A
	South	131.1	A	258.1	A	158.3	A	447.5	A
	West	1851.1	A	1733.6	A	1853.1	A	1589.1	A
East New York Avenue/Pitkin Avenue/Howard Avenue	North	955.3	A	1241.5	A	425.1	A	473.8	A
	East	619.1	A	1107.1	A	861.9	A	735.4	A
	South	421.2	A	378.3	A	224.5	A	123.1	A
	Southwest	1318.1	A	815.8	A	954.9	A	905.6	A
	West	2047.7	A	1221.8	A	708.7	A	1046.4	A
Rockaway Avenue & Pitkin Avenue	North	468.6	A	258.8	A	295.7	A	95.1	A
	East	276.3	A	143.9	A	199.8	A	138.3	A
	South	463.1	A	169.0	A	217.2	A	61.3	B
	West	232.7	A	159.1	A	116.7	A	188.7	A
Eastern Parkway & Howard Avenue	North	2279.3	A	2653.6	A	5332.1	A	2214.1	A
	East	607.3	A	378.8	A	281.2	A	395.5	A
	South	2893.7	A	1064.9	A	5791.2	A	598.7	A
	West	1354.4	A	1172.8	A	738.1	A	938.2	A
Mother Gaston Boulevard/ Eastern Parkway/Pacific Street	North	421.3	A	1624.4	A	607.5	A	890.1	A
	East	1353.5	A	1469.7	A	1427.6	A	1368.6	A
	South	3384.5	A	1563.5	A	2173.1	A	2271.4	A
	Southwest	401.4	A	594.7	A	468.9	A	509.2	A
	West	1354.1	A	1087.2	A	1168.5	A	984.8	A
Pitkin Avenue & Thomas Boyland Avenue	North	504.9	A	279.6	A	247.2	A	205.9	A
	East	427.2	A	499.2	A	412.3	A	610.8	A
	South	335.4	A	168.7	A	159.6	A	144.7	A
	West	975.8	A	1599.7	A	921.0	A	553.6	A

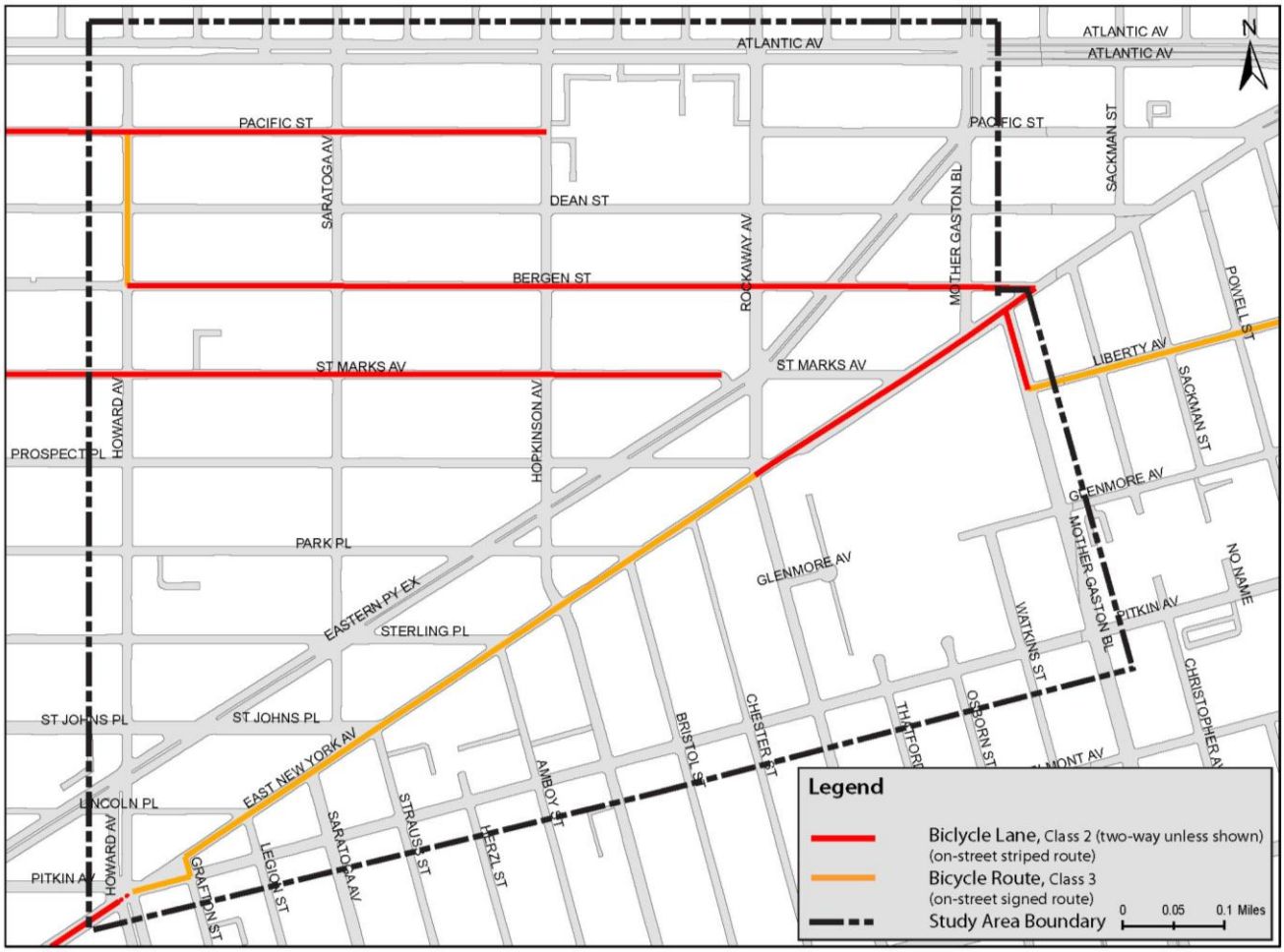
Table 5-4: Existing Corner Level of Service Analysis

Intersection	Corner	AM		MD		PM		SAT MD	
		Corner Space		Corner Space		Corner Space		Corner Space	
		SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
Atlantic Avenue & Rockaway Avenue	Northeast	575.9	A	912.6	A	705.7	A	586.7	A
	Northwest	399.7	A	535.5	A	330.7	A	406.6	A
	Southeast	479.2	A	867.7	A	611.6	A	793.7	A
	Southwest	395.1	A	538.7	A	336.9	A	569.6	A
Atlantic Avenue & Thomas Boyland Avenue	Northeast	408.6	A	1123.4	A	409.1	A	981.7	A
	Northwest	265.1	A	1134.1	A	387.5	A	673.7	A
	Southeast	536.6	A	1276.5	A	459.9	A	1099.8	A
	Southwest	269.6	A	896.7	A	387.9	A	653.7	A
Rockaway Avenue & Dean Street	Northeast	1025.6	A	2814.7	A	1303.6	A	1526.3	A
	Northwest	616.2	A	1082.5	A	705.1	A	1118.0	A
	Southeast	1119.8	A	2658	A	1292.1	A	1073.0	A
	Southwest	187.2	A	367.8	A	258.6	A	246.1	A
Thomas Boyland Avenue & Bergen Street	Northeast	1980.4	A	8208.3	A	2321.8	A	3001.8	A
	Northwest	487.5	A	1401.5	A	1138.7	A	1288.9	A
	Southeast	630.8	A	2500.9	A	737.7	A	1023.7	A
	Southwest	160.9	A	861.9	A	598.4	A	861.0	A
Eastern Parkway/St. Marks Avenue/Rockaway Avenue	Northeast	708.5	A	1309.8	A	872.1	A	352.4	A
	Northwest	437.2	A	484.9	A	364.5	A	263.3	A
	Southeast	974.3	A	1125.1	A	1317.3	A	491.7	A
	Southwest	871.5	A	833.1	A	863.1	A	834.7	A
Mother Gaston Boulevard & East New York Avenue	Northeast	1379.0	A	927.5	A	1038.7	A	1039.5	A
	Northwest	831.0	A	795.7	A	532.0	A	889.2	A
	Southeast	856.7	A	1631.3	A	1205.0	A	1417.1	A
	Southwest	535.3	A	806.9	A	566.5	A	719.3	A
Mother Gaston Boulevard & Pitkin Avenue	Northeast	636.3	A	479.2	A	393.0	A	172.6	A
	Northwest	882.9	A	591.2	A	506.0	A	233.8	A
	Southeast	492.2	A	316.7	A	302.9	A	209.3	A
	Southwest	594.8	A	375.7	A	334.1	A	128.5	A
Rockaway Avenue & East New York Avenue/Prospect Place	Northeast	762.8	A	643.4	A	470.9	A	499.3	A
	Northwest	423.2	A	491.7	A	364.5	A	472.8	A
	Southeast	622.6	A	617.6	A	607.3	A	550.1	A
	Southwest -1	272.5	A	377.5	A	291.9	A	235.9	A
	Southwest - 2	180.9	A	246.1	A	191.4	A	175.2	A
East New York Avenue & St. John's Place/Strauss Avenue	Northeast	387.1	A	705.4	A	496.2	A	976.5	A
	Northwest	88.3	A	145.5	A	109.6	A	93.8	A
	Southeast	624.6	A	585.1	A	370.5	A	592.7	A
	Southwest	341.9	A	460.2	A	280.6	A	185.9	A
East New York Avenue/Pitkin Avenue/Howard Avenue	Northeast	290.5	A	511.7	A	232.3	A	293.6	A
	Northwest	2098.7	A	1836.8	A	779.6	A	1023.9	A
	Southeast	1026.9	A	1185.5	A	616.9	A	652.1	A
	Southwest - 1	2467.5	A	2019.1	A	1024.2	A	1849.4	A
	Southwest - 2	1565.1	A	1335.1	A	853.1	A	749.1	A
Eastern Parkway & Howard Avenue	Northeast	1260.9	A	870.5	A	787.0	A	870.0	A
	Northwest	2652.4	A	2520.3	A	2187.1	A	1866.1	A
	Southeast	2457.7	A	1397.7	A	2053.5	A	1228.0	A
	Southwest	4875.6	A	4366.6	A	6547.9	A	53.5	B
Mother Gaston Boulevard/ Eastern Parkway/Pacific Street	Northeast	1091.3	A	1721.1	A	1226.1	A	1468.2	A
	Northwest	673.2	A	851.3	A	610.2	A	734.7	A
	Southeast	1085.1	A	937.7	A	1015.3	A	957.7	A
	Southwest -1	497.1	A	567.4	A	505.9	A	459.7	A
Rockaway Avenue & Pitkin Avenue	Southwest - 2	251.2	A	309.9	A	222.1	A	204.9	A
	Northeast	449.3	A	244.7	A	312.0	A	155.2	A
	Northwest	389.2	A	238.0	A	235.6	A	179.6	A
	Southeast	450.8	A	200.7	A	261.3	A	121.1	A
Pitkin Avenue & Thomas Boyland Avenue	Southwest	401.5	A	179.0	A	169.3	A	126.9	A
	Northeast	636.3	A	479.2	A	393.0	A	290.1	A
	Northwest	882.9	A	591.2	A	506.0	A	284.7	A
	Southeast	492.2	A	316.7	A	302.9	A	224.5	A

5.3 Bicycle Analysis

There are three on-street bike lanes (Class 2) in the study area. These bike lanes are located on Pacific Street (from Howard Avenue to Thomas Boyland Avenue), Bergen Street (from Howard Avenue to Mother Gaston Boulevard), and St. Marks Place (from Howard Avenue to Eastern Parkway). There is also one on-street bike shared lane (Class 3) located on East New York Avenue (from Howard Avenue to Rockaway Avenue). These shared lanes were installed in 2010, as per the Master Plan. Figure 5-5 shows the existing bicycle routes in the study area.

Figure 5-5
Existing Bicycle Routes



6.0 ACCIDENTS/SAFETY ANALYSIS

6.1 Introduction

Accident analysis is an important component of traffic and transportation planning studies, as transportation related accidents often lead to property damage, injuries and sometimes loss of life. The purpose of this analysis is to identify high accident locations, if any, in the study area and to develop improvement measures to address potential safety issues.

To identify locations with prevalent accidents and safety issues in the study area, it was necessary to examine the accident history data to see if any patterns can be established. Accident data for the most recent three years (2007 to 2009) was examined. Accident 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 the New York Police Department (NYPD). The data provides information on locations, severity, collision type, weather conditions, time of accidents, and other pertinent factors, that can be used to identify locations with high accidents (frequency) and locations where motorists, pedestrians, and bicyclists were either killed or injured (severity) in the study area.

6.2 Accident History (2007-2009)

After reviewing all the intersections in the study area for the most recent three years (2007-2009), only one intersection, Stone Avenue (Mother Gaston Boulevard)/Eastern Parkway Extension qualified as a "High Accident Location" having five pedestrian accidents in 2007. No other location had 23 reportable accidents or five pedestrian accidents in a year; consenquently, locations with no less than 10 "Reportable Accidents" per year were exemined. Based on this analysis seven locations were identified that had 10 or more accidents at least once during the three-year period. Hence, these locations were subjected to detailed analysis. Table 6-1 lists the seven locations and the summary of accident history from 2007 to 2009; while Figure 6-1 shows these locations on a study area map.

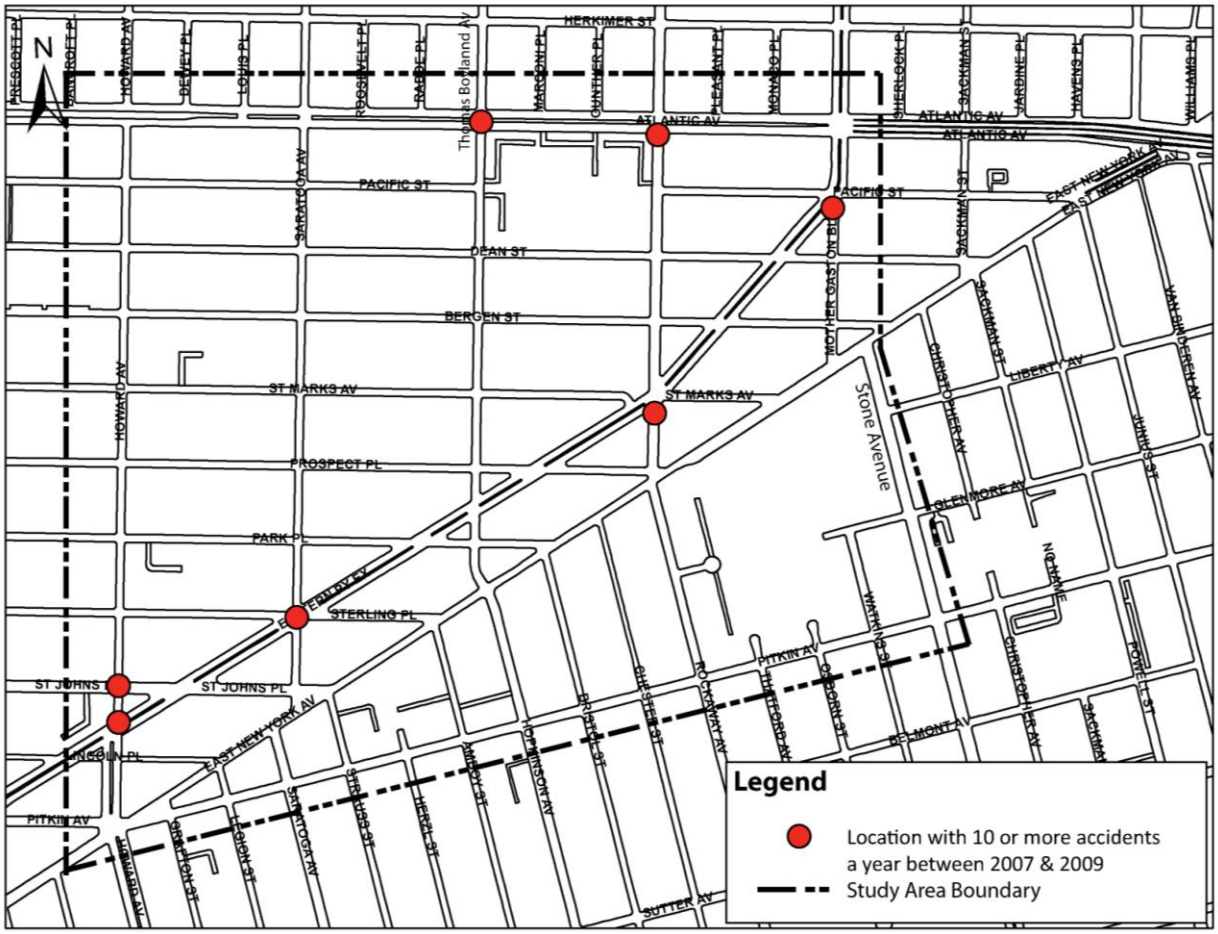
Table 6-1: Accident History in the Study Area (2007 – 2009)

Total Accidents

No.	Location	2007	2008	2009	Total
1	Rockaway Avenue/Atlantic Avenue	11	8	22	41
2	Eastern Pkwy Ext./Mother Gaston Blvd/Pacific St.	10	15	9	34
3	Eastern Parkway Extension/Howard Avenue	7	11	9	27
4	Thomas Boyland Avenue/Atlantic Avenue	4	5	15	24
5	Eastern Parkway Extension/Rockaway Avenue	4	10	7	21
6	Saratoga Avenue/Sterling Place	4	10	7	21
7	Howard Avenue/St. Johns Place	1	1	18	20

The data showed that the Rockaway Avenue and Atlantic Avenue intersection had the highest number of accidents, with a total of 41 accidents over the three-year period. Out of seven intersections listed in the above table, three intersections show significant increase in accidents in 2009 from 2008 and 2007. However, the most dramatic spike occurred at the Howard Avenue/St. Johns Place intersection. Three intersections along Eastern Parkway were among the locations with the most accidents in the study area: Mother Gaston Boulevard/Pacific Street (34), Howard Avenue (27), and Rockaway Avenue (21).

Figure 6-1: Accident Locations (2007-2009)



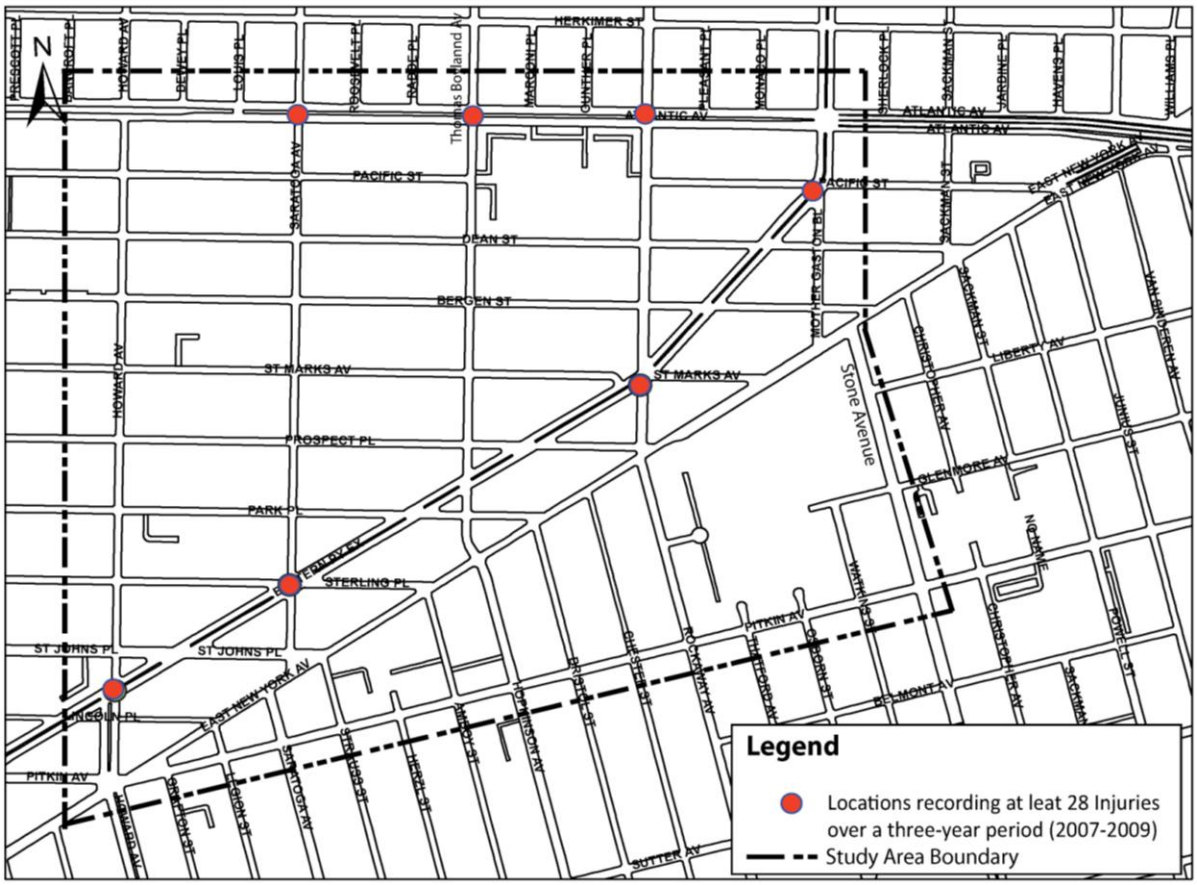
Fatalities and Injuries

Over the three-year period (2007-2009), 659 people sustained injuries as a result of 489 crashes at all intersections in the study area. The only fatality occurred at the Atlantic Avenue and Thomas Boyland Avenue intersection in 2009. Table 6-2 lists the intersections and number of injuries between 2007 and 2009 and Figure 6-2 maps these locations.

Table 6-2: Summary of Injuries (2007-2009)

No.	Location	No. of Injuries	Total Accidents
1	Rockaway Avenue/Atlantic Avenue	57	41
2	Eastern Parkway/Howard Avenue	47	27
3	Eastern Parkway Ext./Mother Gaston Blvd	39	34
4	Saratoga Avenue/Atlantic Avenue	38	22
5	Atlantic Avenue/Thomas Boyland Avenue	36	24
6	Eastern Parkway/Saratoga Avenue/Sterling Place	28	21
7	Rockaway Avenue/Eastern Pkwy Extension	28	21
	Total Injuries/Total Accidents	**273**	**190**

Figure 6-2: Injuries Accident Locations (2007-2009)



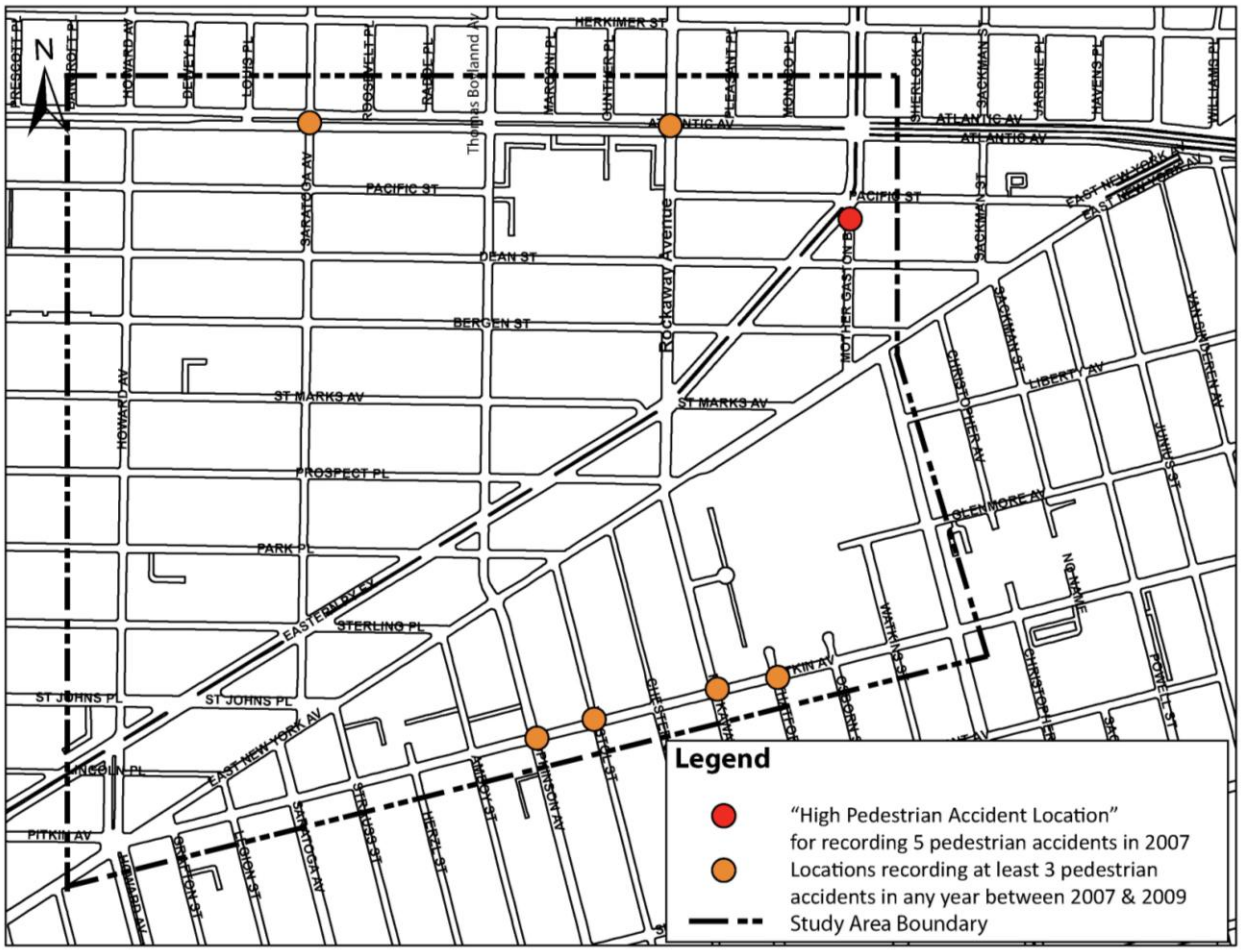
Accidents Involving Pedestrians and Bicyclists

Only the intersection of Eastern Parkway and Mother Gaston Boulevard qualified as a "High Pedestrian Accident Location" having five pedestrian accidents in 2007. However to be conservative, an examination of intersections with at least three pedestrian accidents per year from 2007-2009 was conducted. Seven locations in the study area met the criteria. During the three-year period there were 88 total pedestrian and 21 total bicycle accidents in the study area. Howard Avenue/Eastern Parkway was the only intersection that had two bicycle accidents in 2009. Table 6-3 shows locations where at least three pedestrian accidents occurred during the three-year period (2007-2009), while Figure 6-3 maps these locations.

Table 6-3: Pedestrian Accidents (2007-2009)

No.	Location	2007	2008	2009	Total
1	Eastern Parkway Ext./Mother Gaston Blvd	5	4	2	11
2	Rockaway Avenue/Atlantic Avenue	3	2	2	7
3	Saratoga Avenue/Atlantic Avenue	1	3	2	6
4	Pitkin Avenue/Rockaway Avenue	3	1	1	5
5	Pitkin Avenue/Hopkinson Avenue	1	3	1	5
6	Pitkin Avenue/Bristol Street	3	2	0	5
7	Pitkin Avenue/Thatford Street	3	0	0	3
	Total Pedestrian Accidents	**19**	**15**	**8**	**42**

Figure 6-3: Pedestrian Accident Locations (2007-2009)



Accidents by Collision Type and Driving Conditions

Based on the criteria identified above, eight intersections qualified for detailed analysis. There are a total of 255 accidents at the eight locations over the 3-year period. An analysis of contributing factors in relation to frequency of the 255 accidents at the eight analyzed locations listed in Table 6-4, revealed that 34% of the accidents occurred during night time, and 20% occurred under wet roadway conditions (2007-2009).

The distribution of accident by collision type showed that 26% were *rear end*, 9% *left turn* and 18% *right angle*. The highest number of *rear end* accidents occurred at three intersections: Eastern Parkway Extension/Rockaway Avenue, Eastern Parkway Extension/Mother Gaston Boulevard, and Atlantic Avenue/Rockaway Avenue with 11 *rear end* accidents at each intersection. The locations with the highest frequency of *left turn* collisions were Rockaway Avenue/Atlantic Avenue and Eastern Parkway/Howard Avenue with seven *left turn* accidents at each intersection.

The analysis shows that 17 accidents occurred during the night and 11 occurred under wet roadway conditions (see Table 6-4).

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Table 6-4: Accidents by Collision Type (2007-2009)

	Collision Type/Condition				
Intersection/Location	Rear End	Left Turn	Right Angle	Night Accidents	Wet Road
Eastern Pkwy/Mother Gaston Blvd	11	3	4	7	8
Eastern Pkwy/Rockaway Ave.	11	0	3	8	5
Rockaway Ave./Atlantic Ave.	11	7	6	14	6
Eastern Pkwy/Howard Ave.	8	7	12	17	11
Howard Ave./St. Johns Pl.	2	5	8	4	0
Thomas Boyland/Atlantic Aves.	5	2	9	12	3
Saratoga Ave./Sterling Pl.	8	2	0	10	4
Eastern Pkwy/Hopkinson Ave.	7	2	3	4	6
Total	**63**	**28**	**45**	**76**	**43**

The analysis suggests that from a traffic operation and safety point of view the following locations should be given special attention:

1. Eastern Parkway and Saratoga Avenue/Sterling Place;
2. Eastern Parkway and Howard Avenue;
3. Eastern Parkway and St. Johns Place;
4. Eastern Parkway and Rockaway Avenue/St. Marks Avenue;
5. Eastern Parkway and Mother Gaston Boulevard/Pacific Street;
6. Atlantic Avenue and Rockaway Avenue;
7. Atlantic Avenue and Hopkinson/Thomas Boyland Avenue;
8. Atlantic Avenue and Saratoga Avenue;
9. Howard Avenue and St. Johns Place; and
10. Pitkin Avenue and Rockaway Avenue.

7.0 PARKING

7.1 Introduction

Parking plays an important role in the overall transportation system. Inadequate parking could lead to unnecessary circulation as motorists search for parking spaces, illegally parked, and or double parked vehicles, thus reducing roadway capacity. The study examined the study area's on-street and off-street parking facilities, supply and demand and identified parking shortfalls to address future parking needs.

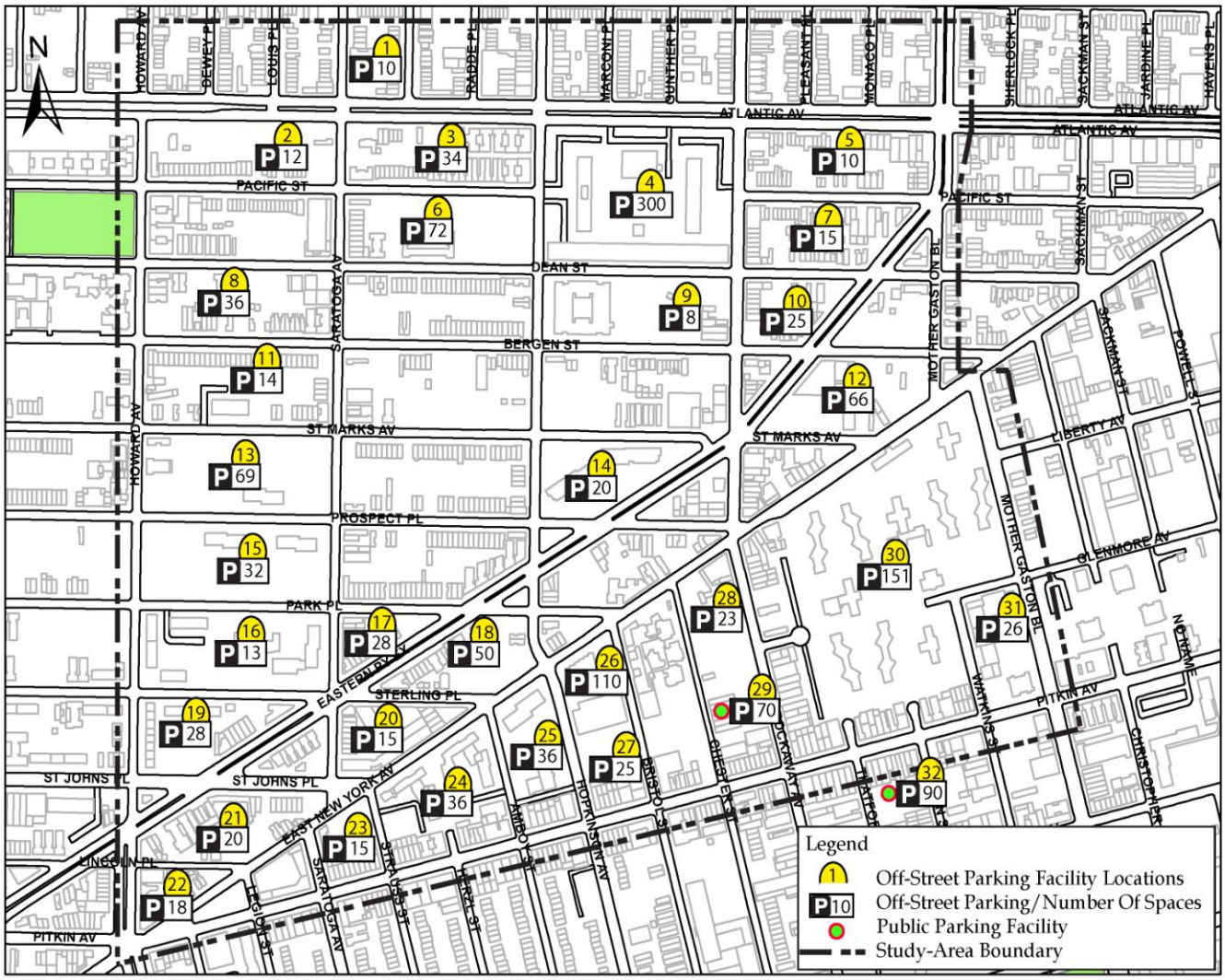
There are several on-street and off-street parking facilities throughout the study-area. Off-street parking facilities are either provided for multi-unit dwellings or commercial and entertainment establishments. On-street parking is generally permitted, except where prohibited by parking regulations for street cleaning, bus stops, and designated curb side loading and unloading zones for trucks.

7.2 Off-Street Parking

A parking survey/inventory was conducted during the AM, midday, PM and Saturday peak hours, concurrently with traffic counts, to evaluate existing parking capacity and utilization.

There are 32 off-street parking facilities (mostly lots) scattered throughout the study area, yielding a total of 1,481 available parking spaces. These facilities are adjacent to public and private entities shown in Figure 7-1. Two of these 32 facilities are for the residents of large apartment complexes such as those on East New York Avenue between Rockaway Avenue and Mother Gaston Boulevard and on Atlantic Avenue between Rockaway Avenue and Hopkinson Avenue. These two large off-street residential parking lots have a combined capacity of about 450 parking spaces. The largest residential complex in the study area, Atlantic Plaza Apartments, has about 300 parking spaces.

Figure 7-1
Off-Street Parking Facilities



The parking lot, located on East New York Avenue between Hopkinson Avenue and Bristol Street, is used by the Police Precinct and has 110 parking spaces combined for officers and staff. The remaining 29 commercial/residential/public off-street parking lots are located randomly throughout the study area. Figure 7-1 shows the locations of off-street parking lots within the study area, while Table 7-1 lists the capacity and utilization for each parking facility. The number of available parking spaces and utilization rates in some cases are estimated because access to some facilities was not possible at the time of observation.

There are only two public off-street parking facilities (Laboriel-Lincan and Park by Jimmy, Inc.) in the study area that are privately owned and operated. These two lots are located off Pitkin Avenue, one on Rockaway Avenue and the other on Thatford Avenue, between Belmont Avenue and Pitkin Avenue, with a combined capacity of 165 parking spaces. The survey showed that 49% of the total available off-street parking capacity was utilized during the average weekday (Noon-4 PM). On weekdays, the total utilization along the southern section of the study area (vicinity of Pitkin Avenue) during midday peak hours ranges from 75% to 100%. Table 7-1 shows all off-street facilities listed by type, location, capacity, and average utilization for the midday peak hours (Noon-4 PM). The majority of off-street facilities, mainly located in the western and northern sections of the study area, had some spare capacity, while in some parts of the southern section of study area (along Pitkin Avenue where major commercial activities are concentrated), demand for on-street and off-street parking regularly matches or exceeds capacity.

Table 7-1
Off-Street Parking Facilities by Type, Locations, Capacity and Utilization (Page 1 of 2)

No.	Off-Street Parking Facility	Type of Parking	Location of Parking Lot	License Capacity	Average Daily Occupancy	Utilization (%)	Available Capacity
1	Dunkin Donuts	Commercial	Atlantic Ave. b/w Saratoga Avenue & Roosevelt Place	10	3	30	7
2	Residential	Lot	Pacific St. b/w Saratoga & Howard Avenues	12	7	58	5
3	Dean Street Family Center	Lot	Dean St. b/w Hopkinson & Saratoga Avenues	34	30	88	4
4	Atlantic Plaza Apartments	Residential Complex Lot	Dean Street b/w Rockaway and Hopkinson Avenues	300	132	44	168
5	Residential	Lot	Pacific St. b/w Mother Gaston Blvd & Rockaway Av	10	6	60	4
6	P.S. 178	Lot	Dean St. b/w Hopkinson & Saratoga Avenues	72	60	83	12
7	Residential	Lot	Dean St. b/w Eastern Pkwy Extension and Rockaway Av	15	9	60	6
8	Residential	Lot	Bergen St. b/w Saratoga and Howard Avenues	36	11	31	25
9	Residential	Lot	Bergen St. b/w Rockaway & Hopkinson Avenues	8	5	63	3
10	EMS Brownsville Station # 44	Lot	Bergen Street b/w Eastern Parkway Extension and Rockaway Avenue	25	12	48	13
11	Brownsville Women's Center	Lot	St. Marks Av. b/w Saratoga & Howard Avenues	14	6	43	8
12	American Medical Centers	Lot	St. Marks Avenue between Mother Gaston Blvd and Eastern Parkway Extension	66	4	6	62
13	The Family Life Center	Lot	Prospect Place between Saratoga and Howard Aves.	69	5	7	64
14	Mt. Ararat Church/Senior Center	Lot	Prospect Pl. b/w Eastern Parkway Extension and Hopkinson Avenue	20	16	80	4
15	Residential	Lot	Park Place between Saratoga and Howard Avenues	32	20	63	12

Table 7-1
Off-Street Parking Facilities by Type, Locations, Capacity and Utilization (Page 2 of 2)

No.	Off-Street Parking Facility	Type of Parking	Location of Parking Lot	License Capacity	Avarege Occupancy	Utilization (%)	Avail. Capacity
16	Chama Brooklyn Child Dvlt. Center	Lot	Sterling Place between Saratoga and Howard Aves.	13	5	38	8
17	Residential	Lot	Eastern Parkway between Park Place and Sterling Pl.	28	20	71	8
18	Unity Temple Baptist Church	Lot	Sterling Pl. b/w Eastern Pkwy and E. New York Av.	50	47	94	3
19	Residential	Lot	Sterling Pl. b/w Howard Ave. & Eastern Parkway	28	16	57	12
20	Residential	Lot	Saratoga Ave. b/w Sterling Place & St. Johns Place	15	1	7	14
21	Holy House of Prayer	Lot	Eastern Parkway between St. Johns Pl. & Lincoln Pl.	20	19	95	1
22	Residential	Lot	Howard Ave. b/w Lincoln Place & E. New York Ave.	18	6	33	12
23	Residential	Lot	E. New York Ave. b/w Saratoga Av. & Strauss St.	15	2	13	13
24	Residential	Lot	East New York Ave. b/w Strauss & Amboy Streets	36	14	39	22
25	Residential	Lot	E. New York Ave. b/w Amboy St. & Hopkinson Av	36	10	28	26
26	73rd Precinct	Lot	E. New York Ave. b/w Hopkinson Av. & Bristol St.	110	111	122	0
27	Residential	Lot	Hopkinson Ave b/w. E. New York & Pitkin Aves.	25	14	0	11
28	Residential	Lot	E. New York Ave. b/w Chester St. & Rockaway Av.	23	20	87	3
29*	Laboriel-Lincan	Public Lot	Rockaway Ave. b/w E. New York & Pitkin Avenues	75	70	93	5
30	Howard Houses Complex	Residential Complex	E. N. Y. Ave. b/w Rockaway Ave. & Mother Gaston Blvd	150	66	44	84
31	P.S. 298	Lot	Glenmore Ave b/w Watkins St. and Mother Gaston Blvd	26	19	73	7
32*	Park By Jimmy, Inc.	Public Lot	Thatford Ave. b/w Pitkin Avenue & Belmont Avenue	90	36	40	54
	Grand Total			**1,481**	**722**	**49**	**759**

7.3 On-Street Parking

On-street parking regulations in the study area affect on-street parking capacity and utilization, which can vary by time of day. An inventory of the on-street parking regulation and spaces was made. A complete list of on-street parking regulations is provided in Table 7-2 and Figure 7-2.

The most common parking restrictions in the study area are street cleaning regulations: "No Parking 8-9:30 AM Monday and Thursday," and "No Parking 8-9:30 AM Tuesday and Friday." These alternate side street cleaning regulations are in effect on Howard Avenue, Saratoga Avenue and Hopkinson/Thomas Boyland Avenue from Pitkin Avenue to Pacific Street. The other street cleaning regulations in the study area are as follows: "No Parking 9-10:30AM Monday and Thursday" and "No Parking 9-10:30AM Tuesday and Friday"; "No Parking 11AM-1PM Monday and Thursday"; and "No Parking 11AM-1PM Tuesday and Friday"; and "No Parking 7:30-8AM Except Sunday"; and "No Parking 8-8:30AM Except Sunday". Figure 7-3 shows alternate side parking regulations throughout the study area.

Table 7-2
On-Street Parking Regulations and Codes

Code No.	On-Street Parking Regulation	Code No	On-Street Parking Regulation
1	No Parking Anytime	15	No Parking 8-9:30AM Monday-Thursday
2	No Standing Anytime	16	No Parking 8-9:30AM Tuesday-Friday
3	No Standing Fire Zone	17	No Parking 9-10:30AM Monday-Thursday
4	No Standing Anytime Except Trucks Loading/Unloading	18	No Parking 9-10:30AM Tuesday-Friday
5	1 Hour Parking 8AM-7PM Except Sunday (limited parking)	19	No Parking 11:30AM-1PM Monday-Thursday
6	1 Hour Parking 8:30AM-7PM Except Sunday (limited parking)	20	No Parking 11:30AM-1PM Tuesday-Friday
7	No Parking 7:30-8AM Except Sunday	21	No Standing Monday to Friday 7-10AM
8	No Parking 8-8:30AM except Sunday	22	No Standing Monday to Friday 4-7 PM
9	No Standing 7AM-4PM School Days	23	No Standing Anytime Except Authorized Vehicles
10	No Parking 7AM-4PM School Days	24	2 Hour Parking 8:30AM-7PM Except Sunday (limited parking)
11	No Standing 7AM-4PM School Days Except School Buses	25	No Parking 7:30-8AM Monday-Thursday
12	No Parking 7AM-7PM Monday to Friday	26	No Parking 8-8:30 Tuesday-Friday
13	No Parking Tow-Away Zone 8-9AM Tuesday-Friday	27	No Parking 7-10AM Monday to Friday
14	No Parking 8-9AM Monday-Thursday	28	No Parking 4-7PM Monday to Friday

Figure 7-2
On-Street Parking Regulations

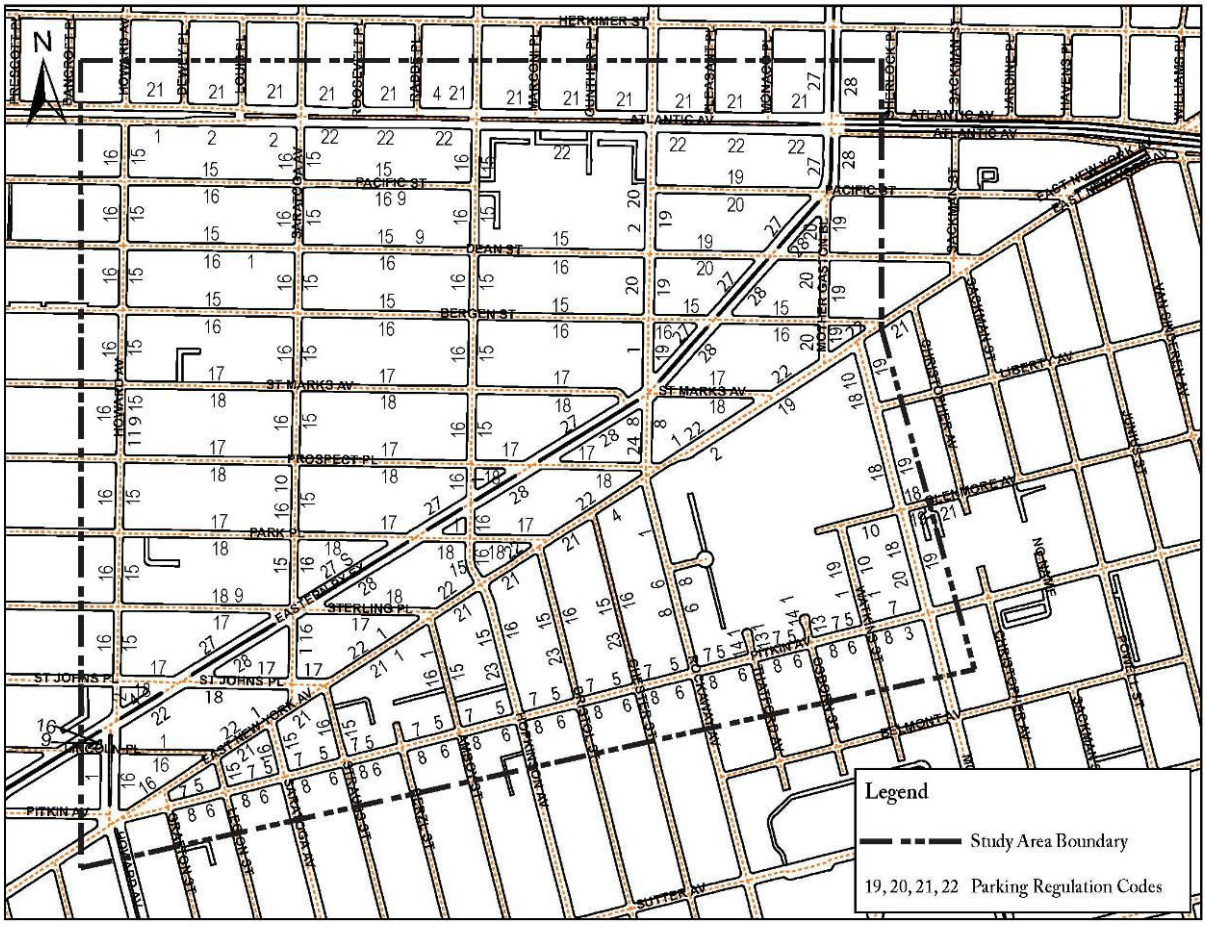
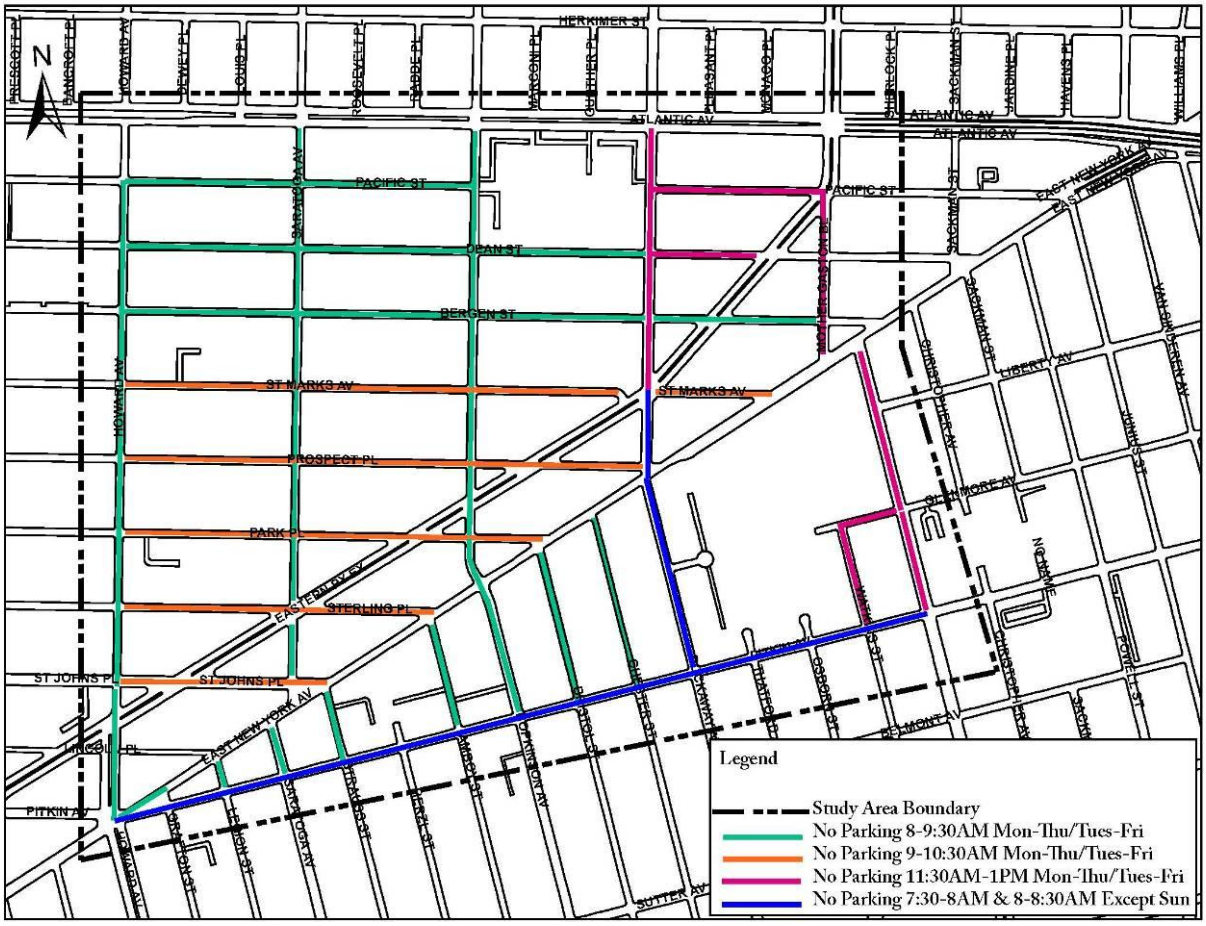


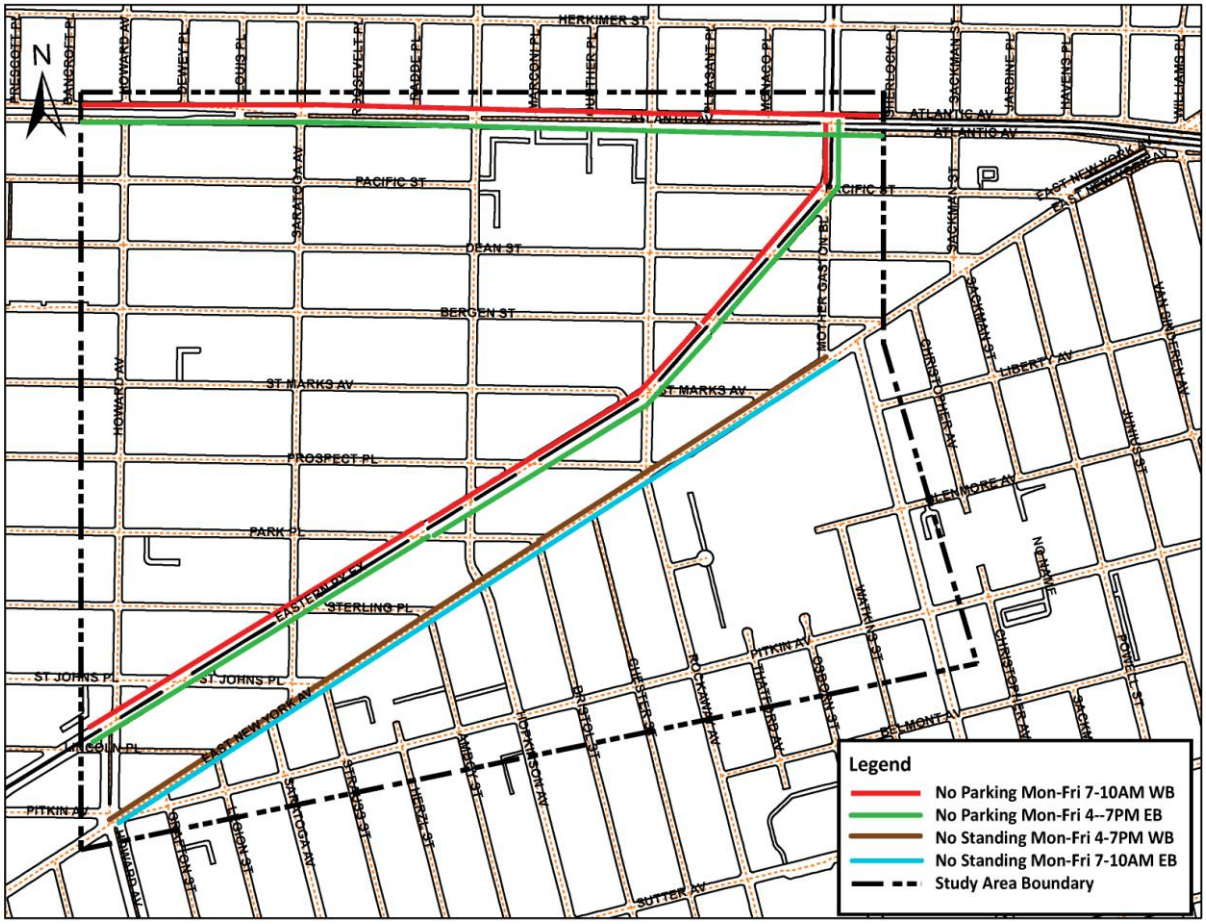
Figure 7-3
Alternate Side Parking Regulations



Corridors with Rush Hour Regulations

There are three east/west corridors (Atlantic Avenue, Eastern Parkway, and East New York Avenue) that have "No Parking 7-10 AM or 4-7PM," and or "No Standing Anytime," regulations during rush hours to ensure the parking lane is available for traffic flow (see Figure 7-4). During the AM peak (7-10 AM) on-street parking is prohibited in the westbound direction on the main corridors and during the PM (4-7 PM) peak rush hours on-street parking is prohibited in the eastbound direction.

Figure 7-4
Corridors with Rush Hour Regulations



On-Street Parking Supply and Demand

The on-street parking survey showed that 59% of the available on-street parking capacity was utilized during the average weekday (Noon-4 PM). Of approximately 2,824 on-street parking spaces, 1,660 were occupied when the survey was conducted. Figure 7-6 shows on-street parking capacity and utilization for each block face during the highest midday peak hour.

Figure 7-5
On-street Parking Capacity and Utilization

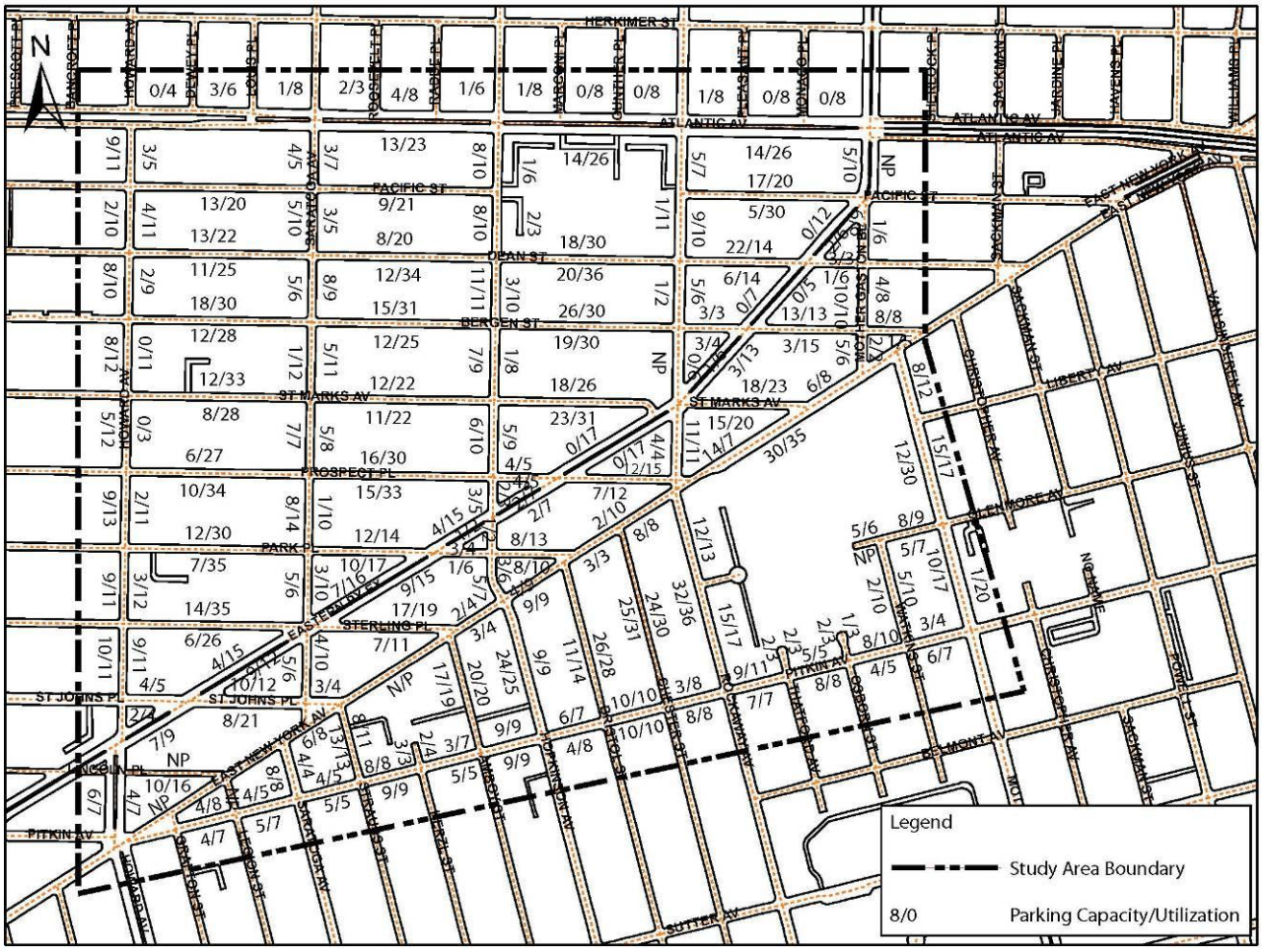


Table 7-3 (Page 1of 2)
On-Street Parking Capacity and Utilization

Roadway		Supply	Utilization (Noon-4 PM)	
Street Name	**Curb-side**	**Legal Capacity (#)**	**Actual Demand (#)**	**Utilized** (%)
Atlantic Avenue b/w Howard Ave. and Mother Gaston Blvd	N*	83	13	16
	S*	75	41	55
Pacific St. b/w Howard Ave. & Thomas Boyland Ave	N	65	60	92
	S	41	22	57
Pacific St. b/w Rockaway Ave. and Mother Gaston Blvd	N	20	17	85
	S	30	5	17
Dean St. b/w Howard Avenue and Mother Gaston Blvd	N	89	64	72
	S	115	50	44
Bergen St. b/w Howard Ave. and Mother Gaston Blvd	N	115	83	72
	S	107	50	47
St. Marks Ave. b/w Howard and E. New York Aves.	N	104	60	58
	S	101	57	56
Prospect Pl. b/w Howard and Rockaway Avenues	N	77	38	49
	S	84	36	43
Parks Place b/w Howard Avenue and Bristol Street	N	61	35	57
	S	68	26	38
Sterling Place b/w Howard Avenue and Amboy Street	N	54	31	57
	S	37	13	35
St. Johns Place b/w Howard Avenue and Strauss Street	N	21	17	81
	S	25	10	40
Lincoln Place b/w Howard Avenue and Legion Street	N	No Parking	N/A	N/A
	S	16	10	63
Pitkin Ave. b/w Howard Ave. and Mother Gaston Blvd	N	97	76	78
	S	95	84	88
Eastern Pkwy b/w Howard Ave and Mother Gaston Blvd	N*	95	15	16
	S*	77	36	47
E. N. York Ave. b/w Howard Ave. and Mother Gaston Blvd	N	45	21	47
	S	67	59	88
Glenmore Ave. b/w Watkins St. and Mother Gaston Blvd	N	15	13	88
	S	7	5	71
Howard Avenue b/w Atlantic Avenue and Pitkin Avenue	E	80	27	34
	W	97	66	68
Saratoga Avenue b/w Atlantic Avenue and Pitkin Avenue	E	74	36	49
	W	74	48	65
Strauss Street b/w East New York Avenue and Pitkin	E	11	8	72
	W	13	13	100
Herzl Street at Pitkin Avenue	E	4	2	50
	W	3	3	100
Amboy St. b/w E. New York Avenue and Pitkin Avenue	E	20	20	100
	W	19	17	90

Table 7-3 (Page 2 of 2)
On-Street Parking Capacity and Utilization

Roadway		Supply	Utilization (Noon-4 PM)	
Street Name	**Curb-side**	**Legal Capacity (#)**	**Actual demand (#)**	**Utilized (%)**
Amboy St. b/w E. New York and Pitkin Avenues	E	20	20	100
	W	19	17	90
Thomas Boyland/Hopkinson Ave. b/w Atlantic and Pitkin Aves.	E	87	73	84
	W	54	26	48
Bristol Street b/w East New York Avenue and Pitkin Avenue	E	28	26	93
	W	14	11	79
Chester Street b/w East New York Avenue and Pitkin Street	E	30	24	80
	W	31	25	81
Rockaway Avenue b/w Atlantic Avenue and Pitkin Avenue	E	70	57	81
	W	53	38	72
Thatford Avenue at Pitkin Avenue	E	3	2	67
	W	3	2	67
Osborne Street at Pitkin Avenue	E	3	1	33
	W	3	2	67
Watkins Street at Pitkin Avenue	E	10	5	50
	W	10	2	20
Mother Gaston Blvd b/w Atlantic Avenue & E. New York Avenue	E	16	7	44
	W	32	26	81
Mother Gaston Blvd b/w E. New York Avenue and Pitkin Avenue	E	49	24	49
	W	47	22	47
Total Capacity/Utilization		**2,824**	**1,660**	**59**

**Rush hour regulations enforced on Atlantic Avenue, East New York Avenue and on Eastern Parkway from Monday to Friday 7-10AM on the north curb (WB) and 4-7PM on the south curb (EB).*

There are number of areas, predominantly in the southern and eastern sections of the study area, with higher utilization and shortfalls during various peak hours while in the northern and western sections of the study area occupancy rates are significantly lower. The highest utilization occurred on Pitkin Avenue as well as on its surrounding street blocks where intensive commercial activities occur.

8.0 PUBLIC TRANSPORTATION

8.1 Introduction

Public transportation plays an important role in the transportation systems. The main transit service provider in the study area is MTA - NYC Transit (NYCT). Within the study area direct transportation options include buses and car services. To access subways or the Long Island Railroad (LIRR) one has to travel a short distance approximately 1/4 mile outside the study area. The study area is well served by buses.

8.2 Surface Transit (Bus Service)

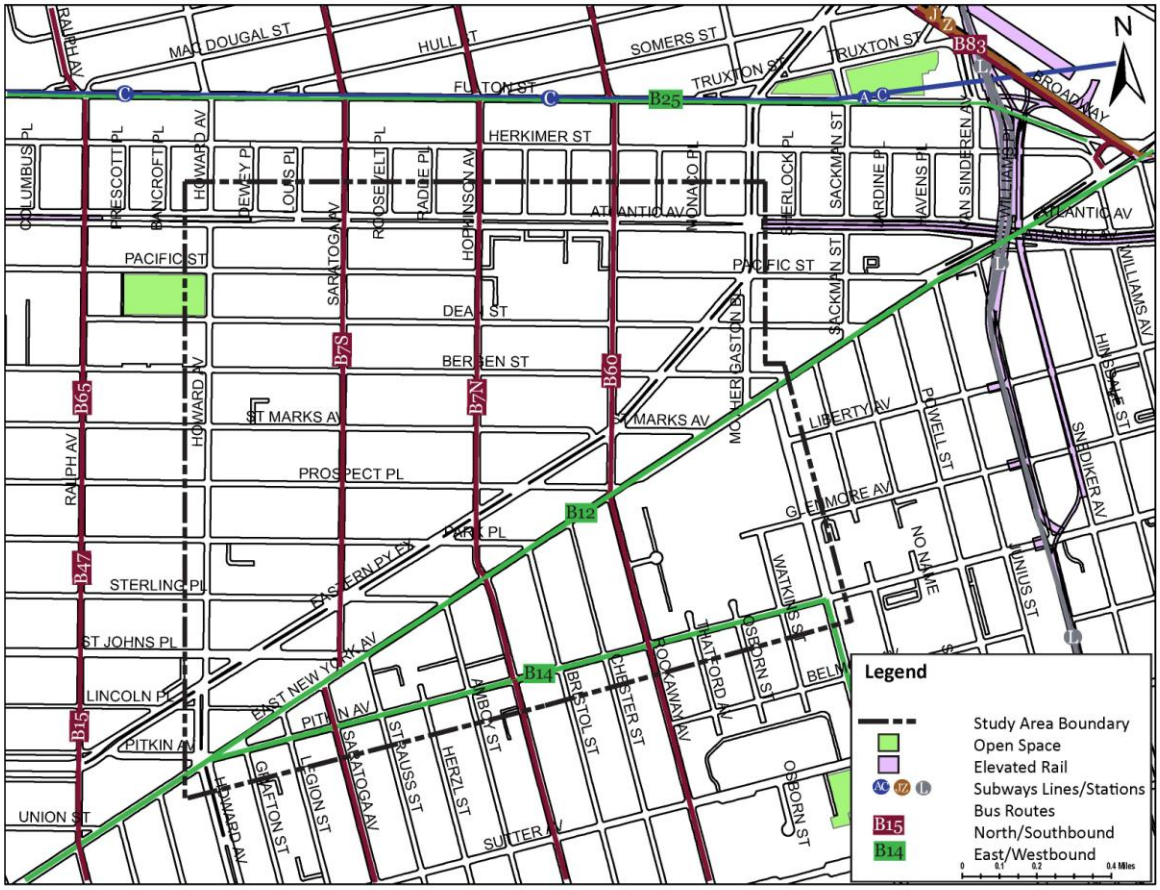
There are four local bus lines (B7, B12, B14, and B60) that serve the study area. They operate on three of the major north-south corridors (Saratoga Avenue, Thomas Boyland Street, and Rockaway Avenue) and two major cross-town streets (East New York Avenue and Pitkin Avenue). Figure 8-1 shows the existing buses routes in the study area, while Table 8-1 provides headway information.

Table 8-1
Average Frequency of NYCT Bus Service (in minutes)

Headway (in minutes)															
	Weekday					Saturday					Sunday				
Route	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night
B7	10	20	12	18	60	20	20	15	15	NS	30	30	20	20	60
B12	9	13	12	12	40	14	13	13	14	40	12	17	13	15	40
B14	12	12	12	12	55	15	12	11	12	60	20	15	15	20	60
B60	6	10	10	12	60	20	11	10	12	60	20	10	12	15	60

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
ns = no service during time period.

Figure 8-1
Local Bus Routes/Subway Routes and Stations



The following is a brief description of each bus route and the frequency of service within the study area:

- **B7 - Midwood/Flatlands and Bedford-Stuyvesant**

The B7 operates between Midwood/Flatlands and Bedford-Stuyvesant in Brooklyn at all times. In the study area, it provides service along Saratoga Avenue, East New York Avenue, and Thomas Boyland Street. Headway varies according to demand for service. The headway during the AM peak hour is 10 minutes and 12 minutes during the PM peak hour.

- **B12 – Cypress Hills and Prospect-Lefferts Garden**

The B12 operates between Cypress Hills and Prospect-Lefferts Garden in Brooklyn at all times. In the study area, it provides service along East New York Avenue between Howard Avenue and Mother Gaston Avenue. Headway varies according to demand for service. The headway during the AM peak hour is nine minutes and 12 minutes during the PM peak hour.

- **B14 - Crown Heights and Eldert Lane/Linden Boulevard**

The B14 operates between Crown Heights and Eldert Lane/Linden Boulevard in Brooklyn at all times. In the study area, it provides service along Pitkin Avenue between Howard Avenue and Mother Gaston Avenue. Headway varies according to demand for service. The headway during the AM and PM peak hours is 12 minutes.

- **B60 – Canarsie and Williamsburg**

The B60 operates between Canarsie and Williamsburg in Brooklyn at all times. In the study area, it provides service along Rockaway Avenue between Atlantic Avenue and Pitkin Avenue. Headway varies according to demand for service. The headway during the AM peak hour is six minutes and 12 minutes during the PM peak hour.

8.3 Subway and Commuter Railroad (LIRR) Services

Subways

There are no subway lines passing through the study area, but there are subway stations on the periphery (about 1/4 mile) of the study area. The A and C line stops at Ralph Avenue, Saratoga Avenue, and Broadway Junction that are just north of the study area boundaries. The J, Z, and L trains stop at Broadway Junction; and the #3 train runs south of the study area with two stops, Saratoga Avenue and Rutland/Sutter Avenues, in close proximity to the study area.

Commuter Railroad (LIRR)

The Long Island Railroad (LIRR) passes throughout the study area (below grade), along Atlantic Avenue but has no stops in the study area. The nearest station to the study area is East New York Avenue/Atlantic Avenue, several blocks to the east of the study area.

A significant portion of study area residents (66%) use the public transportation for journey to work compared to about one-third that use automobiles. The existing bus network adequately addresses current demands for travel and it is anticipated that it will satisfy future demands. Because there are no subways or commuter rail stations in the study area heavy reliance will be on buses.

There is a proposal for bus stops consolidation along Saratoga Avenue (see recommendations).

9.0 RECOMMENDATIONS

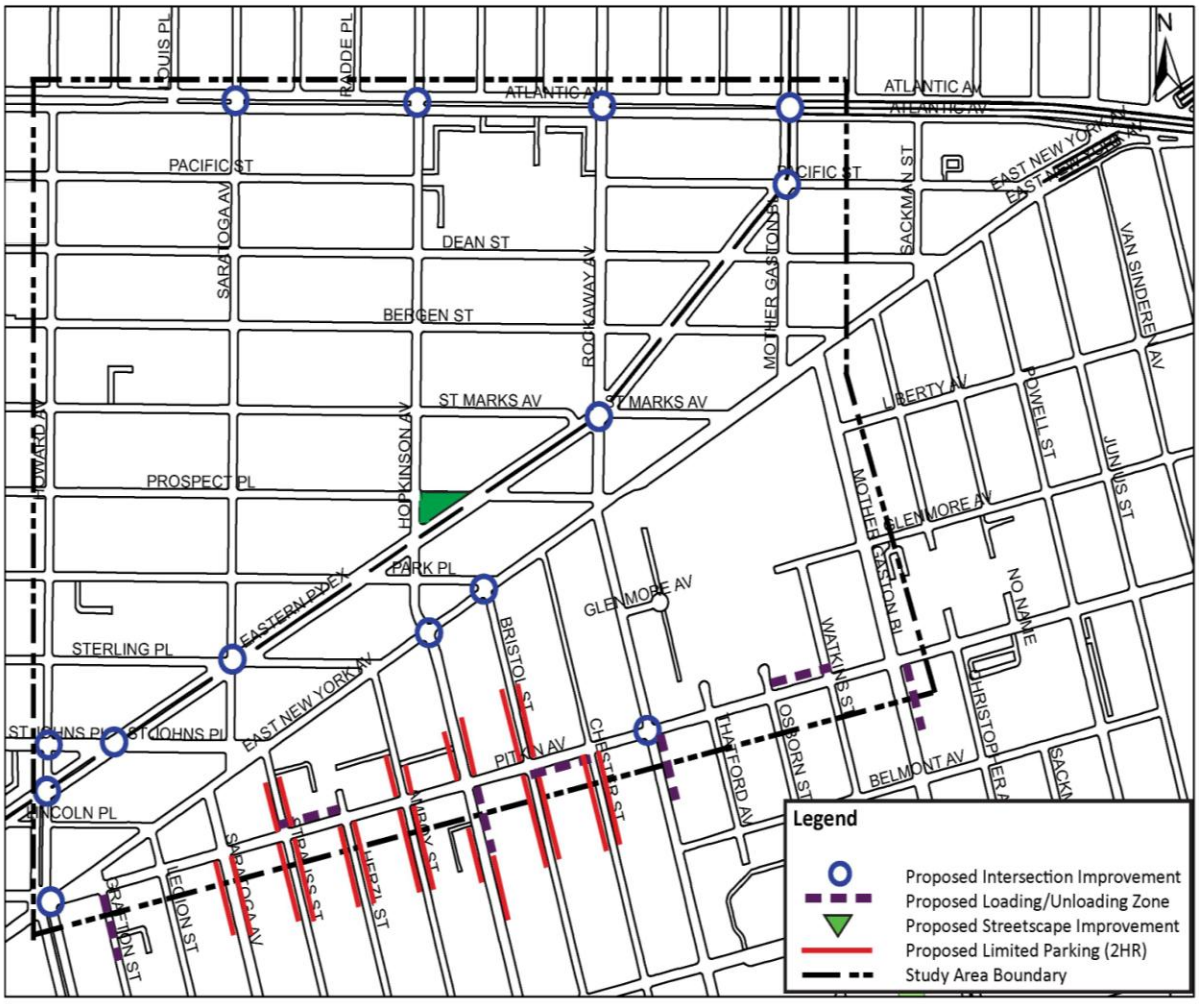
The analysis of the existing and future traffic conditions revealed that there are several locations in the study area that can be improved with respect to mobility and safety of all street users (motorists, pedestrians, cyclists) by making changes to roadway configuration, signal timing, truck loading/unloading, bus stop location, parking restriction, signs and markings.

The following locations are identified for improvements:

1. Saratoga Avenue and Eastern Parkway/Sterling Place (roadway restriping, signs and markings, left turn prohibition, and installation of neckdowns);
2. Rockaway Avenue and Atlantic Avenue (removal of curbside parking, roadway restriping, and signal timing changes);
3. Rockaway and Pitkin Avenues (removal of curbside parking and roadway restriping);
4. Eastern Parkway and St. Johns Place (neckdowns);
5. East New York Avenue and Pitkin/Hopkinson Avenues, Atlantic Avenue and Hopkinson/Saratoga Avenues (signal timing changes);
6. Saratoga Avenue between Eastern Parkway and East New York Avenue (consolidation of bus stops);
7. Pitkin Avenue from Howard Avenue to Mother Gaston Boulevard (installation of truck loading/unloading zones, parking restrictions and crosswalk refurbishing);
8. Install 2 hour limited parking (10AM-7PM) at adjacent streets (approximately five parking spaces) to Pitkin Avenue to increase parking turnovers (Figure 9-1).
9. Streetscape improvement at triangular area between Eastern Parkway, Prospect Place and Thomas Boyland Avenue (pedestrian plaza); and
10. Various safety improvements are recommended for the following intersections: Eastern Parkway and Mother Gaston Boulevard, Eastern Parkway and Howard Avenue, Howard Avenue and St. Johns Place, Eastern Parkway and Rockaway Avenue/St. Marks Avenue, Atlantic Avenue and Hopkinson Avenue, and Atlantic Avenue and Saratoga Avenue

Figure 9-1 below shows locations proposed for improvements..

Figure 9-1
Locations for Proposed Improvements



The results of the capacity analysis for 22 locations indicated that some approaches have poor levels of service. Table 9-1 shows those approaches with LOS E and F along with improvement measures for the various peak hours. All other approaches operate at acceptable LOS (A, B and C) and are listed in Table 4-2. Recommended improvements follow:

TABLE 9-1
IMPROVEMENT MEASURES

AM PEAK HOUR

Intersection	Approach	Lane Group	Existing Condition			Lane Group	Future Condition			Improvement Condition			Proposed Measures	
			V/C	Delay	LOS		V/C	Delay	LOS	V/C	Delay	LOS	NB/SB	EB/WB
Eastern Pkwy @ Saratoga Ave.	SB	LTR	0.96	65.60	E	LTR	1.01	77.10	E	0.65	39.90	D	Rem.parking/restr. 3 lanes**	
Atlantic @ Saratoga Avenues	EB	L	0.87	97.60	F	L	0.99	108.20	F	0.77	53.40	D		+5/-5 secs.
Atlantic @ T. Boyland Avenues	EB	L	0.76	70.70	E	L	0.78	71.10	E	0.84	54.70	D	-2 secs.	+2 secs.
Atlantic @ Rockaway Avenues	EB	L	0.39	59.70	E	L	0.51	65.30	E	0.33	54.80	D		+2/-2 secs.
	WB	L	1.02	125.50	F	L	1.13	159.30	F	0.94	90.70	F		+2/-2 secs.
	NB	LTR	0.96	71.10	E	LTR	1.00	78.60	E	0.48	30.80	C	Rem.parking/restr. 2 Lanes*	
	SB	LTR	0.98	87.30	F	LTR	1.00	90.50	F	0.45	39.00	D	Rem. parking/restr. 2 lanes*	
Atlantic Ave. @ Eastern Pkwy/Mother Gaston Blvd	WB	TR	1.02	61.60	E	TR	1.03	64.30	E	0.99	51.80	D	-2 secs.	+2 secs.

MIDDAY PEAK HOUR

Intersection	Approach	Lane Group	Existing Condition			Lane Group	Future Condition			Improvement Condition			Proposed Measures	
			V/C	Delay	LOS		V/C	Delay	LOS	V/C	Delay	LOS	NB/SB	EB/WB
Pitkin @ Rockaway Avenues	SB	LTR	0.87	58.80	E	LTR	0.89	62.00	E	0.44	27.70	C	Rem. parking/restr. 2 lanes*	
Atlantic @ Saratoga Avenues	WB	L	0.85	81.80	F	L	0.93	98.30	F	0.68	54.40	D		+3/-3 sec.
Atlantic @ Thomas Boyland Aves	EB	L	0.75	62.20	F	L	0.78	65.60	F	0.73	54.20	D	-2 secs.	+2 secs.
Atlantic @ Rockaway Avenues	EB	L	0.55	54.60	D	L	0.61	57.90	E	0.43	43.70	D		+3/-3 secs.
	WB	L	0.93	88.60	F	L	1.10	135.60	F	0.73	53.20	D		+3/-3 secs.
	NB	LTR	0.89	48.80	D	LTR	1.02	77.60	E	0.44	23.70	C	Rem. parking/restr. 2 lanes*	
	SB	LTR	0.96	71.00	E	LTR	0.99	79.20	E	0.48	31.20	C	Rem. parking/restr. 2 lanes*	

PM PEAK HOUR

Intersection	Approach	Lane Group	Existing Condition			Lane Group	Future Condition			Improvement Condition			Proposed Measures	
			V/C	Delay	LOS		V/C	Delay	LOS	V/C	Delay	LOS	NB/SB	EB/WB
E. New York @ T. Boyland Aves.	EB	LTR	1.00	63.70	E	LTR	68.3	68.3	E	0.95	51.6	D	-3 secs.	+3 secs.
Pitkin @ Rockaway Avenues	SB	LTR	0.94	64.90	E	LTR	0.98	74.30	E	0.39	26.70	C	Rem. parking/restr. 2 lanes*	
Pitkin @ Howard/E.N.Y Avenues	EB	TR	0.72	53.00	D	TR	0.79	57.20	E	0.73	51.60	D	-4 secs.	+2/+2 secs.
	WB	L	0.77	65.50	E	L	0.82	71.10	E	0.67	53.50	D	-4 secs.	+2/+2 secs.
Eastern Pkwy @ Saratoga Avenue	SB	LTR	0.94	62.60	E	LTR	1.00	75.40	E	0.67	40.60	D	Rem. parking/restr. 3 lanes**	
Eastern Pkwy @ Rockaway Av.	SB	LTR	0.86	54.90	D	L/TR	0.86	70.20	E	0.76	42.40	D	Rem. parking/restr. 3 lanes**	
Atlantic @ Saratoga Avenues	WB	L	1.02	133.00	F	L	1.06	141.20	F	0.55	54.20	D		-5/+5 secs.
Atlantic @ T. Boyland Aves.	EB	L	0.81	76.10	E	L	0.88	93.30	F	0.72	54.80	D	-2 secs.	+2 secs.
Atlantic @ Rockaway Avenues	EB	L	0.67	75.30	E	L	0.70	78.40	E	0.42	54.40	D	-4 secs.	+4 secs.
	WB	L	1.04	125.20	F	L	1.14	159.30	F	0.84	75.30	E	-4 secs.	+4 secs.
	NB	LTR	0.89	57.50	E	LTR	0.97	73.00	E	0.51	34.20	C	Rem. parking/restr. 2 lanes*	
	SB	LTR	0.98	85.20	F	LTR	1.04	99.00	F	0.57	44.60	D	Rem. parking/restr. 2 lanes*	

SATURDAY PEAK HOUR

Intersection	Approach	Lane Group	Existing Condition			Lane Group	Future Condition			Improvement Condition			Proposed Measures	
			V/C	Delay	LOS		V/C	Delay	LOS	V/C	Delay	LOS	NB/SB	EB/WB
Atlantic @ Saratoga Avenues	WB	L	0.82	90.50	F	L	0.90	105.00	F	0.48	53.90	D		+5/-5 secs.
Atlantic @ Rockaway Avenues	EB	L	0.54	65.80	E	L	0.59	68.90	E	0.41	54.80	D	-2 secs.	+4/-2 secs.
	WB	L	1.04	132.00	F	L	1.13	160.00	F	0.83	70.70	E	-2 secs.	+4/-2 secs.
	SB	LTR	0.88	65.50	E	LTR	0.94	74.00	E	0.60	44.50	D	Rem. parking/restr. 2 lanes*	

Rem. parking/restr. 2 lanes * - Remove parking and restripe roadway to 2 moving lanes

Rem. parking/restr. 3 lanes ** - Remove parking and restripe roadway to 3 moving lanes

Poor LOS / Proposed measures

+2/-2 secs - Realocated time from one phase to the other phase for the same approach (for instance: from LTR phase to excl. left turn phase).

Footnote: Other approaches have not been impacted by improvement measures.

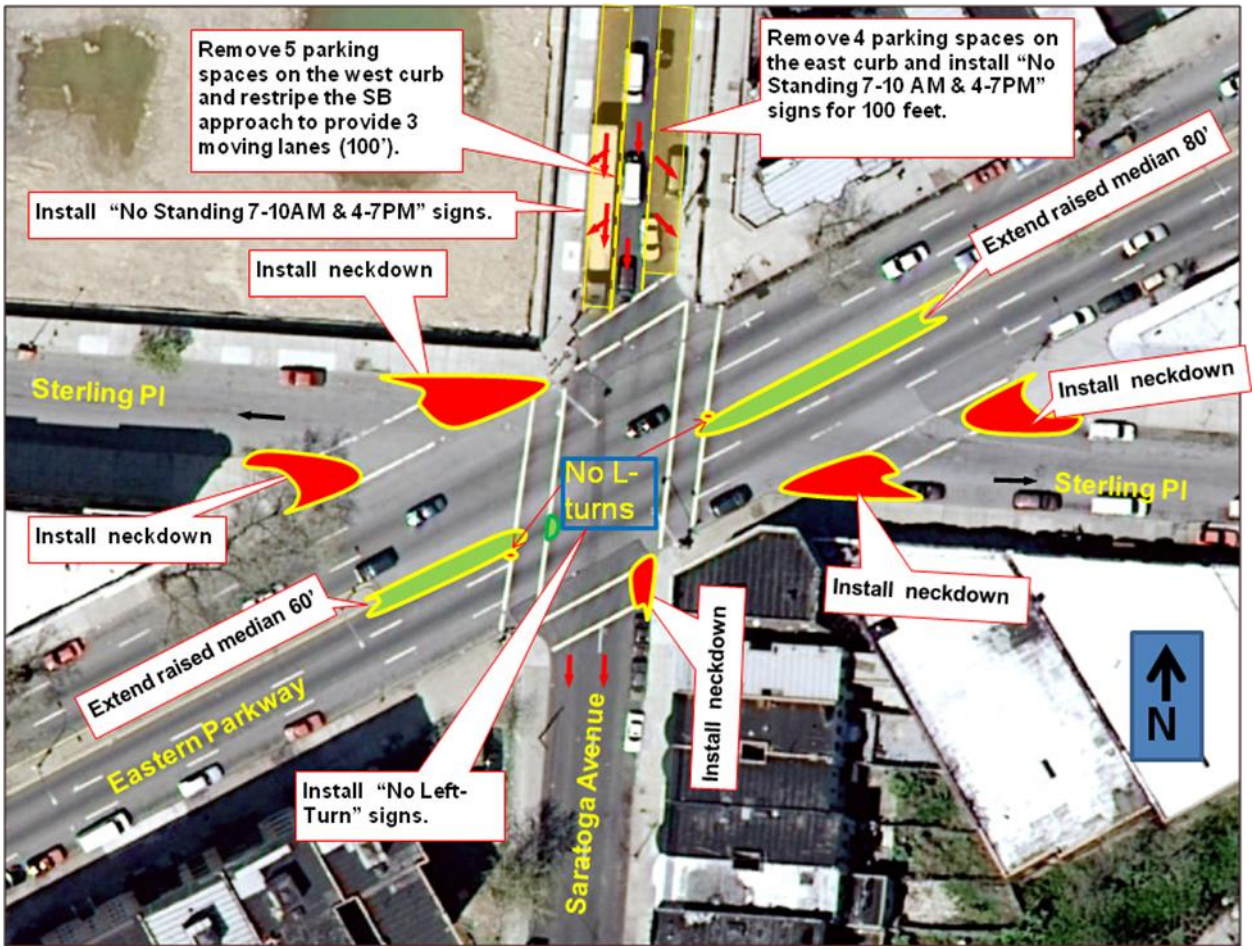
Saratoga Avenue and Eastern Parkway/Sterling Place

1. Extend the existing concrete medians on Eastern Parkway to crosswalk (about 60 feet on the east side of roadway and 80 feet on the west side) to provide refuge for pedestrian safety (see picture below).
2. Prohibit left turns from Eastern Parkway onto Sterling Place.
3. Install five neckdowns; one each on the southwest and northwest corner of Sterling Place and Eastern Parkway, and one on the southeast corner of Saratoga Avenue at Eastern Parkway, and the other on the northeast corner of Sterling Place at Eastern Parkway.
4. Remove curbside parking (100 feet) and restripe three moving lanes (L, T, TR) on Saratoga Avenue southbound approach and install "No Standing 7-10 AM and 4-7 PM" signs on both side curbs.

The aerial photo and Figure 9-2 show the proposed improvements for the intersection.

Saratoga Avenue and Eastern Parkway/Sterling Place

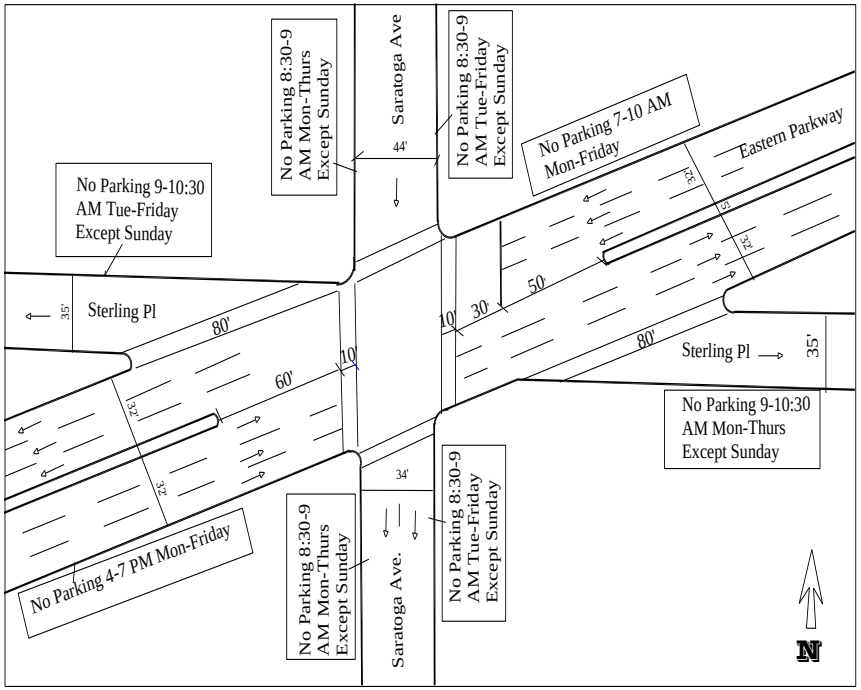
Proposed Conditions



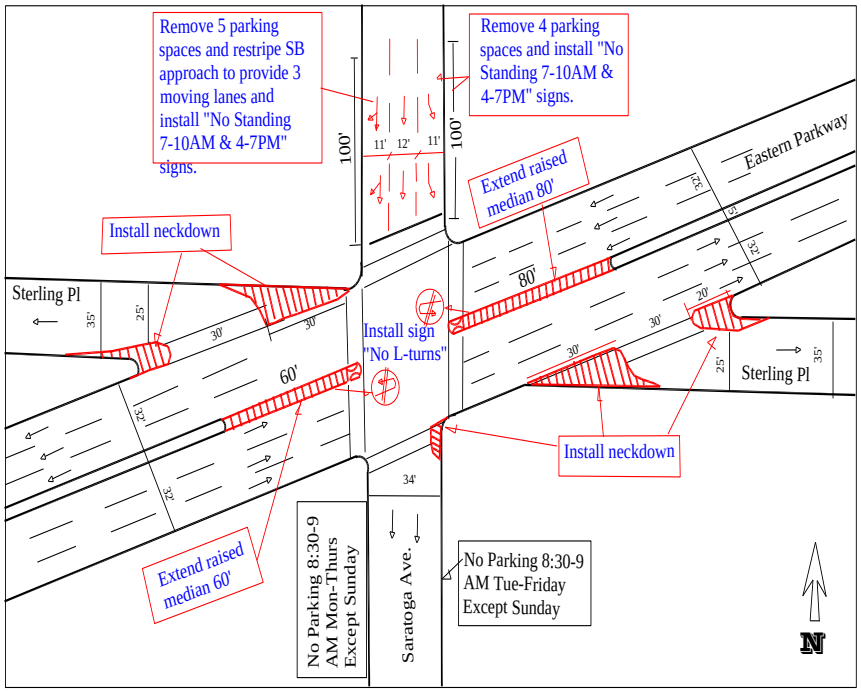
For more details see Figure 9-2.

Figure 9-2
Eastern Parkway and Saratoga Avenue/Sterling Place

Existing Conditions



Proposed Conditions



Rockaway Avenue and Atlantic Avenue

1. Remove curbside parking for 100 feet on the northbound and southbound approaches and restripe roadway to provide two moving lanes on each approach and install "No Standing 7 AM to 7 PM" signs for both approaches.
2. Shift signal timing 2, 3, 4, and 2 seconds from north-southbound phase to east-westbound phase during the AM, midday, PM, and Saturday midday peak hours, respectively.

The aerial photo below and Figure 9-3 show the proposed improvement for the intersection.

Rockaway Avenue and Atlantic Avenue - Proposed Conditions

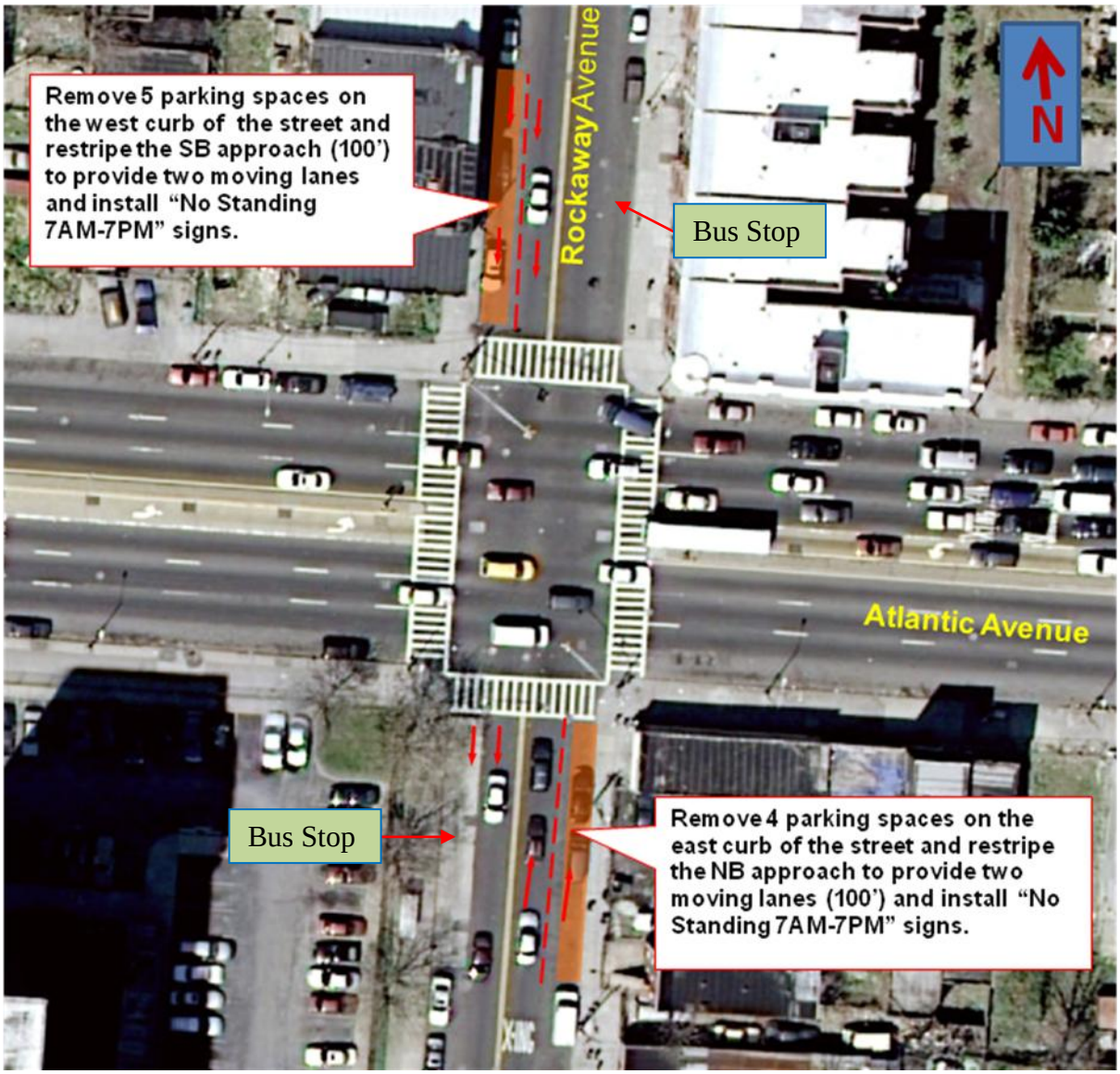
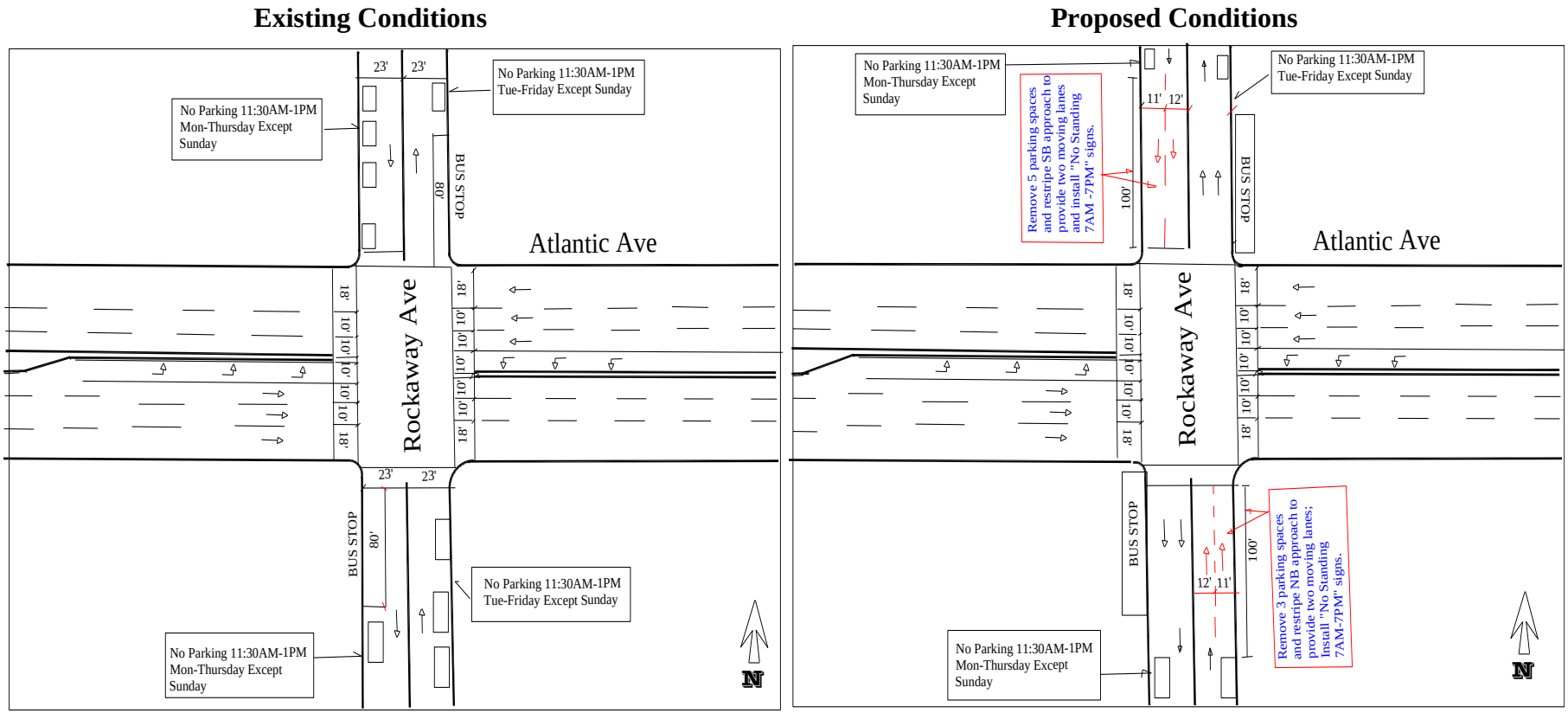


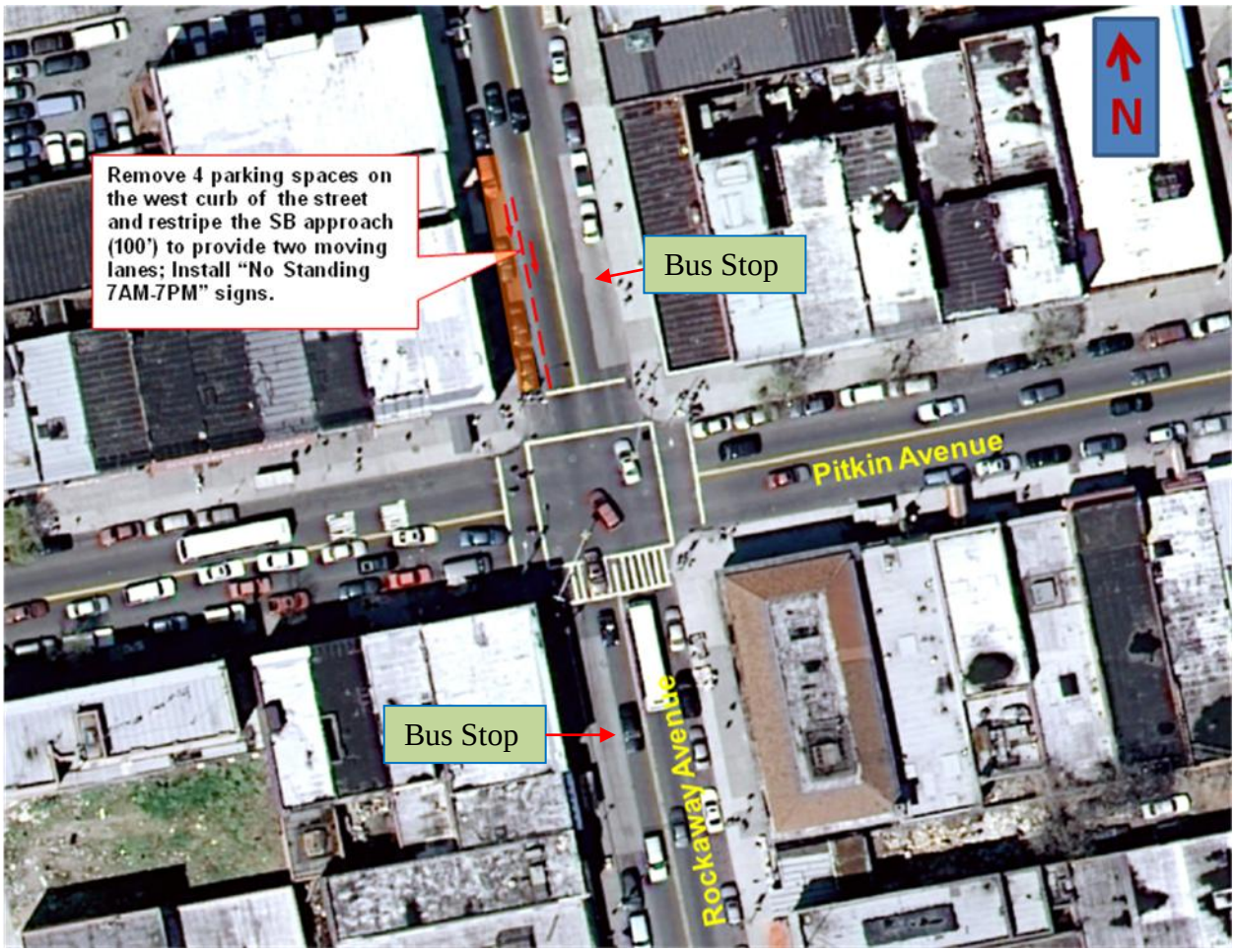
Figure 9-3
Atlantic Avenue and Rockaway Avenue



Rockaway Avenue and Pitkin Avenue

Remove curbside parking for 100 feet on the southbound approach and restripe two moving lanes and install "No Standing 7 AM to 7 PM" signs. The picture below and Figure 9-4 show the proposed improvement for the intersection.

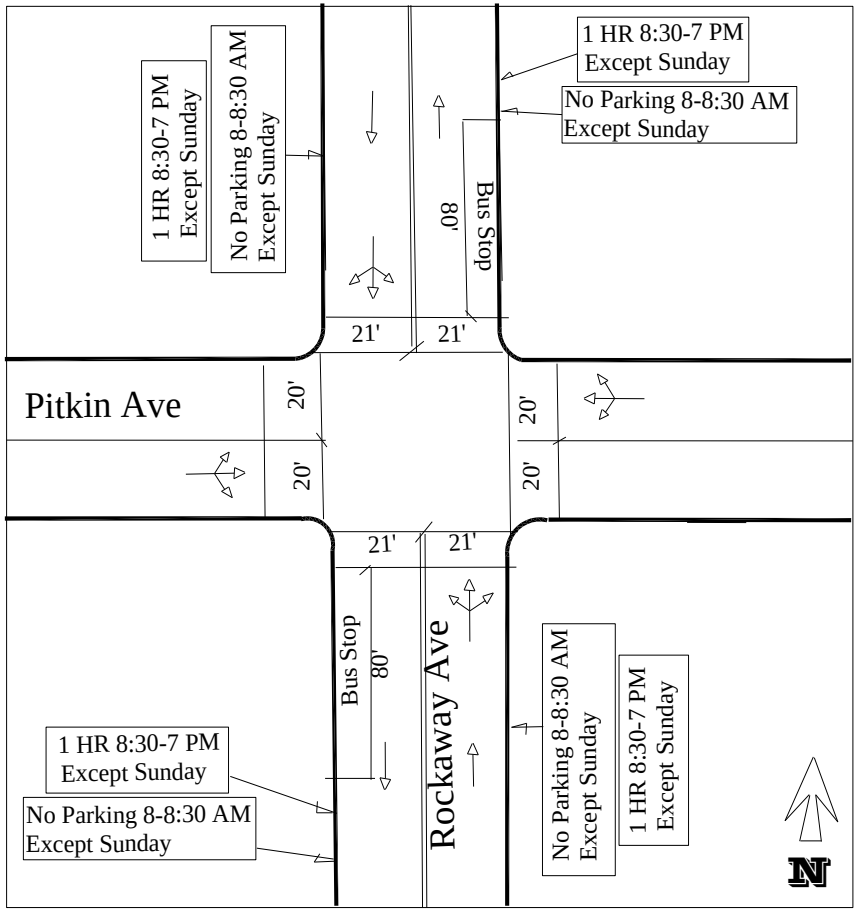
Rockaway Avenue and Pitkin Avenue
Proposed Conditions



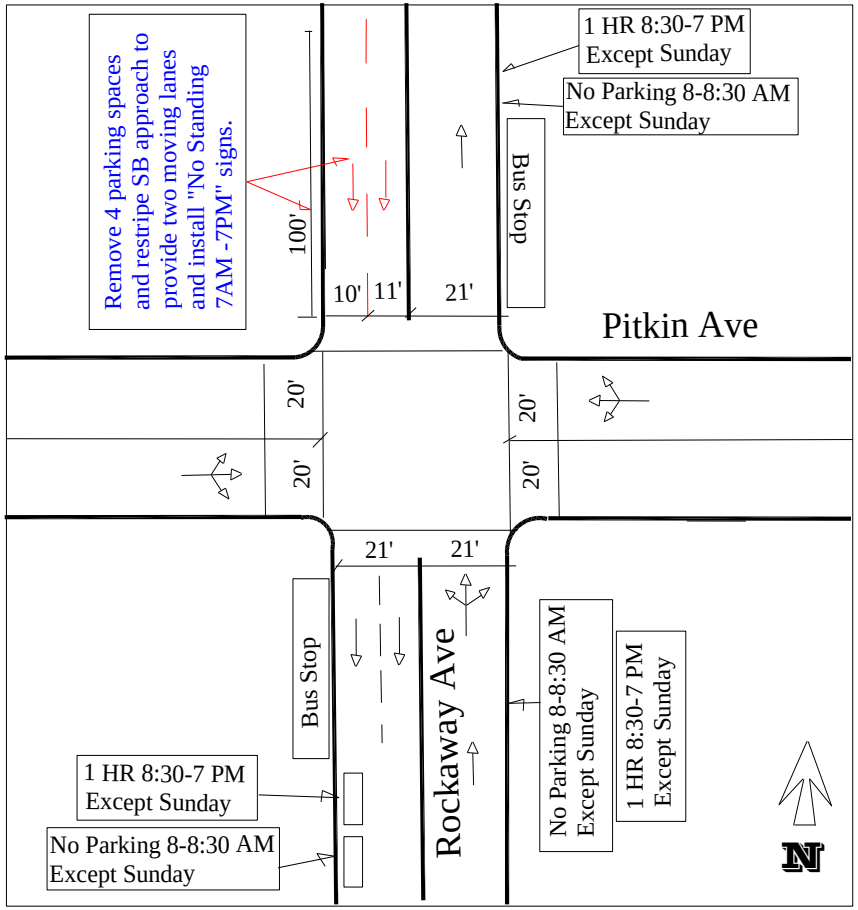
In the study area, a total of 22 parking spaces will be lost during 7AM-7PM to facilitate traffic operations.

Figure 9-4
Pitkin Avenue and Rockaway Avenue

Existing Conditions



Proposed Conditions

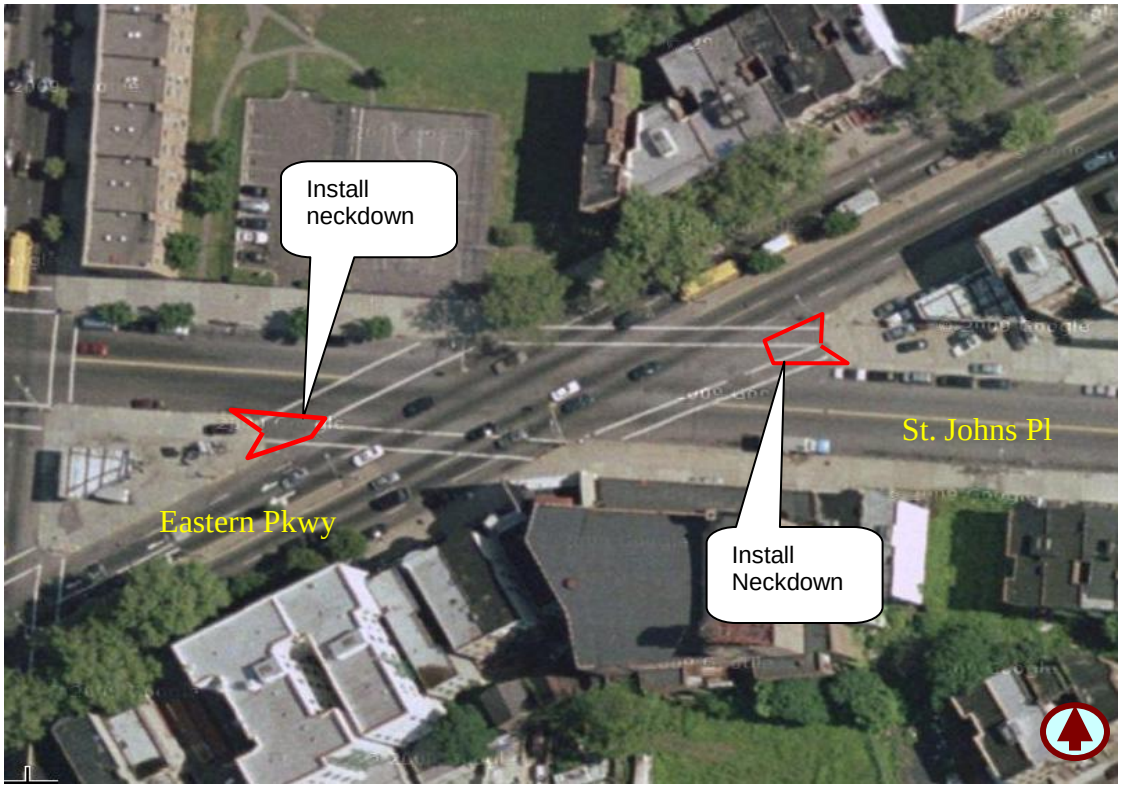


Eastern Parkway and St. Johns Place

Recommended improvements for this location are:

Install two neckdowns at the intersection of Eastern Parkway and St. Johns Place - one on the southwest corner and the other one on the northeast corner to improve pedestrian safety. The picture below shows the recommended improvements.

Eastern Parkway and St. Johns Place – Proposed Conditions



Proposed Signal Timing Changes

In order to improve traffic operations and safety at various locations in the study area, signal timing modifications are recommended for the following intersections as shown in Table 9-1:

1. Atlantic Avenue and Saratoga Avenue (AM, midday, PM, SAT)
2. Atlantic Avenue and Thomas Boyland Avenue (AM, midday, PM),
3. Atlantic Avenue and Rockaway Avenue (AM, midday, PM, SAT),
4. East New York Avenue and Thomas Boyland Avenue (PM), and

5. Pitkin Avenue and Howard/ East New York Avenues (PM).

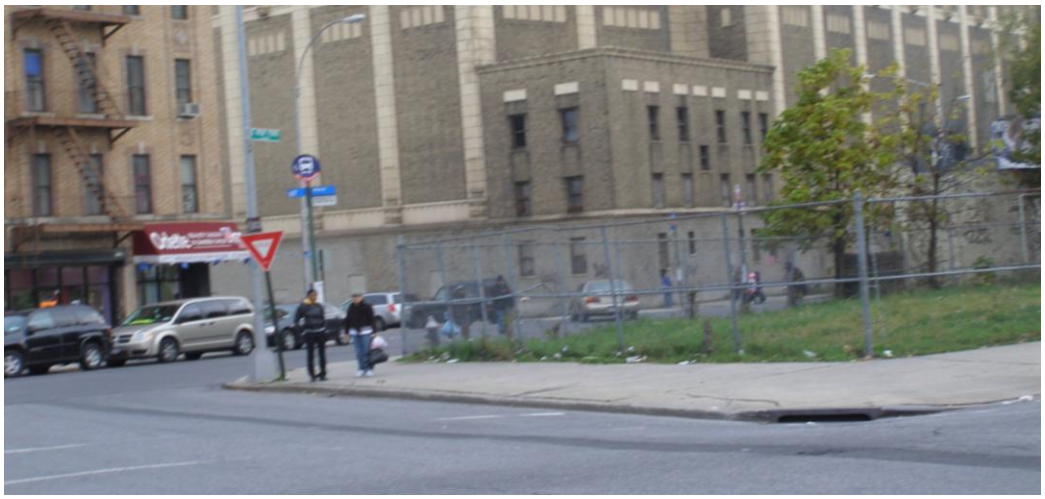
Proposed Loading/unloading Zones

One of the most congested corridors in the study area is Pitkin Avenue with significant delivery activity and heavy vehicular and pedestrian traffic associated with commercial establishments. The designation of three truck loading/unloading zones is proposed along Pitkin Avenue (between Watkins/Osborn, Bristol/Chester, and Hertz/Strauss Streets), this would eliminate conflicts caused by double parking and illegal truck movements for loading/unloading activities. For each proposed loading/unloading zone, approximately three parking spaces would be removed (60'). A total of approximately 18 parking spaces would lost. In addition to the Pitkin Avenue loading zones, similar zones approaching or abutting Pitkin Avenue on Hopkinson Avenue, Rockaway Avenue and Mother Gaston Boulevard are proposed. "No Parking Except Truck Loading and Unloading from 10 AM to 4 PM Monday-Friday" would also be installed. Figure 9-1 (on page 9-2), shows locations of the proposed loading zones along Pitkin Avenue.

Transit Improvements

Illegal parking was observed in bus stops at the intersections of Pitkin/Hopkinson Avenues, Pitkin/Rockaway Avenues, and Pitkin Avenue and Mother Gaston Boulevard. Strict enforcement is recommended to minimize these violations to improve traffic and transit operations.

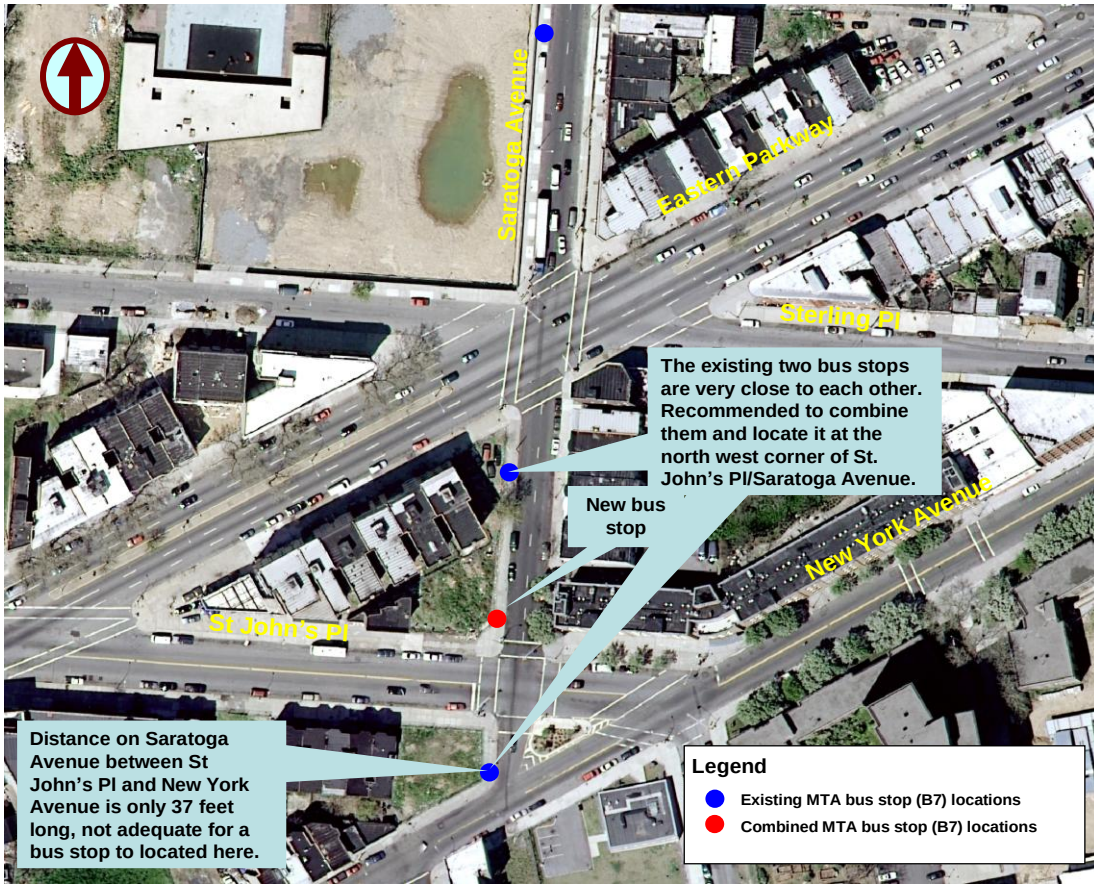
Consolidation of bus stop on Saratoga Avenue between Eastern Parkway and East New York Avenue are also recommended. Currently, there are three bus stops in close proximity between Eastern Parkway and East New York Avenue. Combining the stops on Saratoga Avenue/St. Johns Place and Saratoga/East New York Avenues would be more functional as the existing bus stop at Saratoga/East New York Avenues does not have adequate storage. The length of the block between Saratoga/East New York Avenues and Saratoga Avenue/St. Johns Place is only approximately 45 feet, thus when the bus is in the stop it blocks the crosswalk and compromise safety. The picture below shows the existing bus stop.



Existing B7 bus stop on Saratoga Avenue at East New York Avenue (looking southwest)

The aerial photo below shows the existing and proposed combined bus stops.

Existing and proposed bus stops



Prospect Place Plaza at Eastern Parkway/Thomas S. Boyland Avenue

At the request of a Council Member, the New York City Department of Transportation has designated Prospect Place between Eastern Parkway and Thomas S. Boyland Avenue as a Restricted Use Street, adjacent to a traffic triangle, to enhance the pedestrian environment while encouraging walking and community interactions. The proposal would allow the use of Prospect Place as a pedestrian plaza. The plaza will meet the needs for the surrounding community by converting a roadway into an inviting open space with decorative paving and seating area. It will buffer pedestrians from Eastern Parkway traffic while allowing vehicular access along the west side of the existing traffic triangle on Thomas S. Boyland Avenue, which will remain open to traffic. Traffic volumes on the proposed closure are insignificant and can be accommodated on adjacent streets without causing any adverse impacts. This streetscape improvement was approved and DOT in coordination with Department of Design and Construction (DDC) has developed final design plans for the pedestrian plaza, but has not moved to implement because a maintenance partner has not been identified. The aerial photo below shows the proposed triangular Prospect Place pedestrian plaza.

Eastern Parkway/Thomas Boyland Avenue and Prospect Place
Existing and Proposed Streetscape Conditions

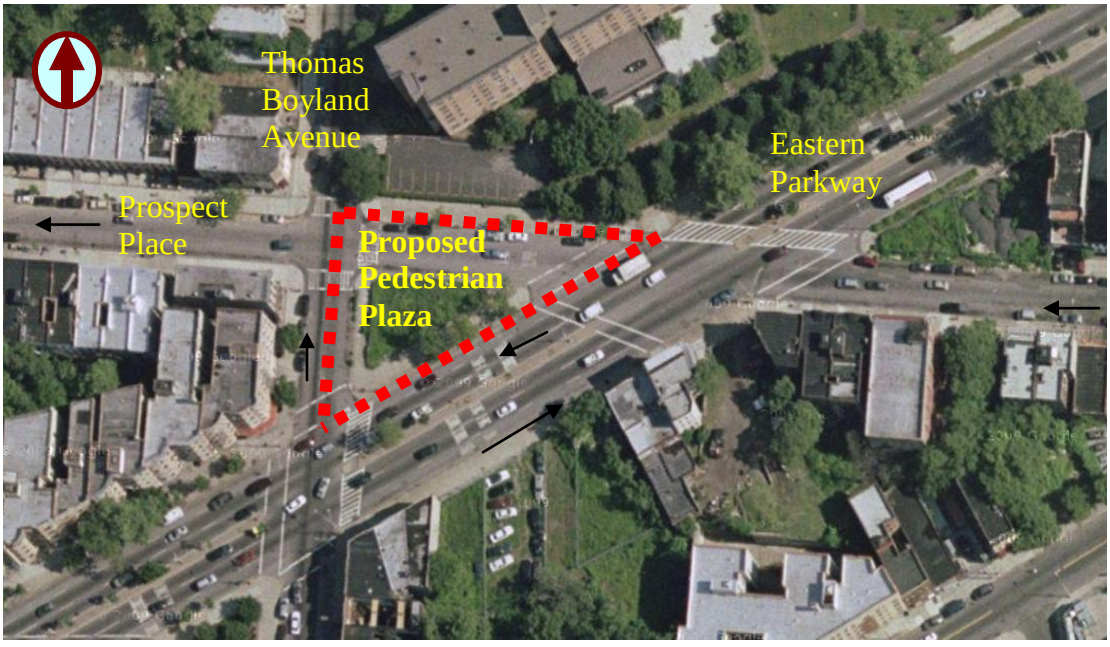
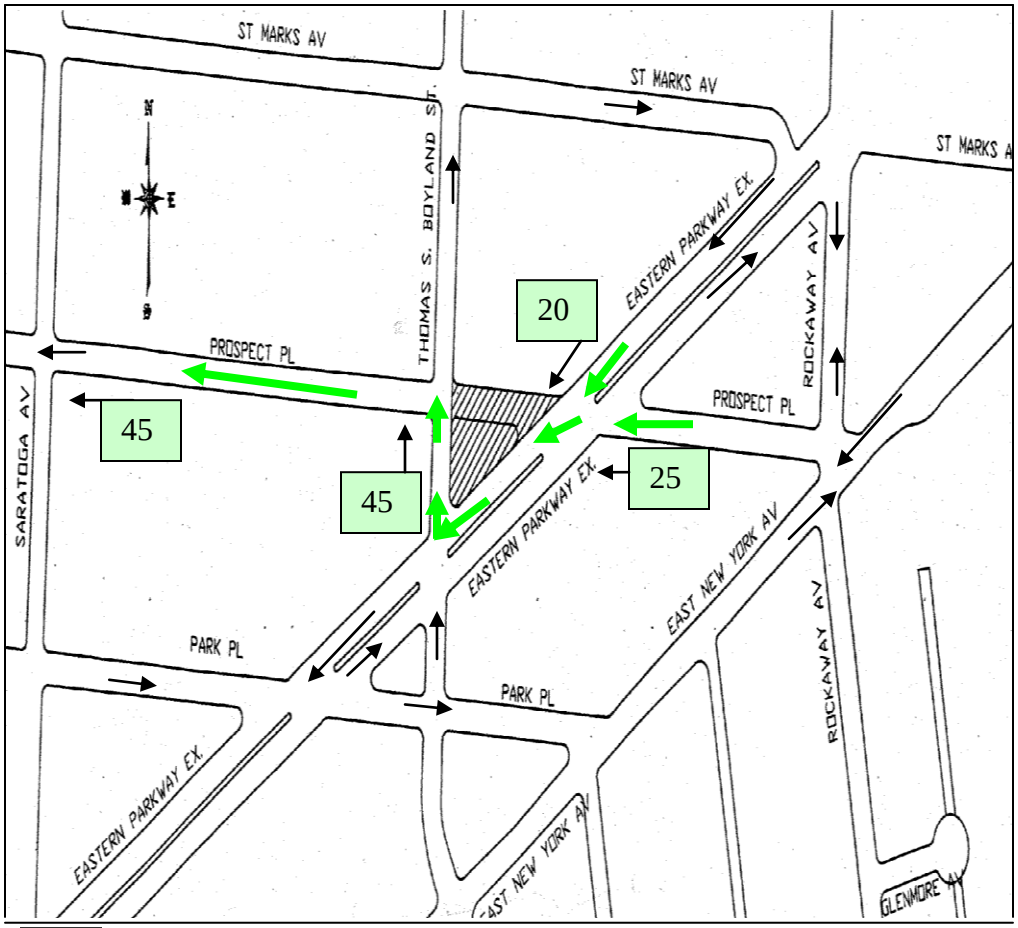


Figure 9-5
Prospect Place Plaza at Eastern Parkway and Thomas Boyland Avenue



Safety Improvements

Traffic accidents are random occurrences, most common types of accidents such as rear-end, left-turn, and right angle occur at various locations; however, certain remedies and measures can be applied to improve overall safety, were appropriate. Based on the safety/accident analysis the following locations were identified for specific safety improvements complementing the recommendations proposed to improve traffic operations and circulation:

Eastern Parkway and Mother Gaston Boulevard/Pacific Street

Apply the following measures to improve the safety at this intersection:

- Move "Stop bar" farther back about 10 feet (from its existing 3 feet) from crosswalk;
- Remove one parking space and daylight the south-east corner (westbound approach) to improve visibility for motorists on Pacific Street; and
- Relocate pedestrian ramp on the south-west corner near to the crosswalk (a pedestrian ramp currently exists about five feet away from the crosswalk).

Howard Avenue and St. Johns Place

Apply the following remedies to improve the safety at this intersection:

- Remove one parking space on the east curb of northbound approach and one parking space on the south curb of eastbound receiving lane;
- Remove sight distance obstruction and improve visibility by trimming tree branches on the north-east corner of the intersection; and
- Refurbish markings for all four crosswalks.

Atlantic Avenue and Saratoga Avenue

To improve traffic operations signal timing changes were recommended as a result of the HCS analysis. In addition, the following remedies are proposed to enhance safety:

- Refurbish pavement markings for all crosswalks at the intersection; and
- Install advance intersection warning signs to yield to pedestrians.

See Table 9-2 for all proposed improvement measures.

Table 9-2
Recommendations Tracking Sheet

No.	Intersection/Area	Peak Period	Proposed Improvement Measures	Division	Status
1	Atlantic Avenue @ Rockaway Avenue	7AM-7PM	Remove curbside parking for 100' and restripe NB/SB approches to provide 2 moving lanes and install No Standing signs.	Highway Design, Parking, Signs and Markings, Borough Eng.	
		AM	● Shift 2 secs. of green time from the EB/WB through phase to EB/WB excl. left phase	Signals	
		MD	● Shift 3 secs. of green time from the EB/WB through phase to EB/WB excl. left phase		
		PM	● Shift 4 secs of green time from the NB/SB phase to EB/WB excl. left phase		
		SAT MD	● Shift 2 secs. of green time from the NB/SB phase and 2 secs. from EB/WB through phase to EB/WB excl. left phase (adding 4 secs.)		
	Atlantic Avenue @ Thomas Boyland Avenue	AM, MD, PM	● Shift 2 secs. of green time from the NB/SB phase to EB/WB excl. left phase		
		All Time Periods	Refurbish all pavement markings and crosswalks and install advance warning signs to yield pedestrins.	Highway Design, Borough Eng.	
3	Atlantic Avenue @ Saratoga Avenue	AM, PM, SAT	● Shift 5 secs. of green time from the EB/WB through phase to EB/WB excl. left phase	Signals	
		MD	● Shift 3 secs. of green time from the EB/WB through phase to EB/WB excl. left phase		
		All Time Periods	Remove one parking space from southeast curb and install advance warning signs to yield pedestrins; refurbish all pavement markings and crosswalks.	Signs and Markings, Parking, Borough Engineering	
4	Eastern Parkway @ Saratoga Avenue @ Prospect Pl	7-10AM & 4-7PM All Time Periods	Remove curbside parking (100') and restripe Saratoga Avenue SB approach to provide three moving lanes and install No Standing signs; Extend raised medians (60' & 80') on Eastern Parkway to crosswalks. Install 4 neckdowns and install "No Left-turn" signs for traffic from Eastern Parkway onto Sterling Place.	Signs and Markings, Highway Design, Borough Engineering, SIMS	
5	Pitkin @ Rockaway Avenues	7AM & 7PM	Remove curbside parking for 100' and restripe SB approach to provide 2 moving lanes; install No Standing signs.	Highway Design, Signs and Markings, Borough Engineering	
6	Pitkin Avenue @ Howard Avenue/E. New York Avenue	PM	● Shift 4 secs. of green time from the NB/SB phase to EB/WB through (2 secs.) and excl. left turn phase (2 secs.)	Signals	
7	East New York Avenue @ Thomas Boyland Avenue	PM	● Shift 3 secs. of green time from the NB/SB phase to EB/WB phase	Signals	
8	Public Transportation Recommendations	Consolidate bus stops on Saratoga Avenue. Prohibit double parking and illegal standing at bus stops along Pitkin Avenue and adjacent streets.		NYCT/DOT Bus Mgmt unit, Signs and Markings.	
9	Proposed pedestrian plaza	Proposed pedestrian plaza at Eastern Parkway and Thomas Boyland Avenue involve redesign of existing triangle. Final design was prepared by DDC. Meintanence partner has to be identified.		Highway design, Boro Eng., DDC.	
10	Proposed truck loading/unloading zones and signs	Install truck loading/unloading and appropriate signs along Pitkin Avenue and abutting streets.		Signs and Markings, Parking, Borough Engineering	
11	Proposed parking restrictions	Install limited parking (2 HR from 10AM -7PM Exc. Sunday) at abutting streets to Pitkin Avenue b/w Saratoga Avenue and Chester Street (approx. 1/2 block).		Signs and Markings, Parking, Borough Engineering	
12	Eastern Parkway @ Mother Gaston Blvd/ Pacific Street.	Remove one parking space and daylight SE corner; Move Stop bar farther back 10', and relocate ped. ramp on the SW corner.		Signs and Markings, Highway Design, Boro Eng., SIMS	
13	Eastern Parkway @ Howard Ave.	Remove two parking spaces and daylight SE/SW corners. Install neckdown on S-W corner and "slippery when wet" signs.		Signs and Markings, Highway Design, Boro Eng., SIMS	
14	Howard Avenue @ St Johns Place	Prohibit two parking spaces on NB corner and EB receiving lane; remove sight distance obstructions and refurbish markings for all 4 C-walks.		Signs and Markings, Borough Eng.	
15	Eastern Parkway @ St Johns Place	Create two neckdowns; one on southwest corner and other on northeast corner.		Highway Design, Borough Eng. SIMS	

10.0 CONCLUSION

The analysis of the existing and future conditions relied on various data sources, primary surveys, field observations and on-site meetings. The effort also relied on input from Community Board 16, the Technical Advisory Committee and officials from other agencies. Based on the analyses, a series of recommendations were developed, as outlined in the recommendations section.

Improvement measures include signal timing changes, parking regulation changes, bus stop relocation, neckdowns, and roadway restriping which would improve mobility and safety of all street users.

The recommendations were presented to the Community Board on June 26, 2012 and were approved for implementation.