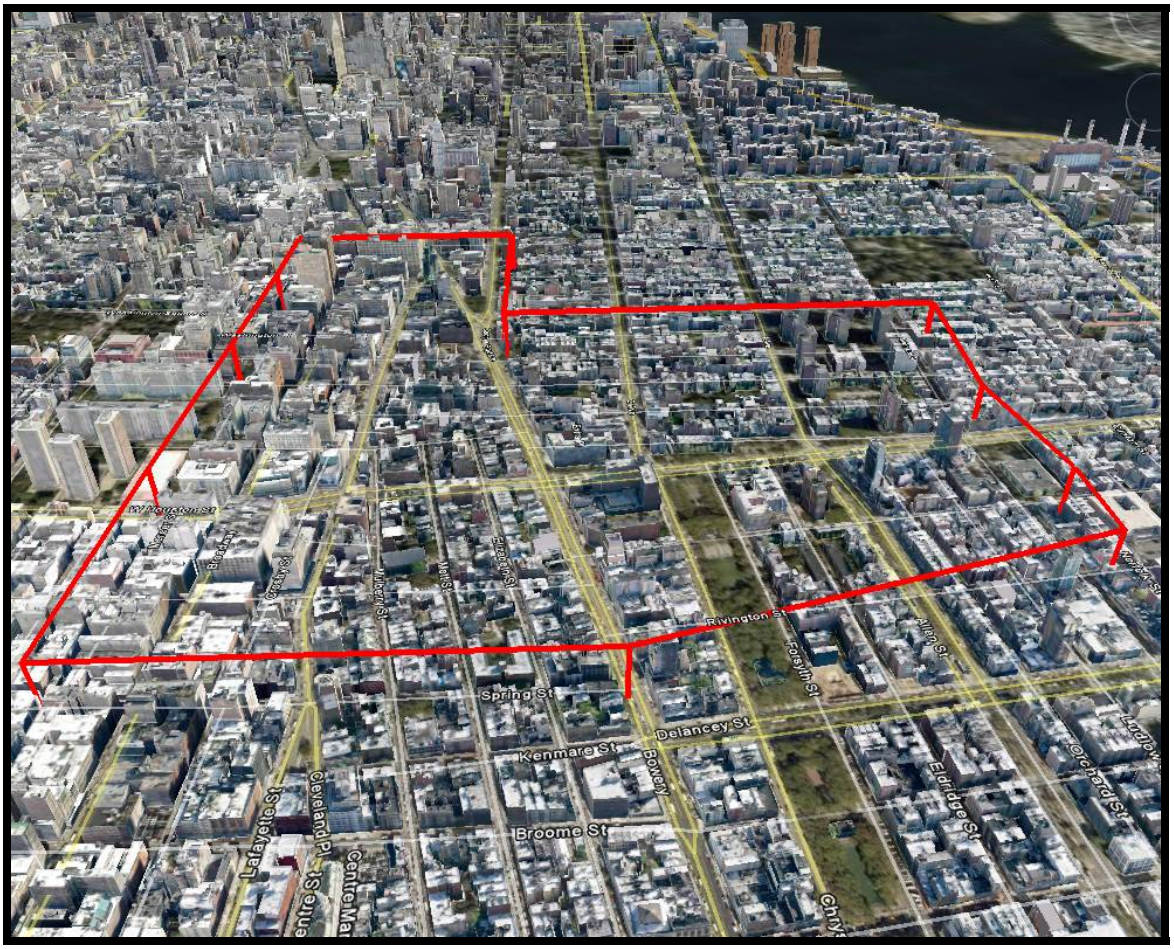
Bowery - Houston - Bleecker Transportation Study

(Congestion Analysis)



Technical Memorandum No. 1 - Existing Conditions

P.I.N. PTDT11D00.H07

DRAFT

December 2011

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Mayor

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Commissioner

A Member of the
New York Metropolitan
Transportation Council

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Table of Contents

Executive Summary

S.1 Introduction

The Bowery Houston Bleecker Transportation Study was initiated in response to community concerns regarding traffic congestion along Houston Street and the Bowery, pedestrian and bicycle safety at congested intersections and late night noise and congested conditions that are a detriment to the area resident's quality of life. The purpose of the study is to assess the existing and future transportation conditions in the study area, to address the community concerns and to improve the transportation conditions for all street users. The study area boundaries are 8th Street and 4th Street in the north, 3rd Avenue and Avenue B/Clinton Street in the east, Delancey Street and Spring Street in the south and Mercer Street in the west. See figure 1-2.

S.2 Demographics

According to the 2000 census, the population of the study area was 33,613 and the population density of the study area was 82,000 persons per square mile. The study area had a higher population density than Manhattan (67,000 persons/SqMile) and NYC (22,000 persons/SqMile). The population growth from 1990 to 2000 was greater in the study area (+11%) than in Manhattan (+3.3%) and NYC (+9.4%) during this same time.

In 2000, the study area's median household income was $41,557, the average household size was 1.98 and there was an average of approximately one private vehicle for every 5 households. In comparison to Manhattan, the household size and private vehicle ownership rates were very similar but the study area's median household income was approximately 12% lower than that of Manhattan.

The 2000 Census Journey to Work data shows that the study area had a lower automobile share (7.7%) than that of Manhattan (11.7%) and NYC (33.9%). The public transportation mode share was 57.8% in the study area compared to 63.2% in Manhattan and 54.2% in all of NYC. While bus mode share was lower in the study area (5.8%) than

in Manhattan (10.7%) and NYC (11.8%), the walk/bike mode share was higher with 33.1% in the study area compared to 24.2% in Manhattan and 11.2% in NYC.

S.3 Zoning and Land Use

A review of the existing land use and zoning districts in the study area reveals that the area is largely divided into three distinct sections. The area west of the Bowery is zoned primarily for commercial and industrial uses and is dominated by office buildings, loft space and retail along Broadway, Lafayette Street and the Bowery. The area north of Houston Street and east of the Bowery is zoned primarily for residential uses and consists of 4-6 story residential units with some local retail along the avenues. The area south of Houston Street and east of the Bowery is zoned for a mixture of commercial and residential uses and has many ground floor entertainment uses (restaurants, bars and nightclubs) with residential units above.

S.4 Traffic and Transportation

Major east/west corridors in the study area include Houston Street and Delancey Street. Major north/south corridors include Broadway, Lafayette Street, the Bowery, 2nd Avenue/Chrystie Street, 1st Avenue/Allen Street and Avenue A/Essex Street. Regarding major transportation facilities in the area, Houston Street connects to FDR Drive, Delancey Street connects to the Williamsburg Bridge and the Bowery is a southbound route to both the Manhattan and Brooklyn Bridges.

2010 traffic data was collected and analyzed using the Highway Capacity Software (HCS). Overall intersection LOS was worst along Houston Street and Delancey Street with Level D occurring at Houston Street/Bowery, Houston Street/2nd Avenue and Delancey Street/Allen Street during all peak periods. Corridor speed runs were conducted along all the major corridors in the study area. Corridor speeds were slowest along Bleecker Street (EB), Houston Street (EB and WB), Delancey Street (EB) and Essex Street/Avenue A (SB) with speeds not exceeding 10mph during the AM, Midday and PM peak periods.

S.5 Public Transportation

An examination of the public transportation system in the study area shows that it is serviced by 6 local bus routes (M5, M9, M14A, M15, M21, M103), 9 subway lines (6, B, D, F, J, M, N, R, Z) and 8 subway stations (8th Street/NYU, Astor Place, Broadway Lafayette, Lower East Side/2nd Ave, Spring Street, Prince Street, Bowery, Delancey Street). No part of the study area is farther than ¼ mile from a bus stop or train station.

The M15 bus had the highest ridership of bus routes through the study area in 2009 with an average weekday ridership of 53,358 (second highest of all NYC local bus routes). Select Bus Service was added to this route in 2010. The Broadway Lafayette St Subway Station is the busiest station in the study area with an average of 32,489 riders entering the station on an average weekday.

S.6 Parking

There are 26 off-street parking facilities in the study area with an approximate capacity of 2,612. The majority of these facilities (19 of the 26 facilities with 57% of the capacity) are located west of the Bowery. The approximate AM, MD and PM off-street utilization is 73%, 76% and 72% respectively.

Legal on-street parking capacity fluctuates during the peak periods based upon parking regulations. The study area has AM, MD and PM capacity of 1,675, 2,115 and 2,135 spaces respectively. The on-street parking utilization rate in the study area is 91%, 102% and 102% during the AM, MD and PM peaks respectively.

On-street parking is over-utilized on the streets west of the Bowery where much of the space is designated as commercial truck loading zones. Many occurrences of illegal parking were observed in this area. The area east of the Bowery and north of Houston Street contains a large amount of free on street parking which serves the residential community; and is also highly utilized. Many of the on street parking spaces south of Houston Street and east of the Bowery are regulated by parking meters. This section has the lowest utilization of the three sub areas but is still more than 80% utilized in the MD and PM peak hours.

S.7 Pedestrian and Bicycle

Six locations were selected for pedestrian analysis based upon field observation, community suggestions and proximity to pedestrian trip generators such as subway entrances. Of the six locations, three intersections had a crosswalk with a pedestrian LOS of D or worse during one of the peak periods; 8th Street /4th Avenue (north crosswalk), Allen Street /Houston Street (north and south crosswalks) and Broadway /Houston Street (west crosswalk). None of the six intersections had corner analysis LOS D or worse.

The study area is traversed by many bicycle paths with north/south routes along Lafayette Street, 2nd Avenue, 1st Avenue, Avenue A and Clinton Street and east/west routes along Bleecker Street, East 1st Street, Prince Street, Stanton Street and Rivington Street. Bike routes are being included along Houston Street from the FDR to Chrystie Street as part of the Houston Street Reconstruction.

S.8 Accidents/Safety

A detailed accident analysis was conducted for the three year period between 2008 and 2010 for every intersection in the study area. Five intersections were identified as high accident locations; Delancey Street/Bowery, Delancey Street/Chrystie Street, Delancey Street/Clinton Street, Delancey Street/Essex Street and Avenue A/1st Street. Six fatalities occurred during this period. Avenue A at East 1st Street, Prince Street at the Bowery, Delancey Street at Allen Street and Delancey Street at Essex Street each had one pedestrian fatality occur while Delancey Street at the Bowery and Delancey Street at Ludlow Street each had one bicycle fatality occur during this period.

S.9 Goods Movement

The study area is traversed by many through and local truck routes. Houston Street from Allen Street to 7th Avenue and Delancey Street act as major east/west through truck routes. Broadway, the Bowery, 2nd Avenue and 1st Avenue all serve as local truck routes for truck deliveries within the area. Truck volumes were highest in the AM and MD peak

periods when approximately 8.7% of all the vehicles recorded at analyzed intersections consisted of trucks.

S.10 Public Participation

Public participation is an integral part of the planning process, providing information and feedback to identify problems and issues in the study. A Technical Advisory Committee (TAC) meeting was held on March 8, 2010. The TAC is comprised of the Community Board (CB) members, elected officials and other government agencies. A public meeting was held on May 6, 2010 with community members to present the scope of the study and get feedback on the transportation issues in the study area. As a result of these meetings the scope and study area were expanded to incorporate additional intersections and areas of analysis.

1 Introduction

1.1 Background

Lower Manhattan is a vibrant part of the Manhattan CBD with dense development accommodating offices, housing, regional and local retail, institutional facilities, and a host of activities related to tourism. The area is also connected to major regional transportation facilities such as the Brooklyn, Manhattan and Williamsburg Bridges, the Holland and Battery Tunnels, and is serviced by an array of transit hubs and stops. The intense transit activity and dense urban development create a dynamic environment that often results in high levels of congestion. The *Bowery Houston Bleecker Transportation Study* area is an integral part of the Lower Manhattan dynamic, and is composed of many distinct neighborhoods: Lower East Side, Bowery, Little Italy, SoHo, NoHo, East Village and Greenwich Village. See Figure 1 which depicts the study area in a broad regional context.

Consistent with the character of Lower Manhattan, the area surrounding Houston Street and the Bowery in Lower Manhattan is host to fairly dense development, some narrow streets, and regional traffic from the Holland Tunnel and Manhattan Bridge that consistently results in traffic congestion. Also, significant pedestrian activity is generated by institutional facilities such as New York University in addition to retail and other commercial activities.

For some time the local community has raised concerns about traffic congestion and associated problems, such as horn honking, air pollution, and pedestrian safety in the area. Also the Community Board (CB 2) has formally requested that NYCDOT conduct a traffic study to address the issues, and passed a resolution to this effect in June 2005. It is in this context that the *Bowery Houston Bleecker Transportation Study* is being undertaken to address traffic congestion and pedestrian safety issues in the study area.

1.2 Study Area

The approximately 0.5 square mile study area is bounded by East 8th and East 4th Streets to the

north, Avenue B/Clinton Street and Bowery to the east, Spring Street and Delancey/Kenmare Street to the south, and Mercer Street to the west. The major north/south arterials in the study area are Broadway, Lafayette Street, the Bowery, 2nd Avenue, 1st Avenue and Avenue A; while the major east/west arterials are Houston and Delancey Streets. The study area contains parts of many different neighborhoods including Greenwich Village, East Village, Alphabet City, SOHO, NOHO, the Bowery, Little Italy and the Lower East Side. See Figures 1-1 and 1-2.

Figure 1-1: Study Area Regional Context

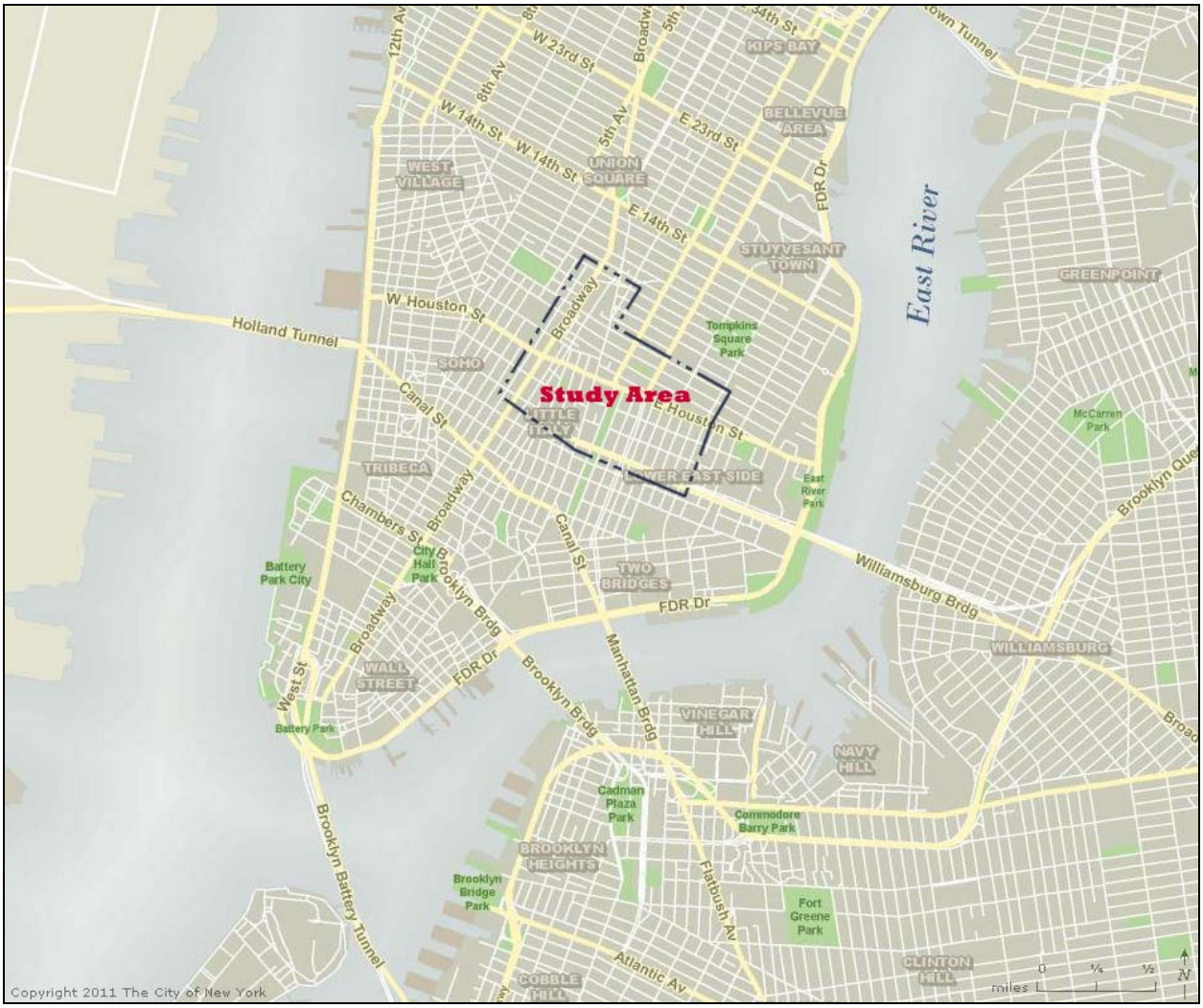
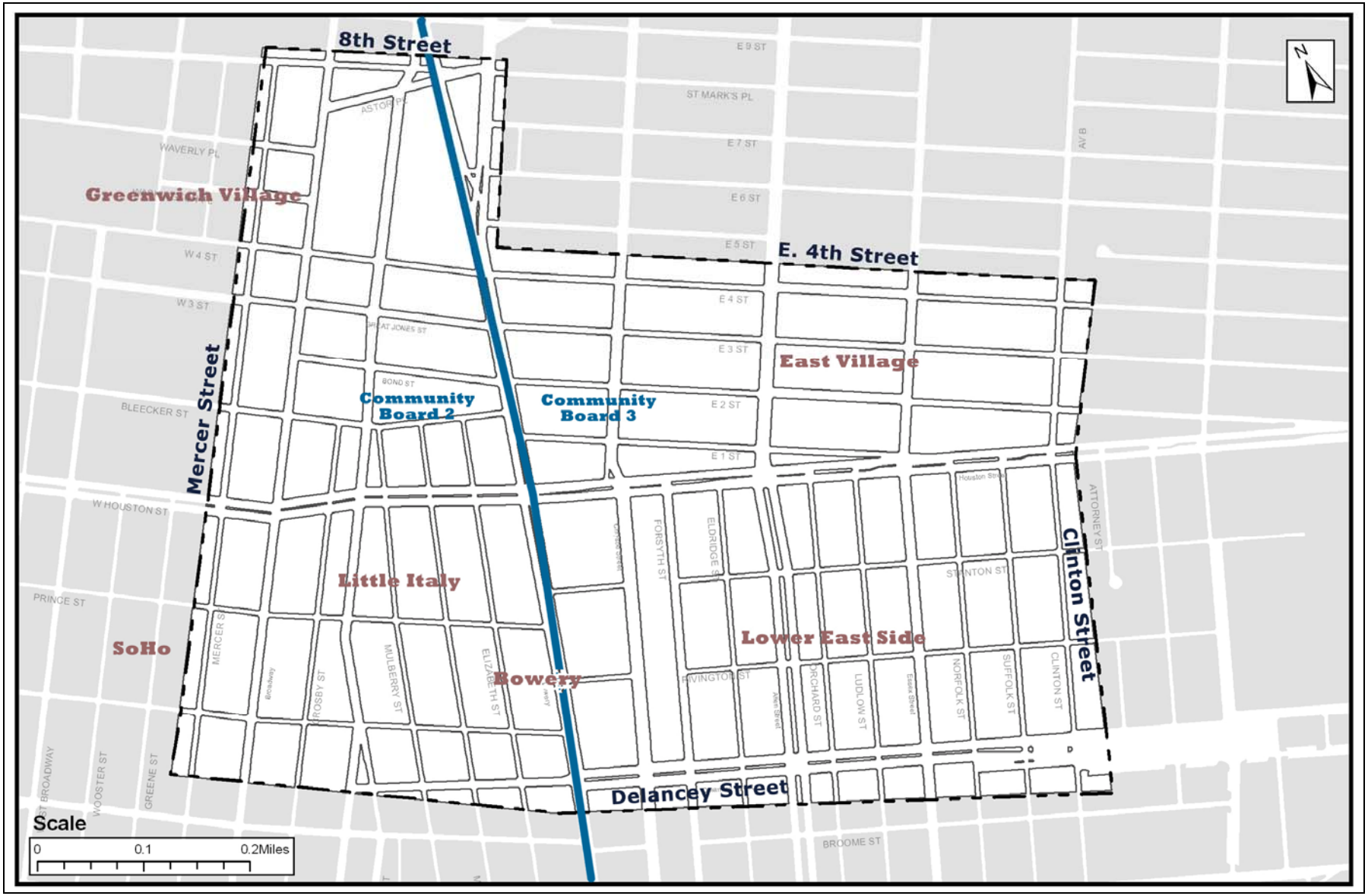


Figure 1-2: Study Area



1.3 Goals and Objectives

The goal of the Bowery Houston Bleecker Transportation Study is to assess the existing and future traffic and transportation conditions within the Study Area, to address community concerns and to formulate long-term solutions to improve traffic operations, pedestrian safety, and ease congestion.

The study objectives are:

- To encourage extensive public participation to ensure meaningful community input;
- To evaluate recent NYCDOT roadway improvements in the area;
- To develop a set of recommendations and improvement measures to reduce vehicular congestion and improve pedestrian access and mobility throughout the study area
- To improve safety for all street users (vehicles, pedestrians and cyclists).

The study will include an analysis of demographics, land use and zoning, traffic and transportation, pedestrians, bicycle, accident/safety, transit, parking, goods movement, and an evaluation of the issues raised by the community.

1.4 Project Organization and Methodology

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

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

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

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

board, elected officials and other stakeholders.

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

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

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

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

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

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

2 Demographic Analysis

2.1 Introduction

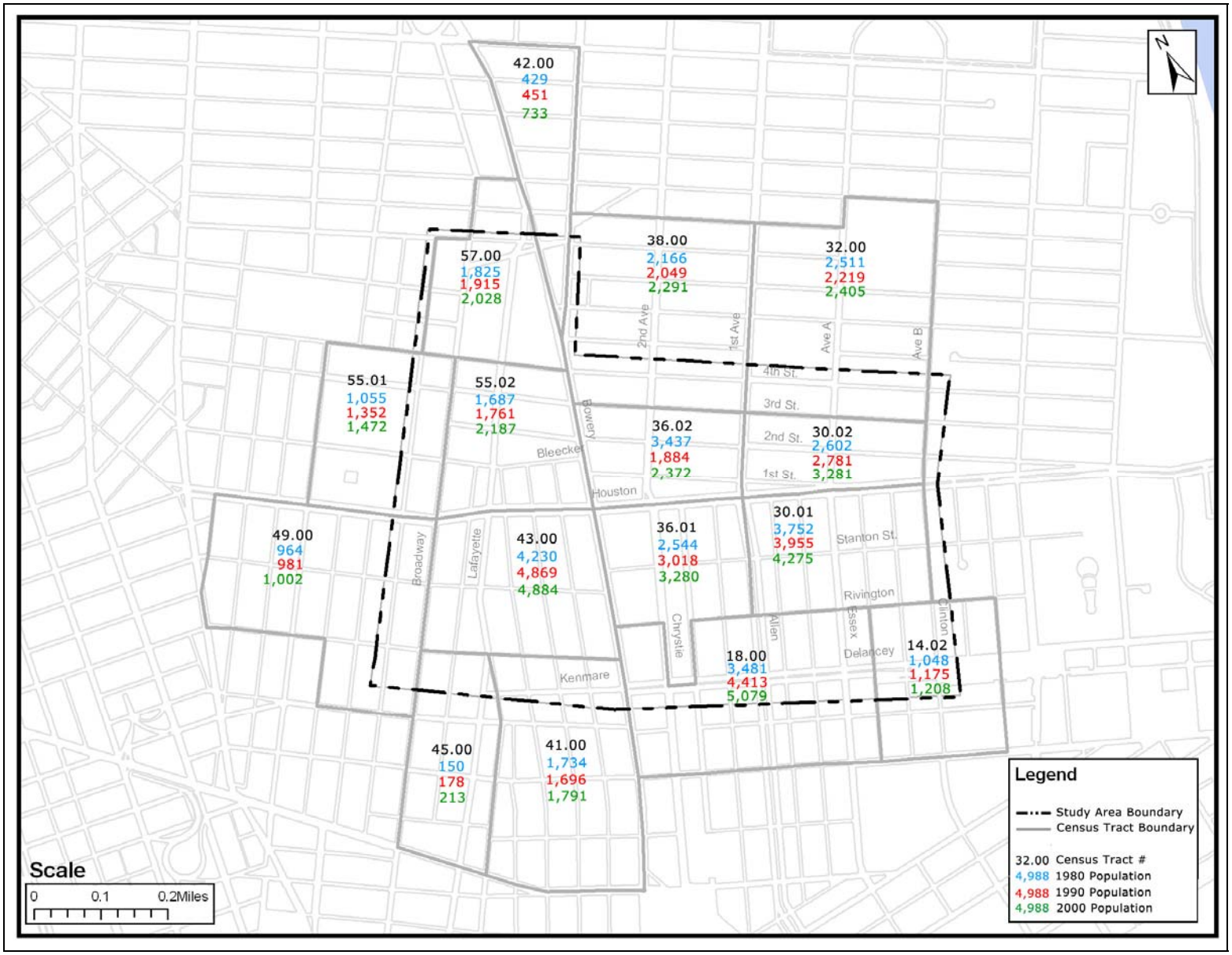
The demographic/socioeconomic analysis of the study area examines population changes and socioeconomic characteristics such as household size, employment, income, and car ownership rate to identify trends to predict future travel needs.

The demographic analysis relied on data from New York City Department of City Planning (NYCDCP) and data compiled by the United States Department of Commerce – Bureau of Census. Data were collected and analyzed for the years of 1980, 1990, and 2000. To better assess the population dynamics of the study area, comparisons were made with the Borough of Manhattan and New York City, where applicable.

The Bleecker Houston study area lies within two Community Districts: CB2 and CB3, and consists of the following Census Tracts (whole or in part): 14.02*, 18.00*, 30.01, 30.02, 32.00*, 36.01, 36.02, 38.00*, 41.00*, 42.00*, 43.00, 45.00*, 49.00*, 55.01*, 55.02, and 57.00*. Six tracts are located entirely within the boundaries of the study area, while ten are partially in the study area. The analysis of the partial census tracts assumes the population and other related variables are evenly distributed geographically. Figure 2-1 shows the community district boundary, census tracts and related decennial population for 1980, 1990 and 2000.

* Tracts partially within the study area.

Figure 2-1: Census Tracts and Population Change



2.2 Population Trends

The population analysis covers three decennial years during which the study area had a population of approximately 33,613, 34,696, and 38,500 in 1980, 1990, and 2000, respectively. This population increase is proportionally similar to that of New York City during the same period. From 1990 to 2000 the study area population increased at a significantly faster rate than Manhattan (see table 2-1). The population density in 2000 of the approximately 1/2 square mile study area, is approximately 82,200 persons per square mile. This is higher than the average population density of Manhattan (approximately 66,800 persons/square mile) and NYC (approximately 26,430 persons/square mile) in 2000.

Table 2-1: Population by Area

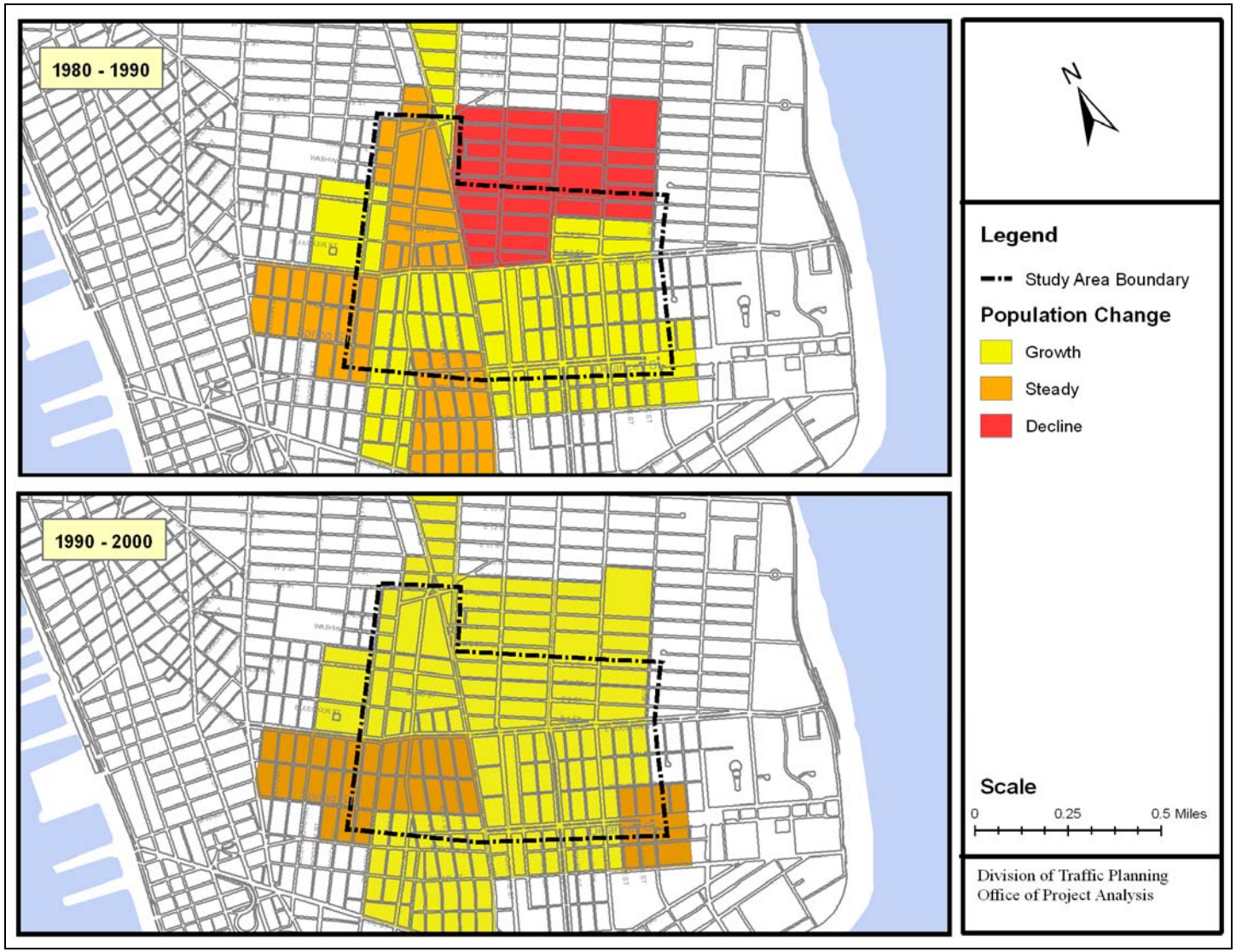
Census Year	Study Area	% Change	Manhattan	% Change	New York City	% Change
1980	33,613		1,428,285		7,071,639	
1990	34,696	3.2%	1,487,536	4.1%	7,322,564	3.5%
2000	38,500	11.0%	1,537,195	3.3%	8,008,278	9.4%

Of the 16 census tracks, 12 exhibited growth through the 3 decennial years. Three declined between 1980 and 1990 but grew between 1990 and 2000 while one lost 1,000 population overall. However, every tract experienced growth from 1990 to 2000 (see table 2-2 and figure 2-2). Between 1980 and 1990, three adjacent tracts in the northeast section of the study area experienced population decline greater than 5%. However, by 2000, all but two tracts (32.00, 36.02) had more population than in 1980. The study area gained 4,887 people and 3,635 households between 1980 and 2000.

Table 2-2: Population by Census Tracts (1980-2000)

Census Tract	Portion of Tract in Study Area	1980 Population	1990 Population	% change 1980-1990	2000 Population	% change 1990-2000	% change 1980-2000
14.02	40%	1,048	1,175	12.1%	1,208	2.8%	15.2%
18.00	50%	3,481	4,413	26.8%	5,079	15.1%	45.9%
30.01	100%	3,752	3,955	5.4%	4,275	8.1%	13.9%
30.02	100%	2,602	2,781	6.9%	3,281	18.0%	26.1%
32.00	30%	2,511	2,219	-11.6%	2,405	8.4%	-4.2%
36.01	100%	2,544	3,018	18.6%	3,280	8.7%	28.9%
36.02	100%	3,437	1,884	-45.2%	2,372	25.9%	-31.0%
38.00	25%	2,166	2,049	-5.4%	2,291	11.8%	5.7%
41.00	20%	1,734	1,696	-2.2%	1,791	5.6%	3.3%
42.00	20%	429	451	5.2%	733	62.5%	70.9%
43.00	100%	4,230	4,869	15.1%	4,884	0.3%	15.5%
45.00	20%	150	178	18.9%	213	19.9%	42.5%
49.00	20%	964	981	1.8%	1,002	2.1%	4.0%
55.01	30%	1,055	1,352	28.1%	1,472	8.9%	39.5%
55.02	100%	1,687	1,761	4.4%	2,187	24.2%	29.6%
57.00	80%	1,825	1,915	5.0%	2,028	5.9%	11.1%
TOTAL		**33,613**	**34,696**	**3.2%**	**38,500**	**11.0%**	**14.5%**

Figure 2-2: Population Change (1980-2000)



2.3 Household Characteristics

In 2000 there were approximately 18,412 households in the study area with an average household size of 1.98 and a median household income of $41,557. On average there was approximately one vehicle for every 5.3 households in the study area. Over the last two decades the household size has generally remained constant while the median household income and the vehicles per household have increased (see table 2-3).

Table 2-3: Study Area Demographics

Year	Population	# of Households	Household Size	Median Household Income	Vehicles /Household
1980	33,613	14,777	1.99	$ 22,606	0.165
1990	34,696 *(+3.2%)*	16,303 *(+10.3%)*	1.98	$ 34,331 *(+52%)*	0.176
2000	38,500 *(+11%)*	18,412 *(+12.9%)*	1.98	$ 41,557 *(+21%)*	0.190

(+/-) represents percentage change from previous decade to specified decade

Table 2-4: Manhattan Demographics

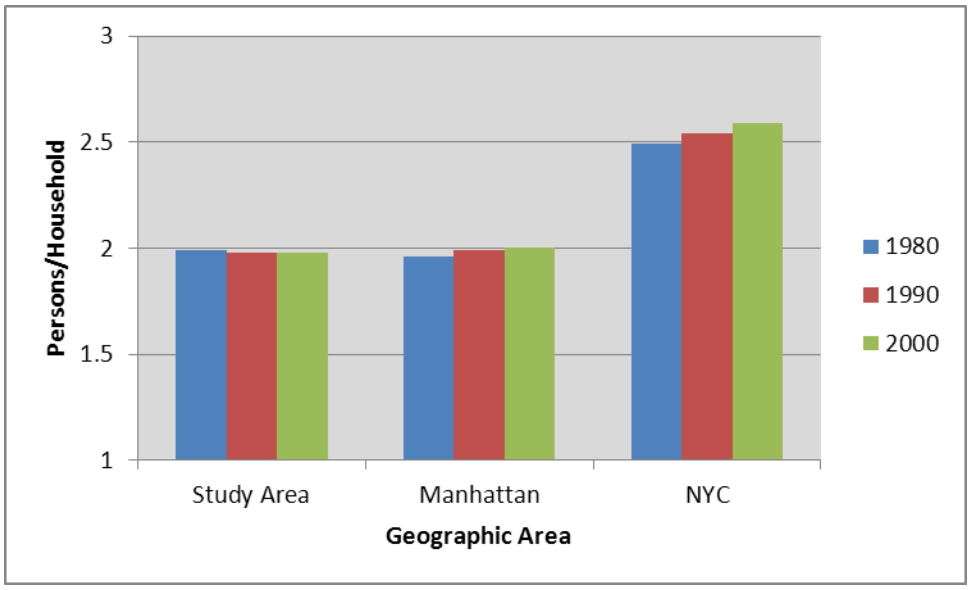
Year	Population	# of Households	Household Size	Median Household Income	Vehicles /Household
1980	1,428,285	704,502	1.96	$ 29,058	0.212
1990	1,487,536 *(+4.1%)*	716,422 *(+1.7%)*	1.99	$ 42,506 *(+46.3%)*	0.246
2000	1,537,195 *(+3.3%)*	738,644 *(+3.1%)*	2.00	$ 47,030 *(+10.6%)*	0.265

Table 2-5: NYC Demographics

Year	Population	# of Households	Household Size	Median Household Income	Vehicles /Household
1980	7,071,639	2,788,530	2.49	$ 28,952	0.516
1990	7,322,564 *(+3.5%)*	2,819,401 *(+1.1%)*	2.54	$ 39,292 *(+35.7%)*	0.603
2000	8,008,278 *(+9.4%)*	3,021,588 *(+7.2%)*	2.59	$ 38,293 *(-2.5%)*	0.614

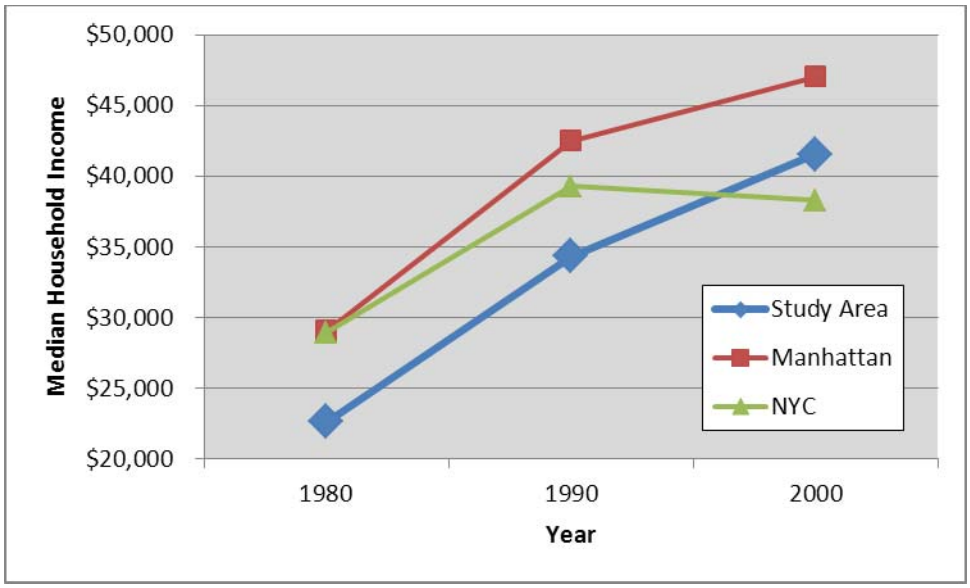
Between 1980 and 2000, the average household size remained generally constant in the study area, in Manhattan and in NYC. The study area's average household size was very similar to Manhattan as both averaged approximately 2 people per household while NYC averaged approximately 2.5 persons per household from 1980 to 2000 (see figure 2-3).

Figure 2-3: Average Household Size



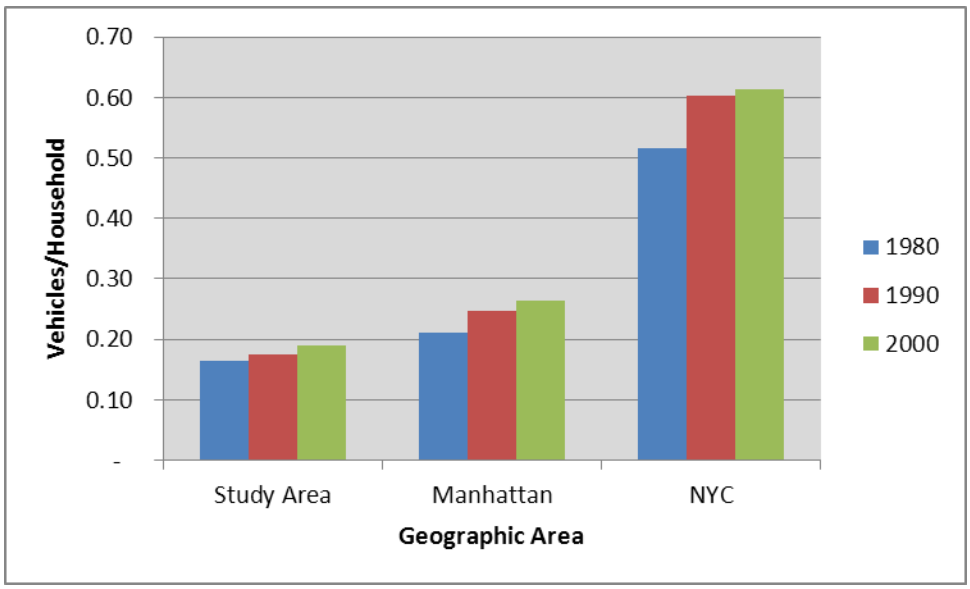
In 1980 the study area's median household income was $22,604 which is more than six thousand dollars less than both Manhattan and NYC. The study area's median household income, though less than Manhattan and NYC, grew at a faster rate during the 1980s and 1990s. The study area's median household income surpassed NYC's in 2000. Figure 2-4 shows the median household incomes from 1980 to 2000.

Figure 2-4: Median Household Income



Vehicle ownership in the study area remained at less than 0.2 vehicles per household from 1980 to 2000 which was less than that of Manhattan and NYC. However, the average number of vehicles per household increased slightly in the study area, Manhattan and NYC since 1980 (see figure 2-5).

Figure 2-5: Vehicles per Household



2.4 Journey to Work by Mode

Journey to work by mode data for 1980 was not available at the same level of detail as in the 1990 and 2000 census. Nonetheless the data for all three decades clearly showed the predominant mode for journey to work was public transportation. The 2000 census showed that the study area's primary mode of transportation for Journey to Work was subway with a mode share of 47.3% followed by 30.5% walking, 7.7% automobile, 5.5% bus and 4% using an uncategorized mode (see table 2-6). This ranking remained largely the same for 1990 and 1980. From 1990 to 2000 the public transportation mode share increased by 6% for subway and decreased 3.6% for bus.

From 1980 to 2000, the study area's automobile share of journey to work was lower than both Manhattan and NYC. Conversely the walk mode share was significantly higher than that for Manhattan and NYC. The study area's public transit mode share was similar to that of NYC

but lower than Manhattan's. Within the public transportation category, the study area bus mode share was smaller than that of Manhattan and NYC but the subway mode share was similar to that of Manhattan and higher than NYC. Tables 2-6, 2-7 and 2-8 show the journey to work mode share for the study area, Manhattan and NYC.

Table 2-6: Journey to Work by Mode - Study Area

Year	Auto	Public Transport			Walk	Other
		Subway	Bus	Total		
1980	8.0%	N/A	N/A	55.1%	33.7%	3.2%
1990	9.4%	41.1%	9.4%	54.2%	33.2%	3.1%
2000	7.7%	47.3%	5.8%	57.8%	30.5%	4.0%

Table 2-7: Journey to Work by Mode - Manhattan

Year	Auto	Public Transport			Walk	Other
		Subway	Bus	Total		
1980	11.3%	N/A	N/A	62.7%	24.2%	1.8%
1990	12.3%	40.3%	15.1%	61.5%	24.3%	1.9%
2000	11.7%	46.3%	10.7%	63.2%	23.3%	1.9%

Table 2-8: Journey to Work by Mode - NYC

Year	Auto	Public Transport			Walk	Other
		Subway	Bus	Total		
1980	30.5%	N/A	N/A	56.8%	11.5%	1.2%
1990	33.4%	37.6%	13.0%	54.5%	10.9%	1.2%
2000	33.9%	38.7%	11.8%	54.2%	10.7%	1.3%

Table 2-9 provides a more detailed analysis of the mode share for the study area, Manhattan and New York City for 1980, 1990 and 2000.

Table 2-9: Journey to Work by Mode

1980 Census Year	New York City	Mode Share	Manhattan	Mode Share	Study Area	Mode Share
Car, Truck, or Van						
Drove Alone	567,774	20.4%	41,721	6.4%	565	4.0%
Carpooled	278,273	10.0%	31,791	4.9%	564	4.0%
Total	**846,047**	**30.5%**	**73,512**	**11.3%**	**1,129**	**8.0%**
Public Transportation	1,576,976	56.8%	406,635	62.7%	7,787	55.1%
Walked	320,308	11.5%	156,861	24.2%	4,758	33.7%
Other Means	33,166	1.2%	11,571	1.8%	448	3.2%
Total Trips	**2,776,497**	**100.0%**	**648,579**	**100.0%**	**14,122**	**100.0%**

1990 Census Year	New York City	Mode Share	Manhattan	Mode Share	Study Area	Mode Share
Car, Truck, or Van						
Drove Alone	765,151	24.6%	59,097	8.3%	1,023	5.6%
Carpooled	271,503	8.7%	28,415	4.0%	706	3.9%
Total	**1,036,654**	**33.4%**	**87,512**	**12.3%**	**1,729**	**9.4%**
Public Transportation						
Bus	403,477	13.0%	107,521	15.1%	1,727	9.4%
Subway	1,168,346	37.6%	287,412	40.3%	7,528	41.1%
Railroad	54,716	1.8%	8,336	1.2%	232	1.3%
Ferry	16,619	0.5%	360	0.1%	9	0.0%
Taxicab	50,096	1.6%	34,798	4.9%	447	2.4%
Total	**1,693,254**	**54.5%**	**438,427**	**61.5%**	**9,943**	**54.2%**
Other Modes						
Motorcycle	1,711	0.1%	545	0.1%	30	0.2%
Bicycle	9,643	0.3%	4,892	0.7%	301	1.6%
Walked	340,077	10.9%	173,619	24.3%	6,082	33.2%
Other Means	24,930	0.8%	8,051	1.1%	245	1.3%
Total	**376,361**	**12.1%**	**187,107**	**26.2%**	**6,659**	**36.3%**
Total Trips	**3,106,269**	**100.0%**	**713,046**	**100.0%**	**18,332**	**100.0%**

2000 Census Year	New York City	Mode Share	Manhattan	Mode Share	Study Area	Mode Share
Car, Truck, or Van						
Drove Alone	794,422	25.6%	57,150	8.1%	829	4.2%
Carpooled	254,974	8.2%	25,604	3.6%	673	3.4%
Total	**1,049,396**	**33.9%**	**82,754**	**11.7%**	**1,502**	**7.7%**
Public Transportation						
Bus	364,408	11.8%	75,859	10.7%	1,129	5.8%
Subway	1,199,226	38.7%	328,246	46.3%	9,283	47.3%
Railroad	51,141	1.6%	8,309	1.2%	186	0.9%
Ferry	11,193	0.4%	411	0.1%	2	0.0%
Taxicab	53,781	1.7%	35,187	5.0%	746	3.8%
Total	**1,679,749**	**54.2%**	**448,012**	**63.2%**	**11,346**	**57.8%**
Other Modes						
Motorcycle	1,488	0.0%	437	0.1%	12	0.1%
Bicycle	15,024	0.5%	6,410	0.9%	503	2.6%
Walked	332,264	10.7%	164,934	23.3%	5,985	30.5%
Other Means	21,998	0.7%	6,714	0.9%	271	1.4%
Total	**370,774**	**12.0%**	**178,495**	**25.2%**	**6,770**	**34.5%**
Total Trips	**3,099,919**	**100.0%**	**709,261**	**100.0%**	**19,618**	**100.0%**

3 Zoning and Land Use

3.1 Introduction

The existing zoning and land use in the study area was examined to help explain travel characteristics, traffic and congestion. Different land uses have different trip generating characteristics which is also a function of the spatial distribution of the various land uses. Field surveys were conducted to document the existing land uses. Secondary data from Department of City Planning (DCP) reports and the NYC zoning resolution were also used in this process.

3.2 Zoning

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

Approximately 50% of the study area was subject to rezoning in 2008. As stated in the East Village / Lower East Side Rezoning EIS, "the purpose of the proposed action is to preserve the low-scale character of the East Village and Lower East Side neighborhoods while focusing new development towards specific areas that are more suitable for new residential construction with incentives for affordable housing" The rezoning provides protection for the low- to mid-rise street wall that characterizes much of the study area and also provides opportunities for new housing development along selected wide streets and major corridors. Affordable housing incentives are also included in the rezoning. The rezoning affects 111 blocks bounded by East 13th Street, Avenue D, East Houston Street, Pitt Street, Grand Street, the Bowery and Third Avenue. Figure 3-1 shows the East Village/ Lower East Side rezoning in relation to the Bowery Houston Bleecker study area while previous and existing zoning are shown in Figures 3-2 and 3-3.

Figure 3-1: Lower East Side Rezoning Context

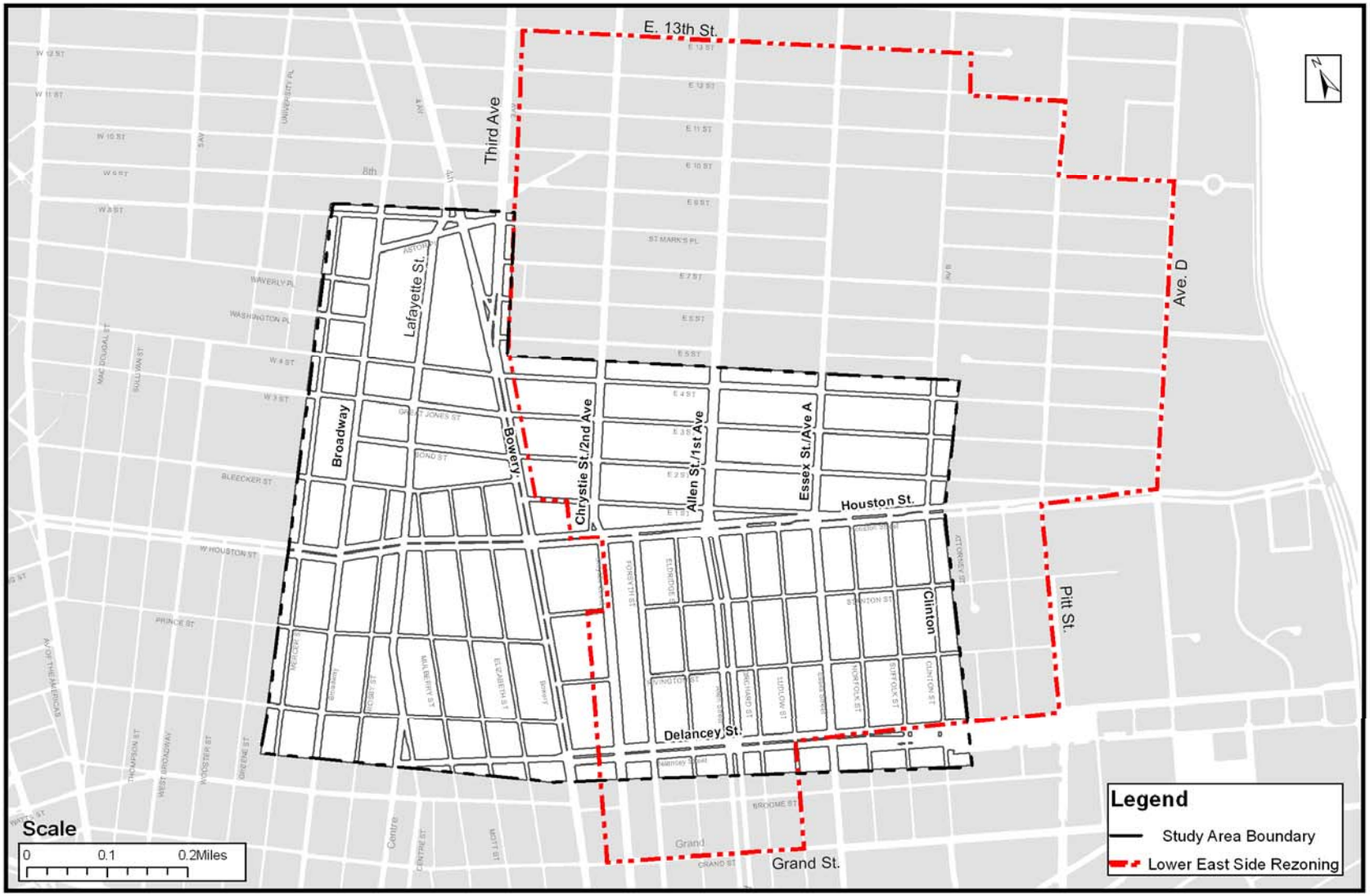


Figure 3-2: Previous Zoning

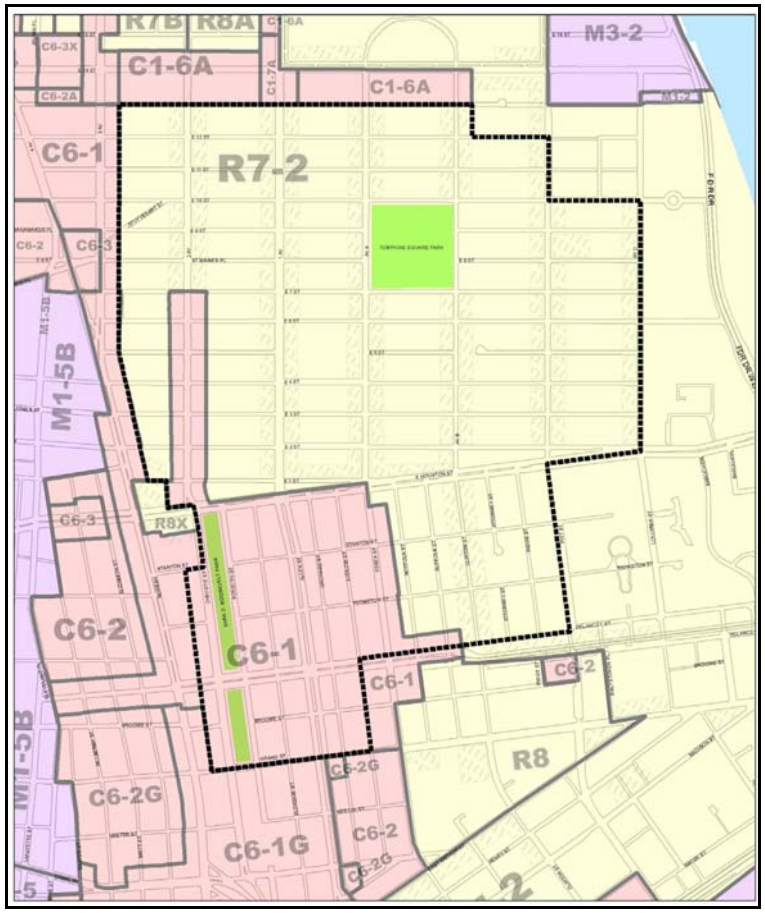
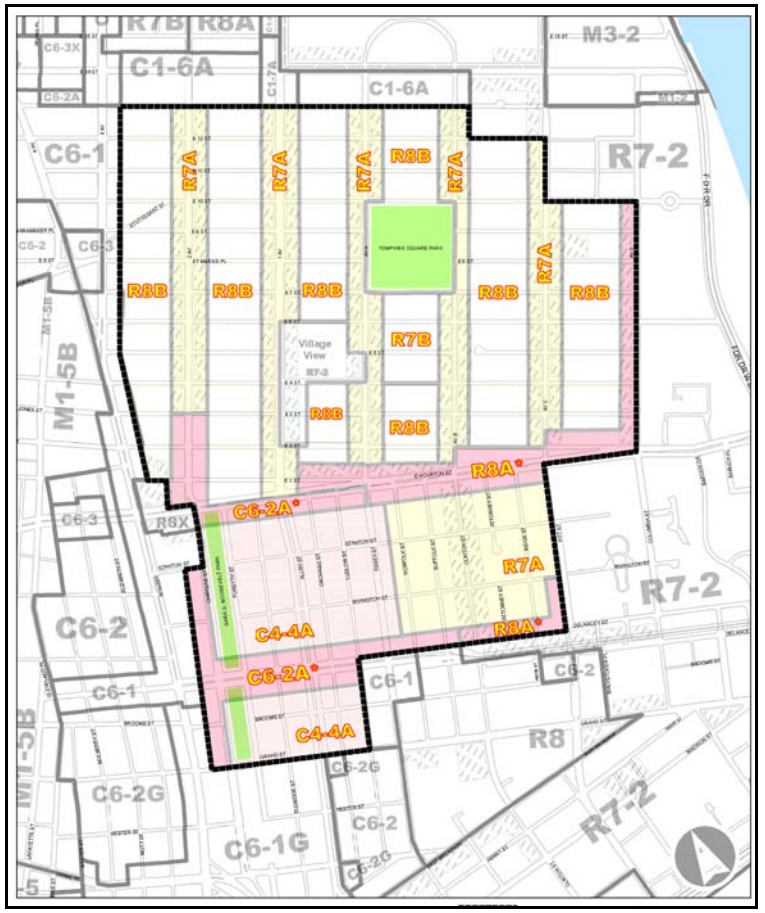


Figure 3-3: Current Zoning



There are two types of residential zoning districts (R7, R8), six commercial zoning districts (C1, C4, C6-1, C6-2, C6-3, C6-4) and one manufacturing zoning district (M1-5) within the study area. Parts of two special zoning districts are also within the study area (Little Italy Special District and a Transit Land Use Special District). See figures 3-1 and figure 3-2. The residential zoning districts account for approximately 30% of the study area, while the commercial districts represent approximately 50%, and the manufacturing district represents approximately 20% of the study area. Table 3-1 shows zoning designations and the percentage distribution in the study area while Figures 3-1 and 3-2 show the city zoning map and zoning districts within the study area.

Table 3-1: Zoning Districts within the Study Area

	Zoning	FAR	Percentage
Residential	R7	0.87 – 3.44	15%
	R8	0.94 – 6.02	15%
Commercial	C4-4	4.0	15%
	C6-1 to C6-4	6.0 – 10.0	35%
Manufacturing	M1-5	5.0	20%

Figure 3-4: Zoning Map

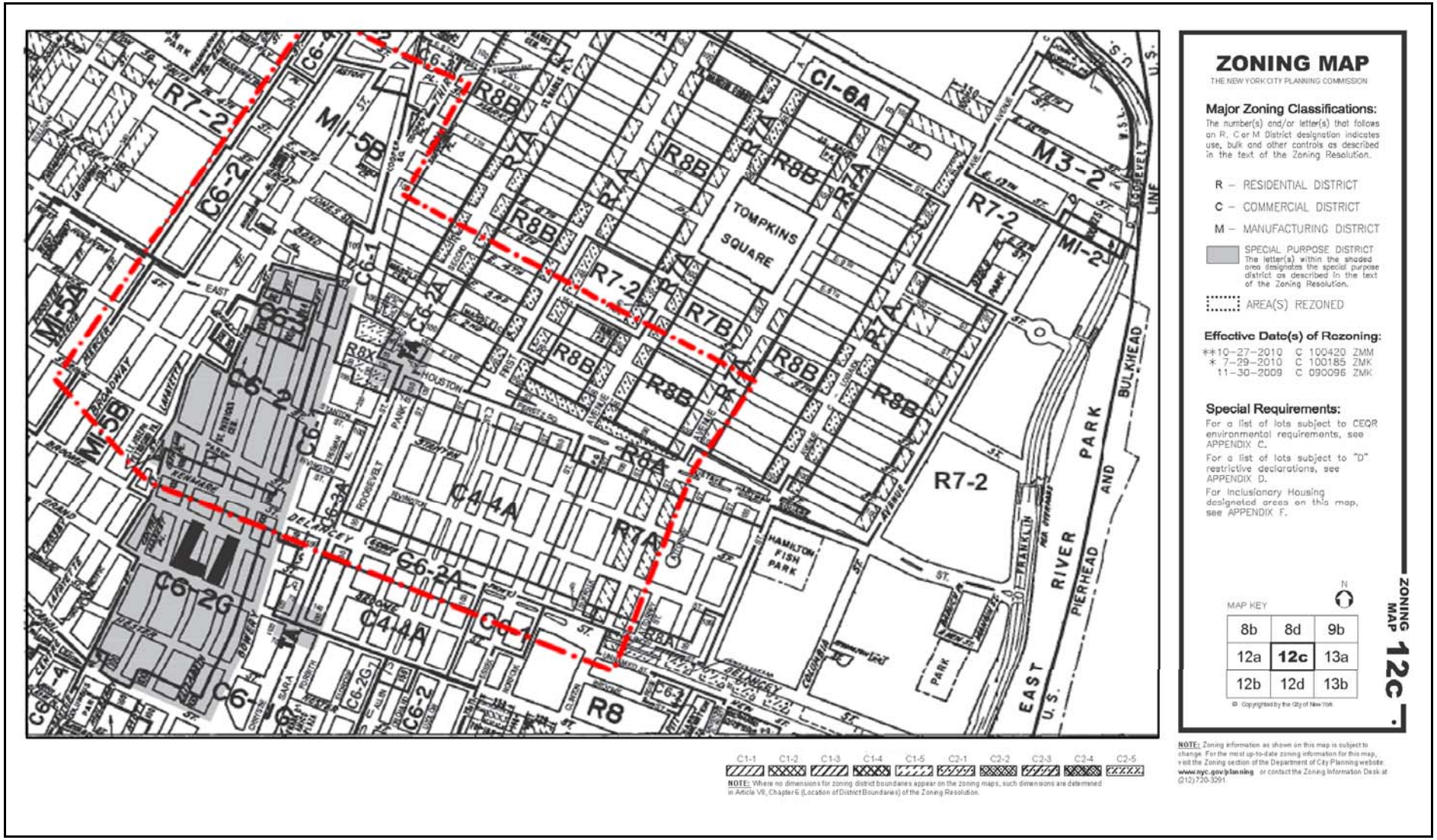
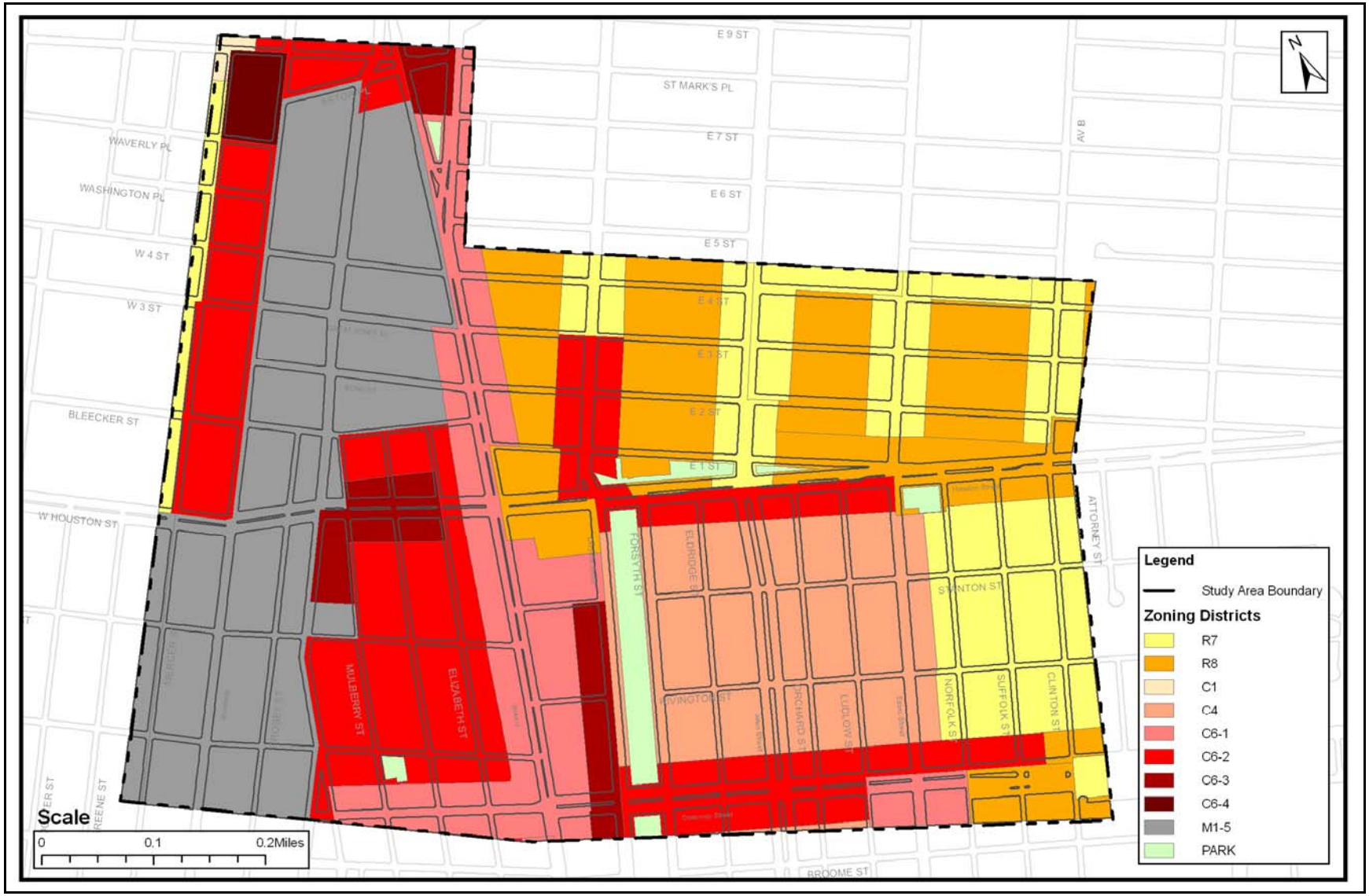


Figure 3-5: Existing Zoning



As shown in figure 3-2, the R7 and R8 districts are located east of the Bowery. The R8A district, typically allows ten to twelve story apartment buildings set on or near the building line. The R8B districts, located north of East Houston Street, permits six story apartment buildings. An R8X district located on East Houston Street between the Bowery and 2nd Avenue permits fourteen to sixteen story apartment buildings. Along the North-South avenues North of Houston Street, C2-5 commercial overlays permit local retail uses (e.g. Grocery stores, restaurants, small retail stores) that serve the surrounding residential neighborhood. South of East Houston Street and east of Essex Street, R7A zoning allows seven and eight story apartment buildings that are meant to blend with the existing neighborhood character. The C1-5 overlay along Clinton Street permits small scale commercial uses that serve the needs of the surrounding residential neighborhood.

A C4-4A district is located south of East Houston between Chrystie Street and Essex Street. There are C6 commercial districts located along major corridors such as Houston Street, Delancey Street, Broadway, The Bowery and 2nd Avenue. Also much of the northern half of the Little Italy Special District is zoned C6. C6 districts permit a wide range of high-bulk commercial uses requiring central locations, and permit central headquarters, large hotels, entertainment facilities, retail stores, and high-rise residences in mixed use buildings. Both C4 and C6 districts serve a larger area and generate more traffic than local neighborhood stores.

There is a M1-5B manufacturing district in the study area, mapped between Broadway and Lafayette/Bowery, south of Astor Place. This district permits light industry such as woodworking shops and wholesale service and storage facilities. This M1-5B district permits joint living-work quarters for artists as an industrial use in loft buildings.

There are two discretionary actions currently proposed in and adjacent to the study area:

1. The Seward Park Mixed Use Development Project is an NYCEDC and HPD sponsored initiative to allow for the implementation of approximately 1.5 million square feet of mixed use development on 10 city owned sites located generally along Essex Street and the south side of Delancey Street. The anticipated build year is 2022.

2. The NYU Core proposal allows for the development of approximately 2.5 million square

feet that will be used for academic uses, an NYU athletic facility, residential units for faculty and students, a hotel and retail as well as four acres of public open space and the provision of a 100,000 square foot public school. NYCDC is the lead agency of this action and the build years are 2021 and 2031. The project site is bounded by W. 3rd Street to the north, Mercer Street to the east, West Houston Street to the South, and LaGuardia Place to the west.

3.3 Land Use

There are various land uses and densities within the study area limits that can be divided into three large areas with distinct urban form and land use characteristics. The area west of the Bowery is higher density commercial buildings with some industrial uses. East of the Bowery and North of Houston Street is primarily residential while south of Houston Street is predominantly mixed use residential and local ground floor retail.

East of the Bowery, the residential buildings primarily consist of small multi-family units with ground floor retail such as bodegas, boutique clothing stores, restaurants and bars. There are also multiple small-scale performance spaces and music venues in this area. The area north of Houston Street has less commercial activities and higher residential densities.

The majority of commercial/retail is concentrated along the Bowery and avenues west of the Bowery. Commercial uses south of Houston Street include clothing and shoe stores, retail chain, and specialty stores (Steve Madden, Lucky Brand Jeans, Guess, Uniqlo, Sephora, Prada, Armani Exchange, Zara, Aldo, Esprit, and Kenneth Cole). Restaurant supply stores and lighting stores are typical along the Bowery while offices are concentrated along Broadway and Lafayette Street. The Little Italy Special District, located immediately south of the study area, contains many Italian restaurants that act as a draw for tourists. Parts of New York University and Cooper Union campuses are located in the north-west section of the study area as are the public Theater/Joe's Pub, located on Lafayette Street south of Astor Place.

These three distinct areas, differentiated by land use and development densities which account for particular urban characteristics, each have different levels of traffic (vehicular and pedestrian) and parking demand. See Figure 3-3 for existing land use.

Figure 3-6: Existing Land Use

4 Traffic and Transportation

The study area is located in Lower Manhattan and includes sections of the NoHo, Greenwich Village, Little Italy, East Village and Lower East Side neighborhoods (see Figure 1-1 in the Introduction)**.** It is bounded by East 8th Street and East 4th Street to the north, Avenue B/Clinton Street to the east, Spring Street/Delancey Street to the south and Mercer Street to the west. Additionally, Bleecker Street from Grove Street Eastward was incorporated into the study area to address community concerns and better assess corridor traffic.

4.1 Street System and Roadway Characteristics

The street network has a grid like pattern with Houston Street and the Bowery being major E/W and N/S axes. The street layout results in longer east/west block faces north of Houston Street and longer north/south block faces south of Houston Street. The Bowery cuts through the study area in a north/south direction. The major east/west arterials are Houston Street and Delancey Street while the major north/south arterials are Broadway, Lafayette Street, the Bowery, 2nd Ave/Chrystie Street, 1st Avenue/Allen Street and Avenue A/ Essex Street (see Figure 4-1).

East/West Corridors

Houston Street is a two-way, six lane arterial with a center median and parking on both sides. It runs from the FDR Drive on the east side of Manhattan to West Street on the west side. Between 6th Ave and FDR Drive the corridor operates two-way with two to three lanes in each direction separated by a median. West of 6th Avenue, the corridor operates one-way westbound with two lanes between 6th Avenue and West Street. East Houston Street is currently under construction from the Bowery to the FDR Drive. The project is scheduled to be completed in 2013.

Delancey Street is a two-way, six lane arterial with a center median and parking on both sides. The corridor extends from the FDR Drive in the east to the Bowery. West of the Bowery to Lafayette Street, Delancey Street becomes Kenmare Street which has one lane per direction with parking on both sides. Delancey Street provides direct access to the Williamsburg Bridge connecting Manhattan and Brooklyn.

North/South Corridors

The Avenue A/Essex Street corridor runs from 14th Street to Canal Street. North of Houston Street Avenue A is a two way, two lane arterial with parking and a bike lane on both sides. South of Houston Street Avenue A becomes Essex Street and operates as a two-way, four lane arterial with parking on both sides.

The First Avenue/Allen Street Corridor runs from the Willis Avenue Bridge in East Harlem to Division Street in Lower Manhattan. North of Houston Street, First Avenue is a four lane arterial with parking on both sides that operates one-way northbound. South of Houston Street, 1st Avenue becomes Allen Street, which has six lanes and operates two-way between Houston Street and Division Street.

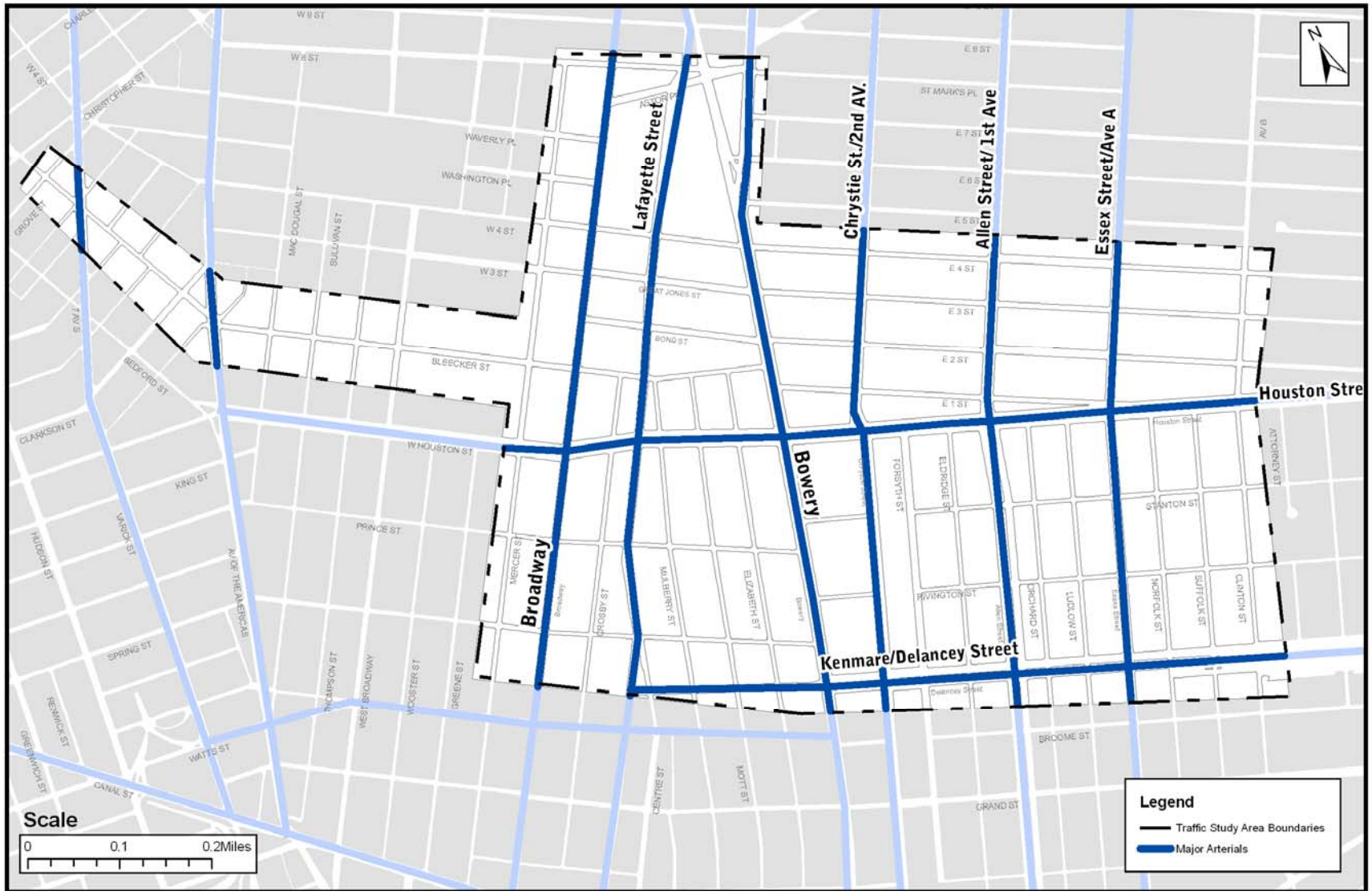
The Second Avenue/Chrystie Street Corridor runs from 128th Street in East Harlem to Canal Street in Lower Manhattan. North of Houston Street Second Avenue is a three lane, one-way, southbound arterial with parking on both sides and a southbound bicycle. South of Houston Street, Second Avenue becomes Chrystie Street which operates two-way with four lanes and parking on both sides to Canal Street.

Third and Fourth Avenues converge at Cooper Square to become the Bowery which operates two-way with three lanes in each direction and parking on both sides between 4th Street and Worth Street south of the study area where it becomes Park Row. The Bowery provides access to both the Manhattan Bridge and the Brooklyn Bridge.

Lafayette Street operates one way southbound from Spring Street to Reade Street and one way northbound from Spring Street to East 8th Street and has two moving lanes and a bike lane with parking on both sides of the street.

Broadway originates at Bowling Green in Lower Manhattan and continues through Manhattan, the Bronx and into the Hudson Valley region. Within the study area it operates one-way southbound with two moving lanes and commercial parking on both sides. The right lane is a bus-only lane Monday through Friday from 7am to 6pm, while the left lane acts as an emergency fire-lane. Broadway is a major commercial corridor with heavy pedestrian activity.

Figure 4-1: Traffic Study Area and Major Arterials



4.2 Traffic Data Collection

Existing traffic conditions were determined from field surveys conducted in 2009 and 2010 and supplemented with information from previous studies and projects within the study area. Traffic volume counts were collected during the weekday AM, Midday and PM and the Saturday midday peak periods. These counts recorded vehicle classification and turning movements. Automatic Traffic Recorders (ATRs) were placed at the following four locations for a duration of seven days:

- E. Houston Street between Broadway and Crosby Street
- Bleecker Street between Mercer Street and Broadway
- Bowery between Great Jones Street and Bond Street
- Bowery between Spring Street and Prince Street

Manual Turning Movement and Vehicle Classification counts were conducted during three weekday peak periods (7:00-9:00AM; 12:00-2:00PM; 4:00-6:00PM), and in some cases during the Saturday Peak (12:00-2:00PM) at the following seventeen intersections:

- E. Houston Street & Broadway
- E. Houston Street & Bowery
- E. Houston Street & Allen Street
- E. Houston & Essex Street
- Broadway & Astor Place
- Broadway & Bleecker Street
- Bleecker Street & Lafayette Street
- Bleecker Street & Bowery
- Bowery & Astor Place
- Bowery & Bond Street

- Bowery & Prince Street
- Bleecker Street & Grove Street (no Saturday counts)
- Bleecker Street & 6th Avenue (no Saturday counts)
- Delancey Street & Chrystie Street (no Saturday counts)
- Delancey Street & Allen Street (no Saturday counts)
- Delancey Street & Essex Street (no Saturday counts)
- Houston Street & Clinton Street/Avenue B (no Saturday counts)

Pedestrian counts were conducted at the following six locations:

- Bowery & Astor Place
- Bleecker Street & Lafayette Street
- E. Houston Street & Broadway
- E. Houston Street & Allen Street
- Bowery & Houston Street
- Essex Street & Delancey Street

Travel time and delay runs were conducted during the weekday peak periods on the following corridors:

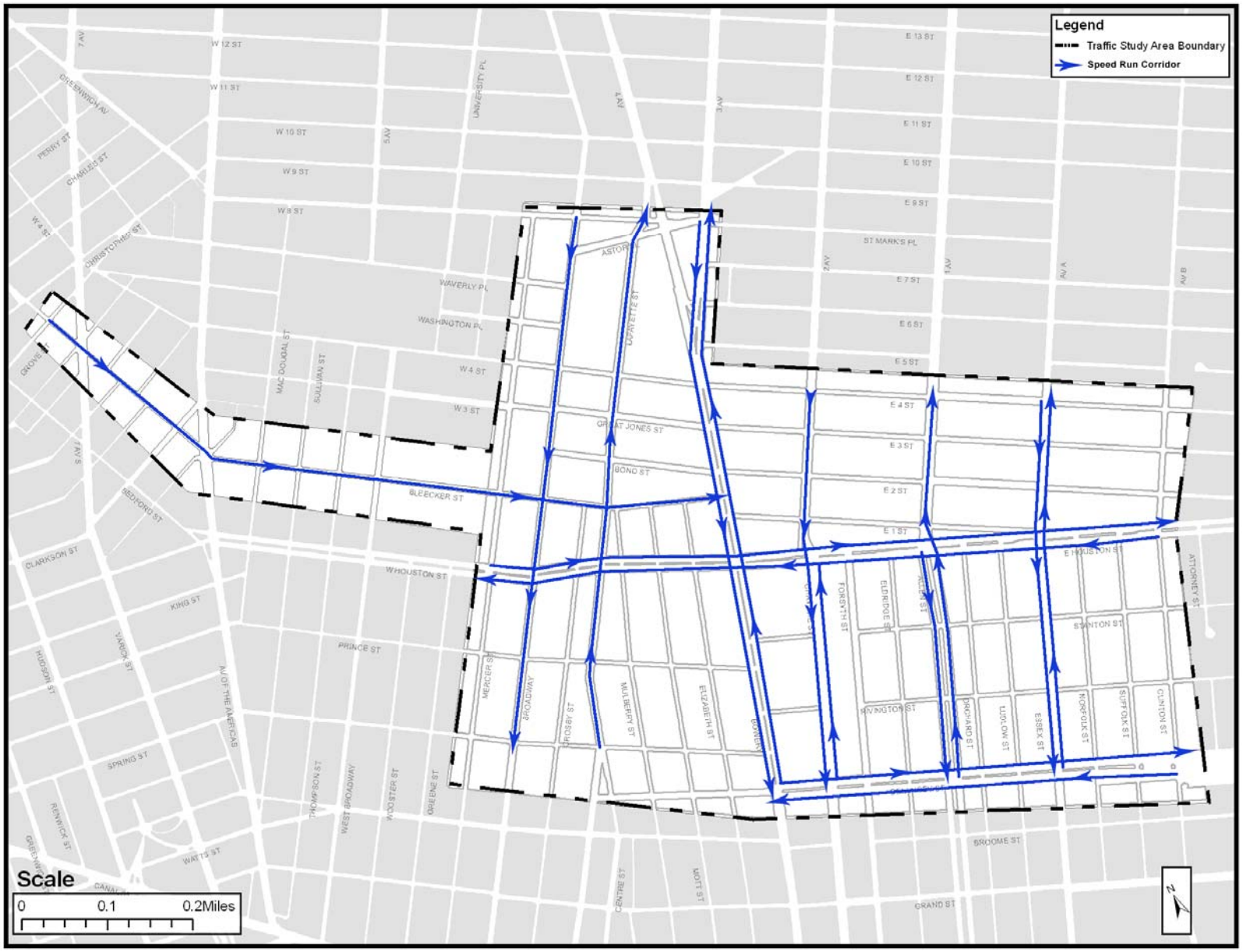
- Houston Street between Mercer Street and Clinton Street
- Delancey Street between The Bowery and Clinton Street
- Bleecker Street between Grove Street and The Bowery
- Broadway between East 8th Street and Spring Street
- Lafayette Street between Spring Street and East 8th Street
- The Bowery between East 8th Street and Delancey Street
- 2nd Ave/Chrystie Street between East 4th Street and Delancey Street
- 1st Ave/Allen Street between East 4th Street and Delancey Street

- Ave A/Essex Street between East 4th Street and Delancey Street

Figure 4-2 shows ATRs, MTMC and pedestrian count locations. Figure 4-3 shows the speed run corridors.

Figure 4-2: Traffic Data Collection Plan

Figure 4-3: Speed Run Corridors



4.3 Network Traffic Volumes

Balanced traffic networks for the various peak hours were prepared using the ATRs and the manual turning movement counts collected during field surveys. This information has been plotted on traffic flow maps for the AM (8:00 - 9:00), Midday (12:30 - 1:30), PM (5:00 - 6:00), and Saturday (12:30 - 1:30) peak hours. Figures 4-3, 4-4, 4-5, and 4-6 show peak hour traffic volumes for the four peak hours. The traffic count data reveal volumes along the major corridors as follows:

- Broadway between Astor Place and Waverly Place carries 896, 990, 1,077 and 1,138 vehicles during the AM, midday, PM and Saturday peek hours, respectively. Further south on Broadway between Houston Street and Prince Street volumes reduced to approximately 666, 680, 803 and 952 vehicles during the AM, midday, PM and Saturday peek hours, respectively.
- The Bowery between 3rd Street and 2nd Street carries 965, 752, 767 and 1,025 vehicles northbound and 517, 596, 683 and 690 vehicles southbound during the AM, midday, PM and Saturday peak hours, respectively. Further south on the Bowery between Prince Street and Rivington Street the volume reduces to approximately 894, 765, 770 and 840 vehicles northbound and 701, 709, 833 and 771 vehicles southbound during the AM, midday, PM and Saturday peak periods, respectively.
- Houston Street between Allen Street and Eldridge Street carries 715, 572, 698 and 798 vehicles westbound and 1020, 1091, 1103 and 1303 vehicles eastbound during the AM, midday, PM and Saturday peak hours, respectively. Houston Street between Broadway and Crosby Street carries 1099, 1009, 1109 and 1138 vehicles westbound and 649, 819, 810 and 914 vehicles eastbound during the AM, midday, PM and Saturday peak hours.
- Delancey Street between Essex Street and Ludlow Street carries 2,074, 1,709 and 1,881 vehicles westbound and 1262, 1462, and 1885 vehicles eastbound during the AM, midday, PM peak hours, respectively. Delancey Street between Bowery and Chrystie Street carries 1,227, 962 and 1,134 vehicles westbound and 761, 930 and 1,125 vehicles eastbound during the AM, midday and PM peak hours, respectively.

Figure 4-4: Existing Conditions Traffic Volume – AM Peak Hour

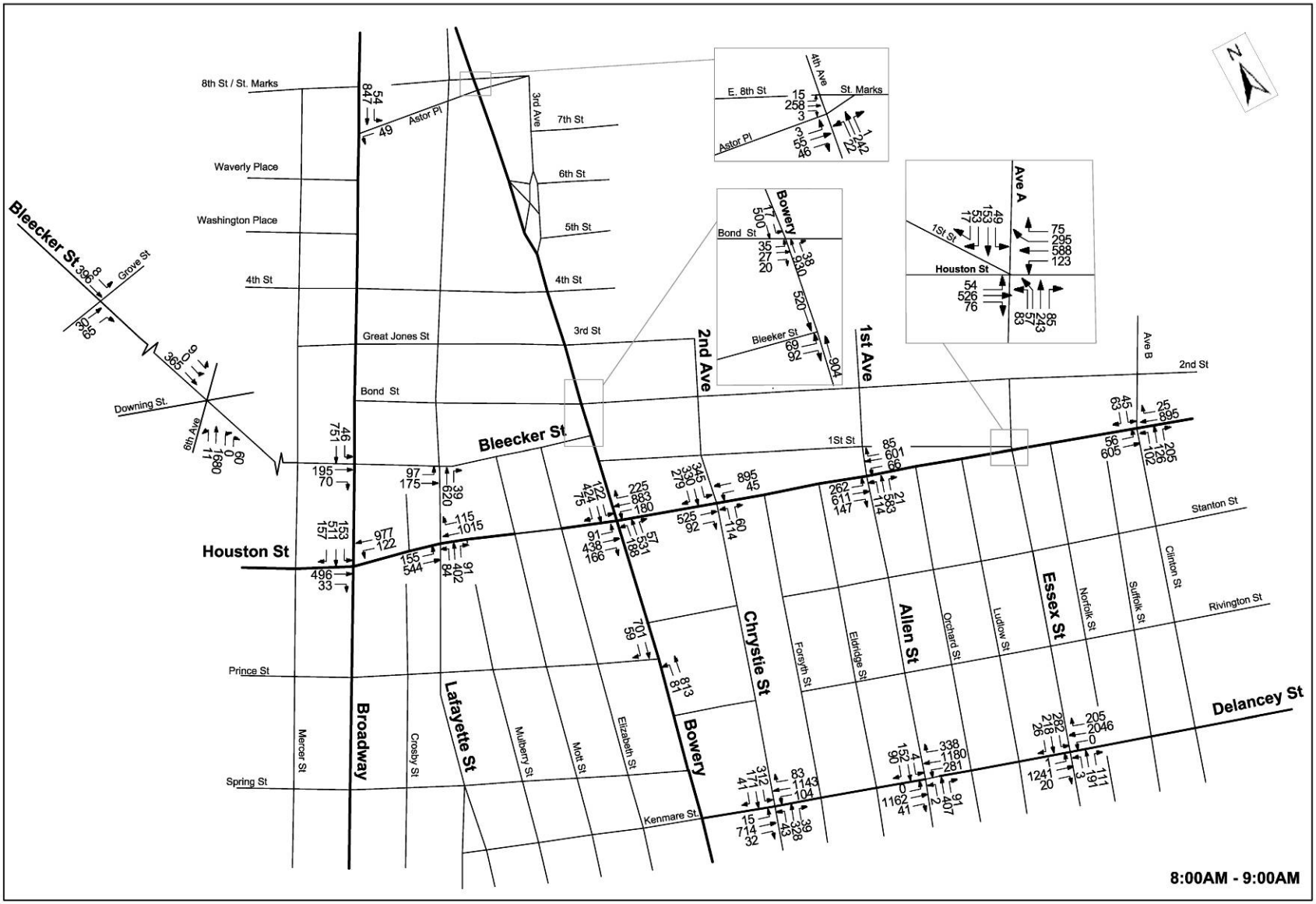


Figure 4-5: Existing Conditions Traffic Volume – MD Peak Hour

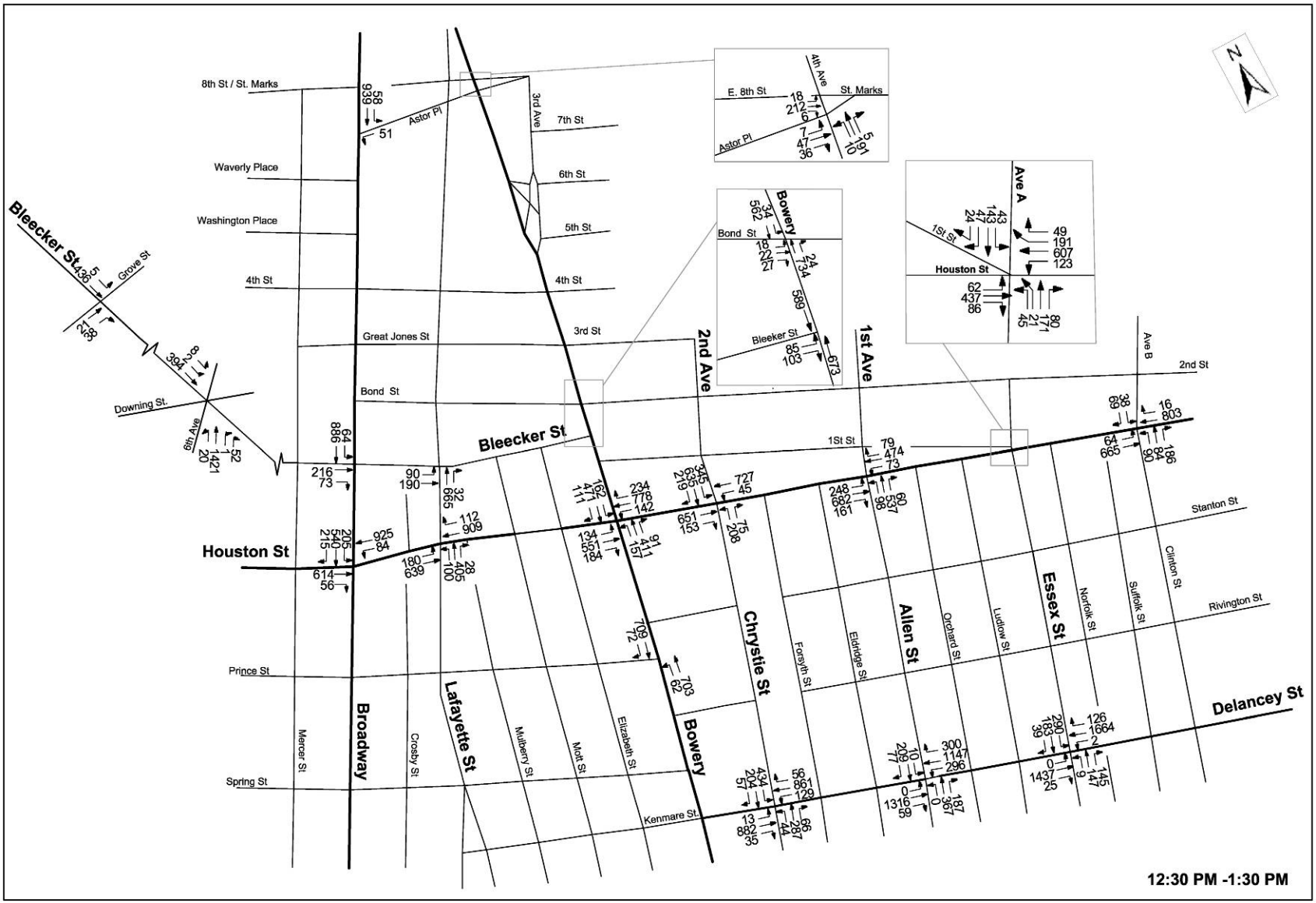


Figure 4-6: Existing Conditions Traffic Volume – PM Peak Hour

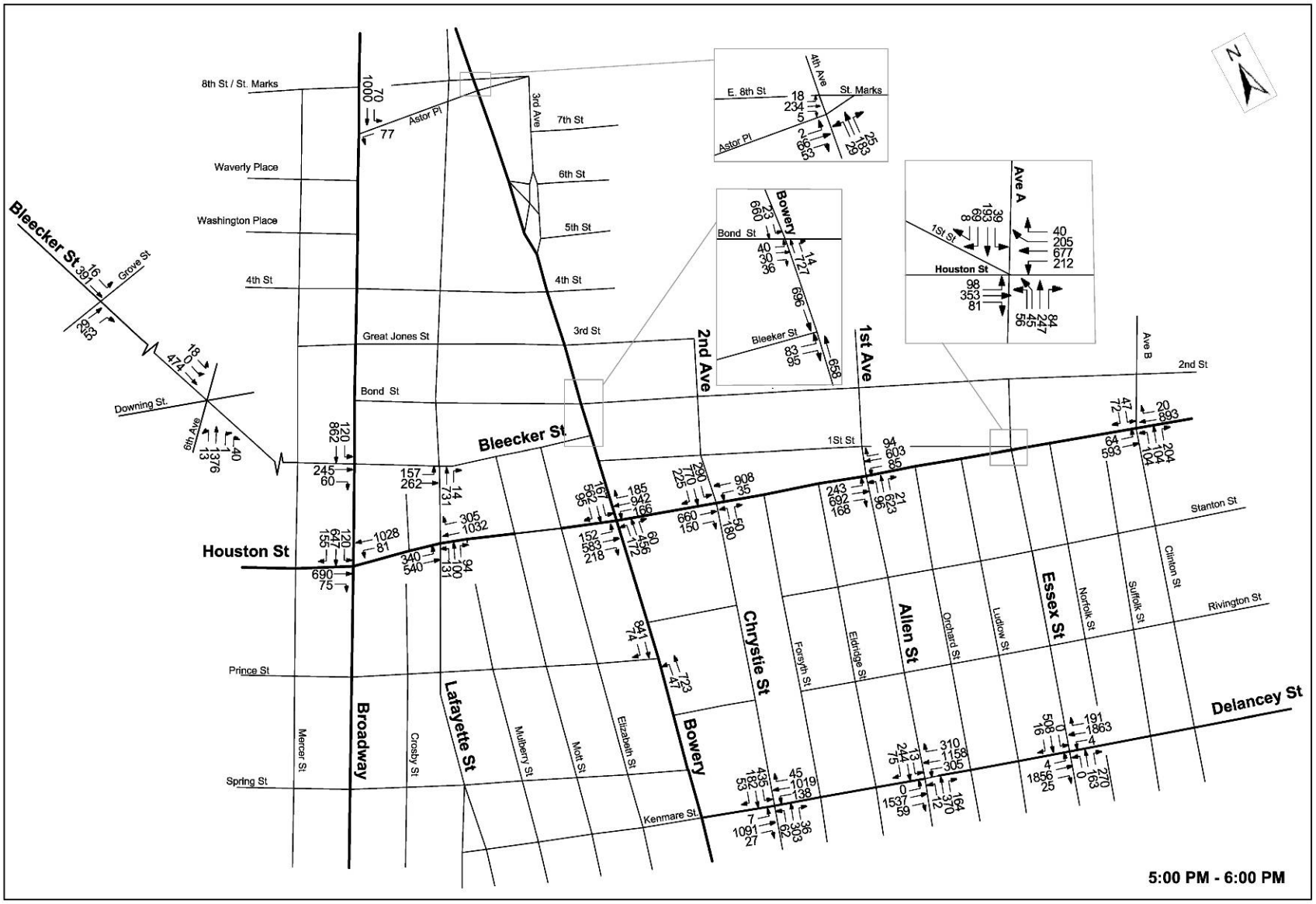
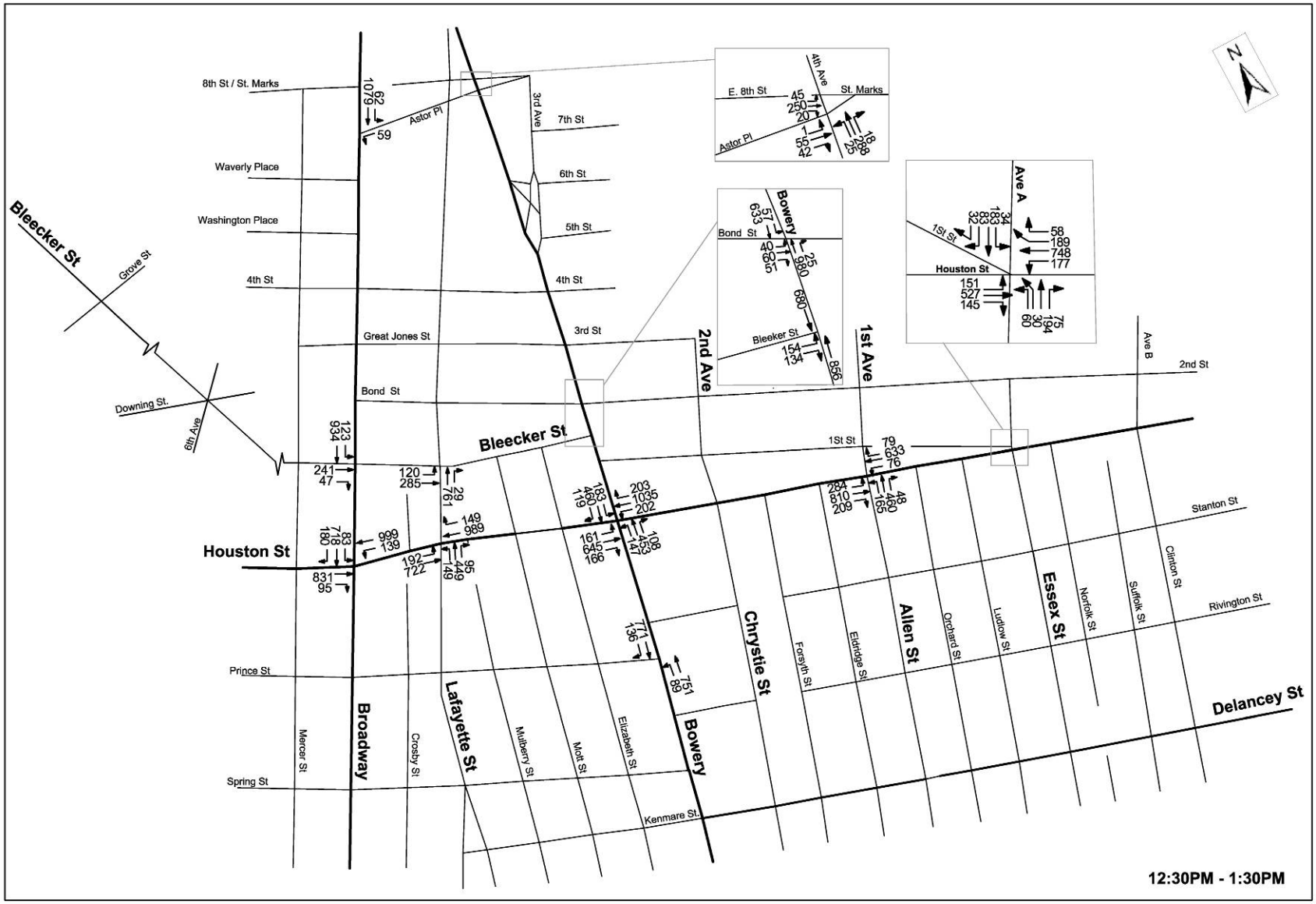


Figure 4-7: Existing Conditions Traffic Volume – Saturday Peak Hour



4.4 Street Capacity and Level of Service (LOS)

The capacity of a roadway is the maximum rate of flow which can pass through a section of roadway under prevailing traffic, roadway and signalization conditions. Capacity is determined by analyzing the interaction of several factors, including turning movements, signal timing, geometric design of the intersection, pedestrian movements, type of vehicle, illegal and/or double parking, grade, roadway conditions, and weather. The 2000 Highway Capacity Manual (HCM) methodology was used to determine street capacity within the study area. The methodology requires the use of official signal timings, street geometry, and other relevant information for performing capacity and LOS analyses. Within the study area, 18 signalized intersections were analyzed, and field visits were conducted in order to observe prevailing conditions.

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

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

Level of Service	Control Delay per Vehicle	Description of Traffic Condition
A	≤ 10.0	LOS A describes operations with low control delay, up to 10 sec/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all.
B	> 10 to 20	LOS B describes operations with control delay greater than 10 and up to 20 sec/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	> 20 to 35	LOS C describes operations with control delay greater than 20 and up to 35 sec/veh. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	>35 to 55	LOS D describes operations with control delay greater than 35 and up to 55 sec/veh. The influence of congestion becomes more noticeable at this level. Longer delays may result from a combination of unfavorable progression, long cycle lengths, and/or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	>55 to 80	LOS E describes operations with control delay greater than 55 and up to 80 sec/veh. These higher delay values generally indicate poor progression, long cycle length, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	LOS F describes operations with delay in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.
Sources:	Highway Capacity Manual, Transportation Research Board;	
	National Research Council, Washington D.C., 2000;	
Note:	Control delay is measured in terms of seconds per vehicle (sec/veh).	

4.5 Existing Traffic Conditions

Table 4-2 shows the 2010 Existing Conditions v/c ratios, delays, and level of service (LOS) for the AM, Midday, PM, and Saturday peaks for the intersections analyzed in the study area. The analysis showed that most intersections operated at an acceptable level-of-service with LOS D or better during all peak periods. However, some intersections experienced LOS D, E or F for some or all lane groups during one or more peak hour.

Overall intersection LOS for the AM, Midday, PM, and Saturday peaks are shown in Figures 4-7, 4-8, 4-9 and 4-10. Lane Groups with LOS, F, E and D (with 45 seconds of delay or worse) are shown in figures 4-11, 4-12 and 4-13. The intersections with approaches or lane groups with mid-LOS D (equal to or greater than 45 sec/veh) or worse are listed below.

- Bleecker Street & 6th Avenue (MD, PM)
- Bleecker Street & Broadway (AM, MD, PM, Sat)
- Bleecker Street & Lafayette Street (MD, PM, Sat)
- Bowery & Prince Street (AM)
- Delancey Street & Allen Street (AM, MD, PM)
- Delancey Street & Chrystie Street (AM, MD, PM)
- Delancey Street & Essex Street (AM, MD)
- Houston Street & Allen Street (AM, PM , Sat)
- Houston Street & Broadway (Sat)
- Houston Street & Chrystie Street (AM, MD, PM)
- Houston Street & Clinton Street (AM, MD, PM)
- Houston Street & Essex Street (AM, MD, PM, Sat)
- Houston Street & Lafayette (AM, MD, PM, Sat

Table 4-2: Traffic Capacity Analysis for Signalized Intersections

2010 Existing Conditions (1 of 2)

Intersection	Approach	Movement	AM			MD			PM			Sat		
			V/C Ratio	Avg Delay	LOS	V/C Ratio	Avg Delay	LOS	V/C Ratio	Avg Delay	LOS	V/C Ratio	Avg Delay	LOS
Cooper SQ & Astor Pl/ 4 Av														
	NB	LTR	0.16	10.4	B	0.17	10.5	B	0.17	10.5	B			
	SB	LTR	0.17	10.5	B	0.16	10.4	B	0.16	10.4	B			
	EB	LT	0.21	21.9	C	0.17	21.3	C	0.17	21.3	C			
		R	0.19	22.1	C	0.33	25.8	C	0.33	25.8	C			
Intersection LOS	**Overall**			12.6	B		13.2	B		13.2	B			
Bleecker Street and 6th Ave														
	NB	TR	0.57	14.3	B	0.44	12.7	B	0.44	12.7	B			
	EB	LT	0.43	24.1	C	1.05	83.7	F	1.05	83.7	F			
	Overall			16.1	B		31.7	C		31.7	C			
Bleecker Street @ Broadway														
	SB	LT	0.66	16.0	B	0.77	19.1	B	0.77	19.1	B	0.95	32.6	C
	EB	TR	0.91	61.3	E	1.03	86.2	F	1.03	86.2	F	0.92	59.4	E
	Overall			27.5	C		36.3	D		36.3	D		38.1	D
Bleecker @Lafayertte Street														
	NB	TR	0.42	11.9	B	0.46	12.3	B	0.46	12.3	B	0.49	12.8	B
	EB	LT	0.83	44.8	D	1.05	86.6	F	1.05	86.6	F	0.96	62.0	E
	Overall			23.0	C		40.9	D		40.9	D		29.9	C
Bowery St & Bleecker St														
	NB	T	0.58	14.6	B	0.44	12.6	B	0.44	12.6	B	0.52	13.6	B
	SB	T	0.33	11.5	B	0.47	13.0	B	0.47	13.0	B	0.48	13.2	B
	EB	L	0.19	22.3	C	0.22	22.8	C	0.22	22.8	C	0.44	26.9	C
		R	0.30	24.3	C	0.29	24.2	C	0.29	24.2	C	0.40	26.3	C
	Overall			14.6	B		14.0	B		14.0	B		15.6	B
Bowery St & Bond St														
	NB	TR	0.49	15.7	B	0.43	14.9	B	0.38	14.4	B	0.75	21.5	C
	SB	LT	0.46	16.0	B	0.53	17.0	B	0.67	19.8	B	0.78	24.2	C
	EB	LTR	0.09	17.5	B	0.08	17.4	B	0.10	17.6	B	0.36	21.5	C
	Overall			15.9	B		15.9	B		17.1	B		22.6	C
Bowery St & Prince St														
	NB	LT	1.00	49.9	D	0.76	21.2	C	0.67	17.5	B	0.95	39.1	D
	SB	TR	0.67	17.3	B	0.63	16.5	B	0.69	17.8	B	0.69	17.7	B
	Overall			34.5	C		18.8	B		17.7	B		28.1	C
Broadway & Astor Pl														
	SB	LT	0.36	12.5	B	0.38	12.7	B	0.41	13.0	B			
	WB	L	0.35	30.0	C	0.33	29.1	C	0.48	33.5	C			
	Overall			13.6	B		13.8	B		14.9	B			
Delancey St & Allen St														
	NB	T	0.73	37.7	D	0.59	32.9	C	0.61	33.4	C			
		R	0.46	35.1	D	0.67	42.0	D	0.87	63.9	E			
	SB	TR	0.41	29.6	C	0.48	30.8	C	0.50	31.0	C			
	EB	TR	0.87	37.8	D	1.05	69.1	E	1.05	70.1	E			
	WB	L	1.02	83.5	F	1.05	83.8	F	0.93	50.7	D			
		TR	0.74	14.6	B	0.64	12.5	B	0.64	12.4	B			
	Overall			32.4	C		41.7	D		41.7	D			
Delancey St & Chrystie St														
	NB	L	0.31	28.9	C	0.36	31.6	C	0.39	32.6	C			
		TR	0.90	53.9	D	1.04	81.6	F	0.80	44.0	D			
	SB	DefL				1.09	94.7	F	1.08	91.8	F			
		L	1.06	93.8	F									
		TR	0.52	22.7	C	0.72	30.9	C	0.55	23.4	C			
	EB	LTR	0.67	22.4	C	0.77	25.4	C	0.76	24.3	C			
	WB	DefL	0.98	92.2	F	0.73	43.7	D	0.89	66.0	E			
		TR	0.77	24.7	C	0.62	21.0	C	0.69	22.2	C			
	Overall			37.6	D		42.8	D		36.1	D			
Delancey St & Essex St														
	NB	LTR	0.58	31.5	C	0.47	29.2	C						
		TR							0.59	31.2	C			
	SB	DefL	1.05	98.6	F	1.05	95.4	F						
		TR	0.82	48.9	D	1.02	86.8	F	0.88	44.5	D			
	EB	TR	0.35	12.3	B	0.41	12.9	B	0.50	13.8	B			
	WB	TR	0.80	19.5	B	0.91	26.1	C	0.72	17.4	B			
	Overall			25.6	C		31.6	C		20.7	C			
E Houston St & Allen St														
	NB	L	0.33	24.5	C	0.29	23.7	C	0.38	25.1	C	0.66	32.9	C
		TR	1.04	73.4	E	0.84	38.3	D	0.77	33.8	C	0.78	34.2	C
	EB	L	0.88	56.3	E	0.73	36.9	D	0.86	53.0	D	0.96	69.8	E
		TR	0.78	33.3	C	0.88	39.1	D	1.00	56.6	E	0.98	53.4	D
	WB	L	0.26	21.6	C	0.30	25.3	C	0.37	30.3	C	0.29	27.8	C
		TR	0.68	29.8	C	0.52	26.4	C	0.66	28.9	C	0.66	29.0	C
	Overall			45.3	D		34.7	C		41.6	D		42.5	D

Table 4-2: Traffic Capacity Analysis for Signalized Intersections

2010 Existing Conditions (2 of 2)

Intersection	Approach	Lane Group	AM			MD			PM			Sat		
			V/C Ratio	Avg Delay	LOS	V/C Ratio	Avg Delay	LOS	V/C Ratio	Avg Delay	LOS	V/C Ratio	Avg Delay	LOS
E Houston St @ Bowery St														
	NB	DefL	0.71	42.6	D	0.82	57.3	E	0.69	44.9	D	0.53	34.9	C
		TR	0.88	44.9	D	0.77	37.4	D	0.73	35.0	C	0.80	38.7	D
	SB	L	0.54	32.6	C	0.72	41.7	D	0.66	37.8	D	0.71	41.5	D
		TR	0.80	39.5	D	0.99	65.3	E	1.01	68.5	E	0.91	50.0	D
	EB	L	0.43	34.1	C	0.53	37.2	D	0.54	37.6	D	0.71	46.1	D
		TR	0.63	28.7	C	0.78	33.1	C	0.82	35.0	C	0.73	31.0	C
	WB	L	0.77	44.0	D	0.73	44.9	D	0.67	40.9	D	0.76	46.1	D
		TR	0.90	39.3	D	1.00	56.4	E	0.89	38.6	D	0.99	53.7	D
	Overall			38.4	D		48.1	D		42.7	D		44.3	D
E Houston St & Broadway														
	SB	LTR	0.55	19.5	B	0.63	20.8	C	0.51	18.9	B	0.55	19.4	B
	EB	TR	0.49	28.1	C	0.73	33.1	C	0.70	32.0	C	0.99	55.1	E
	WB	L	0.68	29.7	C	0.49	24.0	C	0.45	23.2	C	0.73	38.6	D
		T	0.70	22.6	C	0.55	19.5	B	0.56	19.7	B	0.54	19.4	B
	Overall			22.9	C		23.7	C		23.0	C		32.2	C
E Houston St & Chrystie St														
	NB	L	0.37	32.1	C	0.68	42.1	D	0.50	34.9	C			
		R	0.25	30.4	C	0.30	31.2	C	0.20	29.3	C			
	SB	L	1.05	95.4	F	1.05	96.8	F	1.03	95.3	F			
		LT	0.52	33.6	C	1.00	69.6	E	1.05	82.8	F			
		R	0.56	35.1	D	0.44	32.7	C	0.45	32.9	C			
	EB	TR	0.63	30.8	C	0.84	38.5	D	0.82	37.0	D			
	WB	L	0.37	33.5	C	0.54	47.9	D	0.44	41.2	D			
		T	0.85	38.2	D	0.68	31.7	C	0.84	37.3	D			
	Overall			42.2	D		49.5	D		52.5	D			
E Houston St & Clinton St														
	NB	LTR				1.05	91.6	F	1.17	130.8	F			
		LT	0.52	29.8	C									
		R	0.69	39.2	D									
	SB	LR	0.66	43.7	D	0.63	39.2	D	0.75	50.3	D			
	EB	L	0.48	24.3	C	0.61	31.9	C	0.52	26.4	C			
		T	0.33	13.9	B	0.37	14.3	B	0.32	13.8	B			
	WB	TR	0.46	15.4	B	0.45	15.3	B	0.45	15.3	B			
	Overall			31.3	C		29.8	C		40.7	D			
E Houston St & Essex St														
	NB	DefL	0.99	94.1	F							0.95	91.9	F
		LTR				0.64	32.7	C	0.97	61.6	E			
		TR	1.05	91.9	F							0.95	70.1	E
	SB	LTR	1.05	97.6	F	1.01	88.8	F	1.05	97.1	F	1.26	171.1	F
	EB	L	0.32	23.0	C	0.25	18.7	B	0.37	22.7	C	0.54	31.6	C
		TR	0.45	23.2	C	0.46	23.4	C	0.36	22.1	C	0.57	25.2	C
	WB	L	0.34	18.9	B	0.39	19.7	B	0.61	26.0	C	0.57	29.3	C
		TR	0.57	24.7	C	0.48	23.4	C	0.49	23.5	C	0.56	24.5	C
	Overall			45.0	D		32.1	C		39.8	D		51.1	D
E Houston St & Lafayette St														
	NB	LTR	0.69	28.3	C	0.62	26.4	C	0.37	21.9	C	0.83	34.2	C
	EB	L	0.85	50.0	D	0.90	54.3	D	1.05	86.8	F	1.07	103.2	F
		T	0.30	12.5	B	0.32	12.7	B	0.26	12.1	B	0.34	12.9	B
	WB	TR	0.83	30.9	C	0.74	27.6	C	1.04	61.8	E	0.80	29.2	C
	Overall			27.1	C		25.5	C		50.0	D		31.9	C
Bleecker St @ Grove St														
	SB	LT		8.1	A		8.2	A		8.0	A			
	EB	TR		27.9	D		26.9	D		32.9	D			

Figure 4-8: Intersection Level of Service: AM Peak Hour

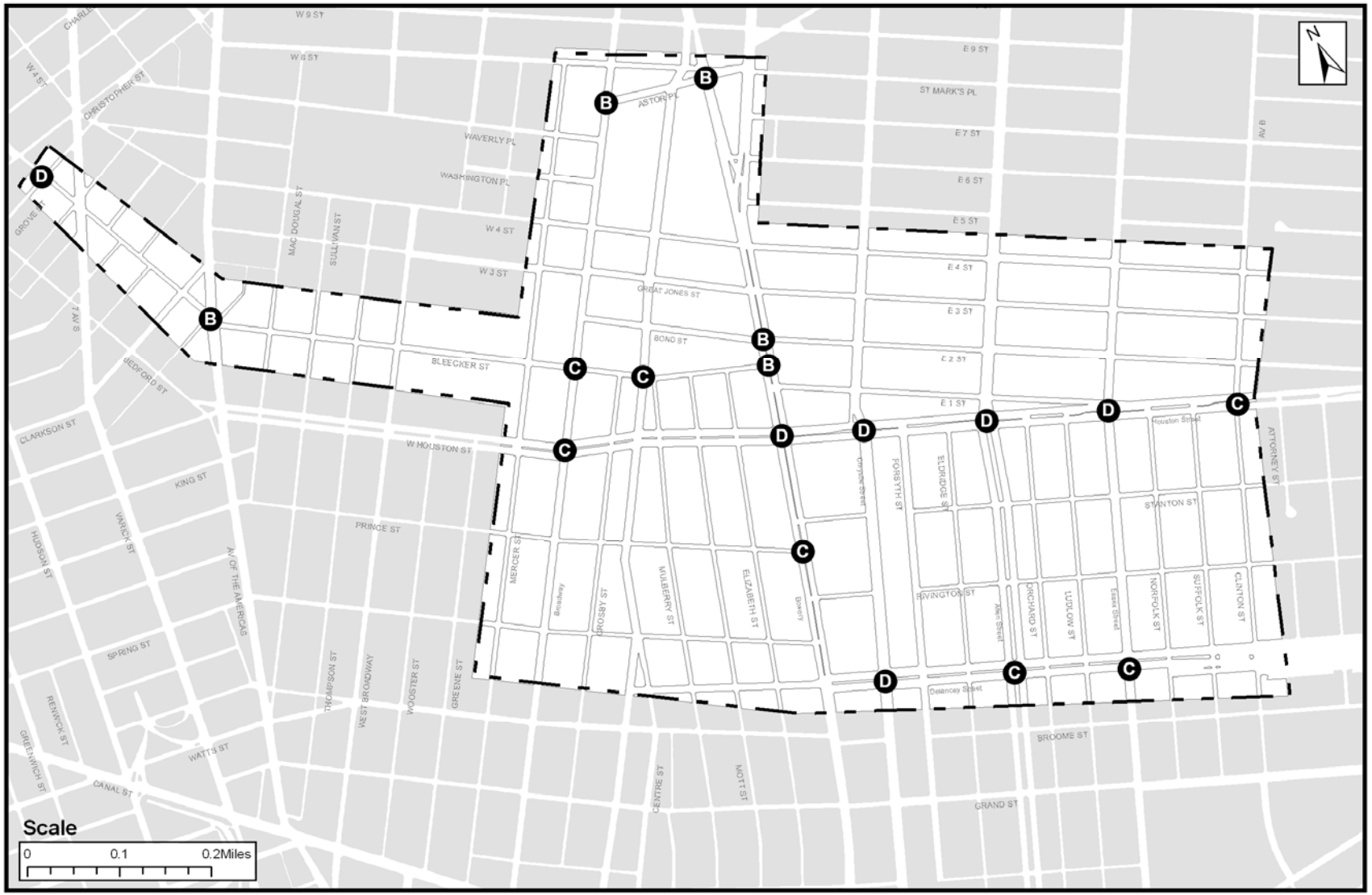


Figure 4-9: Intersection Level of Service: Midday Peak Hour

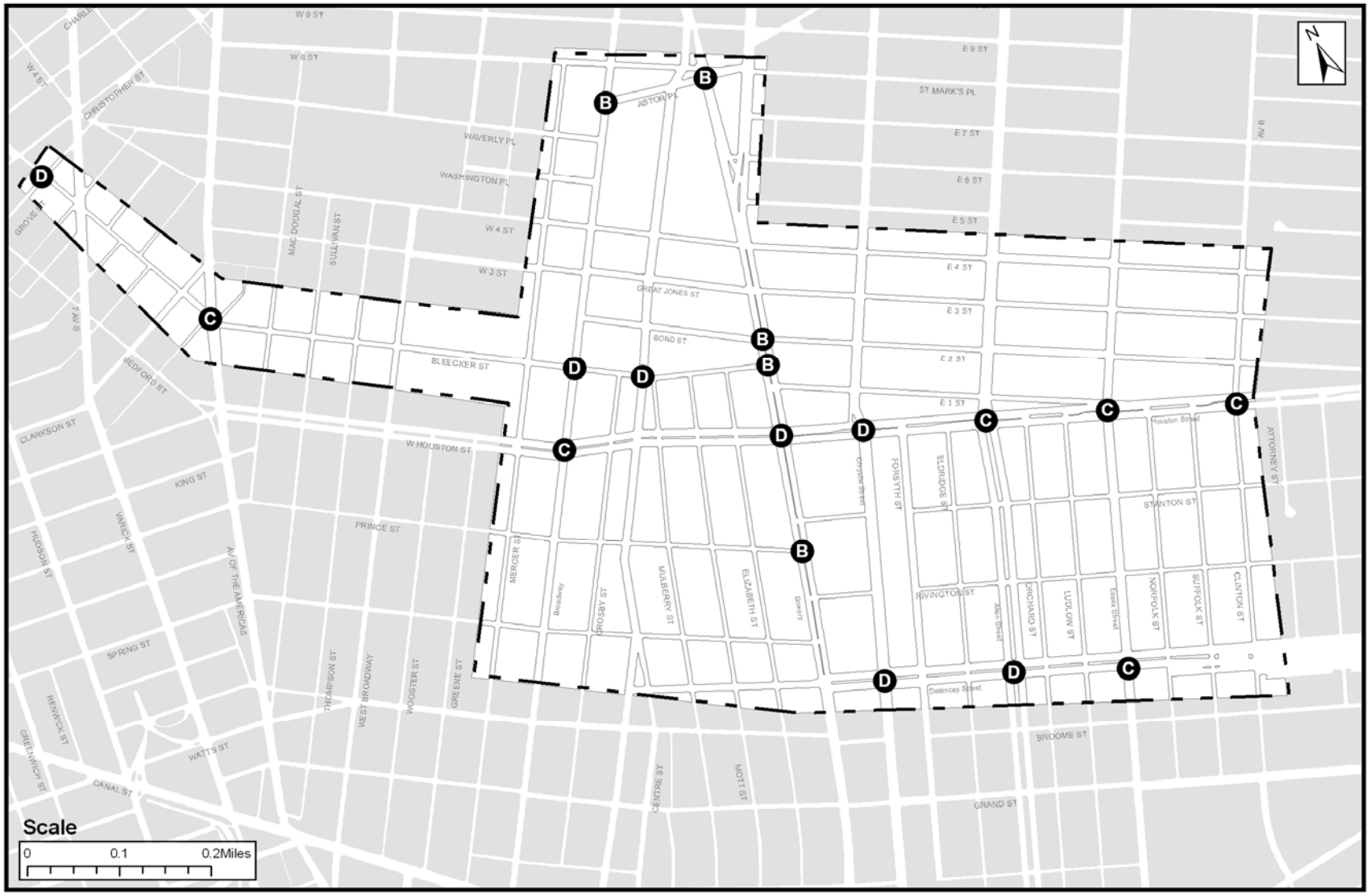


Figure 4-10: Intersection Level of Service: PM Peak Hour

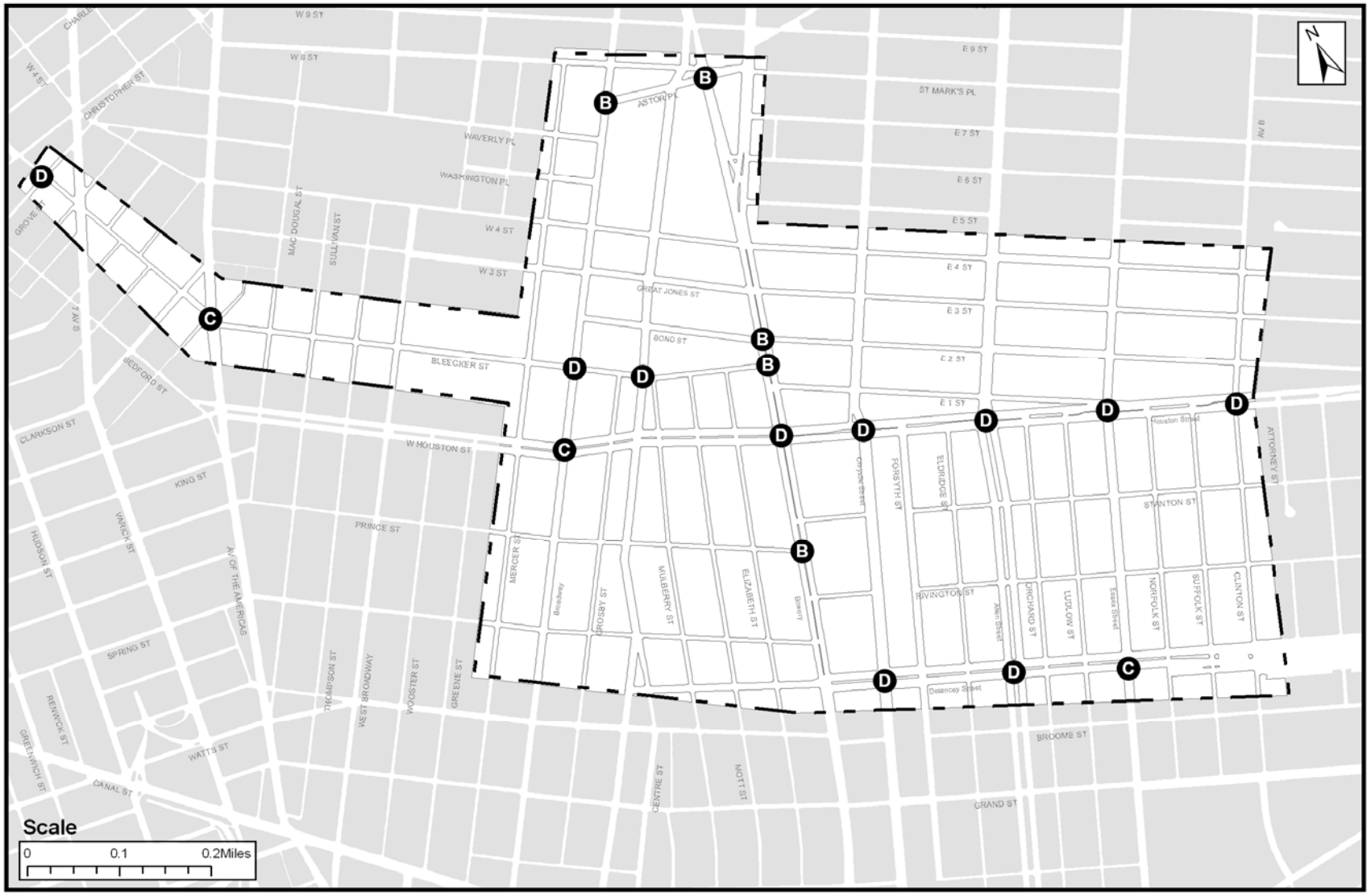


Figure 4-11: Intersection Level of Service: Saturday Peak Hour

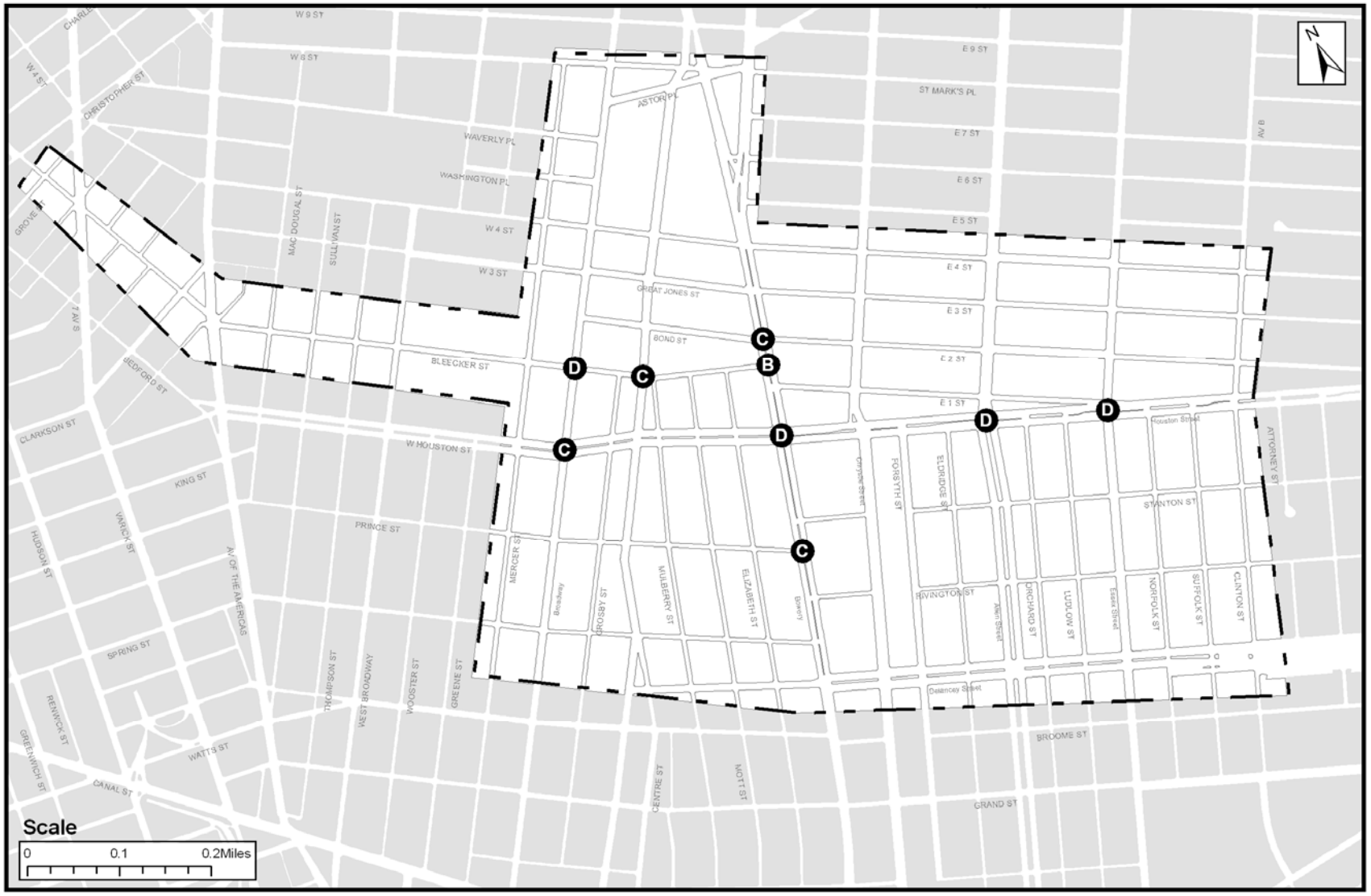
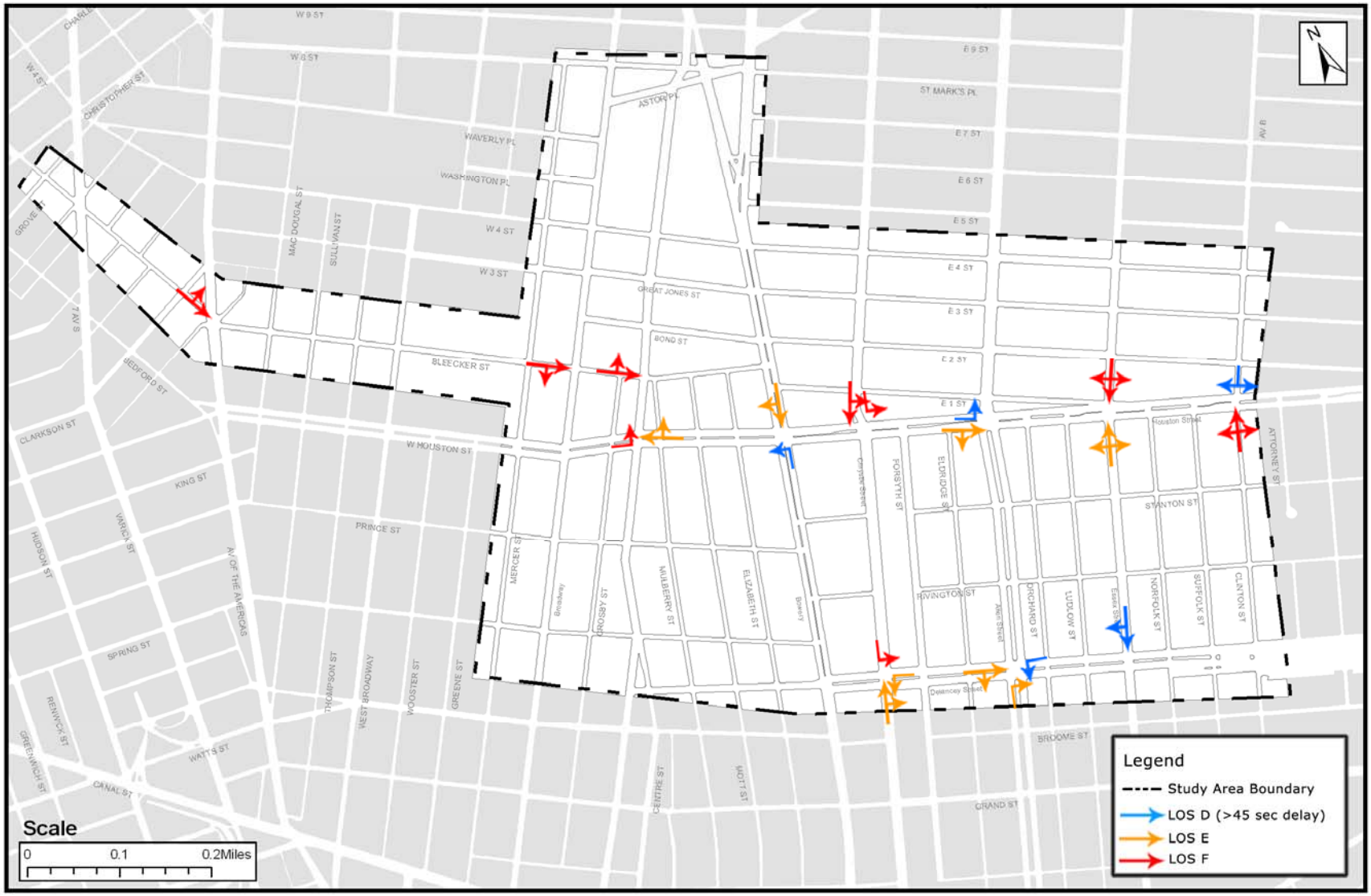


Figure 4-12: Approach/Lane Group LOS - AM

Figure 4-13: Approach/Lane Group LOS - MD

Figure 4-14: Approach/Lane Group LOS - PM



4.6 Vehicular Speeds

Several corridors within the study area experience congestion, particularly during peak hours. Congestion is attributed to factors including bus/car/truck/pedestrian conflicts, illegal curbside parking, double parking, and standing, all of which contribute to reduced roadway capacity, resulting in delays and reduced travel speeds.

Travel time runs were conducted for each peak period and three travel runs were performed during each peak period. The "floating car" method (a technique whereby a field vehicle travels at speeds under prevailing traffic conditions) was used to measure peak hour travel speeds on the main corridors listed below:

East-West Bound:

- Bleecker Street between 6th Ave and the Bowery (WB)
- Houston Street between Clinton Street and Mercer Street (EB & WB)
- Delancey Street between Clinton Street and the Bowery (EB & WB)

North-South Bound:

- Broadway between West 8th Street and Spring Street (SB)
- Lafayette Street between West 8th and Delancey Street (NB)
- The Bowery between West 8th and Delancey Street (SB & NB)
- Chrystie Street/2nd Avenue between Delancey Street and East 4th Street (NB & SB)
- Allen Street/1st Avenue between Delancey Street and East 4th Street (NB & SB)
- Essex Street/Avenue A Delancey Street and East 4th Street (NB & SB)

Average corridor speed was 12mph, 9mph and 10mph during the AM, midday and PM peak hours respectively. Figure 4-15 shows the corridors travel speeds during the MD period which were the slowest peak period speeds. Table 4-3 summarizes the average travel speeds for each corridor by direction for the various peak hours. Travel speeds throughout the study area for the various peak periods range from 5 mph to 20 mph. As shown in Table 4-3, most of the corridors experience low speeds with less than 10 mph during one or more peak hours.

Figure 4-15: Corridor Travel Speeds - Midday

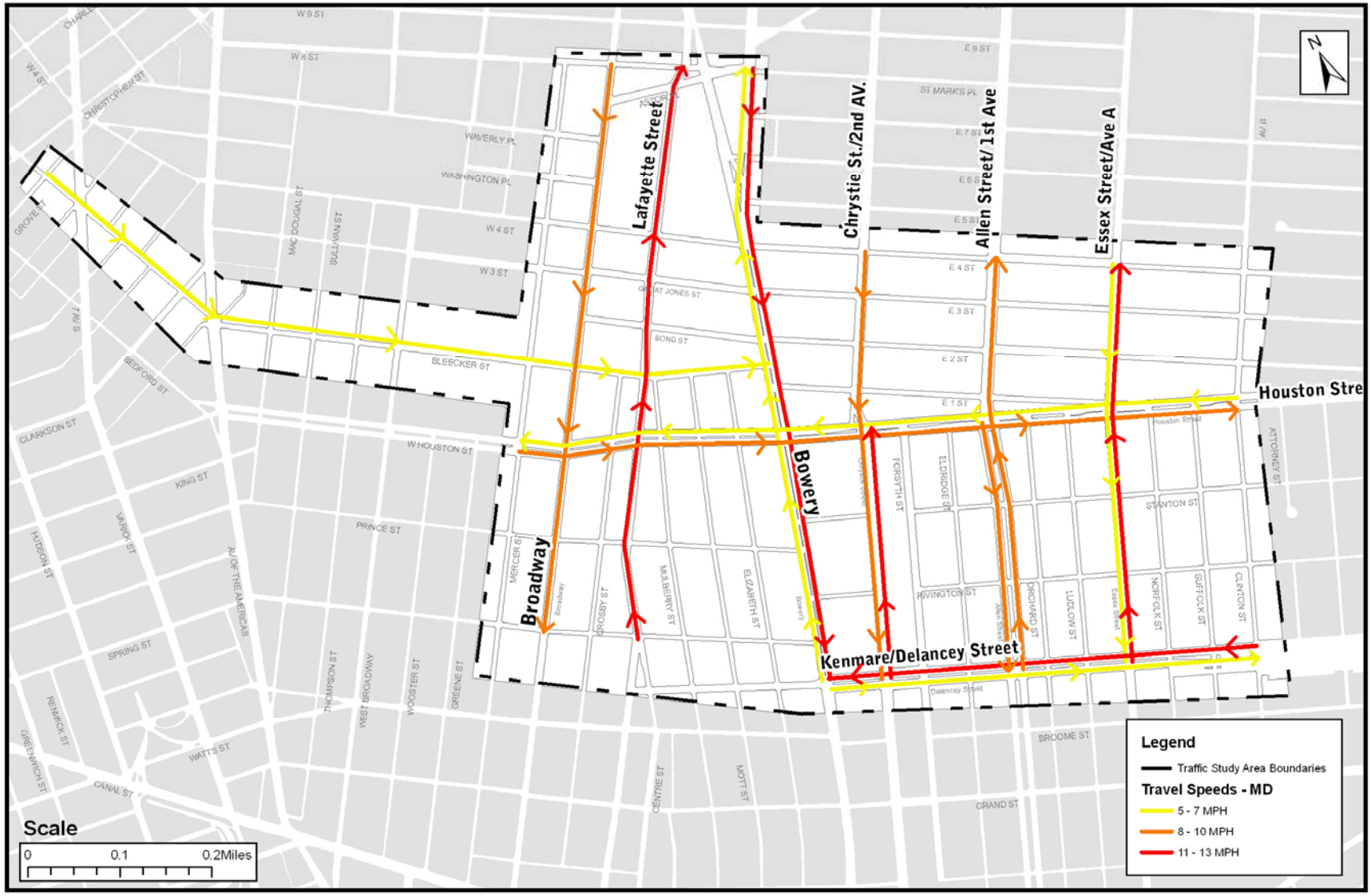


Table 4-3: Corridor Travel Speeds

No.	Corridors	Distance (Miles)	Peak Period	Direction	Avg Speed (MPH)
1	Bleecker Street between Christopher Street and The Bowery	0.85	AM	WB	9.1
			MD	WB	6.7
			PM	WB	7.5
2	Houston Street between Clinton Street and Mercer Street	0.80	AM	EB	7.8
				WB	8.7
			MD	EB	8.2
				WB	5.2
			PM	EB	7.5
				WB	8.6
3	Delancey Street between Clinton Street & The Bowery	0.45	AM	EB	6.1
				WB	14.4
			MD	EB	7.4
				WB	13.4
			PM	EB	10.7
				WB	9.3
4	Broadway between West 8h Street & Spring Street	0.60	AM	SB	20.3
			MD	SB	9.2
			PM	SB	9.5
5	Lafayette Street between West 8th and Delancey Street	0.70	AM	NB	16.9
			MD	NB	12.2
			PM	NB	13
6	The Bowery between West 8th and Delancey Street	0.65	AM	SB	14.3
				NB	10
			MD	SB	7.1
				NB	11.1
			PM	SB	9
				NB	12
7	Chrystie Street/2nd Avenue between Delancey Street and East 4th Street	0.45	AM	SB	13.8
				NB	12.4
			MD	SB	9.8
				NB	11.4
			PM	SB	9.1
				NB	14.2
8	Allen Street/1st Avenue between Delancey Street and East 4th Street	0.45	AM	SB	15
				NB	9.4
			MD	SB	9.6
				NB	9.4
			PM	SB	11.2
				NB	10.2
9	Essex Street/Avenue A Delancey Street and East 4th Street	0.45	AM	SB	8.1
				NB	12.4
			MD	SB	5.9
				NB	11
			PM	SB	9.1
				NB	10.2

5 Public Transportation

5.1 Introduction

The study area is adequately served by public transportation. There are six local bus lines, nine subway lines and nine subway stations in the study area. No area within the study area is more than a quarter mile from a bus or subway stop. However, Houston Street is the only east-west corridor with bus service (weekday only). Also there are no subway stations east of the Bowery between 1st Street and 13th Street. The M14 and M15 bus routes which travel along 1st Avenue and Avenue A were ranked among the top ten for the highest local bus ridership in 2009. Figure 5-1 shows the bus routes and subway stations in the study area.

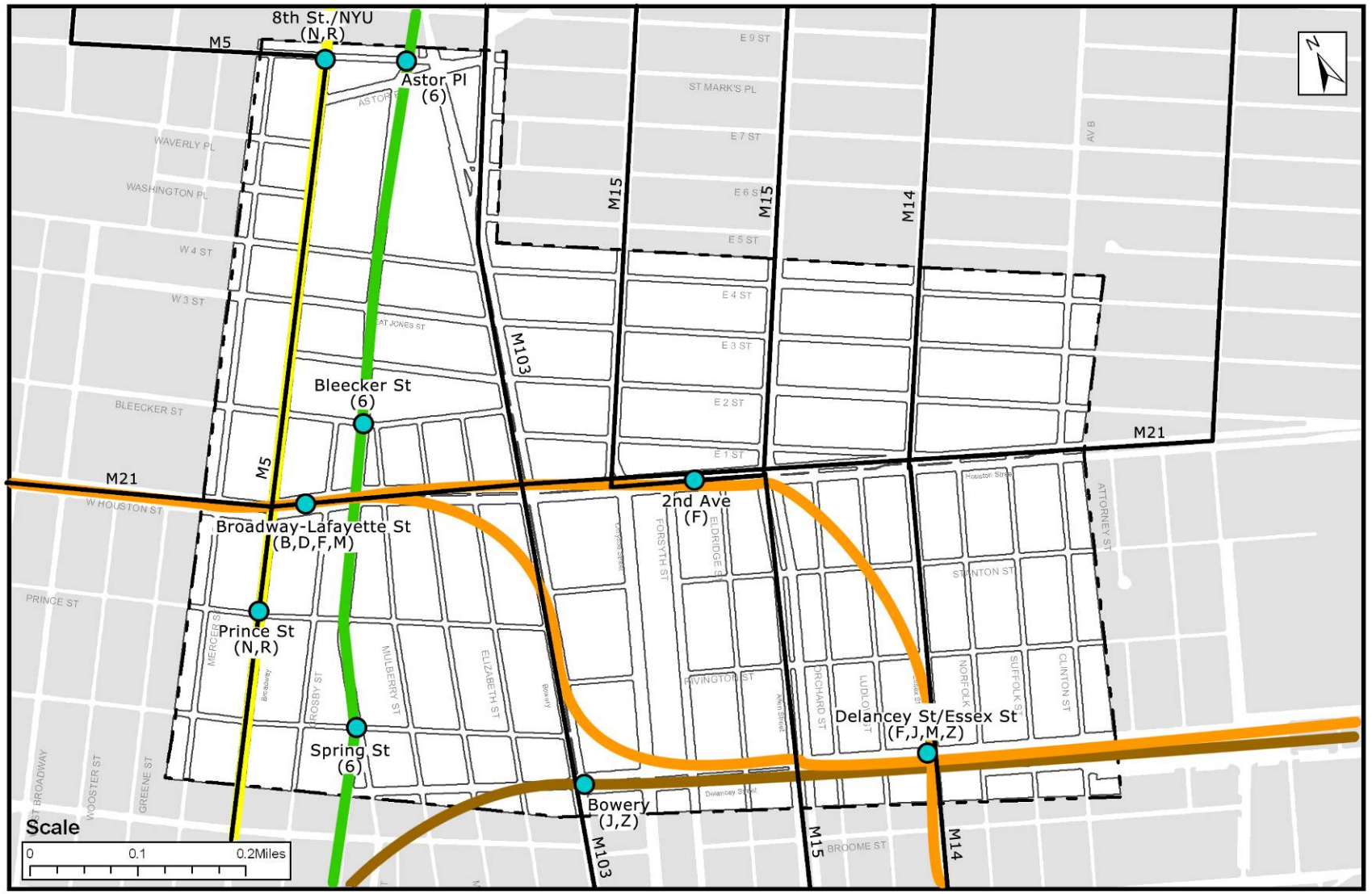
5.2 Bus Routes

The M5 operates between South Ferry and West 178th Street/Broadway daily. Within the study area this bus travels southbound on Broadway and northbound on 6th Avenue. There are transfer points at 8th Street and Broadway with access to the N and R trains, and Houston Street and Broadway with access to the M1 and M21 buses. Limited stop (express) service is provided on weekdays between 157th and 135th streets on Broadway and between 72nd street and 8th street on 14th Street.

The M9 operates between Park Row/City Hall and 1st Avenue at 23rd Street daily. Within the study area, this bus travels along Houston Street from Avenue B to Essex Street then proceeds south past Delancey Street. The Delancey Street/Essex Street intersection is a major transfer point with access to the J/Z, M and F trains.

The M14A operates daily between Bethune Street at Hudson Street and Grand Street at FDR Drive. Along Avenue A/Essex Street it has major transfer points at Houston Street for the M21 and M9 buses and at Delancey Street for the J/Z, M and F train.

Figure 5-1: Bus Routes/Subway Stations within the Study Area



The M15 operates between South Ferry and 2nd Avenue/East 126th Street. Within the study area the M15 travels southbound on 2nd Avenue from 4th Street to Houston Street and Northbound on 1st Avenue from Houston Street to 4th Street. South of Houston Street the M15 operates in both directions on Allen Street past Delancey Street. The M15 Select Bus Service (SBS) operates along this route and stops only at designated stops. The M15 SBS stops only at East 2nd Street northbound between 1st Ave and Houston Street and southbound on Allen Street within the study area. Major transfer points exist at Delancey Street and Allen Street with access to the J/Z, M and F trains and Houston Street and Allen Street with access to the F train and the M21 bus.

The M21 operates along Houston Street between Washington Street and FDR Drive weekdays only. Major transit transfer points in the study area exist at Broadway and Houston Street with access to the B, D, F and M trains and the M5 bus. Another transfer point exists at 2nd Avenue and Houston Street with access to the F train and the M15 bus.

The M103 operates between East 125th Street/Lexington Avenue and Park Row/City Hall daily. Within the study area the M103 travels along 3rd Avenue/the Bowery and there are three major transfer points along the route. One exists at St. Marks Place and 3rd Avenue with access to the M102 and M8 buses. Another transfer point is at Houston Street with access to the B, D, F, M trains and the M21 bus and the third is at Delancey Street with access to the J and Z trains.

5.3 2009 Bus Ridership

Bus ridership consists of all passengers (other than NYC Transit employees) who board buses, including passengers who transfer from other buses or from the subway. Of the 194 local bus routes in NYC, the M15 bus had the second highest average weekday ridership (53,358). The M14 bus ranked ninth with 37,913 riders on an average weekday. The M21 bus has the lowest ridership in the study area, ranking 171st

in the city with a weekday average of 1,923 riders. See Table 5-1 and Table 5-2 for bus ridership and frequency.

Table 5-1: 2009 Bus Ridership

Bus Route	*Rank	Annual Total	Weekday Avg	Saturday Avg	Sunday Avg
M5	72	4,005,787	11,947	10,122	7,675
M9	128	1,814,151	5,844	3,197	2,795
M14	9	12,036,852	37,913	24,531	19,363
M15	2	16,541,900	53,358	29,533	24,972
M21	171	561,567	1,923	792	551
M103	46	4,910,896	15,032	11,068	8,909

*Ranking out of 194 Bus Lines

*Source: MTA

Table 5-2: Bus Headway in Minutes

	Weekday					Saturday					Sunday				
	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night
M5	6*	11*	11*	12	-	12	12	14	15	-	17	11	13	17	-
M9	11	20	16	20	-	40	15	15	30	-	24	17	20	20	-
M14A	8	12	10	12	60	15	12	10	12	60	20	12	12	12	60
M15	6	8	8	8	30	11	8	8	9	30	12	8	8	10	30
M15 Select	4	7	6	10	-	10	8	8	12	-	12	9	9	10	-
M21	15	30	20	30	-	-	-	-	-	-	-	-	-	-	-
M103	12	12	12	15	60	13	10	9	11	60	15	11	11	12	60

* Limited

AM = 7AM-9AM, Noon = 11AM - 1PM, PM = 4PM - 7PM, Eve = 7PM - 9PM, Nite = 12 Mid - 4AM

*Source: MTA

5.4 Subway Service

The Metropolitan Transportation Authority – New York City Transit (MTA-NYCT) operates nine subway lines along four routes, and nine subway stations in the study area. They are the #6, B, D, F, J/Z, M, N, and R trains. Within the study area, these trains make stops at three stations on the IRT line: Astor Place/8th Street (6), Bleecker Street/Lafayette Street(6) and Spring Street/Lafayette Street (6); and six stops on the IND line: 8th Street/NYU (N,R), Prince Street/Broadway (N,R), Broadway/ Lafayette Street (B, D, F, M), 2nd Avenue/Lower East Side (F), Bowery/Delancey Street (J), Delancey Street/Essex Street (J/Z,M,F). Table 5-3 lists the subway lines, stations and station ridership.

The "6" train operates from Pelham Bay Park in the Bronx to Brooklyn Bridge/City Hall in Manhattan. On Weekdays the "6" train runs express in the Bronx (Manhattan bound) from 6:20am to 12:30 pm and from 1pm to 8:45pm (Bronx bound) while running local in Manhattan at all times.

The "B" train provides service from Bedford Park in the Bronx to Brighton Beach in Brooklyn, making one stop in the study area at the Broadway/Lafayette station. During rush hours, this train runs express in the Bronx, midtown Manhattan, and Brooklyn (peak direction); at other times it makes local stops. It operates on weekdays only, at all times except for late nights.

The "D" train provides service from 205th Street/Norwood in the Bronx to Coney Island/Stillwell Avenue in Brooklyn, making one stop in the study area at the Broadway/Lafayette station. During rush hours it runs express in the Bronx (peak direction), in Manhattan, and along the 4th Avenue segment in Brooklyn; at other times it operates local in the Bronx, express in Manhattan, and local in Brooklyn. This train operates at all times.

The "F" train provides service from 179th Street/Hillside Avenue, Jamaica, Queens to Stillwell Avenue/Surf Avenue in Brooklyn. The train runs express in Queens and local in

Manhattan and Brooklyn. In the study area the "F" stops at the Broadway/Lafayette, 2nd Avenue/Lower East Side and Delancey Street/Essex Street stations.

The "J" and "Z" trains operate between Jamaica Center in Queens and Broad Street in Manhattan. They operate alternate skip stop service during peak hours in the peak direction. During off peak hours there is no "Z" service and the "J" train runs local. In the study area they stop at the Delancey Street/Bowery and Delancey Street/Essex Street stations.

The "M" train operates between Forest Hills/71st Ave in Queens, through Manhattan and Brooklyn, to Metropolitan Avenue in Queens. Late night and weekends the "M" runs only from Forrest Hills/71st Ave to Myrtle Avenue. In the study area it stops at the Broadway/Lafayette and Delancey Street/Essex Street stations.

The "N" train which operates between Ditmas Blvd/Astoria in Queens and Coney Island in Brooklyn, runs express in Brooklyn and local in Queens and Manhattan. In the study area the "N" stops at the 8th Street/NYU and Prince Street/Broadway stations.

The "R" train provides local service between Forest Hills/71st Ave in Queens and Bay Ridge/96th Street in Brooklyn. The "R" stops at the 8th Street/NYU and the Prince Street/Broadway stations in the study area.

5.5 Subway Ridership

Subway ridership consists of all passengers (other than NYC Transit employees) who enter the subway system, including passengers who transfer from buses. Ridership does not include passengers who exit the subway or passengers who transfer from other subway lines, with the exception of out-of-system transfers; e.g., between the Lexington Avenue/63rd Street station and the Lexington Avenue/59th Street station, where customers use their MetroCard to make the transfer. The Broadway/Lafayette/Bleecker Street station has the highest ridership in the study area. It is ranked 27th out of 422 stations with over 32,000 average weekday riders. The Bowery/Delancey station has the

lowest ridership in the study area and ranks 341 with approximately 3,000 average weekday riders. Subway station ridership within the study area is shown in Table 5-3.

Table 5-3: 2009 Study Area Subway Ridership

Station	Train Lines	*Rank	Annual Total	Weekday Average	Saturday Average	Sunday Average
8th St-New York University	N,R	75	5,414,133	16,303	13,166	10,286
Astor Place	6	73	5,522,077	17,376	11,275	8,910
Broadway-Lafayette St/Bleecker St	B,D,F,6, M	27	10,439,953	32,489	22,656	17,434
Lower East Side-2 Av	F	67	5,734,200	17,310	13,256	11,157
Spring Street	6	124	3,539,095	10,603	8,775	6,672
Prince Street	N,R	86	4,856,796	13,834	14,315	10,414
Bowery/Delancey Street	J,M,Z	341	1,051,028	3,084	2,535	2,335

*Rankings out of 422 subway stations

*Source:MTA

5.6 2010 Service Changes affecting the Study Area

On June 27th 2010, MTA initiated service reductions throughout the NYC transit system. These reductions affected two bus routes and two subway lines within the study area.

- The M9 bus replaced the M21 on Avenue C from Houston Street to 23rd Street. The M9 no longer travels along 15th Street and Avenue B.
- The M5 bus now travels southbound on Broadway to South Ferry instead of westbound on Houston Street
- The "M" train replaces the "V" train which made stops at Broadway/Lafayette Street and Lower East Side/2nd Avenue. The "M" train does not stop at 2nd Avenue as the "V" train did. The "M" train no longer travels between Essex Street and Bay Parkway and no longer stops at Essex Street and Bowery/Delancey Street.

- The “W” train was removed from the system and replaced in Queens by an extension of the “Q” train into Astoria. In the study area the “W” made stops at NYU 8th Street and Prince Street/Broadway.

6 Parking

6.1 Introduction

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

An extensive parking survey was conducted during the weekday peak periods (7:30AM – 9:30AM, 11:30AM-1:30PM, 4:00PM – 6:00PM) of both on-street and off-street facilities. The survey documented existing on and off-street parking supply and demand through a combination of field observation and interviews. It also documented the location and number of metered parking spaces and commercial truck loading/unloading zones in the study area.

6.2 Off-Street Parking

An inventory of publicly accessible parking lots and garages in the study area was conducted. The inventory shows there are 26 off-street parking facilities in the study area with a combined capacity of 2,612 spaces. Figure 6-1 below shows the location of off-street parking facilities with capacity given in ranges while Table 6-1 provides the number of spaces and utilization by peak hour for each facility. The majority of the garages/lots are located west of the Bowery. There are four lots on Delancey Street near the Manhattan Bridge entrance. The largest garage has 670 spaces while the median lot/garage size is 110 spaces.

The average cost for parking is $12.11 for the first hour, which is usually more expensive than subsequent hours. The average daily and monthly parking cost was approximately $32.16 and $361.29 respectively. There are two municipal parking facilities in the study area, one located at Essex Street at Stanton Street and the other on Essex Street and Broome Street. They charge significantly lower rates than other lots and garages in the area ($2.50/hour, $250/month). One lot at 135 Delancey Street, run by the Lower East Side District Management Association, offers

free 2 hour parking for area customers.

Off street parking data was collected for 22 of the 26 facilities which represent 72% of the off street parking capacity in the study area. There was no data for the remaining four facilities. The survey indicates that off-street parking facilities are on average approximately 73%, 76% and 62% utilized during the AM, MD and PM peak hours, respectively.

Figure 6-1: Off-Street Parking Facilities/Capacity

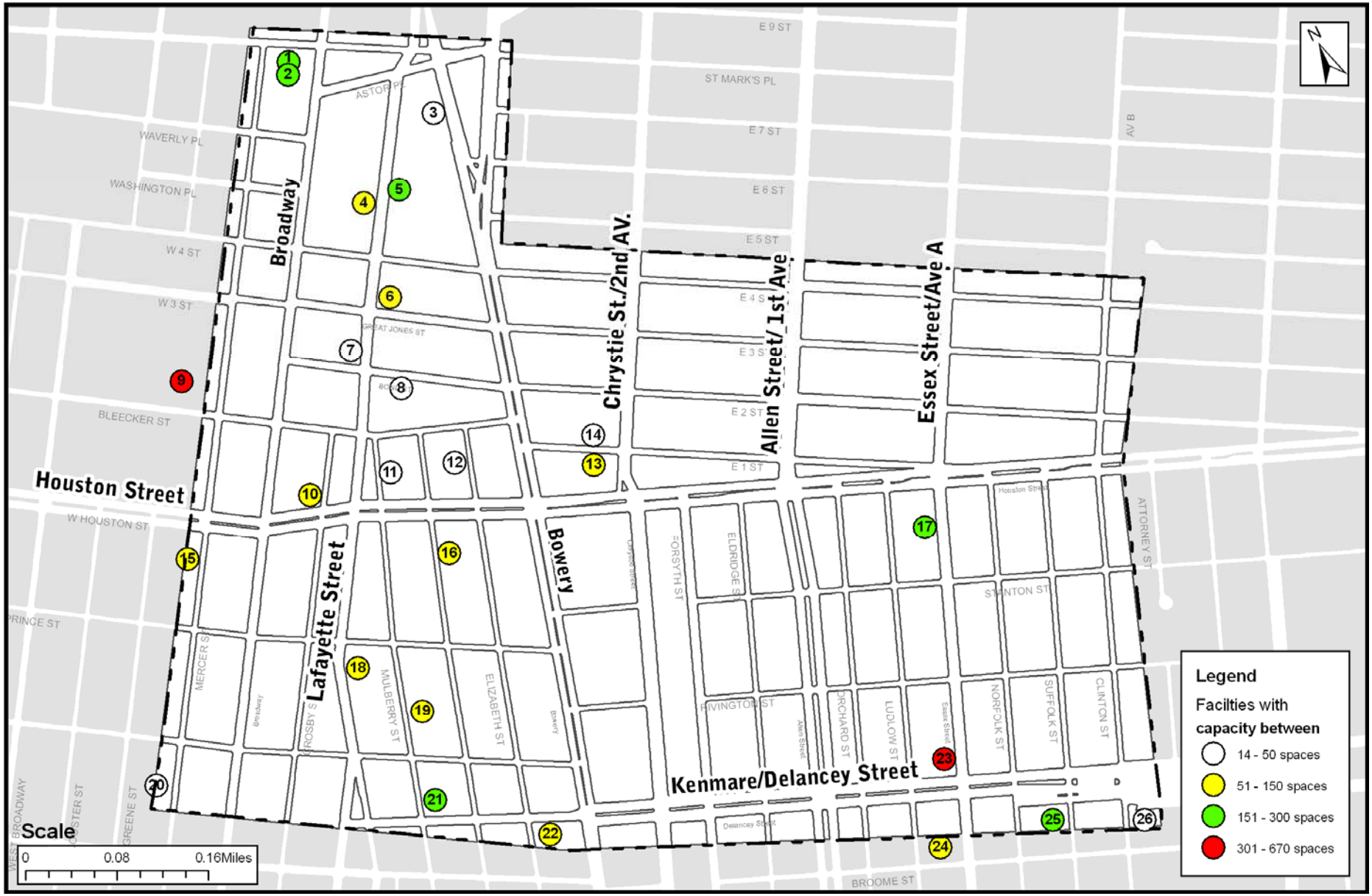


Table 6-1: Off-Street Parking Facilities

Id	Name	License	Address	Spaces	AM	MD	PM	FirstHour	Daily	Monthly
1	Champion Broadway	924489	60 E. 8th Street	169	100	120	10	$ 17.74	$29.57	$379.30
2	Hilary Gardens	1231149	300 Mercer Street	225	157	50	112	$ 16.05	$27.00	$345.99
3	Lafayette Place Parking	1232463	445 Lafayette Street	14	NR	NR	NR	$ 10.98	$30.41	$506.86
4	Lafayette Street Parking	1187631	410 Lafayette Street	53	40	70	70	$ 10.14	$25.34	$350.00
5	403 Lafayette	1026633	403 Lafayette Street	267	267	133	187	$ 10.13	$29.56	$422.39
6	Edison NY Parking	926755	375 Lafayette Street	127	125	140	60	$ 16.00	$34.00	$475.00
7	DKBK Parking	1341974	358 Lafayette Street	25	16	28	25	$ 12.67	$24.50	N/A
8	Bond Street Garage	1268885	25 Bond Street	48	57	46	30	$ 13.52	$40.50	$485.00
9	Central Parking System of New York	975257	91-133 Bleecker Street	670	NR	NR	NR	$ 15.21	$33.80	$371.31
10	Soho Village Parking	1199393	610 Broadway	126	NR	NR	NR	$ 12.67	$29.57	$549.10
11	VIP Capital Parking	962302	298 Mullberry Street	21	15	15	15	$ 15.19	$29.54	$421.94
12	Comfort Park	953176	3401 Elizabeth Street	39	20	39	39	$ 11.83	$27.03	$422.39
13	Central Parking System of New York	1243626	1 East 1st Street	130	118	125	125	$ 8.45	$21.12	$380.15
14	Central Parking System of New York	1290976	22 East 1st Street	50	40	35	50	N/A	$33.79	$380.15
15	Mercer Parking Garage Corp	428016	165-167 Mercer Street	120	80	80	25	$ 12.67	$54.07	$600.00
16	Mott Park	1155049	284 Mott Street	62	24	40	50	$ 14.35	$33.79	$500.00
17	Edison NY Parking	926761	184 Ludlow Street	182	140	83	81	$ 10.98	$29.57	N/A
18	258-262 Lafayette	1248479	258 Lafayette Street	60	43	54	39	$ 21.12	$28.72	$380.00
19	Alexa QP	1340644	224 Mulberry Street	150	100	150	130	$ 12.67	$34.64	$506.86
20	Aspire One	1217279	81 Mercer Street	21	7	14	6	$ 25.00	$50.00	N/A
21	Park In Auto Services	1100556	75 Kenmare Street	190	NR	NR	NR	$ 10.00	$29.00	$400.00
22	Buzz Parking II	1241099	14-24 Kenmare Street	100	20	60	60	$ 14.36	$42.24	$506.86
23	Municiple Parking Garage		107 Essex Street	356	250	350	250	$ 3.00	N/A	$250.00
24	Municiple Parking Garage		Broom St btw Essex/Ludlow	65	17	36	18	$ 2.00	N/A	N/A
25	LES District Management Assoc	1220509	135 Delancey Street	294	235	265	205	$ 5.98	$21.97	$168.97
26	Broome Street Parking Lot	1234764	118 Clinton Street	48	41	46	40	N/A	N/A	$230.00

Utz - Utilization
NR – No Response
N/A – Not Applicable

6.3 On-Street Parking

On-street parking capacity varies by time of day due to parking regulations that range from alternate side of street parking to rush hour regulations. Figure 6-3 and table 6-2 show the study area on-street parking regulations and regulation codes respectively. These regulations determine the location of on-street parking, metered parking, commercial parking and authorized vehicle parking.

Figure 6-4 shows street segments where on-street parking is permitted during at least one peak period. On-street parking is allowed during at least one of the peak periods on almost every street east of the Bowery within the study area. Approximately 70% of the streets west of the Bowery do not allow parking during the peak hours to accommodate commercial truck loading/unloading and to maintain roadway capacity to process vehicular traffic.

There are approximately 3,475 on-street parking spaces in the study are, however only approximately 1,675, 2,115 and 2,140 legal spaces are available during the AM, MD and PM peak hours, respectively. The average parking utilization for the entire study area is approximately 91%, 102% and 102% during the AM, MD and PM peak hours respectively; see Figure 6-2.

Figure 6-2: On Street Parking Capacity and Utilization

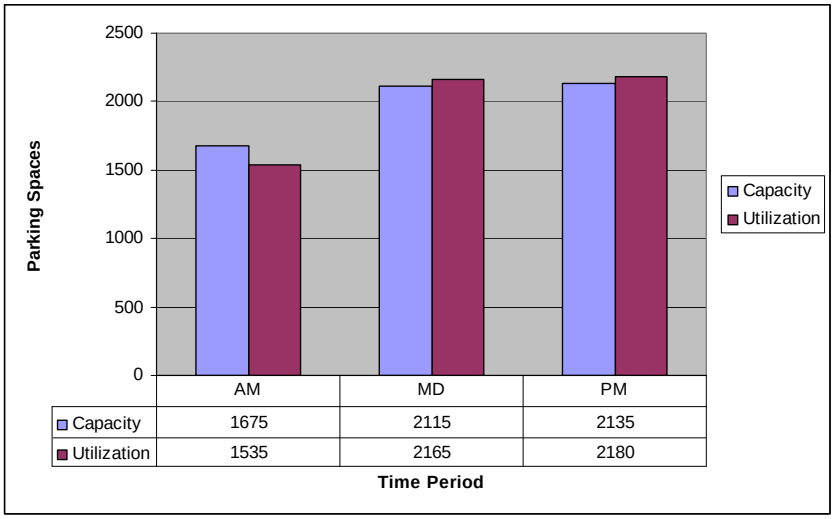
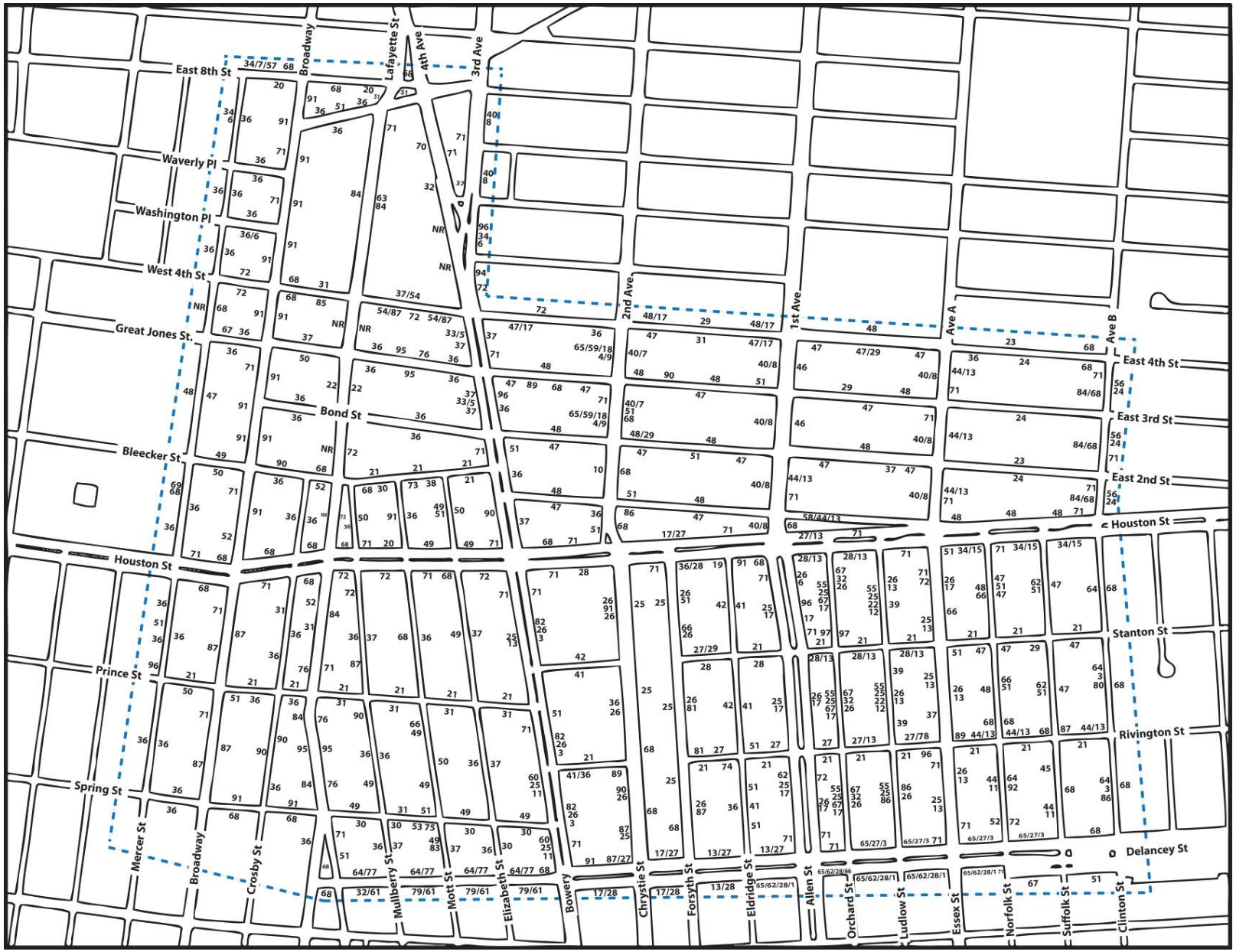


Figure 6-5. 6-6 and 6-7 show the utilization of each street segment in the study area during the AM, MD and PM peak periods respectively. Segments designated as “over capacity” had at least 5 cars more than the available capacity. Segments identified as under capacity had at least 5 cars less than the available capacity. Segments identified as “At Capacity” had less than 5 available spaces on the street segment.

Figure 6-3: Parking Regulations



e.g. 71 – No Standing Anytime, Bus

Table 6-2: Parking Regulation Codes

Code	Regulation	Time	Day
1	1 Hour Parking	1000a-400p	xSunday
2	1 Hour Parking	1000a-400p	Mon-Fri
3	1 Hour Parking	1000a-700p	xSunday
4	1 Hour Parking	700p-1000p	Mon-Fri
5	1 Hour Parking	730a-700p	xSunday
6	1 Hour Parking	800a-700p	xSunday
7	1 Hour Parking	830a-1000p	xSunday
8	1 Hour Parking	830a-700p	xSunday
9	1 Hour Parking	900a-1000p	Sat
10	1 Hour Parking	900a-1000p	xSunday
11	1 Hour Parking	900a-400p	xSunday
12	1 Hour Parking	900a-700p	Sat
13	1 Hour Parking	900a-700p	xSunday
14	1 Hour Parking	900a-700p	Sat
15	2 Hour Parking	800a-700p	xSunday
16	2 Hour Parking	900a-400p	xSunday
17	2 Hour Parking	900a-700p	xSunday
18	3 Hour Limit Commercial Vehicles Metered Parking	1000a-200p	Mon-Fri
19	Bus Layover Area, NS Anytime, MTA Buses		
20	Bus Stop		
21	No Stopping Anytime		
22	NP	700a-700p	Mon-Fri
23	NP	1100a-1230p	Mon, Thur
24	NP	1100a-1230p	Tue,Fri
25	NP	1200a-300a	Mon,Wed,Fri
26	NP	1200a-300a	Tue,Thur,Sat
27	NP	300a-600a	Mon,Wed,Fri
28	NP	300a-600a	Tue,Thur,Sat
29	NP	700a-400p	School Days
30	NP	700a-600p	xSunday
31	NP	700a-600p	Mon-Fri
32	NP	700a-700p	xSunday
33	NP	700a-730a	xSunday
34	NP	730a-800a	xSunday
35	NP	730a-800a	Tue,Fri
36	NP	800a-600p	Mon-Fri
37	NP	800a-600p	xSunday
38	NP	800a-600p	Inc Sun
39	NP	800a-700p	xSunday
40	NP	800a-830a	xSunday
41	NP	800a-930a	Tue,Fri
42	NP	800a-930a	Mon, Thur
43	NP	800a-930a	xSunday
44	NP	830a-900a	xSunday
45	NP	830a-900a	Mon,Thur
46	NP	830a-900a	Tue,Fri
47	NP	900a-1030a	Tue,Fri
48	NP	900a-1030a	Mon, Thur
49	NP	930a-1100a	Mon, Thur
50	NP	930a-1100a	Tue,Fri
51	NP Anytime		
52	NP Anytime, Temporary Construction Regulation		
53	NP Authorized Vehicles, Ambulance Only	800a-700p	xSunday
54	NS	1000p-600a	Inc Sun
55	NS	1100p-600a	Fri-Sun
56	NS	1100p-600a	Thur-Sun
57	NS	1100p-600a	Inc Sun
58	NS	1100p-900a	Inc Sun
59	NS	200p-700p	Mon-Fri
60	NS	400p-700p	xSunday
61	NS	400p-700p	inc Sun
62	NS	400p-700p	Mon-Fri
63	NS	600p-600a	Inc Sun
64	NS	700a-1000a	xSunday
65	NS	700a-1000a	Mon-Fri
66	NS	700a-400p	School Days
67	NS	800a-600p	Sun
68	NS Anytime		
69	NS Anytime Ex Buses with NYU Permit		
70	NS Anytime Ex Vehicles with NYP license Plates		
71	NS Anytime, Bus		
72	NS Anytime, Temporary Construction Regulation		
73	NS Ex Authorized Vehicles, Ambulance	700a-700p	Mon-Fri
74	NS Ex Authorized Vehicles, Ambulance		
75	NS Ex Authorized Vehicles, Doctor		
76	NS Ex Authorized Vehicles, Fire Department, Permits Only	800a-600p	Mon-Fri
77	NS Ex Trucks	1000a-700p	xSunday
78	NS Ex Trucks	1000a-700p	Inc Sun
79	NS Ex Trucks	700a-400p	xSunday
80	NS Ex Trucks L/UL	1000a-700p	Inc Sun
81	NS Ex Trucks L/UL	600a-600p	xSunday
82	NS Ex Trucks L/UL	700a-1000a	xSunday
83	NS Ex Trucks L/UL	700a-600p	xSunday
84	NS Ex Trucks L/UL	700a-600p	Mon-Fri
85	NS Ex Trucks L/UL	700a-700p	xSunday
86	NS Ex Trucks L/UL	700a-700p	Inc Sun
87	NS Ex Trucks L/UL	700a-700p	Mon-Fri
88	NS Ex Trucks L/UL	800a-500p	xSunday
89	NS Ex Trucks L/UL	800a-600p	xSunday
90	NS Ex Trucks L/UL	800a-600p	Mon-Fri
91	NS Ex Trucks L/UL		
92	NS Ex Trucks L/UL	1000a-600p	Mon-Fri
93	NS Ex School Buses	1000a-400p	School Days
94	NS, Access-a-Ride Bus Stop		
95	NS, Fire Zone		
96	NS, Hotel Loading Zone		
97	Orchard Street Pedestrian Mall, Vehicles Prohibited	800a-600p	Sun
NR	No Regulation (Construction underway)		

* NS – No Standing, NP – No Parking, L/UL – Loading and Unloading, ExSunday – Except Sunday

Figure 6-4: Permitted On-Street Parking by Peak Period

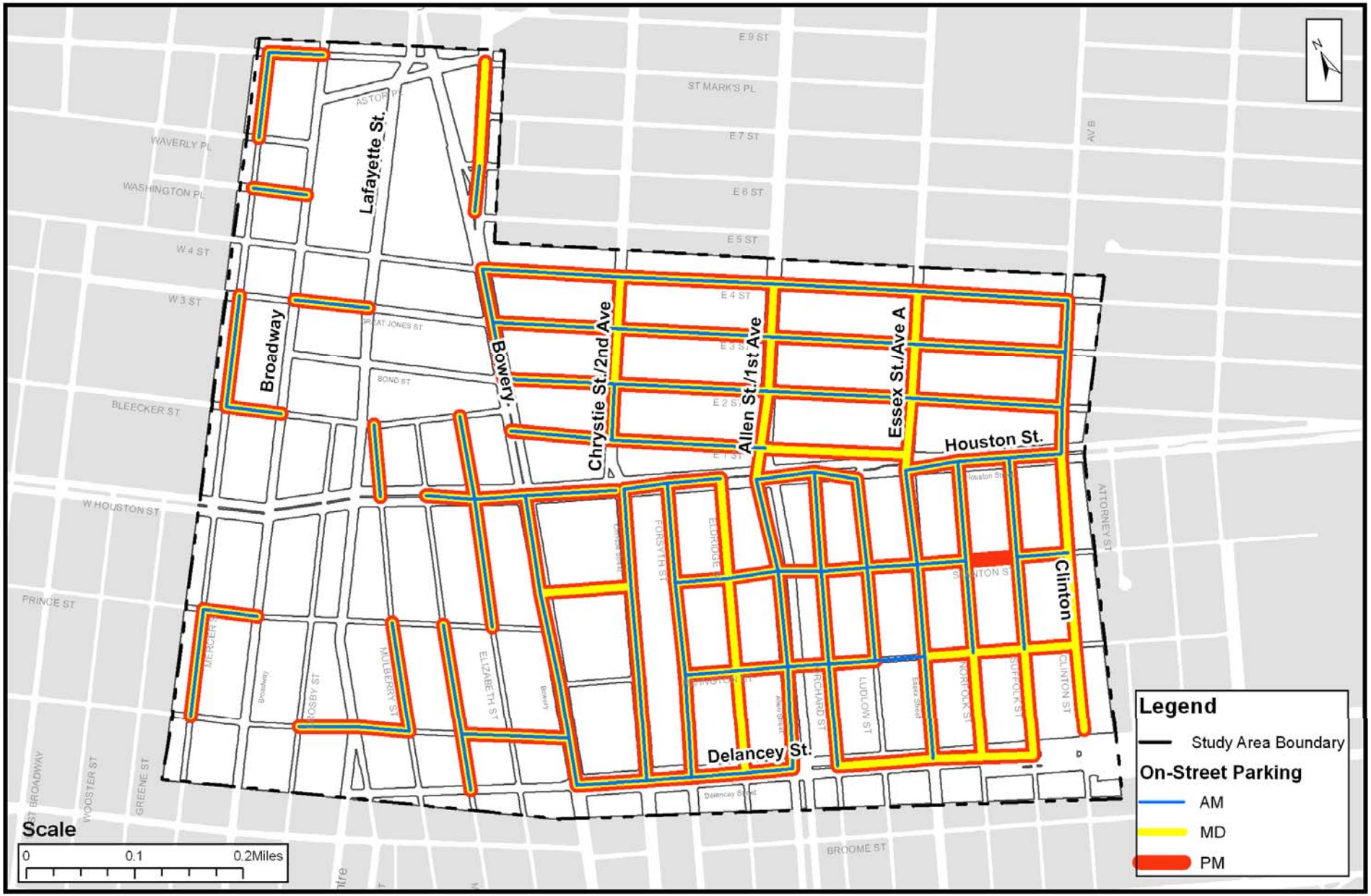


Figure 6-5: On-Street Parking; AM Utilization

Figure 6-6: On-Street Parking; MD Utilization

Figure 6-7: On-Street Parking; PM Utilization

Metered Parking

The NYC municipal parking meter system uses fees and time restrictions to encourage parking turnover in commercial areas. This can help shift some parking demand to off-street facilities. On-street metered parking in the study area costs $2.00 per hour with time limits between one and three hours. Metered parking is not in effect on Sundays. There are approximately 630 metered spaces in the study area, much of which exists east of the Bowery with concentrations along the Bowery south of Houston Street, Delancey Street, 1st Avenue, 2nd Avenue, Avenue A, Allen Street, Orchard Street, and Ludlow Street (see figure 6-5).

Truck Loading and Unloading

Special zones are designated in and around commercial areas for truck loading and unloading to service commercial establishments. These Truck Loading and Unloading (TL/U) zones are shown below in Figure 6-5. There are approximately 530, 540 and 515 truck loading/unloading spaces during the AM, MD and PM peak hours, respectively. Some TL/U regulations are only in effect during the AM peak hours such as the east side of the Bowery south of Houston Street, while others are in effect at all times, such as those on Broadway north of Houston Street. Additional concentrations of truck loading/unloading zones occur along Kenmare Street and Lafayette Street between Astor Place and W. 4th Street.

Truck loading and unloading zone utilization was 31%, 40% and 29% during the AM, MD and PM peak hours, respectively. This is much lower than other on-street parking utilization. This could be due to faster turnover of trucks making deliveries as well as delivery times not coinciding with the peak periods.

The survey revealed a lack of truck loading/unloading space on Chrystie Street between Stanton Street and Rivington Street and on Delancey Street between Chrystie Street and the Bowery where multiple commercial vehicles were standing during the AM, MD and PM peak hours. As a result of the recent rerouting of the M9 bus additional Truck Loading/Unloading spaces on Avenue B between East 4th Street and Houston are available during the AM, MD and PM peak hours where limited commercial activity was observed.

Figure 6-8: Metered Parking and Truck Loading Zones

Parking by Location

The parking activity, based on the type of parking regulations, the availability of off-street parking (supply), demand/utilization and cost, when viewed spatially result in three distinct areas with different parking characteristics (See figure 6-9). Table 6-3 shows the on-street, off-street and truck loading zones capacity and utilization for the AM, MD and PM peak periods.

A cursory glance at the information reveals that the on street parking demand far exceeds capacity in Section 1. In Section 2 demand is more in line with capacity while section 3 generally has spare capacity. The off street parking has an almost inverse relationship to the on street parking with Section 3 having the highest demand.

Figure 6-9: Parking Characteristic Areas

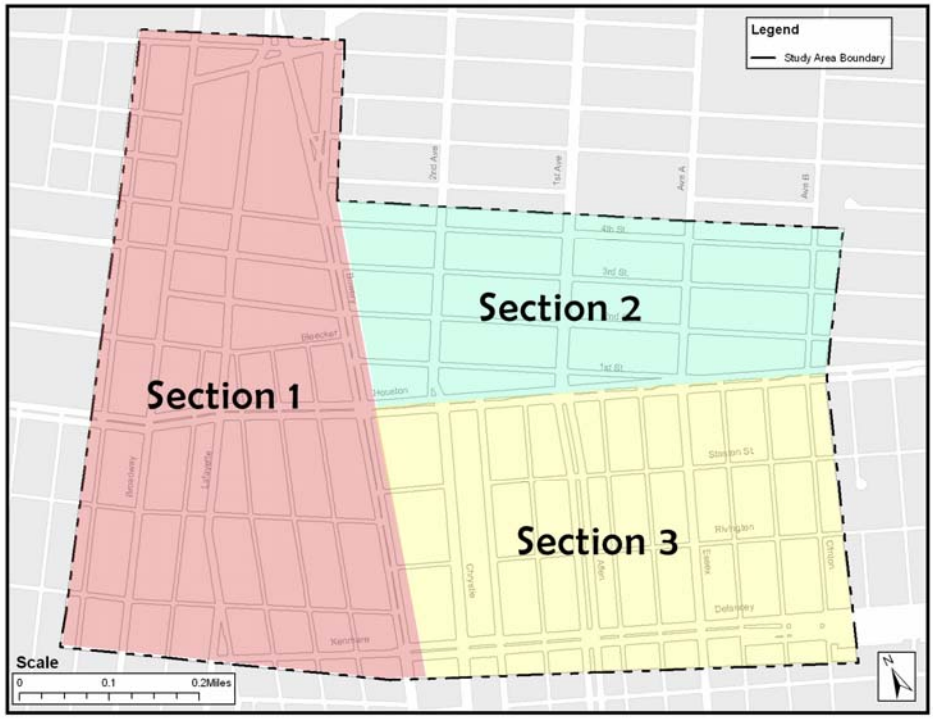


Table 6-3: Parking Supply and Demand

		On Street Parking			Truck Loading and Unloading			Off Street Parking		
		AM	MD	PM	AM	MD	PM	AM	MD	PM
Section 1	Capacity	337	378	375	419	408	385	2,500	2,500	2,500
	Utilization %	142%	157%	155%	31%	42%	29%	75%	69%	58%
Section 2	Capacity	705	860	870	25	25	20	169	169	169
	Utilization %	81%	99%	98%	8%	24%	15%	8%	24%	15%
Section 3	Capacity	635	880	890	90	110	110	945	945	945
	Utilization %	77%	83%	84%	39%	36%	32%	72%	83%	63%

Section 1 encompasses the area west of the Bowery (including the Bowery) and contains 69% of *off-street parking* capacity in the study area (in 19 garages/lots). Many streets in this section are designated truck loading/unloading zones and consequently have much less *on-street parking* than other parts of the Study Area. The peak utilization maps (figures 6-5 through 6-7) show many segments over capacity during all peak periods. The average demand is over 140% of available capacity. Illegal parking was observed on many roadway segments in this section

Section 2 which is east of the Bowery and north of Houston Street, has only two *off-street parking* facilities or 5% of the area's off street parking capacity. They are both located on 1st Street near the Bowery. On-street metered parking exists along the Avenues while the side streets (1st, 2nd, 3rd and 4th street) has many free on-street parking spaces. The parking demand on side streets is generally below capacity in the AM peak, over capacity during the MD peak and at capacity during the PM peak period. The Avenues generally remain at or under capacity during all the peak periods.

Section 3 which is east of the Bowery and south of Houston Street (including Houston Street) has five *off-street parking* facilities or 26% of the area's off street parking. Two facilities are located along Essex Street and three are along Delancey Street. On-street metered parking exists along Allen, Ludlow and Orchard Streets while truck loading zones exist along Chrystie and Forsyth Streets. Peak demand show on many streets in this section is less than capacity during the three weekday peak periods. On average, this section has the lowest parking utilization/demand during all weekday peak periods.

7 Pedestrians and Bicycles

7.1 Introduction

When considering various modes of travel, walking and bicycle share can be significant and play a vital role in managing congestion. NYC has one of the highest "walk" mode shares of all major cities in the United States for journey to work. This is even more so in Manhattan which has a much higher walk mode share than the other four boroughs. Also NYC has expressly encouraged bicycle usage, which is at an all-time high due in part to the city's initiatives to increase the number of bicycle facilities and improve safety for bicyclists throughout the city. Consistent with the objective of improving access and mobility for all street users, this section examines the existing pedestrian and bicycle activity and the adequacy of existing facilities to satisfy existing and future demand.

7.2 Existing Pedestrian Analysis

All person trips generated by land uses within the study area contain a walking component either at the beginning or end of the trip. Each person trip contributes to the pedestrian volumes on sidewalks and crosswalks. Pedestrian trips/volumes tend to be more dispersed in residential and industrial areas and more concentrated around institutional buildings, transit hubs and commercial/retail districts. Significant pedestrian activity was observed along the following corridor: Broadway, Lafayette Avenue, the Bowery, Houston Street and Delancey Street. The New York University facilities, located in the northwest corner of the study area, also generate significant pedestrian trips.

To assess pedestrian activities in the study area pedestrian counts were conducted in 15 minute increments at six locations during the AM (8:00-9:00), MD (12:30-1:30) and PM (5:00-6:00) peak hours. The pedestrian analysis focused on crosswalks and corners at the following locations:

- Astor Place & 4th Avenue/Bowery
- Bleecker Street & Lafayette Avenue
- Houston Street & Broadway
- Houston Street & Bowery (weekday only)
- Houston Street & Allen Street/1st Avenue
- Delancey Street & Essex Street (weekday only)

The AM, MD, PM and Saturday peak hour pedestrian volumes are shown in figures 7-1, 7-2, 7-3 and 7-4 respectively

Figure 7-1: Pedestrian Volume – AM Peak Hour

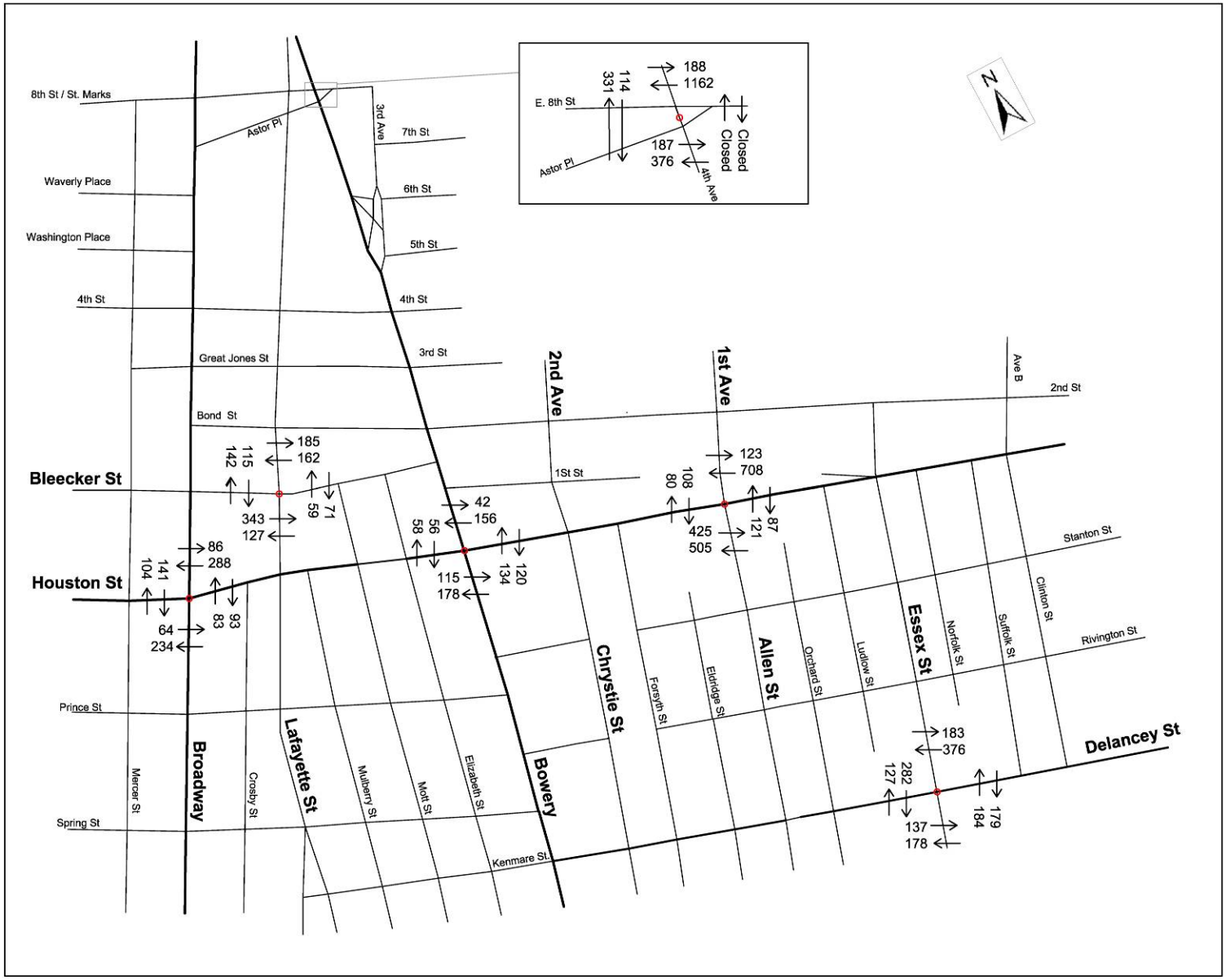


Figure 7-2: Pedestrian Volume – MD Peak Hour

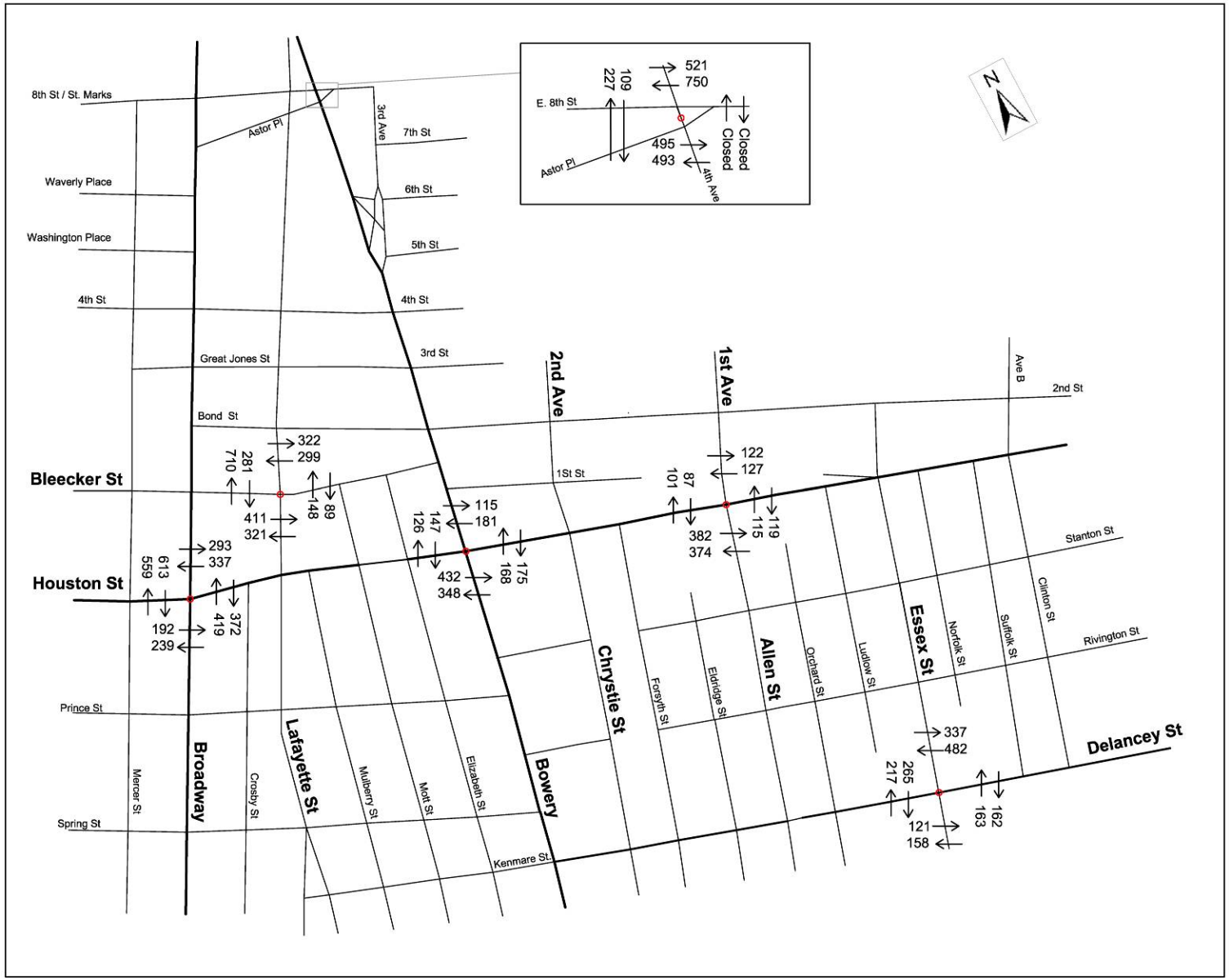


Figure 7-3: Pedestrian Volume – PM Peak Hour

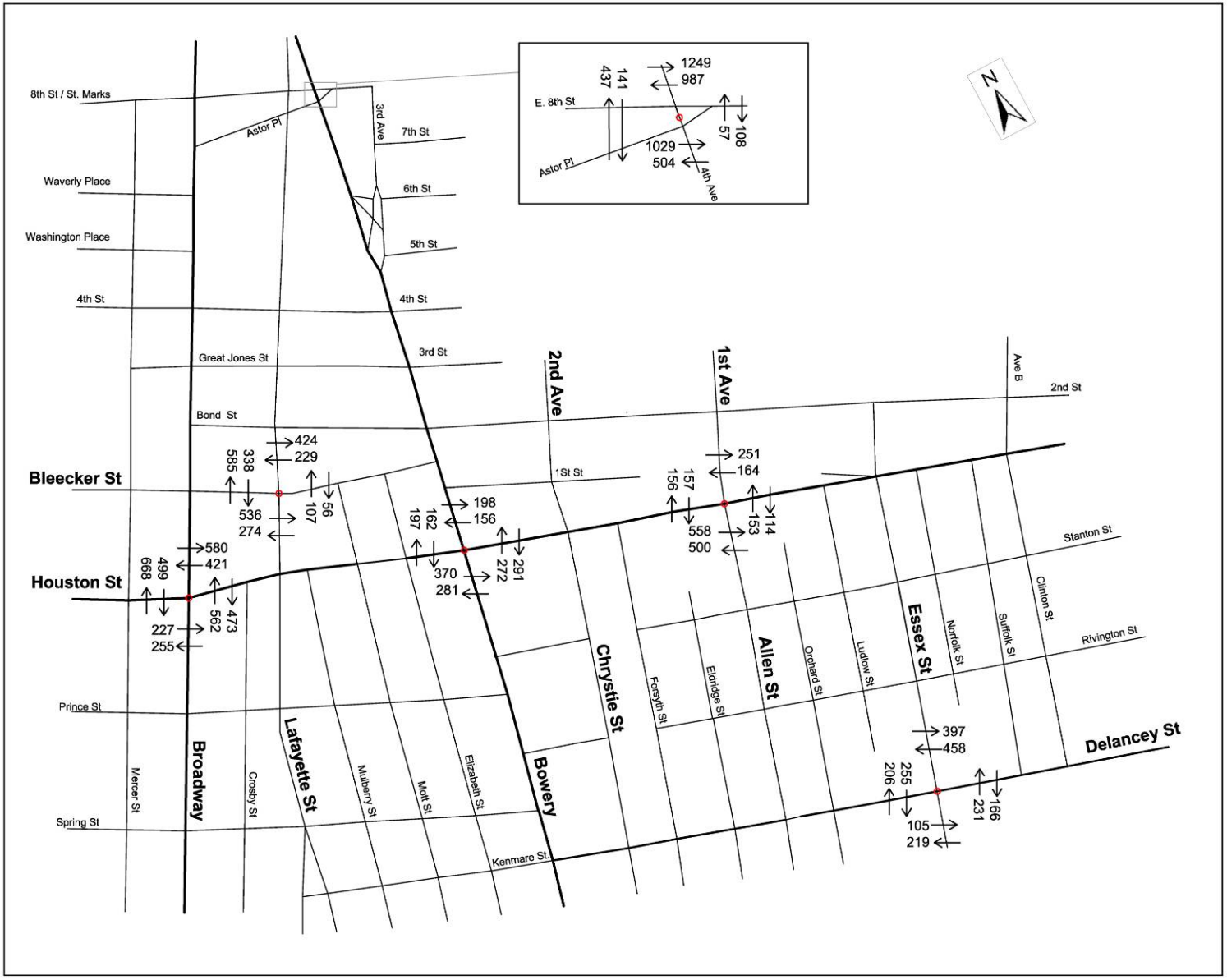
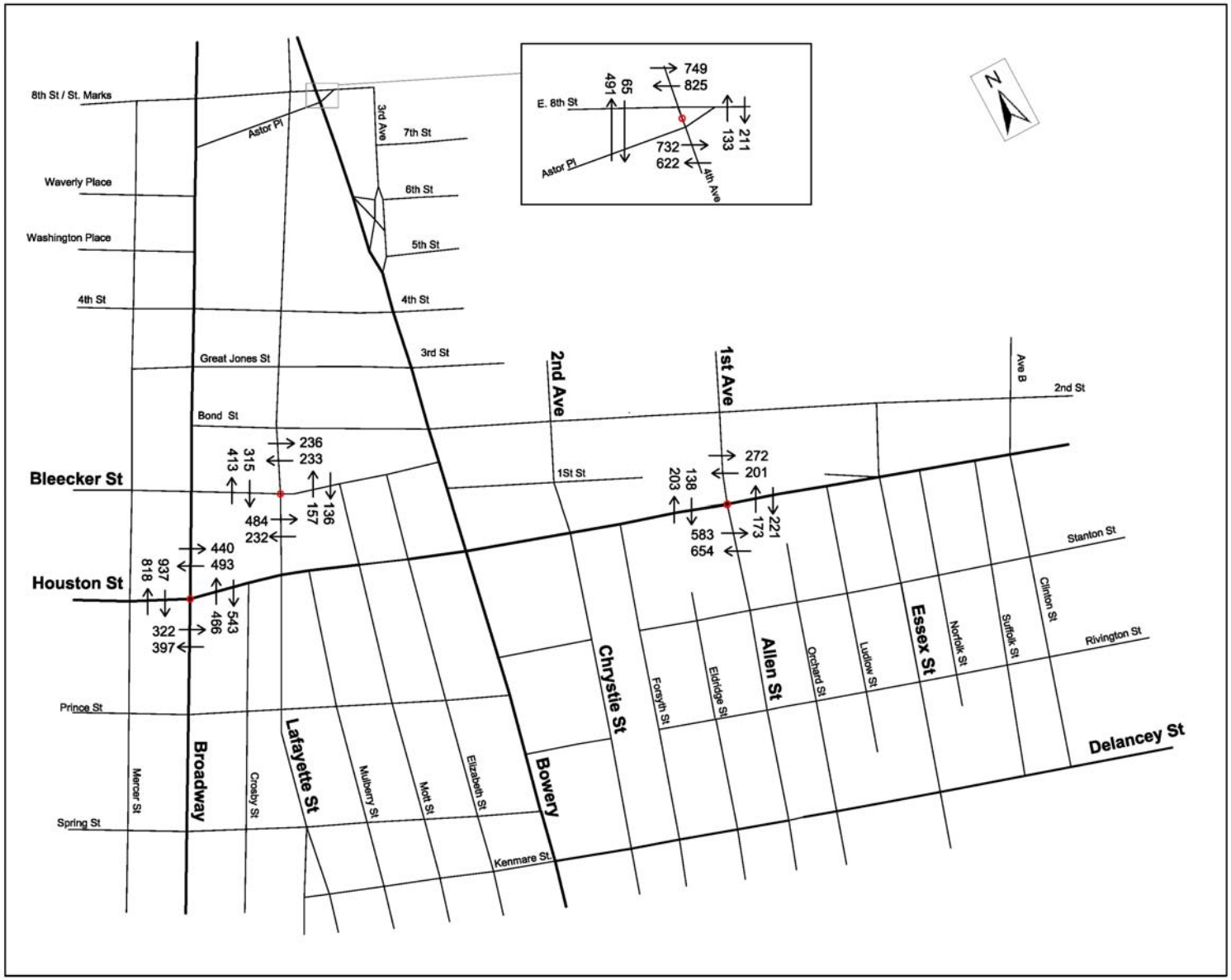


Figure 7-4: Pedestrian Volume – Sat Peak Hour



In addition to the traditional pedestrian counts, an additional 20 locations were observed and evaluated for each peak period and a Friday night from 10:30pm to 1:00am. The pedestrian volumes were used to create pedestrian flow diagrams shown in figures 7-4 through 7-7. The maps were derived by taking pictures of pedestrian activity at the regular count locations to capture pedestrian density which was related to the counts. Pictures were then taken at other locations/sidewalk segments and compared with counted location density to estimate pedestrian volumes. The corridors that recorded the heaviest pedestrian volumes are Broadway, E. 8th Street, Houston Street and Delancey Street.

Broadway, which contains significant retail/commercial space, with transit stops at 8th, Houston and Prince Streets, attracts many pedestrian trips. Pedestrian volumes along Broadway were observed to increase steadily during the day, peaking during the PM peak hour.

E. 8th Street between Broadway and 3rd Avenue recorded the highest pedestrian volumes in the study areas during all peak periods. Pedestrian volume ranged from approximately 2,000 peds/hour in the AM to 3,500 peds/hour in the PM peak. NYU and Cooper union campuses are situated near this roadway segment with two subway stations in this area (Astor Street and 8th Street/NYU).

Houston Street west of the Bowery, is busiest during the AM peak period with pedestrians exiting/entering the 2nd Avenue subway station at Allen Street. West of the Bowery, pedestrian volumes gradually increase throughout the day peaking during the PM period. Volumes increase on Houston Street near Broadway where the Broadway/Lafayette subway station exists.

Pedestrian volumes on *Delancey Street* are relatively constant throughout the three peak periods with entries and exits from the Essex Street subway station, the Williamsburg Bridge entrance and the proximity to clubs, shops and restaurants in the Lower East Side.

Figure 7-5: Pedestrian Volume - AM

Figure 7-6: Pedestrian Volume - MD

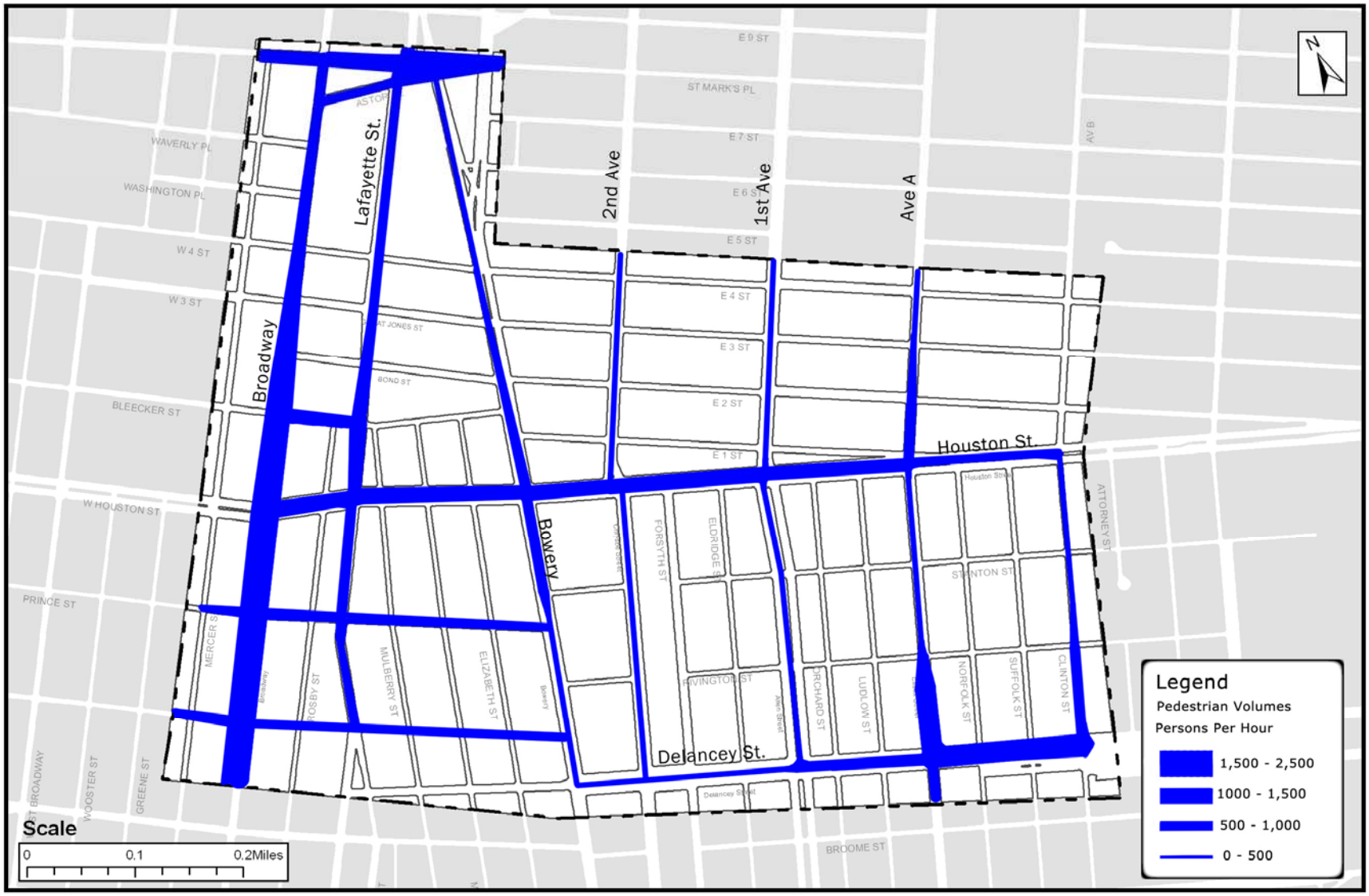


Figure 7-7: Pedestrian Volume - PM

Figure 7-8: Pedestrian Volume – Late Night Weekend

7.3 Pedestrian Level of Service

The pedestrian level of service (LOS) analysis was conducted using the 2000 Highway Capacity Manual methodology. Pedestrian LOS is measured as the pedestrian flow rate per minute per foot of width (p/min/ft). This indicates the quality of pedestrian movement and comfort, and is defined in a density-comfort relationship. LOS criteria for crosswalks and corners, which are measured in square feet of space per pedestrian, are shown in Table 1.

Table 7-1: Level of Service Definitions for Pedestrians

LOS	Descriptions	Space (ft^2/persons)	Flow Rate (persons/min/ft)	Speed (ft/sec)	volume/capacity Ratio
A	Unrestricted	> 60	< or = 5	> 4.25	< or = 0.21
B	Slightly restricted	40 – 60	5 – 7	4.17 – 4.25	0.21 – 0.31
C	Restricted, but fluid	24 – 40	7 – 10	4.00 – 4.17	0.31 – 0.44
D	Restricted; necessary to continuously alter walking stride and direction	15 – 24	10 – 15	3.75 – 4.00	0.44 – 0.65
E	Severely restricted	8 – 15	15 – 23	2.50 – 3.75	0.65 – 1.00
F	Forward progress only by shuffling; no reverse movement possible	< or = 8	Variable	< or = 2.50	Variable

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

Crosswalk Analysis:

Table 7-2 provides a summary of the pedestrian crosswalk analysis. The pedestrian analysis of crosswalks shows that 20 of the 24 crosswalks at the six studied intersections operated at an acceptable LOS of C or better. However, there were three intersections where one or more crosswalks operated at LOS D or worse during one or more peak hours:

- Astor Place & 4th Avenue/Bowery – North: AM (D), Midday (D), PM (E), Saturday (D)
- Houston Street & Allen Street/1st Avenue – North: AM (D), Saturday (E); South: AM (D), PM (D), Saturday (D)
- Houston Street & Broadway – West: Midday (D), PM (D), Saturday (E)

Table 7-2: Existing Crosswalk Level of Service

Intersection	Crosswalk	AM		MD		PM		Sat	
		SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
4th Avenue/Cooper Square & 8th Street/Astor Place	North	19.2	D	21.3	D	12.1	E	17.9	D
	South	57.7	B	42.7	B	25.7	C	33.3	C
	East	Closed	N/A	Closed	N/A	300.0	A	181.9	A
	West	126.2	A	99.3	A	107.2	A	108.1	A
Allen Street & Houston Street	North	23.9	D	89.3	A	50.0	B	14.9	E
	South	22.4	D	31.3	C	21.7	D	17.2	D
	East	153.4	A	130.0	A	133.7	A	106.8	A
	West	167.6	A	172.8	A	106.8	A	59.0	B
Bowery & Houston Street	North	147.9	A	104.0	A	69.1	A	x	x
	South	89.2	A	39.4	C	35.8	C	x	x
	East	81.5	A	59.0	B	41.7	B	x	x
	West	192.1	A	106.0	A	62.9	A	x	x
Broadway & Houston Street	North	140.0	A	104.0	A	69.1	A	68.3	A
	South	178.7	A	130.1	A	114.0	A	84.0	A
	East	335.2	A	74.1	A	54.8	B	62.5	A
	West	92.7	A	22.7	D	23.7	D	14.5	E
Essex Street & Delancey Street	North	188.6	A	123.9	A	114.0	A	x	x
	South	239.6	A	276.9	A	255.4	A	x	x
	East	86.0	A	90.9	A	78.0	A	x	x
	West	72.6	A	64.9	A	75.5	A	x	x
Lafayette Street & Bleecker Street	North	76.6	A	48.1	B	38.9	C	46.3	B
	South	61.6	A	36.8	C	36.5	C	42.5	B
	East	383.5	A	222.6	A	302.6	A	178.7	A
	West	245.7	A	64.2	A	67.8	A	89.1	A

x – no data recorded

Corner Analysis:

The pedestrian analysis of corners shows that all corners at the six studied intersections operated at an acceptable LOS of C or better. See Table 7-3.

Table 7-3: Existing Corner Level of Service

Intersection	Corner	AM		MD		PM		Sat	
		SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
4th Avenue/Cooper Square & 8th Street/Astor Place	NE	78.2	A	99.3	A	57.0	B	67.9	A
	NW	48.6	B	54.5	B	30.4	C	42.6	B
	SE	315.6	A	231.8	A	127.0	A	145.3	A
	SW	141.8	A	125.2	A	75.2	A	95.7	A
Allen Street & Houston Street	NE	243.5	A	560.6	A	389.5	A	167.7	A
	NW	80.9	A	183.0	A	109.8	A	55.8	B
	SE	34.3	C	44.1	B	34.5	C	26.1	C
	SW	76.1	A	101.8	A	64.6	A	48.9	B
Bowery & Houston Street	NE	282.0	A	201.9	A	149.4	A	x	x
	NW	401.6	A	312.3	A	197.1	A	x	x
	SE	247.4	A	145.2	A	120.8	A	x	x
	SW	317.7	A	147.5	A	123.9	A	x	x
Broadway & Houston Street	NE	369.6	A	202.7	A	146.9	A	151.9	A
	NW	155.9	A	65.1	A	57.0	B	40.3	B
	SE	261.9	A	178.5	A	141.7	A	137.8	A
	SW	423.4	A	168.2	A	158.0	A	104.1	A
Essex Street & Delancey Street	NE	144.3	A	127.2	A	114.0	A	x	x
	NW	131.6	A	109.4	A	102.8	A	x	x
	SE	196.7	A	227.6	A	193.7	A	x	x
	SW	148.5	A	163.1	A	160.5	A	x	x
Lafayette Street & Bleecker Street	NE	221.5	A	146.9	A	143.5	A	131.5	A
	NW	175.1	A	75.9	A	74.1	A	88.3	A
	SE	342.7	A	205.5	A	213.3	A	208.1	A
	SW	163.4	A	65.8	A	66.7	A	82.6	A

x – no data recorded

7.4 Bicycle Facilities

The study area has an extensive bicycle network (existing and planned) as shown in the current New York City Cycling Map (See figure 7-8). There are currently seven on-street Class 2 striped bicycle lanes in the study area. They are along 4th Avenue/ Lafayette Street, Bleecker Street, Prince Street, 2nd Street between Bowery and 2nd Avenue, 1st Street, 2nd Avenue/ Chrystie Street, Stanton Street, Rivington Street and Avenue A. There is one Class 1 (separated on-street) bicycle facility on Allen Street and one Class 3 (signed) bicycle route on Bowery between Prince Street and 2nd Street. Bicycle routes are planned for Broadway and Houston Street east of Chrystie Street.

There are 182 bicycle racks in the study area with another 231 pending installation. The existing bicycle racks are concentrated along Allen Street and Broadway in high pedestrian volume areas and around major trip generators and public spaces. Many proposed bicycle racks will be installed along the 1st Avenue, 2nd Avenue and Avenue A in the northeast section of the study area. Figure 7-9 shows the location and capacity of the existing bicycle racks.

In an effort to monitor non-motorized modes of transportation, a comprehensive data-collecting effort was undertaken by the New York Metropolitan Transportation Council (NYMTC). The NYMTC Bicycle Data Collection Program surveyed bicyclists, rollerbladers, joggers, walkers, and other non-motorized mode users during peak periods at 476 locations over six years. The following six on-street count locations monitored in 2004, 2005, or 2008 are within the study area:

- Houston Street & Avenue A (2004)
- Houston Street & 1st Avenue (2004)
- Houston Street & 2nd Avenue (2004)
- Houston Street & Broadway (2004)
- Prince Street & Broadway (2005)
- Delancey Street & Clinton Street (2008)

Additionally, bicycle counts were conducted in 2011 by NYCDOT at 3 locations in the study area; Stanton Street between Ludlow and Essex Street, Rivington Street between Ludlow and Essex Street and Suffolk Street between Stanton and Rivington Street.

The AM (8:00 – 9:00), MD (12:00 – 1:00), and PM (5:00 – 6:00) bicycle counts are shown in figures 7-10, 7-11 and 7-12.

Figure 7-9: Bicycle Facilities

Figure 7-10: Bicycle Rack Locations

Figure 7-11: Bicycle Volumes AM (8AM – 9AM)

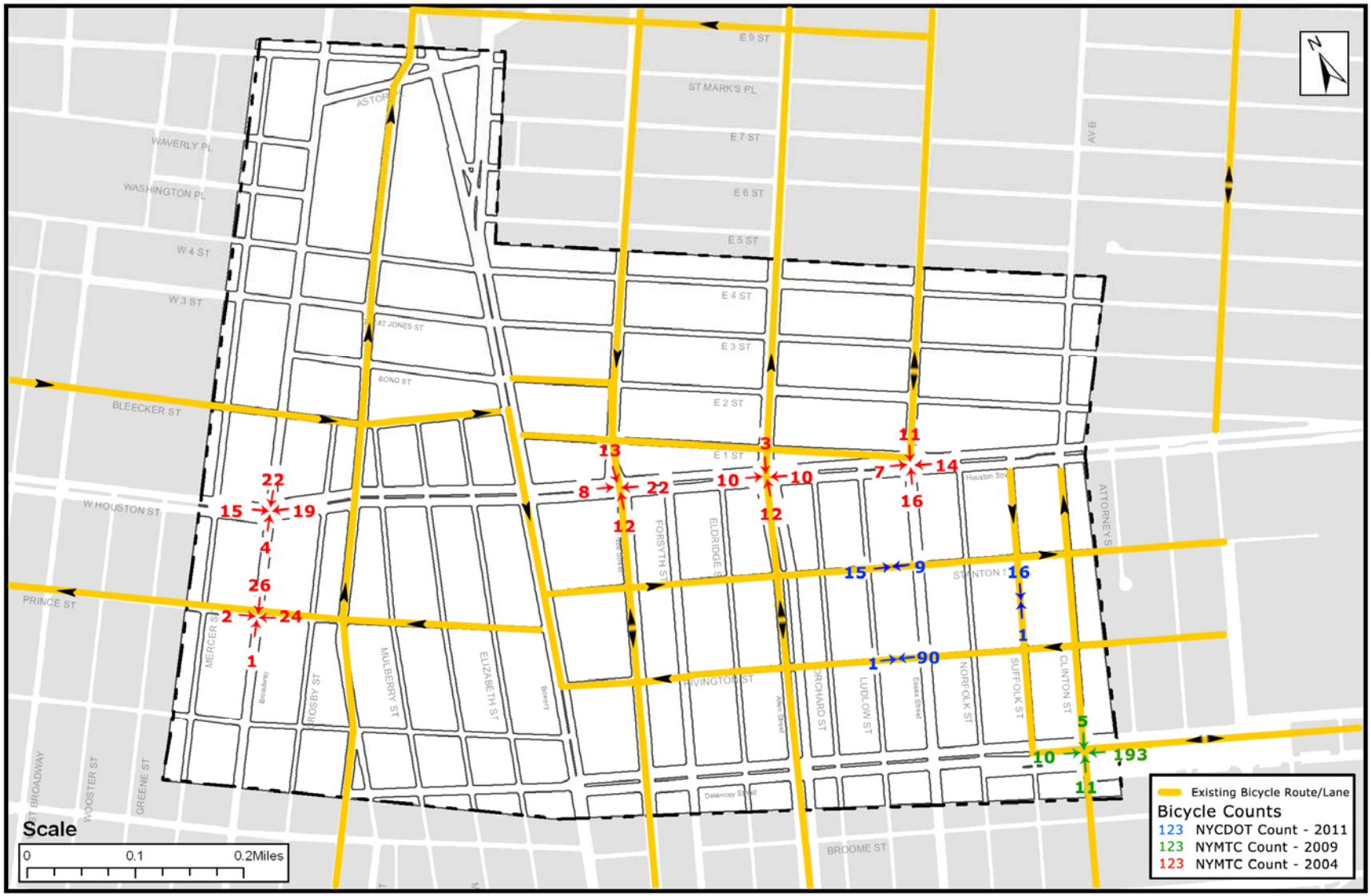


Figure 7-12: Bicycle Volumes MD (1pm - 2pm)

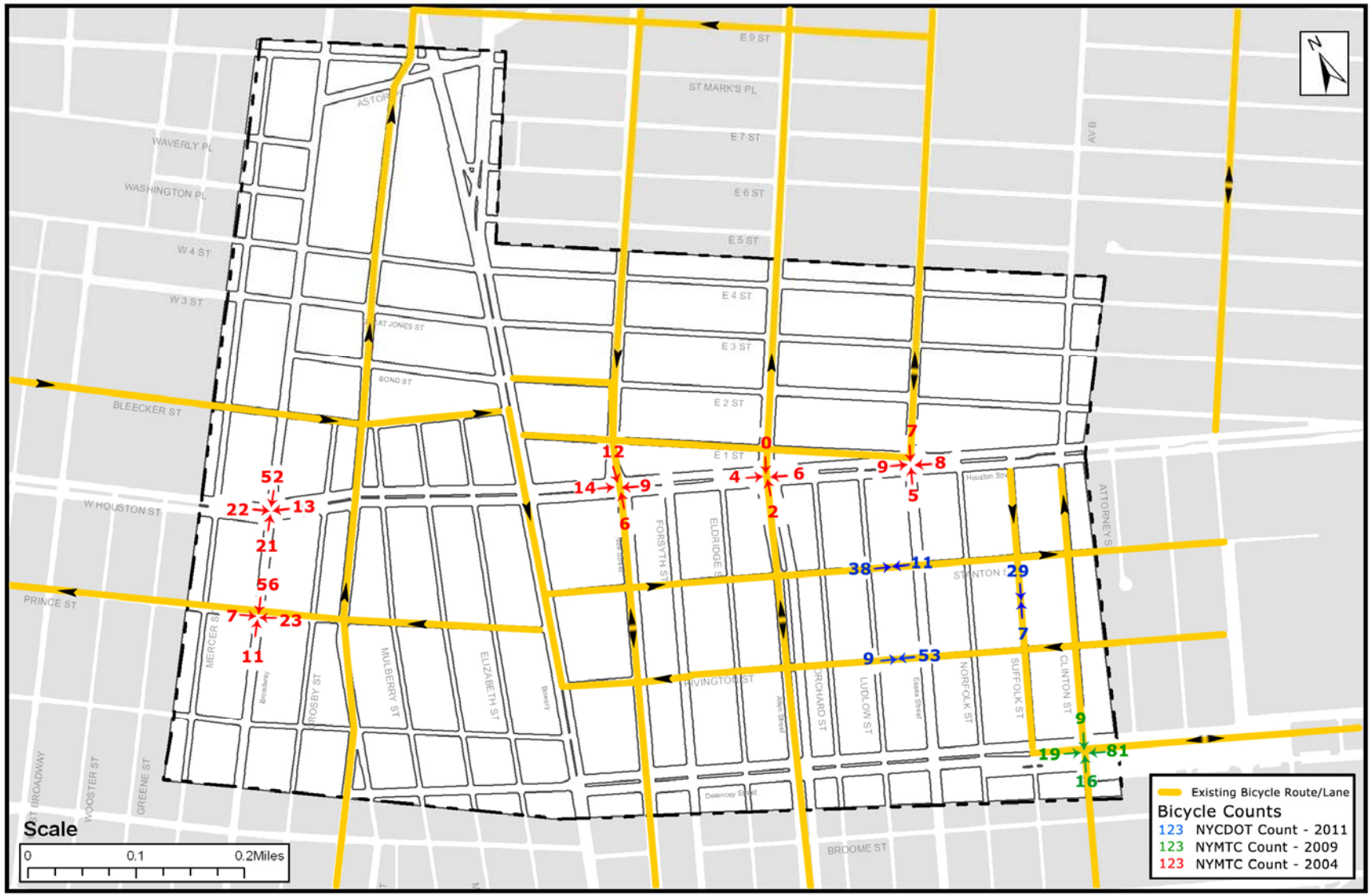
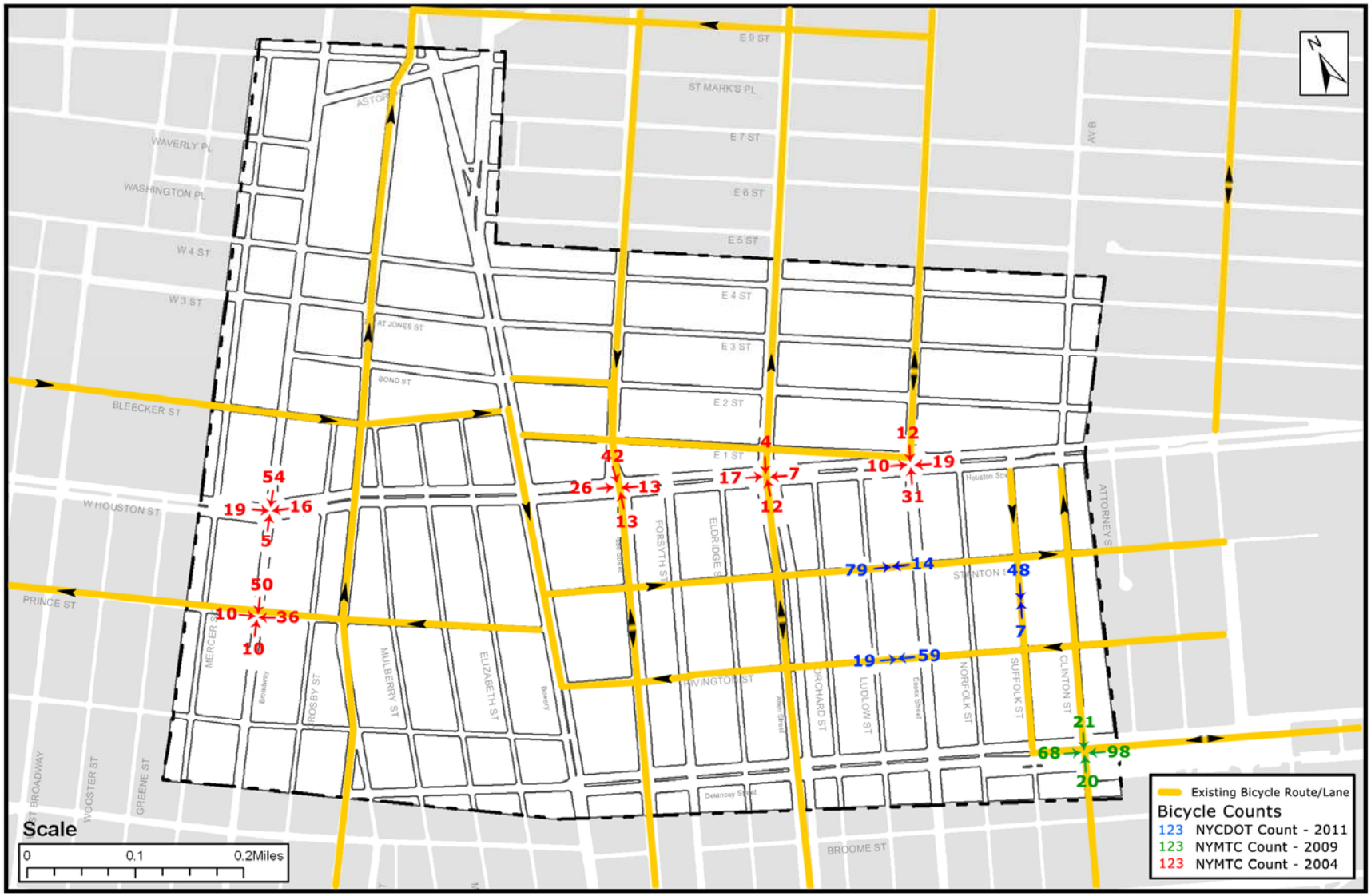


Figure 7-13: Bicycle Volumes PM (5pm - 6pm)



8 Accidents/Safety Analysis

8.1 Introduction

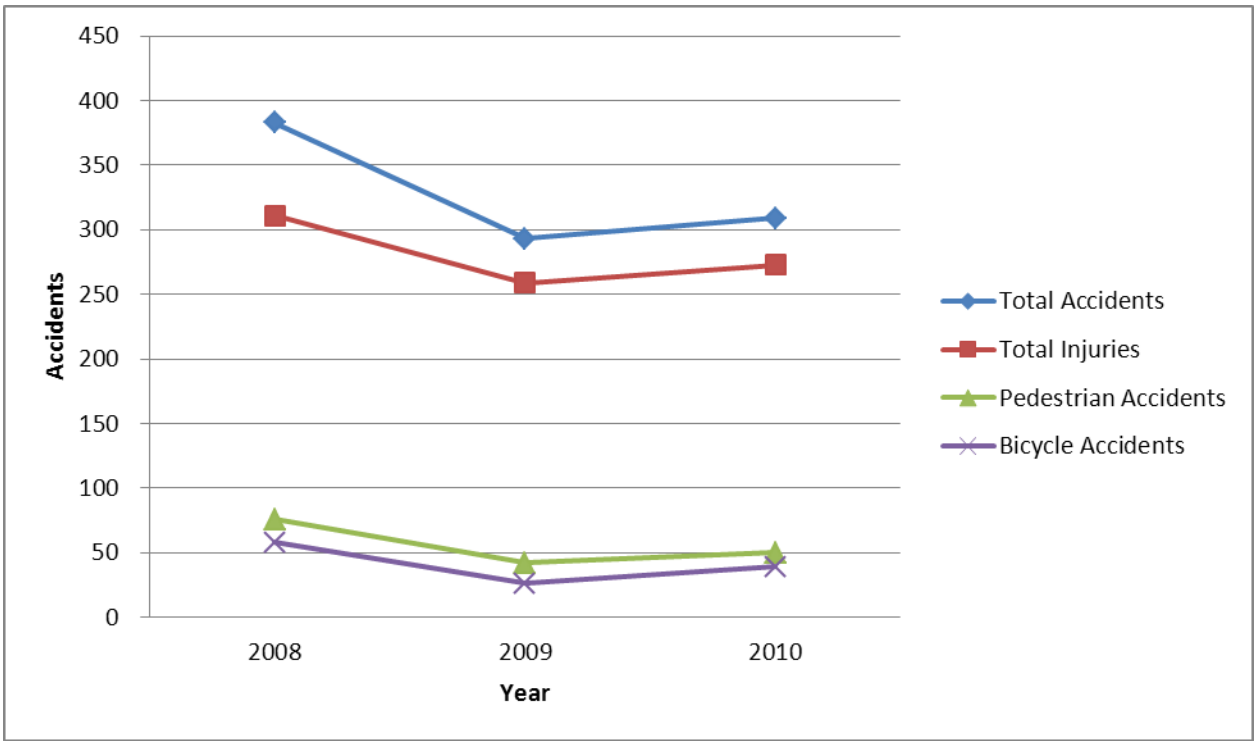
The analysis of accidents and safety is an important component in traffic and transportation planning studies, as transportation related accidents can lead to loss of life and/or property damage. The purpose of this analysis is to identify safety issues and if necessary recommend measures to address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

In order to identify locations with accident and safety issues in the study area, it was necessary to examine the accident history for patterns. Accident data for the most recent three years (2008 to 2010) was assembled and analyzed. These records were collected from the New York City Department of Transportation (NYCDOT) accident database, which includes data from the New York State Department of Motor Vehicle (NYSDMV) and New York City Police Department (NYPD). The data provides information on location, severity, collision type, time of accident, and other pertinent factors such as weather conditions.

8.2 Accidents 2008-2010

Accident records were examined for 97 intersections within the study area for the period 2008-2010. There were 985 accidents resulting in 840 injuries to the driver or vehicle passenger, 168 pedestrian injuries and 123 bicyclist injuries between 2008 and 2010. The data shows that total reportable accidents decreased 32% from 2008 to 2009 and increased 5% from 2009 to 2010. A similar pattern can be seen with respect to injuries, pedestrian accidents, and bicycle accidents. Figure 8-1 shows the total reportable accidents that occurred at the 97 analyzed intersections from 2008 to 2010.

Figure 8-1: Accidents by Year



Pedestrians were involved in 20% of all accidents in the study area while bicyclists were involved in 13% between 2008 and 2010. Eight percent of all injuries were severe Type A injuries (involved a bleeding wound or the person was carried away from the scene), 15% were type B injuries (bruises) 77% were type C severity (no visible injuries), while 303 accidents involved property damage only ($1,000 damage or more). The three most common collision types were rear end accidents (16%) overtaking (12%) and right angle accidents (7%). Sixteen percent of the accidents occurred during wet roadway conditions, while 36% of all accidents occurred during non-daylight hours (night-time).

Table 8-1: Study Area Injury Severity (2008 – 2010)

Type A	Type B	Type C
8%	15%	77%

8.3 High Accident Locations

After reviewing all intersections in the study area for the most recent three years (2008-2010), five intersections were identified as "High Accident Locations"; which is characterized as five or more pedestrian accidents or 23 or more reportable accidents in any one year between 2008 and 2010. Four of the intersections are on Delancey Street at the Bowery, Clinton Street, Essex Street and Chrystie Street. The fifth location is the intersection of Avenue A and 1st Street. See Table 8-3.

Table 8-2: High Accident Locations (2008-2010)

Intersection	Total Accidents			Injuries			Pedestrian Accidents			Bicycle Accidents		
	2008	2009	2010	2008	2009	2010	2008	2009	2010	2008	2009	2010
Delancey St./ Chrystie St.	16	14	27	13	15	29	2	1	5	2	0	1
Delancey St./ Bowery	12	25	7	13	19	10	1	4	0	2	1	1
Delancey St./ Clinton St.	9	27	19	6	30	17	0	2	1	0	2	5
Delancey St./ Essex St.	18	23	24	16	25	24	7	7	2	3	1	2
Avenue A/1st Street	6	7	12	5	4	9	2	0	5	0	3	2

Table 8-3 shows some basic accident related statistics for the five "High Accident Locations and figure 8-1 shows the location of the High Accident Locations in addition to locations with fatalities from 2008 – 2010. The Delancey Street/Clinton Street intersection recorded the highest number of rear end crashes in the study area and the highest number of type A injuries.

Table 8-3: High Accident Location Statistics (2008-2010)

Intersection	Injury Type			Collision Type			Time of Day			
	A	B	C	Rear End	Overtaking	Right Angle	AM	Midday	PM	Night
Delancey St./Chrystie St	3	8	46	12	4	6	8	4	7	25
Delancey St./Bowery	2	3	37	4	7	7	5	6	6	23
Delancey St./Clinton St.	9	4	36	24	6	1	4	10	9	18
Delancey St./Essex St.	6	14	45	6	7	5	8	9	12	15
Ave A/1st St.	3	0	14	0	0	0	4	2	2	9

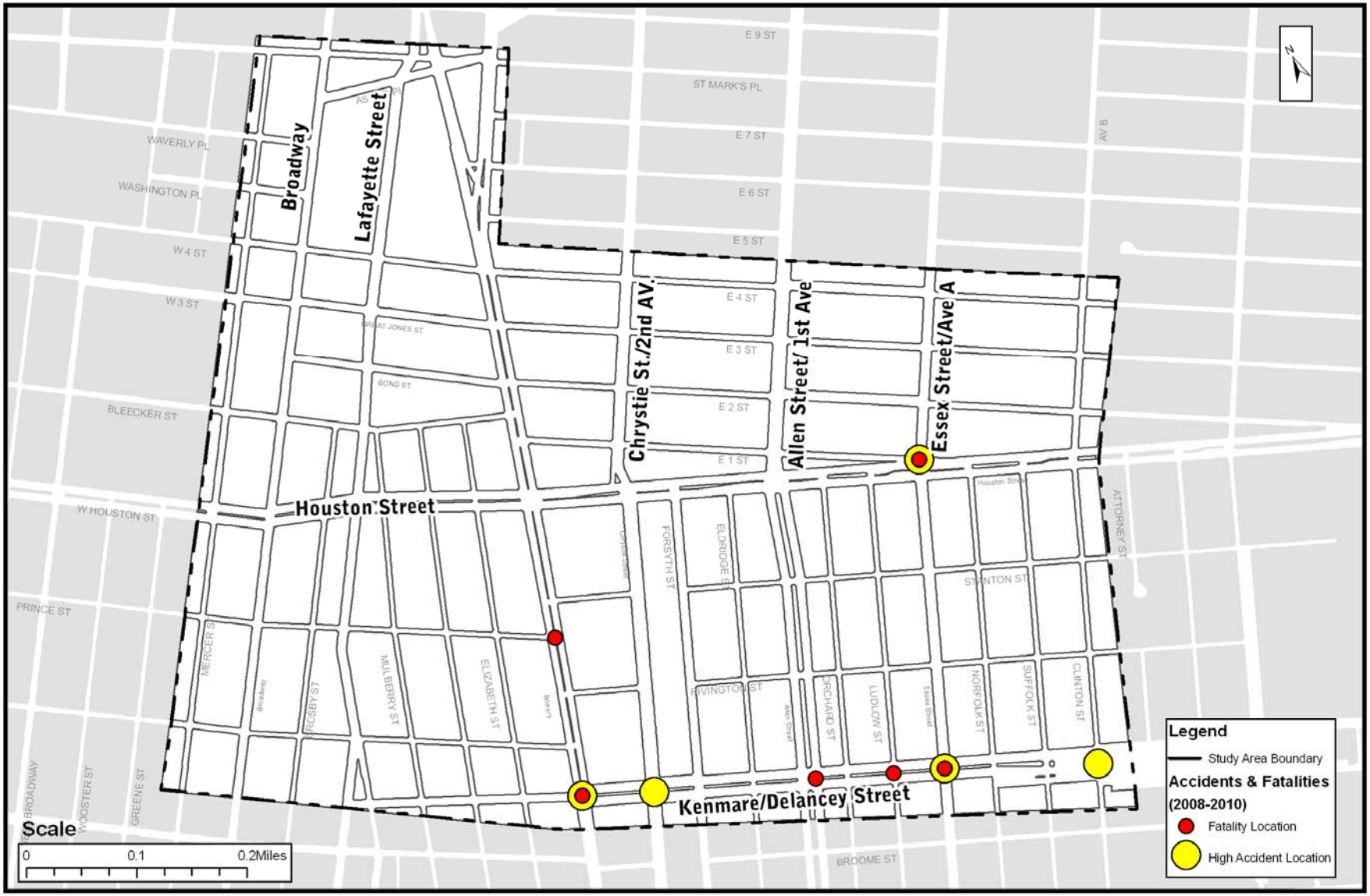
8.4 Fatalities & Injuries

Between 2008 and 2010, there were 6 fatalities in the study area; four pedestrians and two bicyclist. In 2008 a bicyclist was killed in an accident at Delancey and the Bowery. In 2009 a pedestrian was killed at Prince and the Bowery and at Delancey Street and Allen Street. In 2010 a pedestrian was killed at Avenue A and E. 1st Street and at Delancey and Essex Street while a bicyclist was killed at Ludlow and Delancey Street. Table 8-6 below lists locations where fatalities occurred and other related information.

Table 8-4: Fatalities 2008-2010

Location	Fatality			2008 - 2010				
				Injury Type			Total	Property Damage Only
	2008	2009	2010	A	B	C		
Avenue A/E. 1st St.	0	0	1(Ped)	3	0	14	17	6
Prince St./Bowery	0	1(Ped)	0	0	1	7	8	6
Delancey St./Allen St.	0	1(Ped)	0	1	0	18	19	15
Delancey St./Bowery	1(Bicycle)	0	0	2	3	37	42	17
Delancey St./Essex St.	0	0	1(Ped)	6	14	45	65	13
Delancey St./Ludlow St	0	0	1(Bicycle)	2	1	7	10	5

Table 8-5: High Accident Locations and Fatalities (2008-2010)



9 Goods Movement

9.1 Introduction

New York City is heavily dependant on trucks to supply the city with goods and services. Thousands of local and through trucks traverse the city daily to deliver the goods and services required to satisfy the demand of its residential, industrial, and commercial uses.

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

This study undertakes a preliminary assessment of the impact of truck traffic in the study area. For this purpose, field data was gathered and existing studies were reviewed to assess this issue. The recent New York City Department of Transportation (NYCDOT), *Citywide Truck Route Management & Community Impact Reduction Study*, was aimed at responding to citywide concerns about impacts of truck traffic on quality of life, traffic congestion, and the regional transportation system. The study provided recommendations to address the needs of both NYC's residential and business communities while seeking to mitigate many of the negative consequences of truck traffic. Some of the ideas and preliminary conclusions from the study were drawn on to inform the Bowery Houston Bleecker study.

The rules and regulations governing truck traffic in New York City can be found in the New York City Traffic Rules and Regulations (Chapter 4 of Title 34 of the Rules of the City of New York). According to Section 4-13, a truck generally is defined as any vehicle or combination of vehicles designed for the transportation of property which has either of the following characteristics: two axels and six tires, or three or more axels.

In New York City, trucks, as defined above, are required to confine themselves to the designated local and through truck routes except to reach their origin or destination they may operate on non-designated routes. This may be accomplished by leaving a designated truck route at the

nearest intersection that provides the most direct route to their destination. Through truck routes are generally utilized by vehicles with neither an origin nor a destination within the borough that it is crossing.

9.2 Truck Routes

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

North-South Through Truck Routes:

- Chrystie Street between Delancey and East Houston Streets; and
- Allen Street between Delancey and East Houston Streets.

East-West Through Truck Routes:

- Houston Street between Allen Street/1st Avenue and Mercer Street.

North-South Local Truck Routes:

- Broadway between Spring and East 8th Streets;
- Bowery between Spring and East 5th Streets;
- 3rd Avenue between East 5th Street and St Mark's Place;
- 2nd Avenue between East Houston and East 4th Streets; and
- 1st Avenue between East Houston and East 4th Streets.

Through truck route portals to lower Manhattan which also serve the study area are the Williamsburg and Manhattan Bridges, Brooklyn Battery Tunnel and Holland Tunnel. There are restrictions on truck traffic using the Holland Tunnel. No commercial traffic is allowed into Manhattan and only two- and three-axle single-unit trucks are allowed into New Jersey (no

tractor trailers or trucks with four or more axles are permitted). Figure 9-1 shows the local and through truck route map.

9.3 Truck Traffic

The study area's proximity to regional access points such as the Williamsburg and Manhattan Bridges and the Holland Tunnel and the convergence of through and local truck routes along the Houston Street and Delancey Street corridors lead to a significant amount of truck traffic on the study area's streets. Truck volume counts were conducted at 14 locations during the various peak periods (7:30AM-9:30AM, 12:00PM-2:00PM, and 4:00PM-6:00PM weekdays, and 12:00PM-2:00PM Saturday). The percentage share for trucks was 9% during the AM and MD peaks. Lower volumes were observed during the PM (4.0% of total traffic) and Saturday (2.6% of total traffic) peaks. At no time did the trucks traffic exceed 10% of the total traffic volume. See Table 9-1.

Table 9-1: Truck Volumes by Peak Period

	AM	MD	PM	SAT
Total Vehicles	49401	47502	52103	43,131
Trucks	4422	4146	2096	1,116
% Trucks	**9.0%**	**8.7%**	**4.0%**	**2.59%**

Corridors in the study area that received the highest number of trucks are the Bowery and Houston Street west of Bowery. See Figures 9-3 through 9-5 for truck volumes as a percentage of total traffic volume by intersection during the AM, midday, and PM peaks.

Figure 9-1: Truck Routes in Study Area

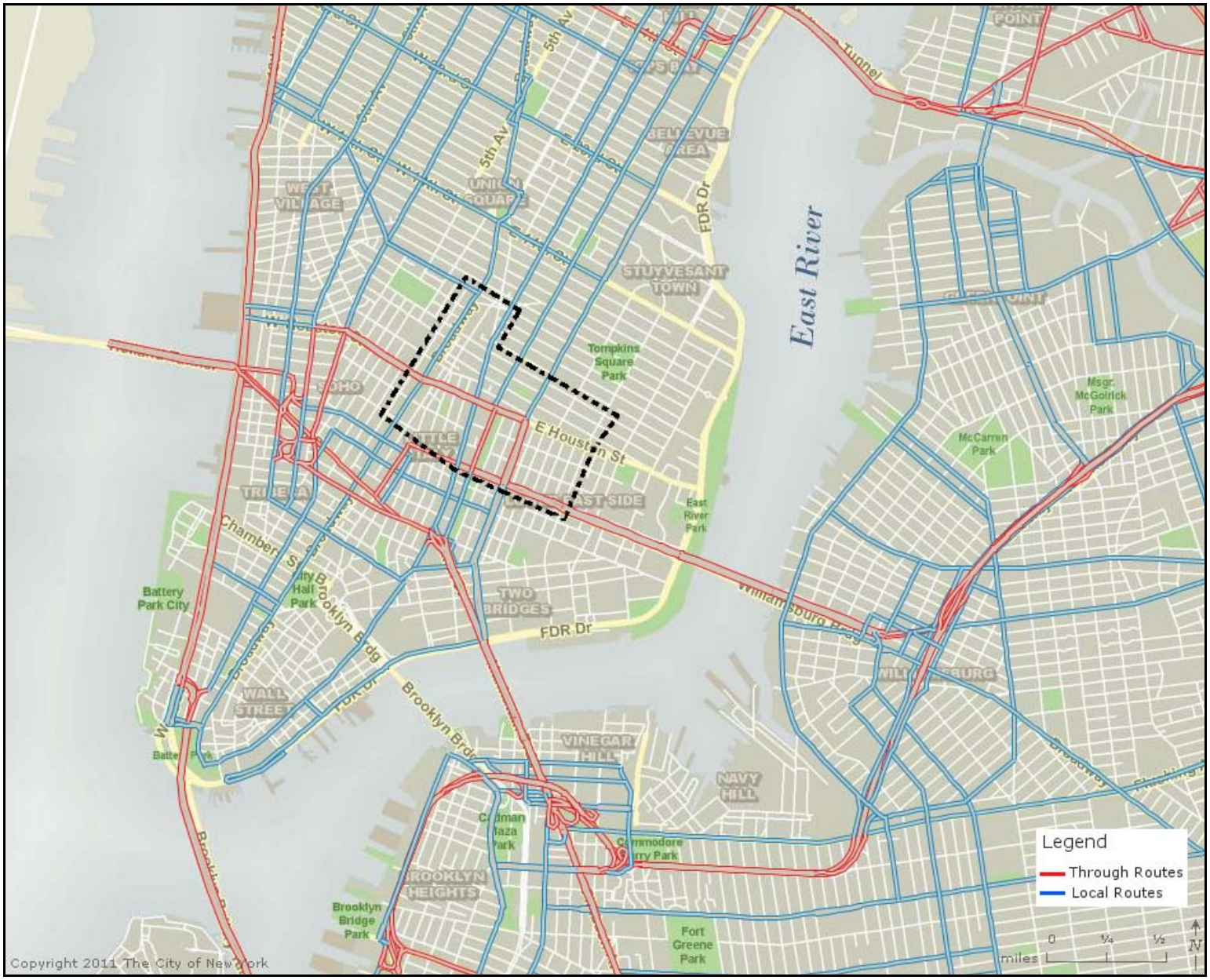


Figure 9-2: Trucks as Percentage of Total Traffic Volumes, AM

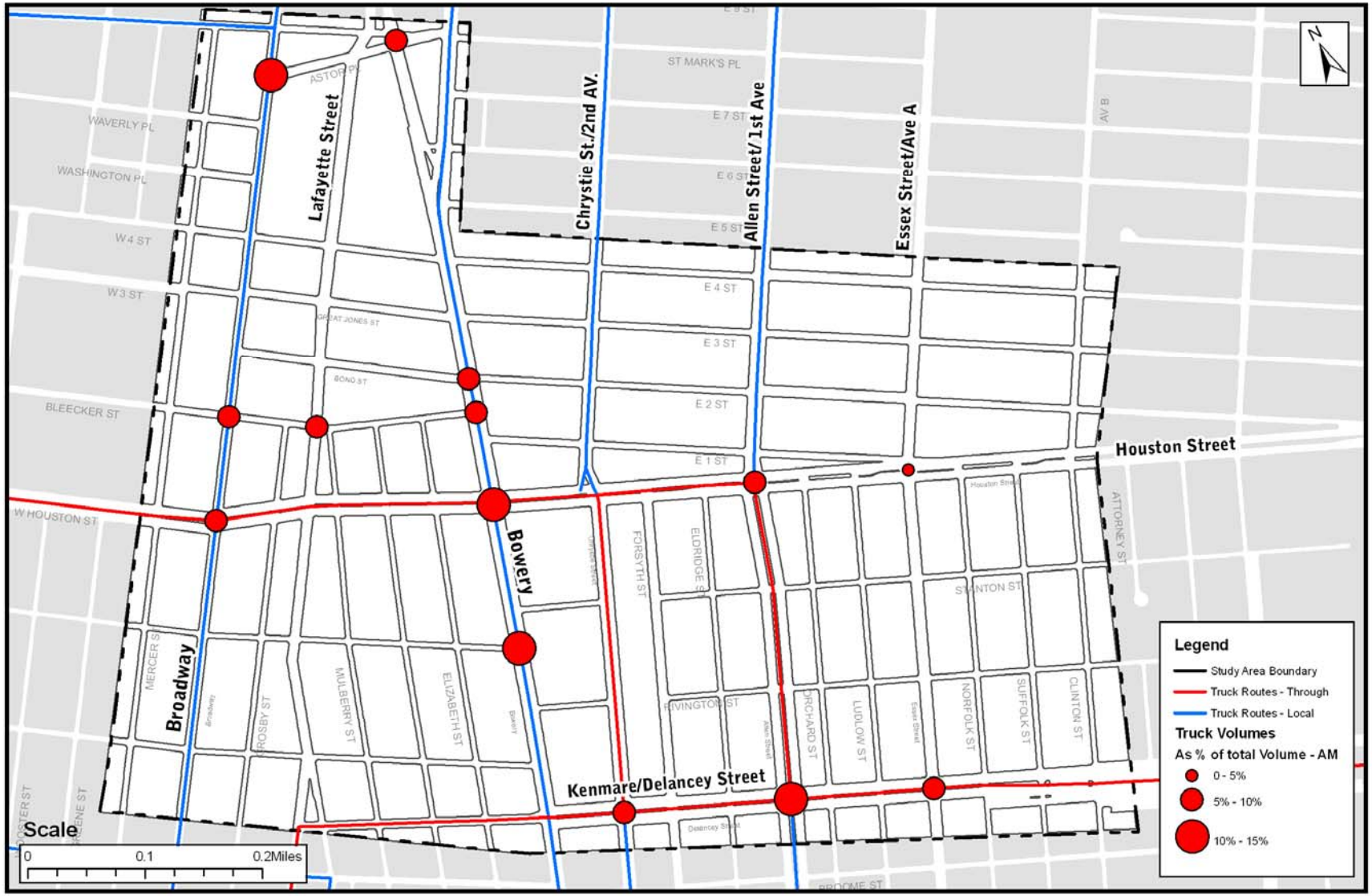


Figure 9-3: Trucks as Percentage of Total Traffic Volumes,, Midday

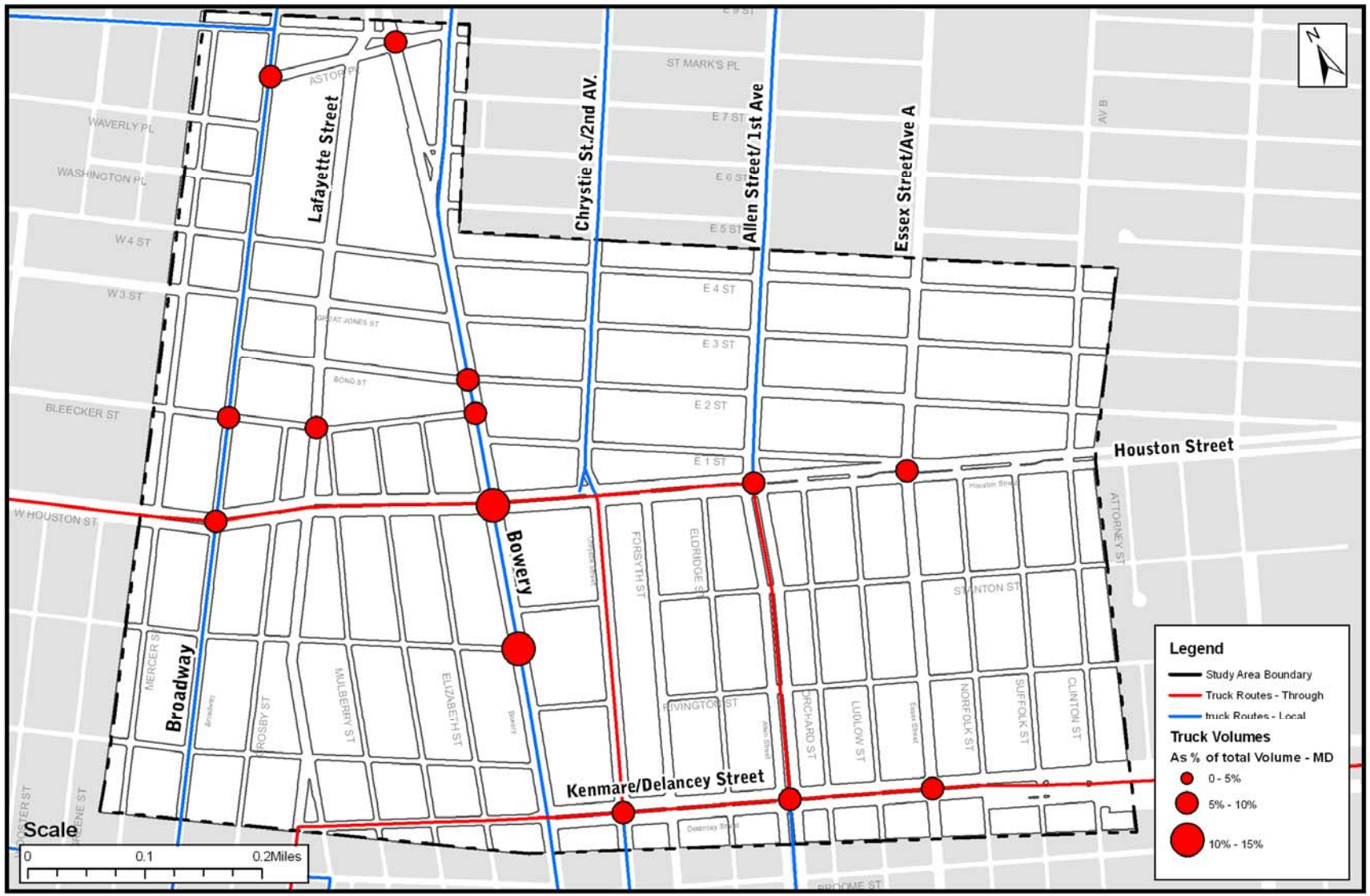
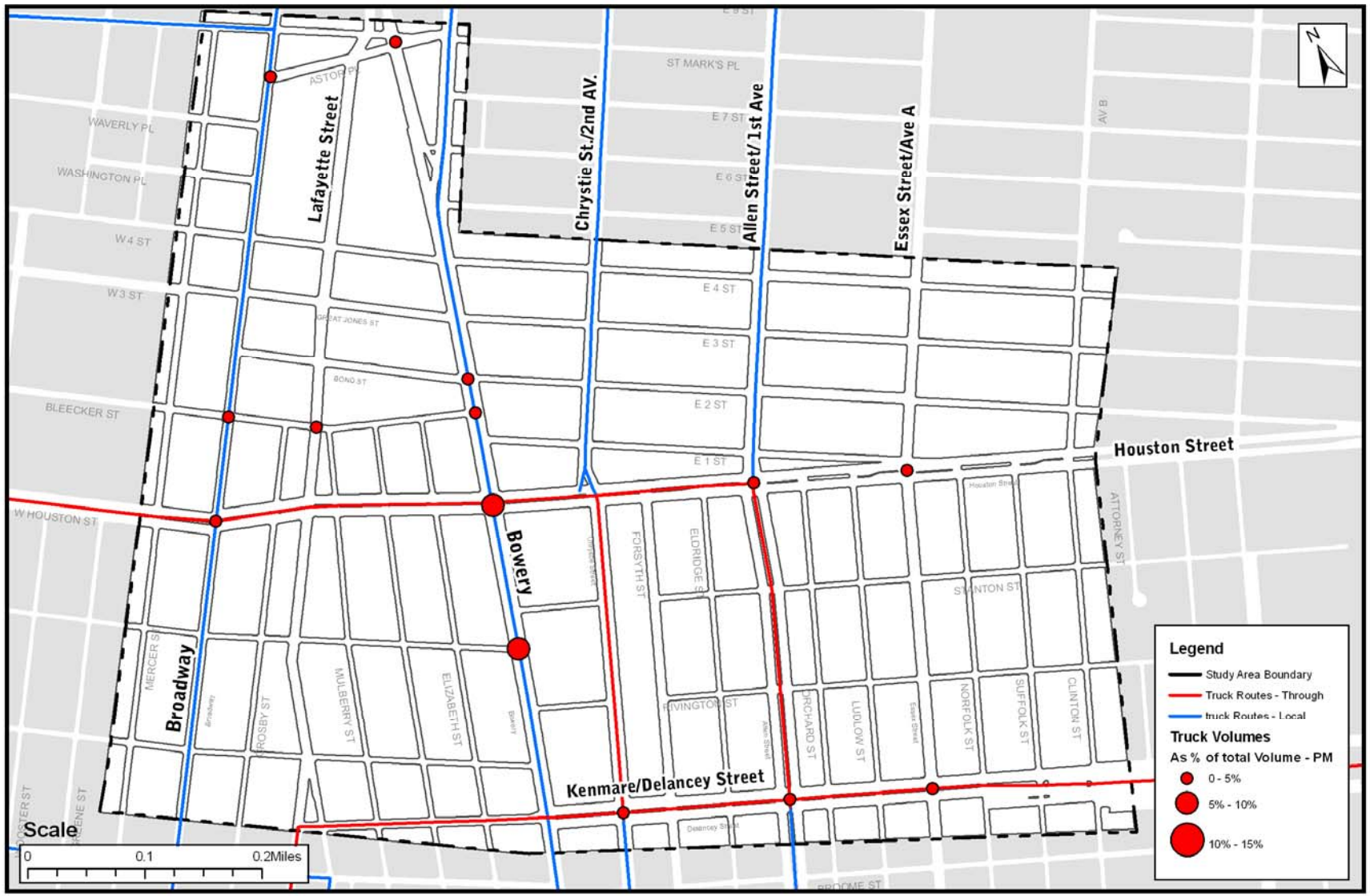


Figure 9-4: Trucks as Percentage of Total Traffic Volumes,, PM



10 Public Outreach and Community Input

10.1 Introduction

To ensure ample public participation that addresses community concerns and issues, NYCDOT planned to host a minimum of two technical advisory committees (TAC) meetings and two public meetings. The first TAC meeting was held March 8, 2010 and the first public meeting took place May 6, 2010 at the Bowery Mission Chapel. In attendance at the TAC meeting were representatives of CB 2, CB 3, State Senator Daniel Squadron, and State Senator Tom Duane, Assemblyman Sheldon Silver, NYC Council Member Rosie Mendez, NYCDCP Transportation Division, NYCT and various DOT divisions. In addition to these participants, the public meeting was attended by members of FDNY, the Merchants and Residents Association, Chamber of Commerce, various community groups and the general public.

The purpose of these initial meetings was to present the scope of the study and to receive input to inform the study. The presentation identified the proposed study area boundaries which were identified at that time as: Essex Street/Avenue A to the east, Mercer Street to the west, East 5/East 8 Street to the north and Spring Street/Rivington Street to the south. It also highlighted the following topics to be studied: demographics, land use, traffic, pedestrian and bicycles, accidents (safety), parking, goods movement, and public transportation, and focused on some of the specific issues the study intends to address. Based upon the input from the first TAC and public meeting the scope of the transportation study was revised.

10.2 TAC Meeting

The TAC member's response to the presentation was positive and they expressed gratitude to DOT for responding to their request with the study. They provided many comments including:

- **Possible changes to the Study Area boundary** – It was suggested that the boundaries expand to include Avenue B due to observed heavy pedestrian activity as well as Delancey Street due to heavy congestion and the changing nature of the area since the release of the Delancey Street Transportation Study.
- **Focus upon the Bowery/ Houston Street intersection** – The addition of Whole Foods at this intersection has increased the pedestrian activities at an already congested intersection and therefore this intersection should be included in the pedestrian counts. Further, the signal timing is causing backup southbound on the Bowery which is in turn causing backup along the side streets such as Bleecker Street and the left turn signal northbound on the Bowery has no dedicated turn lane..
- **Study the late night weekend traffic and pedestrian conditions –** The study area's weekend late night conditions vary from the weekday conditions and these differences need to be reflected in the short and long term transportation solutions of the study. Coordination with NYPD would prove usefull in issues of traffic enforcement.
- **Construction along Houston Street could be problematic for accurate data counts –** the water main reconstruction and subway reconstruction happening at Houston Street and Lafayette Street in addition to the East Houston Reconstruction could create an inaccurate picture of the existing conditions in the area.

Community Board 2 also provided several documents detailing community issues and suggestions that have arisen in the last ten years. These documents are summarized below.

CB2 Resolution (**Feb 21, 2008) -** CB2 urges the re-synchronization of traffic light signals on the Bowery from E. 5th to E. Houston Street to relieve the SB congestion on Bowery that impedes side street traffic from entering Bowery.

CB2 Traffic Strategies Subcommittee Resolution (November 19, 2002) - This resolution focused on southbound backup on Bowery from E. Houston Street to Bond

Street, the need for parking restrictions that convey evening and weekend traffic elements and congestion along Bleecker Street due to NYU buses and vehicle's seeking a northbound route on Mulberry and Elizabeth Street unaware of the streets terminating into Bleecker Street. The resolution suggested a series of short and long term recommendations that ranged from changes in parking regulations to street closures. Some of the recommendations were implemented by the DOT such as the high visibility crosswalk at Bleecker Street and Mott Street and no honking signage along Bleecker Street..

10.3 Public Meeting

The public response at the meeting presentation was generally positive as community members raised many issues they would like DOT to address. Their comments ranged from expanding the study area to specific traffic related issues such as bicycle and pedestrian safety, traffic congestion, double parking and transit congestion. The comments and suggestion are grouped and summarized below.

Expanding the Study Area Boundary

- Expand the study area one block east to Avenue B because of high pedestrian and traffic volumes along the corridor
- Expand the study area one block south to Delancey Street to include a major vehicular and pedestrian corridor that leads to and from the Williamsburg Bridge
- Expand the study area west to 7th Avenue to include the traffic entering the study area eastbound on Bleecker Street. It was pointed out that this section of Bleecker is travelled by a large percentage of tour buses and cabs and that it is used as a major eastbound route that may have added importance due to the closure of Saint Vincent's Hospital.

Late-Night Weekend Activities

- Several community members stated that traffic and pedestrian activities are particularly heavy Thursday through Saturday during the late night hours

(between 11pm and 2am). This congestion is often accompanied by horn honking.

- Ludlow and Orchard Street (between Houston Street and Delancey Street) were described as having heavy pedestrian and vehicle traffic late at night that results in pedestrian/vehicle conflicts and horn honking.

Vehicular Traffic

- A representative from FDNY stated that the study does not address emergency vehicle access and that this should be considered. He pointed out that certain streets in the study area such as the Bowery can be very congested at times.
- Community members stated that traffic turning southbound onto the Bowery from 1st Street tend to disregard the traffic signal on the Bowery.
- Southbound vehicles on Essex Street were observed making left turns onto Delancey Street from the right lane further adding to a potentially dangerous situation.
- Southbound traffic on the Bowery, particularly north of Broadway, experiences heavy congestion.

Pedestrian Safety Issues

- The Delancey Street/Essex Street intersection was described as extremely dangerous for seniors, schoolchildren and other pedestrians to cross. There are many conflicts between vehicles, bicycles and pedestrians with high volumes entering and exiting the Williamsburg Bridge.
- Attention should be paid to the safety of seniors and the youth population with regards to accessing senior centers and schools
- The intersection of Houston Street and Second Avenue was also described as dangerous to cross for pedestrians.
- The community would like to see the medians on the Bowery improved both esthetically and from a safety point of view.
- Members voiced concern over the Crosby Street/ Houston Street intersection where a temporary median was installed and the pedestrian crossing removed as a

result of the West Houston reconstruction. However, the traffic signal remains and pedestrians continue to cross Houston Street at this location making it unsafe.

Bicycle Issues

- Residents said that a major concern was the problem of lawless cyclists who are violating rules of the road and are increasingly becoming safety hazards to pedestrians, especially the elderly. Several people urged DOT to license cyclists the same way motorists are licensed in order to make them exercise more caution.
- Community members inquired about the inclusion of bicycle parking analysis in the study (specifically at transfer points and subway entrance/exits and around NYU).

Parking Issues

- Some residents expressed concern over losing residential parking in the area; others stated that overnight parking regulations in parts of the study area do not reflect the late night activity.

Transit Issues

- Some community members noted that heavy MTA Bus traffic on Allen Street contributes to congestion in the area.

10.4 Addressing Community Concerns

In regards to the community comments, several enhancements to the study scope were made.

- The study area was expanded to include Avenue B and Delancey Street along Bleecker Street to Grove Street.
- The following locations were added to the traffic count program:
    - Bleecker Street & Grove Street
    - Bleecker Street & 6th Avenue
    - Delancey Street & Chrystie Street

    - Delancey Street & Allen Street
    - Delancey Street & Essex Street
    - Houston Street & Avenue B
- Traffic, parking and pedestrian analysis will include a focus on weekend, late night conditions.
- A bicycle parking analysis will be included in the bicycle chapter.
- FDNY and TLC representatives will be invited into the TAC to address emergency routes and situations arising from heavy taxi ridership within the area.

11 Findings

11.1 Demographics

The study area had a population of approximately 33,600 in 2000 having gained nearly 4,000 residents between 1990 and 2000 with growth occurring in every census tract. However, preliminary 2010 census results show that the overall population remained steady over the last decade while some census tracts showed population growth and others declined. The average household size remained stable at approximately 2.0 persons per household since 1980 while median household income increased steadily to $41,557.00, surpassing that of NYC in 2000. Journey to Work data for the study area revealed a higher walk and bicycle mode share but a lower auto and transit (bus) share than that of Manhattan and the city

11.2 Zoning and Land Use

The predominant zoning district in the study area is commercial with approximately 50% of the land zoned for commercial (C4, C6), 30% for residential (R7, R8) and 20% for manufacturing (M1-5). The most recent rezoning in the study area occurred in 2008 when approximately half of the study area was rezoned as part of the East Village/Lower East Side rezoning. According to the EIS, the objective of the rezoning was to "preserve the low-scale character of the East Village and Lower East Side neighborhoods while focusing new development towards specific areas that are more suitable for new residential construction with incentives for affordable housing". Two discretionary actions are currently proposed in and adjacent to the study area. They are The Seward Park Mixed Use Development Project and the NYU Core proposal.

The portion of the study area north of Houston Street and east of the Bowery is predominantly residential with mainly 4-6 story buildings. The area south of Houston Street and east of the Bowery is more mixed use (residential/commercial) buildings with ground floor retail, restaurants and nightclubs. West of the Bowery the land use is a higher density with commercial and office buildings as well as manufacturing lofts and

warehouses. Major commercial establishments exist along Broadway, the Bowery, Houston Street and Delancey Street.

11.3 Traffic

The study area traffic network has two major east/west corridors; Delancey Street which accesses the Williamsburg Bridge and Houston Street which accesses FDR Drive on the east side of Manhattan. There are five major north/south corridors in the study area: Broadway, the Bowery, Chrystie Street/2nd Avenue, Allen Street/1st Avenue and Essex Street/Avenue A. Congestion and delay often occur where the major east/west and north/south corridors intersect. The congestion in some cases affects smaller side streets such as when the Bowery backs up it affects traffic on Bleecker and 1st Streets.

Poor level of service (LOS E or F) was observed at ten intersections where at least one approach had a level of service "F" during one or more peak periods. The majority of these locations are minor street approaches to the major corridors. Travel speed varied considerably ranging from 5 to 20 mph. The average corridor travel speeds for the AM, midday and PM peak periods respectively were 12mph, 9mph and 10mph. The lowest speeds were observed on Bleecker Street, Houston Street and Delancey Street.

11.4 Public Transportation

The study area is traversed by 6 bus routes and 9 subway lines. No point in the study area is farther than 5 blocks from a subway station or bus stop. The Broadway/Lafayette Street/Bleecker Street subway station is the busiest in the study area. It has more than 32,000 riders entering the station on an average weekday. The M14 and M15 buses are in the top 10 for highest ridership in the city. Also, the M15 bus recently added Select Service buses to the route. High volume transfer points are Houston Street between Broadway and Lafayette Street and Essex Street and Delancey Street.

11.5 Parking

There are approximately 2,600 off-street parking spaces in 26 garages in the study area with 73%, 76% and 62% utilization during the AM, midday and PM peaks respectively.

On-street parking spaces vary by time of day from 1,675 in the AM, 2,115 at midday and 2,140 in the PM depending on parking regulations. The average on-street parking utilization for the entire study area is approximately 91%, 102% and 102% during the AM, midday and PM peak periods. The western half of the study area from the Bowery contains far less on-street parking and more off-street parking and truck loading/unloading zones than the area east of the Bowery. Illegal on-street parking is prevalent west of the Bowery where on-street parking utilization was higher than 140% during all peak periods.

11.6 Pedestrian and Bicycle

There are heavy pedestrian volumes along Broadway, at 8th Street and Astor Place, Houston Street at the intersections of Broadway, Lafayette Street, Bowery and Essex Street, and on Delancey St. at Essex Street and the Bowery. Moderate late night pedestrian volumes are found along Bleecker Street, Broadway, Prince and Spring Street and along Ludlow and Orchard Street between Houston and Delancey. Of the six intersections included in the pedestrian analysis, three had at least one crosswalk operating at LOS D or worse. Those intersections were 4th Avenue/8th Street, Houston Street/Allen Street and Broadway/Houston Street.

Bicycle facilities traverse much of the study area with north/south bicycle routes on parts of Lafayette, Chrystie, Allen and Essex Streets and east/west bicycle routes along Bleecker, Prince, Stanton, Rivington and 1st Streets. A bicycle lane is currently being added to Houston Street between Chrystie Street and FDR Drive and there are planned routes along Broadway. Bike counts taken in 2008 showed more than 200 bicycles during the AM and PM peak hours at the Williamsburg Bridge approach at Delancey Street/Clinton Street with the majority entering Manhattan from the Bridge in the AM and approximately half leaving Manhattan on the Bridge in the PM. The Broadway/Houston Street intersection had more than 100 bicycles during the midday and PM peak hours according to counts done in 2004.

11.7 Accidents and Safety

Five intersections in the study area qualified as high accident locations. They are Delancey Street at Clinton Street, Essex Street, Chrystie Street and the Bowery as well as Avenue A at East 1st Street. There were six fatalities in the study area between 2008 and 2010. One pedestrian fatality occurred at the Avenue A /1st Street, Prince Street/Bowery, Delancey Street/Allen Street and Delancey Street/Essex Street intersections while one bicycle fatality occurred at the Delancey Street/Bowery and Delancey Street/Ludlow Street intersections.

11.8 Goods Movement

The through truck routes in the study area are along Houston Street, Delancey Street, Allen Street and Chrystie Street south of Houston Street. Local truck routes are along the Bowery, Broadway and Allen and Chrystie Street north of Houston Street. Truck volumes along most routes in the study area account for approximately 9% of the traffic during the AM and midday peak periods but 4% during the PM peak period. A cursory comparison of truck volumes on Manhattan Bridges and on routes in the Upper West Side shows that the study area has higher truck volumes by approximately 2-5%.

11.9 Public Outreach

The public outreach effort consists of Technical Advisory Committee (TAC) and public meetings throughout the study process. A TAC meeting and public meeting were held in spring 2010. As a result of these meetings the study area boundaries were expanded to Delancey Street in the south and Clinton Street in the east and additional locations were identified for analysis along Delancey Street, Clinton Street and Bleecker Street. The community also voiced concerns about late night weekend pedestrian and vehicular congestion contributing to noise, safety, i.e., quality of life issues, which is different from the typical peak period.

11.10 Recent and Planned Improvements

There are several significant transportation improvements currently under construction

which will have an effect upon the existing transportation conditions. The following improvements are shown in Figure 12-1.

- Houston Street is being completely reconstructed with modified underground infrastructure (water mains and sewer modification) as well as improved medians and pedestrian facilities. One travel lane in each direction from FDR Drive to Chrystie Street/Second Avenue will be replaced with bike lanes and improved medians. The reconstruction of West Houston Street from West Street to the Bowery was completed in 2010 and the East Houston reconstruction is scheduled for completion in spring 2013.
- Bleecker Street Subway Enhancement – The Bleecker Street/Broadway Lafayette Subway Stations is the only in-station transfer point in Manhattan between the IND 6th Avenue Line and the Lexington Avenue IRT line. Passengers can go between the downtown IRT and the IND platforms without exiting but must utilize an out-of-system transfer (with one block between the stations) between the uptown IRT and IND platforms. This subway station enhancement will allow downtown IRT passengers to access the IND line without leaving the system. Construction is scheduled to be completed in late 2011.
- Astor Place Reconfiguration – This project, currently in design, will convert Astor Place between Lafayette Street and Cooper Square into a public space and 4th Avenue/Cooper Square to a one lane northbound operation accessible from 6th Street. This project is currently scheduled to be completed in 2014.

11.11 Locations for Potential Improvements

The following locations have been identified for detailed investigation and evaluation based on surveys, traffic analysis and community concerns. See Figure 11-1.

- Bleecker Street @ Broadway – Eastbound vehicles on Bleecker Street block the intersection impeding traffic on Broadway.
- Bleecker Street @ Bowery – Congestion on the Bowery prevents vehicles on Bleecker from accessing the Bowery.

- Bowery north of Houston Street – Traffic signals may be better coordinated to improve progression.
- Houston Street @ Broadway – High pedestrian volumes conflict with vehicles making left turns from Broadway onto Houston Street.
- Houston Street @ Bowery – In need of changes to better accommodate the north and southbound left turn.
- Houston Street @ Chrystie Street/2nd Avenue – Heavy southbound left turning vehicles create queues on Chrystie Street while vehicles making right turns encroach on the bicycle lane.
- Houston Street @ Allen Street/1st Avenue - Heavy traffic volume creates congestion
- Houston Street @ Essex Street/Avenue A - Heavy traffic volume creates congestion
- Houston Street @ Clinton Street – The narrow roadway on Clinton results in northbound backup.
- Delancey Street @ Bowery – Heavy left and right turn vehicles from westbound Delancey create congestion.
- Delancey Street @ Chrystie Street – Heavy traffic volume creates congestion
- Delancey Street @ Allen Street – Heavy left turn vehicles onto southbound Allen Street result in queues.
- Delancey @ Essex Street – High pedestrian, bike and vehiclular traffic create safety issues.
- Delancey Street @ Clinton Street – Traffic exiting Williamsburg Bridge results in rear-end accidents.
- Delancey Street between Chrystie Street and the Williamsburg Bridge – Outdated signs from reversible lane operation is still in place.

Figure 11-1: Locations for Potential Improvements