Bowery - Houston - Bleecker Transportation Study

Future Conditions and Recommendations
Final Report

September 2014

NYC
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Mayor

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NYMTC
NEW YORK METROPOLITAN TRANSPORTATION COUNCIL

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Bowery – Houston - Bleecker Transportation Study

Final Report

(Future Conditions with Recommendations)

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S.1 Introduction

The Bowery Houston Bleecker Transportation Study seeks to address traffic congestion and other issues in the study area raised by the community. 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. Like the existing conditions analysis (technical memorandum #1, issued in 2012), the future conditions analysis examines: demographics, land use and zoning, traffic, pedestrian and bicycles, accidents, goods movement, transit and parking. The study assesses the existing and future traffic conditions in the study area and makes recommendations to improve mobility and safety for all street users.

S.2 Demographics

Following 11% growth in population between 1990 and 2000, the study area experienced a slight decrease (-.08%) between 2000 and 2010 ending the decade with 38,185 residents. NYMTC's 2040 Demographic and Socio-Economic Forecast for Manhattan (4.3%) was used to project the 2020 population. The Study Area household size and vehicle ownership have remained relatively steady over the three decades with approximately two persons per household and one vehicle for every five households and are anticipated to be the same in 2020. Median household income has grown dramatically over the last three decades from approximately $34,000 to $60,000 and is projected to exceed $80,000 by 2020.

The American Community Survey (2006-2010 5-year estimates) shows that the study area had a lower automobile mode share (6.2%) than Manhattan (8.7%) and NYC (27.7%). The study area's public transit Journey to Work mode share was 57.4% compared to Manhattan (59%) and NYC (55.7%). Bus mode share in the study area was 5.4%, 8.6% in Manhattan and 12.2% in NYC. Walk/Bike mode share was 24% in the study area, 21.1% in Manhattan and 10.1% in NYC.

S.3 Zoning and Land Use

The 2020 future land use will reflect higher density as a result of two major proposed developments in the study area; the New York University (NYU) Core project and the Seward Park Mixed Use Development. The Seward Park Mixed Use Development with a 2022 build year will allow for approximately 1.5 million square feet of mixed use development on 10 city owned sites located on the south side of Delancey Street. NYU Core, with 2021 and 2031 build years, allows for approximately 2.5 million square feet institutional space including academic uses, college athletic facility and residential facilities. Also there are five hotels and two office buildings slated for completion before 2020. These developments are expected to add significant trips to the street network.

S.4 Traffic and Transportation

The 2020 traffic network includes a background growth plus trips generated by known developments (NYU Core and Seward Park Mixed Use Development). The capacity analysis shows 6 of the 19 intersections analyzed with an intersection LOS E or F for one or more peak periods. No intersection had a LOS worse than D under the existing conditions. Future travel speeds are projected to decrease on average by 1.1 mph across all corridors by 2020 with Delancey Street having the largest decrease in speed from 10.2 mph to 5.7 mph.

S.5 Public Transportation

The public transportation system in the study area is comprised of 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 subway station.

S.6 Parking

There are 26 *off-street* parking facilities with approximately 2,612 parking spaces. The off-street parking utilization is approximately 75% during all peak periods. There is a 670 space garage that would be displaced by the NYU Core development in 2021. The Seward Park Mixed Use Development would displace approximately 150 parking spaces.

On-street parking capacity fluctuates during the day due to parking regulations. The study area has 1,675, 2,115 and 2,135 parking spaces during the AM, MD and PM respectively. The on-street parking utilization is 91%, 102% and 102% during the AM, MD and PM peaks respectively. Thus the parking supply does not meet demand.

S.7 Pedestrian and Bicycle

The 2020 future pedestrian volumes were derived from background growth and trips generated by NYU Core and Seward Park Mixed Use Development. Detailed pedestrian analysis was done at six locations and five had crosswalk LOS of D or worse during one period. All of the corners operate at LOS D or better.

The study area has many bicycle facilities along Lafayette Street, 2nd Avenue, 1st Avenue, Avenue A and Clinton Street, Bleecker Street, East 1st Street, Prince Street, Stanton Street and Rivington Street. Houston Street will have a bike route installed from the FDR to Chrystie Street upon completion of construction. The NYC Bike Share program, launched in May 2013, provides 18 bike share locations with more than 600 bicycle docks throughout the study area.

S.8 Crashes/Safety

The Crash/Safety analysis (2008-2011) showed five intersections as high crash locations. They are Delancey Street@Bowery, Delancey Street@Chrystie Street, Delancey Street@Clinton Street, Delancey Street@Essex Street and Avenue A@1st Street.

The study area had eleven fatalities between 2008 and 2011. Seven of these fatalities (four pedestrians, three bicyclists) occurred along the Delancey Street corridor. The other fatalities were not concentrated in any particular area.

S.9 Goods Movement

The study area has many through and local truck routes. Houston Street from Allen Street to 7th Avenue and Delancey Street are the major east/west through truck routes. Broadway, the Bowery, 2nd Avenue and 1st Avenue are local truck routes.

S.10 Public Participation

Public participation was facilitated through a series of Technical Advisory Committee (TAC) meetings and public meetings held at critical junctions of the study. The TAC is made up of elected officials, CB's and governmental agencies. The first public meeting of May 6, 2010 discussed the scope of the study and community issues. The second public meeting of February 21, 2012 provided an update on the existing conditions analysis. The final public meeting was held on November 20, 2013. Public comments ranged from traffic congestion, pedestrian safety, bicycle and parking issues

S.11 Recommendations

Based upon the analysis and community input a set of recommendations were developed to enhance safety and improve traffic operations. The recommendations include geometric improvements and parking regulation changes at the following locations:

- Bleecker Street and Broadway
- Bleecker Street and Lafayette Street
- Bowery from E. 4th Street to Houston Street
- Broadway and Spring Street
- Clinton Street and Houston Street
- Houston Street and Crosby Streets
- Bowery and Delancey Street

1 Introduction

The *Bowery Houston Bleecker Transportation Study* Area is located in Lower Manhattan which 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. Also, significant pedestrian activity is generated by institutional facilities such as New York University in addition to commercial retail and other activities. The 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 1-1 which depicts the study area in a broad regional context.

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) 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 in the study area.

The existing conditions analysis which included an assessment of the demographics, land use and zoning, traffic and transportation, public transportation, parking, pedestrians and bicycles, accidents & safety and goods movement was issued in February 2012 as Technical Memorandum #1. Technical Memorandum #2 focuses on the 2020 future conditions and recommendations and improvement measures.

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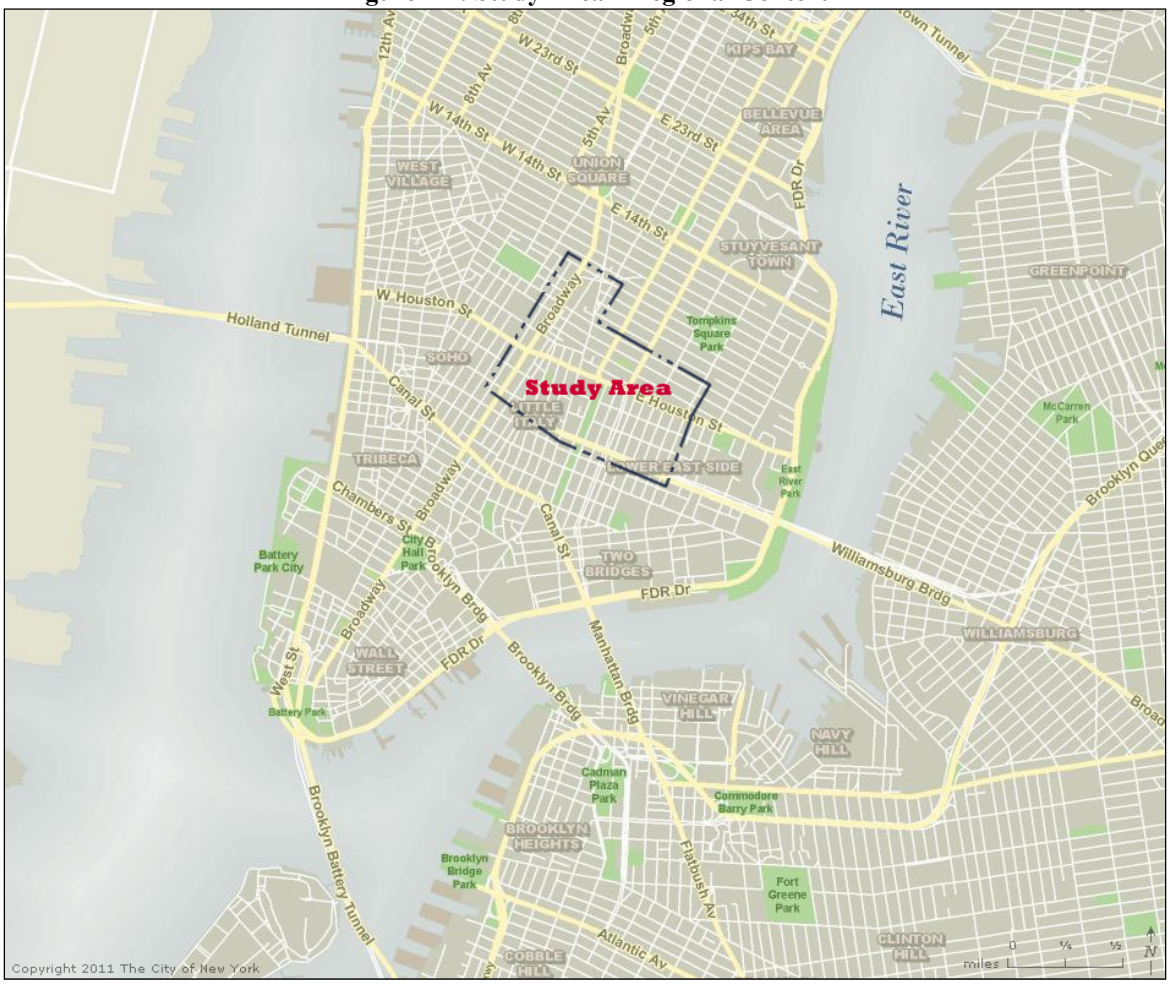
Figure 1-1: Study Area – Regional Context



1.1 Study Area

The study area, which lies within two Community Districts (2 & 3), is centrally located in Lower Manhattan, south of 23rd Street. It is in close proximity to the three east river bridges connecting to Brooklyn and the Holland Tunnel connecting to New Jersey. 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 1-2.

Figure 1-2: Study Area

1.2 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 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).
- To encourage extensive public participation to ensure meaningful community input;
- To evaluate recent NYCDOT roadway improvements in the area;

2 Demographic Analysis

2.1 Introduction

The future demographic analysis of the study area examines population changes and socioeconomic characteristics such as household size, income, car ownership and journey to work by mode to identify trends and help determine future travel needs. The analysis relies on data from New York Metropolitan Transportation Council (NYMTC), New York City Department of City Planning (NYCDCP) and data compiled by the United States Department of Commerce – Bureau of Census. Data was collected and analyzed for 1980, 1990, 2000 and 2010 and projected through 2020. 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 study area consists all or part of 16 Census Tracts (whole or in part) across Brooklyn and Queens (see table 2-1). Six tracts are located entirely in 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. Table 2-1 shows the population by census tracts for 1990, 2000 and 2010.

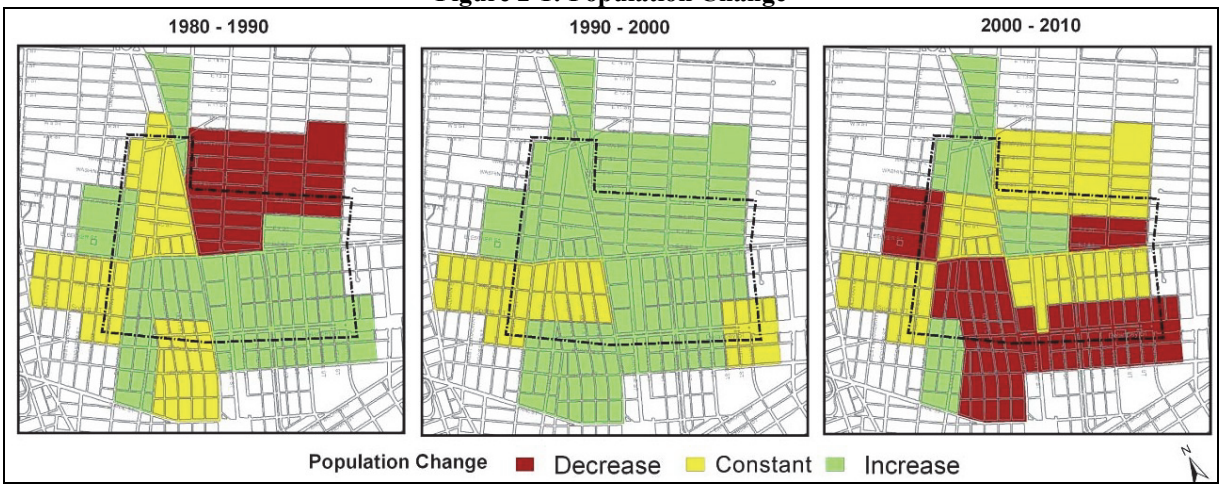
Table 2-1: Population by Census Tracts (1990-2010)

Census Tract	Percentage of Tract in Study Area	1990 Pop	2000 Pop	1990 - 2000 % Change	2010 Pop	2000 - 2010 % Change	1990 - 2010 % Change
14.02	40%	1,175	1,208	3%	1,113	-8%	-5%
18.00	50%	4,413	5,079	15%	4,330	-15%	-2%
30.01	100%	3,955	4,275	8%	4,492	5%	14%
30.02	100%	2,781	3,281	18%	3,106	-5%	12%
32.00	30%	2,219	2,405	8%	2,470	3%	11%
36.01	100%	3,018	3,280	9%	3,393	3%	12%
36.02	100%	1,884	2,372	26%	3,151	33%	67%
38.00	25%	2,049	2,291	12%	2,309	1%	13%
41.00	20%	1,696	1,791	6%	1,563	-13%	-8%
42.00	20%	451	733	63%	1,029	40%	128%
43.00	100%	4,869	4,884	0%	4,270	-13%	-12%
45.00	20%	178	213	20%	227	7%	28%
49.00	20%	981	1,002	2%	988	-1%	1%
55.01	30%	1,352	1,472	9%	1,261	-14%	-7%
55.02	100%	1,761	2,187	24%	2,257	3%	28%
57.00	80%	1,915	2,028	6%	2,225	10%	16%
TOTAL		**34,696**	**38,500**	**11%**	**38,185**	**-1%**	**10%**

2.2 Population Trends

The study area population over the last four decades was 33,613, 34,696, 38,500 and 38,185 in 1980, 1990, 2000, and 2010 respectively. Population in the 16 census tracts grew between 1990 and 2000, however it fluctuated between 2000 and 2010 with 7 tracts decreasing and 9 tracts increasing in population. See figure 2-1.

Figure 2-1: Population Change



NYMTC's *"2040 Demographic and Socio-Economic Forecasts: Employment and Population"*, released in 2011, estimates a 3.6% and 4.3% population increase for NYC and Manhattan respectively between 2010 and 2020. Using Manhattan's 4.3% growth rate, the study area is forecast to have approximately 39,827 residents in 2020. Two major proposed developments in the study area that can affect population distribution, end trip origins and destinations are the Seward Park Mixed Use Development and NYU Core proposals.

The Seward Park Mixed Use Development proposes to add approximately 900 dwelling units to 10 new buildings along Essex Street between Stanton and Delancey Streets and south of Delancey Street between Ludlow and Clinton Streets. It is estimated that the development would add approximately 796 residents to the study area.

NYU Core's reasonable worst case scenario assumes the addition of dormitory space for 1,750 students in two buildings located on the block between Bleecker Street and Houston Street and between LaGuardia Place and Mercer Street by 2021. The block is located in census tract #55.01, 30% of which is in the study area

These two developments are expected to add approximately 1,321 residents to the area in addition to the 4.3% background growth. Table 2-2 shows the population by year and area.

Table 2-2: Population by Area

Census Year	Study Area		Manhattan		NYC	
	Population	% Change	Population	% Change	Population	% 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%	8,008,300	9.4%
2010	38,185	-0.8%	1,585,873	3.2%	8,175,100	2.1%
2020	41,148	7.8%	1,654,200	4.3%	8,469,800	3.6%

2.3 Socio-Economic Trends

In 2010 there were approximately 18,400 households in the study area with an average household size of 1.95 and a median household income of $60,423. On average there was approximately one vehicle for every 5.5 households in the study area. Over the last two decades household size and vehicles ownership remained relatively constant, a trend that is likely to continue. Median household income has steadily increased and nearly doubled over the last 3 decades. The average increase of the last two decades was used to project 2020 median household income.

Table 2-2: Demographics/Socioeconomic Characteristics

	Household Size			Median Household Income			Vehicles/Household		
Year	Study Area	Man	NYC	Study Area	Man	NYC	Study Area	Man	NYC
2000	1.98	2.00	2.59	$41,557	$47,030	$38,293	0.19	0.27	0.61
2010	1.95	1.99	2.57	$60,423	$63,832	$48,743	0.18	0.25	0.62
**** 2020***	*1.95*	*1.99*	*2.57*	*$80,362*	*$78,513*	*$55,080*	*0.18*	*0.25*	*0.62*

*Projected

2.4 Journey to Work by Mode

The Journey to Work data for the last two decades indicate that more than half of the work trips in the study area, Manhattan and NYC were made with public transportation. In the study area and Manhattan, subway was the predominant mode followed by walking, bus and automobile. The mode distribution is not expected to change significantly by 2020. See tables 2-5 for the Journey to Work by Mode.

Table 2-3: Journey to Work By Mode 2000, 2010

	2000 Census			2010 ACS*		
2000 Census	Study Area	Manhattan	NYC	Study Area	Manhattan	NYC
Car, truck, or van:	7.2%	11.0%	32.9%	6.2%	8.7%	27.7%
Drove alone	4.0%	7.6%	24.9%	4.5%	6.7%	22.7%
Carpooled:	3.2%	3.4%	8.0%	1.7%	2.0%	5.0%
Public transportation	54.4%	59.6%	52.8%	57.4%	59.0%	55.7%
Bus or trolley bus	5.4%	10.1%	11.4%	5.4%	8.6%	12.2%
Subway or elevated	44.4%	43.6%	37.6%	50.4%	48.4%	41.2%
Railroad	0.9%	1.1%	1.6%	1.5%	1.5%	1.7%
Ferryboat	0.0%	0.1%	0.4%	0.0%	0.1%	0.3%
Bicycle	2.4%	0.9%	0.5%	2.3%	1.1%	0.8%
Walked	28.6%	21.9%	10.4%	24.0%	21.1%	10.1%
Taxi, Motorcycle or Other	4.8%	5.6%	2.2%	2.7%	3.6%	1.6%
Worked at home	6.1%	5.8%	2.9%	7.4%	6.6%	4.1%

*ACS – American Community Survey

3 Zoning and Land Use

The 2020 future land use will be influenced by two rezoning proposals, NYU Core and Seward Park Mixed Use Development. These two developments would result in approximately 4 million sq/ft being built in and around the study area bringing new residents, workers and visitors, thus adding various trips to the transportation network.

3.1 Seward Park Mixed Use Development

The Seward Park Mixed Use Development is an NYCEDC and HPD sponsored initiative that would allow approximately 1.5 million square feet of mixed use development on 10 city owned sites located generally along Essex Street and along the south side of Delancey Street. The proposed action includes the disposition of city owned land, zoning changes and city map changes. The sites are made up largely of parking lots, vacant space and the existing Essex Street Market, which would be relocated to a larger facility in the new development. The 2022 reasonable worst case scenario anticipates 950,000 sq/ft of residential space, 469,000 sq/ft of new retail, a 100,000 sq/ft hotel and 100,000 sq/ft of community facilities.

3.2 NYU Core

The NYU Core allows for approximately 2.5 million square feet 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. The build years are 2021 and 2031 and 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. The proposal also maps a commercial overlay on a six block area east of Washington Square Park which would allow for 23,200 sq/ft of ground floor retail.

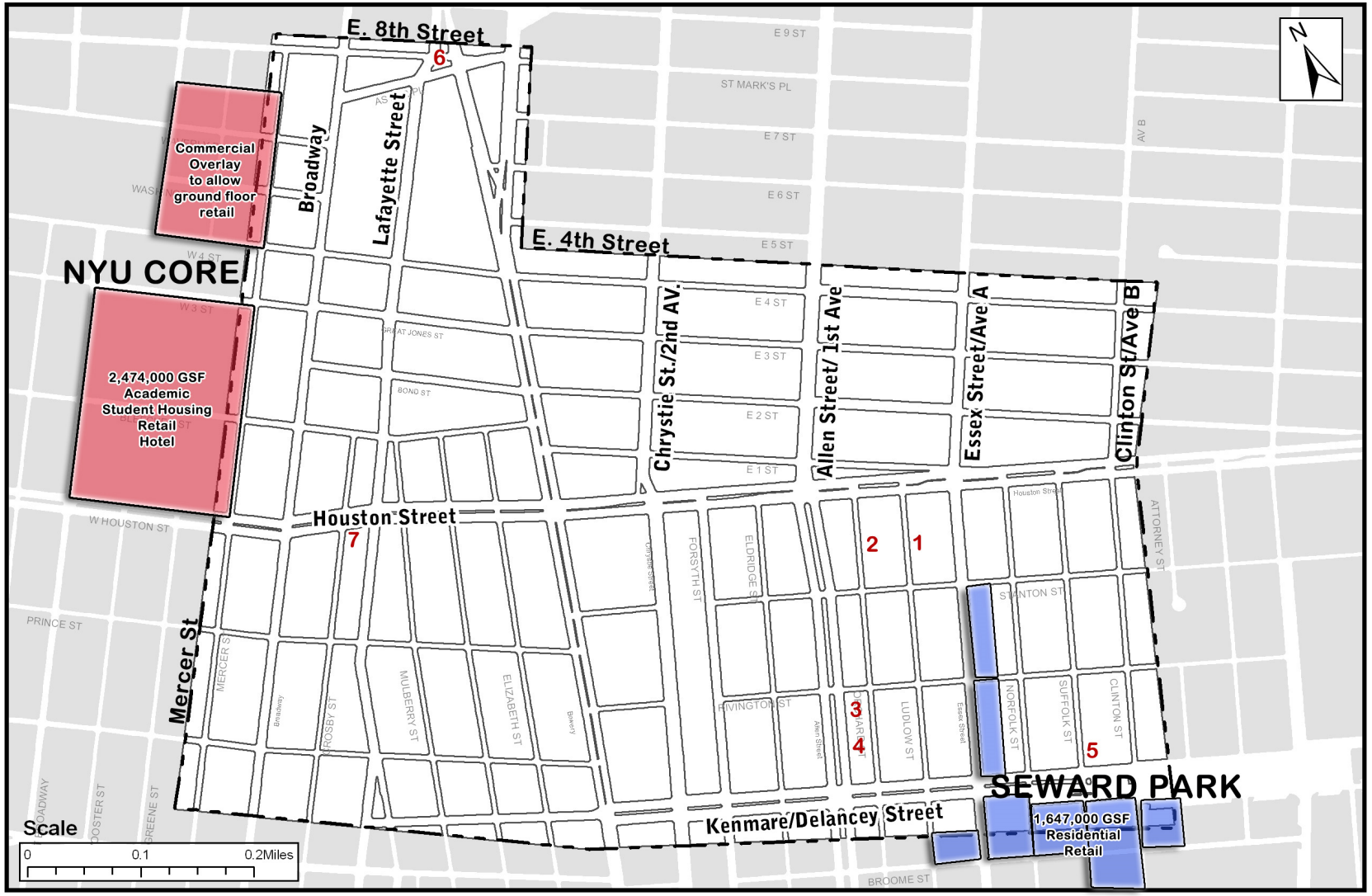
3.3 Other Planned Developments

In addition to these two developments, there are a number of planned developments that are likely to occur in the near future. These include five hotels with a total of 742 rooms and two major office/retail sites. Table 3-1 lists the developments, their use and build year. Figure 3-1 shows the location of these developments.

Table 3-1: Major Site Proposals

ID	Address	Use	Build Date
1	180 Ludlow Street	Hotel (200 Rooms)	2011
2	180 Orchard Street	Hotel (290 Rooms)	2013
3	139 Orchard Street	Hotel (80 Rooms)	2012
4	119 Orchard Street	Hotel (40 Rooms)	2012
5	150 Delancey Street	Hotel (132 Rooms)	2011
6	51 Astor Place	Office (215,000 SqFt)	2015
7	302 Lafayette Street	Office/Retail (72,000 SqFt)	2021

Figure 3-1: Planned Developments



*1 – 7 – See Table 3-1

4 Traffic and Transportation

The study area located in Lower Manhattan includes sections of the NoHo, Greenwich Village, Little Italy, East Village and Lower East Side neighborhoods (see Figure 4-2). 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.

4.1 Street System and Roadway Characteristics

The street network has a grid like pattern with Houston Street and the Bowery being major East/West and North/South axes respectively. The street layout results in longer east/west blocks north of Houston Street and longer north/south blocks south of Houston Street. The major east/west arterials are Houston Street and Delancey/Kenmare 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 divided by a center median with parking permitted on both curbs. It connects the FDR Drive to the west side of Manhattan. Between 6th Ave and FDR Drive it operates with two to three lanes per direction separated by a median. West of 6th Avenue, the corridor operates one-way westbound with two. East Houston Street from the Bowery to the FDR Drive is currently under construction and a bike lane is being added in both directions from FDR Drive to Second Avenue. The project is scheduled for completion in summer 2014.

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 and allows parking on both sides. Delancey Street provides direct access to the Williamsburg Bridge connecting Manhattan and Brooklyn. In 2012 DOT developed a set of comprehensive safety and traffic flow improvements for Delancey Street. The upgrades include the shortening of many

crosswalks along the corridor, clarifying and delineating travel lanes, signal timing changes and an enhanced streetscape at the Manhattan entrance of the Williamsburg Bridge.

North/South Corridors

Avenue A/Essex Street runs from 14th Street to Canal Street. North of Houston Street Avenue A operates as 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 three lane arterial with a bus lane (SBS), a curbside protected bike lane on the west curb and parking on both sides that operates one-way northbound. South of Houston Street, 1st Avenue becomes Allen Street, which has four lanes with a median island and bike lanes in both directions and operates two-way between Houston Street and Division Street.

Second Avenue/Chrystie Street 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 lane. South of Houston Street, Second Avenue becomes Chrystie Street which operates two-way with two lanes southbound and one northbound, parking and a bicycle lane on both sides of the street to Canal Street.

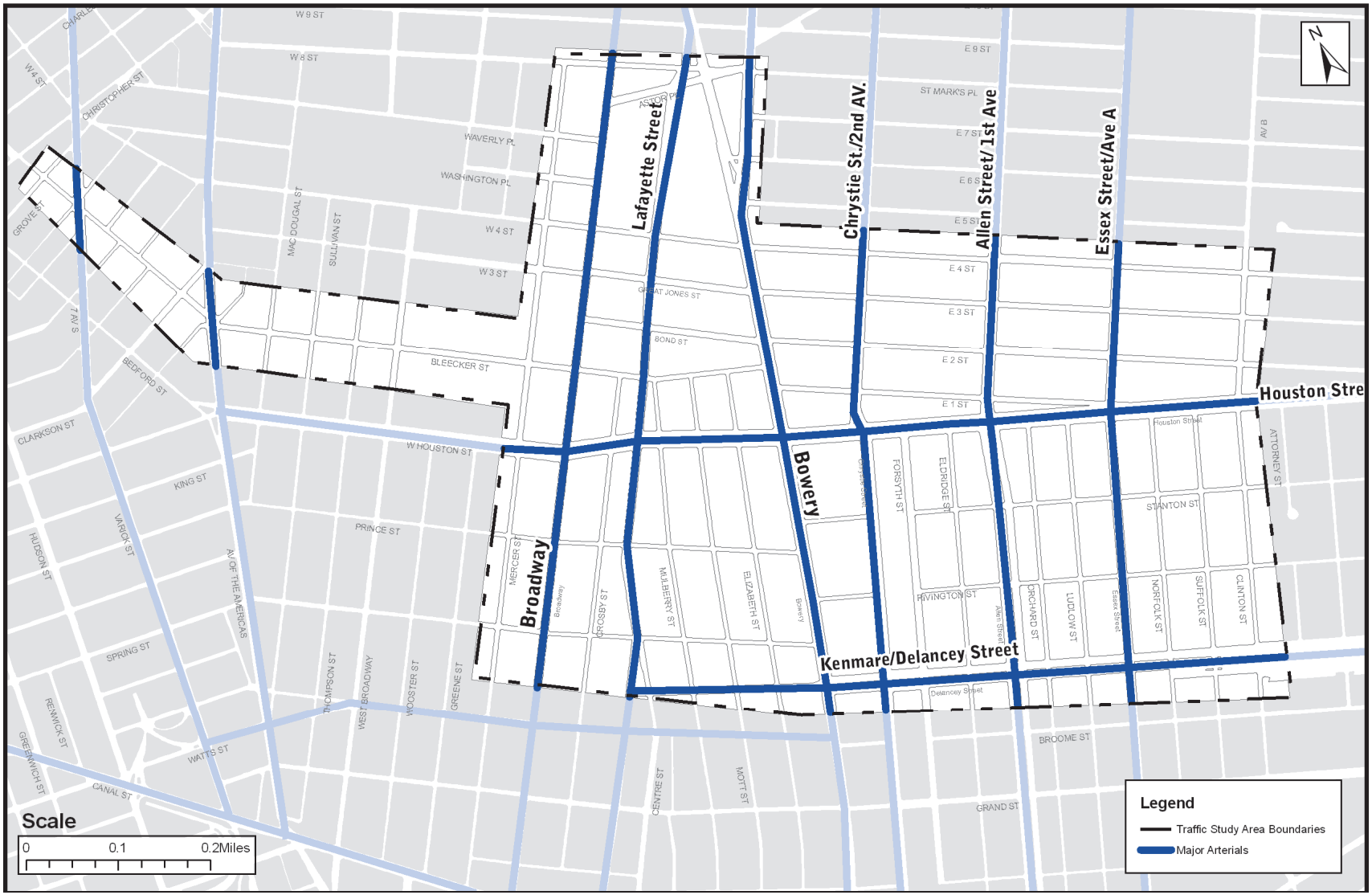
Third and Fourth Avenues converge at Cooper Square to become the Bowery which operates two-way with three lanes in each direction and parking on both sides between 4th Street and Worth Street south of the study area where it becomes Park Row. The Bowery provides access to both the Manhattan Bridge and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



4.2 Future Traffic Conditions

In order to assess future conditions, the existing 2010 traffic volumes were projected to 2020 using a background growth rate of 0.25 percent per year for the first 5 years and 0.125 percent for the next five years in addition to traffic generated by known future developments such as the Seward Park and NYU Core developments.

The Seward Park Mixed Use Development is located around Essex Street and Delancey Street (see figure 3-1) and is expected to generate 2,904, 5,379 and 5,477 person trips and 371, 527 and 540 vehicle trips during the AM, MD and PM peak respectively. The vehicle trips are generally assigned along Delancey Street, Broom Street and Grand Street between Allen Street and Clinton Street as well as along Essex Street, Norfolk Street and Ludlow Street between Houston Street and Grand Street.

The NYU Core is located west of Mercer Street between 8th Street and Houston Street (see figure 3-1). The first phase of the development (2021) is expected to generate 2,470, 3,013, 2,778 person trips and 223, 235 and 221 vehicle trips during the AM, MD and PM peak hours respectively. The trips are assigned mainly along Houston Street, Bleecker Street, Mercer Street and Broadway.

The study area 2020 future traffic network has 19 intersections that were analyzed for the AM (8:00AM – 9:00AM), Midday (12:30PM – 1:30PM), PM (5:00PM – 6:00PM) and Saturday Midday (12:30PM – 1:30PM) peak hours as listed below.

- E. Houston Street & Broadway
- E. Houston Street & Lafayette Street
- E. Houston Street & Bowery
- E. Houston Street & Chrystie Street
- 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*
- Bleecker Street & 6th Avenue*
- Delancey Street & Chrystie Street*
- Delancey Street & Allen Street*
- Delancey Street & Essex Street*
- Houston Street & Clinton Street/Avenue B*

*No Saturday Data

Figure 4-2: 2020 Future Traffic Volume – AM Peak Hour

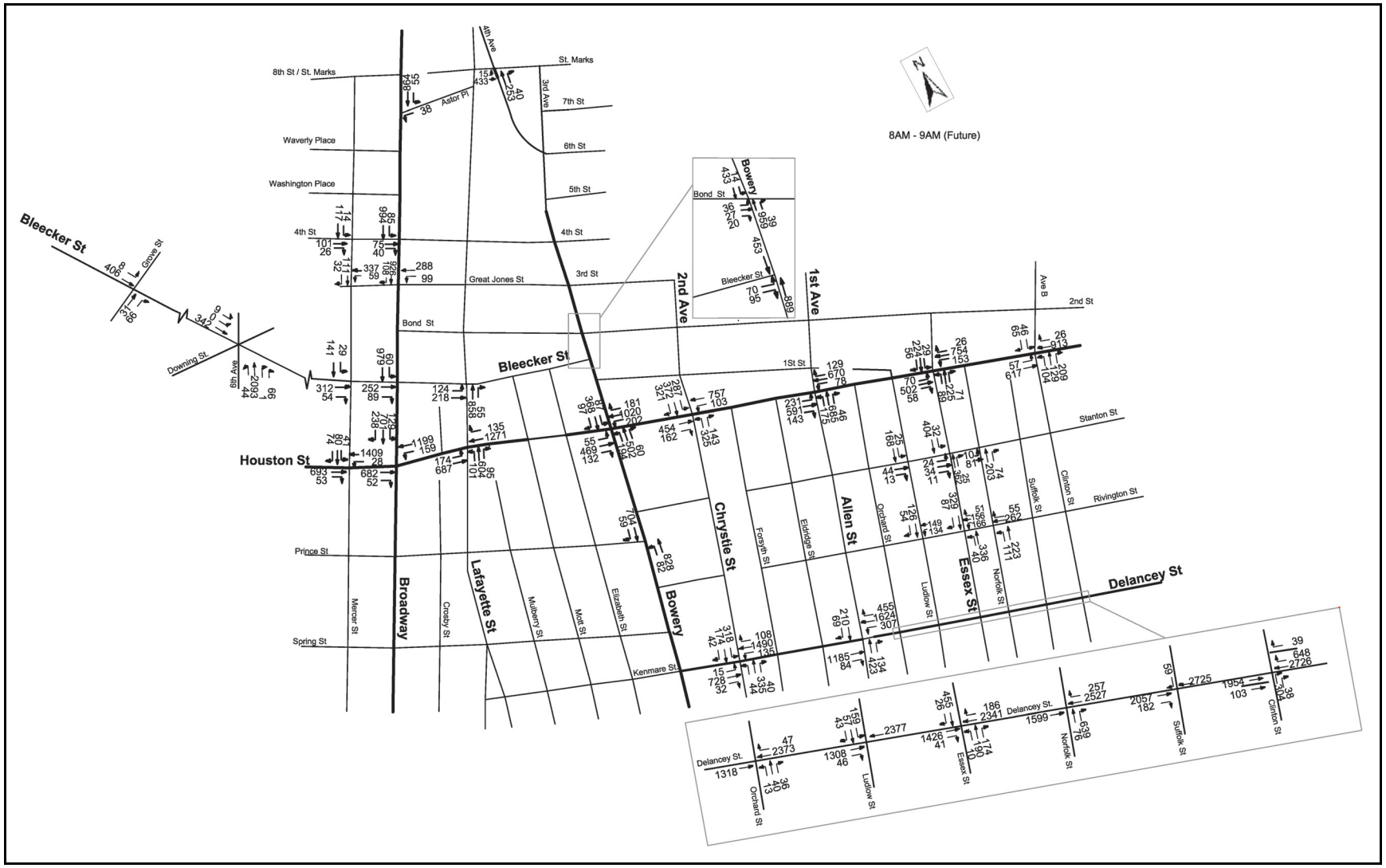


Figure 4-3: 2020 Future Traffic Volume – MD Peak Hour

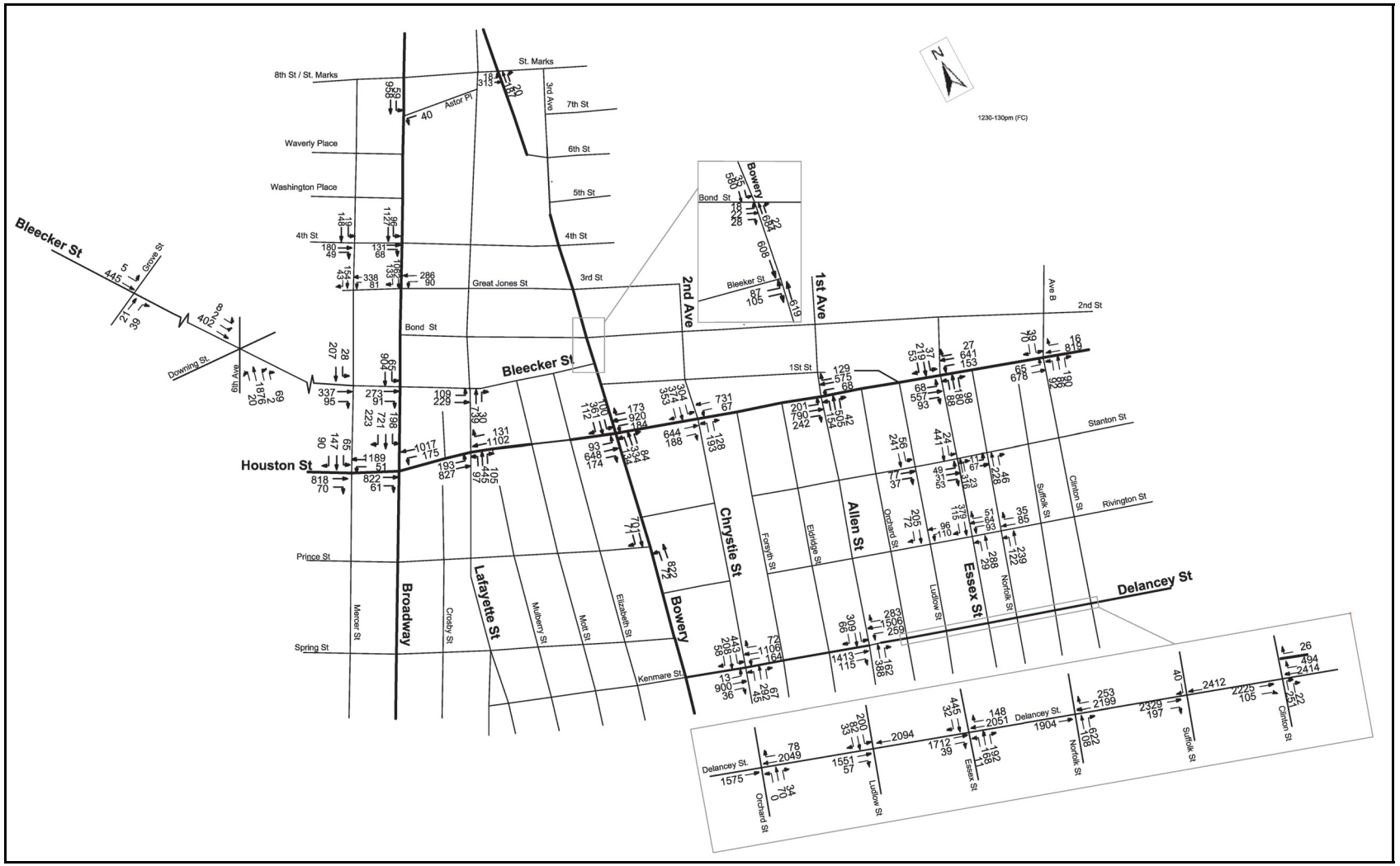


Figure 4-4: 2020 Future Traffic Volume – PM Peak Hour

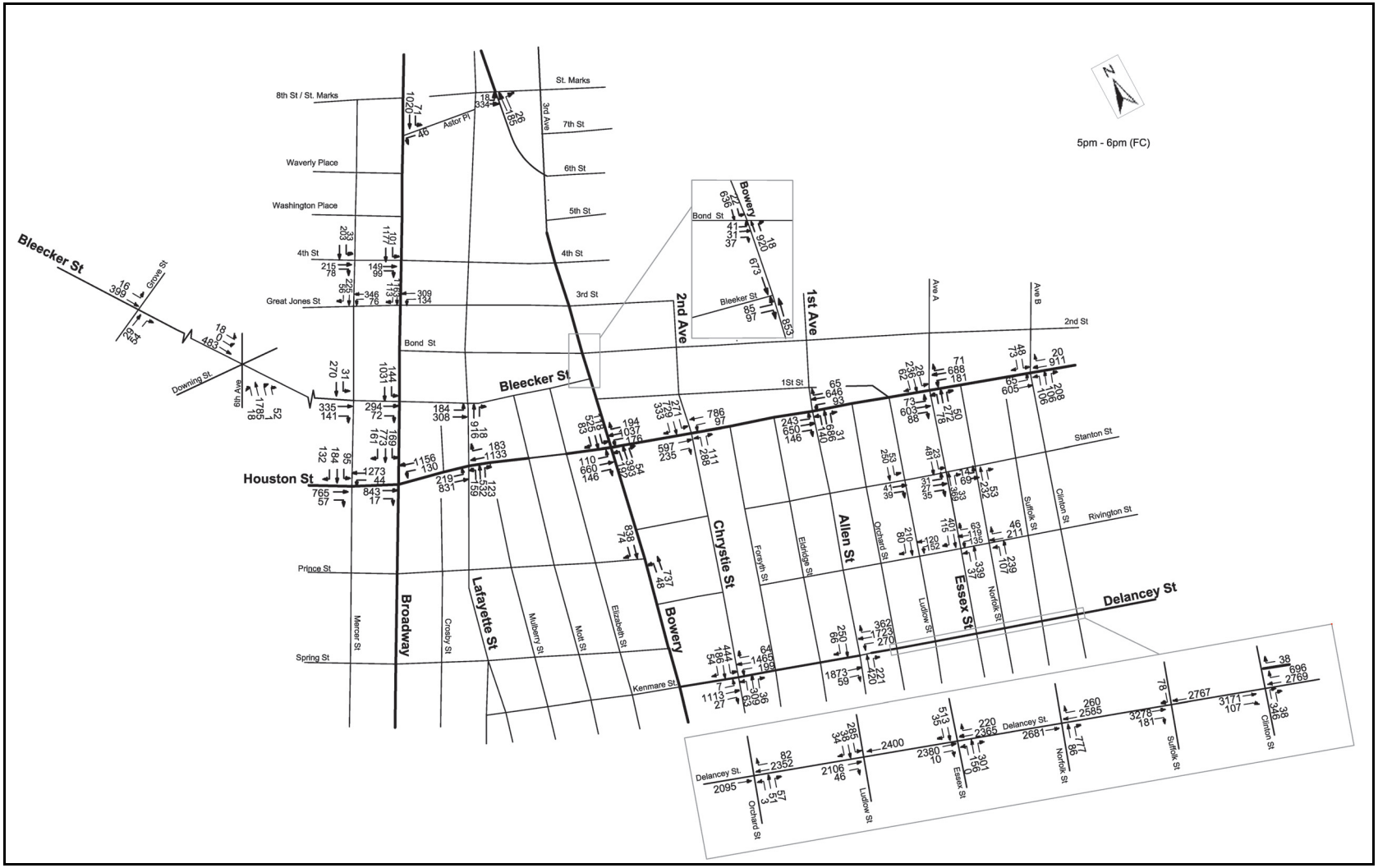
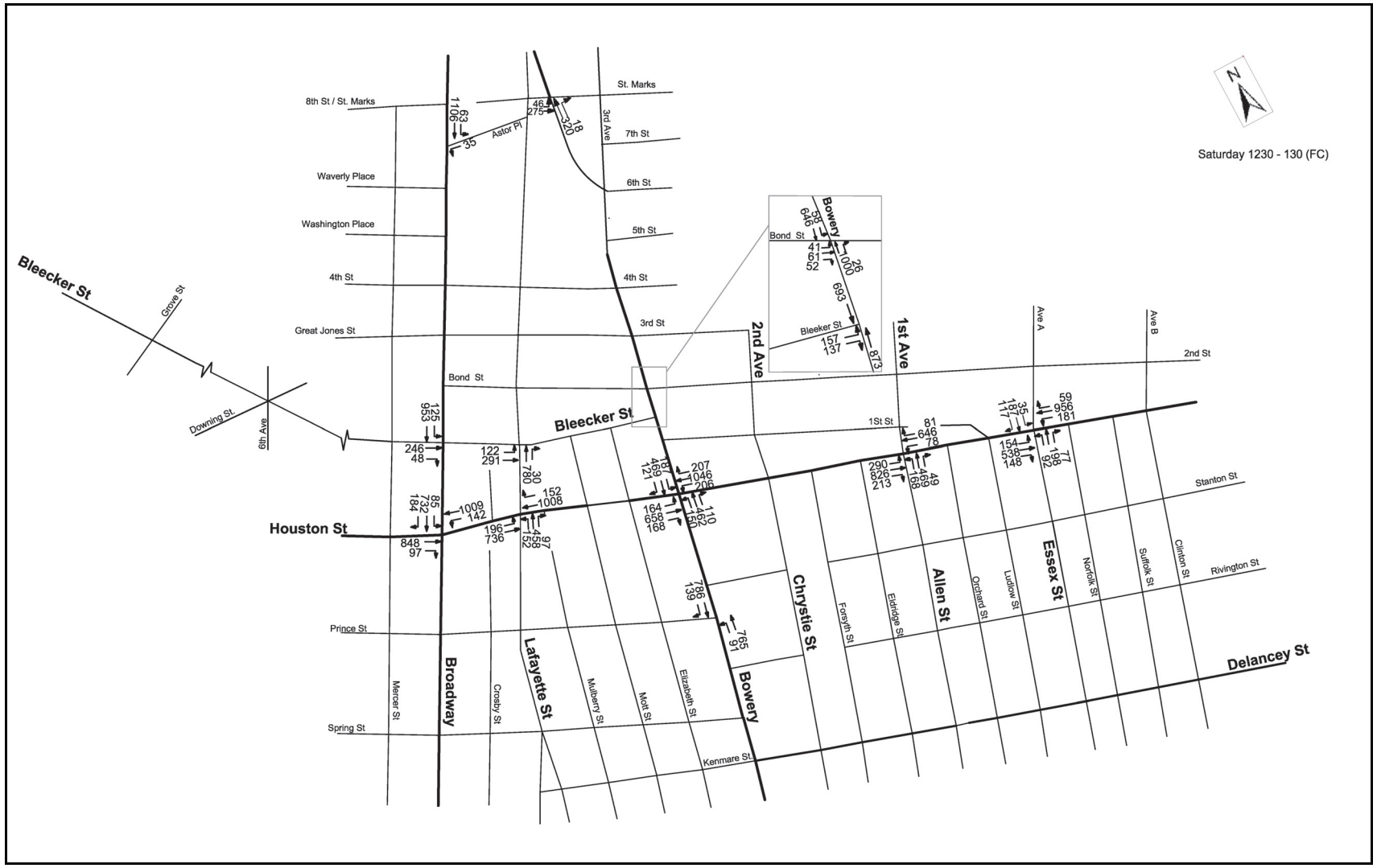


Figure 4-5: 2020 Future Traffic Volume – Saturday Peak Hour



4.3 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).	

Table 4-2 shows the 2020 Future Conditions v/c ratios, delays, and level of service (LOS) for the AM, Midday, PM, and Saturday peak hours. 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

2020 Future 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	TR	0.42	13.6	B	0.29	11.9	B	0.30	12.1	B	0.46	14.3	B
	SB	LTR	0.54	25.9	C	0.40	23.7	C	0.43	24.1	C	0.42	24	C
	Overall			20.8	C		19.1	B		19.4	B		19.1	B
Bleecker Street and 6th Ave														
	NB	TR	0.71	16.6	B	0.63	15.1	B	0.57	14.2	B			
	EB	LT	0.44	24.3	C	0.45	24.4	C	1.08	92.5	F			
	Overall			17.8	B		16.7	B		31.7	C			
Bleecker Street @ Broadway														
	SB	LT	0.88	25.4	C	0.83	21.8	C	1.03	52.4	D	0.99	40.8	D
	EB	TR	1.12	116.1	F	1.17	134.0	F	1.16	128.8	F	0.89	54.1	D
	Overall			48.2	D		53.0	E		72.1	F		46.6	D
Bleecker @Lafayertte Street														
	NB	TR	0.63	15.2	B	0.56	13.9	B	0.57	13.9	B	0.51	12.9	B
	EB	LT	1.04	85.8	F	1.03	82.5	F	1.10	101.1	F	1.01	73.1	E
	Overall			37.5	D		37.5	D		43.7	D		34.4	C
Bowery St & Bleecker St														
	NB	T	0.50	13.4	B	0.49	13.3	B	0.46	12.9	B	0.53	13.8	B
	SB	T	0.29	11.1	B	0.32	11.3	B	0.48	13.1	B	0.49	13.3	B
	EB	L	0.18	22.2	C	0.43	27.1	C	0.46	27.8	C	0.43	26.4	C
		R	0.29	24.3	C	0.79	47.1	D	0.65	36.4	D	0.41	26.6	C
	Overall			13.9	B		18.5	B		16.6	B		15.7	B
Bowery St & Bond St														
	NB	TR	0.61	18.1	B	0.65	18.9	B	0.63	18.3	B	0.76	22.0	C
	SB	LT	0.39	15.0	B	0.40	15.0	B	0.69	20.3	C	0.81	25.5	C
	EB	LTR	0.24	19.5	B	0.22	19.5	B	0.30	20.4	C	0.36	21.6	C
	Overall			17.3	B		17.7	B		19.3	B		23.4	C
Bowery St & Prince St														
	NB	LT	0.79	22.1	C	0.75	20.6	C	0.59	15.8	B	0.99	46.9	D
	SB	TR	0.61	16.1	B	0.57	15.2	B	0.65	16.9	B	0.71	18.2	B
	Overall			19.2	B		18.0	B		16.4	B		32.2	C
Broadway & Astor Pl														
	SB	LT	0.49	14.1	B	0.53	14.6	B	0.56	15.2	B	0.69	17.4	B
	WB	L	0.27	28.0	C	0.50	41.3	D	0.56	45.0	D	0.39	35.4	D
	Overall			14.8	B		15.9	B		16.8	B		18.0	B
Delancey St & Allen St														
	NB	T	0.70	34.3	C	0.68	34.0	C	0.66	33.2	C			
		R	0.24	9.1	A	0.36	15.8	B	0.49	18.0	B			
	SB	TR	0.55	31.2	C	0.68	32.5	C	0.54	30.6	C			
	EB	TR	1.02	50.6	D	0.80	27.3	C	1.15	102.0	F			
	WB	L	0.84	49.9	D	0.73	40.5	D	0.71	42.2	D			
		TR	1.09	67.8	E	0.86	17.4	B	1.09	68.4	E			
	Overall			54.2	D		24.7	C		72.5	E			
Delancey St & Chrystie St														
	NB	L	0.18	19.4	B	0.24	16.8	B	0.26	16.8	B			
		TR	0.88	50.5	D	1.01	73.8	E	0.79	41.7	D			
	SB	L	0.97	71.7	E	1.02	69.6	E	1.01	68.5	E			
		TR	0.79	48.1	D	1.1	113.7	F	0.84	52.3	D			
	EB	TR	0.54	19.6	B	0.69	23.8	C	0.76	25.4	C			
	WB	DefL							1.07	107.6	F			
		LT	1.10	80.8	F	1.08	77.3	E	1.18	116.7	F			
		R	0.37	20.1	C	0.41	23.5	C	0.33	20.6	C			
	Overall			57.2	E		62.1	E		70.0	E			
Delancey St & Essex St														
	NB	LT	0.76	49.9	D	0.65	40.6	D	0.43	31.2	C			
		R	0.87	68.0	E	1.39	245	F	1.93	472.9	F			
	SB	TR	0.93	54.7	D	0.90	49.2	D	0.81	39.8	D			
	EB	TR	0.53	13.1	B	0.70	15.7	B	0.99	35.4	D			
	WB	T	1.17	101.2	F	1.03	38.3	D	1.09	69.8	E			
		R	0.76	33.3	C	0.79	22.7	C	0.98	74.5	E			
	Overall			63.8	E		39.1	D		72.3	D			
E Houston St & Allen St														
	NB	L	0.74	39.3	D	0.54	33.4	C	0.48	31.9	C	0.92	65.3	E
		T	1.11	95.9	F	0.89	44.7	D	1.15	111.2	F	0.87	47.5	D
		R	0.41	32.4	C	0.33	31.4	C	0.22	29.2	C	0.31	31.7	C
	EB	L	0.90	42.4	D	0.68	29.4	C	0.71	34.5	C	0.87	53.4	D
		T	0.89	34.3	C	0.98	39.6	D	0.94	42.7	D	0.96	53.5	D
		R	0.91	48.4	D	1.35	195.0	F	1.02	82.4	F	1.09	117.6	F
	WB	L	0.36	25.3	C	0.22	24.0	C	0.30	25.6	C	0.25	25.5	C
		TR	1.16	115.9	F	0.99	59.6	E	0.96	50.9	D	1.07	82.4	F
	Overall			71.6	E		58.9	E		61.5	E		64.3	E

Table 4-2: Traffic Capacity Analysis for Signalized Intersections

2020 Future Conditions (2 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
E Houston St @ Bowery St														
	NB	DefL	0.72	42.7	D	0.55	34.1	C	0.86	62.5	E	0.54	36.0	D
		TR	0.87	44.6	D	0.68	34.3	C	0.70	34.9	C	0.82	39.6	D
	SB	L	0.41	31.5	C	0.43	28.1	C	0.53	33.2	C	0.80	54.5	D
		TR	0.75	36.8	D	0.80	40.2	D	0.98	62.2	E	0.93	52.5	D
	EB	L	0.26	30.3	C	0.44	35.0	D	0.52	38.5	D	0.72	47.1	D
		TR	0.66	29.4	C	0.93	43.8	D	0.89	39.3	D	0.74	31.4	C
	WB	L	0.79	47.7	D	0.80	55.5	E	0.77	51.5	D	0.78	48.3	D
		TR	1.06	72.1	E	0.98	50.7	D	1.10	89.2	F	1.01	56.7	E
	Overall			49.6	D		43.8	D		60.1	E		46.6	D
E Houston St & Broadway														
	SB	LT	0.88	33.2	C	0.93	38.8	D	0.93	39.3	D	0.31	18.6	B
		R	0.66	27.5	C	0.80	41.5	D	0.53	24.5	C	0.93	37.8	D
	EB	TR	0.75	33.3	C	0.85	38.0	D	0.84	36.9	D	1.01	60.1	E
	WB	L	0.76	40.0	D	0.84	49.9	D	0.61	30.1	C	0.75	39.9	D
		T	0.66	21.4	C	0.56	19.8	B	0.62	20.7	C	0.55	19.5	B
	Overall			29.0	C		33.5	C		31.3	C		39.5	D
E Houston St & Chrystie St														
	NB	L	0.89	42.7	D	0.61	36.8	D	0.72	38.8	D			
		LR	0.84	40.7	D	0.57	37.2	D	0.68	39.2	D			
	SB	L	0.78	38.8	D	0.85	36.7	D	1.06	78.5	E			
		LT	0.79	35.9	D	0.90	36.5	D	1.15	108.4	F			
		R	1.01	64.0	E	1.14	100.0	F	1.07	77.8	E			
	EB	T	0.59	29.7	C	0.79	34.8	C	0.75	33.3	C			
		R	0.91	61.8	E	0.81	47.3	D	1.21	153.3	F			
	WB	L	0.74	48.4	D	0.73	61.2	E	0.99	110.0	F			
		T	0.77	32.5	C	0.69	31.2	C	0.68	30.9	C			
	Overall			46.6	D		59.8	E		94.2	F			
E Houston St & Clinton St														
	NB	LTR	1.22	153.0	F	1.14	124.4	F	1.26	165.9	F			
	SB	LR	0.74	52.3	D	0.79	56.4	E	0.88	71.8	E			
	EB	L	0.57	31.3	C	0.72	45.0	D	0.62	35.0	D			
		T	0.49	16.1	B	0.56	17.2	B	0.48	15.9	B			
	WB	TR	0.70	20.2	C	0.68	19.7	B	0.68	19.8	B			
	Overall			47.9	D		39.6	D		51.8	D			
E Houston St & Essex St														
	NB	LTR	0.79	36.0	D	0.81	37.6	D	0.78	35.2	D	0.94	66.6	E
		DefL										0.99	104.8	F
	SB	LTR	1.02	63.1	E	1.15	104.9	F	1.04	68.2	E	1.09	104.5	F
	EB	L	0.59	22.5	C	0.47	15.0	B	0.34	15.5	B	0.60	40.0	D
		TR	0.72	28.0	C	0.84	28.9	C	0.82	30.8	C	0.84	35.5	D
	WB	L	0.65	23.4	C	0.76	33.3	C	1.03	92.1	F	0.68	39.4	D
		T	0.79	30.9	C	0.66	27.2	C	0.71	28.0	C	0.93	42.7	D
		R	0.11	19.9	B	0.11	19.9	B	0.27	22.2	C	0.23	22.0	C
	Overall			34.3	C		40.0	D		40.2	D		52.8	D
E Houston St & Lafayette St														
	NB	LT	0.77	31.0	C	0.60	25.7	C	0.77	30.7	C	0.62	26.1	C
		R	0.27	21.8	C	0.36	23.9	C	0.44	26.1	C	0.41	25.0	C
	EB	L	1.02	93.3	F	1.15	128.3	F	1.23	160.7	F	1.04	87.8	F
		T	0.39	13.5	B	0.47	14.4	B	0.45	14.1	B	0.35	13.0	B
	WB	TR	0.81	28.9	C	0.72	26.5	C	0.79	28.4	C	0.61	24.0	C
	Overall			29.6	C		29.9	C		35.1	D		26.9	C
Bleecker St @ Grove St														
	SB	TR	0.76	24.3	C	0.36	26.1	C	0.76	24.2	C			
	EB	TR	0.46	28.3	C	0.83	28.6	C	0.44	27.5	C			
	Overall			25.1	C		28.3	C		25.0	C			

Figure 4-6: 2020 Future Intersection Level of Service: AM Peak Hour

Figure 4-7: 2020 Future Intersection Level of Service: Midday Peak Hour

Figure 4-8: 2020 Future Conditions Intersection Level of Service: PM Peak Hour

Figure 4-9: 2020 Future Intersection Level of Service: Saturday Peak Hour

Figure 4-10: 2020 Future Approach/Lane Group LOS –AM

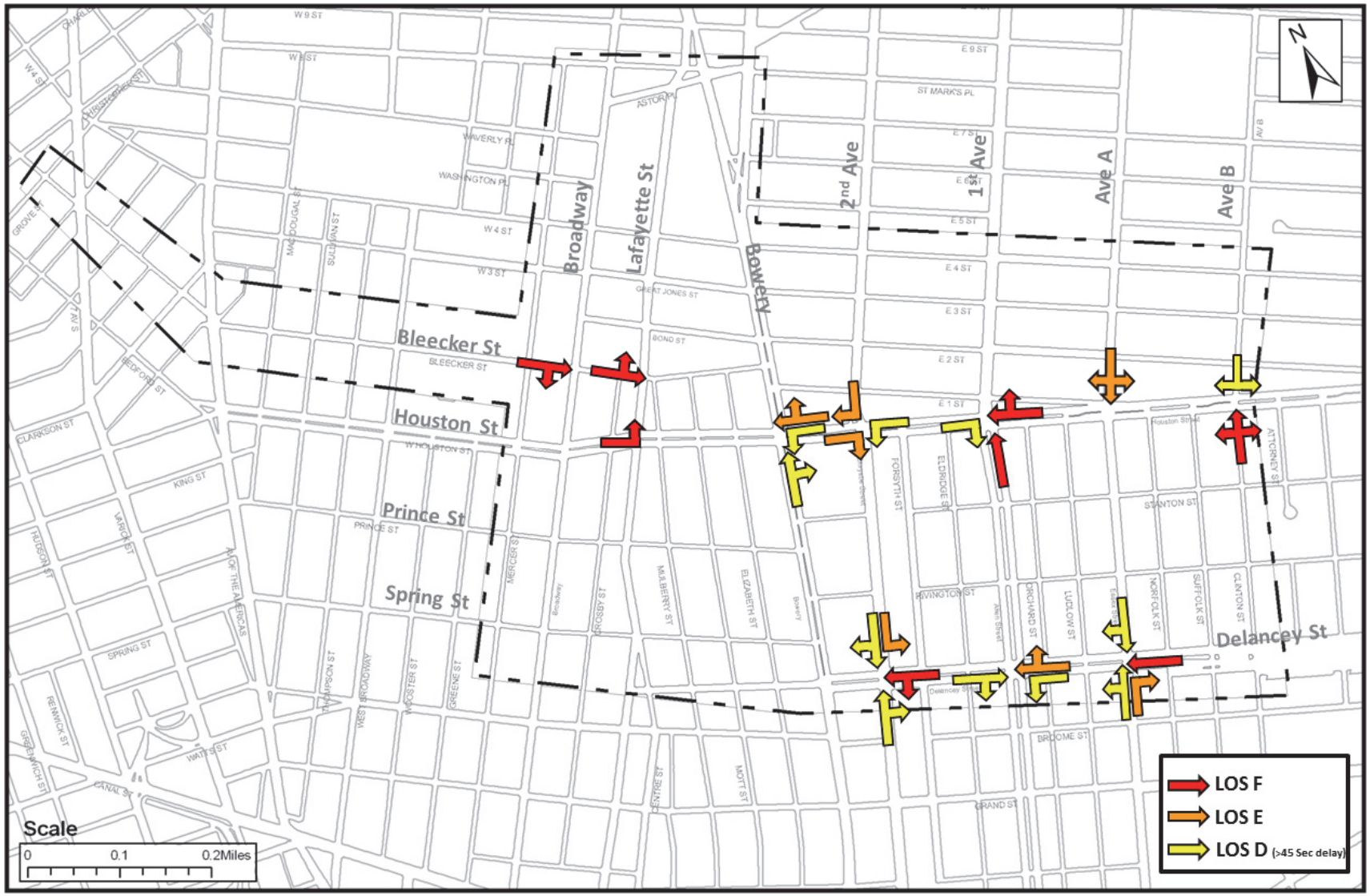


Figure 4-11: 2020 Future Approach/Lane Group LOS - MD

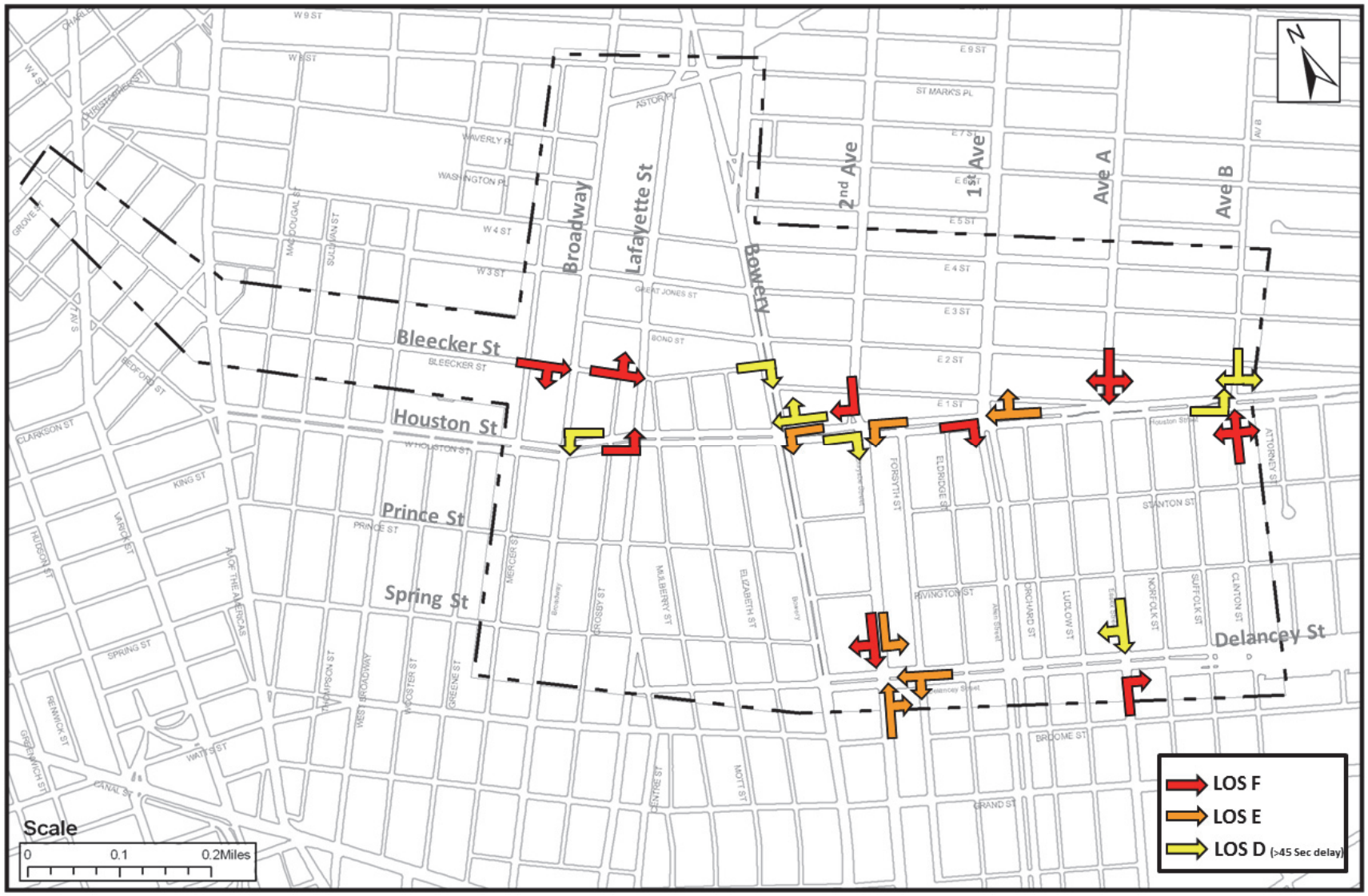
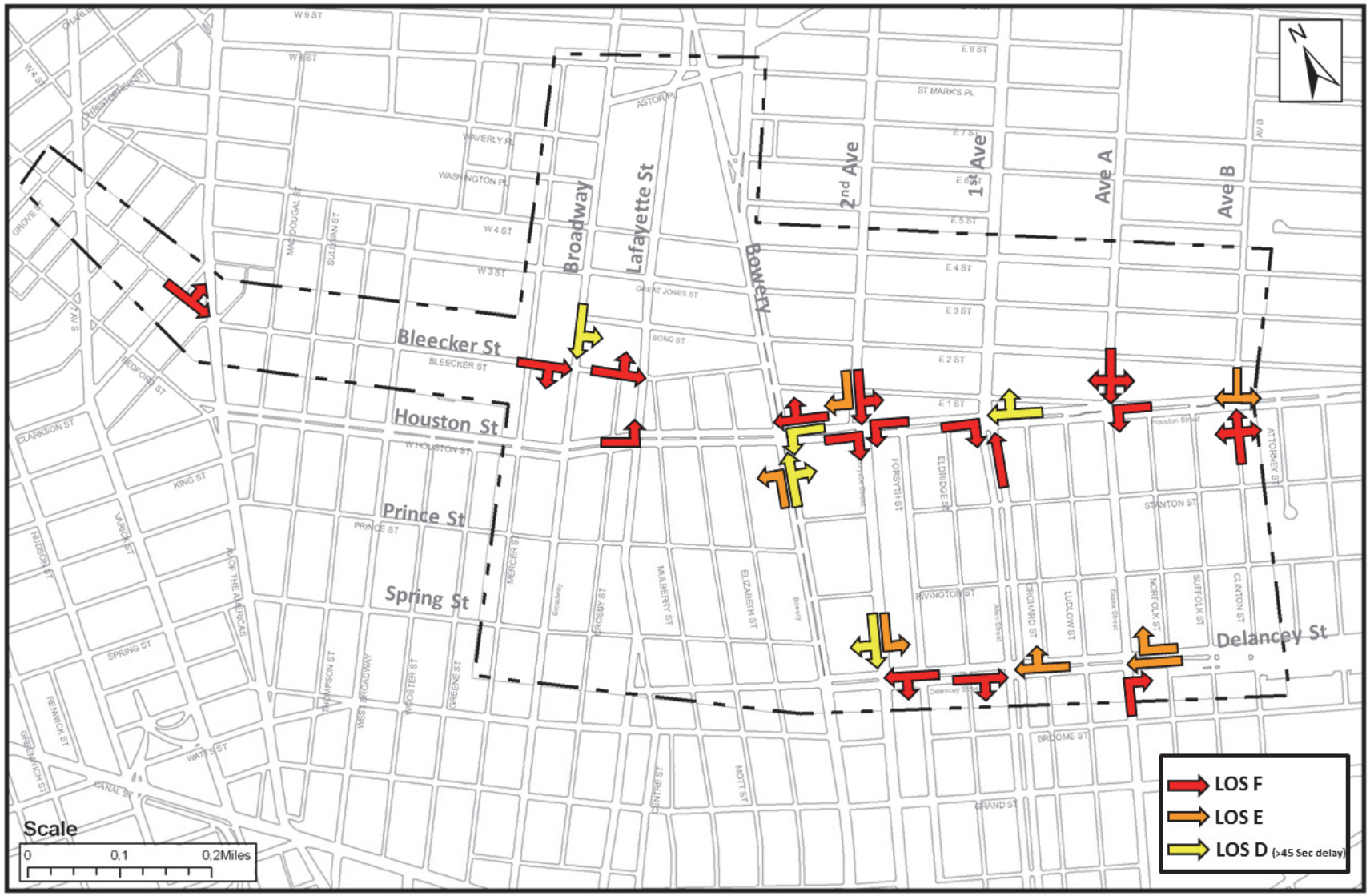


Figure 4-12: 2020 Future Approach/Lane Group LOS - PM



4.4 Future Travel Speeds

The 2020 future travel speeds along the study area's major corridors were calculated using future delays and existing speeds. Future travel speed is another factor in determining future congestion in the study area. 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. The travel speed corridors are listed below. Figure 4-13 shows the average peak hour travel speed.

East-West Corridors:

- 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 Corridors:

- 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)

The 2020 average corridor travel speed is 11mph, 8mph and 8mph during the AM, midday and PM peak hours respectively. Figure 4-13 shows the slowest travel period (MD) travel speeds. Table 4-3 summarizes the average travel speeds for each corridor by direction for the various peak hours. Travel Speeds decreased an average of 1.1 mph from 2010 to 2020 across all corridors with speeds on Delancey Street decreasing the most from 10.2 mph to 5.7 mph in 2020. Travel speeds throughout the study area for the various peaks range from 5 mph to 20 mph. Most of the corridors experience low speeds with less than 10 mph during one or more peak hours.

Figure 4-13: 2020 Future Travel Speeds – Midday

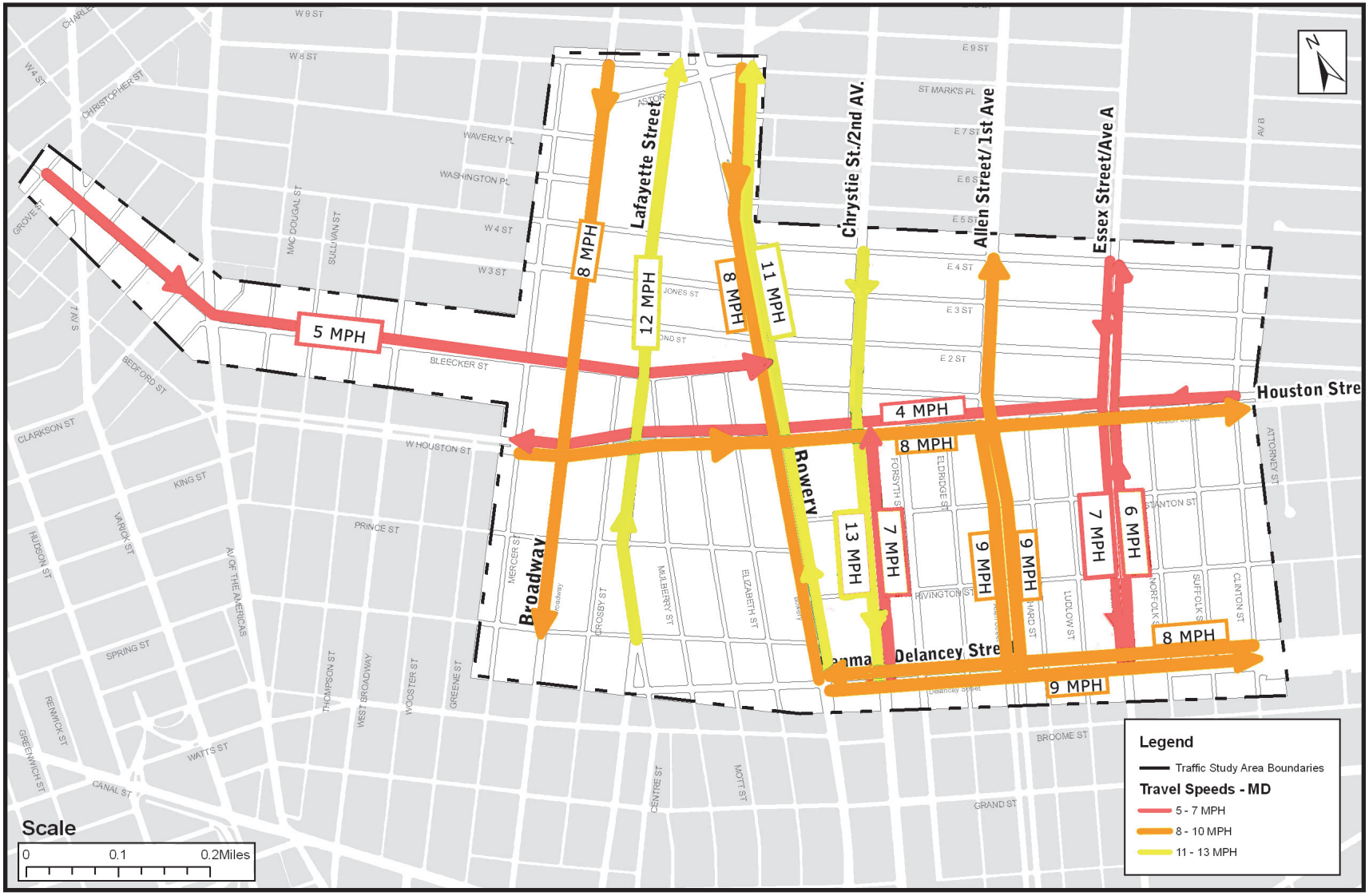


Table 4-3: Travel Speeds – Existing (2010) and Future (2020)

No.	Corridors	Distance (Miles)	Peak Period	Direction	Avg Speed (MPH) - Existing	Avg Speed (MPH) - Future	Difference (MPH)	Avg Difference (MPH)
1	Bleecker Street between Christopher Street and The Bowery	0.85	AM	WB	9.1	7.1	-2	**-1.67**
			MD	WB	6.7	5.4	-1.3	
			PM	WB	7.5	5.8	-1.7	
2	Houston Street between Clinton Street and Mercer Street	0.80	AM	EB	7.8	7.5	-0.3	**-1.03**
				WB	8.7	5.6	-3.1	
			MD	EB	8.2	7.7	-0.5	
				WB	5.2	4.4	-0.8	
			PM	EB	7.5	7.5	0	
				WB	8.6	7.1	-1.5	
3	Delancey Street between Clinton Street & The Bowery	0.45	AM	EB	6.1	4.6	-1.5	**-4.43**
				WB	14.4	4.6	-9.8	
			MD	EB	7.4	8.6	1.2	
				WB	13.4	8.2	-5.2	
			PM	EB	10.7	5.2	-5.5	
				WB	9.3	3.5	-5.8	
4	Broadway between West 8h Street & Spring Street	0.60	AM	SB	20.3	16.6	-3.7	**-2.10**
			MD	SB	9.2	8.4	-0.8	
			PM	SB	9.5	7.7	-1.8	
5	Lafayette Street between West 8th and Delancey Street	0.70	AM	NB	16.9	16.2	-0.7	**-0.47**
			MD	NB	12.2	12.2	0	
			PM	NB	13	12.3	-0.7	
6	The Bowery between West 8th and Delancey Street	0.65	AM	SB	14.3	14.8	0.5	**0.38**
				NB	10	11.2	1.2	
			MD	SB	7.1	7.8	0.7	
				NB	11.1	11	-0.1	
			PM	SB	9	9.2	0.2	
				NB	12	11.8	-0.2	
7	Chrystie Street/2nd Avenue between Delancey Street and East 4th Street	0.45	AM	SB	13.6	12.4	-1.2	**-1.02**
				NB	12.4	11.6	-0.8	
			MD	SB	9.6	7	-2.6	
				NB	11.4	13	1.6	
			PM	SB	8.9	6	-2.9	
				NB	14.2	14	-0.2	
8	Allen Street/1st Avenue between Delancey Street and East 4th Street	0.45	AM	SB	15	14.6	-0.4	**-0.68**
				NB	9.4	8.7	-0.7	
			MD	SB	9.6	9.4	-0.2	
				NB	9.4	9.4	0	
			PM	SB	11.2	11.3	0.1	
				NB	10.2	7.3	-2.9	
9	Essex Street/Avenue A between Delancey Street and East 4th Street	0.45	AM	SB	8.1	11.4	3.3	**0.05**
				NB	12.4	17.8	5.4	
			MD	SB	5.9	6.6	0.7	
				NB	11	6	-5	
			PM	SB	9.1	11.4	2.3	
				NB	10.2	3.8	-6.4	

5 Public Transportation

As presented in the existing conditions analysis, 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) and there are no subway stations east of the Bowery between 1st Street and 13th Street.

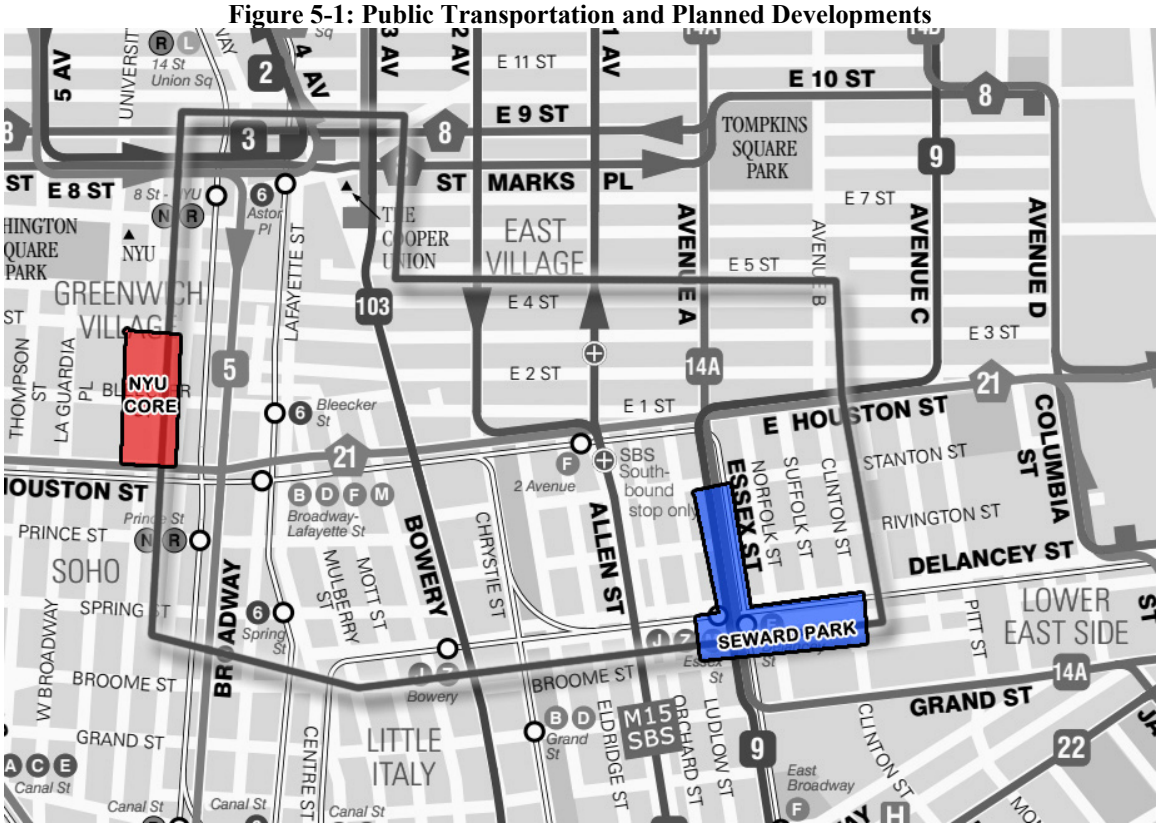
The Second Avenue Subway will create a North/South line along Second Avenue from 125th Street to Hanover Square with a station at Houston Street. However, it is not expected to be operational in the study area before 2020. Otherwise there are no known significant public transportation infrastructure changes planned in the study area by 2020

The Seward Park Mixed Use development is expected to add 801, 873 and 1,279 subway trips to the Delancey Street/Essex Street Station during the AM, MD and PM peak period respectively. Subway stairway analysis and subway control area analysis revealed no significant impacts at this station. The project is expected to add 220, 380 and 397 bus trips during the AM, MD and PM peak periods respectively which are expected to exceed NYCT guideline capacity on the M9 and M14A bus lines.

The NYU Core project is expected to add 554, 561 and 839 subway trips during the AM, MD and PM peak period respectively which are expected to be distributed primarily among the Bleecker Street Station, the Broadway Lafayette Station and the West 4th Street Station. Subway stairway analysis and subway control area analysis reveal no significant impacts at these stations. The project is expected to generate 86, 177 and 169 bus trips during the AM, MD and PM peak periods respectively which do not pose significant impacts to the areas bus lines.

The location of the NYU Core and Seward Park Mixed Use Developments in relation to the existing public transportation can be seen in figure 5-1.

Figure 5-1: Public Transportation and Planned Developments



6 Parking

The existing conditions parking analysis showed that *on-street parking* utilization in the study area was 91%, 102% and 102% during the AM, MD and PM peak periods, respectively while the *off-street parking* utilization was 73%, 76% and 62% during the weekday AM, MD and PM peak periods. The area east of the Bowery contained more off-street parking facilities and less on-street parking spaces than the area west of the Bowery. Also, illegal parking was observed along many roadway segments east of the Bowery.

The future parking demand is expected to increase with increased residential and commercial retail density generating more traffic. With on-street parking at or near capacity during all peak periods, off-street parking utilization is expected to increase. However, off-street parking supply is expected to decrease by the year 2020 with the elimination of some facilities. The Seward Park Mixed Use Development Project (SPMUDP) EIS requires three parking garages (407 spaces) to be displaced within the Bowery Houston Bleecker study area. Another garage south of Broome Street on Clinton Street will also be displaced accounting for the loss of another 100 spaces. The SPMUDP provides for 500 off-street parking spaces while generating a demand for 257 spaces. This reduces the off-street parking supply in the study area by approximately 150 spaces. Off-street parking supply is not expected to change due to the NYU Core development before phase 2 is completed in 2031. Truck loading and unloading zones in the area are adequate and will be evaluated in the future to address changing needs.

7 Pedestrians and Bicycles

7.1 Pedestrian Analysis

Pedestrian volumes are expected to increase in the study area resulting from economic growth and new developments. The existing conditions analysis shows high pedestrian volumes near transit hubs, institutional buildings such as NYU and commercial/retail areas along major corridors. The highest pedestrian volumes were observed along Broadway, at Astor Place and 3rd Avenue, along Houston Street west of the Bowery and along Delancey Street near the Essex street subway station. The 2020 projected pedestrian volumes for the AM, Midday, PM and Saturday peak hours are shown in figures 7-1, 7-2, 7-3 and 7-4 respectively. These volumes take into account proposed projects such as the NYU Core and the Seward Park development which are projected to add significant pedestrian volumes to the transportation network.

By 2022 the Seward Park Mixed Use Development is expected to add 1,433, 3,467 and 3,108 pedestrian trips to the network during the AM, MD and PM peak hours with the highest project related increments on Essex Street, Delancey Street, Broome Street and Grand Street. By 2021 the NYU Core Development is expected to add 1,491, 1,965 and 1,441 pedestrian trips during the AM, MD and PM peak periods respectively with the highest volumes on Bleecker Street, Mercer Street, Broadway, Houston Street and LaGuardia Street.

The future pedestrian level of service for crosswalks and corners was determined using the 2000 Highway Capacity Manual methodology. Figures 7-1, 7-2, 7-3 and 7-4 show the 2020 pedestrian volumes for the AM, MD, PM and Saturday peak hours respectively, while tables 7-1 and 7-2 show the crosswalk and corner level of service analysis.

Figure 7-1: Future (2020) Pedestrian Volume – AM Peak Hour

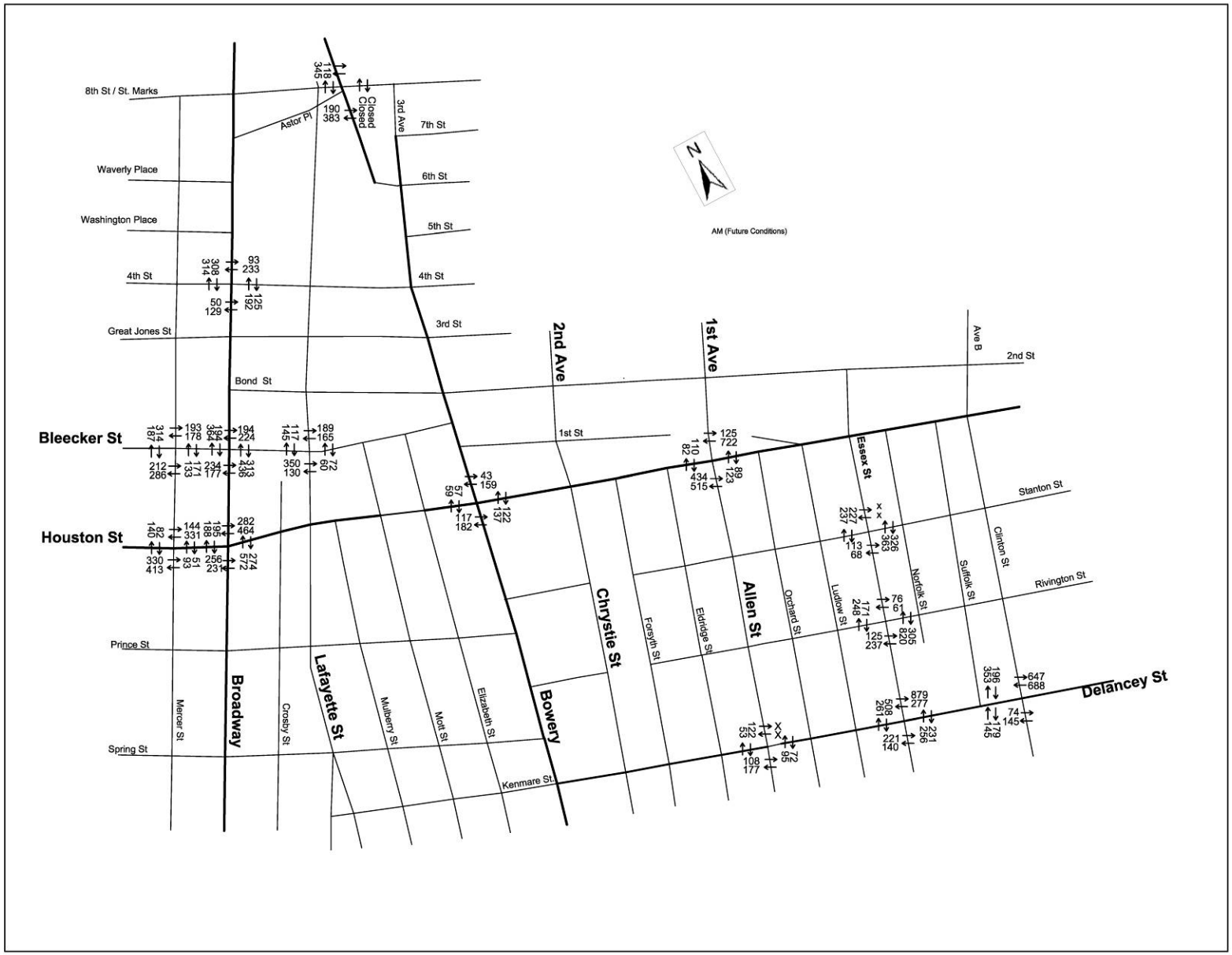


Figure 7-2: Future (2020) Pedestrian Volume – MD Peak Hour

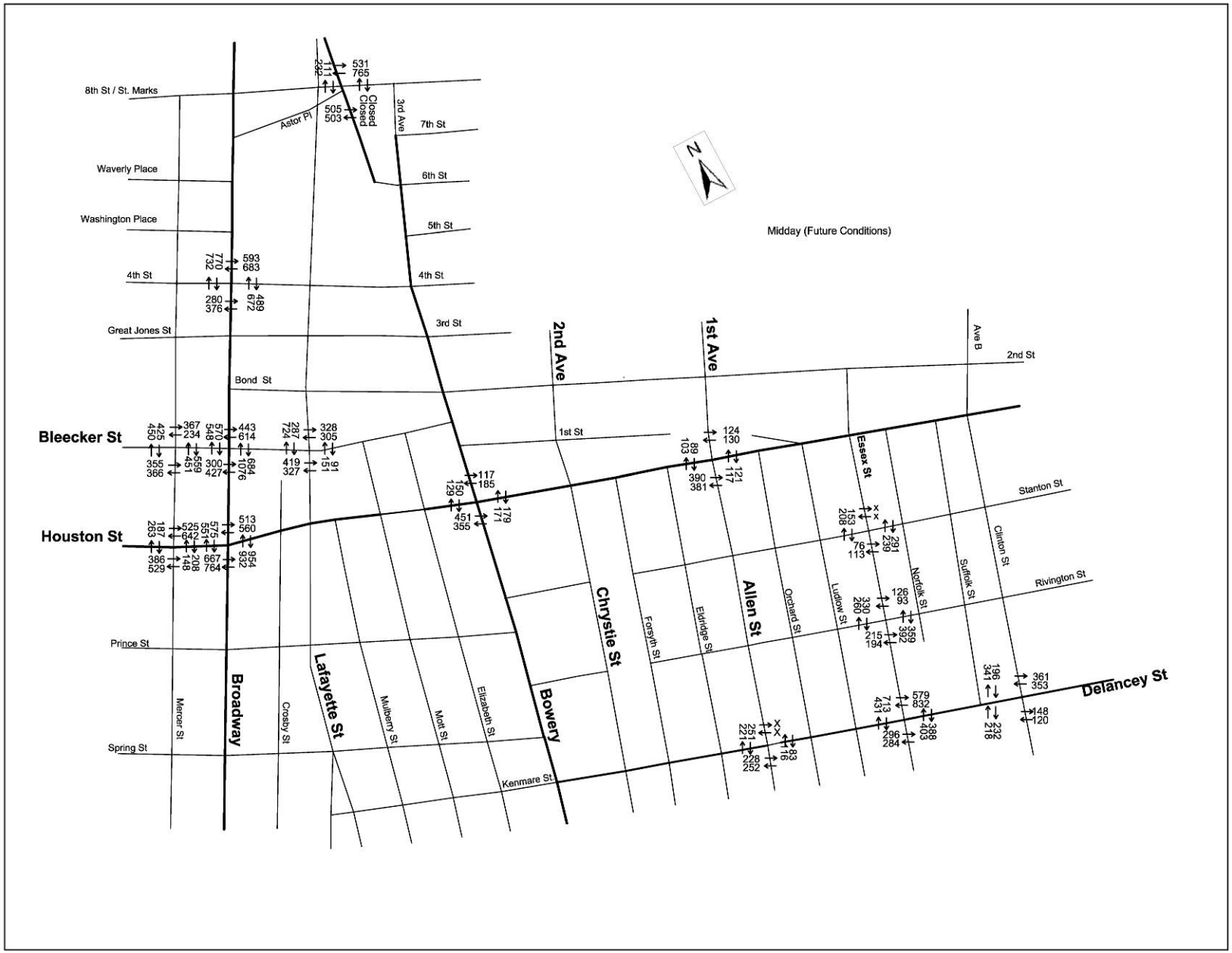


Figure 7-3: Future (2020) Pedestrian Volume – PM Peak Hour

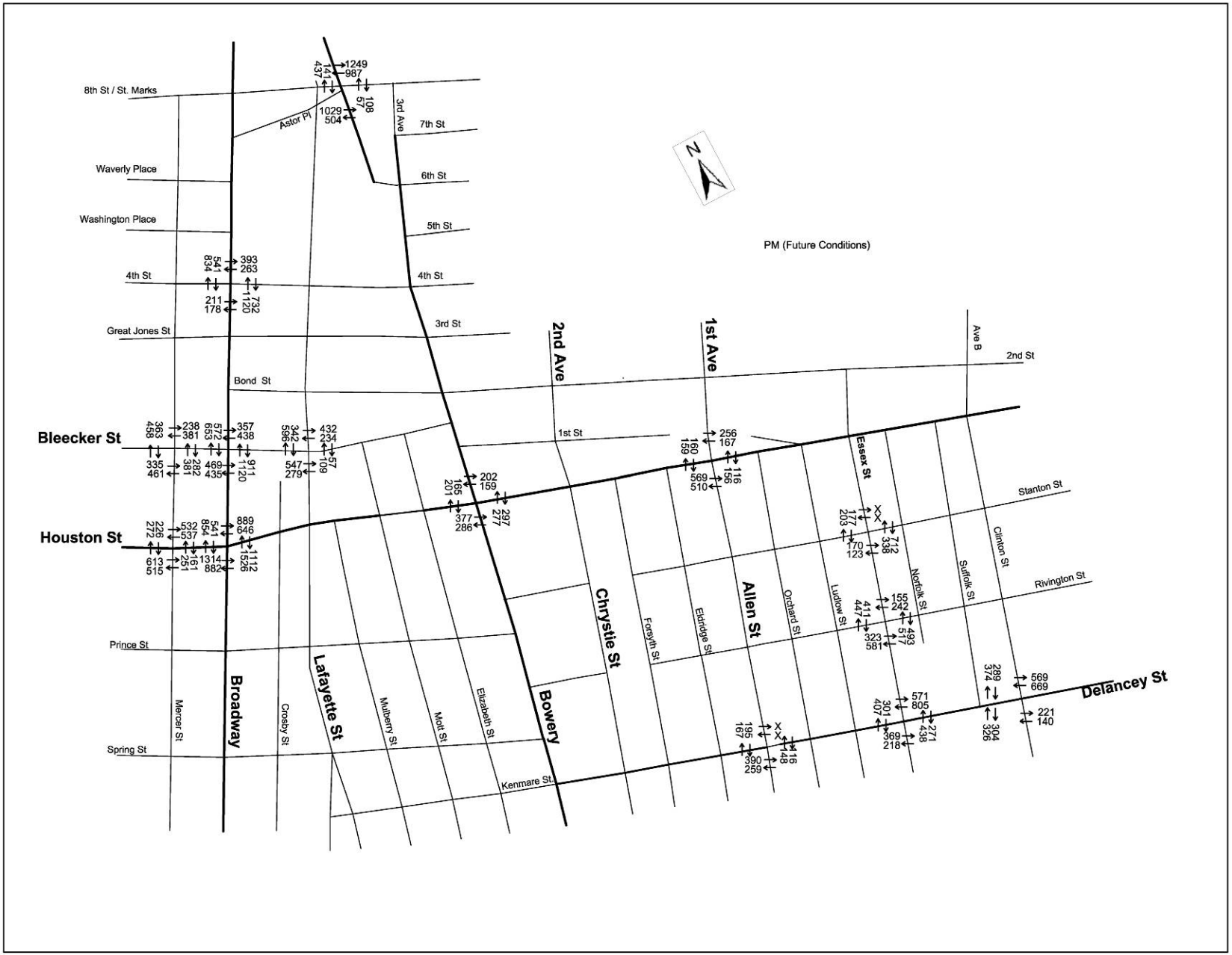
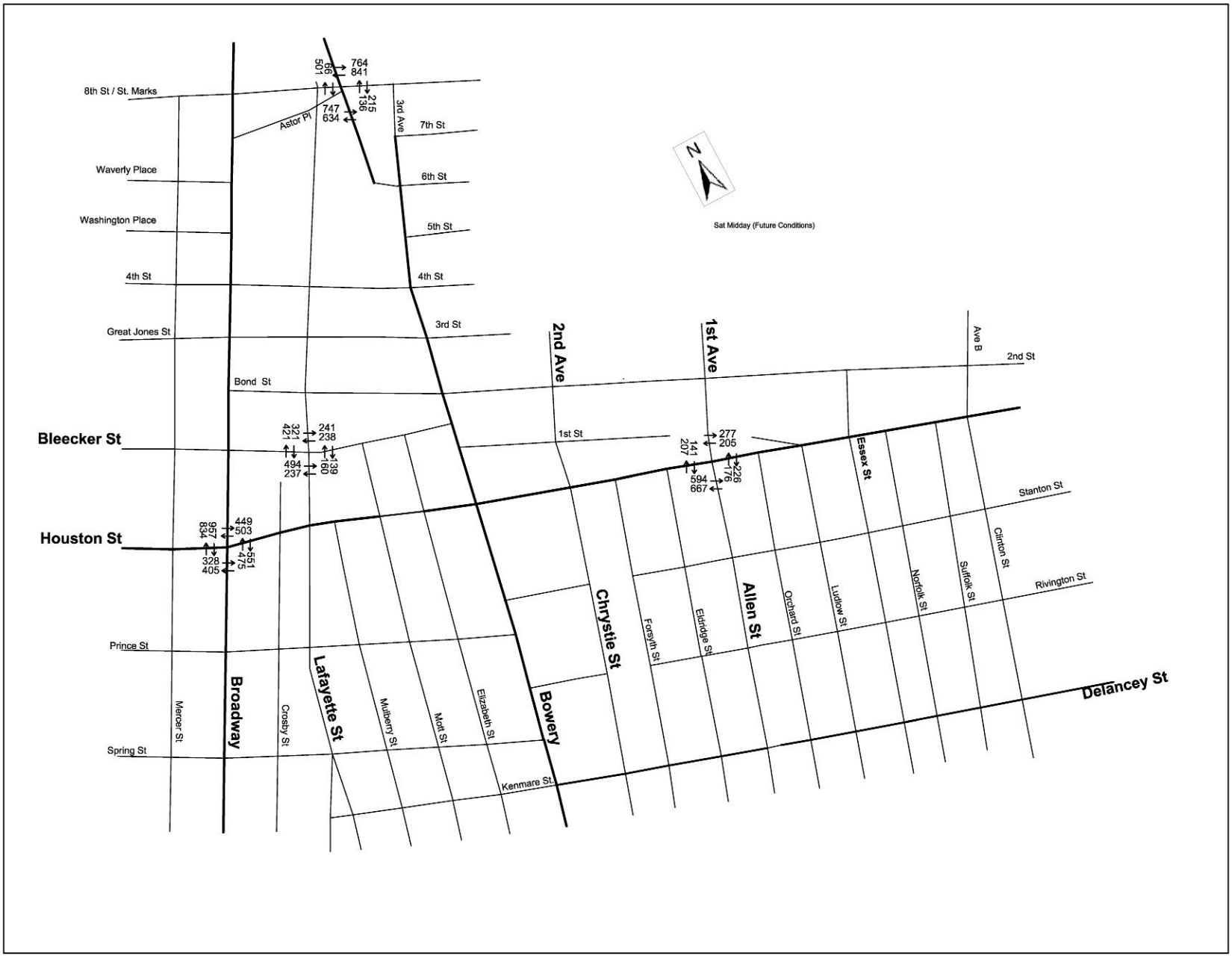


Figure 7-4: Future (2020) Pedestrian Volume – Sat Peak Hour



Fourteen of the 24 crosswalks at the six studied intersections operated at LOS C or better, however, five of the six intersections had at least one crosswalk with LOS D or worse during one or more peak hours. See locations below.

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

All intersection corners operated at an acceptable LOS C or better.

Table 7-1: Future (2020) 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	11.1	E	13.9	E	7.4	F	11.2	E
	South	28.2	C	19.4	D	10.1	E	14.4	E
	East	X	N/A	X	N/A	205.9	A	121.3	A
	West	81.3	A	99.8	A	67.8	A	67.4	A
Allen Street & Houston Street	North	11.2	E	48.6	B	27.6	D	8.5	E
	South	11.4	E	14.6	E	10.7	E	10.1	E
	East	109.1	A	91.3	A	96.4	A	81.6	A
	West	113.2	A	114.6	A	72.8	A	42.6	B
Bowery & Houston Street	North	103.0	A	78.8	A	55.4	B	X	N/A
	South	58.5	B	24.1	C	23.0	D	X	N/A
	East	54.4	B	38.3	C	27.4	C	X	N/A
	West	113.7	A	65.9	A	37.6	C	X	N/A
Broadway & Houston Street	North	65.9	A	45.5	B	30.4	C	55.0	B
	South	46.0	B	12.9	E	8.5	E	29.9	C
	East	56.5	B	22.8	D	15.6	D	48.3	B
	West	102.3	A	36.8	C	29,8	C	21.9	D
Essex Street & Delancey Street	North	55.0	B	43.1	B	43.4	B	X	N/A
	South	136.4	A	77.8	A	78.1	A	X	N/A
	East	35.1	C	18.5	D	19.5	D	X	N/A
	West	27.9	C	16.8	D	28.1	C	X	N/A
Lafayette Street & Bleecker Street	North	123.5	A	78.3	A	62.9	A	76.5	A
	South	100.9	A	60.7	A	58.6	B	68.3	A
	East	157.8	A	95.5	A	119.0	A	76.4	A
	West	107.6	A	24.1	C	26.3	C	36.1	C

Table 7-2: Future (2020) 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	68.3	A	88.0	A	49.9	B	59.6	B
	NW	51.0	B	57.3	B	32.3	C	44.9	B
	SE	152.3	A	111.8	A	60.7	A	68.9	A
	SW	49.5	B	41.4	B	21.5	D	30.0	C
Allen Street & Houston Street	NE	238.3	A	545.5	A	379.3	A	163.8	A
	NW	79.3	A	178.1	A	107.7	A	54.5	B
	SE	33.9	C	43.3	B	31.1	C	25.2	C
	SW	74.8	A	99.4	A	63.6	A	47.0	B
Bowery & Houston Street	NE	278.2	A	199.0	A	149.4	A	x	x
	NW	398.5	A	310.5	A	197.1	A	x	x
	SE	245.2	A	142.8	A	120.8	A	x	x
	SW	315.5	A	146.0	A	123.9	A	x	x
Broadway & Houston Street	NE	166.0	A	89.1	A	64.2	A	142.0	A
	NW	90.6	A	46.8	B	34.8	C	38.7	C
	SE	136.2	A	61.8	A	41.4	B	125.6	A
	SW	279.5	A	102.9	A	71.4	A	103.6	A
Essex Street & Delancey Street	NE	81.5	A	56.5	B	56.8	B	x	x
	NW	67.8	A	47.8	B	53.2	B	x	x
	SE	125.9	A	71.5	A	73.8	A	x	x
	SW	110.4	A	73.1	A	88.5	A	x	x
Lafayette Street & Bleecker Street	NE	217.8	A	145.9	A	142.4	A	130.1	A
	NW	171.2	A	74.5	A	73.0	A	86.5	A
	SE	335.2	A	202.6	A	209.0	A	203.2	A
	SW	162.7	A	61.8	A	64.7	A	81.4	A

x – no data recorded

7.2 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 7-5). There are currently nine 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, Suffolk Street, Avenue A and Avenue B. There is one bicycle path on Allen Street/First Avenue and one along 2nd Avenue north of 2nd Street. One shared bicycle lane exists on the Bowery between Rivington Street and 2nd Street. Bicycle routes are being installed along Houston Street from Chrystie Street to the FDR as part of the East Houston Street Reconstruction. Essex Street, Broadway and Mercer Street were identified for potential bicycle routes.

One of the goals of DOT's 2009 Strategic Plan was to double bicycle ridership between 2007 and 2012 and to triple it by 2017. According to screen line counts, bicycle ridership doubled between 2007 and 2011 with the Williamsburg Bridge having the highest bicycle volume of all the east river crossings. Twelve hour (7am-7pm) screen line counts on the Williamsburg Bridge showed average weekday volume greater than 4,500 bicycles in 2011.

The NYC Bike Share program was launched in May 2013 with 5,500 bikes and 300 bike share stations. The program will continue to grow with a goal of more than 10,000 bikes in the program. There are 18 planned bike share stations in the study area with more than 600 bicycle docks. Figure 7-7 shows the locations of the bicycle stations.

Figure 7-5: Bicycle Facilities

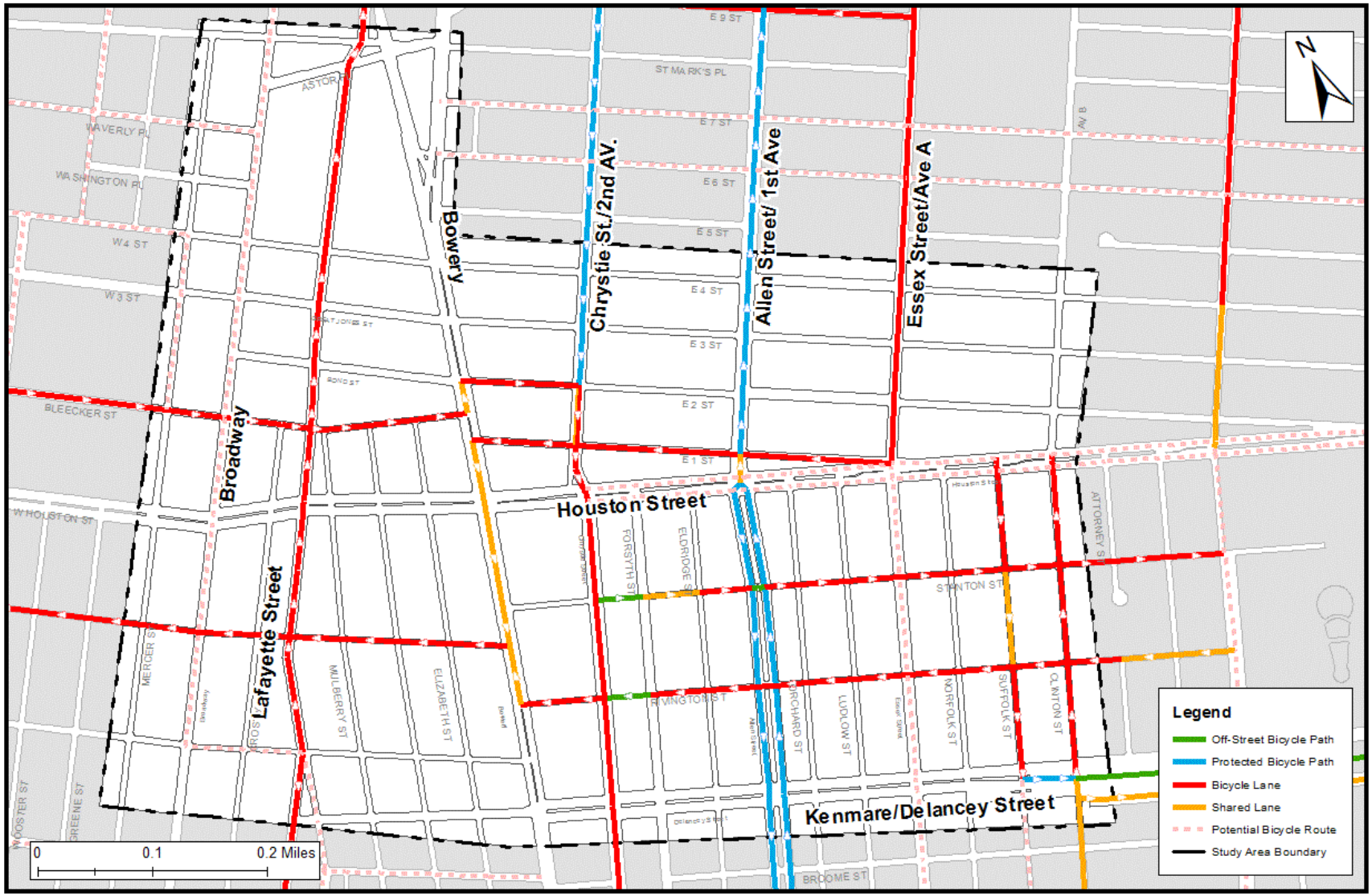
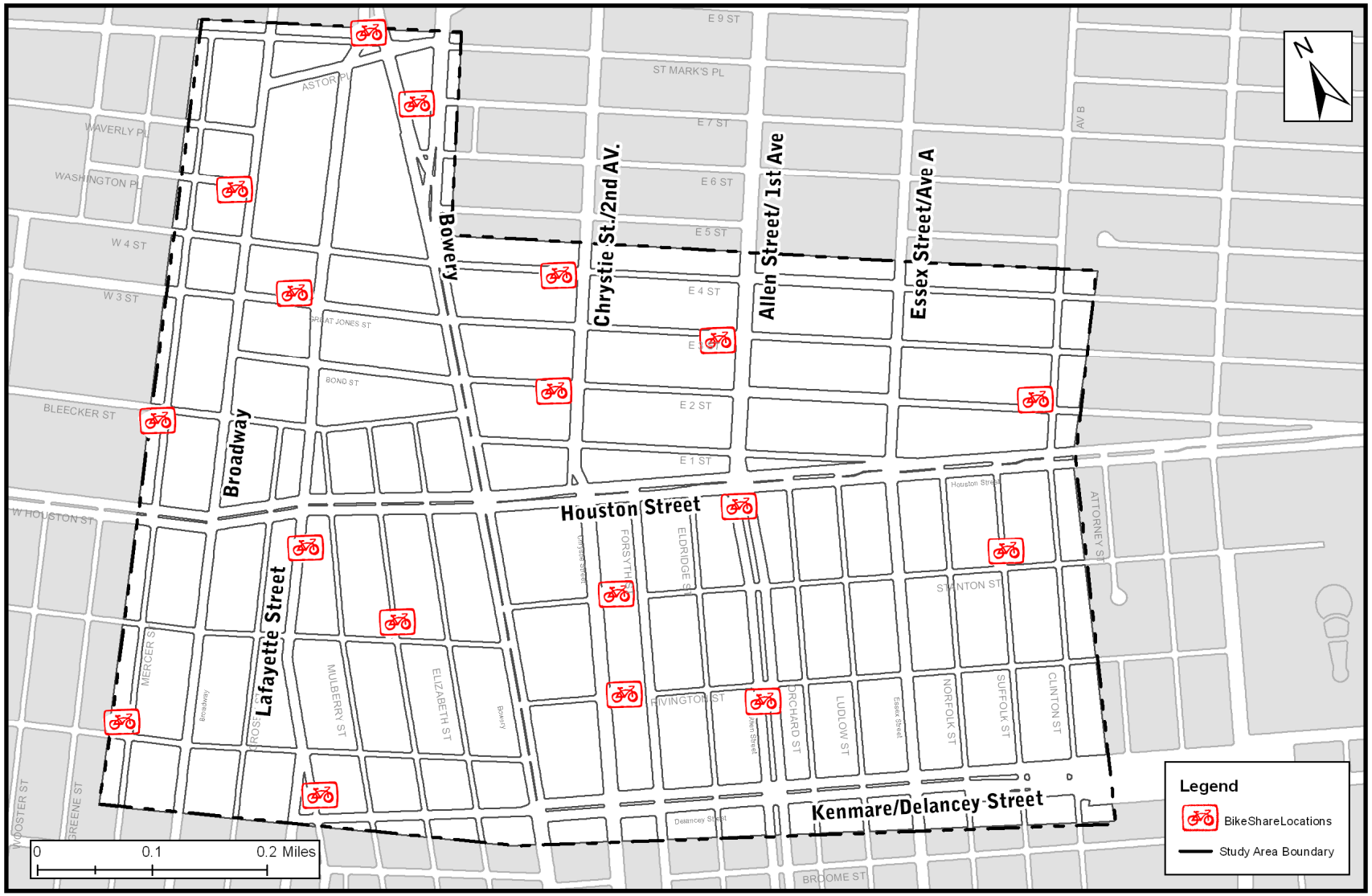


Figure 7-6: NYC Bike Share Planned Locations

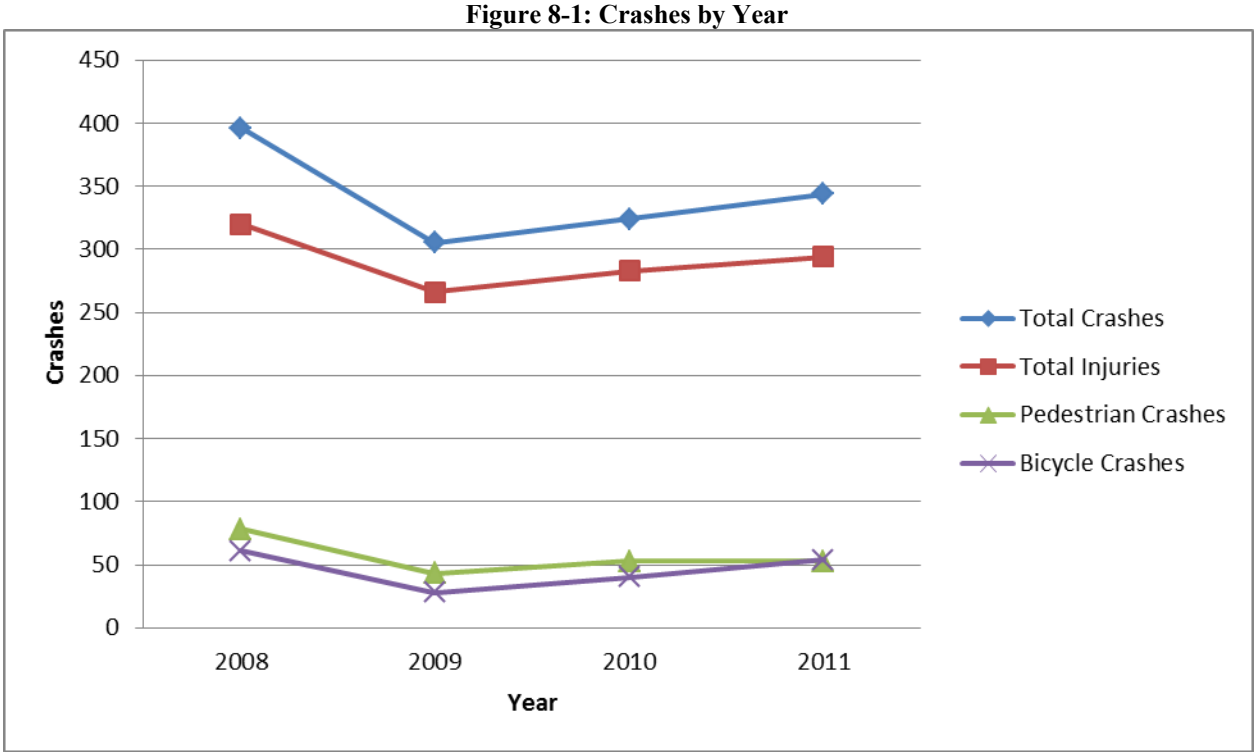


8 Crash/Safety Analysis

8.1 Crashes 2008-2011

Crash records were examined for 102 intersections in the study area for the period 2008-2011. There were 1,369 crashes resulting in 1,163 injuries to the driver or vehicle passenger while 227 pedestrians and 183 bicyclists were injured between 2008 and 2011. The data shows that total reportable crashes decreased 23% from 2008 to 2009 and then increased 6% from 2009 to 2010 and also 6% between 2010 and 2011. Total crashes decreased 13% from 2008 to 2011. Injuries, pedestrian and bicycle crashes exhibit a similar pattern. Figure 8-1 shows the total reportable crashes, injuries, pedestrian and bicycle crashes from 2008 to 2011.

Figure 8-1: Crashes by Year



The analysis shows that between 2008 and 2011 pedestrians were involved in 17% of all crashes in the study area while bicyclists were involved in 13%. Eight percent of all injuries were Type

A injuries[1], 15% were type B injuries[2], 77% were type C[3], while 435 crashes involved property damage only ($1,000 damage or more). The three most common collision types were rear end (16%) overtaking (13%) and right angle (6%). Fourteen percent of the crashes occurred under wet roadway conditions, while 36% of all crashes occurred during non-daylight hours (night-time).

8.2 Crash Analysis

After reviewing crashes at all intersections in the study area for the most recent three years (2009-2011), five intersections qualified as "High Crash Locations" (HCL); which is five or more pedestrian crashes or 23 or more reportable crashes in any one year. Four HCLs are on Delancey Street at the intersections of the Bowery, Clinton Street, Essex Street and Chrystie Street. The recently implemented Delancey Street Improvements project aimed at enhancing pedestrian safety would significantly alter this situation. The fifth intersection is Avenue A and 1st Street. See Table 8-1.

[1] Type A – Involved a bleeding wound or a person was carried away from the scene
[2] Type B – Bruises
[3] Type C – No visible injuries

Table 8-1: High Crash Locations (2009-2011)

Intersections	Total Crashes			Injuries			Pedestrian Crash			Bicycle Crash		
	2009	2010	2011	2009	2010	2011	2009	2010	2011	2009	2010	2011
Delancey St.@ Chrystie St.	14	27	20	15	29	15	1	5	1	0	1	3
Delancey St.@ Bowery	25	7	18	19	6	13	4	0	0	1	1	2
Delancey St.@ Clinton St.	27	19	15	30	17	15	2	1	1	2	5	3
Delancey St.@ Essex St.	23	24	30	25	24	21	7	2	2	1	2	4
Avenue A/1st Street	7	12	3	4	9	3	0	5	2	3	2	0

Table 8-2 shows summary statistics for the HCLs and figure 8-2 shows the High Crash Locations as well as fatalities from 2008 – 2011. The intersection of Delancey Street and Clinton Street recorded the highest number of rear end crashes and the highest number of type A injuries.

Table 8-2: High Crash Location Statistics (2008-2011)

Intersections	Injury Type			Collision Type			Time of Day			
	A	B	C	Rear End	Overtaking	Right Angle	AM	Midday	PM	Night
Delancey St.@Chrystie St	5	11	56	14	6	12	8	4	7	36
Delancey St.@Bowery	4	4	47	8	11	11	5	6	6	31
Delancey St.@Clinton St.	10	11	47	29	6	2	4	10	9	27
Delancey St.@Essex St.	7	17	62	13	9	5	8	9	12	26
Ave A@1st St.	3	0	17	0	0	0	4	2	2	11

8.3 Fatalities & Injuries

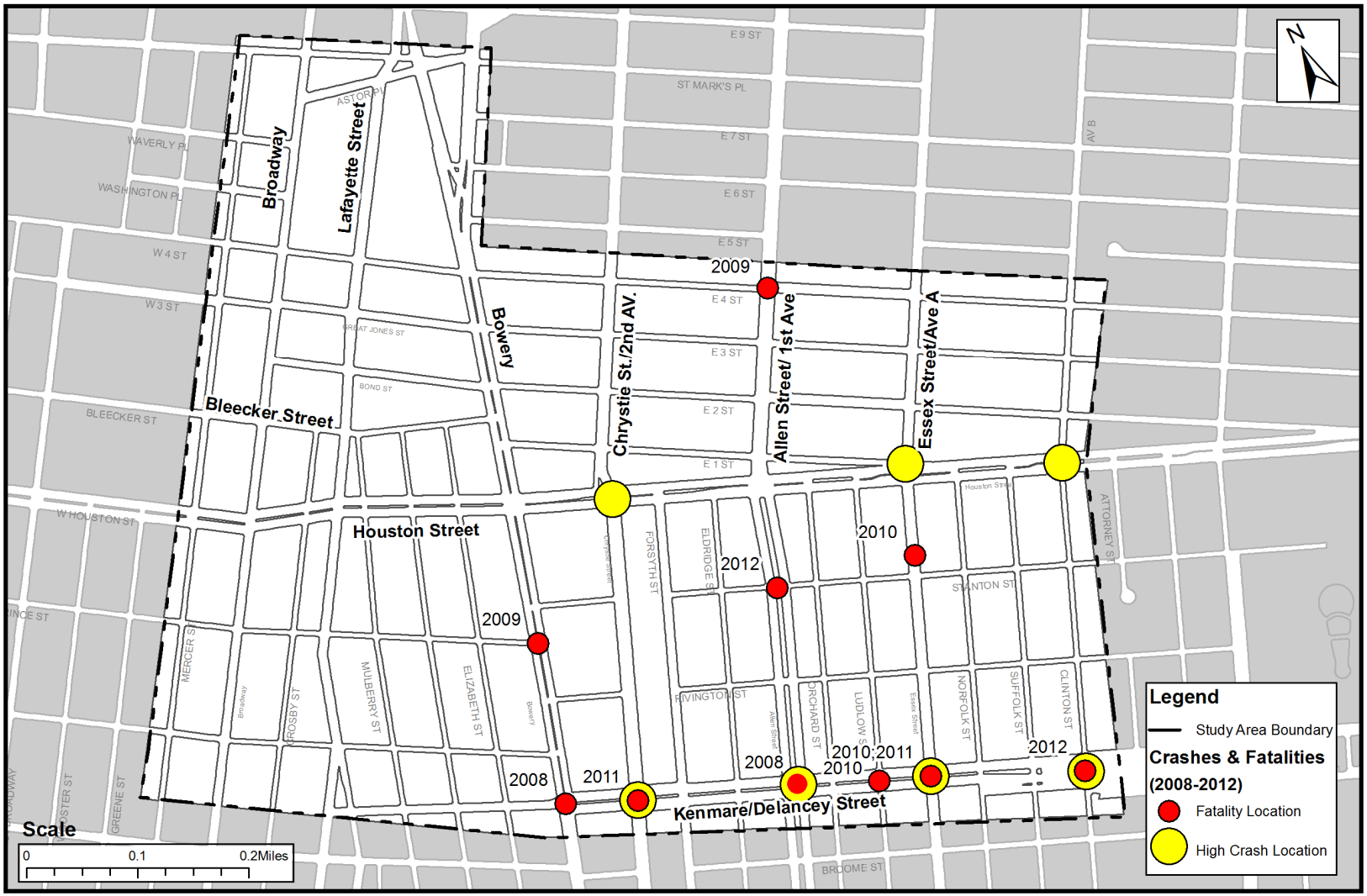
Between 2008 and 2011, there were eleven fatalities in the study area; seven pedestrians, three bicyclists and one vehicle occupant. Table 8-4 below lists locations where these fatalities occurred and other related information.

Table 8-3: Fatalities 2008-2011

Intersection	Year				Injury Type			Total	Property Damage Only
	2008	2009	2010	2011	A	B	C		
Avenue A/E. 1st St.	0	0	1-p	0	3	0	17	20	6
Prince St./Bowery	0	1-p	0	0	1	1	10	12	9
Delancey St./Allen St.	0	1-p	0	0	3	3	28	34	25
Delancey St./Bowery	1-b	0	0	1-p	4	4	47	55	26
Delancey St./Essex St.	0	0	1-p	1-p	7	17	62	86	27
Delancey St./Ludlow St.	0	0	1-b	0	2	1	24	27	10
Delancey Street/Chrystie St.	0	0	0	1-b	5	11	56	72	25
Essex St./Stanton St	0	0	1 -p	0	0	1	4	5	4
1st Ave/E. 4th St.	0	1-v	0	0	1	1	6	8	4

p – pedestrian
b – bicyclist
v - vehicle

Figure 8-2: High Crash Locations (2009-2011) and Fatalities (2008-2011)

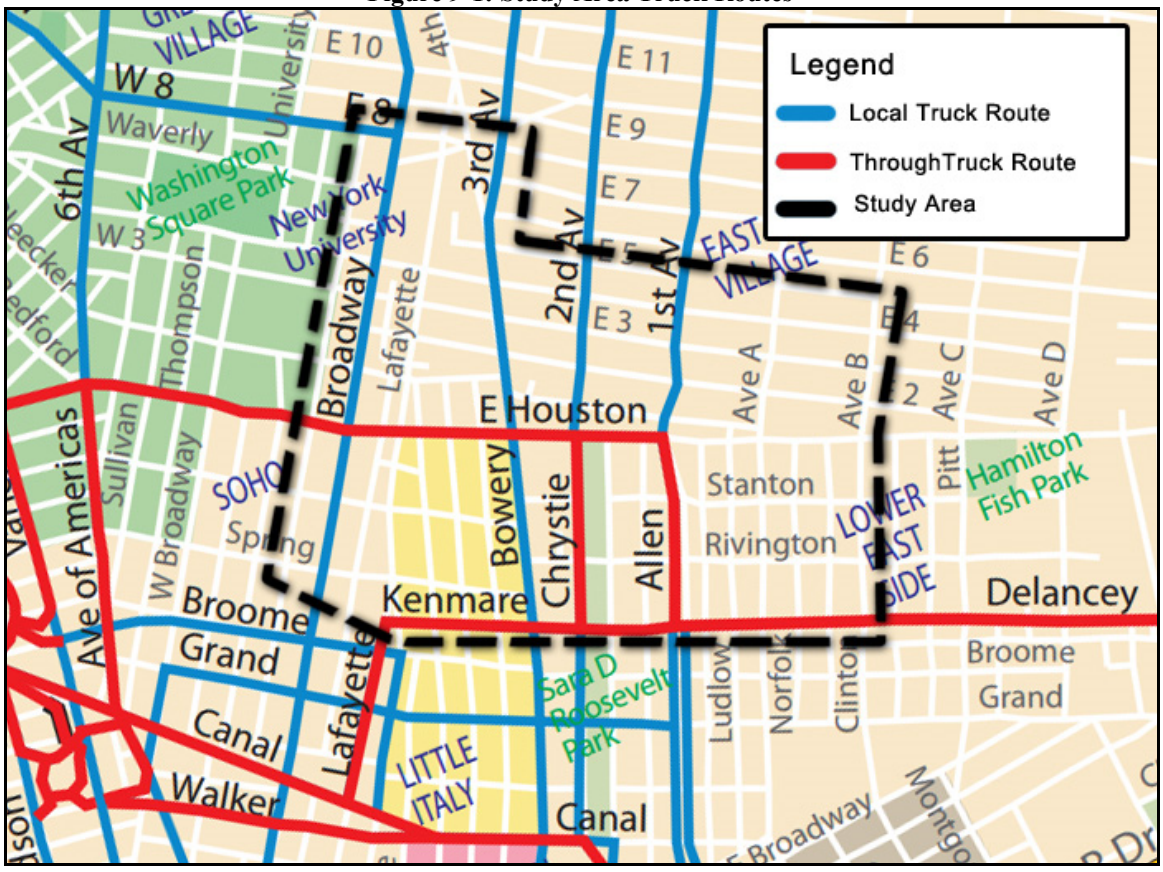


9 Goods Movement

9.1 Truck Routes

As documented in Technical Memo No. 1, the study area is well served by local and through truck routes. 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. However, there are restrictions on truck traffic using the Holland Tunnel. No commercial traffic is allowed into Manhattan via the tunnel 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 truck routes. There are no substantial changes expected that will affect the truck routes or through truck volumes in the study area. However, increased development activity would attract more loading and unloading activity.

Figure 9-1: Study Area Truck Routes



10 Public Outreach and Community Input

10.1 Introduction

To ensure ample public participation that addresses community concerns and facilitate community input, NYCDOT as part of the planning process, hosted a series of technical advisory committees (TAC) meetings and public meetings. To date, three TAC meetings and three public meetings were held. The first TAC meeting was held March 8, 2010 and the first public meeting took place May 6, 2010 at the Bowery Mission Chapel. The second TAC meeting occurred on January 26, 2012 and the second public meeting was held on February 21 at the JASA community room at 200 East 5th St. The third TAC meeting was held October 23, 2013 and the third public meeting was held November 20th 2013 at the University Settlement Center. Following are the notes of meeting for the respective TAC and public meetings.

10.2 Notes of Meeting

A. TAC Kickoff Meeting – March 8, 2010

B. Public Meeting #1 – May 6, 2010

C. TAC Meeting #2 – January 26, 2012

D. Public Meeting #2 – February 21, 2012

E. TAC Meeting #3 – October 23, 2013

F. Public Meeting #3 – November 20, 2013

G. CB2 Traffic and Transportation Committee Meeting – February 6, 2014

Bleecker/Houston/Bowery Transportation Study

Notes from TAC Kick-off Meeting

March 8, 2010

NYCDOT's Traffic Planning unit conducted the kick-off TAC meeting for the study on March 8, 2010 which was held in Manhattan Borough Commissioner's Office. In attendance were representatives of CB 2, CB 3, Senator Daniel Squadron, and Senator Tom Duane, Assemblyman Sheldon Silver, NYC Council Member Rosie Mendez, NYCDCP Transportation Division, NYCT and various NYCDOT offices.

The purpose of the meeting was to present the draft scope to the TAC members and to receive their input to inform the study. The study area is bounded by Essex Street/Avenue A to the east, Mercer Street to the west, East 4th/East 8th Street to the north and Spring Street/Delancey Street to the south.

The goal of the study is to improve traffic circulation and enhance safety for all road users while addressing community concerns that were raised in a CB2 resolution.

The objective of the study is to assess traffic and transportation conditions in the area, identify deficiencies and generate solutions to address both existing and future travel demands.

The presentation, covered issues related to: – demographics, land use, traffic, pedestrian and bicycles, accidents (safety), parking, goods movement, and public transportation, and highlighted some of the specific issues CB2 had raised in their resolution.

The attendees' 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:

- There was a question regarding up coming public meeting and the process of getting the word out to the local stake-holders
- There was a request to extend the study area one block east to include Houston

Street and Avenue B in the study area based upon increased pedestrian activity.

- There were concerns about a lack of coordination w/ W. Houston Reconstruction project

- Delancey Street neighborhood character has changed since the Delancey Street Transportation Study was released in 2005; Reservations were expressed about over-reliance on outdated secondary data source. DCP to provide information about project follow-up.

- Concerns were expressed about unreliable data collection in the study area since there are two construction projects are currently underway at Houston/Lafayette (Water main project and Subway Reconstruction)

- Water main project behind schedule six months while slated to be completed in 2011

- East Houston Street to mirror West Houston Street in terms of roadway configuration---narrowing from 3 to 2 lanes and adding a bike lane---when completed (18 months)

- Since the opening of Whole Foods supermarket, there is increased pedestrian/motor vehicle conflicts at the intersection of Bowery/Houston Streets. This intersection is one of the top injury/fatality locations and should be included in the pedestrian count survey. Turn lane signal without dedicated turn lane creates traffic problems as well.

- Request for traffic signal recalibration at Houston Street & the Bowery in May 2008 to work in congruence with rest of Houston Street

- Understand and reflect nighttime activities in both the signals and parking regulations

- There is increased night time pedestrian activity beyond 2am in the vicinity of

Bowery/Bleecker/Spring;

- Nature of traffic problems is different. Side streets are more of a problem late night and weekend while arterial congestion is the issue during the WD peaks.
- There has been observed congestion on Spring Street Lafayette and Broadway during daytime peaks
- Consider providing advanced green signal for bicyclists;
- Consider Crosby/Jersey/Mulberry street closure possibilities. Crosby currently has restricted access.
- At Crosby St. /Houston intersection, the cross walk was removed while the traffic light remained leaving two T intersections with no place to cross for the pedestrians.
- A red light camera at Houston Street & Avenue A has been requested.
- Community Boards will attempt to provide key intersections for possibility of additional pedestrian counts
- The CB2 2005 Resolution request for turn lane on SB Bowery @ E. 2nd Street was an attempt to divert traffic earlier than 4th street.
- There are two new Hotels on Bowery (destination) at Cooper/5th and Bowery/2nd that should be considered.
- Consider coordination with local police precincts (regarding the late-night activities) and possibly TLC

CB2 agreed to assist in facilitating the public meeting which is to follow. They also provided several documents detailing community issues and suggestions that have arisen in the last ten years

Bleecker/Houston/Bowery Transportation Study

Notes from Public Meeting #1

May 6, 2010

NYCDOT Traffic Planning conducted the first public meeting for the study on May 6, 2010 at 6:30 PM at the Bowery Mission Chapel -227 Bowery, Manhattan. In attendance were representatives of CB 2, CB 3, Senator Daniel Squadron, and Senator Tom Duane, Assemblyman Brian Kavanagh, Assemblyman Sheldon Silver, NYC Council Member Rosie Mendez, NYCDCP Transportation Division, NYCT, FDNY, Merchants and Residents Association, Chamber of Commerce, various DOT offices, various community groups and the general public.

The purpose of the meeting was to present the scope of the study and to receive community input to inform the study. The goal of the study is to improve traffic circulation and enhance safety for all road users while addressing community concerns that were raised in a CB2 resolution. The objective of the study is to assess traffic and transportation conditions in the area, identify deficiencies and generate solutions to address both existing and future travel demands.

The presentation identified the proposed study area boundaries which are: Essex Street/Avenue A to the east, Mercer Street to the west, East 4th/East 8th Street to the north and Spring Street/Delancey Street to the south; and highlighted the following topics to be studies: demographics, land use, traffic, pedestrian and bicycles, crashes (safety), parking, goods movement, and public transportation, and focused on some of the specific issues the study intends to address.

The public response to DOT's planned study following the presentation was 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.

- It was suggested that the study area be expand one block east to Avenue B because of high pedestrian and traffic volumes along the corridor. The focus should be between 11 p.m. and 1 a.m. when there is great activity due to the large number of bars and restaurants along that street.

- 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 busses 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.

- 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.

- Members cited heavy congestion throughout the study area late at night sometimes accompanied by horn honking.

- Southbound traffic on the Bowery, particularly north of Broadway, experiences heavy congestion.

- 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.

- 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.

- 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 D.O.T. 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).

- 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.

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

- The suggestions to expand the study area will be examined and assessed based on the nature of the issues and available resources.

- DOT invited the FDNY to be a part of the Technical Advisory Committee for the study

- A bike parking analysis will be conducted for the study which will involve examination of existing bike racks and conducting a bike parking survey to assess the need for additional bike racks.

- Bicycle licensing is not currently being considered but the growth in the number of cyclists in the city will make this an increasingly important issue in the future. Dot is currently involved in training seniors and children on how to cross bicycle paths and not be threatened by them.

- Late night and weekend traffic conditions will be observed and analyzed as appropriate.

Bleecker/Houston/Bowery Transportation Study

Notes from TAC Meeting #2

January 26, 2012

NYCDOT Traffic Planning conducted the second Technical Advisory Committee meeting on January 26, 2012. In attendance were representatives from State Senator Daniel Squadron and State Senator Tom Duane's office, Congresswoman Carolyn Maloney's office, City Council Member Rosie Mendez and City Council Speaker Christine Quinn's office, FDNY, CB3 and the Manhattan Borough Commissioner's Office. The purpose of the meeting was to present the Existing Conditions Analysis and to get feedback on the findings and direction of the study.

The presentation began with the goals and objectives of the study, followed by the findings of the Existing Conditions Analysis. Feedback regarding the presentation was generally positive with many suggestions for potential improvements and in the study area discussion points including the following:

- FDNY suggested that clear street markings, striped right turn bays on Delancey Street and Houston Street (at Allen, Essex and Chrystie Streets), signal coordination and additional enforcement of double parking and blocking the box would improve congestive conditions and emergency vehicle response times.

- Avenue B at 4th Street was noted as an intersection with heavy weekend late night congestion and horn honking.

- An irregular sidewalk on Avenue B south of 4th Street is causing congestive conditions.

- Pedestrians entering Houston Street at Chrystie Street before the pedestrian signal

- The Houston Street/Allen Street intersection is often blocked by articulated buses.

- Delancey Street has two westbound lanes crossing the Bowery but only one receiving lane on Kenmare causing sideswiping and a bottleneck.
- The prohibited left turn northbound onto the Bowery from Bleecker Street is causing additional queuing on Bleecker Street.
- Much of the late night/weekend noise is caused by traffic stopped behind taxis picking up customers.
- The Study should be aware of new hotel loading zones on the Bowery.
- Red Light cameras should be installed at Houston Street and the Bowery.
- There is a need for increased police presence in the study area.

Bleecker/Houston/Bowery Transportation Study

Notes from Public Meeting #2

February 21, 2012

NYCDOT, Traffic Planning conducted the second public meeting for the subject study which was attended by representatives from the offices of Assemblyman Sheldon Silver, Senator Daniel Squadron, Council Member Rosie Mendez, Community Boards 2 and 3, NYMTC, FDNY, NYPD – 5th Precinct, and NYCDOT Manhattan Borough Commissioner. Other attendees included representatives from NoHo-Bowery Stakeholders Inc, Downtown Independent Democrats, East 4th Street Block Association, The Local East Village, The Lo-Down, New York University, DNAinfo.com and the general public.

The objective of the meeting was to provide an update on the study and present the findings of the existing conditions analysis. The PowerPoint presentation highlights the study's goals, objectives, and findings of the existing conditions analysis that focused on Demographics, Zoning and land use, Traffic, Parking, Pedestrian and Bicycles, Crashes/Safety, Public transit and Goods Movement. Following the presentation, members of the audience commented and asked questions on a variety of issues, as summarized below:

- Questions were raised with regards to the accuracy of the crash data. Someone reported that there were other fatalities at other locations during the reporting period that were not reflected in the presentation.

- The community considered construction noise at 6 AM on weekends to be a nuisance. They requested that DOT Street Construction Permits office require construction to start no earlier 9 AM on the weekends and not allow it to start at 6 AM which is currently the case. DOT construction noise policy should be consistent with that of Department of Buildings.

- It was noted that the M21 bus is the least used East/West bus in the study area. The community concurred and added that there was no service at all on weekends. During the week the M21 frequency is approximately 30-45 minutes. As a result ridership on the line is low because no one wants to wait that long for a bus. This creates the cycle of little use due to poor service that leads to even less use, justifying MTA service cuts because ridership is low.

- There is heavy congestion/delay on West Houston Street due to roadway construction at Lafayette Street and also between the Bowery and the FDR Drive due to the East Houston Street reconstruction.

- It was observed that the traffic signal at the intersection of Bleecker Street and the Bowery is not coordinated with the signal at First Street and the Bowery. Traffic blocks the box on Bowery making it difficult for the side streets to clear.

- The community requested DOT to take a look at Bleecker Street between Lafayette and the Bowery which is very congested. The intersections along Bleecker Street are STOP controlled and have heavy pedestrian volumes. The intersections neither have stop bars nor pedestrian crosswalks. They would like DOT to examine these locations for potential pedestrian improvements.

- With respect to the demographics that showed a slight decline in population between 2000 and 2010 the community commented that though the population in the study area may be declining, the neighborhood is a destination that attracts both pedestrian and vehicular traffic, contributing to increased traffic, particularly at nights and weekends.

- At the intersection of Houston Street and Elizabeth Street the pedestrian crossing time for Houston Street is insufficient.

- The Bowery corridor has potential for major pedestrian and traffic improvements. The community boards suggested that DOT look at signage on the Bowery some of which is confusing and difficult to see. They suggested some beautification

improvements along the median on the Bowery to enhance the aesthetics.

- The community would like to see the 2020 future conditions take into consideration proposed major developments in the study area such as NYU expansion (with two phases and build years, 2021 and 2030) and the Cooper Square/Astor Place reconstruction project which will result in some traffic direction changes (4th Ave from 2 way to 1 way; Cooper Square to be closed or changed, etc).

- It was stated that on weekends Traffic Enforcement Agents (TEAs) are needed at W. Houston and Lafayette Street and other locations west of the Bowery to enhance safety. TEAs should also be more cognizant of pedestrian traffic and not on motor vehicles. It was commented that two TEAs were on duty at Clinton Street and Delancey Street when a recent pedestrian fatality occurred.

- FDNY uses west 4th as an eastbound route but the firehouse located on Great Jones Street must drive westbound to Lafayette to access 4th Street.

- The State Liquor Authority mapping project shows night clubs and liquor licenses; this might be used as a tool to identify late night/weekend congestion and taxi pickups/drop-offs in the area by overlaying this map on the street network.

- The west side sidewalk on Avenue B between 4th Street and 3rd Street juts out 18" to 24" creating bottleneck conditions when commercial vehicles are parked on that segment. Parking regulations should be changed to No Standing Anytime in this location.

- New York University expansion (NYU Core EIS with 2021/2031 build years) will increase traffic and congestion in the area and eliminate 200+ parking spaces. These changes should be accounted for in the future conditions.

- Changes (e.g. installation of elevators) at several train stations in the area

(Broadway/Lafayette) will increase pedestrian activity in the area.

- Bicycle parking facilities should be expanded close to subways where increased pedestrian activity is likely.

- It was stated that parking regulations in the study area reflect past zoning and land use conditions; the study area is changing, many manufacturing buildings are being converted to residential use, thus the parking regulations should reflect current demand.

- DOT should explore the possibility of providing more space on narrow streets for cabs to load and unload passengers; with parking on both sides of narrow streets when a cab stop to unload/load passengers all traffic stands still; most of the honking in the study area arises from traffic delay as taxis stop for pickups and drop-offs; an example to possibly follow is Prince Street where parking is permitted on only one side of street; this allows motorists and taxis to make curb stops and not block the moving lane.

- Consider implementing ParkSmart programs in the study area; parking should not be free; the cost of free parking is high.

- The community requested that the presentation be available online.

- The community was informed that a meeting to present preliminary recommendations would be convened sometime in June or July.

Notes of TAC #3 Meeting for Bowery-Houston-Bleecker Transportation Study

Held on October 23, 2013 @ 10:00AM

59 Maiden Lane, 37 FL – New York, NY

NYC Department of Transportation, Traffic Planning conducted a Technical Advisory Committee (TAC) meeting for the Bowery-Houston-Bleecker Transportation Study at the Manhattan Borough Commissioner's Office. In attendance were representatives from the Community Boards 2 and 3, State Senator Hoylman's Office, NYCT, NYMTC, NYCDCP, and NYCDOT.

Margaret Forgione, Manhattan Borough Commissioner opened the meeting by outlining the objectives of the meeting and invited attendees to introduce themselves. She then asked the project team to proceed with the presentation.

Michael Griffith provided a brief introduction to the background of the study and the study process.

Harvey LaReau (project manager) delivered a Power Point presentation that identified the study area boundaries, goals/objectives, the subjects studied and areas of analysis for the existing and future conditions along with specific improvement measures. The improvement measures highlighted recent DOT initiatives such as the Astor Place reconstruction, Houston Street Reconstruction and Delancey Street Pedestrian Improvements; and listed eight locations where geometric and parking changes are recommended.

After the presentation the meeting was open for questions and comments.

Susan Stetzer from CB #3 asked how the 2020 traffic volumes were derived and what was the difference between existing and future conditions?

It was explained that a background growth consistent with the CEQR Technical Manual was used plus vehicle trips generated by known future developments. These were added

to the existing traffic network volumes to establish the 2020 traffic volumes.

Ms. Stetzer stated that she believes the future growth will be higher than expected due to new residential and hotels developments coming to the area.

Ms. Stetzer asked what DOT plans to do about the night life activity on Houston Street at the intersections of Avenues A and B, as congestion at nights and early morning are worse than during the day.

DOT explained that the issue was examined in detail and night time surveys were conducted to assess the situation. Also traffic volumes during the day were compared to the late-night traffic volumes, and it was found not to be higher hence the congestion and increased activity was not the result of increased traffic. The observed activities associated with the night life are destination related. It was stated that enforcement would be the primary measure to address these quality of life issues in the area.

Ms. Forgione stated that DOT examined the parking situation and the possibility of police enforcement to alleviate the existing problems.

Ms Stetzer asked if DOT looked at the curb configuration along Avenue B between E 3rd and E 4th Streets and the existing parking regulations on the street segments.

Ms. Forgione explained that the location was investigated, and the parking regulations satisfied the current needs for loading and unloading (commercial parking). It was also explained that underground utilities may make it difficult to realign the curb.

Ms. Stetzer stated that she would like to know if it is really difficult or impossible to do because people might ask these questions at the upcoming public meeting.

Ms. Stetzer also asked what the congestion on Houston Street would be after the reconstruction is completed.

A representative of DOT responded that with the improvements and signal timing coordination, traffic conditions should not deteriorate.

Ms. Stetzer commented that day merchants complained about losing business due to traffic changes on Clinton Street. She asked for clarification about the number of parking spaces affected by the proposed improvements.

A representative asked about the effectiveness of adding the left turn lane on the SB approach of Broadway at Spring Street and how many parking spaces will be lost.

A representative of DOT explained that four parking spaces (80 feet) will be lost. The Borough Commissioner explained that DOT usually take 100 feet of parking to add a moving lane on the approach.

Bob Gormley from CB 2 expressed support for cutting the center median on Houston Street at Crosby Street to provide a crosswalk. This is a good solution to improve pedestrian safety since many people cross at this location.

In concluding Ms. Stetzer stated that there are problems at Bowery and 5th Street where congestion exists. She further explained that senior citizens complain about horn honking and noise in the vicinity. Also crossing Delancey and Bowery is very difficult and the issues along Avenues A and B were restated being related to the quality of life.

Karen Blatt (DCP) asked about the criteria for a high crash location and how many years are usually considered for the safety analysis?

DOT explained that the accident analysis is usually done for three consecutive years. However additional years can be included to provide more data points. The threshold for high accident locations was also explained.

The BC concluded the meeting by inviting attendees to send additional questions or comments to the contact email address for the study.

The meeting concluded at 11AM.

Notes of Public Meeting for Bowery-Houston-Bleecker Transportation Study

Held on November 20, 2013 @ 6:30PM

University Settlement at Houston Street Center, 273 Bowery

NYC Department of Transportation, Traffic Planning Division conducted the third and final public meeting for the Bowery-Houston-Bleecker Transportation Study on November 20, 2013 at the University Settlement – Houston Street Center, 273 Bowery. The meeting was attended by representatives from Community Boards #2 and #3, NYU, Council Member Mendez, Block Associations, the New Museum, Community Coalition, the general public and Manhattan B/C Office. The purpose of the meeting was to present the future conditions analysis and recommendations. The presentation which focused on transportation improvements including current DOT initiatives such as Astor Place reconstruction and detailed improvement measures for various locations provided the context for an open discussion.

The chairpersons of CB #2 and CB #3 provided a brief introduction before DOT's presentation.

DOT representative Michael Griffith provided a brief introduction to the background of the study, the process, and the project team before inviting Harvey Lareau (DOT-Project Manager) to make the presentation. The presentation identified the study area boundaries, goals/objectives, the subjects studied and areas of analysis for the existing and future conditions along with specific improvement measures. The improvement measures highlighted recent DOT initiatives such as the Astor Place Reconstruction, Houston Street Reconstruction and Delancey Street Pedestrian Improvement; and listed seven locations where geometric and parking changes are recommended by the study.

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

A resident observed that there were no recommendations for the intersection of 2nd Avenue and Houston Street, and another wanted to know what changes can be

expected due to the Houston Street Reconstruction. She felt that DOT should have included those recommendations in the presentation.

Commenting on the increasing traffic, a member stated that the gas station on Houston Street and Lafayette Street will be converted to a high rise building.

It was suggested that left turn signs be installed on all approaches at the intersection of the Bowery and Houston Street. It took over 25 years, one said, for DOT to finally implement one and emphasized that this intersection is also a high crash location.

It was suggested that DOT should have better communication with other city agencies, and the public.

DOT said that a fair amount of coordination among agencies does exist. The Technical Advisory Committee (TAC) meetings perform this role and this third public meeting allows community input during the study.

Concerns about traffic circulation as a result of the Astor Place Reconstruction were expressed and it was stated that traffic needs to move and people who drive need to get around.

Pedestrian safety at the intersection of the Bowery and Delancey Street was a concern for seniors due to wide crossings with heavy vehicle, pedestrian and bicycle traffic. The number of bikes has increased exponentially in the last few years.

It was suggested that parking be removed from the west curb of the Bowery south of Bleecker Street to provide additional capacity.

One resident said she bikes every day and is a great supporter of bike lanes but the shared bike lane in the middle of the Bleecker Street and Lafayette Street intersection would be too dangerous for cyclists. She asked DOT to take a second look at the proposal and explore relocating the loading and unloading zone.

It was suggested that DOT obtain more bicycle data such as bike ownership and consider

more bike lanes.

It was pointed out that Kenmare Street at Lafayette Street and Broome Street at Lafayette Street are major congestion points that were not included in the study.

A resident indicated that there is neither a traffic light nor crosswalks at the intersection of Crosby Street and Prince Street. It is a high pedestrian volume location where vehicles travel at high speeds also. She suggested DOT consider installing "All Way Stop" at the intersection. She also asked why the truck traffic from the Williamsburg Bridge which continues on Delancey/Kenmare Streets making left at Broome Street was not mentioned as an issue.

A major concern was for commercial vehicles and buses travelling at high speeds during late night hours on E 10 Street between 4th & 5th Avenues. It was suggested that DOT coordinate with NYPD Traffic to strengthen enforcement.

Clarification was sought on the coordination of the reconfiguration of the Bowery with the Astor Place Reconstruction which continues to Houston Street. Additionally, the issue of truck speeding on 2nd and 3rd Avenues was brought up.

A member of the public expressed appreciation for the study and commented in the good work done by DOT. He then commented on the increase of traffic and pedestrians in the area, as well as the need to coordinate with NYPD on the enforcement of traffic rules.

A resident complained about the increase in motor propelled bicycles (mopeds) in the area.

It was suggested that better enforcement for bicycles was needed and that bikes should have license plates in order to be identified to avoid cyclists hit and run, especially for those running red lights or going against the traffic at high speeds.

DOT supported the idea of licensing bikes but explained that this a legislative issue, meaning laws would have to be passed and suggested that a letter to the City Council be drafted to initiate such action.

It was stated that MTA will soon start construction on the installation of more than 100' of ventilation on the sidewalk near the intersection of Crosby Street and Houston Street where wider sidewalks will be needed on the south side of Houston Street approaching Lafayette Street.

It was suggested to remove parking on the east curb of Clinton Street south of Houston Street and replace it with "No Standing Anytime" to provide a left lane.

Residents on Clinton Street between Houston and Delancey Streets complained about very heavy traffic and horn honking which disturb residents, particularly during the night. Noise related to heavy motorcycle traffic was also of concern.

It was mentioned that there is a fire and police station five to six blocks north of Houston Street and Avenue B which exacerbates both congestion and noise. Additionally the study area should have been extended to the FDR to address the problems east of Clinton Street.

A community member asked if there were any recommendations for Avenue A & B north of Houston Street, particularly regarding the sidewalk on Avenue B between E 4 and E 3 Streets that jots out which creates bottlenecks.

It was stated that pedestrians need more time to cross Houston Street at Elizabeth Street. Additionally, heavy westbound traffic on Kenmare Street turning left onto Lafayette Street southbound to access the Holland Tunnel makes it difficult for pedestrians to cross the street. DOT was asked to develop recommendations to address this problem.

It was stated that the center median at the Bowery and Delancey Street has been modified three times already and still has not addressed the safety issue. It was suggested that "Don't Block the Box" signs be installed.

DOT informed the audience that "Don't Block the Box" signs are no longer used as they create confusion for the pedestrians and drivers.

A resident suggested that DOT adjusts the traffic signal to achieve better coordination along Kenmare Street between Bowery and Lafayette Street, as vehicles have to wait two to three cycles to go through one intersection.

DOT stated that signal timing coordination requires a broader look at the network to address demand from multiple corridors and promised to re-examine the situation.

A community member stated that her granddaughter was killed at the intersection of Delancey Street and Clinton Street, and suggested DOT install more cameras to monitor traffic from the Williamsburg Bridge.

DOT informed the audience that 50 more cameras had been installed recently but the cameras were approved for specific locations such as school zones.

A resident stated that pedestrians have difficulty crossing the east crosswalk of Delancey Street at the Bowery due to the crosswalk length and high traffic volumes. He also stated that this is a high fatality location.

It was stated that heavy truck traffic westbound on Houston Street making right turn onto Bowery NB conflicts with pedestrians and bicyclists. A bike box style treatment was suggested for this location.

A community member stated that the proposed shared bike lane in the middle of the roadway at Bleecker Street and Lafayette Street is too dangerous and that DOT should consider removing parking on both side of the street while keeping the bike lane on the north curb.

A local resident stated that the proposed redesign of the Bowery and Delancey Street intersection removes the existing median and noted that the location has many seniors crossing due to the existence of a senior center on the block. He suggested a mid-block crossing between Broome Street and Kenmare Street. Additionally, there is a large hotel slated for construction on the north east corner of the intersection.

It was mentioned that traffic lights along Houston Street are very close to each other due

the short blocks which makes it hard to stop when the signal changes.

A CB2 representative spoke about the importance of educating the public (bikes and motorists) on traffic rules and emphasized that an education campaign should be put in place to affect a behavioral shift.

It was stated that muni-meters have been recently installed on Broadway north of Spring Street. Additionally illegal parking on the north curb of Spring Street east of Broadway is creating congestion at this location.

A community member felt that traffic enforcement agents posted at the Bowery and Delancey Street intersection are focused more upon moving vehicles and not concerned enough with pedestrian safety.

The CB3 representative stated that the lack of tolls on the east bridges contribute to most of the congestion in the study area.

A resident asked about the implementation decision making process and the impact of budgetary constraints on implementing the recommendations.

Notes from CB2 Transportation Committee Meeting

Held on February 6, 2014 @ 6:30PM

Little Red Schoolhouse, 272 6th Avenue

NYCDOT attended Manhattan Community Board # 2, Traffic and Transportation Committee meeting on February 6, 2014 to address issues related to the Bowery-Houston-Bleecker Transportation Study. On the agenda were three related items:

1. Community response and recommendations for DOT's Bowery-Houston-Bleecker Transportation Study
2. Request for a (traffic light) signal phase change that allows for separate, conflict free pedestrian crossing on the south side of Lafayette St. at Kenmare St., a left-turn arrow on Kenmare St. and other potential solutions (e.g. a bulbout and/or other traffic calming) to safeguard pedestrians from left turning vehicles.
3. Request for a (traffic light) signal phase change that allows for a separate conflict free pedestrian crossing on 8th St at the east side of 5th Avenue.

After the meeting was called to order, the first item on the agenda regarding bus parking at the Lady of Guadalupe church was addressed and it was determined that reserved parking spaces were not required.

NYCDOT was invited to provide an update on the Bowery-Houston-Bleecker Study status since the public meeting and presentation. DOT representatives described the Bowery Houston Bleecker Study process and content. Following the overview members were engaged in discussing specific locations and problems that need to be addressed.

First, the intersection of Houston St. and Crosby St. was discussed. DOT proposed a pedestrian at grade crosswalk on the west leg of the intersection as an improvement to the existing situation where no crosswalk exists.

A member of the public stated that the Crosby St. and Houston St. intersection needs pedestrian crosswalks on both the east and west legs, not just the west leg. He then pointed out that the subway station elevator which is often used by the disabled and persons with children in strollers is located on the north east corner of the intersection.

A member of the public stated that the planned developments on both the southeast and southwest corners of the Crosby St./Houston St. intersection will generate more pedestrians.

A board member asked if the sidewalk on the south curb of Houston St. between Broadway and Lafayette St. could be widened to align with the curb extensions at the end of the block. He stated that the sidewalks on the south curb between Broadway and

Mercer St. were widened approximately 10 years ago.

The next location discussed was the Prince St. and Broadway to which a community member stated that a pedestrian friendly recommendation should have been included in the study. He stated that all four corners of the intersection have subway entrances and the pedestrian volumes are extremely high. He would like to see curb extensions added on the northeast curb.

It was pointed out that a bike rack behind the subway entrance on the southwest corner of Broadway and Prince St. obstructs pedestrians and it should be removed or added to the existing rack on the southeast corner.

A committee member enquired of the possibility of removing parking on Broadway at Prince St. to create a right turn lane. NYCDOT representative stated that the right turns are allowed from the bus lane which is not as congested as the left lane.

Traffic operations on the Bowery between 4th St. to Houston St. were then discussed. The study proposed widening the median to 10'-0 to continue the treatment from the Astor Place Reconstruction and to prevent the weaving that occurs as vehicles approach Houston Street due to the left turn only lane.

A community member stated that the median on the Bowery should be closed at 1st St. keeping vehicles from turning left onto the southbound Bowery. He feels this would ease some of the southbound congestion on the Bowery.

A community member stated that the accident data in the report should be updated and that a fatality at Lafayette St. and Houston St. that occurred about four months ago was not in the report. He further stated that Bleecker St. needs crosswalks at Mott St. and at Elizabeth St.

As per the agenda, the next location under discussion was Kenmare St. and Lafayette St.

A committee member said that she was disappointed that there were no recommendations for Kenmare St. which is congested from vehicles headed to Broome St. and the Holland Tunnel. She said there is a major pedestrian safety issue at Lafayette St. and Kenmare St. where vehicles turn left onto southbound Lafayette St. conflict with the pedestrians in the south crosswalk when they have the walk signal during the green light. She would like to see a pedestrian only phase for the intersection.

The community members discussed the option of removing the crosswalk on the south leg of the intersection. However they concluded that this was not a good option.

There was a discussion among the committee members about restricting the left turn from Lafayette onto Kenmare St. but it was decided that that movement was not a problem.

A letter from a community member was read which noted many accidents on Lafayette at Kenmare St and at Broom St. and stated that something should be done to protect

pedestrians at these locations.

A committee member stated that any resolution about Lafayette and Kenmare St. should be tied to the Broome and Lafayette St. intersection which is one block away and is a route to the Holland Tunnel.

A community member asked if the Citi bike program had affected the Kenmare St. and Lafayette St. location overall.

The next location under discussion was 5th Avenue and 8th St. which is approximately 3 blocks west of the study area.

It was stated that the intersection is dangerous for pedestrians because of the heavy left turns onto 8th St. from southbound 5th Avenue and the number of buses in the bus stop on the far side of 8th St. Of note also are the large number of NYU students and tourists in the area.

A community member asked if DOT still uses Barnes Dance as potential solutions.

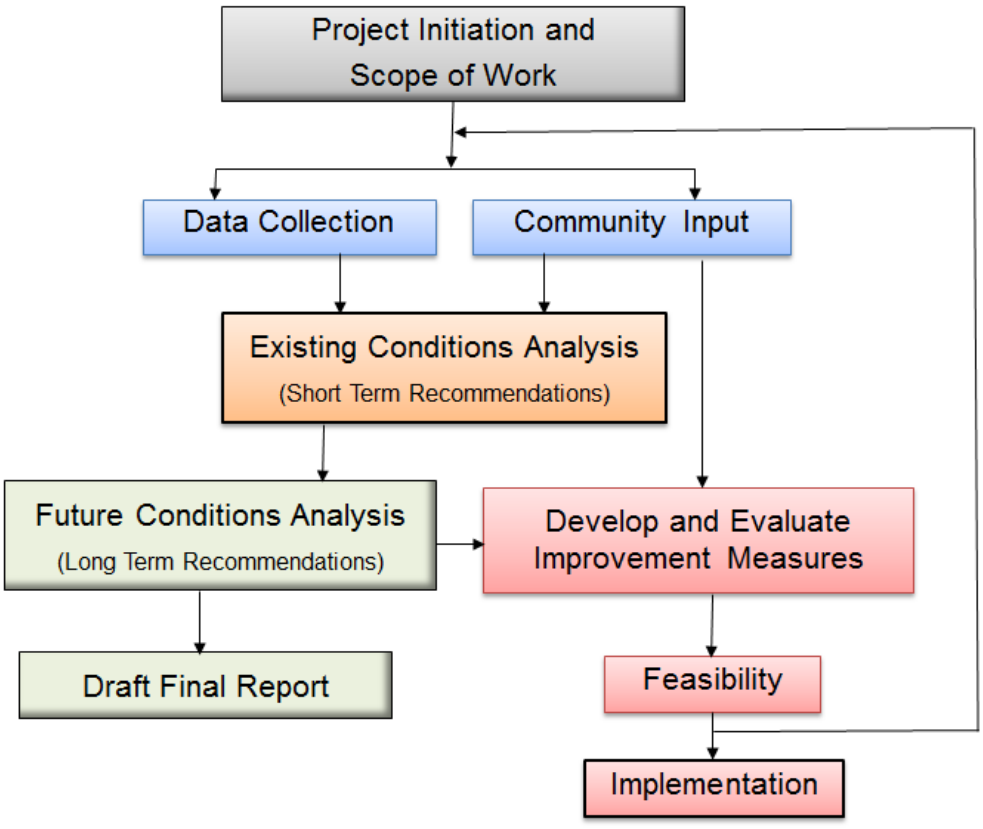
A DOT representative stated that as each intersection gets analyzed the best treatment is sought while balancing the needs and safety of all the street users. There is no one size fits all approach.

10.3 Conclusion

The issues raised and suggestions made as a part of the public participation process helped to shape the study to the extent where the study area boundaries were extended and specific community issues such as late night activities were surveyed and evaluated in great detail. The public participation also informed the many recommendations presented in the next section.

From the outset, the study process and public participation plan were designed to maximize community input. Figure 10-1 below shows the process and the extent to which community input was integrated into the effort and influenced the direction and outcome of the study.

Figure 10-1: Study Process



The community will continue to be involved in the implementation process of the projects that come out of this study. With respect to the issues raised at CB#2 Traffic and

Transportation Committee meeting of February 6, 2014, each idea/suggestion will be evaluated for feasibility and implementation.

11 Recommendations

To identify areas for potential improvements, traffic and transportation issues identified in the existing and future conditions analyses were overlaid and assessed. Figure 11-1 shows locations of traffic congestion, intersections with approach LOS D or worse, high pedestrian volumes, heavy truck volumes, low travel speeds and high accident locations in the study area. A combination of transportation issues can be found along major corridors of the study area such as Houston St, Delancey Street and Broadway. See figure 11-1.

DOT always seek to enhance traffic operations and safety for all street users. As a result, in addition to the recommended improvements of this study there are three other major DOT initiatives planned, underway and recently implemented to enhance the transportation network.

In the study area, Delancey Street has the highest traffic volumes, four of the five high accident locations and five of the nine fatalities that occurred between 2008 and 2011. In 2012 the Delancey Street Improvements Project addressed many traffic and safety issues by shortening pedestrian crossing distances, adjusting roadway geometry and changing signal timings to improve operations and safety.

Houston Street, which is under reconstruction scheduled for completion in 2014, also has high traffic and pedestrian volumes. The reconstruction involves installation of high visibility crosswalks, improved medians, a bike lane from FDR Boulevard to Chrystie Street, upgraded Street lighting and enhanced streetscape along the corridor.

The Astor Place/8th Street area around Cooper Union and the NYU campus has the highest pedestrian volumes in the study area. DOT has initiated a pedestrian improvement plan as of summer 2013. The Astor Place/Cooper Square reconstruction will simplify the street network reducing vehicle conflicts, improving the streetscape, reducing pedestrian crossing distances and increased public space in an area with high

pedestrian and bicycle traffic.

The Bowery Houston Bleecker Transportation Study takes account of these various initiatives and generates a set of improvement measures based upon engineering analysis, field observations and community input. The recommendations seek to issues such as:

- Congestion along ***Bleecker Street*** between Broadway and the Bowery
- Congestion along ***the Bowery*** between E. 4th Street and Houston Street
- Weaving on the Bowery SB between Bleecker Street and Houston Street
- Congestion along ***Broadway*** between Houston Street and Spring Street
- Congestion on ***Clinton Street*** northbound at Houston Street
- Pedestrians crossing at ***Houston Street at Crosby Street*** with no crosswalks or pedestrian signals
- The ***Bowery south of Delancey/Kenmare Street*** intersection configuration creates a bottleneck

Figure 11-3 shows the locations where improvements are recommended.

Figure 11-1: Study Area Transportation Issues

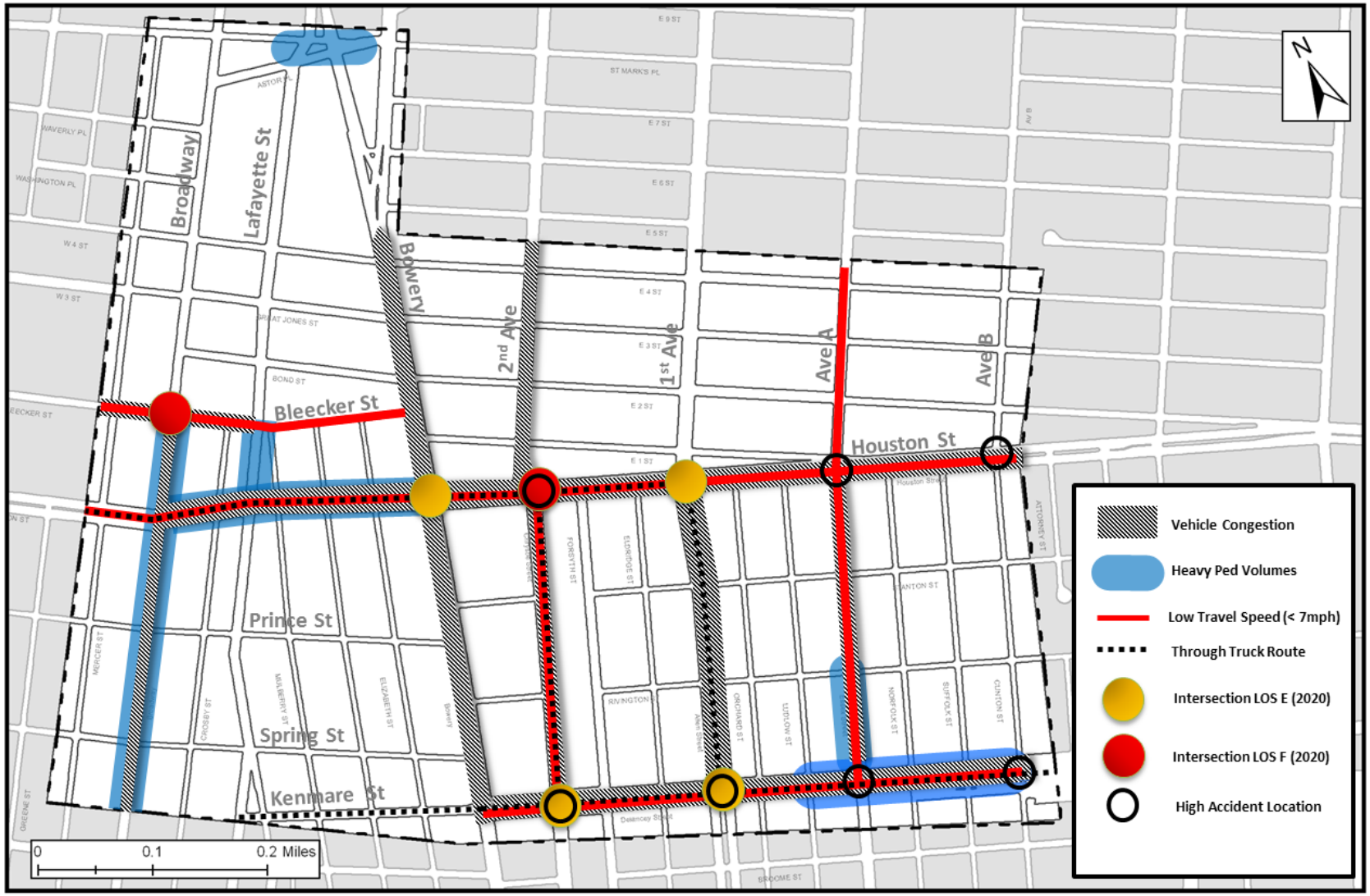


Figure 11-2: DOT Initiatives

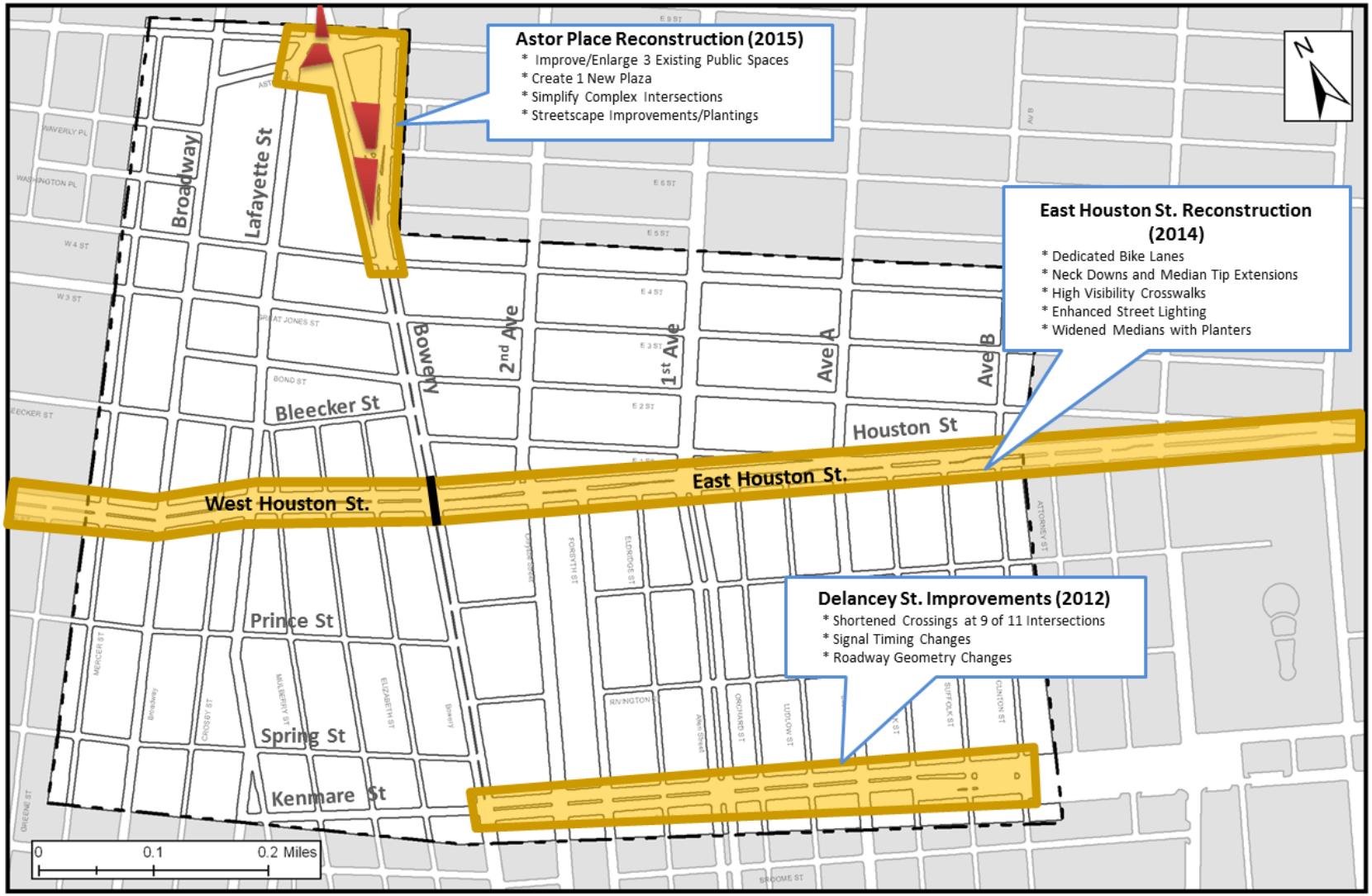
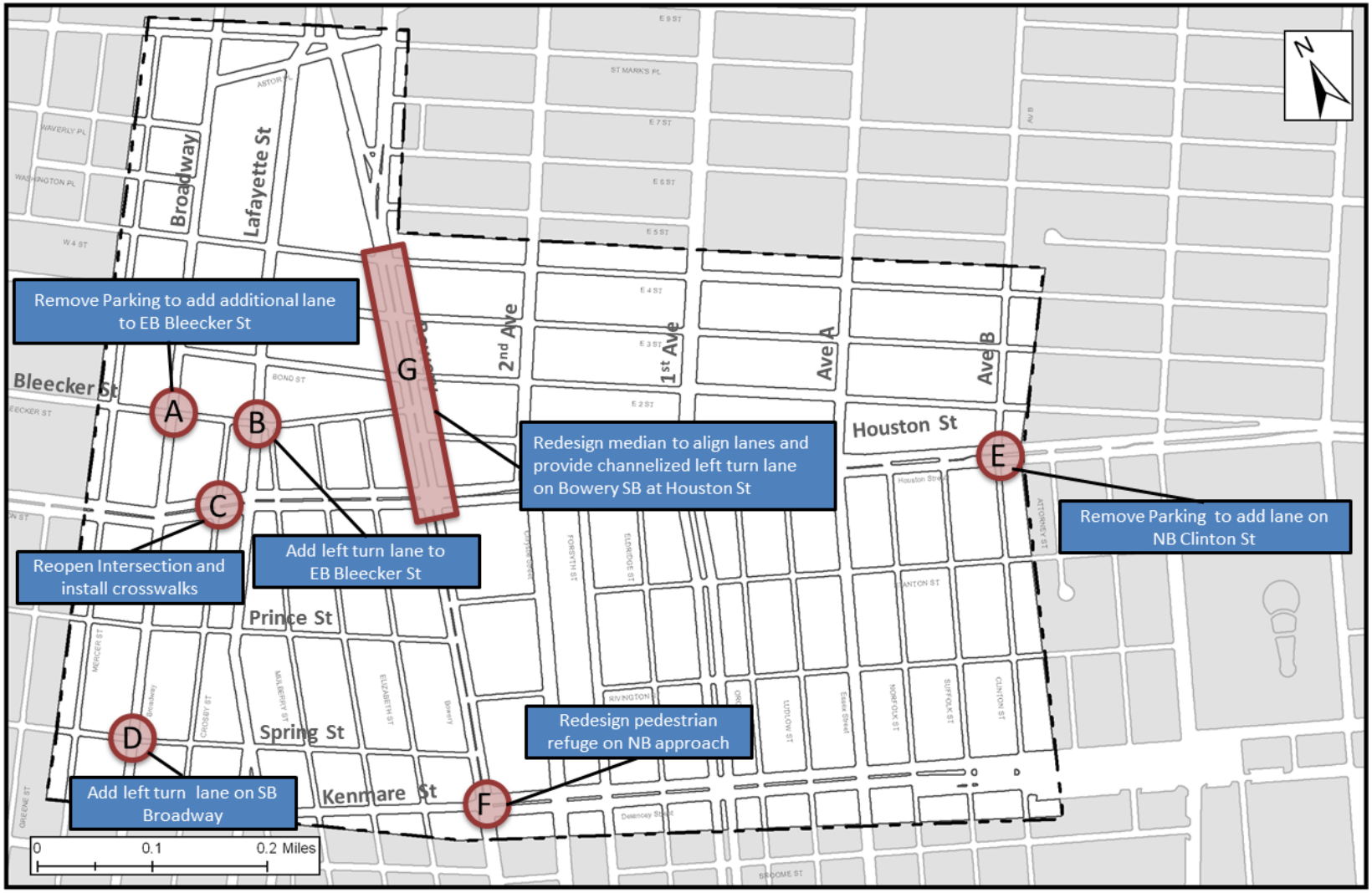


Figure 11-3: Improvement Locations



11.1 Bleecker Street and Broadway

Both Bleecker Street and Broadway operate one way EB and SB respectively. The eastbound approach (Bleecker Street) has one moving lane and parking on both sides. It also has a bike lane between the moving lane and the parking on the north curb. The approach processes approximately 350 vehicles during the PM peak hour with approximately 100 vehicles turning right onto Broadway.

The southbound approach (Broadway) has two moving lanes with truck loading and unloading on both sides during all peak periods. It processes approximately 1170 vehicles during the PM peak hour with 150 vehicles making the southbound left onto Bleecker Street.

The intersection operates at LOS D, E and F during the AM, MD and PM peaks periods respectively with the eastbound approach operating at LOS F during all peaks. Vehicles are often queued from Lafayette Street to Broadway after the Broadway signal turns red. The eastbound signal at Lafayette Street/Bleecker Street turns green as the Bleecker Street/Broadway eastbound signal turns red, thus leaving little opportunity to clear out the traffic. To address this problem signal timing changes have been made recently to along Bleecker Street.

Proposal: Prohibit parking for 60'-0" on the south curb of the eastbound approach and provide additional capacity for right turning vehicles. Figure 11-4 and 11-5 show the existing and proposed configuration. The proposed configuration is expected to operate at LOS-C during the weekday peak periods (See table 11-1, 11-2 and 11-3).

Figure 11-4: Broadway and Bleecker Street - Existing

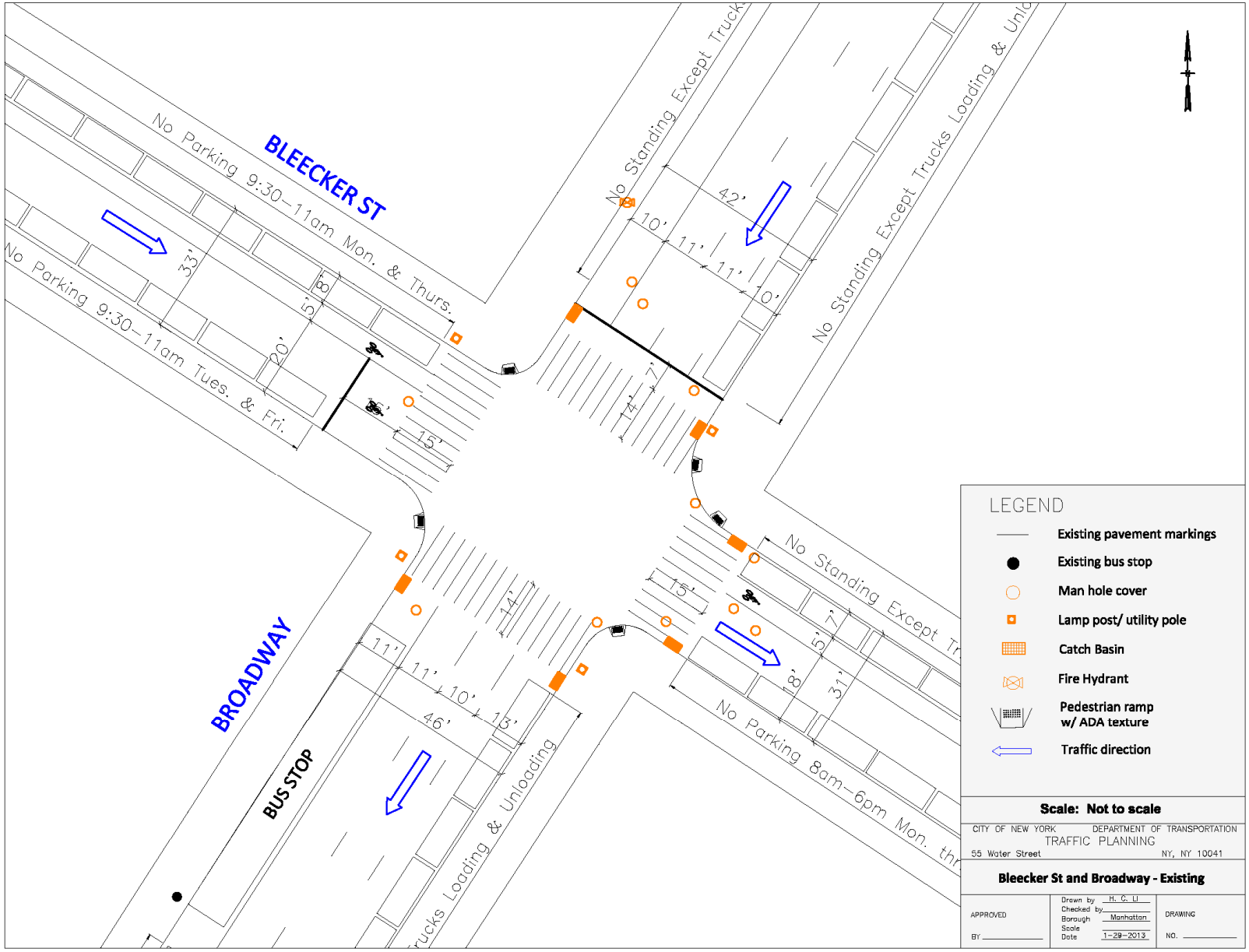
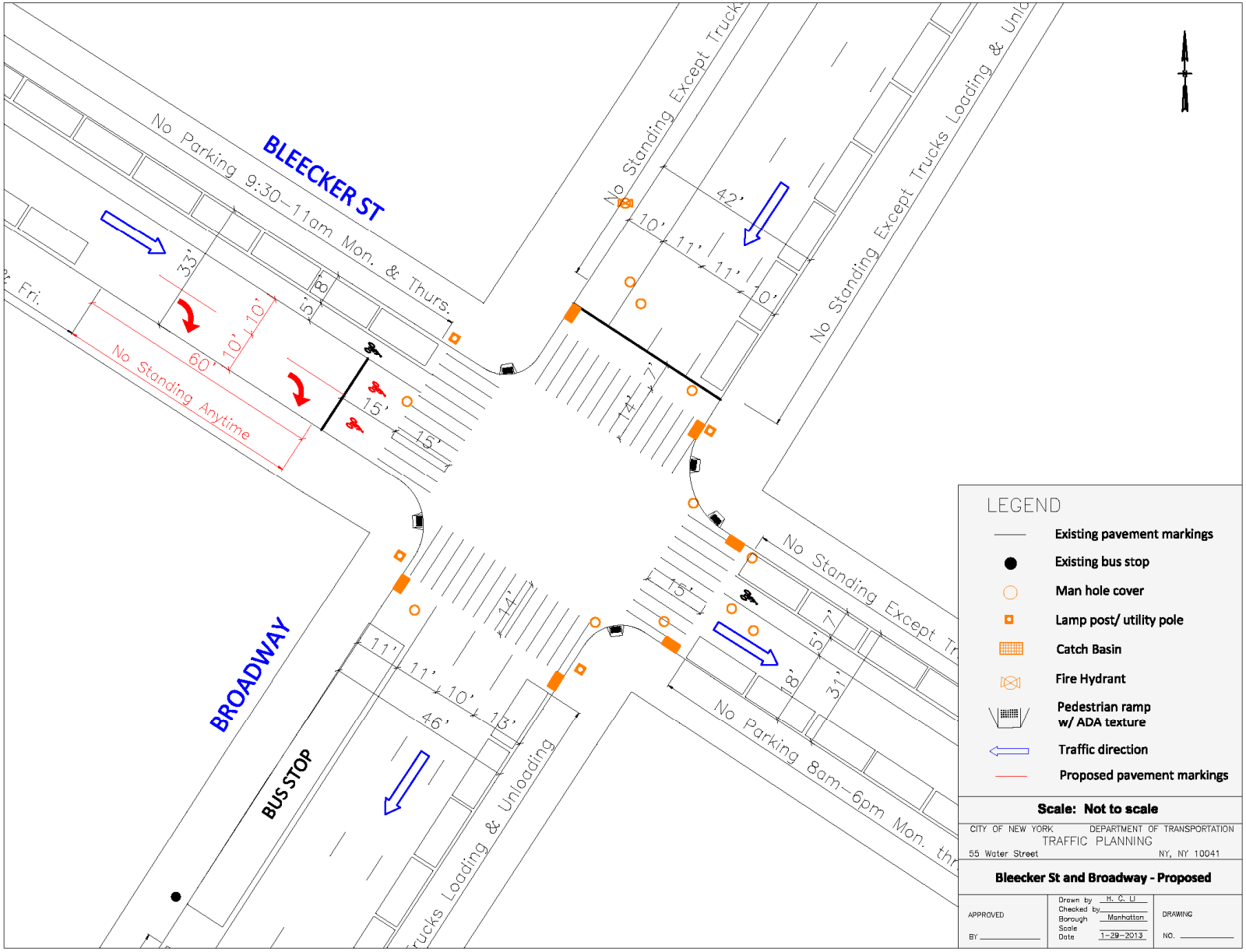


Figure 11-5: Broadway and Bleecker Street - Proposed



11.2 Bleecker Street and Lafayette Street

Bleecker Street and Lafayette Street operate as one way streets EB and NB respectively. The eastbound approach has one moving lane and a bike lane. There are truck loading and unloading zones on the north curb with no standing on the south curb of the east leg. Subway entrances exist on both the north and south sidewalk. During the PM peak period, the EB approach processes approximately 500 vehicles with nearly 200 vehicles turning left onto Lafayette Street.

The northbound approach has two lanes and a bike lane. Parking is prohibited on the east curb Monday to Friday from 7 AM to 6 PM and the west curb is used as a loading zone 6 AM to 6 PM Monday through Friday. During the PM peak hour the NB approach processes approximately 940 vehicles with 20 vehicles turning right.

The intersection operates at LOS-D during all peak hours with the eastbound approach operating at LOS-F during the midday and PM peak hours.

Proposal: To facilitate the eastbound left turn, provide an exclusive eastbound left turn lane by moving the truck loading zone from the north curb to the south curb and convert the bike lane to a shared lane that continues in the through lane (figure 11-7). The proposal would improve the eastbound approach from E, F and F for the AM, MD and PM Hours to LOS-C during all peak hours (see table 11-1, 11-2 and 11-3) and improve traffic operations.

Figure 11-6: Bleecker Street and Lafayette Street - Existing

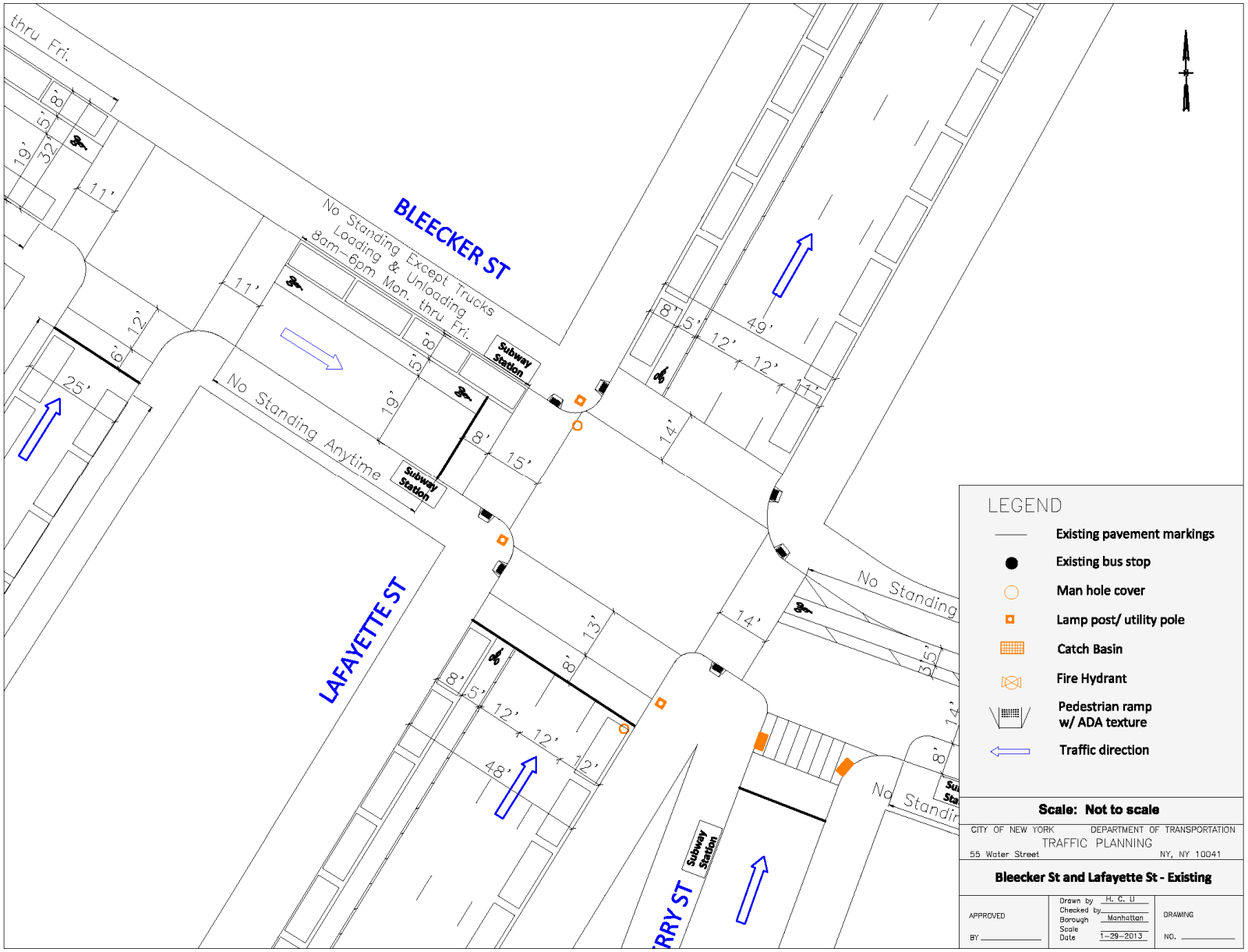
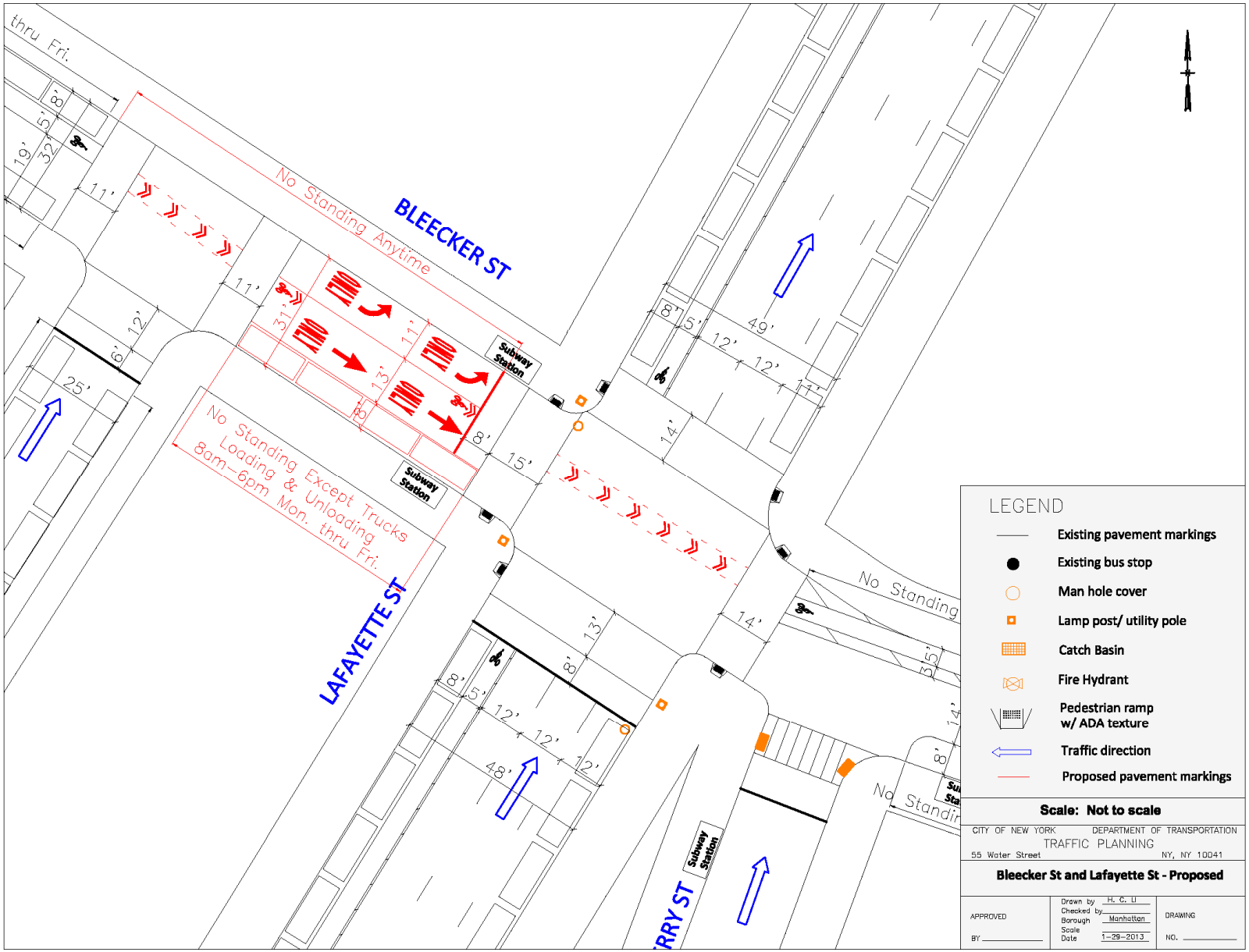


Figure 11-7: Bleecker Street and Lafayette Street – Proposed



11.3 Broadway and Spring Street

Broadway and Spring Street operate one way southbound and eastbound respectively. The southbound approach (Broadway) has two moving lanes, one lane functions as a bus only lane from 7 AM to 6 PM Monday through Friday. There are truck loading zones on both the east and west curbs. The southbound approach processes approximately 1,300 vehicles in the PM peak hour with 250 vehicles turning left.

The eastbound approach (Spring Street) operates as one lane with truck loading zones on the north curb and no-parking 8 AM-6 PM Monday through Friday on the south curb. The approach processes approximately 240 vehicles during the PM peak hour with 50 vehicles turning right.

The intersection operates at LOS-F during the PM peak hour with the southbound approach operating at LOS-E,E and F during the AM, MD and PM peak hours. High pedestrian volumes (more than 1,500 during the PM peak) along Broadway conflict with the southbound left turning vehicles creating queues on Broadway.

Proposal: Restrict the truck loading and unloading zones for 100'-0" long SB left turn lane. The existing geometry and proposed recommendation are shown in figure 11-7 and 11-8. The intersection will operate at LOS-C with the southbound approach operating at LOS-C with the proposed recommendation (see table 11-1, 11-2 and 11-3). Because of the high pedestrian volumes, it is also recommended that a traffic enforcement agent be assigned to this intersection.

Figure 11-8: Broadway and Spring Street – Existing

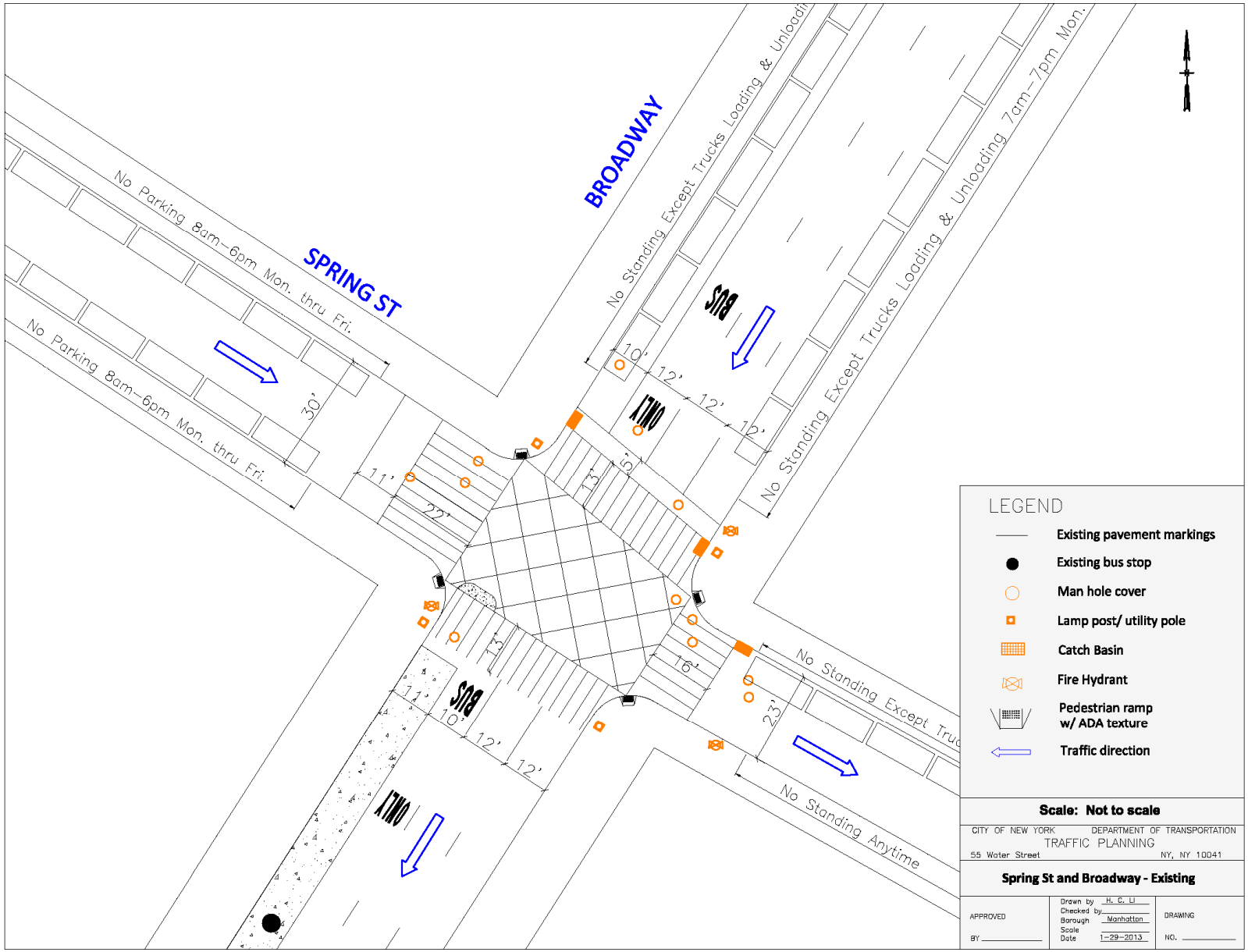
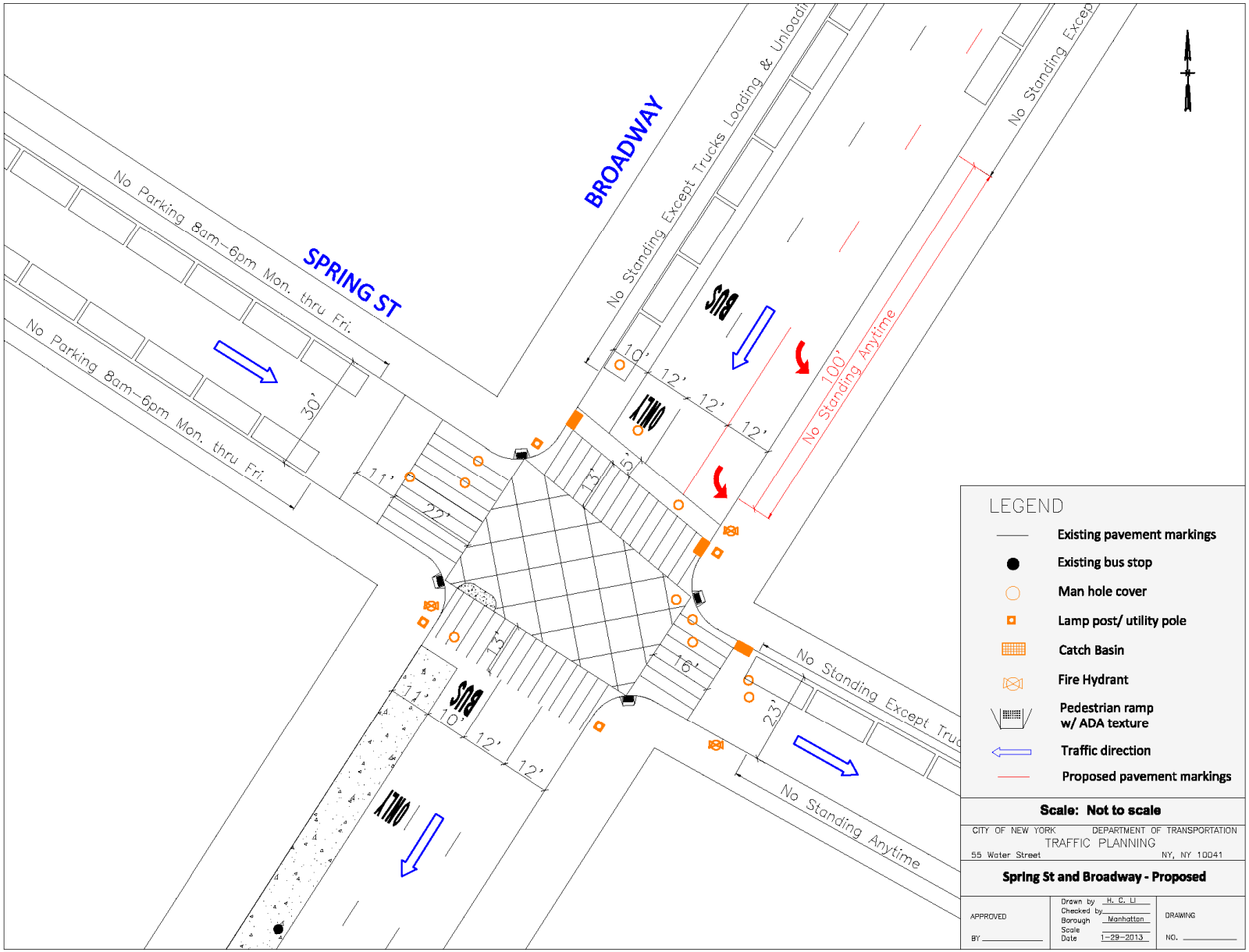


Figure 11-9: Broadway and Spring Street - Proposed



11.4 Crosby Street and Houston Street

During the East Houston Street Reconstruction the Crosby Street/Houston Street intersection was reconfigured making Crosby Street discontinuous by creating two T-intersections separated by a continuous, 5'-0" wide, raised concrete median. The preexisting configuration included crosswalks with signals to facilitate pedestrian crossing. The reconstructed intersection eliminated the pedestrian crosswalks but retains the signal with the new continuous center median. High pedestrian volumes cross Houston Street when the upstream and downstream signals display red.

Proposal: Reopen the intersection to vehicles and provide crosswalks. This would enable pedestrians to cross safely and improve vehicle circulation.

Figure 11-10: Houston Street and Crosby Street - Existing

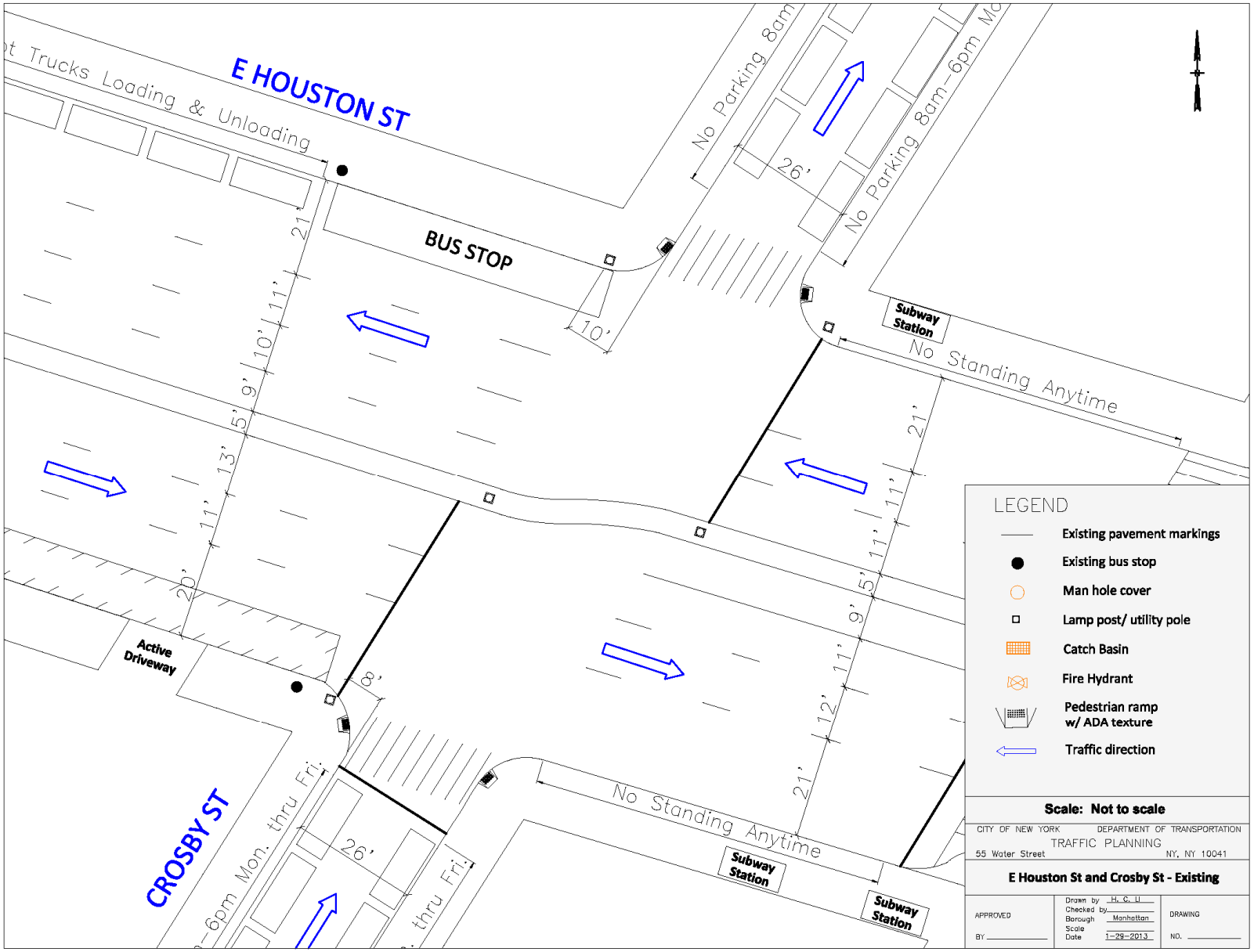
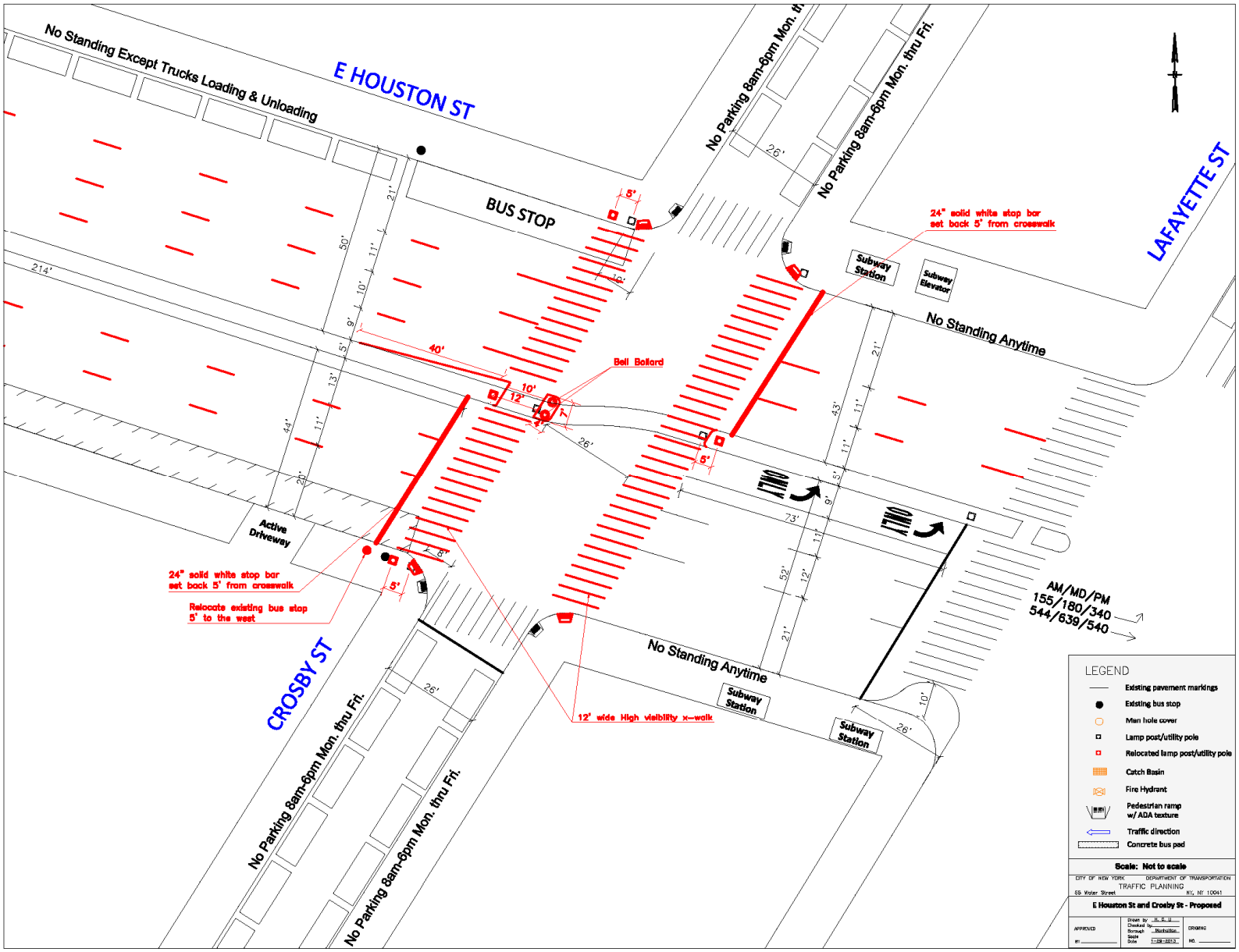


Figure 11-11: Houston Street and Crosby Street - Proposed



11.5 The Bowery between Bond Street and Houston Street

Southbound traffic along the Bowery backs up from Houston Street blocking Bleecker Street and 1st Street. The blocks between Bleecker Street and Houston Street are very short and the traffic signal at Houston Street is not coordinated with the other signals north of Houston Street contributing to gridlock and blocked intersections

The Bowery southbound has as two lanes north of Bleecker Street and three lanes south of Bleecker Street. The left lane becomes a turn only lane at First Street creating excessive weaving for through vehicles.

Proposal: Widen the median to 10'-0 to align the two through lanes from Great Jones Street to 1st Street and keep two through lanes from Great Jones to Houston Street with a left turn lane at Houston St. The Cooper Union/Astor Place reconstruction will install a 10'-0" median on the Bowery from 9th Street to 4th Street. This proposal would continue the treatment to Houston Street. See figure 11-12 and 11-13.

Figure 11-12: Bowery between 4th Street and Houston Street - Existing

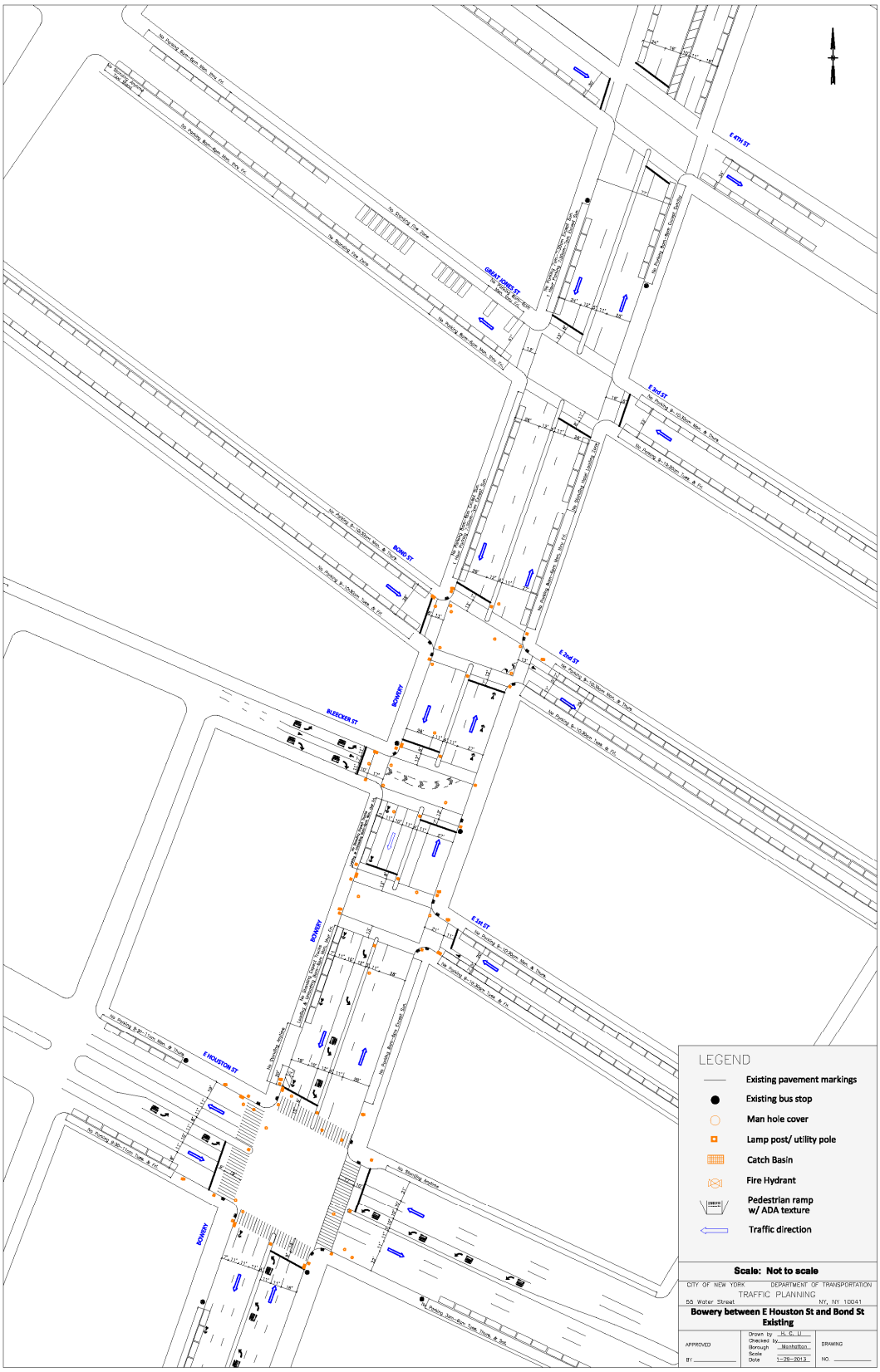
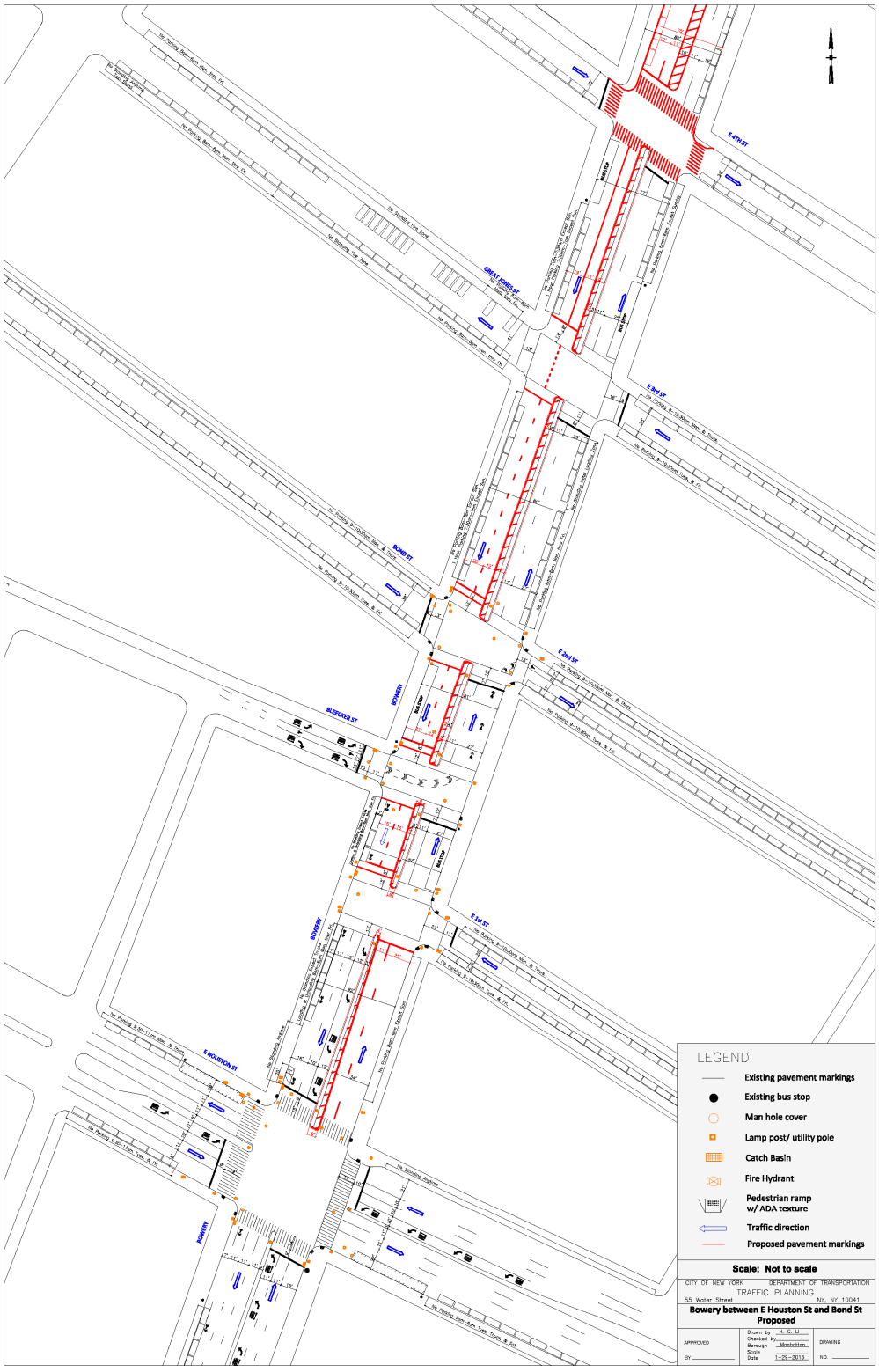


Figure 11-13: Bowery between 4th Street and Houston Street - Proposed



11.6 Houston Street and Clinton Street/Avenue B

Clinton Street operates one-way northbound with one lane, a bike lane and parking on the west curb. The approach processes approximately 400 vehicles during the PM peak hour with 100 left turns and 200 right turns. Much of the volume comes from the Williamsburg Bridge going eastbound on Houston Street to the FDR Drive.

North of Houston Street, Clinton Street, which becomes Avenue B, operates two-way with truck loading zones on the west curb and parking on the east curb. Approximately 50 vehicles turn eastbound onto Houston Street and 70 vehicles turn westbound onto Houston Street from the southbound approach during the PM peak period.

Houston Street processes approximately 650 vehicles eastbound and 925 vehicles westbound during the PM peak hour.

The intersection operates at LOS D during all three peak hours. The northbound approach operates at LOS E, F and F during the AM, Midday and PM peak hours respectively and the southbound approach operates at LOS F, E and E during the AM, midday and PM peak hours respectively. Both the eastbound and westbound approach operate at LOS D or better during all three peak hours.

Proposal: Extend the No Standing 7 AM to 10 AM regulation to 7 AM to 7 PM for at least 60'-0" from the stop bar on the west curb of the northbound approach to provide an additional lane and improve traffic operations. (See figure 11-14 and 11-15).

Figure 11-14: Houston Street and Avenue B - Existing

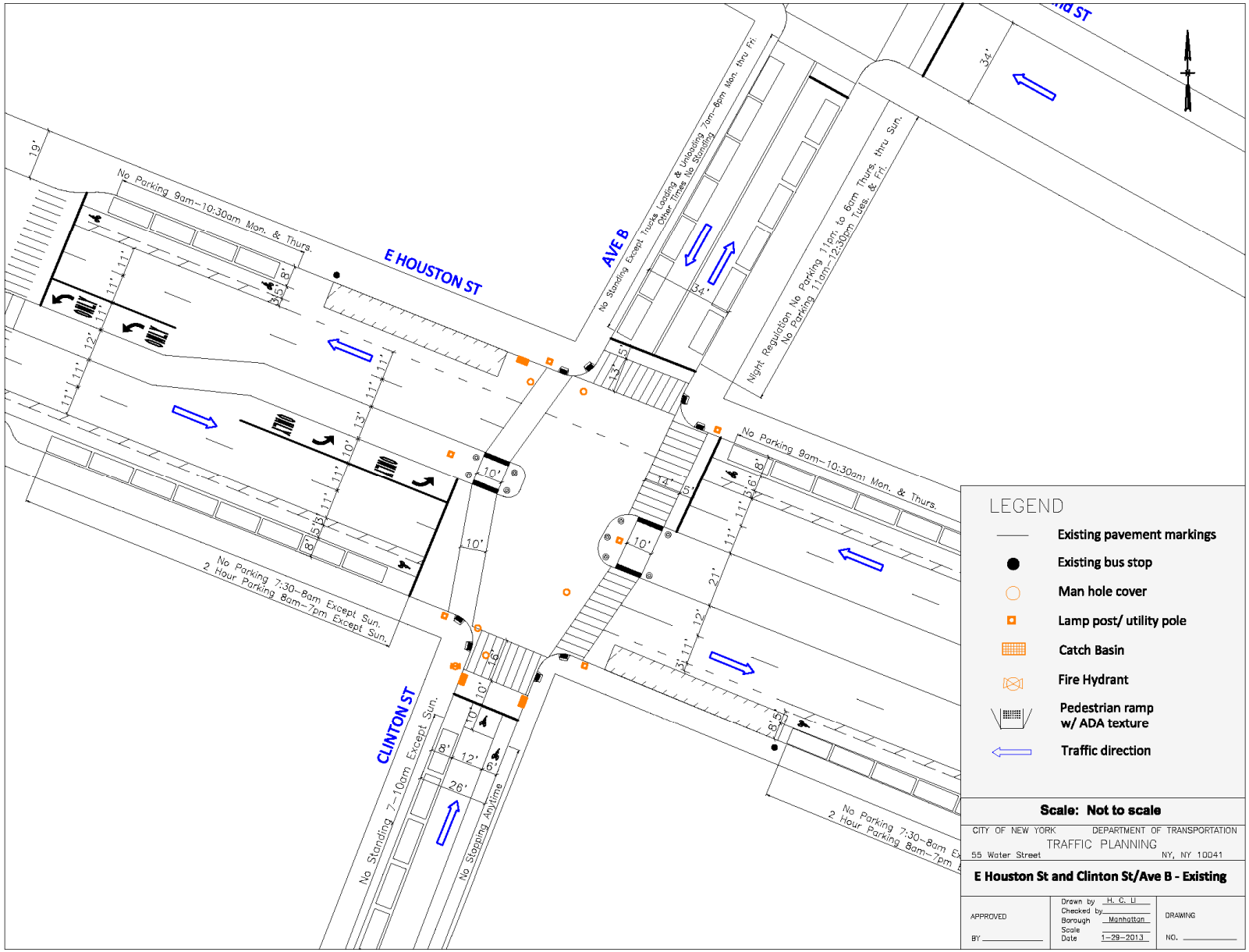
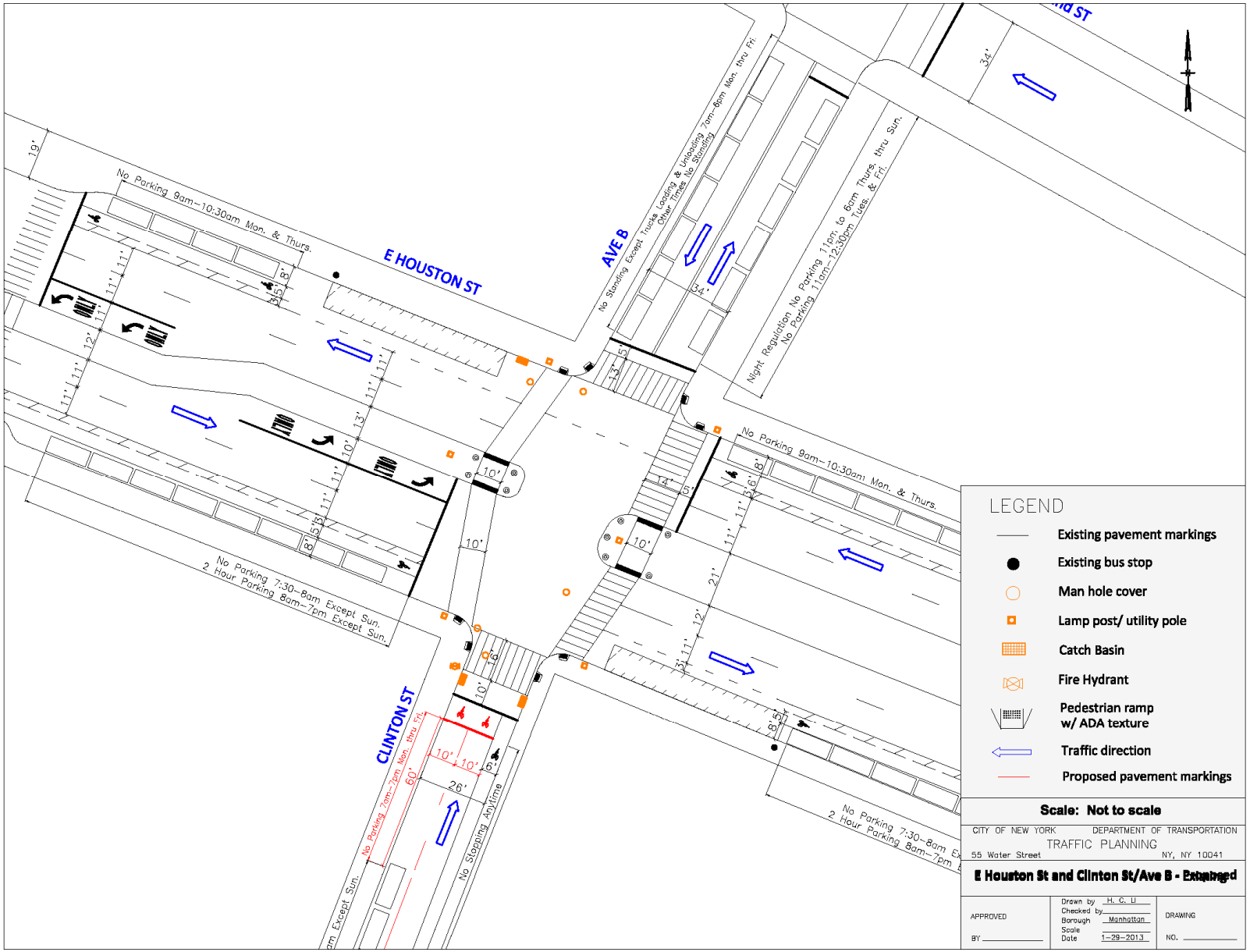


Figure 11-15: Houston Street and Avenue B – Proposed



11.7 Delancey Street/Kenmare Street and the Bowery

This intersection is the convergence of two high traffic volume corridors, with Delancey being a through truck route and the Bowery a local truck route. The southbound M103 bus stop is located approximately 100' south of Delancey Street. The pedestrian island in the south crosswalk impacts WB left turning heavy vehicles and creates a bottleneck. There is also a bus stop on the west curb, south of Delancey/Kenmare Street.

Proposal: To improve the traffic operations and reduce left turn conflicts with pedestrians redesign the pedestrian island on the southbound approach be reconfigured to a width of 10'-0". Proposal #2 has a different configuration of the median and adds a 3rd through lane to the southbound traffic (see figure 11-16, 11-17 and 11-18).

Figure 11-16: Kenmare Street and the Bowery – Existing

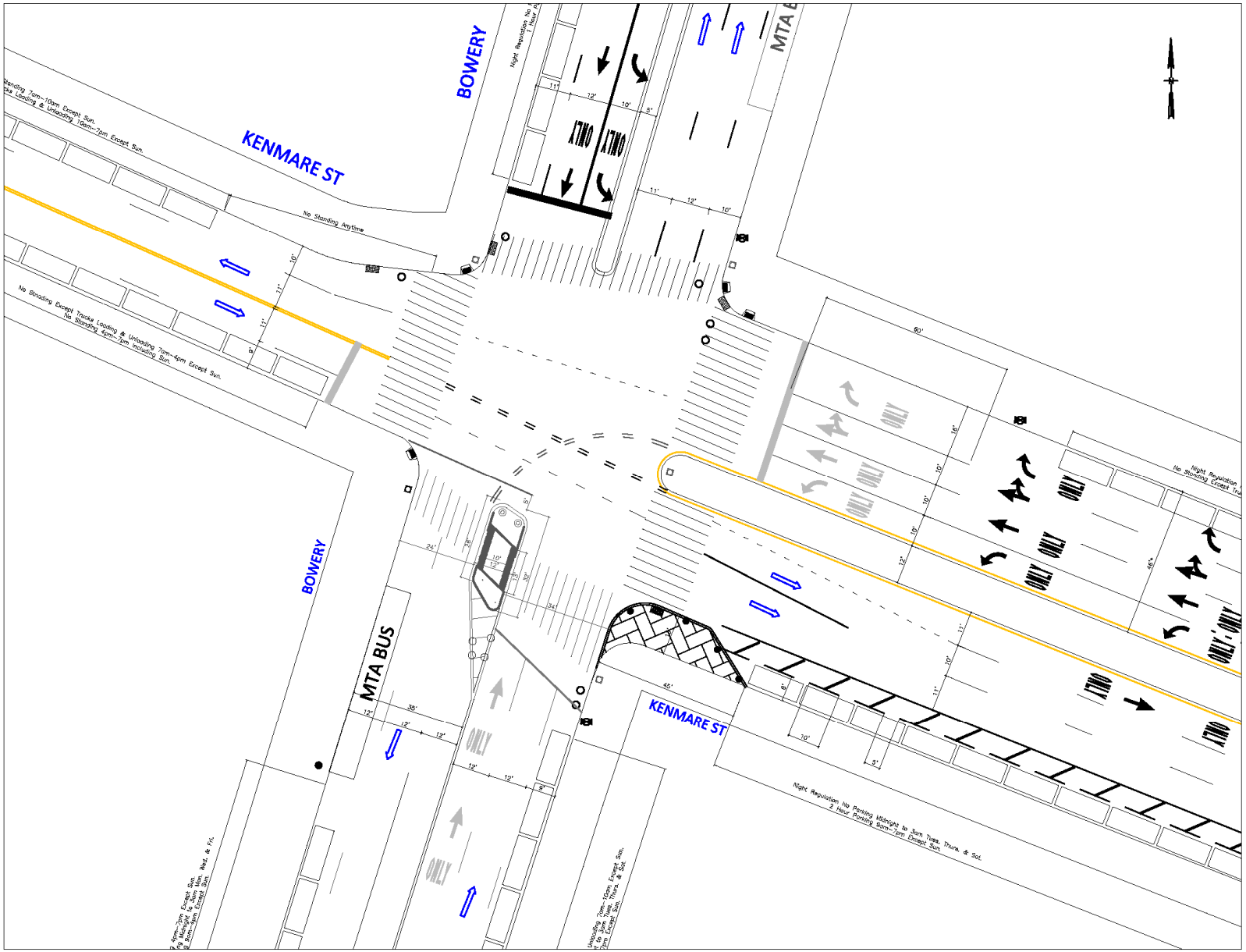


Figure 11-17: Kenmare Street and the Bowery – Option 1

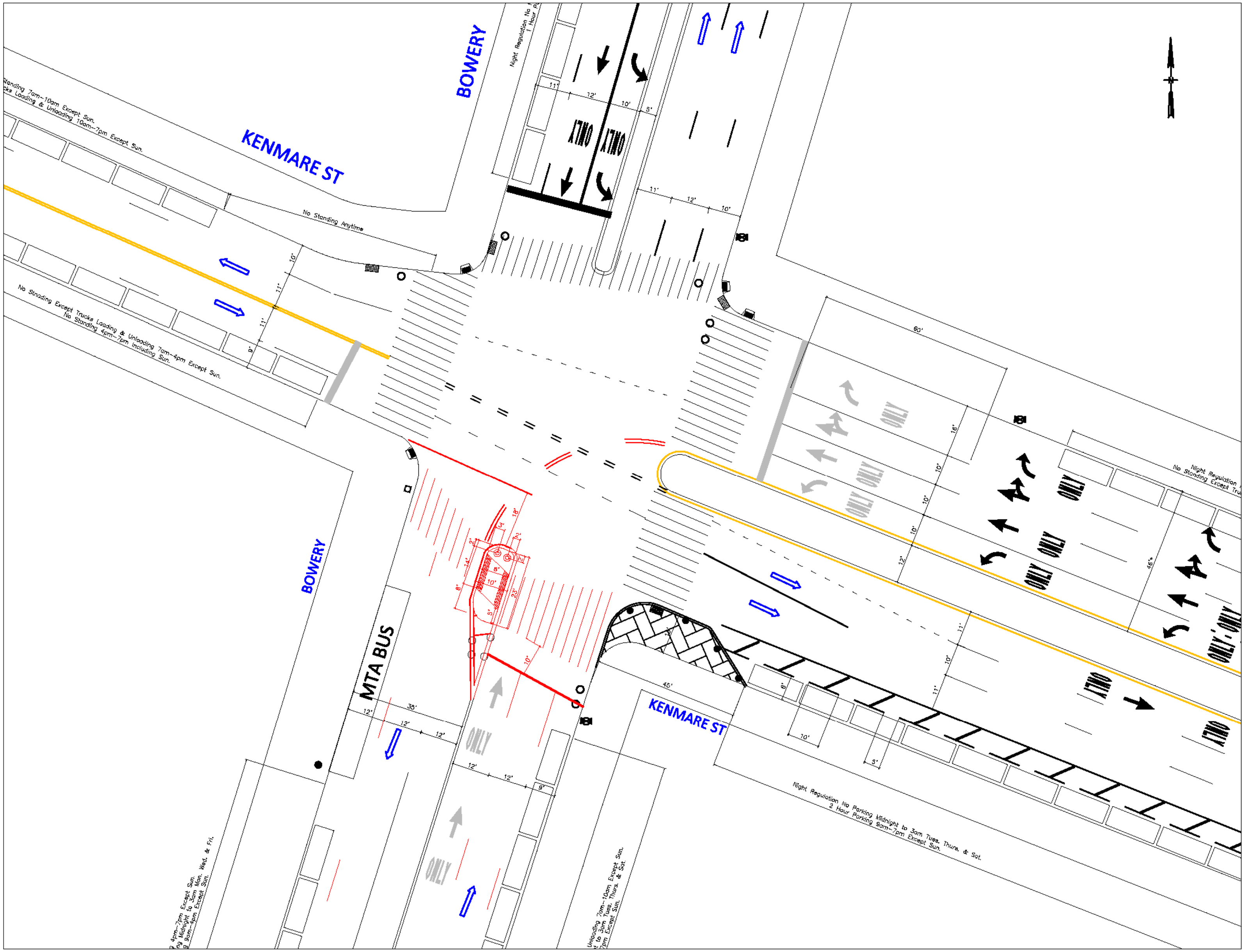
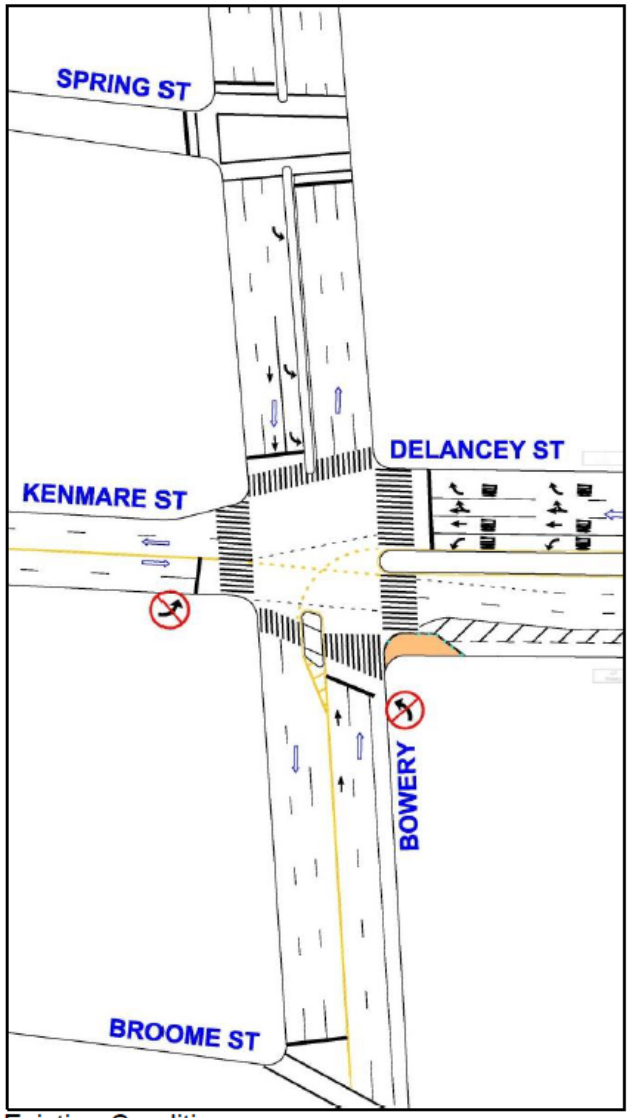
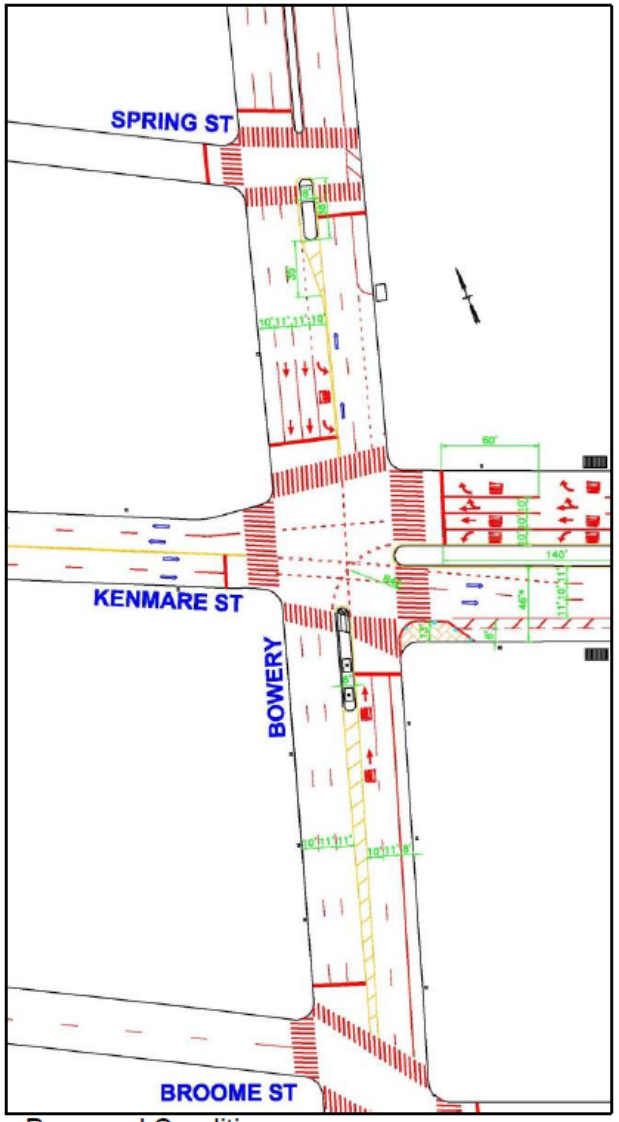


Figure 18: Figure 11-19: Kenmare Street and the Bowery – Option 2



Existing Condition



Proposed Condition

11.8 Lafayette Street @ Kenmare Street/Lafayette Street @ Broome Street

Kenmare Street operates as a two-way street between Bowery and Lafayette Street with the westbound traffic ends at Lafayette Street. All westbound traffic turns left onto southbound Lafayette Street which results in significant conflicts with the pedestrians crossing the south crosswalk of the intersection. The short block to block distance on Kenmare Street between Cleveland Place and Lafayette Street (80 ft), the extensive green time for Kenmare Street westbound traffic during each cycle, and the simultaneous signal progression at Cleveland Place and Lafayette Street prevent pedestrians from taking advantage of the existing 8 second LPI as pedestrians arrive at the intersection after the LPI has concluded. This forces the pedestrian to wait for the next available pedestrian walking phase to cross the street which is the phase that will conflict with the heavy left turn traffic from westbound Kenmare Street.

The majority of this traffic then turns right onto westbound Broome Street towards the Holland Tunnel. Though the existing 7 second LPI works better at this location the west crosswalk has heavy vehicle volumes turning across it during the walk phase.

Proposal – Remove existing parking (no parking 8-6 m-f) from the west curb of Lafayette St north of Kenmare and stripe one through lane and one left turn lane. This will prevent vehicles from standing at this location and provide the capacity needed for the proposed signal timing changes. Allow parking on the east curb of Lafayette Street between Kenmare and Broome Street. Install curb extensions to the southeast curb of Lafayette and Kenmare St to shorten crossing distances. Install curb extensions on the northeast and southwest curb of Lafayette and Broome Street to shorten crossing distances. See figure 20 and 21. Addition signal timing changes would lengthen the existing Leading Pedestrian Interval (LPI) on the east/west crosswalk at Broome Street and create a pedestrian only phase for the north/south crosswalks at Kenmare St

Proposal #2 – Remove the south crosswalk at Kenmare and Lafayette Street

Figure 20: Lafayette St @ Kenmare St/Broom St – Existing Conditions

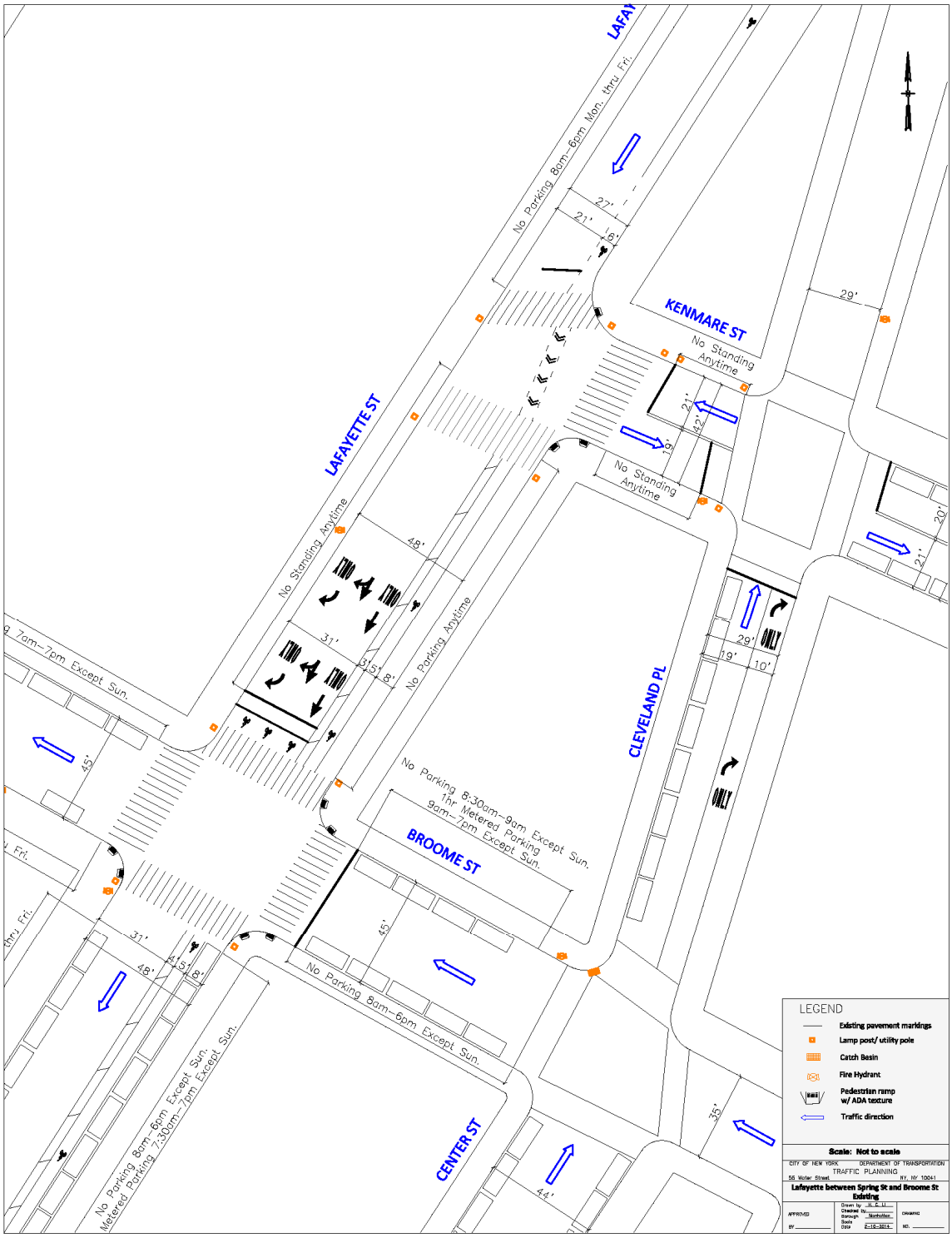


Figure 21 Lafayette St @ Kenmare St/Broom St – Proposal

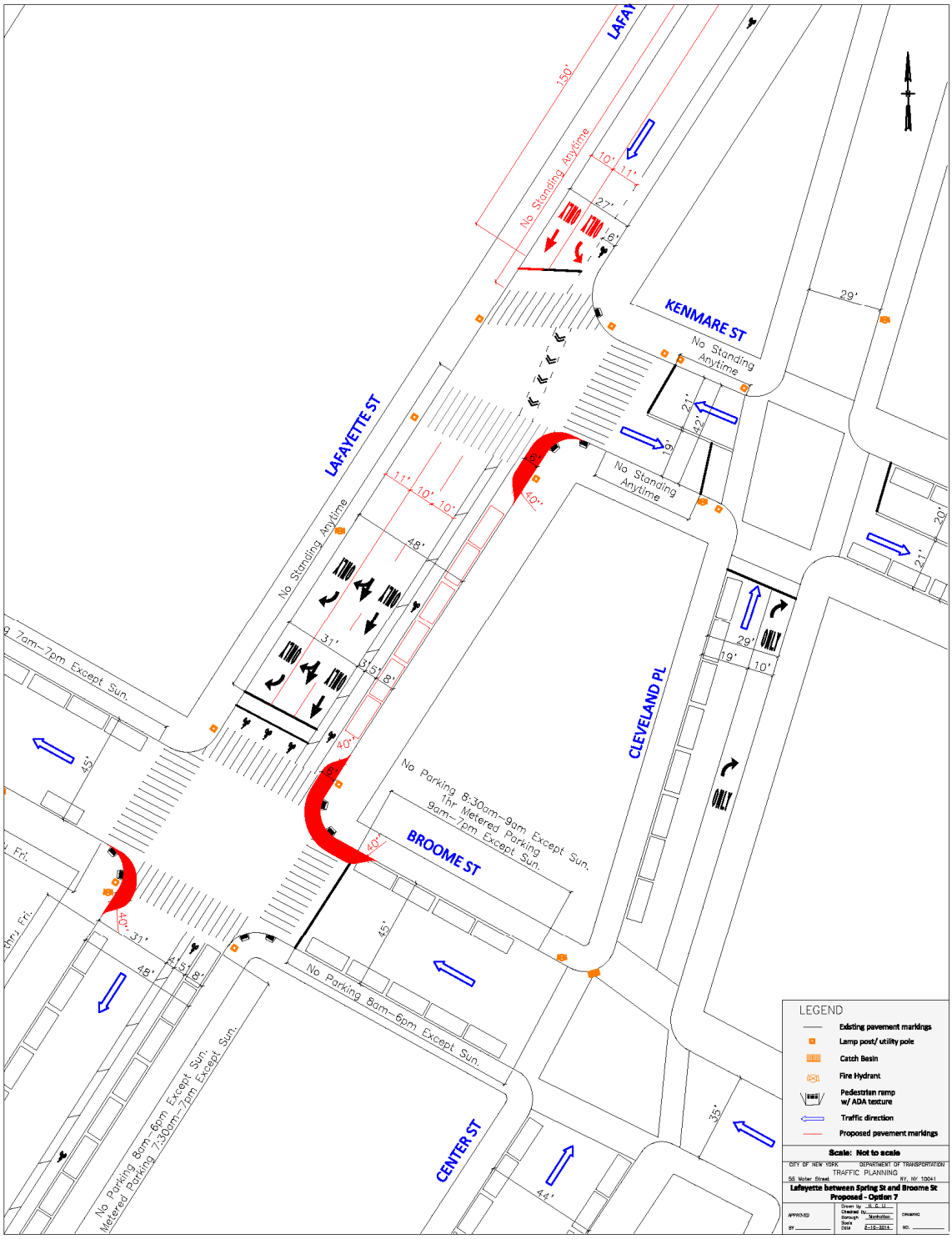


Table 11-1:Summary LOS - AM

			Existing Conditions			Future No Build			With Improvement			
Intersection	Approach	Lane Group	VC	Delay	LOS	VC	Delay	LOS	VC	Delay	LOS	Proposed Recommendation
Bleecker Street @ Broadway	SB	LT	0.65	15.9	B	0.84	22.6	C	0.84	22.6	C	Remove parking from south curb of Bleecker Street to add right turn lane
	EB	TR	0.91	61.3	E	1.12	116.1	F				
		T							0.73	39.2	D	
		R							0.48	30.9	C	
				27.4	C		46.1	D		26.2	C	
Bleecker Street @ Lafayette Street	EB	LT	0.83	44.8	D	1.04	85.8	F				Remove parking from north curb of Bleecker Street to add left turn lane
		L							0.36	25.6	C	
		T							0.59	30.7	C	
	NB	TR	0.43	12	B	0.63	15.2	B	0.63	15.2	B	
				23	C		37.5	D		19.5	B	
Broadway @ Spring Street	EB	TR	0.62	28	C	0.63	28.3	C	0.63	28.3	C	Remove Truck Loading Zones from east curb of Broadway to add Left turn lane
	SB	LT	1.04	61.9	E	1.06	68.7	E				
		L							0.18	9.5	A	
		T							0.71	16.7	B	
				51.8	D		56.7	E		19.2	B	
Clinton Street @ Houston Street	EB	L	0.48	24.3	C	0.57	31.3	C	0.57	31.3	C	No Change for the AM
		T	0.33	13.9	B	0.49	16.1	B	0.49	16.1	B	
	WB	TR	0.46	15.4	B	0.7	20.2	C	0.7	20.2	C	
	NB	L	0.24	24.4	C	0.25	24.6	C	0.25	24.6	C	
		TR	0.95	65.8	E	0.97	69.9	E	0.97	69.9	E	
	SB	LR	0.93	91.3	F	1.05	125.4	F	1.05	125.4	F	
				27.7	C		33.2	C		33.2	C	
Lafayette Street @ Kenmare St	WB	L	0.48	9.3	A	0.49	11.4	B	0.52	10.6	B	Signal Timing Changes and Curb Extensions
	SB	LT	0.18	24.2	C	0.18	24.2	C	0.28	34.1	C	
Lafayette Street @ Broome St	WB	LT	0.34	17.2	B	0.35	17.2	B	0.41	22.5	C	Signal Timing Changes and Curb Extensions
	SB	T	0.53	85.4	F	0.54	85.8	F	0.53	86.6	F	
	SB	TR	0.54	93.8	F	0.55	95.9	F	0.54	96.9	F	
Kenmare Street @ The Bowery	N/A		N/A			N/A			N/A			Redesign of the pedestrian island on south leg of intersection
Bowery btw 4th Street and Houston Street	N/A		N/A			N/A			N/A			Expanding the median to from 5' to 10' to align lanes and eliminate weaving condition
Crosby Street @ Houston Street	N/A		N/A			N/A			N/A			Opening intersection to Vehicle and Pedestrian acess

Table 11-2: Summary LOS - MD

			Existing Conditions			Future No Build			With Improvement			
Intersection	Approach	Lane Group	VC	Delay	LOS	VC	Delay	LOS	VC	Delay	LOS	Proposed Recommendation
Bleecker Street @ Broadway	SB	LT	0.76	18.6	B	0.77	19.2	B	0.77	19.2	B	Remove parking from south curb of Bleecker Street to add right turn lane
	EB	TR	1.04	91.7	F	1.17	134	F				
		T							0.79	42.3	D	
		R							0.59	37.2	D	
				36	D		51.1	D		25.2	C	
Bleecker Street @ Lafayette Street	EB	LT	0.72	36	D	1.03	82.5	F				Remove parking from north curb of Bleecker Street to add left turn lane
		L							0.32	24.9	C	
		T							0.62	31.7	C	
	NB	TR	0.53	13.5	B	0.56	13.9	B	0.56	13.9	B	
				20.7	C		37.5	D		19.3	B	
Broadway @ Spring Street	EB	TR	0.7	30.7	C	0.69	30.3	C	0.69	30.2	C	Remove Truck Loading Zones from east curb of Broadway to add Left turn lane
	SB	LT	1.05	64.8	E	1.07	71.3	E				
		L							0.22	9.8	A	
		T							0.71	16.7	B	
				54.3	D		59	E		19.8	B	
Clinton Street @ Houston Street	EB	L	0.61	31.9	C	0.72	45	D	0.72	45	D	Remove parking from west curb of Clinton Street (NB) for additional lane
		T	0.37	14.3	B	0.56	17.2	B	0.56	17.2	C	
	WB	TR	0.45	15.3	B	0.68	19.7	B	0.68	19.7	B	
	NB	LTR	1.05	91.6	F	1.14	124.4	F				
		L							0.36	27.5	C	
		TR							0.65	34.1	C	
	SB	LR	0.63	39.2	D	0.79	56.4	E	1.04	116.5	F	
				29.8			39.6	D		28.1	C	
Lafayette Street @ Kenmare St	N/A		N/A			N/A			N/A			Signal Timing Changes and Curb Extensions
Lafayette Street @ Broome St	WB	LT	N/A			N/A			N/A			Signal Timing Changes and Curb Extensions
	WB	T										
	SB	T										
	SB	TR										
	SB	R										
Kenmare Street @ The Bowery	N/A		N/A			N/A			N/A			Redesign of the pedestrian island on south leg of intersection
Bowery btw 4th Street and Houston Street	N/A		N/A			N/A			N/A			Expanding the median to from 5' to 10' to align lanes and eliminate weaving condition
Crosby Street @ Houston Street	N/A		N/A			N/A			N/A			Opening intersection to Vehicle and Pedestrian acess

Table 11-3: Summary LOS - PM

			Existing Conditions			Future No Build			With Improvement			
Intersection	Approach	Lane Group	VC	Delay	LOS	VC	Delay	LOS	VC	Delay	LOS	Proposed Recommendation
Bleecker Street @ Broadway	SB	LT	0.8	20.5	C	0.92	29.1	C	0.92	29.1	C	Remove parking from south curb of Bleecker Street to add right turn lane
	EB	TR	1.07	97.2	F	1.16	128.8	F				
		T							0.89	52.6	D	
		R							0.43	29.6	C	
				40.2	D		54.8	D		33.8	C	
Bleecker Street @ Lafayette Street	EB	LT	1.04	84	F	1.1	101.1	F				Remove parking from north curb of Bleecker Street to add left turn lane
		L							0.39	26	C	
		T							0.6	30.4	C	
	NB	TR	0.52	13.3	B	0.57	13.9	B	0.57	13.9	B	
				40.4	D		43.7	D		19	B	
Broadway @ Spring Street	EB	TR	0.48	27.6	C	0.48	27.6	C	0.46	26.9	C	Remove Truck Loading Zones from east curb of Broadway to add Left turn lane
	SB	LT	2.24	582.5	F	2.63	758.5	F				
		L							0.38	12.2	B	
		T							0.87	25	C	
				495.9	F		646.5	F		23.3	C	
Clinton Street @ Houston Street	EB	L	0.52	26.4	C	0.62	35	D	0.62	35	D	Remove parking from west curb of Clinton Street (NB) for additional lane
		T	0.32	13.8	B	0.48	15.9	B	0.48	15.9	B	
	WB	TR	0.45	15.3	B	0.68	19.8	B	0.68	19.8	B	
	NB	LTR	1.05	88	F	1.26	165.9	F				
		L							0.42	28.7	C	
		TR							0.72	36.3	D	
	SB	LR	0.74	49.8	D	0.88	71.8	E	1.23	185.7	F	
				31.5	C		51.8	D		32.8	C	
Lafayette Street @ Kenmare St	WB	L	0.32	3.2	A	0.32	3.4	A	0.34	3.5	A	Signal Timing Changes and Curb Extensions
	SB	LT	0.16	24	C	0.16	24	C	0.25	32.9	C	
Lafayette Street @ Broome St	WB	LT	0.19	15.6	B	0.19	15.6	B	0.23	20.3	C	Signal Timing Changes and Curb Extensions
	SB	T	0.35	31.3	C	0.36	31.6	C	0.35	32.8	C	
	SB	TR	0.35	34.1	C	0.36	34.5	C	0.35	35.7	C	
Kenmare Street @ The Bowery	N/A		N/A			N/A			N/A			Redesign of the pedestrian island on south leg of intersection
Bowery btw 4th Street and Houston Street	N/A		N/A			N/A			N/A			Expanding the median to from 5' to 10' to align lanes and eliminate weaving condition
Crosby Street @ Houston Street	N/A		N/A			N/A			N/A			Opening intersection to Vehicle and Pedestrian acess