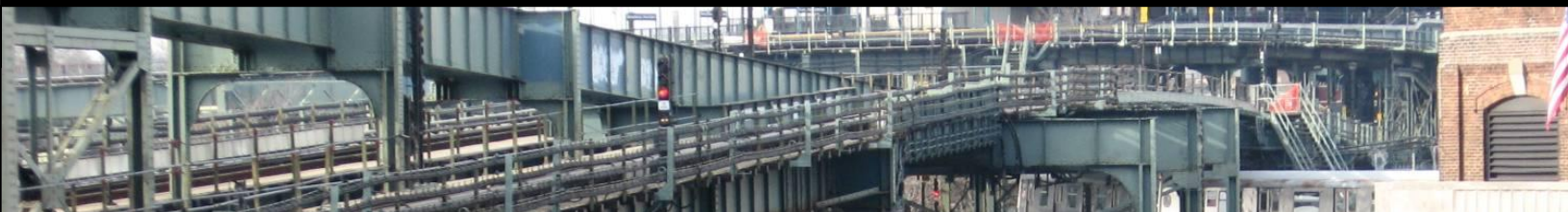




# BROADWAY JUNCTION TRANSPORTATION STUDY



NYC DEPARTMENT OF CITY PLANNING  
FINAL REPORT • NOVEMBER 2008





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# EXECUTIVE SUMMARY

## Introduction

The goal of the Broadway Junction Transit Capacity Study is to assess the unused existing and future transit capacity available on the five subway routes, six bus routes and one commuter rail line which serve the study area. These findings will be used to guide and inform any future discussions about land use and development in the Broadway Junction area.

Despite public transportation densities comparable to locations such as Fordham, Jamaica and the Queens Plaza/Court Square area, the heart of the study area lacks the kind of development often seen at a location so amply served by transit. Broadway Junction is specifically mentioned as an underutilized neighborhood with transit-oriented development potential in *PlaNYC: A Greener, Greater New York*, the City's comprehensive sustainable planning framework released in 2007.<sup>1</sup>

Although the study broadly outlines potential land uses, specific development scenarios and recommendations are beyond the scope of this study.

## Existing Conditions

The study area is generally characterized by medium-density two-to four-story housing, and low- to medium density industrial uses. Automotive uses are also quite common, especially along Atlantic Avenue but also scattered elsewhere throughout the study area. To a large degree, existing zoning does not reflect current land use.

The vast majority of the study area's 4,377 residents (as of the 2000 Census) were located along its eastern and western edges. The northern and central parts of the area are dominated by East New York Yard (the primary storage and maintenance facility for the J/Z, L, and M lines) and the East New York Bus Depot and Central Maintenance Facility. The southern part of the study area contains part of the East New York Industrial Business Zone (IBZ). IBZs are areas where the City has specifically committed to not rezone land for residential use and to strengthen enforcement against illegally converted buildings. A residential enclave exists within the part of the IBZ in the study area, but manufacturing uses dominate.

Current subway service is provided by the A (Fulton-8<sup>th</sup> Avenue Express), C (Fulton-8<sup>th</sup> Avenue Local), J/Z (Broadway Brooklyn-Jamaica), and L (Canarsie) lines. Six local bus routes serve the study area: the B12, B20, B25, B83, Q24 and Q56. The LIRR Atlantic Division's East New York station is primarily served by trains to or from terminals in Nassau County and Far Rockaway. All trains on this route terminate to the west at Flatbush Avenue/Atlantic Terminal.

Internal passenger circulation counts within the Broadway Junction subway complex were conducted in September 2007. Analysis of the count data determined that passengers entering and exiting the station make up a relatively small portion of total internal activity within the complex – no more than one-fourth of all activity and often considerably less. The data also proved that the dominant passenger movement within the complex was from Manhattan-bound L Line trains to Manhattan-bound A and C trains in the AM peak, and from Euclid Avenue/Queens-bound A and C trains to Canarsie-bound L trains in the PM peak. In the AM peak, Manhattan-bound J/Z and L trains act as feeders to A and C trains, and in the PM peak the process is reversed: A and C trains to Euclid Avenue and Queens experience a large net loss and Queens- and Canarsie-bound J/Z and L trains gain passengers.

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<sup>1</sup> *PlaNYC: A Greener Greater New York*. Mayor's Office for Long-Term Planning and Sustainability, April 2007. Housing Initiative 6, p. 24.

Numerous infrastructure, operational and equipment limitations exist on all subway lines serving Broadway Junction, though the A and C have them to a lesser degree. The A and C Lines are operating 25-26 trains per hour (tph) through the two-track stretch between Hoyt-Schermerhorn Streets and Canal Street – the maximum number of trains which can realistically be run over a single track in a single hour. However, these trains have room for thousands of additional passengers.

The J/Z Lines lack direct service to Midtown, must navigate a full at-grade crossover at Myrtle Avenue, travel along a route with several sharp curves which reduce operating speeds, and do not fully utilize potential express service, though doing so would create other operational issues.

The L Line operates at relatively low frequencies, though recent service upgrades in 2007 partially alleviated this condition. The line is also limited to eight car trains by platform lengths along the route, a more significant limitation than it is for J/Z trains, which are also limited to eight cars. Finding the yard space to accommodate a growing fleet is an ongoing need. Other technical limitations, discussed in the main body of the report, also prevent the L from operating at its maximum potential.

## Findings

After taking peak hourly ridership, calculating systemwide ridership growth through September 2007, factoring in anticipated population growth along the A, C, J/Z and L subway routes in Brooklyn and Queens between 2007 and 2030, and considering potential and anticipated subway service improvements on these lines in the coming decades, an estimate was determined of available 2030 passenger capacity at peak hour for potential development at Broadway Junction.

**Table E-A: Potential Available Peak Hour Subway Line Capacities, 2030**

Line	2030 estimated peak hour ridership	existing 2007 peak guideline capacity	peak guideline capacity with improvements	2030 volume/ capacity ratio with existing capacity	2030 volume/ capacity ratio with capacity improvements	estimated available 2030 capacity with improvements
A	21,807	24,733	25,574-26,142	88.17%	83.42%-85.27%	3,767-4,335
C	7,610	9,087	11,358	83.75%	67.00%	3,748
J/Z	10,328	13,920	18,560	74.20%	55.65%	8,232
L	22,287	19,720	23,200-25,520	113.02%	87.33%-96.06%	913-3,233
	<b>62,032</b>	<b>67,460</b>	<b>78,692-81,580</b>	<b>91.95%</b>	<b>76.04%-78.83%</b>	<b>16,660-19,548</b>

If potential and anticipated capacity improvements are made, the subway routes serving Broadway Junction would be able to accommodate the possible population growth scenario for 2030, with substantial additional capacity remaining.

DCP estimates that up to 16,660 to 19,548 additional peak-hour, peak-direction subway users could be accommodated in 2030 by the subway routes serving the study area. Note that this figure represents estimated future available capacity not just for the Broadway Junction station, but for other stations on these lines as well. Future decisions regarding land use changes within the study area would require consideration of numerous factors that are outside the scope of this study, including land use, neighborhood character, and other infrastructure, and would entail outreach and consensus building with community stakeholders.

However, even with the capacity upgrades described in the body of this report, the L may be running at over 96 percent of capacity by 2030. Construction of more a more mixed-use or commercial nature

would also reduce the urgency of meeting any of these conditions, since a larger proportion of reverse commuters would be entering the study area.

## **Recommendations and Next Steps**

The study makes several recommendations, split between those that can be implemented given existing conditions, longer-term transit capacity, service and facility enhancement, and next steps which would engage the community in planning for its own future. Among these recommendations are the following:

### *Recommendations Based Upon Existing Land Uses and Transit Capacity*

- Working with community stakeholders, a further study should be undertaken which would determine the best way to utilize the land immediately surrounding this juncture of subway, bus and rail routes.
- To help balance platform loading, seating areas on all A/C and J/Z platforms should be more evenly distributed along their lengths. Signage encouraging passengers to move towards the center of the platforms should be installed. Additionally, the Eastern Parkway J/Z Line platform entrances should be rehabilitated and reopened. For the A/C platforms, stairways to Sackman Street (a short distance from Eastern Parkway) should be constructed at the west end of both platforms. Currently, the only entrances for these platforms are at their far eastern ends. Seating on the A/C and J/Z platforms also is more prevalent at their eastern ends.

### *Suggestions to Improve Transit Capacity, Facilities and Service*

- If significant development is expected in or west of the study area along Broadway, NYCT should study whether reintroducing 6<sup>th</sup> Avenue K Line service via Chrystie Street and the Broadway-Brooklyn/Jamaica Line is viable, either as a stand-alone service or merged with another line. J/Z and M trains do not serve Midtown Manhattan, which has almost four times more annual station entries than Lower Manhattan does. K Line service would provide one-seat service from the study area to Midtown.
- NYCT should undertake detailed design, engineering and cost analyses for extending all L Line platforms and yard tracks to be used by 9- and 10-car trains. Although other, less costly improvements should be taken first to alleviate Canarsie Line overcrowding in the near term, platforms which can accommodate longer trains could offer lasting relief from overcrowding in the long term.
- Construction of additional yard space for L trains will ultimately be necessary, regardless of whether lengthier trains are ultimately needed. The City should work with and support NYCT efforts to find suitable locations for extra traincar storage.
- Significant amount of excess infrastructure has been removed along the L Line between Broadway Junction and Sutter Avenue, but large sections of elevated deck remain that currently serve no active purpose. These sections should be: a) reused for car storage, b) rehabilitated for use as a terminal for Midtown service, or c) demolished, once the active L Line tracks are retrofitted to make them structurally independent. By either making use of or removing this excess infrastructure, both the City and NYCT would be more effectively utilizing their resources.
- The L Line could ultimately be relocated into the Bay Ridge Line ROW from Wilson Avenue to New Lots Avenue. These two redundant and overbuilt alignments parallel each other through most of eastern Brooklyn, and sufficient space exists to consolidate the two – ultimately saving on maintenance costs and opening up additional land within the study area for reuse.
- Since the J/Z largely parallels the L Line's alignment through northern Brooklyn, it has the potential to partially relieve the overburdened L. However, several infrastructure deficiencies on the J/Z (and M) exist. These deficiencies should ultimately be addressed, to the extent that doing so is feasible. Doing so could increase line operating speeds and capacity.



To varying degrees, all of these recommendations will require financial commitments. Decisions about whether or how many of these recommendations should be implemented will have to be made after weighing the priorities of all relevant planning, transportation and community stakeholders, and will have to be cognizant of economic realities.

# 1. INTRODUCTION

The goal of the Broadway Junction Development Study is to obtain and assess the unused transit capacity available on the five subway routes, six bus routes and one commuter rail line which serve the study area.

This study seeks to determine the amount of available capacity to and from Broadway Junction on each relevant transit service, partly by using the **peak loading point** of each subway line to determine how much excess space is available to accommodate future growth within the study area. (Service increases on bus routes within the study area are dictated by other factors, such as depot space and operational costs.) However, the report also considers the impact that additional development, anticipated population growth, and rezonings may have on subway route ridership levels in coming years. Even after these elements are factored in, the study does not automatically assume that all remaining excess capacity will exist for the benefit of the study area alone.

“Available capacity” is not confined to a to-Manhattan-in-the-morning and a from-Manhattan-in-the-evening standard. The ultimate form, scale and land uses within the study area will largely dictate its commuting patterns.

The study will make broad assumptions about the level and type of development possible in the area given whatever excess transit capacity may exist, while remaining cognizant of the existing active industrial uses within the study area. However, specific development scenarios and recommendations are beyond the scope of this study.

*The **peak loading point** is the station or stations where each subway route is carrying the greatest amount of passengers in the peak direction during the peak hour. The peak loading point is the primary factor used by NYCT to determine whether service should be added on a particular route.*

The study’s area’s boundaries appear in Figure 1-A. Starting in the northwest, they are:

- **NORTH:** Bushwick Avenue; the southern border of Cemetery of the Evergreens; a line from the southern cemetery border to the Jackie Robinson Parkway service road located at the southern edge of Crosby Avenue.
- **EAST:** The Jackie Robinson Parkway service road, which becomes Vermont Avenue.
- **SOUTH:** Liberty Avenue.
- **WEST:** Mother Gaston Boulevard south of Eastern Parkway, a short jog west that the boulevard makes at East New York Avenue; Eastern Parkway; Mother Gaston Boulevard north of Eastern Parkway; Somers Street; Eastern Parkway Extension; Broadway, and De Sales Place.

The subways servicing the study area are:

- **A:** 8<sup>th</sup> Avenue-Fulton Street Express. Operates from 207<sup>th</sup> Street in Manhattan to Lefferts Boulevard or Mott Avenue-Far Rockaway in Queens, with limited peak-directional service to Beach 116<sup>th</sup> Street-Rockaway Park in Queens during rush hours. A Line trains run local when C Line service is not in operation.
- **C:** 8<sup>th</sup> Avenue-Fulton Street Local. Operates from 168<sup>th</sup> Street in Manhattan to Euclid Avenue in Brooklyn, from approximately 6:00am to 10:30pm seven days a week.
- **J/Z:** Nassau Street-Broadway-Jamaica. Operates from Broad Street in Manhattan to Jamaica Center-Parsons Archer in Queens. Service is truncated to Chambers Street in Manhattan late



nights and weekends. All J and Z trains run peak-directional express service between Marcy Avenue and Myrtle Avenue weekdays. Z service only operates for about an hour in the peak direction; J/Z services during these periods provide skip-stop service in the peak direction only.

- **L:** 14<sup>th</sup> Street-Canarsie Local. Makes all stops between 14<sup>th</sup> Street-8<sup>th</sup> Avenue in Manhattan and Rockaway Parkway in Brooklyn.

The six bus routes servicing the study area are:

- **B12:** Ocean Avenue and Parkside Avenue in Brooklyn to Sheridan Avenue and Liberty Avenue in Brooklyn. Some trips to and from Ocean Avenue begin and end at East New York Avenue and Alabama Avenue.
- **B20:** Putnam Avenue and Fairview Avenue in Queens to the Brooklyn General Mail Facility. Some trips to and from the General Mail Facility end at Broadway Junction.
- **B25:** Fulton Landing in Brooklyn to Broadway Junction in Brooklyn. From 7:00am to 7:00pm weekday, service is extended to One Main Street on the Brooklyn waterfront.
- **B83:** Broadway Junction in Brooklyn to Pennsylvania Avenue and Gateway Center Mall in Brooklyn.
- **Q24:** Lafayette Avenue and Patchen Avenue in Brooklyn to 168<sup>th</sup> Street and Jamaica Avenue in Queens. Some trips to and from Queens begin and end at Broadway Junction on weekends.
- **Q56:** Broadway Junction in Brooklyn to 170<sup>th</sup> Street and Jamaica Avenue in Queens.

The commuter rail line is the Long Island Rail Road's Atlantic Division, which runs exclusively under, over or adjacent to Atlantic Avenue from Flatbush Avenue in Brooklyn to Jamaica in Queens. An East New York station is located beneath Atlantic Avenue at Van Sinderen Avenue, and is primarily served by trains to or from Hempstead, West Hempstead and Long Beach in Nassau County, and Far Rockaway in Queens.

Despite public transportation densities comparable to locations such as Fordham, Jamaica and the Queens Plaza/Court Square area, the heart of the study area lacks the kind of development often seen at a location so amply served by transit. The assessment of available transit capacity contained in this report will be used to guide and inform any future discussions about land use development in the Broadway Junction area. Broadway Junction is specifically mentioned as an underutilized neighborhood with transit-oriented development potential in *PlaNYC: A Greener, Greater New York*, the City's comprehensive sustainable planning framework released in 2007. "The zoning capacity [of Broadway Junction] has never matched this area's potential. By recognizing this neighborhood's ability to absorb responsible growth, we could create capacity for thousands of new housing units."<sup>2</sup>

This study also inventories the existing roadway network within the study area, including on-street parking regulations. The study area is at the confluence of several major roads, including Broadway, Bushwick Avenue, Eastern Parkway Extension, East New York Avenue, Jamaica Avenue, Pennsylvania (Granville Payne) Avenue, and the Jackie Robinson Parkway. Traffic counts conducted in the fall of 2007 at three key intersections within the study area are discussed.

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<sup>2</sup> *PlaNYC: A Greener Greater New York*. Mayor's Office for Long-Term Planning and Sustainability, April 2007. Housing Initiative 6, p. 24.



## 2. HISTORY

### 2.1 Development of the Project Area

The study area was originally largely located in the Dutch town of Flatbush, organized in 1652, though the northwestern part of the study area was in the Town of Bushwick (created 1660). Known as Jamaica Pass in the colonial era, Broadway Junction marked the convergence of the roads which became Fulton Street, Jamaica Avenue and Broadway. During the Battle of Long Island in August 1776, British troops passed through the study area on the way to Gowanus, where they defeated colonial forces.<sup>3</sup>

The area appears to have been largely undeveloped as late as the 1850s.<sup>4</sup> In 1854, Bushwick became part of the City of Brooklyn; the rest of the study area was in New Lots, which had seceded from the Town of Flatbush two years earlier.<sup>5</sup>

By 1865 or 1866, when railroad access to the study area began to expand, some development appeared to have taken place in the study area, which had by then become a de facto railroad town. The Howard House, a hotel, bar and restaurant at the corner of Atlantic and Alabama avenues, opened in 1861, and is in an 1865 photo of the area.<sup>6</sup> An 1873 map indicates that all streets within the study area had apparently been opened.<sup>7</sup>

New Lots became part of the City of Brooklyn in 1886, and in 1898 the City of Brooklyn became a borough of Greater New York.

Historical photos suggest that the study area developed gradually in the early 20<sup>th</sup> century – some locations near the LIRR East New York station were vacant as late as 1916.<sup>8</sup> However, almost the entire study area was developed by 1924.<sup>9</sup> The mixed-use character of the area is already evident, although there appears to have been a slightly higher proportion of residential buildings than there are today.

### 2.2 Rail and Transit

The study area was one of the first locations in what is now New York City to be served by a railroad. Construction of the initial segment of the LIRR between today's Downtown Brooklyn and Jamaica was completed by 1836. Some sort of service to a station in the study area appears to have been put in place by March 1843, if not earlier.<sup>10</sup>

In 1865 or 1866, the Brooklyn and Rockaway Beach Railroad was built from Jamaica Bay to Broadway Junction – a period when development in the study area seems to have begun in earnest.<sup>11</sup>

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<sup>3</sup> “Broadway Junction,” *Encyclopedia of New York City*, Kenneth T. Jackson, editor (1995). P. 141; “Bushwick,” *ibid.*, p.171.

<sup>4</sup> The M. Dripps maps of 1855 and 1858 show developed areas as shaded in. <http://www.bklyn-genealogy-info.com/Map/1855.botright.html>, <http://www.bklyn-genealogy-info.com/Map/1858.Dripps2.html>.

<sup>5</sup> J.H. French, *Gazetteer of the State of New York*. Pearsall Smith, publisher. Pp. 367, 373.

<sup>6</sup> <http://www.arrts-archives.com/enyeast.html>

<sup>7</sup> <http://www.bklyn-genealogy-info.com/Map/NewLots.html>. Although these streets may have officially been open, this should not be interpreted as meaning that widespread development had occurred on all of these streets at the time.

<sup>8</sup> Rick Gomes’s “The East New York Project” website has numerous historic photos of the study area and East New York. The LIRR photos can be found at <http://www.tapeshare.com/LIRR.html>.

<sup>9</sup> Fairchild citywide aerial photo survey, 1924.

<sup>10</sup> *Brooklyn Daily Eagle*, March 4, 1843. Advertisement on p. 3, towards the bottom of column 5. An exact opening date for the station is unknown at this time.

<http://eagle.brooklynpubliclibrary.org/Default/Scripting/ArchiveView.asp?BaseHref=BEG/1843/03/04&Page=3&skin=BE>

<sup>11</sup> Most of the following material comes from Joseph Cunningham and Leonard De Hart, *A History of the New York Subway System, Part II: Rapid Transit in Brooklyn* (self-published, 1977).

A second wave of transit expansion into the area occurred between 1885 and 1889, when elevated lines were built to and through Broadway Junction along three routes: 1) the Fulton Elevated, along western Fulton Street and Liberty Avenue from Downtown Brooklyn, 2) the Broadway Elevated, along Broadway and eastern Fulton Street from the Brooklyn waterfront, and 3) the Lexington Elevated, via Lexington Avenue and Broadway from Downtown Brooklyn. The Lexington-Broadway route was actually first; the Broadway line was eventually extended west from Gates Avenue to the East River. All service through the area was electrified in 1899 and 1900.

Between 1906 and 1919 a third wave of expansion took place. The Brooklyn and Rockaway Beach Railroad began to be transformed into today's Canarsie Line in 1906 when service was moved to the current elevated viaduct south of Broadway Junction. In 1908, Broadway Line service was extended over the Williamsburg Bridge to Essex Street; five years later it reached Chambers Street. Between 1914 and 1918 a third, reversible express track was added to the Fulton and Broadway elevateds and both were extended: the Fulton El to Lefferts Avenue (now Boulevard) and the Broadway El to 168<sup>th</sup> Street, both in Queens. Today's J Line Broadway Junction station (originally called Eastern Parkway) opened in 1919.

The era between the world wars arguably marked the peak of "elevated era" mobility to and from the study area. One-seat service to Jamaica Bay ended in 1920, but a 1928 extension of the 14<sup>th</sup> Street Line to Broadway Junction resulted in a virtually complete version of today's L Line to 6<sup>th</sup> Avenue in Manhattan. (A one-stop extension in Manhattan to 8<sup>th</sup> Avenue in 1931 completed the line.) In 1936, the City-run Independent (IND) system opened as far as Rockaway Avenue, one stop from Broadway Junction, prompting the Fulton El to be closed west of Rockaway Avenue in 1940.

The IND Broadway-East New York (now Broadway Junction) station was nearly complete when World War II resulted in a construction moratorium. The station finally opened in December 1946. Two years later, when the line was extended to Euclid Avenue, all currently existing subway alignments within the study area were in place. Demolition of the remaining non-subway elevated lines followed: the Lexington El in 1950 and the Fulton El within Brooklyn in 1956. (The eastern part of the Fulton El was "recaptured" by the A Line when it was extended to Ozone Park and the Rockaways that year.)

A major departure from previous service patterns existed from 1968 to 1976. With the opening of the Chrystie Street Connection, direct service between the 6<sup>th</sup> Avenue and Jamaica lines became possible. Rush hour-only KK trains ran between either 168<sup>th</sup> Street in Jamaica or Broadway Junction and 57<sup>th</sup> Street-6<sup>th</sup> Avenue in Manhattan. In 1973, the service was renamed K and truncated to Broadway Junction, only to be eliminated in 1976. While still technically possible, no such service now exists.

The transportation history of the study area is so complex that, in the 172 years since the LIRR first arrived in the area, approximately 50 different subway, elevated and railroad service changes have occurred. However, the pace of change has slowed over the past 30 years. Since 1977, the following subway service changes affecting the study area have taken place:

- September 1977: J (Jamaica) Line cut back to Queens Boulevard.
- April 1985: J (Jamaica) Line cut back to 121<sup>st</sup> Street.
- December 1988: 1) J Archer Avenue Extension opens, adding two new stops at Sutphin-Archer and Parsons-Archer. Peak-directional skip-stop service instituted on from Marcy Avenue to 121<sup>st</sup> Street with new companion Z Line service. 2) C Line local service begins running to Euclid Avenue middays. Midday A service becomes express.

- March 1998: C Line northern terminal switches from Bedford Park Boulevard, Bronx to 168<sup>th</sup> Street, Manhattan.
- April 1999: A Line express service and C Line local service begins running seven days a week from 6:00am to 10:00pm.<sup>12</sup>

Table 2-A summarizes the major service changes which have occurred since 1946, when the station complex had nearly assumed its present form. Discontinuance and demolition of the Fulton Elevated nearly a decade later left the rail transit network within the area essentially as it is today.

A significant streamlining of the L (Canarsie) Line infrastructure between Broadway Junction and Sutter Avenue in the early 2000s removed a section of elevated trackage above Snediker Avenue. Previously, northbound L trains had to navigate a sharp curve north of Sutter Avenue station, travel above Snediker Avenue and stop at Atlantic Avenue at a separate platform from southbound trains. L Line trains in both directions now share a single island platform at Atlantic Avenue, but some excess infrastructure remains. (Atlantic Avenue is the stop which provides connections with the LIRR East New York station.)<sup>13</sup>

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<sup>12</sup> Numerous sources, including the line-by-line postwar service history at <http://community-2.webtv.net/ajkristopans/MODERNURBANRAIL/index.html>. This is a compendium of service histories for heavy rail systems throughout the United States, drawn from primary sources such as transit authority websites and the *Bulletin*, published by the New York Division of the Electric Railroaders' Association.

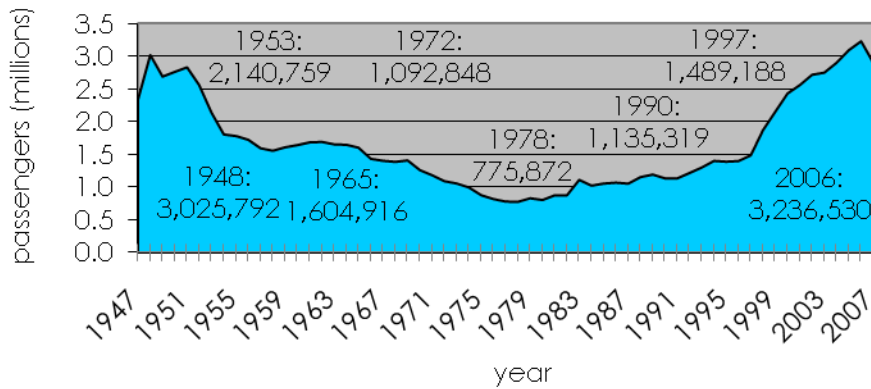
<sup>13</sup> The entire Atlantic Avenue complex once had six-tracks and three-platforms, which allowed Canarsie, Fulton Elevated, and short-turn Jamaica local trains to operate simultaneously. The western platform today serves L trains, and part of the abandoned middle platform remains. In recent years, ridership at this station has rebounded somewhat, but in 2007 it still ranked 410<sup>th</sup> out of 422 active station complexes in average weekday ridership, with 1,144.

**Table 2-A: Major Transit Service Changes Affecting Broadway Junction Since 1946**

year	services	notes
1946-1948	LIRR, A, Lexington Avenue-Lefferts Avenue (12), Fulton Street El (13), Broadway-Canarsie Line (14), Broad Street-168th Street via Broadway El (15), 14th Street-Canarsie Line (16), 14th Street-Fulton Line (17).	December 1946: A extended to Broadway-East New York (Broadway Junction). Local only.
1948-1951	LIRR, A, Lexington Avenue-Lefferts Avenue (12), Fulton Street El (13), Broadway-Canarsie Line (14), Broad Street-168th Street via Broadway El (15), 14th Street-Canarsie Line (16), 14th Street-Fulton Line (17).	November 1948: A extended to Euclid Avenue. Local only. October 1949: A begins express rush hour service from Hoyt-Schermerhorn to Broadway Junction. E local service extended to Broadway Junction rush hours. October 1950: Lexington El closes. Lexington Avenue-Lefferts Avenue service ends.
1951-1956	LIRR, A, E, Fulton Street El (13), Broadway-Canarsie Line (14), Broad Street-168th Street via Broadway El (15), 14th Street-Canarsie Line (16), 14th Street-Fulton Line (17).	1951-1952: Jamaica Line (14) non-rush hour express service to Broadway Junction phased out. Saturday Broadway-Canarsie (14) service also ends. June 1952: Rockaway Avenue station on Fulton Street El (13) open weekdays rush hours and middays only. Fulton El service ends at Broadway Junction all other times.
1956-1958	LIRR, A, E, Broadway-Canarsie Line (14), Broad Street-168th Street via Broadway El (15), 14th Street-Canarsie Line (16).	April 1956: Fulton El closed to 80th Street; remainder recaptured by A Line, which is extended to Lefferts Boulevard. August: 14th Street-Canarsie Line (16) express service ends. 1956-1958: Various service patterns send either A or E to Beach 25th Street-Wavecrest and Rockaway Park, depending on time of day.
1958-1959	LIRR, A, E, Broadway-Canarsie Line (14), Broad Street-168th Street via Broadway El (15), 14th Street-Canarsie Line (16).	January 1958: A/E Rockaways service extended to Mott Avenue-Far Rockaway. June 1959: Peak-directional Skip stop service begins on Jamaica El (15) service from Broadway Junction to 168th Street. Broadway-Canarsie (14) service scaled back further. September: E begins running express to Euclid Avenue rush hours.
1960-1967	LIRR, A, E, Broadway-Canarsie Line (14/JJ), Broad Street-168th Street via Broadway El (15/JJ), 14 <sup>th</sup> Street-Canarsie Line (16/LL).	1960: BMT routes given letters, but system used haphazardly. July 1967: A runs to Far Rockaway, non-rush hours.
1967-1973	NOVEMBER 1967-JUNE 1968: LIRR, A, E, JJ (to 168th Street; some rush hour trains to Rockaway Parkway), LL, QJ, RJ. JULY 1968-JANUARY 1973: LIRR, A, E, KK, LL, QJ.	November 1967: All routes now identified by letter. New QJ (168th Street-Brighton Beach), RJ (168th Street-95th Street Brooklyn, rush hours) routes begin service. July 1968: Chrystie-6th Avenue connection opens. JJ, RJ discontinued. New KK rush hour service runs from 168th Street or Eastern Parkway to 57th Street-6th Avenue. KK/QJ skip stop peak directional rush hours. August 1968: QJ extended to Coney Island.
1973-1976	LIRR, A, E, J, K, LL.	January 1973: A rush hour express, E rush hour local. KK truncated to Broadway Junction, renamed K. QJ replaced with J to Broad Street. J runs skip stop east of Broadway Junction AM rush hours.
1976-1985	LIRR, A, CC, J, LL.	August 1976: J runs local between Myrtle Avenue and Broadway Junction. CC replaces E to Rockaway Park rush hours. K discontinued. September 1977: J cut back to Queens Boulevard. April 1985: J cut back to 121st Street.
1986-1998	LIRR, A, C, J (J/Z starting December 1988), L.	1986: All lines now identified by a single letter. December 1988: 1) Archer Avenue Extension opens. J/Z skip stop introduced; route extended to Jamaica Center. 2) C begins running to Euclid Avenue middays; A runs express AM rush, middays and PM rush.
1999-present	LIRR, A, C, J/Z, L.	March 1998: C's northern terminal switches from 145th Street or Bedford Park Boulevard to 168th Street. April 1999: A begins running express and C begins running local 6am-10am every day, including weekends.



**Figure 2-A: Broadway Junction:  
Annual Station Entries, 1947-2007**



**Figure 2-B: Annual Ridership Fluctuations,  
Broadway Junction and Entire System, 1947-2007**

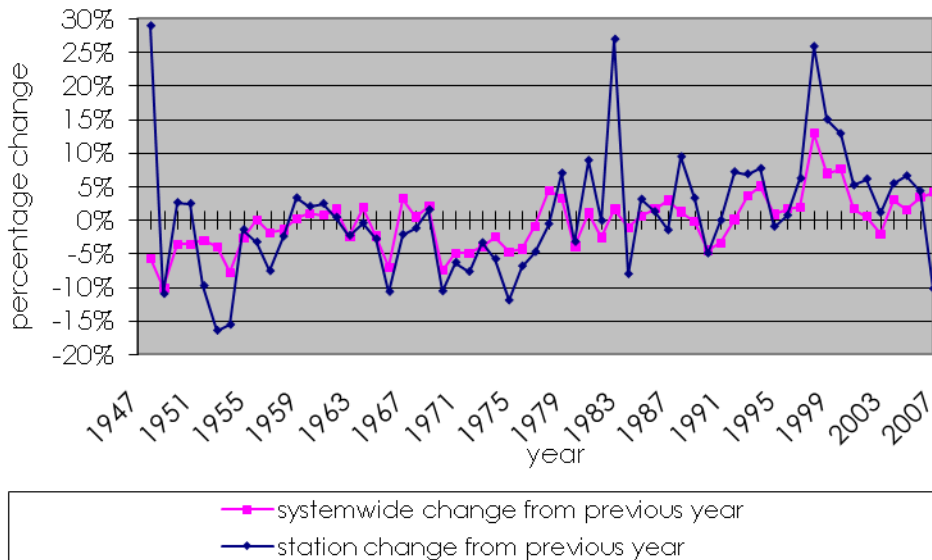


Figure 2-A displays annual subway fares paid at Broadway Junction since 1947, and Figure 2-B displays the annual ridership fluctuations, in percentage terms, of both Broadway Junction and the entire system. The long-term ridership trends from Broadway Junction are an exaggerated version of postwar systemwide ridership. After record usage in 1946-1947, system ridership plummeted by a third over the next eight years. Broadway Junction defied this trend through 1951 but then abruptly shed over a million entering passengers over three years. Between 1965 and 1978 Broadway Junction lost station entries at a higher rate than the rest of the system in every year but one. This resulted in a nadir of 775,872 entries in 1978. Since then, however, Broadway Junction has regularly exceeded systemwide ridership trends. Between 1979 and 2007, Broadway Junction has outperformed

the rest of the system 22 out of 29 years (including a sudden spike in 1983 that saw entries jump by 27 percent). Growth has been especially rapid since 1997, when MetroCard discounts began. From 1997 to 2006, systemwide ridership grew by 41.2 percent; Broadway Junction's grew by 117.3 percent, outpacing the entire system every year. In 2005, the station broke its 1948 ridership record, and 2006 saw further gains. However, ridership dropped by over 10 percent in 2007. The reasons for this decrease were not known at the time this report was written.

## 2.3 Roads

The Jackie Robinson (formerly Interborough) Parkway opened in 1935. This was to be the only one of the three limited-access highways planned for the area which was actually built.

Interstate 78, the Bushwick Expressway, was intended to link the Williamsburg Bridge and Idlewild (JFK) Airport. Although one of the three proposed routes would have cut directly through Broadway Junction itself, an alignment just north of the study area, through the Cemetery of the Evergreens and Highland Park, was ultimately chosen. In 1966, Mayor Lindsay and the Regional Plan Association both agreed that the Cross-Brooklyn Expressway (I-695) was a higher priority, and in 1969, the Lindsay administration removed I-78 from the City map. Governor Rockefeller officially halted plans for I-78 in March 1971.

The Cross-Brooklyn Expressway would have originated at the junction of the Long Island and Brooklyn-Queens expressways in Maspeth, Queens, and continued to a junction with the Interborough Parkway in Highland Park before merging with the Bushwick Expressway in East New York at Atlantic Avenue and North/South Conduit Boulevard. Eventually it would have traversed southern Brooklyn and central Queens, largely along the right-of-way of today's LIRR/NY&A Bay Ridge Line and Fremont Secondary. The expressway would have ended at the Grand Central Parkway, providing access to the Triborough and Whitestone bridges. Repeatedly modified and enhanced throughout the 1960s – including one plan that would have realigned the LL (Canarsie) Line and the freight tracks into the expressway's median – the proposal ultimately was shelved due to community opposition in 1973.

Significant reconstruction of the Jackie Robinson parkway was initiated by NYSDOT between 1987 and 1992. A tight, nonstandard interchange at Metropolitan Avenue (Exit 6) was also replaced with a four-ramp diamond interchange. Speed limits were lowered through the winding section of parkway that passes through Cypress Hills Cemetery.

A detailed discussion of the major roads which pass through the study area appears in Section 3.7.2.

## 3. EXISTING CONDITIONS

### 3.1 Population, Demographics and Socioeconomic Conditions

Data from the 2000 United States Census provided block-by-block population figures for the study area. This section of the report relies both on “100 percent” Census data taken at the block level (which is sent to every household) and “sample” data (which is sent to one in every six or seven households) taken at the block group level. In cases where 100 percent data was used, this section will refer to the Broadway Junction study area. In cases where sample data was used, this section will refer to the Broadway Junction general area. Figure 3-A shows the boundaries of the study area versus the general area. The general area includes locations where block groups extend past the study area boundaries; this data should be used with caution since land use patterns within the study area are not necessarily identical to those immediately beyond it. No attempt was made to prorate the journey-to-work data to conform to the study area bounds.

For example, while the Census counted 4,377 residents within the study area, the journey-to-work data is drawn from a total population of 9,520 – 2,631 of which were workers age 16 and over. While inclusion of these additional households is unavoidable, the data below still provides a reasonably accurate sample of journeys to work by mode.<sup>14</sup>

As of 2000, the Broadway Junction study area had 4,377 inhabitants, the majority of whom (74 percent) lived in rental units. The age profile of the study area was a fairly typical distribution, with about 20 percent of the population under the age of 17 years.

In the Broadway Junction general area, approximately half of the population (56 percent of men and 45 percent of women) over the age of 16 was in the labor force. Of those in the labor force, 75 percent of all men and 84 percent of all women were employed. Among study area residents other than the labor force, the total unemployment rate was 21 percent.

The majority of households in the Broadway Junction general area (78 percent) had an annual income of less than \$50,000. Thirty-seven percent of the total population had an annual household income of less than \$15,000 per year. Educational attainment underscores this. For about 50 percent of the Broadway Junction general area population, a high school degree or GED equivalency was the highest level of education attained. Less than 5 percent of men and less than 4 percent of women held Bachelor’s degrees.

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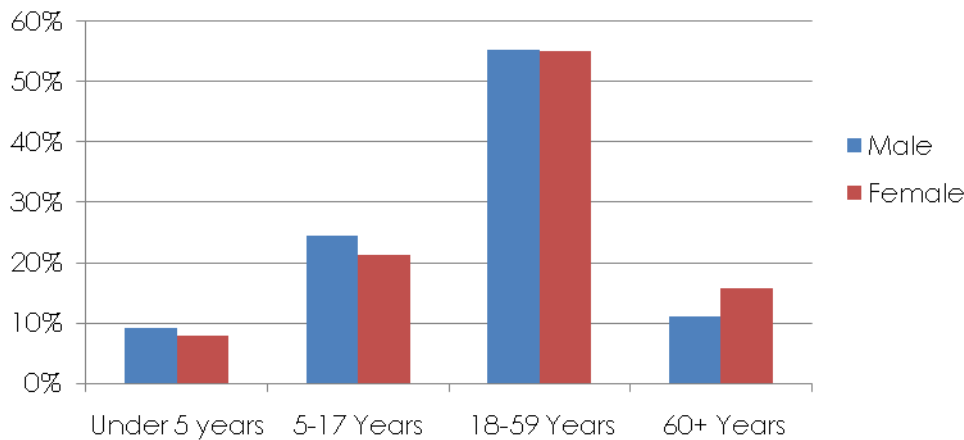
<sup>14</sup> United States 2000 Census, Summary File 3.

[http://factfinder.census.gov/servlet/DatasetMainPageServlet?\\_program=DEC&\\_submenuId=&\\_lang=en&\\_ts=](http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=&_lang=en&_ts=)





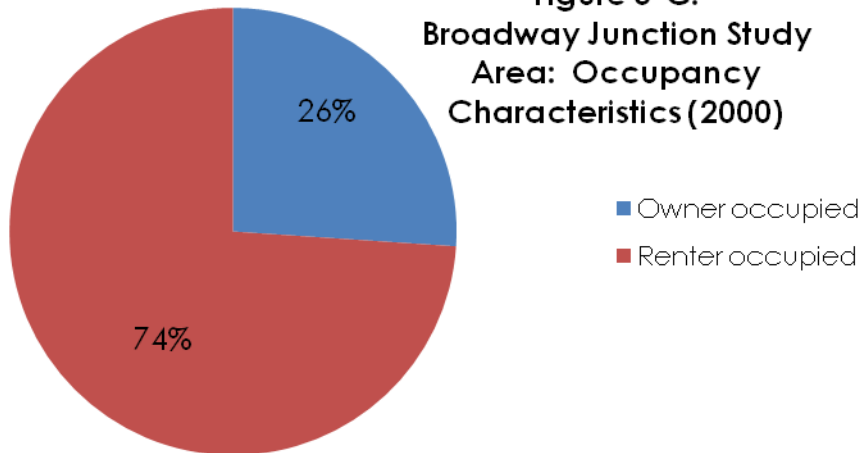
**Figure 3-B: Broadway Junction Study Area:  
Age by Sex (2000)**



Figures 3-B through 3-F illustrate the study area's and general area's characteristics described above. Figure 3-G shows concentrations of populations within the study area down to the block level.<sup>15</sup>

Journey-to-work general area data from the 2000 Census shows the percentages of workers age 16 and over that commute primarily by car (alone), carpool, bus, subway, railroad, bicycle, or on foot. Table 3-A shows the combined modal split amongst the workers within all block groups that enter the study area, excluding those that work from home. Journeys to work by subways predominate, but the combined total of buses, subway and rail equals 57.81 percent. Bicycle and pedestrian

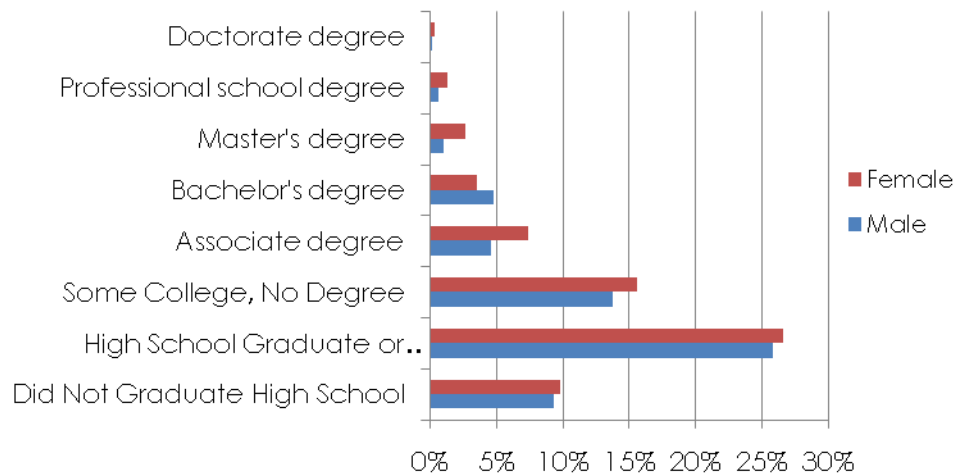
**Figure 3-C:  
Broadway Junction Study Area: Occupancy Characteristics (2000)**



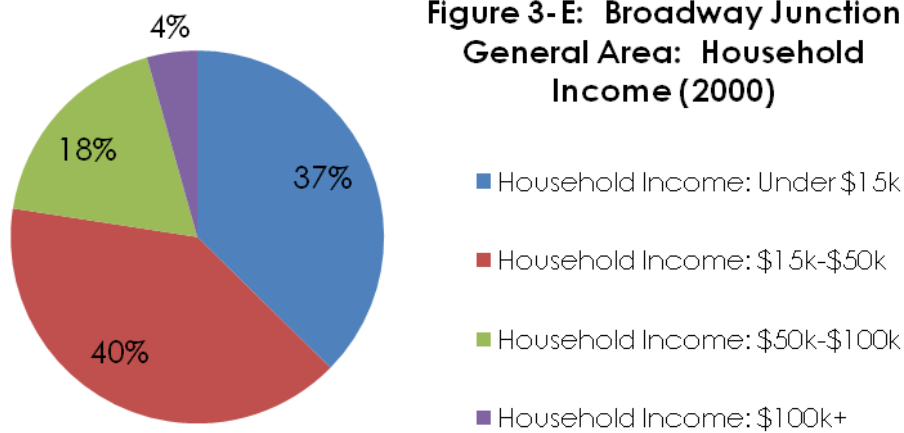
commuting equals 5.55 percent. The study area and vicinity utilizes public transportation somewhat more than the City as a whole, although bus ridership is lower than the citywide average. A sizeable gap also exists between the percentages of pedestrians walking to work in the Broadway Junction area and in the City as a whole.

<sup>15</sup> While largely accurate, the 2000 Census data are now 8 years old and cannot capture more recent development or changes in the population of existing housing. For example, on the western half of the block bounded by East New York Avenue, Van Sinderen Avenue, Liberty Avenue, and Junius Street, Women In Need, Inc.'s Junius Family Residence opened on this block after 2000. According to Women In Need, transitional housing residents stay at their facilities for an average of 6 months. The residence has enough units to house 216 families. See <http://www.women-in-need.org/housing.html>.

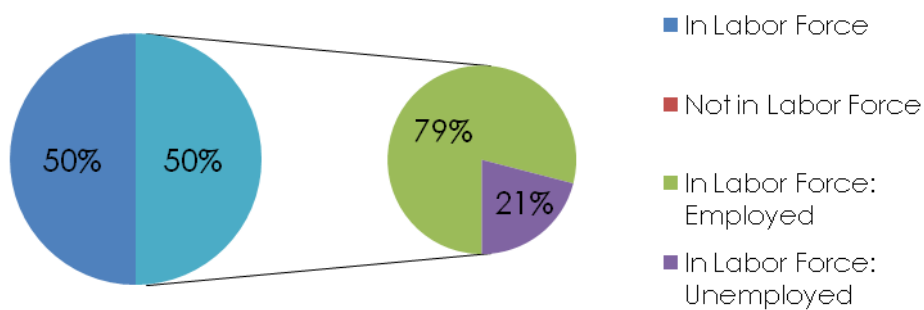
**Figure 3-D: Broadway Junction General Area:  
Educational Attainment (2000)**

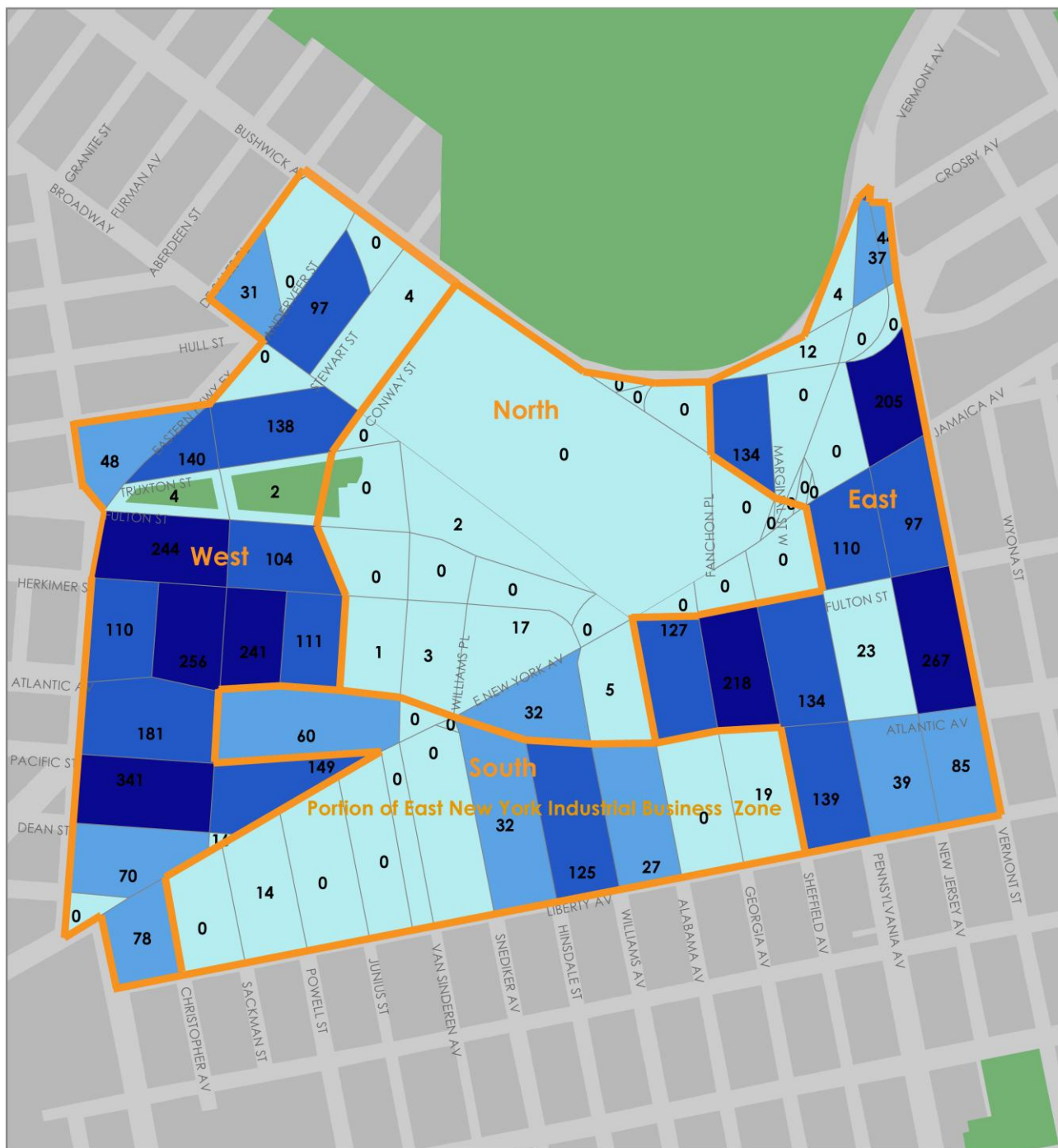


**Figure 3-E: Broadway Junction  
General Area: Household  
Income (2000)**



**Figure 3-F: Broadway Junction General Area: Employment  
(2000)**





Persons per block

- 0 - 23
- 24 - 85
- 86 - 181
- 182 - 341
- Subareas
- Open Space

Broadway Junction Transit Capacity Study

**STUDY AREA SUBAREAS AND 2000 POPULATION BY CENSUS BLOCK**  
**FIGURE 3-G**

0 250 500 Feet

**Table 3-A: Comparison of Primary Journey-to-Work Mode:  
Broadway Junction Area vs. Citywide**

<i>mode</i>	<i>Broadway Junction Area</i>	<i>citywide</i>	<i>difference in percentage points</i>
drive alone	21.66%	24.89%	-3.23%
carpool	9.65%	7.99%	1.66%
bus	6.65%	11.42%	-4.77%
subway	48.84%	37.57%	11.27%
railroad	2.32%	1.60%	.72%
bicycle	.34%	.47%	-.13%
walking	5.21%	10.41%	-5.20%
other	2.13%	2.61%	-.48%

\*Figures do not add up to 100 percent due to rounding and excluding those that work from home.

## 3.2 Land Uses and Zoning

The study area is generally characterized by medium-density two-to four-story housing, and low- to medium density industrial uses. Automotive uses are also quite common, especially along Atlantic Avenue but also scattered elsewhere throughout the study area.

Much of the study area's land uses do not conform with existing zoning, especially in the neighborhood's western third. A zoning map of the study area appears in Figure 3-H. A map of all land uses within the study areas appears in Figure 3-I.

The study area was divided up into four subareas: North, West, South, and East. The boundaries of these subareas appear in Figure 3-G. These subareas were created purely to break up the study area into four easily-defined regions with roughly distinct land use and population characteristics. Overviews of each subarea appear in Sections 3.2.1 through 3.2.4 below.

### 3.2.1 North (NYCT Subway/Bus Facility Area)

Dominating the northern and central area of the study area are two NYCT properties. East New York Yard is the primary storage and maintenance facility for the over 500 cars needed on the J/Z, L, and M lines. The yard has an eight-track inspection shed. Adjacent to the yard lies the East New York Depot and Central Maintenance Facility, one of two bus facilities in the city where heavy maintenance and general overhauls take place. Bus components are also rebuilt here.

As of January 2008, 1,580 New York City Transit employees work at the combined bus and subway facilities.<sup>16</sup>

<sup>16</sup> Source: NYCT. The breakdown by employment is as follows:

Bus depot	734
Non Revenue Shop (Buses)	81
Administrative jobs related to ENY depot (Buses)	261
MTA NYCT Bus headquarters (Admin)	205
Subway yards and maintenance facility	299





Above: Composite image of the NYCT East New York Bus Depot. From this angle, NYCT's East New York Subway Yards are in back of the depot, to the northwest.

The area – bounded by Conway Street, Havens Place, Atlantic Avenue, Alabama Avenue, Fulton Street, Pennsylvania Avenue, Bushwick Avenue, Fanchon Place, Highland Boulevard, and Bushwick Avenue (again) – is predominantly zoned M1-1 and M1-2.<sup>17</sup> M1-1 zoning allows a maximum FAR of 1.0 and requires off-street parking, while M1-2 allows a maximum FAR of 2.0 and also requires off-street parking. Unlike much of the rest of the study area, land uses here generally conform with the zoning. One- to four-story manufacturing uses predominate. As of the 2000 Census, only 60 people were counted as living here, and 58 of them lived in the five blocks south of Herkimer Street and East New York Avenue. Residences tend to be one to three stories; some are detached.



The L Line between Atlantic Avenue and Herkimer Street. Much of the north-central part of the study area is dominated by transit infrastructure and parking. The Herkimer Lot, which is used to store NYCT buses, is beneath the L viaduct, on the left side of the photo.

Parking lots prevail south of the NYCT yards, and beneath the L Line viaduct, especially around Fulton Street and Williams Place. Some of this parking appears to be for NYCT employees, but two lots – the Herkimer Lot (see photo at right) and the Havens Lot (at Havens Place and Atlantic Avenue) are used for NYCT bus storage.

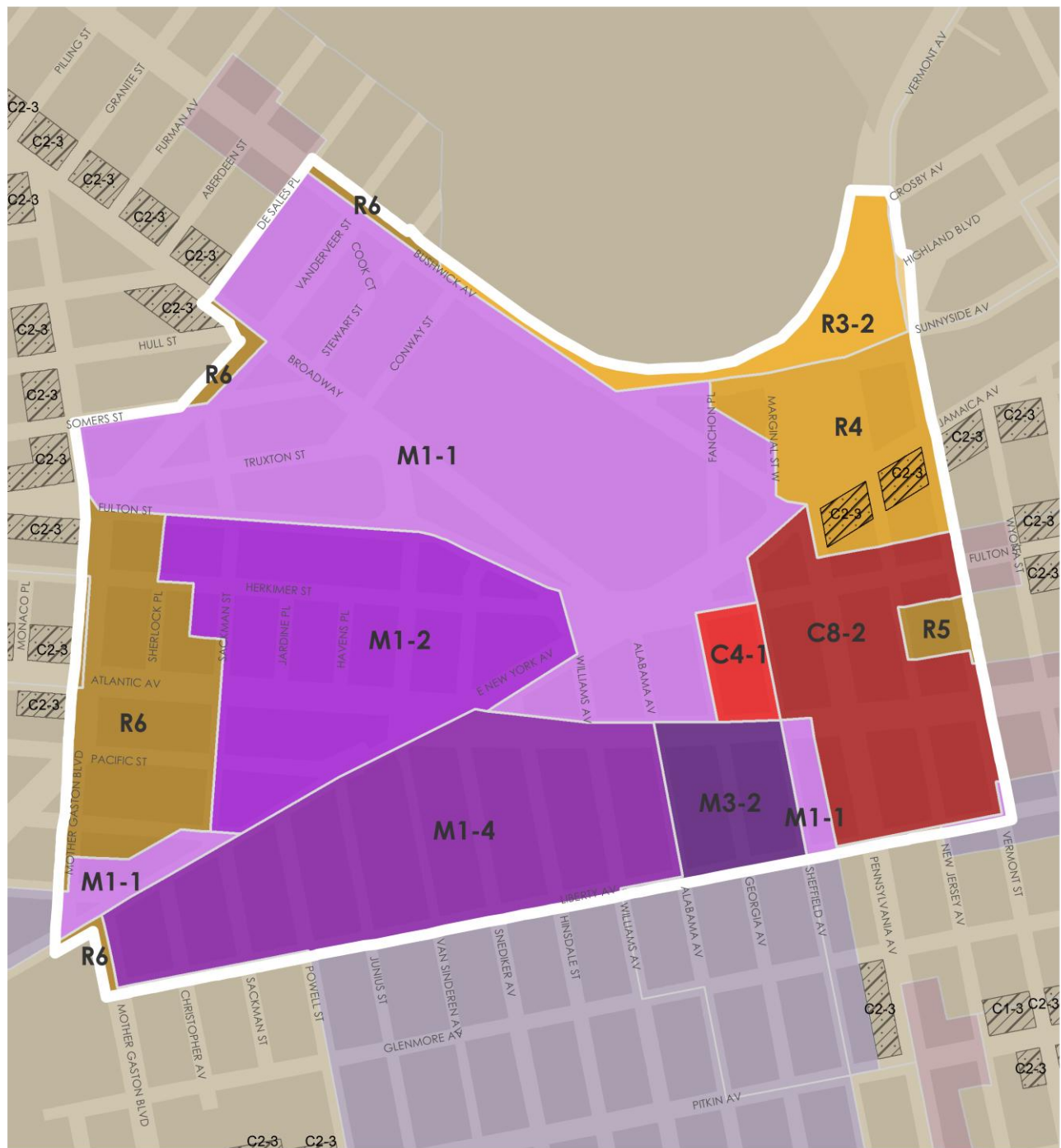
Two motels also exist within the subarea. Both of them received their certificates of occupancy in 2007.<sup>18</sup> A four-story motel is on East New York Avenue, west of Alabama Avenue; and a six-story motel is on Atlantic Avenue between Van Sinderen Avenue and Williams Place.

One block, bounded by Jamaica Avenue, Pennsylvania Avenue, Fulton Street, and Sheffield Avenue, falls within a C8-2-zoned area, which is meant for automobile-related uses and other commercial facilities. The maximum allowed FAR in a C8-2 district is 2.0. All commercial uses and some community facilities are allowed in a C8-2 district, but residential uses are not permitted. This block contains a two-story commercial structure and a parking facility.

<sup>17</sup> A miniscule portion of this subarea, within the intersection of Pennsylvania Avenue, Bushwick Avenue, Jamaica Avenue, and the Jackie Robinson Parkway, is zoned R4. R4 zoning is covered in the discussion of the eastern part of the study area.

<sup>18</sup> Source: New York City Department of Buildings, Buildings Information System (BIS)

<http://a810-bisweb.nyc.gov/bisweb/bsqpm01.jsp>



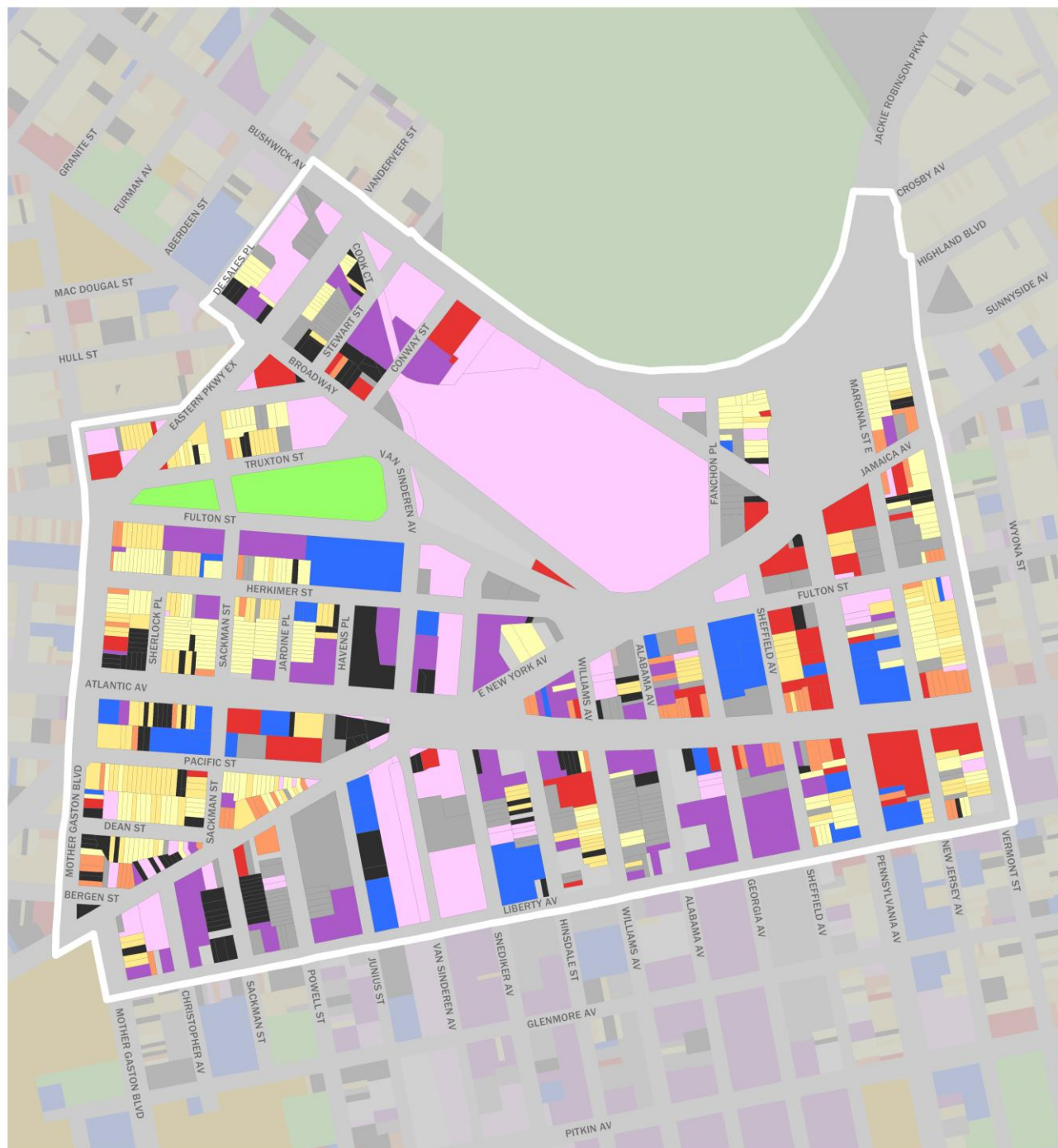
Broadway Junction Transit Capacity Study

## ZONING & COMMERCIAL DESIGNATIONS

### FIGURE 3-H

0 250 500 Feet





- |   |                                       |                         |
|---|---------------------------------------|-------------------------|
| 01 - One & Two Family Buildings             | 05 - Commercial/Office Buildings      | 09 - Open Space         |
| 02 - Multi-Family Walkup Buildings          | 06 - Industrial/Manufacturing         | 10 - Parking Facilities |
| 03 - Multi-Family Elevator Buildings        | 07 - Transportation/Utility           | 11 - Vacant Land        |
| 04 - Mixed Commercial/Residential Buildings | 08 - Public Facilities & Institutions | All Others or No Data   |

Broadway Junction Transit Capacity Study  
**LAND USE**  
**FIGURE 3-1**

0 255 510 Feet

### 3.2.2 West (west of Havens Place, the NY&A East New York Tunnel, and Conway Street)

The largest and densest concentration of housing within the study area is along its western flank. The 2000 Census counted 2,262 inhabitants within this cluster of blocks, or more than half of the study area population. Four different zoning classifications exist within this part of the study area:

- Three entire blocks and portions of three additional blocks, roughly bounded by Eastern Parkway, Fulton Street, Sackman Street, and Dean Street are zoned R6. Allowed FARs range from .78-2.43, or 2.20-3.00 if the higher lot coverage for Quality Housing is chosen. (Quality Housing maximum building heights are either 55 or 70 feet, depending on how wide the facing street is.) Off-street parking is generally required for 70 percent of conventional R6 dwelling units or 50 percent for Quality Housing R6 dwelling units. Although this is the lowest residential classification which allows “tower-in-the-park” style housing, none exist here.<sup>19</sup> Two-to four-story residential uses predominate (there is one five-story building), with some ground-floor retail along Eastern Parkway. A few small pockets of vacant land were also observed. A well-delineated, six-block residential community which continues into the M1-2 zone described below, has its western half in this zone.
- East of Sackman Street and south of Fulton Street lies an M1-2-designated area. M1-2 zoning allows a maximum FAR of 2.0; off-street parking is required. However, while manufacturing uses predominate along these sections of Atlantic Avenue and Fulton Street, Herkimer Street and the streets immediately to the north and south are surrounded by a community of two-to four-story residential structures which do not conform to manufacturing zoning.
- North of Fulton Street and west of Conway Street (bisecting Callahan-Kelly Playground), the area is zoned M1-1, which allows a maximum FAR of 1.0 and requires off-street parking. A hodgepodge of land uses exist here – cemetery-related businesses, automotive, and a strip of retail along Bushwick Avenue. Light industrial uses alternate with two- to four-story residential enclaves such as the two blocks bracketed by Somers Street, Conway Street, Truxton Street and Eastern Parkway. A small, irregular wedge to the north of East New York Avenue is also designated M1-1. One small, triangular block within the study area is vacant; to the north, along Dean Street and East New York Avenue, lie one-story manufacturing-use buildings, a three-story attached group of residences with ground-floor retail, and two detached two-story residential buildings.
- The southernmost block of this area, bounded by East New York Avenue, Christopher Avenue, Liberty Avenue, and Mother Gaston Boulevard, is designated M1-4. This zoning allows a maximum FAR of 2.0; off-street parking is not required. Three- and four-story residences line Mother Gaston Boulevard; 78 residents were counted on this block in the last Census. The rest of the block is industrial, including an approximately six-story building under construction as of December 2007.

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<sup>19</sup> Tower-style public housing lies immediately southwest of the study area.





*Eastern Parkway and Somers Street.*



*Callahan & Kelly Park.*



*Looking east on Herkimer Street from Eastern Parkway.*



*Jardine Place.*



*New housing on Mother Gaston Boulevard.*



*The pale blue and white three-story buildings are examples of abandoned housing on East New York Avenue.*



### 3.2.3 South (Industrial Business Zone)

Eleven blocks in the southern portion of the study area (shown in Figure 3-G) are part of the East New York Industrial Business Zone (IBZ). IBZs are areas where the City has specifically made a commitment not to rezone land for residential use and to strengthen enforcement against illegally converted buildings. Businesses which have relocated to within an IBZ since July 2005 can receive a one-time tax credit of \$1,000 per relocated employee, up to the lesser of actual relocation costs or \$100,000. IBZ businesses also have access to Industrial Business Service Providers, which provide a range of services and assistance with regulatory requirements and assistance programs. There are 16 IBZs within the City.<sup>20</sup>

Most of the East New York IBZ is south of the study area's border. An eight-block-wide section continues for four blocks south of the study area, to Sutter Avenue, and a block-long protrusion continues for six blocks farther south, to New Lots Avenue.

According to *Making It In New York: The Manufacturing Land Use and Zoning Initiative*, a document prepared by the Pratt Institute Center for Community and Environmental Development for the Municipal Art Society of New York in June 2001, manufacturing within ZIP Code 11207 (which overlaps most of the study area and IBZ) accounted for 2,108 jobs. Milk and juice manufacturing, signmaking, household wood furniture, and plastics were some of the major industries within the ZIP code.<sup>21</sup>

The area is primarily zoned M1-4, with one block of M1-2 and two blocks of M3-2 zoning also existing. M1-4 zoning allows a maximum FAR of 2.0; off-street parking is not required. (M1-2 zoning is identical except that off-street parking is required.) Houses of worship are allowed in M1 districts as-of-right. M3-2 zoning, which is meant for heavy industry, allows a maximum FAR of 2.0 and does not require off-street parking.

Residential uses can be found within the IBZ, especially along Hinsdale and Williams streets between Atlantic and Liberty avenues, where a pocket of 184 people were counted in 2000. (Thirty-three additional residents resided on two other blocks, giving the IBZ a total population of 217.) These are generally one- to three story buildings – a mix of attached, semidetached and detached houses, similar to R4- or R5-level zoning. Other pockets of housing can be found at Atlantic and Sheffield avenues, and along the south side of East New York Avenue, between Powell and Sackman streets. A five-story school also exists on Hinsdale Street.

Pockets of vacant land were observed, especially within the more westerly blocks of Powell Street, Sackman Street and Christopher Avenue, and along Pacific Street just west of East New York Avenue.

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<sup>20</sup> The Mayor's Office for Industrial and Manufacturing Business: IBZ Benefits and Incentives.

[http://www.nyc.gov/html/imb/html/ibz/ibz\\_benefits.shtml](http://www.nyc.gov/html/imb/html/ibz/ibz_benefits.shtml)

<sup>21</sup> Appendix E-Study Area 6: East New York. <http://www.prattcenter.net/advocacy/mluzi/12-APPENDIX%20E-06-ENY-REC.PDF>



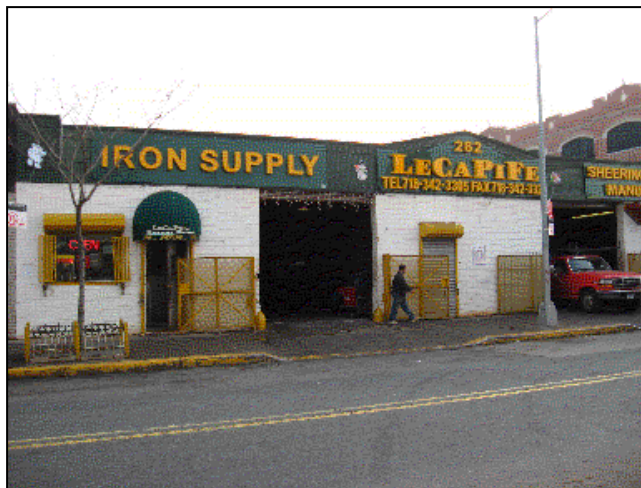
*Vacant lot on Sackman Street.*



*Atlantic Avenue L Line station, over East New York LIRR station. Though streamlined earlier in the decade, the L Line station is still overbuilt.*



*A residential enclave on Williams Avenue, within the East New York Industrial Business Zone.*



*On Liberty Avenue, a typical business within the IBZ.*



*The former LIRR Substation No. 2, on Snediker Avenue, just south of Atlantic Avenue.*



*Georgia Avenue, north of Liberty Avenue.*

### 3.2.4 East (Residential and Automotive)

The eastern portion of the study area is bounded by Cemetery of the Evergreens, Vermont Street, Liberty Avenue, Sheffield Avenue, Atlantic Avenue, Alabama Avenue, Fulton Street, Bushwick Avenue, and Fanchon Place. A total of 1,622 people were counted in this area during the 2000 Census. No one focal point exists for this concentration of residents – three discontinuous blocks had populations over 200.

Six different zoning designations overlay this part of the study area:

- One of them, R3-2, only affects the northeastern tip of the area, at Vermont Street, north of Highland Boulevard. Two-story detached houses exist here.
- An area roughly bounded by eastbound Highland Boulevard, Marginal Street West, a line north of Fulton Street, and the project boundary is designated R4. Areas zoned R4 have a maximum allowable FAR of .90 (or 1.25 if the site qualifies under “infill rules”), and allow attached, semidetached and detached housing. Building heights are limited to 35 feet, with a 25-foot perimeter wall maximum. Parking for one vehicle per dwelling unit is the required minimum. Land use generally conforms or is below the maximum build-out allowed by the zoning, but some four-story buildings were observed, along with what appeared to be light manufacturing or commercial uses. A C2-3 overlay exists on the south side of Jamaica Avenue, east of Pennsylvania Avenue. C2-3 districts allow a maximum commercial FAR of 1.0.
- A small pocket of R5 zoning is mapped on the midblocks of New Jersey Avenue and Vermont Avenue between Fulton and Atlantic Avenues. Areas zoned R5 have a maximum allowable FAR of 1.25, and tend to result in more attached housing than in R4 districts. Building heights are limited to 40 feet, with a 30-foot street wall maximum. A minimum of 85 percent of all dwelling units must have parking for one vehicle per dwelling unit. Two- to three-story attached and semidetached houses exist within this R5 district.
- The majority of the area south of Fulton Street and east of Sheffield Avenue is zoned C8-2. This designation is meant for automobile-related uses and other large commercial facilities which require a lot of land. The maximum allowed FAR in a C8-2 district is 2.0. All commercial uses and some community facilities are allowed in a C8-2 district, but residential uses are not permitted. Although automotive uses were evident, numerous two- to four-story attached and semidetached residences also exist here, some with ground floor retail. Atlantic Avenue, Fulton Street and Pennsylvania (Granville Payne) Avenue are the main commercial corridors in the part of the C8-2 district within the study area.
- One block, bounded by Fulton Street, Sheffield Avenue, Atlantic Avenue, and Georgia Avenue is zoned C4-1. With a residential district equivalent of R5, C4-1 zones have a maximum commercial FAR of 1.00 and a maximum residential FAR of 1.25. This is generally the lowest-density designation associated with regional commercial centers. An automotive use along Atlantic Avenue shares the block with a two- to four-story attached residential use.
- The block bounded by Fulton Street, Georgia Avenue, Atlantic Avenue and Alabama Avenue is designated M1-1, as is east side of Sheffield Avenue between Atlantic Avenue and Liberty Avenue. M1-1 zoning allows a maximum FAR of 1.0 and requires off-street parking. While the sliver along Sheffield Avenue contains a mix of one- to three-story commercial and manufacturing uses, the M1-1 block within this subarea contains low-rise residential buildings, along with manufacturing uses, plus commercial space along Atlantic Avenue and Fulton Street.



Right: Sheffield Avenue, looking south from the J Line Alabama Avenue platform.

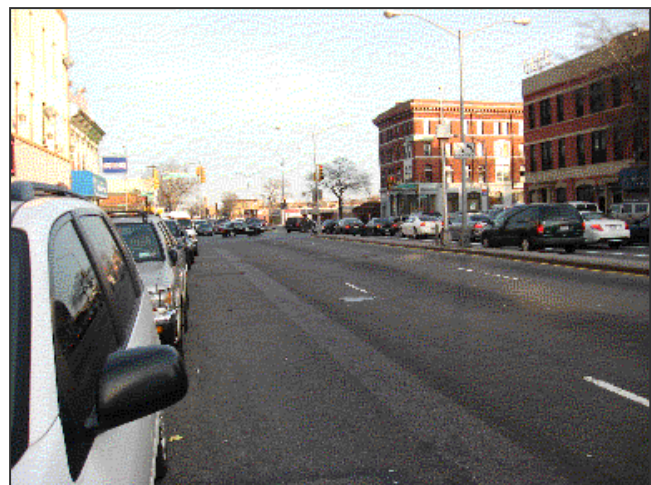
Far right: Pennsylvania Avenue, looking south from Fulton Street.

Below: Vermont Avenue, looking north from Fulton Street.

Below right: Vermont Avenue north of Highland Boulevard, in the northeast corner of the study area.



Typical automotive uses along Atlantic Avenue.



Looking east along Atlantic Avenue towards Pennsylvania Avenue.

### 3.2.5 Rezoning Affecting the Study Area's Transit Capacity

In a continuing effort to encourage contextual development and increase opportunities for creating vibrant, higher-density areas served by transit, DCP has rezoned numerous neighborhoods over the course of the last 6 years. Several of these rezonings could impact the available transit capacity for future development within the study area.

The following rezoned areas in Brooklyn and Queens can potentially impact the Broadway Junction area in the short to medium term. The rezoned areas in these two boroughs may reduce available capacity on the A, C, J/Z and L subway lines and a few of the neighboring LIRR stations through upzoning neighborhoods, increasing their densities. The six relevant rezonings are outlined below.

Much of the information used in this section comes from reports generated as part of DCP's rezoning efforts. Since not every rezoning required analyses that went into identical levels of detail, the data from these analyses used in this report can only be as specific as what was available.

Table 3-B summarizes and Figure 3-J plots the rezoned areas. New development permitted under the new zoning can be expected to add passengers on these subway routes.

#### **Bedford-Stuyvesant South Rezoning**

##### *Boundaries*

The rezoning area is bounded by Lafayette Avenue and Quincy Street to the north, Classon Avenue to the west, Saratoga Avenue and Broadway to the east, and Atlantic Avenue to the south.

##### *Goal of Rezoning*

The rezoning aims to preserve the neighborhood scale and character, allow residential growth along the Fulton Street transit and retail corridor, and encourage affordable housing development.

##### *Affected Transit Facilities*

The A and C lines and the Nostrand Avenue LIRR station are within the rezoning area.

##### *Additional Potential Development*

The proposed rezoning, within ½ a mile of the subway lines, could result in projected 1,344 dwelling units in the area.

#### **Fort Greene/Clinton Hill**

##### *Boundaries*

The rezoning area is bounded by Park Avenue to the north, Atlantic Avenue to the south, Fort Greene Park, Ashland Place, and Carlton Avenue to the west, and Classon Avenue to the east.

##### *Goal of Rezoning*

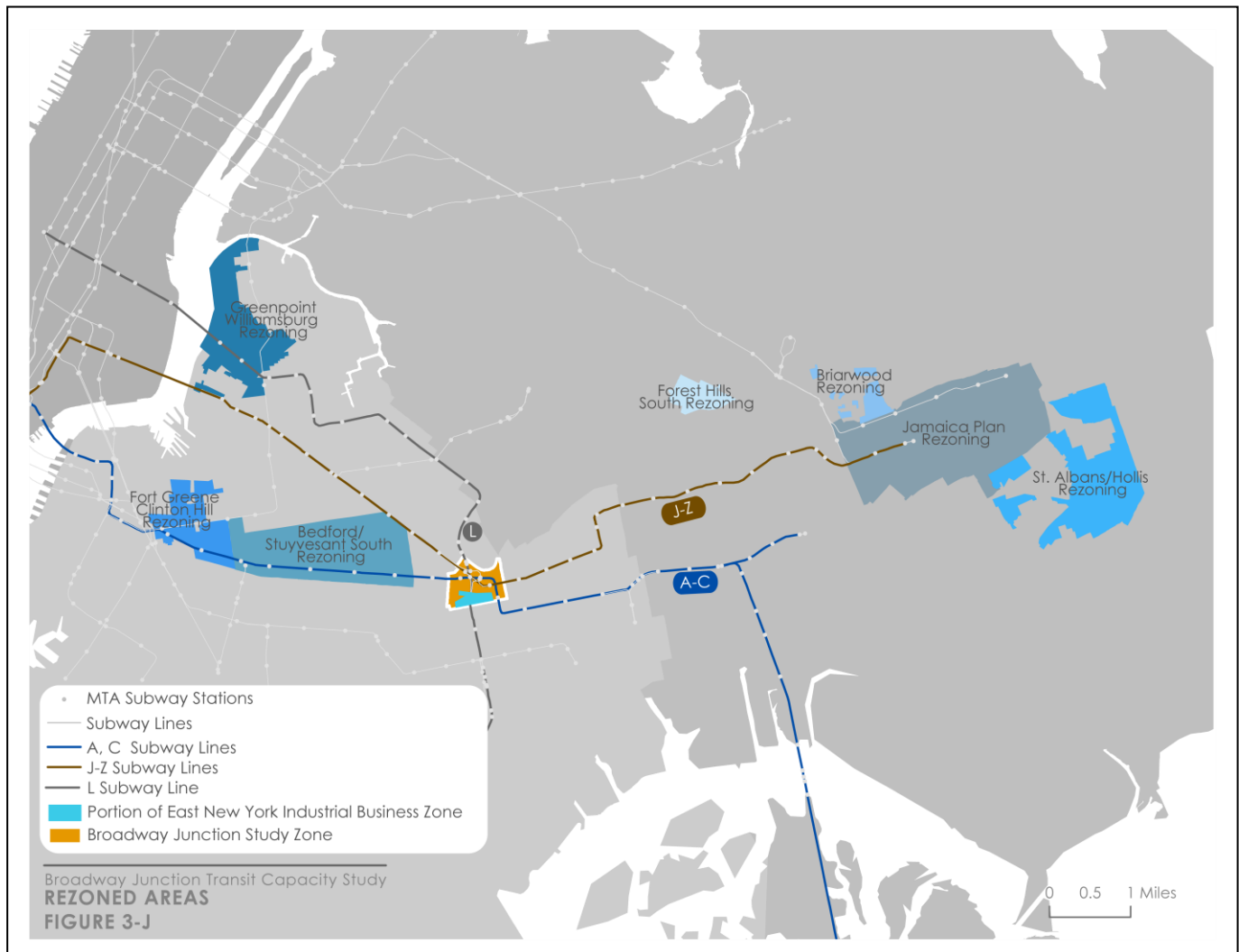
To preserve the current neighborhood scale and character of one and two-family homes to multi-family apartment buildings. The residential core has brownstone rowhouses ranging from three to five stories, historic mansions, and mid-rise apartment buildings. The rezoning also provides opportunities for affordable housing on Myrtle Avenue, Fulton Street, and Atlantic Avenue.

##### *Affected Transit Facilities*

The A, C, and G subway lines all serve this area as well as the Atlantic Avenue Terminal of the LIRR to the southwest of the rezoning area.

##### *Additional Potential Development*

The proposed rezoning, within ½ a mile of the subway lines, could allow a projected 710 dwelling units in the area.



## **Greenpoint-Williamsburg**

### *Boundaries*

The rezoning area is generally bounded by the East River, the Williamsburg Bridge, the Brooklyn-Queens Expressway, and McGuinness Boulevard.

### *Goal of Rezoning*

The rezoning facilitates new housing and local commercial development as well as upgrading and enhancing waterfront areas.

### *Affected Transit Facilities*

The G and L subway lines traverse the Greenpoint-Williamsburg rezoning area. The J/Z and M lines skirt the southern edge of the rezoning.

### *Additional Potential Development*

The proposed rezoning, within ½ a mile of the subway lines, could result in a projected 3,225 dwelling units in the area.



## **Briarwood**

### *Boundaries*

The rezoning area is bounded by Parsons Boulevard to the east, Queens Boulevard and the Van Wyck Expressway to the west, Grand Central Parkway to the north, and Hillside Avenue to the south.

### *Goal of Rezoning*

The rezoning aims to preserve the established residential character and scale of the neighborhood, which includes detached, semi-detached, rowhouses, and multi-family buildings.

### *Affected Transit Facilities*

The E and F subway lines traverse the Briarwood rezoning area, while the J/Z lie south of the rezoning..

### *Additional Potential Development*

The rezoning action does not create the potential for additional development.

## **St. Albans/Hollis**

### *Boundaries*

The rezoning area is generally bounded by Francis Lewis Boulevard to the east, 99<sup>th</sup> Avenue to the north, 121<sup>st</sup> Avenue to the south, and Baisley Boulevard and 172<sup>nd</sup> Street to the west.

### *Goal of Rezoning*

The rezoning aims to preserve the low-density character of the neighborhood. Housing includes detached, semi-attached, and attached residences.

### *Affected Transit Facilities*

The LIRR St. Albans and Hollis stations are located in the area. The F subway line lies northwest of the rezoned area.

### *Additional Potential Development*

The proposed rezoning, within ½ a mile of the subway lines, could result in a projected 92 dwelling units in the area.

## **Jamaica Plan**

### *Boundaries*

The rezoning area is generally bounded by 87<sup>th</sup> Road and Highland Avenue to the north, Waltham Street, 105<sup>th</sup>, 108<sup>th</sup>, 109<sup>th</sup>, Sayres, and 110<sup>th</sup> avenues to the south, Van Wyck Expressway Service Road to the west, and 189<sup>th</sup>, 190<sup>th</sup>, 191<sup>st</sup> streets and Farmers Boulevard to the east. The rezoned area also includes Jamaica Center and the AirTrain JFK station.

### *Goal of Rezoning*

The rezoning of Jamaica aims to preserve the lower-density character and scale of the neighborhood, create opportunities for new residential development, revitalize downtown, and strengthen the AirTrain connection while supporting businesses in the area.

### *Affected Transit Facilities*

The E, F, and J/Z subway lines are potentially affected by the rezoning as well as LIRR's Jamaica station, through which all lines except for the Port Washington Branch pass. AirTrain JFK could also be affected.

### *Additional Potential Development*

The proposed rezoning, within ½ a mile of the subway lines, could result in a projected 4,400 dwelling units in the area.

<b>Table 3-B: Summary of Rezoned Areas in Brooklyn and Queens</b>			
<b>rezoned area</b>	<b>goal of rezoning</b>	<b>affected transit lines**</b>	<b>additional DUs from rezoning*</b>
<b>Brooklyn</b>			
Bedford-Stuyvesant South	Preserve neighborhood character, target Fulton Street corridor, promote affordable housing	A, C, LIRR	1,344
Fort Greene/Clinton Hill	Preserve neighborhood character	A, C, G, LIRR	710
Greenpoint-Williamsburg	Facilitate new housing and local commercial development. Upgrade and enhance waterfront areas.	G, J/Z, L, M	3,225
<b>Queens</b>			
Briarwood	Preserve established character	E, F	No Change
St. Albans/Hollis	Preserve low-density character	F, LIRR	92
Jamaica	Preserve low-density character, build new residential development, revitalize Downtown, strengthen AirTrain connection	E, F, J, Z, LIRR	4,400
<b>TOTAL</b>			<b>9,771</b>

Source: New York City Department of City Planning EAS/EIS reports for rezoned areas.

\*Additional DU's are those units which are within 1/2 a mile of a subway station. It does not account for the whole rezoned area.

\*\*Not all potentially affected transit lines are directly relevant to the study area.

### 3.3 Subways

For sheer complexity, few locations within the City can compare with the transit infrastructure of the Broadway Junction area. Three subway lines served by five services, six bus routes, the Long Island Rail Road, and a rail freight line all converge upon this relatively small study area.

Each subway route – and each set of platforms which serve these routes at Broadway Junction itself – has its own set of issues when it comes to accommodating future neighborhood development. The L Line has a notably complex set of factors, some of which are changing as this report is being written. Two of the three sets of platforms at Broadway Junction have design elements that discourage an even passenger distribution throughout their platform lengths. The J/Z and L routes also have notable design deficiencies which prevent these services from operating at their maximum potential. The J/Z was built for reaching Lower Manhattan, and does not provide direct service to the City’s largest business district, in Midtown.

#### 3.3.1 *The Broadway Junction Station Complex*

The complex evolved haphazardly over several decades, but the existing layout has been largely unchanged since the IND (today’s A/C) platform was completed shortly after World War II. It has recently been renovated. An aerial photo of the complex is shown in Figure 3-K



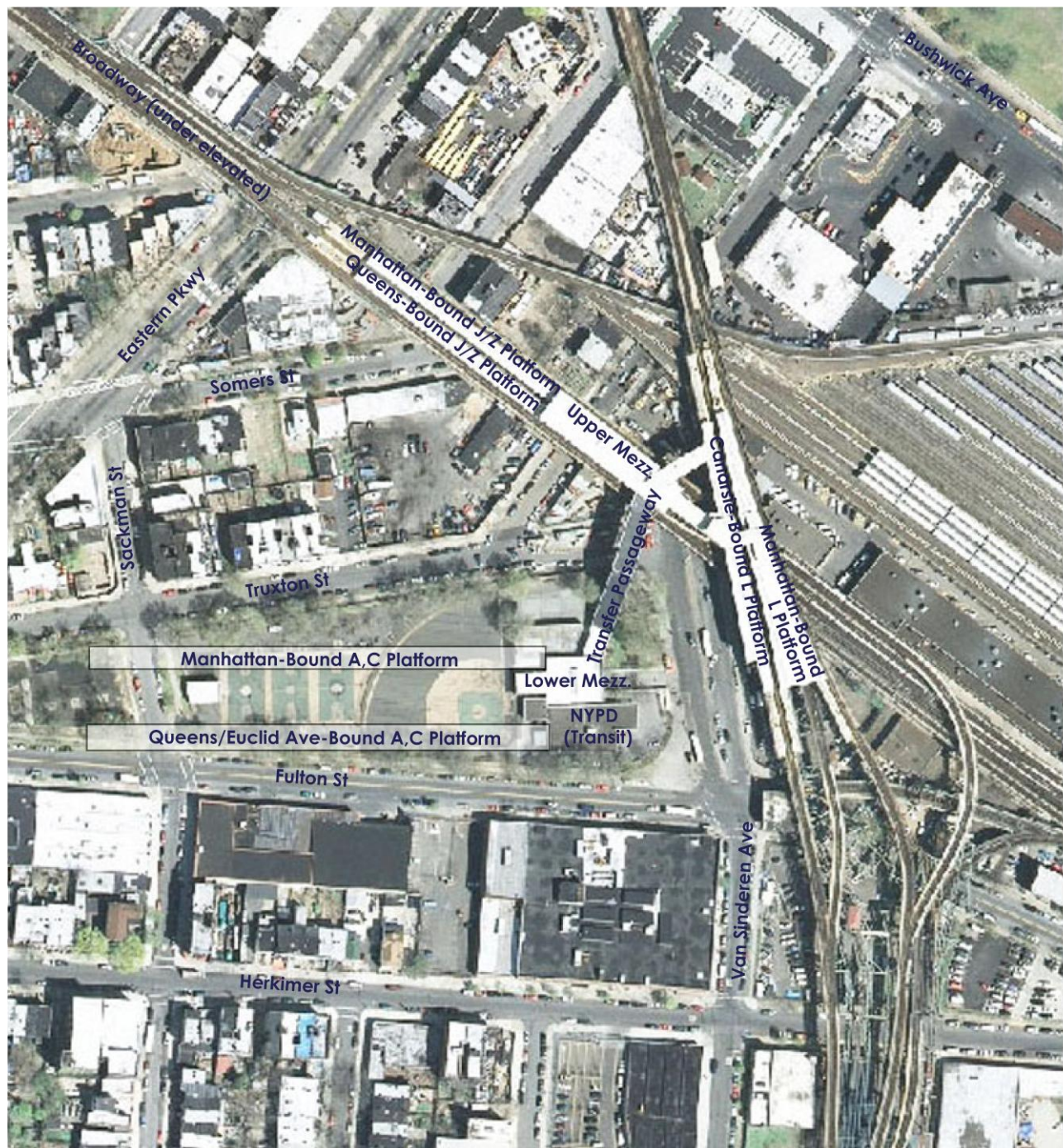
*Broadway Junction's sole station entrance, on Van Sinderen Avenue between Broadway and Fulton Street.*

Only one entrance and fare control exists for the entire complex, on Van Sinderen Avenue. Most of the six bus routes which pass through the area stop in front of this entrance. Passengers enter a boxlike ground-floor space, most of which is within fare control. Beyond the turnstiles, passengers can either go downstairs to access the Manhattan- or Queens-bound A/C platforms or turn right (i.e. north) and ascend to an upper mezzanine via a lengthy enclosed passageway supplied with three parallel escalators and a stairway. The NYPD's Transit District 33 offices are inside the building but outside fare control, immediately to the left (south).

The upper mezzanine is at the level of the L (Canarsie) Line. Passengers can turn right (i.e. east) and walk onto the Canarsie-bound platform, or can ascend a stairway to cross over and descend to the Manhattan-bound platform. To the left (or west) the mezzanine extends above the eastern end of both J/Z platforms; two stairways each provide access to the Queens- and Manhattan-bound platforms.

Table 3-E on page 52 summarizes the service frequencies of all transit routes which enter the study area as of December 2007. Two significant service additions occurred while this report was being written: L Line service frequencies were increased, and the B83 bus route was extended to Gateway Center Mall.





Broadway Junction Transit Capacity Study

**Broadway Junction Station Complex -- Aerial View**

**FIGURE 3-K**





*The Manhattan-bound A and C Line platform, with sign and divider to encourage even passenger distribution.*



*The lower mezzanine.*



*The stairs and escalators of the transfer passageway connecting street level and the A and C with the J/Z and L platforms.*



*Looking down from the upper mezzanine corridor to the top of the escalator bank and stairs.*



*The upper mezzanine, looking from the L Line walkway to the J/Z platform stairs.*



*The Manhattan-bound J/Z platform.*





Left: Passengers from a Manhattan-bound L train descend from an overpass towards the upper mezzanine. The Canarsie-bound L platform is left of the stairs.

Middle left: The Canarsie-bound L platform.

Middle right: The Manhattan-bound L platform. Canarsie-bound trains can use this platform if necessary.

Bottom left: Outside the station, passengers wait for the B20, B83, Q24 or Q56 buses.

Bottom right: The B25 stop is around the corner, on Fulton Street.





### *Internal Passenger Circulation*

In an attempt to better understand the internal circulation of the station, on Thursday, September 27, 2007, DCP conducted a passenger flow count between 7:30am and 9:30am, and between 4:30pm and 6:30pm, throughout the complex. Eleven people were stationed at locations which allowed them to count passenger entrances and exits from distinct subway platforms.

The count was done in an attempt to learn more about how the station functions, and figure out how many passengers were transferring from one subway line to another, and in which directions. While the sheer volume of foot traffic made the count challenging, it provided valuable insight into the station's general internal circulation patterns.



*The transfer passageway and east end of Callahan & Kelly Park, as seen from the Queens-bound J/Z platform.*

While the data within the following tables provided valuable insight into how the station functioned, identifying detailed passenger flows was difficult. There were four reasons for this:

- A largely unavoidable reason was due to the station layout. Both the station's fare control and A/C Line platform entrances are at ground level, and both the L and J/Z entrances are on the upper level of the complex. The destinations of passengers traveling between these two parts of the complex via the enclosed passageway could not be differentiated. Given enough time, future station analyses could find a way to more accurately track these passengers, possibly using questionnaires, cameras, or other random sampling methods.
- Each J/Z Line platform has two stairways to mezzanine level, making it difficult to keep track of passenger flows on both stairways with complete accuracy. Furthermore, the flow of L Line passengers to other destinations could not be separated out by the original direction of the L train they were on.
- At some locations within the complex, the sheer volume of passengers in the station made it very difficult to count them accurately. At both the transfer passageway and the A/C Line peak direction stairways, an average of more than one passenger per second was counted during the peak 15 minute periods.
- The counts were divided into 15-minute increments, and the size of the complex made it likely that some passengers who were counted at one end of the complex during one 15-minute period would have reached the other end during the next period.

Even with these limitations, the results of these counts, shown in Figures 3-L through 3-O, provided a reasonably accurate snapshot of internal passenger flows within the complex. After an analysis of the data, the following major trends became evident:

- Passengers entering and exiting the station made up a relatively small portion of total internal activity within the complex. When measured against the total of all possible passenger movements within the ground-level portion of the complex, it was found that about 16.87 percent of all passengers – about one-sixth – were actually entering from the street, and 8.16 percent of all passengers – about one twelfth – were exiting the station in the AM peak hour. AM peak hour station entries (1,429) were almost identical to PM peak hour station exits (1,451), but because

PM peak hour volumes were about 27 percent lower than the AM peak, PM peak station exits made up 23.57 percent of total ground floor activity.<sup>22</sup> (PM station entries made up 8.82 percent of total ground-level complex activity.)

- The dominant passenger movement within the complex was from both Canarsie- and Manhattan-bound L Line trains to Manhattan-bound A and C trains in the AM peak, and from Euclid Avenue/Queens-bound A and C trains to Canarsie-bound L trains in the PM peak. It is mathematically impossible that the passenger flows described in Figures 3-L through 3-O can lead to any other conclusion. In both the AM and PM peaks, while a sizeable percentage of disembarking L passengers were transferring to and from the J and Z, there were too few passengers entering or exiting the complex to account for any other movement by the rest of these commuters than to and from the A and C routes. The PM 60-minute peak provides an example:

The AM 15-minute peak (Figure 3-L) occurred between 7:45am and 8:00am.

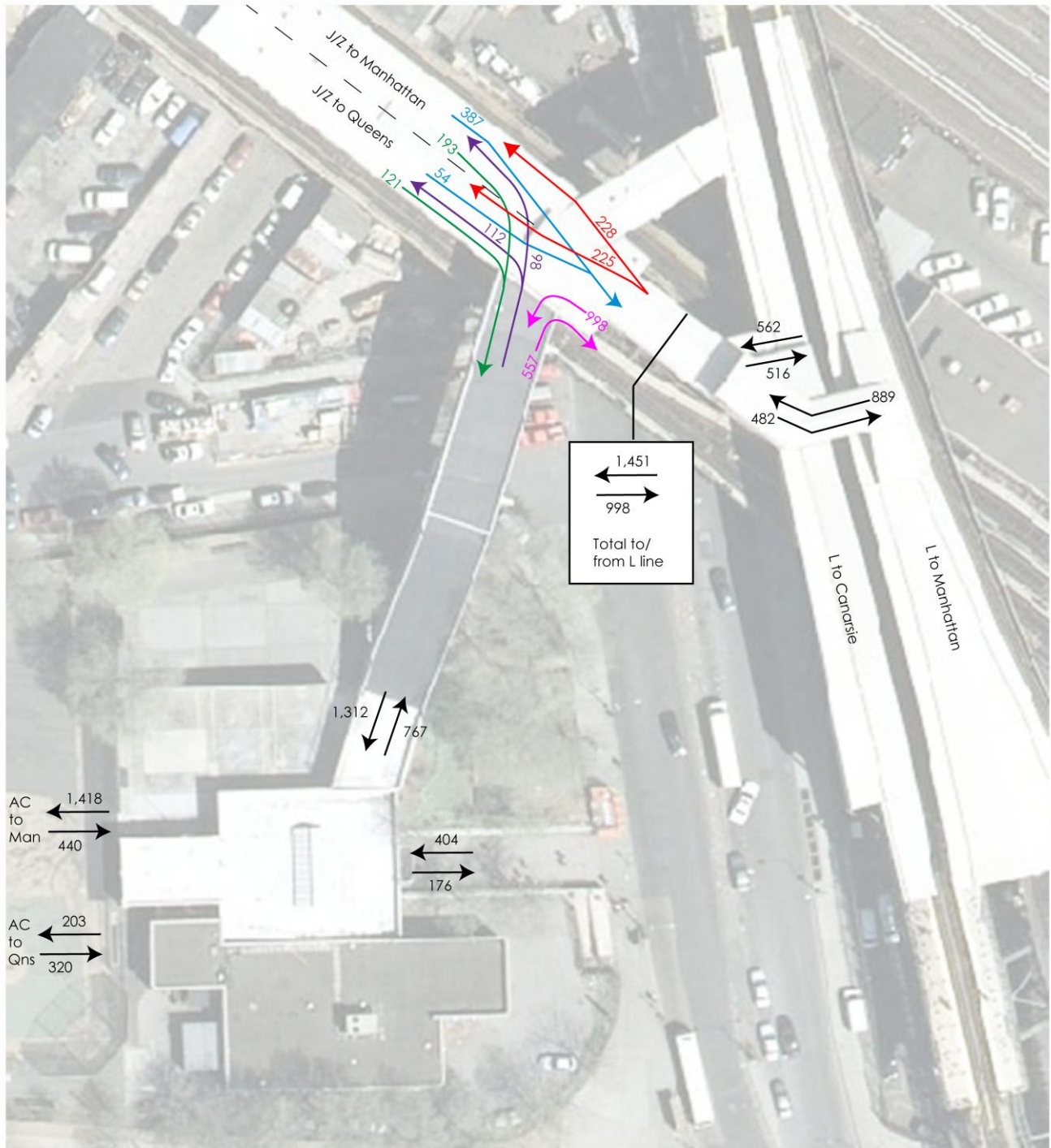
The AM 60-minute peak (Figure 3-M) occurred between 7:45am and 8:45am.

The PM 15-minute peak (Figure 3-N) occurred between 5:30pm and 5:45pm.

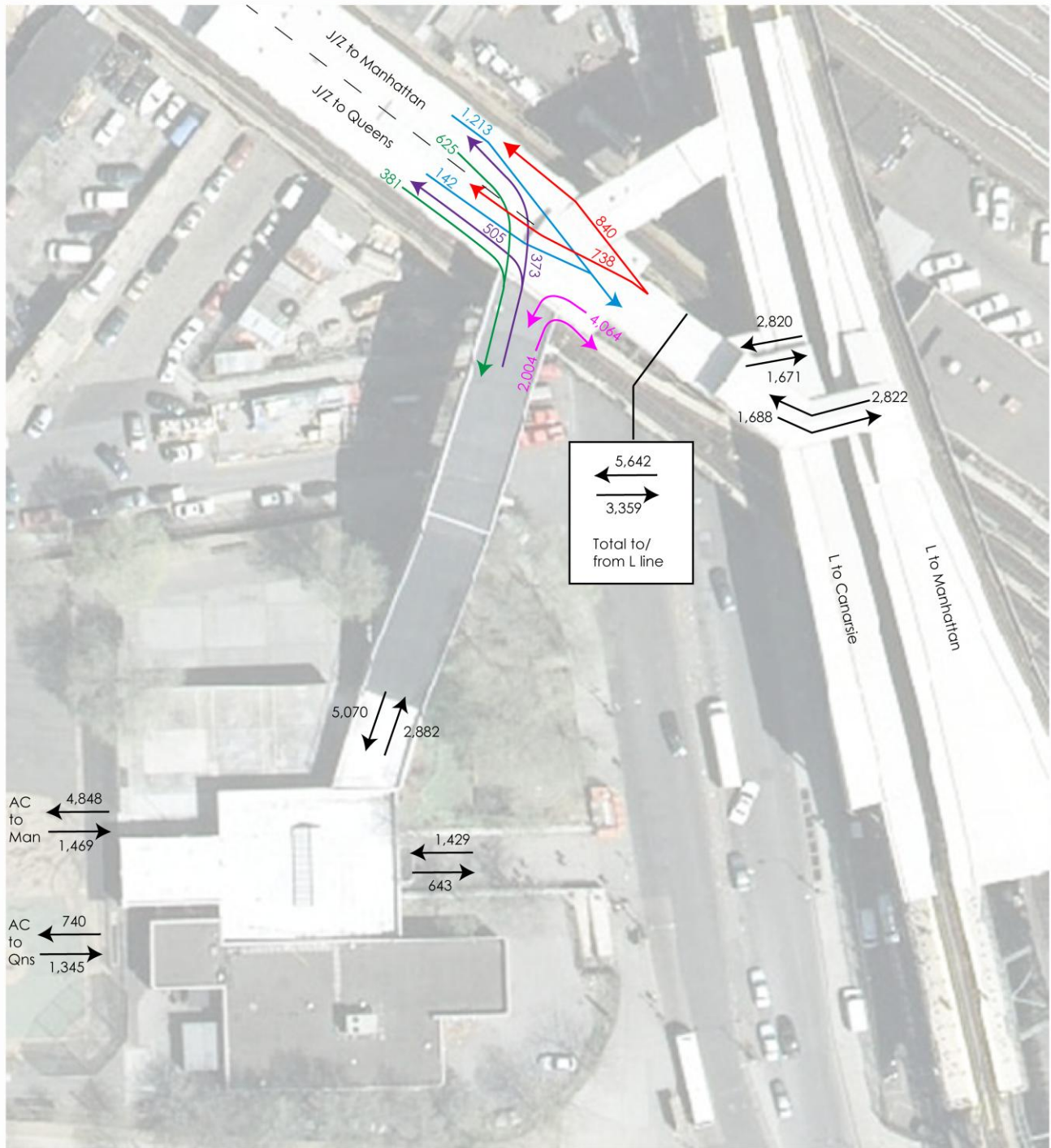
The PM 60-minute peak (Figure 3-O) occurred between 4:45pm and 5:45pm.

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<sup>22</sup> This may be due to the lack of students coming home from school that late in the day and the tendency of PM peak ridership to be less concentrated than the AM peak.

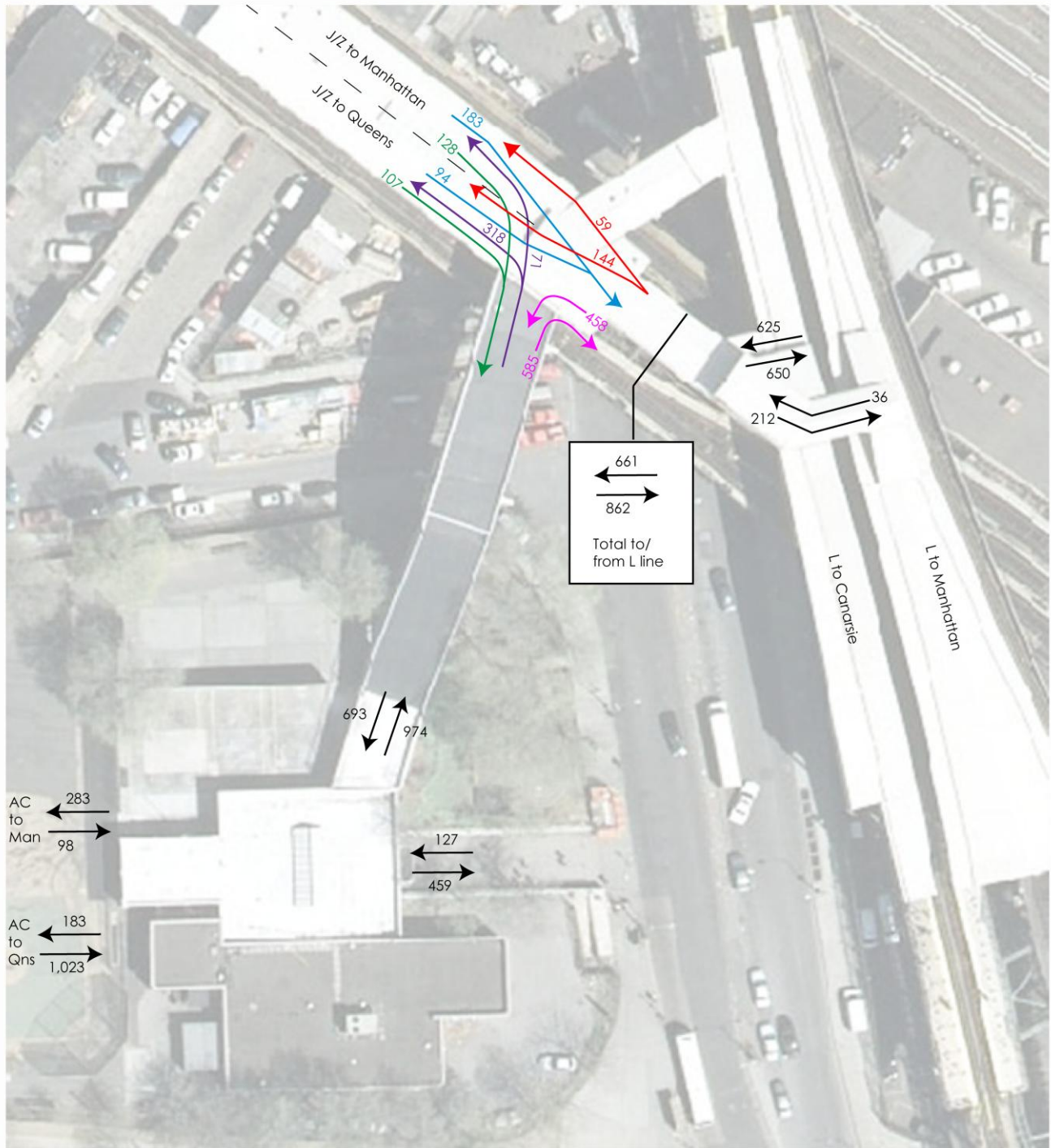


Broadway Junction Transit Capacity Study  
**AM 15-MINUTE PEAK PEDESTRIAN VOLUMES**  
**FIGURE 3-L**

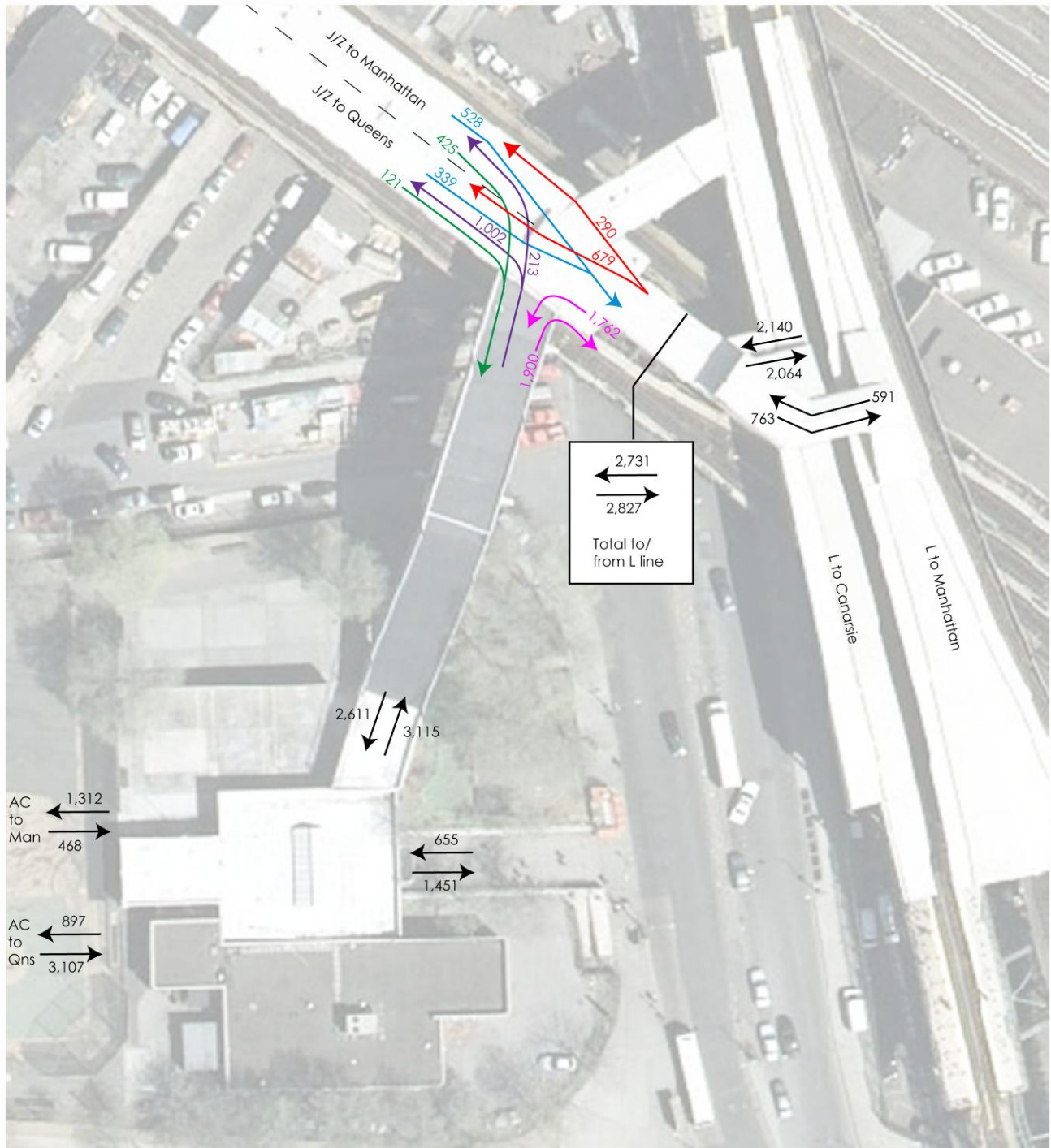


Broadway Junction Transit Capacity Study  
**AM 60-MINUTE PEAK PEDESTRIAN VOLUMES**  
**FIGURE 3-M**





Broadway Junction Transit Capacity Study  
**PM 15-MINUTE PEAK PEDESTRIAN VOLUMES**  
**FIGURE 3-N**



Broadway Junction Transit Capacity Study  
**PM 60-MINUTE PEDESTRIAN VOLUMES**  
**FIGURE 3-O**



**Table 3-C: Approximate Net Gain/Loss of Passengers by Subway Lines at Broadway Junction, AM and PM Peak Hours**

	AM Peak (7:45-8:45)	PM Peak (4:45-5:45)	difference, AM vs. PM peaks
A/C to Manhattan	+3,379	+844	2,535 higher in AM than PM
J/Z to Manhattan	-625	-450	175 lower in AM than PM
L to Manhattan	-1,134	+172	1,306 lower in AM than PM
A/C to Euclid/Queens	-605	-2,210	1,605 lower in PM than AM
J/Z to Queens	+720	+1,221	501 higher in PM than AM
L to Canarsie	-1,149	-76	1,073 higher in PM than AM

- A sizeable amount of Manhattan-bound J/Z passengers in the AM peak hour (1,213, or enough to pack one eight-car J/Z train to capacity) were switching to the L. However, it cannot be conclusively stated that a majority of these transfers were to peak-directional L trains. The opposite movement from the L to the J/Z was not as intense in the PM peak.
- A secondary, weaker pattern may also exist, where AM peak A, C and L trains feed passengers to Queens-bound J trains. This may primarily be a student-fed circulation pattern – both the 2,600-student Franklin K. Lane High School and 3,700-student Richmond Hill High School are near J/Z stations. The opposite effect exists in the PM peak, where Manhattan-bound J trains lose ridership and Manhattan-bound A/C and L trains gain passengers, as shown in Table 3-C. While the data in Figures 3-L through 3-O imply this, it cannot be conclusively stated. Further research may be warranted.
- Table 3-C summarizes the net gain or loss in riders by subway line(s) and direction during both the AM and PM peak hours. A/C Manhattan-bound trains experience a net gain of nearly 3,400 in the AM peak hour (enough to fill two and one-third trains), but also have a much smaller net positive in the PM peak. Euclid Avenue and Queens-bound A and C trains experience a less severe inverse pattern, with a net loss of over 600 in the AM peak and over 2,200 in the PM peak. J/Z trains to Manhattan leave Broadway Junction emptier than they are when they arrive in both the AM and PM peak hours, and Queens-bound J/Z trains leave the station fuller in both peaks. Manhattan- and Canarsie-bound L Line trains lose almost an entire eight-car train worth of passengers in the AM peak.<sup>23</sup> In the PM peak, trains to Manhattan and Canarsie both lose a modest amount of passengers in the peak hour.<sup>24</sup>

Although the counts were which supplied this data are imperfect, they do begin to clarify Broadway Junction's larger role in processing passengers throughout eastern Brooklyn and southern Queens. In the AM peak, Manhattan-bound J/Z and L trains act as feeders to A and C trains, and in the PM peak the process is roughly reversed: A and C trains to Euclid Avenue and Queens experience a large net loss and Queens- and Canarsie-bound J/Z trains gain passengers. L trains, especially to Canarsie, likely receive many transferring eastbound A and C passengers, but still have minor net passenger losses in the PM peak.

#### *A/C Line Platforms*

These platforms are laid out in a standard four-track express station configuration: two island platforms, one for trains in each direction. Each platform can accommodate eight 75-foot traincars or 10 60.5-foot

<sup>23</sup> An eight-car L train's guideline capacity is 1,160.

<sup>24</sup> Due to the limitations discussed earlier, data from these counts is imperfect, and should not be regarded as accurate down to the single passenger. However, it provides a reasonably complete and accurate picture of general passenger flow trends throughout the complex.

traincars. (C trains currently use eight 60.5-foot cars.) Opened in 1946, this is the newest of the three station areas that make up the complex.

The station itself lies immediately beneath Callahan & Kelly Park. The City's 1924 aerial surveys show the block where the park now is occupied by buildings; at some point the block was cleared and regraded when the Fulton Street subway was built in the years immediately before and after World War II. In fact, much of the park is above grade to make room for the station below, which had to be built to pass over *another* four-track tunnel, formerly used by the LIRR Bay Ridge Line and now used for New York and Atlantic Railway freight operations. Two passive ventilation chambers extend upward from the tunnel roof and puncture the park above.

The sole entry point to the platforms is at their far eastern end. This encourages uneven loading, which may be an inevitable byproduct of passengers wanting to position themselves so that they can quickly access the ground-floor mezzanine and transfer between lines. However, if conditions eventually warrant, ample room exists to build a new western entrance near Sackman Street, near Eastern Parkway. This may eventually help balance loading, especially if additional development comes to the neighborhood.

Bench distribution on each platform also encourages uneven loading. (See photo below.) Both the Manhattan- and Queens-bound platforms have two benches at their eastern ends and none at their western ends. Adding a western bench and moving one of the existing ones on each platform west would help more evenly distribute passengers.

*Left: Lack of seats at the western end of the Euclid Avenue/Queens-bound A and C platform – a condition which is identical on the Manhattan-bound side.*

*Right: The same seating disparity exists at the west ends of the J/Z platforms. Since both sets of platforms only have entry points at their east ends, this encourages uneven loading. Redistributing and adding seats at their western ends may encourage more evenly-spaced passenger distribution.*



*J/Z Line Platforms*

This three-track station is made up of two island platforms that can each accommodate eight 60.5-foot traincars. Although no J/Z express service runs from Broadway Junction, the station is set up to allow it – trains arriving on the middle track can open their doors on either side.

Like the A/C platforms, the J/Z platforms are only accessible from their eastern ends. A fare control mezzanine near Eastern Parkway still exists but has long since been decommissioned; another one at Conway Street was removed completely earlier in this decade. This encourages uneven loading, which may be an inevitable byproduct of passengers wanting to position themselves so that they can quickly access the upstairs mezzanine and transfer between lines. Restoring the Eastern Parkway entrance may eventually help balance loading, especially if additional development comes to the neighborhood.

Bench distribution on each platform also encourages uneven loading. (See photos on previous page.) Both the Manhattan- and Jamaica-bound platforms have two benches at their eastern ends and one at their western ends. Moving one of those benches on each platform west would help more evenly distribute passengers.

### *L Line Platforms*

Even with all of the constraints described below, the L Line's Broadway Junction station is probably the most functional of the three platforms that make up the complex. In an unusual layout, the L Line station has both an island *and* a side platform. The side platform is used by Canarsie-bound trains, and empties into a seamless, stair-free transfer to the elevated mezzanine. From there, passengers can proceed to J/Z line service in either direction or down a lengthy set of escalators or stairways to street level or the A/C Line platforms. The island platform is used by Manhattan-bound trains, though Canarsie-bound trains can also use it if needed. This platform is wide and spacious at its midpoint and southern ends, and largely protected by a canopy. Passengers to and from this platform must use a stairway to cross over the Canarsie-bound track and reach the upstairs mezzanine.

### 3.3.2 Average Daily and Hourly Ridership

Table 3-D summarizes the average annual weekday, Saturday and Sunday subway ridership at Broadway Junction. Annual, daily and most recently hourly ridership for all subway stations has been made available to DCP by MTA New York City Transit (NYCT).

<b>Table 3-D: Average Daily and Weekly Subway Ridership, Broadway Junction, 1995-2007<sup>25</sup></b>						
<i>year</i>	<i>weekday</i>	<i>Saturday</i>	<i>Sunday</i>	<i>full week</i>	<i>change</i>	<i>deviation from systemwide</i>
1995	4,470	2,696	2,003	27,049		
1996	4,466	2,770	2,005	27,105	0.20%	-0.97%
1997	4,704	3,076	2,280	28,876	6.53%	4.22%
1998	6,115	3,396	2,439	36,410	26.10%	13.12%
1999	6,944	4,134	3,053	41,907	15.10%	8.03%
2000	7,473	5,619	4,167	47,151	12.51%	5.16%
2001	7,766	6,289	4,562	49,681	5.37%	3.53%
2002	7,982	7,379	5,479	52,768	6.21%	5.58%
2003	8,112	7,367	5,474	53,401	1.20%	3.21%
2004	8,545	7,852	5,642	56,219	5.28%	2.61%
2005	9,035	8,721	6,677	60,573	7.74%	4.94%
2006	9,293	9,488	6,779	62,732	3.56%	0.92%
2007	8,731	7,326	5,315	56,296	-10.26%	-14.50%

<sup>25</sup> Source: NYCT annual ridership data

Like most of the rest of the subway system, ridership began to markedly increase in 1997 and 1998, when free systemwide bus-to-subway transfers were first allowed and discounted fare plans took effect. Since six bus routes all converge at or near the subway station, Broadway Junction was bound to get a significant boost in ridership once the barrier of an extra fare was removed.

Aside from the above-average ridership growth on the L Line discussed in Section 3.3.5, the increases in weekend ridership are also notable. Both Saturday and Sunday ridership has more than tripled, and average Saturday entries into the station actually surpassed average weekday amounts in 2006 – a rare occurrence within the subway system. While closing the adjacent Alabama Avenue station on the J (Jamaica) Line for 6 months of reconstruction in 2005 probably shunted several passengers to Broadway Junction that fails to account for the continued strong ridership gains of 2006. However, ridership fell markedly in 2007 for reasons unknown.



**Table 3-E: Service Frequencies of Transit Serving Broadway Junction Area, in Minutes, December 2007**

Route	AM Peak	midday	PM Peak	evenings	late nights	Saturday midday
A (EB)	6-9	5-10	3-5	6-10	20	7-8
A (WB)	3-6	7-9	6-9	9-10	20	7-9
C (EB)	9-12	10	8-12	8-11		9-11
C (WB)	7-11	10	8-12	9-11		9-11
J/Z (EB)	4-13 (most 8-10)	10	5-10	11-12	20	9
J/Z (WB)	5-10	10	4-10 (most 8-10)	12-14	20	9
L (EB)	3-8	6	4-6	4-10	20 (10-18 until 2:00)	5
L (WB)	4-6	6	3-6	4-10	20 (12-16 until 1:15)	5
LIRR (EB)	8-53	29-31	2-28	12-32	17-97	30
LIRR (WB)	3-21	29-31	13-47	12-36	15-84	30
B12 (EB)	3-12	4-9	4-7	5-12	20-40 (12-27 until 2:00)	6-7
B12 (WB)	3-7	4-8	6-8	10-15	20-40 (10-12 after 4:00)	6-7
B20 (NB)	6-18 (most 6-8)	12	5-9	7-12		12
B20 (SB)	6-12 (most 8-9)	11-13	8-10	10-15	Ends 1:51	12
B25 (EB)	7-46 (most 7-12)	8-11	5-7	6-15	30-83	7-10
B25 (WB)	7-10	6-10	6-10	12-30	35-89	6-10
B83 (NB)	6-15	10-13	8-10	10-30	Ends 1:34	11-13
B83 (SB)	10-20	7-12	7-9	10-35	Starts 4:37	11-12
Q24 (EB)	8-10	10-11	10-12	13-20	60 (15-20 after 4:00)	10-12
Q24 (WB)	7-19	10-13	7-11	7-15	58-60	10-13
Q56 (EB)	10-12	12	10-12	15-20	60-62 (15-28 after 4:00)	10
Q56 (WB)	10-16	12-13	8-10	10-15	60 (22-40 until 2:30)	8-10

- A trains run local when C service is not running – generally about 10:30pm-6:00am.
- B12: Alternate westbound trips begin at East New York Avenue and Alabama Avenue, 5:30am-7:40pm. Slightly less than half of eastbound trips end at East New York Avenue and Alabama Avenue, 8:00am-8:15pm.
- B20: Slightly less than half of all northbound trips end at Broadway Junction, 6:20am-9:15pm. Alternate southbound trips begin at Broadway Junction, 6:00am-8:00pm.
- B25: Extended to One Main Street complex on Brooklyn waterfront, 7:00am-7:00pm.
- Q24: Some Saturday westbound trips end at Broadway Junction, 8:30am-9:00pm. Slightly less than half of all Saturday eastbound trips begin at Broadway Junction, 6:00am-6:30pm.

### 3.3.3 A, C (Fulton Street) Line Services and Structural Issues

The existing service pattern has been largely the same since 1999: A trains run express and C trains run local seven days a week from approximately 6:00am to 10:30pm. Most A trains have 207<sup>th</sup> Street in Inwood as their Manhattan terminus, although a few only go to Dyckman Street. In Queens, A trains mostly run to either Lefferts Boulevard in Ozone Park or Mott Avenue in Far Rockaway; five peak directional A trains run to and from Beach 116<sup>th</sup> Street-Rockaway Park weekdays. (Shuttle trains to Broad Channel serve Rockaway Park all other times.) Local service between 168<sup>th</sup> Street in Washington Heights and Euclid Avenue in Brooklyn is provided by C trains. From around 10:30pm to 6:00am, C service is suspended and A trains make all local stops to Far Rockaway. Passengers to Lefferts Boulevard transfer for a shuttle at Euclid Avenue.

Unlike the J/Z and L services described below, the A/C runs through trackage that has relatively few substandard design elements and structural deficiencies. Perhaps the most crucial one is the compression of all A and C service from four tracks to two between Hoyt-Schermerhorn Streets and Canal Street. During the AM peak, combined A/C service runs 25-26 trains per hour (tph), which is about the maximum realistic capacity possible for a single track in one direction. Even if this constriction didn't exist, the full four-track route could not operate at maximum capacity because both the A and C lines must be scheduled around other routes that share their trackage in Manhattan. However, in the long term, this bottleneck may complicate efforts to add service if needed.<sup>26</sup>

As of 2006, both the A and C Line's AM peak loading points in Brooklyn were at Jay Street-Borough Hall, where the A was running at 74.61 percent of capacity and the C was at 70.62 percent of capacity.<sup>27</sup> A trains could therefore accommodate an additional 6,279 passengers in the AM peak hour; C trains could hold 2,670 additional passengers as they now run; expanded to 10 cars, they could carry 2,262 more passengers per hour above and beyond that total, for a total excess capacity of about 4,932. However, it should not be assumed that everyone boarding a C train will stay on it instead of transferring to a waiting A express at the first opportunity.

### 3.3.4 J/Z (Jamaica) Line Services and Structural Issues

Except for some changes in weekend Manhattan terminal locations, this service has been largely unaltered since December 1988, when J Line service was extended to Archer Avenue. All trains generally run between Broad Street in Manhattan and Jamaica Center/Parsons-Archer in Queens. On weekends, all service terminates at Chambers Street. Peak-directional express service runs between Marcy Avenue and Myrtle Avenue, Manhattan-bound between about 7:00am and 1:00pm and Queens-bound between about 1:30pm and 8:00pm weekdays.

When the Archer Avenue Extension opened, a companion peak-directional skip-stop service designated Z was created. During the peak hour J and Z trains make alternating stops between Myrtle Avenue and Sutphin Boulevard. However, all J and Z trains stop at Broadway Junction and two other stations to the east: Crescent Street and Woodhaven Boulevard.

Ample capacity exists on the J/Z lines. At Marcy Avenue, which was the 2006 AM peak load point for these routes, trains reached only 65.43 percent of capacity. At 12tph of 60.5-foot eight-car trains in the AM peak, that means that 4,813 additional passengers could be accommodated on the J/Z in the peak

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<sup>26</sup> In Manhattan, A trains share trackage with the D from 59<sup>th</sup> Street to south of 145<sup>th</sup> Street. C trains share with the E from Canal Street to south of 50<sup>th</sup> Street and the B from south of 59<sup>th</sup> Street to north of 135<sup>th</sup> Street.

<sup>27</sup> Peak loading points for the A and C coming from upper Manhattan are far higher – both reach 83 to 85 percent – but these are largely passengers who are traveling from uptown to the CBD. By the time these trains get to Broadway Junction, they are operating in the reverse peak direction and are carrying far fewer passengers.

hour, even without adding additional service. (The M train, which shares trackage with the J/Z west of Myrtle Avenue, runs 6tph in the AM peak and was at 60.77 percent of capacity in the AM peak.)

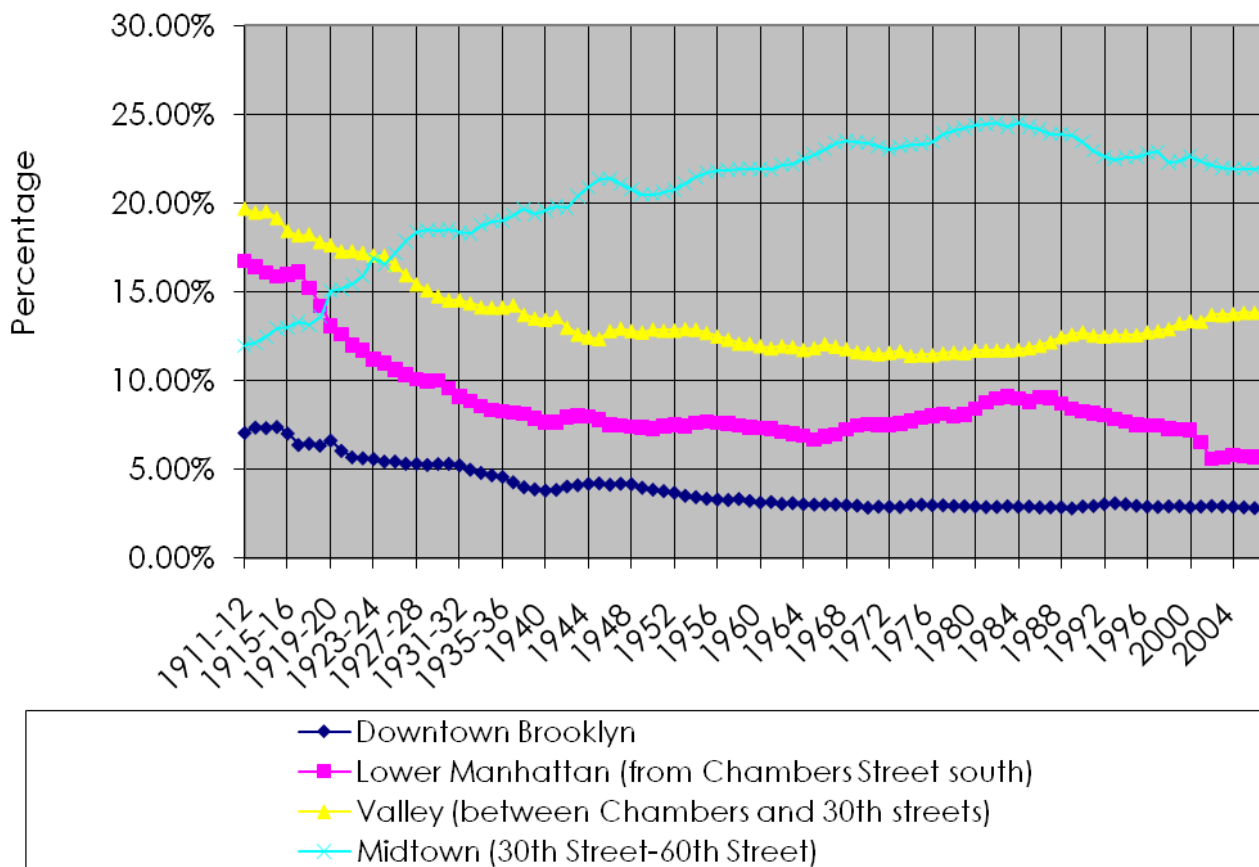
However, several factors limit the J/Z's potential appeal as a service which can provide rapid access to places that passengers may want to go. These factors may play roles in keeping passenger counts low.

#### *Lack of Direct Service to Midtown*

J/Z (and M) service does not go to Midtown. Passengers wanting to reach points north of Delancey Street must transfer for the F at Essex Street, or the N, Q, R, W or 6 at Canal Street. Figure 3-P shows just how significant this is. Seven years after the Centre Street (today's J/Z and M) Line was completed from the Williamsburg Bridge to Chambers Street in 1913, ridership from all Midtown subway stations surpassed those of Lower Manhattan. By the time the line was extended via the Nassau Street Loop to Broad Street and the Montague Street Tunnel in 1931, Midtown station entries were almost double those of Lower Manhattan's.

Since then, the gulf between Midtown and Downtown has only grown wider. While systemwide annual subway ridership has grown markedly over the past decade, ridership has remained stuck between 74

**Figure 3-P: Percentage of Subway Ridership  
Originating from Business Districts  
in Manhattan and Brooklyn, 1911-2007**



million and 100 million for Lower Manhattan since 1957, despite a rise in percentage terms between 1966 and 1986.<sup>28</sup> By 2007, Lower Manhattan's passenger entries had shrunk to just over one fourth of Midtown's – 89.0 million to 346.3 million.<sup>29</sup> Furthermore, a steady rise (both in percentage and absolute terms) in ridership from the “Valley” – the area north of Chambers Street and south of 30<sup>th</sup> Street – is better accommodated by the L Line, which runs crosstown in Manhattan along 14<sup>th</sup> Street, than the J/Z.

To address this long-term ridership shift, NYCT built connecting tracks between Essex Street station on the Centre Street Line and Broadway-Lafayette station on the 6<sup>th</sup> Avenue Line as part of the Chrystie Street Connection project. The resulting service, the KK (later the K), ran from 168<sup>th</sup> Street in Queens (Broadway Junction starting in 1973) to 57<sup>th</sup> Street-6<sup>th</sup> Avenue in Manhattan from July 1968 to August 1976, when the service was dropped during the City's fiscal crisis. No regular service has used this part of the Chrystie Street Connection since.

Even if demand for reinstating K Line service exists, actually doing it will be more complicated than it was 40 years ago. The station at 57<sup>th</sup> Street and 6<sup>th</sup> Avenue is no longer a terminal; F trains now use it as a through stop south of the 63<sup>rd</sup> Street Tunnel. Furthermore, 6<sup>th</sup> Avenue now has two local services, the F and V. Little room exists for a new route on either 6<sup>th</sup> Avenue or Queens Boulevard, where both the F and V routes go. Using the interlockings that connect the 6<sup>th</sup> and 8<sup>th</sup> Avenue Line tracks south of West 4<sup>th</sup> Street is not practical either – the switching movements would delay C, E, F and V trains, and capacity for additional trains on the 8<sup>th</sup> Avenue local tracks is already very limited.

#### *At-grade Myrtle Avenue Crossover*

Another design deficiency impedes existing service and may inhibit future growth. Immediately east of the three-track Myrtle Avenue express station, the two tracks which carry M service to Metropolitan Avenue cross directly through the J/Z Line tracks which continue to Broadway Junction. This at-grade intersection negatively impacts the potential for more J/Z and M service in several ways:

- Eastbound M trains have to wait for westbound J/Z trains to clear the intersection before proceeding, potentially delaying subsequent eastbound local trains.
- Westbound J/Z local trains must wait for both westbound *and* eastbound M trains to pass in front of them before continuing on to Myrtle Avenue. This also adds to train delays.
- J/Z trains running eastbound on the express track are blocked by eastbound M trains crossing in front of them, and vice versa. This prevents both trains from simultaneously leaving the station, causing delays.
- Westbound J/Z trains switching onto the express track prior to entering Myrtle Avenue are forced to wait for eastbound M trains to cross in front of them before proceeding.

During the AM peak, J/Z and M services run a combined total of 18tph west of Myrtle Avenue, which theoretically leaves capacity for eight or nine more tph. However, even if such a need ever arises, it may be difficult to add trains due to the delays caused by this junction. A complete redesign of this station, or at least a reroute of the eastbound M tracks on a combination of new viaduct and the abandoned MJ (Myrtle Avenue Elevated) viaduct, would greatly enhance the entire Jamaica Line's effectiveness.

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<sup>28</sup> Source: NYCDOP Subway Ridership Database (1904-2007), with data provided by NYCT. From 1995 to 2000, Lower Manhattan ridership rose rapidly and was poised to break the 100 million mark in 2001. The World Trade Center attacks severely reduced the area's passenger totals, causing them to drop to about 78.5 million by 2003. By 2007, half of that loss had been recovered.

<sup>29</sup> While Midtown's percentage of the total system ridership has shrunk since 1984 from 24.5 percent, to 21.9 percent, its absolute ridership has grown by nearly 42 percent.



### *Reduced Speeds due to Sharp Curves along the Route*

Five tight curves greatly reduce operating speeds along sections of the route. Four of them rank among the 30 tightest curves in the entire system, and one is effectively tied for first. From west to east, they are:

- Between Canal Street and Bowery (295-foot turning radius). Speeds are reduced along this section of the line, particularly eastbound.
- Immediately west of Marcy Avenue (190-foot radius Jamaica-bound, 175-foot Manhattan-bound). The Broadway El originally continued to a waterfront ferry terminal. This sharp curve was needed to merge the Williamsburg Bridge tracks with the existing Broadway Line. Although service to the ferry ended in 1916, this curve remains.
- Between Broadway Junction and Alabama Avenue. (175-foot radius). Speeds are reduced at this location, where trains must climb and descend to accommodate tracks passing above and below. Trains also must pass through three interlockings between these stations.
- East of Crescent Street (180-foot radius Jamaica-bound 175-foot Manhattan-bound). This nearly 90-degree curve is so sharp that trains must reduce speed before even entering Crescent Street from the west.
- West of Cypress Hills (200-foot radius Jamaica-bound, 210-foot Manhattan-bound). A similar situation exists here as at Crescent Street, where trains from the east must slow down before entering Cypress Hills.<sup>30</sup>

The last two curves are particularly vexing, because they are both between the Crescent Street and Cypress Hills stations. J/Z trains must navigate the entire distance between these stations at no more than 15 miles per hour, creating significant delays for passengers.

The cumulative impact of these five curves is hard to quantify, although they foster the impression of a meandering and circuitous journey. Rebuilding any of these segments to create wider, gentler, faster curves is in most locations nearly impossible, given surrounding structures. Only at Williamsburg Bridge Plaza does space exist to completely redesign the curve.

### *Difficulty of restoring express service east of Myrtle Avenue*

Until August 1976, when K local service was discontinued, J trains ran express in the peak direction during rush hours from Essex Street to Broadway Junction. Since then, J expresses have run only between Marcy and Myrtle avenues.

Express service from Myrtle Avenue to Broadway Junction would be impeded by the following obstacles:

- the junction at Myrtle Avenue, described above;
- determination of how many trains would run express, and the impact expresses would have on service levels at the four bypassed stops: Kosciuszko Street, Gates Avenue, Halsey Street, and Chauncey Street; and
- the likelihood that express trains would not be able to overtake and put sufficient distance in front of locals leaving ahead of them before being forced to merge back into the two-track viaduct that continues east of Broadway Junction.

### 3.3.5 L (Canarsie) Line Services and Structural Issues

L service runs local, making all stops from 8<sup>th</sup> Avenue to Rockaway Parkway. Middays on weekdays, some trains from Manhattan terminate at Myrtle Avenue.

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<sup>30</sup> Conversation with NYCT staff.

Of all the bus and subway routes that enter Broadway Junction, the L is the service that is most in flux, both in terms of ridership and proposed capacity improvements. However, the route also has impediments that reduce its speed and carrying capacity.

#### *Service Levels*

A 2007 MTA analysis found that the L Line was operating at 103 percent of passenger capacity at its peak loading point, 1<sup>st</sup> Avenue.<sup>31</sup> NYCT regards both 1<sup>st</sup> Avenue and Bedford Avenue as the line's peak loading point.

While NYCT's realistic train-per-hour capacity is 26 or 27 trains per track, the L currently is constrained by several factors, and until recently only operated a maximum of 15 trains per hour during peak periods. In October 2007, MTA New York City Transit announced significant service level increases on the L Line, which took effect in over the following 2 months. Table 3-F summarizes these increases below.

<b>Table 3-F: L Line Service Levels, Before and After December 2007 Service Increases<sup>32</sup></b>		
<i>time of day</i>	<i>before service increases</i>	<i>after service increases</i>
AM rush (weekdays)	15tph, or one train every 4 minutes	17tph, or one train every 3.5 minutes*; two new trains between 9:30am and 10:30am
Midday (weekdays)	7.5tph, or one train every 8 minutes	10tph, or one train every 6 minutes
Evenings (weekdays)	Every 6-12 minutes	Every 5-10 minutes
Saturdays	Every 6 minutes from 9:00am-7:00pm; every 8-12 minutes all other times	Every 5 minutes from 9:00am-7:00pm; every 6-15 minutes all other times except overnights
Sundays	Every 8 minutes from 12:00pm-9:00pm; every 10-15 minutes all other times	Every 6 minutes from 12:00pm-9:00pm; every 8-12 minutes all other times except overnights

\*The two additional trains per hour in the AM peak began running on October 29, 2007.

Since L trains run eight-car trainsets with a guideline capacity of 1,160 passengers per train, the expanded AM peak service added capacity for 2,320 additional passengers. This brings L line service back to just below capacity, although increased ridership since could again bring this figure above 100 percent within the near future.

#### *Substandard Platform Lengths*

Unlike most of the subway system, the lines that make up the former BMT Eastern Division – the J/Z, L and M – never had their platforms extended. The L is constrained to eight-car trains of 60.5-foot cars.<sup>33</sup>

The Canarsie Line, which was largely built later than most other BRT/BMT routes, had platforms generally capable of accommodating eight 67-foot-long cars. These cars, popularly called “Standards,” ran on BMT routes between 1915 and 1969. (See Table 3-G for L station platform lengths.) Unlike other parts of the BMT system, which had their platforms extended to accommodate 10 60.5-foot-long train cars between the end of World War II and the early 1970s, the Canarsie Line's platforms were never lengthened, nor were those of the Broadway-Brooklyn, Myrtle Avenue, and Jamaica lines.

With the exception of 8<sup>th</sup> Avenue, the full Canarsie Line was open by 1928. Ridership peaked at the non-transfer stations in 1929-1930, when nearly 45 million passengers entered at these stations, but

<sup>31</sup>New York Times, June 26, 2007

<sup>32</sup> 2006-2007 L Line timetables; NYCT press release, Oct. 18, 2007: <http://mta.info/mta/news/releases/?en=071018-NYCT130>

<sup>33</sup> NYCT's 75-foot cars cannot run on the line due to turning radii constraints.

plummeted by approximately 30 percent over the next 15 years, and generally continued to decline through 1982, when it reached a nadir of 13.7 million in 1982. Ridership fluctuated but had rebounded to almost 18.4 million by 1997.

However, ridership growth over the past decade has eclipsed the advances of previous years. From 1997 to 2007, ridership from these stations grew to over 35.4 million – their highest ridership since 1936-1937 and a nearly 93 percent increase over the past decade, far outpacing the rest of the system’s 47 percent increase over the same period. The share of total systemwide usage at these stations was 2.27 percent, an all-time record.

**Table 3-G: L Line Platform Lengths (in feet)<sup>34</sup>**

Blue: can accommodate 10-car 60.5-foot trains without modifications.

Green: can accommodate 9-car 60.5-foot trains without modifications.

Yellow: can accommodate 9-car 60.5-foot trains, but front and back ends of train beyond the first and last doors would be beyond the station limits.

Station	platform type	island platform	Manhattan-bound side platform	Canarsie-bound side platform
8 Ave.	island	545		
6 Ave.	Island	610		
Union Sq.	Island	519		
3 Ave.	side		529	529
1 Ave.	side		534	534
Bedford Ave.	island	530		
Lorimer St.	Side		530	530
Graham Ave.	Side		530	530
Grand St.	Side		519	519
Montrose Ave.	Side		530	530
Morgan Ave.	Side		540	540
Jefferson St.	Side		530	538
DeKalb Ave.	Side		540	540
Myrtle Ave.	island	540		
Halsey St.	Side		540	540
Wilson Ave.	Side		540	540
Bushwick-Aberdeen	Side		540	540
Broadway Junction	island + side	546		540
Atlantic Ave.	island	550		
Sutter Ave.	Side		518	518
Livonia Ave.	Side		523	523
New Lots Ave.	Side		531	534
E. 105 St.	island	575		
Rockaway Pkwy.	island	561		

An additional reason that platform extensions were not done may have had to do with systemwide integrations of BMT and IND trackage. None of them directly affected the Canarsie Line. After the BMT and IRT were taken over by the City in 1940, efforts were made to fuse the BMT and IND systems together. (The IRT’s narrower cars and clearances prevented a similar integration.) However, while the

<sup>34</sup> Source: NYCT.

Chrystie Street Connection and other efforts successfully integrated the BMT and IND systems, none of these connections seriously affected the Canarsie Line.<sup>35</sup>

New York City Transit has committed to **Communications-Based Train Control (CBTC)** as a primary means of expanding capacity on the L Line. However, if ridership ever increases to the point where platforms need to be extended, NYCT will face an additional obstacle: Subway platforms are regarded by New York State as “buildings,” and thus fall under the state’s Building Code. Any attempt to add capacity to platforms would trigger Americans with Disabilities Act (ADA) regulations mandating that at least one but no less than 50 percent of all egresses from expanded stations would need to be ADA compliant. For all practical purposes, this means that newly-extended stations would need to be equipped with elevators.<sup>36</sup>

As Table 3-G shows, half of the 24 stations along the L Line either exceed or meet the bare minimum length needed to accommodate nine-car trains, though for safety reasons any such platform should be at least 555 feet long. (Nine cars at 60.5 feet long each plus 10 feet to spare equals 554.5 feet.) NYCT has recently purchased semipermanently-attached four-car R160 trainsets, two each of which will make a J/Z, L or M train. Semipermanently-attached five-car R160 sets have also been purchased for 10-car N and Q or W trains. According to NYCT, these two sets could be made compatible with each other, allowing nine-car trains. L Line capacity would be increased by one-eighth if this were possible.

**Communications-Based Train Control (CBTC)** is a signaling system that allows trains to run with shorter intervals between them. In standard “block” signaling, trains must stop if trains in front of them have not fully cleared a preset amount of signals in front of them. CBTC signaling measures a train in terms of the relative distance between it and the train in front of it, allowing tighter spacing between trains, and adding capacity to the line as a whole.

A less obvious cosequence, whether L trains were to eventually be increased to either nine or 10 cars, would be that L trains would no longer be able to run on the J/Z or M lines – the only lines the L has a connection with. The J/Z and M platforms were never lengthened either, and these routes still have ample excess capacity. Such an investment along the J/Z and M lines would be unnecessary for the foreseeable future.

Retrofitting the entire L Line to allow 10-car trains would be a far greater undertaking. Currently, only one station on the route can hold a 10-car train. However, this would bring the line into conformity with most of the rest of the subway system.

In the short and medium terms, signalization and other improvements could further boost L Line service without the need to extend platforms. However, as a long-term remedy to overcrowding, lengthening platforms should not be discounted.

#### *Terminal Interlocking and Automatic Train Operation (ATO) west of 6<sup>th</sup> Avenue*

Another constraint preventing additional service on the L Line is the location of its Manhattan terminal interlocking east of 8<sup>th</sup> Avenue, the last stop. The switches are too far from the terminal – a situation similar to that at the E Line’s Parsons-Archer terminal in Queens. Trains arriving at and leaving 8<sup>th</sup>

<sup>35</sup> At Broadway Junction, the track configuration would have allowed KK trains to use Canarsie Line stations from Atlantic Avenue to Rockaway Parkway, and while a few trains actually made this run in 1967-1968 (designated “JJ”), it was not a long-lived service pattern. Thus it would not have been necessary on service delivery grounds to extend Canarsie Line platforms.

<sup>36</sup> New York State Building Code, Appendix K9 (Additions)



Avenue are therefore forced to operate on the “wrong” track considerably farther from the terminal than is ideal. For example, a train leaving 8<sup>th</sup> Avenue terminal from the westbound track<sup>37</sup> needs to travel eastbound along that track until reaching the interlocking, where it can then switch to the correct track. Since the interlocking is farther east than just past the end of the terminal platform – the ideal location for such an interlocking – trains have to wait at 6<sup>th</sup> Avenue for longer than they otherwise should to proceed to 8<sup>th</sup> Avenue. This reduces the amount of trains per hour that the entire line can run.

The interlocking itself is also substandard, which means that trains have to move through it at a slower speed. NYCT plans to replace this switch with a higher-capacity one, albeit at the same location.

NYCT also plans to eventually improve 8<sup>th</sup> Avenue terminal throughput by installing an Automatic Train Operation (ATO) system. Right now the terminal’s signaling is set up to have trains enter the station very slowly, since the tunnel ends at a wall at the west end of the station. ATO will allow L trains to automatically enter the station faster at a preset speed, thus improving line capacity. Train operators entering an ATO area are not, strictly speaking, controlling the train’s maximum speed, although they retain the ability to slow or stop the train. Instead, they are required to punch a button at regular intervals to acknowledge that they are still lucid and capable of taking control of the train if needed. At the time this report was being written, undisclosed health and safety aspects of this plan were a source of disagreement between NYCT and the unions which operate the transit system.

#### *CBTC and Retrofitting of the R160 Fleet*

As of late 2007, most L Line service is being provided with 212 R143 model traincars. These subway cars, which entered service between 2001 and 2003, are equipped to utilize CBTC, which has now been largely installed throughout the route. However, exceptional ridership growth along the L Line, especially west of the Myrtle/Wyckoff Avenue station, led to a situation where the R143 fleet could not provide all the service that was needed on the L Line. Older R40 and R42 cars, which are not CBTC-

compatible, were added or retained to provide extra service.



*East New York Yard from the L Line overpass to the Manhattan-bound platform. Graffiti mars the left edge of the photo.*

At the time this report was being written, newer R160 cars were being delivered, and were replacing the R40/42s. The R160 cars, while “CBTC-compatible,” were not actually delivered with the software and equipment to utilize CBTC. Therefore, before CBTC can be utilized to its utmost potential, at least the entire set of R160 cars that would be usable on the L Line will need to have CBTC installed.<sup>38</sup> This is essential for two reasons: 1) CBTC can only really be effective if multiple consecutive trainsets are equipped with it, because all train speeds are governed by their position relative to the train in front of

<sup>37</sup> Internally, NYCT generally uses only north and south when referring to directions of travel or line segments. However, since many lines run east-west along parts of their routes, this report uses all four compass directions.

<sup>38</sup> The R160 order includes semipermanently coupled four- and five-car sets. Realistically, CBTC would need to be installed on the four-car sets, which run on the L Line. CBTC implementation elsewhere in the subway system will eventually require the five-car sets to also be retrofitted.

them. A train without CBTC renders the system ineffective. 2) As the R143s begin to age, they will need to be periodically be taken out of service for system maintenance. R160 cars will need to be CBTC-compatible to maintain a high level of service.

Ultimately, NYCT wishes to reach a service level of 20-22tph, which they believe will be adequate for L Line ridership levels. Without a full CBTC fleet, other improvements such as the rebuilt 8<sup>th</sup> Avenue terminal interlocking and ATO will not reach their full effectiveness.

#### *Lack of Storage Yard Space*

L Line trains are stored at one of two locations: Canarsie Yard and East New York Yard. Canarsie Yard is primarily a storage facility, although it does have a car wash. East New York Yard, however, is also a maintenance and inspection facility; J/Z and M trains are also stored or maintained at of this yard.

A major deficiency of East New York Yard is that only a relatively small amount of uncut eight-car trains can be stored there. Due to the yard's compact layout and the fact that trains tended to be shorter many decades ago (the yard dates back in some form or another to at least 1880), most of the yard's tracks are too short to hold trains of this length, meaning that many trainsets entering the yard need to be split into smaller subsets and then reattached when going back into service. The yard's existing layout makes it hard to expand to accommodate more eight-car trains, no less nine- or 10-car sets, should that need arise.

Since more trainsets will eventually be needed to provide more frequent service on the L, additional storage space at an alternate location will be needed. Several locations where the L Line parallels the New York and Atlantic Railway cut between Wilson Avenue and New Lots Avenue could be viable. In the long term, much of the northerly outdoor storage part of East New York Yard could then be decommissioned.

### **3.4 Commuter and Freight Rail**

#### **3.4.1 LIRR Atlantic Division: East New York Station**

The LIRR Atlantic Division runs in a two-track alignment beneath, above or alongside Atlantic Avenue throughout its entire length, from Flatbush Avenue in Downtown Brooklyn to Jamaica in Queens. East New York is one of two active intermediate stops; the other is at Nostrand Avenue, to the west of the study area. To the east lies the abandoned Woodhaven Boulevard station, closed in January 1977.

Although the station is approximately 1,000 feet south of the Broadway Junction subway station, it is almost directly below the Atlantic Avenue station on the L Line, the next stop for Canarsie-bound trains. The A and C lines largely parallel the Atlantic Division into Downtown Brooklyn, and unlike the LIRR, these subway lines continue directly into Manhattan.

The station, composed of two side platforms, is set in an unusual semienclosed environment, built as part of a complicated grade crossing



*An LIRR train bound for Jamaica and Hempstead enters the East New York station.*

elimination project in the early 1940s. Between Eastern Parkway and Georgia Avenue, two narrow one-way service roads remain at ground level while the main, central portion of Atlantic Avenue vaults above ground. The LIRR tracks, in a tunnel below Atlantic Avenue, rise with the through road above it, so that the East New York platforms are essentially flush with street level. While enclosed by the road above, most of the platform is indirectly exposed to open air and receives natural light. An underpass, which contains a ticket booth, provides access between the platforms and to Van Sinderen Avenue to the north.

As of November 2007, 56 eastbound and 61 westbound trains stopped at East New York on a typical weekday; 43 eastbound and 44 westbound trains stopped there on weekends. During weekdays, some additional trains bypass East New York. The default midday and off-peak service interval is 30 minutes, but trains also stop there more or less frequently by time of day and peak direction. (See Table 3-E for a more detailed breakdown.)

Trains to and from Far Rockaway and Hempstead predominate at East New York on weekdays and virtually dominate the weekend schedule, but direct service to the Long Beach and West Hempstead branches is also available to varying degrees. Less frequently, East New York also has weekday trains that serve the Babylon, Port Jefferson and Ronkonkoma lines.

Ridership to and from East New York is relatively low, according to LIRR data from the spring of 2006. Weekday ridership totaled 1,127 – just over a third of one percent of total entries and exits at the LIRR’s New York City stations. Train capacity, even at peak hours, is adequate to handle ridership at East New York and along the Atlantic Division as a whole. Depending on the time of day and demand, the LIRR runs six-, eight- or 10-car trains through the Atlantic Division (most of which continue east of Jamaica). At a capacity of 107 people per car, up to 1,070 passengers per train can be accommodated.

As shown in Table 3-H, the vast majority of ridership from East New York is to and from points east, even during peak periods when the assumption would be that more passengers would be commuting to and from Flatbush Avenue.

**Table 3-H: LIRR East New York Station Ridership, Spring 2006<sup>39</sup>**

<i>direction/ time of day</i>	<i>entries</i>	<i>exits</i>	<i>totals</i>
EB AM Peak	290	8	EB Weekdays: 636 entries, 24 exits
EB Midday	202	8	
EB PM Peak	144	8	
EB Saturdays	353	9	
EB Sundays	304	7	
WB AM Peak	10	181	WB Weekdays: 23 entries, 444 exits
WB Midday	10	86	
WB PM Peak	3	177	
WB Saturdays	23	444	
WB Sundays	25	290	

### 3.4.2 New York & Atlantic Bay Ridge Line

A freight rail line also passes through the study area. Currently operated by the New York & Atlantic Railway, the right of way runs from south to north, paralleling Van Sinderen Avenue and the elevated L Line in the southern half of the study area. At East New York Avenue, the line enters an unventilated,

<sup>39</sup> *Long Island Rail Road, Origin & Destination Study Station-Based Passenger Counts, Spring 2006*. Prepared for the LIRR by SRBI, Inc.

3,500-foot-long four-track tunnel, part of which has an abandoned passenger station within.<sup>40</sup> This tunnel necessitated elevating the A and C (Fulton Street) Line subway station at Broadway Junction enough to force the park above it to be regarded at several feet above the surrounding ground level.

### 3.5 Buses

Six NYCT local bus routes traverse the study area: the B12, B20, B25, B83, Q24 and Q56. All of them except for the B12 stop immediately adjacent to the Broadway Junction subway entrance.

Figure 3-Q is a map of all six bus routes, with peak loading points along each route by time of day. Table 3-I shows the average hourly station entries at Broadway Junction, and hourly transfers from each bus route serving the station, for May 2007. Detailed bus ridership data for the six routes which traverse the study area, including peak loading points, stop-by-stop entries and exits by daypart, and hour-by-hour bus-to-subway transfers from each route to Broadway Junction subway station, were provided by NYCT. Such detailed data has only become possible over the last decade with systemwide conversion to MetroCards.

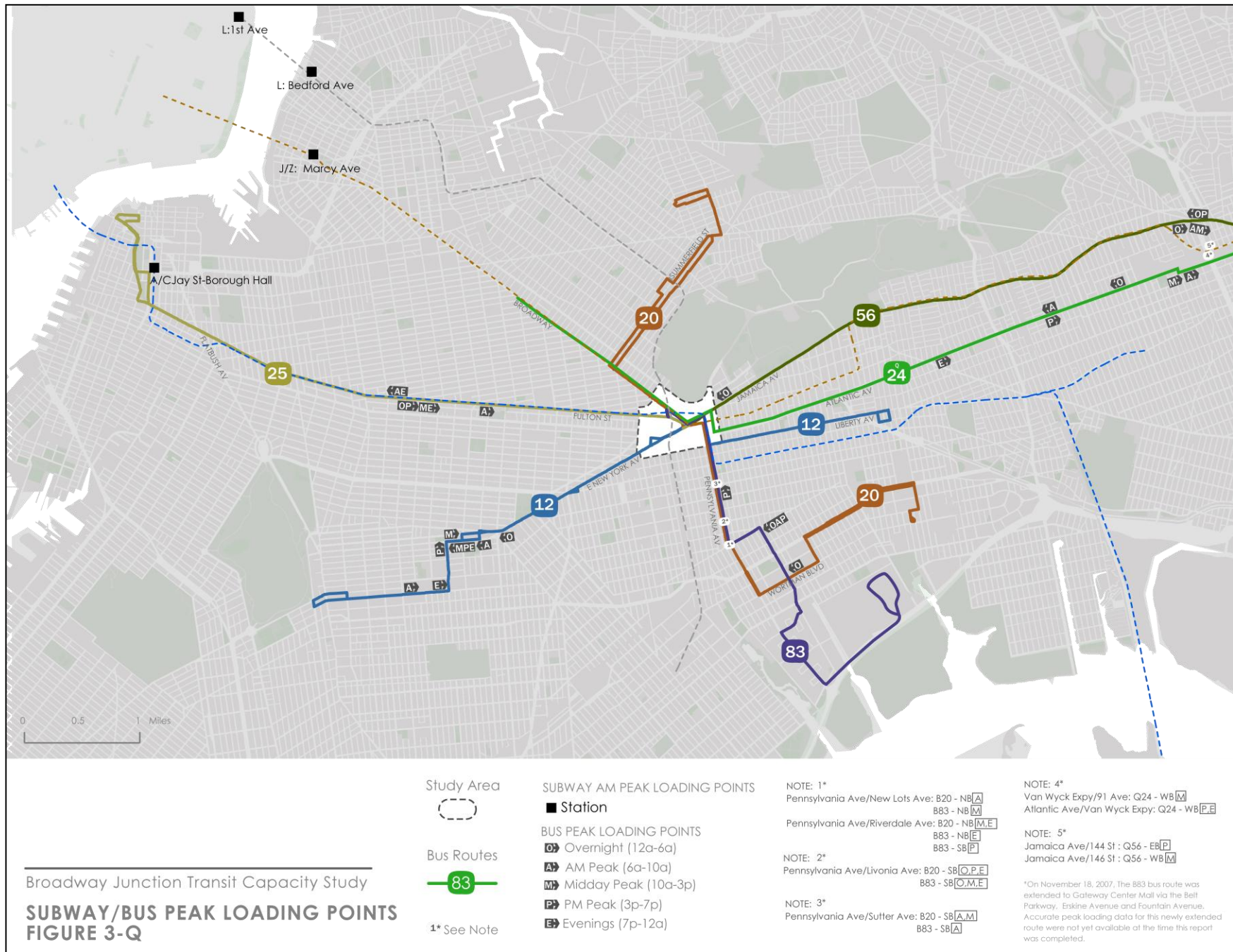
**Table 3-I: Average Hourly Station Passenger Entries and Bus-to-Subway Transfers at Broadway Junction, May 2007<sup>41</sup>**

hour	subway entries	from B12	from B20	from B25	from B83	from Q24	from Q56	all bus xfers*	% of entries
12a	85	1	5	1	2	5	3	17	20.00%
1a	40	0	2	1	0	0	1	4	10.00%
2a	26	0	0	0	0	0	0	0	0.00%
3a	34	0	0	0	0	1	2	3	8.82%
4a	85	1	0	0	0	6	7	14	16.47%
5a	249	4	13	2	37	26	27	109	43.78%
6a	658	10	67	8	106	56	75	323	49.09%
7a	1,168	11	112	13	148	73	95	453	38.78%
8a	1,082	10	89	17	111	58	57	344	31.79%
9a	644	10	48	9	66	31	38	203	31.52%
10a	416	7	33	5	47	20	23	135	32.45%
11a	365	7	31	6	43	16	19	123	33.70%
12p	367	6	37	7	37	19	20	127	34.60%
1p	393	9	37	9	48	21	16	141	35.88%
2p	426	8	45	8	53	19	18	152	35.68%
3p	552	7	49	13	56	21	17	164	29.71%
4p	522	8	55	12	46	19	16	157	30.08%
5p	508	5	48	14	46	16	17	146	28.74%
6p	374	6	36	10	35	12	15	115	30.75%
7p	306	6	30	10	33	12	12	104	33.99%
8p	261	3	26	7	37	9	12	95	36.40%
9p	221	3	21	5	25	8	9	71	32.13%
10p	195	4	13	4	19	5	11	56	28.72%
11p	123	2	5	3	9	3	3	25	20.33%
<b>TOTAL</b>	<b>9,102</b>	<b>128</b>	<b>802</b>	<b>164</b>	<b>1,004</b>	<b>456</b>	<b>513</b>	<b>3,081</b>	<b>33.85%</b>
<b>%/route</b>		<b>4.15%</b>	<b>26.03%</b>	<b>5.32%</b>	<b>32.59%</b>	<b>14.80%</b>	<b>16.65%</b>	<b>100.00%</b>	

<sup>40</sup> The line was once electrified, and was used for passenger service until 1924.

<sup>41</sup> Source: NYCT \*Hourly and total numbers do not add up because 14 additional transfers (no more than two in any given hour) were made from other bus routes.





Slightly more than a third of all passengers entering the Broadway Junction subway station transferred from the six bus routes in the study area. While the B83 route was responsible for the plurality of these transfers, the B20 and B83 both operate along Pennsylvania Avenue down to New Lots Avenue, so it can be reasonably assumed that some of the transferring B20 passengers are also boarding along Pennsylvania Avenue.<sup>42</sup> The Q24 and Q56 bus routes, which roughly parallel each other from the study area to Jamaica, account for almost as many transferring passengers as the B83: over 31 percent. Therefore, it is likely that approximately two-thirds of all passengers transferring from buses to the subway are originating south, southeast or east of the study area.

The percentage of passengers entering the subway at Broadway Junction who transferred there from a connecting bus route remained relatively stable from 7:00am through 11:00pm, never fluctuating above 39 percent (7:00am-8:00am) or below 28 percent (5:00pm-6:00pm). Only during late nights does this share drop significantly. During the early shoulder of the AM peak – from 5:00am to 7:00am – the share of subway passengers entering the station from a connecting bus climbs to well above 40 percent, reaching nearly half of all entering subway passengers in the 6:00am hour.

A route-by-route description follows.

### 3.5.1 B12

This route runs between Ocean Avenue and Parkside Avenue in Prospect-Lefferts Gardens, and Sheridan Avenue and Liberty Avenue in East New York. From west to east, the B12 route runs predominantly along Clarkson Avenue, Albany Avenue, East New York Avenue, Pennsylvania Avenue, and Liberty Avenue.

During the following times, approximately every other bus to and from Ocean Avenue terminates at East New York Avenue and Alabama Avenue, adjacent to the J Line subway station immediately east of Broadway Junction:

- Weekday peak and midday hours.
- Saturdays from 7:00am to 8:00pm.
- Sundays westbound from 9:30am to 9:00pm.
- Sundays eastbound from about 10:00am to 10:30pm.

During the following times, some buses run only between East New York Avenue and Alabama Avenue, and Sheridan Avenue and Liberty Avenue:

- Saturdays westbound from 8:00pm to 5:30am.
- Saturdays eastbound from 1:00am to 8:30am.
- Sundays westbound from 6:00pm to 6:00am, especially from 12:00am to 2:00am.
- Sundays eastbound from 1:00am to 9:00am.

B12 buses run at high frequencies (with 3- to 7-minute peak intervals) and at all times. Two to seven buses per hour run overnights, and as of August 2007 19 buses had scheduled stops near Broadway Junction during the peak hour of 9:00am to 10:00am. In general, 13 to 17 B12 buses per hour stopped at Broadway Junction peaks and middays (both directions inclusive) as of August 2007.

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<sup>42</sup> In November 2007, B83 bus service was extended to Gateway Center Mall, which has the potential to boost station entries still further. However, a definitive analysis of the B83 extension's impact will not be practical until early in the 2010s, by which point new bus usage patterns should stabilize.

Unlike the other five bus routes, the B12 does not stop directly in front of Broadway Junction, passing only as close as East New York Avenue and Junius Street (eastbound) or East New York Avenue and Pacific Street (westbound). It has fewer weekday bus-to-subway transfers at Broadway Junction than the other five routes – 128 out of 3,081, or 4.2 percent of the total. The B12's stop at Alabama Avenue, where transfers are available to the J Line station above, is the busiest bus stop on the bus route in eastbound exits or westbound entrances.

### 3.5.2 B20

This route runs between Putnam Avenue and Fairview Avenue in Ridgewood, Queens, and the Brooklyn General Mail Facility in Spring Creek, Brooklyn. From north to south, the B20 route runs predominantly along Fresh Pond Road; Decatur Street (northbound) or Summerfield and Schaeffer streets (southbound); Broadway, Pennsylvania Avenue, Wortman Avenue, Ashford Street, and Linden Boulevard.

B20 service does not run overnights. Buses do not run from 2:00am to 5:00am weekdays, nor from about 2:00am to 5:45am weekends.

During the following hours, alternate buses generally end at Broadway Junction instead of proceeding north into Queens:

- Weekday peak and midday hours.
- Saturdays from about 8:45am to 7:00pm.
- Sundays southbound from 8:45am to 7:00pm.
- Sundays northbound from about 11:00am to 7:00pm.

B20 buses tended to run at 5- to 12-minute intervals during peak and evening hours, and at 12-minute intervals middays and Saturday middays. As of August 2007, 12 buses had scheduled stops at Broadway Junction during the peak hour of 8:00am to 9:00am. In general, seven to 11 B20 buses per hour stopped at Broadway Junction peaks and middays (both directions inclusive) as of August 2007.

The B20 has the second highest amount of average weekday transfers to the subway at Broadway Junction: 802 out of 3,081 total bus transfers, or 26.0 percent.

### 3.5.3 B25

This route runs the length of Fulton Street between Downtown Brooklyn and Broadway Junction.<sup>43 44</sup> A short extension to One Main Street at Fulton Landing runs from 7:00am to 7:00pm weekdays.

B25 service runs at all times.

B25 buses tend to run at 6- to 12-minute intervals during peak and midday hours, with evening intervals ranging between 9 and 30 minutes, depending on the peak direction and time of day.

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<sup>43</sup> Road construction during 2007 and 2008 is temporarily diverting B25 service to Atlantic Avenue between Vanderbilt Avenue and Bedford/Nostrand avenues.

<sup>44</sup> The B25 largely follows the historic path of Fulton Street. Much of Cadman Plaza West and Old Fulton Street, which the route runs along in Downtown Brooklyn, was originally part of Fulton Street. The original alignment of Fulton Street crosses diagonally northeast of Borough Hall and remains a pedestrian path.

As of August 2007, 10 buses had scheduled stops at Broadway Junction during the peak hour of 6:00pm to 7:00pm. In general, six to seven B25 buses per hour stopped at Broadway Junction during AM peaks, middays and evenings (both directions inclusive) as of August 2007.

The B25 has the fifth highest amount of average weekday transfers to the subway at Broadway Junction: 164 out of 3,081 total bus transfers, or 5.3 percent. In all likelihood this is due to the fact that the B25 largely duplicates the route of the A and C subway lines, which run below Fulton Street into Fort Greene.

#### 3.5.4 B83

This route's northern terminal is Broadway Junction. On November 18, 2007, B83 service was extended .9 miles from its previous terminal at Pennsylvania and Seaview avenues to the Gateway Center Mall, where it now shares a terminal with the B13 route. The B83 now primarily runs along Pennsylvania Avenue, Van Siclen Avenue, the Belt Parkway, Erskine Avenue and Fountain Avenue.

B83 service does not run overnights. Buses do not run from 1:30am to 4:30am weekdays, 1:30am to 5:00am Saturdays, or 1:00am to 5:30 Sundays.

During the following hours, alternate buses generally end at Seaview Avenue and Pennsylvania Avenue instead of proceeding to or from Gateway Center:

- Weekdays southbound from 3:30pm to 8:00pm.
- Weekdays northbound from about 6:15am to 8:00am.

B83 buses predominantly run at 10-minute intervals during peak hours, and midday hours, with midday intervals ranging between 7 and 13 minutes, and evening intervals ranging between 10 and 30 minutes depending on the peak direction and time of day.

As of August 2007, nine buses had scheduled stops at Broadway Junction during each of the peak hours of 7:00am to 9:00am. In general, five to seven B83 buses per hour stopped at Broadway Junction during nearly all other hours the route was operating (both directions inclusive) as of August 2007.

The B83 has the highest amount of average weekday transfers to the subway at Broadway Junction: 1,004 out of 3,081 total bus transfers, or 32.6 percent. While it will probably be some time before the impact of the Gateway Center Mall extension is fully felt, if the extension of the B13 to the mall in April 2003 is any indication, B83 ridership could grow further. When the B13 was first extended to the mall, an average of 240 weekday, 70 Saturday and 90 Sunday customers used the route at its terminal. By the fall of 2007, approximately 1,000 customers during both weekdays and weekends accessed the B13 at the mall. According to NYCT, almost 60,000 people live within a quarter mile of the B83 route.<sup>45</sup> Nonetheless, the impact of the B83 extension upon ridership patterns at Broadway Junction may not be fully known until long after this project is completed.

#### 3.5.5 Q24

This route runs between Broadway and Patchen Avenue in Bushwick, and 168<sup>th</sup> Street and Jamaica Avenue in Jamaica, Queens. From east to west, the Q24 route runs predominantly along Broadway, Fulton Street, Jamaica Avenue, Pennsylvania Avenue, Atlantic Avenue, and Archer Avenue (eastbound)/Jamaica Avenue (westbound).

Q24 service runs at all times.

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<sup>45</sup> NYCT press release, September 24, 2007. <http://mta.info/mta/news/releases/?en=070924-NYCT118>



During the following hours, alternate buses generally end at Broadway Junction instead of proceeding northwest to and from Bushwick:

- Saturdays eastbound from about 6:00am to 6:15pm.
- Saturdays westbound from about 8:45am to 9:00pm.
- Sundays eastbound from 10:45am to 7:15pm.
- Sundays westbound from about 10:45am to 7:45pm.

Q24 buses tended to run at 8- to 10-minute intervals during the AM peak eastbound and 7- to 19 minute intervals during the AM peak westbound. Middays, intervals in both directions were 10 to 13 minutes. In the PM peak intervals were 10 to 12 minutes eastbound and 7 to 11 minutes westbound. Evenings, intervals were 13 to 20 minutes eastbound and 7 to 15 minutes westbound. Overnight intervals were about 60 minutes in both directions. Saturday intervals were 10 to 13 minutes in both directions.

As of August 2007, 13 buses had scheduled stops at Broadway Junction during three peak hours: 8:00am to 9:00am, 9:00am to 10:00am, and 6:00pm to 7:00pm. In general, 12 Q24 buses per hour stopped at Broadway Junction middays (both directions inclusive) as of August 2007.

The Q24 has the fourth highest amount of average weekday transfers to the subway at Broadway Junction: 456 out of 3,081 total bus transfers, or 14.8 percent.

#### 3.5.6 Q56

This route runs between Broadway Junction and 170<sup>th</sup> Street and Jamaica Avenue in Jamaica, Queens. The Q24 route runs predominantly along Jamaica Avenue.

Q56 service runs at all times.

Q56 buses tended to run at to 10- to 12-minute intervals during the AM peak, midday and PM peak eastbound, and at 8- to 16 minute intervals during the AM peak, midday and PM peak westbound. In the PM peak intervals were 10 to 12 minutes eastbound and 7 to 11 minutes westbound. Evenings, intervals were 15 to 20 minutes eastbound and 10 to 15 minutes westbound. Overnight intervals were about 60 minutes in both directions. Saturday intervals were 8 to 10 minutes in both directions.

Although a 24-hour service, the Q56 runs less frequently than any of the other routes. As of August 2007, an average of six to seven buses had scheduled stops at Broadway Junction during the peak hours of 6:00pm to 7:00pm. In general, five Q56 buses per hour stopped at Broadway Junction during other weekday hours from 7:00am to 11:00pm (both directions inclusive) as of August 2007.

Despite its lower service frequency, the Q56 has the third highest amount of average weekday transfers to the subway at Broadway Junction: 513 out of 3,081 total bus transfers, or 16.7 percent – almost exactly one-sixth.

### **3.6 Travel Times to Other Destinations**

Table 3-J summarizes the average scheduled travel times from Broadway Junction to other locations served by the bus, subway and rail routes through the area. All of the times in this station imply a one-seat ride on each particular route. In general, the lower number in each range represents travel time during off-peak periods while the higher end indicates peak travel times.

**Table 3-J: Scheduled Weekday Travel Times to Selected Destinations, Excluding Late Nights, in Minutes, 2007<sup>46</sup>**

A

207 <sup>th</sup> Street (Manhattan)	54-63
168 <sup>th</sup> Street (Manhattan)	46-53
125 <sup>th</sup> Street (Manhattan)	38-47
42 <sup>nd</sup> Street (Manhattan)	28-35
Chambers Street (Manhattan)	18-24
Jay Street-Borough Hall	11-16
Euclid Avenue	4-6
Lefferts Boulevard (Queens)	14-20
JFK Airport-Howard Beach (Queens)	16-20
Rockaway Park-Beach 116 <sup>th</sup> Street* (Queens)	31-35
Far Rockaway-Mott Avenue (Queens)	35-40

\* limited peak directional through service. Travel times tend to be lengthier in the peak direction. (Times listed are for express service only. A trains make all local stops late nights.)

C\*\*

168 <sup>th</sup> Street (Manhattan)	56-64
125 <sup>th</sup> Street (Manhattan)	49-55
42 <sup>nd</sup> Street (Manhattan)	34-41
Chambers Street (Manhattan)	23-28
Jay Street-Borough Hall	16-20
Euclid Avenue	6-8

\*\* Broadway Junction is not specifically listed on this MTA public timetables. Rockaway Avenue, the next station to the west, is. Travel times are a conservative DCP estimate. Travel times tend to be lengthier in the peak direction.

J/Z\*\*\*

Broad Street (Manhattan)	24-31
Chambers Street (Manhattan)	22-28
Essex Street (Manhattan)	18-23
Myrtle Avenue	6-10
Crescent Street	6-9
Woodhaven Boulevard (Queens)	11-16
Jamaica Center (Queens)	21-25

\*\*\*All J/Z trains run peak directional express service towards Manhattan from about 7:00am to 1:00pm and from Manhattan from about 1:30pm to 8:00pm. J/Z skip-stop service runs towards Manhattan from about 7:00am to 8:15am and from Manhattan from about 4:30pm to 5:45pm. Travel times tend to be quicker in the peak direction, due to the combination of skip-stop and express service.

<sup>46</sup> Source: NYCT online timetables. <http://mta.info/mta/schedules.htm>.

<u>L</u>	
8 <sup>th</sup> Avenue (Manhattan)	26-30
Union Square (Manhattan)	23-26
1 <sup>st</sup> Avenue (Manhattan)	21-24
Lorimer Street	15-18
Myrtle Avenue	5-7
Rockaway Parkway	9-10

LIRR Atlantic Division

Flatbush Avenue-Atlantic Terminal	9-14
Nostrand Avenue	4-7
Jamaica (Queens)	7-10

B12 (from East New York Avenue and Alabama Avenue)

Ocean Avenue/Parkside Avenue	28-46
Flatbush Avenue/Clarkson/Nostrand Avenues	21-37
East New York Avenue/Utica Avenue	12-20
Sheridan Avenue/Liberty Avenue	11-24

B20

Putnam Avenue/Fairview Avenue (Queens)	17-32
Broadway/Decatur Street	3-9
Pennsylvania Avenue/Sutter Avenue	6-15
Linden Boulevard/Ashford Street	17-33
Brooklyn General Mail Facility	23-44

B25

Fulton Landing	34-69
Cadman Plaza West/Tillary Street	33-63
Fulton Street/DeKalb Avenue	28-52
Fulton Street/Greene Avenue	22-45
Fulton Street/Nostrand Avenue	12-29

B83

Pennsylvania Avenue/Liberty Avenue	4-12
New Lots Avenue/Van Siclen Avenue	11-20
Pennsylvania Avenue/Seaview Avenue	20-36
Gateway Center Mall	32-45

Q24

Lafayette Avenue/Patchen Avenue	9-17
Atlantic Avenue/Crescent Street	11-20
Atlantic Avenue/Lefferts Boulevard (Queens)	23-37
Archer Avenue/Sutphin Boulevard (Queens)	28-50
168 <sup>th</sup> Street/Jamaica Avenue (Queens)	33-62

## Q56

Jamaica Avenue/Crescent Street	9-15
Jamaica Avenue/Woodhaven Boulevard (Queens)	16-27
Jamaica Avenue/Lefferts Boulevard (Queens)	24-39
Jamaica Avenue/ Sutphin Boulevard (Queens)	30-51
168 <sup>th</sup> Street/170 <sup>th</sup> Street/Jamaica Avenue (Queens)	39-65

## 3.7 Roads

### 3.7.1 The Roadway Network

Broadway Junction is a junction in the truest sense of the word. Not only do several bus, subway and rail lines converge within the study area, but four separate street grids also meet here, each of them demarcated by major roadways.

The Bushwick grid, which extends into Ridgewood, Queens, reaches its southeastern extremity at East New York Yard. Broadway, a NYCDOT-designated local truck route, divides this grid from the Bedford-Stuyvesant grid, which has its eastern tip at the convergence of Broadway and Fulton Street. Atlantic Avenue, a major divided arterial and NYCDOT-designated through truck route, parallels Fulton Street one to two blocks to the south through the study area.

The easternmost tip of another grid lies south of Fulton Street. This is the Crown Heights extension of a mammoth grid which covers almost the entire western third of Brooklyn from Boerum Hill to Bensonhurst.<sup>47</sup> Eastern Parkway runs just to the north of East New York Avenue, which divides this grid from the East New York grid, which extends west to Brownsville and east to Howard Beach, Queens. By area, this grid occupies more of the study area than the others. Pennsylvania Avenue, a NYCDOT-designated local truck route, runs north to south within this grid.<sup>48</sup> A relatively small cove of streets bounded by the Jackie Robinson Parkway, Highland Park and Jamaica Avenue lies to the north of this grid, at the northeastern extremity of the study area.



*The Jackie Robinson Parkway, Pennsylvania Avenue, Bushwick Avenue and Jamaica converge. Left: View looking south. Right: View looking north.*

<sup>47</sup> A case can be made that this grid is separate from the larger one west of Flatbush Avenue. However, all east-west streets from Atlantic Avenue to Sterling Place bend slightly but continue west of Flatbush Avenue.

<sup>48</sup> See <http://www.nyc.gov/html/dot/downloads/pdf/lowertruckroute.pdf> for a map of truck routes which includes the study area. Short sections of Herkimer Street, Van Sinderen Avenue and Fulton Street are also designated local truck routes within the study area.



### 3.7.2 Major Roads

A concentration of major roads exist within the study area. They are summarized below, in alphabetical order.

#### *Atlantic Avenue*

This road passes from east to west through the study area. It runs the entire width of Brooklyn, with a western endpoint at the Brooklyn waterfront near the northern edge of Cobble Hill and an eastern endpoint currently at 94<sup>th</sup> Avenue in Jamaica, Queens. (A short extension is expected to be built to 95<sup>th</sup> Avenue.) Atlantic Avenue has been designated by NYCDOT as a through truck route, meaning that trucks with neither an origin nor destination within the same borough as the road may use the route.

Atlantic Avenue is a two-way street. East of Georgia Avenue, Atlantic Avenue is a divided roadway, with three travel lanes and a parking lane on each side of the median. From Eastern Parkway to Georgia Avenue, Atlantic Avenue at ground level has one lane per direction for local traffic and a parking lane; an elevated express bypass, with two travel lanes in each direction, vaults over much of the study area. (The LIRR Atlantic Division tracks rise beneath the elevated roadway; the East New York station platforms are at ground level).

#### *Broadway*

This road enters the study area from the northwest, and ends at the confluence of East New York Avenue/Jamaica Avenue and the eastern continuation of Fulton Street. Its western terminus is at Kent Avenue, on the Brooklyn waterfront in Williamsburg. Broadway has been designated by NYCDOT as a local truck route, meaning that trucks with an origin or destination within the same borough as the road may use the route to reach their destinations.

For virtually its entire length, including within the study area, Broadway lies beneath the Jamaica Elevated tracks. The support pillars in the study area are not within the street bed, but are instead on the sidewalk.

Broadway is generally a two-way street. One travel lane and one parking lane exists in each direction. However, east of Van Sinderen Avenue, Broadway is a one way street, with two westbound travel lanes and two parking lanes. One of the two travel lanes is also sometimes occupied by parked NYCT vehicles, and a gate near Jamaica Avenue exists which can entirely block access to Broadway from the east, if need be.

#### *Bushwick Avenue*

This road enters the study area from the northwest, and ends at the junction of Pennsylvania Avenue, Jamaica Avenue and the Jackie Robinson Parkway. It generally parallels Broadway, which is one block south, but to reach its origin at Metropolitan and Maspeth avenues in East Williamsburg, the road hooks north.

Within the study area, Bushwick Avenue has two travel lanes in each direction. No parking is allowed along any part of Bushwick Avenue within the study area. However, in practice, parked cars often occupy all or part of one travel lane at the avenue's eastern extremity, between Highland Avenue and Jamaica Avenue. Often these cars are largely parked on the sidewalks, but they will sometimes edge into the adjacent travel lane, limiting that lane's viability for travel.

### *East New York Avenue/Jamaica Avenue*

This road passes from southwest to northeast through the study area. It is essentially one continuous road, but the name changes from East New York Avenue to Jamaica Avenue at Broadway. From Williams Avenue to Alabama Avenue, Jamaica Avenue has been designated by NYCDOT as a local truck route, meaning that trucks with an origin or destination within the same borough as the road may use the route to reach their destinations.

This is one of the longest roads on geographic Long Island, changing names several different times over its entire course, East New York Avenue/Jamaica Avenue begins as Lincoln Road at Ocean Avenue in Prospect-Lefferts Gardens. East of the study area, Jamaica Avenue continues through the remainder of Brooklyn and Queens, becoming Jericho Turnpike at Bellerose, straddling the Queens/Nassau County border. This continuous road, designated NY 25, is named Main Street, Main Road Middle Country Road, or Jericho Turnpike until ending in Greenport, over 80 miles from the City line. (NY25 continues to Orient Point.)

From southwest to northeast, this road has the following configurations as it passes through the study area:

- *Mother Gaston Boulevard-Sackman Street:* Two way traffic with one travel lane and one parking lane per direction.
- *Sackman Street-Junius Street/Pacific Street:* One-way traffic with two parking lanes. No lane markers were evident on this section of East New York Avenue, and traffic generally flows in one lane. However, at the eastern end of this segment, where a bus stop precludes parking on the south side of the street, traffic was witness assuming a two-lane formation, in anticipation of the next configuration.
- *Junius Street/Pacific Street-Fulton Street/Williams Avenue:* Two-way traffic. At this point, the road divides. The exterior service road in each direction remains at ground level. Parking is only permitted on the eastbound service road northeast of Atlantic Avenue; all other service roads north and south of Atlantic Avenue have no parking. Each of these roads are cut off by the ground-level Atlantic Avenue service roads which bracket the East New York LIRR station. Through traffic on East New York Avenue travels via a four lane (two-per direction) underpass beneath the LIRR and the Atlantic Avenue service roads.
- *Fulton Street/Williams Avenue-Pennsylvania Avenue/Bushwick Avenue/Jackie Robinson Parkway:* The road, named Jamaica Avenue east of Broadway, is divided by a median, and carries two to three lanes of traffic in each direction. Parking is only permitted on the eastbound side of the street between Georgia Avenue and Sheffield Avenue.
- *Pennsylvania Avenue/Bushwick Avenue/Jackie Robinson Parkway-New Jersey Avenue/Marginal Street East:* Jamaica Avenue has one eastbound and two westbound travel lanes. There is no parking on the westbound side of the street; parking is technically allowed on the eastbound side, but the presence of a bus stop and several curb cuts limit vehicles to two parking spaces.
- *East of New Jersey Avenue/Marginal Street East:* Jamaica Avenue has one eastbound and one westbound travel lane. On the westbound side of the street, parking is allowed only from 7:00pm to 7:00am every day; parking is permitted on the eastbound side of the street.

### *Eastern Parkway*

This road enters generally runs north-south or northeast-southwest, and largely hugs the western edge of the study area. Its northernmost block is officially known as “Eastern Parkway Extension.” The road originates at Grand Army Plaza in Brooklyn and ends at Bushwick Avenue, within the study area.

A two-way road throughout its run, the segment within the study area is divided by a median and has two travel lanes in each direction. From southwest to northeast, this road has the following parking as it passes through the study area:

- *Pacific Street-Atlantic Avenue:*
  - Northbound: no parking.
  - Southbound: no parking, and no standing from 7:00am to 10:00am Mondays through Fridays.
- *Atlantic Avenue-Herkimer Street:* parking permitted on both sides of the street.
- *Herkimer Street-Fulton Street:*
  - Northbound: parking permitted.
  - Southbound: parking permitted, but no standing 7:00am-4:00pm on school days.
- *Fulton Street-Truxton Street:* no parking on either side of the street.
- *Truxton Street-Cooke Court:* parking permitted on both sides.
- *Cooke Court-Bushwick Avenue:* no parking on either side of the street.

### *Fulton Street*

This road passes from east to west through the study area, although it is briefly interrupted for a block between Williams Avenue and Alabama Avenue. Its western endpoint is at Fulton Ferry in Downtown Brooklyn.<sup>49</sup> The road continues east throughout the width of the Brooklyn before assuming the name 91<sup>st</sup> Avenue and ending about half a mile into Queens, in Woodhaven. From Williams Avenue to Alabama Avenue, Fulton Street has been designated by NYCDOT as a local truck route, meaning that trucks with an origin or destination within the same borough as the road may use the route to reach their destinations.

The western portion of Fulton Street within the study area is a two-way road, with one travel lane and one parking lane per direction. The eastern portion which runs beneath the Jamaica Elevated, is an eastbound one-way street with one travel lane and two parking lanes.

### *Pennsylvania (Granville Payne) Avenue*

This road enters the study area from the south, and runs north, ending at the intersection of Bushwick Avenue, Jamaica Avenue and the Jackie Robinson Parkway. Its southern origin is Exit 14 of the Belt Parkway, south of Starrett City in Brooklyn. Within the Study Area, Pennsylvania Avenue has been designated by NYCDOT as a local truck route, meaning that trucks with an origin or destination within the same borough as the road may use the route to reach their destinations.

A two-way road throughout its run, two to three lanes of traffic exist in each direction. From north to south, this road has the following parking as it passes through the study area:

- *Bushwick Avenue/Jamaica Avenue/Jackie Robinson Parkway-Fulton Street:* no parking.
- *Fulton Street-Atlantic Avenue:*

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<sup>49</sup> Fulton Street’s original path has been renamed Cadman Plaza West between Prospect Street and Pierrepont Street; the portion north of Prospect Street is now called Old Fulton Street. Additionally, a short strip of the road between Cadman Plaza West and Adams Street/Brooklyn Bridge Boulevard is now part of Cadman Plaza, but a pedestrian pathway which passes diagonally to the north of Borough Hall still marks the street’s original alignment. Finally, a section of the street between Adams Street/Brooklyn Bridge Boulevard and Flatbush Avenue is called Fulton Mall; it is effectively a busway.

- Northbound: On the northern half of the block, no standing from 7:00am to 10:00am and 4:00pm to 7:00pm, except Sundays. On the southern half of the block, a special parking restriction exists immediately in front of a medical building, but otherwise, the no standing regulation from the northern half of the block exists, along with one-hour parking from 10:00am to 4:00pm. A no stopping regulation exists immediately for a short distance to the north of Atlantic Avenue.
- Southbound: no parking.
- *Atlantic Avenue-Liberty Avenue:*
  - Northbound: One-hour parking is permitted from 10:00am-4:00pm Mondays through Saturdays.
  - Southbound: No parking.

### 3.8 Vehicular Traffic

While vehicular traffic was not the primary focus of this study, the confluence of several major roads – and the bus routes which travel along them – would ultimately necessitate a detailed traffic volume analysis if larger-scale development is contemplated within the study area. Any future activity within the study area, no matter how transit-oriented it is, will inevitably affect vehicular movement. Therefore, a baseline of existing conditions would be needed.

Any lack of available vehicular capacity along crucial arteries such as Atlantic Avenue, Pennsylvania (Granville Payne) Avenue, and Eastern Parkway would reinforce the need to make any future reuse of land within the study area transit oriented. Effective parking policies and siting of future land uses could encourage development predominantly reached by subway, bus and commuter rail.

### 3.9 On-Street Parking Regulations

In August of 2007, the study team walked all streets in the study area to inventory all on-street parking regulations. Again, this was done to provide baseline existing conditions that could be used in future analyses or activity.

The on-street parking regulations vary greatly in the area – 49 different regulation types were found within the relatively small study area. They include alternate side parking on the residential blocks to restricted parking on commercial streets such as meter parking, time restricted parking, no standing, bus stops, hydrants, and authorized parking only. Regulations cover either a specific time of the day or a specific day of the week. The most common form of curbside regulations is alternate side parking, which is necessary for street cleaning once or twice per week.

Parking is permitted within the study area, except at locations where the traffic flow would be adversely affected, particularly during the AM and PM peak periods, or where curb space is needed for trucks and/or other authorized vehicles (such as police, fire, or transit vehicles). See Table 3-K for a list of the different curb regulations and Figure 3-R for their locations.





Broadway Junction Transit Capacity Study  
**ON-STREET PARKING REGULATIONS**  
**FIGURE 3-T**

Study Area



Open Space



On-Street  
 Parking Regulations



0 250 500 Feet



**Table 3-K: Key to On-Street Parking Regulations in Figure 3-R**

<i>number</i>	<i>regulation</i>	<i>number</i>	<i>regulation</i>
1	Bus Stop – No Standing	26	No Standing – Except Trucks Loading/Unloading - 8:00 AM to 6:00 PM – Mon–Fri
2	1 Hour Metered Parking – 8:00 AM to 7:00 PM – Mon–Fri	27	No Standing Anytime
3	1 Hour Metered Parking – 9:00 AM to 4:00 PM – Except Sun	28	No Standing Anytime - 7:00 AM to 7:00 PM – Mon–Fri
4	1 Hour Metered Parking – 10:00 AM to 4:00 PM – Except Sun	29	No Standing Anytime – Except New York City Police Department Vehicles
5	1 Hour Metered Parking – 10:00 AM to 7:00 PM – Except Sun	30	Street Cleaning Regulations – 12:00 to 3:00 AM – Mon & Thurs
6	No Parking – 7:00 to 10:00 AM – Mon–Fri	31	Street Cleaning Regulations – 12:00 to 3:00 AM – Tues & Fri
7	No Parking – 7:00 to 10:00 AM – Except Sun	32	Street Cleaning Regulations – 3:00 to 6:00 AM - Mon & Thurs
8	No Parking – 7:00 to 10:00 AM & 4:00 to 7:00 PM – Mon–Fri	33	Street Cleaning Regulations – 3:00 to 6:00 AM – Tues & Fri
9	No Parking – 7:00 AM to 7:00 PM – Except Sun	34	Street Cleaning Regulations – 7:30 to 8:00 AM - Mon & Thurs
10	No Parking – 8:00 AM to 6:00 PM – Mon–Fri	35	Street Cleaning Regulations – 7:30 to 8:00 AM - Tues & Fri
11	No Parking – 8:00 AM to 6:00 PM – Except Sun	36	Street Cleaning Regulations – 8:00 to 9:00 AM - Mon & Thurs
12	No Parking – 4:00 to 7:00 PM – Mon–Fri	37	Street Cleaning Regulations – 8:00 to 9:00 AM - Tues & Fri
13	No Parking Anytime	38	Street Cleaning Regulations – 8:00 to 9:30 AM - Mon & Thurs
14	No Parking Anytime - 7:00 AM to 7:00 PM – Except Sun	39	Street Cleaning Regulations – 8:00 to 9:30 AM - Tues & Fri
15	No Standing - 7:00 to 10:00 AM – Mon– Fri	40	Street Cleaning Regulations – 8:00 to 9:30 AM - Except Sun
16	No Standing - 7:00 to 10:00 AM – Except Sun	41	Street Cleaning Regulations – 8:30 to 10:00 AM - Mon & Thurs
17	No Standing - 7:00 to 10:00 AM & 4:00 to 7:00 PM – Mon – Fri	42	Street Cleaning Regulations – 8:30 to 10:00 AM - Tues & Fri
18	No Standing - 7:00 to 10:00 AM & 4:00 to 7:00 PM – Except Sun	43	Street Cleaning Regulations – 9:00 to 10:30 AM - Mon & Thurs
19	No Standing - 7:00 to 8:00 AM – Except Sun	44	Street Cleaning Regulations – 9:00 to 10:30 AM - Tues & Fri
20	No Standing - 7:00 AM to 4:00 PM – Except School Days	45	Street Cleaning Regulations – 9:30 to 11:00 AM - Mon & Thurs
21	No Standing - 7:00 AM to 7:00 PM – Mon–Fri	46	Street Cleaning Regulations – 9:30 to 11:00 AM - Tues & Fri
22	No Standing - 4:00 to 7:00 PM – Mon–Fri	47	Street Cleaning Regulations – 11:30 AM to 1:00 PM - Mon & Thurs
23	No Standing - 4:00 to 7:00 PM – Except Sun	48	Street Cleaning Regulations – 11:30 AM to 1:00 PM - Tues & Fri
24	No Standing – Except New York City Transit Vehicles	49	No Posted Curb Regulations or Regulation Sign Missing
25	No Standing – Except Trucks Loading/Unloading - 6:00 AM to 6:00 PM – Mon–Fri		

## 4. EXISTING AND PROJECTED TRANSIT CAPACITY

### 4.1 Methodology

This chapter attempts to project transit capacity based upon anticipated populations growth in the neighborhoods through which the A, C J/Z and L pass through east of their peak loading points in Brooklyn.

To attempt a projection of year 2030 conditions, DCP's own population projections were used. In 2006, DCP developed citywide population projections for 10-year increments through 2030. Table 4-A shows the anticipated population growth in Brooklyn and Queens (the two boroughs through most relevant to this report) through 2030.

Using a scenario where this population is generally distributed in higher concentrations along existing transit, all data was projected to 2007 by subtracting 70 percent of the projected population growth between 2000 and 2010, assuming a steady 10 percent of the 2000-2010 growth rate per year over the decade. This was done to try to eliminate projected 2000-2007 population growth so that NYCT hourly ridership data from May 2007 could match with population projections with the same year as a baseline.

The May 2007 peak hour riderships for each station at and east of the peak loading points of the A, C, J/Z and L services (shown in Figure 3-Q) were then multiplied by anticipated 2007-2030 population growth.<sup>50</sup> For the A, C and L lines the aggregate peak hour is 8:00am-9:00am, while for the J/Z it is 7:00am-8:00am. Since these hours reflect the peak loading points, they are the ones used, regardless of whether individual stations may have higher ridership at other hours. Broadway Junction, where all of these lines converge, has a 7:00am-8:00am peak; this hour is used in the calculations for that station. 2007 data for the Broadway Junction station itself comes from the results of DCP's internal station count, as shown in Table 3-C in Section 3.3.1.

**Table 4-A: 2000 Population and Projected 2030 Populations of Brooklyn and Queens, and Projected 2000-2030 and 2007-2030 Population Changes<sup>51</sup>**

<i>Borough</i>	<i>2000 population</i>	<i>2007 U.S. Census Bureau population estimate</i>	<i>projected 2030 population</i>	<i>projected 2000-2030 population change</i>	<i>projected 2007-2030 population change</i>
Brooklyn	2,465,326	2,528,050	2,718,967	10.3%	7.6%
Queens	2,229,379	2,270,338	2,565,352	15.1%	13.0%
Brooklyn + Queens	4,694,705	4,798,338	5,284,319	12.6%	10.1%

<sup>50</sup> May ridership tends to be over 3.4 percent above average, meaning that the final projected available subway capacity will be slightly more conservative than if the hourly ridership was taken over the course of an entire year: Source: NYCT monthly ridership reports, as analyzed by the study team.

<sup>51</sup> <http://www.census.gov/>

Aside from structural constraints, the primary limitation affecting available subway capacity is each line's peak loading point. (See definition, page 9) Since the most recent systemwide peak loading point data is from 2006 (Table 4-B), ridership for 2007 at all stations east of the peak loading points except for Broadway Junction was compared to 2006 (Table 4-C). While inexact, the result yielded a reasonable extrapolation of peak loading point passenger volumes for 2007. L Line service enhancements implemented in late 2007 were also factored in.

Using the subway as the prime determinant of how much capacity there is for future land uses was chosen over buses or the LIRR because the affected bus routes act to some degree as feeder services to the Broadway Junction Complex, and because the LIRR does not go to Manhattan. Motor vehicle capacity was not used because doing so would be inconsistent with the goal of encouraging transit-oriented development.

Obviously, these estimates have their limitations. Growth will not be uniform across each borough or neighborhood – specific developments may affect nearest subway station's ridership differently depending on its land use or distance from the station. For example, neighborhoods such as East Williamsburg, which have more than one set of subway lines running through it, may not necessarily accrue ridership at the same rate adjacent to each line. Growth projections for small areas also have greater variability than city- or boroughwide projections do. Other external factors (described in Section 4.4.3) could also affect overall ridership, and if disproportionate growth in passenger levels continues, ridership may exceed projections. However, the following tables indicate, in a general sense, the pressures upon available subway capacity and how they could impact Broadway Junction's development potential.<sup>52</sup>

## 4.2 Current Available Transit Capacity

A step-by-step approach was taken to determine what a reasonably accurate range would be for how much additional development could be sustained within the study area, given existing and anticipated future conditions.

### 4.2.1 Peak Subway Loading Points

Table 4-B shows the peak loading points of each relevant subway line as of 2006, the last year for which data is available.

<b>Table 4-B: Peak Loading Point Volumes and Available Capacity of A, C, J/Z and L Subway Lines, 2006</b>						
<i>line</i>	<i>peak load point<sup>53</sup></i>	<i>TPH<sup>54</sup></i>	<i>peak hour passenger volume</i>	<i>guideline capacity<sup>55</sup></i>	<i>volume/ capacity ratio</i>	<i>available capacity</i>
A	Jay Street-Borough Hall	17.7	18,454	24,733	74.61%	6,279
C	Jay Street-Borough Hall	7.8	6,417	9,087	70.62%	2,670
J/Z	Marcy Avenue	12.0	8,716	13,920	62.61%	5,204
L	Bedford Avenue	15.0	18,258	17,400	104.93%	-858
<b>TOTALS</b>			<b>51,845</b>	<b>65,140</b>	<b>79.59%</b>	<b>13,295</b>

<sup>52</sup> Nothing in this report implies any specific sequence or timeline for development. For example, Broadway Junction is not necessarily being considered "first in line" or "last in line" as a development priority due to the data contained within this report.



Before factoring in ridership growth and service increases from 2007, the L Line was running over capacity with 15tph. While A and C Line trains had ample additional capacity, they were running at a combined 25-26tph, which is the maximum capacity of the two-track segment both lines share from Hoyt-Schermerhorn Streets to Canal Street.

To obtain a more recent estimate of peak hour passenger volumes, ridership for 2007 at all stations east of the peak loading points except for Broadway Junction (which had internal passenger flow counts done as part of this study) was compared to 2006. The total average percentage growth for each line in 2007 was then added to the 2006 peak hour passenger volumes. While inexact, the result yielded a reasonable estimate of peak loading point capacities in 2007. The results are in Table 4-C. Two additional peak hour tph introduced on the L Line in late 2007 are factored into this table.

**Table 4-C: Estimated Peak Loading Point Volumes and Available Capacity of A, C, J/Z and L Subway Lines, 2007**

<i>line</i>	<i>peak load point</i>	<i>TPH</i>	<i>estimated peak hour passenger volume</i>	<i>guideline capacity</i>	<i>estimated volume/capacity ratio</i>	<i>estimated available capacity</i>
A	Jay Street-Borough Hall	17.7	18,686	24,733	75.55%	6,047
C	Jay Street-Borough Hall	7.8	6,498	9,087	71.51%	2,589
J/Z	Marcy Avenue	12.0	9,170	13,920	65.88%	4,750
L	Bedford Avenue	17.0	19,645	19,720	99.62%	75
<b>TOTALS</b>			<b>53,999</b>	<b>67,460</b>	<b>80.05%</b>	<b>13,461</b>

The additional L service has brought that line's v/c ratio just barely below 100 percent, but given the relentless ridership growth along this line over the past decade (which showed no signs of abating in 2007), a ratio below 100 percent appears short-lived. In Section 3.3.5, this report reviews several improvements NYCT is planning or implementing on the line to allow it to carry 20-22tph. Should that happen, 3,480 to 5,800 additional passengers would be able to utilize the L during the peak hour, increasing capacity by approximately 18 to 29 percent.

While the need for capacity expansion on the other subway lines is not as urgent, all three other routes have the potential to accommodate more passengers. C Line trains could expand from eight to 10 cars. Additional service is theoretically possible on the J line, although the numerous infrastructure deficiencies on that line may severely limit the ability to add more service if needed. In the long term, A Line capacity could be expanded slightly if the proposed 75-foot-long R179 car fleet, tentatively scheduled to be delivered in the '10s, eliminates transverse seating and uses standard longitudinal seats, i.e. seating entirely facing inward from both edges of the car to the center. Table 4-D summarizes potential capacity improvements on all of the above lines.

<sup>53</sup> Both the A and C lines have southbound peak loading points in Manhattan which carry more passengers than the ones in Brooklyn. Service planning decisions would probably be governed by the Manhattan peak loading points more than the Brooklyn ones.

<sup>54</sup> For the A and C lines, this figure represents actual tph through the peak loading point. The A has 18.0 scheduled tph; the C has 8.0 tph. The v/c ratio is calculated using actual tph, not scheduled tph. Guideline capacity is calculated by multiplying

<sup>55</sup> Guideline capacity is a standard used by NYCT to determine the threshold at which passenger loading exceeds available space within a subway car. For 60.5-foot B Division cars such as those on all of the above lines, the threshold is 145 passengers per car; 75-foot B Division cars, which share the A Line with 60.5-foot cars, have a 175 passenger per car threshold. C, J/Z and L trains all run 484-foot-long trains (eight 60.5-foot cars). A trains run with either 10 60.5-foot cars (605 feet) or eight 75-foot cars (600 feet), but NYCT uses 75-foot cars for its A Line guideline capacity calculations. If necessary, C trains can run 10 cars, but, J/Z and L trains, due to platform limitations, are confined to their current lengths.

**Table 4-D: Potential Capacity Improvements on A, C, J/Z and L Subway Lines**

<i>line</i>	<i>capacity improvement</i>	<i>peak hour impact</i>	<i>potential obstacles and drawbacks</i>
A	R179 subway car fleet with longitudinal seating only	Guideline raised from 175 passengers per car to 181-185, an increase of 841-1,409 passengers per hour, or 3.4%-5.7%.	Less seating; will not be available until at least 2014.
C	10-car trains	Passenger capacity increase of 2,188, or 25%.	Storage space needed for additional cars; passengers might switch to faster A express trains at the first possible opportunity, crowding them further.
J/Z	Expansion to 16TPH (leaving 10TPH for M Line)	Passenger capacity increase of 4,640, or 25%.	Numerous physical limitations of line may affect ability to add this much service; storage space needed for additional cars.
L	Expansion to 20-22TPH	Passenger capacity increase of 3,480-5,800, or 17.6%-29.4%.	Storage space needed for additional cars; contingent on planned NYCT line upgrades.

The L Line faces the press of rapidly increasing ridership, but it may be the A Line which will be the most severely constrained if ridership continues to grow along its route. In Manhattan, its southbound peak load point – 125<sup>th</sup> Street – was operating at over 83 percent of capacity in 2005 and 87 percent in 2006. Additional trains per hour on this line are not likely, since the Cranberry Street Tunnel, through which the A and C share trackage, is now maxed out at 26tph. All A trains are already running at their maximum possible lengths. Only a reconfigured car interior offers some modest relief.

#### 4.2.2 Bus and LIRR Analyses

Lack of depot space and the cost of adding service do more to limit adding bus service than peak loading points do. A discussion of both factors, including the impact that a new depot which opened in January 2008 has had on available capacity at East New York, is included in a discussion of bus service in Section 4.4.1.

Since the LIRR's ample capacity to accommodate additional passengers has been documented, and since future service patterns (discussed in Section 4.3.3) could assume one of several forms over the coming decades, analysis was not done of how many more potential passengers could be accommodated by this stretch of railroad.

### **4.3 Projected 2030 Transit Capacity**

#### 4.3.1 Subways

Table 4-E yields line-by-line estimates of available subway capacity in 2030, both using existing subway service levels and the potential capacity improvements reviewed in Table 4-D. It is important to stress that the estimated 2030 available capacity is *post*-projected population growth and *post*-capacity improvements.

The estimated ridership was *not* derived by simply adding up all of the projected 2030 boardings at each line's station, because not all projected new passengers will be heading to the CBD/Downtown Brooklyn core. Instead, the total May 2007 average peak hour ridership for each line was compared to projected 2030 levels, and the percentage change in ridership per line was applied to the 2007 figures from Table 4-C.

<b>Table 4-E: Potential Available Subway Line Capacities, 2030</b>						
Projected Ridership Increases: A: 16.70% C: 17.11% J/Z: 12.63% L: 13.45%						
<i>Line</i>	<i>2030 estimated peak hour ridership</i>	<i>existing 2007 peak guideline capacity</i>	<i>peak guideline capacity with improvements</i>	<i>2030 volume/ capacity ratio with existing capacity</i>	<i>2030 volume/ capacity ratio with capacity improvements</i>	<i>estimated available 2030 capacity with improvements</i>
A	21,807	24,733	25,574-26,142	88.17%	83.42%-85.27%	3,767-4,335
C	7,610	9,087	11,358	83.75%	67.00%	3,748
J/Z	10,328	13,920	18,560	74.20%	55.65%	8,232
L	22,287	19,720	23,200-25,520	113.02%	87.33%-96.06%	913-3,233
	<b>62,032</b>	<b>67,460</b>	<b>78,692-81,580</b>	<b>91.95%</b>	<b>76.04%-78.83%</b>	<b>16,660-19,548</b>

Based on the data, and based on the assumptions laid out in Section 4.1, DCP estimates that, if the potential and anticipated capacity improvements from Table 4-D are made, subway routes serving Broadway Junction would be able to accommodate the possible population growth scenario for 2030, with substantial additional capacity remaining.

DCP estimates that up to 16,660 to 19,548 additional peak-hour, peak-direction subway users could be accommodated by the subway routes serving the study area. Note that this figure represents estimated future available capacity not just for the Broadway Junction station, but for other stations on these lines as well.

However, these analyses results come with a significant caveat. Note the lack of capacity on the L Line and the copious available space for passengers on the J/Z Line. Even with capacity upgrades, the L may be running at over 96 percent of peak-hour, peak-direction capacity by 2030. While this peak would not affect all L service users at all times of the day, it does represent a potential planning challenge.

While the estimates shown in Table 4-E apply to the peak hour and peak direction, it is important to note that in the coming years many new passengers may be regularly using these routes outside peak hours, or will not be commuting through the peak loading point. Many subway passengers may be reverse commuting – recent rezonings such as the one at Jamaica could encourage development of regional business centers that would generate more reverse-peak and intermediate-distance commuters. (Reverse commuting in general is growing at a faster rate than traditional commuting.)

The capacity for growth within the study area could also be affected by future land use decisions in the Broadway Junction vicinity. These decisions would require consideration of numerous factors that are outside the scope of this study, including land use, neighborhood character, and other infrastructure, and would entail outreach and consensus building with community stakeholders.

Any projection, no matter how well-grounded in available data and reason, is subject to unforeseen social, economic, geopolitical and technological developments. If the rapid subway ridership growth of the past decade continues unabated, the projected passenger loads in the above table may be reached far sooner than 2030. As with many projections, the reasoning and methodology creating it is always open to argument. Other, more mundane factors can also warp these numbers. Try as they might, after over 100 years, no one has successfully convinced New Yorkers to uniformly stay on a local train when an express is pulling in across the platform. C Line passengers in or near the study area will probably continue to seek out a faster ride on arriving A trains, making truly accurate predictions about both routes' available capacities elusive.

#### 4.3.2 Buses

In January 2008, a new depot at Grand Avenue in Queens opened, and although none of the routes discussed in this report were transferred there, the total amount of buses stored overnight at East New York Depot and its bus storage yards dropped from 286 to 234. With a total complex bus capacity in the range of 276-279, the overnight occupancy rate has dropped to 83.9 to 84.8 percent.

At first glance, this means that 42 to 45 additional buses can be accommodated at the depot and its associated yards. However two additional factors must be considered. 1) While five of the bus routes which pass through the study area are based out of East New York, seven other routes (the B7, B14, B17, B42, B45, B65, and B82) also use East New York as their base. Ridership increases or extensions of these routes would also warrant allocation of additional buses to the depot. 2) Currently, 17 to 20 buses are stored in the “paint shop” section of the depot, and a decision about whether to demolish this structure and replace it with a new bus parking area has not yet been made. If this project were to occur in the coming years, total available capacity of the depot and its yards would temporarily be reduced to 259, shrinking the potential available capacity to 25 additional buses for at least 14 months.<sup>56</sup>

Additional bus capacity has the potential to increase the study area’s attractiveness for development. However, an additional factor to consider is that buses and subways do not exist in a vacuum. Any significant expansions, changes, additions, or reductions to the bus network serving Broadway Junction would likely impact that station’s subway ridership, since, as seen in Table 3-I, over a third of the current passengers entering the station are doing so from local buses.

#### 4.3.3 LIRR Atlantic Division

Even at peak hours, LIRR train capacity between Jamaica and Flatbush Avenue is adequate to handle ridership at East New York and along the Atlantic Division as a whole. (See Table 3-H in Section 3.4.1.) The vast majority of ridership from East New York is to and from points east, even during peak periods when the assumption would be that more passengers would be commuting to and from Flatbush Avenue. Since the LIRR parallels the A and C west of the study area, some of that excess capacity may have limited use as a relief valve, drawing passengers destined for Downtown Brooklyn from more crowded A trains. Reduced LIRR fares between East New York and Flatbush Avenue could draw more riders, but could push more connecting subway passengers to the already-overcrowded 2, 3, 4 and 5 lines instead of keeping them on the A and C, which have more available capacity.

Longer-term questions about utilization of the LIRR East New York station – and the Atlantic Division – remain open. One of several potential fates await this right-of-way after completion of the East Side Access project, which will provide direct LIRR service into Grand Central Terminal. Service could continue as is, or could be truncated to a permanent shuttle between Flatbush Avenue and Jamaica. If funding materializes to use the Atlantic Division as part of a link between JFK Airport/Jamaica and Lower Manhattan (either as a commuter rail or subway), the right-of-way’s use as an alternative to A and C service could become much more significant than it now is, and could augment this corridor’s capacity. Proposals to link such a route to the 2<sup>nd</sup> Avenue Subway, creating a continuous service from 125<sup>th</sup> Street in Manhattan to JFK Airport, would further amplify the line’s importance. Still other possibilities, such as partially relocating J/Z service into the tunnel east of the study area, cannot be discounted.

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<sup>56</sup> MTA New York City Transit Contract C-40451. <http://www.mta.info/nyct/procure/miscproj/c40451.pdf>.



## 4.4 Factors Within and Beyond the Study Area

DCP has been able to determine a range of potential transit capacity that can be utilized at Broadway Junction. However, the complicated relationship between the study area and existing transit to and from the area prevents simple, unambiguous proclamations that all potential development is viable.

Other factors also can affect the future of Broadway Junction – some of them from well beyond the study area boundaries. These are described below.

### 4.4.1 Buses: Depot Storage Space and Cost of Operations

According to NYCT, peak loading is not the significant obstacle on the bus routes serving Broadway Junction that it is on the subways. Scheduling along all six routes is dictated by the ability to match capacity with the peak passenger load, and all six routes roughly achieve that match.<sup>57</sup> Unlike subways, buses are not as constrained by exclusive signaling and rights-of-way – buses can leapfrog a delayed bus on their own route, and as many of them can be scheduled as the road's capacity will allow. Yet buses are limited by two other considerations: depot space and operational cost.

Every route discussed in this study except for the B20 is based out of East New York Depot; the B20 originates at Fresh Pond Depot.<sup>58</sup> By the end of 2007, East New York – including Havens Lot and Herkimer Lot (see Section 3.2.1) – was storing 286 buses in the overnight hours, when depots are at their fullest. This was seven to 10 buses over capacity. However, in January 2008, a new depot at Grand Avenue in Queens opened, and while none of the Broadway Junction routes were transferred there, the total overnight depot and bus storage yard count was reduced from 286 to 234 due to buses serving other routes being transferred to the Grand Avenue Depot..

Cost is another factor when adding bus service. Expanding the B83 bus route is expected to increase annual operating expenses on the route by \$875,000.<sup>59</sup> While service expansion costs may be partially offset by the additional revenues, NYCT and the MTA as a whole are operating under tremendous economic pressures in an increasingly uncertain economic climate. The MTA is also paying for two additional major network expansions: the 2<sup>nd</sup> Avenue Subway and LIRR East Side Access – this aside from ongoing efforts to rehabilitate the subway and bus networks and keep them in a state of good repair. Amid constant pressure to keep transit fares at or close to their current levels and search for new revenue sources, NYCT may find it more difficult to obtain funding for service expansions.

### 4.4.2 Existing Population and Land Use Within the Study Area

Any reuse of existing land within the study area would have to be cognizant of the 4,377 residents (as of 2000) who live there. Most of these residents are predominantly clustered in the eastern and western thirds of the study area.

The eleven blocks largely along the southern edge of the study area are part of the East New York Industrial Business Zone. The Bloomberg administration has guaranteed not to support rezoning of any lots within an IBZ for residential uses. While this does not preclude development within the IBZ, it limits its type to manufacturing uses.

The land and airspace directly above and land surrounding the NYCT subway/bus depots and maintenance facilities appear to be the most viable locations for new development. One possible way to

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<sup>57</sup> Source: Ira Haironson, Manager, Brooklyn/Queens/Staten Island Bus Service Planning, NYCT, November 30, 2007.

<sup>58</sup> Some buses based out of East New York normally assigned to other routes are assigned to the B20 run during school hours.

<sup>59</sup> NYCT press release, September 24, 2007. <http://mta.info/mta/news/releases/?en=070924-NYCT118>. NYCT expects increased ridership on the route to partially offset these costs.

accommodate new land uses is to build a deck over existing ones. Both NYCT's East New York Yards and the New York & Atlantic Railway's Bay Ridge Line are included in DCP's *Inventory of Decking Opportunities over Transportation Properties*. One such parcel in the study area lies immediately above the subway yards and measures over 5 acres.<sup>60</sup>

#### 4.4.3 External Factors

No neighborhood's long-term development exists in a vacuum. As of September 2007, there may have been enough combined subway capacity to add over 13,450 available passengers to the A, C, J/Z and L (see Table 4-D), but committing that number entirely to the Broadway Junction study area would be short-sighted—especially since several external factors limit the potential growth of the study area, and the transit system's ability to absorb such growth:

- *Citywide growth in subway ridership, and transit capacity constraints.* From 1997 to 2007, annual systemwide subway ridership grew by about 47.2 percent – from 1.062 billion to 1.562 billion – a level not reached since 1951.<sup>61</sup> The disproportionate growth in subway ridership is attributable to several factors, such as introduction of universal free bus-subway transfers, unlimited-ride MetroCards, and free ride incentives for purchases on declining-balance MetroCards. Increasing system reliability and a prosperous economy may also have played roles. More recently, the high cost of gasoline may have also caused modal shifts to transit. Rapid usage growth, however, brings its own problems: by 2006, nine of the subway's 22 major lines were operating at over 95 percent of capacity at their peak loading points: the 2, 3, 4, 5, 6, 7 (express), B, E, and L.<sup>62</sup> The L is a particular source of concern as far as Broadway Junction is concerned. (See Section 3.3.5.)
- *Systemic transit constraints.* The lack of one-seat J/Z service to Midtown decreases the attractiveness of the study area, but options such as combining the M and V offer no easy panacea, since the new service would not be able to run 605-foot trains. Construction of a commuter-oriented residential enclave could therefore further tax the L Line, which travels along 14<sup>th</sup> Street and provides transfers to trains along every north-south subway route in Manhattan farther north than the J/Z does.
- *Changes in bus operating practices.* In 2008, NYCT introduced limited-stop Select Bus Service on the Bx12 route in the Bronx. Incorporating some elements of bus rapid transit, Select Buses utilize priority signaling and exclusive lanes along parts of their route. Prepaid boarding, widely used in other transit systems worldwide, also reduces bus stop times, since passengers can now legally enter through the back door and avoid queuing at the farebox. Bus routes serving the study area could theoretically be candidates for future Select Bus routes, which would increase the potential reach of the study area as an easy commuting destination.
- *Other external factors.* Several other factors beyond the control of the City or community can affect the course, pace, or capacity of development in the area, such as transit fare increases, shifts in employment destinations, economic cycles and the cost of materials and labor.

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<sup>60</sup> *Inventory of Developable Air Rights over Transportation Properties*. NYDCP, publication pending. Pp. 228-231

<sup>61</sup> MTA NYCT 2007 subway station annual ridership data

<sup>62</sup> Source: NYCT 2006 peak loading point data. While ridership has grown since 2006, it is unlikely that peak loading point ridership has broken 95 percent of capacity on any other line by early 2008. N/W Line express trains were the next most crowded, reaching 89.10 percent of capacity at Queensboro Plaza.

## 5. RECOMMENDATIONS AND NEXT STEPS

### 5.1 Recommendations Based Upon Existing Land Use and Transit Capacity

- Working with community stakeholders, a further study should be undertaken which would determine the best way to utilize the land immediately surrounding this juncture of subway, bus and rail routes.
- Determine locations within the station complex where passenger flow is constrained – both on platforms and along transfer passageways. Station element capacity expansion may ultimately be needed, especially if development occurs in the study area. The lengthy escalator and elevated walkway connecting the J/Z and L with the A, C and the front entrance may ultimately need to be widened, and a fourth escalator installed, if feasible.
- To help balance platform loading, add two seating areas at both the Queens- and Manhattan-bound J/Z platforms and the Queens- and Manhattan-bound A/C platforms. Signage encouraging passengers to move towards the center of the platforms should be installed.
- If NYCT decides to supply the C Line with 10-car trains in the near future, a targeted marketing campaign aimed at C Line passengers between Euclid Avenue and Jay Street should be launched encouraging passengers to stay on the C instead of transferring to the A train at express stops. Brooklyn C Line passengers from Broadway Junction west save up to only 6 minutes when heading to destinations as far away as 42<sup>nd</sup> Street. With 10 cars, C trains would be operating with appreciably more available capacity than A trains.



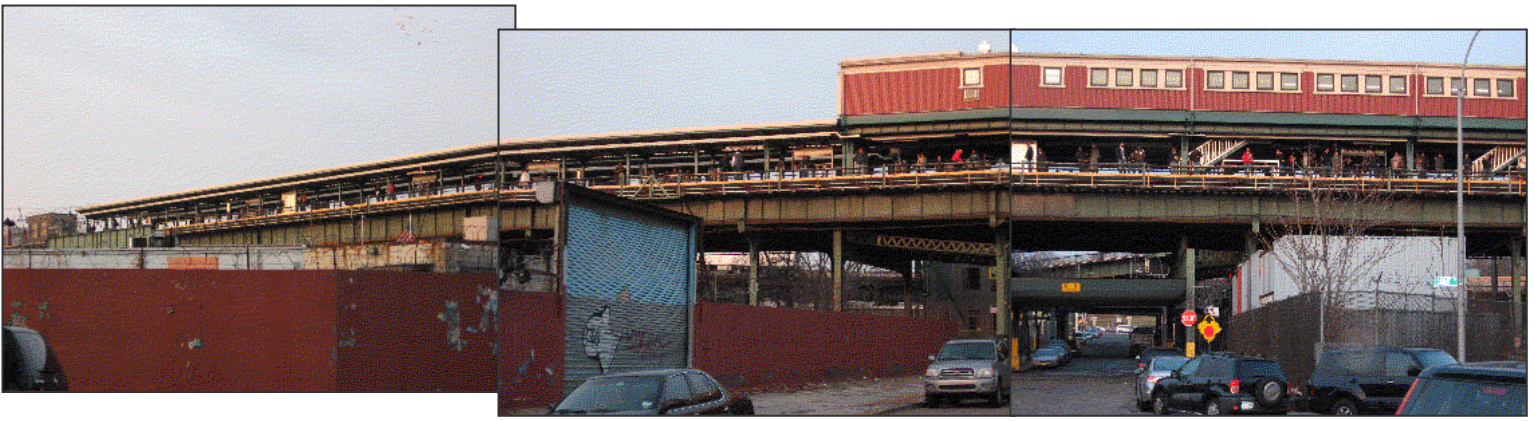
*In the PM peak, passengers from a Queens-bound A train fill the platform's only existing platform exit.*

### 5.2 Suggestions to Improve Transit Capacity, Facilities and Service

The following suggestions tend to be longer term in scope. Some of them also would require larger expenditures, but with the benefit of more significant service or facility improvements.

- To help balance platform loading, the Eastern Parkway entrance to the J/Z Line platforms should be rehabilitated and reopened – especially if increased activity comes to the study area. For the A/C platforms, stairways to Sackman Street (a short distance from Eastern Parkway) should ultimately be constructed at the west ends of both platforms.
- Investigate ways that future development in the study area could be linked with employment, residential or cultural destinations that do not involve use of the L Line. Commercial development in places such as Jamaica and reverse commute destinations could, in the long term, more equitably balance service utilization. Lower Manhattan, the Lower East Side, Downtown Brooklyn, and along Broadway in Brooklyn are among other potential destinations. The vast





*Above: Although only 73 people were visible on the eastbound J/Z platform at the beginning of this typical PM rush hour period, uneven platform loading exists in this composite view. Thirty-one passengers were counted in the photo of the platform's east end (at right, near the stairs), 24 in the middle photo, an 18 in the left (western) photo – which covers more than one-third of the entire platform. When the platform is more crowded, this trend is exacerbated.*

*Below: the Eastern Parkway mezzanine entrance, closed to passengers.*

majority of available subway capacity is geared towards these area, and while it appears that some minor excess L Line capacity will exist in 2030, it may be limited compared to that of the J/Z, C, and to some extent the A services. However, if the study area is developed as a commercial center, larger quantities of reverse peak commuters could be accommodated on the L Line.



- The upcoming R179 order of 75-foot subway cars should have longitudinal seating to allow higher guideline capacities per car.
- The L Line terminal interlocking east of 8<sup>th</sup> Avenue should ultimately be rebuilt closer to 8<sup>th</sup> Avenue, increasing line capacity.
- If significant development is expected to occur in or west of the study area along Broadway, NYCT should investigate the feasibility of reintroducing 6<sup>th</sup> Avenue K Line service via Chrystie Street to the Broadway-Brooklyn/Jamaica Line. The cost and difficulty of extending platforms to allow 10-car trains would be a major factor in determining how far east such a service would penetrate. Any analysis of reactivating K service would have to measure the impact of potential service losses along the Nassau Loop and the current peak hour M service along the West End Line. A comparative analysis of the benefits and drawbacks of K Line service versus extended V Line service to Church Avenue in Brooklyn would also need to be undertaken.
- An L Line which ultimately runs 20 to 22TPH should be able to accommodate anticipated growth through 2030. However, should additional capacity be needed, NYCT should consider undertaking detailed design, engineering and cost analyses in the short term for extending all



platforms and yard tracks used by the route to accommodate both 9- and 10-car trains in the long term.

- The City should work with and support any future efforts by NYCT to find additional yard space for L Line traincars. Construction of additional L Line yard space will ultimately be necessary, regardless of whether lengthier trains are ultimately needed. Five to six 10-car tracks could be added by adding onto the southern flank of the six-track elevated deck which parallels Broadway within East New York Yard. (The extension would need to be at a slightly higher elevation than the existing deck.) Additional tracks could be added if the building to the southwest can be shaved down. In general, the more that East New York Yard can be reconfigured to allow complete 8- or 10-car trainsets to use it, the more operationally efficient it will be. A long-term goal should be the removal of all tracks that cannot hold at least an 8-car, 484-foot train (and preferably a 10-car, 605-foot train).

Additional storage and maintenance possibilities abound along the lengthy stretch of the L Line which parallels the NY&A Bay Ridge Line between the Brooklyn borough line and New Lots Avenue. Besides the unused elevated deck between Atlantic Avenue and Sutter Avenue (see below), two of the four trackways within the mostly-abandoned the NY&A East New York Tunnel could provide all-weather storage for approximately 116 cars if the tunnels were to be retrofitted to allow sufficient secure employee access and ventilation. Other property, including an approximately 1,900-foot-long parcel between Livonia Avenue and New Lots Avenue generally used for storage of railties and prefabricated track segments, also can be used.

- Although a significant amount of excess infrastructure was removed along the L Line between Broadway Junction and Sutter Avenue, large sections of elevated deck remain that currently serve no purpose. Three possible scenarios exist for this infrastructure:
  - Reuse as an elevated storage area. At slightly over 1,800 linear feet each, these two trackways can store a total of 60 railcars.
  - Rehabilitation of the former middle platform at Atlantic Avenue for use as a terminal for K Line service, if such a service is ever reactivated.
  - Demolition, if the active elevated deck is reinforced to make it structurally independent from the unused trackways.

Demolition would partly restore some daylight to Van Sinderen Avenue, an exceptionally narrow roadway that acts more as a service alley than a road along this stretch. This could in turn spur some modest additional industrial development along this road.

- Ultimately, if either a new maintenance facility can be built or yard leads to East New York's maintenance shops can be connected to the NY&A East New York Tunnel, the L Line could be relocated from its current alignment into the Bay Ridge Line ROW from Wilson Avenue to New Lots Avenue. Doing so would open up approximately 140,000 to 150,000 square feet of land (or more than 3 acres) within the study area for reuse.

Built and then grade-separated by two separate private railroads between about 1865 and 1915, these two parallel alignments once accommodated six elevated tracks and room for four more in an open cut.<sup>63</sup> Both alignments are now owned by MTA agencies. (The LIRR owns the Bay

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<sup>63</sup> Peter Dougherty, *Tracks of the New York City Subway*, Version 3.3 (2002), pp. 64-65; Bob Emery Map Collection, LIRRHistory.com, <http://www.lirrhistory.com/emery/bayridge/br4tunlib.jpg>. Although the open cut was built to

Ridge Line.) Neither one is being used at anywhere near its capacity, and continued maintenance of both is a costly, redundant commitment of resources. As of 2008, only three out of the eight remaining trackways are in use: the two active L Line tracks on the surviving four-track elevated deck, and one NY&A freight track in the Bay Ridge Line open cut, which can accommodate four tracks. Placing the L Line in the Bay Ridge Line open cut would put three of its four trackways in use, leaving room for an additional track if future needs require it.

Connecting tracks could be built beneath Broadway between the relocated L Line and the A/C (Fulton Street) tracks, opening up new service possibilities such as a 14<sup>th</sup> Street-JFK Airport route, or an 8<sup>th</sup> Avenue-Fulton-Canarsie service. The latter could be a major service improvement, since DCP's subway count data suggests significant peak-directional passenger flows between the southeastern end of the L Line and A and C trains to and from Manhattan. Reassignment of the L fleet to Pitkin Yards could also become possible if sufficient space exists.

A new, consolidated, 10-car L Line Broadway Junction-Atlantic Avenue station, built between Fulton Street and Atlantic Avenue, would provide a greatly simplified transfer to the A and C platforms at its north end and the LIRR East New York station at its south end. The new station would take the place of two existing ones, further reducing travel times and operational costs.



*Rebuilt by two separate corporations in the early 20<sup>th</sup> century, today's L Line viaduct (left) and the NY&A Bay Ridge freight line (right) operate redundant rights-of-way which can be consolidated, reducing maintenance costs and opening up more space for potential reuse.*

The existing elevated structure could then be demolished, Van Sinderen Avenue could also be widened to a more standard street width, if desired.

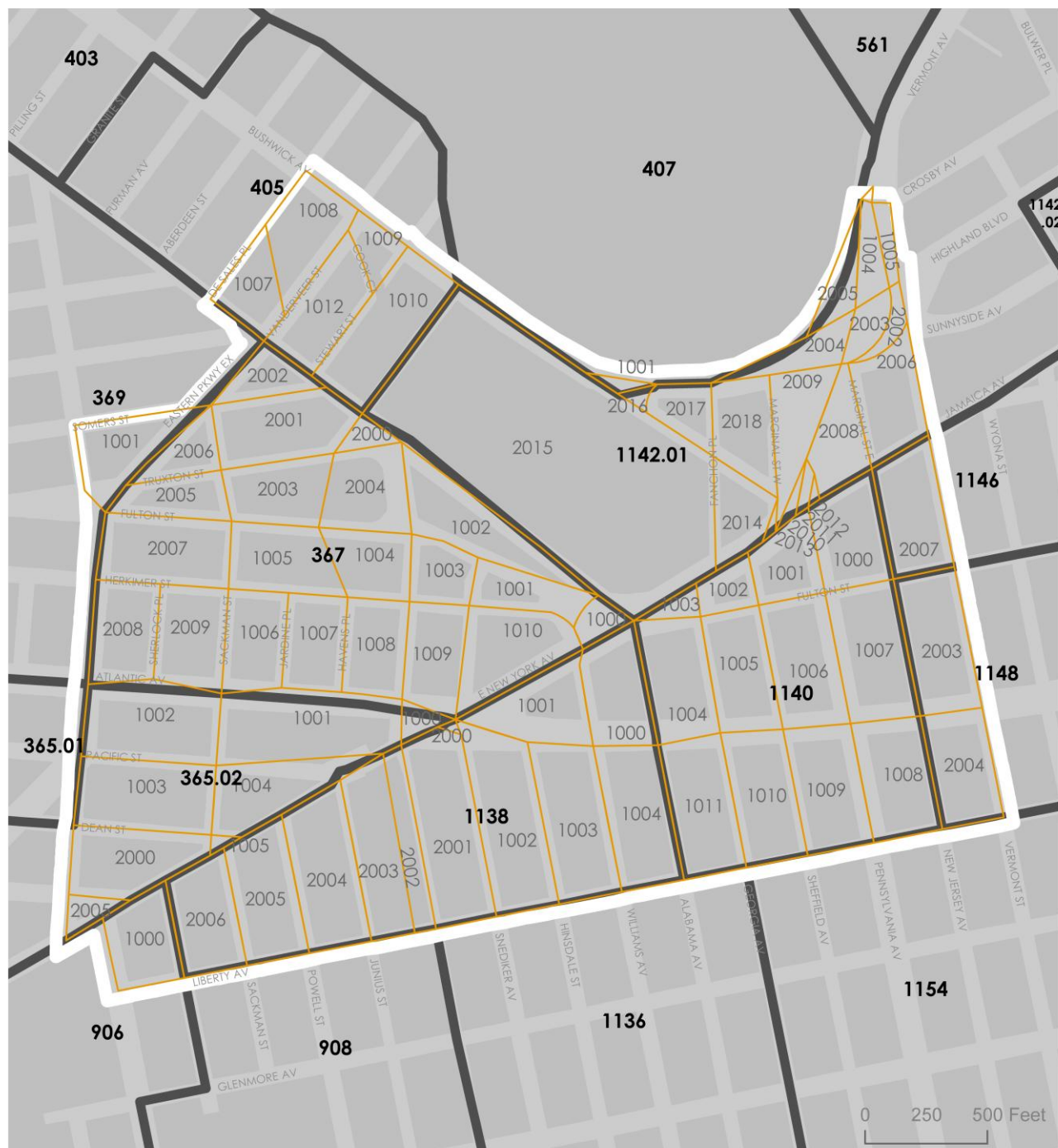
- Addressing the design deficiencies discussed in Section 3.3.4 along entire Jamaica Line would provide long-term benefits to the study area by increasing capacity and operating speeds along the route.

### 5.3 Next Steps

Few areas in the City have as much potential to effectively utilize their transit capacity as Broadway Junction does. Future land use and zoning analyses can consider what types of development might best take advantage of its available transit capacity.

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accommodate four tracks, there is some uncertainty as to whether more than three tracks ever existed at any one time through the study area. The six elevated tracks included two which were demolished in the early 2000s that ran a block to the east above Snediker Avenue.



1000 Study Area Census Blocks 2000

100 Census Tracts 2000

  Broadway Junction Study Area

Broadway Junction Transit Capacity Study

## CENSUS BLOCKS AND TRACTS FIGURE A-A

# APPENDIX A:

**Table A-A: 2000 United States Census Block List, with Populations and Current Zoning**

Entirely M-zoned blocks with residential populations are shaded in yellow. In 2000, 1,623 people were counted on these blocks.

2000 US CENSUS TRACT	BLOCK	BOUNDED BY:				2000 pop.	zoning
		N	E	S	W		
365.02	1000	Atlantic Ave.		East New York Ave.	Van Sinderen Ave.	0	M1-2
365.02	1001	Atlantic Ave.	Van Sinderen Ave.	Pacific St., East New York Ave.	Sackman St.	60	M1-2
365.02	1002	Atlantic Ave.	Sackman St.	Pacific St.	Eastern Pkwy. Ext.	181	R6
365.02	1003	Pacific St.	Sackman St.	Dean St.	Mother Gaston Blvd., Eastern Pkwy. Ext.	341	R6
365.02	1004	Pacific St.		Dean St., East New York Ave.	Sackman St.	149	M1-2
365.02	2000	Dean St.	Sackman St.	Bergen St., East New York Ave.	Mother Gaston Blvd.	70	M1-1, R6
365.02	2005	Bergen St.		East New York Ave.	Mother Gaston Blvd.	0	M1-1
365.02	(E)1005	Dean St.		East New York Ave.	Sackman St.	16	M1-1
365.02	(W)1005		Sackman St.	East New York Ave.	Sackman St.		M1-1
367	1000	Broadway		Jamaica Ave.	Williams Ave.	0	M1-1
367	1002	Broadway		Fulton St.	Van Sinderen Ave.	2	M1-2
367	1003	Fulton St.	Williams Pl.	Herkimer St.	Van Sinderen Ave.	0	M1-2
367	1006	Herkimer St.	Jardine Pl.	Atlantic Ave.	Sackman St.	241	M1-2
367	1007	Herkimer St.	Havens Pl.	Atlantic Ave.	Jardine Pl.	111	M1-2
367	1008	Herkimer St.	Van Sinderen Ave.	Atlantic Ave.	Havens Pl.	1	M1-2
367	1009	Herkimer St.	Williams Pl.	Atlantic Ave.	Van Sinderen Ave.	3	M1-2
367	2000	Broadway		Truxton St.	Conway St.	0	M1-1
367	2001	Somers St., Broadway	Conway St.	Truxton St.	Sackman St.	138	M1-1
367	2002	Broadway		Somers St.	Eastern Pkwy. Ext.	0	M1-1
367	2005	Truxton St.	Sackman St.	Fulton St.	Eastern Pkwy. Ext.	4	M1-1
367	2006		Sackman St.	Truxton St.	Eastern Pkwy. Ext.	140	M1-1
367	2007	Fulton St.	Sackman St.	Herkimer St.	Eastern Pkwy. Ext.	244	M1-2, R6
367	2008	Herkimer St.	Sherlock Pl.	Atlantic Ave.	Eastern Pkwy. Ext.	110	R6
367	2009	Herkimer St.	Sackman St.	Atlantic Ave.	Sherlock Pl.	256	M1-2, R6
367	(E)1004	Fulton St.	Van Sinderen Ave.	Herkimer St.	Sackman St.	0	M1-2
367	(E)2004	Truxton St.	Van Sinderen Ave.	Fulton St.	Sackman St.	0	M1-1
367	(N)1001	Fulton St.		Herkimer St.	Williams Pl.	0	M1-2
367	(S)1010	Herkimer St.	Williams Ave.	East New York Ave.	Williams Pl.	17	M1-2



367	(W)1005	Fulton St.	Van Sinderen Ave.	Herkimer St.	Sackman St.	104	M1-2
367	(W)2003	Truxton St.	Van Sinderen Ave.	Fulton St.	Sackman St.	2	M1-1
369	1001	Somers St.	Eastern Pkwy Ext.	Truxton St.	Mother Gaston Blvd.	48	M1-1
405	1010	Bushwick Ave.	Conway St.	Broadway	Stewart St.	4	M1-1
405	(N)1008	Bushwick Ave.	Eastern Pkwy Ext.		De Sales Pl., diagonal N-S line	0	M1-1
405	(N)1009	Bushwick Ave.	Stewart St.	Cooke Ct.	Eastern Pkwy. Ext.	0	M1-1
405	(S)1007		Eastern Pkwy Ext., diagonal N-S line	Broadway	De Sales Pl.	31	M1-1
405	(S)1012	Cooke Ct.	Stewart St.	Broadway	Eastern Pkwy. Ext.	97	M1-1
407	(W)1001			Bushwick Ave.		0	R3-2
906	1000	East New York Ave.	Christopher Ave.	Liberty Ave.	Mother Gaston Blvd.	78	M1-4
1138	1000	East New York Ave.	Alabama Ave.	Atlantic Ave.	Williams Ave.	5	M1-1
1138	1001	East New York Ave.	Williams Ave.	Atlantic Ave.		32	M1-1
1138	1002	Atlantic Ave.	Hinsdale St.	Liberty Ave.	Snediker Ave.	32	M1-4
1138	1003	Atlantic Ave.	Williams Ave.	Liberty Ave.	Hinsdale St.	125	M1-4
1138	1004	Atlantic Ave.	Alabama Ave.	Liberty Ave.	Williams Ave.	27	M1-4
1138	2000	East New York Ave.	Snediker Ave.	Atlantic Ave.		0	M1-4
1138	2001	East New York Ave., Atlantic Ave.	Snediker Ave.	Liberty Ave.	Van Sinderen Ave.	0	M1-4
1138	2004	East New York Ave.	Junius St.	Liberty Ave.	Powell St.	0	M1-4
1138	2005	East New York Ave.	Powell St.	Liberty Ave.	Sackman St.	14	M1-4
1138	2006	East New York Ave.	Sackman St.	Liberty Ave.	Christopher Ave.	0	M1-4
1138	(E)2002	East New York Ave.	Van Sinderen Ave.	Liberty Ave.	Junius St.	0	M1-4
1138	(W)2003	East New York Ave.	Van Sinderen Ave.	Liberty Ave.	Junius St.	0	M1-4
1140	1000	Jamaica Ave.	New Jersey Ave.	Fulton St.	Granville Payne Ave.	110	C8-2, R4
1140	1001	Jamaica Ave.	Granville Payne Ave.	Fulton St.	Sheffield Ave.	0	C8-2
1140	1002	Jamaica Ave.	Sheffield Ave.	Fulton St.	Georgia Ave.	0	M1-1
1140	1003	Jamaica Ave.	Georgia Ave.	Fulton St.		0	M1-1
1140	1004	Fulton St.	Georgia Ave.	Atlantic Ave.	Alabama Ave.	127	M1-1
1140	1005	Fulton St.	Sheffield Ave.	Atlantic Ave.	Georgia Ave.	218	C4-1
1140	1006	Fulton St.	Granville Payne Ave.	Atlantic Ave.	Sheffield Ave.	134	C8-2
1140	1007	Fulton St.	New Jersey Ave.	Atlantic Ave.	Granville Payne Ave.	23	C8-2
1140	1008	Atlantic Ave.	New Jersey Ave.	Liberty Ave.	Granville Payne Ave.	39	C8-2
1140	1009	Atlantic Ave.	Granville Payne Ave.	Liberty Ave.	Sheffield Ave.	139	C8-2, M3-2

1140	1010	Atlantic Ave.	Sheffield Ave.	Liberty Ave.	Georgia Ave.	19	M3-2
1140	1011	Atlantic Ave.	Georgia Ave.	Liberty Ave.	Alabama Ave.	0	M3-2
1142.01	1004	Jackie Robinson Pkwy: WB Highland Blvd., NW of mainline				37	R3-2
1142.01	1005	Jackie Robinson Pkwy: WB Highland Blvd., NE of mainline				44	R3-2
1142.01	2002	Jackie Robinson Pkwy: minor blocks (2002, 2003, 2008, 2009, 2010, 2011, 2012, 2013)				0	R3-2, R4
1142.01	2004	Jackie Robinson Pkwy: between EB and WB Highland Blvd.				12	R3-2
1142.01	2006	Highland Blvd.	Vermont St.	Jamaica Ave.	Marginal St. E.	205	R4
1142.01	2014	Bushwick Ave.		Jamaica Ave.	Fanchon Pl.	0	M1-1
1142.01	2015	Bushwick Ave.	Fanchon Pl.	Broadway, Jamaica Ave.	Conway St.	0	M1-1
1142.01	2017	Highland Blvd.	Fanchon Pl.	Bushwick Ave.		0	M1-1
1142.01	2018	Highland Blvd.	Marginal St. W.	Bushwick Ave.	Fanchon Pl.	134	M1-1, R4
1142.01	(E)2005			Highland Blvd.		4	R3-2
1142.01	(E)2016	EB Highland Blvd.	Bushwick Ave-EB highland Blvd cnxn.	Bushwick Ave.		0	M1-1
1142.01	(W)2016	WB Highland Blvd.		Bushwick Ave., EB Highland Blvd.			M1-1
1146	2007	Jamaica Ave.	Vermont St.	Fulton St.	New Jersey Ave.	97	C8-2, R4
1148	2003	Fulton St.	Vermont St.	Atlantic Ave.	New Jersey Ave.	267	C8-2, R5
1148	2004	Atlantic Ave.	Vermont St.	Liberty Ave.	New Jersey Ave.	85	C8-2
					<b>TOTAL:</b>	<b>4,377</b>	

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