Existing Conditions Report

Brooklyn Bus Network Redesign

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EXECUTIVE SUMMARY

This report on existing conditions is the first step in the bus network redesign process. The goal is to take a fresh look at Brooklyn, its people, its travel needs, and what can be done to improve bus travel to meet those needs. The Brooklyn Bus Network has not substantially changed in decades. The continuing decline in bus ridership in Brooklyn, and in New York City, requires a fresh look at how we provide bus service. Buses are slowing down and bus reliability is suffering. Over that same period, our customers' needs have transformed dramatically. The bus network needs to evolve with them. We will build a new bus network to meet those needs.

This report represents a joint effort by MTA New York City Transit (NYCT) and MTA Bus Company.

A glossary of terms used in this report can be found in **Appendix A.**

KEY FINDINGS

Customer Priorities

- **Decreased wait time and increased frequency**

  Customers want more frequent bus service to shorten waits at bus stops. In the existing network, Brooklyn customers wait longer for the bus than they expect to, about two minutes on average for each trip.

- **Decreased travel time through faster buses**

  Customers want faster travel on buses to get to their destinations more quickly. Average bus speeds in Brooklyn are the second-lowest of the five boroughs, at 7.0 miles per hour (MPH) in May 2019, and have slowed 5% since 2014.

- **A more reliable network**

  Customers want buses to be more reliable and less bunched. Once on the bus, Brooklyn customers spend more time traveling to their destination than the schedule would indicate, about one minute on average for each trip. About one-third of the time, it takes customers five minutes longer than expected to complete their trip.

- **Improved connections to more places**

  Customers want access to more of the city than they have now, both within and between Brooklyn neighborhoods and onward to other boroughs.

- **Network simplification to increase ease of use**

  Customers want the bus network to be easier to use.

Brooklyn at a Glance

- Brooklyn's population has grown 5.2% since 2010. Since 2009, private sector job growth in the borough as a whole has outpaced the rest of New York City, New York State, and the country, with the number of businesses growing 32 percent and private sector employment growing 39 percent. Growth has occurred in nearly every sector.

- Brooklyn's ongoing population and employment growth is expected to continue, though some neighborhoods are expected to grow faster than others. While the Brooklyn Bus Network covers nearly the entire borough, it has not changed much in the past decades to support this growth.

- Currently 31 of the 170 subway stations in Brooklyn are accessible according to standards established by the Americans with Disabilities Act (ADA). The network redesign will be particularly important for those customers whose transit options are currently more limited.

- According to Census data, about 55 percent of Brooklyn households do not own a vehicle. About 62 percent of Brooklyn commuters travel via transit. About 53 percent of Brooklyn commuters identified rail modes as their primary means of transportation, while 9 percent identified bus as their primary means. About 23 percent of commuters drive to work.

- The Brooklyn Bus Network, comprised of 72 routes, carries over 650,000 riders on an average weekday. In general, bus boardings are more prevalent in the eastern half of the borough, particularly in the neighborhoods east of Prospect Park.

- Most Brooklyn bus customers transfer as part of their journey; 37% transfer to another bus and 35% transfer to the subway.

Limitations of the Existing Network

- Much of the network is a grid, though in some neighborhoods, circuitous routes slow down travel to key destinations and transfer points.
- Bus routes sometimes operate on nearby parallel streets, splitting the available resources.
- Bus priority is generally limited to SBS corridors and does not benefit most Brooklyn bus riders.
- Bus stops spaced close together slow down bus travel, as the bus needs to frequently decelerate to a stop and then wait to re-enter the flow of traffic.
- Narrow streets and difficult turns, particularly left turns, hamper bus speeds and reliability.
- Even with bus routes covering much of the borough, there are opportunities to improve connectivity and provide easier access to places in Brooklyn and beyond where customers want to go.

Next Steps

Following this report, we will develop a Draft Plan of a new bus network that reflects the findings in this report and the input we receive. The new draft bus network will be a 'blank slate' reimagining of the bus network, drawn from scratch. We will develop the Draft Plan with support and participation from NYCDOT. Additional public input sessions will be held following the release of the Draft Plan. We will ask the public to share their thoughts and provide input on adjusting the Draft Plan to better suit their needs. Input received will help inform the development of the Proposed Final Plan.

1. THE BOROUGH OF BROOKLYN

- The People of Brooklyn
- Brooklyn's Centers of Activity and Other Key Destinations

THE BOROUGH OF BROOKLYN

The borough of Brooklyn is immense, with a land area of over 70 square miles; it is truly a city within a city. It is the most populous of the five boroughs, with more than 2.6 million residents. If the 19th-century consolidation of the outer boroughs into New York City was undone, Brooklyn would be the third-largest city in the country.

Brooklyn is also tremendously diverse. It has always been a borough of immigrants, and it continues to be the home of New Yorkers of a multitude of ethnic and racial backgrounds. As of 2016, nearly 36 percent of Brooklyn's residents were immigrants. [1]

Like any large city, Brooklyn contains a wide variety of activities and destinations, offering many opportunities for employment, education, shopping, leisure, and outdoor activities at parks and beaches. From the renowned cultural scene in Williamsburg to the iconic amusement parks and boardwalk in Coney Island, Brooklyn attracts visitors from around the city and the world.

Brooklyn is a booming business hub, with the number of businesses borough-wide growing 32 percent since 2009, faster than the other four boroughs and almost double the citywide rate.[2] Downtown Brooklyn is New York City's largest business district outside of Manhattan, though many other Brooklyn neighborhoods have experienced notable job growth in recent years.

Brooklyn is also a borough of diverse and distinct neighborhoods. From high-rise apartment buildings in Downtown Brooklyn to single-family homes in Mill Basin, and from historic neighborhoods such as Prospect-Lefferts Gardens to new neighborhoods in Spring Creek, the borough is a constantly evolving collection of intertwined communities.

THE PEOPLE OF BROOKLYN

Brooklyn is New York City's most populous borough, with over 2.6 million residents. More than a third of Brooklyn residents were born outside the United States. Brooklynites come from a diverse variety of racial and ethnic backgrounds, with 57 percent of its residents being non-white.[3] The spatial distribution of Brooklyn's population by race and ethnicity can be seen in **Figures AB.1** and **AB.2** in **Appendix B.**

The population of the borough grew from 2,505,000 to 2,635,000 between 2010 and 2017 – an increase of approximately 130,000 residents, or 5.2 percent. [4] Pockets of growth and decline are dispersed throughout the borough. Areas with notably large growth can be found in Downtown Brooklyn, Williamsburg, and Spring Creek. Some neighborhoods have seen small declines in population, generally in an east-west line across central Brooklyn, and also in Coney Island and Brighton Beach. **Figure 1.1** shows population changes between 2010 and 2017. **Figure AB.3** in **Appendix B** shows Brooklyn's population density.

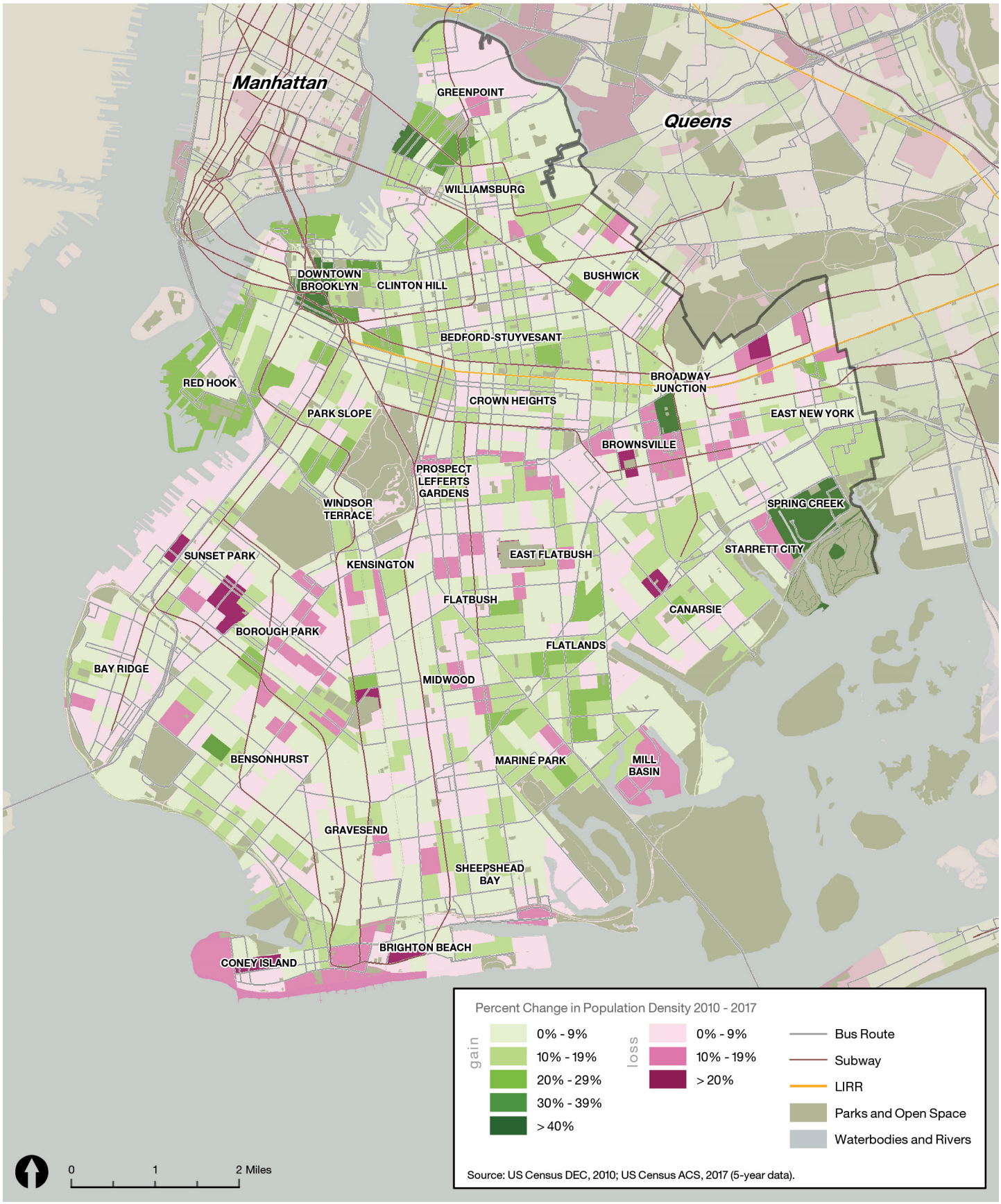
[1]An Economic Snapshot of Brooklyn, June 2018, Office of the New York State Comptroller

[2]An Economic Snapshot of Brooklyn, June 2018, Office of the New York State Comptroller

[3]U.S. Census Bureau American Community Survey, 2013-2017 5-Year Estimates

[4]U.S. Census Bureau Decennial Census, 2010; U.S. Census Bureau American Community Survey, 2013-2017 5-Year Estimates

Figure 1.1 Population Change



Teenagers and young adults (ages 10-24), senior citizens, and residents with disabilities live throughout the borough. Residents aged 10 to 24 often depend on public transit to get around, as most are not old enough to drive or do not have the means to own and maintain an automobile. **Figure AB.4** in **Appendix B** shows the concentration of residents aged 10 to 24 as being somewhat reflective of overall population distribution, with higher-density areas in Williamsburg, Bushwick, Flatbush, and Sunset Park. **Figure AB.5** shows higher concentrations of seniors in southern Brooklyn, particularly in Coney Island and Brighton Beach, and also in other neighborhoods such as Prospect-Lefferts Gardens, Crown Heights, and Williamsburg. **Figure AB.6** shows that residents with disabilities are distributed somewhat similarly to the overall population distribution within the borough, with noteworthy exceptions in areas such as Coney Island and Brownsville. This emphasizes the importance of maintaining coverage throughout the borough despite redesigning the bus network.

The income level of a neighborhood is an important consideration as we design a new bus network. Lower-income neighborhoods are less likely to have high levels of automobile ownership, making access to public transit vital for the area to thrive. **Figure AB.7** shows that some areas with lower median incomes, such as Flatbush, are rich in transit. Other areas, such as East New York, have fewer options. Brooklyn's median household income grew 31% between 2010 and 2016, reaching $55,100, but it remains below the city average. Income growth has not been evenly distributed across Brooklyn's neighborhoods, and the poverty rate of 20% is above the city average.[5]

Brooklyn residents generally use public transit to commute to work. **Figure AD.1** in **Appendix D** shows a few exceptions to this pattern in neighborhoods such as South Williamsburg, Borough Park, and Mill Basin. **Figure AD.2** shows the percentage of each neighborhood that commutes to work via bus. Note that the wording of these Census questions limits respondents to choosing either subway or bus, so people that use both often indicate subway as the more dominant mode. Therefore, the bus map is generally better understood as bus-only commuters.

Neighborhoods with a noteworthy percentage of bus-only commuters can primarily be found in southeastern Brooklyn in areas far from the subway. Over the last several decades, commuting trips made for 9-to-5 jobs have decreased as a percentage of total trips. Large areas of Brooklyn show many trips made outside these peak commuting times, especially in generally working-class neighborhoods such as Sunset Park, Bushwick, and Canarsie. **Figure AC.2** shows the percentage of each borough's residents commuting between 7 AM and 9 AM.

[5] An Economic Snapshot of Brooklyn, June 2018, Office of the New York State Comptroller

BROOKLYN'S CENTERS OF ACTIVITY AND OTHER KEY DESTINATIONS

Brooklyn's Changing Economy

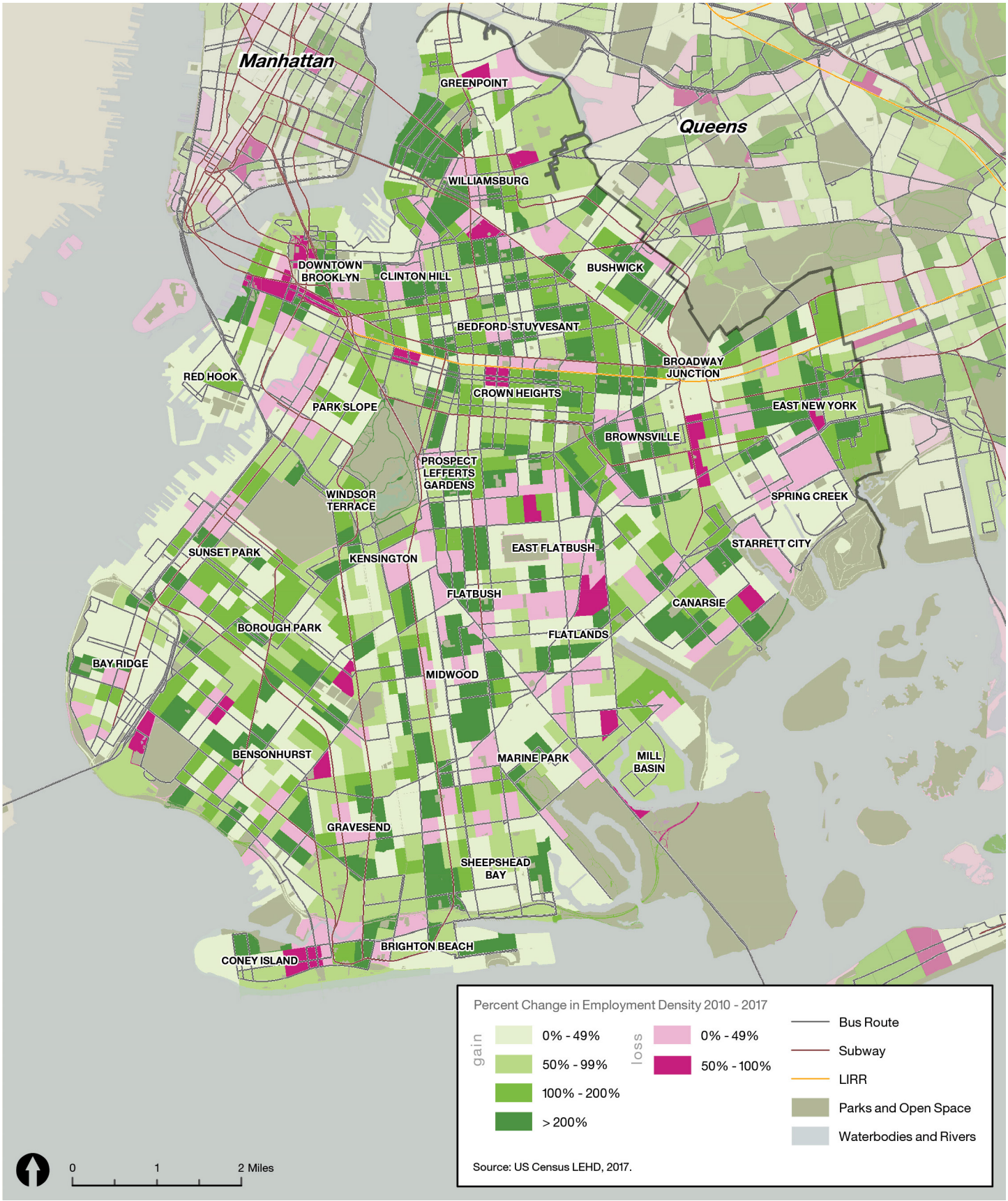
Brooklyn's economy is booming. Since 2009, private sector job growth in the borough as a whole has outpaced the rest of New York City, New York State, and the country, with the number of businesses growing 32 percent and private sector employment growing 39 percent. Growth has occurred in every sector, save for a small decline in manufacturing jobs. The health care and leisure/hospitality sectors comprised nearly half the job gains since 2009, and health care and retail are the two largest employers in the borough. Recent growth in the technology sector is noteworthy as well. Of Brooklyn's 61,300 businesses as of 2017, 71 percent had fewer than five employees, indicating that the Brooklyn economy is built on small enterprise.[6]

Downtown Brooklyn is the largest business district outside of Manhattan. While it is developing rapidly, nearly every other neighborhood has experienced faster job growth since 2009 – jobs are becoming more decentralized in Brooklyn. Employment has grown by more than 60 percent in Bedford-Stuyvesant, Flatbush, Borough Park, and Bensonhurst.[7] **Figure 1.2** shows employment density change between 2010 and 2017. **Figure AB.8 in Appendix B** shows Brooklyn's employment density.

[6] An Economic Snapshot of Brooklyn, June 2018, Office of the New York State Comptroller

[7] An Economic Snapshot of Brooklyn, June 2018, Office of the New York State Comptroller

Figure 1.2 Employment Density Change



The Geography of Brooklyn's Economy

Figure 1.3 is an activity index of Brooklyn, combining residential and employment data to show the overall density of the borough. Areas that are primarily shaded red are mostly residential. Areas that are primarily shaded blue are mostly commercial or industrial. Areas that are shaded purple are a mix of both land uses. Regardless of the color, the darker the shade, the higher the concentration of activity. In general, the density of activity increases as one travels north and west.

Figure 1.3 Activity Index

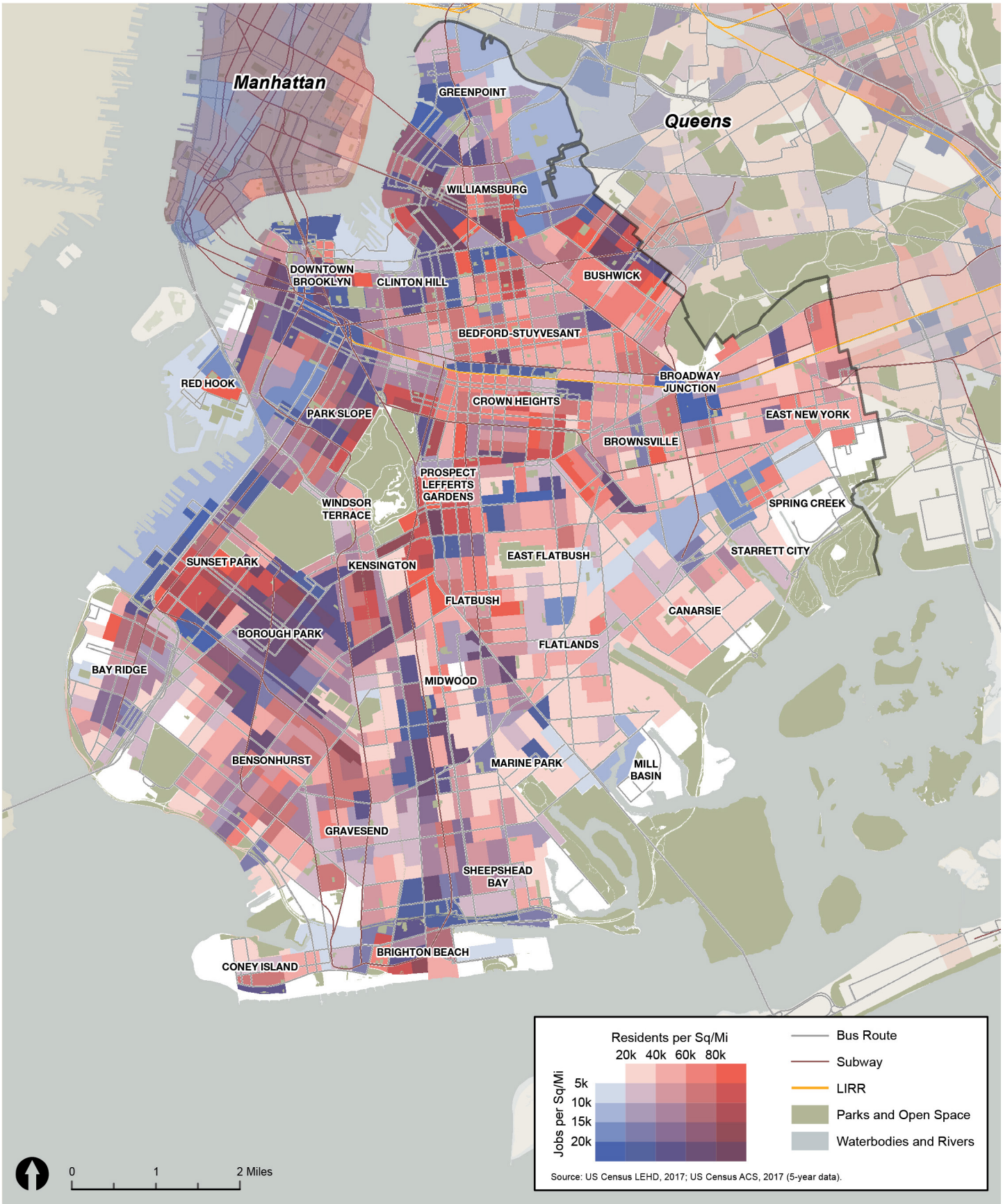


Figure AB.9 shows land use in Brooklyn by the type of development. In many cases, the distinct sectors of Brooklyn's economy appear clearly on the map, with industrial areas, for instance, visibly delineated in purple.

Key Destinations

Large city that it truly is, Brooklyn contains many notable destinations. Many are concentrated downtown, but plenty of others are scattered throughout the rest of the borough.

There are numerous colleges in Downtown Brooklyn. Brooklyn College is located at a busy intermodal bus-subway hub at The Junction in Flatbush. Kingsborough Community College is located far from the subway in Manhattan Beach and is an important driver of bus ridership.

Hospitals are located throughout the borough. Many are far from the subway, but all are accessible by bus. Health care workers comprise the largest sector of Brooklyn's economy, and Brooklyn residents travel to these locations for medical care.

Brooklyn has many remarkable cultural institutions, such as the Brooklyn Museum and the Brooklyn Academy of Music. Recreation destinations and other popular locations range from the Coney Island Boardwalk to Prospect Park to Barclays Center.

Despite the rise of online retail, shopping malls such as Kings Plaza and Gateway Center remain important hubs of economic activity and employment.

Figure 1.4 shows a selection of Brooklyn's key destinations.

Figure 1.4 Key Destinations

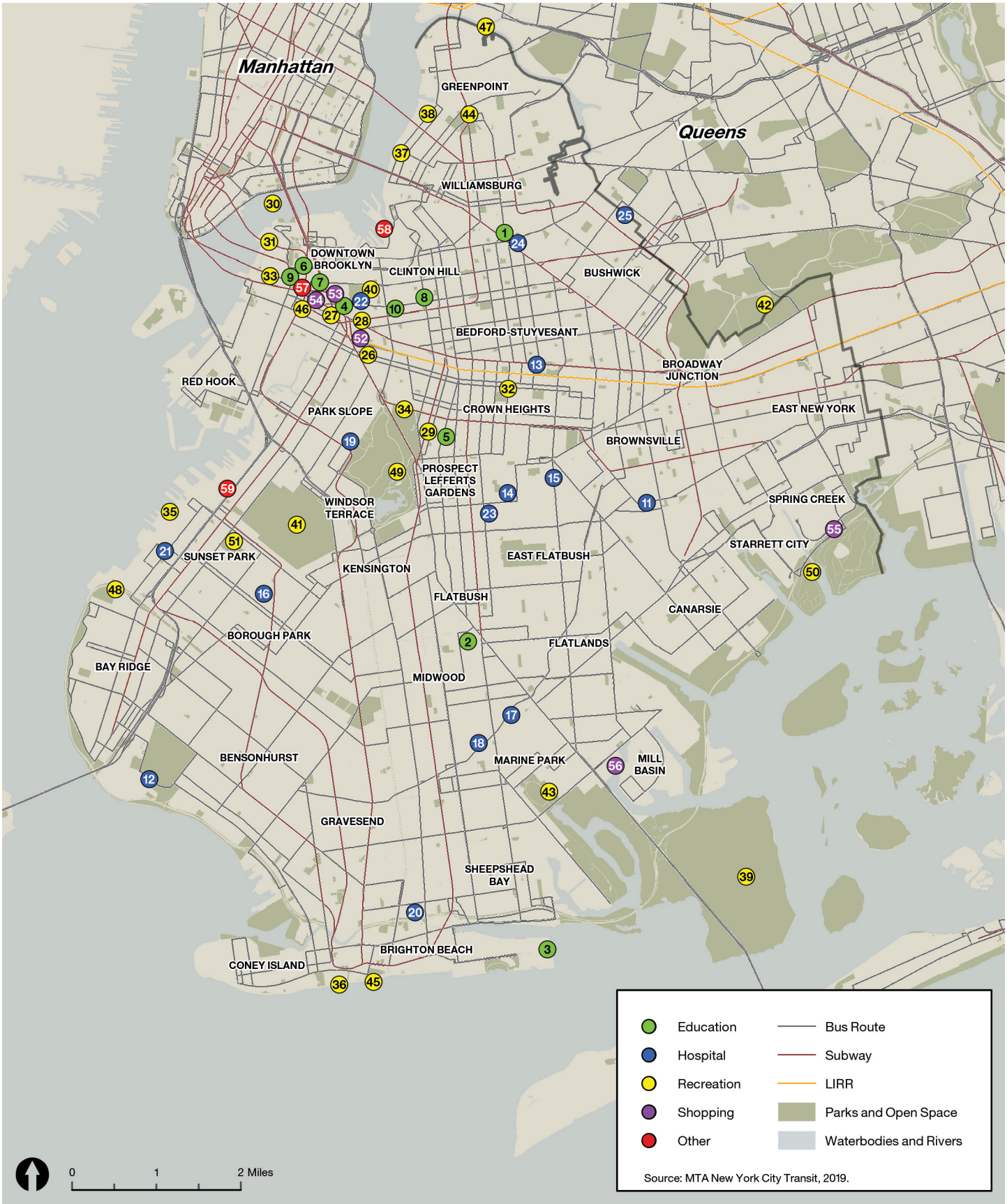


Figure 1.4a Key Destinations Table

Education	
Map ID #	**Name**
1	Boricua College
2	Brooklyn College
3	Kingsborough Community College
4	Long Island University Brooklyn
5	Medgar Evers College
6	New York City College of Technology
7	New York University Tandon School of Engineering
8	Pratt Institute
9	St. Francis College
10	St. Joseph's College New York
Hospitals	
Map ID #	**Name**
11	Brookdale Hospital Medical Center
12	Brooklyn Veterans Administration Medical Center
13	Interfaith Medical Center
14	Kings County Hospital
15	Kingsbrook Jewish Medical Center
16	Maimonides Medical Center
17	Mount Sinai Brooklyn
18	New York Community Hospital
19	New York-Presbyterian Brooklyn Methodist Hospital
20	NYC Health + Hospitals/Coney Island
21	NYU Langone Hospital - Brooklyn
22	The Brooklyn Hospital Center
23	University Hospital-SUNY Downstate
24	Woodhull Medical and Mental Health Center
25	Wyckoff Heights Medical Center

Figure 1.4a Key Destinations Table

Recreation	
Map ID #	**Name**
26	Barclays Center
27	BRIC
28	Brooklyn Academy of Music
29	Brooklyn Botanic Garden
30	Brooklyn Bridge
31	Brooklyn Bridge Park
32	Brooklyn Children's Museum
33	Brooklyn Heights Promenade
34	Brooklyn Museum
35	Bush Terminal Piers Park
36	Coney Island Beach & Boardwalk
37	Domino Park
38	East River State Park
39	Floyd Bennett Field
40	Fort Greene Park
41	Green-Wood Cemetery
42	Highland Park
43	Marine Park
44	McCarren Park
45	New York Aquarium
46	New York Transit Museum
47	Newtown Creek Nature Walk
48	Owl's Head Park
49	Prospect Park
50	Shirley Chisholm State Park
51	Sunset Park

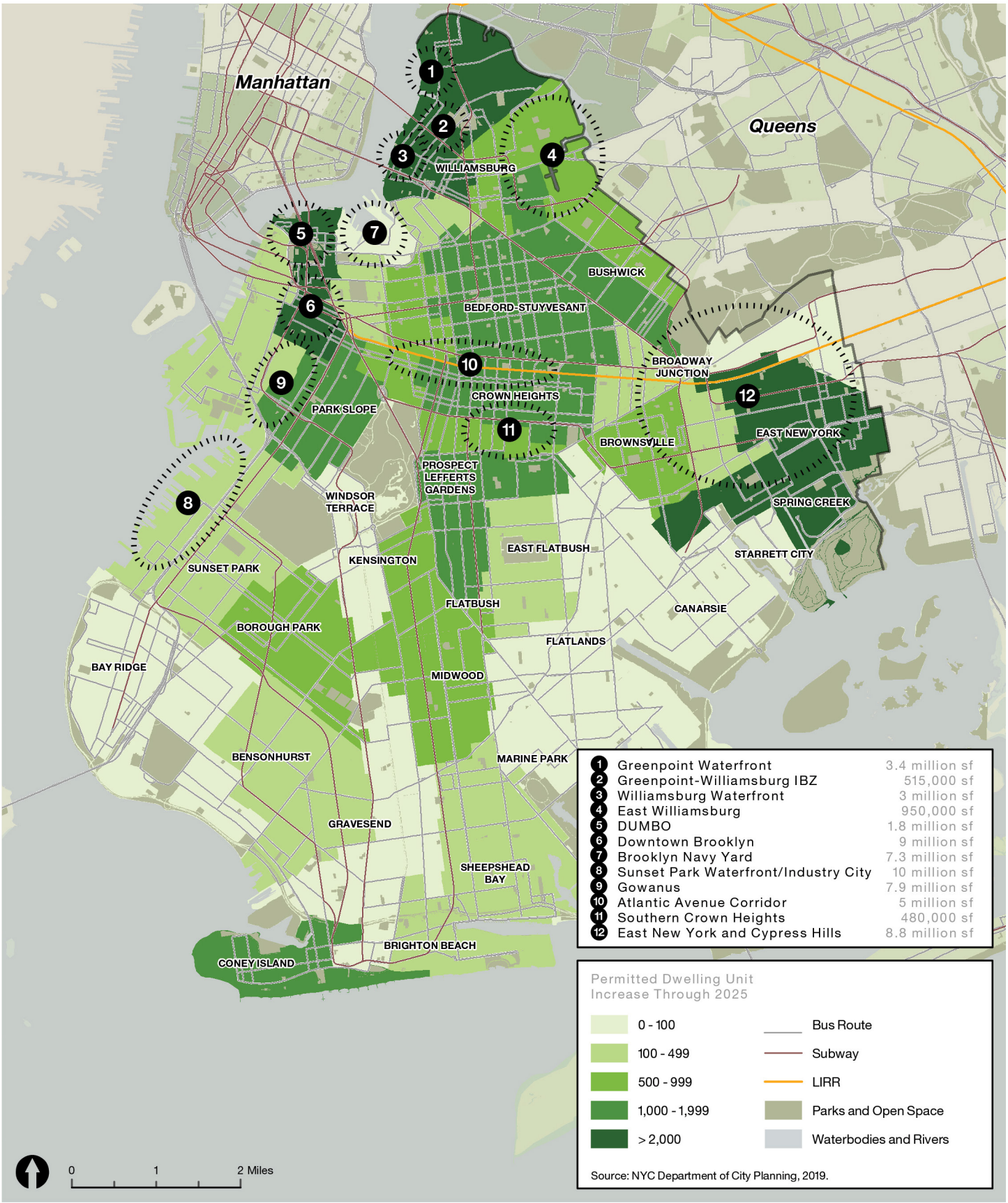
Figure 1.4a Key Destinations Table

Shopping	
Map ID #	**Name**
52	Atlantic Terminal Mall
53	City Point BKLYN
54	Fulton Mall
55	Gateway Center
56	Kings Plaza
Other	
Map ID #	**Name**
57	Brooklyn Borough Hall
58	Brooklyn Navy Yard
59	Industry City

Future Developments

The current growth in Brooklyn is expected to continue. **Figure 1.5** shows projected growth in dwelling units through 2025. (This data was provided by New York City's Department of City Planning and is based on new buildings and alterations permits issued by the Department of Buildings between January 2010 and June 2019.) The most significant housing growth is expected in Downtown Brooklyn, Williamsburg, and Greenpoint. Other neighborhoods expecting notable growth are in Northern Brooklyn, along with East New York and Coney Island.

Figure 1.5 Projected Housing and Non-Residential Growth



Figures 1.5 and **1.6** show significant future non-residential developments as identified by the Department of City Planning. Numerous neighborhoods will see millions of square feet of development from projects that are under construction and/or recently approved. Some of these future growth areas are already well-situated near the subway, such as Downtown Brooklyn and some portions of East New York. Some, such as the Sunset Park Waterfront and the Brooklyn Navy Yard, are in bus-dependent neighborhoods where strategic thinking surrounding the bus network will be necessary to support the expected growth.

Source: NYC DCP

Figure 1.6 Significant Future Non-Residential Developments

Sunset Park Waterfront/Industry City	**~10 million sf (square feet)**
Downtown Brooklyn	**~9 million sf**
570 Fulton Street	Mixed use (residential, office, retail)
80 Flatbush Avenue	Mixed use (residential, office, retail, community facility)
One Willoughby Square	Office
141 Willoughby Street	Office
181 Livingston Street - The Wheeler	Office
101 Fleet Place	Office
East New York and Cypress Hills	**~8.8 million sf**
East New York Rezoning	
Gowanus	**~7.9 million sf**
Gowanus Rezoning	
Brooklyn Navy Yard/Area	**~7.3 million sf**
Brooklyn Navy Yard Masterplan	Mixed use (industrial, office, retail, community facility)
47 Hall Street - The Hall	Mixed use (office, retail, light industrial)
Atlantic Avenue Corridor	**~5 million sf**
Greenpoint Waterfront	**~3.4 million sf**
Williamsburg Waterfront	**~3 million sf**
Domino	Mixed use (residential, commercial, community facility), waterfront access
DUMBO	**~1.8 million sf**
85 Jay Street	Retail and residential uses
29 Jay Street	Office
30 Columbia Heights	Office and retail
East Williamsburg – Morgan and Jefferson	**~950,000 sf**
333 Johnson Avenue (Netflix)	Office and light industrial
100 Bogart	Office and light industrial
Greenpoint - Williamsburg IBZ	**~515,000 sf**
25 Kent	Mixed use (office, industrial, retail)
12 Franklin Street	Mixed use (commercial, industrial, retail)
Southern Crown Heights	**~480,000 sf**

2. TRAVELING AROUND BROOKLYN

- Subways
- MTA Long Island Rail Road
- Access-A-Ride
- Taxis, Transportation Network Companies (TNCs), and Commuter Vans
- Other Local Transportation Options
- Surface Travel Within Brooklyn
- Connections to Other Boroughs

TRAVELING AROUND BROOKLYN

The robust Brooklyn transportation network includes buses, subways, Long Island Rail Road commuter rail, ferries, taxis, and Transportation Network Companies (TNCs) like Uber and Lyft. The subways are heavily oriented towards feeding residents into Manhattan's central business district below 60th Street, the region's most densely-developed employment center, with most subway lines also serving high-density Downtown Brooklyn on the way. Long Island Rail Road also provides connections to Downtown Brooklyn in addition to Jamaica, Queens, and Long Island. Buses cross the entire borough.

Brooklyn is crisscrossed with transportation infrastructure. There are many options for traveling to destinations nearby, across the city, and beyond. The amazing extent of these roads and rail lines provides access to many locations and ties together all the different neighborhoods of the city. However, large features such as bodies of water and parks create choke points, funneling many people through a few locations, leading to challenges in Brooklynites' ability to seamlessly traverse the city.

SUBWAYS

Brooklyn is served by 18 subway lines, as seen in **Figure 2.1**: the Canarsie Line L, the Jamaica and Myrtle Avenue Lines J M Z, the Crosstown Line G, the Fulton Street Line A C, the Eastern Parkway and Nostrand Avenue Lines 2 3 4 5, the Brighton Line B Q, the Culver Line F, the 4th Avenue, West End, and Sea Beach Lines D N R, and the Franklin Avenue Shuttle S.

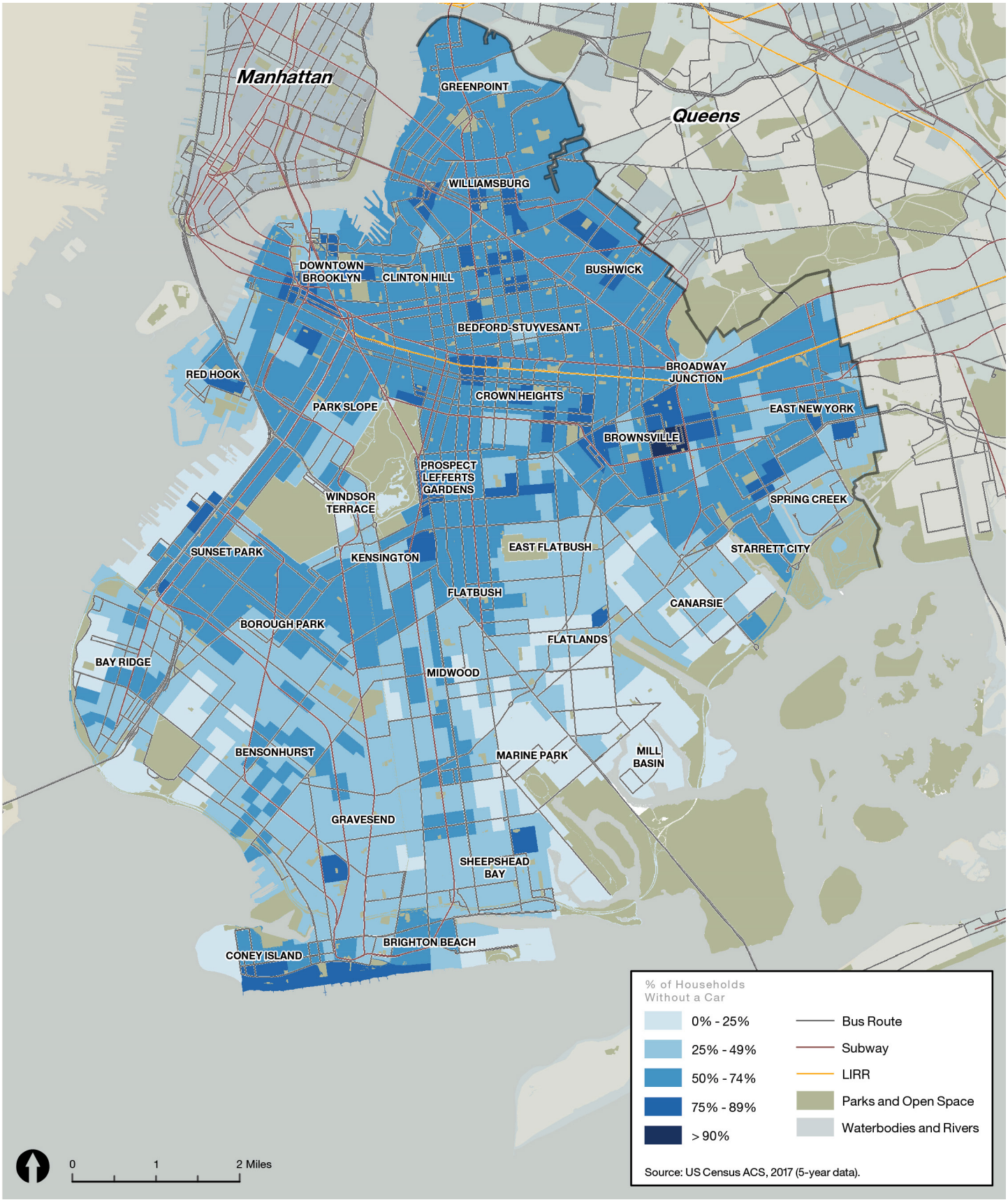
All subway lines connect Brooklyn to Manhattan except for the S and the G, the latter of which travels directly to Long Island City in Queens. Most subway lines serve Downtown Brooklyn – the exceptions are the J M Z, which travel via the Williamsburg Bridge to Manhattan, the L, which travels through northern Brooklyn on its way to 14th Street in Manhattan, and the S, which is a short shuttle line connecting the Brighton Line and the Fulton Street Line. The A J Z and M also directly link Brooklyn to Queens, providing important connections in Jamaica and to JFK Airport.

Figure 2.1 Rail Transit and Accessible Stations

Subway Deserts

Though Brooklyn subway coverage is extensive, significant portions of the borough lack subways, especially in the southeast. These subway deserts constitute a challenge for travel and lead many residents in these areas to submit to long commutes or buy a car. Households that can rely on public transportation and other modes to get around beyond owning a personal automobile are generally concentrated around the subways. The number of households with vehicles increases significantly southeast of Flatbush, as seen in **Figure 2.2**, though there are a noteworthy number of zero-car households in neighborhoods such as Red Hook, Bedford-Stuyvesant, East Flatbush, and Spring Creek that are a long distance from the subway.

Figure 2.2 Zero-Vehicle Households



ADA Accessibility

Accessible transit service is important to residents throughout Brooklyn. Buses are a key element of this service, particularly in subway deserts. As seen in **Figure AB.5** in **Appendix B**, there are high-density areas of residents with disabilities in Williamsburg, Kensington, Flatbush, Brownsville, Coney Island, and Brighton Beach, as well as other scattered locations throughout the borough. These areas often match high-density neighborhoods, but not always. Buses provide key transportation connections within and among these communities, and to key destinations throughout the borough, including healthcare facilities and senior centers.

Thirty-one of the 170 subway stations in or on the border of Brooklyn are accessible according to standards set by the Americans with Disabilities Act (ADA), including four stations that are accessible in one direction. This limits transit options for those with mobility-related disabilities. Most of the current accessible subway stations in Brooklyn have elevators, though several have ramps and some are located at street level, such as the Canarsie-Rockaway Parkway station on the L. **Figure 2.1** shows the stations within Brooklyn that are currently accessible, as well as those 28 stations within the borough with current or planned construction to make them fully ADA accessible.

We are currently working to make stations accessible at a faster rate than ever before, but it will be more than a decade before we reach maximum feasible subway station accessibility.

The Brooklyn Bus Network helps fill in the transit service gaps left by subway stations that are not accessible, both by supplementing service along Brooklyn corridors and by connecting customers to accessible subway stations. Importantly, the bus fleet is well-equipped to serve customers with mobility-related disabilities, as 100 percent of buses have ramps or lifts for step-free access. We are also continuing to outfit our entire fleet with Digital Information Screens, which provide key service information in both text and audio formats.

Pedestrian infrastructure — sidewalks, street crossings, and grades — is another element connected to bus service that can impact customers with mobility-related disabilities. Sidewalks that have breaks or do not extend all the way to the curb are especially challenging for customers who use mobility devices trying to reach bus stops. In support of expanding accessibility, New York City Department of Transportation (NYCDOT) will conduct a citywide survey of bus stop accessibility, so gaps can be addressed and the accessibility of the bus network can be maximized.

MTA LONG ISLAND RAIL ROAD

Long Island Rail Road (LIRR) primarily serves suburban Nassau and Suffolk Counties with terminals at Penn Station, Atlantic Terminal in Downtown Brooklyn, and Hunterspoint Avenue in Long Island City, as well as a major transfer hub in Jamaica. A connection to Grand Central Terminal, known as East Side Access, is scheduled to open in 2022.

There are three LIRR stations in Brooklyn: Atlantic Terminal, Nostrand Avenue, and East New York. LIRR provides service from these stations to Jamaica and points east but not directly to Manhattan. As of 2019, Nostrand Avenue is fully ADA accessible, with new elevators installed and a full renovation completed. Atlantic Terminal is also ADA accessible.

LIRR is currently piloting Atlantic Ticket, a ticket for customers traveling between select stations in Brooklyn and Southeast Queens, including all three Brooklyn stations and Jamaica. Between these stations, the fare is $5 for a one-way ticket, and a weekly ticket is $60 and includes an Unlimited Ride MetroCard for buses and subways.

As part of the East Side Access opening day service plan beginning in 2022, LIRR will initiate frequent, dedicated train service between Atlantic Terminal and Jamaica. This new LIRR service will make all local stops (Atlantic Terminal, Nostrand Avenue, East New York, and Jamaica), with trains operating from a dedicated, newly-constructed platform in Jamaica. Peak-period train service between Brooklyn and Jamaica will operate every 7-8 minutes in both directions, while off-peak and weekend service will operate every 15 minutes in both directions. This represents a large increase in off-peak and weekend service frequency compared with the current 30-minute headway.

ACCESS-A-RIDE

Access-A-Ride Paratransit Service provides public transportation for eligible customers with disabilities or health conditions that prevent them from using the public buses and subways for some or all their trips. Access-A-Ride operates 24 hours a day, 7 days a week, 365 days a year. Eligible customers can use the service throughout all of New York City, and within a three-quarter-of-a-mile corridor beyond fixed-route bus and subway service across the City border into nearby areas of Nassau and Westchester counties. More Access-A-Ride trips occur in Brooklyn, and more Access-A-Ride customers live in Brooklyn, than in any other borough.

TAXIS, TRANSPORTATION NETWORK COMPANIES (TNCS), AND COMMUTER VANS

New York City "yellow" taxis do not serve Brooklyn often, with just 1.5 percent of citywide trips originating in the borough between 2016 and 2018.[8] Brooklyn is more frequently served by "green" outer-borough taxis, though their popularity has been decreasing recently. E-hail Transportation Network Companies (TNCs) such as Uber and Lyft continue to grow in popularity and exist alongside more "traditional" black car and livery for-hire vehicles. In certain corridors, particularly on Flatbush and Utica Avenues, there are shared-ride van services that are popular for residents heading to and from subway terminals or directly to Downtown Brooklyn.

New York City has seen substantial growth in the number of for-hire vehicles and passengers in a short amount of time. From 2010 to 2017, the number of total for-hire vehicle registrations more than doubled, with an increase of nearly 60,000 vehicles. Over that same stretch, for-hire vehicle ridership increased nearly 90 percent, with 315 million trips made citywide in 2017.[9] The rapid growth of the e-hail TNC industry [10] continues, with a 137 percent increase in average daily trips between 2016 and 2018. Many of those trips likely replaced rides on transit: a NYCDOT mobility survey found that 50 percent of respondents used for-hire vehicles to complete trips that could have been made using public transit.[11]

The most popular TNC trips within Brooklyn are short trips between northern neighborhoods such as Greenpoint, Williamsburg, Bushwick, Bedford-Stuyvesant, and Crown Heights. There is also significant activity in Spring Creek, Canarsie, and other neighborhoods in southeastern Brooklyn. Recently, TNC use has grown most quickly in eastern and southern Brooklyn.[12] Common interborough trips are short rides between Greenpoint and Long Island City, Queens, as well as between Bushwick and Ridgewood, Queens. Trips to the two airports in Queens originate primarily from northern Brooklyn.

Figures AC.3, **AC.4**, and **AC.5** depict TNC origin and destination flows for trips starting or ending in Brooklyn.

[8] 2018 Factbook, New York City Taxi & Limousine Commission
[9] New York City Mobility Report, August 2019, New York City Department of Transportation
[10] 2018 Factbook, New York City Taxi & Limousine Commission
[11] New York City Mobility Report, June 2018, New York City Department of Transportation
[12] 2018 Factbook, New York City Taxi & Limousine Commission

Commuter Vans

Commuter vans are 9-20 passenger vans and minibuses that can be licensed by the Taxi and Limousine Commission (TLC) to operate in specific territories. Licensed commuter vans are not permitted to duplicate MTA bus routes, stop at bus stops, or accept street-hail passengers. Most commuter vans operating in Brooklyn do so outside the regulations and without a license. Many vans focus their operations along corridors also served by buses and often pick up passengers at bus stops.

In 2017, NYCDOT analyzed commuter van operations around the city, including those that serve parts of Brooklyn. The primary territories are Flatbush and Utica Avenues in Central Brooklyn, as well as Sunset Park. The services on Flatbush Avenue typically run to and from Downtown Brooklyn, and the services on Utica Avenue typically run to and from the subway station at Eastern Parkway. Meanwhile, the services in Sunset Park connect to Chinatown (Manhattan) and Flushing (Queens). Less than 10 percent of commuter vans in Brooklyn operate with an active TLC license.

The commuter vans operate their service differently depending on the geography they are serving. Flatbush and Utica Avenue services typically make frequent stops and depart regularly from their terminals. Utica Avenue sees comparable vehicle volumes to Flatbush Avenue, but significantly lower ridership.

Sunset Park commuter van services are targeted to the local Chinese communities. The vans operate as express services, loading the vehicles at either end of the trip and then traveling direct to their destination with no interim stops. Manhattan's Chinatown is a much more popular destination than Flushing, though growth in Flushing trips is expected.

OTHER LOCAL TRANSPORTATION OPTIONS

Ferries

NYC Ferry is operated by Hornblower on behalf of New York City. Service recently expanded throughout the city. Brooklyn has ferry landings at nine locations on the East River and Upper Bay, providing service to Wall Street and East 34th Street in Manhattan. Brooklyn landings comprise about half of systemwide AM peak ridership.

A new landing will open in Coney Island in 2021. This new Coney Island route will also provide the Bay Ridge landing with express service to Wall Street.

Citi Bike

Citi Bike is a bikeshare program run by Lyft for NYCDOT. Citi Bikes are available at dozens of stations in northern Brooklyn, with recent expansions into eastern Williamsburg and Bushwick. Additional stations will be installed during the next phase of expansion, which will take place from 2020 to 2023. Those new stations will serve Bedford-Stuyvesant, Brownsville, Crown Heights, Prospect-Lefferts Gardens, East Flatbush, Sunset Park, South Slope, Windsor Terrace, Prospect Park South, and Kensington.

Revel

Revel is an electric moped ridesharing company that recently arrived in New York City. The current service area is in northern Brooklyn, as well as Long Island City and Astoria in Queens, within which one must start and end the ride. Rides can extend outside this zone, though it is forbidden to ride in Manhattan, on major bridges other than the Pulaski Bridge, and on highways.

SURFACE TRAVEL WITHIN BROOKLYN

Brooklyn began as a collection of towns (including Gravesend, Midwood, and Flatbush). Each developed its own street grid and naming conventions. Even with the later consolidation of Kings County and then New York City, these standalone street grids can still be seen clearly on a map of the borough. Though many individual sections have predictable street grids with major arterials and minor side streets, at the junctures of these small grids, the streets often do not line up. Occasionally, 20th-century development projects connected such streets, such as Utica Avenue and Malcolm X Boulevard on either side of Fulton Street. However, in many more instances, continuing “straight” on a street requires a quick series of turns, such as traveling on Avenue R crossing Gerritsen Avenue.

North-south and east-west arterials across long portions of the borough allow for surface transportation, including bus routes, to travel in generally straight lines in many instances. The confluences of the smaller historic street grids do present challenges in navigating from certain neighborhoods to others, as the grids change orientation and do not always line up. Large land features such as Prospect Park and Green-Wood Cemetery also present obstacles to direct travel across Brooklyn, as do other border vacuums such as highways and rail lines. These hindrances impede surface travel, both on buses and on other modes.

CONNECTIONS TO OTHER BOROUGHS

Jurisdictional boundaries established centuries ago are less relevant in an age when development brings residents and workers across long distances every day. Travel between Brooklyn and Queens is heavy for residents of both boroughs, as the border winds through neighborhoods that blur the boundaries. Travel to Manhattan creates connections to many more jobs and destinations than could otherwise be accommodated in one single borough. Travel to Staten Island is also a key interborough connection for commuting, education, and shopping trips. Yet for each of these interborough pairs, there are a limited number of crossings, which frequently end up being choke points. The connections from northern Brooklyn to Queens, and from Brooklyn to Manhattan and Staten Island, are all water crossings and rely on a handful of bridges (and one tunnel to Manhattan).

3. BUSES IN BROOKLYN

- Improving Transportation in Brooklyn
- Brooklyn's Public Transit History
- Brooklyn's Bus Network Today
- Brooklyn's Bus Riders
- Frequency
- Speed
- Reliability
- Connectivity
- Ease of use
- Productivity and Financial Efficiency

IMPROVING TRANSPORTATION IN BROOKLYN

Travel throughout Brooklyn is available via several different modes, including automobiles, subways, Long Island Rail Road, ferries, bikeshare, taxis, commuter vans, black cars, Transportation Network Companies, Access-A-Ride, and our bus network. There are severe limitations to how much each mode can be improved as part of any effort to enhance transportation in and around Brooklyn.

Bus service is the only mode that can create access for everyone affordably and can be significantly improved in a timely manner. Improving transportation in Brooklyn begins with a new, better bus network.

Expanding subways and Long Island Rail Road with new track segments as part of new lines is expensive and can take decades to complete. The MTA's Utica Avenue Transit Improvements Study considers a subway extension as one alternative for bringing improved customer mobility to the area. However, even if such a long-range investment package proceeds, it will not bring immediate benefits to most of the borough.

Historically, yellow cabs have not provided access for many in the outer boroughs. Understanding this, New York City created "green" taxis, which provide access to more people, but still not for everyone, and at a higher cost to customers. Black cars similarly provide access, but not affordably and not in mass quantities. Uber, Lyft, and other TNCs are not affordable for many, and limited for people in wheelchairs and people with children.

Individual automobile ownership is available for many, but affordable for few. Access is limited by congestion and the availability of parking at either end of the trip.

Commuter vans can provide affordable access to people in areas with high ridership (usually already served by buses), but not to everyone (such as people in wheelchairs and children). In addition, they do not cover most areas of the borough.

Bikeshare can provide access somewhat affordably (public housing residents receive discounts) to people in areas of high ridership, but only for able-bodied people. Like commuter vans, bikeshare does not cover most areas of the borough.

Access-A-Ride can provide affordable access for people who qualify.

Redesigning the Brooklyn Bus Network is an opportunity to bring near-term improvements to the borough's entire transportation system.

BROOKLYN'S PUBLIC TRANSIT HISTORY

Brooklyn's long history of public transit goes back well into the 1800s. Horsecars, cable cars, and elevated railroad lines were all part of this early transportation landscape. Around 1890, Brooklyn electrified its streetcar lines, and by the turn of the twentieth century, the Brooklyn streetcar network was one of the most extensive in the country.

In 1908, the subway was first extended into Brooklyn through the Joralemon Street Tunnel. Rapid expansion of the subway network, plus pressure from the automobile industry, led to the decline of the streetcar, with tracks being ripped out and lines replaced with diesel buses. In 1956, the last two streetcar lines on McDonald and Church Avenues were discontinued.

Most of today's bus routes are direct descendants of old streetcar routes or original 1920s and '30s-era bus routes. Nonetheless, notable changes have been made over the decades:

- **1964:** bus service started between Brooklyn and Staten Island on the Verrazzano-Narrows Bridge
- **1965:** the first express bus route was introduced, connecting Staten Island with Downtown Brooklyn
- **1997:** MetroCard Gold was introduced, allowing free bus-to-subway transfers for the first time and leading to a spike in bus ridership
- **2005:** the MTA took over operations for the Command Bus Company, the only remaining private bus transit operator in Brooklyn
- **2013:** the first Select Bus Service route was introduced in Brooklyn (**B44 SBS**), which introduced articulated buses to the borough

Over the past decades, the MTA regularly has changed individual Brooklyn bus routes to serve new and growing destinations, such as JFK Airport, Gateway Center, and the Brooklyn Navy Yard. The MTA has also occasionally revamped the bus network in certain quadrants of the borough. But overall, the structure of the Brooklyn Bus Network today looks remarkably similar to the bus network in 1969 (see **Figure 3.1**) and even the streetcar network from 100 years ago.

Figure 3.1 Historic Bus Map

BROOKLYN'S BUS NETWORK TODAY

Brooklyn has a dense bus network that covers nearly the entire borough (see **Figures 3.2** and **3.2a**), with some routes that provide a one-seat ride to Flushing, JFK Airport, and Midtown Manhattan. Seventy-eight bus routes currently operate within the borders of the borough. Of these, 72 routes are considered Brooklyn routes for the purposes of the Brooklyn Bus Network Redesign project. These include all routes operated by New York City Transit out of the six bus depots of its Department of Buses' Brooklyn Division (East New York, Flatbush, Fresh Pond, Grand Avenue, Jackie Gleason, and Ulmer Park). In addition, it includes all routes operated by MTA Bus Company out of Spring Creek Depot. Each route is classified as either local, Limited-Stop (or Limited), Select Bus Service (SBS), or express.

Figure 3.2 Local Bus Network Map

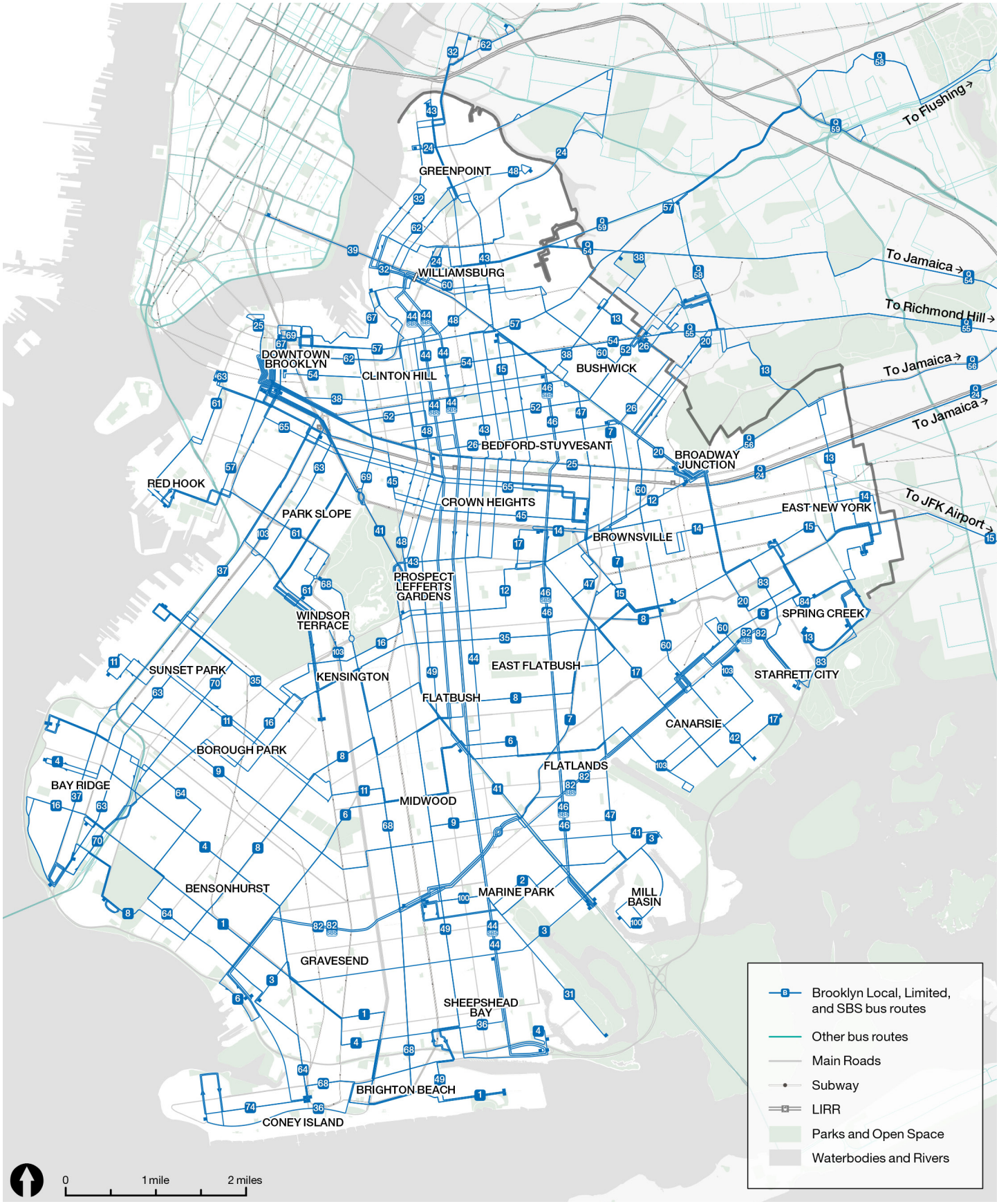
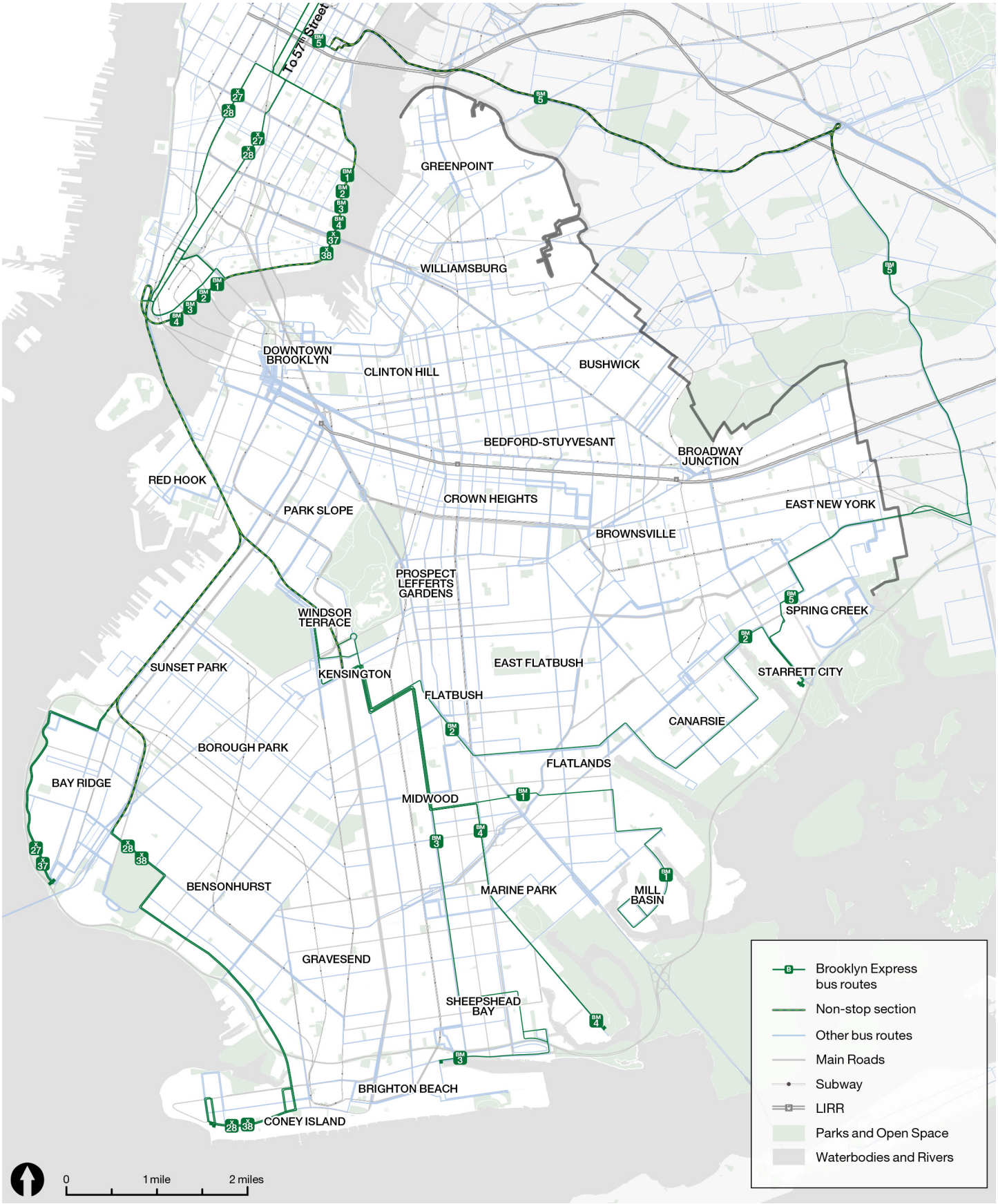


Figure 3.2a Express Bus Network Map



Local Routes

There are 59 local routes. These include all 'B' routes in addition to six 'Q' routes that operate out of Brooklyn Division depots: **Q24**, **Q54**, **Q55**, **Q56**, **Q58**, and **Q59**. There are wide variations in the functions and characteristics of these routes based on alignments, spacing (in relation to nearby routes), activity centers and key destinations along the route, neighborhoods served, frequency, and ridership volume. In addition, the subway system influences the function and design of several bus routes. Some routes primarily feed residents to subway stations, while others provide underlying local service parallel to subway lines to fill in gaps between widely-spaced stations.

Limited Routes

There are seven Limited routes that serve the busier corridors of the borough. Six are paired with a local route: **B6**, **B35**, **B38**, **B41**, **B49**, and **Q58** (each pair is counted only once in the grand total of 72 routes). One route, the **B103** Limited (LTD), has no underlying local service. Generally, Limited routes have longer distances between bus stops. This increased stop spacing is not always present on every portion of the route. The Limited service does not operate 24 hours a day and does not necessarily operate seven days a week.

SBS Routes

There are three SBS routes: **B44 SBS**, **B46 SBS**, and **B82 SBS**. These routes feature faster service through BRT (bus rapid transit) elements such as greater stop spacing, off-board fare collection, dedicated bus lanes, and transit signal priority (TSP).

Express Routes

There are nine express routes. These premium-fare routes generally operate, but not exclusively, in residential areas beyond the reaches of the subway system, and offer a one-seat ride to either Downtown or Midtown Manhattan via the Hugh Carey Tunnel.

Other Routes in Brooklyn

Of the other six routes operating within Brooklyn, three are Queens local bus routes:

- **Q7** operating from the JFK Airport Cargo Area to Euclid Av A C via Rockaway Boulevard;
- **Q8** operating from Jamaica to Gateway Center via 101st Avenue;
- **Q35** operating from Rockaway Park to Flatbush Av-Brooklyn College 2 5 via Flatbush Avenue.

These routes are primarily being analyzed as part of the ongoing Queens Bus Network Redesign project, though exact routings within Brooklyn are being studied in conjunction with the Brooklyn project team.

Three routes are Staten Island routes that travel over the Verrazzano-Narrows Bridge and terminate at 86 St R in Bay Ridge:

- **S53**, a local route operating from Port Richmond;
- **S79 SBS**, an SBS route operating from the Staten Island Mall via Hylan Boulevard;
- **S93 LTD**, a Limited route operating from the College of Staten Island via Victory Boulevard.

These routes will primarily be analyzed as part of the future Staten Island Local Bus Network Redesign project, though the Brooklyn project will study their Bay Ridge routings.

BROOKLYN'S BUS RIDERS

The Brooklyn Bus Network carries over 650,000 riders on an average weekday.[13] Though Brooklynites board buses throughout the borough, there are noticeable concentrations of riders in several neighborhoods, including Flatbush, Downtown Brooklyn, Crown Heights, Bensonhurst/Gravesend, Prospect-Lefferts Gardens, Canarsie, and near the Kings Highway B Q subway station. Each of these locations is a node in the public transit network, where bus routes and subway lines connect to provide access across the borough and city for Brooklyn residents and employees. In general, bus boardings and alightings are more prevalent in the eastern half of the borough, particularly in the neighborhoods east of Prospect Park. Other sections of Brooklyn which have subway service nearby and higher car-ownership rates have less ridership. **Figure 3.3** shows bus boardings and alightings combined, with darker colors representing more activity and lighter colors representing less.

[13]Unless otherwise noted, all data in Chapter 3 is from May 2019.

Figure 3.3 Ridership Intensity

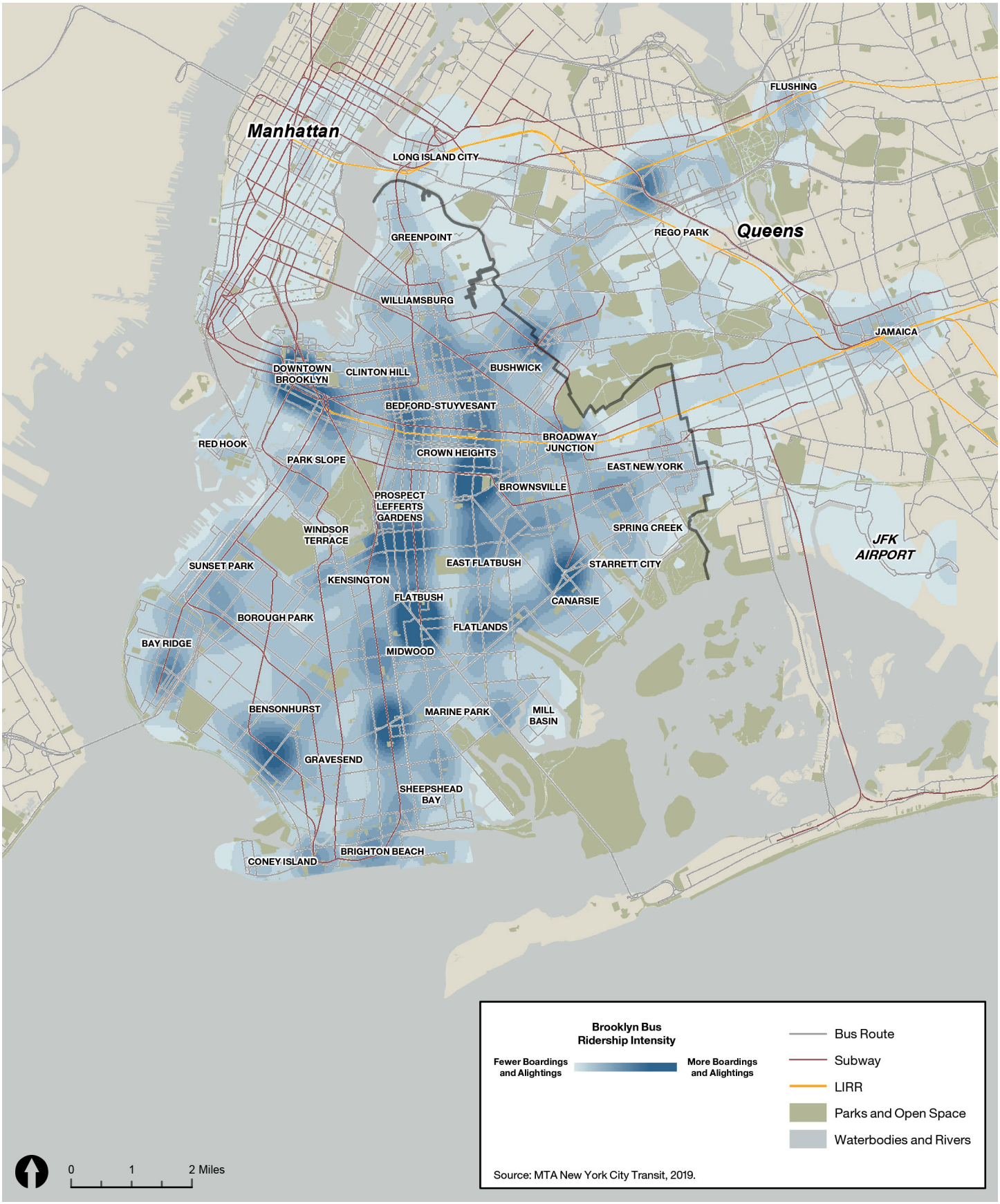
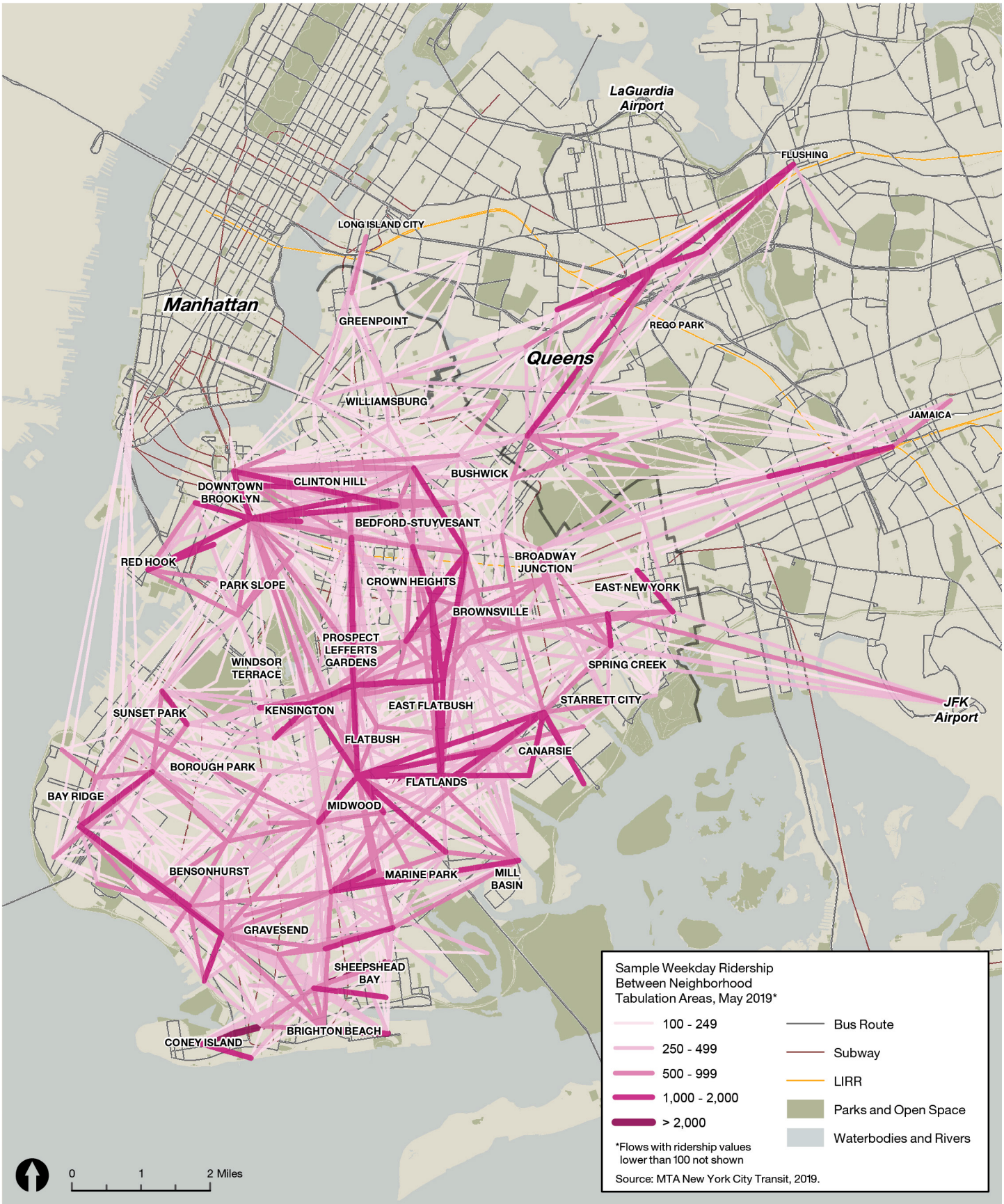


Figure 3.4 shows origins and destinations of trips on Brooklyn buses aggregated by neighborhood. The data displayed does not account for transfers – it only shows trips on any one bus route, ignoring any onward travel via another bus route or the subway. Similar patterns can be seen as in the ridership intensity map above, with the busiest bus activity east of Prospect Park. One can also see that shorter bus trips are often the most prevalent, and many of these are trips to busy subway stations. Many medium-length trips are also common.

Figure 3.4 Bus Origins and Destinations



Declining Ridership

Nationally, transit ridership declined by 2.1 percent between May 2016 and May 2019.[14] Ridership losses in New York City hit the bus network the hardest, with ridership declining 12.4 percent between May 2016 and May 2019, compared to a 2.6 percent loss on the subway system. The Brooklyn Bus Network experienced a significant decline during the same time period, with ridership decreasing by 14 percent. Note that this decrease does not account for an increase in fare evasion on New York City buses during this time, from 15 percent to 25 percent. Though substantial, this increase does not account for the entirety of the 14 percent ridership decline.

There are many explanations for this ridership loss on Brooklyn buses, including increasing economic prosperity and higher automobile ownership, and consistently low gasoline prices. Advances in technology also play a serious role in the ridership decline: competition from TNCs like Uber and Lyft, availability of bikeshare, and increasing numbers of people telecommuting and working flexible schedules.

The evolving economy of New York City has changed the travel patterns of residents in the outer boroughs. Decades ago, many residents worked in the same borough they lived in, riding buses to reach their jobs. As industrial and commercial activity in New York transformed, many of these businesses dissolved, changing the dynamics of neighborhoods in the outer boroughs. At the same time, white-collar jobs with 9-to-5 shifts grew in Manhattan, taking commuters off intra-borough bus routes and redirecting them to Manhattan-bound subway service. This pattern aligns with the increased ridership during peak hours that the subway has experienced over the last two decades.

However, Brooklyn's jobs have recently begun to decentralize away from Manhattan and Downtown Brooklyn. Many of these same outer neighborhoods contain a significant percentage of residents with jobs that are not 9-to-5 (see **Figure AC.2**). Yet bus ridership has still decreased. It appears that the existing Brooklyn Bus Network is not working for many Brooklynites.

[14]National Transit Database, October 2019 Adjusted Database, United States Department of Transportation Federal Transit Administration

Coverage

In many cities with large bus networks, a portion of the network is built to serve as a lifeline to residents to provide access and achieve specific social goals, even if high ridership is not expected. This is typically referred to as coverage service. The remainder of the bus network is focused toward high-ridership areas of the city where the bus network works productively. Coverage services require subsidies, as they do not get enough ridership to pay for the cost of running the bus in the area. However, the transit agency determines that the benefits of serving the area outweigh the costs of providing the financially unproductive service. Cities must try to accommodate coverage services while pursuing ridership. They do this by limiting the areas of the city where these coverage services run.

New York City, and Brooklyn in particular, is an outlier compared to these other cities, as it covers nearly all of its population and jobs with bus service. The MTA has guidelines in place that establish the goal that residents should be within a quarter-mile walk of a bus route if the population density in the area is above 12,000 people per square mile and the number of zero-vehicle households exceeds 15 percent. Very few areas of Brooklyn have no bus service at all, as seen in **Figure AD.3** in **Appendix D**. Portions of a few less-dense, car-oriented neighborhoods such as Bergen Beach are not covered by bus service. A neighborhood such as Sea Gate has private roads that prohibit easy operation of buses. Some areas only have infrequent bus service, such as the industrial areas of eastern Greenpoint.

Ridership Versus Coverage

As Brooklyn's Bus Network provides service to almost all corners of the borough, the trade-offs of allocating bus resources are not as much between coverage-oriented services and ridership-oriented services, but on how to spread resources among various neighborhoods and among parallel streets. In many neighborhoods, bus routes are spread on multiple parallel streets. While for many this provides easy access to a bus route via a short walk, it divides up the MTA's limited resources. Buses cannot run as frequently on any one route, since some buses need to serve another parallel route nearby. Another approach would be to consolidate routes on the most transit-oriented streets with the heaviest bus ridership, the densest land use, or the fastest bus speeds. For some riders, a longer walk to the bus would be required as there would not be a bus on the closest street any more, but the MTA would be able to run buses much more frequently on the street where service remains. Therefore, for many riders bus service would be more frequent, improving the quality of the service provided. For an illustration of this trade-off, see **Figure 4.7** on page **94**.

FREQUENCY: WAITING FOR THE BUS

One of the main factors driving how long a rider's bus trip takes is how long they must wait at the bus stop. Consistent, frequent bus service throughout the day provides customers with the ability to spontaneously choose when they travel, rather than letting the schedule decide for them. Less-frequent service can require customers to consult a schedule and time their departure accordingly, rather than having the liberty to step outside and expect a bus within a short amount of time.

The MTA determines frequencies for a route based on how many people ride it at its most crowded point, and we regularly adjust schedules to accommodate changes in ridership. While the most frequent routes generally carry the most riders, this does not mean that all frequent routes have high ridership throughout the entire route.

Figure 3.5 shows route frequencies by hour throughout the entire day on weekdays, with varying colors to represent the frequency. (See **Figures AE.1** and **AE.2** in **Appendix E** for Saturdays and Sundays.) The frequency shown is for the most frequent direction for that hour at the busiest point along the route. Routes that share a corridor for a substantial portion of their length (e.g. **B67** and **B69**) are shown together to display what the frequency and span are like in the shared section of the corridor.

Source: MTA, May 2019

Figure 3.5 Weekday Frequencies and Span

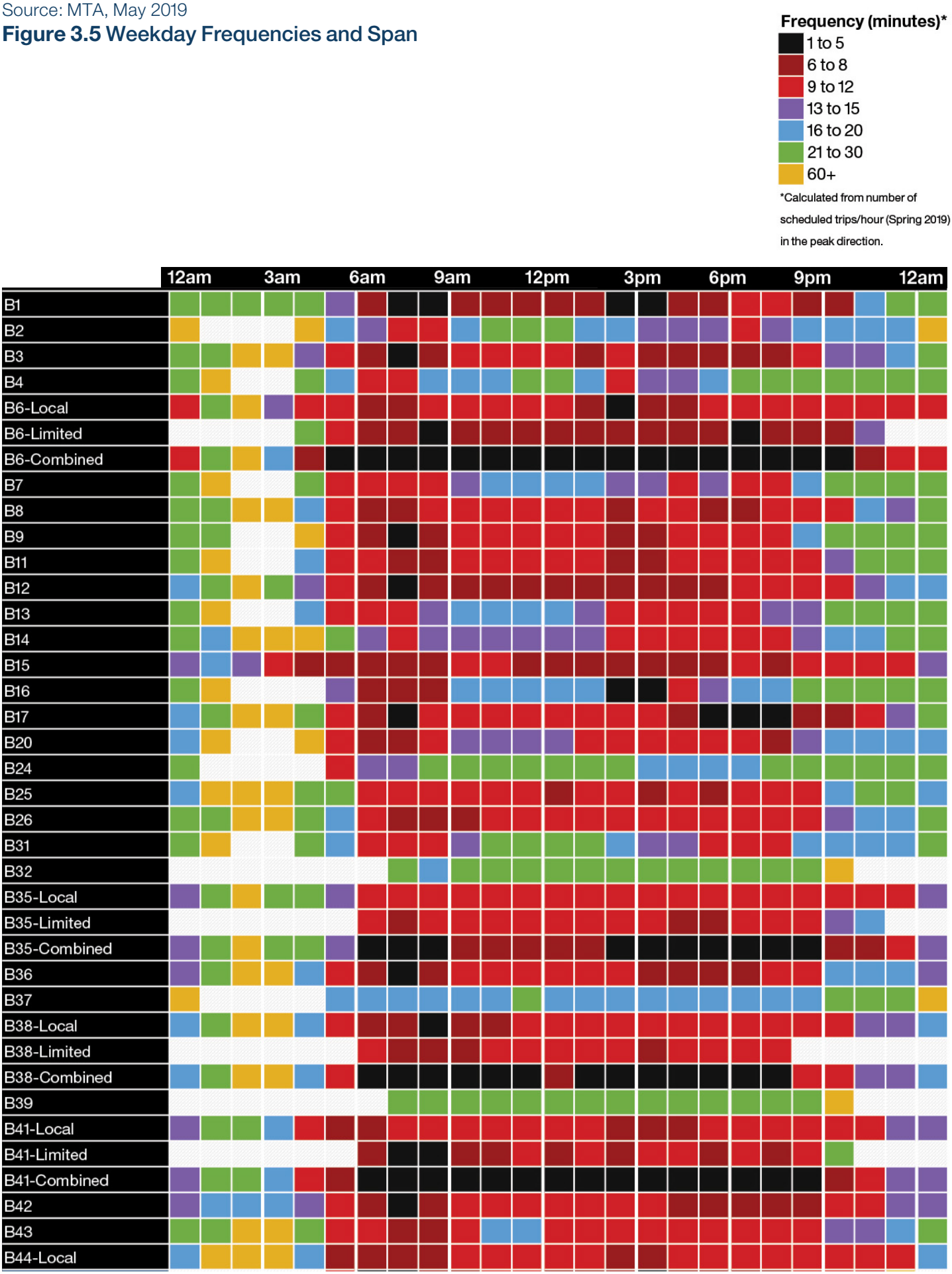
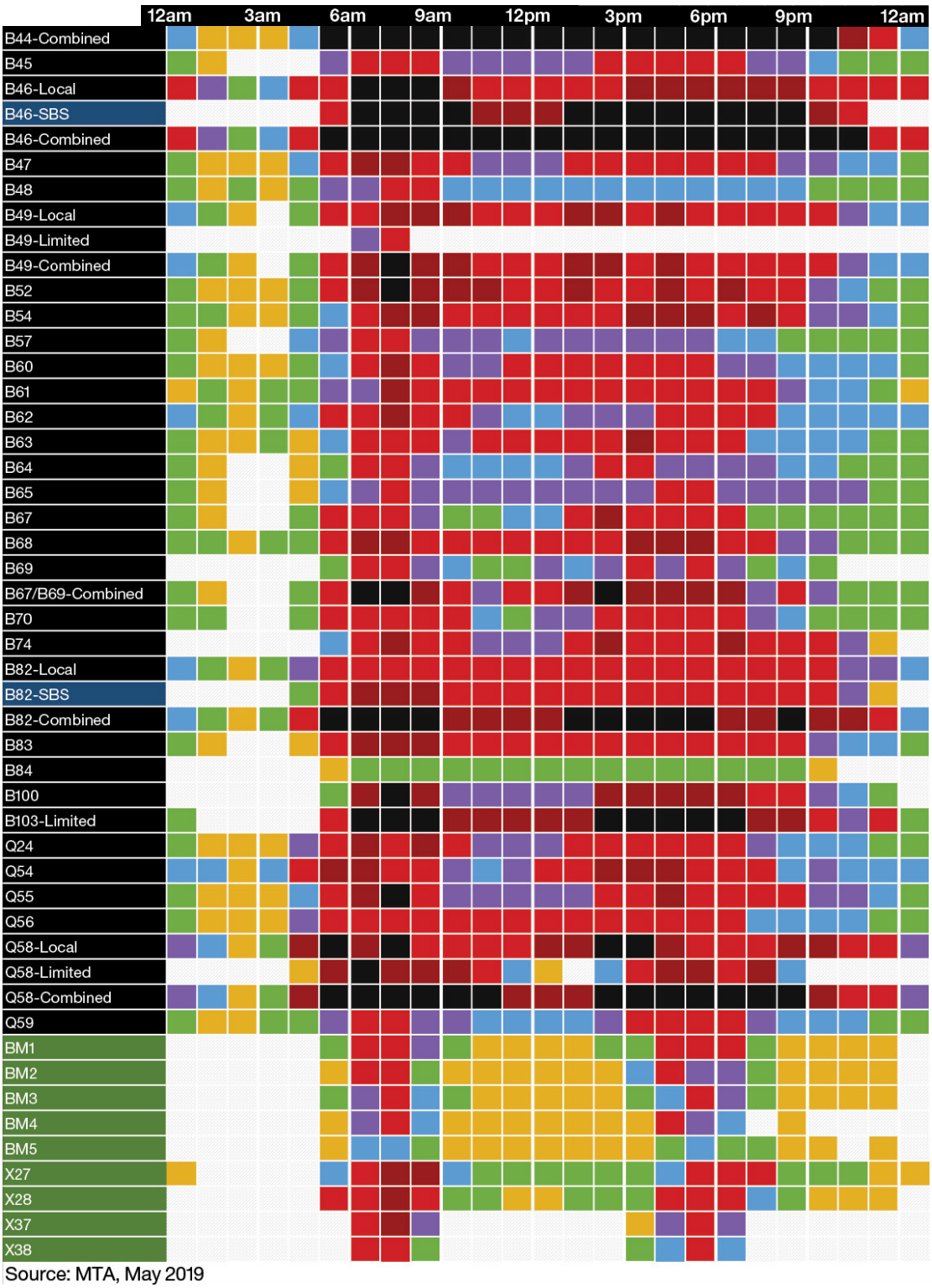


Figure 3.5 Weekday Frequencies and Span



Source: MTA, May 2019

Peak Service

The bus system carries an incredible number of people, and many of these people use buses during the peak commute times. The highest demand for bus service occurs between 7 AM and 9 AM, while a secondary peak occurs between 4 PM and 7 PM. Many jobs start around the same time as the school day begins, leading to a sharper morning peak as students and workers travel to their respective destinations. School lets out earlier than most workplaces and workdays end at different times, helping to spread out the afternoon peak.

A typical peak period requires every one of our buses to be out on the street and in service. Finding land to build additional depots is incredibly difficult, which sets a hard limit on the number of buses we can run at any given time. This forces us to become as efficient as possible during peak service demand.

In Brooklyn, most routes run all day. The exceptions are the **B49 LTD**, which operates only southbound in the morning peak; the **Q58 LTD**, which does not operate midday; and the **X37** and **X38**, which operate only in the peak hours and only in the primary commuting direction.

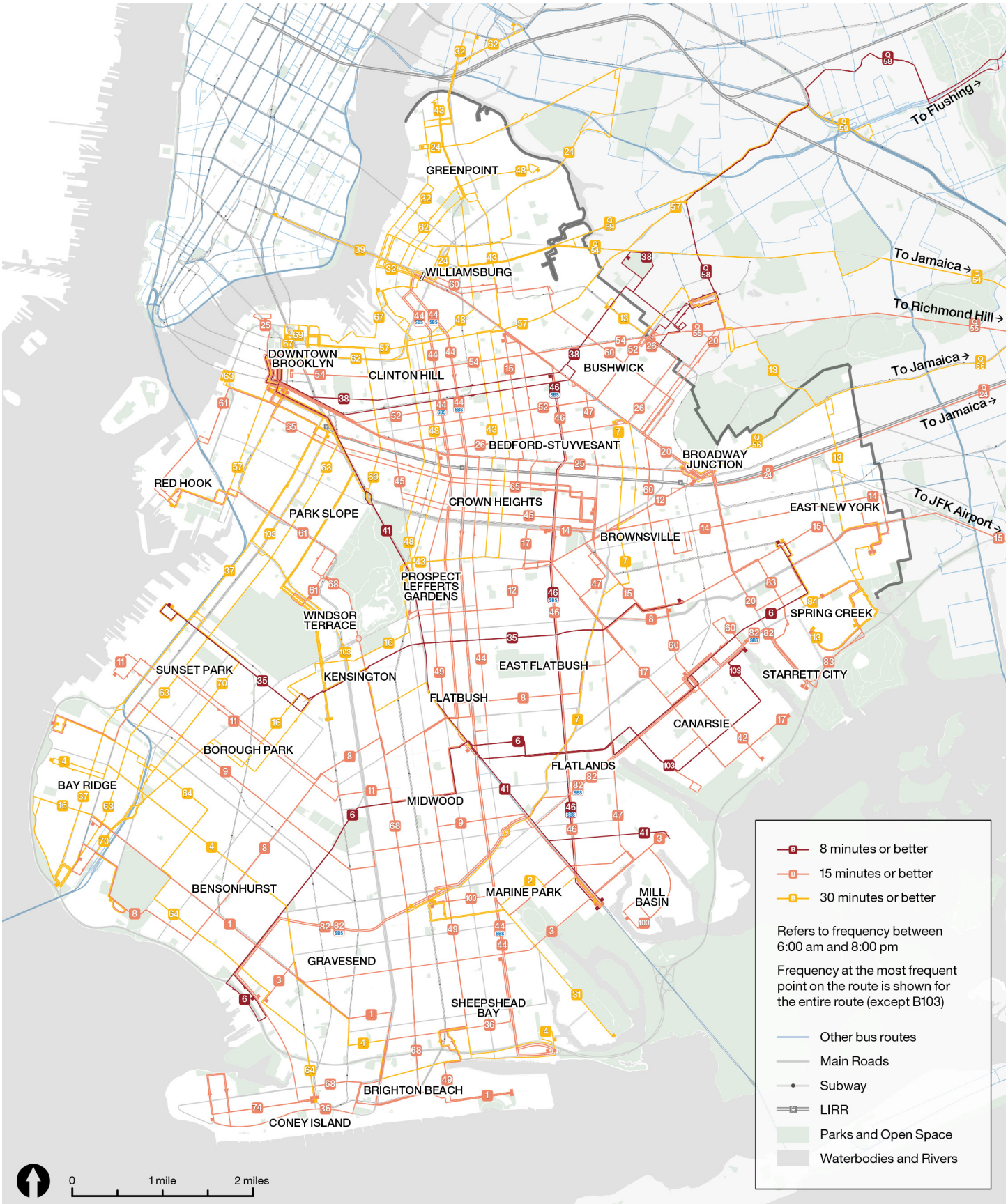
Most Brooklyn bus routes run frequently during the peak periods. Of the 72 routes, 61 run every 15 minutes or better during the AM peak and 56 do so during the PM peak. Many routes run every 8 minutes or better during the peaks, though twice as many do so during the AM peak (28) as during the PM peak (14). Service begins to tail off on some routes at around 6 PM, which might not match the needs of Brooklynites today.

Off-Peak Service

Outside times of peak demand, bus frequencies vary. Some routes, especially routes that feed subway stations, see a drastic reduction in demand after the morning peak and a drastic increase in demand once again for the afternoon peak. Other bus routes, especially ones traveling along corridors with a mix of uses, see sustained demand throughout the day. These corridors with high off-peak demand are more productive, making better use of limited resources.

Currently, only 26 Brooklyn routes have frequent service all day (i.e. 15 minutes or better between 6 AM and 8 PM), and only 5 routes have 8 minute or better frequencies all day. A consistent, all-day frequent schedule gives customers more freedom to travel and makes bus service more attractive, especially for those who do not have typical work hours.

Figure 3.6 Frequent Bus Network Map



Overnight Service

Thirty-four local bus routes operate 24 hours a day and cover the majority of the borough, though no Limited, SBS, or express bus routes operate overnight. (See **Figure AE.3** in **Appendix E** for a map of overnight routes.) With employment in the largest late-shift sectors, such as healthcare, food services, and hospitality/leisure, expected to continue growing quickly in the next decade,[15] the importance of the overnight bus network will only increase.

Weekend Service

All local routes operate seven days a week. The **B38 LTD** and **B82 SBS** do not operate on weekends and the **B6 LTD** does not operate on Sundays. The **X37** and **X38** do not operate on weekends, and the **BM1**, **BM2**, **BM3**, **BM4**, and **BM5** do not operate on Sundays.

SPEED: BUSES ARE SLOW

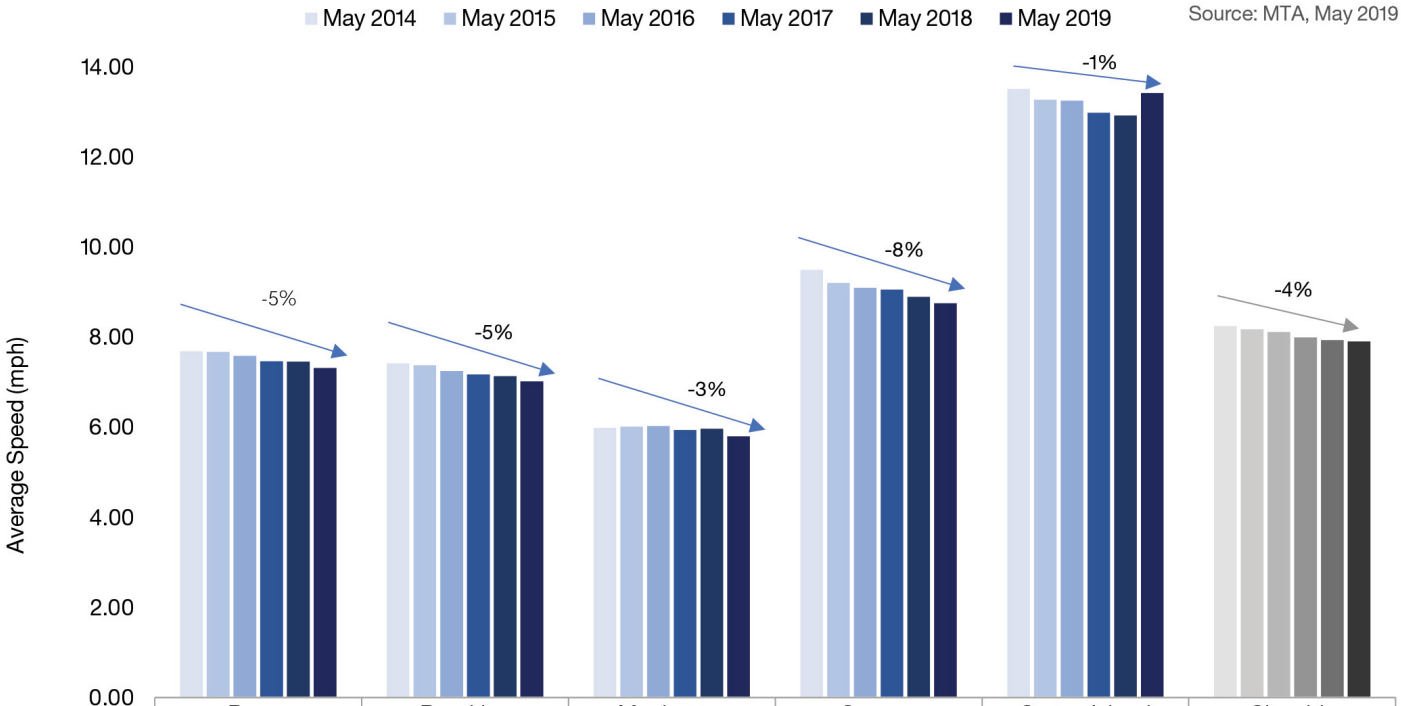
In addition to waiting for the bus to arrive, the other primary factor driving a bus customer's overall travel time is the speed of the bus on the street. In New York City, customers' travel time on the bus continues to increase as buses continue to slow down. This is a challenge to efficient bus service. As congestion intensifies, it is crucial that we work with NYCDOT to increase bus speeds and move Brooklynites to their destinations as quickly and safely as possible.

Slowing Bus Speeds

Bus speeds have fallen significantly across New York City over the past five years. Figure 3.7 shows speeds falling system-wide on our routes since 2014. Average speeds in Brooklyn are the second-lowest of the five boroughs, at 7.0 miles per hour (MPH) in May 2019. In addition, the average speed has fallen five percent since 2014, when it was 7.4 MPH. This is a larger percentage drop than the four percent slow-down citywide since 2014.

[15]Supporting Late-Shift Workers: Their Transportation Needs and the Economy, September 2019, American Public Transportation Association

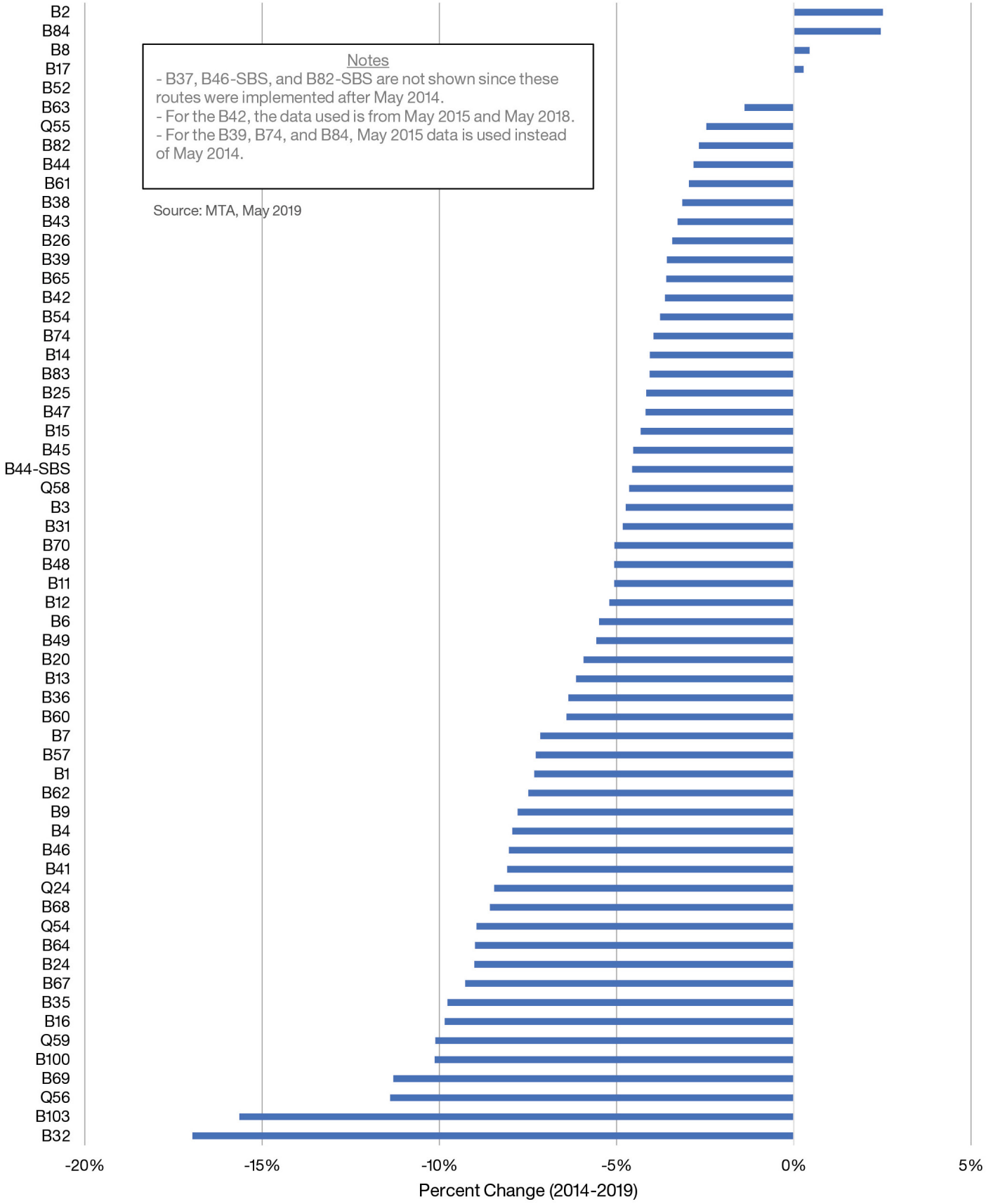
Figure 3.7 Average Bus Speeds by Borough



	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Citywide
May 2014	7.69	7.42	5.99	9.50	13.52	8.25
May 2015	7.68	7.38	6.02	9.21	13.28	8.18
May 2016	7.59	7.25	6.03	9.10	13.26	8.12
May 2017	7.47	7.18	5.94	9.06	12.99	8.00
May 2018	7.46	7.14	5.97	8.90	12.93	7.94
May 2019	7.32	7.02	5.80	8.76	13.43	7.91

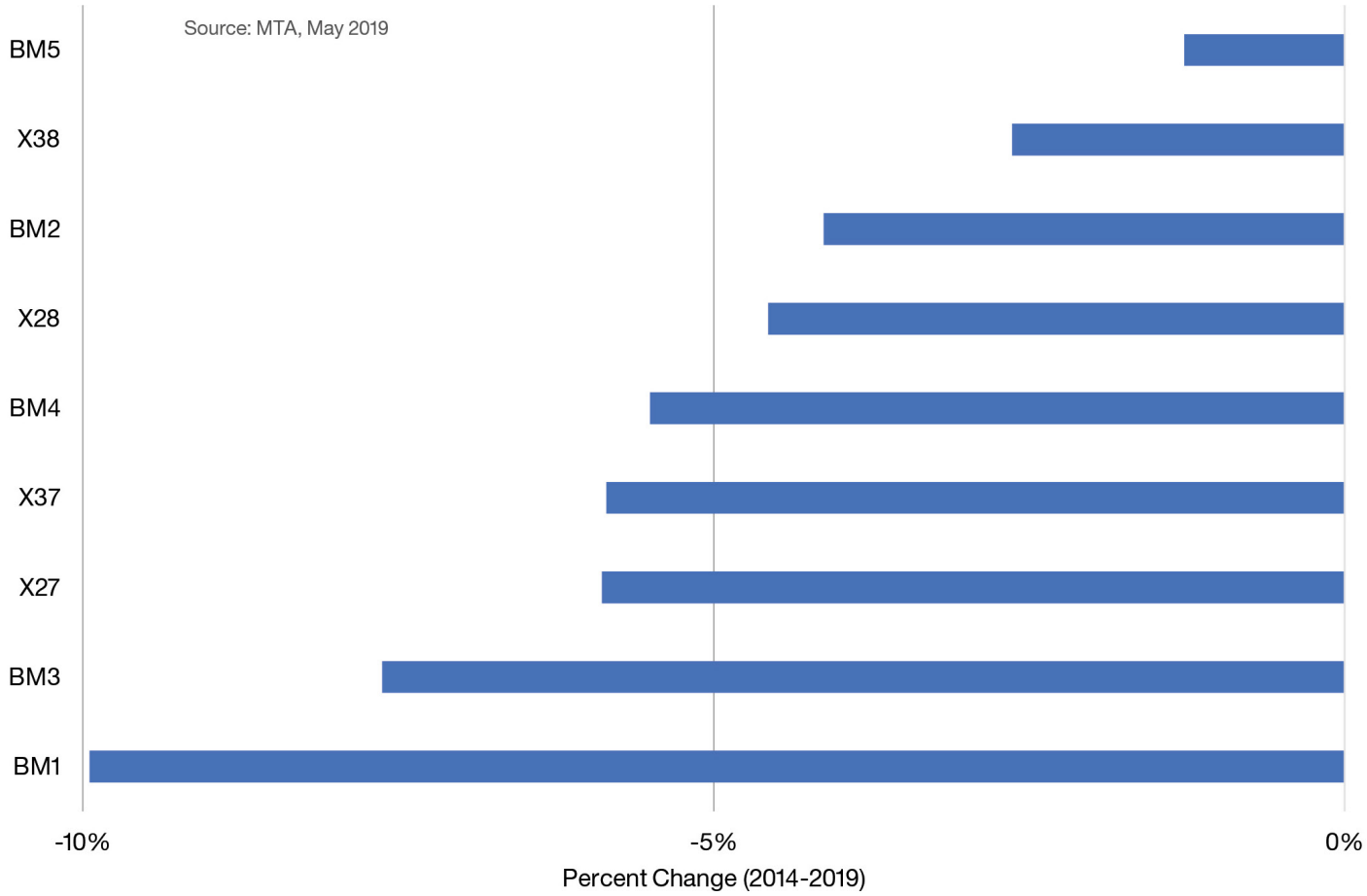
As seen in **Figure 3.8**, speed has declined on almost all local, Limited, and SBS routes, and by more than five percent on more than half the routes. Seven routes saw their speed decline by more than 10 percent. None of the routes with the largest drops in speed share significant common travel paths, suggesting that loss of speed is a widespread problem in the Brooklyn Bus Network.

Figure 3.8 Average Bus Speed Change by Route – Local



Speed decline is a significant issue on express routes as well, as seen in **Figure 3.9**. All routes are slower than in 2014, and five of the nine express routes' speeds declined by more than five percent. Speeds on these routes are affected by Manhattan congestion as well.

Figure 3.9 Average Bus Speed Change by Route – Express



Slow Bus Corridors

While buses are generally slow and getting slower, the issue is worse in some areas of the borough than others. **Figure 3.10** maps the slowest Brooklyn bus routes by their average speed over the whole route, as well as those routes that have slowed down the most since 2014. Most of the routes within the slowest quartile are east-west routes in the northern half of the borough. Many of them travel within Downtown Brooklyn, an area known for extensive congestion.

Zooming in further, **Figure 3.11** shows bus speeds during the PM peak by the specific sections of the streets on which they travel. There are many streets where buses travel slower than 5 MPH during this time. East-west streets tend to be a particular challenge, such as Church Avenue, Foster Avenue, and Avenue U, as are narrow streets such as Broadway, 50th Street, and Sheepshead Bay Road.

Figure 3.10 Slowest Bus Routes

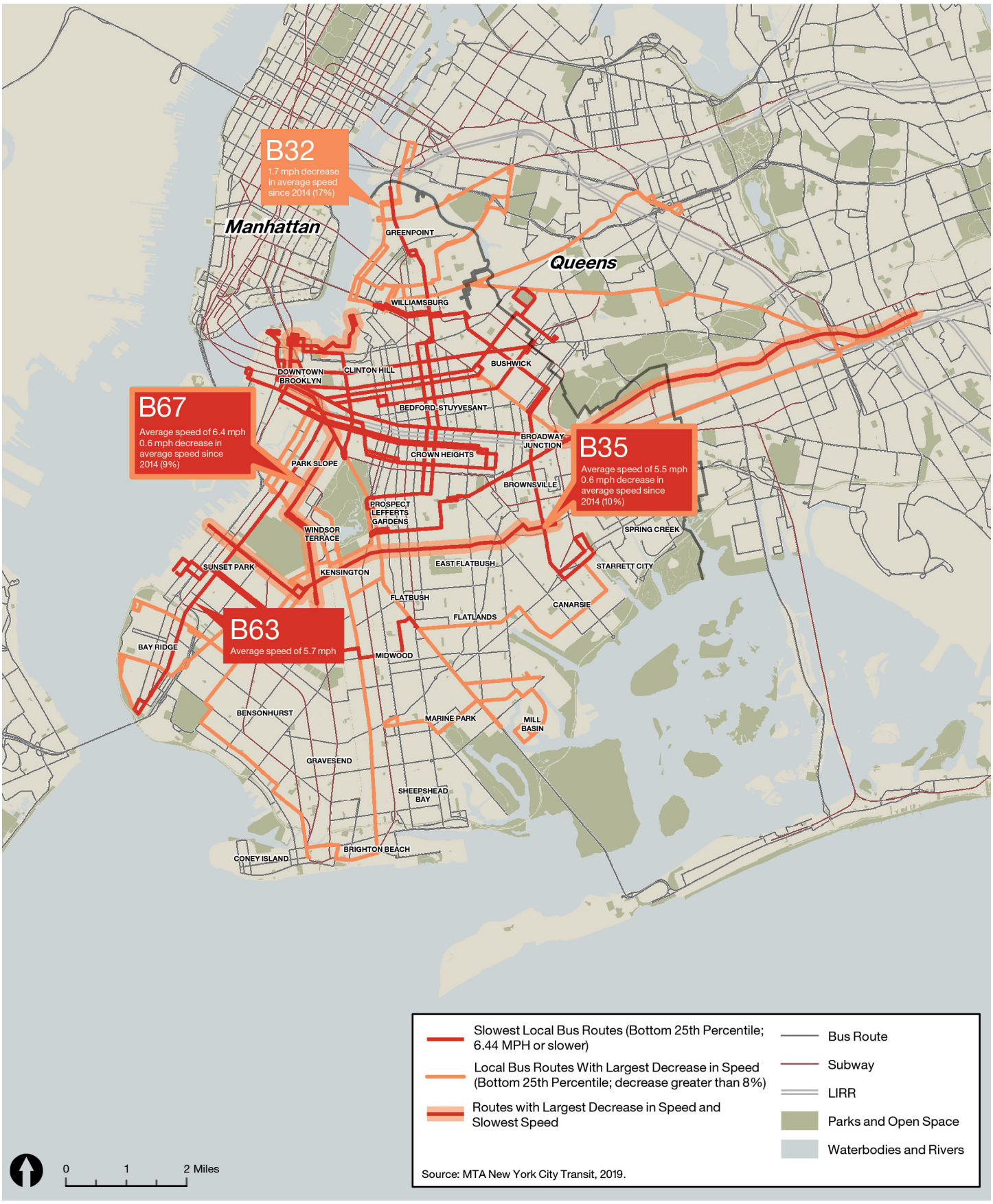
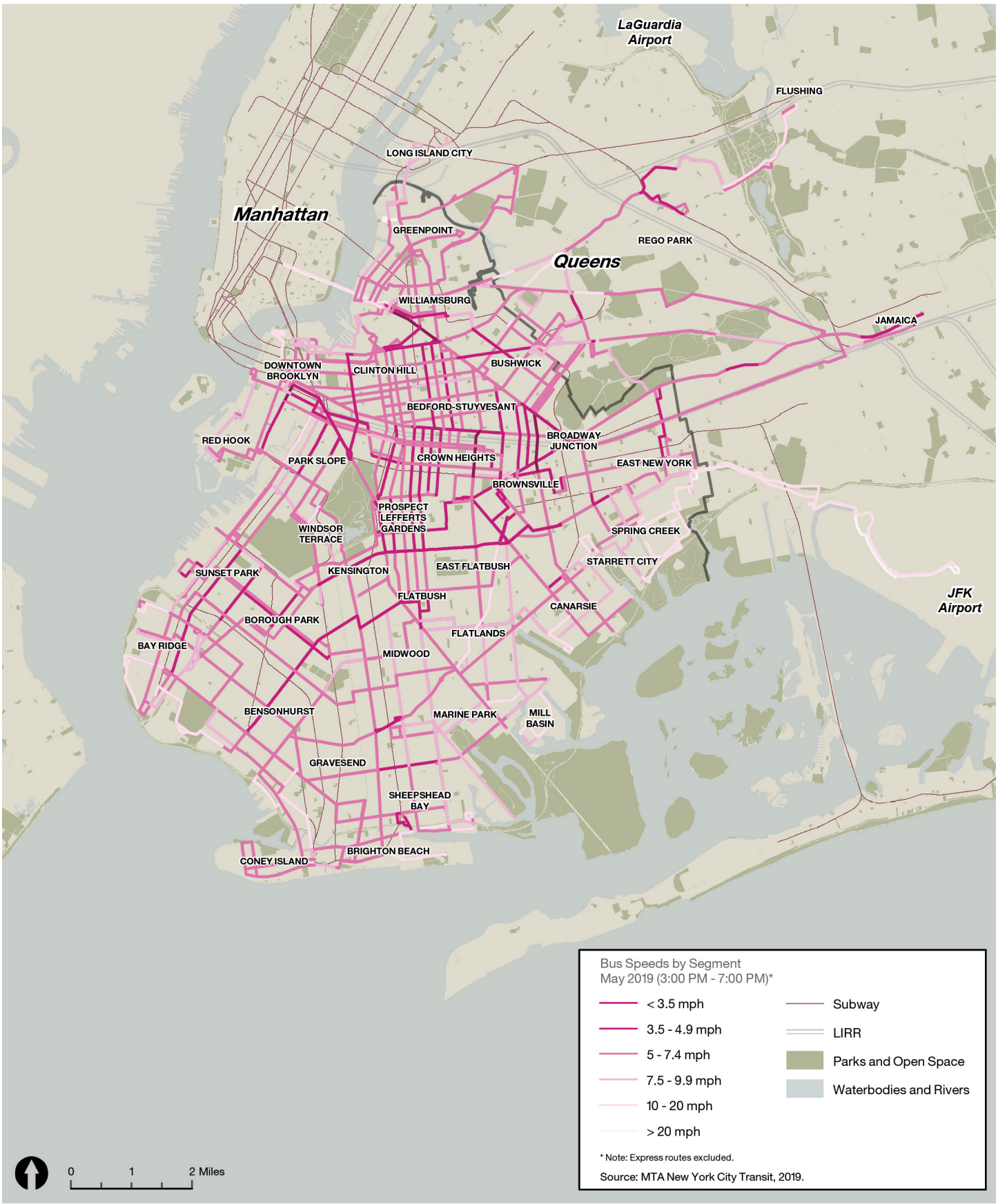


Figure 3.11 Bus Speeds by Segment



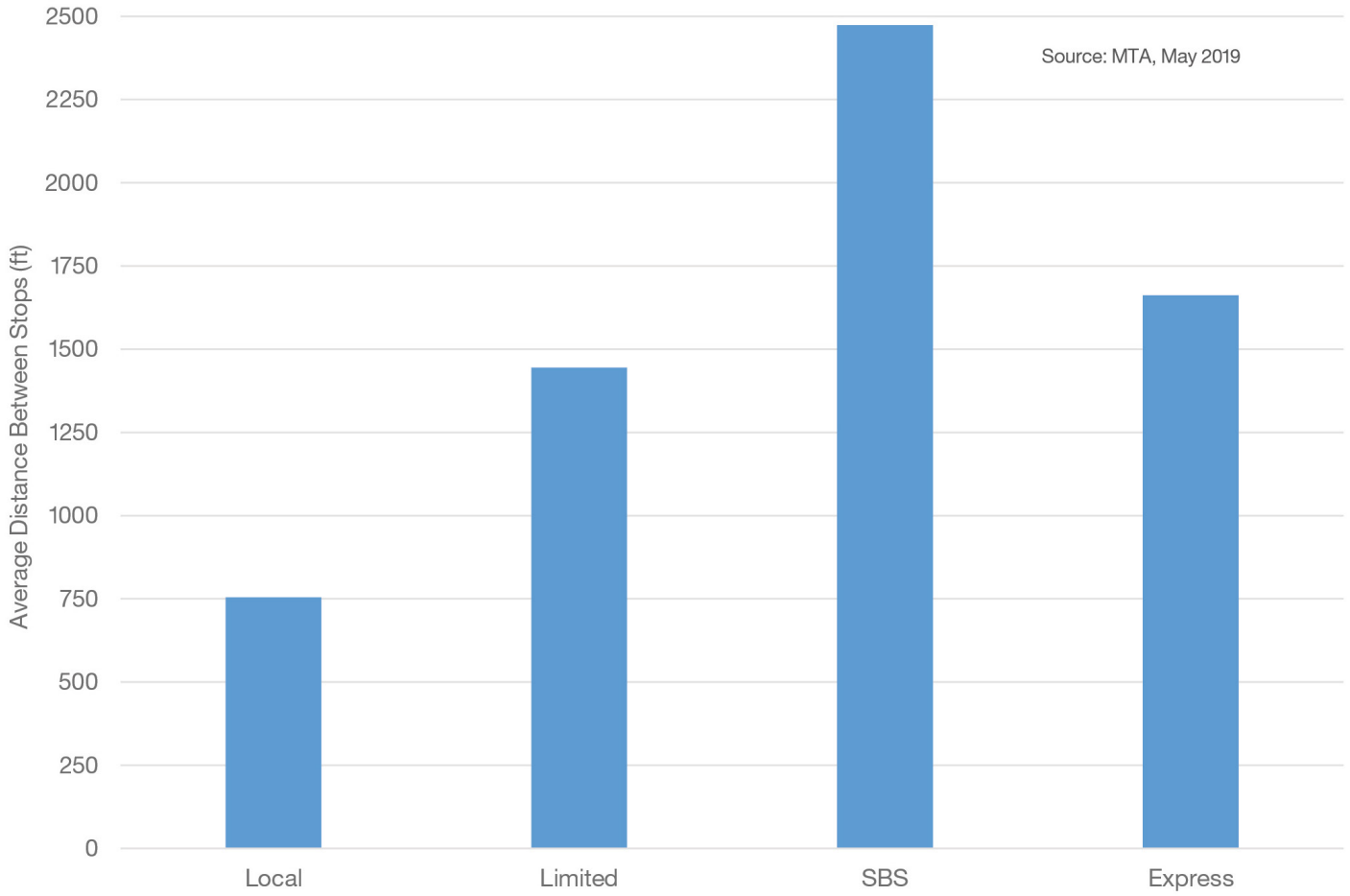
There are many causes for slow bus speeds. Traffic congestion is one of the primary reasons, caused both by many vehicles on the road and also by traffic signal timing. Turns, especially left turns, slow down buses. A left turn without a protected signal often requires a long wait to catch a break in the traffic moving in the opposite direction.

Bus stops spaced close together are another reason for slow bus speeds in Brooklyn. Bus stops can be so close together that the bus barely has enough time to leave one bus stop before it enters the next one. A 40-foot long bus traveling between two bus stops that are 400 feet apart is already a tenth of the way to the next stop as soon as it fully leaves the preceding stop. During these interludes between bus stops, the bus never picks up any real speed. This contributes to the overall reduction in speed experienced by customers.

In addition to slow bus speeds, closely-spaced stops increase the number of times a bus experiences re-entry delay over the course of running its route. Re-entry delay is the amount of time that passes between the bus door closing and the bus operator successfully rejoining the flow of traffic. This delay can easily reach 20 seconds per stop during off-peak travel times. In peak rush-hour traffic, that delay can exceed one minute per stop. Taken together, these small delays create major service problems that directly impact reliability.

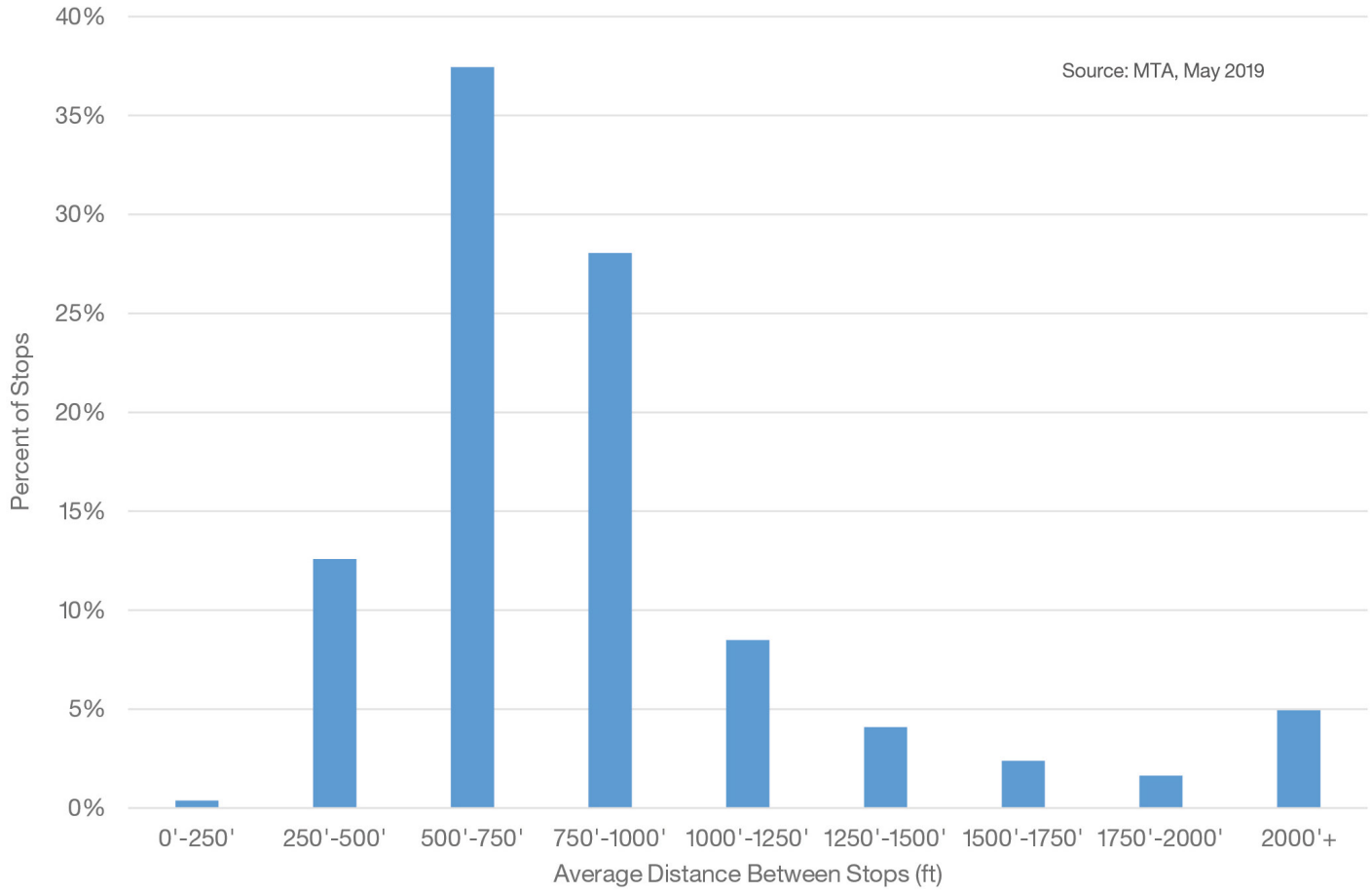
Figure 3.12 shows the average bus stop spacing for each route type in Brooklyn. As intended in their design, stop spacing on Limited and SBS routes is greater than on local routes. The 754-foot average for local Brooklyn routes is significantly less than the distance between stops in international peer transit systems around the world, which typically range from 1,000 to 1,680 feet.

Figure 3.12 Bus Stop Spacing by Type of Route



A significant percentage of stop pairs are closer than 500 feet (as shown in **Figure 3.13**). Thirteen percent of Brooklyn stop pairs – 812 in total – are especially close and are a noteworthy factor in the slowness of Brooklyn buses.

Figure 3.13 Bus Stop Spacing by Distance



Another challenge that slows down buses in Brooklyn is encroachment on bus-only lanes. Illegal standing and double-parking in bus lanes forces bus operators to weave out of the lane and into general traffic, defeating the purpose of the bus lane and slowing down both bus travel and other surface travel. Commuter vans are an especially frequent culprit in blocking bus lanes in Brooklyn, as shown in **Figure 3.14** on Utica Avenue at Eastern Parkway.

Currently, enforcement of bus lanes is done in three ways: NYPD, fixed on-street cameras operated by NYCDOT, and mobile on-bus cameras on MTA buses under the ABLE (Automated Bus Lane Enforcement) program. ABLE was introduced on the **B44 SBS** in 2019. Forward-facing cameras on buses serving the route issue violations to motorists illegally standing or parking in bus lanes. Since bus-mounted camera enforcement began, data shows an overall improvement in bus speeds of 4 percent and up to 17 percent on segments of Nostrand and Rogers Avenues. To heighten awareness of the program, "Are you a bus?" posters noting that, "Bus lanes are for buses" have been posted on the backs of the buses equipped with camera systems. ABLE will be expanded to more routes in 2020, and will be further expanded as part of the MTA's proposed 2020-2024 Capital Plan.

Figure 3.14 Commuter Vans in Bus Lane

Narrow streets in Brooklyn also hamper bus speeds and reliability. Narrow streets cause buses to get caught in traffic, and in some instances buses must negotiate with other vehicles to determine which can traverse particularly narrow streets first. Numerous streets are too narrow for two buses to pass each other, including St. Johns Place in Crown Heights, as seen in **Figure 3.15** (34 feet wide with four total lanes), Sheepshead Bay Road in Sheepshead Bay (34 feet wide with four total lanes), and Bay Ridge Avenue in Bay Ridge (35 feet wide with four total lanes). These are just a few instances where street width challenges create reliability issues that ripple throughout the system. **Figure AB.10** in **Appendix B** shows the widths of streets in Brooklyn.

Figure 3.15 Narrow Street

Bus Priority

NYCDOT implements, oversees, and maintains street infrastructure, including bus priority measures. For over a decade, we have worked with NYCDOT to install bus priority street features, such as dedicated bus lanes, off-board fare collection, bus stop spacing, and transit signal priority (TSP). These features help create faster and more reliable service on high-ridership bus routes. With NYCDOT, we are working to prioritize our buses on streets citywide. They are committed to helping us improve bus speeds and reliability and support the overall goals of the Brooklyn Bus Network Redesign project.

Figure 3.16 shows corridors where bus priority in Brooklyn current exists. There are three existing SBS routes in Brooklyn with extended stretches of bus lanes (**B44 SBS**, **B46 SBS**, and **B82 SBS**).

We work closely with NYCDOT to improve bus service through many different strategies. NYCDOT's Better Buses program seeks to address declines in bus speeds through the following approaches:

- New bus lanes
- Upgraded bus lanes
- Bus lane enforcement, including:
    - o On-bus enforcement cameras
    - o Stationary street-mounted enforcement cameras, and
    - o NYPD tow-truck teams
- Long-term capital improvements, including special accommodations for buses
- Intersection-specific projects to benefit riders
- Transit Signal Priority to move buses through intersections
- Bus bulbs and bus boarding islands to speed up boarding and eliminate re-entry delay
- Bus queue jump signals

Figure 3.16 Existing Bus Priority

RELIABILITY: BUSES ARRIVE LATE

Bus riders in Brooklyn face a harsh reality: buses arrive late all the time. If a Brooklynite's bus was infrequent and slow, yet arrived exactly on schedule and took as long to travel to their destination as expected, at least that time could be properly accounted for in their day. But it is especially difficult to rely on buses to go to work, school, or appointments if the bus does not arrive when it is scheduled to, and runs into unexpected congestion or other delays en-route. When planning out their day, a Brooklyn bus rider must account for these delays in the time they allocate to get to their destination. In an ideal situation, maybe their trip takes 45 minutes. Factoring in all the things that could go wrong, they may instead allocate an hour and 15 minutes to make that same trip to assure they arrive on time.

Bus bunching is a common challenge in customers' daily lives. Bunching occurs when buses run close together, leaving a large gap ahead of or behind them between the previous and next bus. For example, one bus may run into delays from a double-parked car, causing it to run late. The bus may eventually get around the double-parked car, but by the time it does, the next scheduled bus is hot on its heels. When that second bus arrives at the same spot, the double-parked car may be gone and this second bus can cruise right through and catch up to the bus in front of it.

Additional Bus Stop Time and Travel Time

Brooklyn customers wait longer for the bus than they expect to, about two minutes on average for each trip. Additional Bus Stop Time is a metric that measures the average added time that customers wait at a stop for a bus, compared with their scheduled wait time. The measure assumes that customers arrive at the bus stop uniformly, except for routes with lower frequencies where customers arrive more closely aligned to the schedule.

Figure 3.17 shows Additional Bus Stop Time by route for local, Limited, and SBS routes. There is a wide range, from 53 seconds on the **B31** to more than five minutes on the **B32**. SBS routes do particularly well on this metric. The four worst-performing routes (**B32**, **B24**, **Q56**, **Q24**) are all interborough routes to Queens.

Figure 3.17 Additional Bus Stop Time – Local

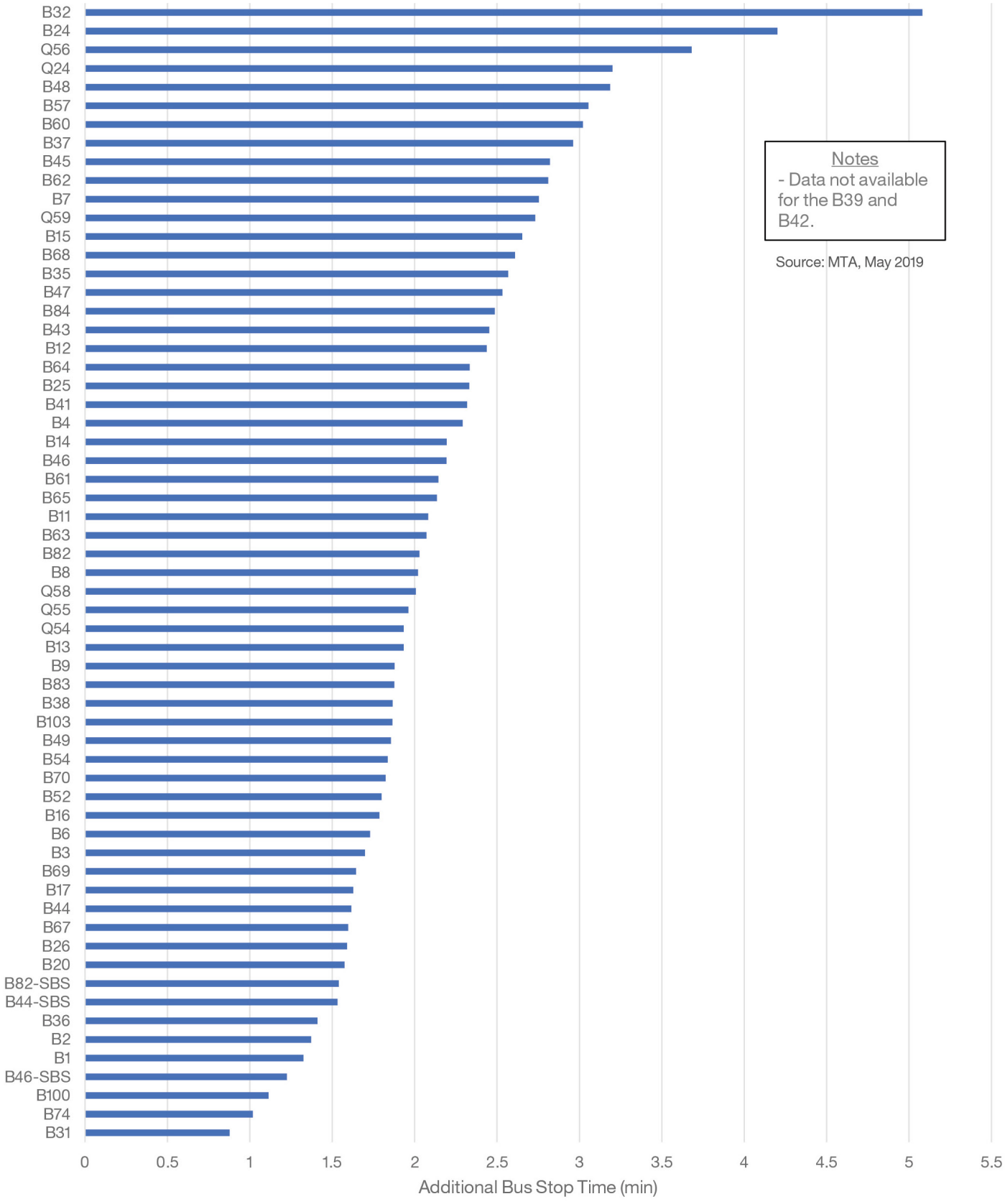
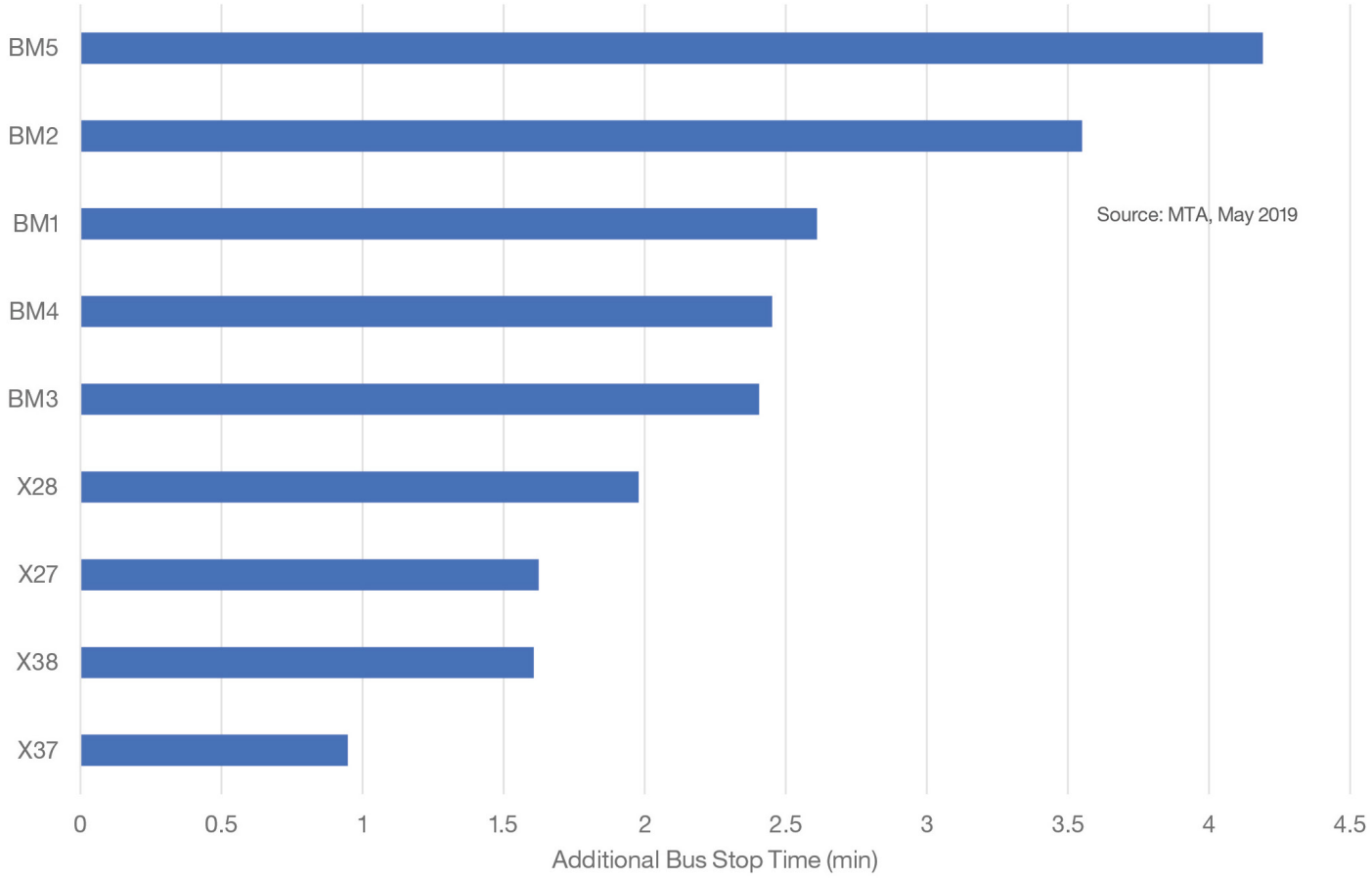


Figure 3.18 shows Additional Bus Stop Time by route for express routes. There is once again a wide range, with the express routes in southwestern Brooklyn performing notably better than those in the eastern section of the borough.

Figure 3.18 Additional Bus Stop Time – Express



Once on the bus, Brooklyn customers spend more time traveling to their destination than the schedule would indicate, about one minute on average for each trip. Additional Travel Time is a metric that measures the average time customers spend onboard a bus beyond their scheduled travel time.

Figure 3.19 shows Additional Travel Time by route for local, Limited, and SBS routes. The **B2**, on average, travels faster than scheduled, while the **B61, B20, B74,** and **B17** also travel relatively delay-free. Customers on the **B100, B35, Q56, and B47,** on average, must travel more than two minutes longer on the bus than expected.

Figure 3.19 Additional Travel Time – Local

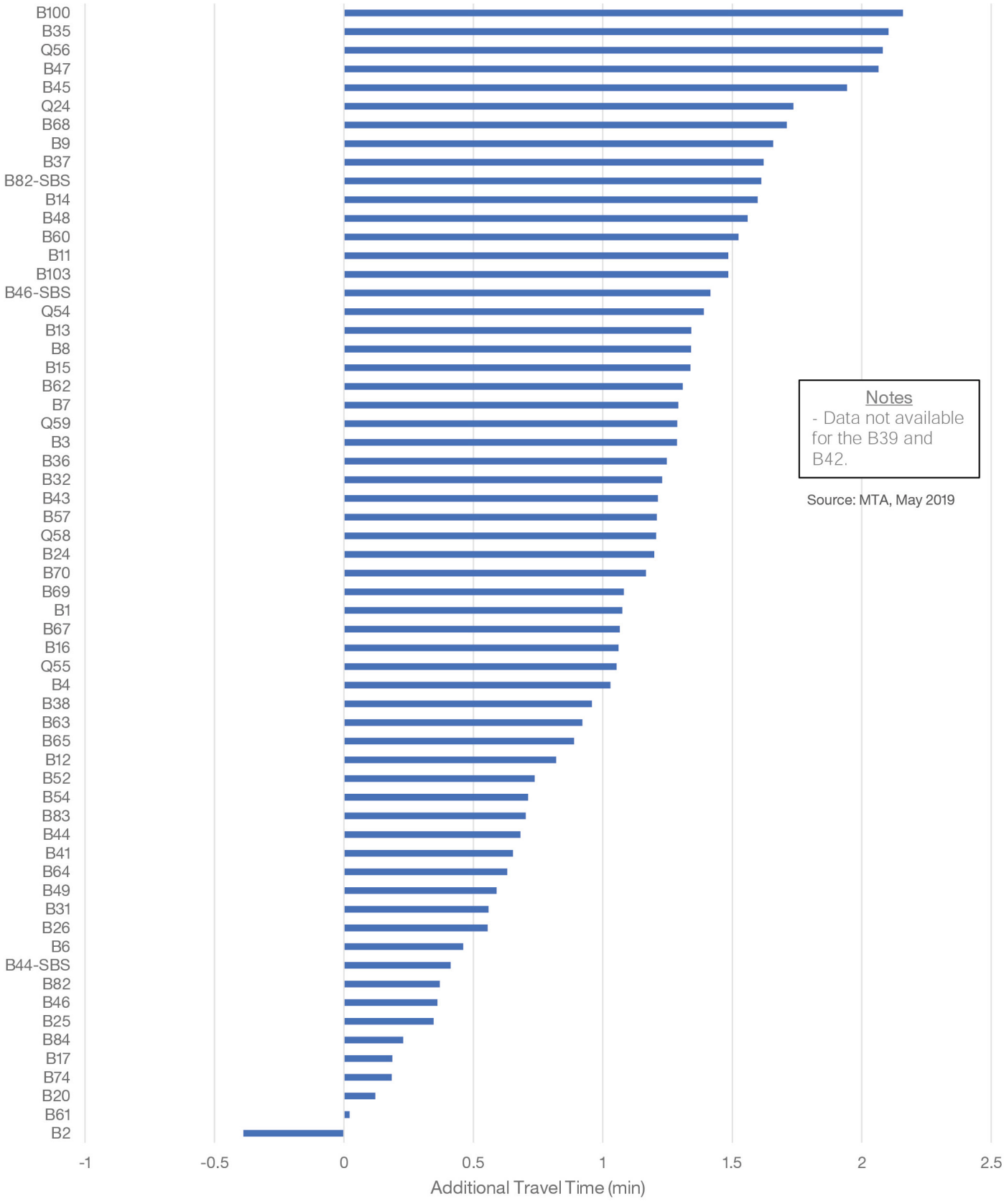
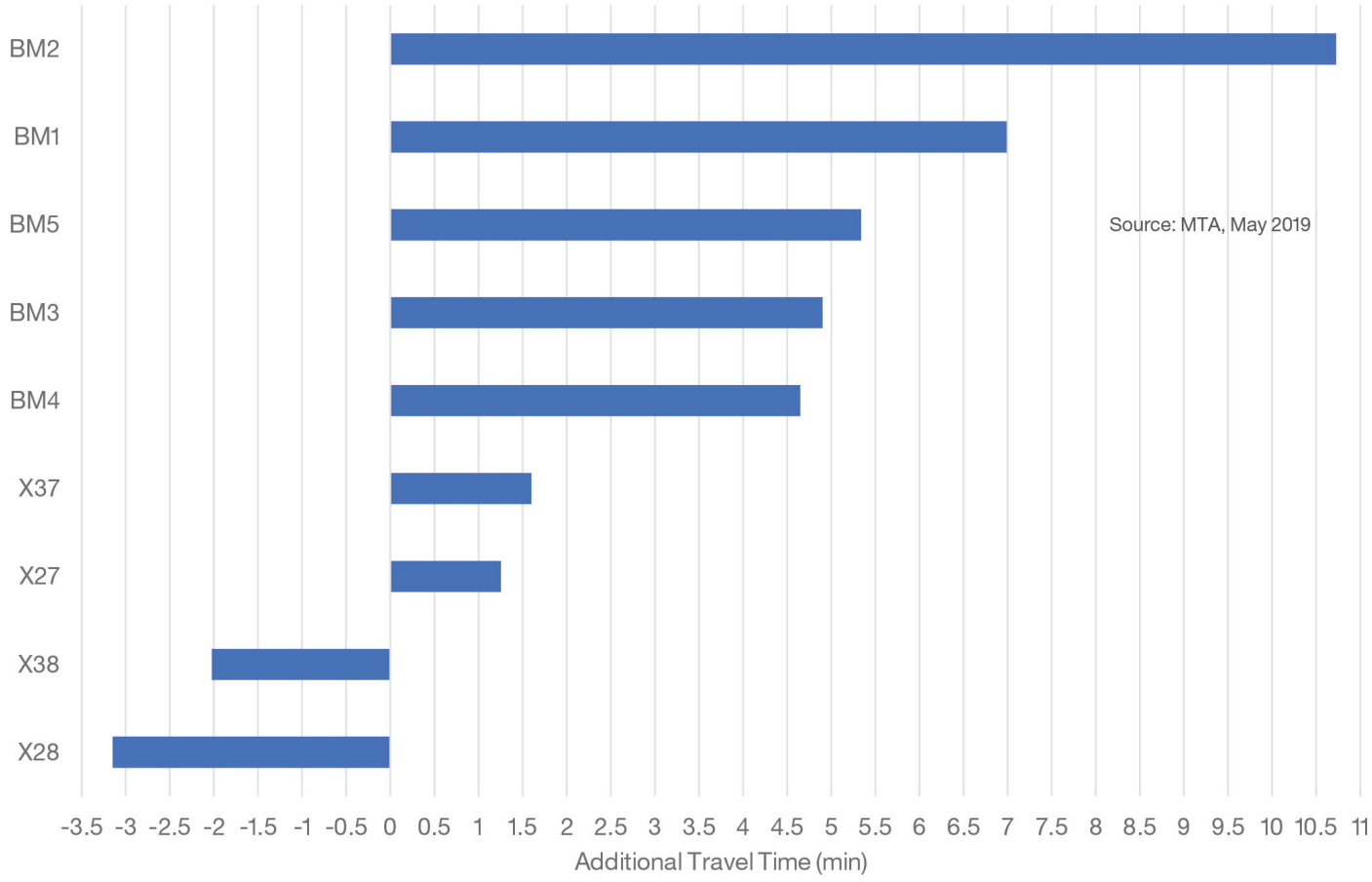


Figure 3.20 shows Additional Travel Time by route for express routes. Like with Additional Bus Stop Time, there is a notable difference between the southwestern Brooklyn routes and those in eastern Brooklyn. This is perhaps due to the **X27**, **X28**, **X37**, and **X38** using the HOV lane on the Gowanus Expressway for a larger percentage of their trip than the other express routes.

Figure 3.20 Additional Travel Time – Express



Customer Journey Time Performance

Customer Journey Time Performance (CJTP) combines Additional Bus Stop Time and Additional Travel Time and measures the percentage of customers whose journeys are completed within five minutes of the scheduled time. CJTP for the average Brooklyn bus customer is only 69 percent. In other words, about one-third of the time, it takes customers 5 minutes longer than expected to complete their trip.

Figure 3.21 shows CJTP by route for local, Limited, and SBS routes. Short subway feeders such as the **B31** and **B2** perform relatively well on this metric, as does the **B44 SBS**. The same interborough routes that perform poorly on the Additional Bus Stop Time metric also perform poorly on CJTP, with nearly half of all customers' journeys taking more than five minutes beyond what the schedule allots.

Figure 3.21 Customer Journey Time Performance – Local

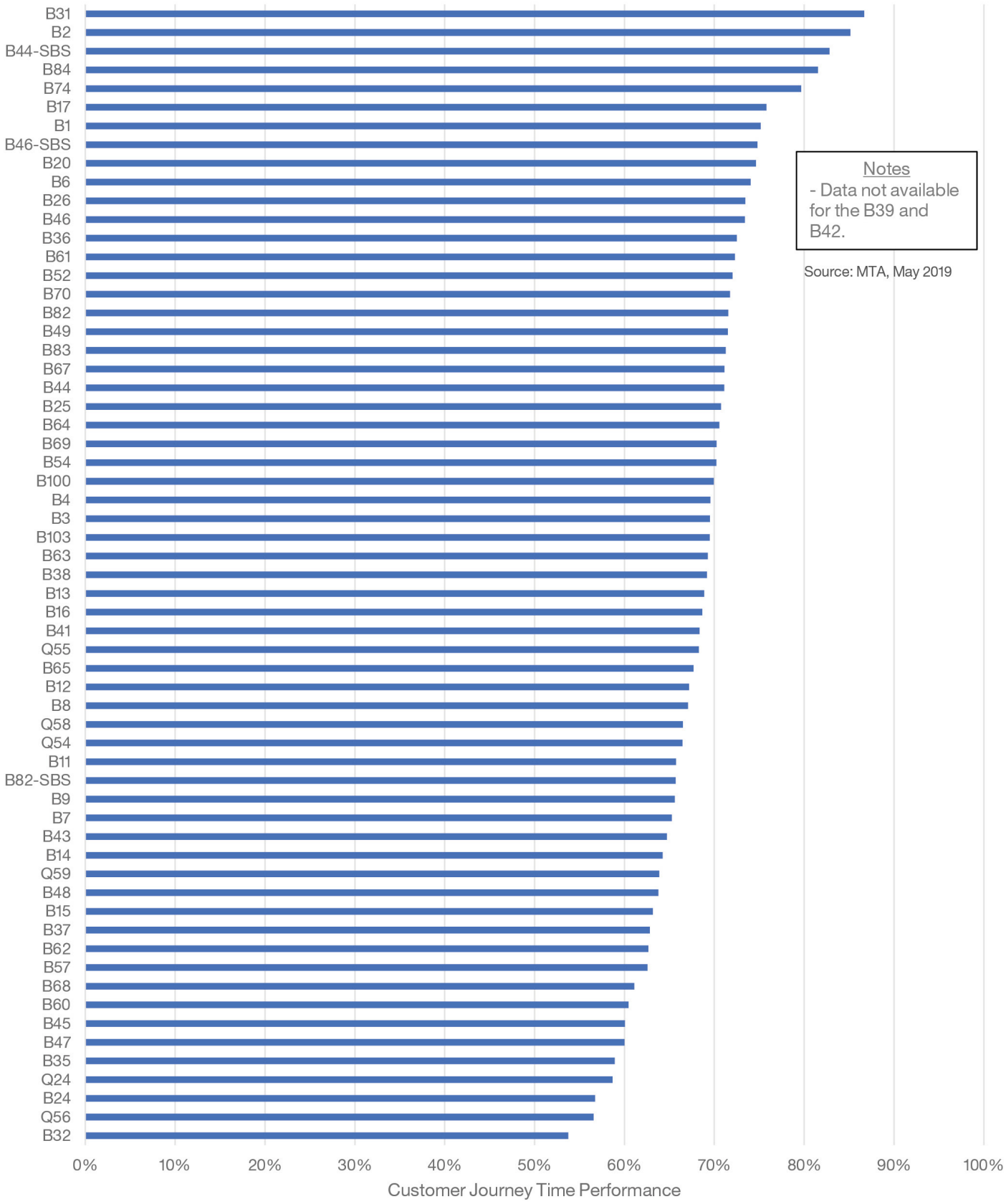
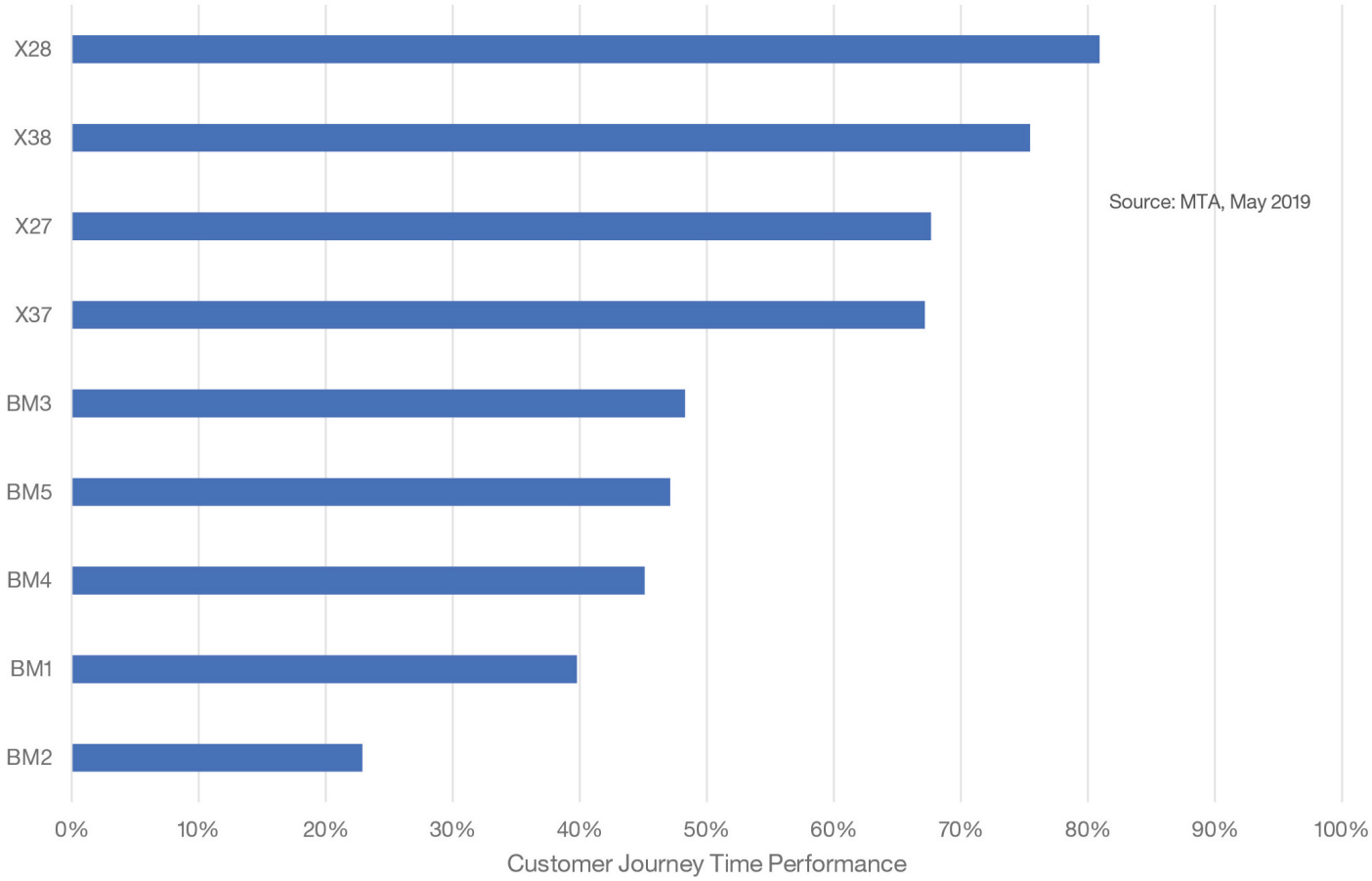


Figure 3.22 shows CJTP by route for express routes. Once again, southwestern Brooklyn routes perform better than eastern Brooklyn routes.

Figure 3.22 Customer Journey Time Performance – Express



On-Time Performance

On-time performance is a reliability metric that measures how well a bus route performs compared to its schedule. On-time performance is defined as the percentage of buses that are between one minute early and five minutes late as compared to the schedule at specific locations along the route defined for evaluating punctuality.

The average on-time performance for Brooklyn local, limited, and SBS routes is 52 percent, and the average for express routes is 58 percent.**Figures AF.1** and **AF.2** in **Appendix F** show on-time performance by route.

CONNECTIVITY: PUBLIC TRANSIT DOESN'T TAKE YOU EVERYWHERE YOU WANT TO GO

The extensive Brooklyn Bus Network provides critical transit connections to residents of and visitors to the myriad communities and neighborhoods throughout the borough. In particular, buses travel to areas of the borough where there is no subway service and connect neighborhoods that the subway does not. Though daily ridership has declined in recent years, Brooklyn bus routes are still heavily used, with average weekday ridership exceeding 650,000. Buses provide several intra- and inter-borough connections that cannot otherwise be made via the Manhattan-centric subway network.

Today, most bus routes serve multiple neighborhoods and provide intraborough travel to many Brooklynites. Most routes carry a substantial number of secondary school students. They bring customers to subway stations that are not within walking distance. Buses feed existing and emerging job centers, such as Downtown Brooklyn, the Brooklyn Navy Yard, and the Sunset Park waterfront. Buses also bring students to Kingsborough Community College, which is not served by the subway. Hospitals are also important destinations for bus customers and many are located far from the subway. Finally, buses directly connect Brooklyn to every other borough besides the Bronx.

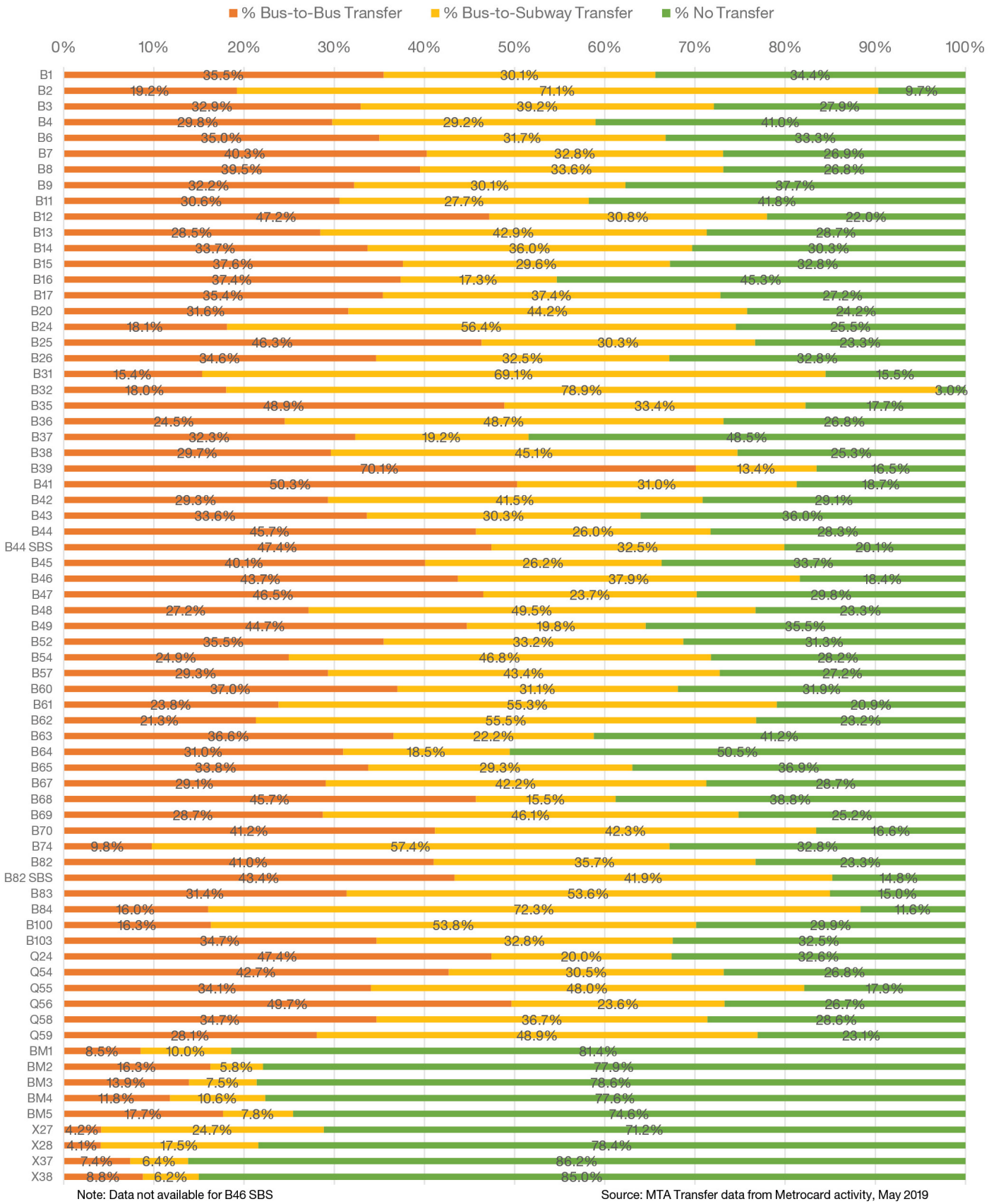
However, the ability to travel that the bus network provides does not chiefly come from individual routes operating in isolation. It is the interaction of bus routes with other bus routes and subway lines that truly delivers connectivity across Brooklyn and New York City. Even the best-designed bus route can only travel to a handful of key destinations without becoming very long and circuitous. But a bus network that is designed as a grid to allow connections from one bus route to multiple other bus routes allows travelers to reach a much larger set of destinations across a much larger area. Add in New York City's expansive subway network and, with just one or two transfers, even more of the city is accessible from anywhere in Brooklyn.

The Brooklyn Bus Network is generally already used in this manner, with transfers leading to connectivity. Of all trips on Brooklyn local, Limited, and SBS buses, only 28 percent do not include another leg on another bus or the subway. Thirty-seven percent of customers transfer to another bus and 35 percent transfer to the subway.

There are noticeable differences in these percentages between routes though. Some routes like the **B2** are primarily subway feeders, where 71 percent of customers transfer to the subway. Long, straight routes such as the **B41**, **B44**, and **B46** serve as spines in the grid system of the Brooklyn Bus Network, and therefore the percentage of customers who transfer to another bus is higher than on other routes.

The pattern on express routes is very different. Customers predominantly use these routes for one-seat rides directly from their home to their destination. Seventy-eight percent of express customers do not transfer as part of their trip.

Figure 3.23 Transfers by Route



Note: Data not available for B46 SBS

Source: MTA Transfer data from Metrocard activity, May 2019

How Far Can You Go?

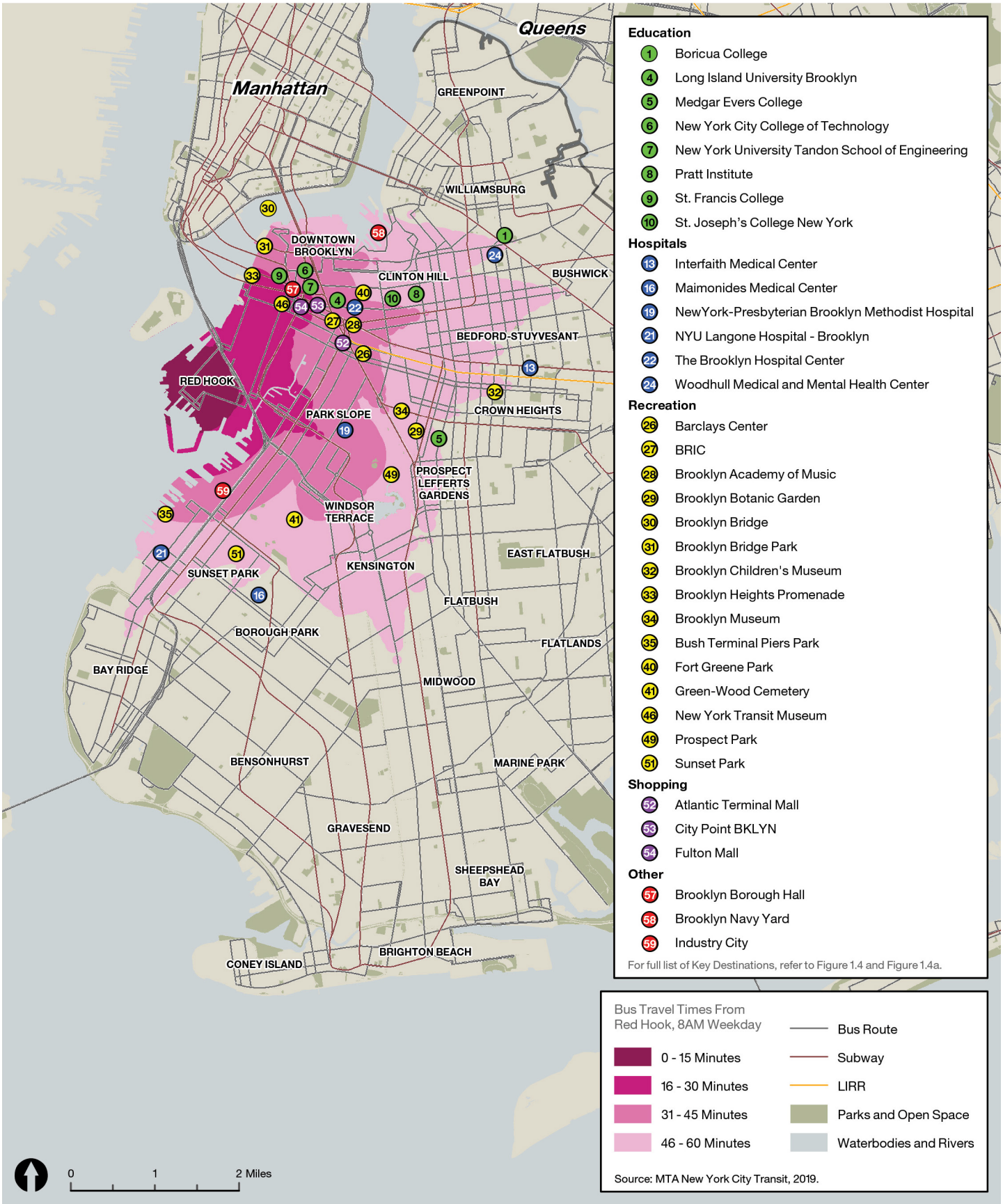
The connectivity of a transit network plays a major role in how many destinations someone can reach in a certain amount of time. Having a larger number of reachable destinations leads to more job opportunities and school options while keeping commute times reasonable.

One of the tools we have at our disposal is an isochrone. An isochrone uses trip data to create a visual map of how much of a surrounding area one can access in a set amount of time. This helps identify portions of the bus network that are less effective in transporting people where they need to go.

As examples, we selected two Brooklyn locations in subway deserts with heavy reliance on buses, Red Hook and Spring Creek. **Figures 3.24** and **3.25** show how far you can go from these locations at 8 AM on a weekday using existing bus service.

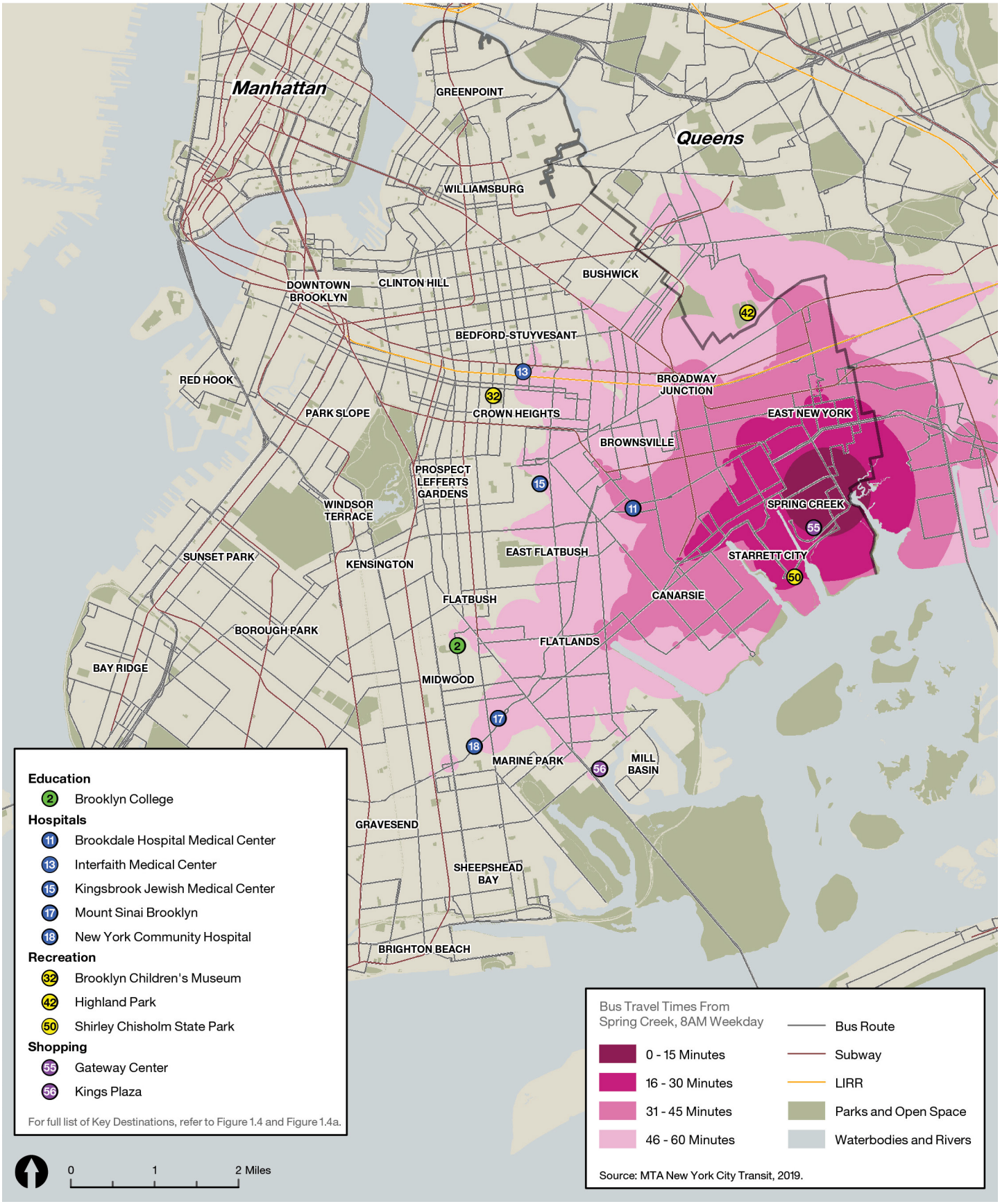
Red Hook is an isolated area whose residents and employees rely on two bus routes, the **B57** and **B61**, as their only transit service. Even at 8 AM, during the AM peak, the **B57** runs every 15 minutes and the **B61** runs every 7 minutes. Starting your trip with a long wait for the bus means that it takes, on average, more than 15 minutes just to reach the nearest subway station at Smith-9 Sts. Staying on the bus to reach Downtown Brooklyn takes a total of 30 minutes to cover a distance of 1.7 miles as the crow flies. Only a small portion of Brooklyn can be reached within an hour. Reaching many destinations requires three buses. Even if every bus runs frequently, which not all do, the combined waits add a significant amount of time to the total trip and reduces the number of places you can get to within an hour.

Figure 3.24 Sample Bus Travel Times from Red Hook



Many areas in the growing neighborhood of Spring Creek are far from the subway. Though the area near Erskine Street and Vandalia Avenue (the starting point for this sample isochrone) is served by three bus routes, the **B13**, **B84**, and **Q8**, none runs very frequently even at 8 AM. The **B13** and **Q8** run every 15 minutes, the **B84** only every half-hour. This means that accessing the nearest subway stations – New Lots Av 3 or Euclid Av A C – takes, on average, about 30 minutes. If you are trying to get to the 3 and just miss a **B84**, this adds nearly 30 minutes to your 14-minute bus ride. As in Red Hook, only a small portion of Brooklyn can be reached within an hour. Because all three of the bus routes in this area head north, reaching the central section of Brooklyn requires multiple buses and increases total wait time.

Figure 3.25 Sample Bus Travel Times from Spring Creek



Many customers use the bus network to access the subway, and as the subway generally travels faster than the bus, this transfer opens up much more of the borough and the city in a set amount of time. Though less illustrative of the connectivity purely of the bus network, isochrones for Red Hook and Spring Creek that include both bus and subway travel can be found in the appendix in **Figures AG.1** and **AG.2**.

Difficult Trips

Figure 3.26 illustrates difficult transit trips within Brooklyn according to an NYCDOT Network Matching Tool. The tool analyzed travel between NYCDOT's Transit Analysis Zones using travel directions from Google Maps. Each trip's flow is based on data from the Census Transportation Planning Products, adjusted by New York City Department of City Planning to 2015 levels. The Census Transportation Planning Products, while robust, are infrequent and limited in the timeframes available. The data have been updated to bring the timeframe forward for more appropriate analysis.

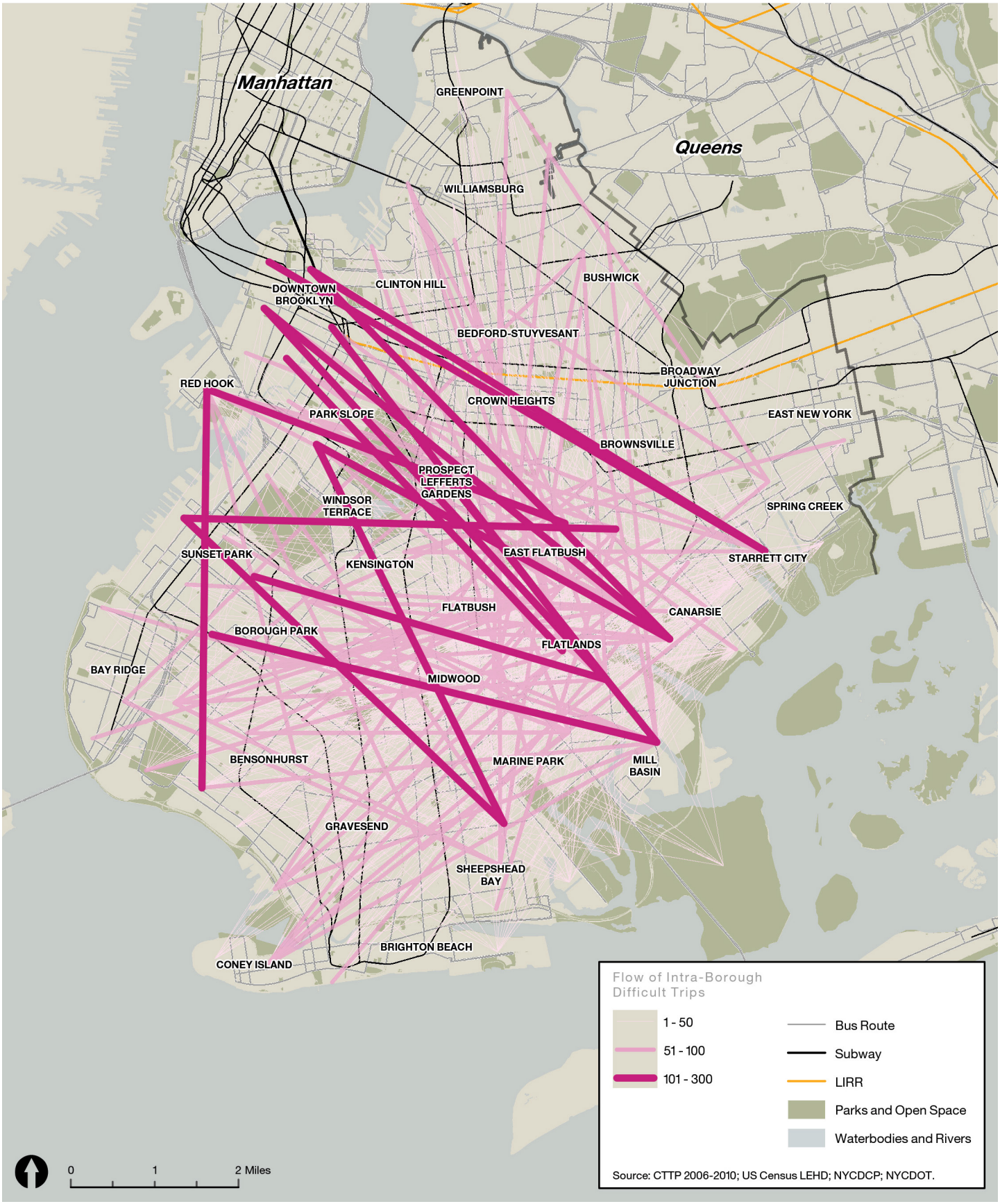
Each potential trip was run for driving directions and transit directions during the AM peak. Difficult trips are classified as having one or more of the following criteria: no good transit options, long trips, burdensome trips, and long and slow trips.

The criteria are defined as:

- **No good transit options:** transit trips that meet one of the following two criteria:
  - require 2 or more transfers, or
  - require walking more than 1-mile roundtrip for subway, regional rail, or SBS, or more than 0.5 miles for non-SBS buses
- **Long trips:** transit trips that take longer than 60 minutes
- **Burdensome trips:** transit trips that take at least 20 minutes and take 1.5 times as long as or longer than the driving time
- **Long and slow trips:** transit trips that take at least 30 minutes and whose overall speed is less than 8 miles per hour

As seen in **Figure 3.26**, there are a number of commute trips in which transit does not currently provide a convenient travel option. Primarily, these are long trips across the borough that are not served by the subway or that require a bus to access a long subway trip.

Figure 3.26 Difficult Trips Within Brooklyn



Interborough Connectivity

While some trips within Brooklyn can be difficult to make on public transit, the challenges only increase when one needs or wishes to travel to another borough.

Queens

Brooklyn and Queens share a landmass. The Brooklyn and Queens bus networks intertwine and connect, providing the ability to travel between the two boroughs. Brooklyn Division buses travel to the three main Central Business Districts in Queens – Long Island City, Flushing, and Jamaica. Queens Division buses travel to Gateway Center and Brooklyn College. Though many Brooklyn-Queens trips are not possible by subway without first traveling into Manhattan, extending travel time and distance, there are subway connections possible from many parts of Brooklyn to Long Island City, Ridgewood, Jamaica, the Rockaways, and JFK Airport. Nonetheless, there are many hurdles facing Brooklyn-Queens bus travel.

There are a limited number of roadway crossings on the northern half of the border between the two boroughs, and many of these streets are narrow and/or congested. There are only a few bridge crossings over Newtown Creek. There are multiple crossings between Bushwick and Ridgewood, Queens, though no street in this area is particularly wide. Travel east from Ridgewood to the rest of Queens is limited to a few narrow corridors. The southern half of the border near East New York does have easier roadway crossings with some wider streets.

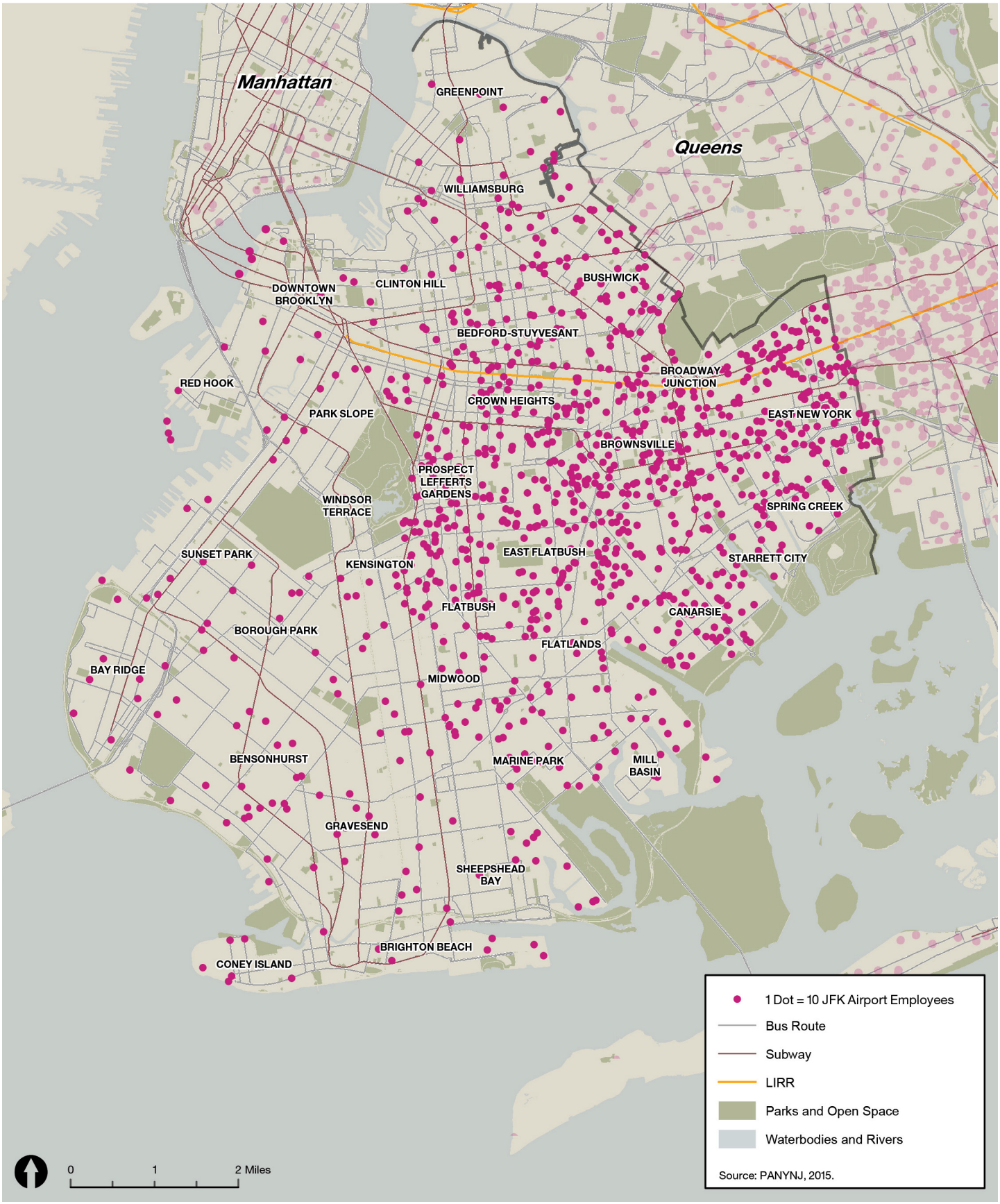
Most of these interborough corridors already have bus service, though connectivity well into Queens is often lacking. Many interborough Brooklyn and Queens Division routes end just over the border and do not truly tie the boroughs together. For instance, the **B57** ends in a low-density area of Maspeth, Queens, missing the opportunity to connect Downtown Brooklyn to major destinations further into Queens.

In addition, these interborough routes – whose intent should be to connect far-flung locations together – rarely have stop spacing any wider than typical local bus service. Customers traveling long distances are stopping very frequently, slowing their journey. Other than the **Q58 Limited**, which barely enters Brooklyn, there are no Limited or SBS routes connecting the two boroughs.

Perhaps the most noteworthy example of this is the **B15**, which travels to JFK Airport in Queens. Airport-bound **B15** customers are primarily airport employees, as bus fare is significantly cheaper than the AirTrain fare. However, other than a non-stop section on Conduit Avenue in Queens, this route has bus stops as close together as any other route despite the long distances that its customers commute.

Figure 3.27 shows the home zip codes of JFK Airport employees. Notably, many commute from central Brooklyn to their job site.

Figure 3.27 JFK Airport Employee Home Zip Codes



Manhattan

Public transit to Manhattan from Brooklyn is extensive, though travel occurs primarily on the subway system. There are a limited number of bridge and tunnel crossings of the East River and the Upper Bay separating the two boroughs. The subway traverses the Manhattan Bridge. The Brooklyn Bridge is paralleled by multiple subway tunnels. The subway traverses the Williamsburg Bridge, though the **B39** bus route does as well in order to provide an accessible option. Notably, the Essex St J M Z station will become fully ADA accessible as part of the 2020-2024 Capital Plan (see **Figure 2.1**). With the Marcy St J M Z station already ADA accessible, subway service over the Williamsburg Bridge will become accessible to all within a few years.

The primary purpose of Brooklyn's express routes is to connect Brooklyn residents far from the subway to the Manhattan Central Business Districts. Other than the **BM5**, which travels via Queens, Brooklyn express routes travel through the Hugh Carey Tunnel to access Manhattan.

Staten Island

Three Staten Island routes travel over the Verrazzano-Narrows Bridge, the lone roadway crossing between the two boroughs. In Staten Island, these routes fan out to cover much of the borough, providing access to destinations on the North Shore and the South Shore, the College of Staten Island, and the Staten Island Mall. In Brooklyn, these routes terminate at a major bus hub at 86th Street in Bay Ridge, and provide connectivity to multiple Brooklyn bus routes. These Brooklyn routes provide service to some areas of Brooklyn, though most routes travel north, as does the R train which also stops there.

EASE OF USE: BUSES CAN BE HARD TO FIGURE OUT

Getting Information About Your Bus Trip

The MTA shares information with the public about the Brooklyn Bus Network in multiple ways.

The Brooklyn bus map shows all the local, Limited, SBS, and express routes serving the borough. For each route, it displays the routing, the span, and general frequencies by time period. Brooklyn and Queens bus maps each show portions of the other borough, as several routes originating in one provide service to areas in the other.

Customers have a few different ways to find the real-time location and anticipated arrival of buses. Bus Time within the MYmta app shows the location of buses in real-time and their expected arrivals across the entire system. SMS messaging services are available for customers, who can send a six-digit code unique to a bus stop to receive a text message with the anticipated arrival of the next bus. Some bus stops have digital signs within the bus stop pole indicating the expected arrival times, installed by NYCDOT. Customers can sign up to receive alerts related to their preferred routes with MYmta Alerts.

However, the Brooklyn Bus Network is complex. In many instances, the complexity is necessary and benefits the borough by connecting many different neighborhoods and key destinations to each other. For instance, there are multiple ways to travel from Canarsie to Brooklyn College, depending on where within the neighborhood you are. The flip side is that the bus network is not always easy to comprehend, particularly for those new to the bus system or attempting to travel to a new location. The Gates Avenue bus does not continue on Gates Avenue all the way to Fulton Street when heading to Downtown Brooklyn. The northbound **B44** Local does not always travel on the same street as the **B44 SBS**. There is no single bus route that travels the length of Pennsylvania Avenue, a wide, straight street that could support service. These intricacies can make the bus network feel overwhelming to Brooklynites.

One way to encourage bus ridership is to find the proper balance between simplicity and complexity in the bus network.

Connections to Other Routes and Other Transit

Easy, seamless transfers are an important part of a bus network where 71 percent of customers transfer to another bus or to a subway as part of their trip.

All bus routes currently serve subway stations, and most of the bus stops at subway stations allow for quick and easy transfers from the bus to the subway.

Many bus-to-bus transfers occur with a short walk between buses. Some transfers are simple, easy, and require no walking at all — simply alighting from one bus, waiting, and boarding the next bus. Crosswalks are present for almost all the transfers that require the customer to cross a street to get to the connecting bus service.

Providing connections to other modes, such as ferries and Long Island Rail Road, is also important to some customers who use the bus to access these modes. In most instances, the bus network gets customers as close to the ferry landing or rail station as is operationally feasible.

PRODUCTIVITY AND FINANCIAL EFFICIENCY: USE OF BUS RESOURCES IS UNEVEN

Productivity

The operation of public transit services is subsidized in most cities in the United States. Still, there is a limit to how much funding is available to subsidize operations, even if the budget grows.

Public transit, by definition, relates to the act of moving people. Therefore, the more people it moves, the more successful it is. However, a transit agency operating under a fixed budget must track ridership relative to cost as a measure of success. Ridership relative to cost is called "productivity." We use boardings per in-service hour as a measure for productivity.

Productivity is a metric that helps track the goal of maximizing ridership. Bus service can be designed for different goals, like coverage routes that provide lifeline access. These services may not be highly productive.

Figure 3.28 shows the weekday boardings per in-service hour of Brooklyn local, Limited, and SBS routes. In May 2019, an average of 59 people boarded a Brooklyn bus (excluding express routes) for every hour of service provided on a weekday. The productivity of local, Limited, and SBS bus routes on weekdays in Brooklyn ranges from a high of 110 boardings per in-service hour on the **B74** to a low of 31 on the **B39**.

Figure 3.29 shows the weekday boardings per in-service hour of Brooklyn express routes. An average of only 17 people boarded a Brooklyn express bus for every hour of service provided on a weekday. The most productive express route, the **X37**, is still less productive than the least productive local route.

Productivity can also be measured by tracking boardings per in-service mile. Routes that are particularly slow, such as the **B35** and **B12**, appear more productive by this metric as they are covering fewer miles per hour out on the street. **Figures AH.1** and **AH.2** in **Appendix H** show boardings per in-service mile for local, Limited, and SBS routes, and for express routes.

Figure 3.28 Weekday Route Productivity – Local

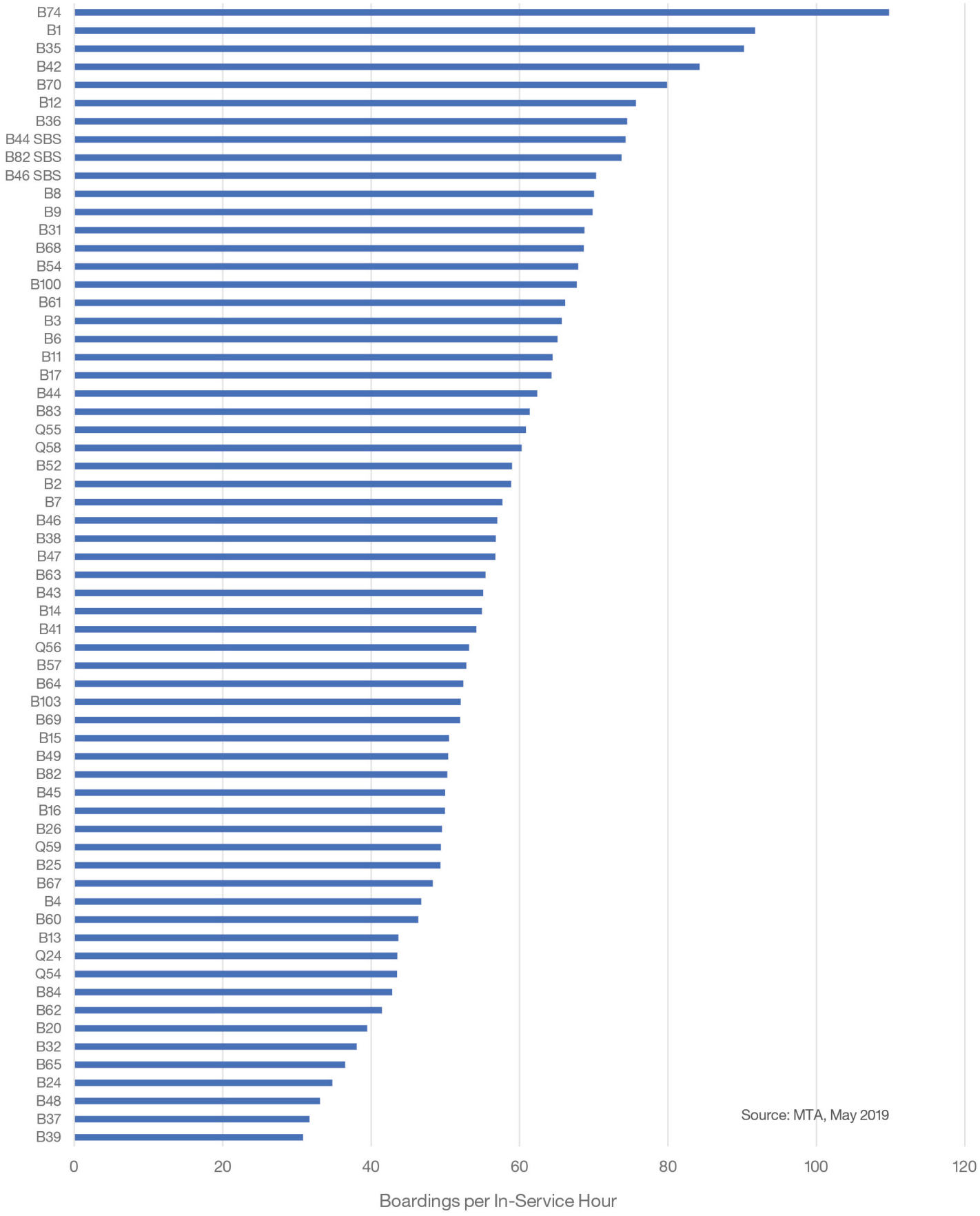
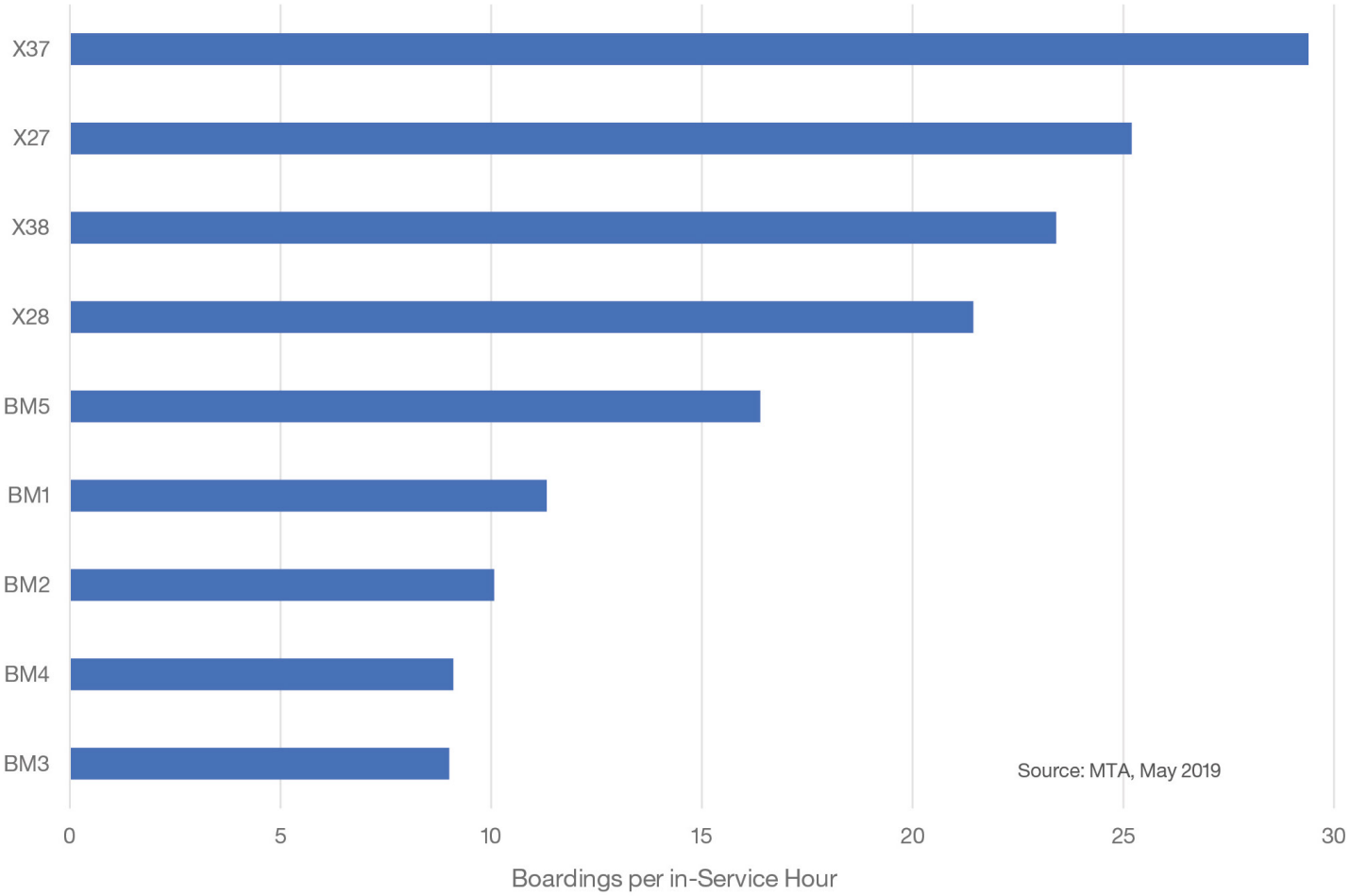


Figure 3.29 Weekday Route Productivity – Express

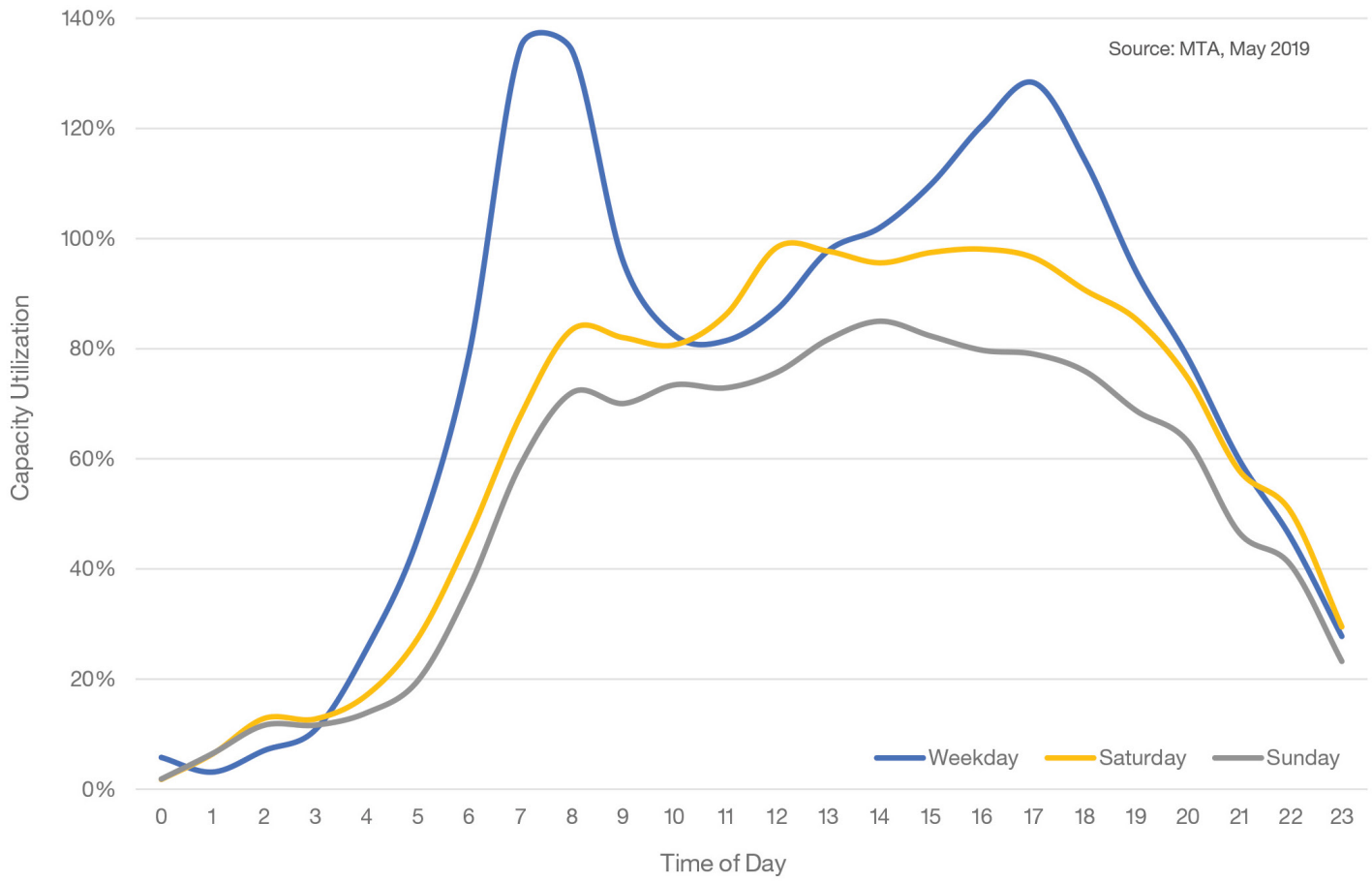


Capacity utilization measures the number of unlinked passenger boardings compared to the total number of seating and standing spaces that are scheduled on a route. This measure considers vehicle size and capacity (e.g. standard versus articulated buses) and is represented as the percentage of total scheduled spaces that are used by customers. Routes with significant passenger turnover may have a capacity utilization over 100 percent. A limitation of this measure is that it does not consider the length of time a vehicle is on the road. As a result, it favors longer routes that generate more opportunities for customers to board and alight.

Figure 3.30 displays the average capacity utilization by hour for weekdays, Saturdays, and Sundays on Brooklyn bus routes. Whenever the lines on the chart rise, buses are, on average, more crowded. Capacity utilization goes above 100 percent between 7 AM and 9 AM and between 2 PM and 7 PM on weekdays, peaking during the 7 AM hour at 135 percent.

Though generally lower than weekdays, average capacity utilization on Saturdays and Sundays is still high, approaching 100 percent for many hours on Saturdays and in the 70 to 80 percent range for many hours on Sundays. Interestingly, service provided during weekends is more uniform and less oriented to peaks. The service supply distribution is even and does not show a dip in capacity utilization, unlike weekday service where boardings and service provided decrease heavily during the off-peak hours.

Figure 3.30 Average Capacity Utilization



Financial Efficiency

Financial efficiency measures typically correlate with productivity measures and bring cost and revenue into the conversation to provide more insight into a route's performance.

Cost per boarding measures the cost of providing bus service relative to the number of customers using that service (annual service cost divided by annual boardings). The measure is broken down to show how much of the total cost per passenger is recovered from fare revenue (fare revenue per boarding) and how much is subsidized by the agency beyond the fare (subsidy per boarding). This measure is related to farebox recovery (see below), but adds ridership into the equation and is shown as a dollar figure.

Figure 3.31 shows cost per boarding for local, Limited, and SBS routes on weekdays, and **Figure 3.32** shows this metric for express routes. Each bar is split to show fare revenue per boarding in blue and subsidy per boarding in orange. The lower the cost per boarding, the more financially efficient the route. The greater the cost per boarding, the more subsidized the route and the greater the cost to provide service.

The cost per boarding on express routes ranges between $5.40 and $20.91. On the other hand, the average cost per boarding of all other routes in Brooklyn is $2.43 (the individual route values range between $1.45 on the **B70** to $7.38 on the **B39**).

Figure 3.31 Weekday Cost Efficiency – Local

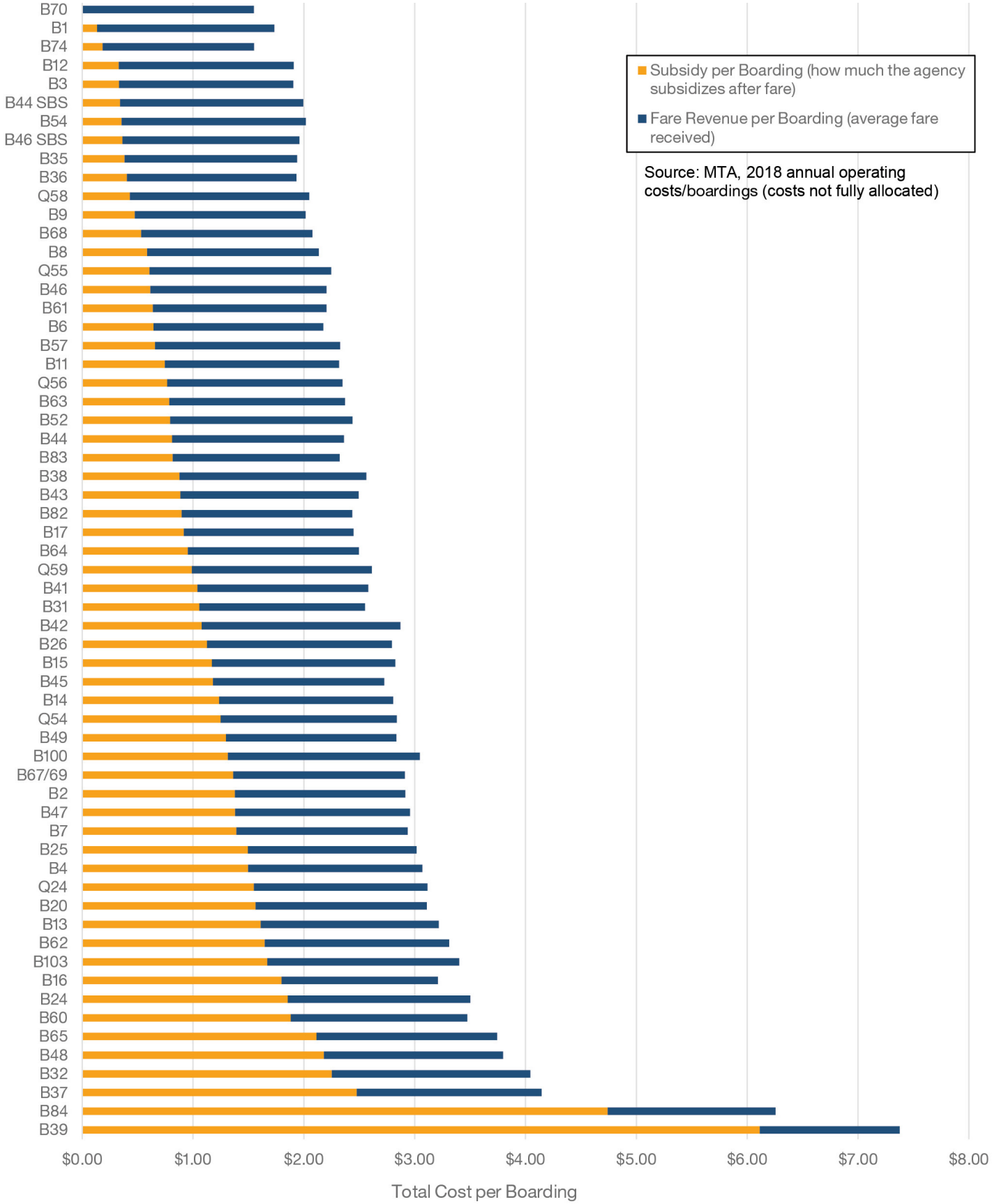
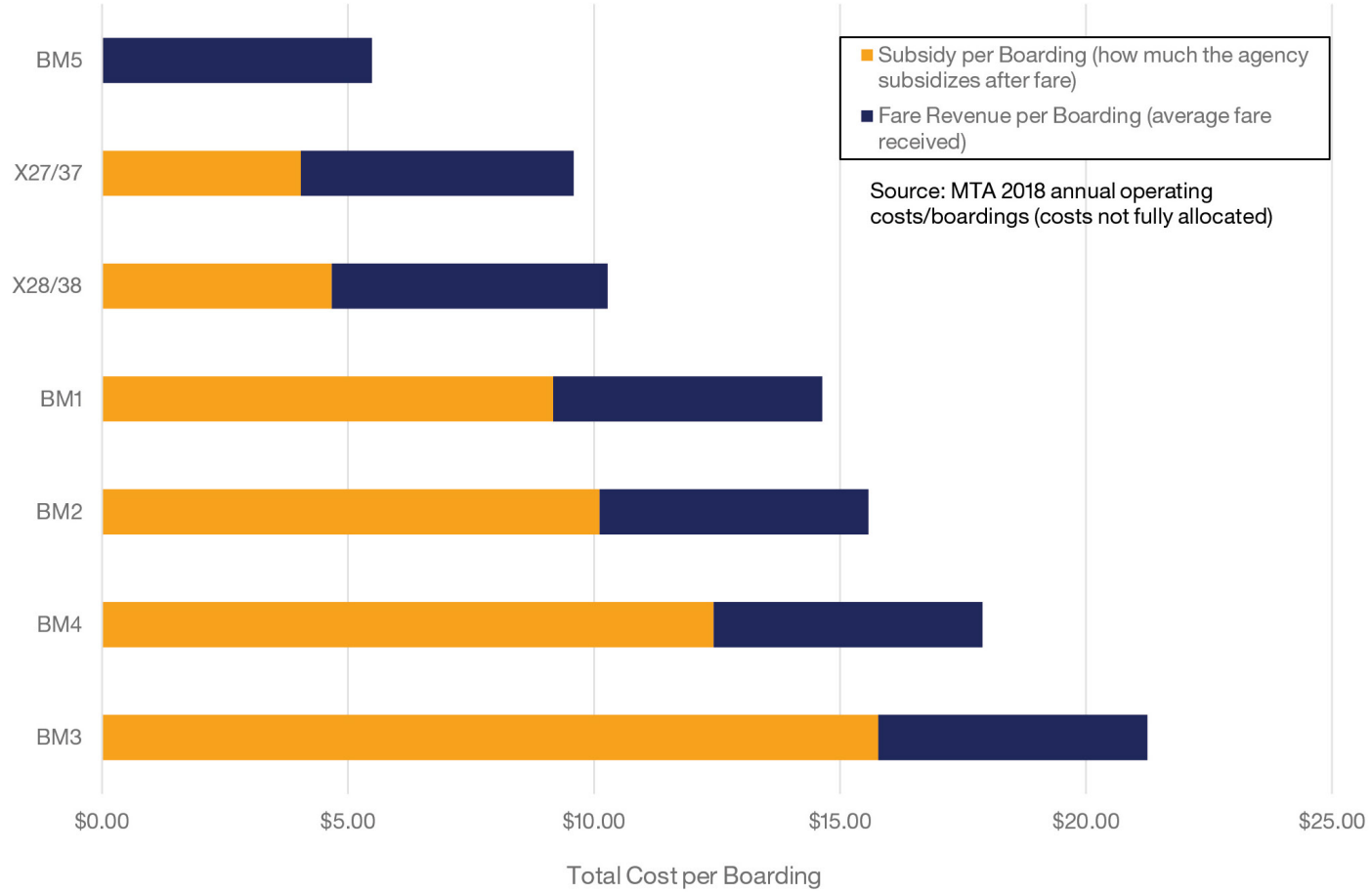


Figure 3.32 Weekday Cost Efficiency – Express



Farebox recovery ratio is the ratio of fare revenue to service cost. Subsidized routes have a farebox recovery ratio below 100 percent, while profitable routes have a farebox recovery ratio over 100 percent. **Figure 3.33** shows farebox recovery ratio for local, Limited, and SBS routes on weekdays, and **Figure 3.34** shows this metric for express routes.

Only one route, the **B70**, has a farebox recovery ratio over 100 percent, meaning that it turns a profit. The average ratio of local, Limited, and SBS routes is 65 percent; for express routes it is 47 percent. It is worth noting that not all express bus routes are non-profitable; the **BM5** has a farebox recovery ratio around 100 percent. However, many express bus routes have farebox recovery ratios under 40 percent.

Figure 3.33 Weekday Farebox Recovery – Local

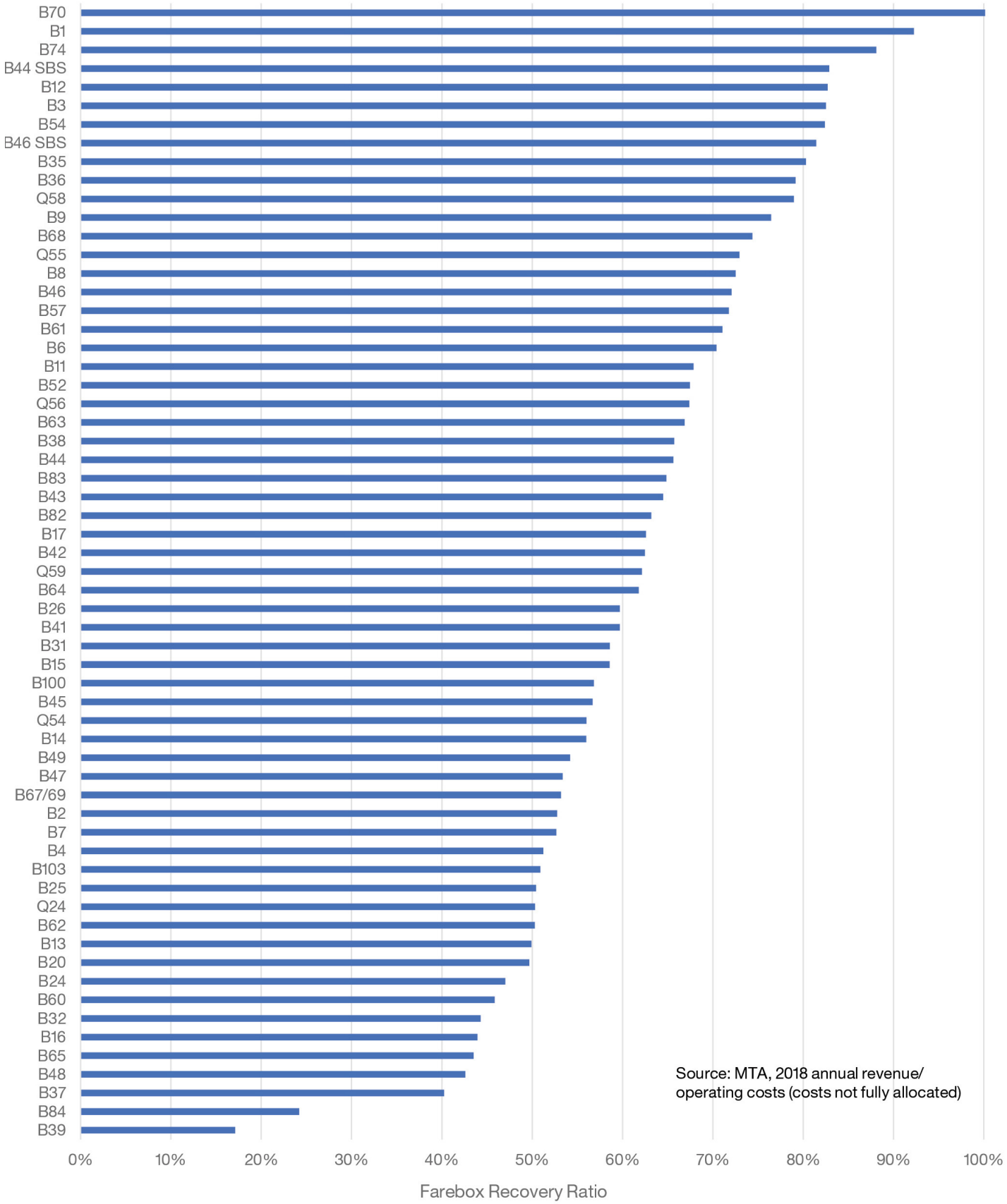
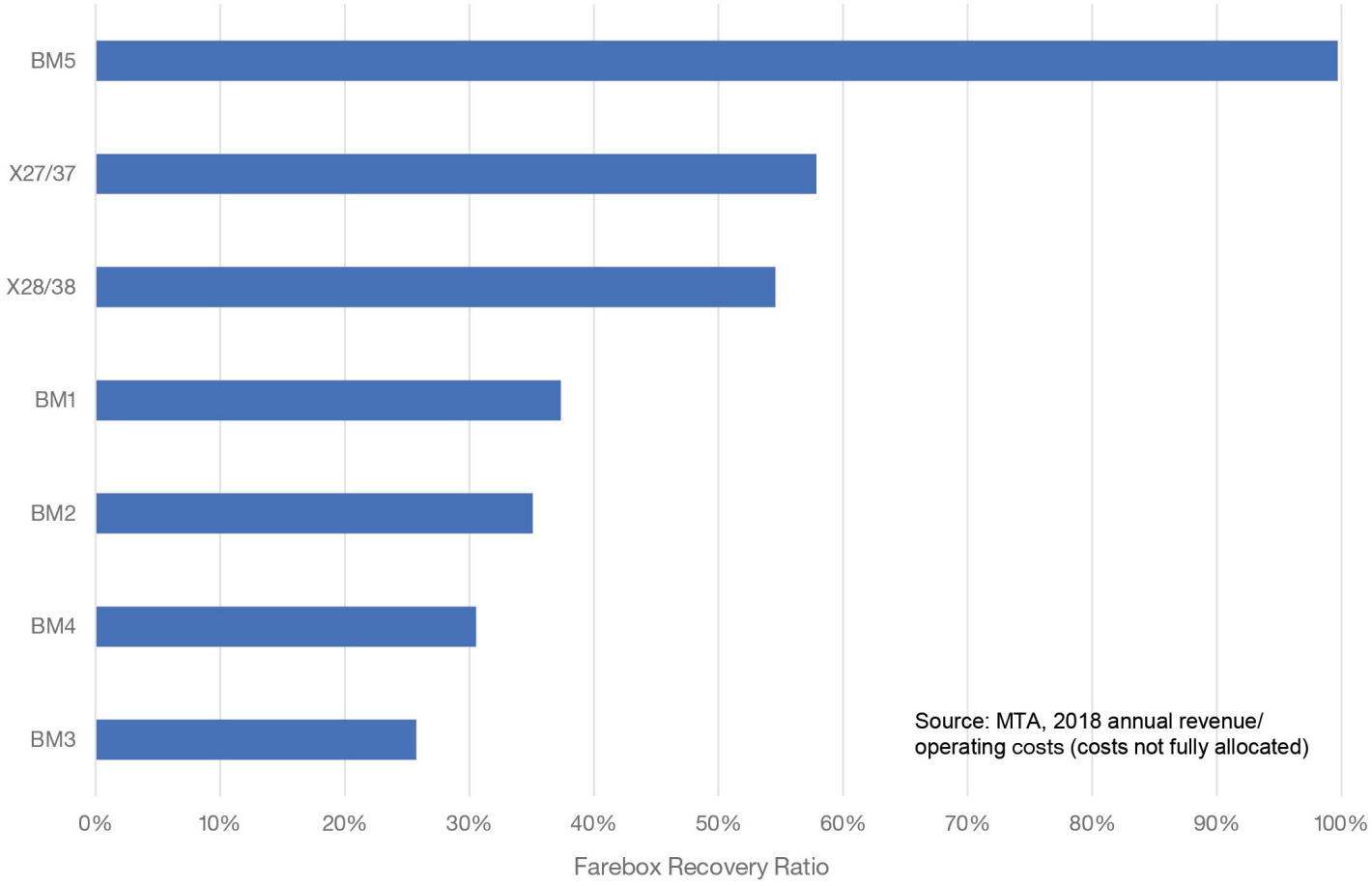


Figure 3.34 Weekday Farebox Recovery – Express



4. WHAT CUSTOMERS WANT

- What We Have Heard
- Outreach
- Customer Priorities

WHAT CUSTOMERS WANT

WHAT WE HAVE HEARD

We receive many suggestions from customers, transit advocates, and elected officials about changes they would like to see made to bus service. In addition to those, we went out and asked for more. From October through December 2019, we held meetings with elected officials, hosted public input sessions, met with community boards, and talked to people at busy bus hubs. More than 2,300 respondents completed our online survey.

Throughout the feedback process, common themes quickly surfaced, regardless of where a customer lived or worked. People want buses to come more often. They want faster trips once they are on the bus. They want to be able to rely on the bus to get them where they need to go in a predictable amount of time. They want better connections to more places. They want the whole process to be easier. We received plenty of route-specific advice, and we received some suggestions as simple as, "speed it up!"

ON-STREET ENGAGEMENT

Significant on-street public engagement was performed throughout the borough in October 2019. Our staff conducted ten pop-up sessions at bus stops and subway entrances. We handed out over 17,000 brochures introducing the Bus Network Redesign project, and provided people with the opportunity to take the online survey on a tablet. Several customers completed our survey based on these in-person discussions.

Some riders had specific recommendations for the bus stops where we talked to them, such as:

- in Crown Heights, some expressed concerns that commuter vans were blocking the bus lanes on Utica Avenue, resulting in slower bus service;
- in Midwood, residents asked for improved access to Gateway Center.

Figure 4.1 On-Street Engagement

OPEN HOUSES

To introduce bus network redesign to residents and collect early input about how they would like bus service to improve, we conducted ten open houses throughout Brooklyn in October and November 2019. In total, more than 300 attendees examined information boards that were staffed by experts from the MTA and NYCDOT and introduced the complicated trade-offs made as part of a bus network redesign (as seen in **Figures 4.7**, **4.8**, and **4.9**). Attendees voted on their top priorities, described their concerns about existing bus service, and offered ideas for improvements.

Figure 4.2 Open House

Attendees were asked to vote on how the MTA should prioritize its resources to improve the Brooklyn Bus Network. They were given four stickers and could distribute them among the six categories shown in **Figure 4.3** as they saw fit, including putting more than one sticker in a category. The top priorities of attendees were decreased waiting time/increased service frequency, decreased travel times, and improved reliability.

Figure 4.3 Priorities of Open House Attendees

Priority	Vote Percentage
Decreased waiting time/increased service frequency	***25%***
Decreased travel times – dedicated bus lanes, transit signal priority (TSP)	***20%***
Improved reliability	***19%***
Bus stop improvements – shelters, benches, real-time arrival information	***15%***
Reduced crowding	***11%***
Extended times when buses run	***9%***

Attendees were given the opportunity to take our online survey at the meeting venue. In addition, if attendees had additional comments, post-it notes were provided which could be placed on a board asking, "If you had a blank slate, how would you provide better service?" More than 500 comments were left. These comments were both specific, such as, "increase service to Brooklyn Navy Yard, a growing hub" (**Figure 4.4**) and general, such as, "frequent connections between Brooklyn and Queens" (**Figure 4.5**). Some comments included actions that can be taken immediately without going through the entire network redesign process, like addressing the dangerous or awkward locations of bus stops. Some comments, such as making transit in New York City entirely free, are far beyond the scope of this project.

Figure 4.4 Comments of Open House Attendees 1

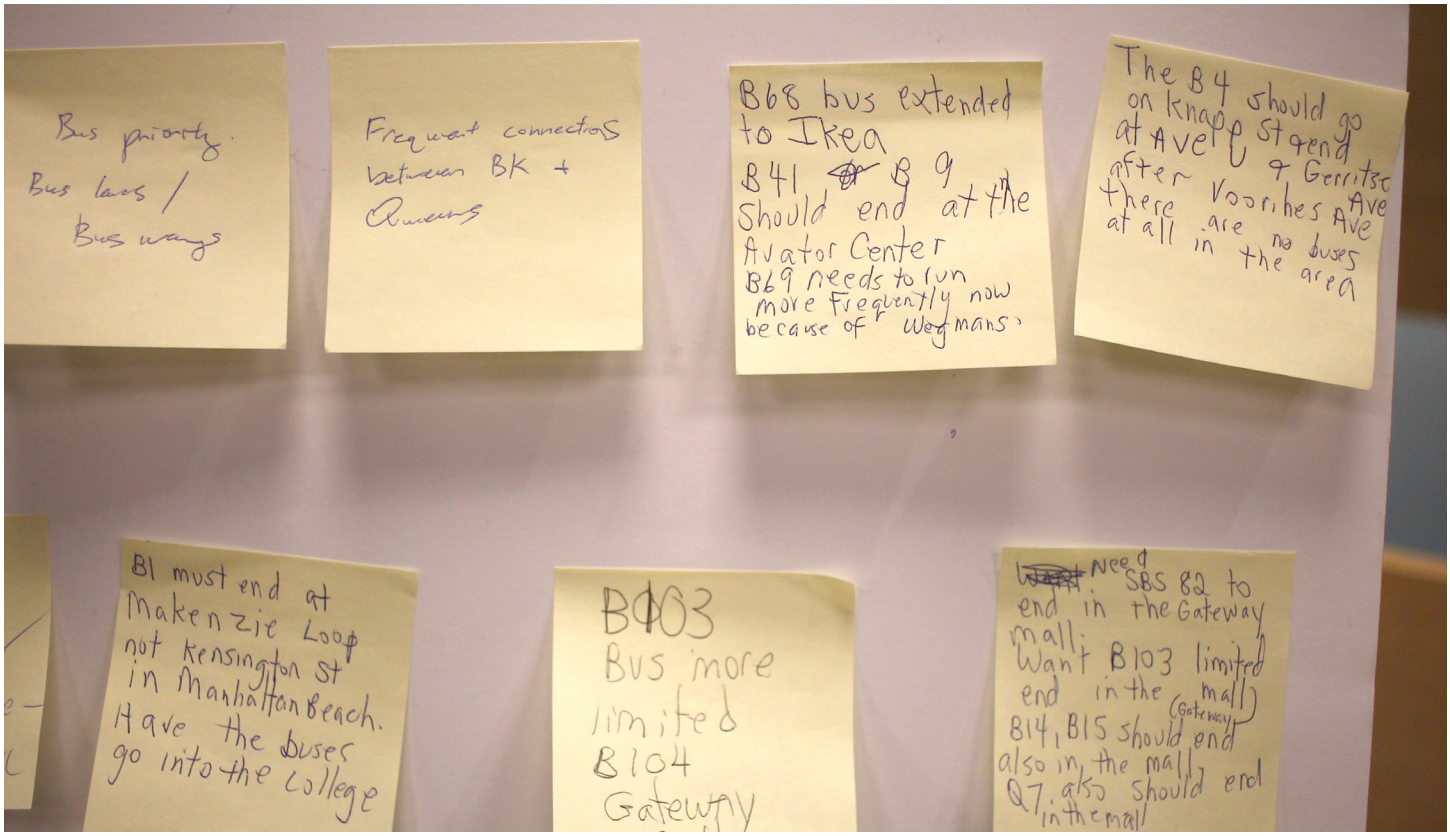
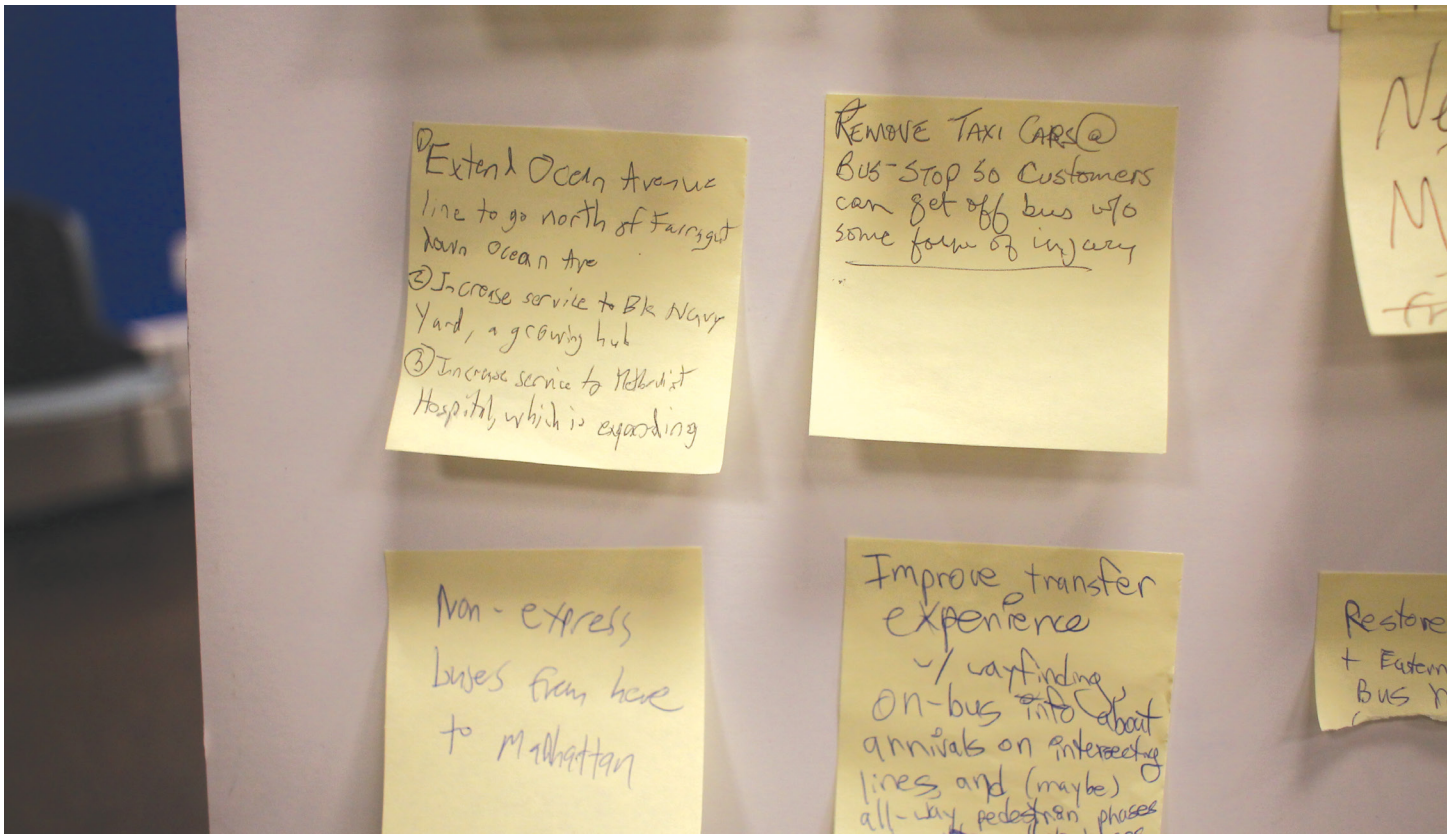


Figure 4.5 Comments of Open House Attendees 2



SURVEY

We conducted an online public survey to begin the Brooklyn Bus Network Redesign project. More than 2,300 respondents took the survey in English and in Spanish, providing information on the existing bus network and their everyday experiences using it.

Sixty-one percent of respondents use the bus at least 3 days a week, and 82 percent use it at least weekly.

In characterizing their most frequent trip, 61 percent of respondents said it takes them less than five minutes to get to the bus stop, and 32 percent said it takes them between five and ten minutes.

For this most frequent trip, the largest group of respondents, 44 percent, use one bus and the subway to reach their destination. Twenty-six percent use one bus but do not transfer to the subway. Fifty percent use the subway and at least one bus; 35 percent travel solely on buses during this trip. Trips of seven percent of respondents would require a second fare due to more than one transfer if they do not have an Unlimited Ride MetroCard.

Like the Open Houses, respondents were asked to choose what is most important to them in a redesigned bus network. (Unlike at the Open Houses, survey respondents were only able to choose one priority.) The top priority by far was decreased waiting times/increased service frequency. Improved reliability and decreased travel times were the second and third most common responses.

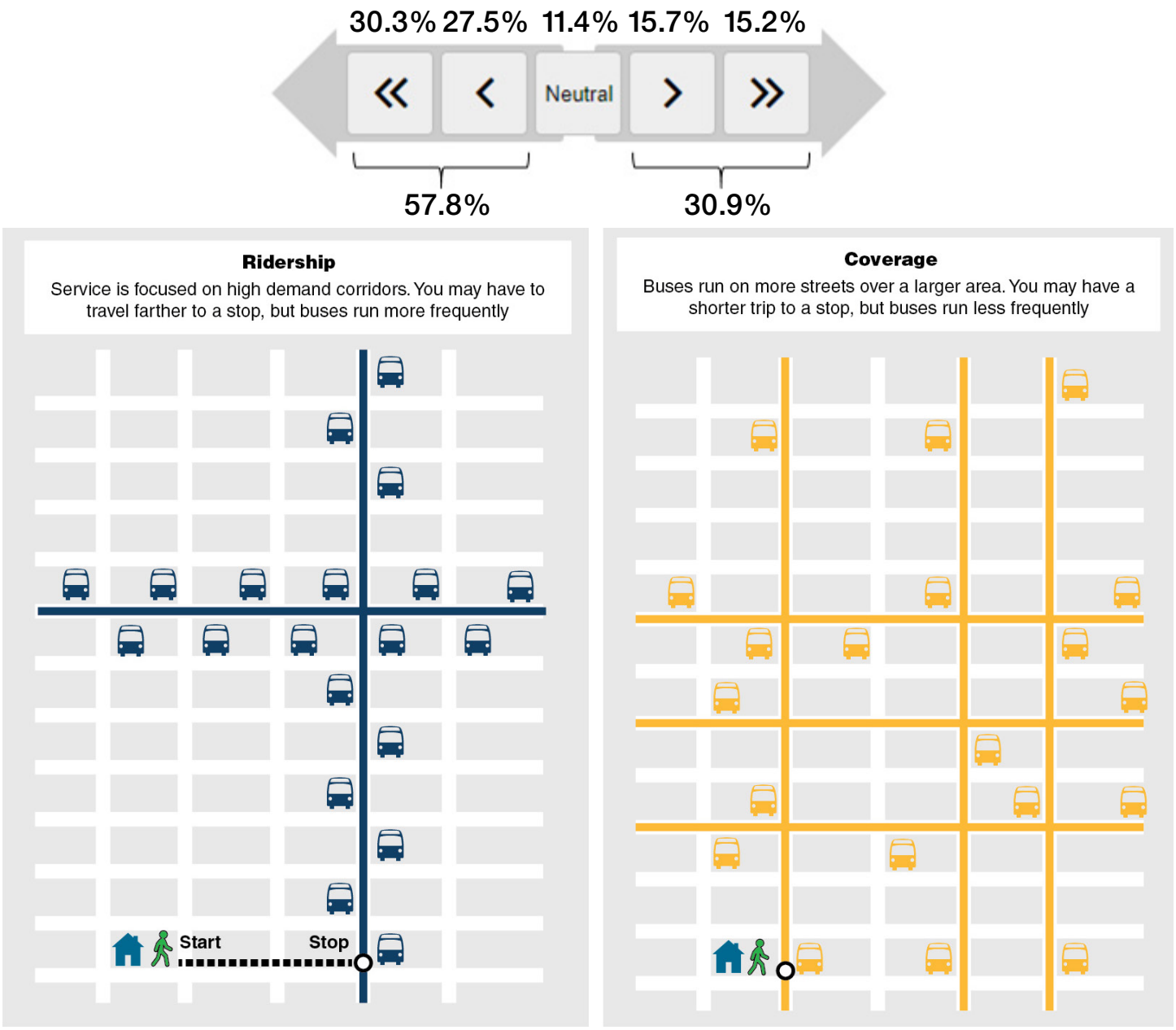
Figure 4.6 Top Priority of Survey Respondents

Priority	Vote Percentage
Decreased waiting times/increased service frequency	*53%*
Improved reliability	*17%*
Decreased travel times	*14%*
Reduced crowding	*8%*
Extended days and/or times when buses run	*4%*
Improved bus stop amenities	*2%*
None of the above	*3%*

Respondents were also asked to think about their preferences for three trade-offs that public transit planners must balance in any network redesign. These are difficult choices and preferences can vary by neighborhood and by the characteristics of the respondent. A younger person without any mobility challenges might respond differently to these trade-offs than an elderly person or a person with a mobility disability. Nonetheless, the preferences of survey respondents as a whole give us a sense of the direction in which our customers would like us to go with a network redesign project.

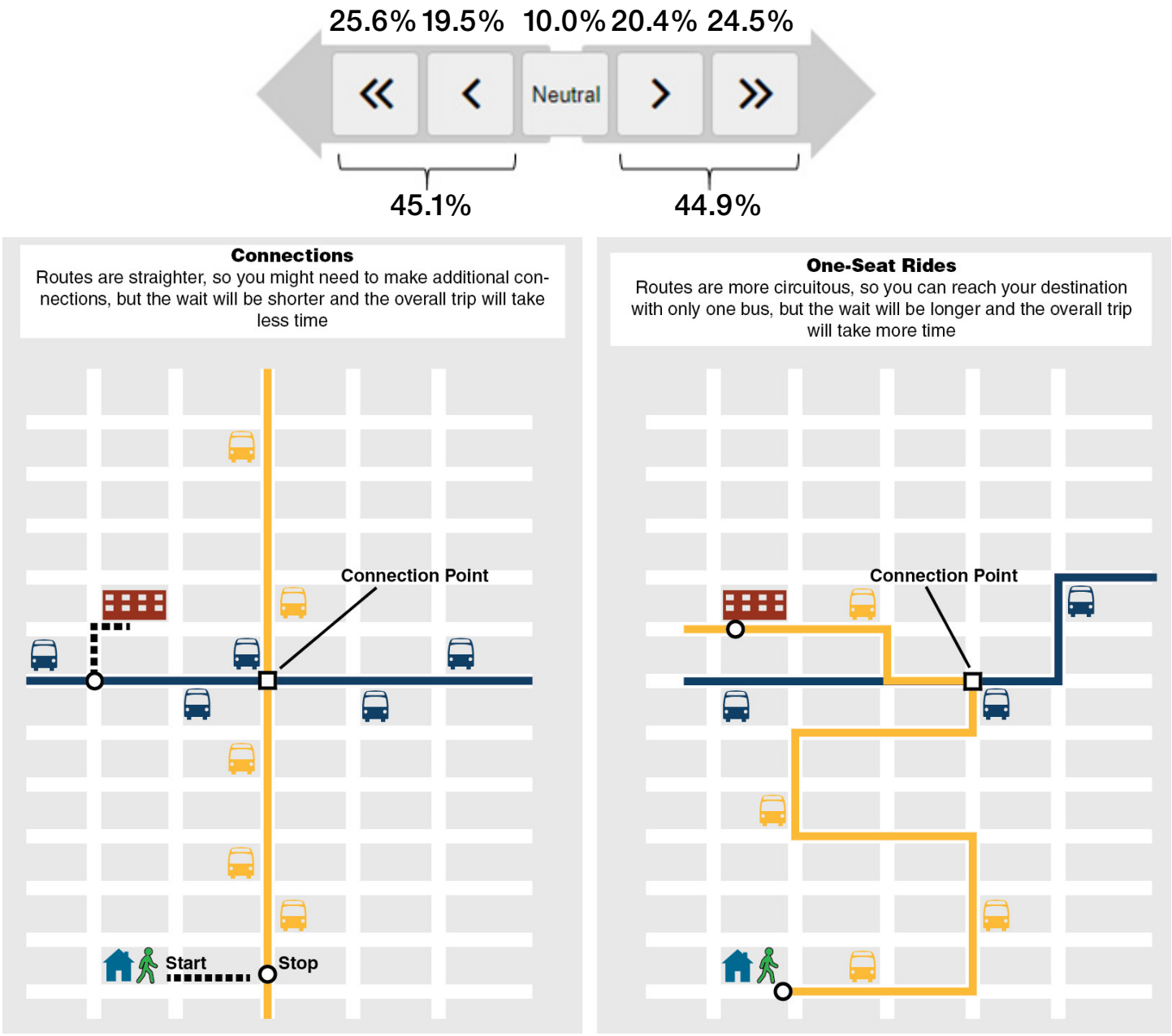
The first trade-off is between ridership and coverage. Respondents were asked, "Is it better to target dense areas with frequent service (ridership) or provide coverage equally?" With "ridership," service is focused on streets with a lot of people. A bus rider may have to walk farther to a stop, but buses run more frequently. With "coverage," buses run on more streets over a larger area. A bus rider may have a shorter walk to a stop, but buses run less frequently. The graphic in **Figure 4.7** illustrates the differences between these two choices. Most respondents, 58 percent, preferred "ridership;" 31 percent preferred "coverage."

Figure 4.7 Ridership vs. Coverage



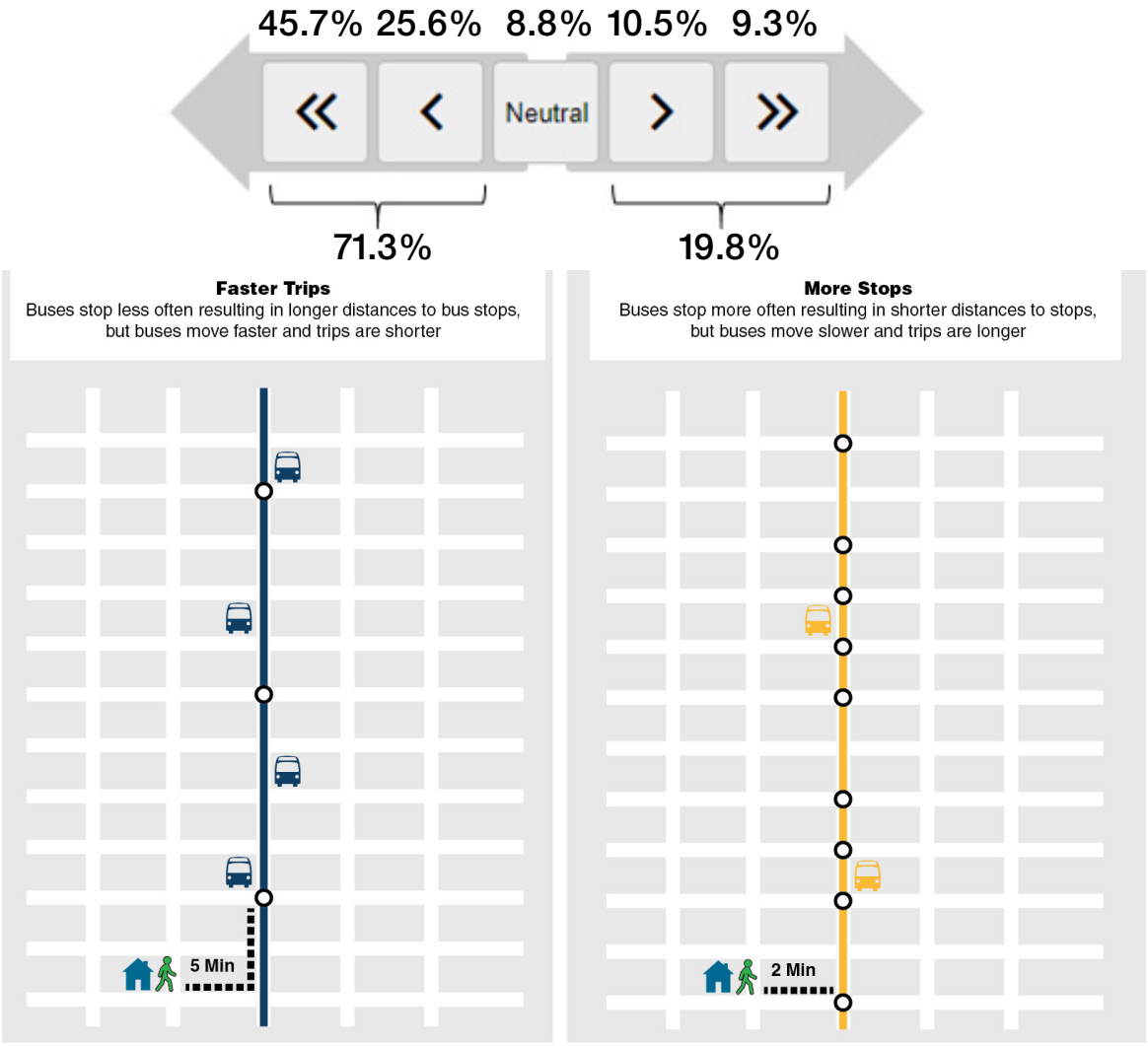
The second trade-off is between connections and one-seat rides. Respondents were asked, "Do you prefer a shorter ride that requires you to transfer from bus to bus or a longer one-seat ride?" With "connection," a bus rider may have to transfer from bus to bus, but the wait will be shorter and the overall trip will take less time. With "one-seat ride," a bus rider can reach their destination with only one bus, but the wait will be longer and the overall trip will take more time. The graphic in Figure 4.8 illustrates the differences between these two choices. Preferences between these two trade-offs were exactly split, with 45 percent favoring each and 10 percent stating that they were neutral.

Figure 4.8 Connection vs. One-Seat Ride



The third trade-off is between faster rides and more stops. Respondents were asked, "Do you prefer speeding up the bus or having bus stops close together?" With "faster rides," buses stop less often, resulting in longer walks to bus stops, but buses move faster and rides are shorter. With "more stops," buses stop more often, resulting in shorter walks to stops, but buses move slower and rides are longer. The graphic in **Figure 4.9** illustrates the difference between these two choices. A large majority of respondents, 71 percent, preferred "faster trips;" 20 percent preferred "more stops."

Figure 4.9 Faster Rides vs. More Stops



The last activity in the survey asked respondents to think about difficult bus trips and destinations that are hard to reach by bus. Respondents were given an interactive map of Brooklyn and beyond and were asked to drop three to five markers on the map to show hard-to-reach destinations by bus in Brooklyn and from Brooklyn. For each dropped marker, the respondent was asked whether they generally use the bus to travel to this destination, and they were also asked to choose from a drop-down menu of possible options why it was hard to reach. In total, respondents placed more than 4,100 markers on the map.

As shown below, we chose three of the most telling options of why particular destinations were hard to reach and mapped their locations. **Figure 4.10** maps destinations where respondents told us the "bus doesn't run often/too long of a wait." Red Hook was by far the most common neighborhood noted in this category. Brooklyn Navy Yard, and other neighborhoods in and near Downtown Brooklyn such as Park Slope and Prospect Heights, were also mentioned often, as were Bay Ridge and Marine Park.

Figure 4.10 Hard to Reach Destinations: Bus Doesn't Run Often

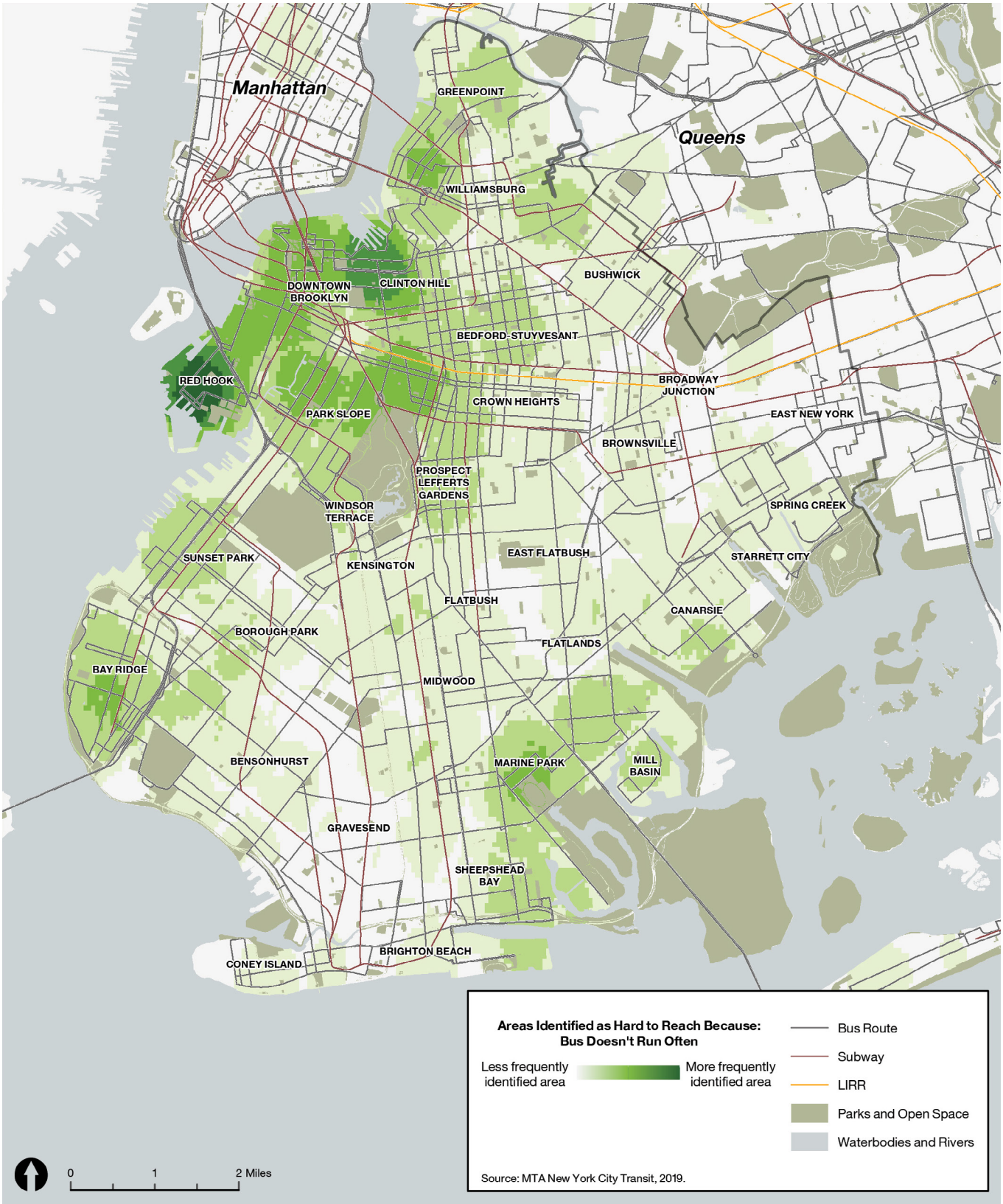


Figure 4.11 maps destinations where respondents told us the "bus doesn't take a direct route." Similar neighborhoods as **Figure 4.10** were common responses, such as Red Hook and Brooklyn Navy Yard. Park Slope, DUMBO, and the Williamsburg waterfront were other frequently-mapped areas in this category.

Figure 4.11 Hard to Reach Destinations: Bus Doesn't Take a Direct Route

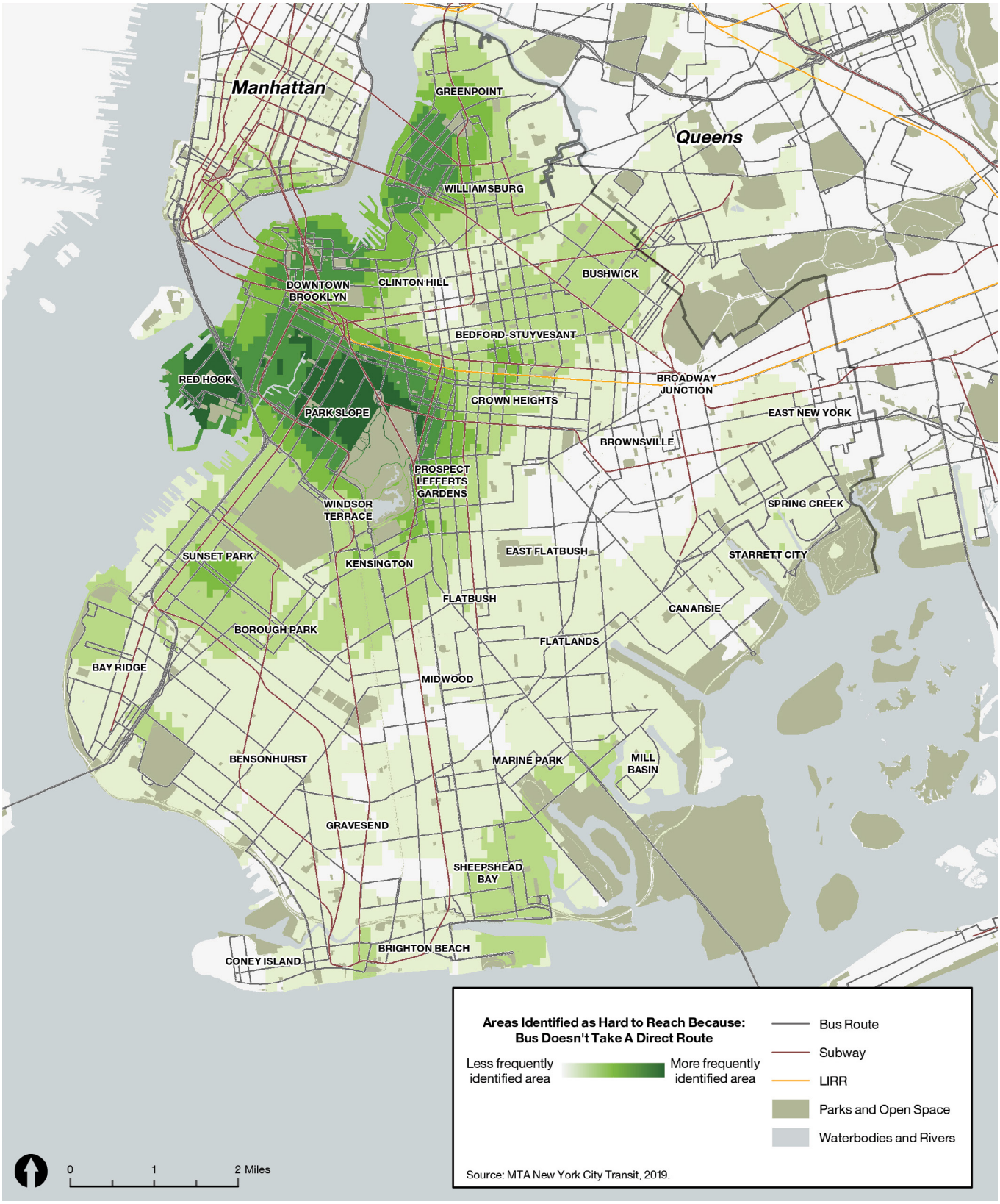
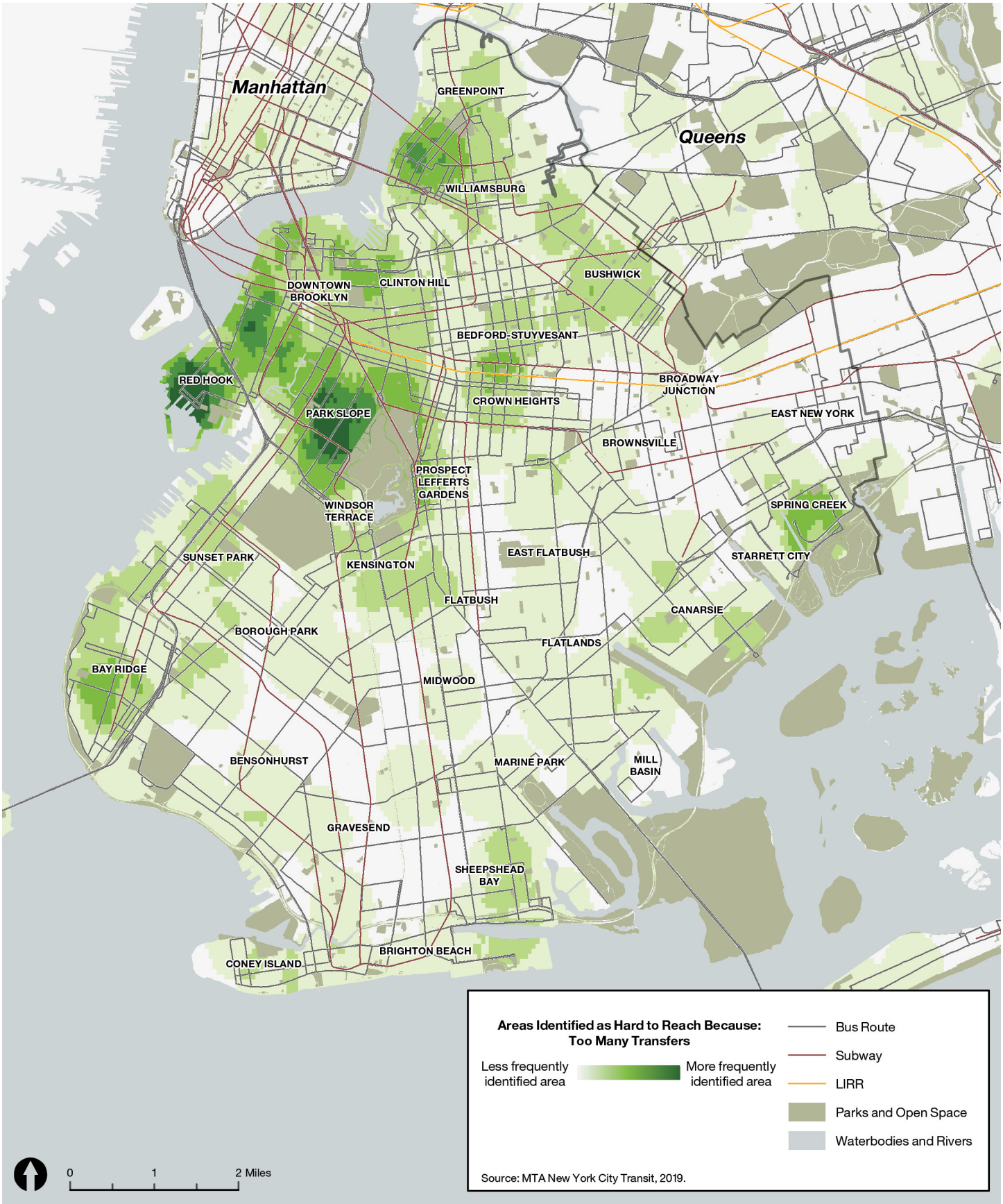


Figure 4.12 maps destinations where respondents told us it was hard to reach due to "too many transfers." These responses were more scattered throughout the borough, though Red Hook, Park Slope, and Williamsburg stand out.

Figure 4.12 Hard to Reach Destinations: Too Many Transfers



CUSTOMER PRIORITIES

After listening at bus stops, at meetings, and at the open houses, and after analyzing survey results, we have grouped what we heard into these five primary areas of concern: frequency, travel time, reliability, connections, and ease of use.

Priority 1: Frequent Service

When asked to choose their top priority for improving bus service at both the open houses and through the online survey, the majority of respondents voted for decreased wait times and increased service frequency. On the survey, when respondents could only choose their one top priority, more frequent service was by far the most popular choice. When asked their preference for ridership versus coverage, a sizable majority of survey respondents preferred to focus bus service on fewer streets and thereby increase frequency.

In individual comments, customers requested more service on many specific routes. They also requested more service to specific destinations such as Red Hook, the Brooklyn Navy Yard, and JFK Airport.

Customers also asked for more service at certain times, such as before and after school and on weekends. They asked us to lengthen spans to provide service on particular routes at times of day and days of the week where we currently do not.

"More buses should run overnight, otherwise people use Uber or have no option if they can't afford it." – open house attendee

Priority 2: Faster Travel

Speeding up travel times on the bus was another high priority for Brooklyn bus riders. At open houses, where attendees were asked to vote for their top four priorities, decreased travel times through infrastructure such as dedicated bus lanes and transit signal priority was a close second choice to decreasing wait times.

Consolidating bus stops is one way to speed up bus travel. Survey respondents were overwhelmingly in favor, with a large majority choosing faster trips over more bus stops. Many individual comments referenced having fewer bus stops.

"Stops are WAY too close together. The B38 in Bed-Stuy stops, what, every block? Seriously?" – survey respondent

Some individual comments rightfully noted that buses should continue to stop at all major destinations and that while "fewer stops are a good idea,…keep in mind" customers with disabilities.

Customers asked for more Limited or SBS-style routes, which stop much less frequently to get riders across long distances faster.

Customers requested more bus lanes and were in favor of introducing a 14th Street-style Transit/Truck Priority busway in Brooklyn. One open house attendee requested "more bus lanes, especially in areas not served by subway." Another noted:

"When buses are traveling along one-way streets, they often get stuck in heavy traffic. One-way streets have an average of 3-4 lanes, which … bottleneck[s] traffic [and] slow[s] down travel time for bus commuters. By painting in red curbside bus lanes and forbid[ding] parking at all times, you'll be seeing faster bus service which will benefit customers [with] a smoother, faster ride."

Customers noted the ongoing issues with bus lane enforcement and enforcement of other traffic and parking issues that delay bus service. Illegal parking and standing in bus stops were mentioned as particularly frustrating issues, especially for people with mobility impairments accessing the bus, but also for everyone trying to get where they are going in a timely manner.

Narrow streets such as those on the **B13** and **B45** were also mentioned as challenges that slow down the bus.

Priority 3: Reliable Service

Improved reliability was another top priority for Brooklyn bus riders. Issues noted by customers in the previous section about the lack of bus priority in most sections of the borough and minimal traffic enforcement directly relate to reliability challenges as well.

The trade-off presented in the survey between connections and one-seat rides also relates to this reliability concern. If connecting routes are straighter with fewer turns and less circuitousness, reliability should increase. Turns are a particular challenge in keeping buses running on-time and well-spaced. However, customers were torn as to whether the reliability advantages of straighter routes outweighed the transfers that would be required.

Customers pointed to bus bunching as a key reliability issue, with one open house attendee calling it, "the #1 problem."

"Q54 is never on-time, comes bunched, and has unscheduled short-turns at Fresh Pond Rd westbound." – open house attendee

Priority 4: Better Connections

Customers want to go more places, faster. While part of the solution certainly involves speeding up buses, there are other things we can do, like establishing connections between routes that do not currently exist in the bus network. Since the bus network has not changed much in the past decades, there are many pairs of origins and destinations that are not served well. These include both trips within and between Brooklyn neighborhoods, and trips to other boroughs.

"I would like more cross-town buses, especially because there are no subway lines that cross east-west in southern Brooklyn! The B3 is always very crowded and Avenue U has so much traffic that it almost feels faster to walk. I would love for my best option to get from Marine Park to Bay Ridge to be something better than to take the train all the way to Barclays Center and then go back down south." – survey respondent

Connections Within Brooklyn

Many customers requested new connections within Brooklyn. Connecting the bus network more effectively to Gateway Center and other entertainment and shopping areas – particularly on weekends – was a frequent comment. Others requested better connections to nearby subway stations, bus hubs, hospitals, and schools.

"At least 1 crosstown bus (B6, B82, B103) needs to go to Gateway Mall. All buses that go there now come from East New York." – open house attendee

Connections Beyond Brooklyn

Customers often called out challenges traveling to Queens, stating that the existing network lacks frequent and direct service between the two boroughs. Destinations in Queens that customers would like to reach more easily include JFK Airport, the Rockaways, Glendale, Long Island City, and Flushing.

Priority 5: An Easy Ride

Getting Informaton About Your Bus Trip

Customers want the whole process of riding the bus to be easier, from figuring out which bus to take, to finding the right bus stop, to paying and boarding, to knowing when to get off. Riding the bus can be daunting for those who have never done it before. You must have enough change to board a bus or a MetroCard with money on it. Even if you have exact change or a MetroCard, the network is complex with few visual cues to help you decipher a map so you can figure out which bus you need to take to get where you need to go. In the age of smartphones and e-hail TNCs, you are likely going to find another option.

The convenience of on-demand technology has set expectations for quick, easy, user-friendly service in all aspects of life. Customers expect riding the bus to be no different. Many open house attendees expressed frustration at the recent removal of each bus stop's printed, unique six-digit code that allowed a customer without a smartphone to text to receive information about the next bus's real-time arrival.

Customers also noted that many routes that primarily travel on one street do not always continue on that same street for their full length, making the bus network unnecessarily complicated. Gates Avenue, Ocean Avenue, and Fort Hamilton Parkway were specific instances that customers noted where the primary bus route on the street deviates, perhaps unnecessarily, from traveling in a straight line, increasing complexity.

Boarding the Bus

Customers requested all-door boarding on all buses, as currently exists only on SBS routes. Some customers, particularly those with limited mobility, expressed frustration at private vehicles illegally parking or standing in bus stops. This forces them to board or alight in the street instead of on the curb, which is a safety issue for all, but which is impossible for a significant number of customers.

Connections to Other Routes and Other Transit

Many customers commented on the challenges of transferring between two buses or between the bus and the subway. They requested that buses have better-planned transfer locations with as short a walk as possible and with wayfinding when the boarding location of the second leg is not in an obvious location.

Customers also expressed interest in having more flexibility with free transfers.

5. FINDING THE WAY FORWARD

- Decrease Wait Time and Increase Frequency
- Decrease Travel Time and Speed Up Buses
- Design a More Reliable Network
- Expand Connectivity Across the Borough and City
- Make It Easier to Travel by Bus
- Make Brooklyn's Resources More Productive and Efficient
- Designing a New Network from Scratch

FINDING THE WAY FORWARD

In May 2018, Andy Byford, President of MTA New York City Transit, announced that as part of the Fast Forward plan we would reimagine the entire bus network over the following three years. This effort is essential to move beyond the complications attached to the existing network. So much of the existing network was developed piecemeal almost 100 years ago, with few changes made to the overall network structure since.

Increasing traffic congestion — whether caused by new development, more trucks and delivery vehicles on the street, or the proliferation of rideshare options — is taking a toll on New York City's Bus Network. Continued erosion in bus speeds and service reliability impact performance and passenger confidence in the bus system, contributing to ridership loss. As more riders abandon buses for other modes, congestion worsens, and transit operations and ridership are further impacted.

Relief is likely not coming from an expanded subway network. Resources for the subway are focused on repairing the existing system and increasing accessibility, which may provide relief for surface transit in the long-term, but will have little or no impact in the short-term.

We have made small changes to the bus network for decades. These include regular adjustments to schedules, as well as rerouting along neighboring blocks. We have extended bus routes and created new ones to serve new and growing destinations such as JFK Airport, Gateway Center, and the Brooklyn Navy Yard. We have innovated with the creation of Select Bus Service. We have occasionally revamped the bus network in certain quadrants of the borough. These changes helped, but they were not enough to overcome the inertia of the existing system. Tinkering at the edges cannot solve the major problems with our bus network. To really make a difference, we need to look at the entire network.

A network redesign is a comprehensive restructuring of an existing transit system's layout and operations. The goal of this network redesign is to draw a new bus network as a comprehensive whole rather than through incremental, short-term planning, which over time can lead to a fragmented, poorly-coordinated network. This network redesign is essential to improve bus transit and to reverse ridership loss. To turn the corner, we must develop a redesigned network of routes and schedules that better respond to origin-destination patterns, passenger demand, and traffic conditions. This will help maintain existing ridership and also attract more riders.

Incorporating public input is one of the primary objectives of this network redesign. In listening to our Brooklyn customers, as well as other local residents and stakeholders, their identified goals for this network redesign include:

- decreased wait time and increased frequency;
- decreased travel time through faster buses;
- a more reliable network;
- improved connections to more places; and,
- network simplification to increase ease of use.

Specific strategies to meet these goals and better respond to Brooklyn's needs through a new bus network are detailed in the following sections, which delve further into these overarching objectives one by one.

DECREASE WAIT TIME AND INCREASE FREQUENCY

Decreasing wait time and increasing frequency is the top priority of Brooklyn bus riders. Consistent, frequent bus service throughout the day provides customers with the ability to spontaneously choose when they travel, rather than letting the schedule decide for them.

However, with a fixed number of buses available in the fleet during the peaks partly due to limited space available in Brooklyn bus depots, as well as a limited operating budget and fiscal constraints, increasing frequency is not a simple task. Adding bus service to the existing network is not a feasible option and would only exacerbate some current challenges, such as bus bunching. Solutions will require a creative redesigning of the network.

Some potential strategies to decrease wait time include the following:

- Bus routes operating on nearby parallel streets could be combined. While some customers would have to walk farther to reach the nearest bus stop, buses would run much more frequently on the street where service remains.
- A bus route that overlaps with another for a portion of its path could be shortened, removing redundancy. Service on the redundant portion would be reinvested in the remaining section of the route and in the route that remains in the former overlapping section. While some customers would need to transfer to complete their trip, with increased frequency the overall journey time may be shorter.

- Strategies that increase bus speeds, such as installation of bus lanes, consolidation of bus stops, and straightening routes to reduce the number of turns, save minutes from each trip. When operating buses, time is money, and these saved minutes can be reinvested in additional bus service, potentially providing increased frequency. Designing more Limited- or SBS-style routes, with significantly greater stop spacing, is another strategy that will be examined to both speed up buses and increase frequency.
- Off-peak frequencies could be increased without running into the challenge of a fixed number of available buses, since fewer buses are out on the road during these times. A close examination of the existing overnight network is especially important. With employment in the largest late-shift sectors such as healthcare, food services, and hospitality/leisure expected to continue growing quickly in the next decade, this project will examine whether the routes that currently have overnight service constitute an effective and efficient overnight bus network, and where improvements to service frequency and connectivity can be made.

DECREASE TRAVEL TIME AND SPEED UP BUSES

Shortening up travel time once on the bus is another top priority of Brooklyn bus riders. The following are a few different strategies to accomplish this through a network redesign.

Expanded Bus Priority

In conjunction with the Brooklyn Bus Network Redesign project, NYCDOT is conducting an analysis of Brooklyn bus corridors to identify streets where future bus lanes and other priority treatments would provide the biggest benefit to Brooklyn bus riders. The goal of this analysis is to identify streets for further study, planning, public outreach, design, and implementation through future Better Buses projects of street interventions that enhance the customer benefits of the network redesign.

The map in **Figure 5.1** shows corridors where new or upgraded bus priority could provide meaningful benefits for bus customers. There are three existing SBS routes in Brooklyn with extended stretches of bus lanes, but many other streets in the borough could be considered for bus lanes and other priority features.

Included in this map is a potential Ridgewood Busway in the right-of-way under the elevated Myrtle Avenue Line (M) between Fresh Pond Road and Palmetto Street. Though in Queens, the busway would primarily support Brooklyn Division buses. The busway would require a long-term capital project unlike most of the other bus priority corridors shown in the map.

NYCDOT will continue to analyze the ridership, street, and traffic characteristics of Brooklyn corridors in the coming months. They will also coordinate with the MTA on where service patterns may be reimagined over the course of the redesign process, and solicit input from the public at Brooklyn Bus Network Redesign public outreach events. NYCDOT will present draft corridors in the Brooklyn Bus Network Redesign's Draft Plan.

Figure 5.1 Preliminary Analysis of Brooklyn Bus Priority

Bus Stop Consolidation

Bus stop consolidation is another way to increase bus speeds. The average stop spacing for local Brooklyn routes is significantly less than the distance between stops in international peer transit systems around the world. Each time the bus stops, it must decelerate, wait for customers to alight and board, and wait again to re-enter traffic. While eliminating some targeted bus stops requires some customers to walk further to access the nearest bus stop, overall travel times decrease when summing up the time saved for each customer already on the bus who is now not subjected to the delay of an additional stop.

Bus stop consolidation involves an in-depth analysis of bus stop usage, analysis of the demographics of users, including those who would be most impacted by a stop removal, outreach to riders, and potential improvements to remaining bus stops. Care must be given to maintain stops that are important transfer points and that serve key destinations, such as senior centers.

NYCDOT is improving bus stops to make them accessible throughout the city, but we do not want to make investments in stops that are likely to be removed. We are coordinating closely with NYCDOT during the network redesign to ensure that bus stops scheduled for upgrades will remain after the network redesign has been implemented and that investments in bus stop accessibility are well-targeted to areas of the greatest need based on our own demographic analysis.

Limited- and SBS-style Routes

Routes where customers are traveling long distances might warrant even greater stop spacing. This network redesign will investigate whether more Limited- or SBS-style routes with fewer stops will better serve Brooklyn bus riders, particularly those with long trips within Brooklyn and into Queens.

DESIGN A MORE RELIABLE NETWORK

Making service more reliable is far from simple, and correcting reliability issues for even one route can mean tackling a wide range of problems, some of which are outside the direct control of the MTA. However, improving reliability is necessary to retain existing riders and to encourage bus usage for more types of trips.

Avoiding Narrow Streets

Customers, bus operators, and MTA staff all identified streets throughout the borough that need to be examined to determine if they are too narrow for bus travel. If these streets do prove to be too narrow for fast, frequent bus travel, they will be avoided if possible when drawing the new bus network. Some streets may be the best possible way to move across the borough or serve a specific neighborhood. So, instead of avoiding the street altogether, where possible we will work with NYCDOT to examine possible improvements to the street to better accommodate bus travel.

Avoiding Turns

Some routes meander through the borough and take multiple turns along the way. Turns slow the speed of buses. Left turns are especially cumbersome. Generally, straighter lines make for better transit, because fewer turns mean faster and more reliable buses.

Sometimes turns are necessary due to the quirks of the historic street grids of the borough. Sometimes turns are necessary to directly connect to a key destination that is a ridership generator. But every turn created as part of the new network will be evaluated to balance the sometimes-opposing interests of increasing reliability and providing customers immediate access to their destination.

The Challenges of Downtown Brooklyn

Downtown Brooklyn is an important generator of bus ridership. Many bus routes from all corners of the borough travel through or end there. Yet the business district is blessed with a very robust subway network. Traffic congestion is severe, and buses often get in each other's way at bus stops that are not quite long enough and at traffic signals that are too short to allow multiple buses to turn during one cycle. Paradoxically, the very factors that promote and encourage bus ridership — dense urban areas that are walkable and have lots of activity — are the same factors that contribute to bus delays. These delays that start in Downtown Brooklyn often cascade out to other areas of the borough.

This network redesign will examine the pros and cons of providing so much bus service to Downtown Brooklyn. Alternatives will be explored that will balance providing access to the borough's central business district with the need to increase reliability throughout the borough.

EXPAND CONNECTIVITY ACROSS THE BOROUGH AND CITY

A transit network with a grid structure is the most effective way to provide connectivity across large areas. With just one or sometimes two transfers, one can get from any point to nearly any other point within the network.

Much of the Brooklyn Bus Network is already a grid. Strong spines – routes traveling long distances across the borough in generally straight lines, such as the **B46** on Utica Avenue and the **B38** on DeKalb and Lafayette Avenues – form the backbone of the network. Brooklyn bus customers already use the network as a grid, with most transferring to other bus routes or to the subway to get to their final destination.

Yet there are sections of the borough where routes are particularly circuitous. This warrants investigating the possibility of a stronger grid structure that could improve the quality of the bus service provided. East New York, with routes such as the **B20** and **B83** crossing over each other multiple times, is one such example.

One consequence of creating a stronger grid in more of the Brooklyn Bus Network is that it will likely require some customers to transfer who do not currently have to. A trip that is now made on one bus on an 'L'-shaped route might be made in the new network on two buses that each travel straight on short, reliable routes with few turns. If travel time on each of the two routes is short, and if frequency on each is great and the wait time for the transfer is low, then overall journey time could be lower even with the necessary connection. This analysis must be done for any potential new transfer introduced into the new bus network, to ensure that the overall benefits for Brooklyn bus riders as a whole outweigh the negatives. If the network redesign results in some riders requiring a second transfer to complete their trip, an additional second free transfer will be provided in these cases to minimize the number of riders adversely affected.

It is worth noting that Brooklyn Bus Network Redesign survey respondents were divided in their views on transfers, even if transferring led to a shorter overall journey time. Many preferred one-seat rides, even if the route was circuitous and less frequent, and therefore longer. The network redesign project will strategically look for opportunities to create a stronger grid where warranted and where negative effects on customers can be minimized.

Another tactic to increase connectivity will be to analyze gaps in the existing grid. In some instances, routes terminate short of a major transfer point, hampering connectivity. The **B67** stops a half-mile short of the bus hub at Williamsburg Bridge Plaza, for instance. We will analyze whether the increase in connectivity is worth the investment required to extend these routes.

Filling gaps in the grid will also be essential to increasing interborough connectivity. With fiscal constraints, not every route can connect to key destinations in Queens, for instance, and still run frequently enough to be a viable service. Yet maximizing connective hubs within the new network, where one can transfer from intra-Brooklyn routes to interborough routes to be able to seamlessly travel long distances by bus, is a cost-effective way to enable greater freedom in traveling across the city. Hubs such as Ridgewood Terminal and 86th Street & 4th Avenue already function in this manner today. Network redesign will explore augmenting the connectivity of these particular hubs and potentially creating new ones.

MAKE IT EASIER TO TRAVEL BY BUS

Part of the network redesign process goes beyond the route network itself and aims to improve ease of use for customers. We will look for ways to adjust the bus network itself to alleviate some of the frustration and make the entire experience easier and more likely to result in additional use.

Getting Information About Your Bus Trip

As part of network redesign, we will build a simpler grid that is easier for customers to understand. Knowing where each bus goes and where customers can get to in a reasonable amount of time is easier if the system itself is easy to read and understand. Running more routes in straight lines that stay on major streets is more user-friendly for Brooklynites. One way to encourage bus ridership is to find the proper balance between simplicity and complexity in the bus network, increasing comprehension while still getting people where they need to go.

Part of this bus network redesign will include creating bus routes that are fast, frequent, and reliable, so customers can depend on the routes without having to know the schedule. This may involve moving to a system in which some buses are advertised as arriving "every 8 minutes or better." Someone can arrive at a bus stop on one of these routes and can count on frequent service for much of the day.

Boarding the Bus

As part of the network redesign process, we will make adjustments to bus stops, including eliminating some bus stops to speed up travel along a corridor, creating bus stops on corridors not currently served by a bus, and shifting bus stops to help buses avoid unnecessary delays. We will evaluate bus stop locations for the appropriateness for customers, the ability of a bus to properly get to the curb to eliminate passengers boarding in the street, and ensuring other vehicles or obstructions do not interfere with safe, fast bus service.

As part of Fast Forward, all-door boarding will be launched on all bus routes in 2021. This will significantly reduce the time required to board the bus, as well as alleviate some of the seemingly-overcrowded conditions that are caused by front-door boarding and passengers not moving toward the back. The new OMNY payment system will allow customers to make tap-and-go fare payments with a smartphone or contactless credit or debit card, speeding up the payment process as well. These improvements should cut down on the amount of time spent boarding buses, which can be upcycled into more service for the same number of service hours, based on faster speeds along the route.

Connections to Other Routes and Other Transit

With a revised grid of bus routes and wider stop spacing in much of the borough, special attention will be given to transfer locations between buses. Customers that need to transfer from one route to another to access more of the borough should be able to see immediately where the bus stop is for the connecting service. It should be located nearby, if not at the same stop, and if crossing a street is required there should be a crosswalk available.

We will also ensure that connection points between the bus network and other modes – subway, ferry, Long Island Rail Road – are as optimal as possible considering operational constraints.

MAKE BROOKLYN'S BUS RESOURCES MORE PRODUCTIVE AND EFFICIENT

Though not a stated goal of Brooklyn bus customers, any new bus network must be a financially responsible enterprise for the MTA. Providing public transportation is expensive and rarely turns a profit, so subsidies will always be required. However, there are opportunities to improve productivity and financial efficiency to maximize use of the fixed resources available.

Our initial findings regarding the productivity and financial efficiency of Brooklyn buses are as follows:

- Express bus routes are less productive overall. Express bus routes typically cost more to operate, as they are peaked, directional services and travel longer distances with less passenger turnover. Higher "deadhead" times also make express buses more expensive to operate. Deadhead time is the time a bus spends out of service on its way to the beginning of its route.
- Operating specialized routes that are not efficient, such as express bus routes or small neighborhood routes, uses resources that could be utilized to provide more frequent service along more productive routes.
- To improve the productivity of the system, bus service needs to be ridership-oriented. Factors that predict ridership include mixed, high-activity density, linearity of the bus route, walkability, and connectivity.
- Ideally, the amount of service provided should be sufficient so that capacity utilization is even throughout the day. This can be achieved by reallocating service hours from unproductive services and assigning them to more productive, ridership-oriented services.
- High-frequency routes are more productive, but we must allocate that frequency where it can spur additional ridership. Higher ridership-per-operator-hour leads to a positive feedback loop: more fare revenue allows us to increase operator hours, which creates even more frequent service, which in turn spurs increased ridership. To expand low ridership-per-operator-hour service would require additional revenue from other sources, because the fare revenue on the route is not sufficient. The only path to avoid additional funding gaps is to focus service where ridership can grow: dense walkable places where most people do not own cars.

DESIGNING A NEW NETWORK FROM SCRATCH

To meet current and future needs, a new Brooklyn Bus Network must balance the needs of numerous stakeholders, including the MTA, its bus operators and bus dispatchers, and, most importantly, its customers.

The process begins with input from customers and incorporates feedback from many stakeholders:

- Customers
    - o Open Houses (October and November 2019)
    - o Project website (launched October 2019)
    - o On-street pop-up outreach events (October 2019)
    - o Online survey and comments (October through December 2019)
    - o Social media (ongoing)
- Brooklyn Community Boards and other stakeholders
- Permanent Citizens' Advisory Committee
- NYCDOT
- Brooklyn bus operators
- Bus operator unions

The project team will collect and analyze recommendations and concerns while taking a 'blank slate' approach to drawing the new bus network. Data analyses will include bus performance metrics, census data, existing bus origin-destination patterns, activity hubs, and also Transportation Network Company data to understand current non-bus trip patterns. Identifying prime corridors, understanding trip patterns, and striking a balance between different types of effective routes (local, Limited, SBS, express) will be the challenge in creating a new, customer-driven bus network.

The bus network redesign for Brooklyn will begin with existing ridership, but may not preserve specific parts of the existing network. There will always be buses on Utica Avenue, DeKalb Avenue, and Kings Highway, for instance, but they may not continue to the same destinations or have the same frequencies.

All options will be examined to maximize the ability of the network to meet the needs of customers. Buses will run better if we run them in straight lines. Bus routes will be more reliable if they have fewer turns. A network more closely resembling a grid will help create access across the borough and neighboring boroughs. But this may involve adding a transfer for some customers.

The MTA is analyzing bus network redesigns undertaken in other cities to determine how applicable those efforts are to a network like ours, as well as any lessons learned and what elements were essential for success.

Queens Bus Network Redesign

The Queens Bus Network Redesign (QBNR) project was announced in April 2019 and the Draft Plan was released in December 2019. The QBNR Draft Plan, developed in accordance with the Brooklyn team, is a first look at how the MTA can improve bus service in Queens to benefit the greatest number of customers.

Throughout the public outreach efforts so far, the following customer priorities were identified: reliable service, faster travel, better connections, and ease of use. Additionally, customers asked for better connections between Queens and Brooklyn. We listened and proposed the following routes that extend into Brooklyn:

- **QT1** – Astoria-Downtown Brooklyn
  - This route will run northbound to Astoria/27th Avenue-2nd Street and southbound to Downtown Brooklyn/Tillary Street via 21st Street, the Pulaski Bridge, and Driggs/Bedford Avenues. The **QT1** will resemble portions of the existing **Q100** and **B62**. It will provide a quick connection between Astoria and Downtown Brooklyn, with few stops in between to move customers as quickly as possible between the two areas.
- **QT2** – Steinway-Williamsburg
  - This route will run northbound to Steinway/20th Avenue and southbound to Williamsburg Bridge Plaza via Steinway Street, the Brooklyn Queens Expressway, and Grand Street. The **QT2** will resemble portions of the existing **Q101** and **B24**. It will provide a quick connection between Northwest Queens and Williamsburg, with few stops in between to move customers as quickly as possible between the two areas.
- **QT3** – Metropolitan Avenue
  - This route will run westbound to Williamsburg Bridge Plaza and eastbound to Jamaica/170th Street. The **QT3** will resemble portions of the existing **Q54**. It will provide a quick connection between Williamsburg and Jamaica, with few stops in between to move customers as quickly as possible between the two areas.
- **QT4** – Flushing Avenue
  - This route will run westbound to Downtown Brooklyn/Tillary Street and eastbound to the Jackson Heights/74th St-Roosevelt Ave E F M R 7 subway station via 69th Street, Flushing Avenue, Metropolitan Avenue, and Park Avenue. The **QT4** will resemble portions of the existing **B57**, **Q18**, and **Q47**. It will provide a quick connection between Downtown Brooklyn and Jackson Heights, with few stops in between to move customers as quickly as possible between the two areas.

- **QT5** – Brownsville-Jamaica
  - This route will run westbound to Brownsville/Brookdale Hospital and eastbound to Jamaica/Sutphin Boulevard-Hillside Avenue. The **QT5** will resemble portions of the existing **Q8** and **B15**. It will provide a quick connection between Brownsville and Jamaica, with few stops in between to move customers as quickly as possible between the two areas.
- **QT6** – Flushing-Ridgewood and **QT58** – Flushing-Ridgewood via Corona
  - Both of these routes will run westbound to Ridgewood Terminal and eastbound to Flushing/Main Street. The **QT58** resembles the portion of the existing **Q58** from Flushing/Main Street to 108th Street/Horace Harding Expressway. The **QT6** resembles the portion of the existing **Q58** from 108th Street/52nd Avenue to Broadway/Queens Boulevard. Both the **QT6** and **QT58** resemble the portion of the existing **Q58** from Broadway/Queens Boulevard to Ridgewood Terminal.
- **QT7** – Linden Boulevard
  - This route will run westbound to Spring Creek/Gateway Center and eastbound to Cambria Heights/Francis Lewis Boulevard. The **QT7** will resemble portions of the existing **Q4** and previous **Q89**. It will provide a quick connection between Southeast Brooklyn and Eastern Queens, with few stops in between to move customers as quickly as possible between the two areas.
- **QT24** – Atlantic Avenue East
  - This route will run westbound to Bushwick/Lafayette Avenue-Patchen Avenue and eastbound to Jamaica/Archer Avenue-Merrick Boulevard. The **QT24** will resemble portions of the existing **Q24**. It will provide a link to areas in between the two terminals.
- **QT35** – Brooklyn College-Rockaway Park
  - This route will run westbound to Brooklyn College/Flatbush Ave 2 5 subway station and eastbound to Rockaway Park/Beach 116th Street via Rockaway Beach Boulevard and Flatbush Avenue. The **QT35** will resemble portions of the existing **Q35**. It will provide a quick connection to the subway from an area of the Rockaways that does not have nearby subway service.
- **QT54** – Metropolitan Avenue
  - This route will run westbound to Williamsburg Bridge Plaza and eastbound to Jamaica/170th Street. The **QT54** will resemble portions of the existing **Q54**. It will have the same routing as the **QT3** with more frequent stops to provide access to areas in between the two terminals.

- **QT55** – Myrtle Avenue
  - This route will run westbound to Ridgewood Terminal and eastbound to Jamaica/165th Street Terminal. The **QT55** will resemble portions of the existing **Q55**. It will provide a link to areas in between the two terminals.
- **QT56** – Jamaica Avenue West
  - This route will run westbound to Broadway Junction/Van Sinderen Avenue and eastbound to Jamaica/165th Street Terminal. The **QT56** will resemble portions of the existing Q56. It will provide a link to areas in between the two terminals.
- **QT59** – Williamsburg-Rego Park
  - This route will run westbound to Williamsburg Bridge Plaza and eastbound to Rego Park/Queens Boulevard-62nd Drive via Queens Boulevard and Grand Avenue/Street. The **QT59** will resemble portions of the existing **Q59**. It will provide a link to areas in between the two terminals.
- **QT62** – East New York-Cedarhurst
  - This route will run westbound to Cypress Hills/Crescent St J Z subway station and eastbound to Cedarhurst/Falcaros Plaza via Rockaway Turnpike/ Boulevard, Liberty Avenue, and Crescent Street. The **QT62** will resemble the existing **Q6**, **Q7**, and **Q114**. It will provide a link to areas in between the two terminals.
- **QT76** – Astoria-Williamsburg
  - This route will run northbound to Astoria/21st Street-Ditmars Boulevard and southbound to Williamsburg Bridge Plaza via Steinway Street, Greenpoint Avenue, and Driggs/Bedford Avenues. The **QT76** will resemble the existing **Q101** and **B62**. It will provide a link to areas in between the two terminals.
- **QMT155** – Spring Creek-Madison
  - This express route will run into Manhattan via Woodhaven Boulevard, the Queens-Midtown Tunnel, and Madison Avenue, and out to Spring Creek via Madison Avenue, the Queensboro Bridge, and Woodhaven Boulevard. The **QMT155** will resemble portions of the existing **BM5**. It will provide a commuting service between low density/low demand neighborhoods and the central business district in Manhattan.

To maintain the flexibility of the Brooklyn project, potential bus stops within Brooklyn for the above routes have not yet been decided.

The Brooklyn Draft Plan will pick up where the Queens Draft Plan left off. It will continue to fill in important Queens-Brooklyn connections. Public input on the Queens Draft Plan is encouraged. Let the MTA know what can be improved before the Proposed Final Plan is released in the second quarter of 2020. Please visit https://new.mta.info/queensbusredesign for more information on the project and to provide comments.

NEXT STEPS

This Existing Conditions Report marks the completion of the first phase of the Brooklyn Bus Network Redesign project. We will share the existing conditions findings with the Brooklyn Borough Board and any Brooklyn Community Boards that request our attendance. We will then develop a Draft Plan of a new bus network that reflects the findings in this report and the input we receive. We will develop the Draft Plan with support and participation from NYCDOT. Additional public input sessions will be held following the release of the Draft Plan. We will ask the public to share their thoughts and provide input on adjusting the Draft Plan to better suit their needs. Input received will help inform the development of the Proposed Final Plan.

APPENDIX

APPENDIX

(Appendix A) Glossary of Terms

Accessibility – a service, vehicle, or facility is accessible if it is in compliance with the **American with Disabilities Act (ADA)**, or in general (nonlegal) terms, if it is readily usable by persons with disabilities.
See: **ADA**

ACS – American Community Survey. An ongoing, nationwide survey conducted by the U.S. Census Bureau from which data on employment, demographics, commuting behavior, and other subjects is gathered and distributed.

ADA – the American with Disabilities Act of 1990, which applied to public transit, requires that transit providers must follow regulations ensuring that services, vehicles, and facilities are accessible to and usable by individuals with disabilities.
See: **accessibility**

Additional Bus Stop Time – measures the average added time that customers wait at a stop for a bus, compared with their scheduled wait time.

Additional Travel Time – measures the average time customers spend onboard a bus beyond their scheduled travel time.

Alighting – exiting or getting off a bus, train, or other mode of transit.
See: **boarding**

Articulated bus – a bus with "two connected passenger compartments that bend at the connecting point when the bus turns a corner." From the APTA Glossary of Transit Terminology.

Boarding – entering or getting onto a bus, train, or other mode of transit.
See: **alighting**

BRT – Bus Rapid Transit. BRT systems strive to bring faster, more reliable, and quality bus service to high ridership corridors by combining amenities of rail-based rapid transit systems with the flexibility of buses. New York City Transit's implementation of BRT is **Select Bus Service (SBS)**, which improves speed and reliability through dedicated bus lanes, off-board fare payment, stop spacing, and transit signal priority.

Bus boarding island – a bus boarding platform separated from the sidewalk to accommodate a bike lane that enables easier boarding for bus passengers and continuous flow for bicyclists. Bus boarding islands are as close to level with the floor of the bus as feasible.

Bus bulb – a sidewalk platform extending from the sidewalk that enables easier boarding for bus passengers. Bus bulbs are as close to level with the floor of the bus as feasible.

Bus depot – a site used to store buses overnight, often with maintenance facilities and office space for administration and bus operator facilities.

Bus lane – a lane of the roadway dedicated exclusively to bus movement.

Bus network – a collection of bus routes, including the physical paths they take as well as their scheduled frequencies and spans of service. Essentially, where buses travel, when buses travel, and how often buses travel.

Bus priority – any number of techniques or tools that enable bus transit to take precedence over other modes of surface transportation in traffic. For example, with **transit signal priority (TSP)**, traffic lights can change more quickly from red to green or a green light can be held longer if a bus is approaching.

Bus stop consolidation – removing and adjusting (moving) bus stops so that buses can travel more quickly along their routes. Buses currently stop too frequently. With bus stop consolidation, improvements in overall travel time and reliability will outweigh small increases in the time spent walking to bus stops.

Bus Time – Also, MTA Bus Time. A GPS-tracking system that tracks the real-time location of buses and communicates that information to customers via desktop and mobile websites, smartphone applications, and SMS text messaging.

Capacity utilization – the number of unlinked passenger boardings compared to the total number of seating and standing spaces that are scheduled on a route.

Corridor – one or more roadways that connect to provide continuous travel. For example, Malcolm X Boulevard and Utica Avenue combine to form a north-south corridor between Bedford-Stuyvesant and Flatlands.

Cost per boarding – the ratio of the cost of bus service provision to the number of passengers that use this service. In this report, the cost per boarding is calculated by dividing the annual service cost by annual **boardings**.

CJTP – Customer Journey Time Performance. The percentage of customers whose journeys (trips) are completed within five minutes of the scheduled time. Customer Journey Time Performance considers both how long customers wait at the bus stop beyond what they would have if their bus arrived on time, as well as how long customers spend on the bus beyond what they would have if the bus completed its trip in the time allotted in the schedule.

Express bus service – bus service focused specifically on transporting commuters between Manhattan and the outer boroughs. Express bus routes typically have a series of pick-up locations in one borough and a series of drop-off locations in the other, between which is an express segment. The bus does not stop throughout the express segment, which is generally on a highway.

Farebox recovery ratio – the ratio of operating revenue to operating cost. A route with a farebox recovery ratio greater than 100 percent indicates that the route is profitable, while a farebox recovery ratio less than 100 percent indicates that the route is subsidized.

Fast Forward Plan – New York City Transit's 2018 strategic plan to modernize transit in New York City.

Frequency – the rate at which buses run along a specific route.
See: **headway**

Headway – the scheduled interval of time between buses running along a specific route.
See: **frequency**

In-service hour – the unit of time during which a bus route is in operation. This measure is especially helpful for an understanding of efficiency when comparing different routes across the system. For example, one route may have many more riders than another, but is aided by being in service for much longer throughout the day.

Interborough- travel between two or more boroughs.

Intraborough- travel within one borough.

Limited (or Limited-Stop) bus service – often operates in conjunction with a local bus serving the same corridor, but makes fewer stops to travel the length of the route more quickly.

Local bus service – the most commonly provided bus service. Local bus service—in contrast to **Limited bus service**—makes all stops along a route.

MetroCard – the Metropolitan Transit Authority's predominant fare payment method, being phased out in favor of **One Metro New York (OMNY).**

NYCDOT – New York City Department of Transportation

OMNY – One Metro New York. The MTA's new contactless fare payment system, replacing the **MetroCard**. Customers can use contactless debit and credit cards, as well as smart devices, to pay their fare. Full rollout of **OMNY** throughout the entire subway system and on all bus routes is expected by late 2020.

OTP – On-time performance. Measures how well a bus route performs compared to its schedule. It is defined as the percentage of buses that are between one minute early and five minutes late as compared to the schedule at each official timepoint along the route.

Peak – the times during which commuter demand is heaviest and typically when the most service is provided. The morning peak period is weekdays between 7:00 A.M. and 9:00 A.M. The afternoon peak period is weekdays between 4:00 P.M. and 7:00 P.M.

Productivity – the measure of ridership given the level of service provided. Bus routes are more productive when they attract more riders per unit of time that they are in service.

Queue jump – queue jump lanes give buses priority at signalized intersections by providing buses the space (a dedicated lane) and time (a bus-specific, early green light) to enter traffic flow ahead of other vehicles.

Reliability– service reliability constitutes buses arriving at stops on time and at regular intervals, as well as customers completing their journey in the scheduled time frame. Our reliability metrics include measures of passenger wait times, on-time performance, and Customer Journey Time Performance at the borough-wide and route levels.

Ridership – the total number of customers using a specific route or the bus system generally.

SBS – Select Bus Service. New York City Transit's branded implementation of **BRT (Bus Rapid Transit).**

Span – the time period throughout the day that a route is in service.

Stop spacing – the average traveled distance between bus stops along a route.

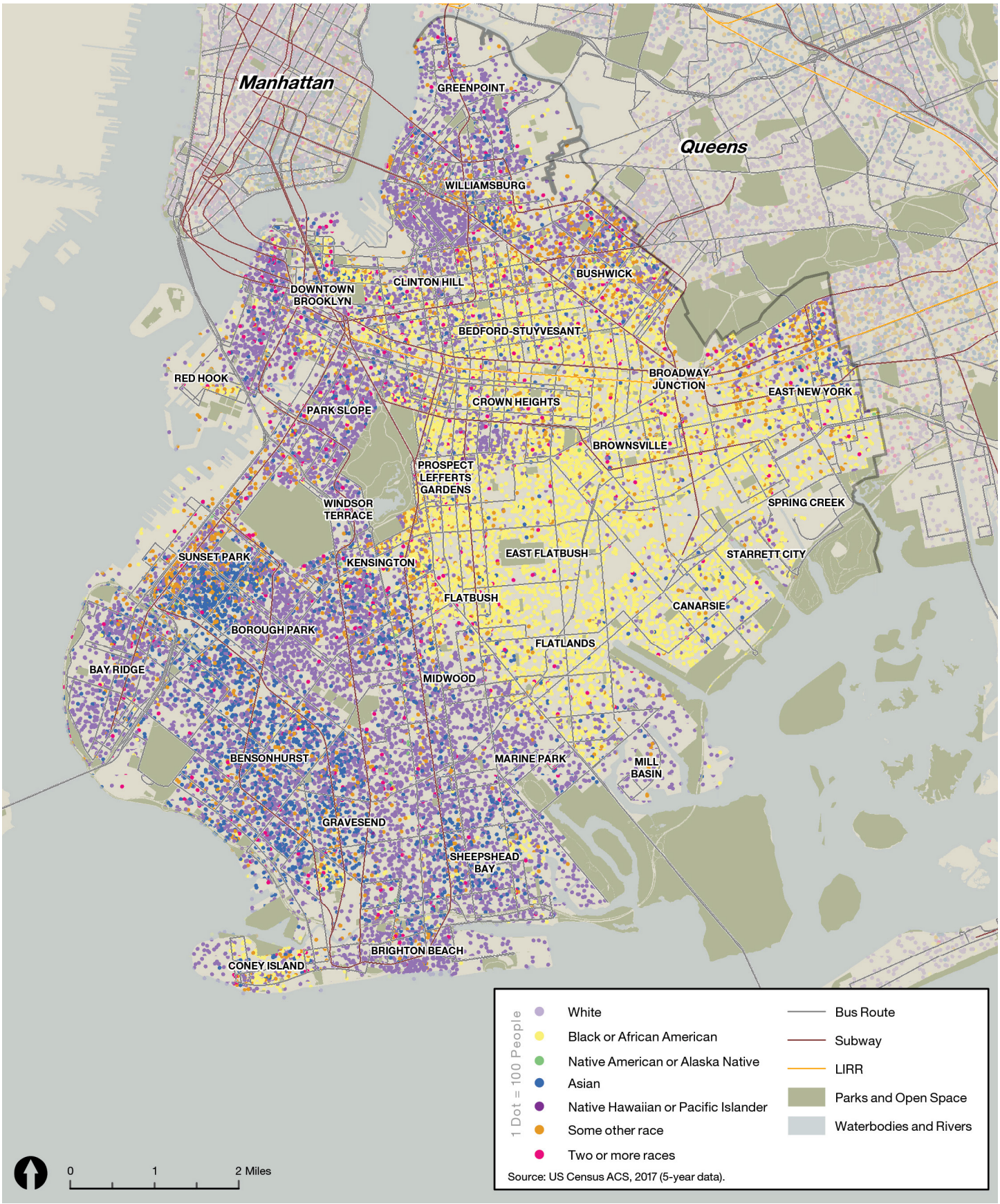
TNC – Transportation Network Company. Also known as ride-hailing service companies. TNC customers hail for-hire vehicles using mobile apps associated with various TNCs. Companies with a significant presence in New York City include Uber, Lyft, Juno, and Via.

TSP – Traffic Signal Priority.
See: **bus priority**

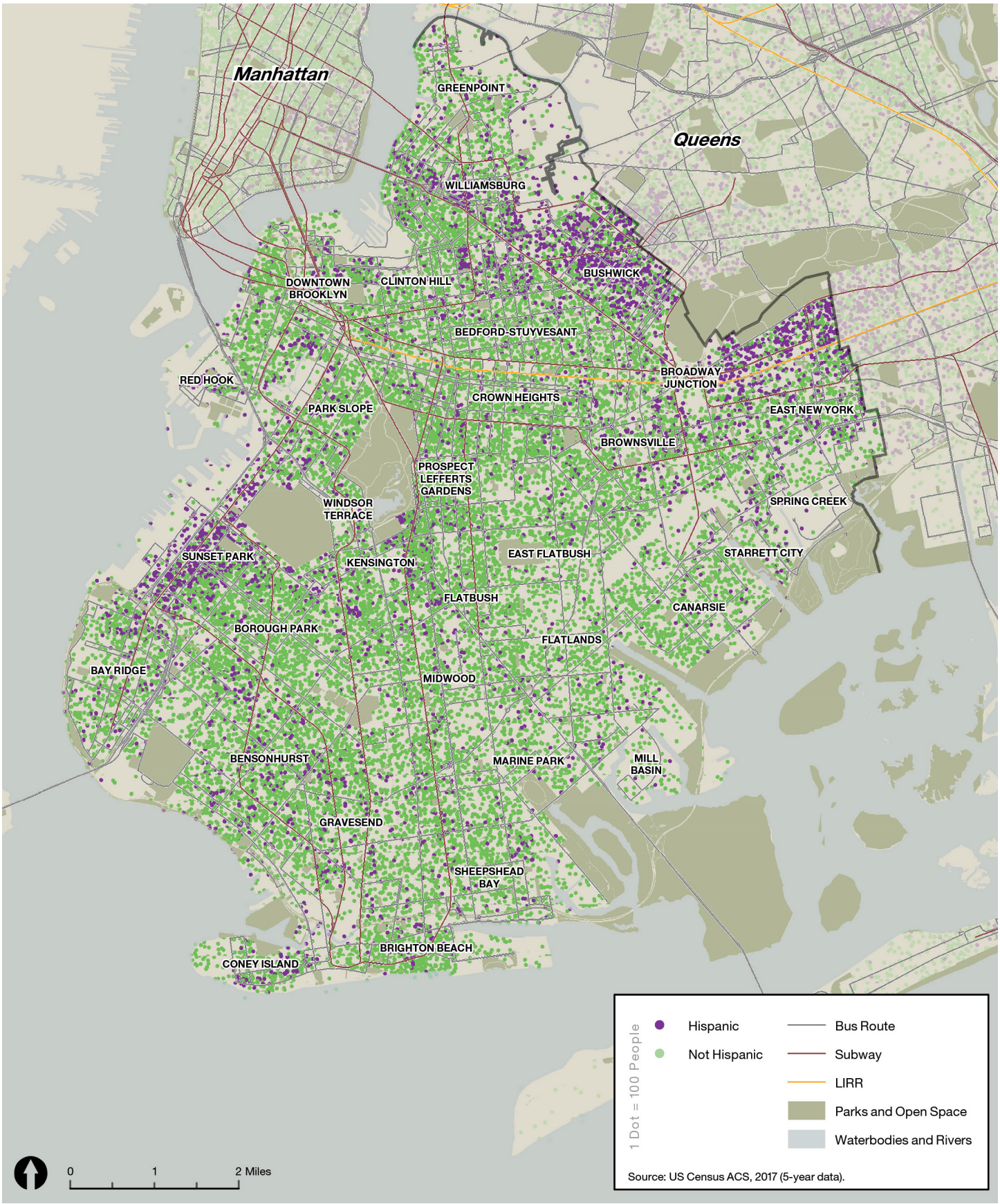
(Appendix B) Additional Demographic/Background Data

Demographic data, like population and employment density, as well as other background data, such as land use and street widths, help inform our analyses of where to run bus service and how. **Appendix B** contains visual representations of this additional information about Brooklyn.

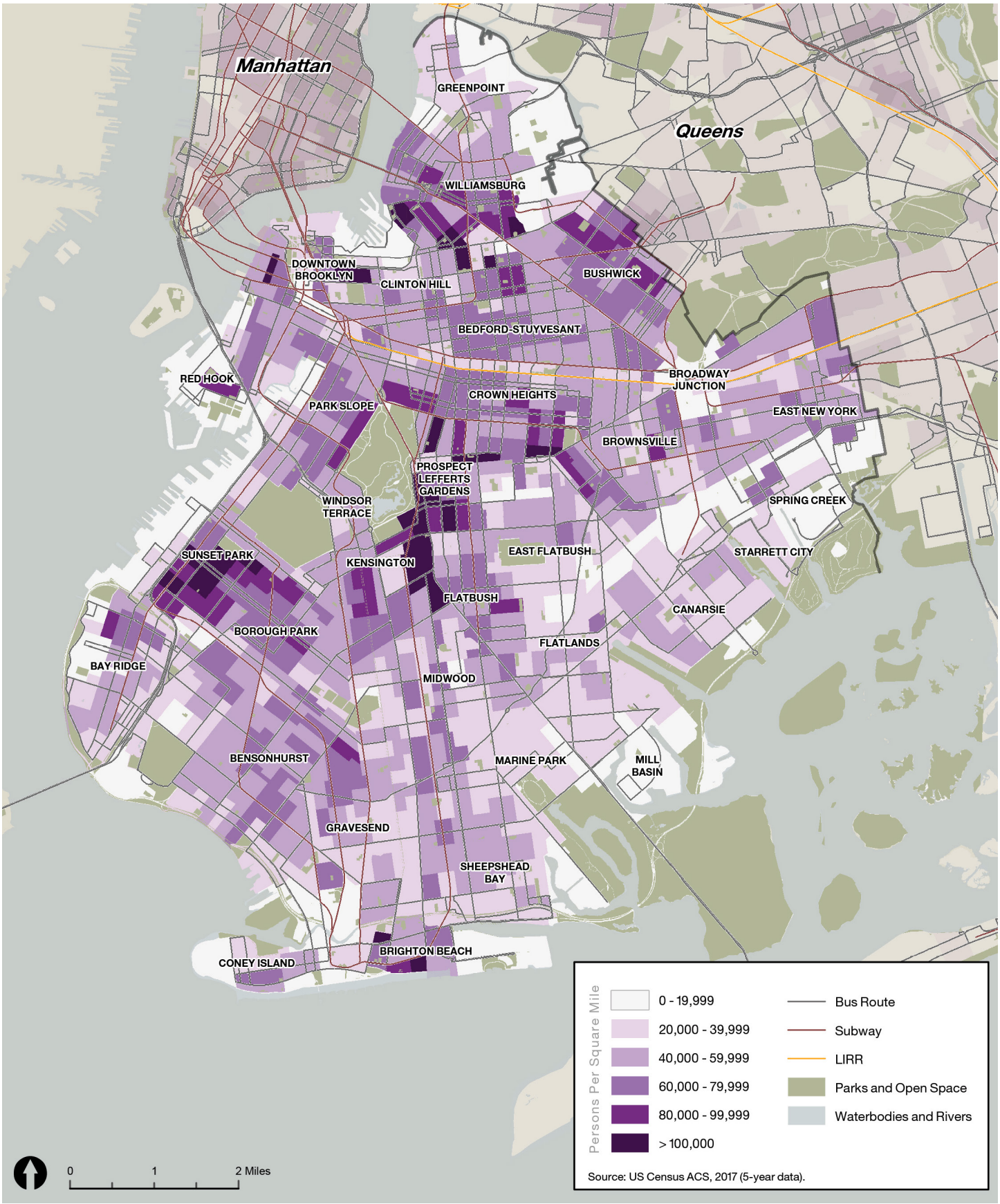
AB.1 Population/Race Distribution



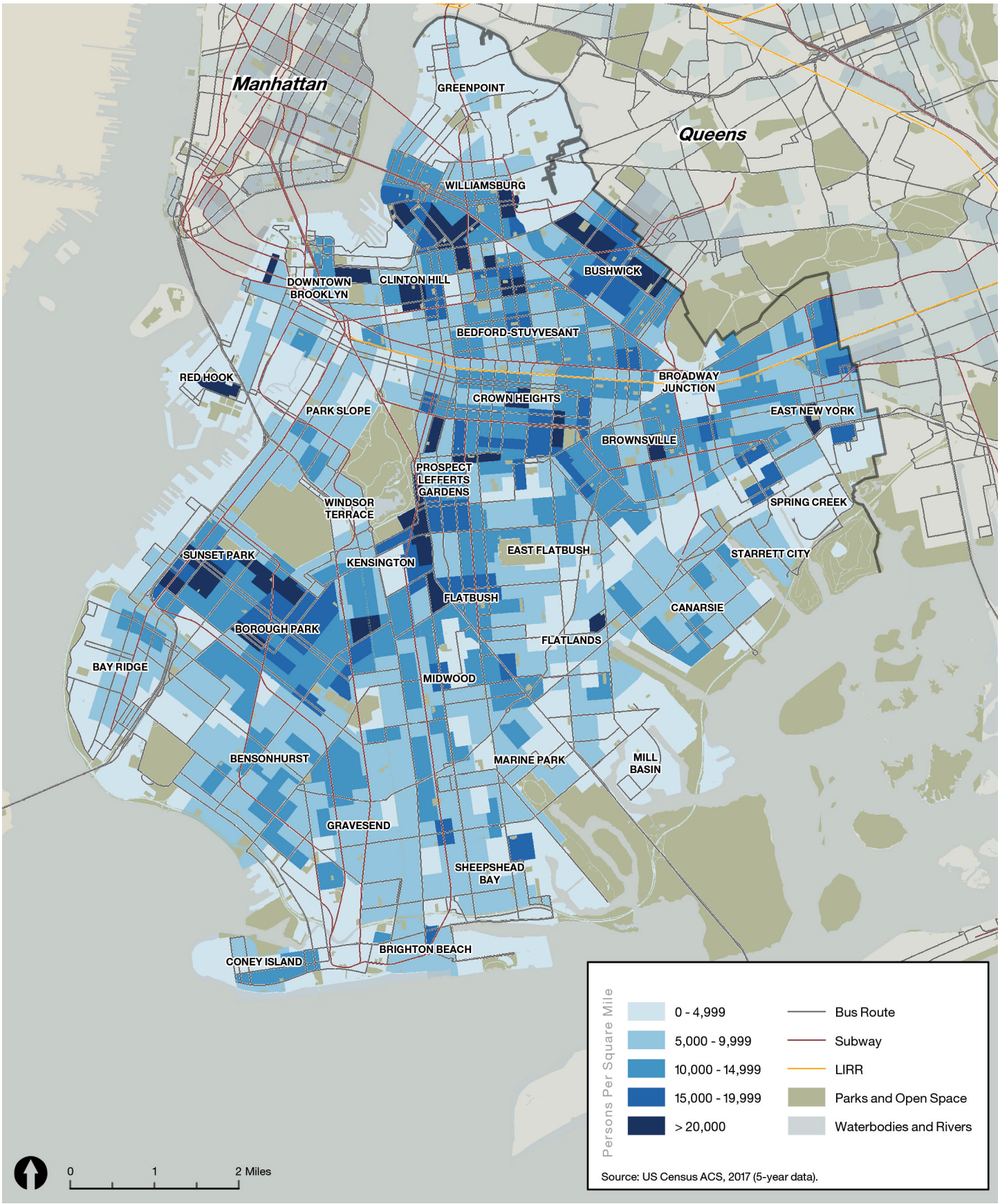
AB.2 Population/Ethnicity Distribution



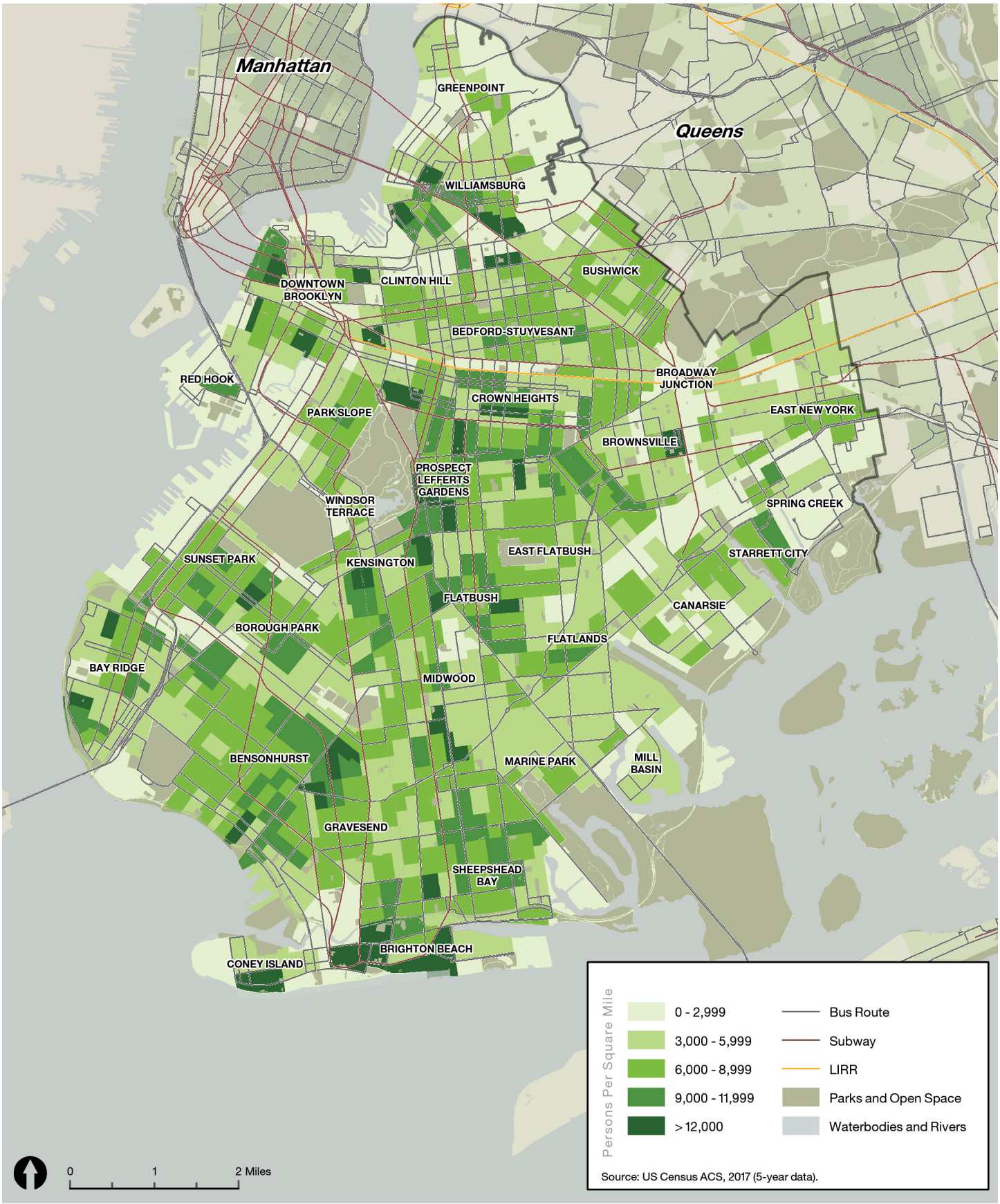
AB.3 Population Density



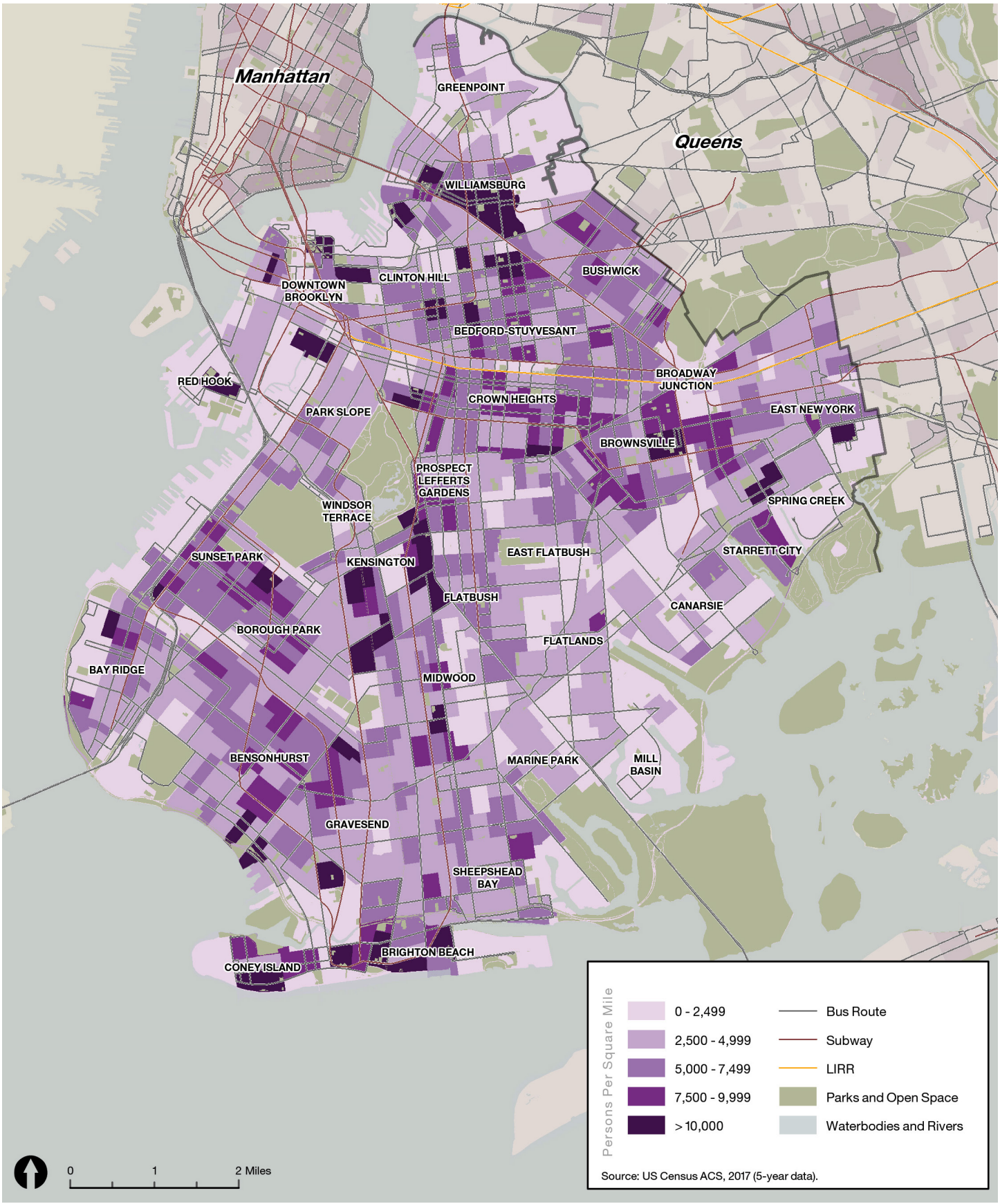
AB.4 Residents 10-24 Years of Age



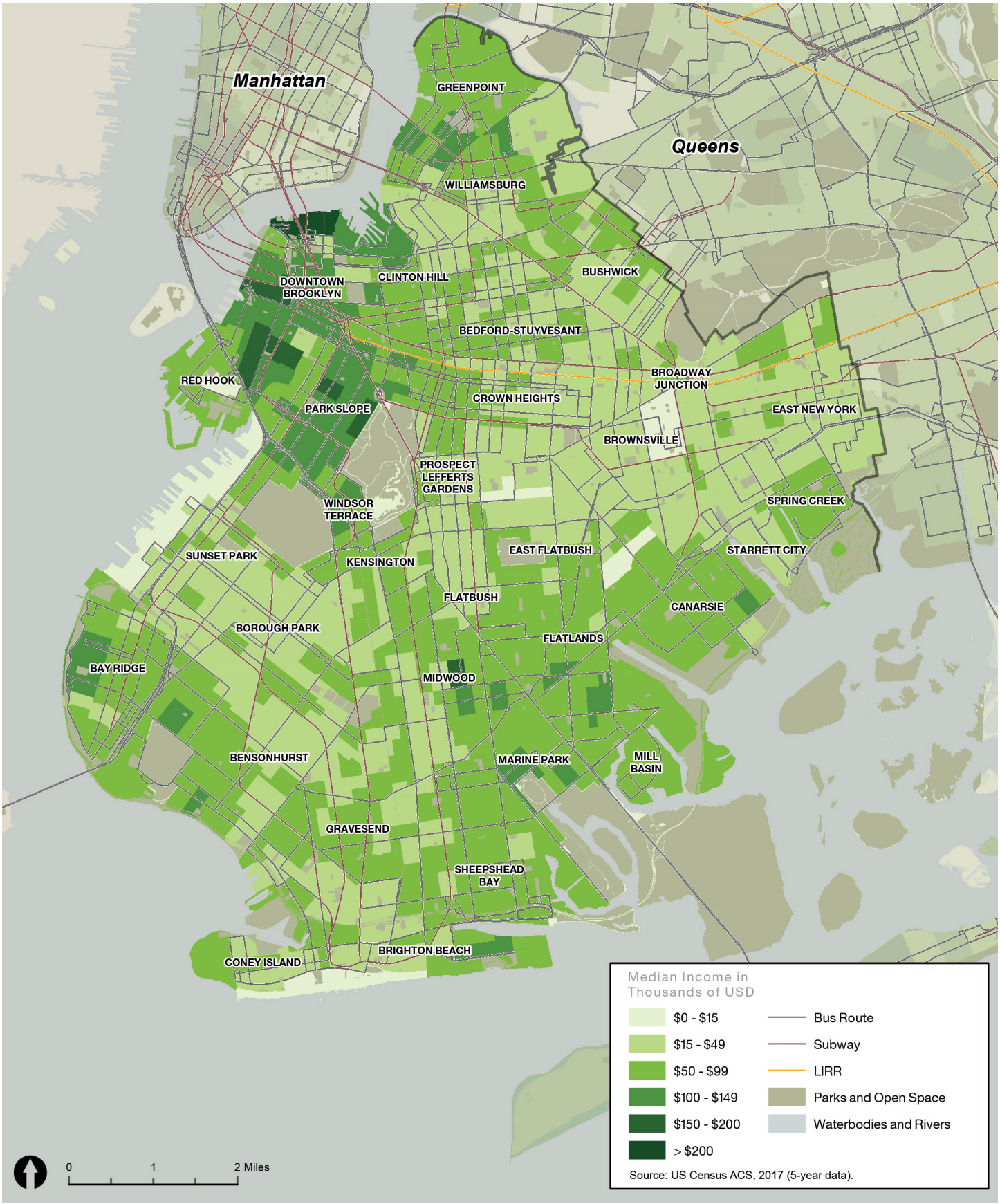
AB.5 Residents 65 Years and Older



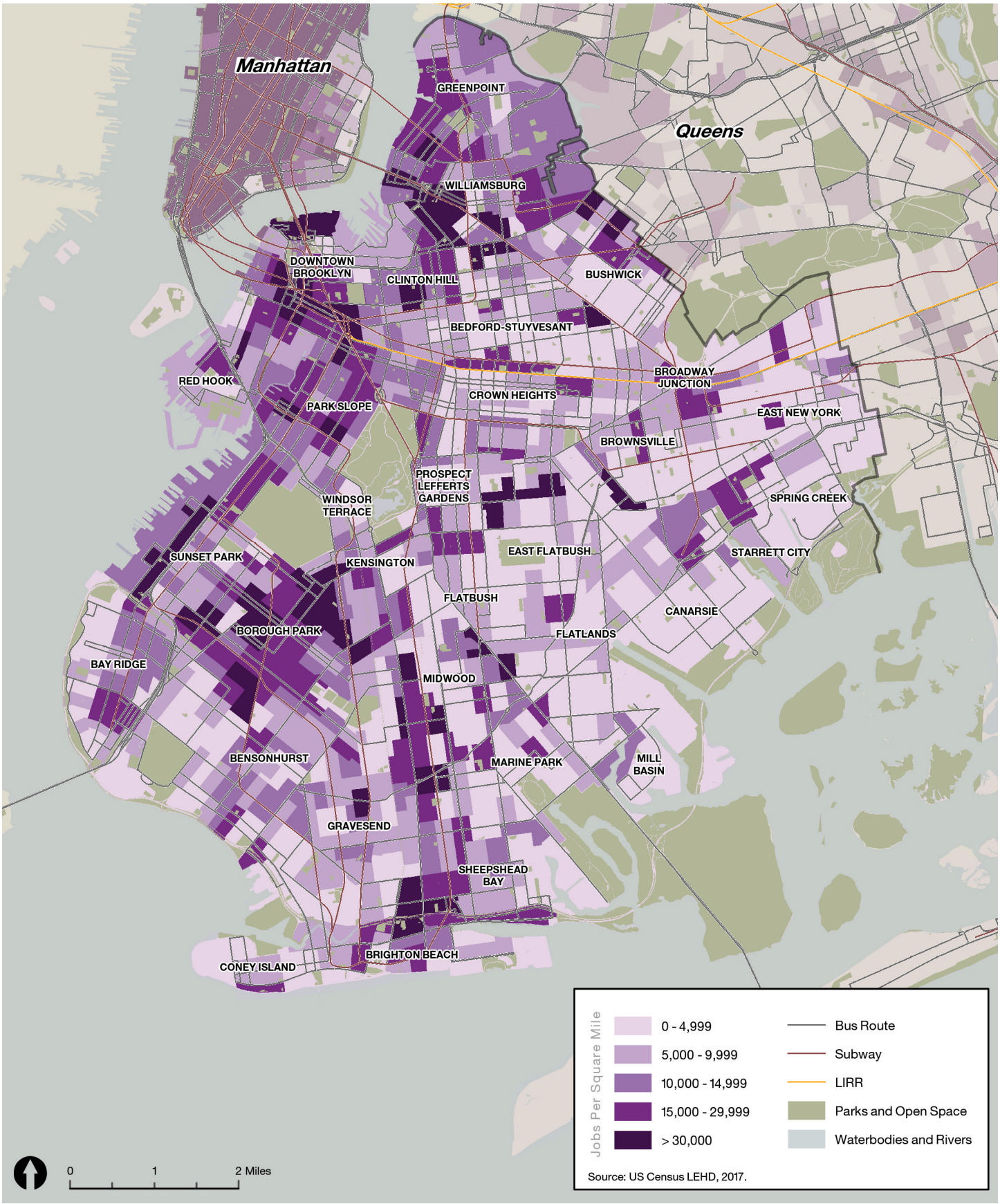
AB.6 Residents with Disabilities



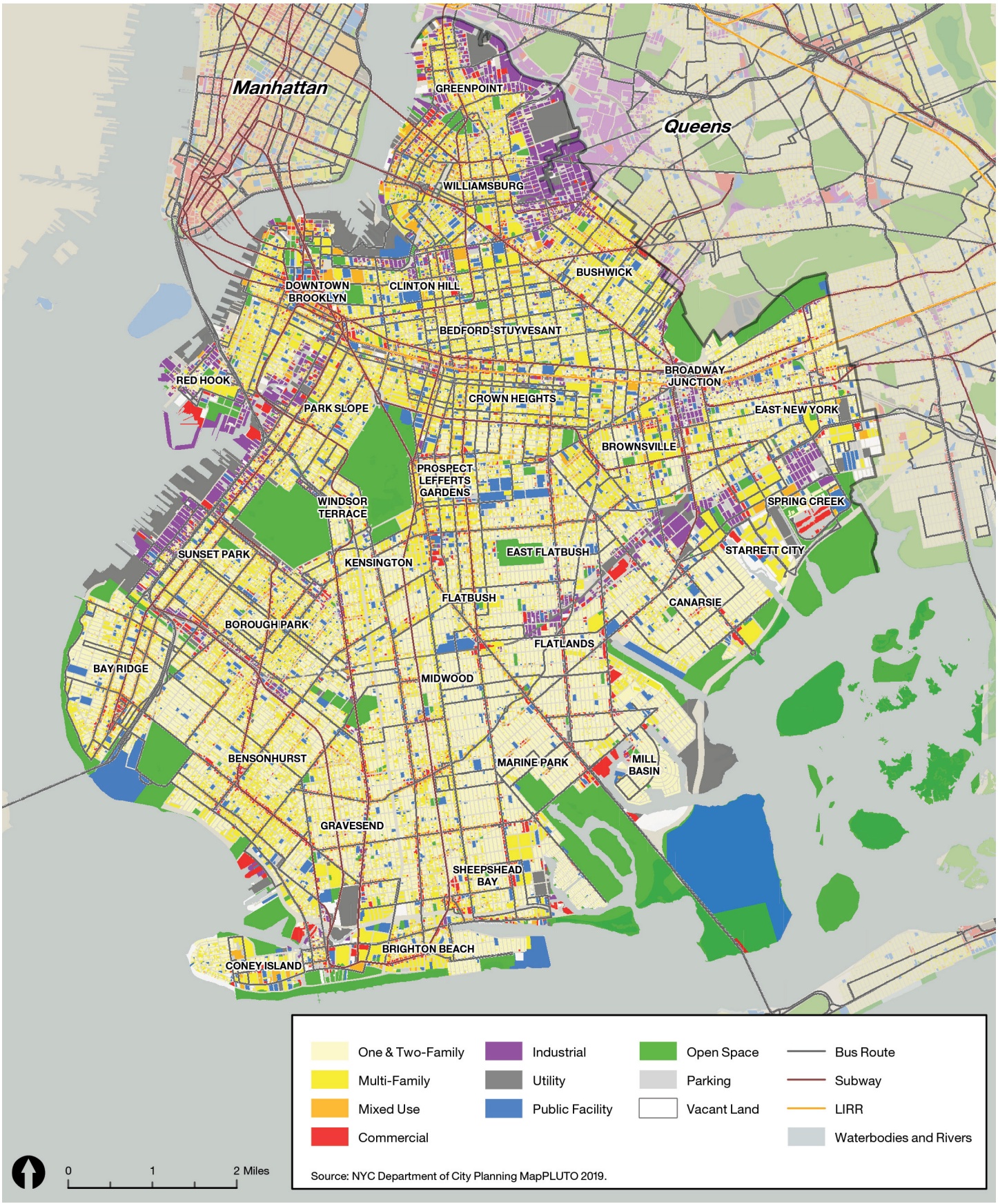
AB.7 Median Income



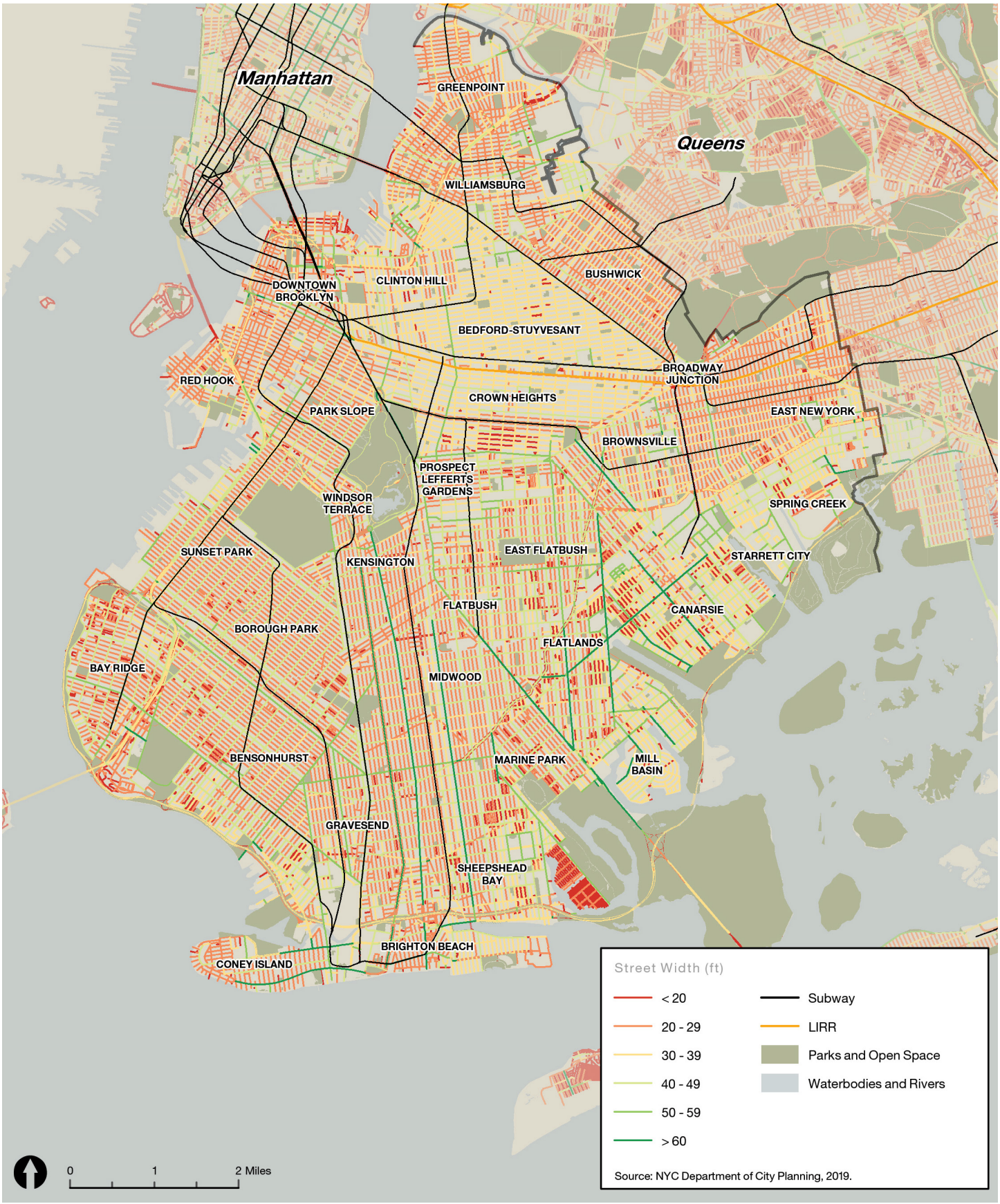
AB.8 Employment Density



AB.9 Land Use


Manhattan
Queens
GREENPOINT
WILLIAMSBURG
BUSHWICK
DOWNTOWN BROOKLYN
CLINTON HILL
BEDFORD-STUYVESANT
RED HOOK
PARK SLOPE
CROWN HEIGHTS
BROADWAY JUNCTION
EAST NEW YORK
BROWNSVILLE
PROSPECT LEFFERTS GARDENS
WINDSOR TERRACE
SPRING CREEK
STARRETT CITY
SUNSET PARK
KENSINGTON
EAST FLATBUSH
FLATBUSH
CANARSIE
BOROUGH PARK
FLATLANDS
BAY RIDGE
MIDWOOD
BENSONHURST
MARINE PARK
MILL BASIN
GRAVESEND
SHEEPSHEAD BAY
BRIGHTON BEACH
CONEY ISLAND
One & Two-Family
Multi-Family
Mixed Use
Commercial
Industrial
Utility
Public Facility
Open Space
Parking
Vacant Land
Bus Route
Subway
LIRR
Waterbodies and Rivers
0
1
2 Miles
Source: NYC Department of City Planning MapPLUTO 2019.

AB.10 Street Widths



(Appendix C) Additional Travel Data

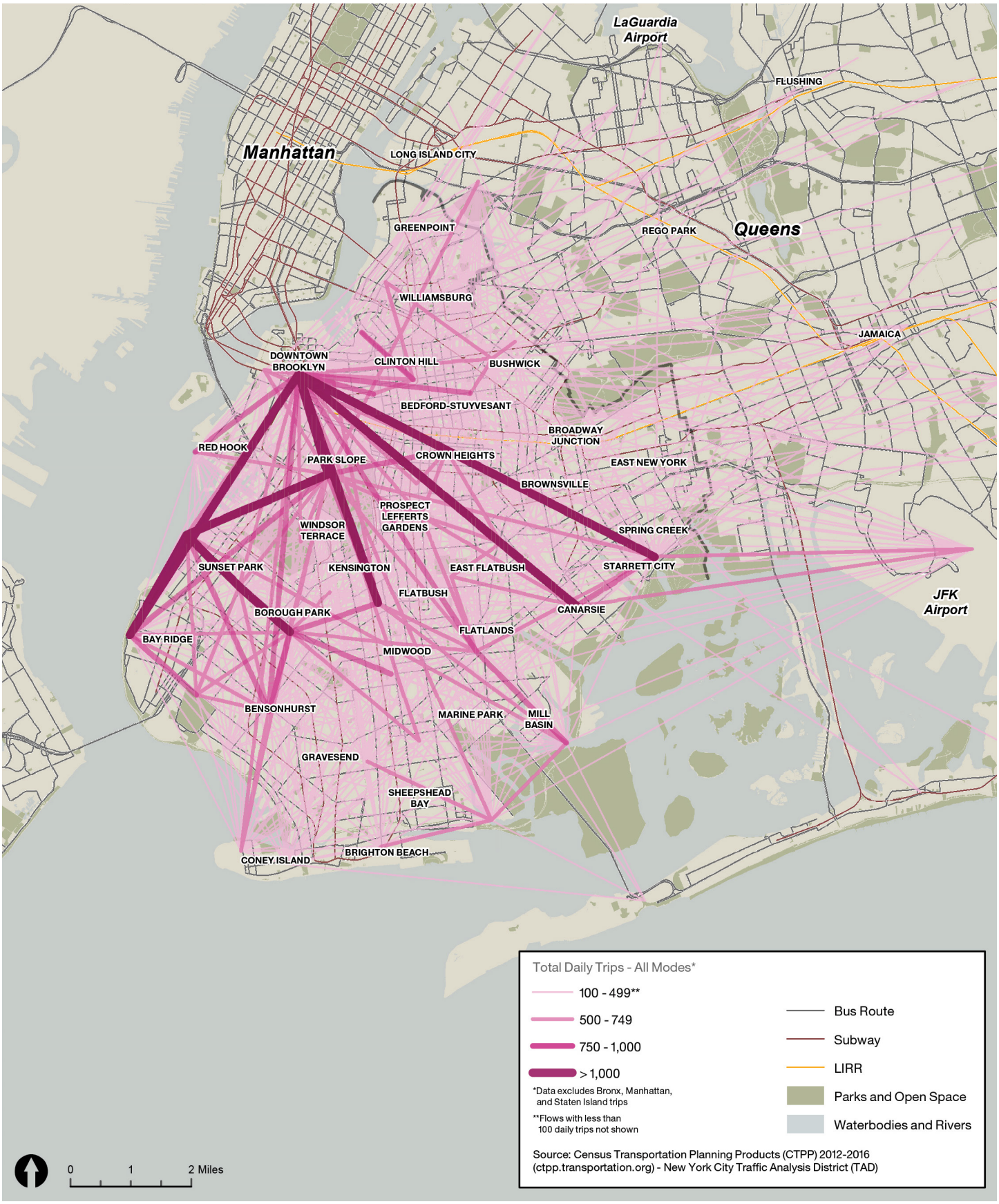
Appendix C contains additional information about travel around Brooklyn.

Figure AC.1 shows origins and destinations of work commute trips as compiled by the Census Bureau, grouped by neighborhood. It shows all flows of more than 100 daily trips within Brooklyn and between Brooklyn and Queens.

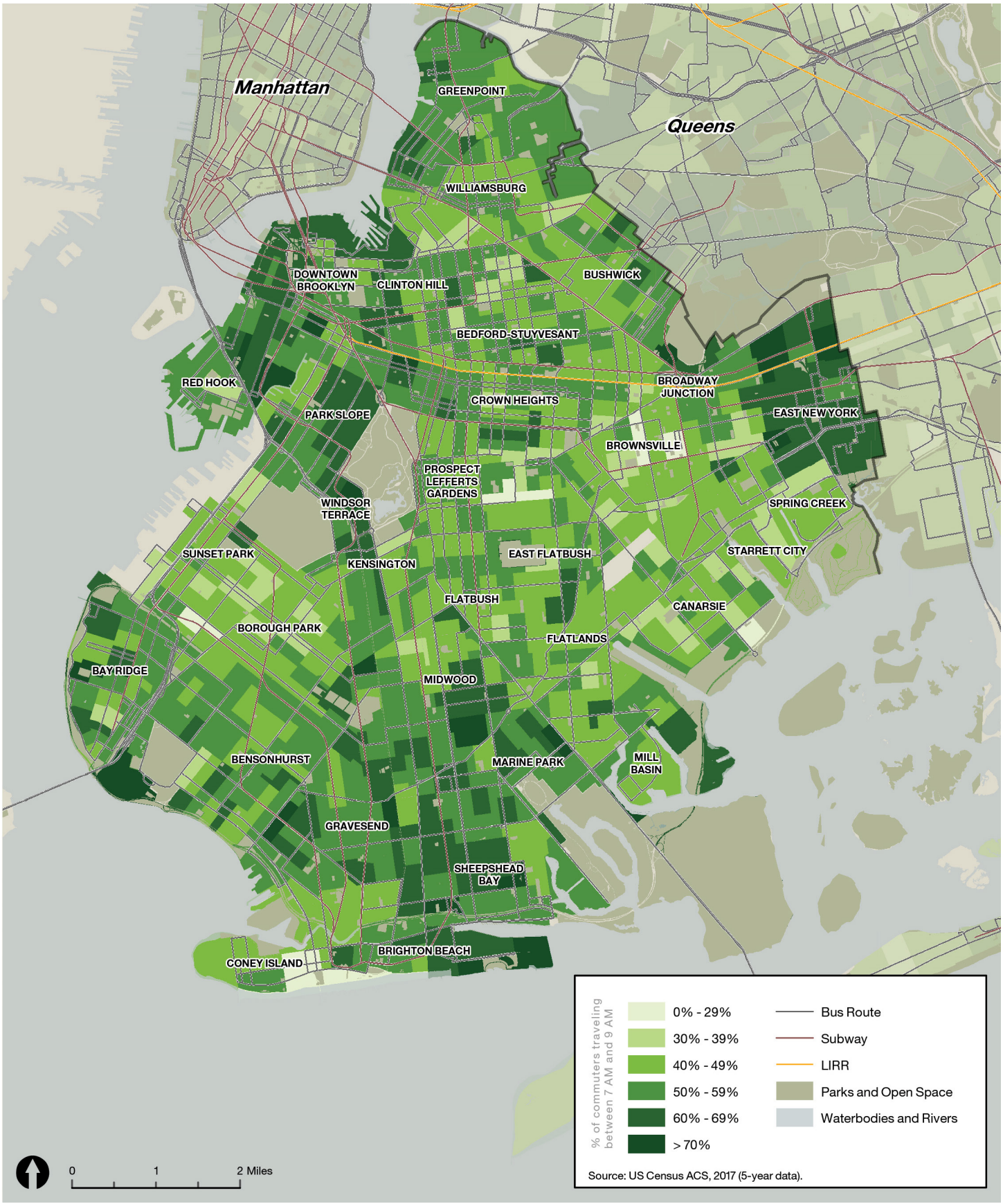
Figure AC.2 shows the percentage of all commutes which occur between 7AM and 9 AM. More detail can be found in **Chapter 3** on page **44**.

Figures AC.3, **AC.4**, and **AC.5** show TNC flows. More detail can be found in **Chapter 2** on page **23**.

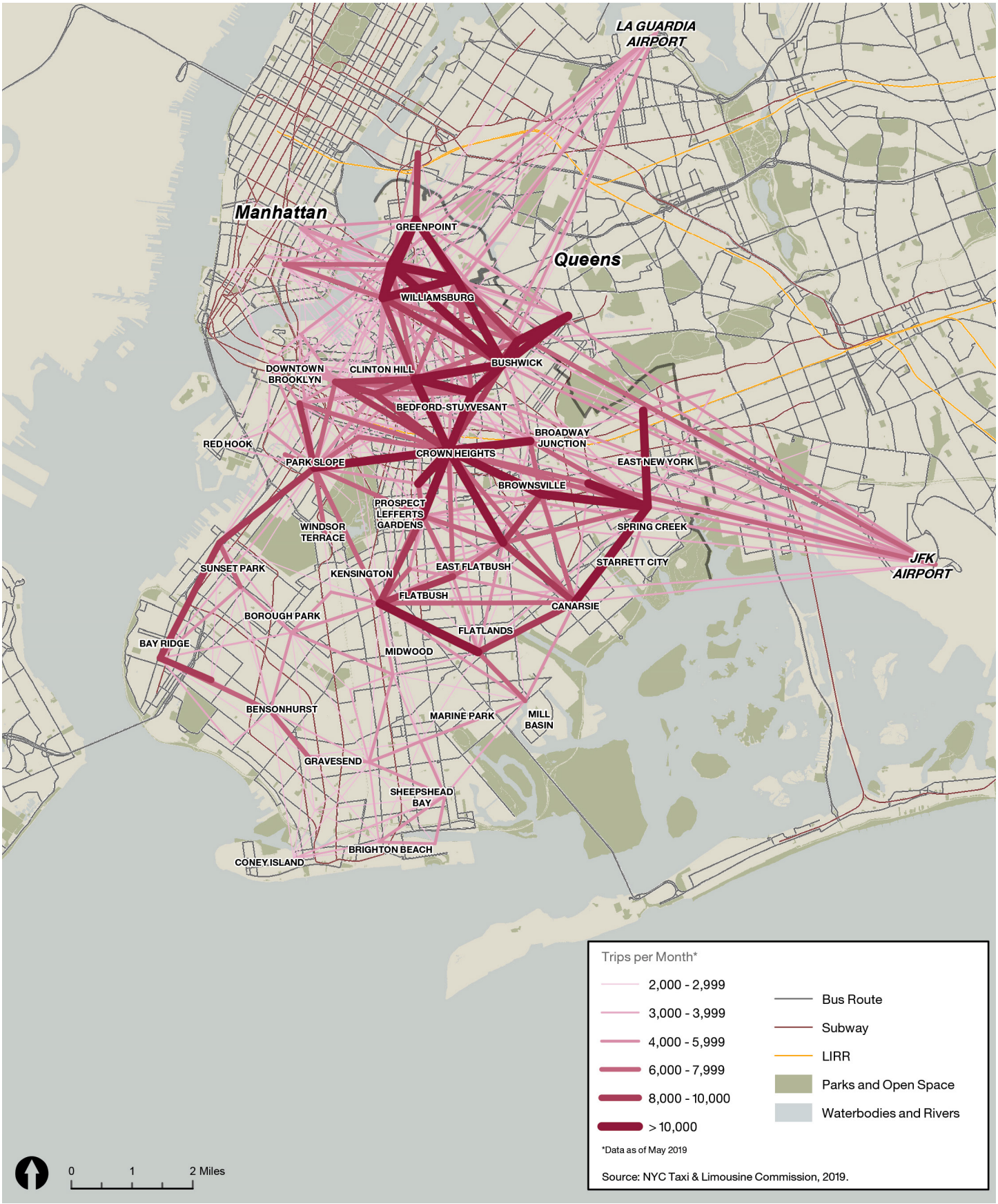
AC.1 Origin and Destination Flows (CTPP)



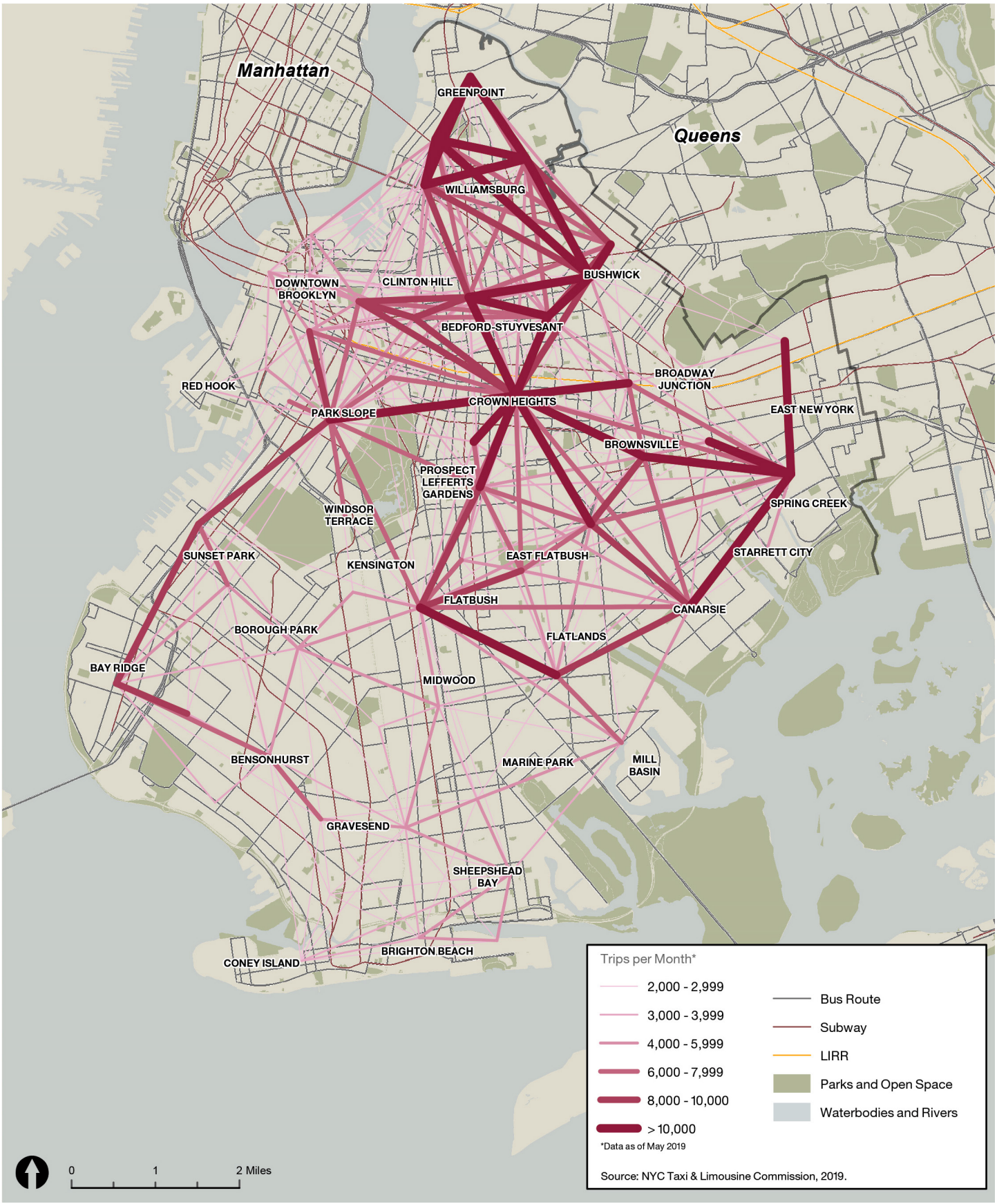
AC.2 Peak Commuters



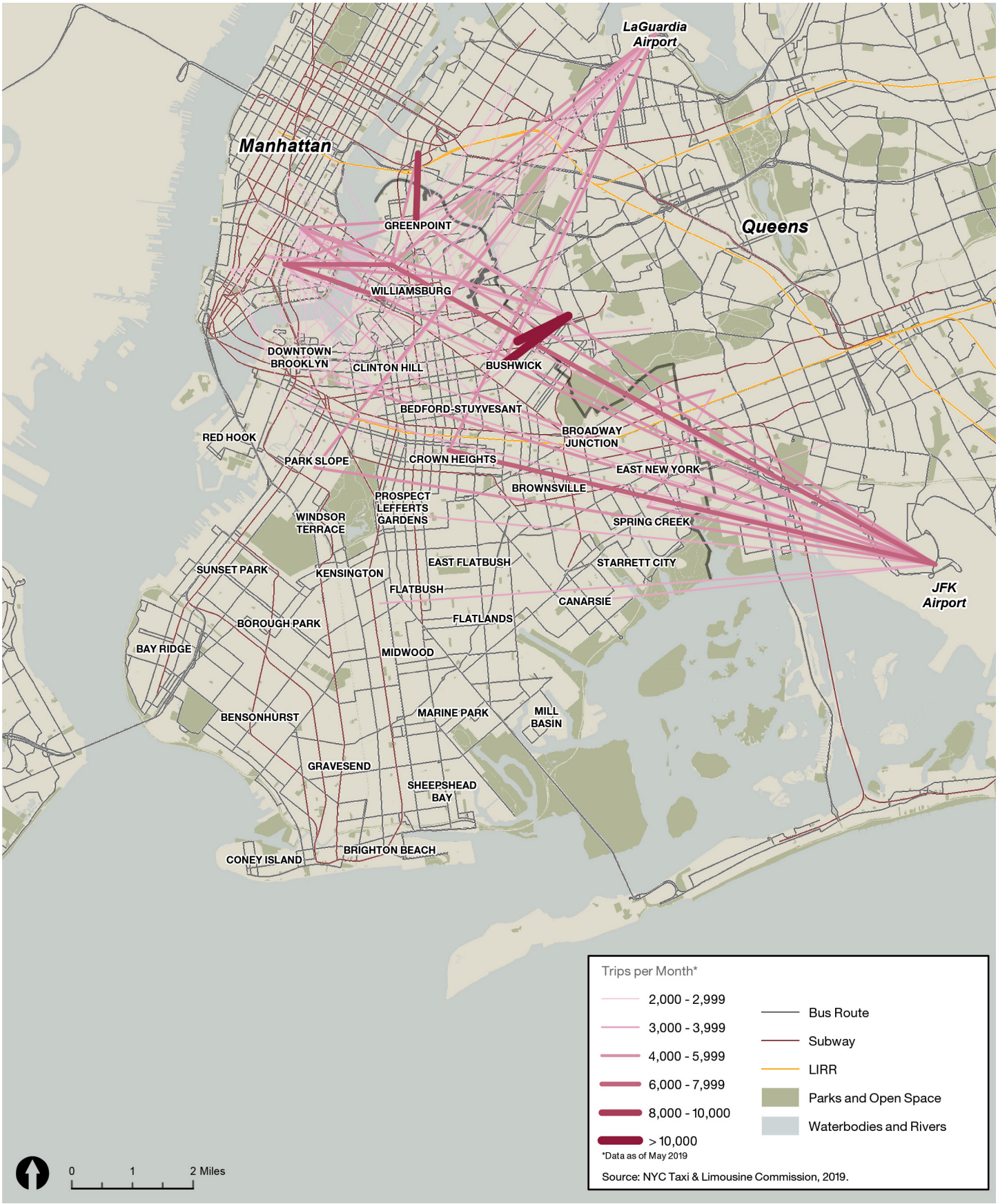
AC.3 TNC OD Flows, All Trips



AC.4 TNC OD Flows Within Brooklyn



AC.5 Interborough TNC OD Flows



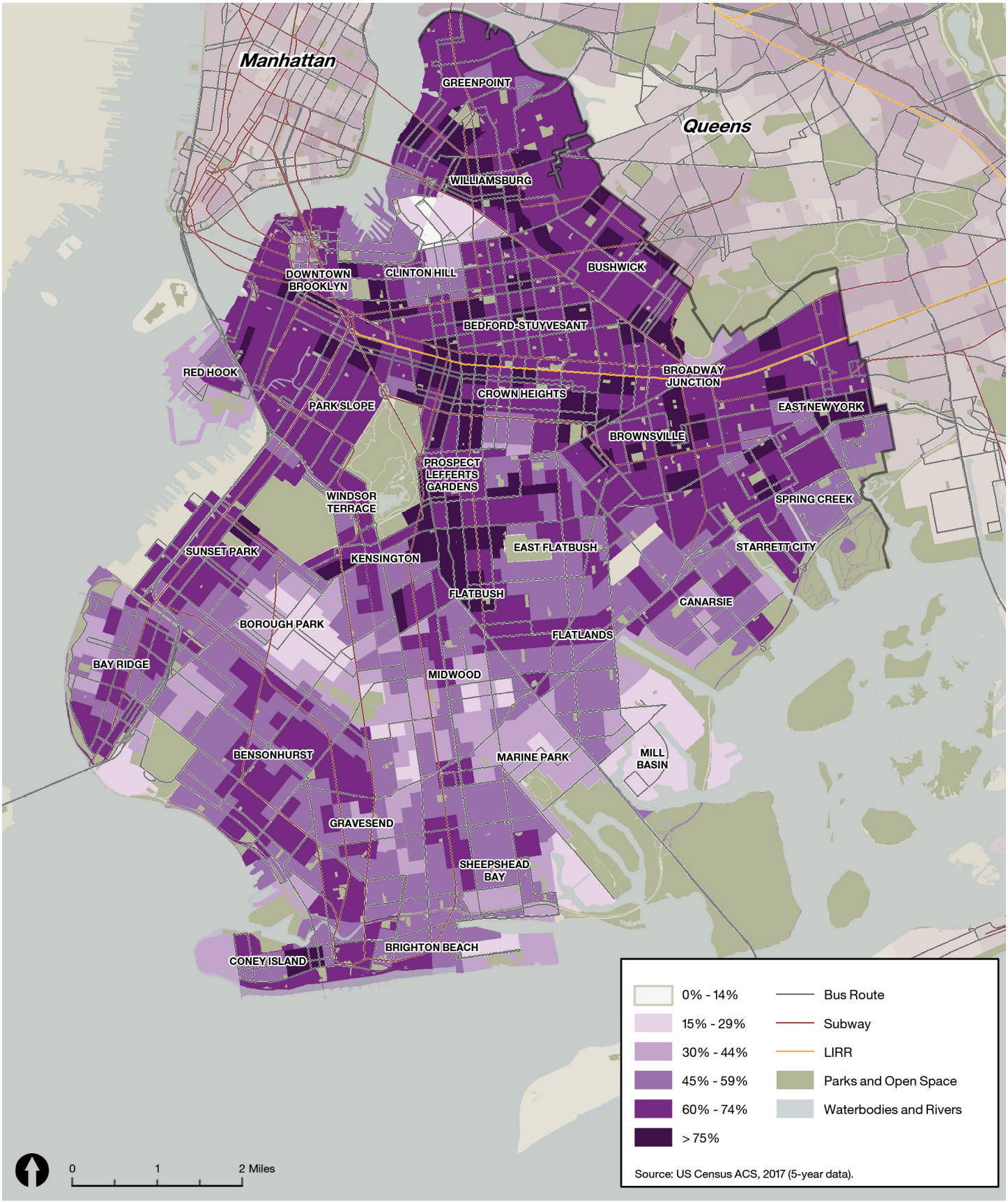
(Appendix D) Additional Bus Ridership Data

Appendix D shows additional information about public transit customers in Brooklyn.

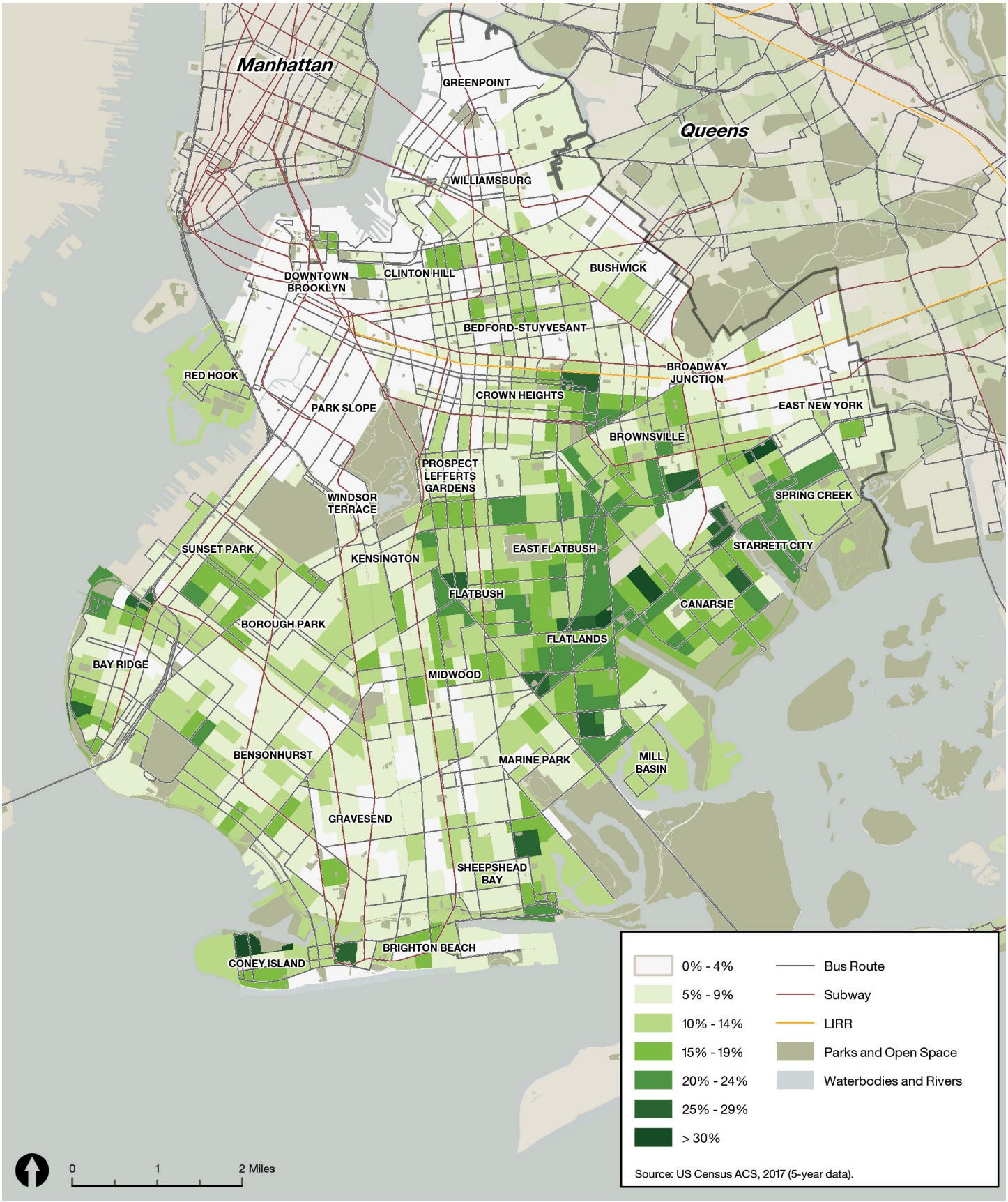
Figure AD.1 shows the percentage of commuters who use public transit, and **Figure AD.2** shows the percentage of commuters who use bus as their primary commuting mode. Further detail can be found in **Chapter 1** on page **4.**

Figure AD.3 shows the few areas of Brooklyn that do not have access to a bus stop within a quarter-mile. Further detail can be found in **Chapter 3** on page **31.**

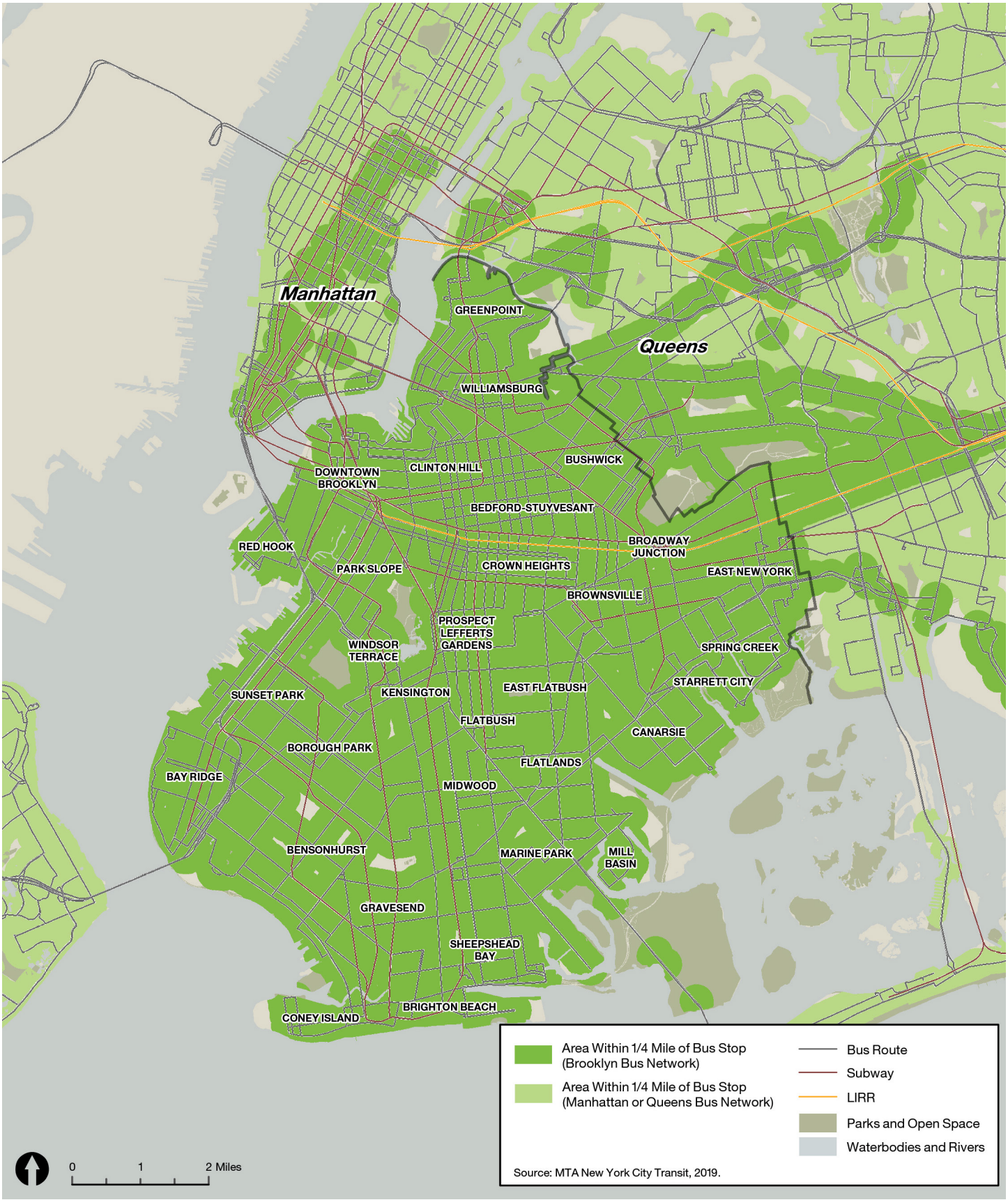
AD.1 Percentage of Residents Commuting to Work by Transit



AD.2 Percentage of Residents Commuting to Work by Bus



AD.3 Bus Stop Walkshed

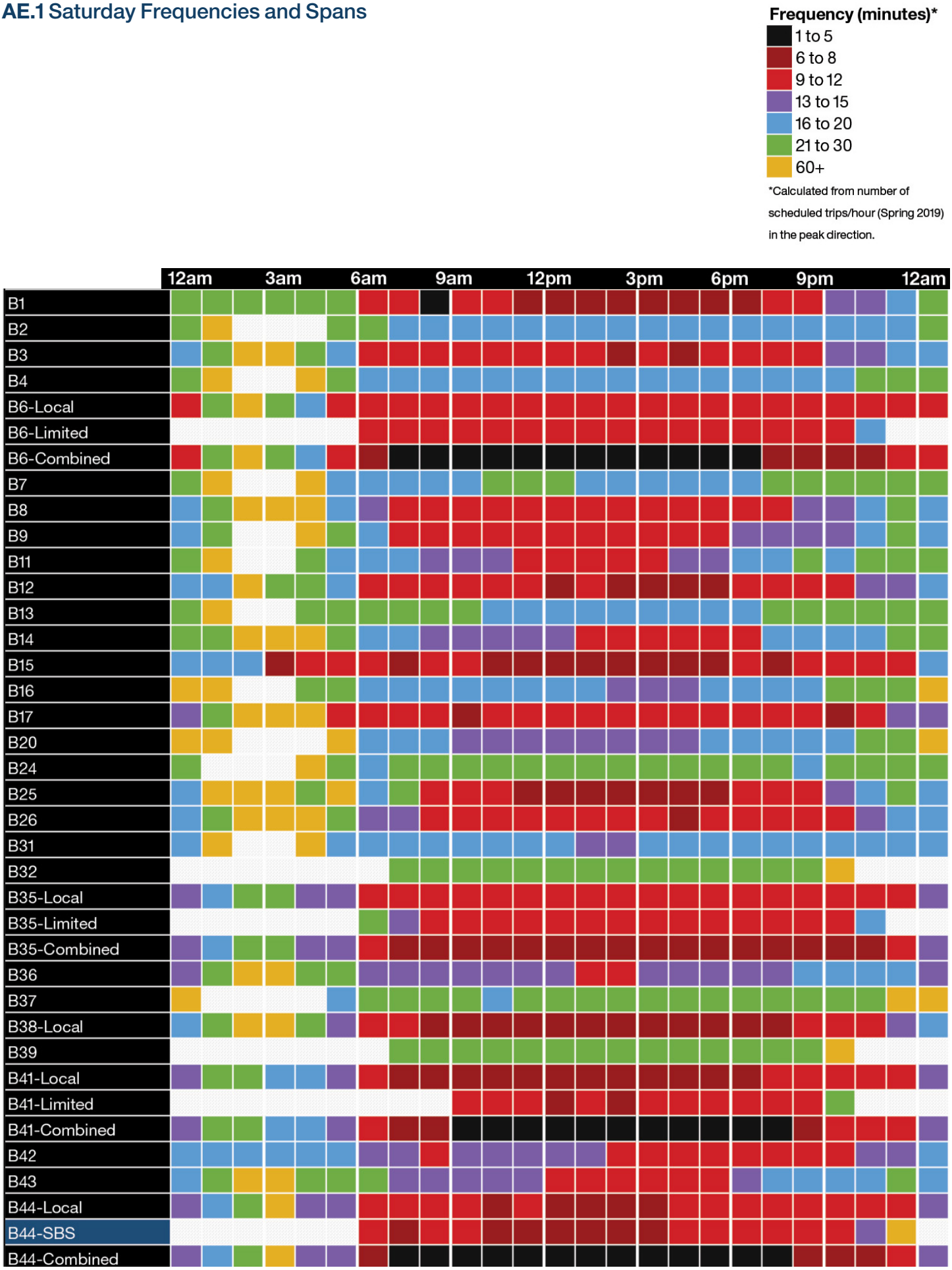


(Appendix E) Additional Bus Frequency Data

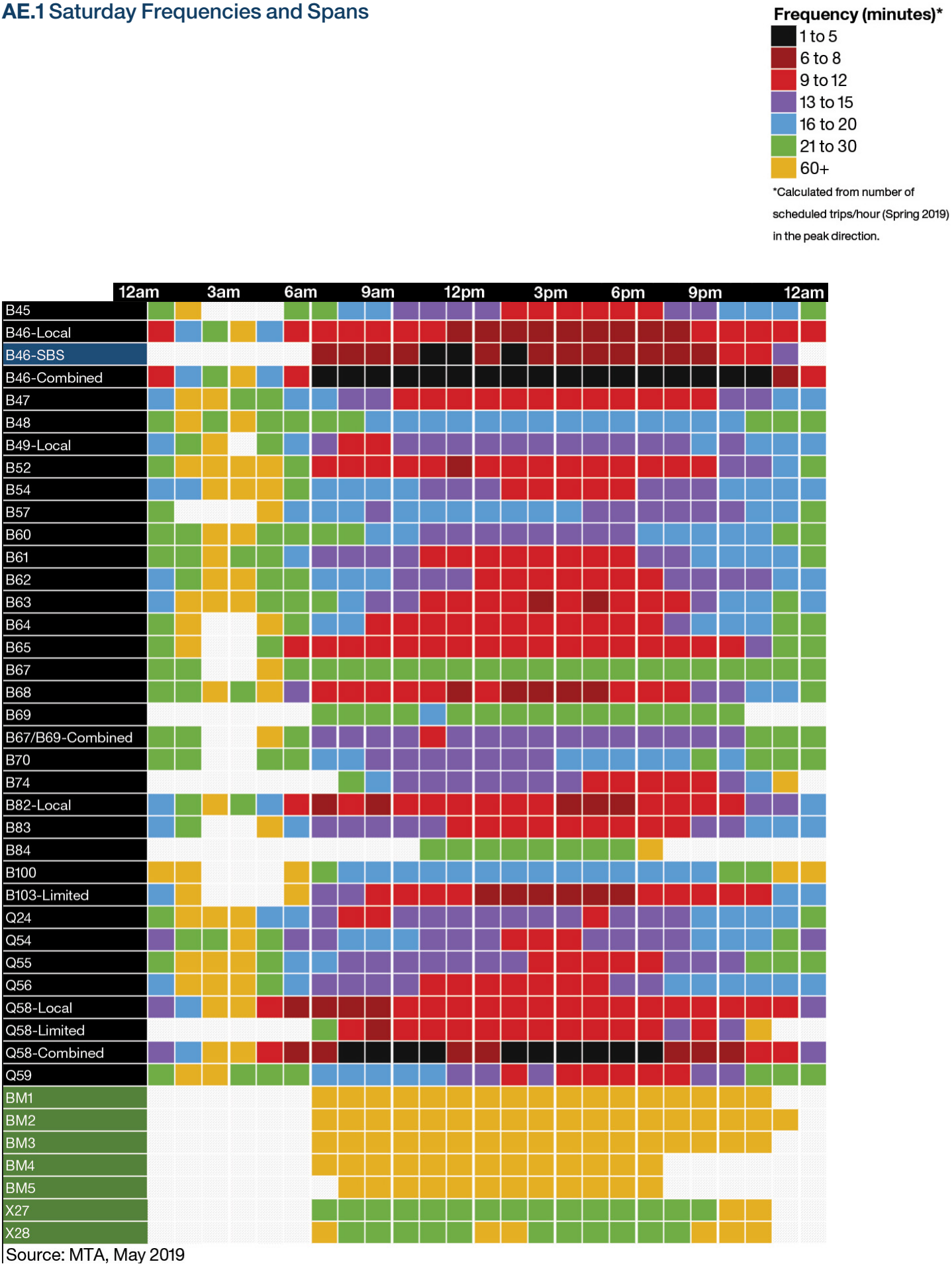
Figure AE.1 shows route frequencies by hour throughout the entire day on Saturdays, with varying colors to represent the frequency, and **Figure AE.2** shows the same for Sundays. The frequency shown is for the most frequent direction for that hour at the busiest point along the route. Routes that share a corridor for a substantial portion of their length (e.g. **B67** and **B69**) are also shown together, to display what the frequency and span are like in the shared section of the corridor.

Figure AE.3 shows the Brooklyn bus routes that operate overnight.

AE.1 Saturday Frequencies and Spans

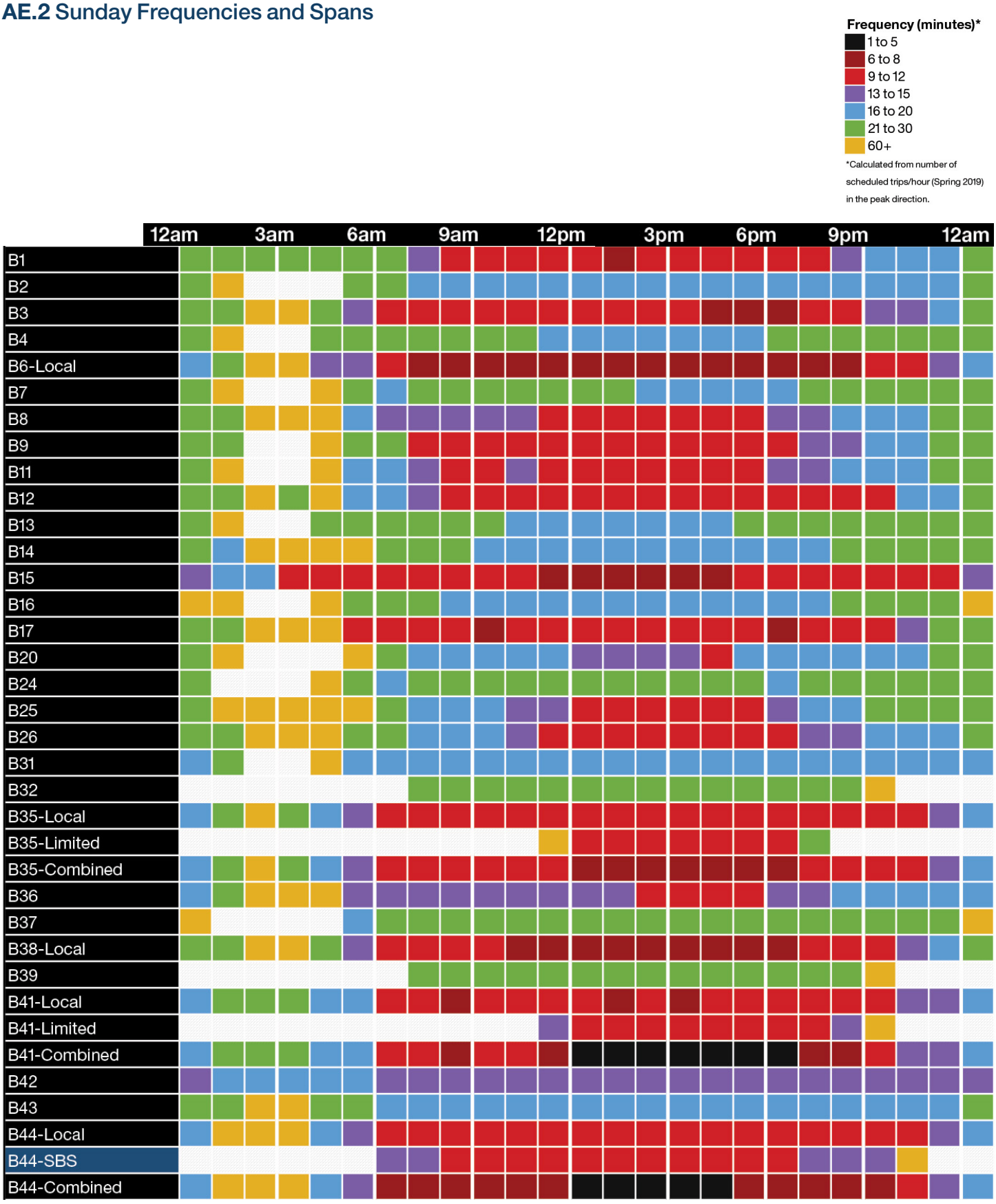


AE.1 Saturday Frequencies and Spans

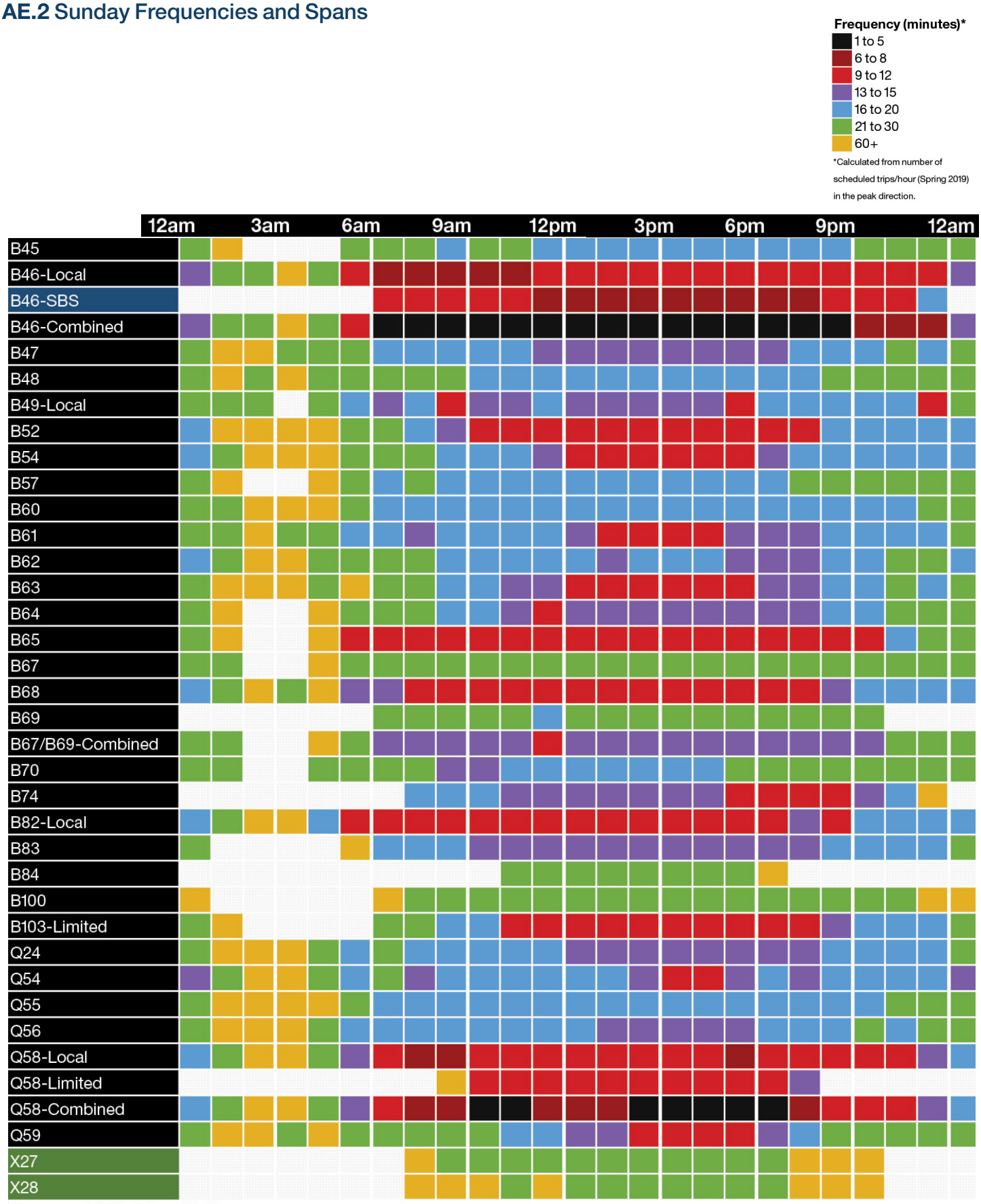


Source: MTA, May 2019

AE.2 Sunday Frequencies and Spans

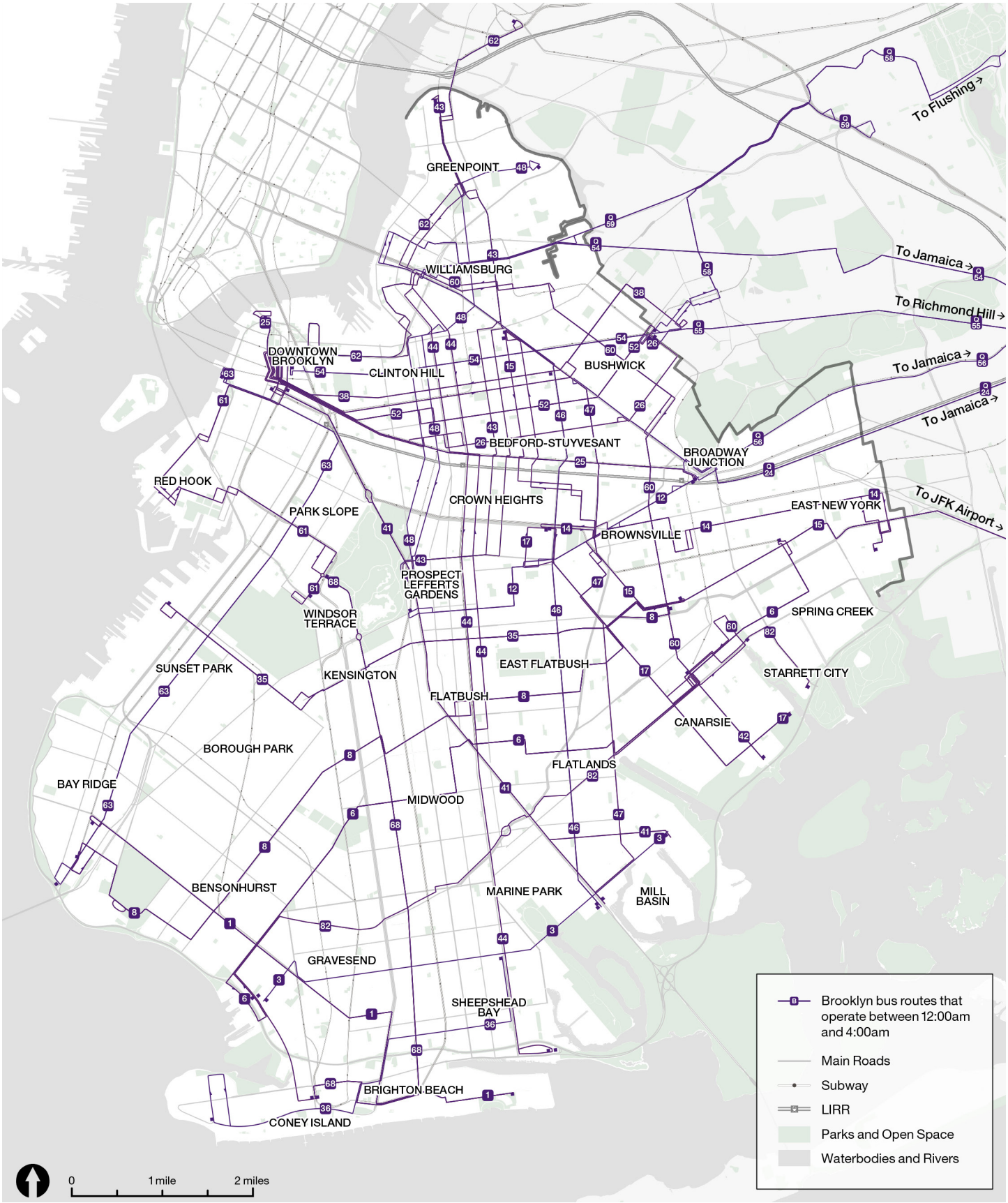


AE.2 Sunday Frequencies and Spans



Source: MTA, May 2019

AE.3 Overnight Bus Network Map

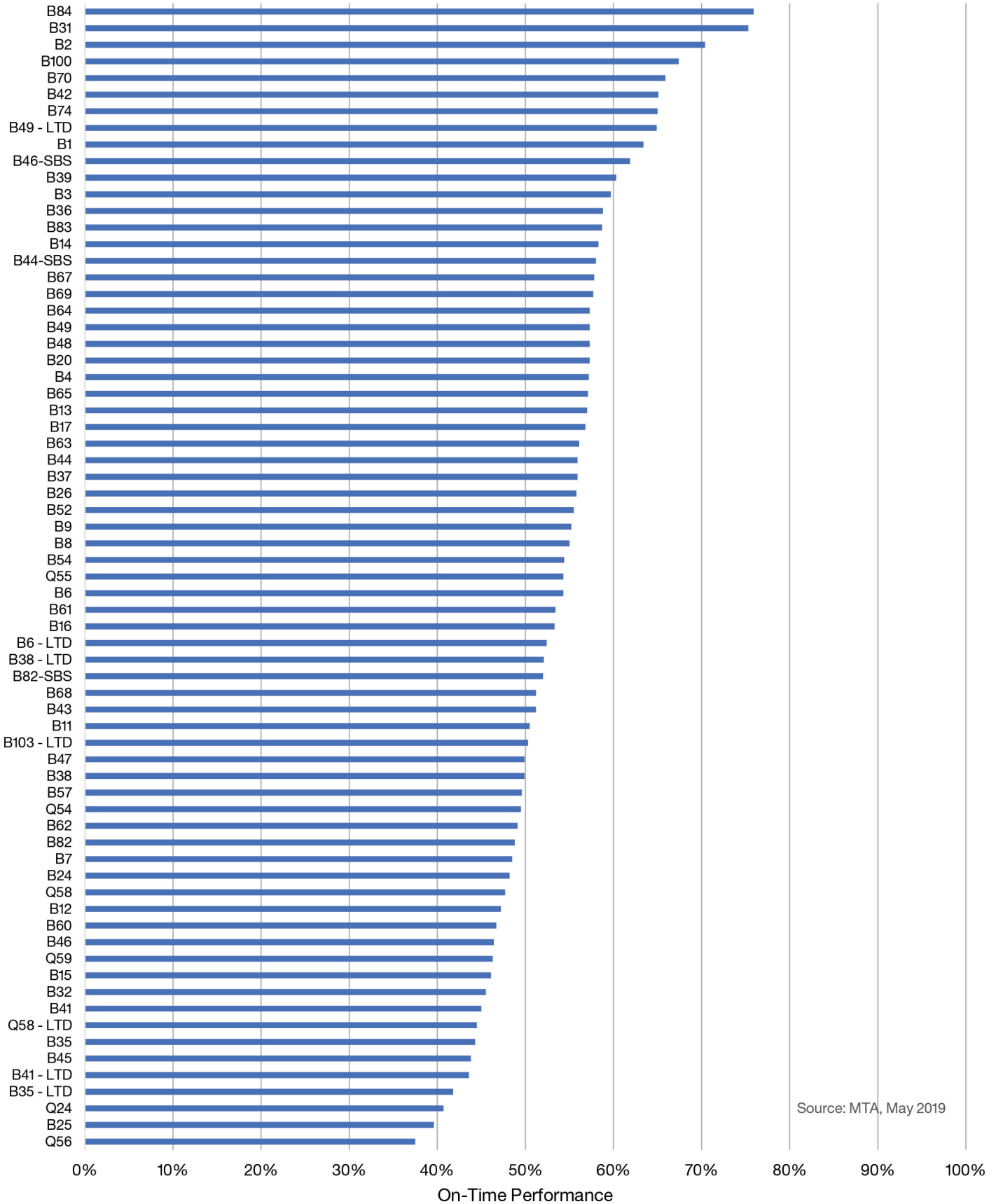


(Appendix F) Additional Bus Perfromance Data

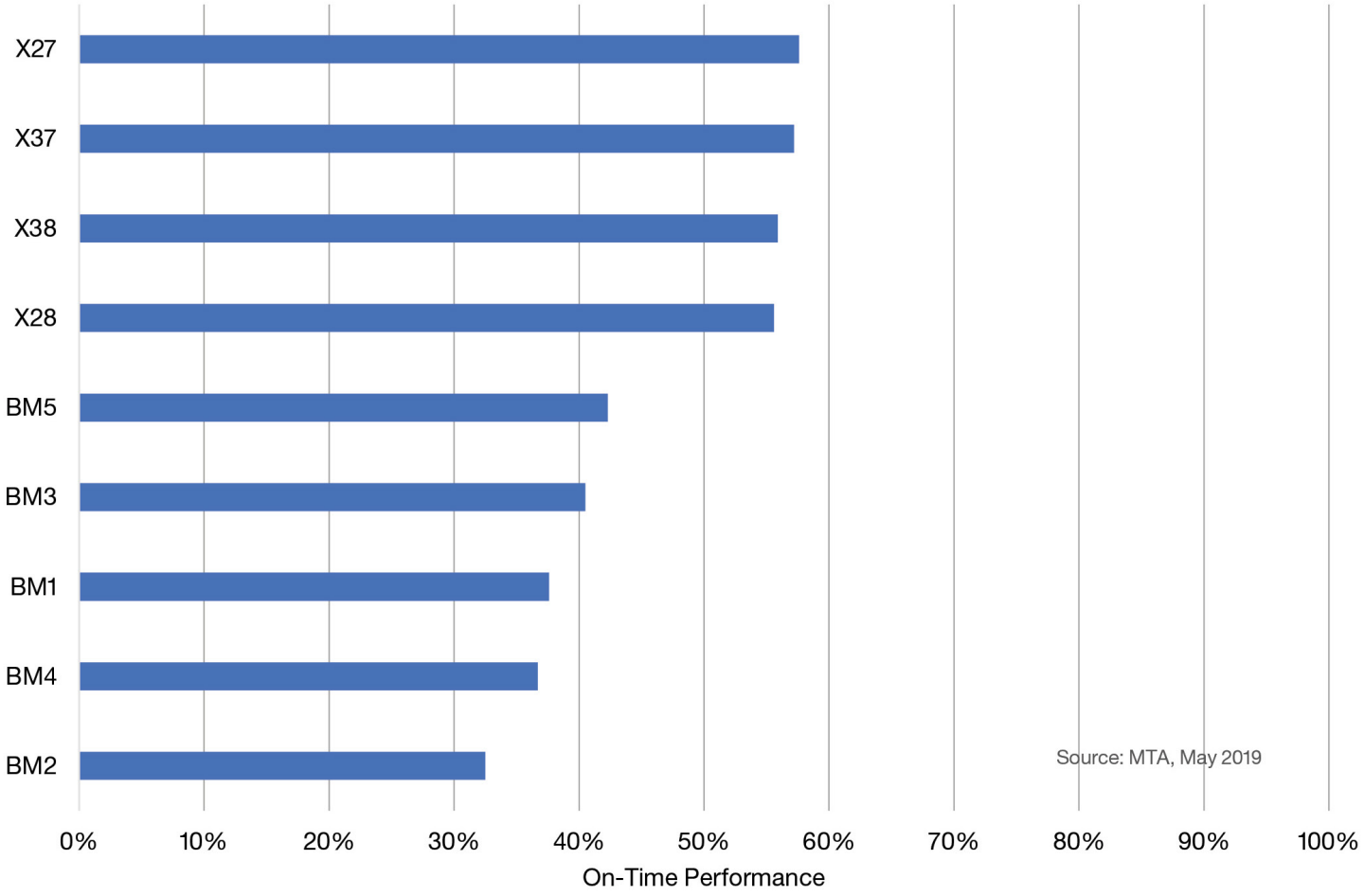
On-time performance is a reliability metric that measures how well a bus route performs compared to its schedule. On-time performance is defined as the percentage of buses that are between one minute early and five minutes late as compared to the schedule at specific locations along the route defined for evaluating punctuality.

The average on-time performance for Brooklyn local, limited, and SBS routes is 52 percent, and the average for express routes is 58 percent. **Figures AF.1** and **AF.2** show on-time performance by route.

AF.1 On-Time Performance – Local



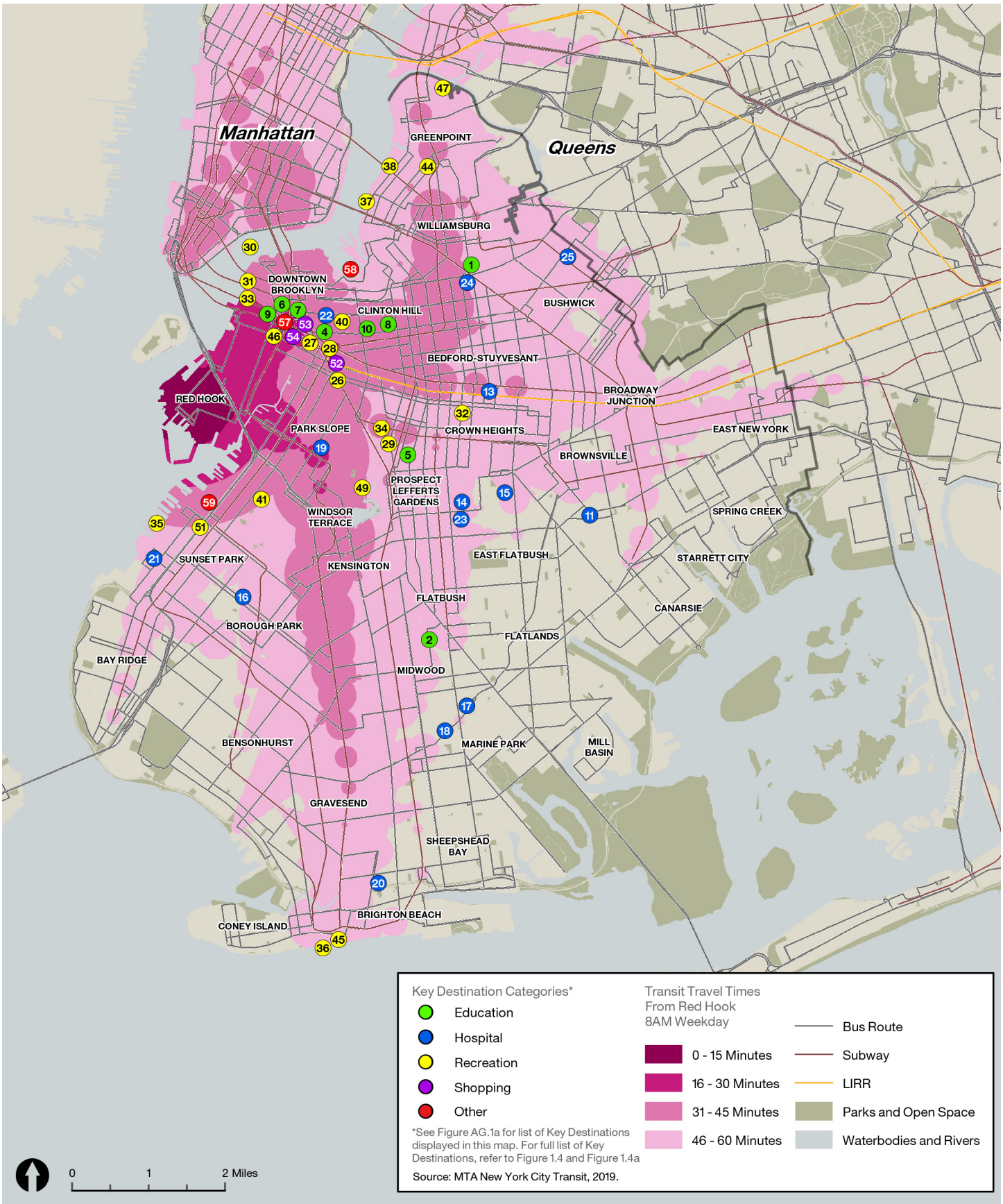
AF.2 On-Time Performance – Express



(Appendix G) Additional Bus Connectivity Data

Figures AG.1 and **AG.2** show isochrones for Red Hook and Spring Creek that incorporate both the bus and subway networks. For further explanation of isochrones, see page **68** in **Chapter 3.**

AG.1 Sample Transit Travel Times from Red Hook



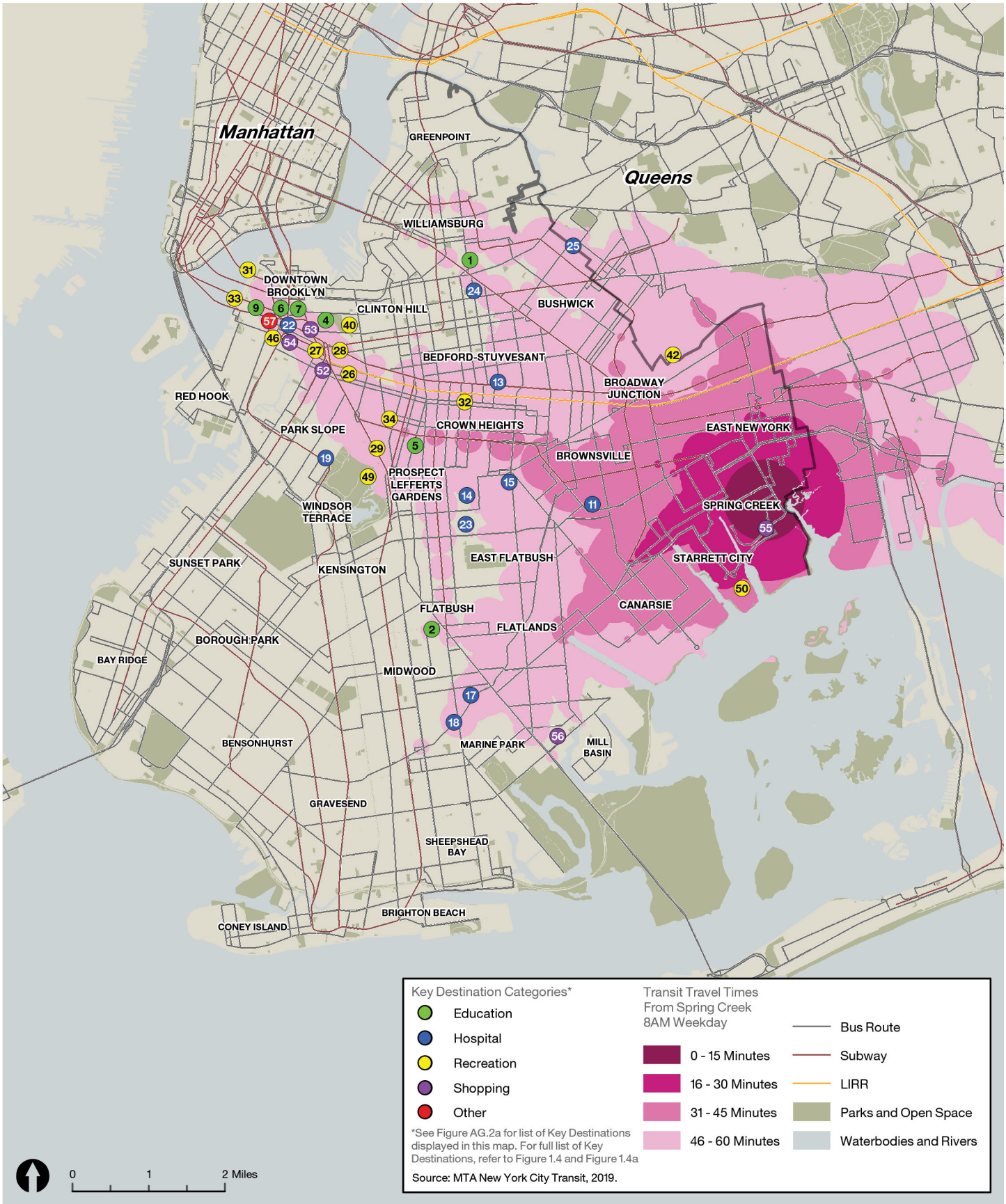
AG.1a Key Destinations Legend (Red Hook)

Education	
Map ID #	**Name**
1	Boricua College
2	Brooklyn College
4	Long Island University Brooklyn
5	Medgar Evers College
6	New York City College of Technology
7	New York University Tandon School of Engineering
8	Pratt Institute
9	St. Francis College
10	St. Joseph's College New York
Hospitals	
Map ID #	**Name**
11	Brookdale Hospital Medical Center
13	Interfaith Medical Center
14	Kings County Hospital
15	Kingsbrook Jewish Medical Center
16	Maimonides Medical Center
17	Mount Sinai Brooklyn
18	New York Community Hospital
19	NewYork-Presbyterian Brooklyn Methodist Hospital
20	NYC Health + Hospitals/Coney Island
21	NYU Langone Hospital - Brooklyn
22	The Brooklyn Hospital Center
23	University Hospital-SUNY Downstate
24	Woodhull Medical and Mental Health Center
25	Wyckoff Heights Medical Center
Recreation	
Map ID #	**Name**
26	Barclays Center
27	BRIC
28	Brooklyn Academy of Music
29	Brooklyn Botanic Garden
30	Brooklyn Bridge
31	Brooklyn Bridge Park
32	Brooklyn Children's Museum
33	Brooklyn Heights Promenade
34	Brooklyn Museum
35	Bush Terminal Piers Park
36	Coney Island Beach & Boardwalk
37	Domino Park
38	East River State Park
40	Fort Greene Park
41	Green-Wood Cemetery
44	McCarren Park
45	New York Aquarium
46	New York Transit Museum
47	Newtown Creek Nature Walk

AG.1a Key Destinations Legend (Red Hook) ...continued

49	Prospect Park
51	Sunset Park
Shopping	
Map ID #	**Name**
52	Atlantic Terminal Mall
53	City Point BKLYN
54	Fulton Mall
Other	
Map ID #	**Name**
57	Brooklyn Borough Hall
58	Brooklyn Navy Yard
59	Industry City

AG.2 Sample Transit Travel Times from Spring Creek



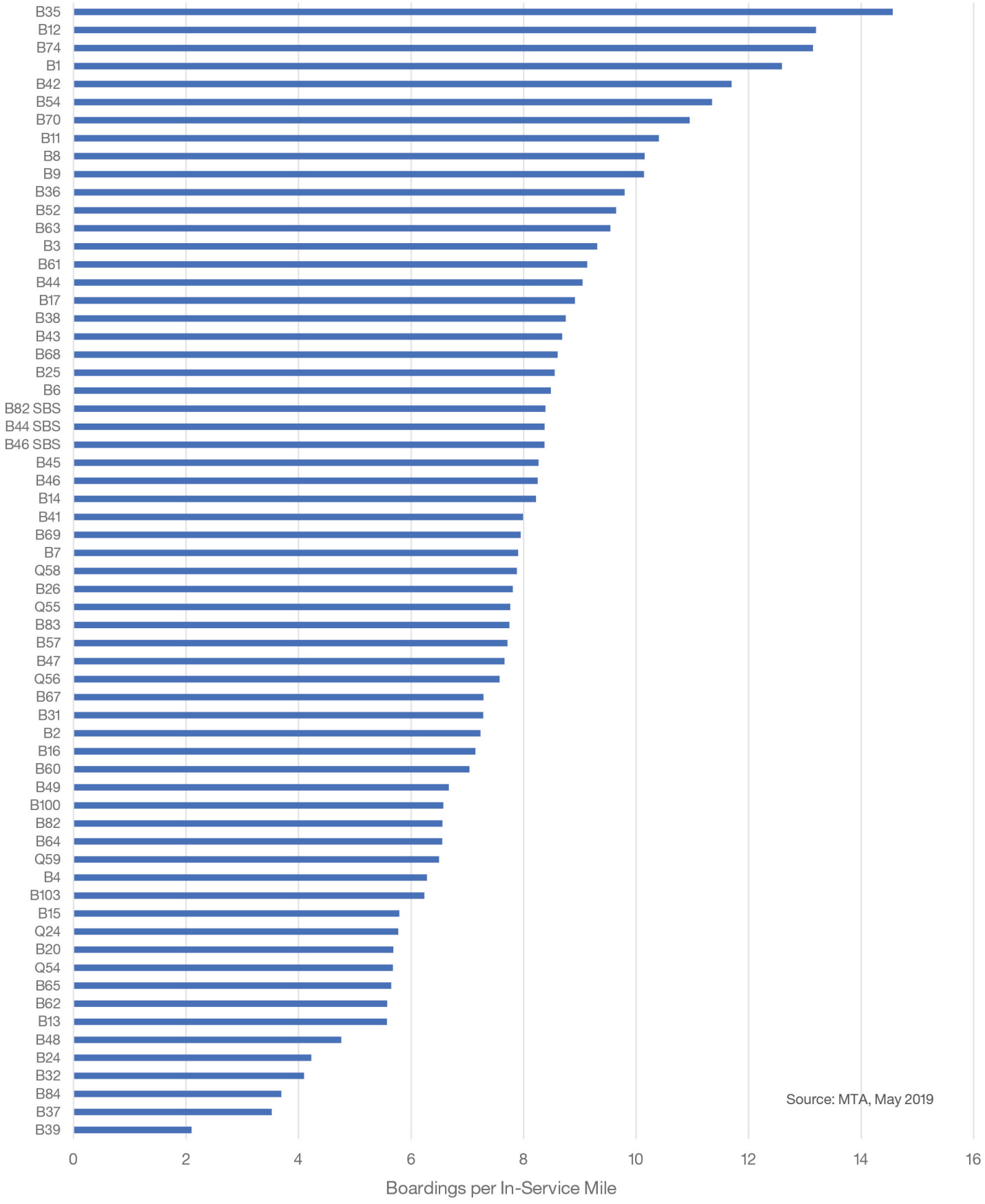
AG.2a Key Destinations Legend (Spring Creek)

Education	
Map ID #	**Name**
1	Boricua College
2	Brooklyn College
4	Long Island University Brooklyn
5	Medgar Evers College
6	New York City College of Technology
7	New York University Tandon School of Engineering
9	St. Francis College
Hospitals	
Map ID #	**Name**
11	Brookdale Hospital Medical Center
13	Interfaith Medical Center
14	Kings County Hospital
15	Kingsbrook Jewish Medical Center
17	Mount Sinai Brooklyn
18	New York Community Hospital
19	New York-Presbyterian Brooklyn Methodist Hospital
22	The Brooklyn Hospital Center
23	University Hospital SUNY Downstate
24	Woodhull Medical and Mental Health Center
25	Wyckoff Heights Medical Center
Recreation	
Map ID #	**Name**
26	Barclays Center
27	BRIC
28	Brooklyn Academy of Music
29	Brooklyn Botanic Garden
31	Brooklyn Bridge Park
32	Brooklyn Children's Museum
33	Brooklyn Heights Promenade
34	Brooklyn Museum
40	Fort Greene Park
42	Highland Park
46	New York Transit Museum
49	Prospect Park
50	Shirley Chisholm State Park
Shopping	
Map ID #	**Name**
52	Atlantic Terminal Mall
53	City Point BKLYN
54	Fulton Mall
55	Gateway Center
56	Kings Plaza
Other	
Map ID #	**Name**
57	Brooklyn Borough Hall

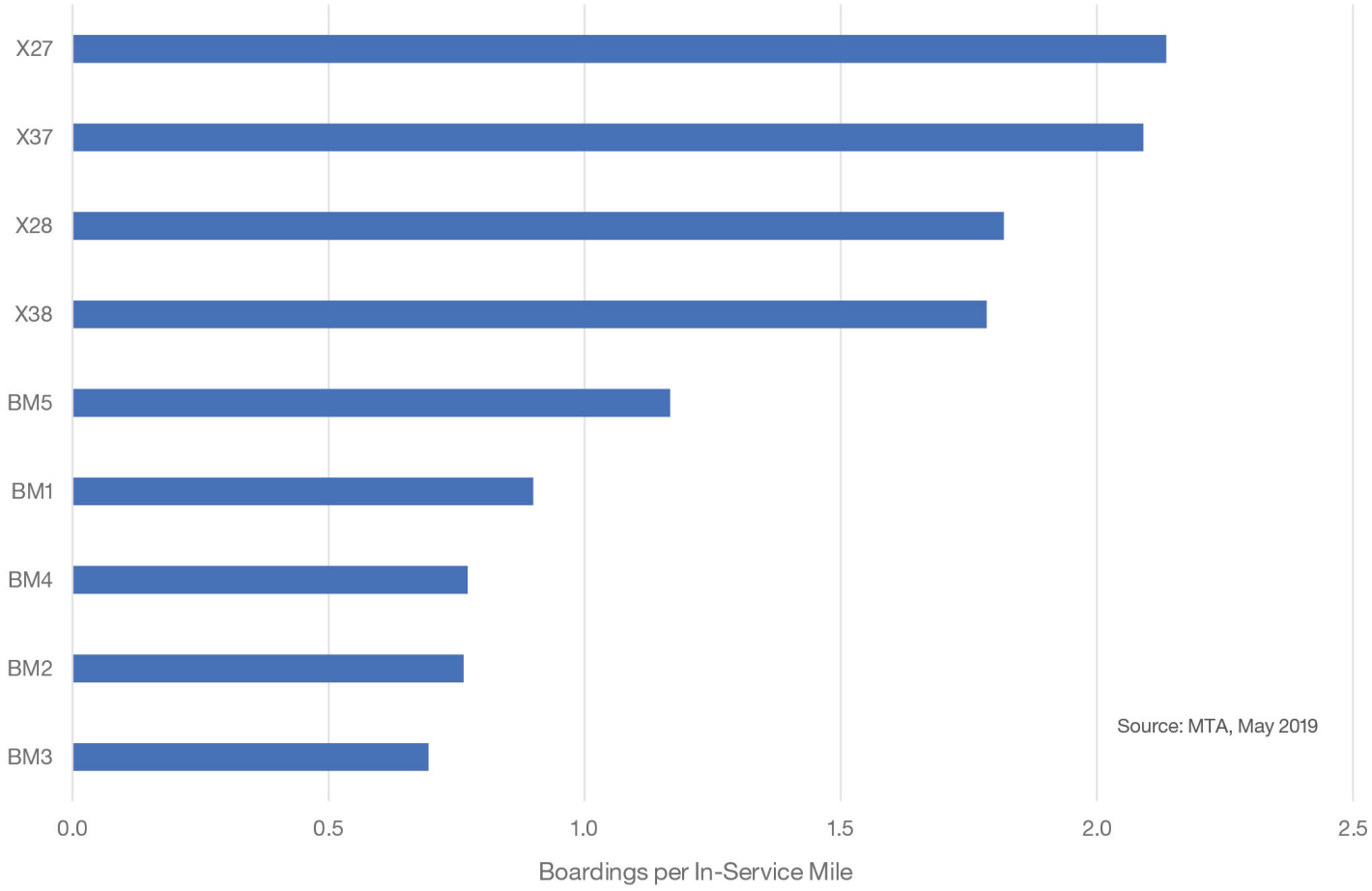
(Appendix H) Additional Bus Productivity Data

Productivity is a metric that helps track the goal of maximizing ridership. In addition to measuring productivity by in-service hour, as seen on page **78** in **Chapter 3**, productivity can also be measured by tracking boardings per in-service mile. Routes that are particularly slow, such as the **B35** and **B12**, appear more productive by this metric as they are covering fewer miles per hour out on the street. **Figures AH.1** and **AH.2** show boardings per in-service mile for local, Limited, and SBS routes, and for express routes.

AH.1 Weekday Route Productivity (Boardings per In-Service Mile) – Local



AH.2 Weekday Route Productivity (Boardings per In-Service Mile) - Express



(Appendix I) Route Profiles

HOW TO READ A ROUTE PROFILE

Route Characteristics:

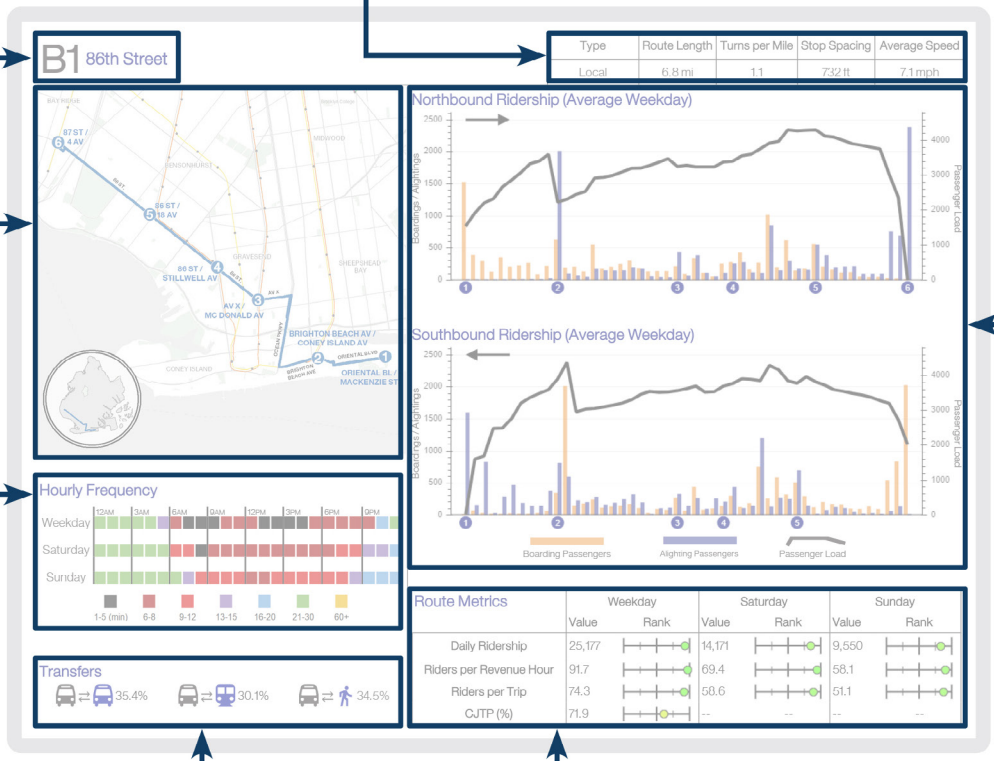
- **Route Type** – indicates whether the route is Local, Limited, Select Bus Service (SBS), or Express.
- **Route Length** – the route's one-way mileage.
- **Turns per Mile** – the average turns per mile along the route.
- **Stop Spacing** – the average distance between any two sequential stops along the route, excluding non-stop segments on Express routes. If a route has both Local and Limited trips, only the Local stop spacings are considered.
- **Average Speed** – the average weekday travel speed for the route.

Ridership Charts*: shows average weekday ridership by stop (boarding and alighting) and passenger load estimates.**

- Charts show the most common route variant and major branches.
- Figures along the x-axis correspond to the timepoints displayed on the route map.
- Passenger boardings and alighting are shown in bars, corresponding to the left Y-axis.
- Passenger loads (the number of people on the bus at once) are shown in continuous line charts, corresponding to the right Y-axis.

Route Name and Descriptor

Route Map: displays the route travel path and timepoints which correspond to the ridership charts.



Frequency Chart: shows the scheduled headway of the route by hour, for weekdays, Saturdays, and Sundays (see key below the chart).

Transfer Chart*: shows the proportion of transferring passengers to/from other bus routes, to/from the subway, and non-transferring passengers.

Route Metrics*: displays key performance indicators for weekdays, Saturdays and Sundays.

The quartile charts specify the route's rank in each indicator, as compared to all other routes in the Brooklyn bus network; the median (50th percentile) is represented by the middle tick marks, best-performing routes are placed at the right portion of the charts, and worst-performing routes are to the left.

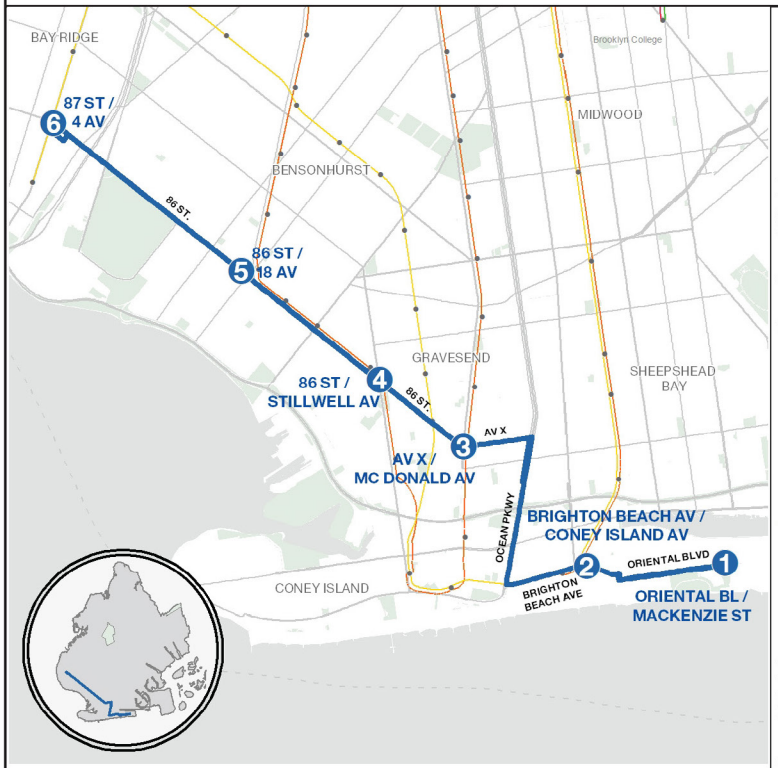
- **Daily Ridership** – the average daily number of unlinked passenger boardings. "Unlinked" means that one person may be counted more than once, for example if they make a round trip over the course of the day.
- **Riders per Revenue Hour** – measures the number of unlinked passenger boardings generated for each hour a bus is in service.
- **Riders per Trip** – measures the number of unlinked passenger boardings generated for each trip operated in service.
- **CJTP (Customer Journey Time Performance)** – the percentage of customers whose trips are completed within five minutes of the scheduled time. CJTP considers both how long customers wait at the bus stop beyond what they would have if their bus arrived on time, as well as how long customers spend on the bus beyond what they would have if the bus completed its trip in the time allotted in the schedule.

* All data is from the MTA and is from May 2019.

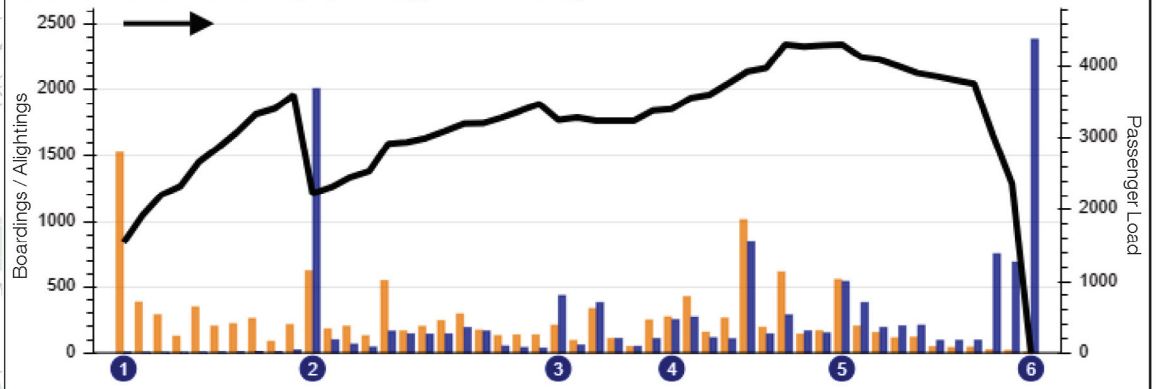
** All boarding, alighting, and loading estimates are derived from the NYCT Bus Ridership Model. The model accounts for MetroCard fare registrations and GPS data on bus locations; it has been calibrated to match observed conditions, considering fare evasion, children under 44", and other riders not paying with MetroCard. As with all models, some inherent uncertainty and ridership activity may diverge from what is observed, particularly at the individual stop level. This is due to the 6-minute interval for MetroCard transaction data downloads, as many stops are closer than 6 minutes apart. Boarding, alighting, and loading estimates at or near terminals may be subject to further uncertainty, as riders may board before an operator turns on bus and sets the farebox for the departure trip.

B1 86th Street

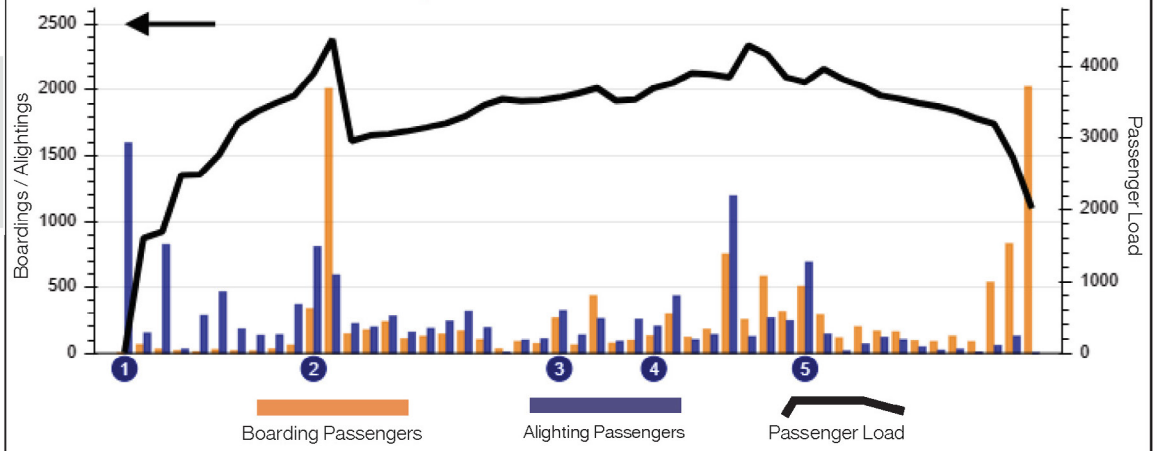
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.8 mi	1.1	732 ft	7.1 mph



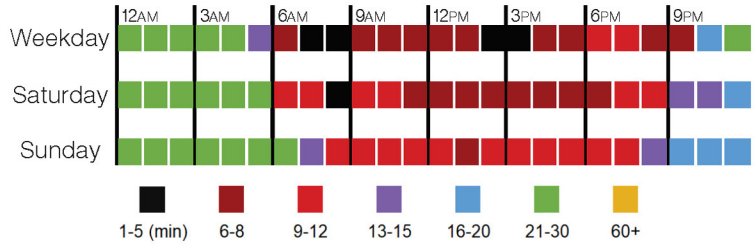
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

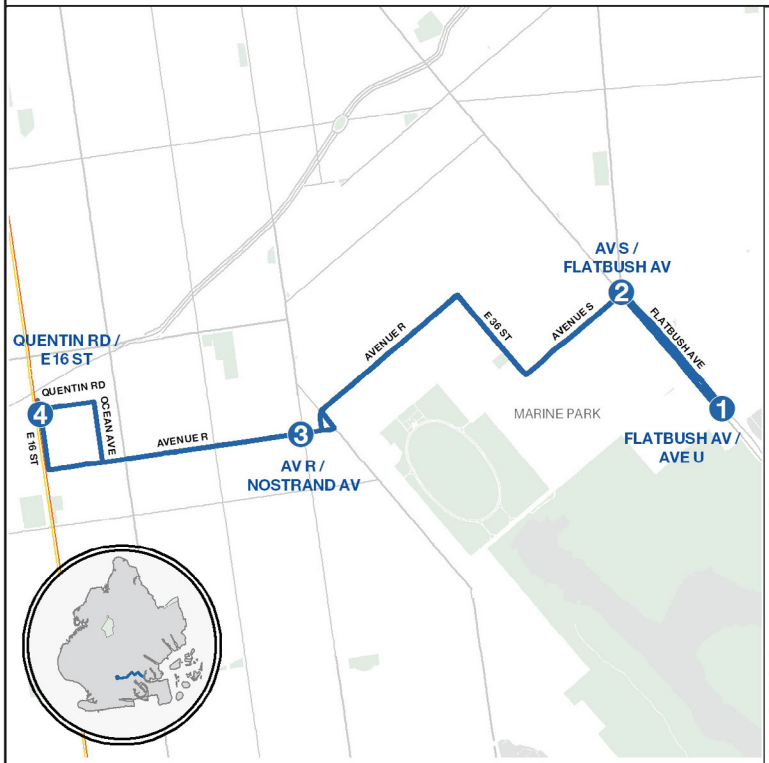
35.5% 30.1% 34.4%

Route Metrics

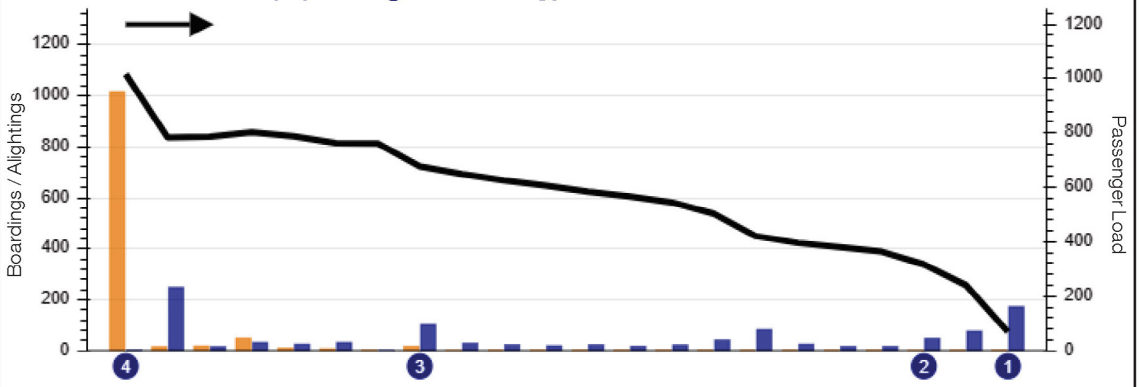
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	25,177		14,171		9,550	
Riders per Revenue Hour	91.7		69.4		58.1	
Riders per Trip	74.3		58.6		51.1	
CJTP (%)	75.2		--	--	--	--

B2 Avenue R / Flatbush Avenue

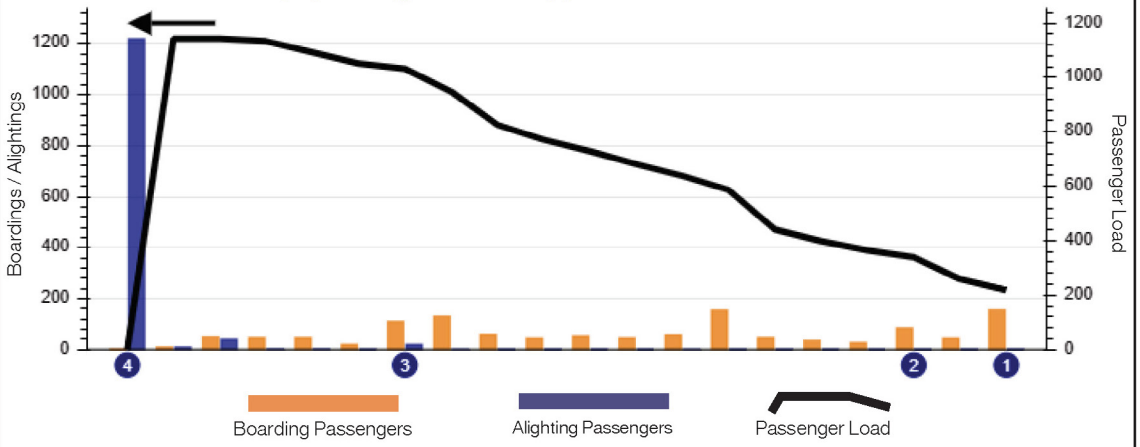
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	2.6 mi	2.9	682 ft	8.6 mph



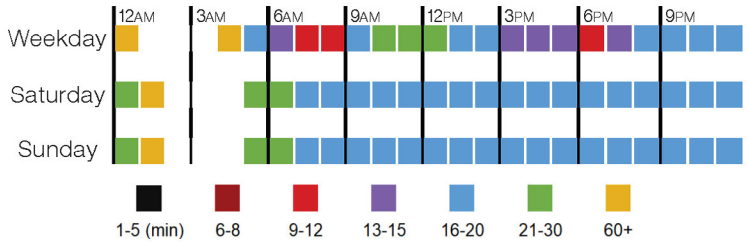
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

19.2% 71.1% 9.7%

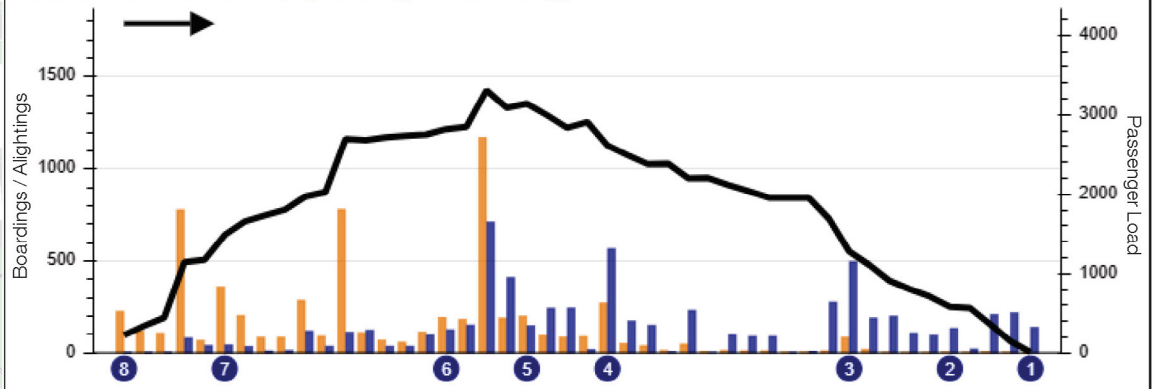
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	2,351		1,168		906	
Riders per Revenue Hour	58.9		40.6		31.5	
Riders per Trip	18.7		10.2		7.9	
CJTP (%)	85.1		--	--	--	--

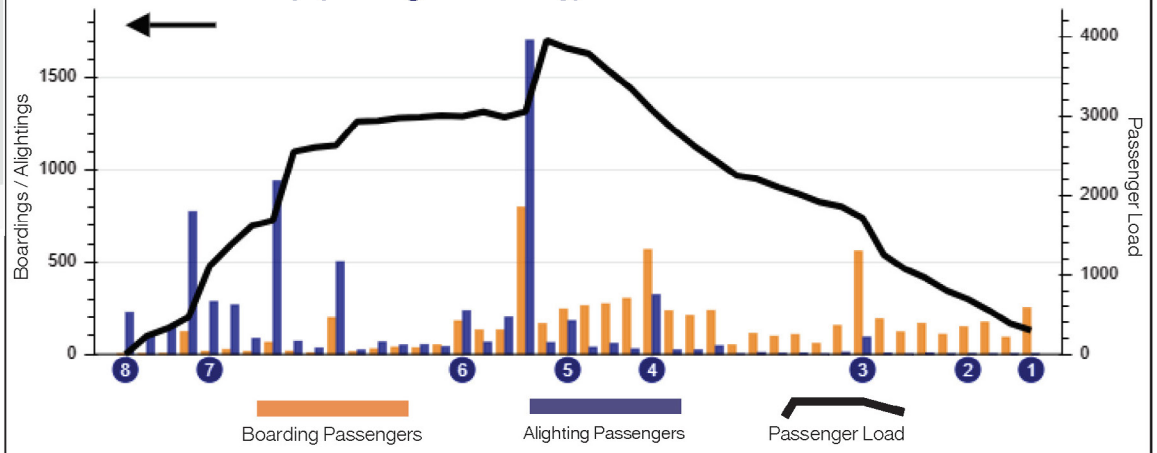
B3 Avenue U

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	5.3 mi	0.7	641 ft	6.8 mph

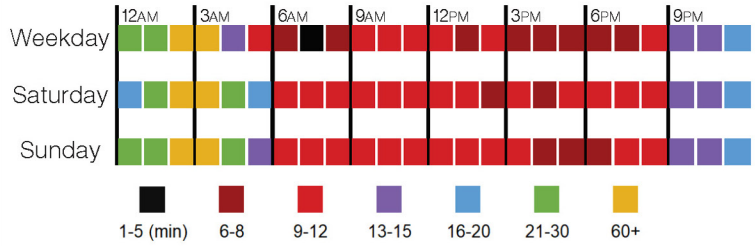
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



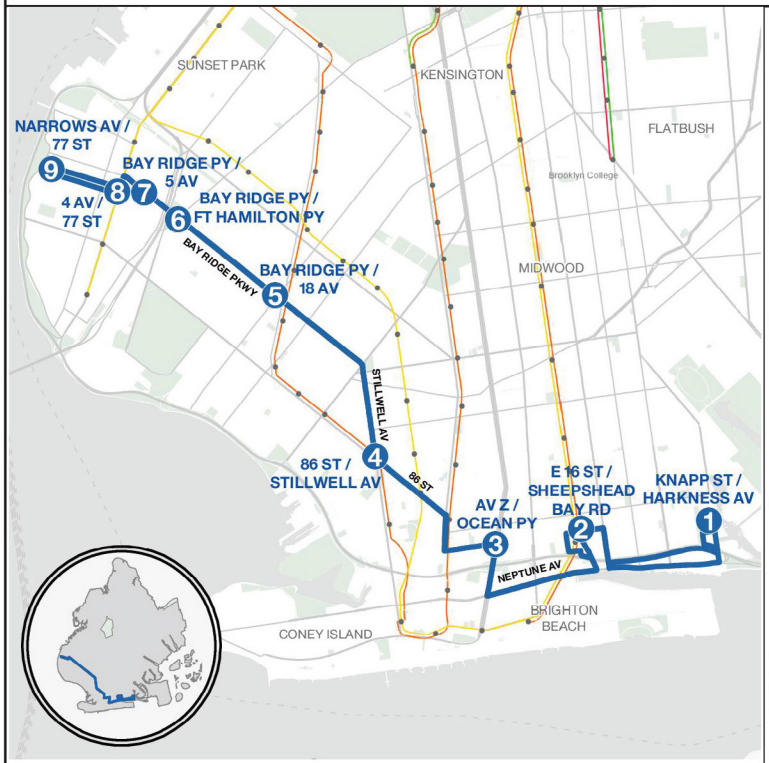
Transfers

Route Metrics

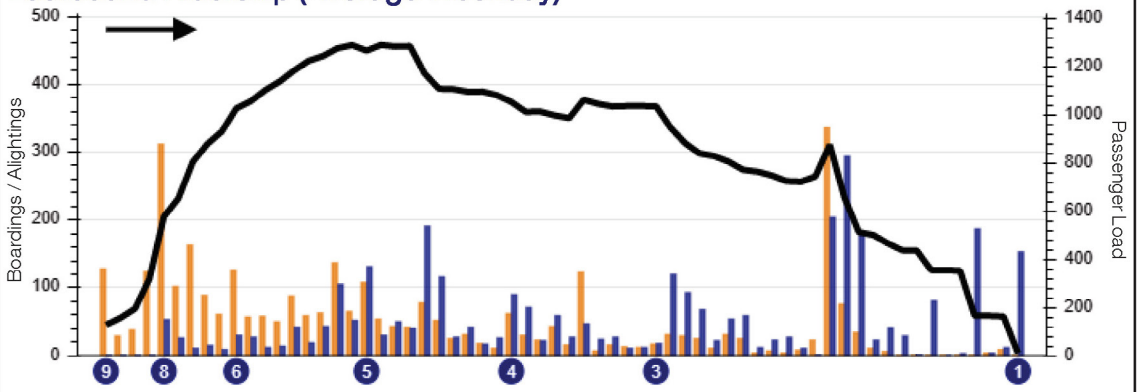
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	13,004		10,263		7,814	
Riders per Revenue Hour	65.7		65.5		49.6	
Riders per Trip	49.6		45.0		35.2	
CJTP (%)	69.5		--	--	--	--

B4 Bay Ridge - Sheepshead Bay

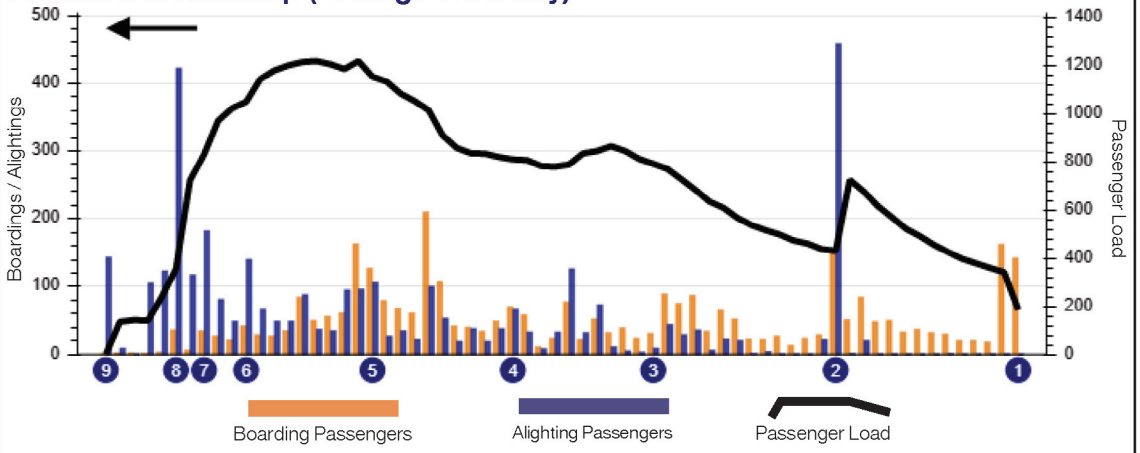
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	9.2 mi	2.1	755 ft	7.4 mph



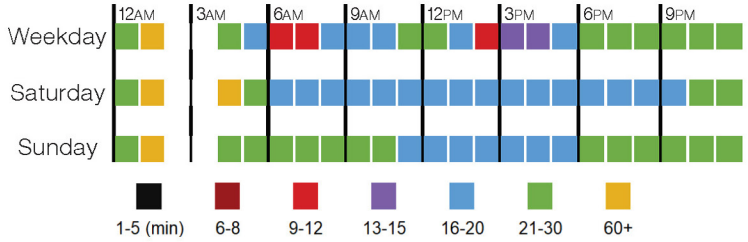
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

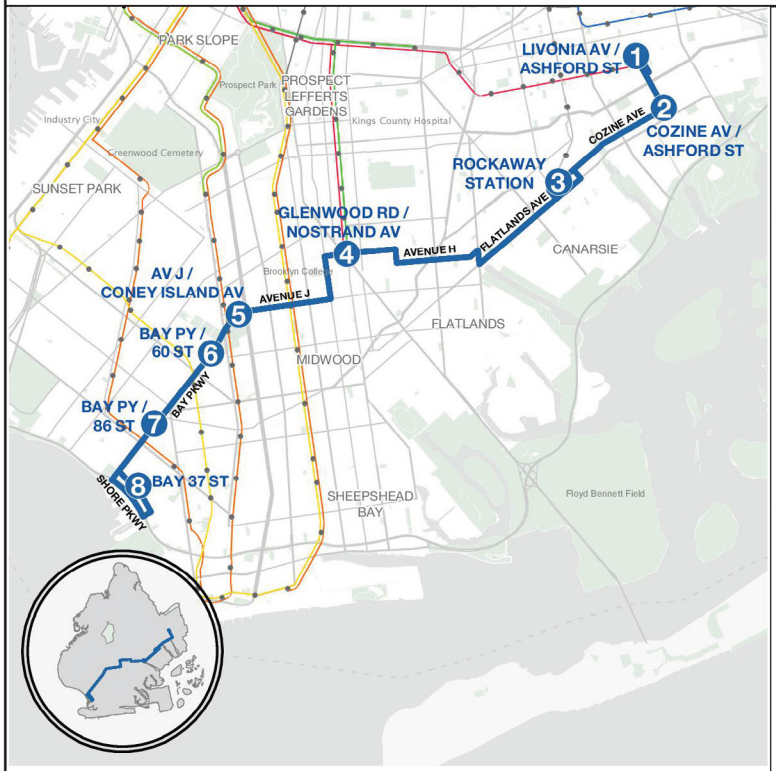
29.8% 29.2% 41.0%

Route Metrics

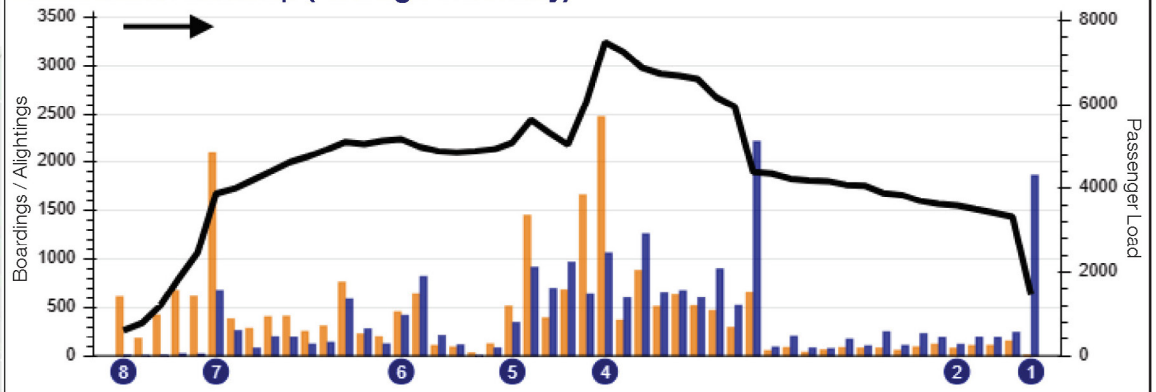
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	6,602		3,433		2,269	
Riders per Revenue Hour	46.7		32.3		24.7	
Riders per Trip	57.4		31.2		23.6	
CJTP (%)	69.6		--	--	--	--

B6 Bay Parkway / Glenwood Road

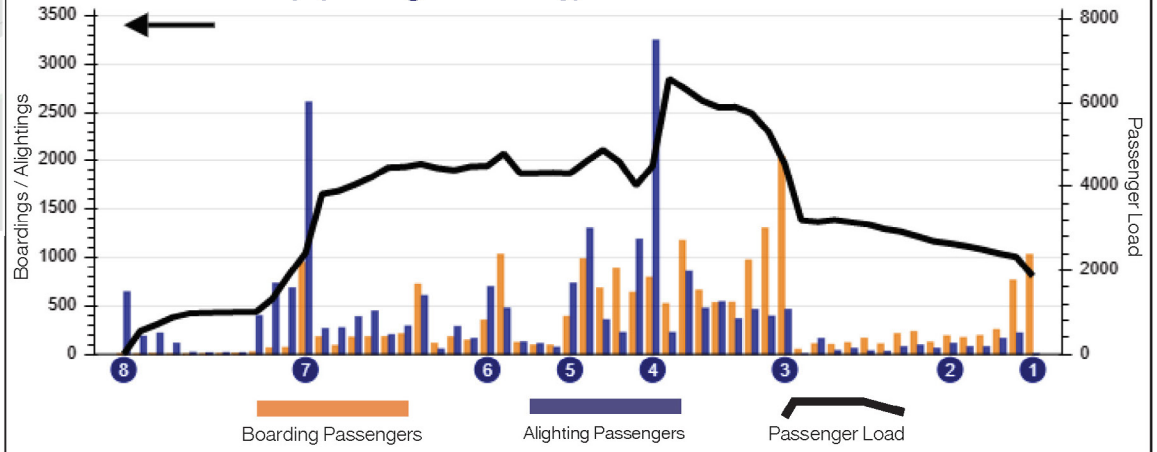
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local / Limited	10.5 mi	1.8	691 ft	7.6 mph



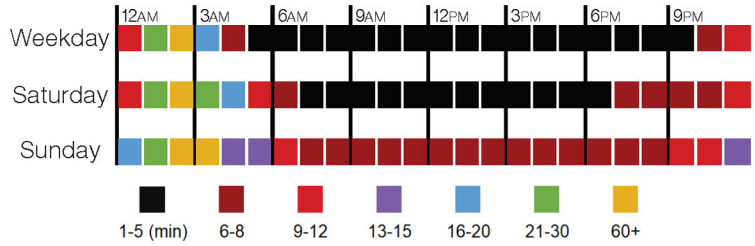
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

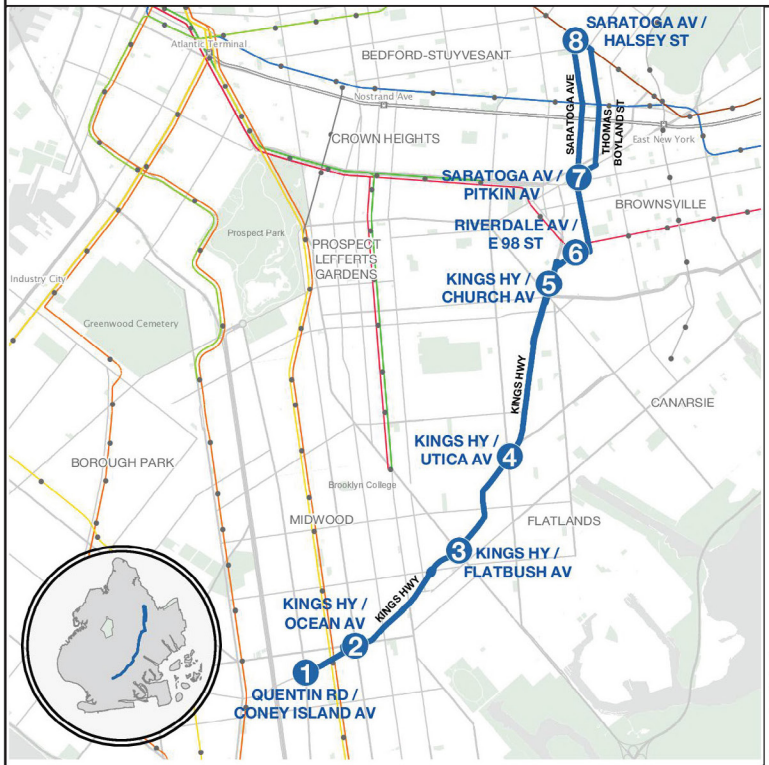
35.0% 31.7% 33.3%

Route Metrics

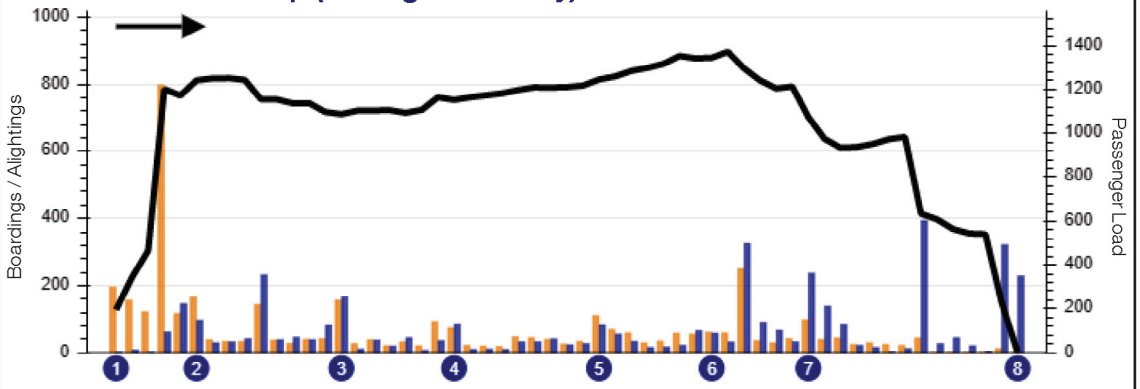
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	45,985		28,326		18,653	
Riders per Revenue Hour	65.1		57.5		54.2	
Riders per Trip	77.7		66.2		64.1	
CJTP (%)	74.0		--	--	--	--

B7 Kings Highway / Saratoga Avenue

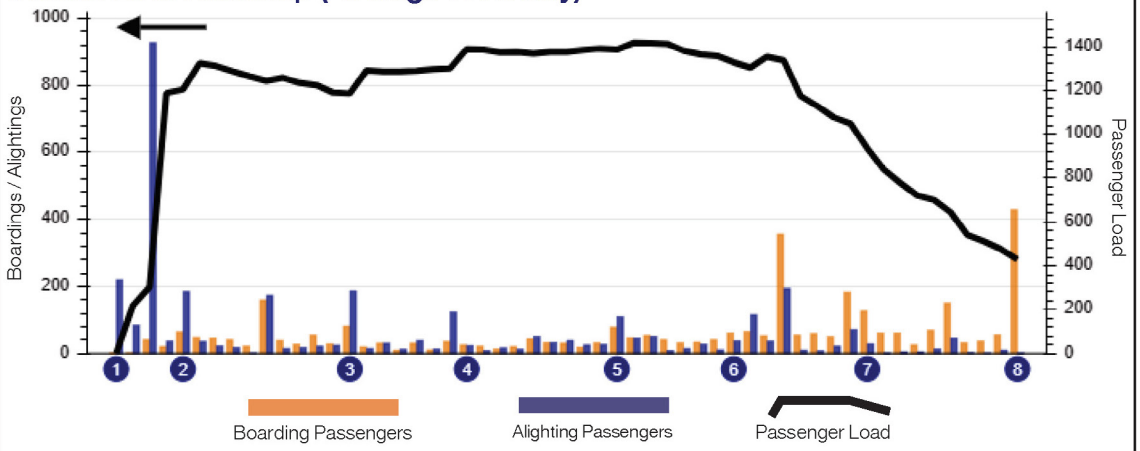
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.8 mi	2.0	648 ft	6.9 mph



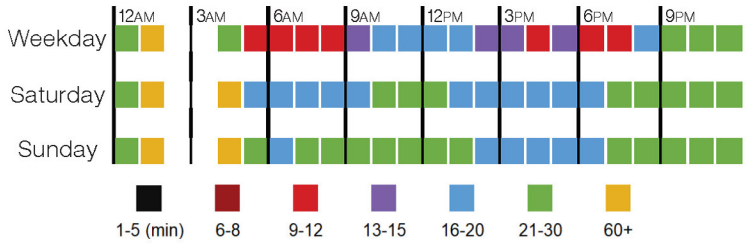
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

40.3% 32.8% 26.9%

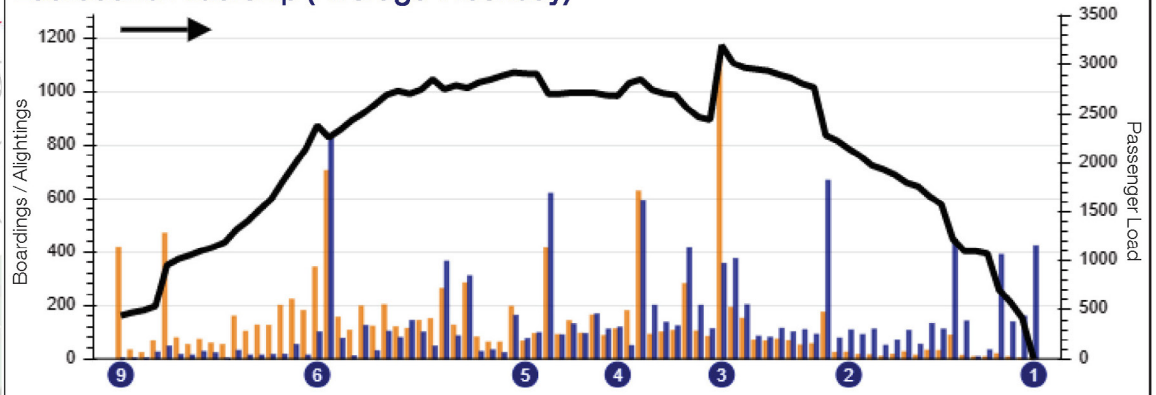
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	7,138		2,717		1,850	
Riders per Revenue Hour	57.7		37.4		26.8	
Riders per Trip	51.0		27.7		20.6	
CJTP (%)	65.3		--	--	--	--

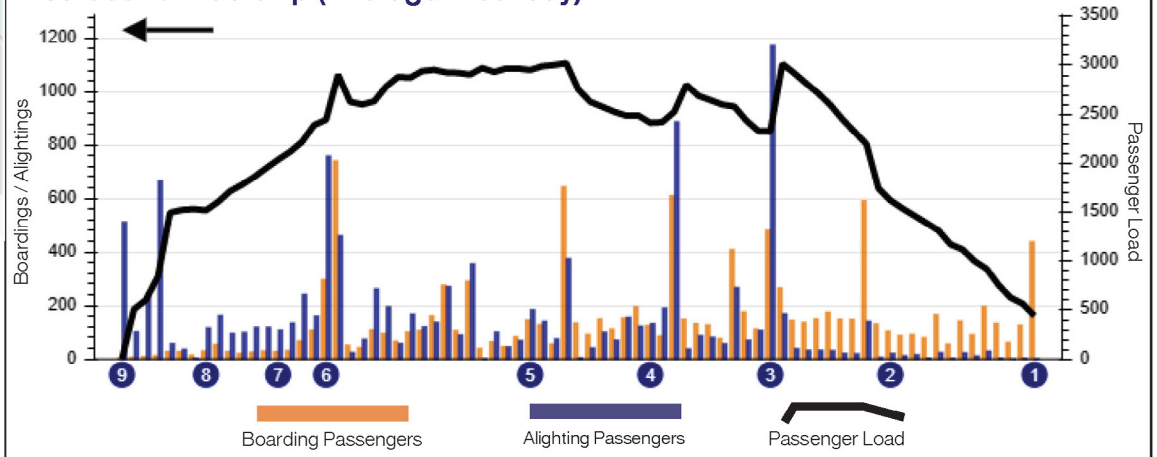
B8 18th Avenue / Avenue D

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	10.2 mi	2.0	685 ft	6.7 mph

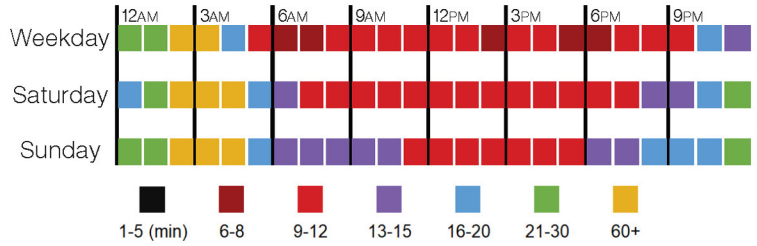
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

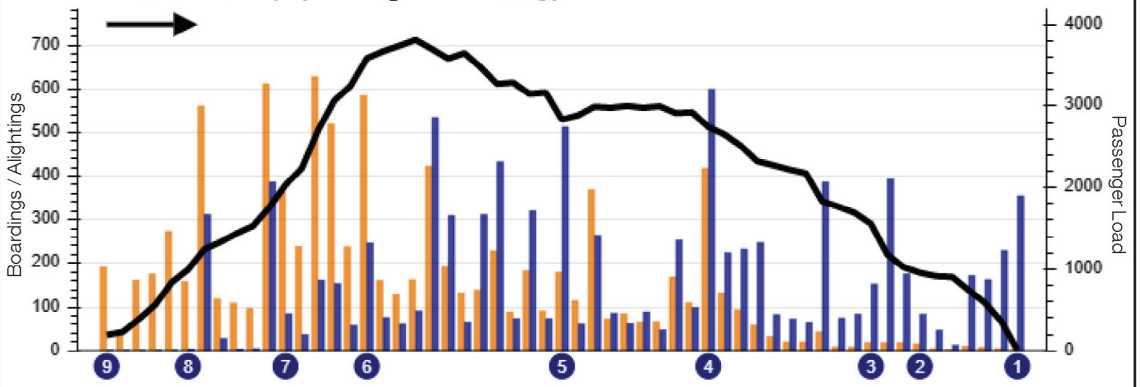
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	22,244		12,767		10,208	
Riders per Revenue Hour	70.0		53.4		49.8	
Riders per Trip	95.1		66.2		63.8	
CJTP (%)	67.1		--	--	--	--

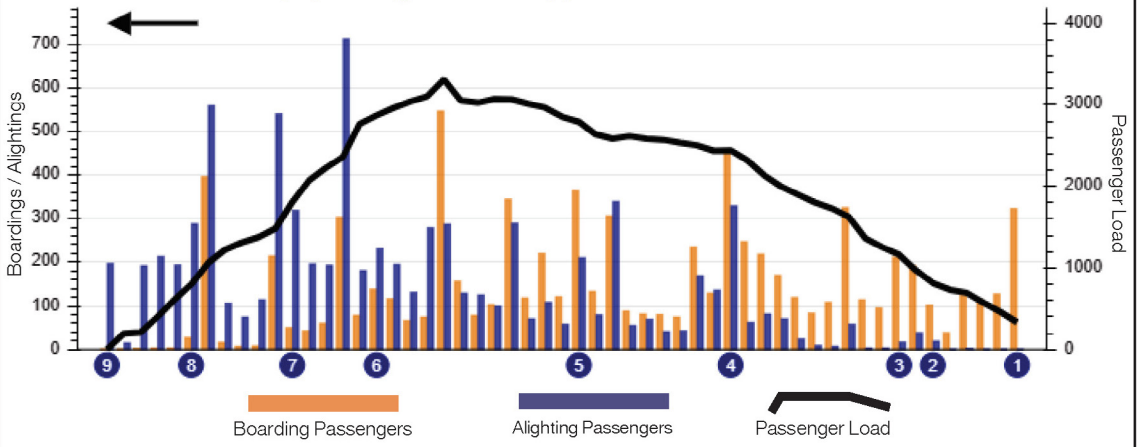
B9 60th Street / Flatbush Avenue

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	8.0 mi	1.3	770 ft	6.6 mph

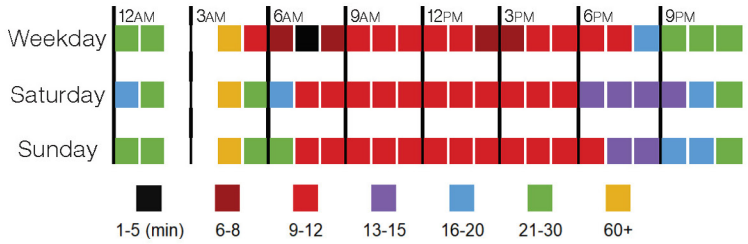
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

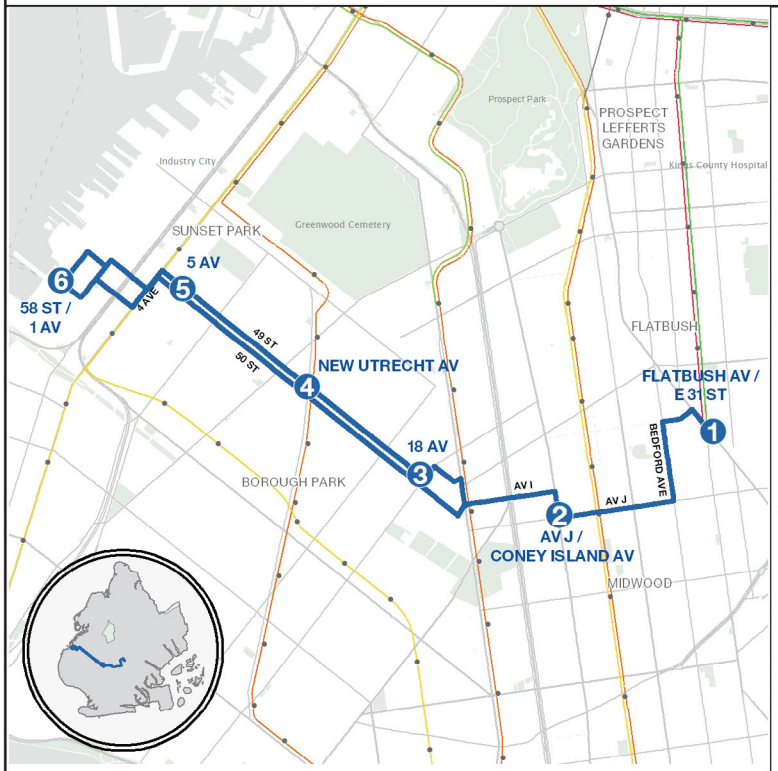
32.2% 30.1% 37.7%

Route Metrics

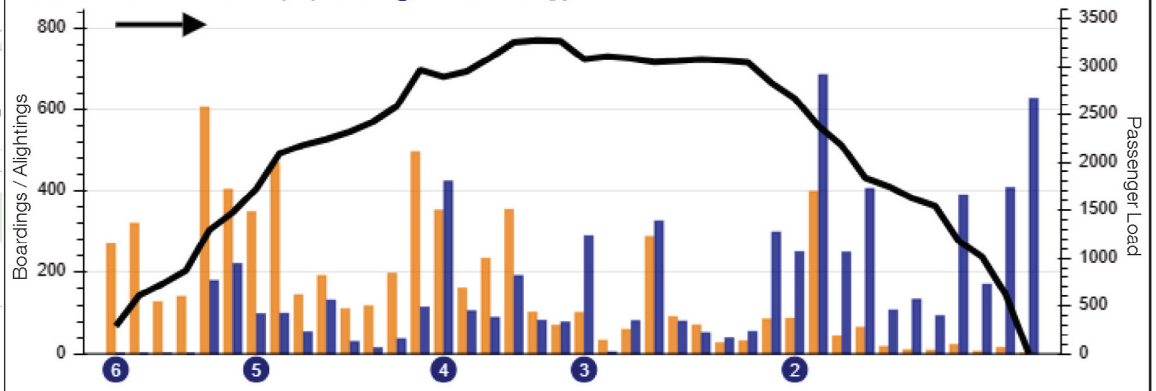
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	17,072		9,599		9,558	
Riders per Revenue Hour	69.8		63.0		56.0	
Riders per Trip	78.7		57.1		54.3	
CJTP (%)	65.6		--	--	--	--

B11 49th/50th Streets

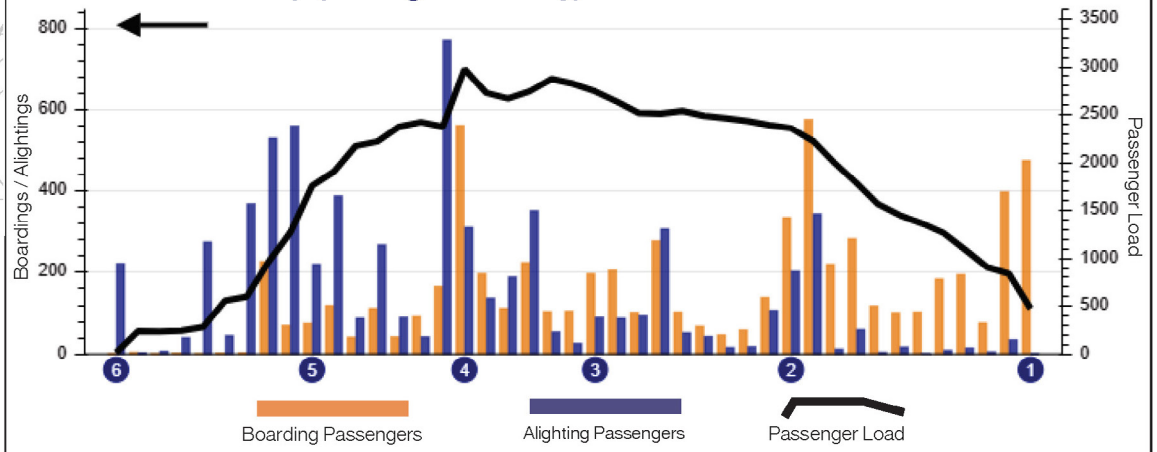
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	5.8 mi	2.4	760 ft	5.8 mph



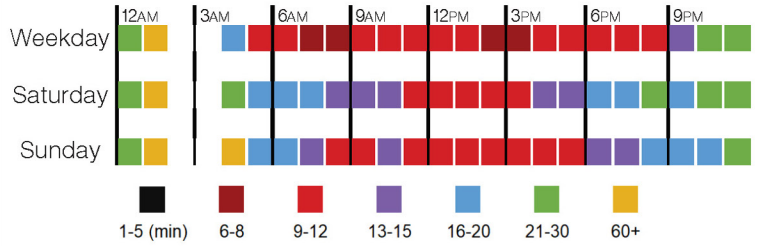
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

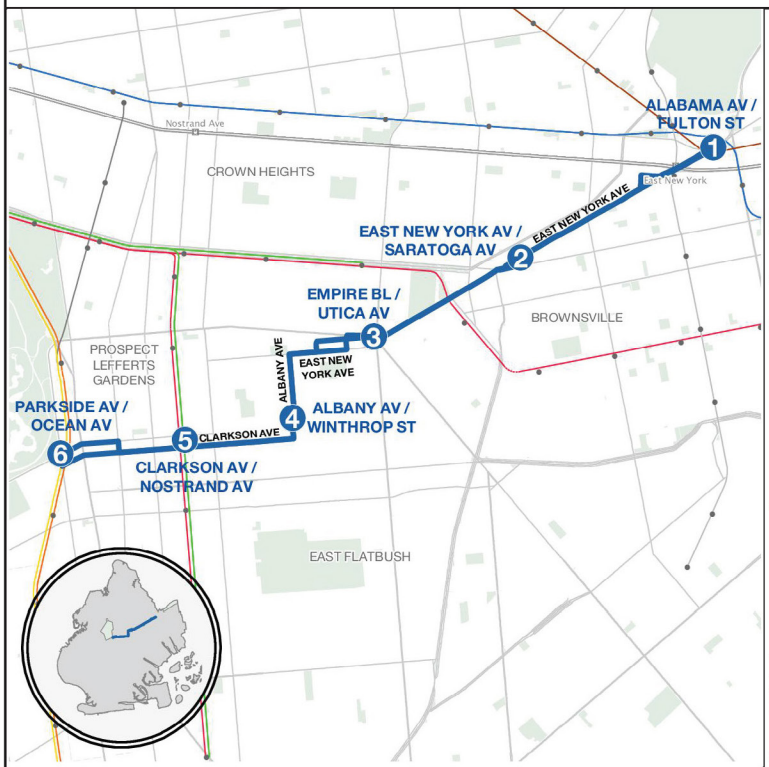
30.6% 27.7% 41.8%

Route Metrics

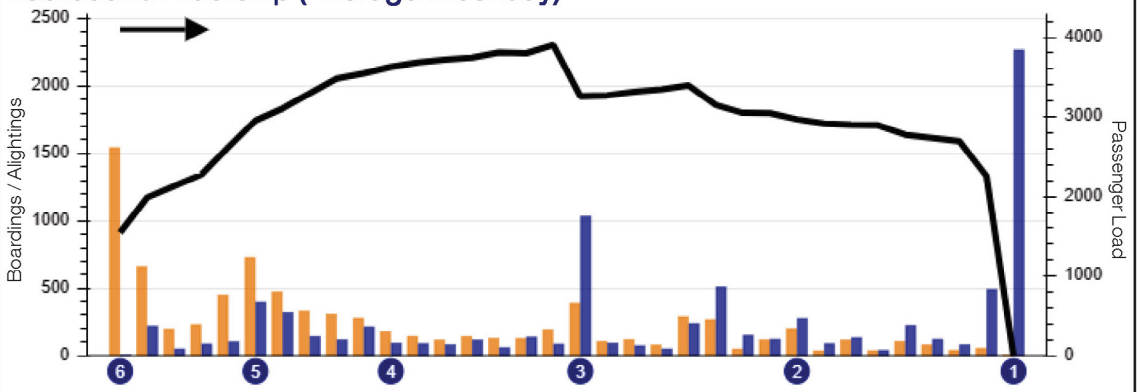
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	13,190		4,449		6,025	
Riders per Revenue Hour	64.5		45.9		48.9	
Riders per Trip	60.0		32.2		39.1	
CJTP (%)	65.7		--	--	--	--

B12 East New York Avenue / Clarkson Avenue

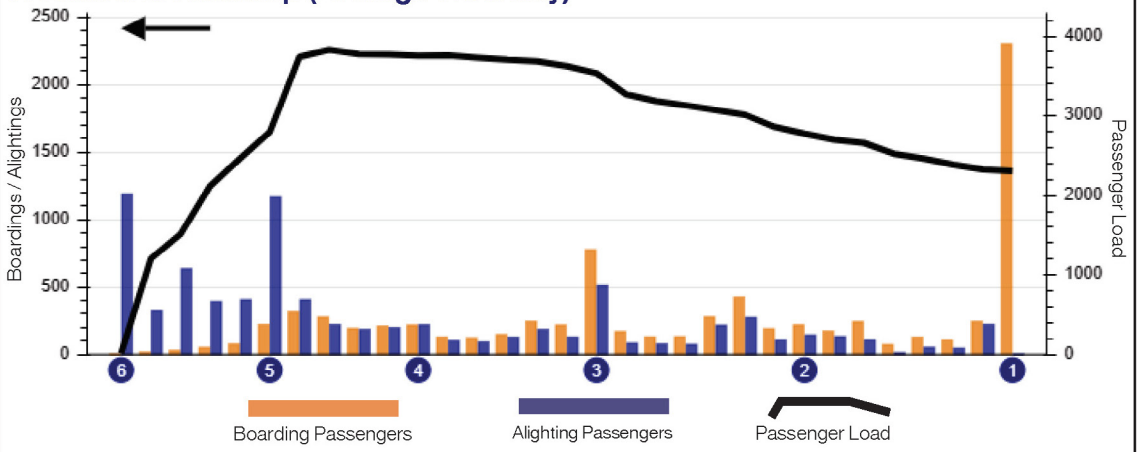
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	4.1 mi	2.4	690 ft	5.7 mph



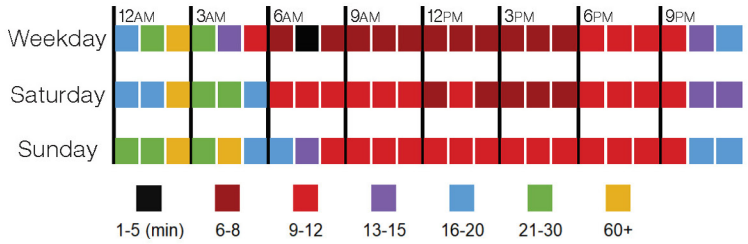
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

47.2% 30.8% 22.0%

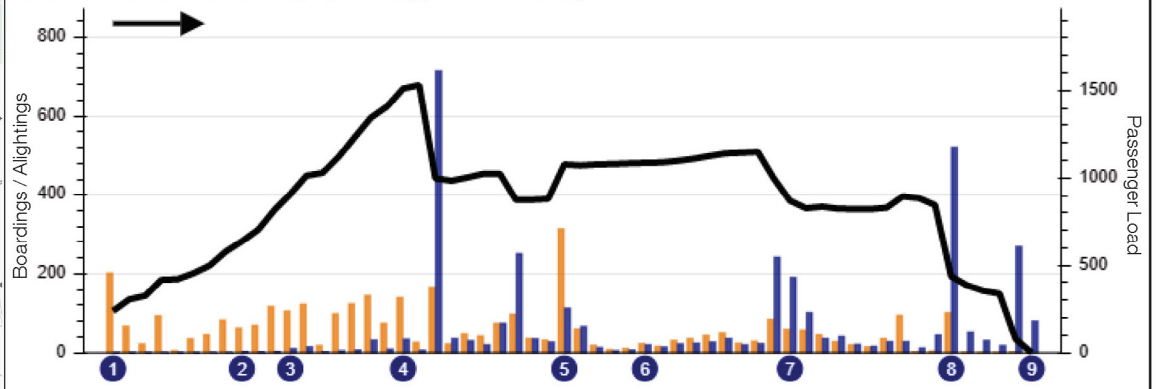
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	16,299		9,348		6,021	
Riders per Revenue Hour	75.7		55.7		50.0	
Riders per Trip	54.1		36.8		31.7	
CJTP (%)	67.2		--	--	--	--

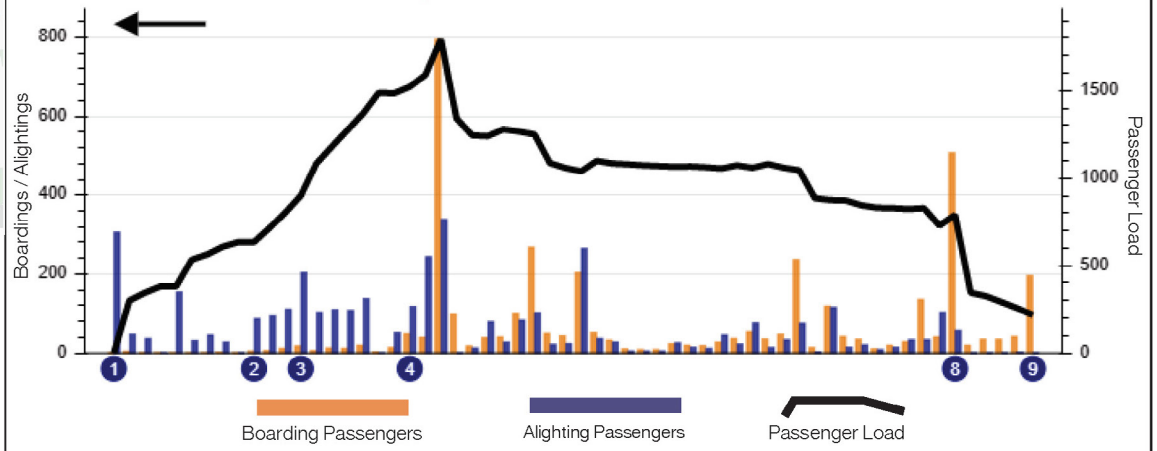
B13 Bushwick - Gateway Center

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	8.7 mi	3.6	791 ft	8.0 mph

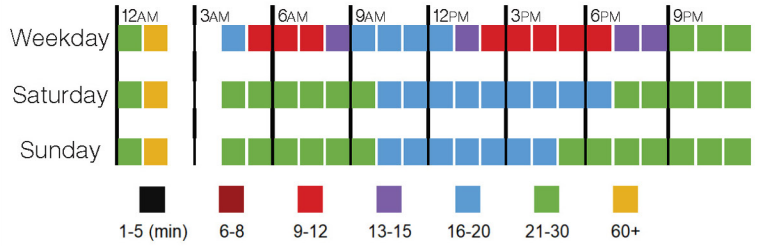
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



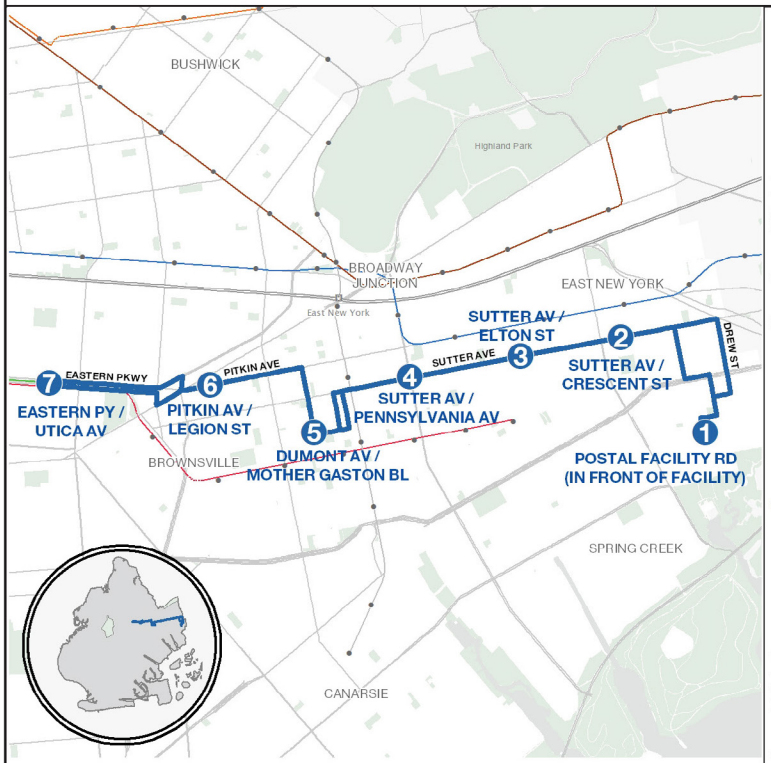
Transfers

Route Metrics

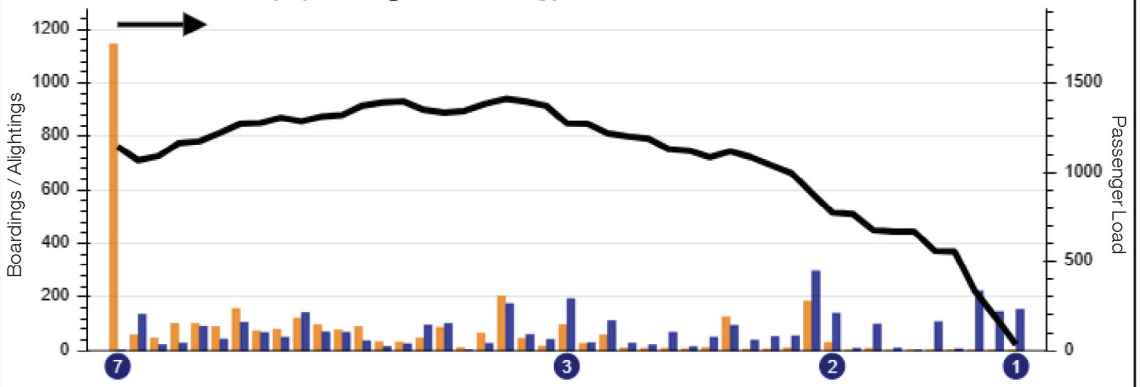
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	7,164		3,625		2,134	
Riders per Revenue Hour	43.7		36.6		23.2	
Riders per Trip	48.4		37.8		23.2	
CJTP (%)	68.9		--	--	--	--

B14 Sutter Avenue

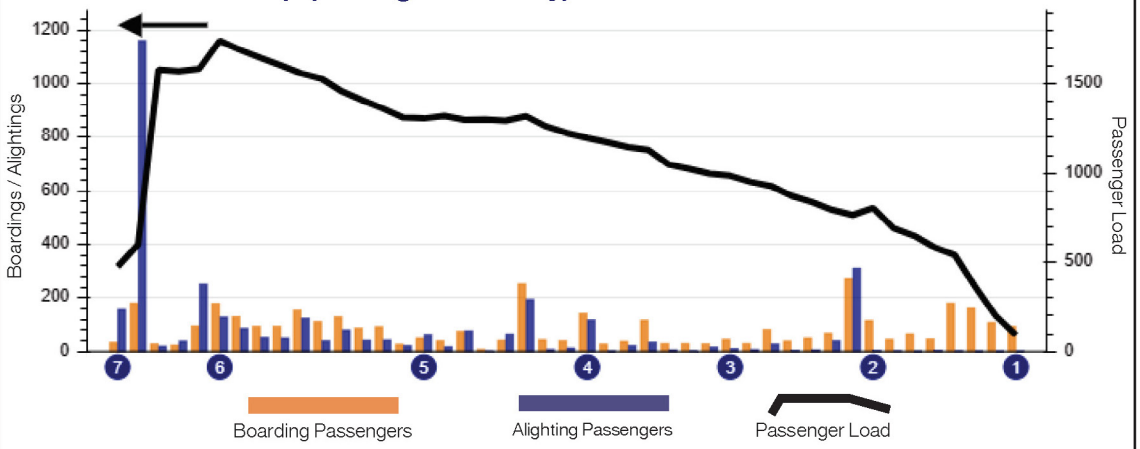
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	5.2 mi	2.4	622 ft	6.6 mph



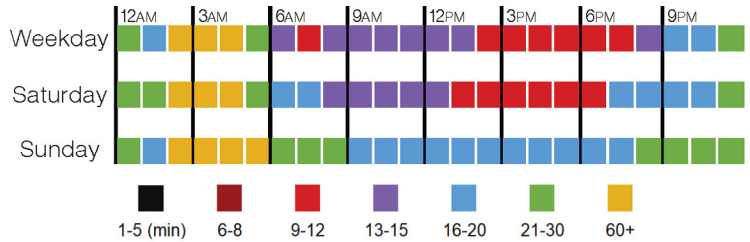
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

33.7% 36.0% 30.3%

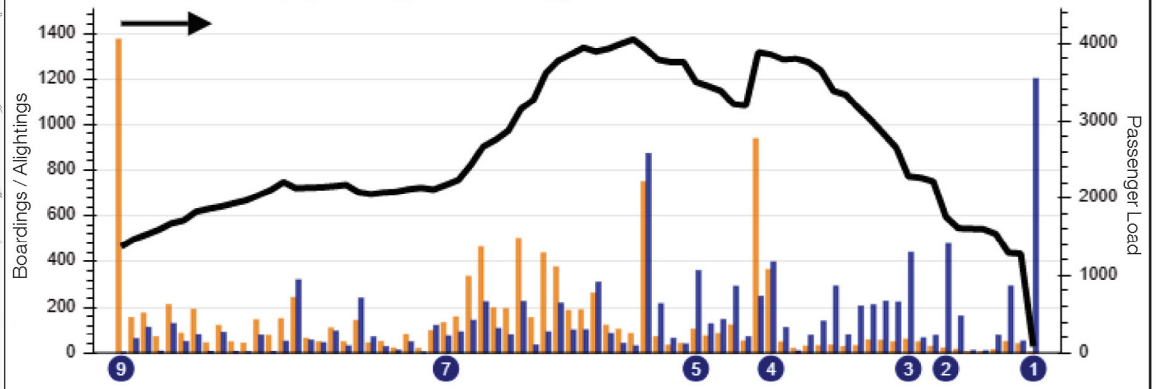
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	7,149		4,904		2,528	
Riders per Revenue Hour	54.9		47.6		36.6	
Riders per Trip	43.1		33.1		24.1	
CJTP (%)	64.2		--	--	--	--

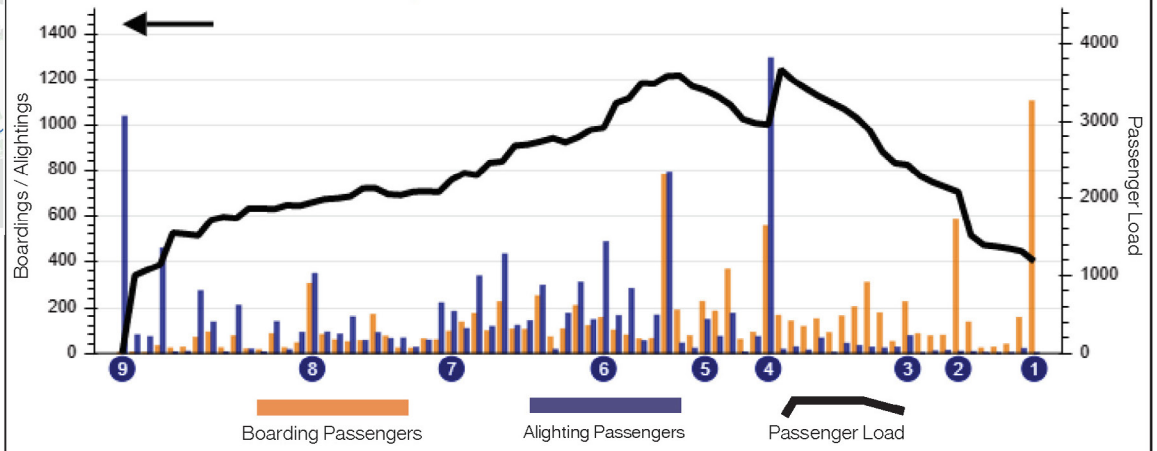
B15 Bedford Stuyvesant - JFK Airport

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	13.0 mi	2.0	864 ft	8.4 mph

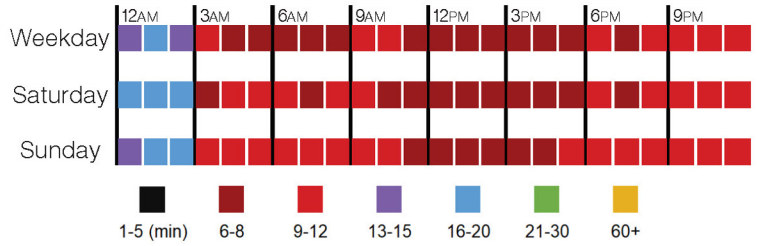
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

37.6% 29.6% 32.8%

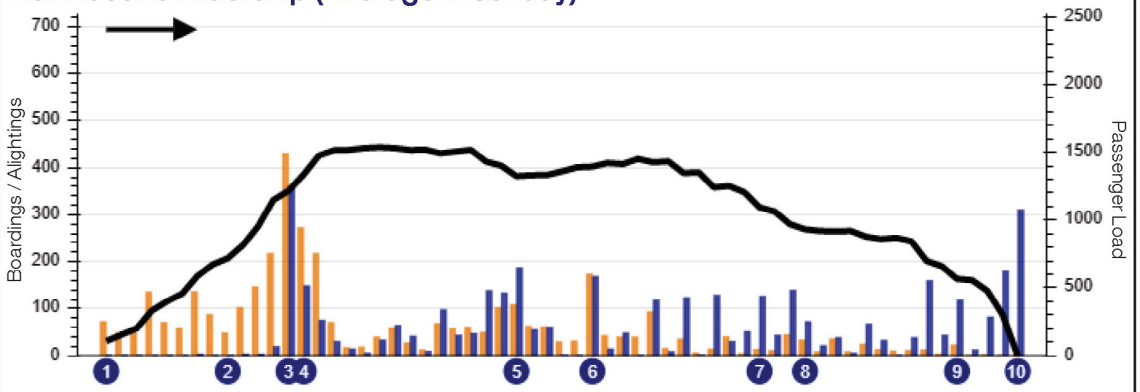
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	21,298		15,427		11,434	
Riders per Revenue Hour	50.5		42.1		35.3	
Riders per Trip	67.0		50.4		41.9	
CJTP (%)	63.2		--	--	--	--

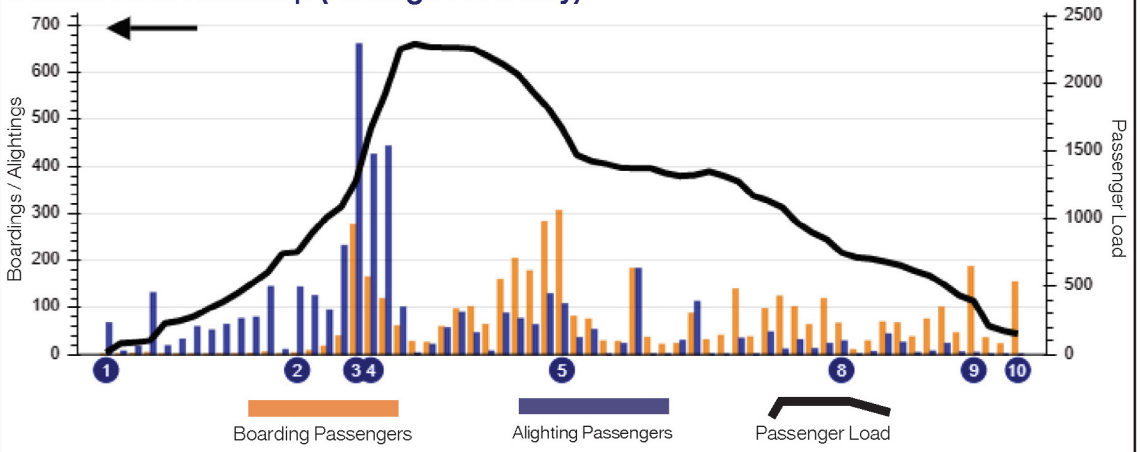
B16 Fort Hamilton - Prospect-Lefferts Gardens

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.8 mi	1.9	674 ft	7.0 mph

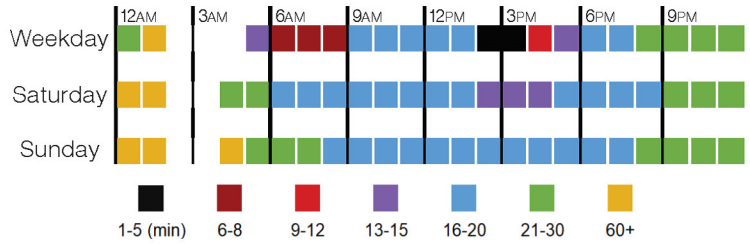
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

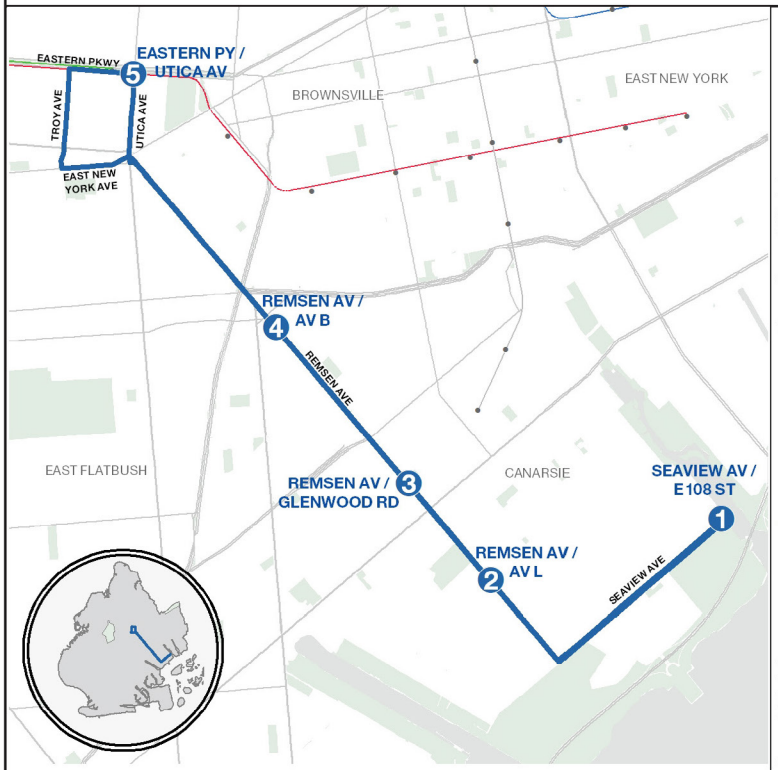
37.4% 17.3% 45.3%

Route Metrics

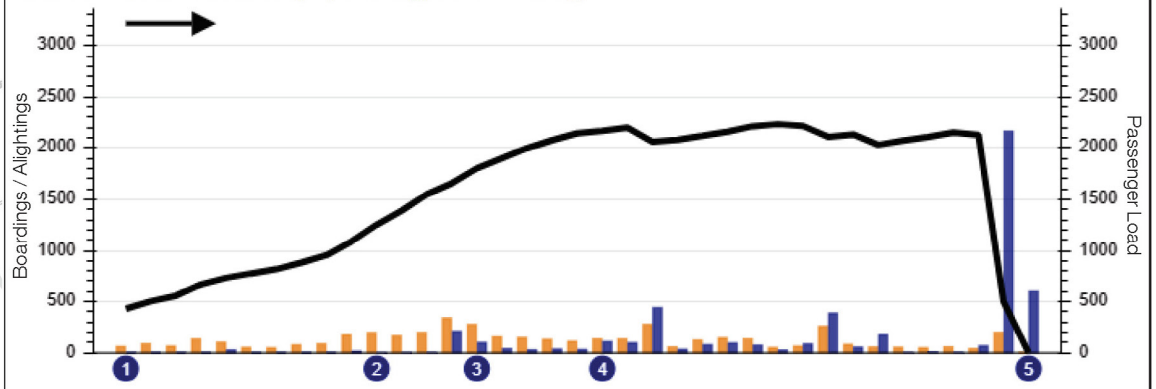
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	8,130		3,562		2,952	
Riders per Revenue Hour	49.9		37.9		34.2	
Riders per Trip	48.7		31.8		29.8	
CJTP (%)	68.7		--	--	--	--

B17 Remsen Avenue

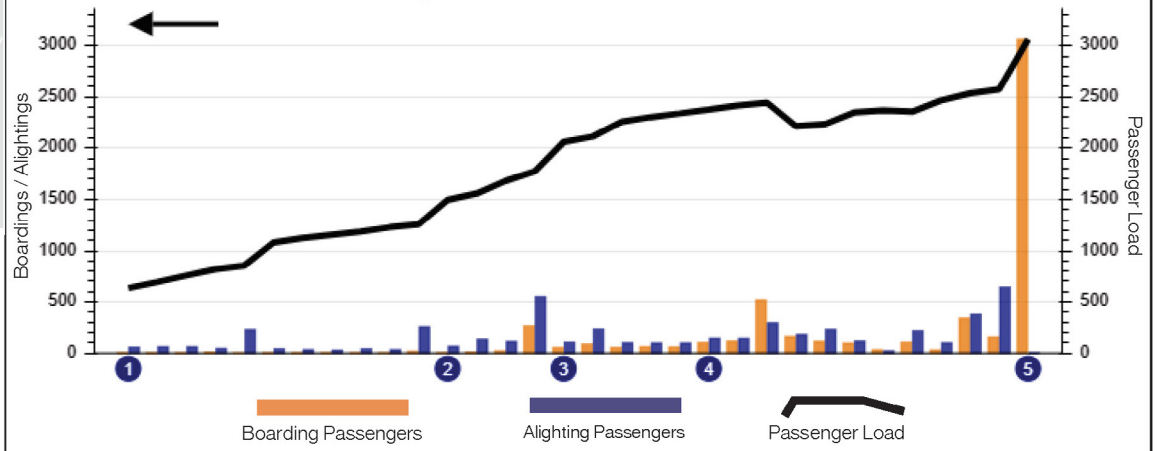
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	4.6 mi	1.6	739 ft	7.2 mph



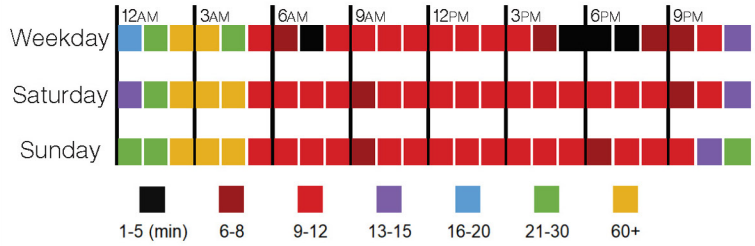
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



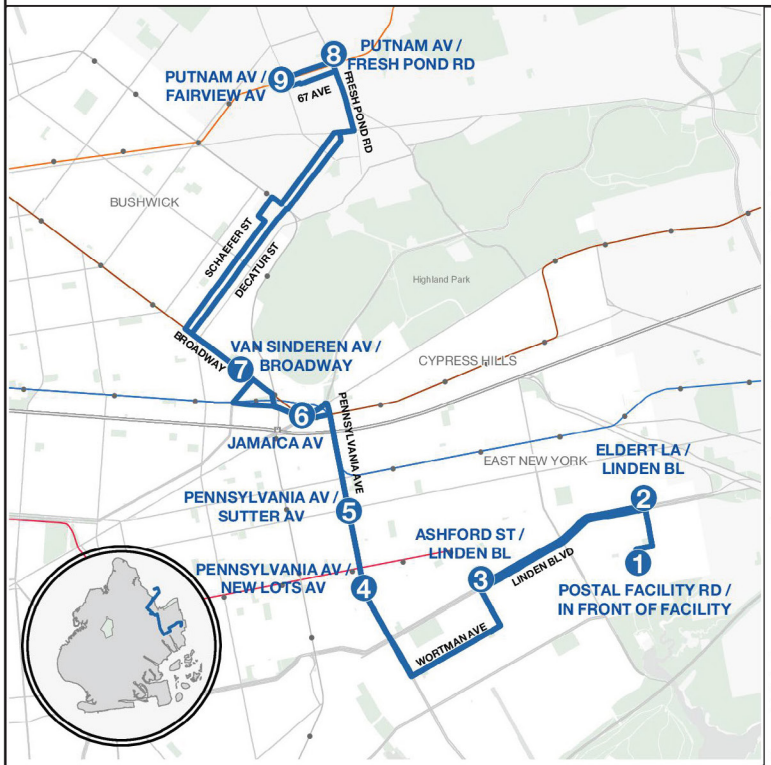
Transfers

Route Metrics

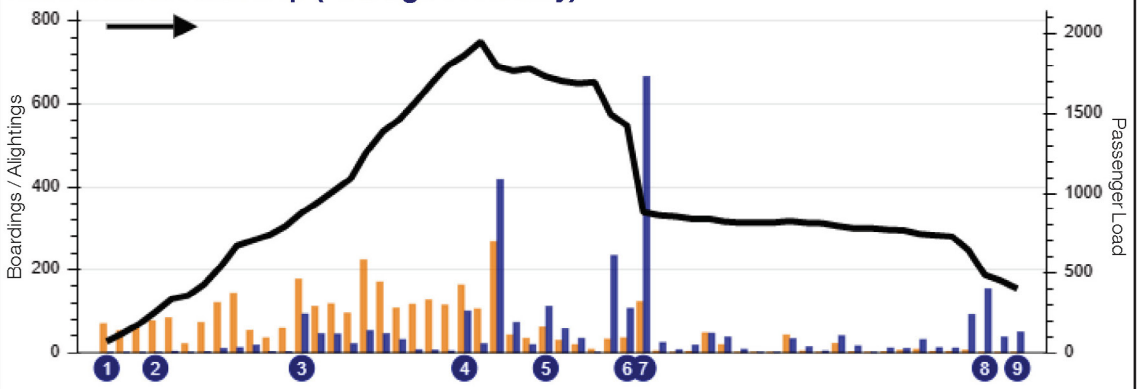
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	11,766		7,171		4,922	
Riders per Revenue Hour	64.3		49.7		35.2	
Riders per Trip	42.3		26.4		18.9	
CJTP (%)	75.8		--	--	--	--

B20 East New York - Ridgewood

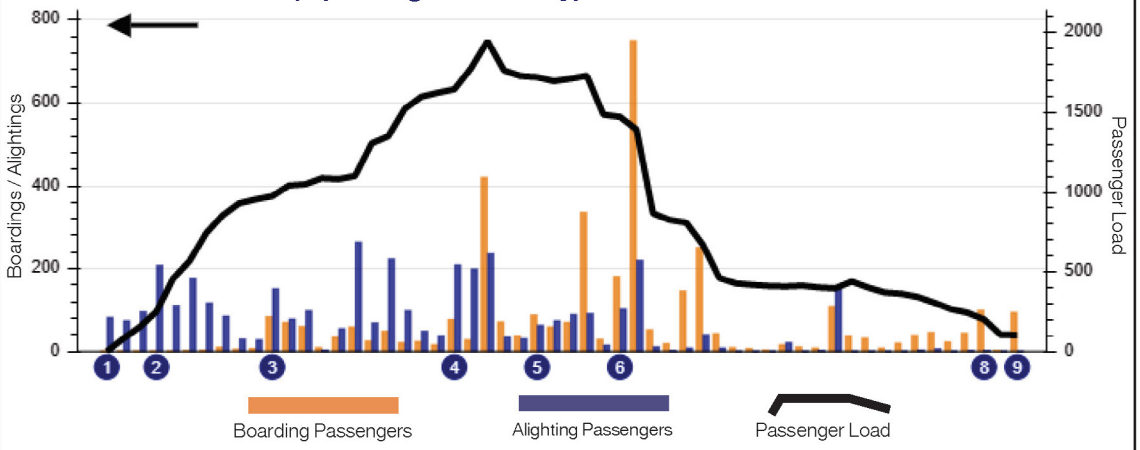
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.3 mi	2.8	685 ft	6.7 mph



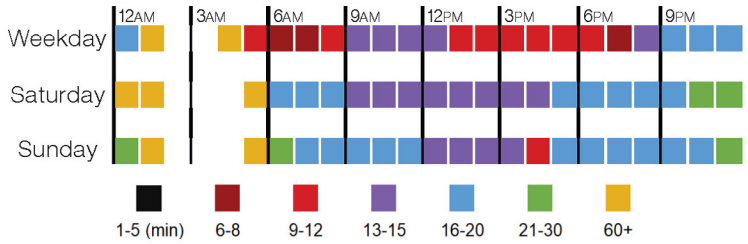
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

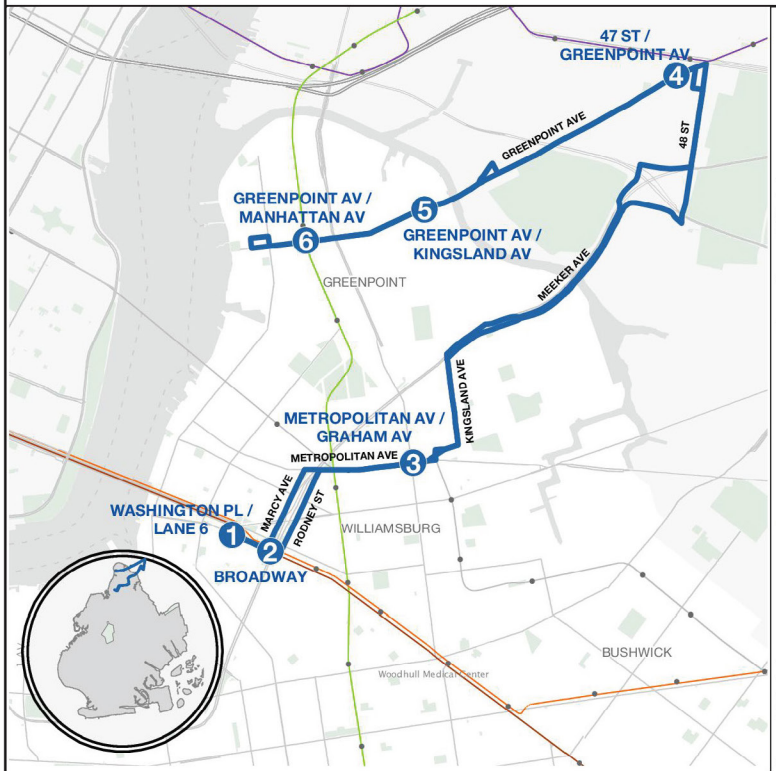
31.6% 44.2% 24.2%

Route Metrics

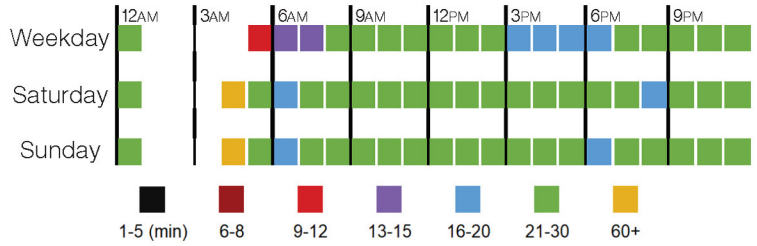
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	7,098		3,682		2,400	
Riders per Revenue Hour	39.5		34.9		26.2	
Riders per Trip	37.8		31.7		21.1	
CJTP (%)	74.6		--	--	--	--

B24 Greenpoint - Sunnyside - Williamsburg

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.5 mi	2.6	891 ft	8.5 mph



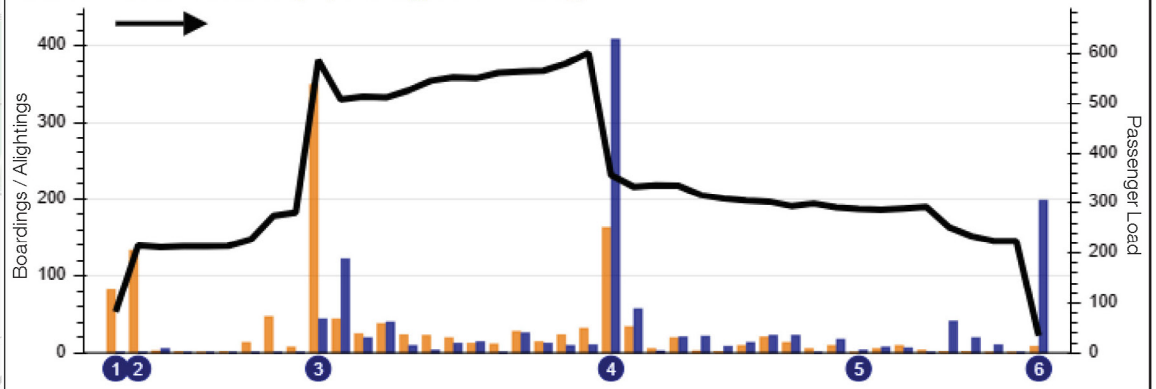
Hourly Frequency



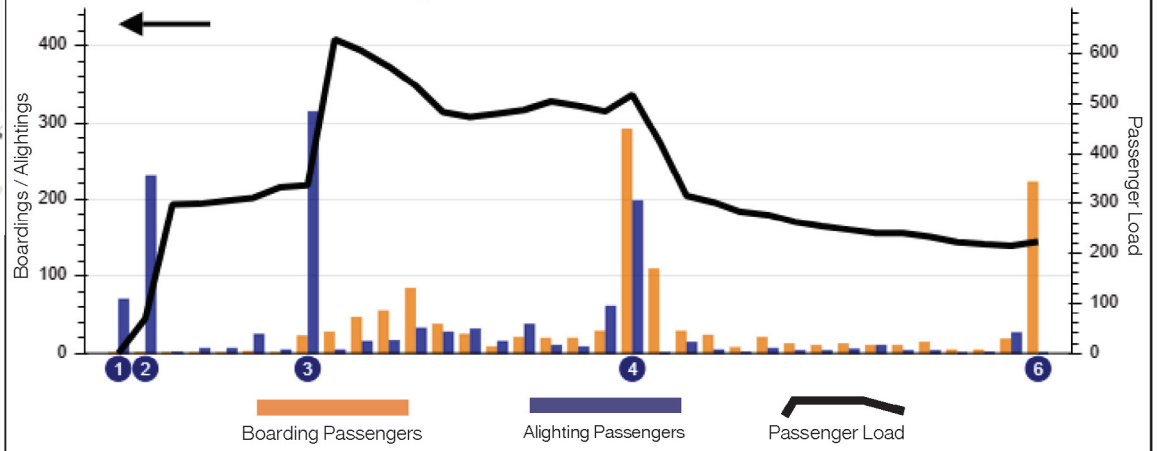
Transfers

18.1% 56.4% 25.5%

Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)

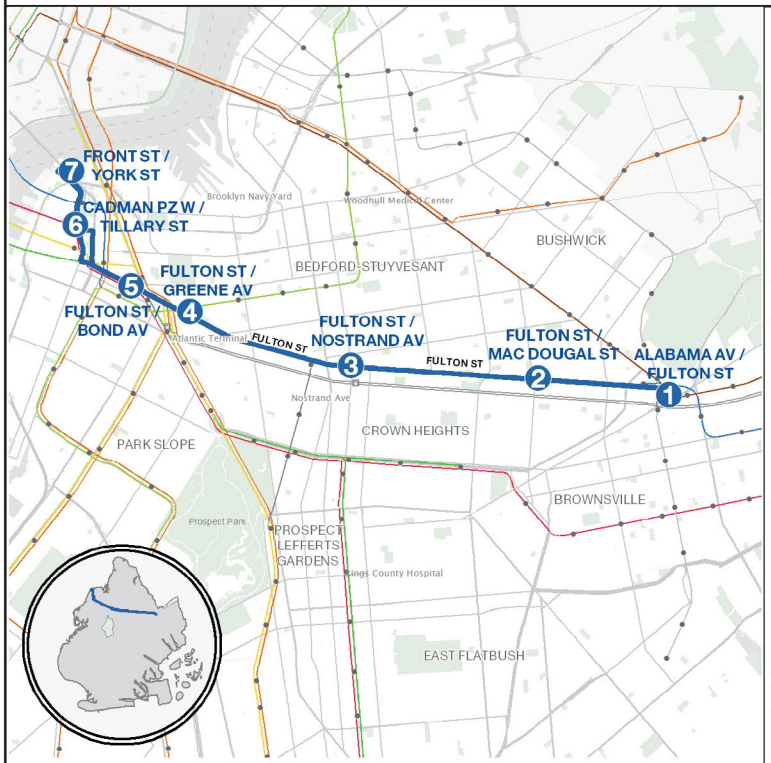


Route Metrics

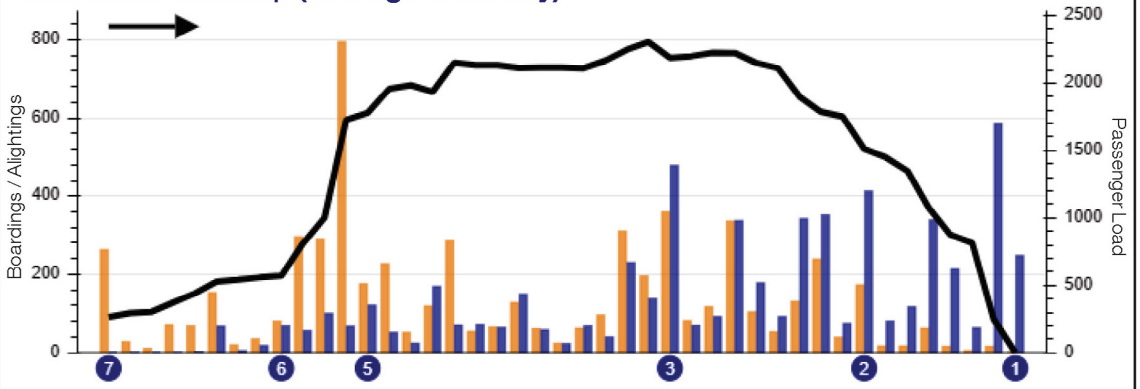
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	2,419		1,444		970	
Riders per Revenue Hour	34.8		27.0		19.5	
Riders per Trip	26.6		17.6		11.8	
CJTP (%)	56.7		--	--	--	--

B25 Fulton Street

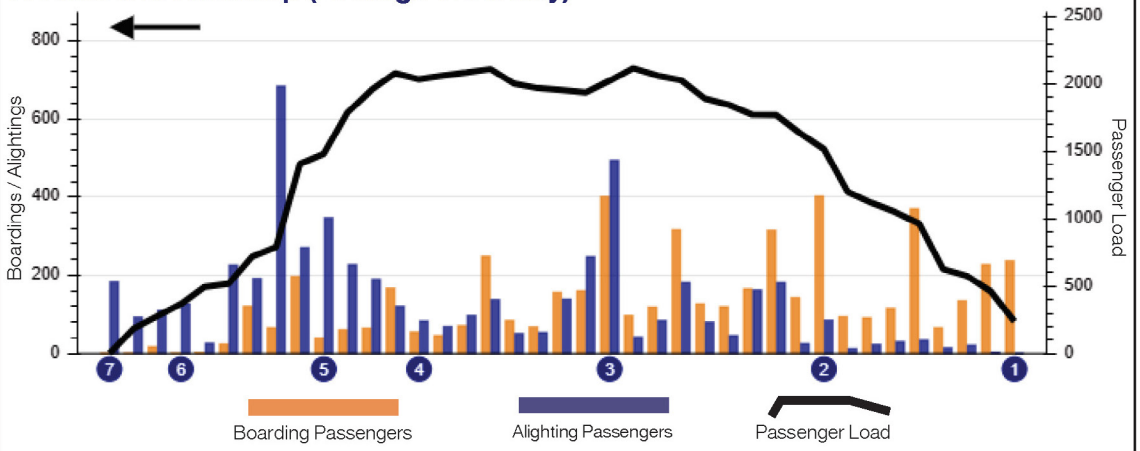
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.0 mi	1.0	788 ft	6.0 mph



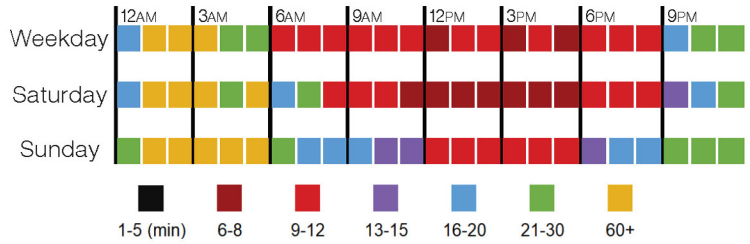
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

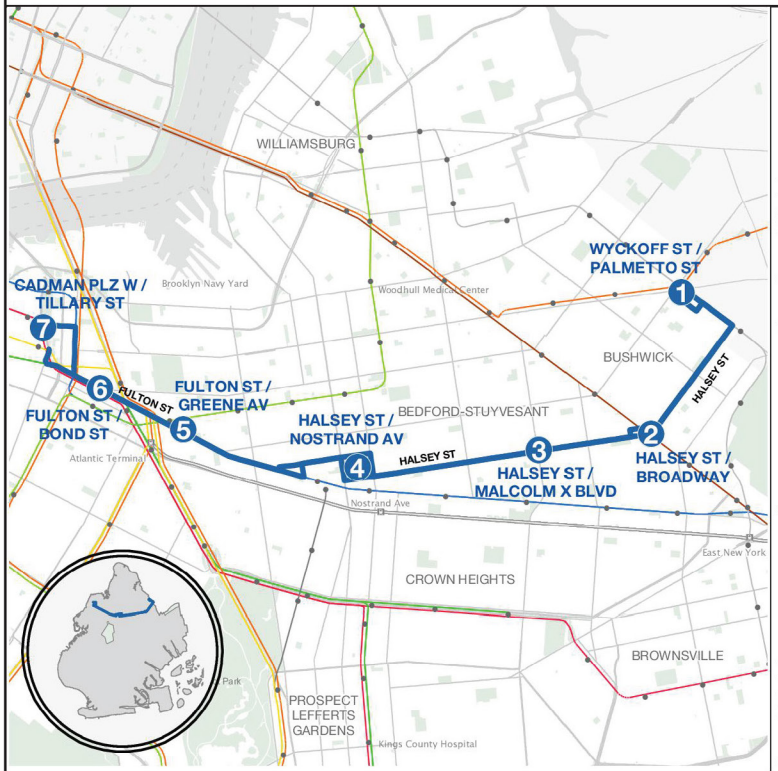
46.3% 30.3% 23.3%

Route Metrics

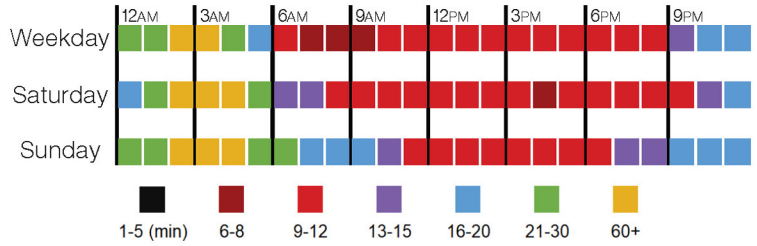
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	10,924		8,263		4,252	
Riders per Revenue Hour	49.4		45.6		37.9	
Riders per Trip	51.0		40.9		32.2	
CJTP (%)	70.7		--	--	--	--

B26 Halsey Street / Fulton Street

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.0 mi	1.8	778 ft	6.5 mph



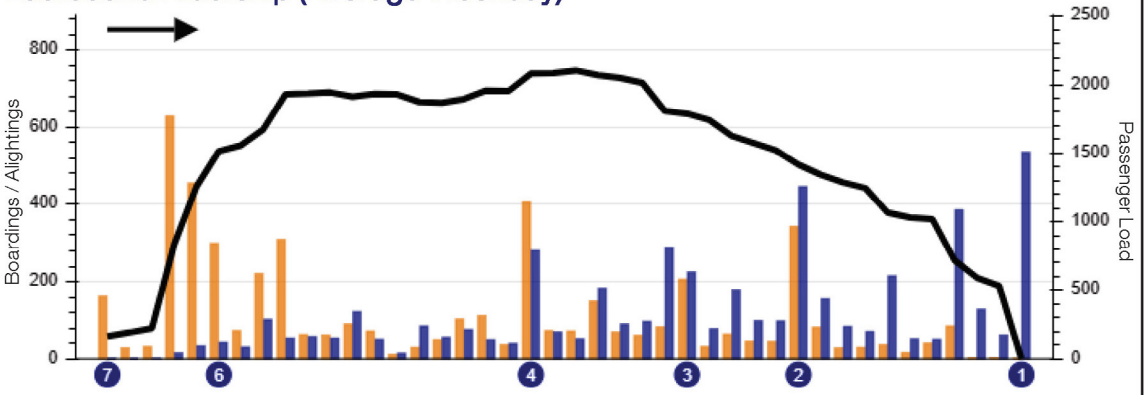
Hourly Frequency



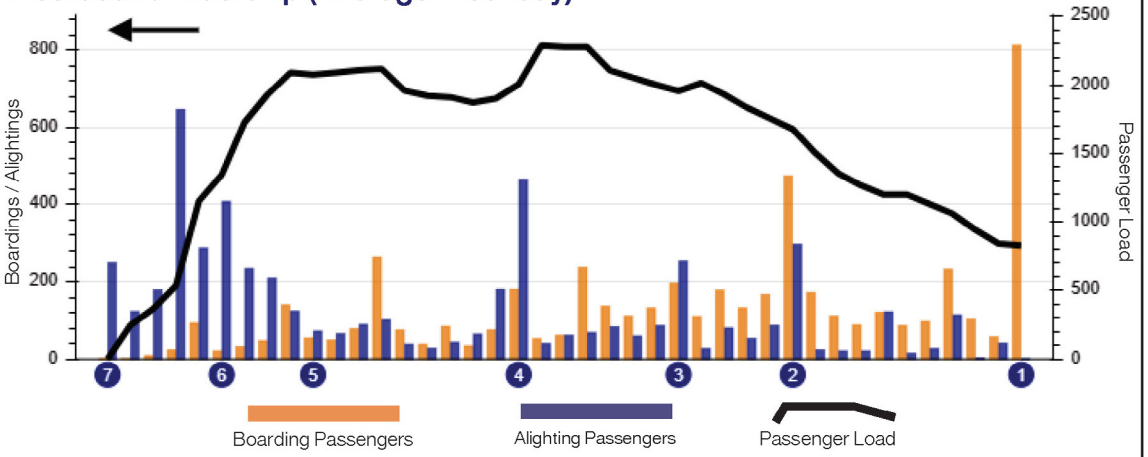
Transfers

34.6% 32.5% 32.8%

Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)

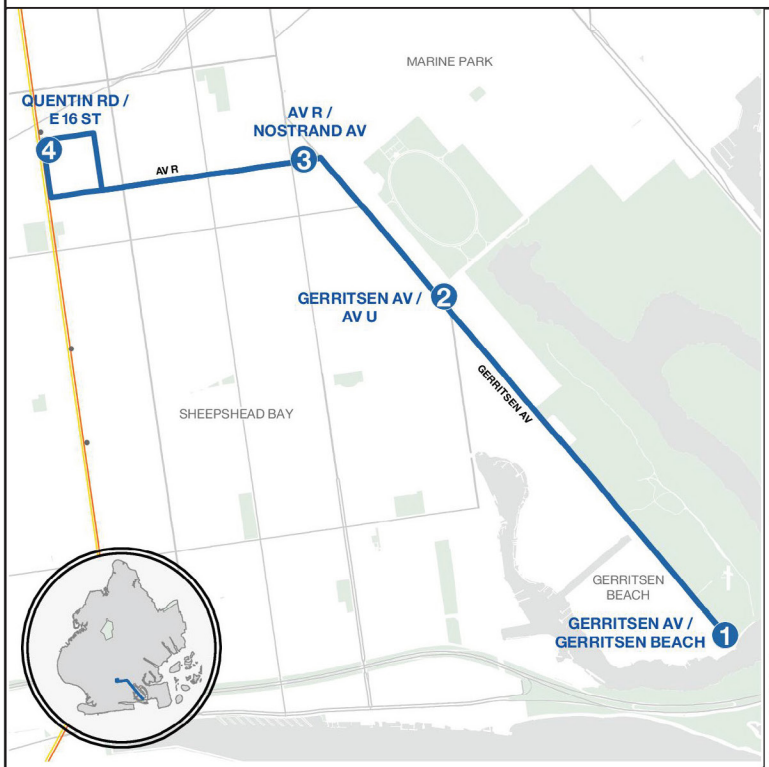


Route Metrics

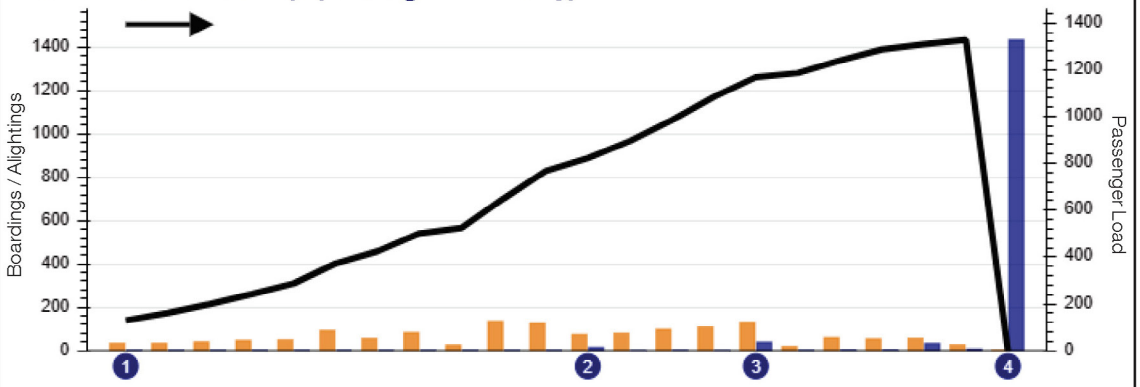
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	9,970		7,156		4,732	
Riders per Revenue Hour	49.5		40.2		39.4	
Riders per Trip	46.6		34.1		29.2	
CJTP (%)	73.4		--	--	--	--

B31 Gerritsen Avenue

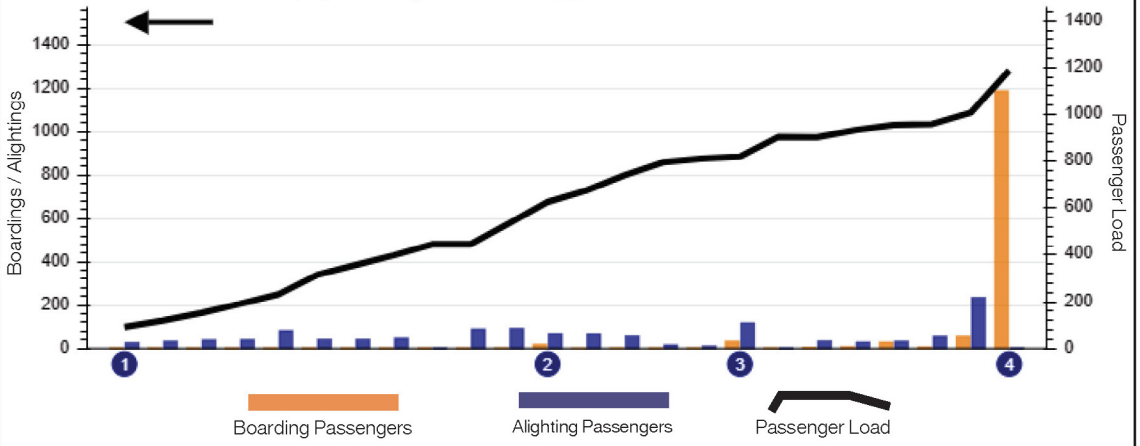
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	2.8 mi	1.1	681 ft	8.9 mph



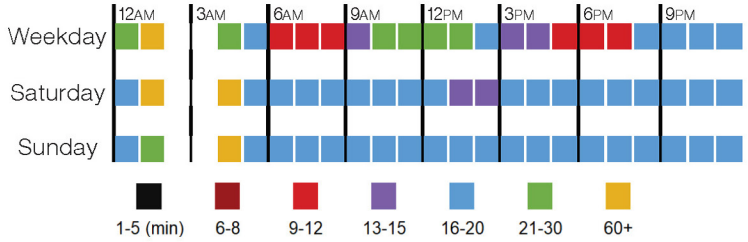
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

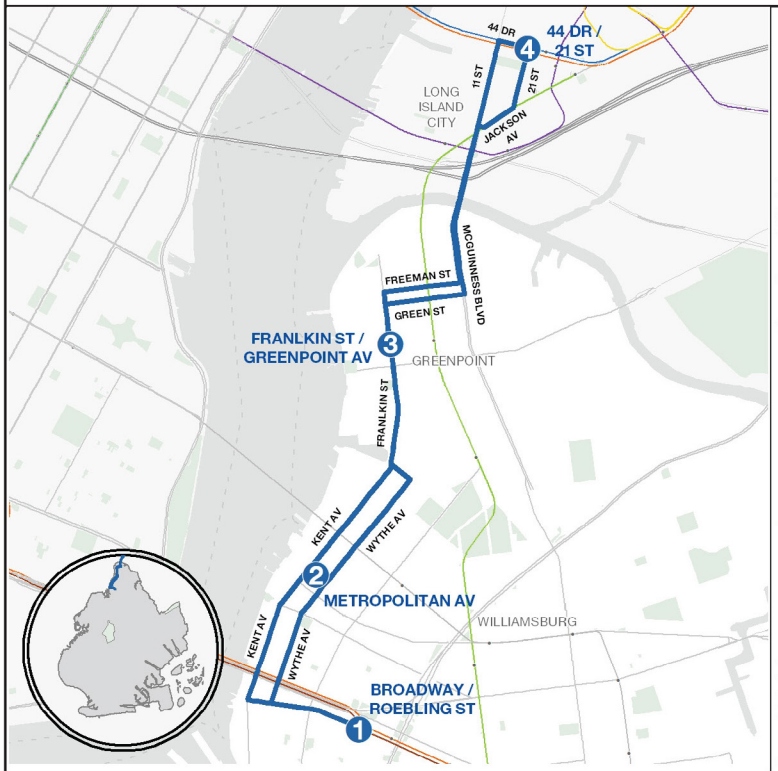
15.4% 69.1% 15.5%

Route Metrics

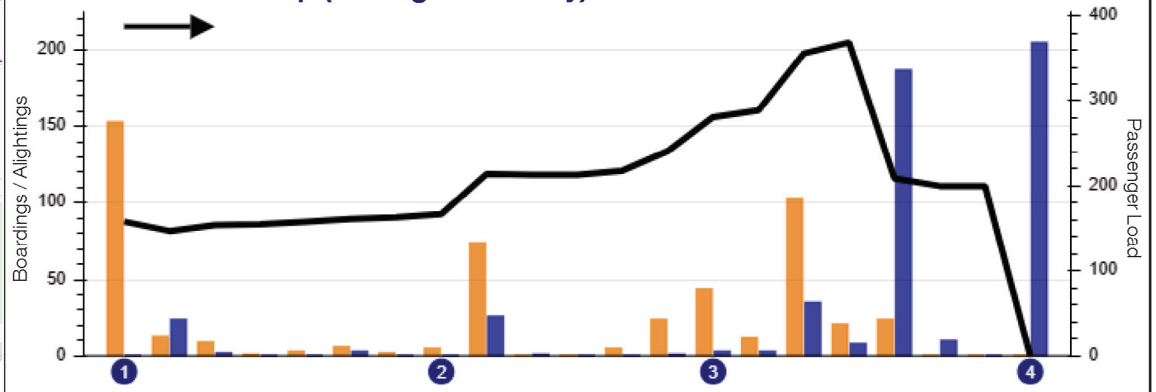
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	2,780		965		765	
Riders per Revenue Hour	68.7		32.4		25.7	
Riders per Trip	20.6		7.8		6.2	
CJTP (%)	86.7		--	--	--	--

B32 Williamsburg - Long Island City via Franklin Street

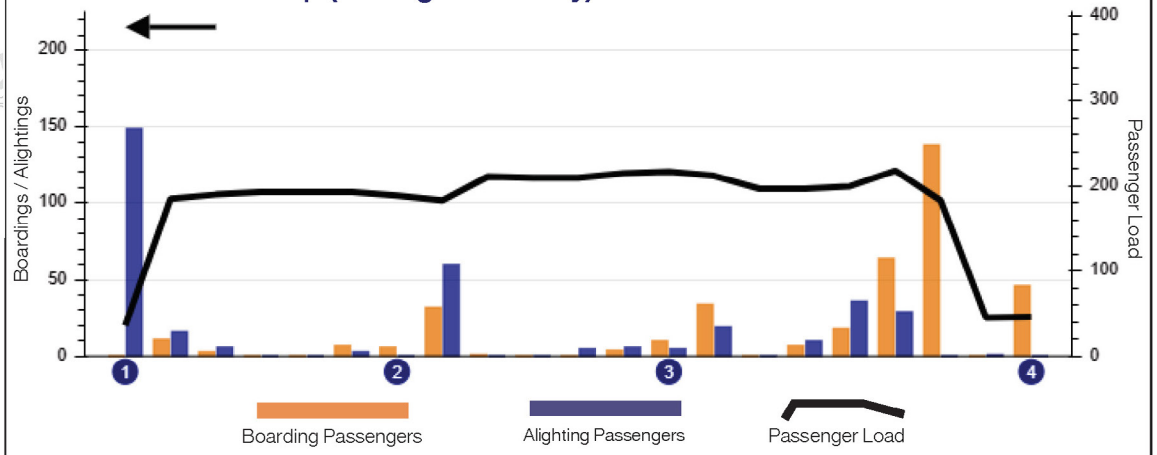
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	3.6 mi	2.3	961 ft	8.3 mph



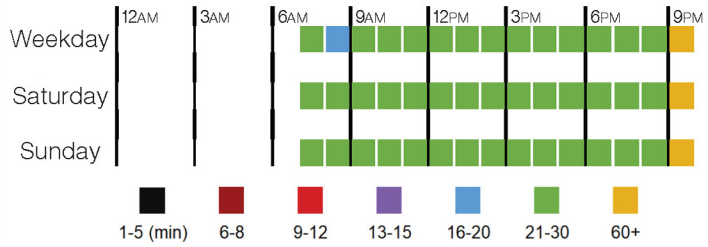
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



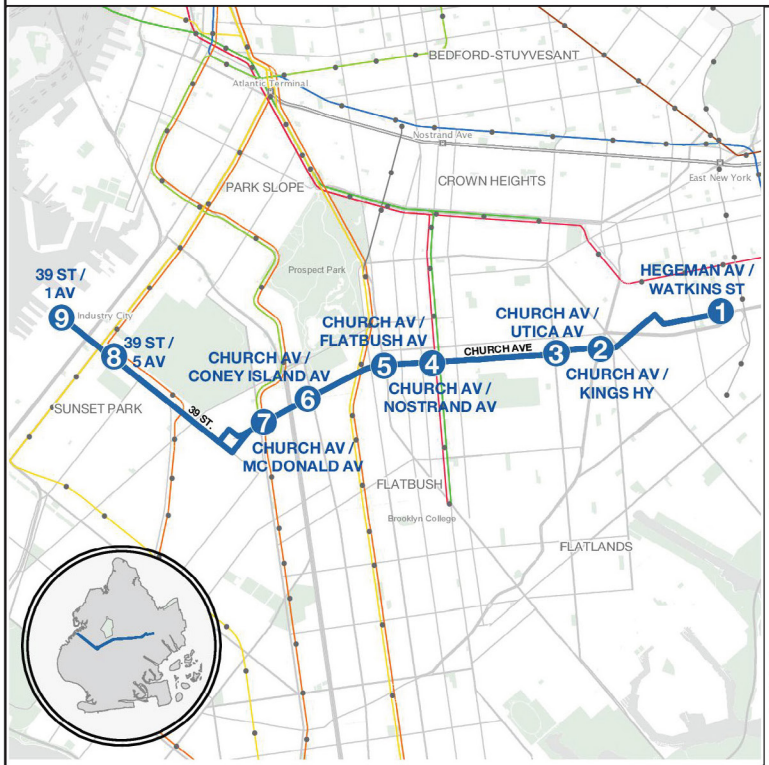
Transfers

Route Metrics

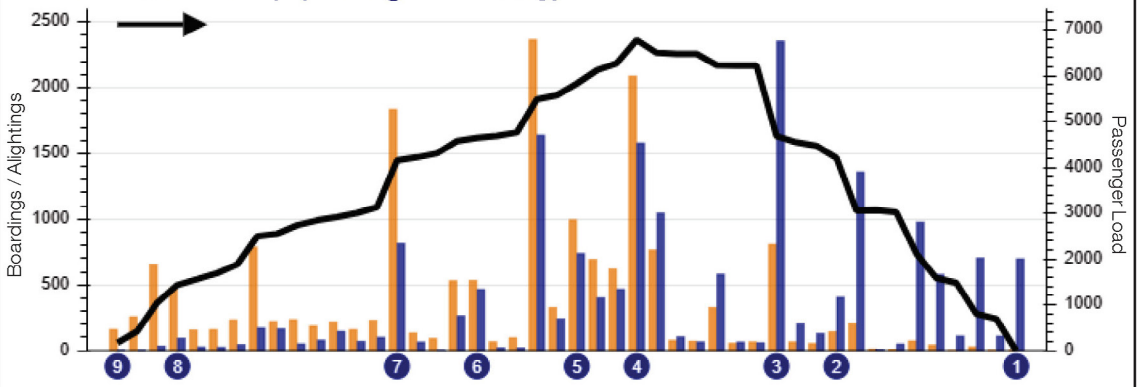
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	880		737		428	
Riders per Revenue Hour	38.0		32.6		19.5	
Riders per Trip	14.9		12.7		7.4	
CJTP (%)	53.7		--	--	--	--

B35 Church Avenue / 39th Street

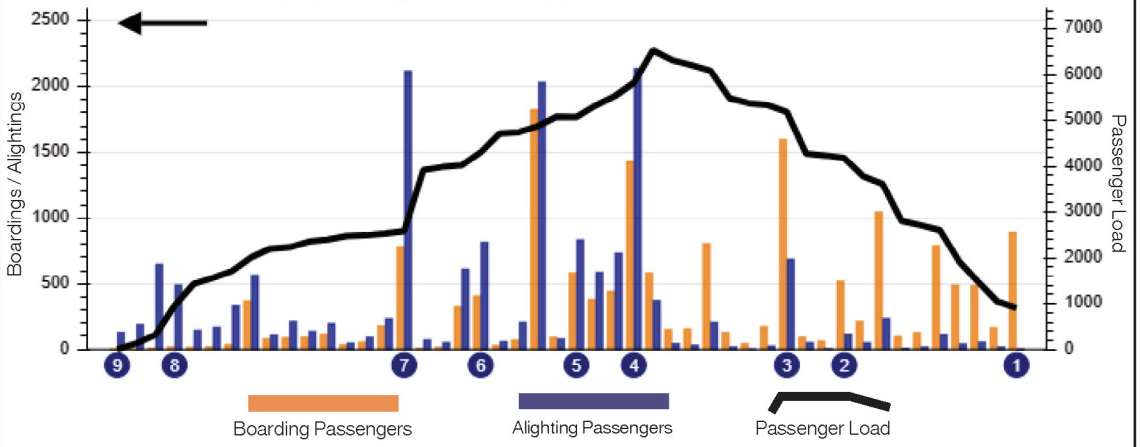
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local / Limited	6.6 mi	0.8	727 ft	5.5 mph



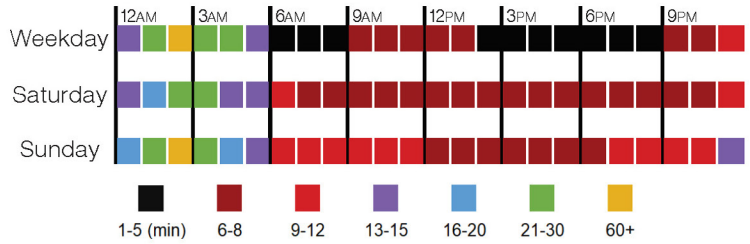
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

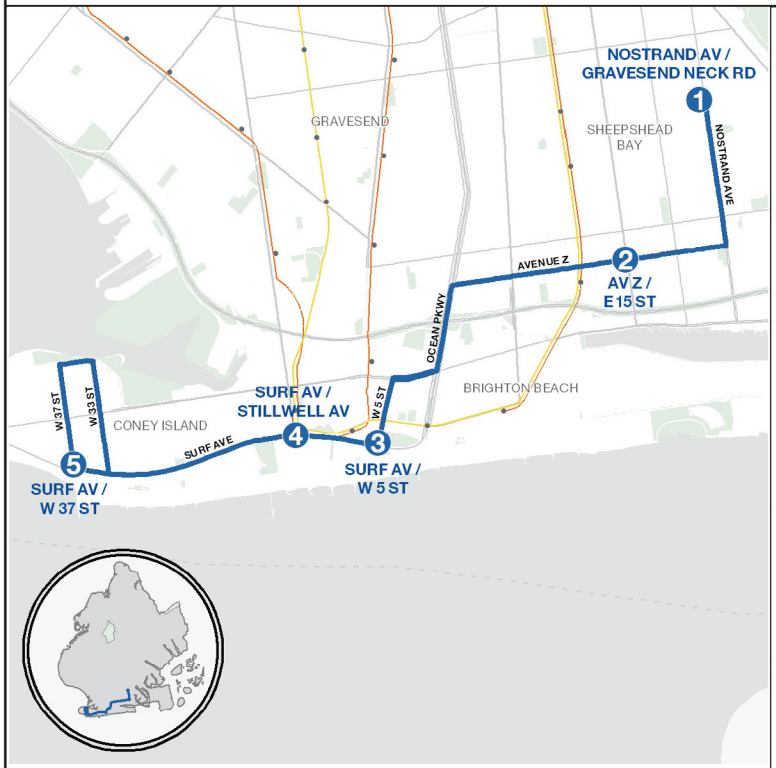
48.9% 33.4% 17.7%

Route Metrics

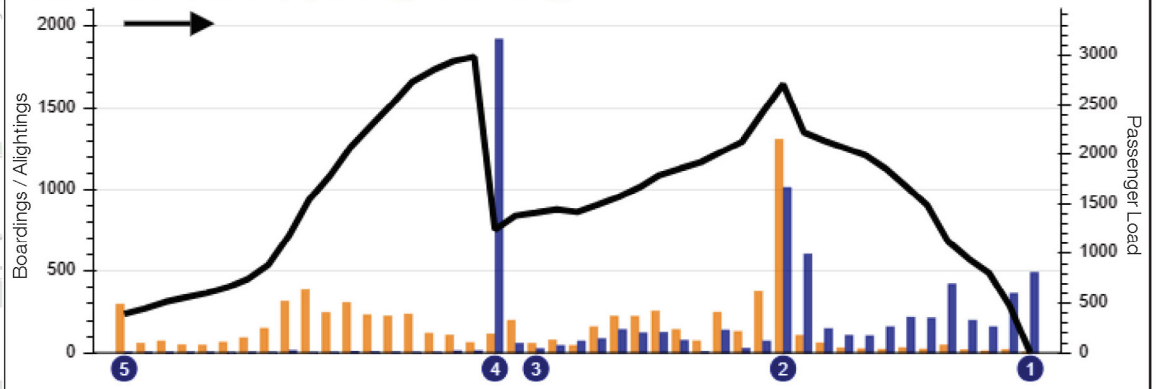
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	33,416		25,814		17,199	
Riders per Revenue Hour	90.2		80.1		75.0	
Riders per Trip	81.7		70.9		64.2	
CJTP (%)	58.9		--	--	--	--

B36 Surf Avenue / Avenue Z

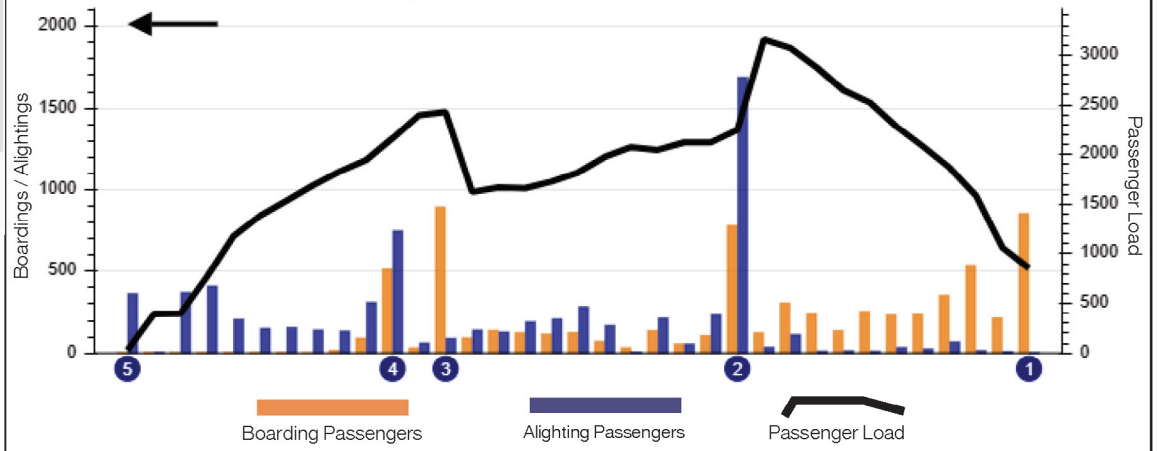
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	5.3 mi	1.9	705 ft	7.2 mph



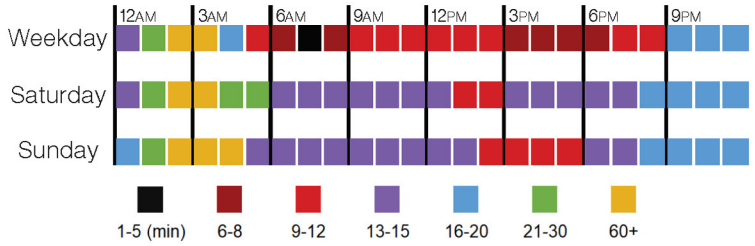
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

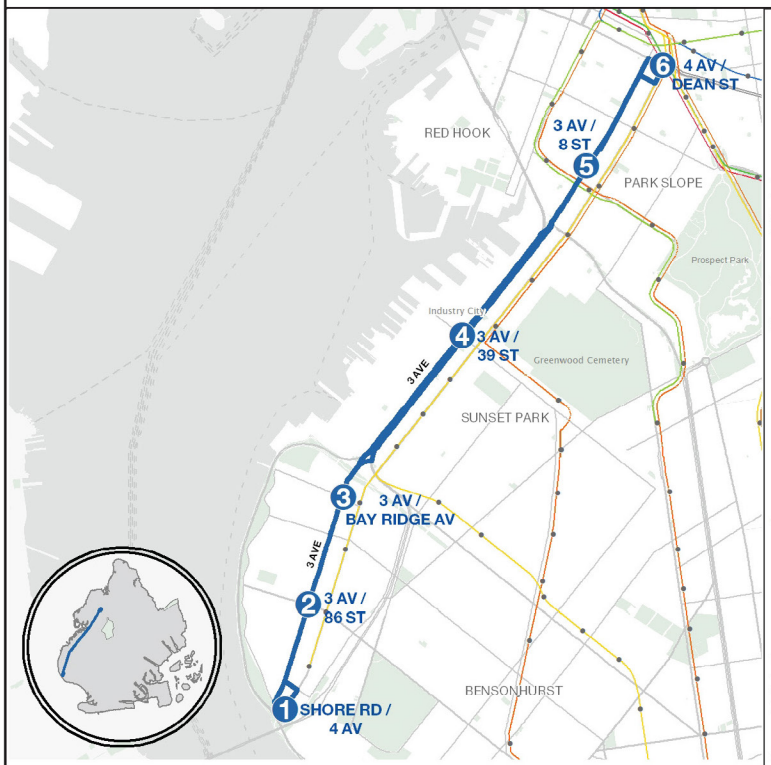
24.5% 48.7% 26.8%

Route Metrics

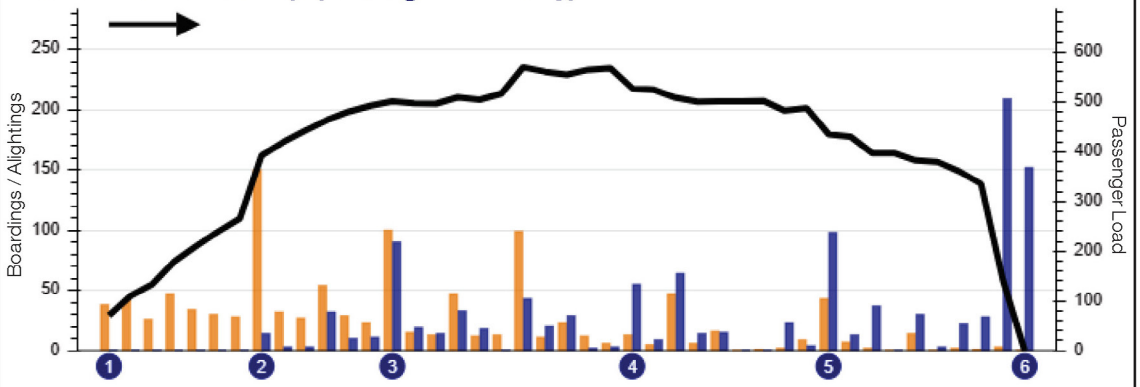
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	13,950		6,030		4,598	
Riders per Revenue Hour	74.5		63.1		47.6	
Riders per Trip	52.1		38.9		29.1	
CJTP (%)	72.5		--	--	--	--

B37 3rd Avenue

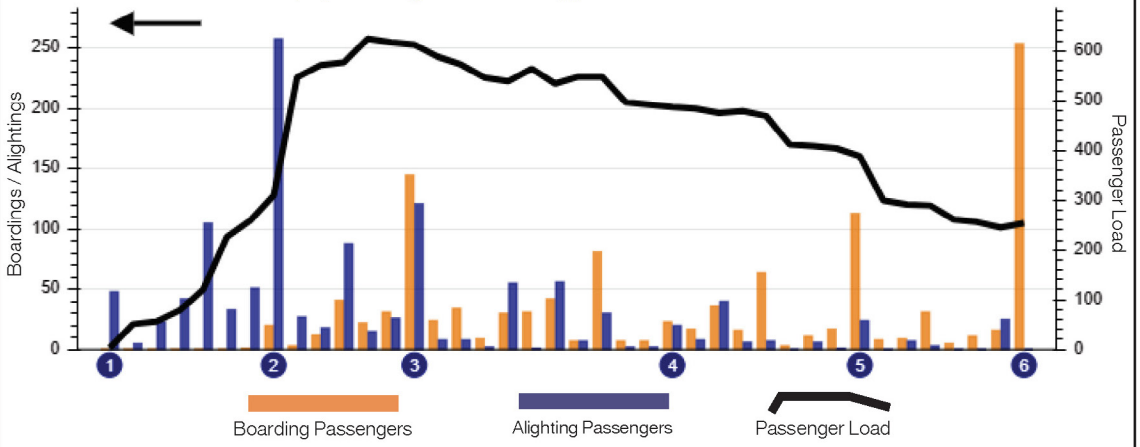
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.3 mi	0.8	821 ft	7.9 mph



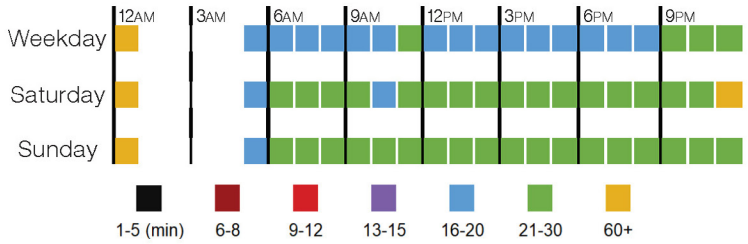
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



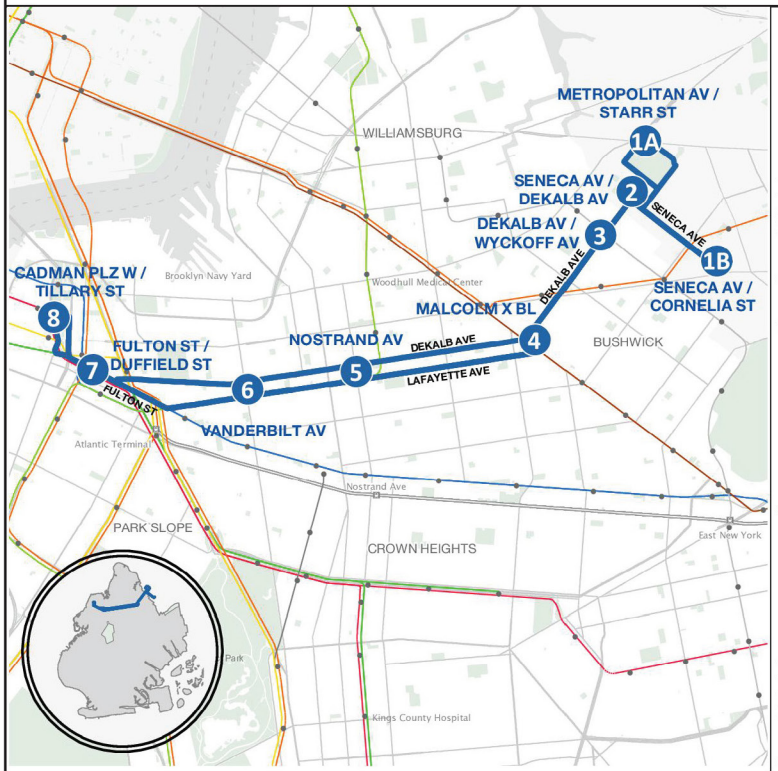
Transfers

Route Metrics

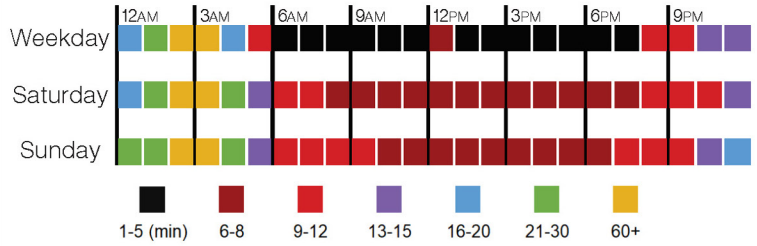
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	2,263		1,532		870	
Riders per Revenue Hour	31.7		30.9		19.6	
Riders per Trip	22.2		19.6		11.2	
CJTP (%)	62.8		--	--	--	--

B38 Dekalb/Lafayette Avenues

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local / Limited	5.6 mi	1.5	730 ft	6.2 mph



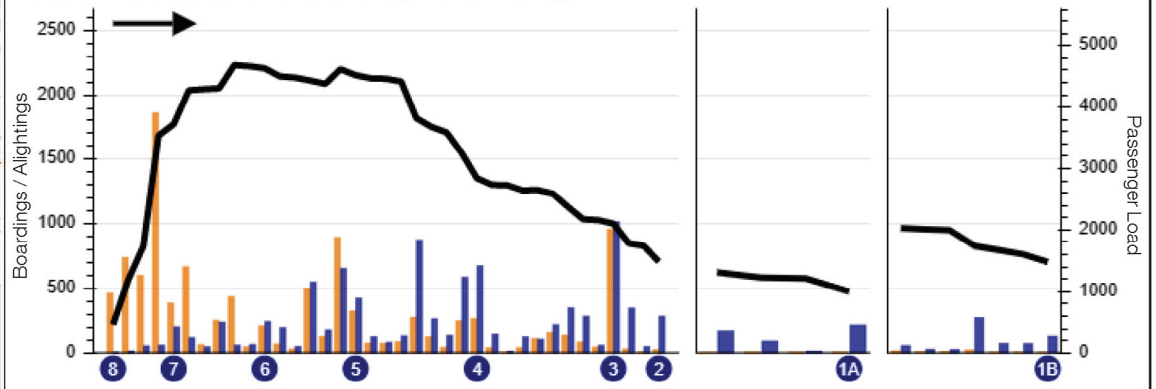
Hourly Frequency



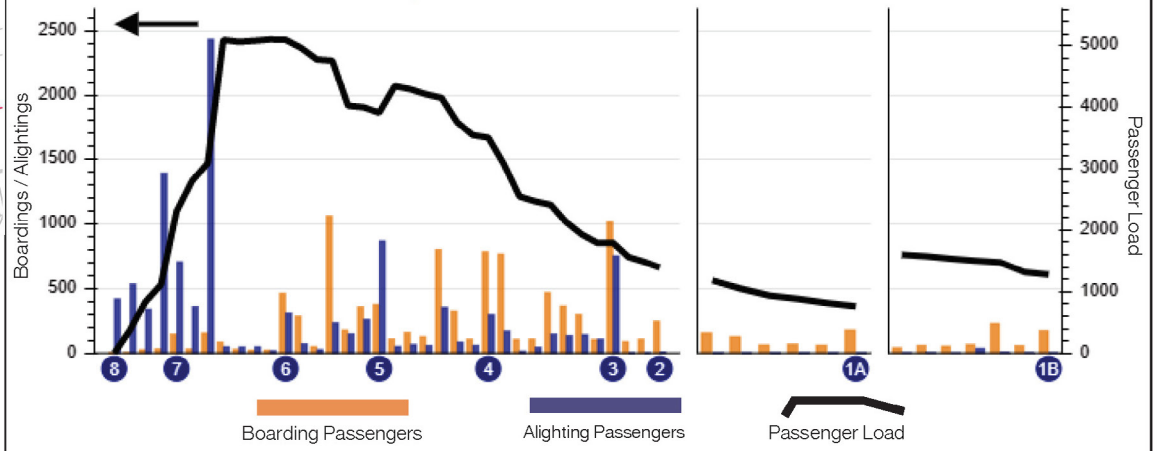
Transfers

29.7% 45.1% 25.3%

Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)

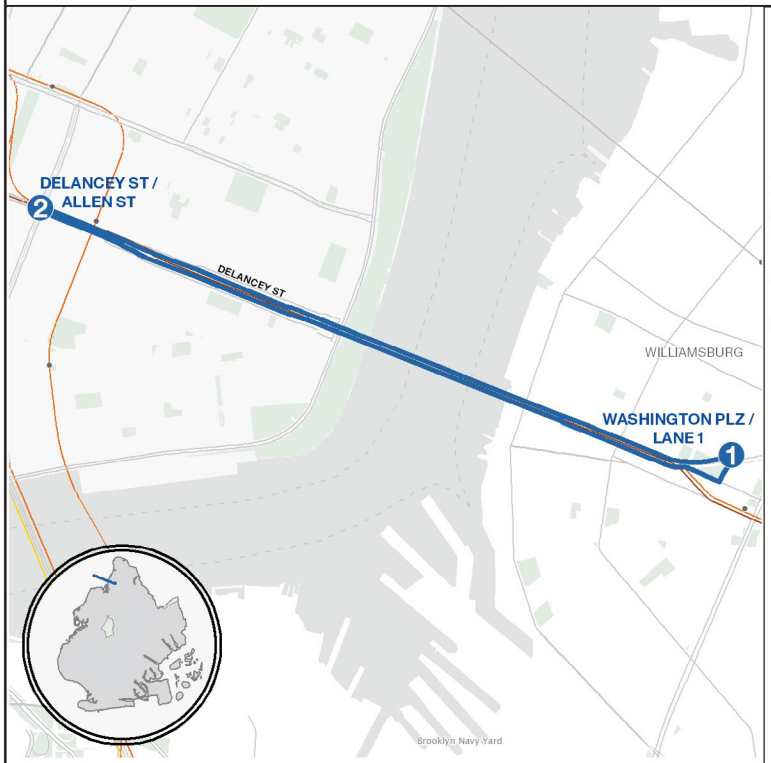


Route Metrics

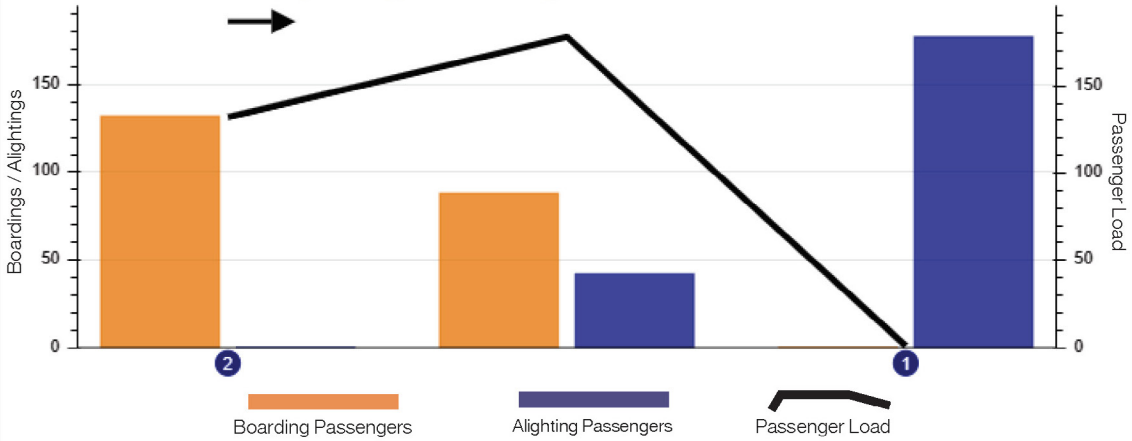
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	21,202		12,528		9,239	
Riders per Revenue Hour	56.8		57.3		44.8	
Riders per Trip	49.8		42.9		35.5	
CJTP (%)	69.2		--	--	--	--

B39 Williamsburg Bridge

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	1.8 mi	6.9	4,776 ft	12.9 mph

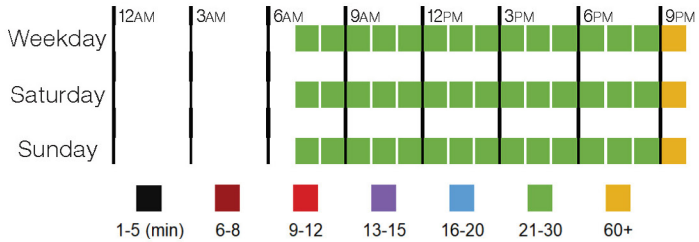


Eastbound Ridership (Average Weekday)



Westbound Ridership Data Unavailable

Hourly Frequency



Transfers

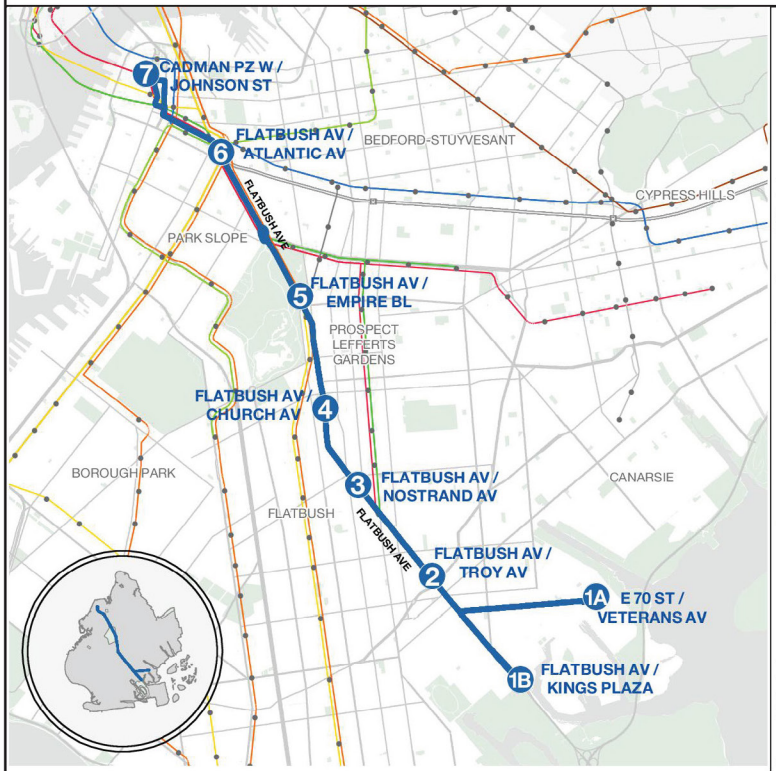
70.1% 13.4% 16.5%

Route Metrics

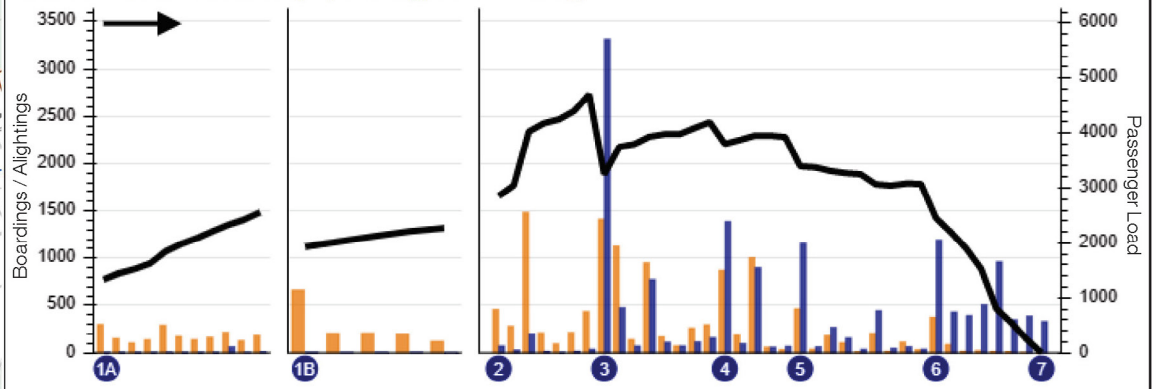
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	220		58		45	
Riders per Revenue Hour	30.8		6.4		5.3	
Riders per Trip	3.8		1.0		0.8	
CJTP (%)	--		--	--	--	--

B41 Flatbush Avenue

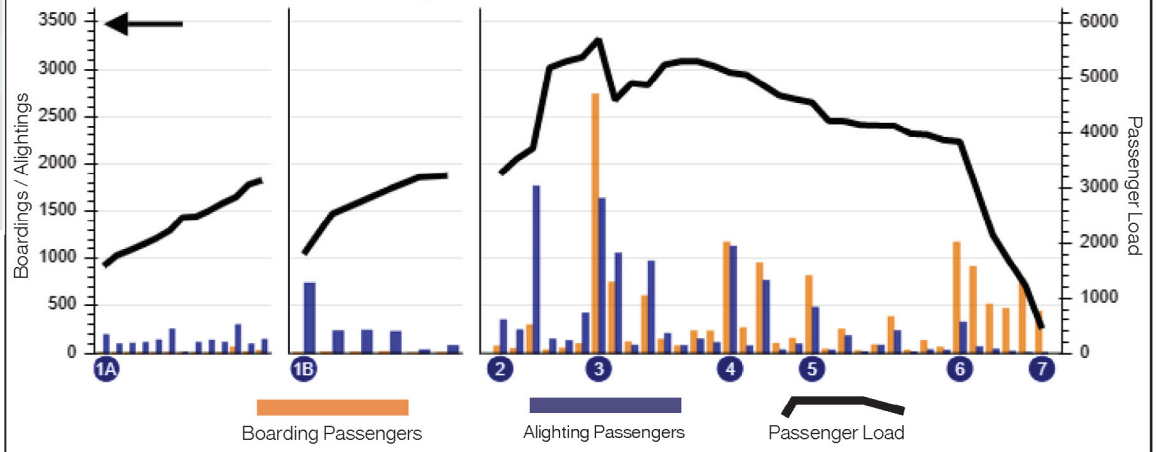
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local / Limited	7.7 mi	0.7	928 ft	6.5 mph



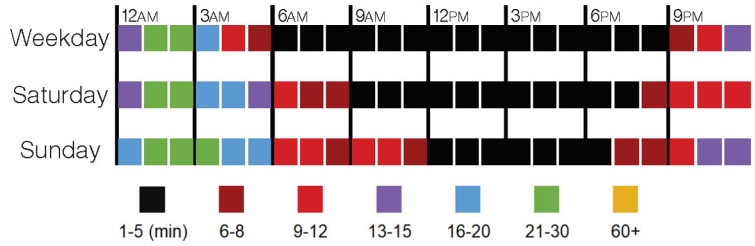
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

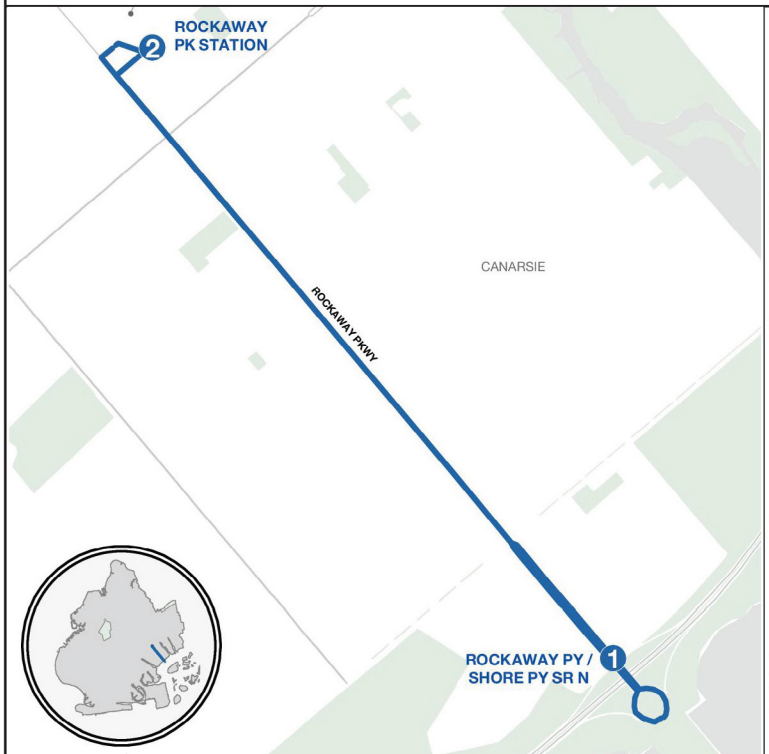
50.3% 31.0% 18.7%

Route Metrics

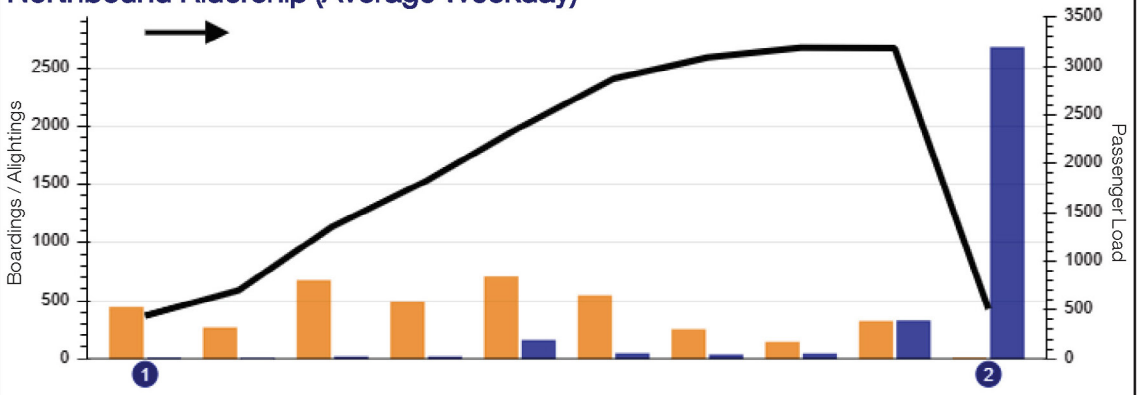
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	29,175		23,144		13,693	
Riders per Revenue Hour	54.2		52.1		40.8	
Riders per Trip	59.3		54.2		41.0	
CJTP (%)	68.4		--	--	--	--

B42 Rockaway Parkway

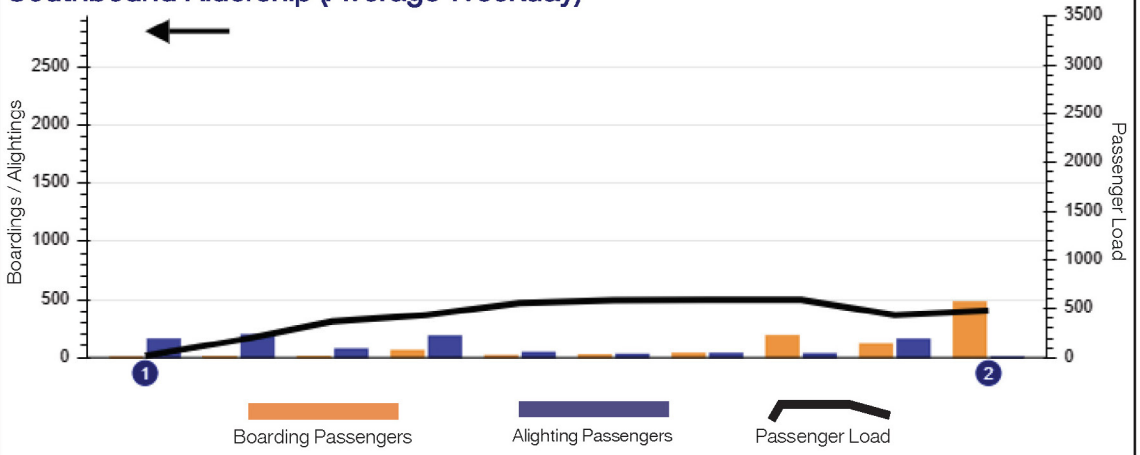
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	1.3 mi	1.5	781 ft	7.0 mph



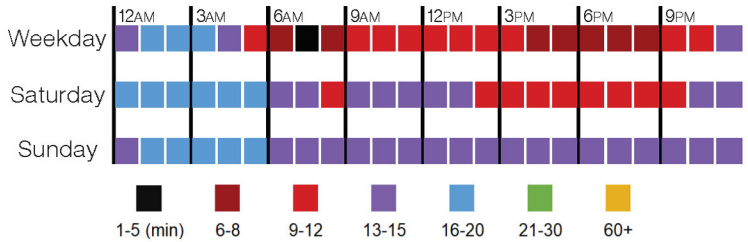
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

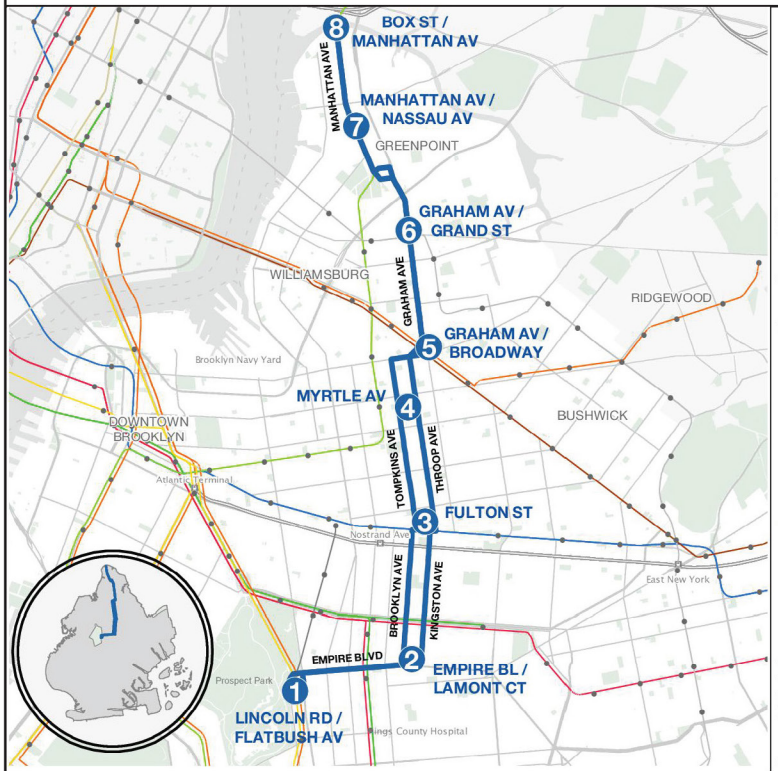
29.3% 41.5% 29.1%

Route Metrics

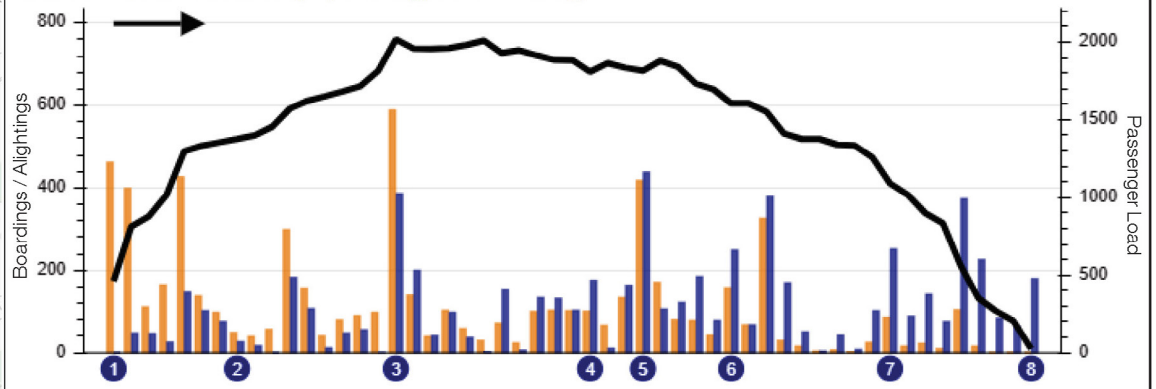
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	4,733		2,262		1,408	
Riders per Revenue Hour	84.2		69.1		58.5	
Riders per Trip	15.6		11.0		7.8	
CJTP (%)	--		--	--	--	--

B43 Greenpoint - Prospect-Lefferts Gardens

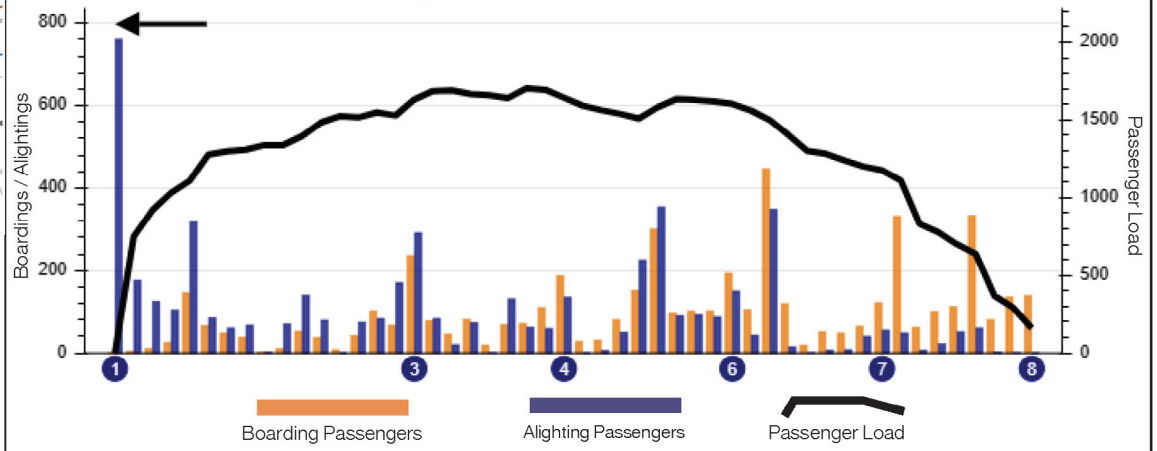
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.8 mi	1.8	710 ft	6.2 mph



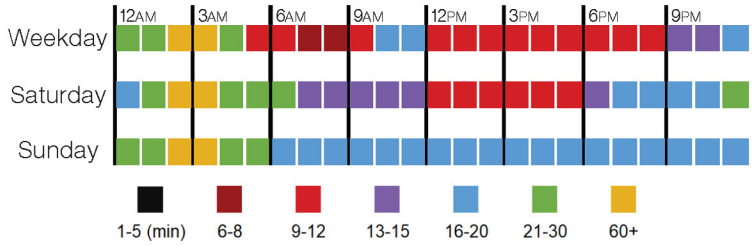
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



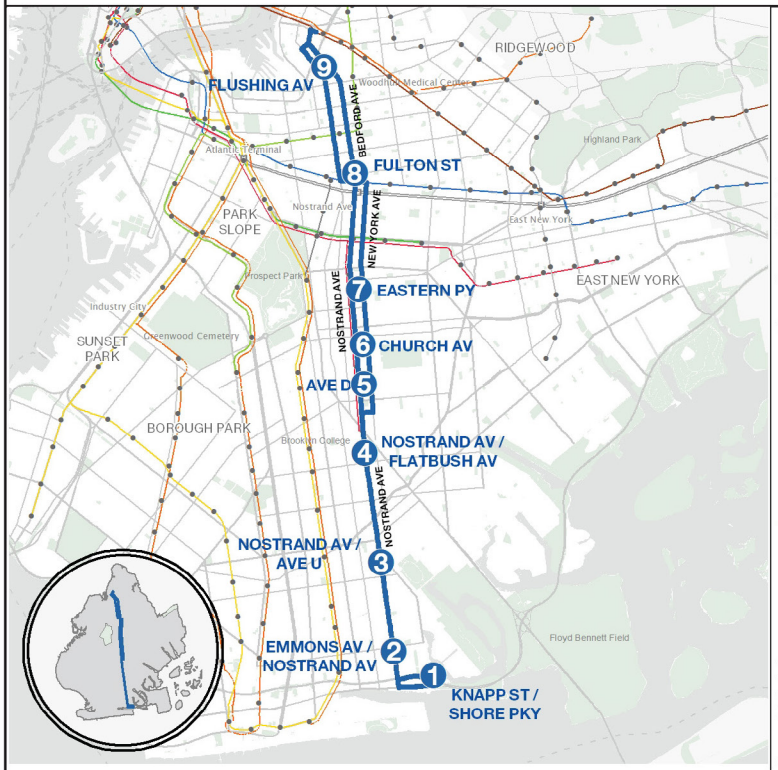
Transfers

Route Metrics

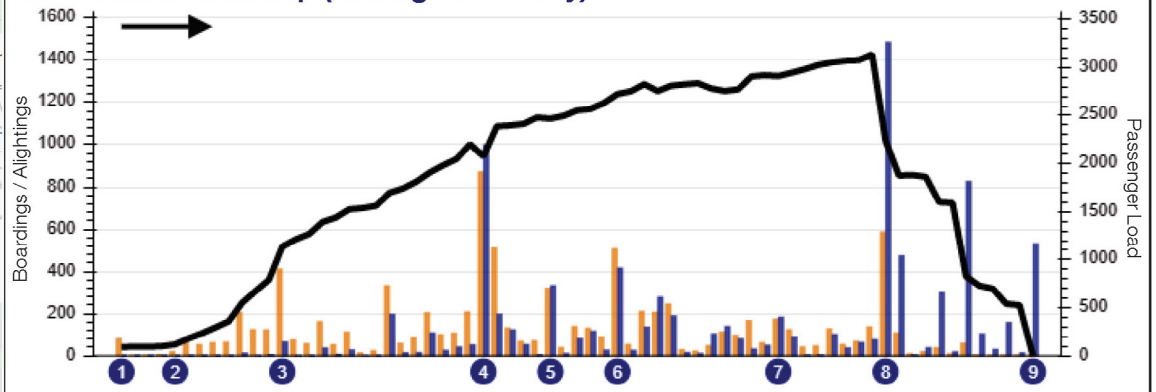
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	10,964		6,886		4,362	
Riders per Revenue Hour	55.1		47.1		40.1	
Riders per Trip	58.9		45.9		35.2	
CJTP (%)	64.7		--	--	--	--

B44 Nostrand/New York Avenues

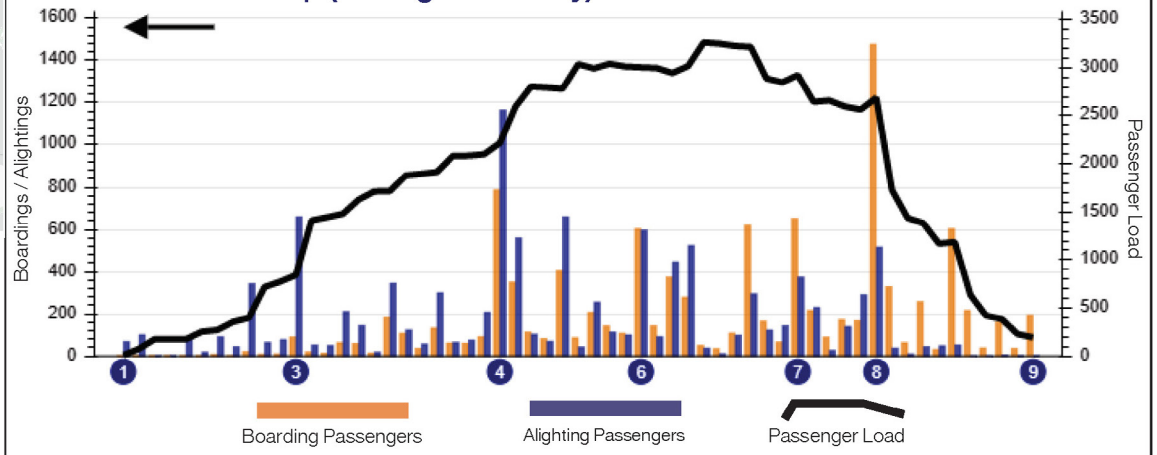
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	8.6 mi	0.8	734 ft	6.9 mph



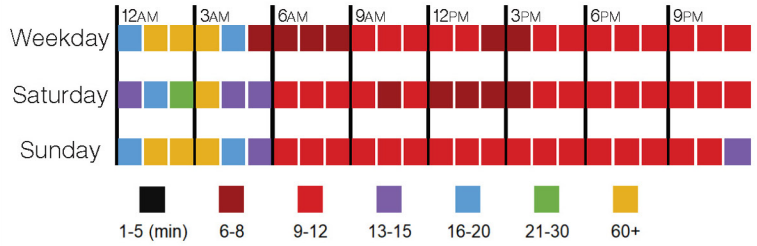
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

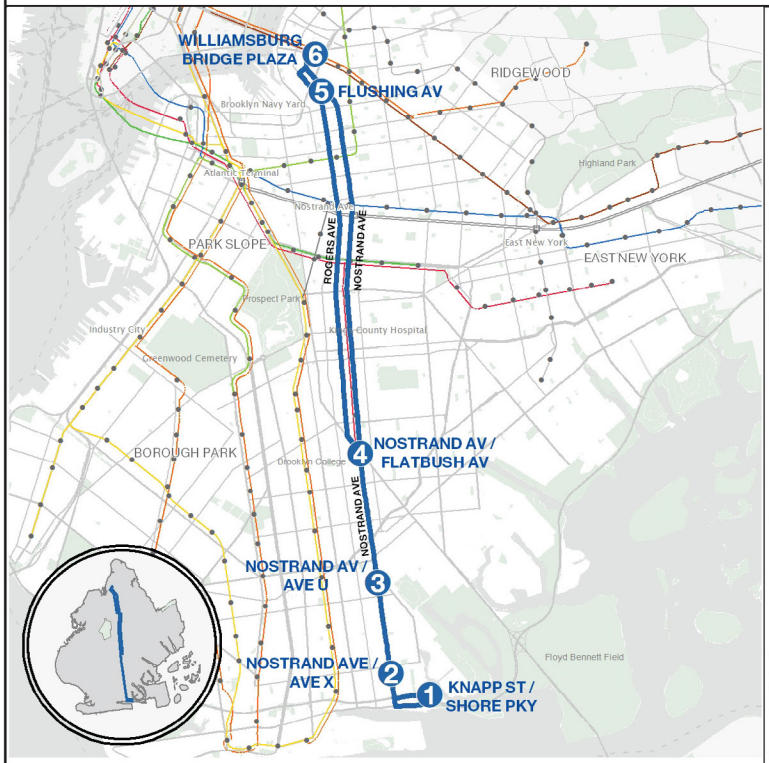
45.7% | 26.0% | 28.3%

Route Metrics

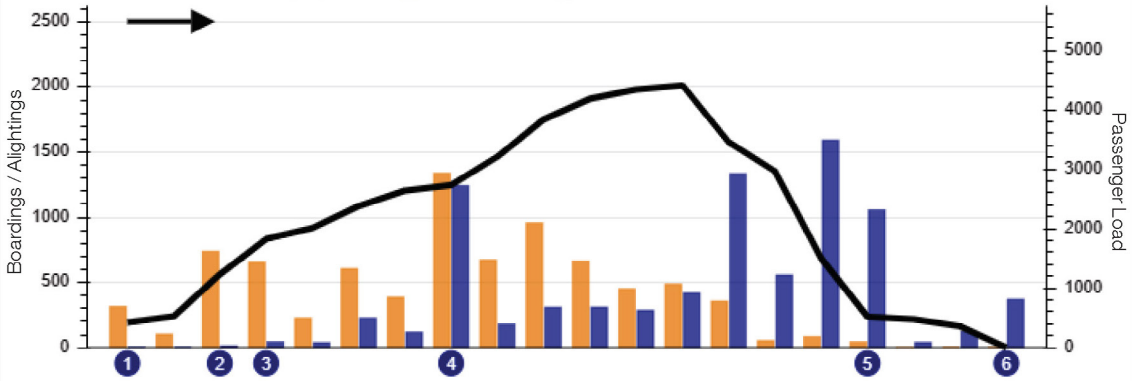
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	18,951		14,203		10,440	
Riders per Revenue Hour	62.4		52.9		46.5	
Riders per Trip	71.8		55.7		49.0	
CJTP (%)	71.1		--	--	--	--

B44 SBS Nostrand/Rogers Avenues

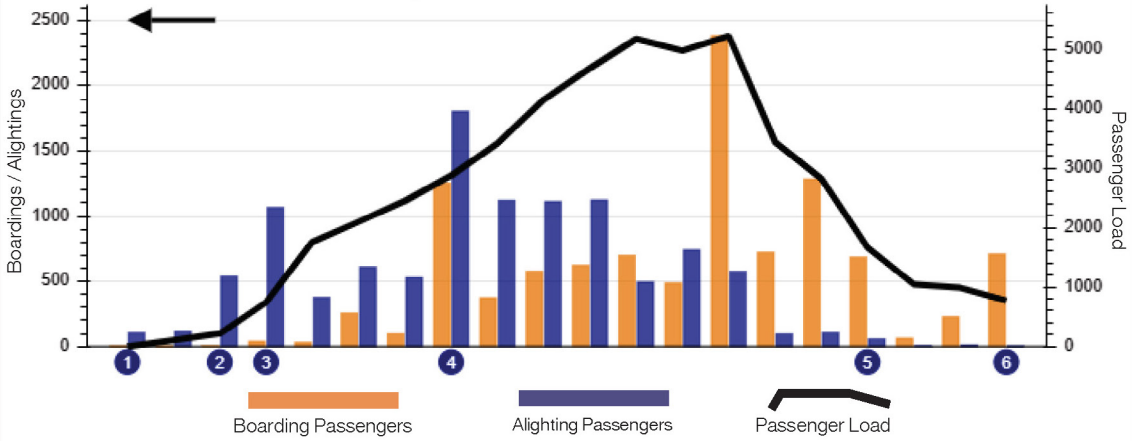
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
SBS	9.4 mi	0.6	2,669 ft	8.8 mph



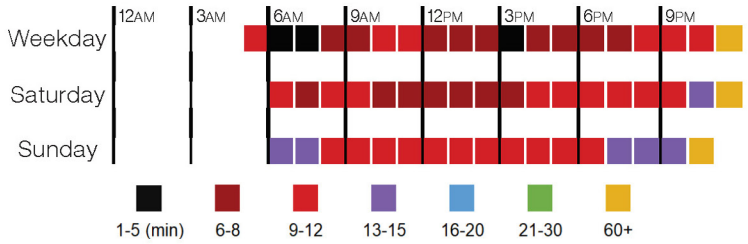
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

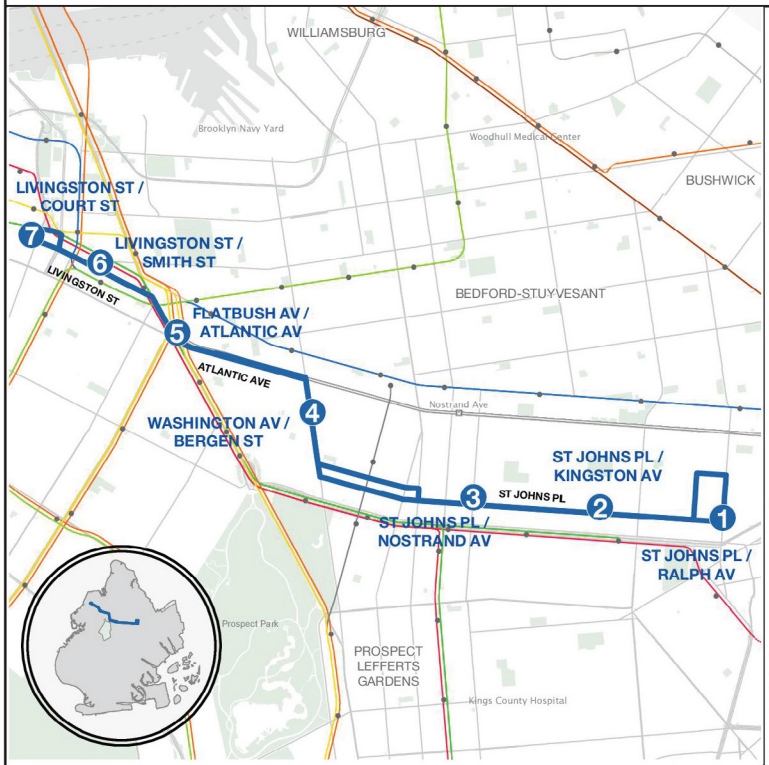
47.4% 32.5% 20.1%

Route Metrics

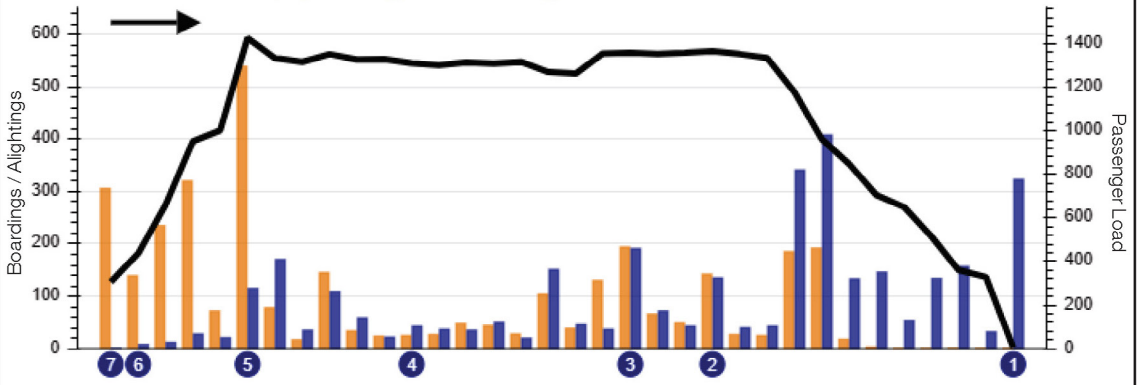
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	18,634		12,280		8,584	
Riders per Revenue Hour	74.3		68.5		62.4	
Riders per Trip	68.5		59.0		57.2	
CJTP (%)	82.8		--	--	--	--

B45 St. Johns Place

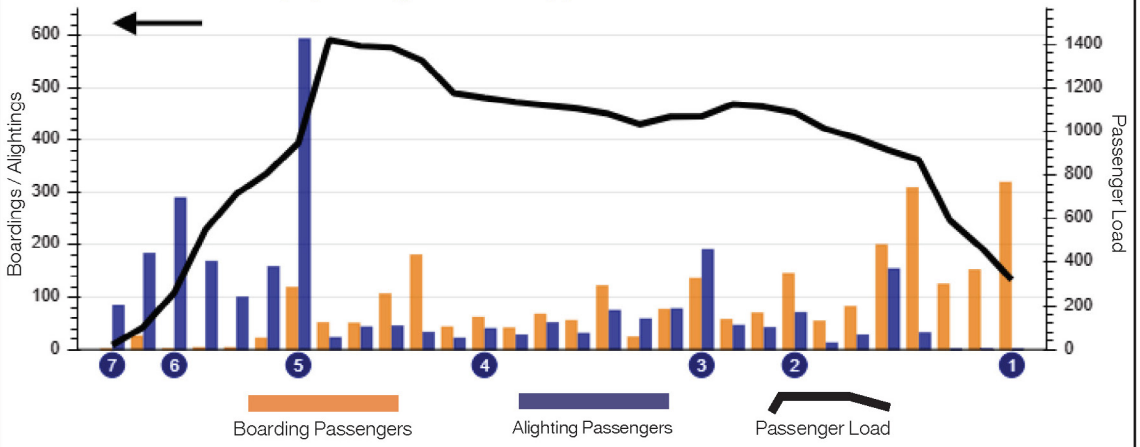
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	4.6 mi	1.8	785 ft	5.7 mph



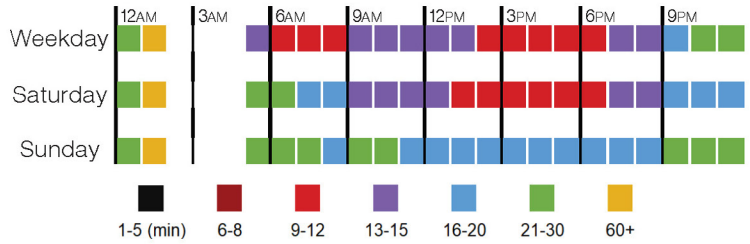
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

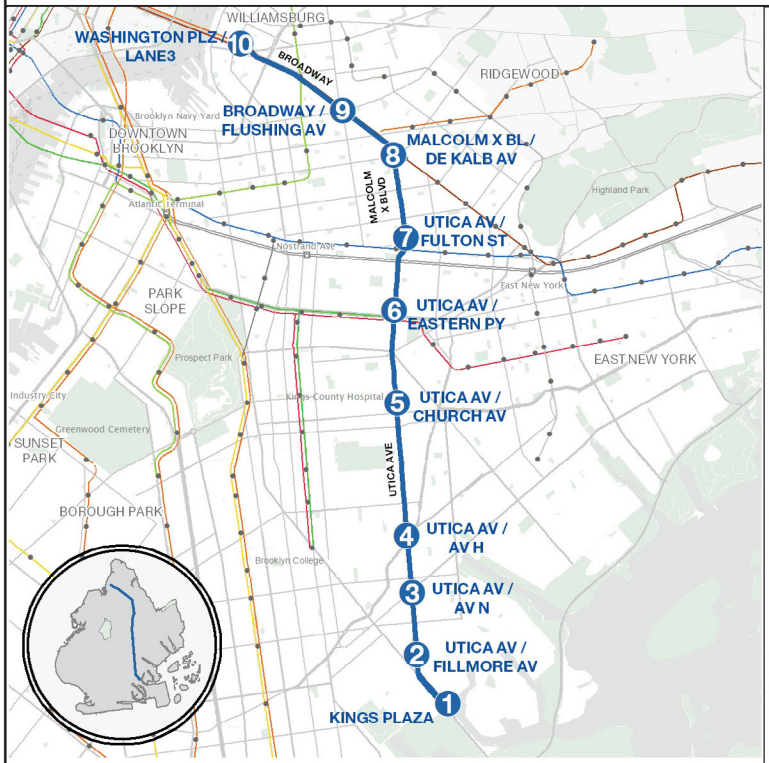
40.1% 26.2% 33.7%

Route Metrics

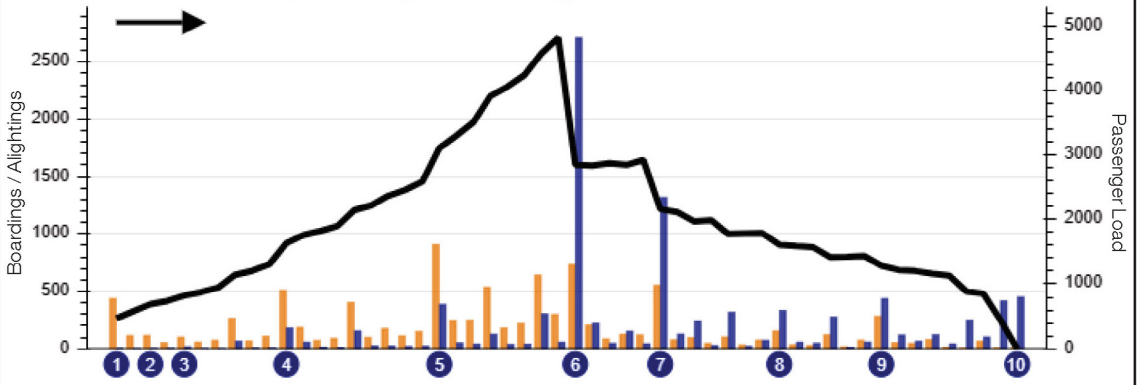
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	5,946		3,975		2,107	
Riders per Revenue Hour	50.0		40.4		33.8	
Riders per Trip	38.1		28.0		21.1	
CJTP (%)	60.0		--	--	--	--

B46 Utica Avenue / Broadway

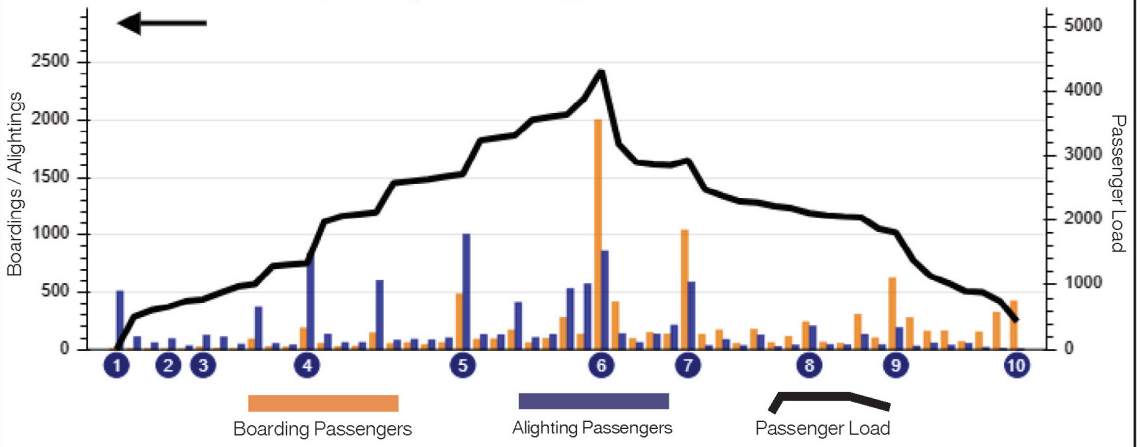
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	8.0 mi	0.6	801 ft	6.8 mph



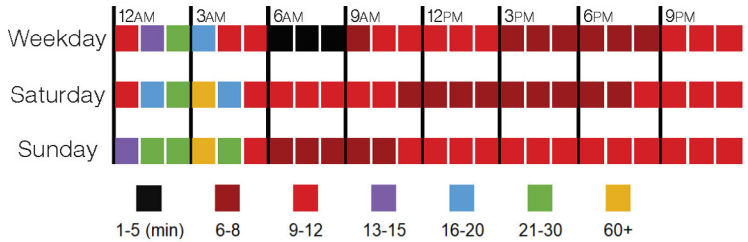
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

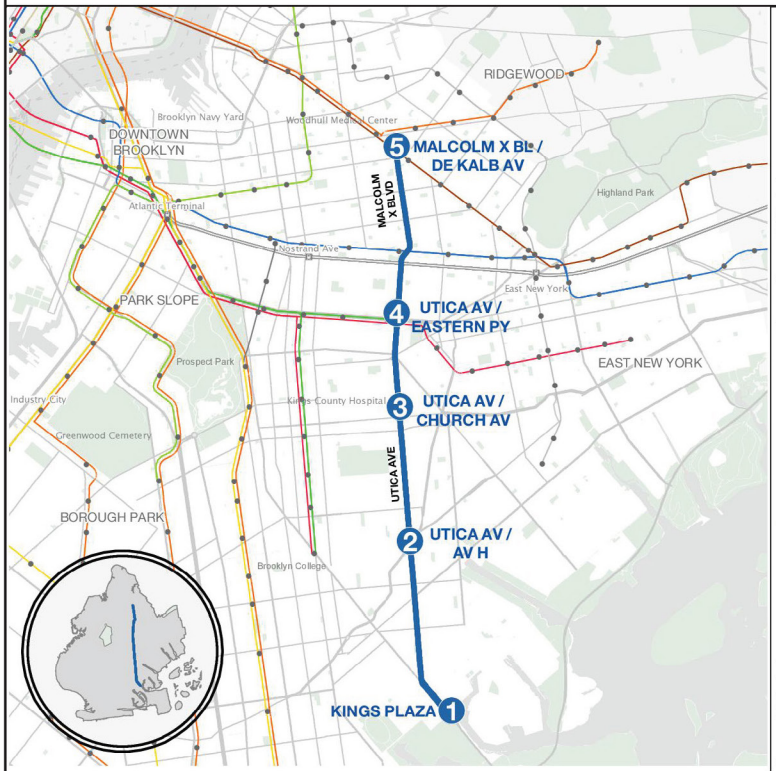
43.7% 37.9% 18.4%

Route Metrics

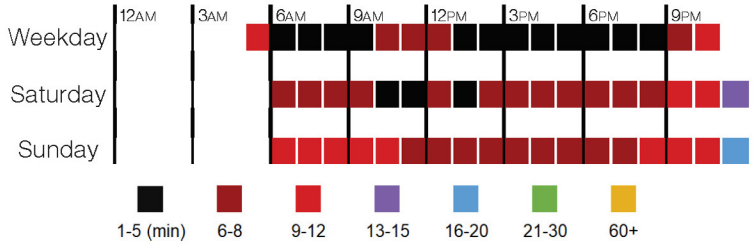
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	19,248		15,586		11,951	
Riders per Revenue Hour	57.0		48.8		44.9	
Riders per Trip	59.8		54.9		46.0	
CJTP (%)	73.4		--	--	--	--

B46 SBS Utica Avenue

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
SBS	6.0 mi	0.3	2,637 ft	8.3 mph

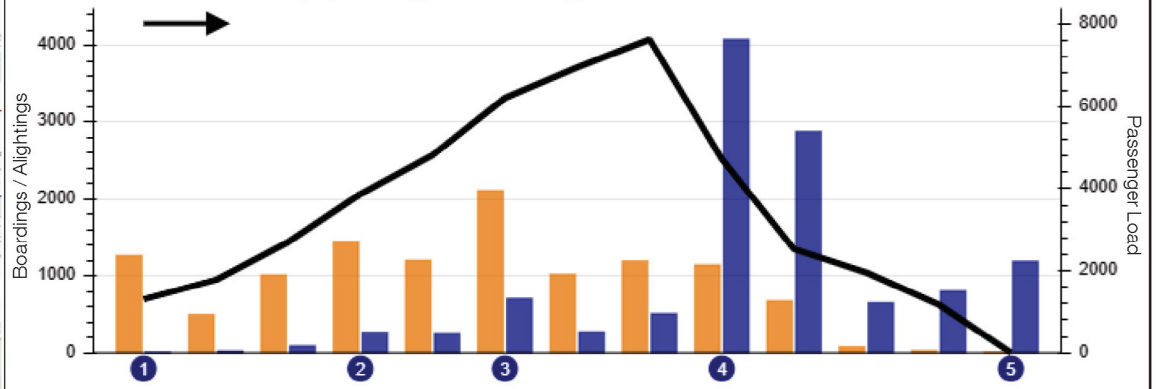


Hourly Frequency

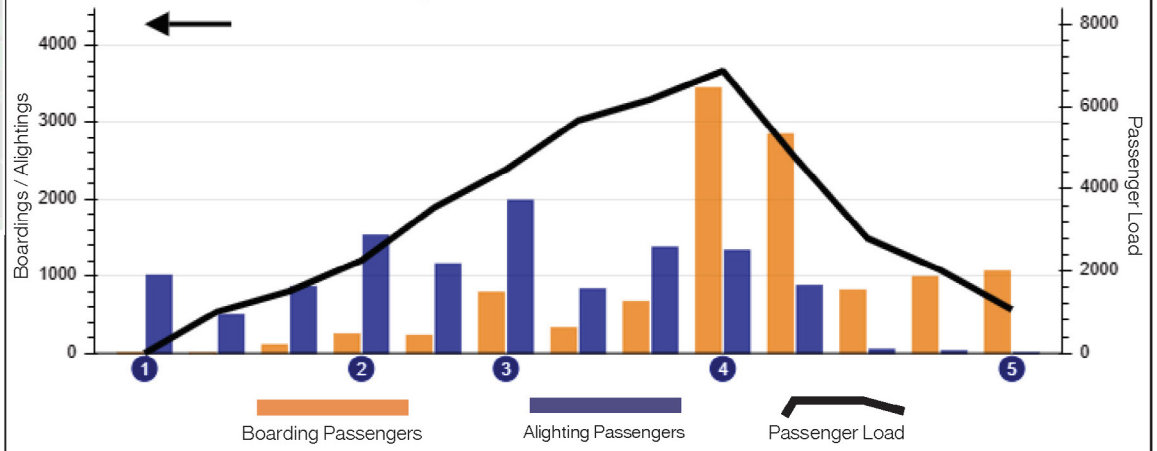


Transfer Data Unavailable

Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



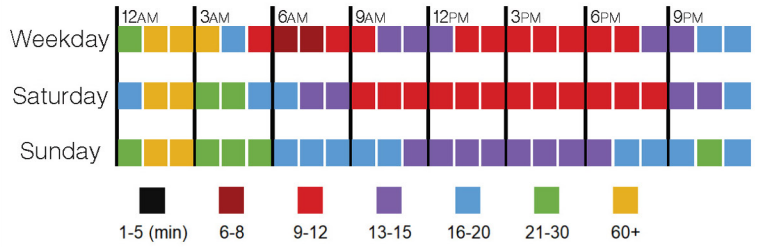
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	23,223		16,202		9,988	
Riders per Revenue Hour	70.3		67.1		68.3	
Riders per Trip	49.7		50.3		43.8	
CJTP (%)	74.8		--	--	--	--

B47 Ralph Avenue

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.6 mi	1.7	715 ft	6.9 mph

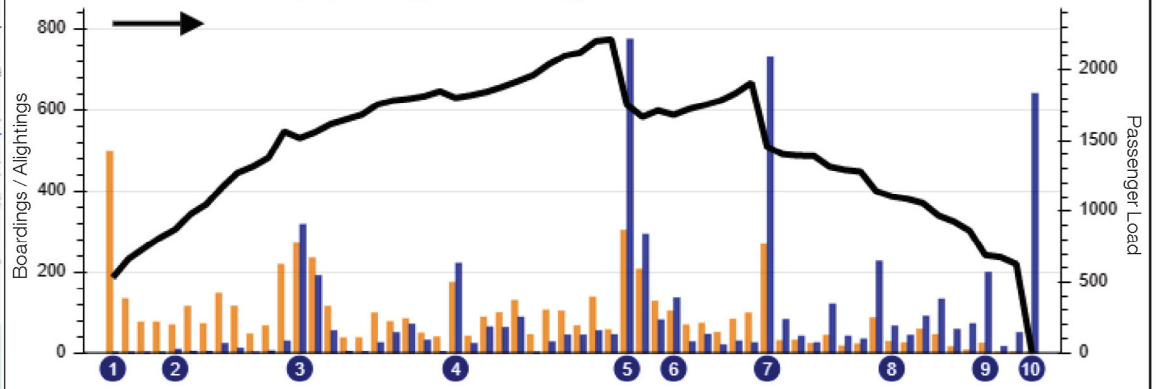
Hourly Frequency



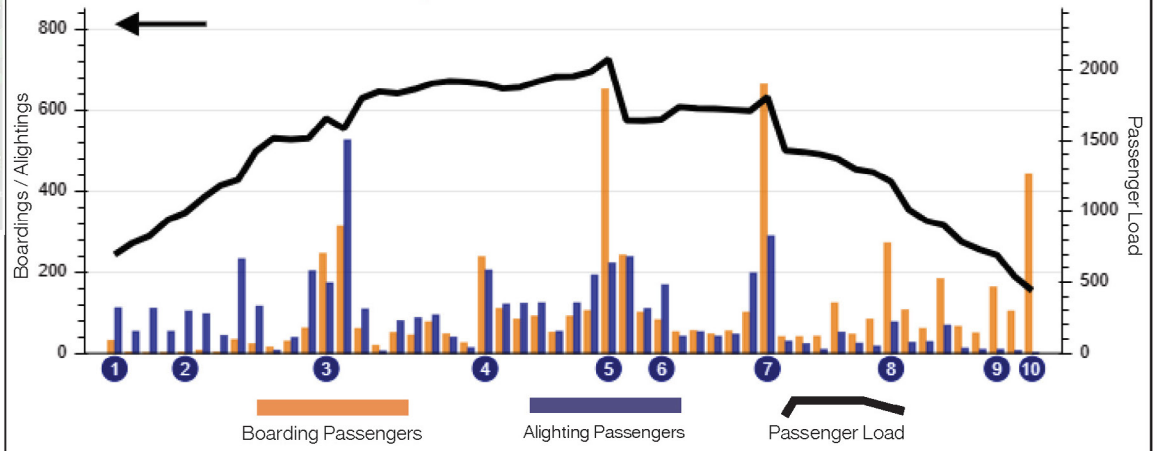
Transfers

46.5% 23.7% 29.8%

Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)

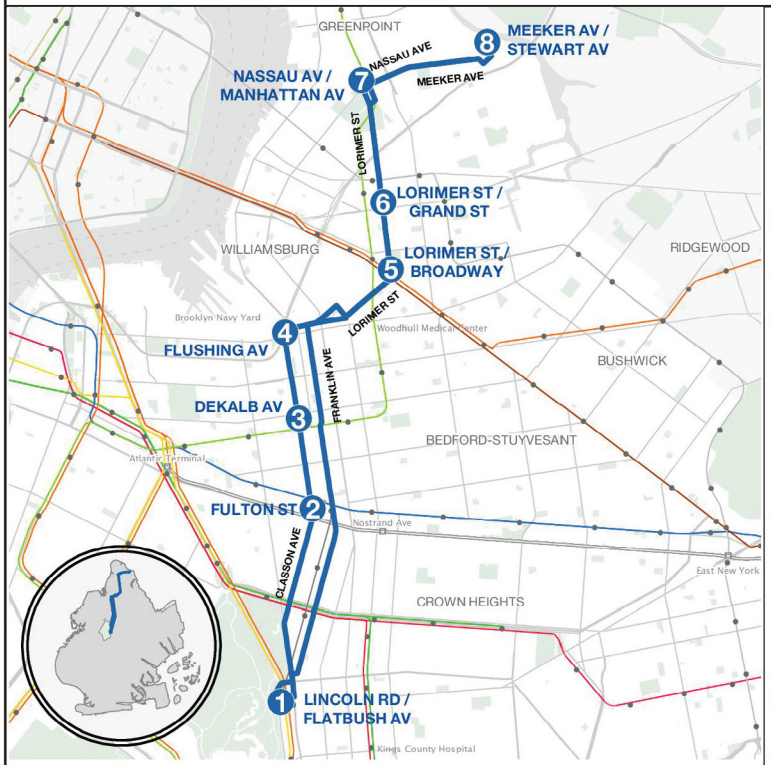


Route Metrics

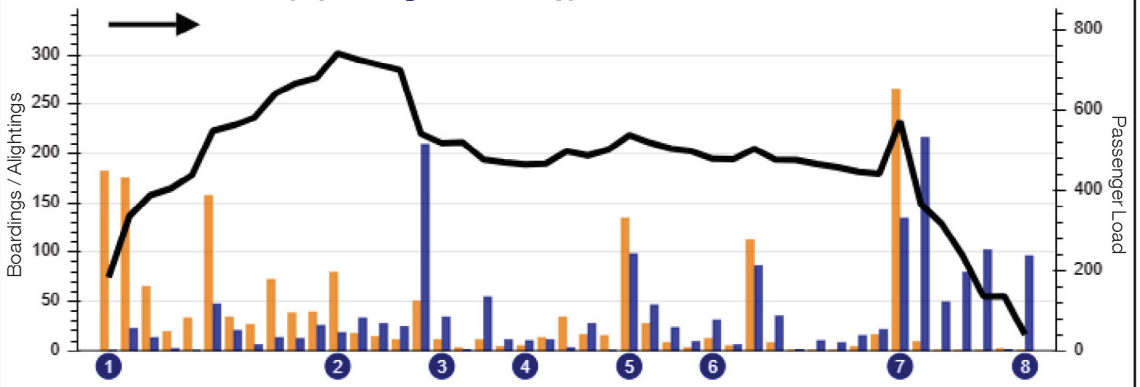
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	11,254		7,808		4,525	
Riders per Revenue Hour	56.7		45.6		36.1	
Riders per Trip	56.6		43.4		33.8	
CJTP (%)	60.0		--	--	--	--

B48 Lorimer Street / Franklin/Classon Avenues

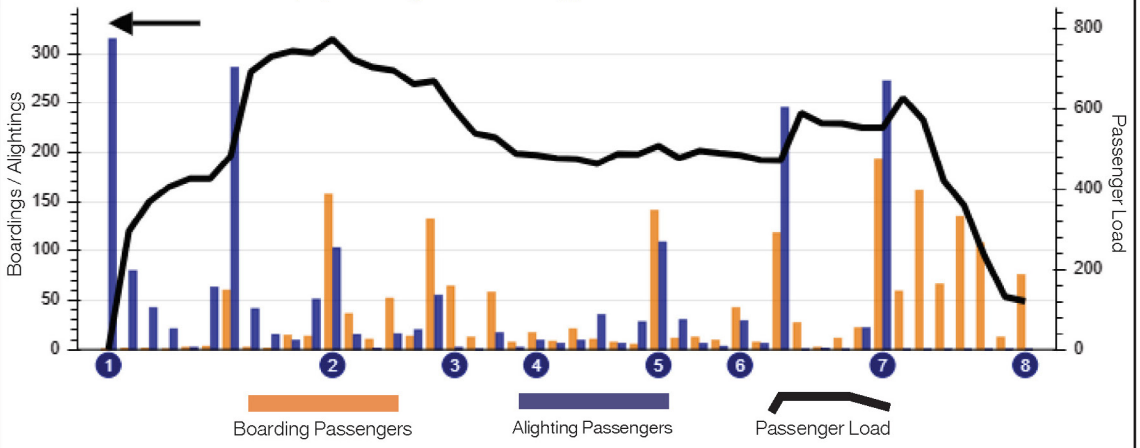
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.0 mi	1.8	710 ft	6.6 mph



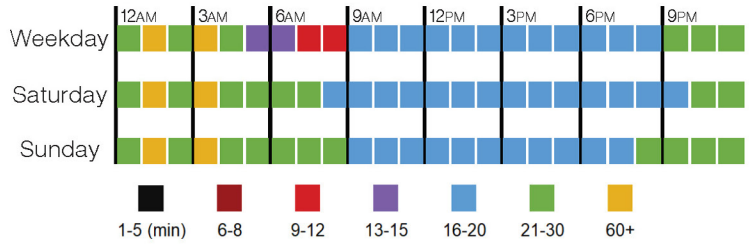
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

27.2% 49.5% 23.3%

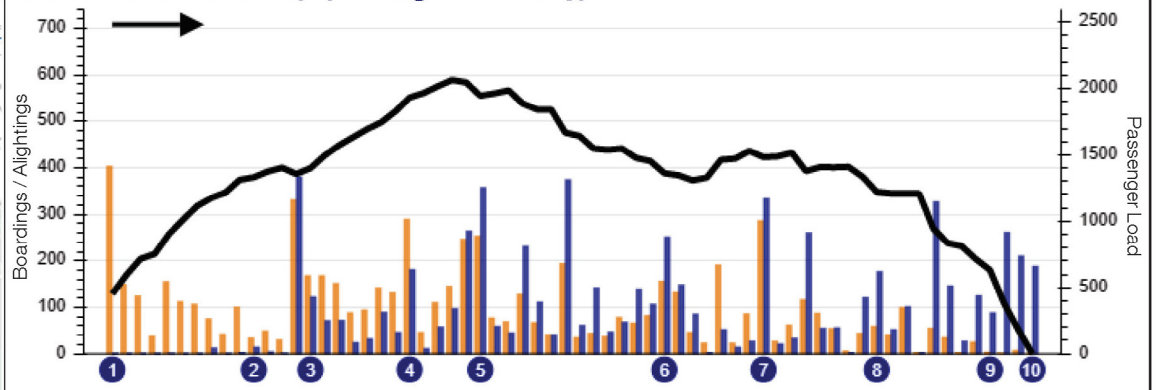
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	3,646		2,270		1,673	
Riders per Revenue Hour	33.1		25.9		22.0	
Riders per Trip	28.5		19.9		15.2	
CJTP (%)	63.8		--	--	--	--

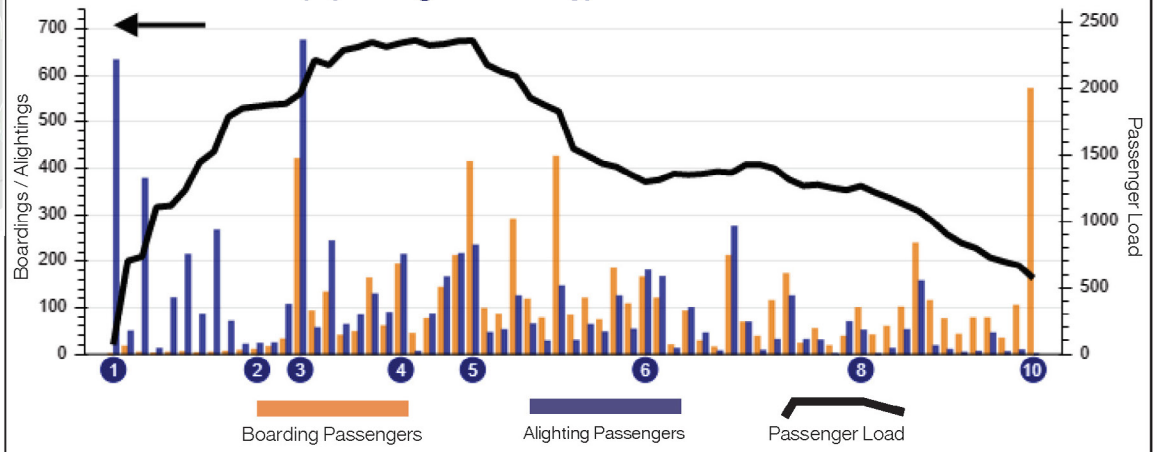
B49 Ocean Avenue / Rogers/Bedford Avenues

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local / Limited	8.8 mi	1.5	718 ft	7.3 mph

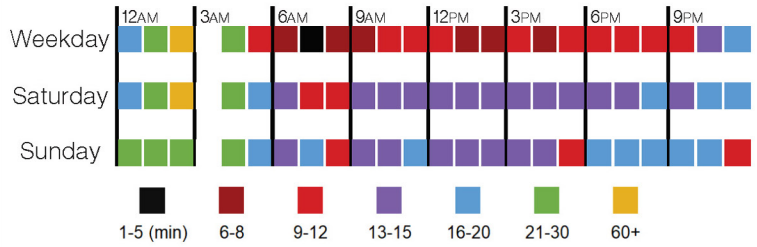
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



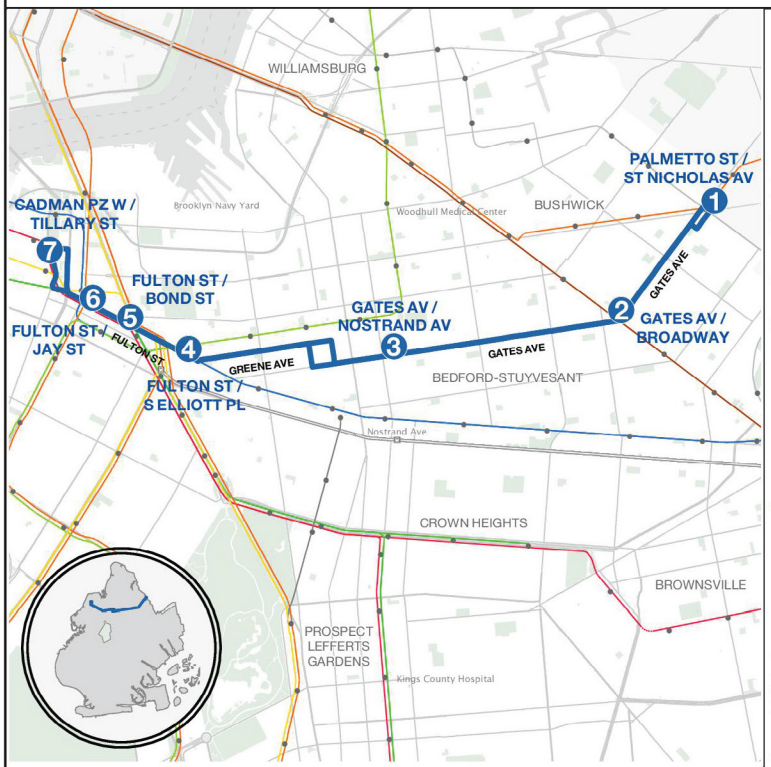
Transfers

Route Metrics

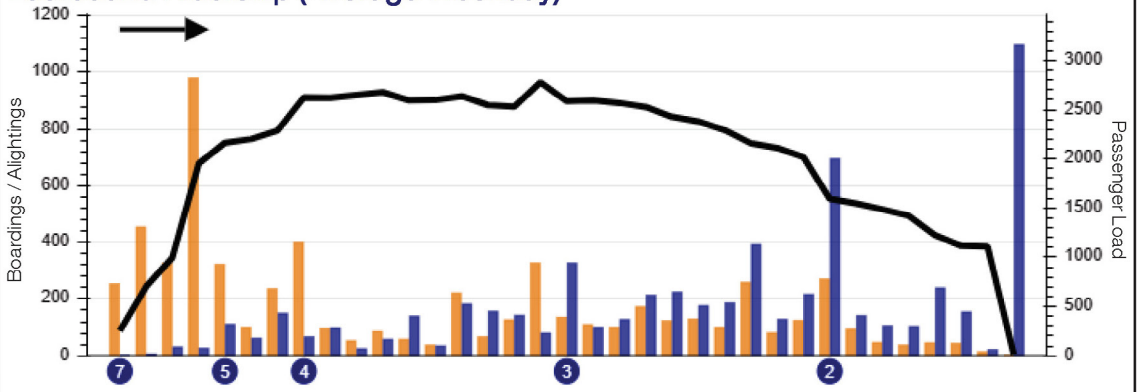
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	12,990		6,010		4,451	
Riders per Revenue Hour	50.4		37.6		32.5	
Riders per Trip	54.1		38.0		30.9	
CJTP (%)	71.5		--	--	--	--

B52 Gates Avenue

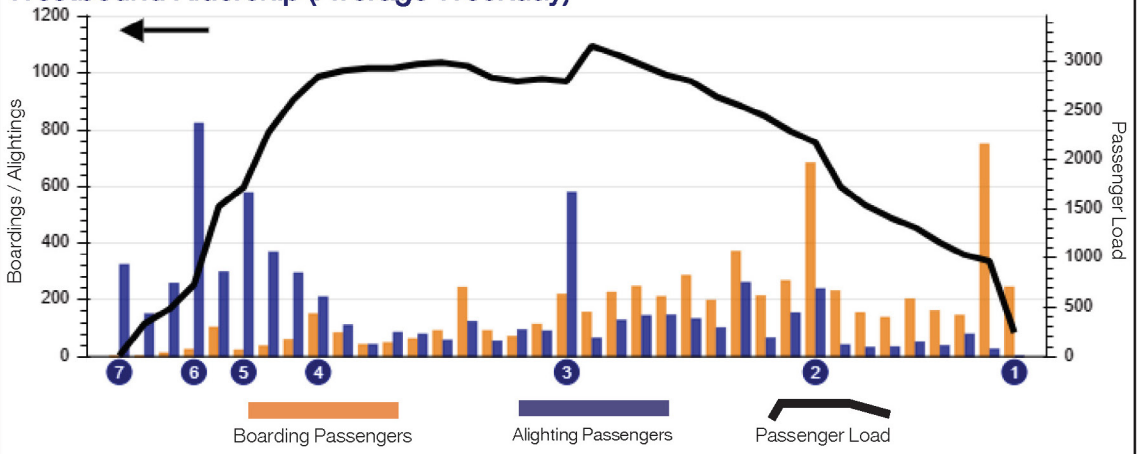
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	5.1 mi	1.4	767 ft	6.2 mph



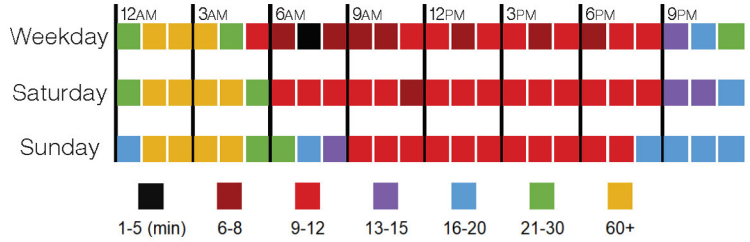
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

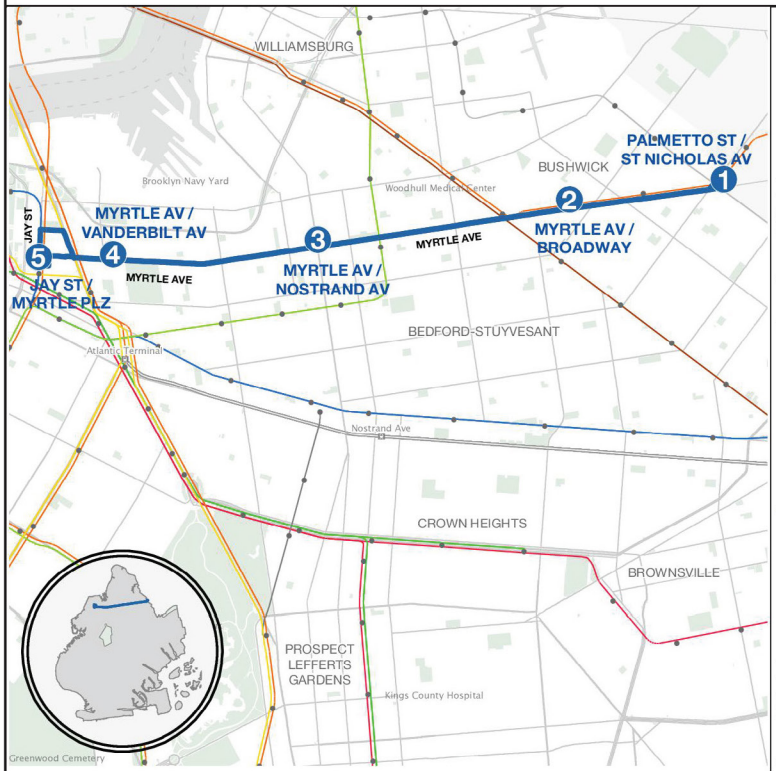
35.5% 33.2% 31.3%

Route Metrics

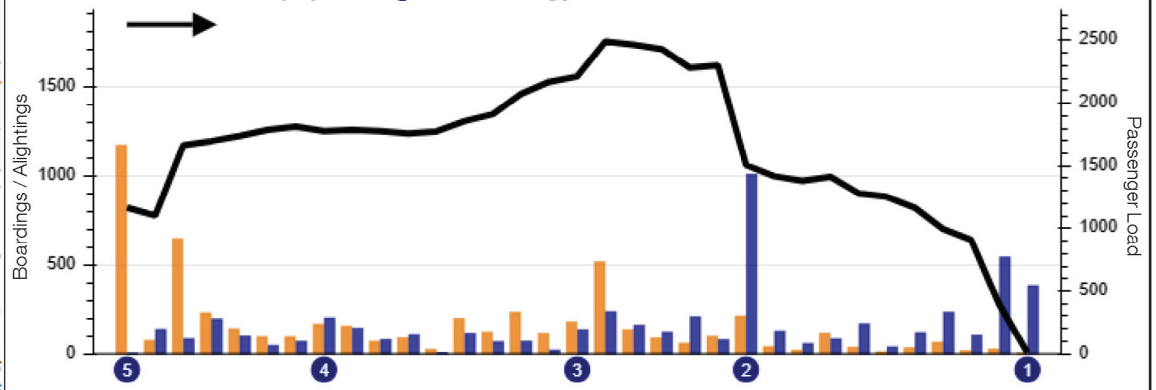
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	12,365		8,474		5,411	
Riders per Revenue Hour	59.0		52.5		46.3	
Riders per Trip	49.1		38.2		32.6	
CJTP (%)	72.0		--	--	--	--

B54 Myrtle Avenue

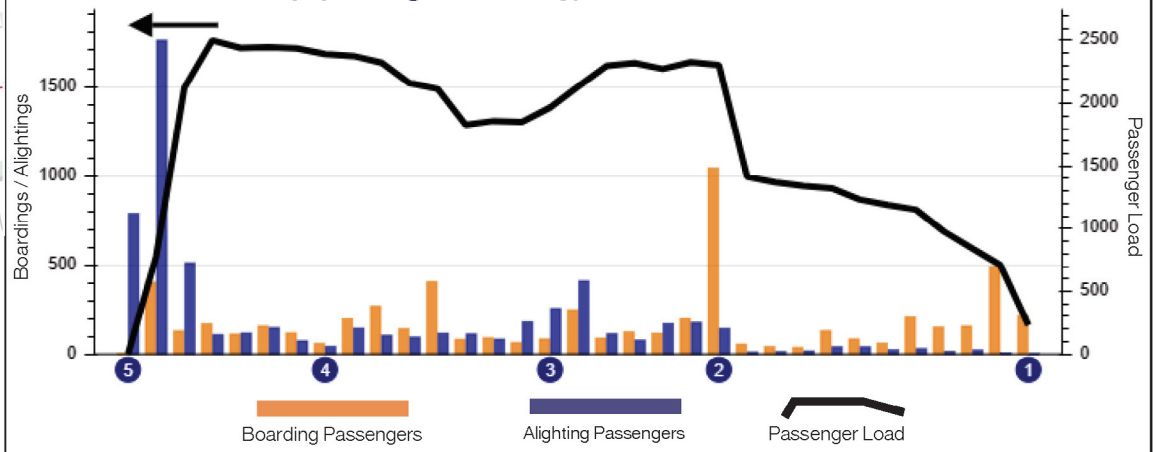
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	4.3 mi	1.2	714 ft	5.9 mph



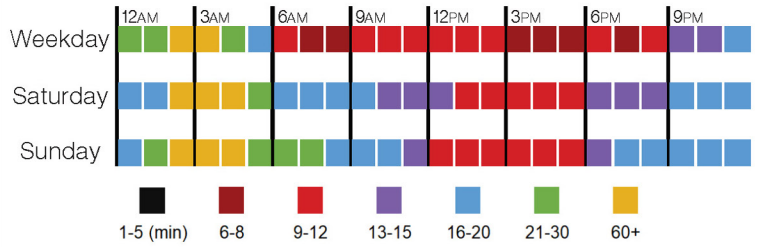
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



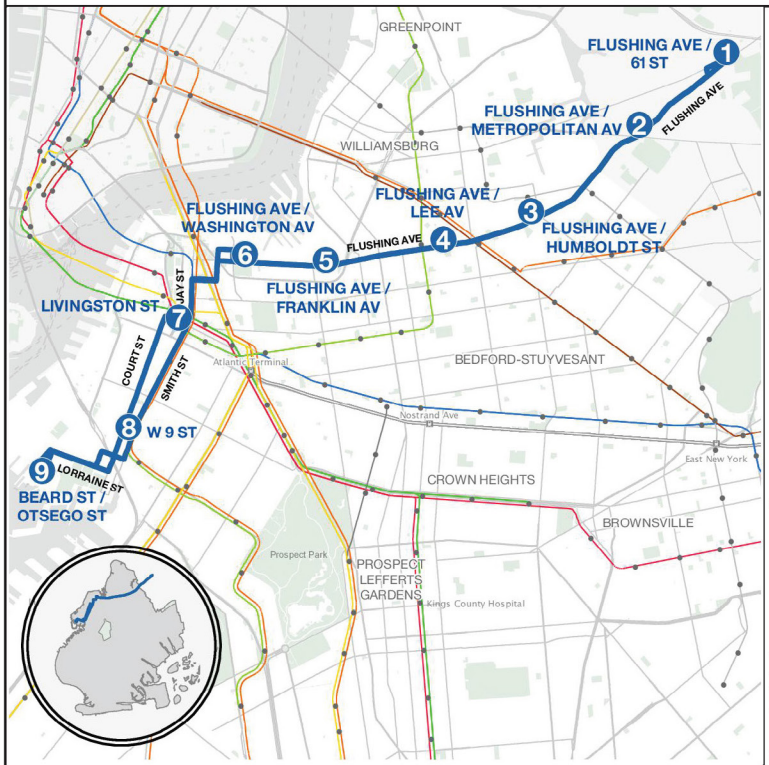
Transfers

Route Metrics

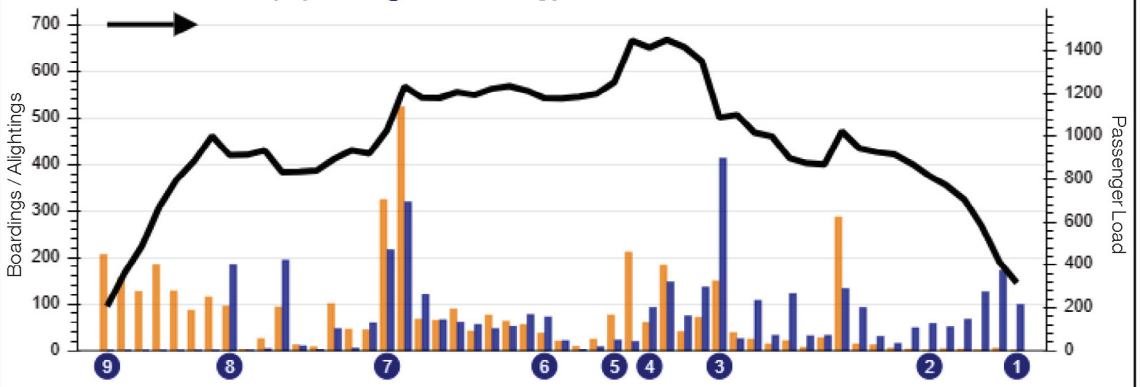
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	11,142		5,796		4,499	
Riders per Revenue Hour	67.9		65.8		56.5	
Riders per Trip	49.1		37.6		30.8	
CJTP (%)	70.2		--	--	--	--

B57 Flushing Avenue / Court/Smith Streets

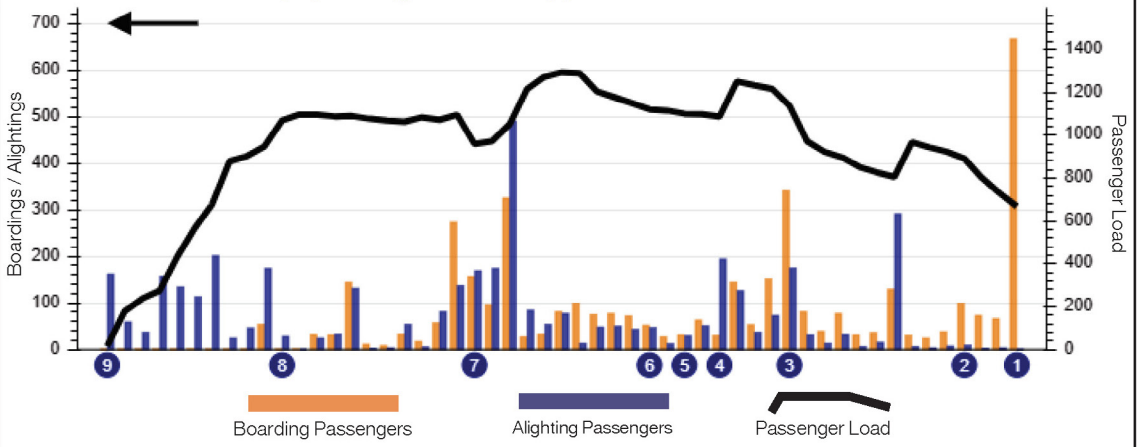
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	8.0 mi	1.4	808 ft	6.8 mph



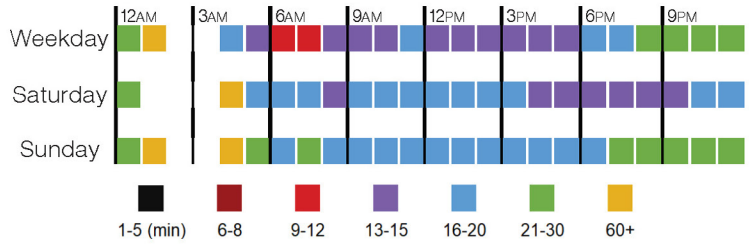
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

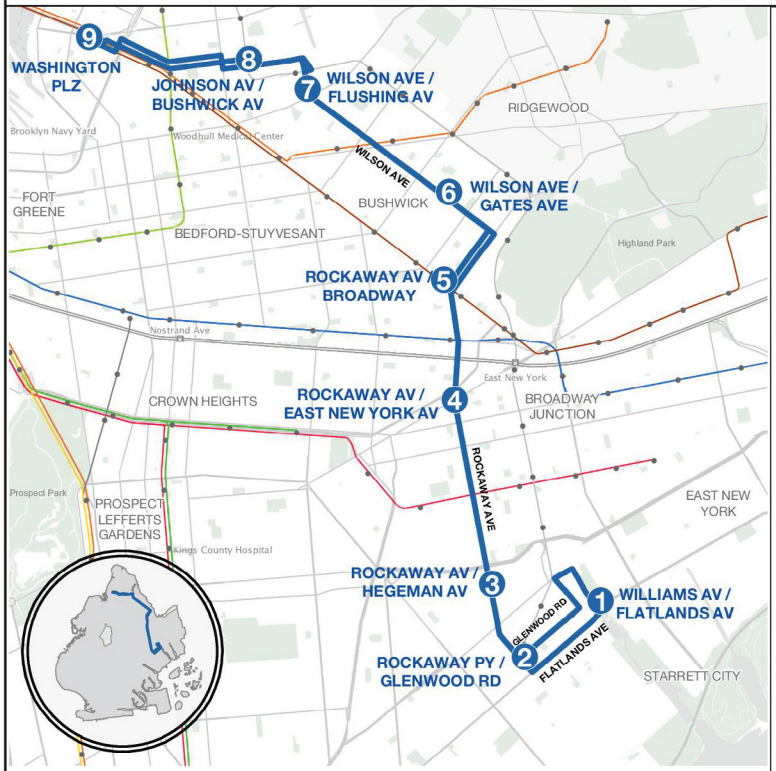
29.3% 43.4% 27.2%

Route Metrics

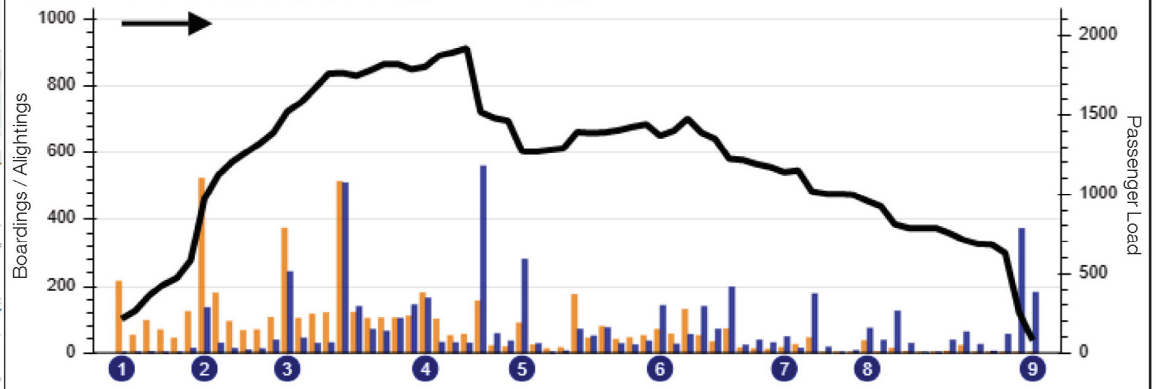
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	8,058		5,091		3,184	
Riders per Revenue Hour	52.8		42.5		35.0	
Riders per Trip	62.0		41.1		31.2	
CJTP (%)	62.6		--	--	--	--

B60 Rockaway Avenue / Wilson Avenue

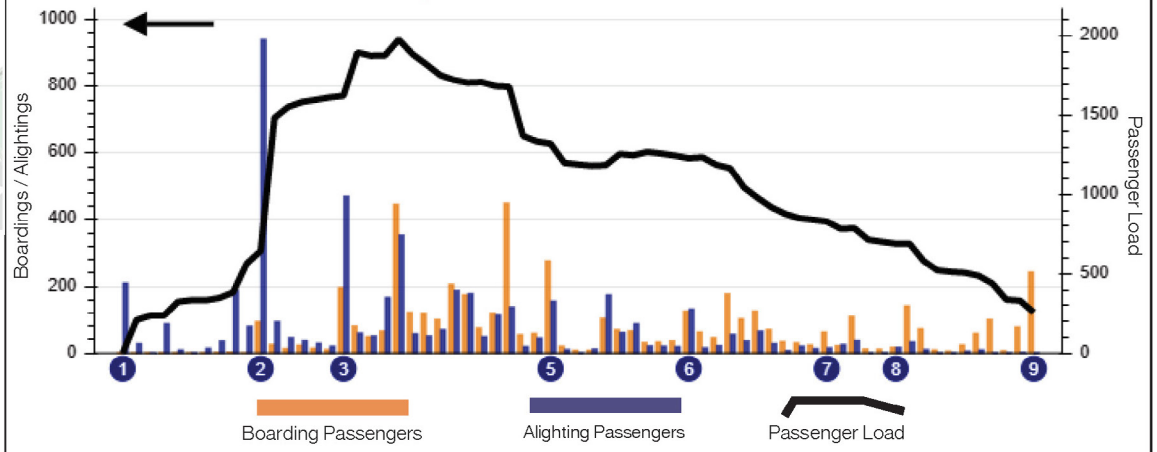
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.9 mi	1.5	634 ft	6.4 mph



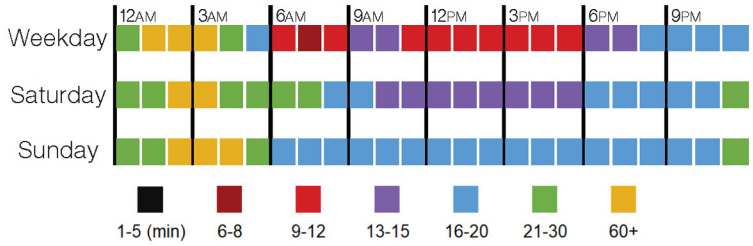
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

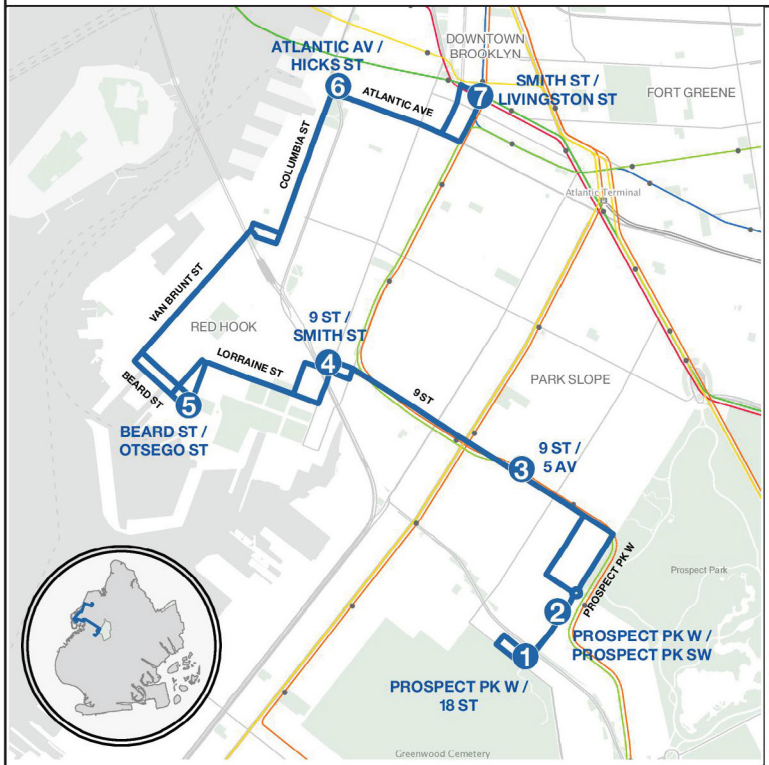
37.0% 31.1% 31.9%

Route Metrics

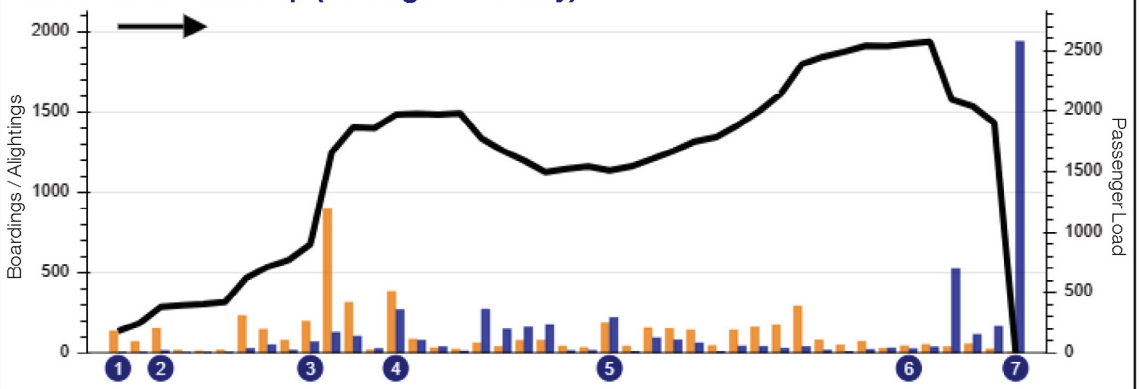
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	10,116		5,904		4,009	
Riders per Revenue Hour	46.3		42.3		35.4	
Riders per Trip	55.6		44.4		34.0	
CJTP (%)	60.5		--	--	--	--

B61 Park Slope - Red Hook - Downtown Brooklyn

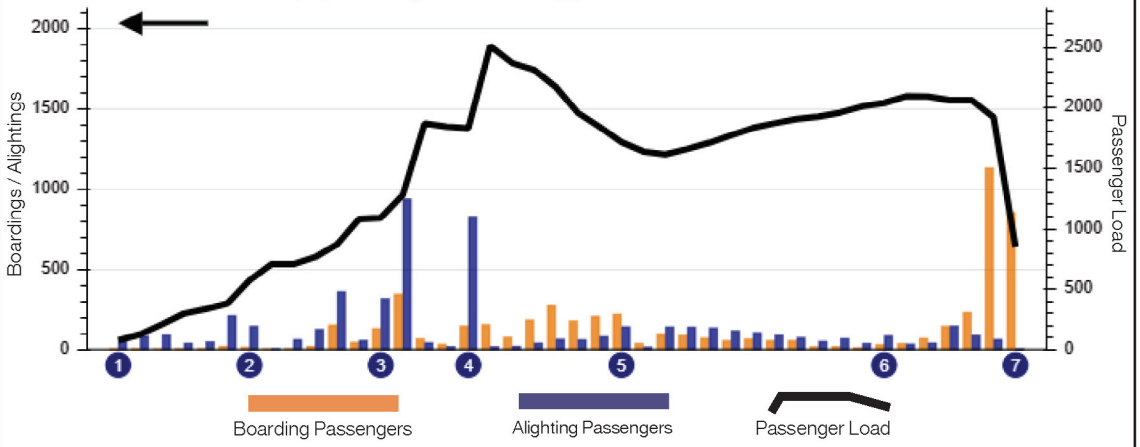
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	5.8 mi	3.0	742 ft	7.5 mph



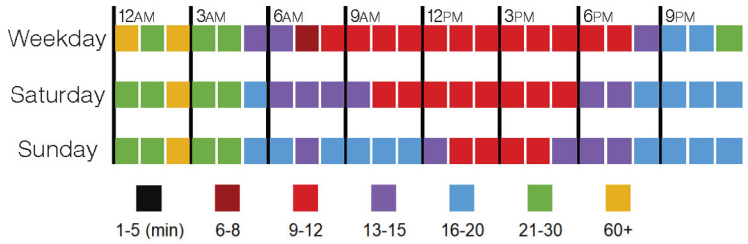
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

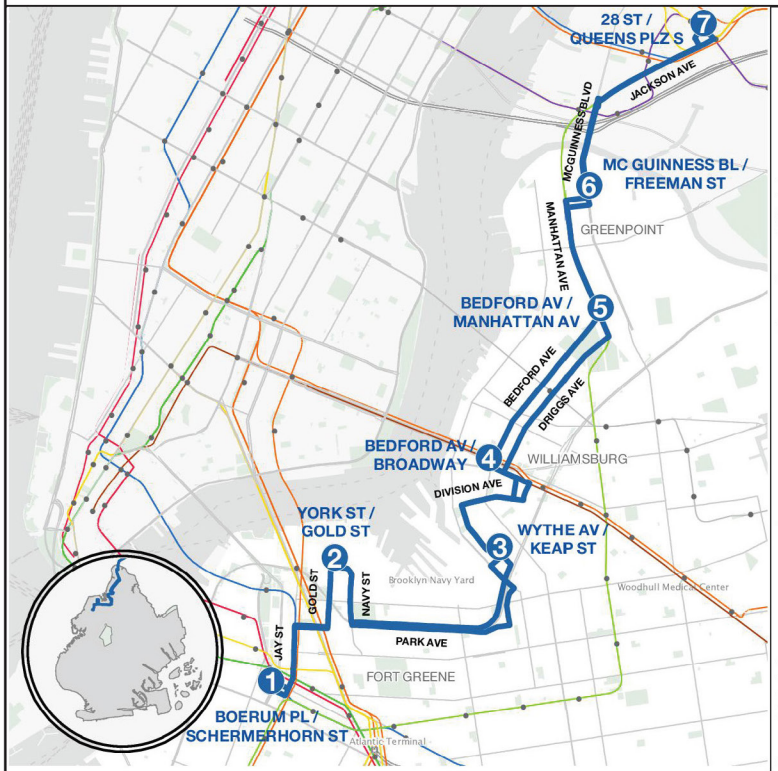
23.8% 55.3% 20.9%

Route Metrics

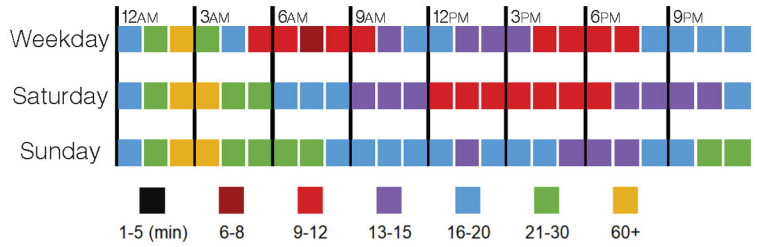
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	10,278		6,577		4,396	
Riders per Revenue Hour	66.1		52.7		41.4	
Riders per Trip	53.3		38.2		29.3	
CJTP (%)	72.3		--	--	--	--

B62 Downtown Brooklyn - Long Island City

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.6 mi	2.4	870 ft	7.3 mph



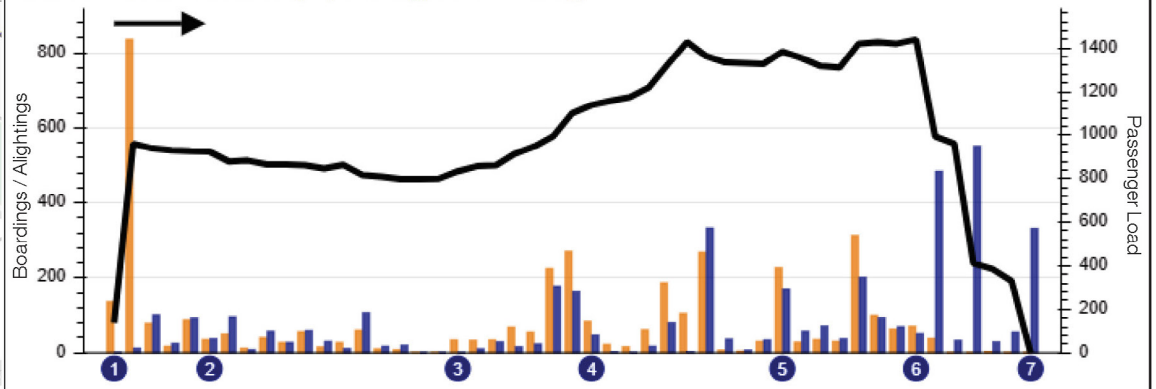
Hourly Frequency



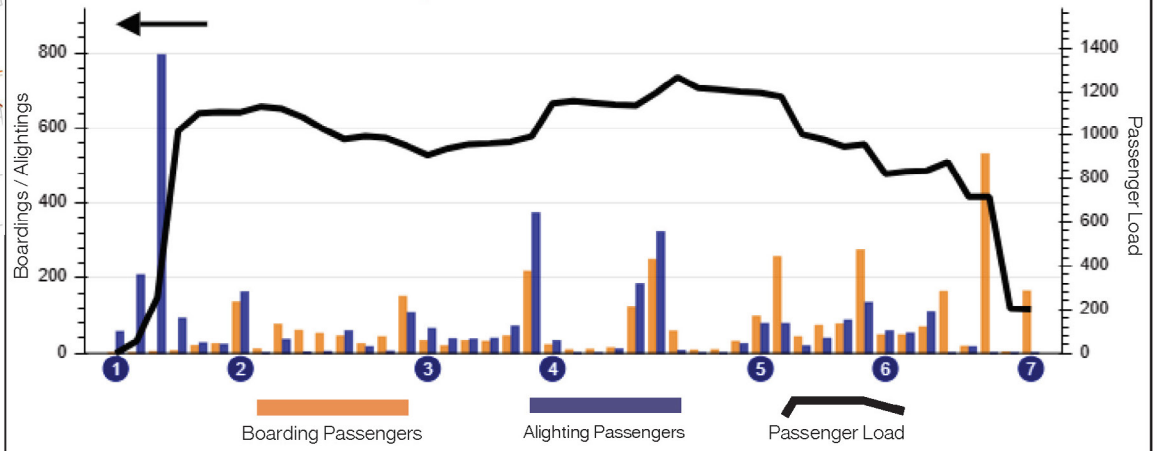
Transfers

21.3% 55.5% 23.2%

Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)

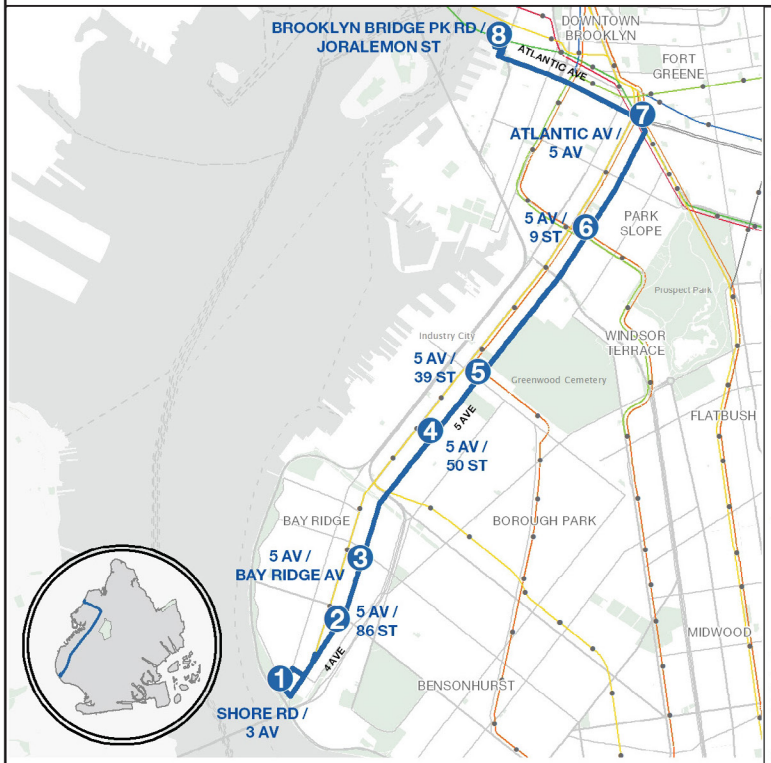


Route Metrics

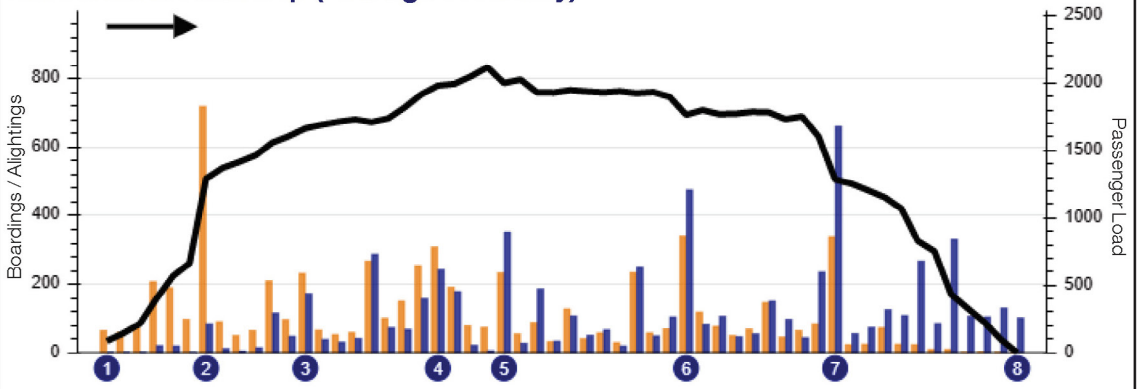
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	7,350		5,219		2,997	
Riders per Revenue Hour	41.5		32.7		26.4	
Riders per Trip	42.2		31.4		24.2	
CJTP (%)	62.7		--	--	--	--

B63 5th Avenue

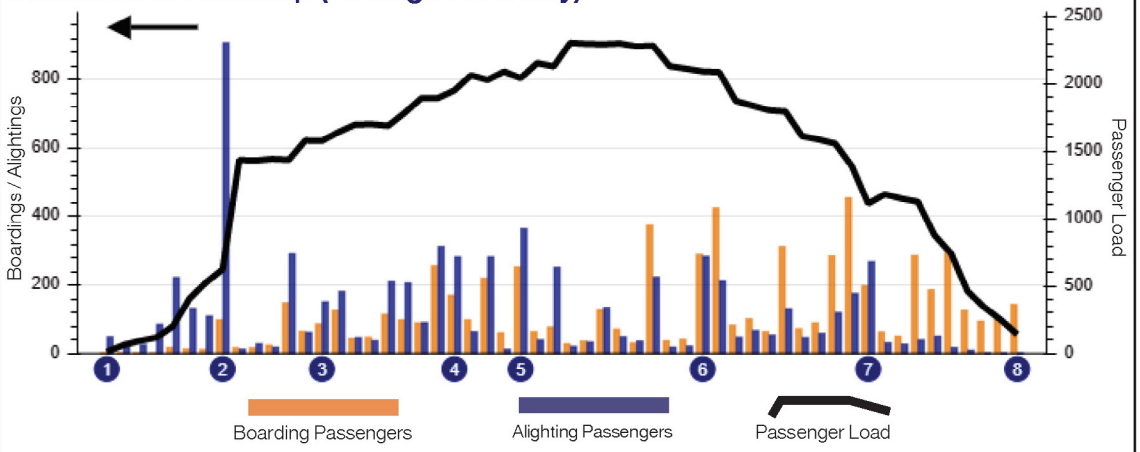
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.6 mi	1.1	730 ft	5.7 mph



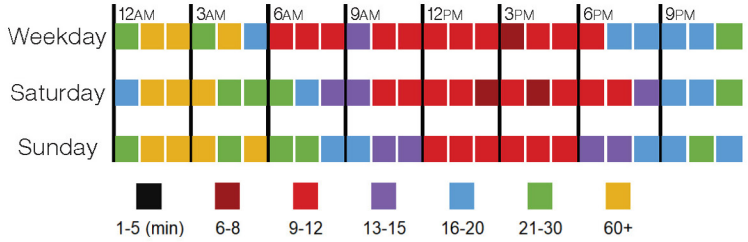
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

36.6% 22.2% 41.2%

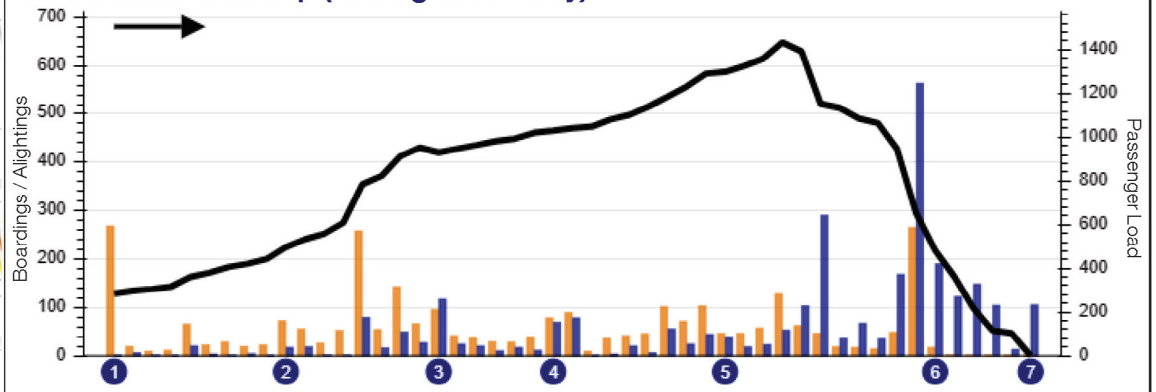
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	12,967		14,184		8,427	
Riders per Revenue Hour	55.4		60.7		49.2	
Riders per Trip	71.2		74.7		55.4	
CJTP (%)	69.3		--	--	--	--

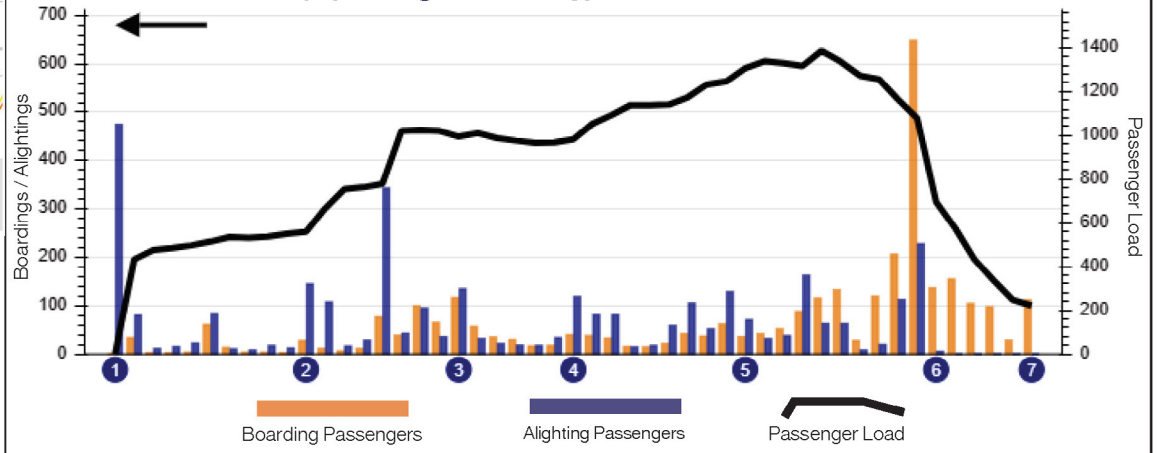
B64 Bay Ridge - Coney Island

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.7 mi	2.1	726 ft	7.8 mph

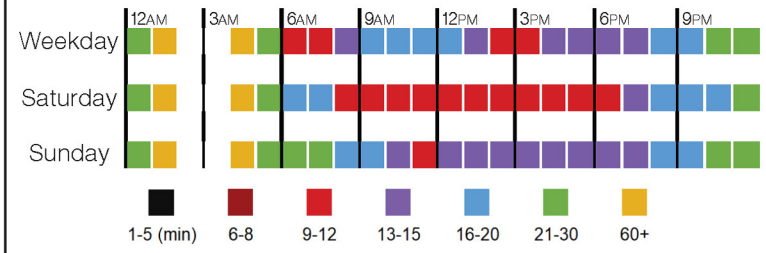
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

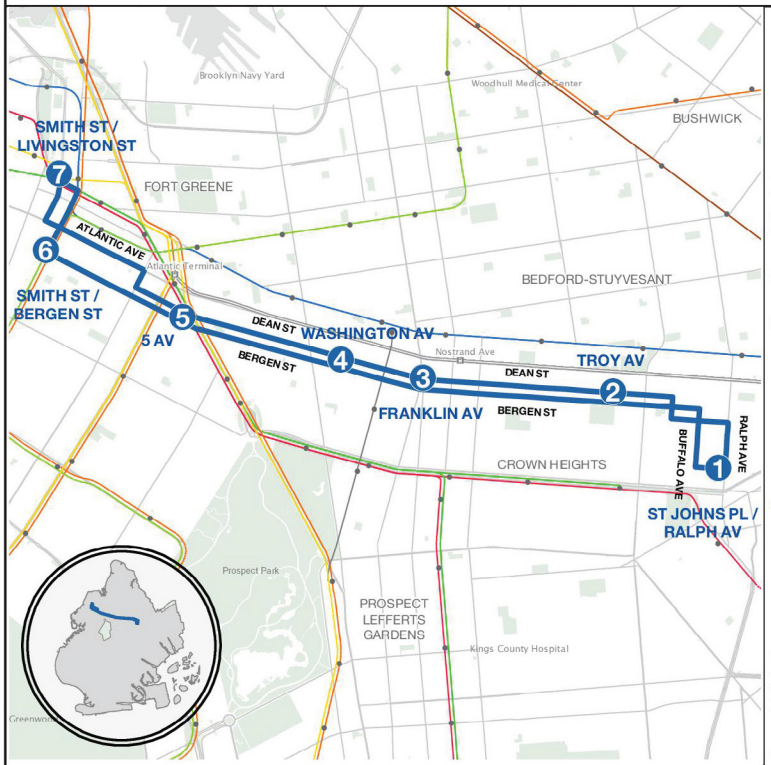
31.0% 18.5% 50.5%

Route Metrics

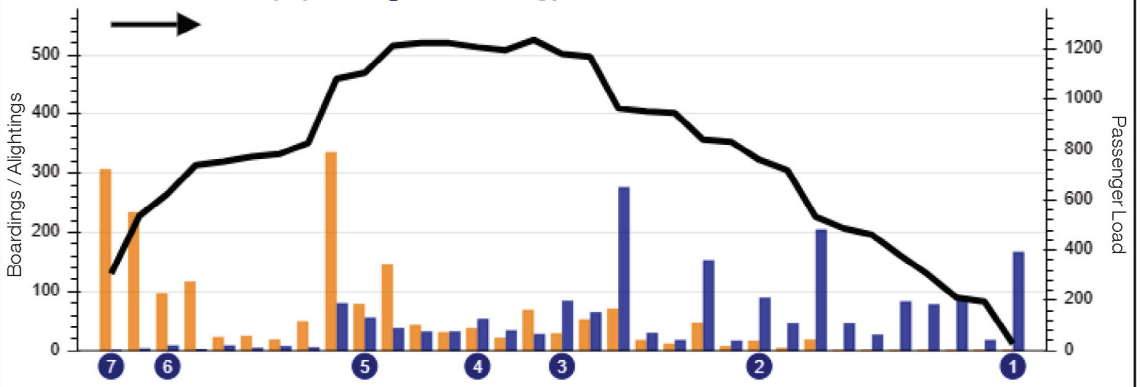
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	6,135		4,707		3,011	
Riders per Revenue Hour	52.4		41.6		34.8	
Riders per Trip	42.9		31.0		23.9	
CJTP (%)	70.5		--	--	--	--

B65 Bergen/Dean Streets

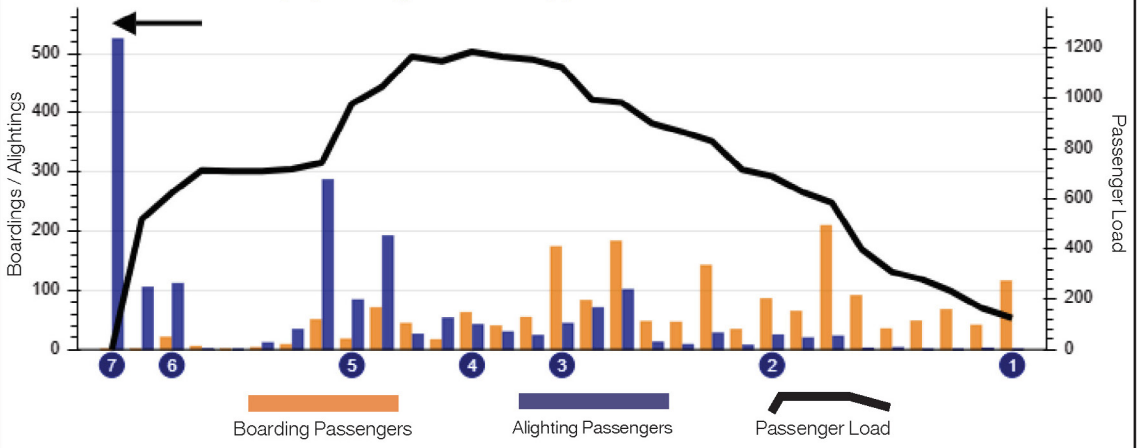
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	4.4 mi	1.2	743 ft	6.4 mph



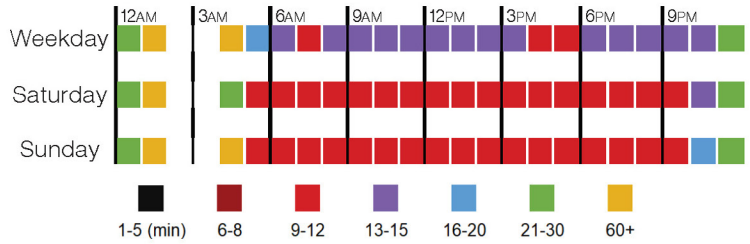
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

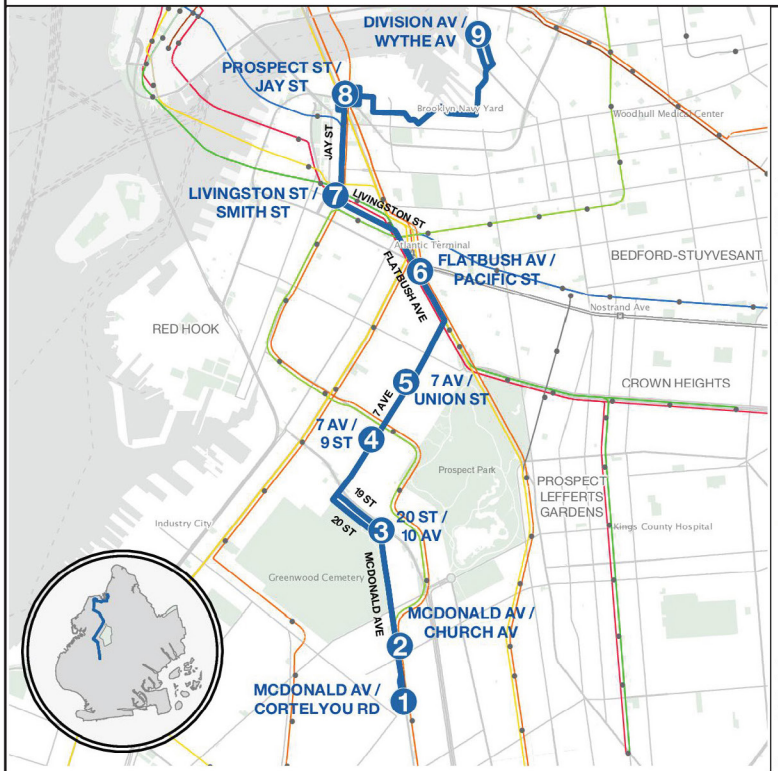
33.8% 29.3% 36.9%

Route Metrics

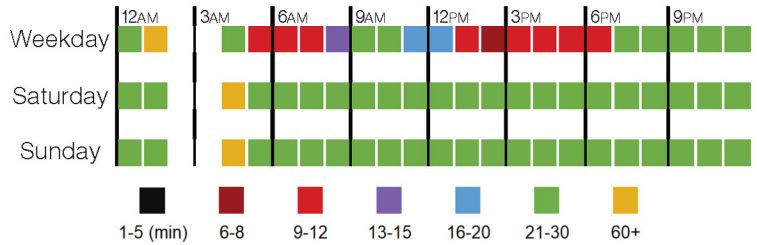
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	3,752		3,015		2,260	
Riders per Revenue Hour	36.5		27.5		22.0	
Riders per Trip	25.0		16.4		12.4	
CJTP (%)	67.7		--	--	--	--

B67 Kensington - Downtown Brooklyn via Flatbush Avenue

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.0 mi	2.5	864 ft	6.4 mph



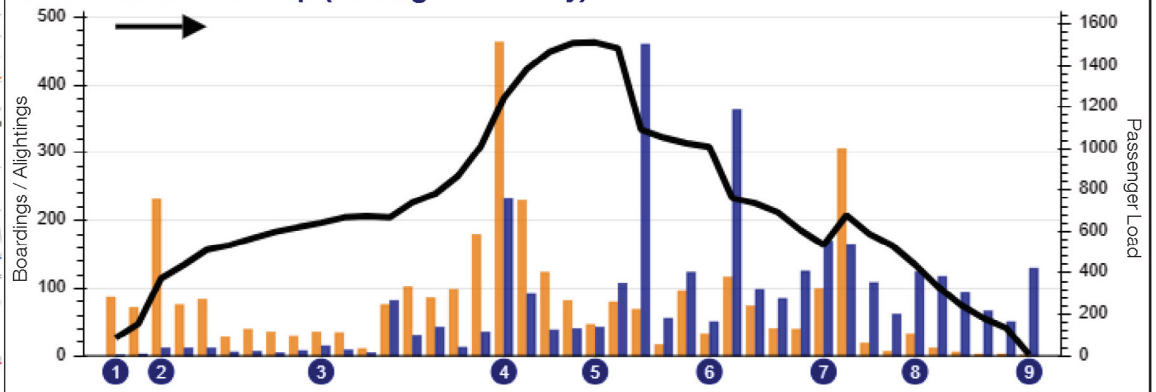
Hourly Frequency



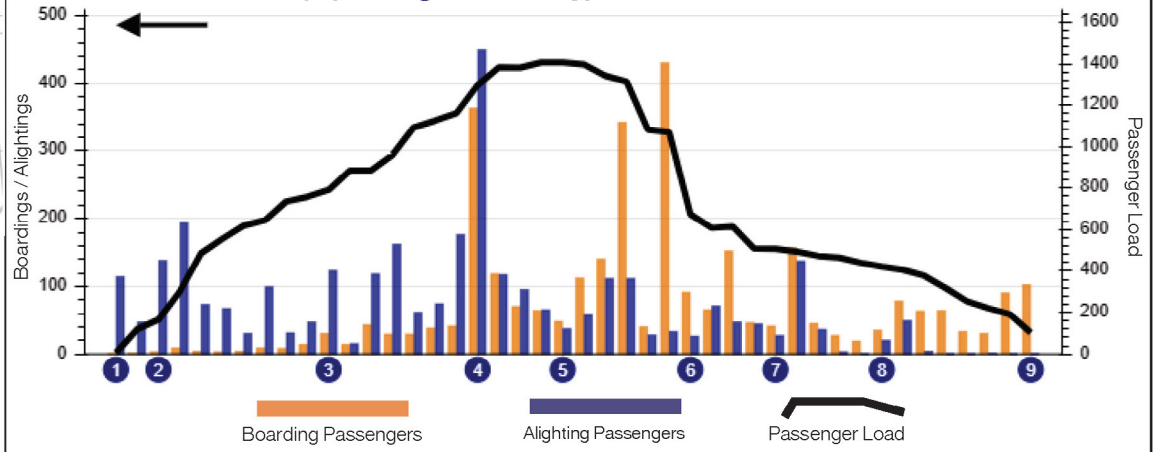
Transfers

29.1% 42.2% 28.7%

Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)

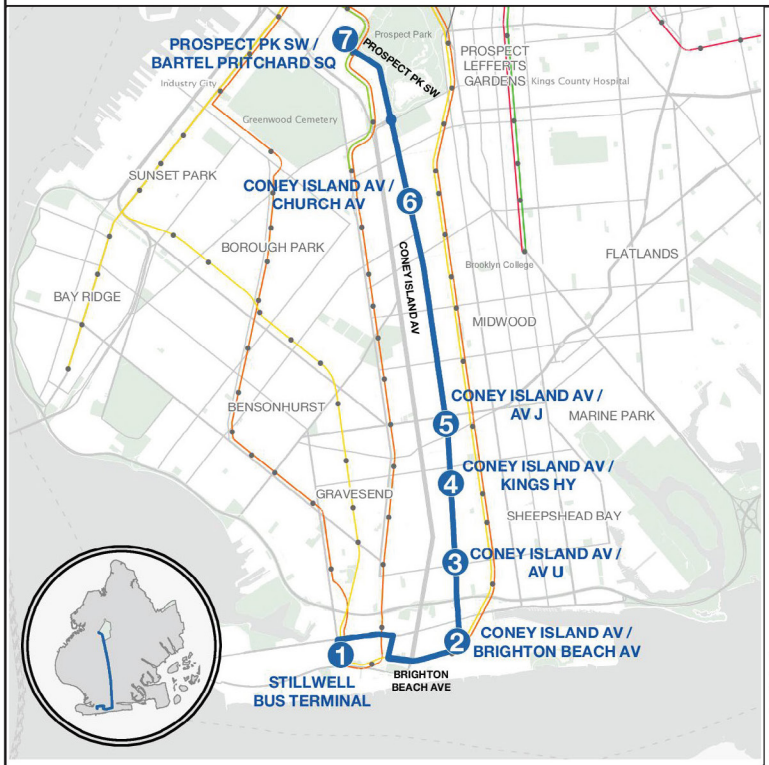


Route Metrics

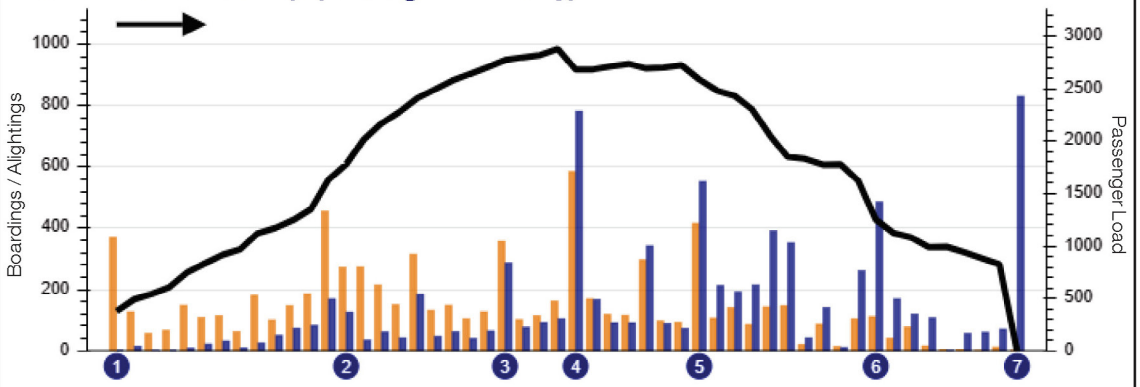
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	6,421		2,041		1,324	
Riders per Revenue Hour	48.3		40.1		26.8	
Riders per Trip	45.9		24.9		16.1	
CJTP (%)	71.1		--	--	--	--

B68 Coney Island Avenue

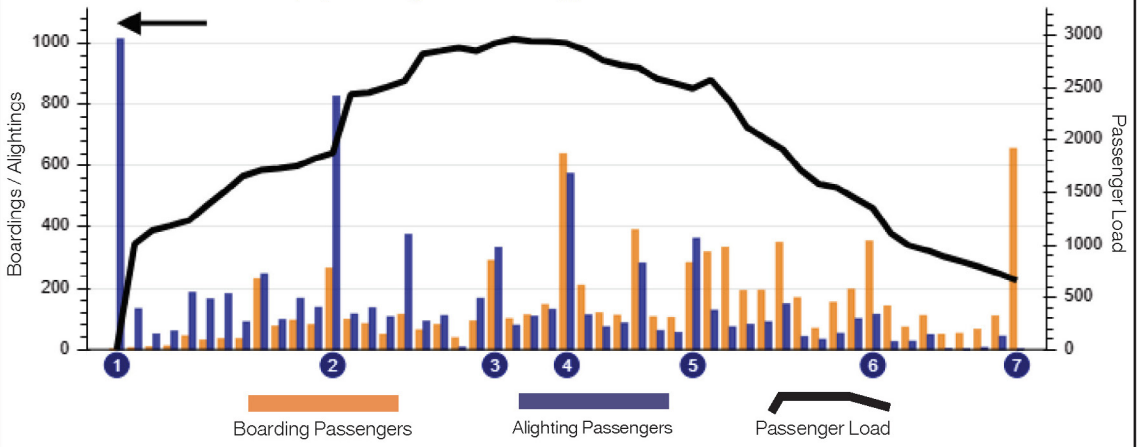
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.6 mi	0.5	793 ft	7.4 mph



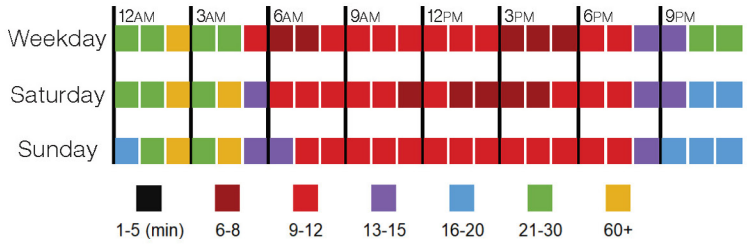
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

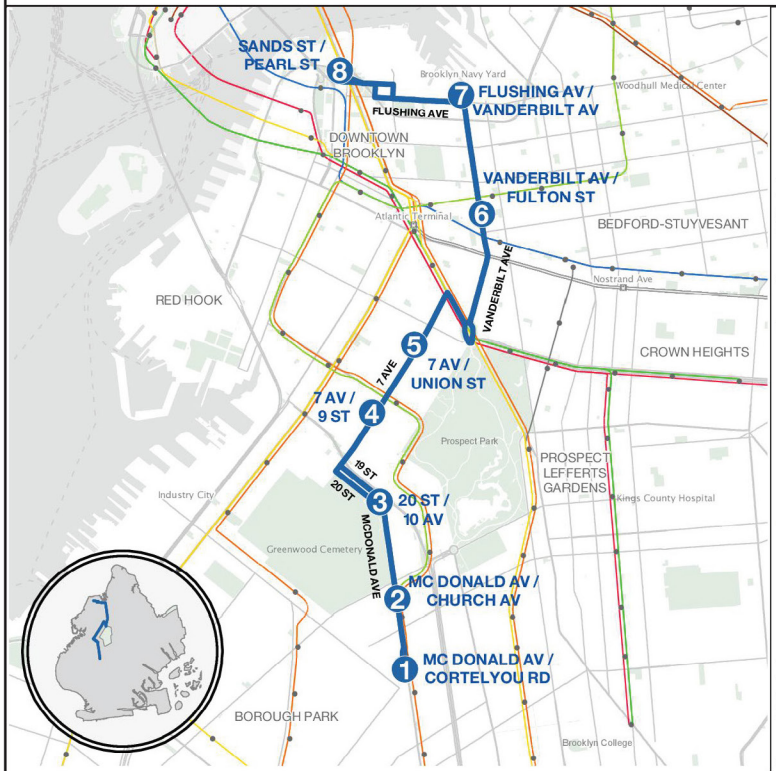
45.7% 15.5% 38.8%

Route Metrics

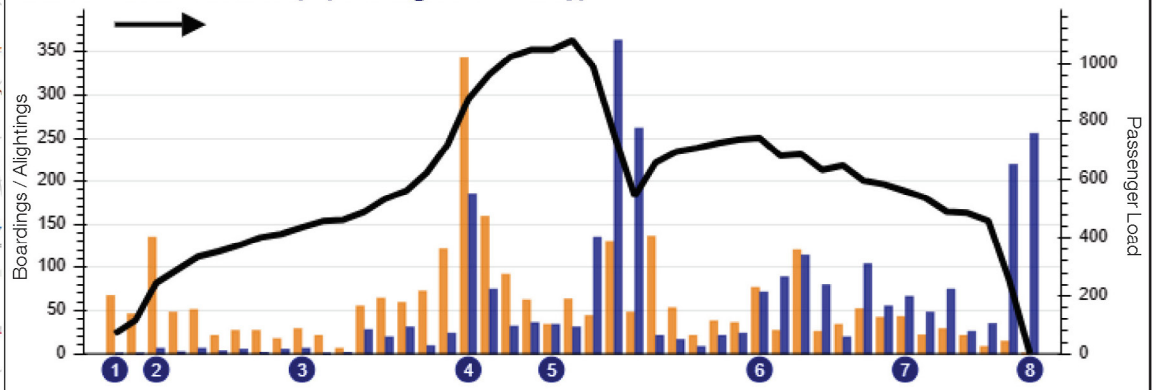
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	15,282		10,739		9,280	
Riders per Revenue Hour	68.7		53.2		52.1	
Riders per Trip	65.3		47.1		45.9	
CJTP (%)	61.1		--	--	--	--

B69 Kensington - Downtown Brooklyn via Vanderbilt Avenue

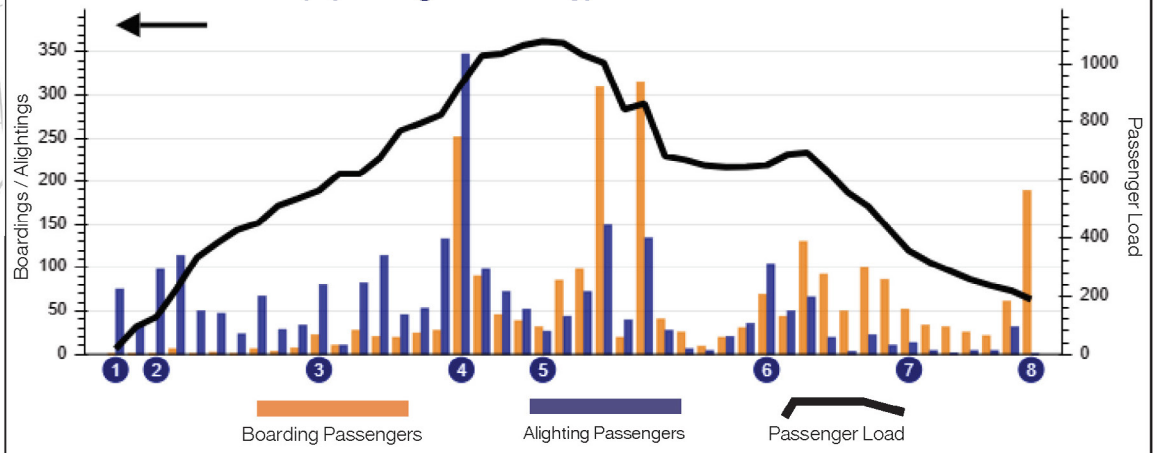
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.2 mi	1.8	741 ft	6.4 mph



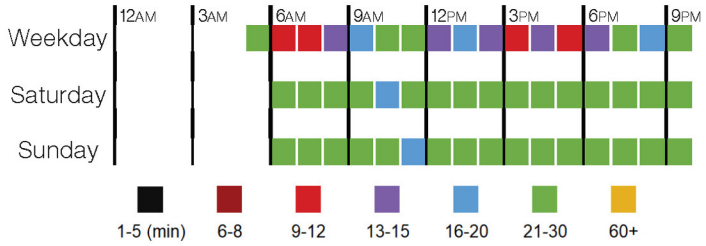
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

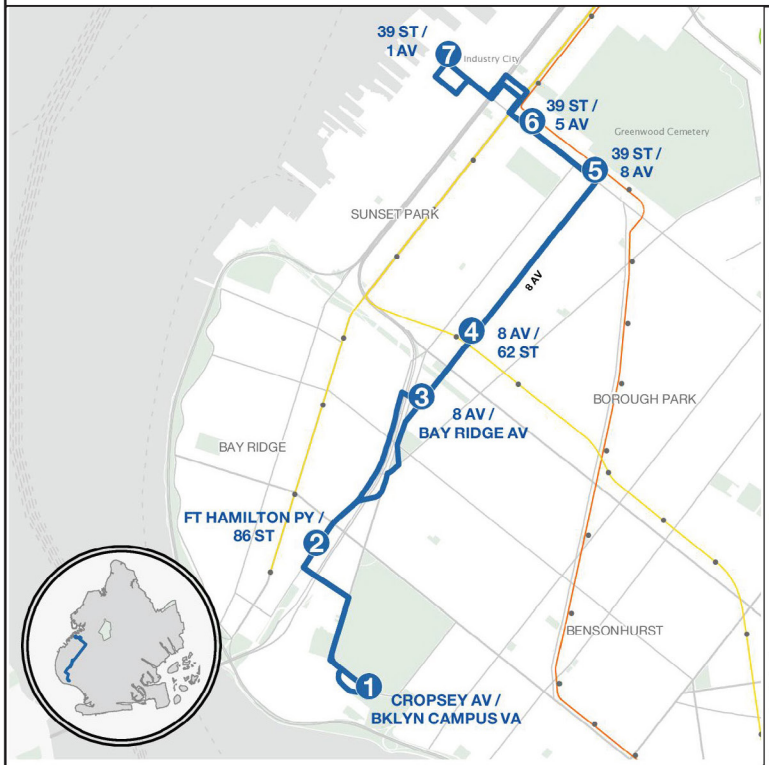
28.7% 46.1% 25.2%

Route Metrics

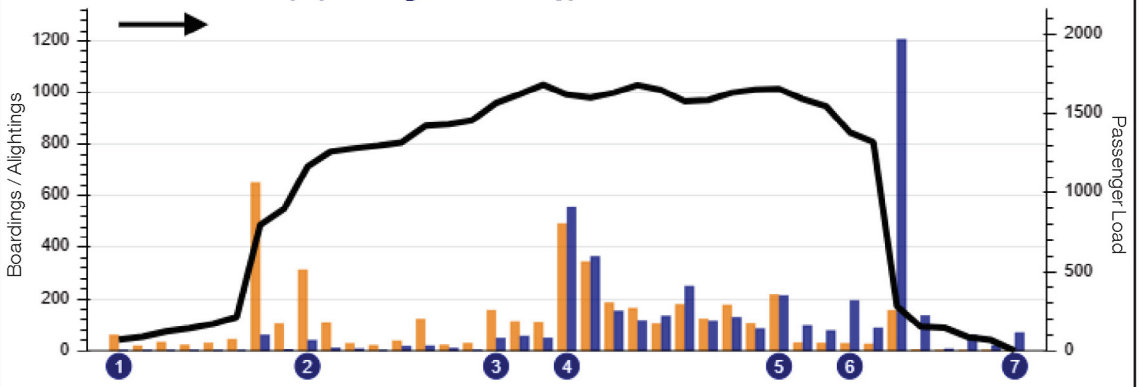
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	5,199		1,783		1,342	
Riders per Revenue Hour	52.0		39.5		30.4	
Riders per Trip	49.5		28.8		21.6	
CJTP (%)	70.3		--	--	--	--

B70 Sunset Park - V.A. Medical Center

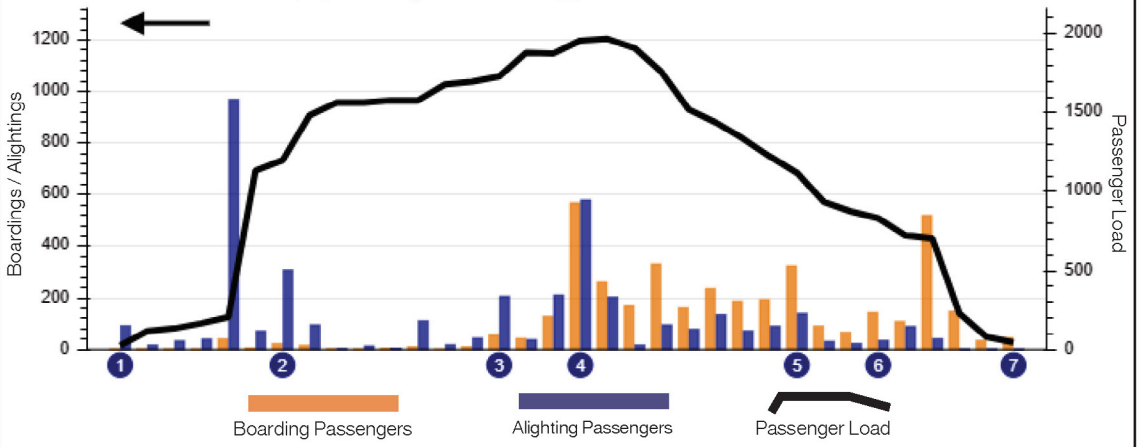
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	5.0 mi	2.4	749 ft	6.9 mph



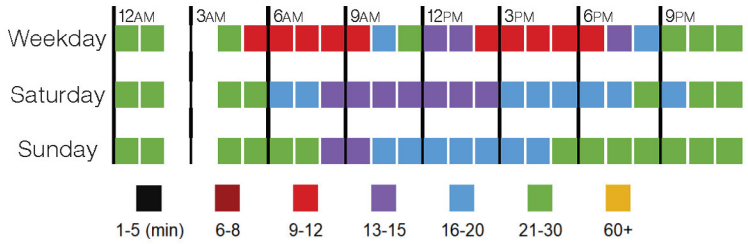
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

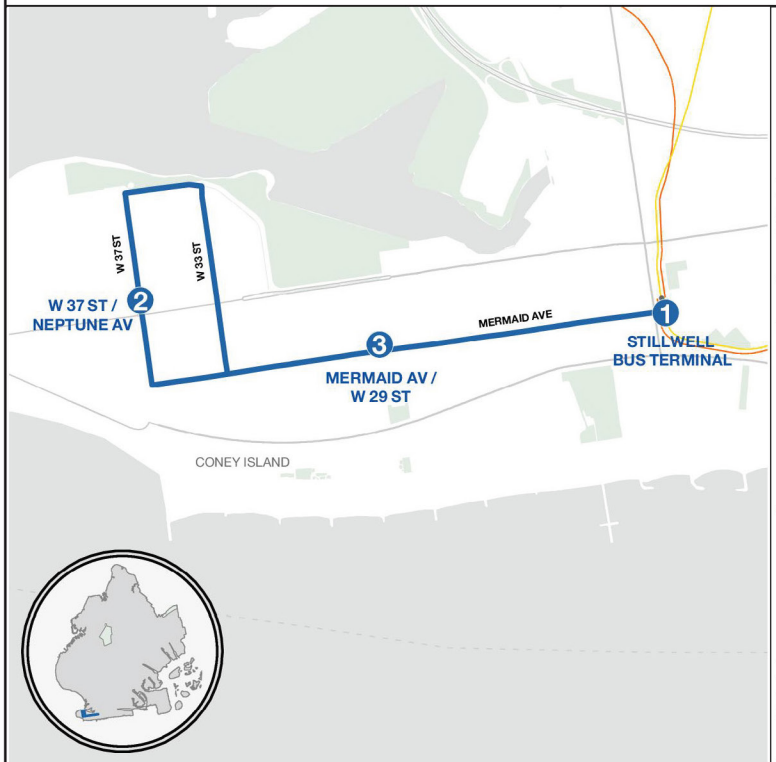
41.2% 42.3% 16.6%

Route Metrics

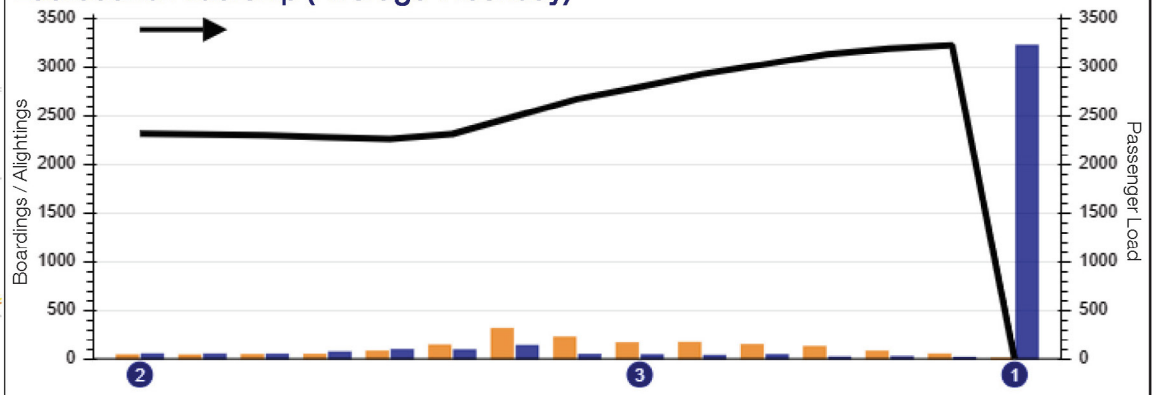
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	8,270		5,371		3,882	
Riders per Revenue Hour	79.9		70.3		63.9	
Riders per Trip	55.1		43.3		37.3	
CJTP (%)	71.7		--	--	--	--

B74 Mermaid Avenue

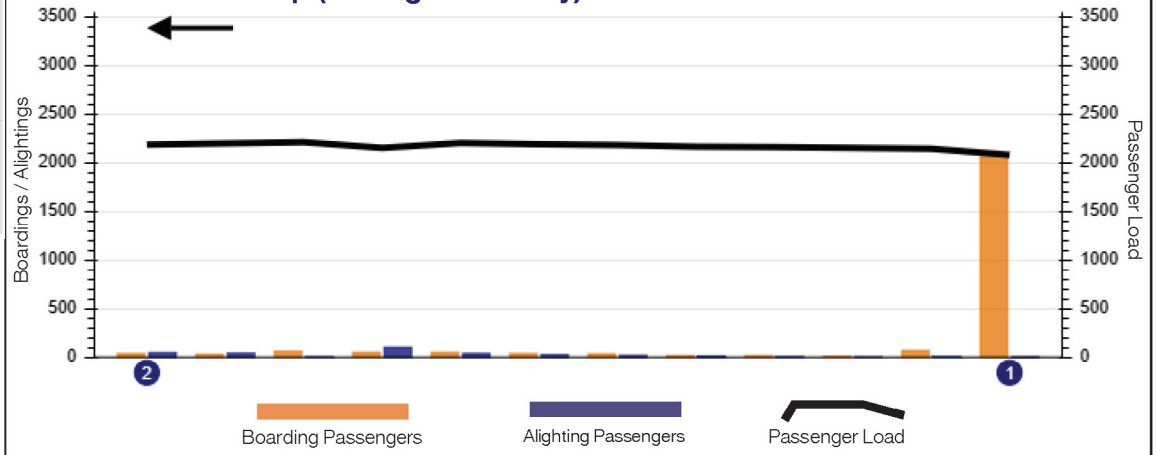
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	3.2 mi	0.6	617 ft	7.8 mph



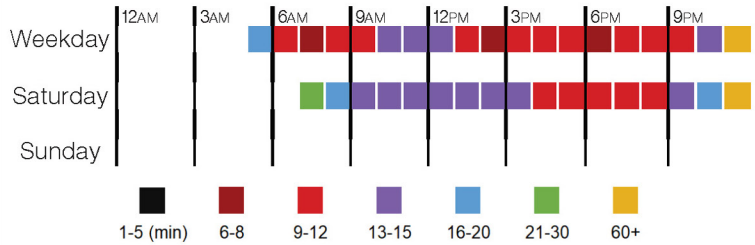
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

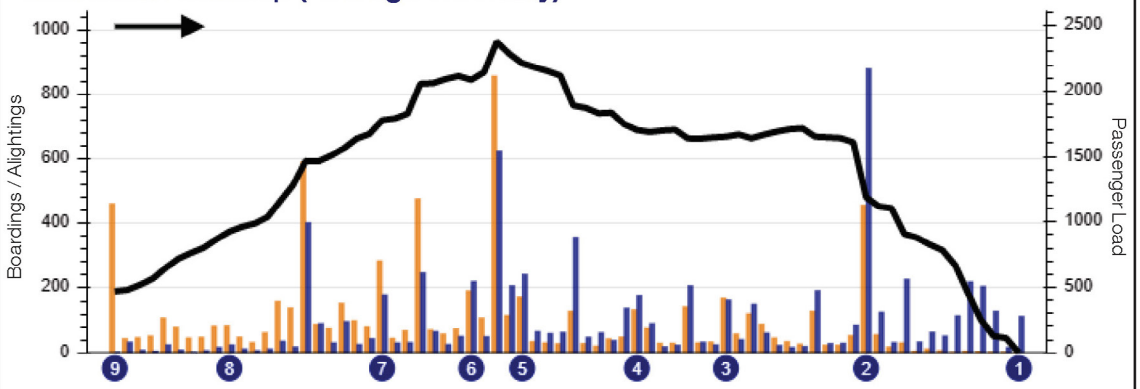
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	4,357		2,358		1,614	
Riders per Revenue Hour	109.8		91.4		74.3	
Riders per Trip	40.3		34.7		24.8	
CJTP (%)	79.7		--	--	--	--

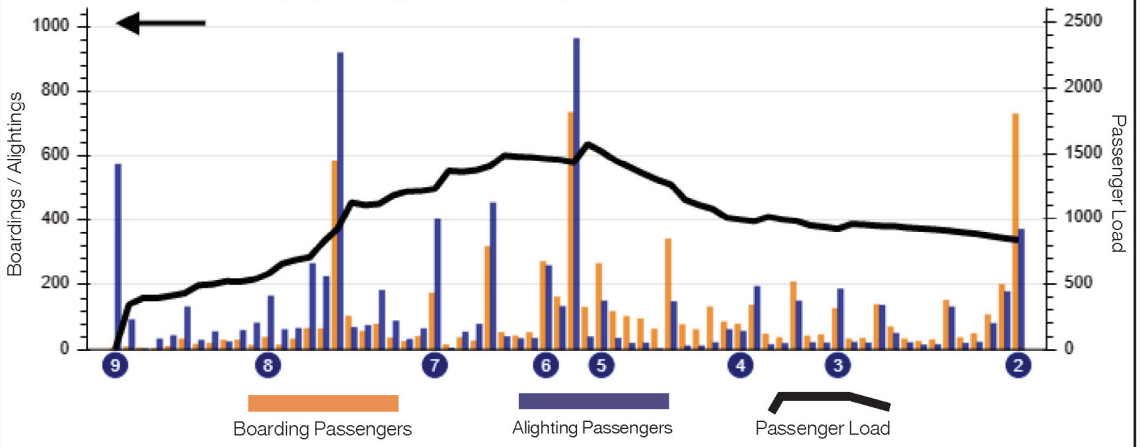
B82 Kings Highway / Flatlands Avenue

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	10.7 mi	1.3	750 ft	7.3 mph

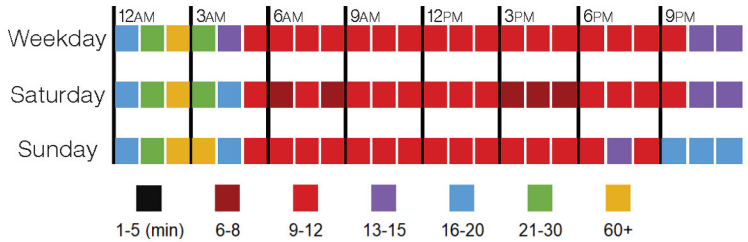
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

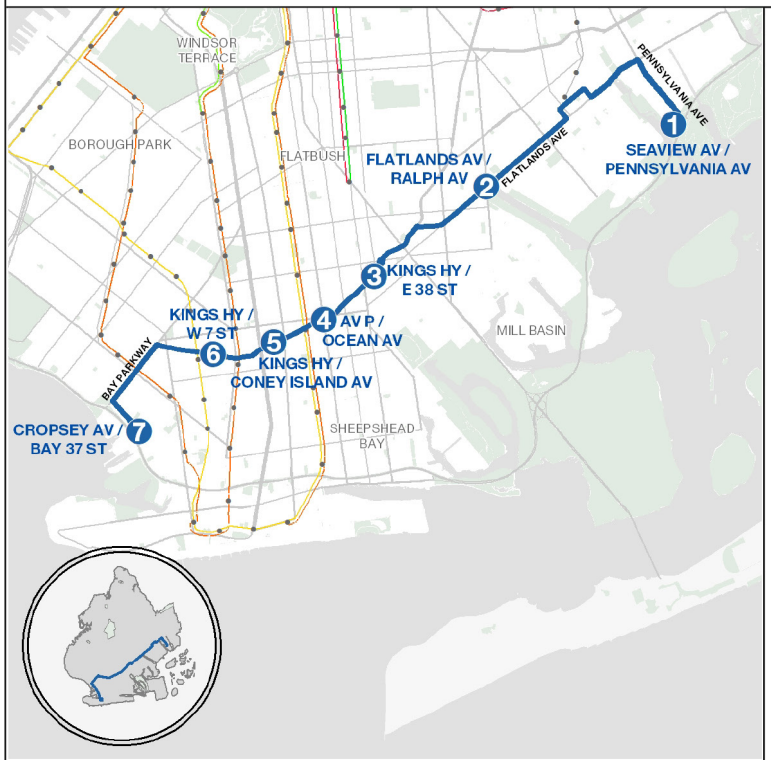
41.0% 35.7% 23.3%

Route Metrics

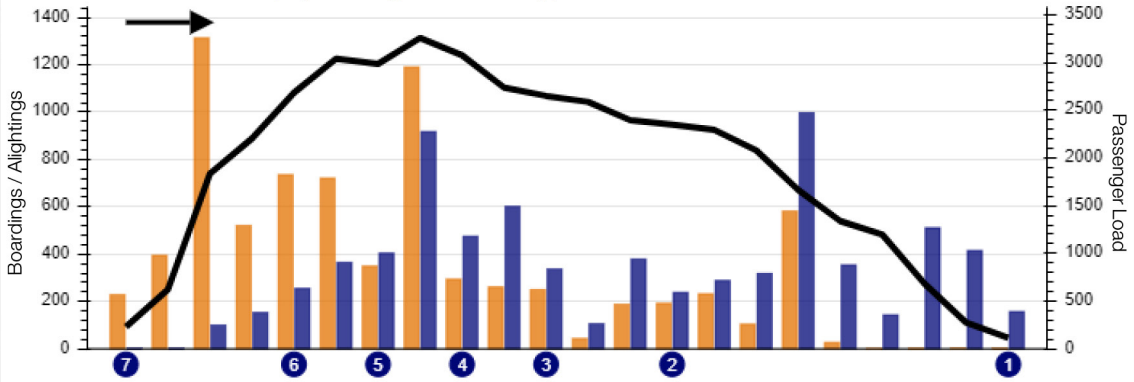
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	15,235		16,505		13,173	
Riders per Revenue Hour	50.3		53.4		50.0	
Riders per Trip	69.2		71.1		63.9	
CJTP (%)	71.6		--	--	--	--

B82 SBS Kings Highway / Flatlands Avenue

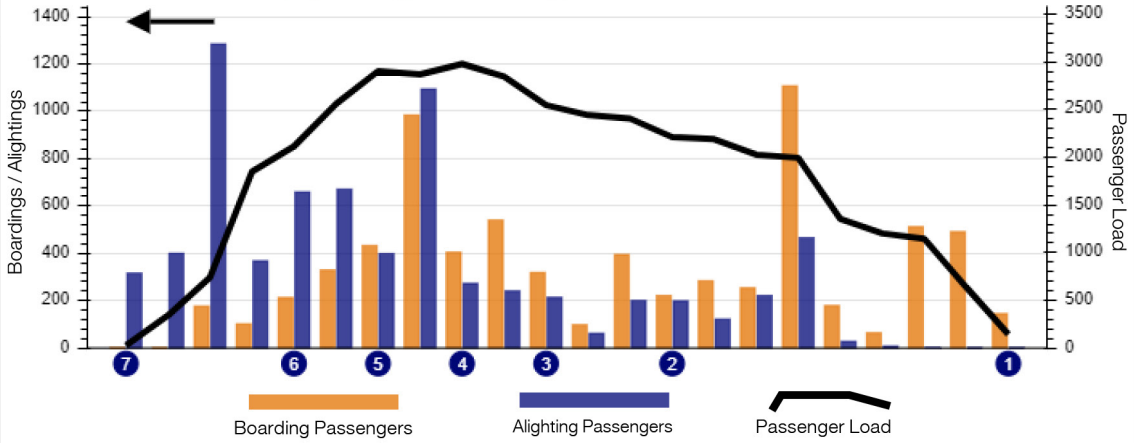
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
SBS	9.0 mi	1.2	2,253 ft	8.5 mph



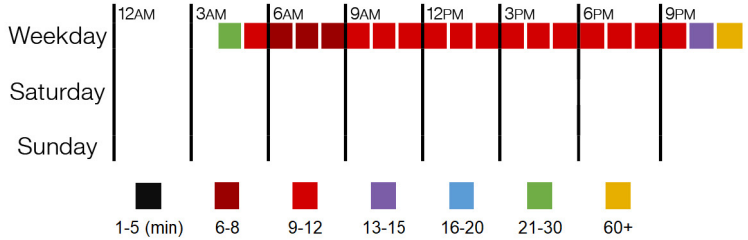
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



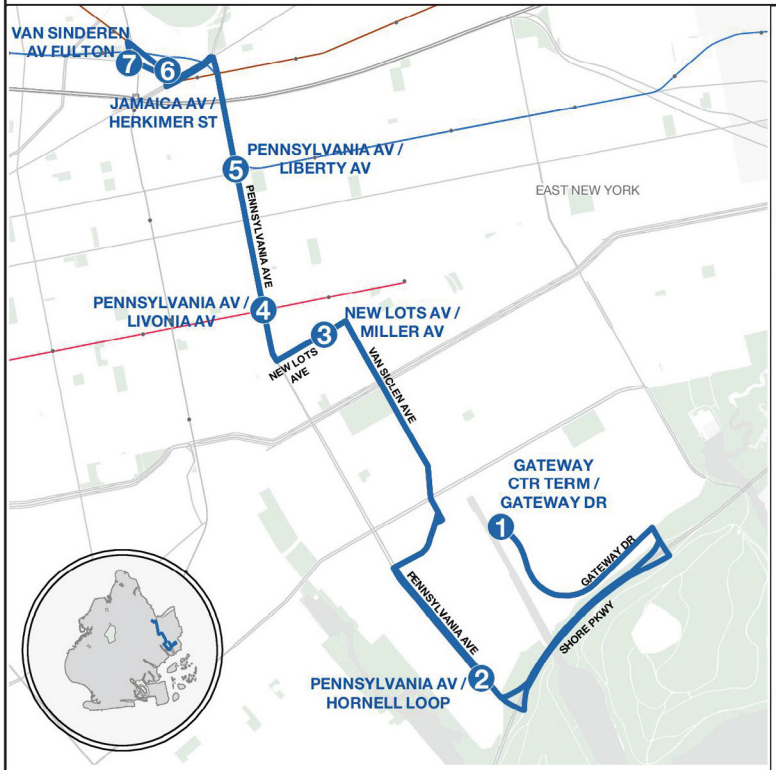
Transfers

Route Metrics

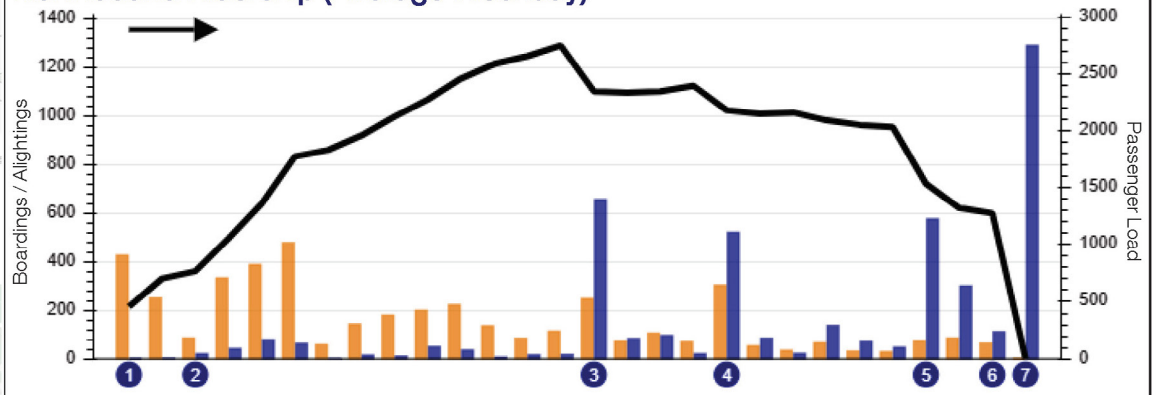
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	14,883		--		--	
Riders per Revenue Hour	73.7		--		--	
Riders per Trip	75.2		--		--	
CJTP (%)	65.7		--	--	--	--

B83 Pennsylvania Avenue / Van Siclen Avenue

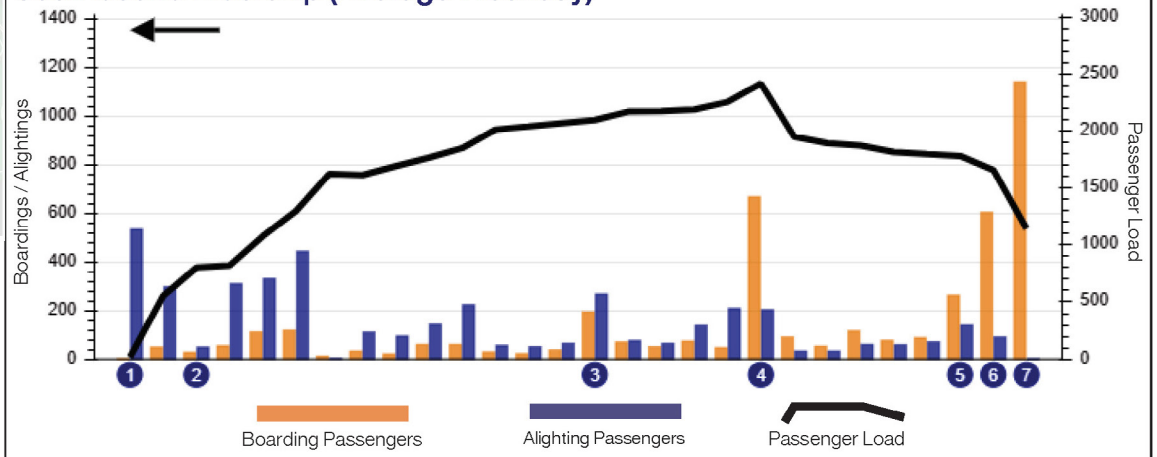
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	5.3 mi	1.9	1,011 ft	7.5 mph



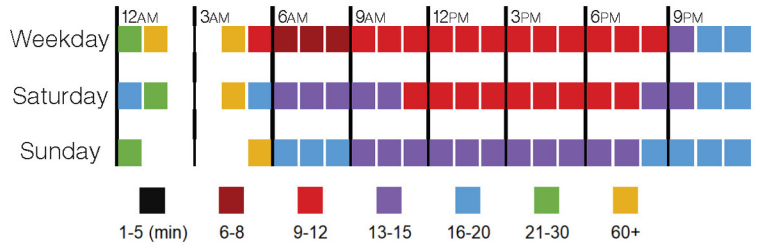
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

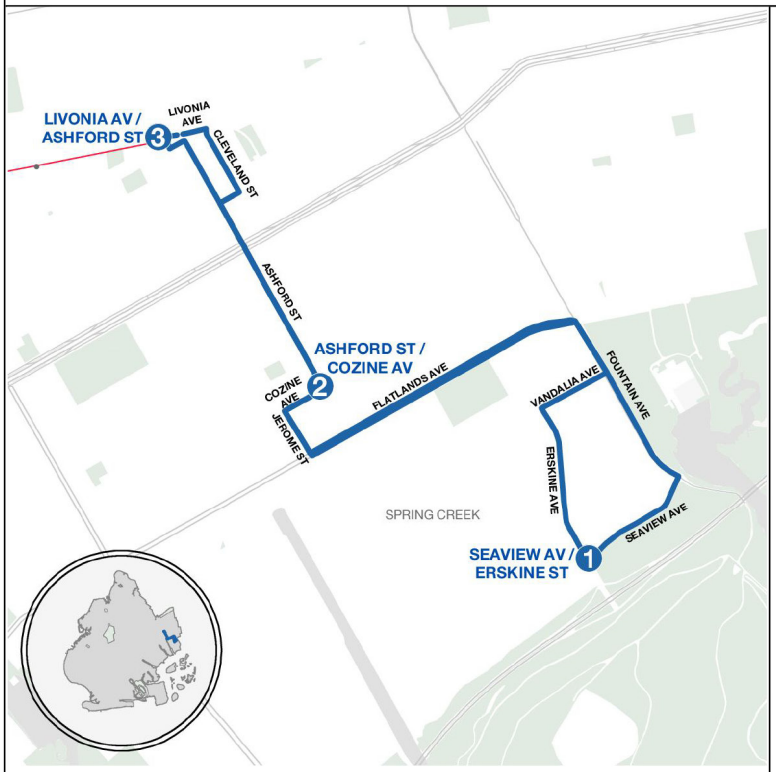
31.4% 53.6% 15.0%

Route Metrics

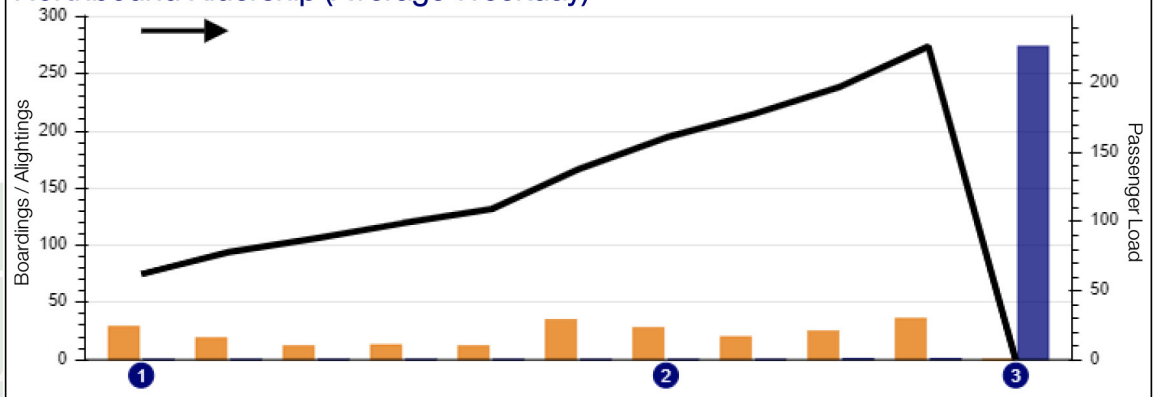
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	8,550		5,943		3,493	
Riders per Revenue Hour	61.4		59.8		49.2	
Riders per Trip	40.0		33.0		26.9	
CJTP (%)	71.3		--	--	--	--

B84 Ashford Street / Flatlands Avenue

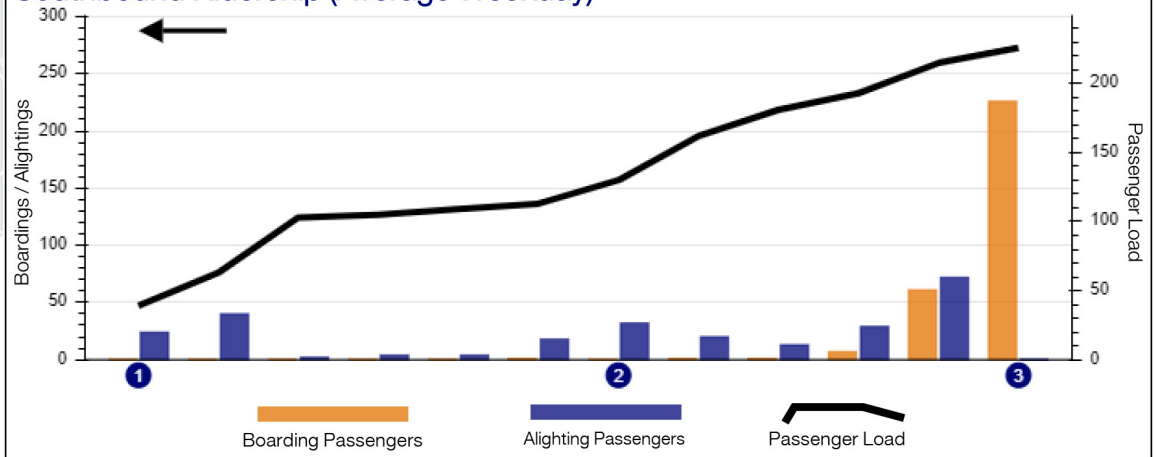
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	2.2 mi	3.8	1,119 ft	10.0 mph



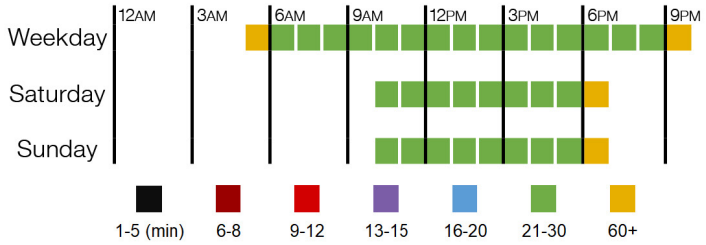
Northbound Ridership (Average Weekday)



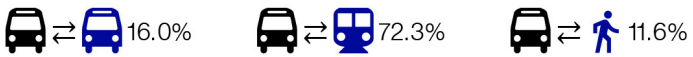
Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

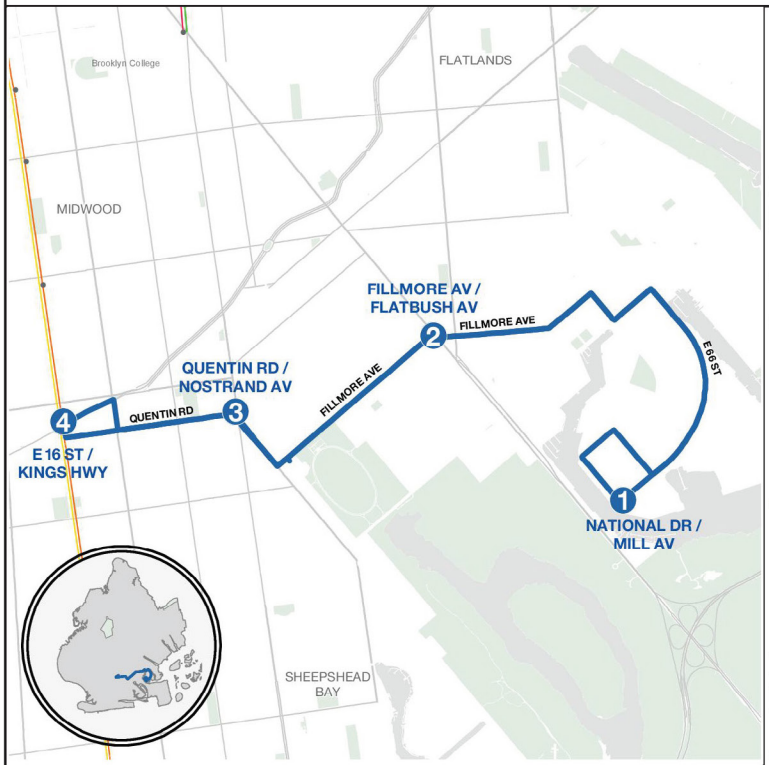


Route Metrics

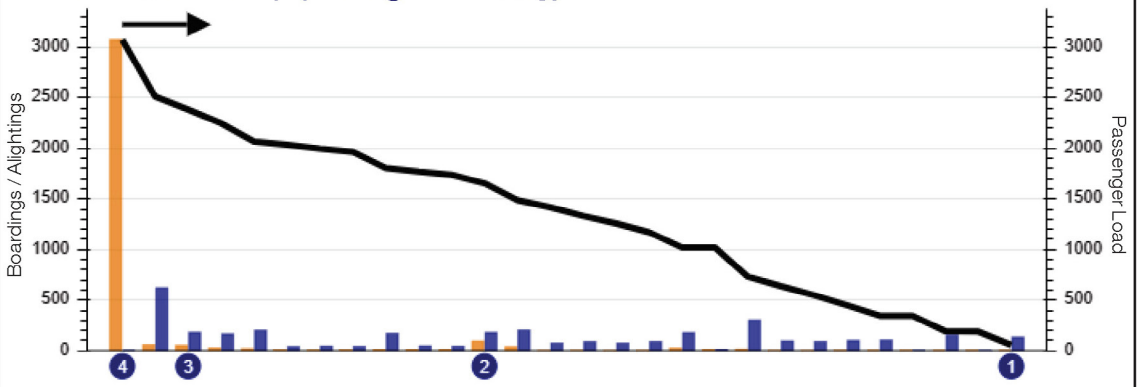
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	526		142		86	
Riders per Revenue Hour	42.8		13.9		8.4	
Riders per Trip	8.2		4.2		2.5	
CJTP (%)	81.5		--	--	--	--

B100 Mill Basin - Kings Highway (B)(Q)

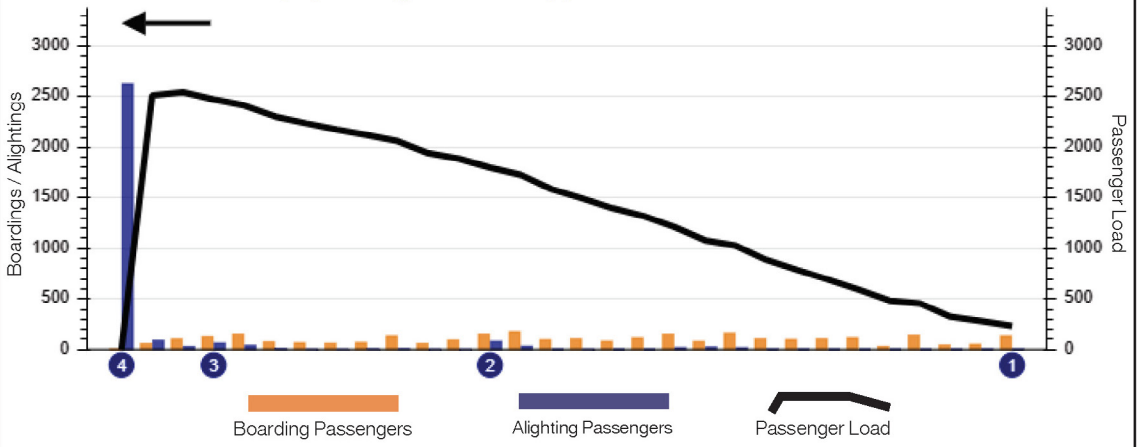
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	4.3 mi	3.0	820 ft	8.8 mph



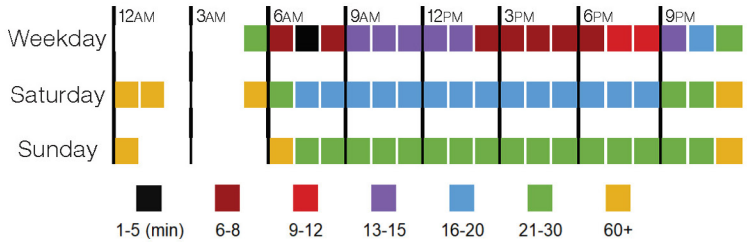
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

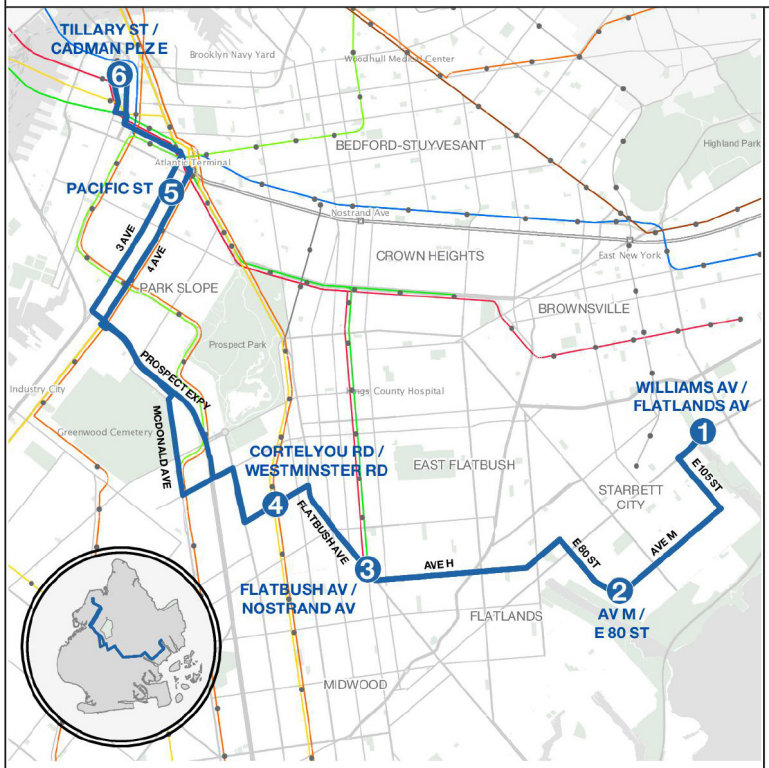
16.3% 53.8% 29.9%

Route Metrics

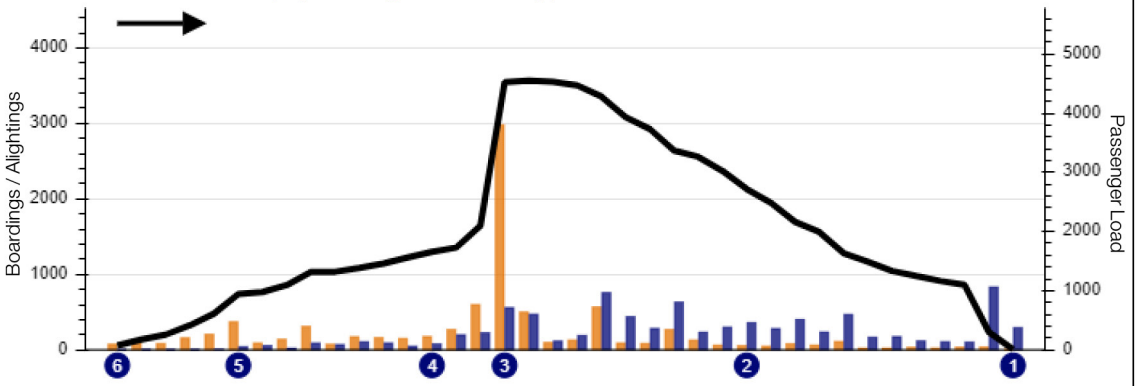
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	6,400		1,705		855	
Riders per Revenue Hour	67.7		42.4		37.8	
Riders per Trip	27.8		17.4		13.0	
CJTP (%)	70.0		--	--	--	--

B103 Canarsie - Downtown Brooklyn

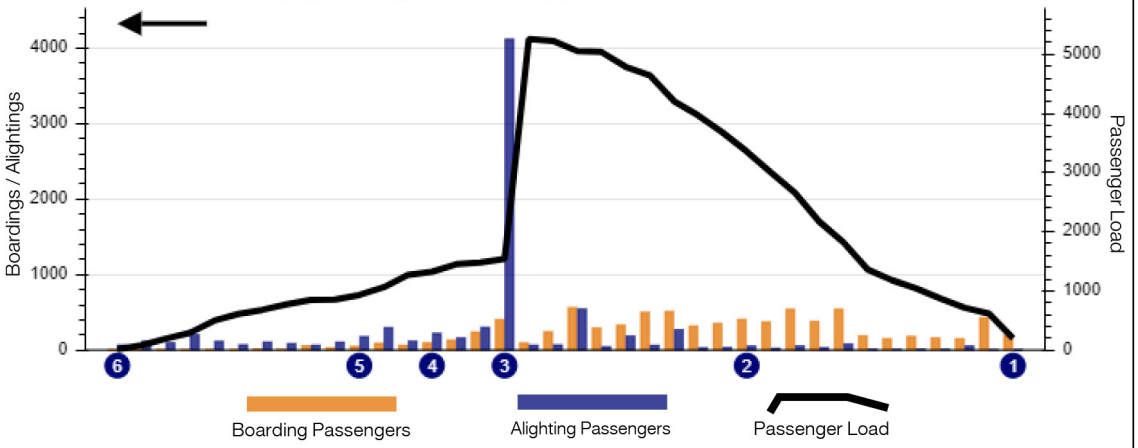
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Limited	11.8 mi	1.6	1,496 ft	7.7 mph



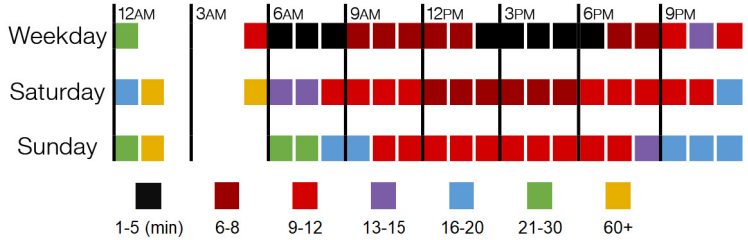
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



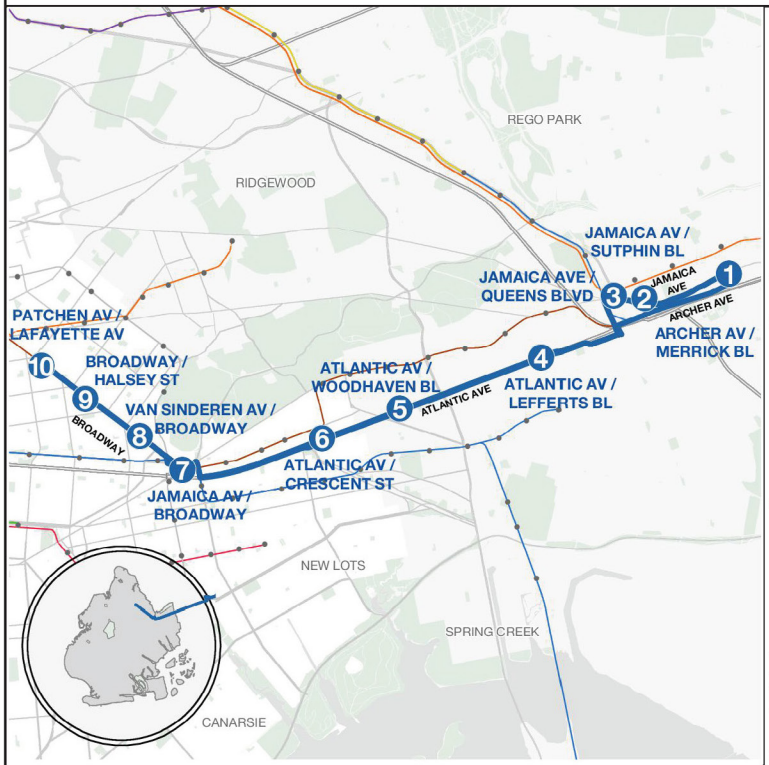
Transfers

Route Metrics

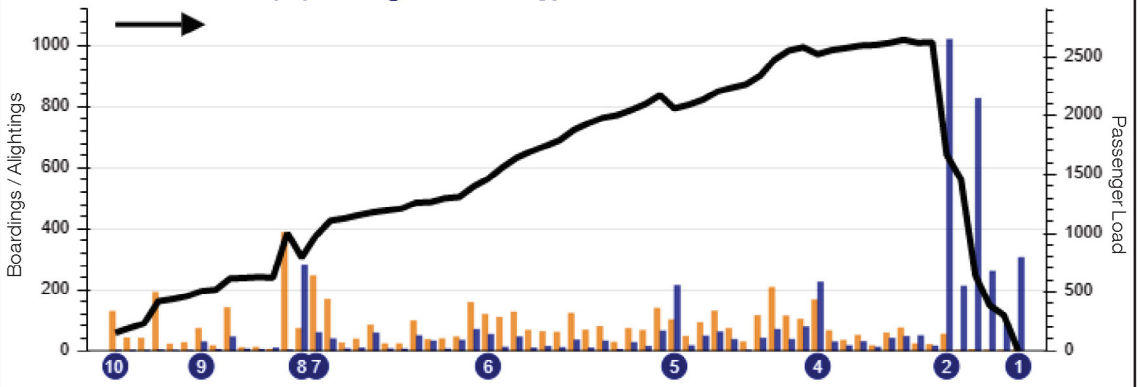
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	16,583		9,704		6,047	
Riders per Revenue Hour	52.1		45.6		43.1	
Riders per Trip	51.5		45.3		38.5	
CJTP (%)	69.5		--	--	--	--

Q24 Atlantic Avenue / Broadway

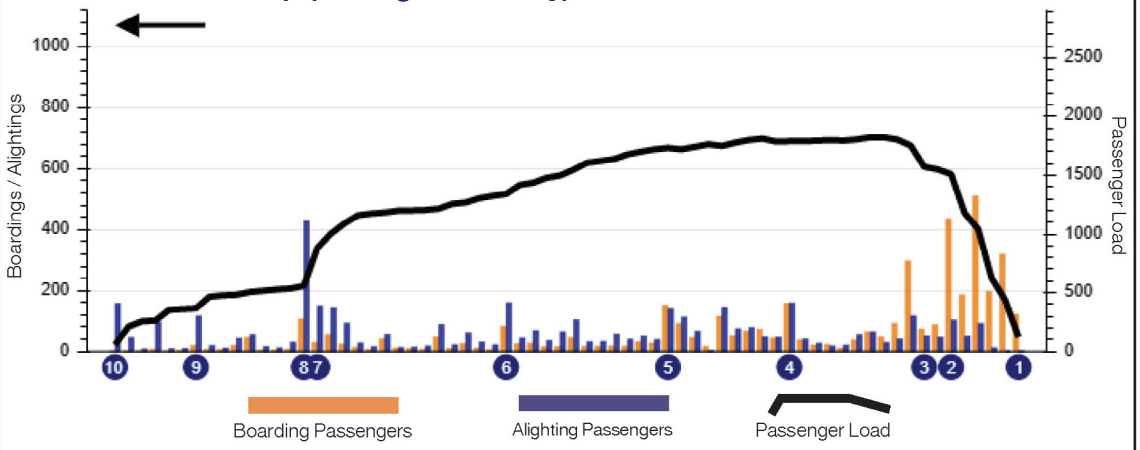
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	8.5 mi	1.0	687 ft	7.2 mph



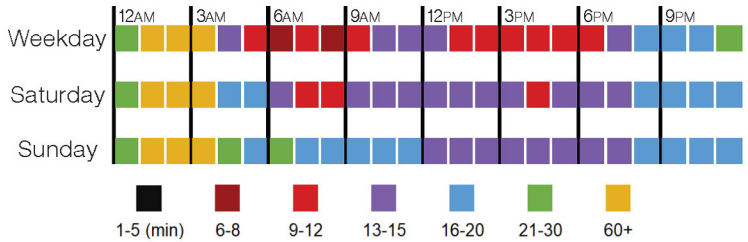
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

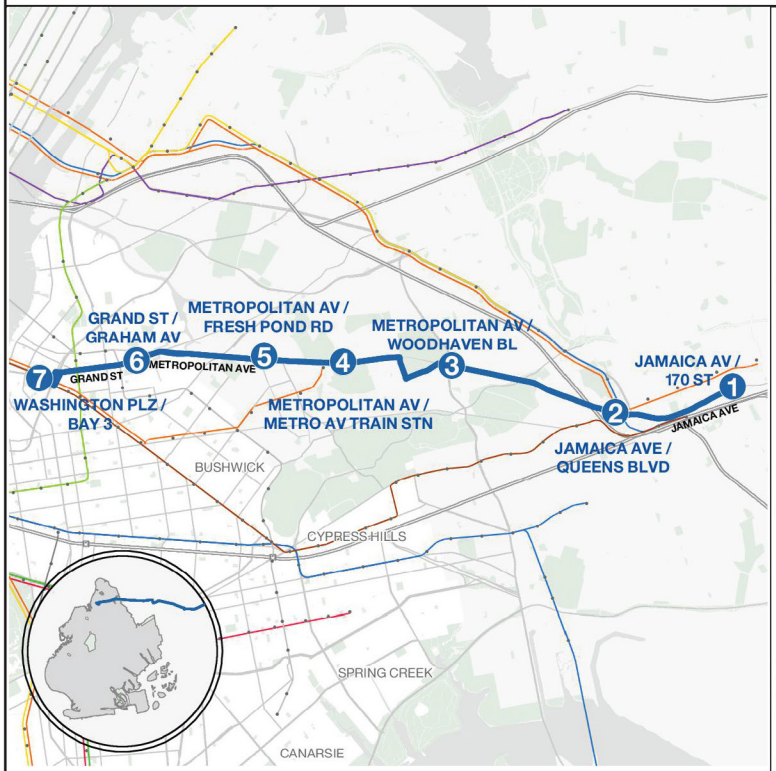
47.4% 20.0% 32.6%

Route Metrics

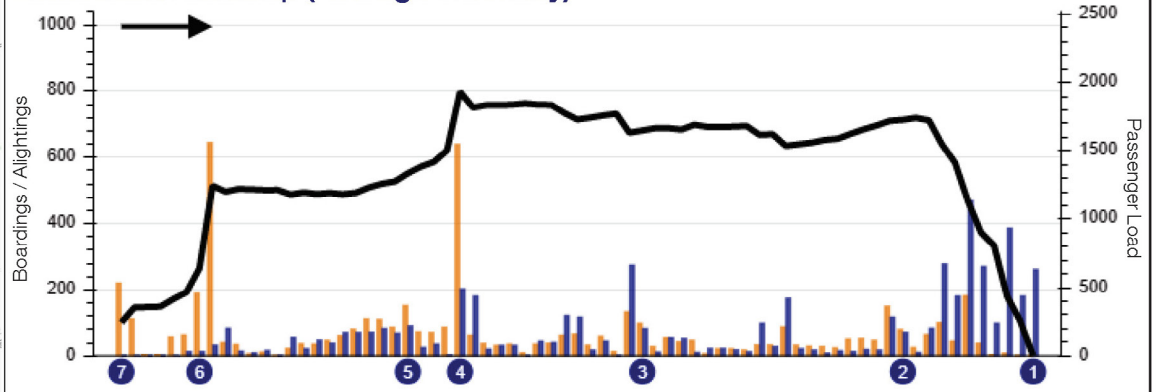
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	8,982		7,706		5,159	
Riders per Revenue Hour	43.5		50.5		42.3	
Riders per Trip	48.8		49.4		37.9	
CJTP (%)	58.7		--	--	--	--

Q54 Metropolitan Avenue

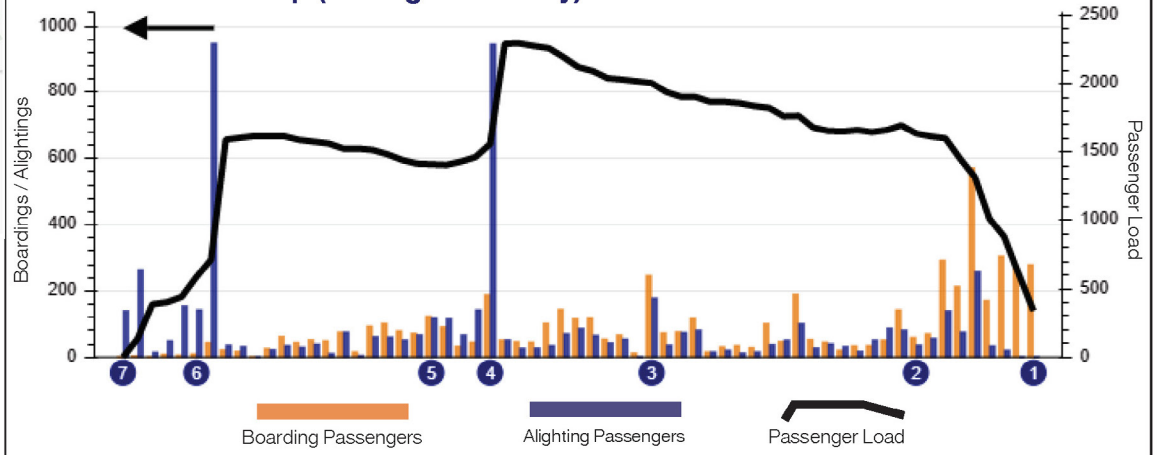
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	9.7 mi	0.9	769 ft	7.2 mph



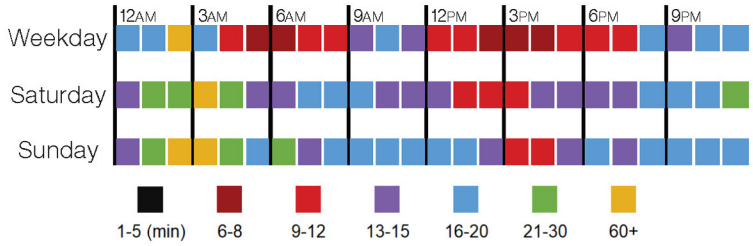
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

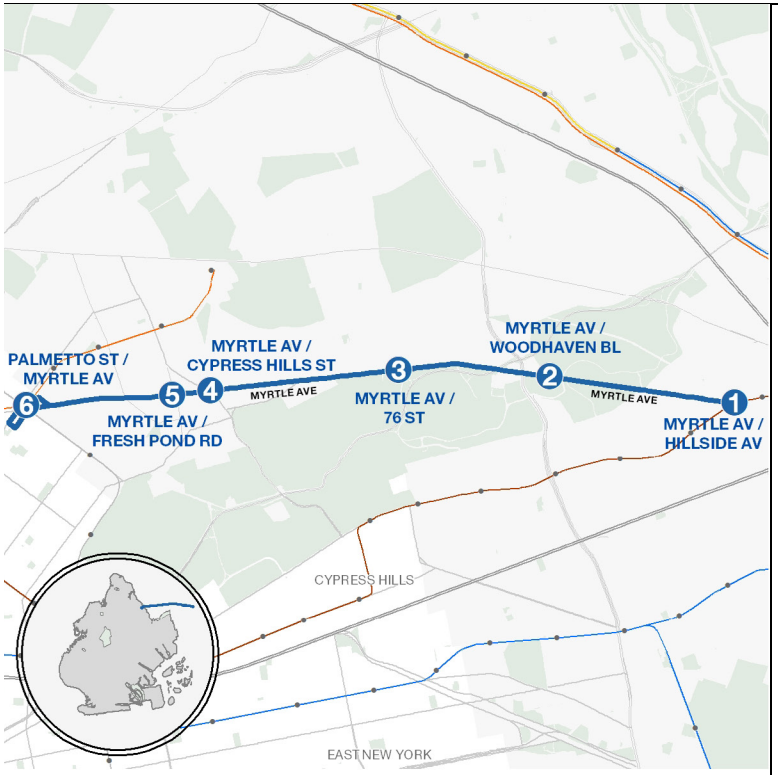
42.7% 30.5% 26.8%

Route Metrics

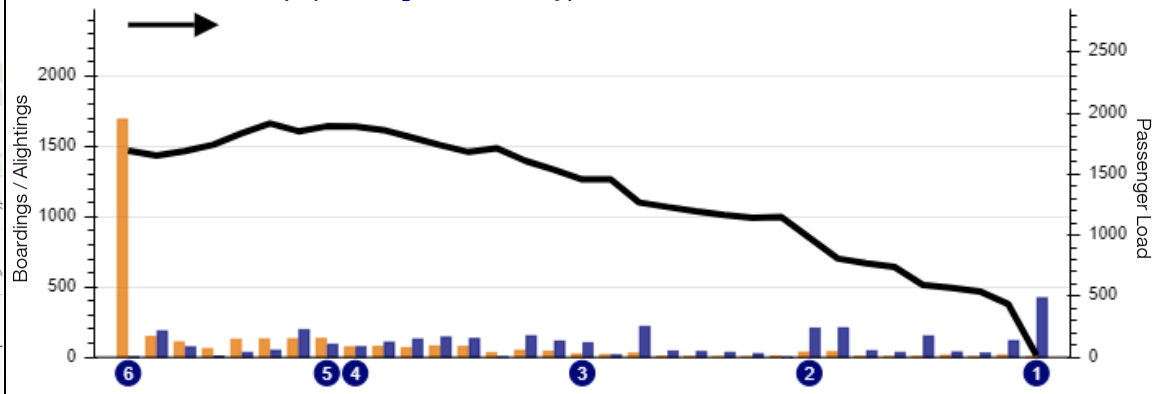
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	10,831		6,974		4,146	
Riders per Revenue Hour	43.5		43.9		32.1	
Riders per Trip	51.1		46.5		30.5	
CJTP (%)	66.5		--	--	--	--

Q55 Myrtle Avenue

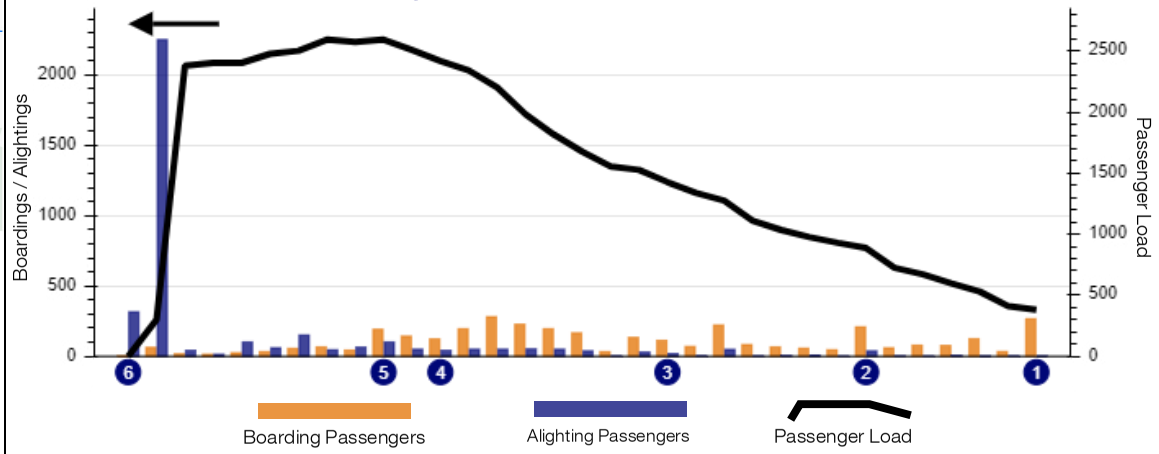
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	4.4 mi	1.0	716 ft	7.9 mph



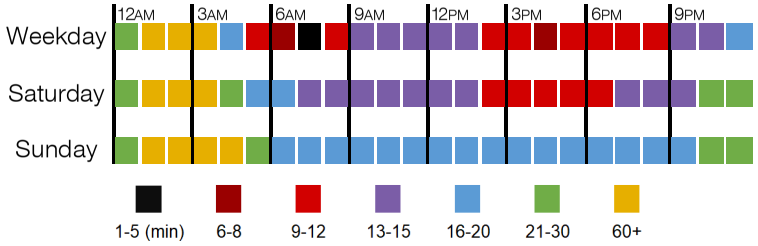
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

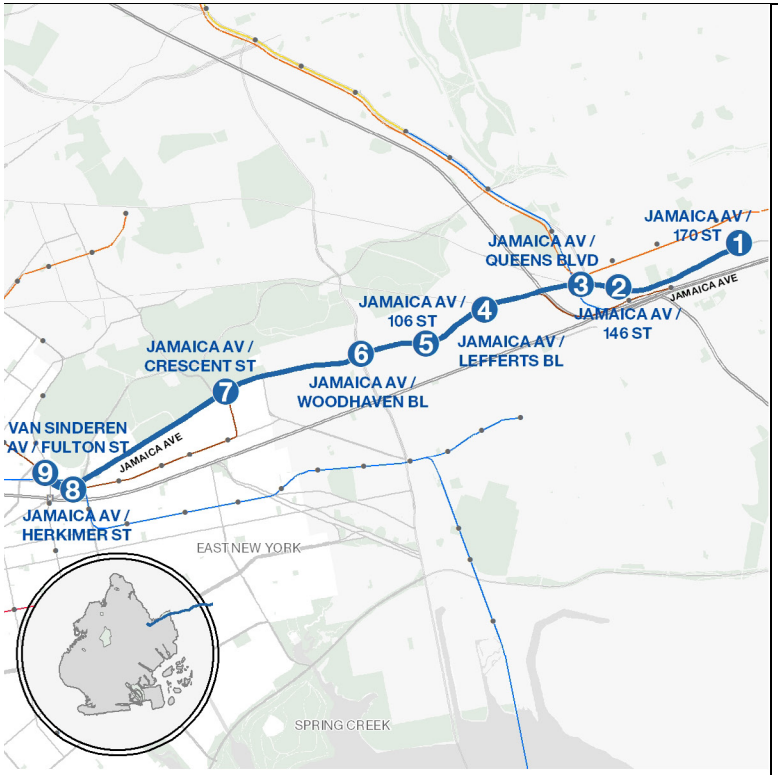
34.1% 48.0% 17.9%

Route Metrics

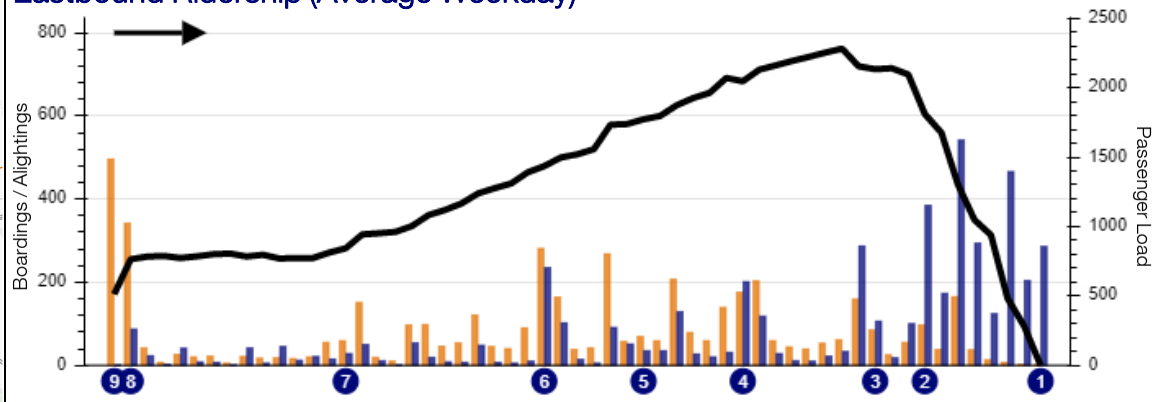
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	6,933		3,956		2,426	
Riders per Revenue Hour	60.9		49.4		45.8	
Riders per Trip	34.2		24.7		20.6	
CJTP (%)	68.3		--	--	--	--

Q56 Jamaica Avenue

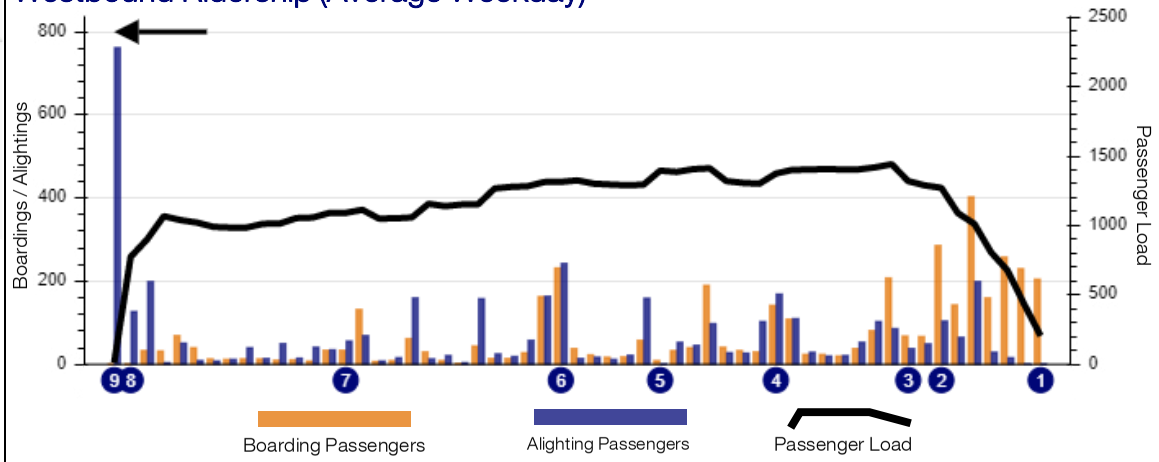
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	6.6 mi	0.5	621 ft	6.4 mph



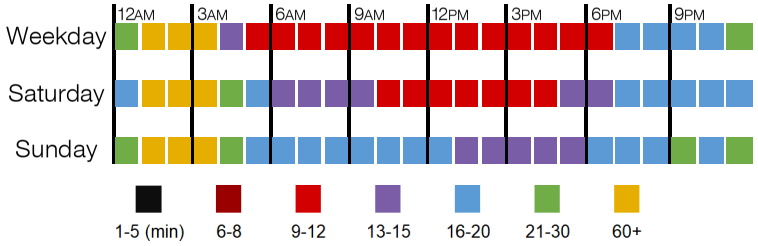
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

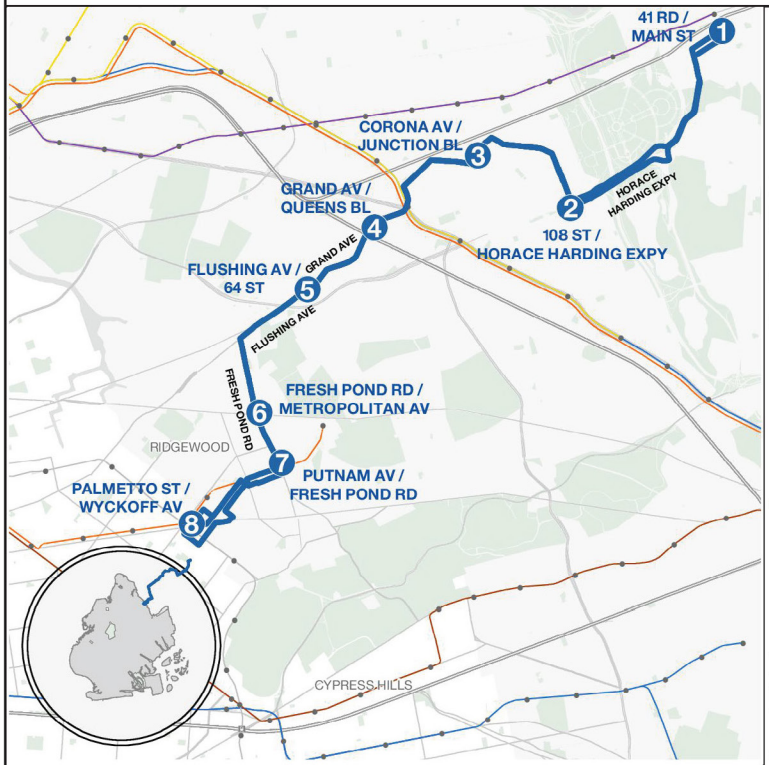
49.7% 23.6% 26.7%

Route Metrics

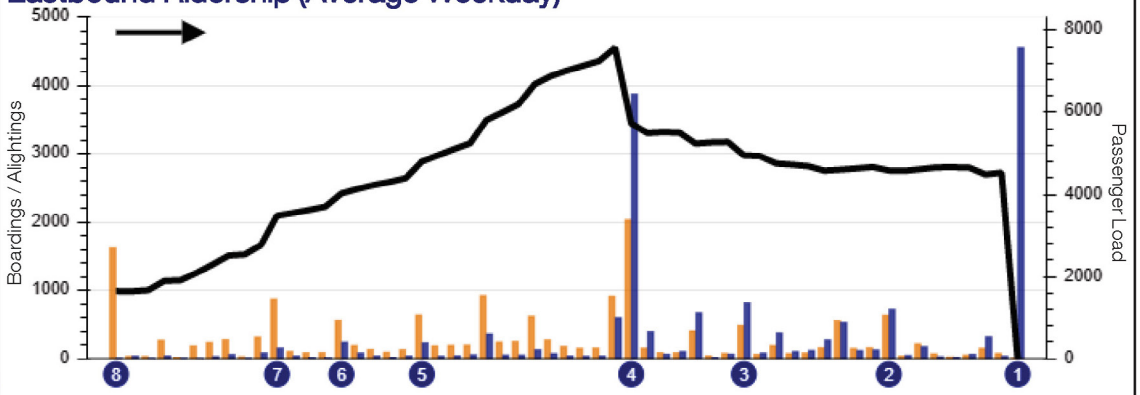
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	8,781		8,133		4,907	
Riders per Revenue Hour	53.2		61.9		49.8	
Riders per Trip	49.9		50.8		38.3	
CJTP (%)	56.6		--	--	--	--

Q58 Ridgewood - Flushing

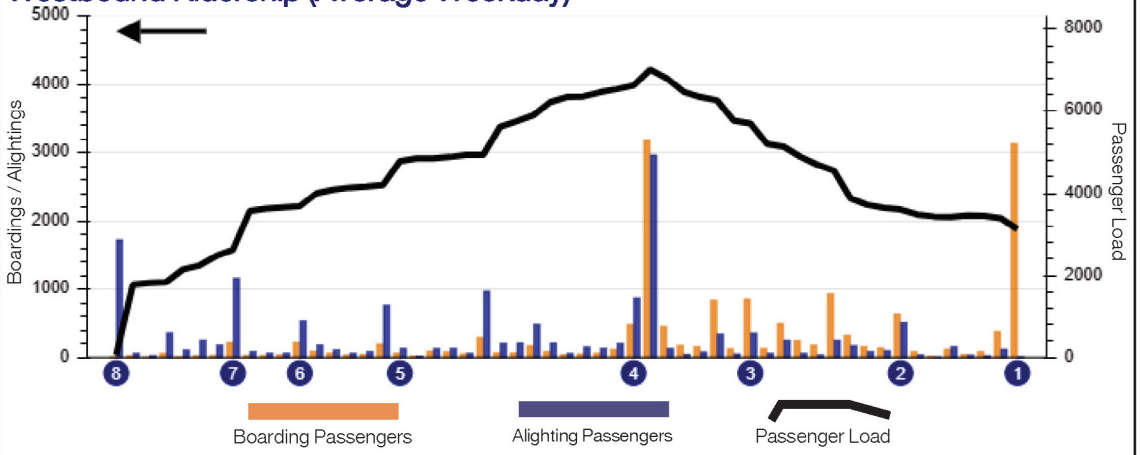
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local / Limited	8.2 mi	1.7	786 ft	7.4 mph



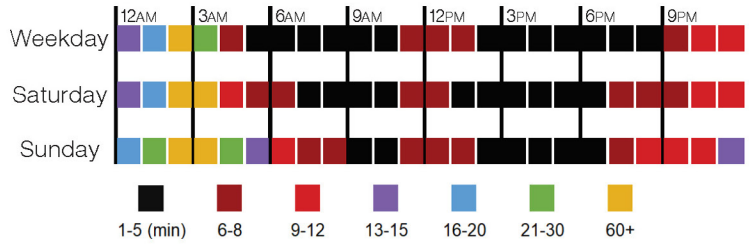
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

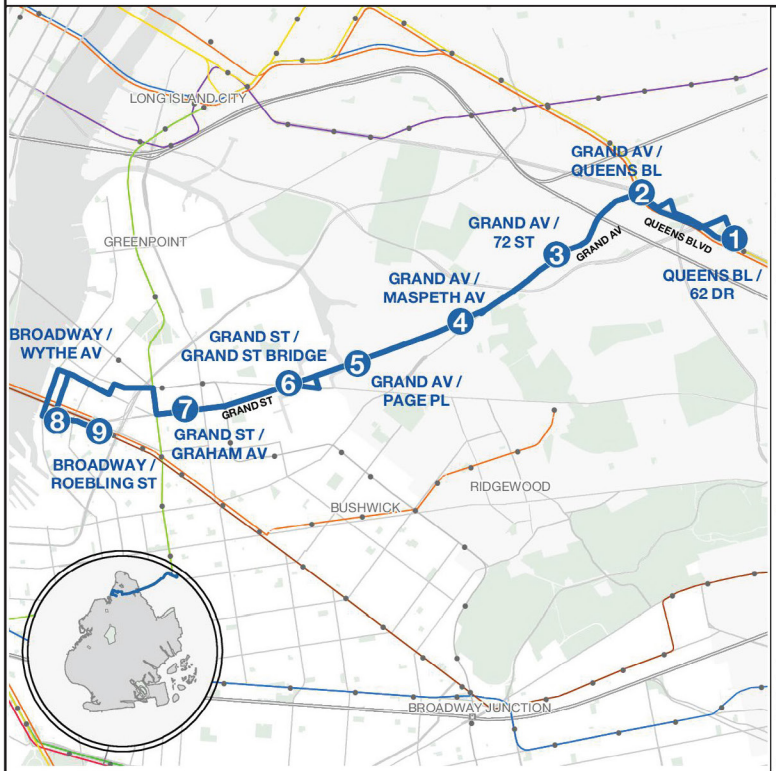
34.7% 36.7% 28.6%

Route Metrics

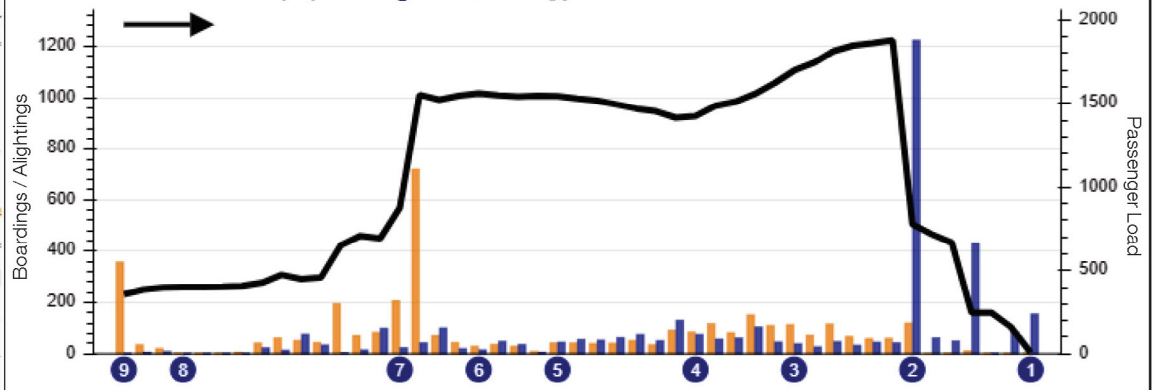
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	31,909		24,942		18,037	
Riders per Revenue Hour	60.3		60.1		56.5	
Riders per Trip	63.6		60.5		54.0	
CJTP (%)	66.5		--	--	--	--

Q59 Grand Street / Grand Avenue

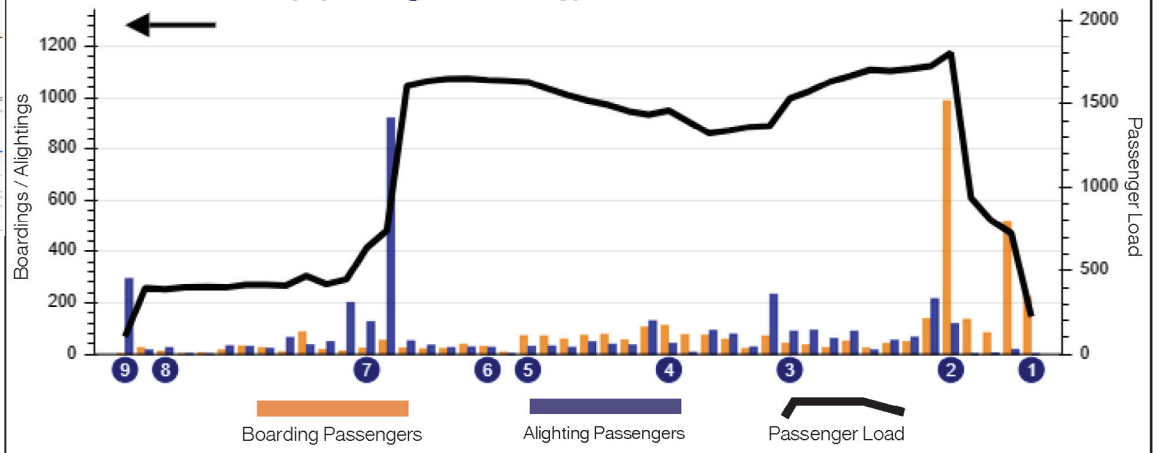
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Local	7.2 mi	1.9	839 ft	7.1 mph



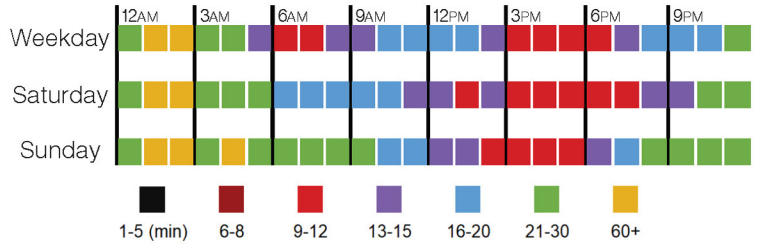
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

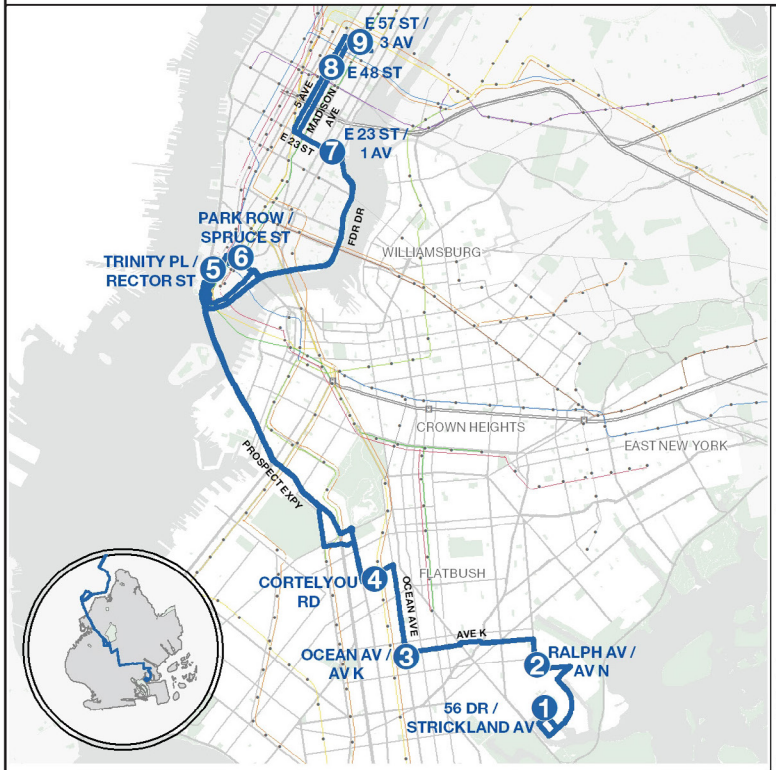
28.1% 48.9% 23.1%

Route Metrics

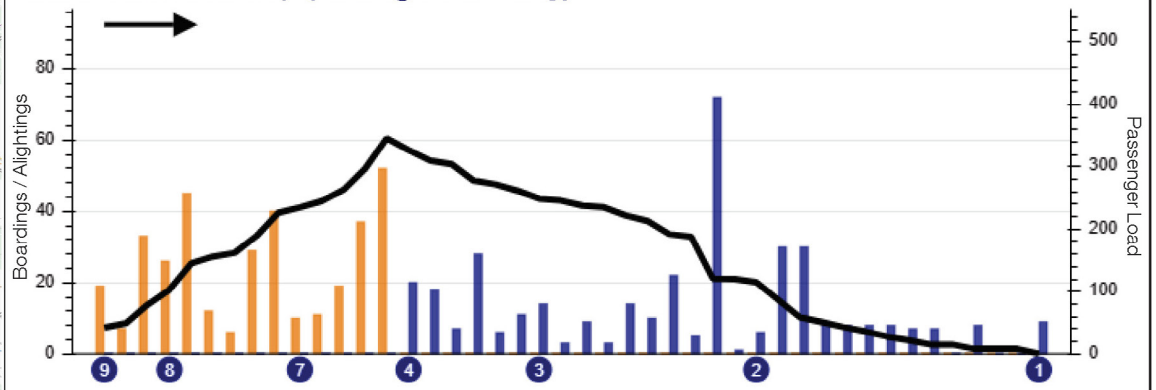
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	7,322		4,494		2,785	
Riders per Revenue Hour	49.4		37.1		30.5	
Riders per Trip	46.9		29.6		22.8	
CJTP (%)	63.9		--	--	--	--

BM1 Mill Basin - Downtown/Midtown Manhattan

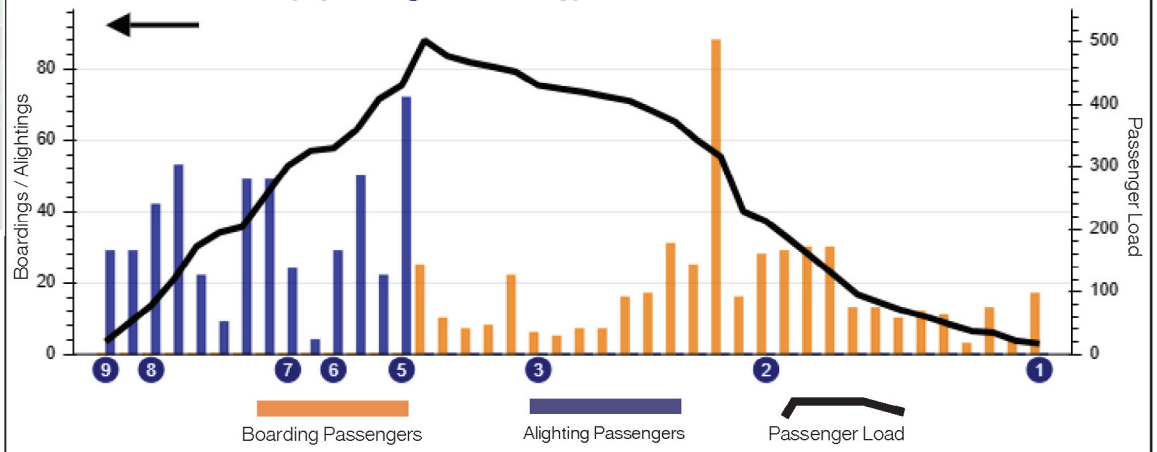
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	19.6 mi	1.0	1,727 ft	11.7 mph



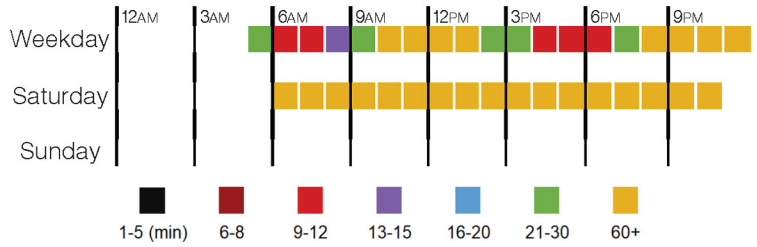
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



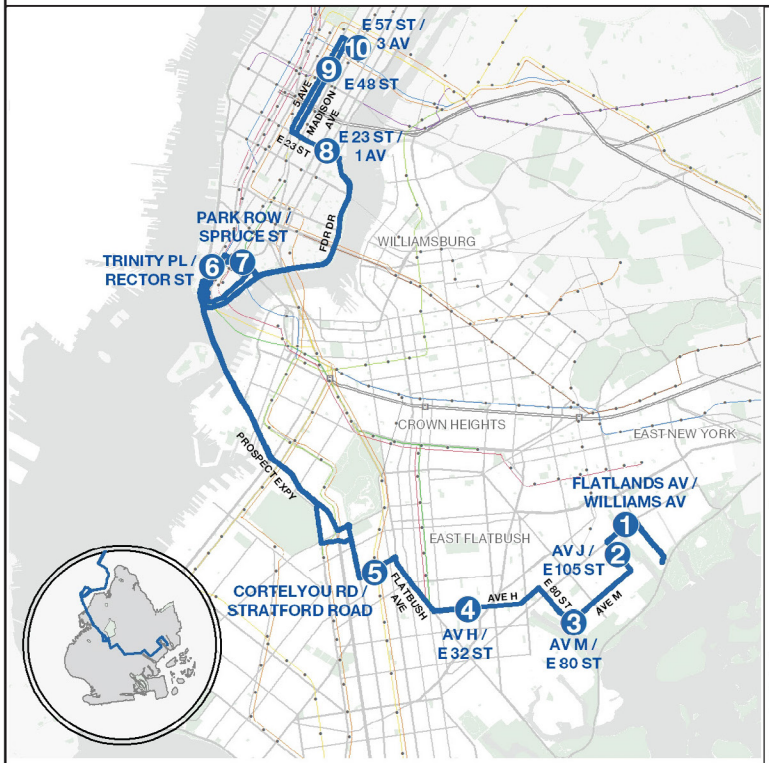
Transfers

Route Metrics

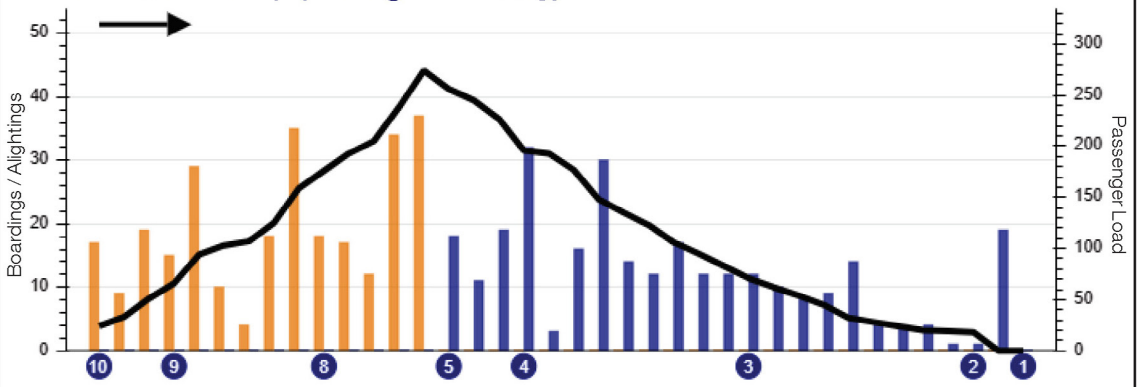
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	950		66		--	
Riders per Revenue Hour	11.3		2.3		--	
Riders per Trip	16.4		3.0		--	
CJTP (%)	39.8		--	--	--	--

BM2 Spring Creek/Canarsie - Downtown/Midtown Manhattan

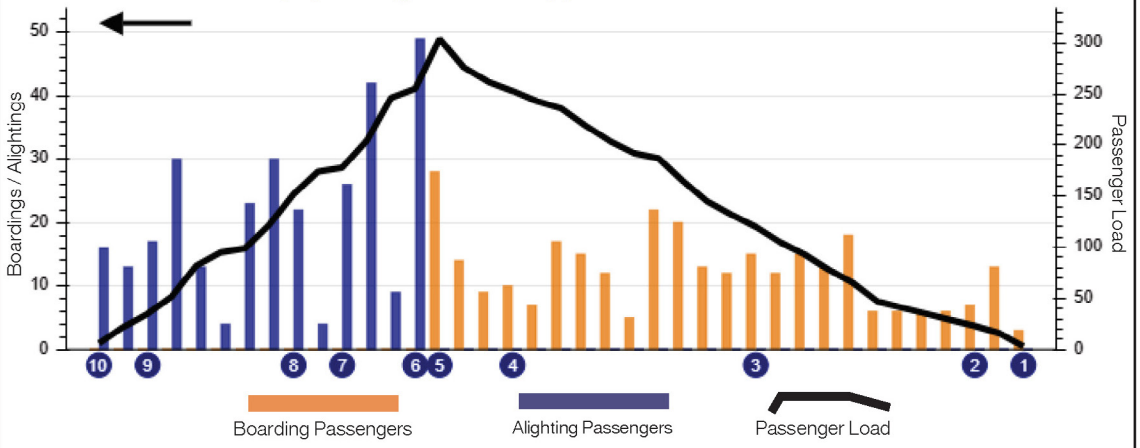
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	19.2 mi	0.8	1,909 ft	11.6 mph



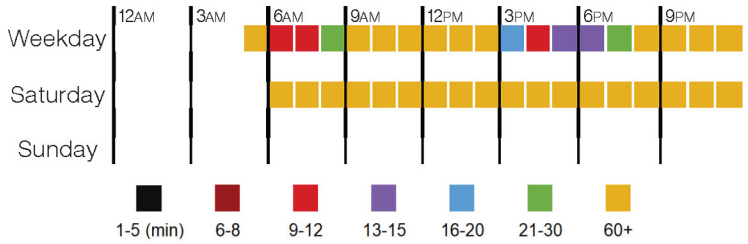
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

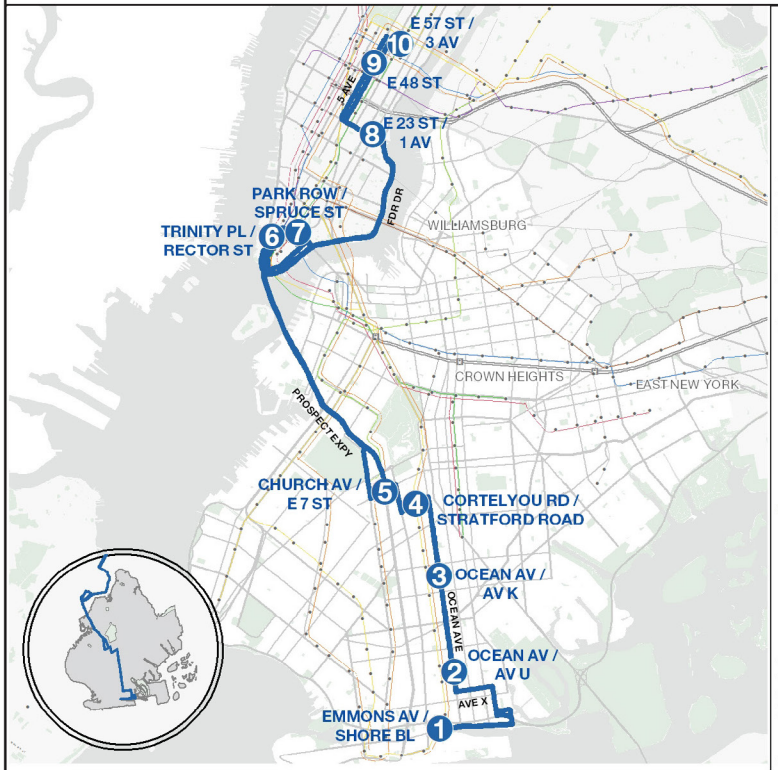
16.3% 5.8% 77.9%

Route Metrics

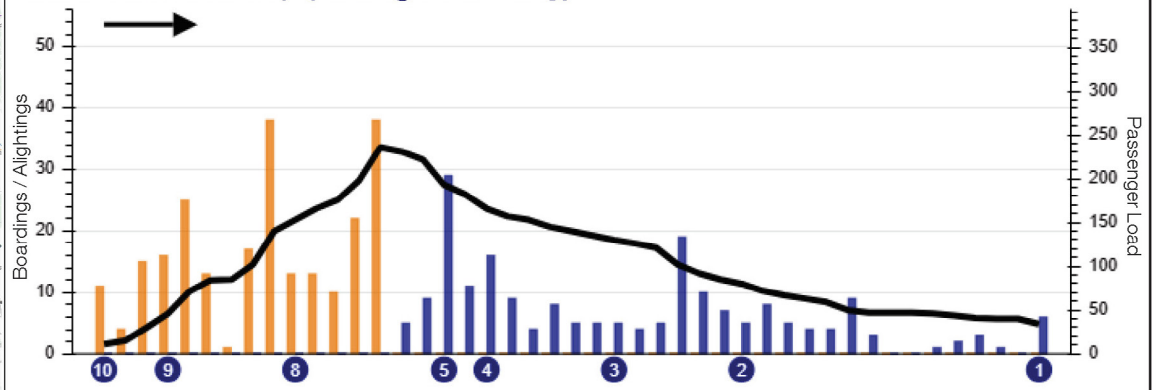
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	657		76		--	
Riders per Revenue Hour	10.1		2.5		--	
Riders per Trip	14.0		3.3		--	
CJTP (%)	22.9		--	--	--	--

BM3 Sheepshead Bay - Downtown/Midtown Manhattan

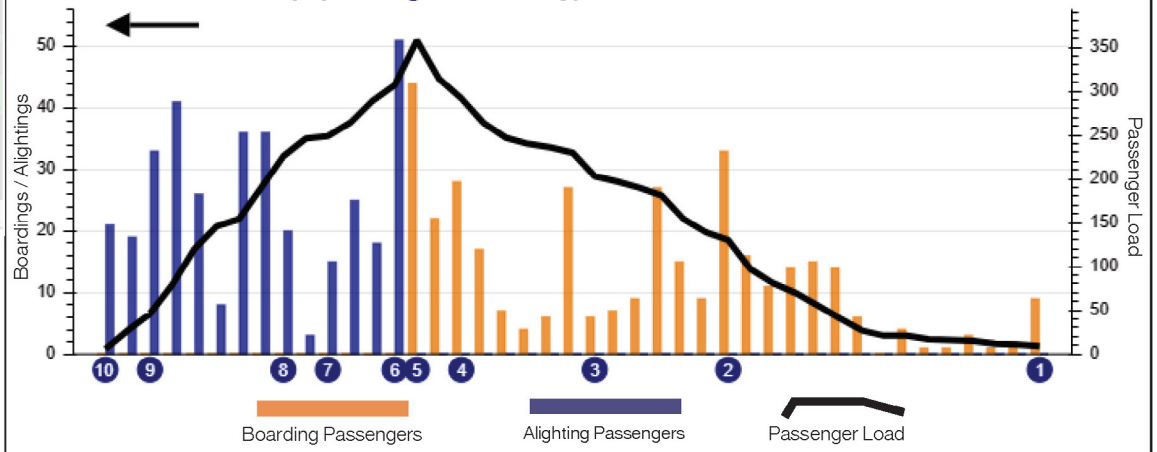
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	20.0 mi	0.7	1,871 ft	12.3 mph



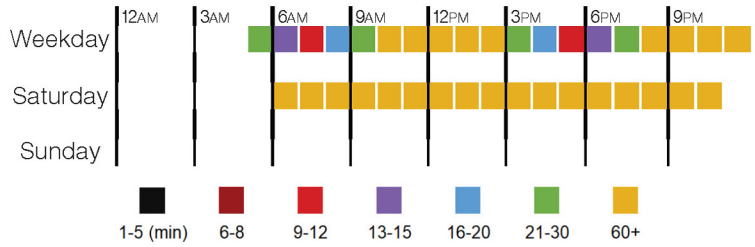
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



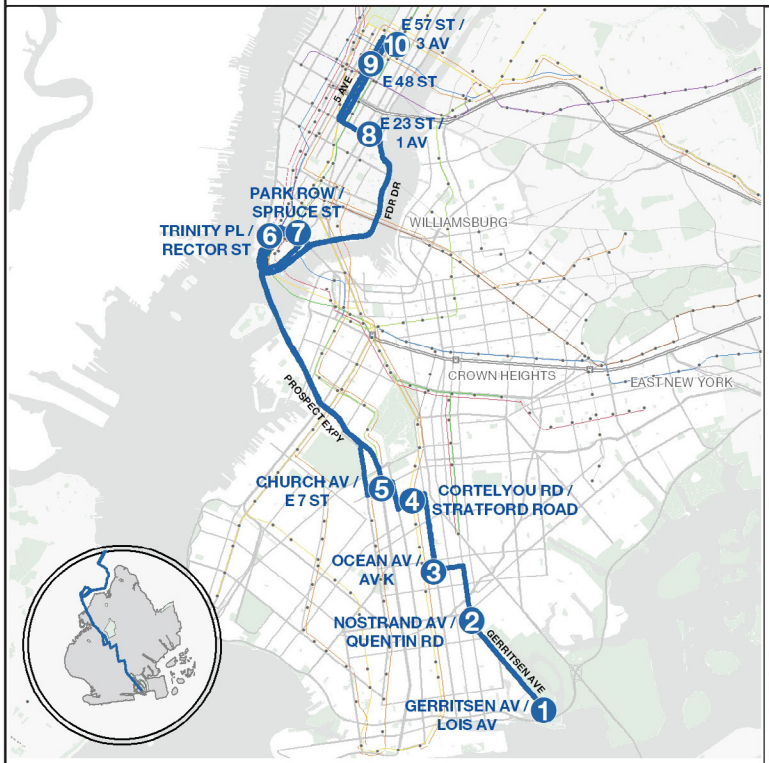
Transfers

Route Metrics

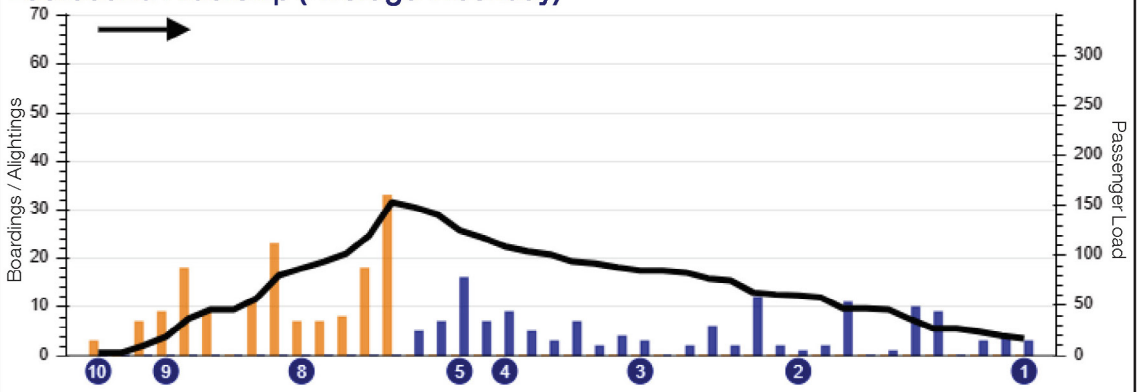
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	609		50		--	
Riders per Revenue Hour	9.0		1.7		--	
Riders per Trip	13.2		2.2		--	
CJTP (%)	48.3		--	--	--	--

BM4 Gerritsen Beach - Downtown/Midtown Manhattan

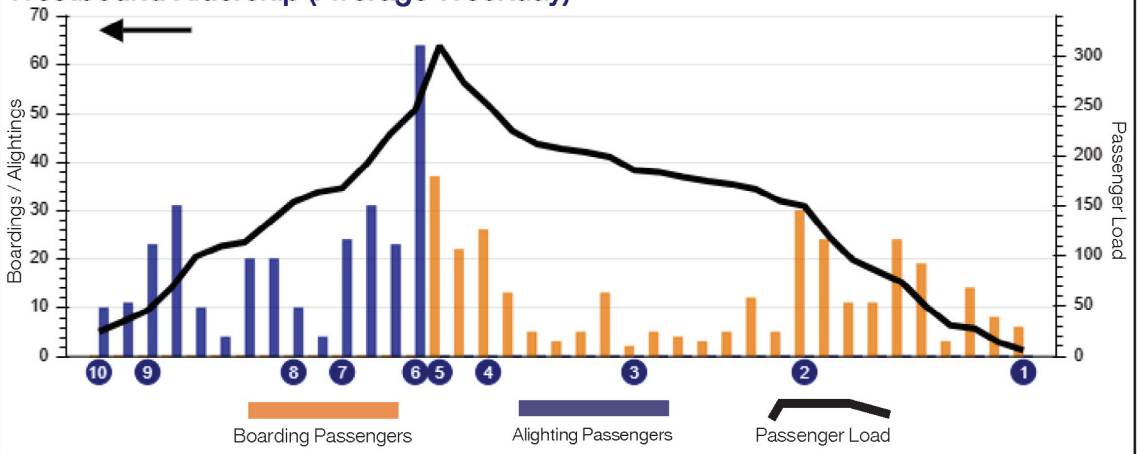
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	18.5 mi	0.6	1,841 ft	11.1 mph



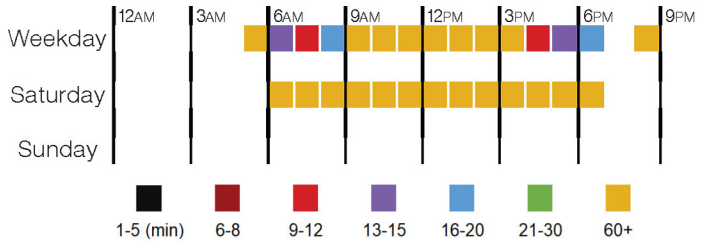
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

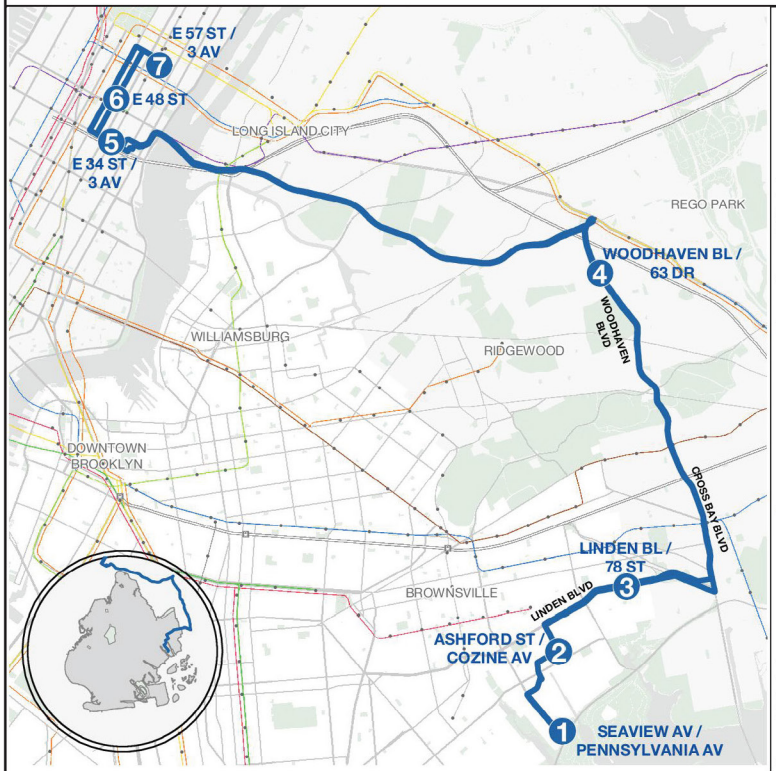
11.8% 10.6% 77.6%

Route Metrics

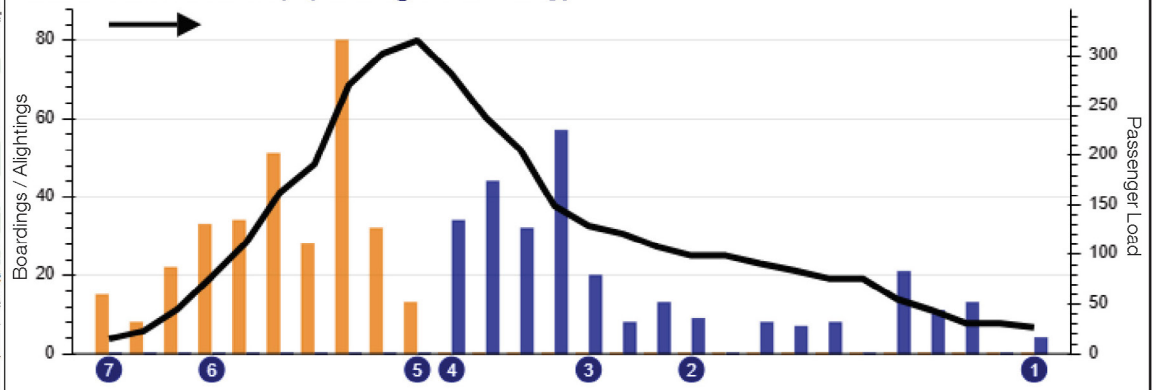
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	480		34		--	
Riders per Revenue Hour	9.1		1.3		--	
Riders per Trip	13.3		1.8		--	
CJTP (%)	45.1		--	--	--	--

BM5 Spring Creek - Midtown Manhattan

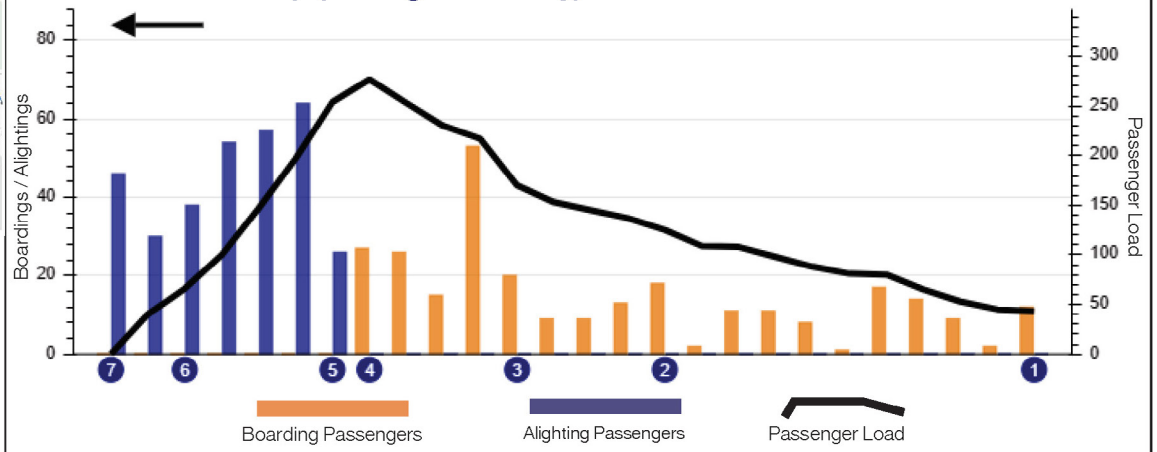
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	17.0 mi	0.6	2,103 ft	12.4 mph



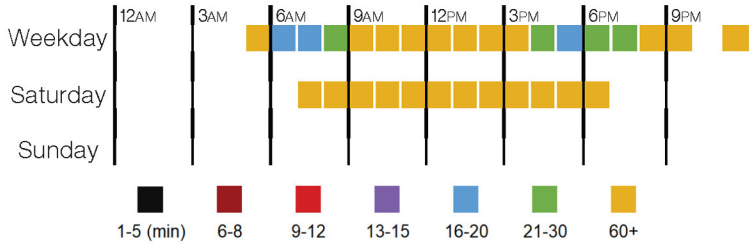
Eastbound Ridership (Average Weekday)



Westbound Ridership (Average Weekday)



Hourly Frequency



Transfers

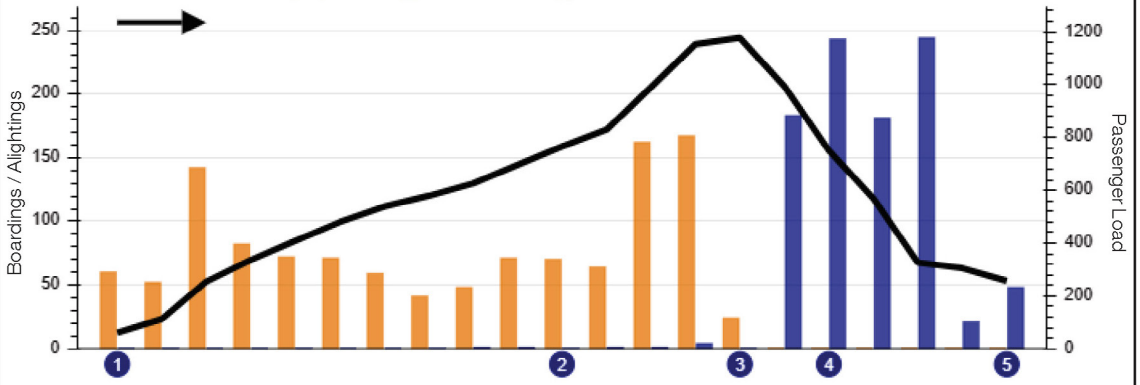
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	593		62		--	
Riders per Revenue Hour	16.4		3.6		--	
Riders per Trip	19.8		3.9		--	
CJTP (%)	47.1		--	--	--	--

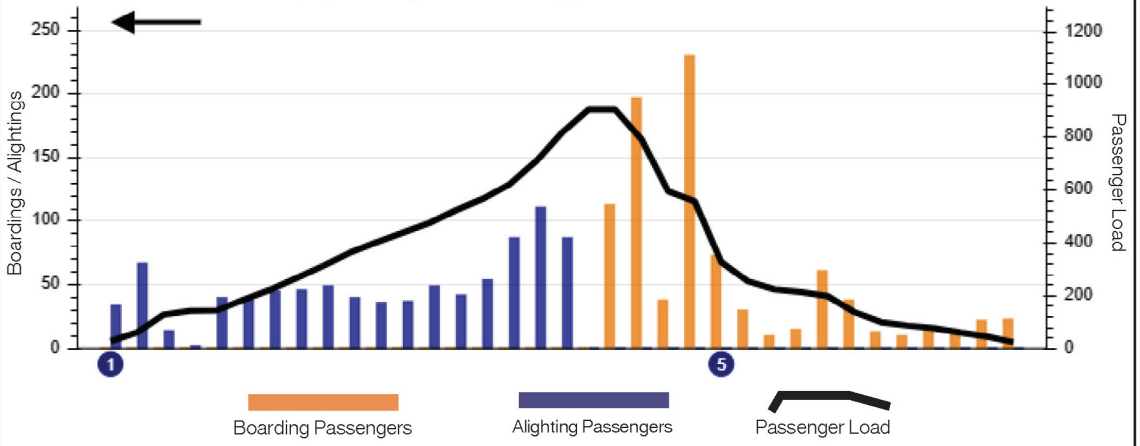
X27 Bay Ridge - Downtown/Midtown Manhattan

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	12.8 mi	0.8	1,232 ft	12.1 mph

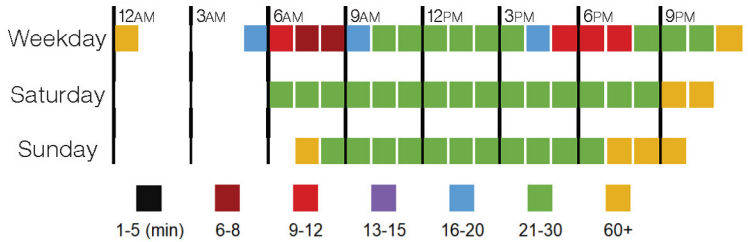
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

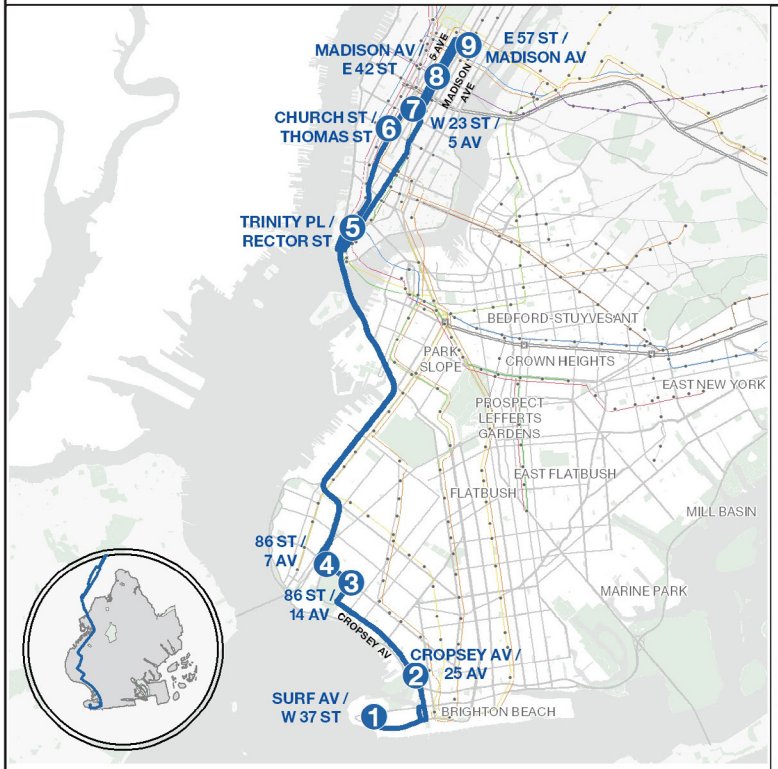
4.2% 24.7% 71.2%

Route Metrics

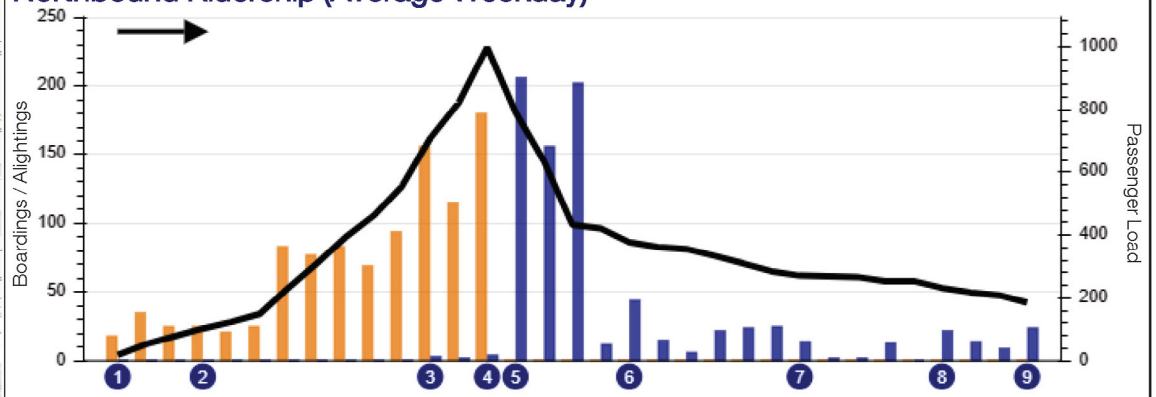
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	2,090		599		260	
Riders per Revenue Hour	25.2		9.2		5.2	
Riders per Trip	26.5		10.7		5.9	
CJTP (%)	67.6		--	--	--	--

X28 Bay Ridge - Midtown Manhattan

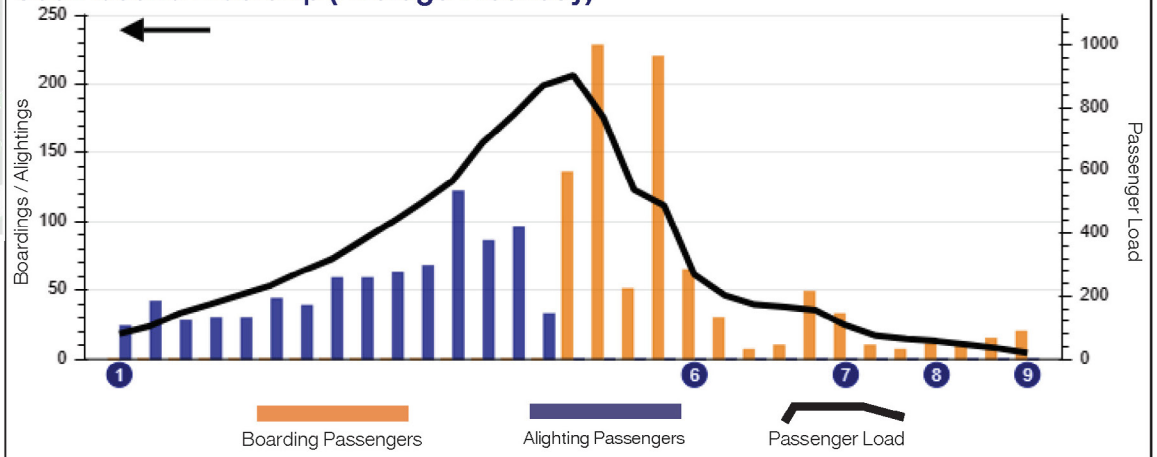
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	15.5 mi	0.7	1,461 ft	11.8 mph



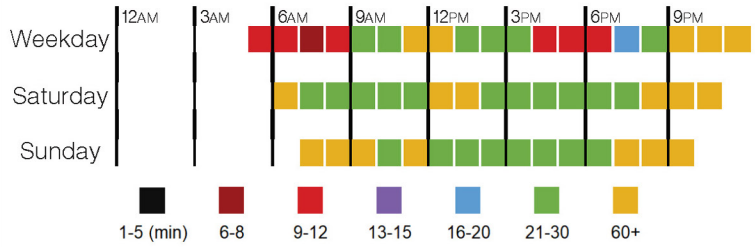
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

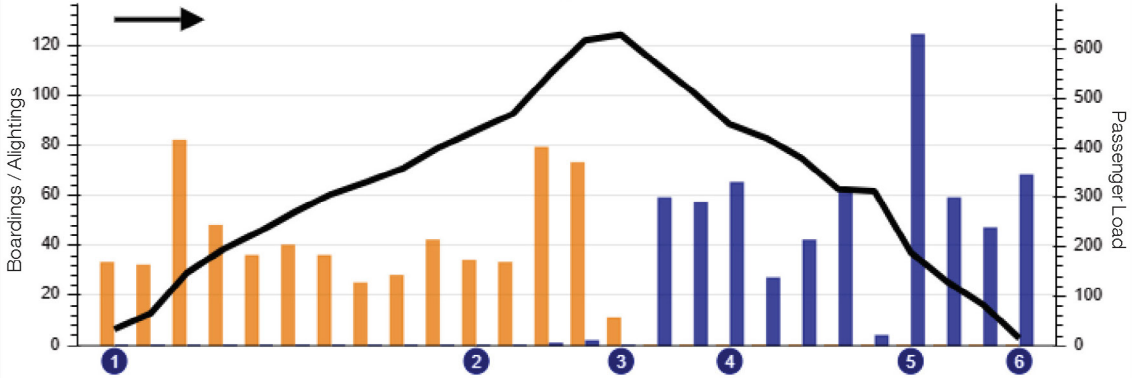
Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	1,937		335		159	
Riders per Revenue Hour	21.4		5.1		2.7	
Riders per Trip	26.9		7.3		4.0	
CJTP (%)	80.9		--	--	--	--

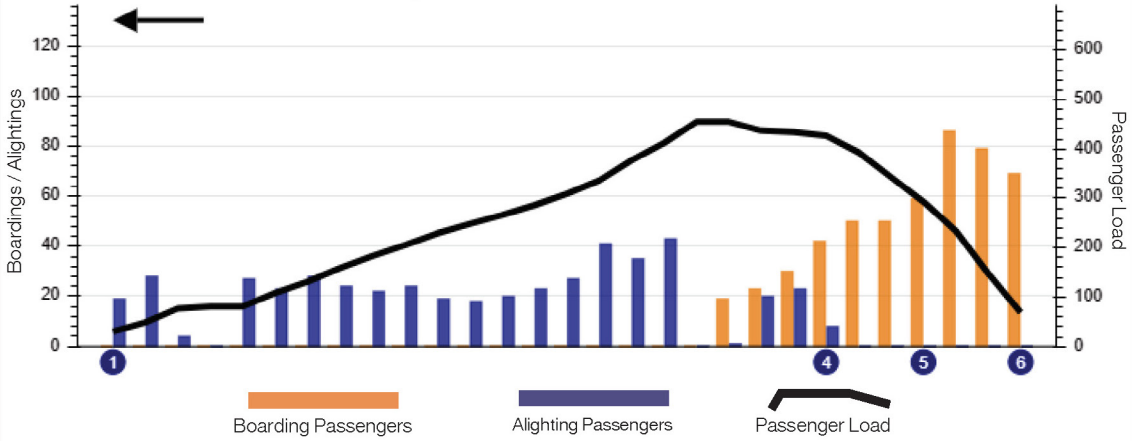
X37 Sea Gate/Gravesend - Downtown/Midtown Manhattan

Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	15.6 mi	0.5	1,129 ft	12.9 mph

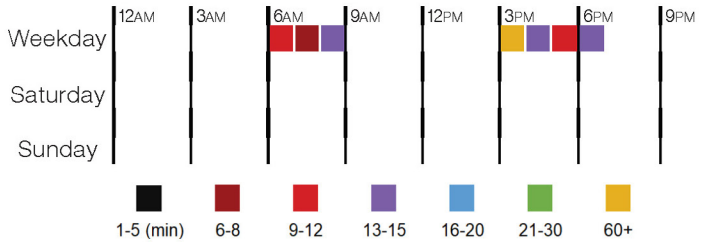
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

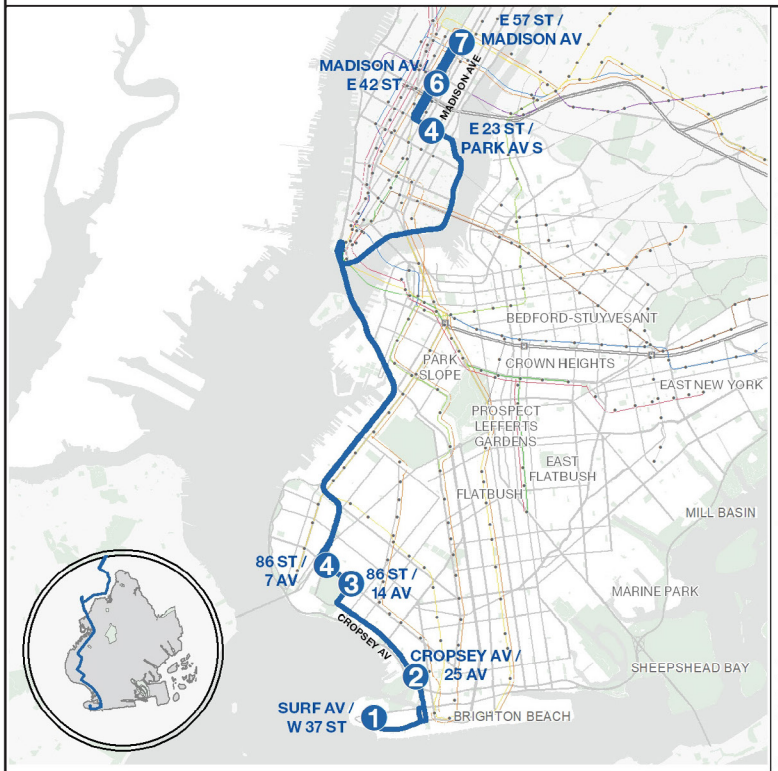
7.4% 6.4% 86.2%

Route Metrics

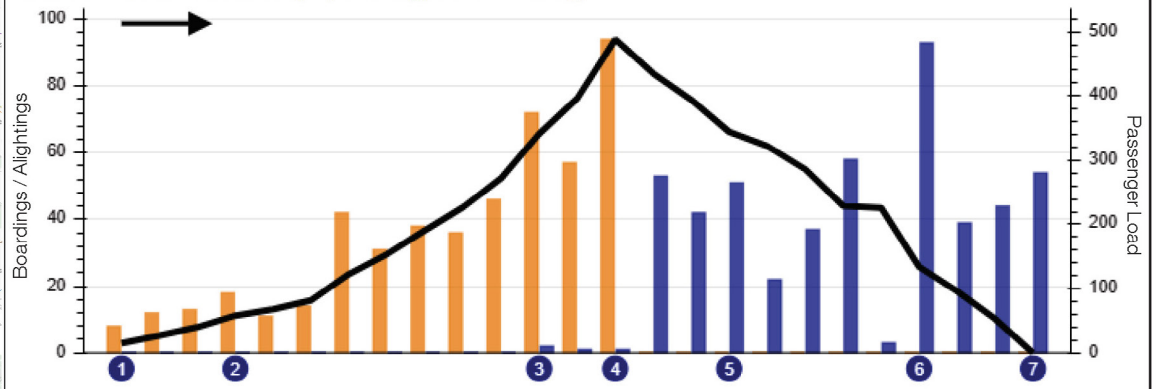
	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	1,139		--		--	
Riders per Revenue Hour	29.4		--		--	
Riders per Trip	34.5		--		--	
CJTP (%)	67.1		--	--	--	--

X38 Sea Gate/Gravesend - Midtown Manhattan

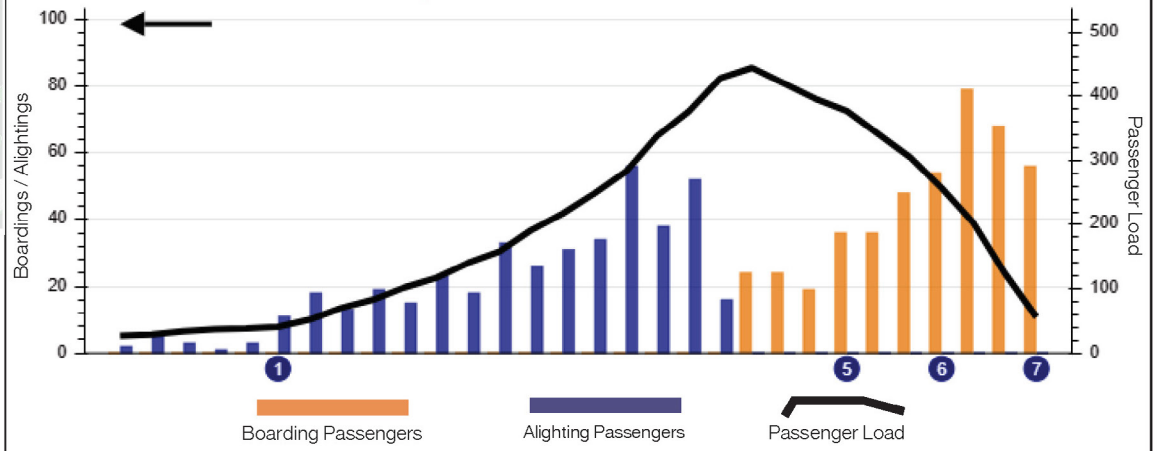
Type	Route Length	Turns per Mile	Stop Spacing	Average Speed
Express	17.8 mi	0.3	1,364 ft	12.9 mph



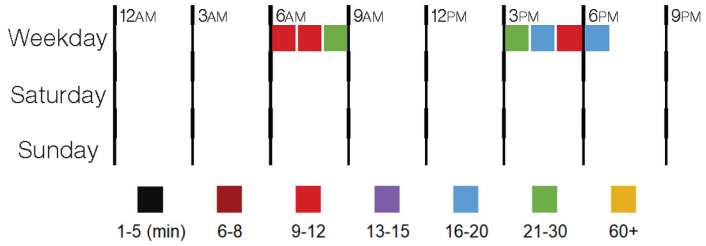
Northbound Ridership (Average Weekday)



Southbound Ridership (Average Weekday)



Hourly Frequency



Transfers

Route Metrics

	Weekday		Saturday		Sunday	
	Value	Rank	Value	Rank	Value	Rank
Daily Ridership	946		--		--	
Riders per Revenue Hour	23.4		--		--	
Riders per Trip	32.6		--		--	
CJTP (%)	75.4		--	--	--	--