



*Long Island City, Queens*

STRATEGIES

# INTERMODAL CONNECTIVITY & COMMUTER RAIL STATIONS



# INTERMODAL CONNECTIVITY & COMMUTER RAIL STATIONS

## STRATEGIES

### INTRODUCTION

The safe and efficient movement of passengers between modes of transportation—or intermodal connectivity—is paramount to creating complete and livable communities. New York’s mass transit network moves more people than any other city in the nation. In New York, residents have an extensive range of public transportation options to make their daily commute, including subways, local, express and select buses, commuter rail, and ferry service. Many commuters combine one or more of these mass-transit modes with walking, bicycling or using a vehicle— be it a taxi, rental car, or personal vehicle. While cost is a critical factor in choosing a transit mode, comfort, convenience, consistency and speed are also important elements which influence the choice a commuter makes for their mode of transit. Along regional commuter rail systems such as Metro-North, stops are less frequent and stations are more interspersed than those associated with bus or subway service. While this allows commuter trains to cover great distances, it may also require secondary means of transit to shuttle passengers to and from the station, or feeder systems, especially in neighborhoods which are outside of the walkable radius and reliant on mass-transit.

Many Metro-North stations throughout the regional rail network have a layout and function created for a suburban ridership pool which is accustomed to fixed arrival and departure schedules and convenient station parking for their vehicles. Bronx commuters differ from this template though, as they are generally walking to and between modes of transit and are typically not driving to the station. In fact,

none of the Metro-North stations in our study area have station parking. The threshold for waiting is likely lower for Bronxites since they are not limited to one mode of transit as suburban commuters may be. Since the manner in which Bronxites access and utilize their stations differs greatly from their suburban neighbors, Bronx stations should reflect this difference in the manner in which they are designed and integrated into the urban fabric.

While the communities we studied all have unique qualities, there are a number of common issues surrounding the successful integration of Metro North stations into the complex fabric of Bronx neighborhoods. The streets surrounding transit stations not only need to support multiple divergent and potentially conflicting transportation modes (automobiles, buses, pedestrians, and bicyclists), they simultaneously need to do so in a safe and fluid manner. The relative disconnect most Metro North stations have from other modes of transit and the neighborhood proper surrounding land uses prevent stations from reaching their full potential. This in turn prevents Metro-North ridership from becoming integrated with the NYC mass transit system and from becoming a viable alternative for most Bronx commuters. Improvements to the connections between Metro-North and other modes of transit will ensure greater accessibility for Bronx residents and workers and improve overall ridership. The following section identifies some of the strategies for creating more seamless intermodal transit connections and integrating commuter rail stations into local transit networks.

## STRATEGIES

### SUBWAYS

The subway system is a relatively fixed feature of the New York City environment. It is the most extensive subway system in the world, and the most utilized and efficient mode of transit in the city. The initial construction of the subway lines facilitated a de-concentration of population intensity from Lower Manhattan, especially the Lower East Side. Through the following decades, the lines accommodated rapid movement through quickly growing population centers and sparked new residential, retail and employment centers in its vicinity.

As neighborhoods have evolved throughout the decades, station entrances are still predominantly located along retail corridors and active pedestrian pathways. Subway entrances are typically embedded into the surrounding streetscape, with simple entrances either on the sidewalk or adjacent buildings, yet, despite a small street presence, the consistent signage and fixtures, like the prominent globe lamps, make stations easily recognizable throughout the city. All subway stops near Metro-North stations should include wayfinding signage, schedules and geographic locators to Metro-North which are easily readable and consistent.

Efforts at connectivity typically involve working to create more seamless connections between different subway lines at major transfer stations. In Court Square in Queens, for example, where the below-grade G train intersects with the below-grade E and M trains and the above-grade 7 train, a recently constructed passageway has allowed transfer between lines without having to leave the transit system, removing an additional step from many passengers' commute. While buses and Metro-North transfers are unlikely to have this level of connectivity with subway lines, similar measures should be included where reasonable overlaps occur. This could include enhanced pathways, signage, as well as fare and schedule coordination. Additional entrances to subway stops should be explored where they can increase proximity to Metro-North Station entrances.

### BUSES

Buses are an integral part of the commuter landscape in the Bronx. Within our study areas they are often the initial transit mode for commuters, and frequently provide connections to subways and commuter rail. As non-fixed modes of transit, population



**FIGURE 1** | New York City's transportation mode choices: the subway, bus system, bike lanes, and taxi services give residents options throughout the five boroughs. Commuter rail increasingly plays a large role within the transportation network.

Source: ZZZ/ CC-BY-SA-3.0, via Wikimedia Commons from Wikimedia Commons



**FIGURE 2 |** Efficient and reliable transfers between different public transportation modes improve the commuting experience, and increase the likelihood of usage. (Left) The Long Island Rail Road station in Queens connects users to the E and J subway lines, buses, and to John F. Kennedy Airport. (Right) The 125th Metro-North station in Harlem provides easy access to LaGuardia Airport, connecting buses, and the 4, 5, 6 subway lines.

growth patterns have not traditionally followed bus corridors. Traffic and crowding can lead to fluctuating schedules, and slow, erratic service. Combined with the lack of fixed station amenities this detracts from the potential for transit-oriented development around them. While the relative flexibility of bus service and lower capital cost provides an opportunity to adjust routes, schedules and stops to meet local needs, bus service remains one of the least efficient transit modes in terms of commute times.

Recently several Select Bus Service (SBS) routes were created in the Bronx to begin to remedy this inefficiency. SBS includes dedicated bus lanes, prepaid ticketing, and fewer stops, the combination of which is intended to decrease commute times. Future SBS routes should be carefully planned to ensure a streamlined transfer between modes and, where feasible, should ensure bus stops are correlated with subway and Metro-North stations. The Fordham, University Heights, Williamsbridge, Melrose, and Tremont stations all have SBS stops within a ¼ mile of their respective Metro-North stations, and this constitutes a tremendous step towards intermodal connectivity. The flexibility of bus routes and stops should be utilized to ensure maximum overlap with commuter rail and subway stations.

Current SBS lanes in NYC operate curbside or within a lane offset from the curb and although these have produced reductions in travel time of up to 20%, they have yet to meet the definition of true Bus Rapid Transit according to the Institute for Transportation and Development Policy.<sup>1,2</sup> This is due to a combination of mode conflicts, turning lanes, general traffic volume and boarding delays. Bus routes which operate in a center lane or routes which have a physical barrier separating the bus lane from other traffic can provide the best opportunity to dramatically increase speeds. These options minimize conflicts with other vehicles, parking and right turns as well as allow for faster floor level boarding where raised boarding platforms allow riders to step on the bus at grade. Center lane options were considered along the Webster Avenue SBS BX41, and both options should continue to be considered and implemented wherever possible to continue to reduce transit times for Bronx residents.

Bus stop amenities not only provide shelter and rest for riders; they create a more stable atmosphere which projects safety. While full shelters and seating are unlikely for every bus stop, most should have some combination of amenities. NYCDOT has embarked on an ambitious program to have 3,500 to

tal shelters installed by 2013. The NYCDOT bench program is another option to provide supplementary seating where narrow sidewalks and other constraints prevent the placement of shelters. Detailed information on street furniture and the dimensional criteria needed for a potential shelter location can be found on the NYC DOT website.<sup>3</sup> Shelters should not impede walkability and a clear path through the sidewalk should be maintained. To facilitate the variety of streetscapes found in NYC, NYCDOT provides four shelter categories, which vary in width and length.

Finally, announcements should consistently be made at the applicable bus stops where subway and/or Metro-North service is available. Wayfinding signage, as recently implemented in University Heights, should direct potential subways and rail users from bus stops to the station.

## BICYCLE NETWORK

Bikes are an integral part of the transportation network, and as bike infrastructure has become a city-wide priority, ridership in New York City has been consistently rising. According to the U.S. Bureau of the Census, bikers in New York City recently accounted for roughly 36,000 daily commuters.<sup>4</sup> Bikes can inexpensively fill a gap in transit connections or replace an inefficient mode. This is especially relevant in our study area where buses are often the first line of transit for many inter-borough trips or further connections, and some of these trips could be replaced by a simpler, more convenient bicycle trip. Bike share programs will help facilitate this, as the flexible systems allows bike removal and return at different locations, and allows users to avoid the inconvenience of taking a bicycle on a subway or rail car.

## CASE STUDY | Citi Bike

In May 2013, Citi Bike, New York City's bike share program, was launched. Citi Bike is the largest bike sharing system in the country and has had great early success.<sup>1</sup> The program helps fill gaps in public transit service, and provides short rides intended for commuting, running errands, and traveling the "final mile" to a destination.

The fleet of 4,300 bikes can be accessed at 330 docking stations in Manhattan south of 59th street and in Brooklyn north of Atlantic Avenue and west of Nostrand Avenue, with several docks in North Williamsburg.<sup>2</sup> As of November 8th 2013, riders had already taken 5 million trips and ridden over 10 million miles. Riders can sign up for an annual membership with unlimited 45 minute rides, or purchase a weekly or daily pass with unlimited 30 minute rides.

Citi Bike has been successful in large part due to the 350 miles of bike lanes added over the past decade; in the Bronx alone, there are now over 88 miles of bike lanes, with 56 miles added since 2006.<sup>3</sup>

The bike lane network in NYC has made cycling safer and a more desirable mode of transportation across all boroughs. Increasingly, cycling has become a practical way for Bronx commuters to reach their final destinations, or provide a connection to subway service from a Metro North station. The next phase of Citi Bike will bring docks to 79th street in Manhattan,

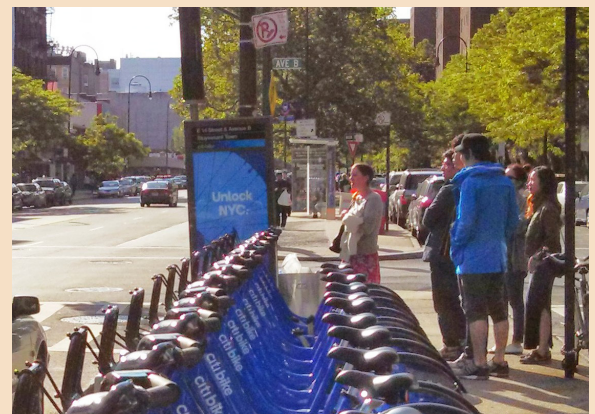
parts of Queens, and additional neighborhoods in Brooklyn increasing the number of docks and bicycles system wide to 600 and 10,000 respectively. As Citi Bike continues to grow, bike share will strengthen transportation options for Bronx residents and Metro North riders.

### SOURCES

<sup>1</sup> Office of the Mayor. <http://www1.nyc.gov/office-of-the-mayor/news/357-13/mayor-bloomberg-transportation-commissioner-sadik-khan-that-citi-bike-exceeds-5-million/#/0>

<sup>2</sup> Citi Bike. <http://citibikenyc.com/about>

<sup>3</sup> New York Times. [http://www.nytimes.com/2013/05/27/nyregion/on-eve-of-bike-sharing-debut-watching-for-a-fiasco-or-a-success.html?\\_r=0](http://www.nytimes.com/2013/05/27/nyregion/on-eve-of-bike-sharing-debut-watching-for-a-fiasco-or-a-success.html?_r=0)



**FIGURE 3 |** Citi Bike, the largely successful bike-sharing program launched in 2013.

A fully connected bikeway system is the first element in encouraging bike use. Gaps in existing bikeways in the Bronx are still abundant and are a strong deterrent to riders. Local bikeways should connect to regional trail systems and recreational pathways. Institutions, attractions, retail and transit points need to be accessible by bike path from population centers. Bike share locations at the Fordham Station and the Bronx Zoo, for example, would allow Manhattanites to take Metro-North to the Bronx, obtain a bike at the station and ride the ½ mile down Fordham Road and Southern Boulevard to the zoo entrance while avoiding the often crowded #12 or #9 buses.

All Metro-North rail stations should have bike racks to encourage bike usage, and locations should be provided within rail cars to store bicycles. Adding bike racks near the stations would give cyclists a place to lock their bike before boarding a train and could incentivize new riders to take advantage of Metro-North. Currently, bringing a bike on the train requires a permit which can be bought only at Grand Central Station. A less restrictive system could encourage bike usage, specifically where the train provides a connection to regional trails. Multi mod-

al transit hubs or connections to attractions, which have the potential to generate bike demand should have additional bike amenities that may include protected bike parking and bike stations. The surrounding zoning should permit bike repair shops.

## ALTERNATIVE TRANSPORT

Transportation choice is an important element of a livable community, and it is an advantage New York City maintains over other cities. However, despite the plethora of options, gaps remain between multiple modes of mass transit. Alternative transit options such as ferry service, car and bike share, as well as for hire vehicles, can supplement these gaps, and increase the ease of commuting.

### FERRY SERVICE

The East River Ferry pilot program began in 2011, and provides regular ferry service between seven stops in Manhattan, Queens, and Brooklyn. The service has been a resounding success with the pilot only halfway through ridership, 1.4 million passengers, already exceeding the total projected ridership

**FIGURE 4 |** The East River Ferry provides regular ferry service between seven stops in Manhattan, Queens, and Brooklyn.



of 1.6 million. Additionally, 69% of riders identified themselves as commuting, solidifying the idea that the service is not a tourist attraction, but a viable mode of transport for daily commuters. Ferry locations are flexible, and service requires little capital investment when compared to modes like subway extensions.

The location of commuter rail lines along waterways, specifically Metro-North's Hudson Line, provides an opportunity to connect Metro-North stations to ferry stops as service increases. As waterfront demand continues, and development opportunities increase, ferry service along the Harlem or Hudson River provides an opportunity to expand service to reach new population centers and connect to commuter rail lines. The city's Economic Development Corporation (EDC) completed a study in 2011 analyzing the possibility of expanding existing ferry lines.<sup>5</sup> As residential population in areas along the Hudson Line continues to expand, ferry service in this area should be considered.

### CAR SHARE & RENTAL CARS

In 2010, the Department of City Planning passed a zoning text amendment allowing car share ser-

vice parking in off-street parking garages and lots in suitable locations and zoning districts. Since almost 62% of Bronx residents do not have access to a personal vehicle, car share services such as Zip Car can provide access for occasional users without the burden of car ownership.<sup>6,7</sup> Locations should be accessible by public transit and low emission vehicles should be the standard. Additionally, car share would have the benefit of freeing up neighborhood parking spaces.

### TAXI & LIVERY SERVICE

For hire cars provide residents with a flexible option to reach areas that are either inconvenient or inaccessible through public transit. The outer boroughs, however, have historically had little access to for hire services, depending on public transit, private vehicles, or walking long distances. In 2013, the NYC Department of Transportation launched a new fleet of inter-borough taxis aimed at addressing this growing need for services outside the Manhattan core.

The new green metered taxis pick up customers in northern Manhattan, the Bronx, Brooklyn, Queens, and Staten Island. Over 18,000 of these new taxis will be available over the next three years, greatly in-





creasing the access of for hire services to Bronx residents. This expansion of services provides an opportunity to increase the use of Metro-North stations, as addressing the gap between stations and neighborhoods becomes increasingly more convenient.

## COORDINATION OF SERVICE

### SCHEDULES

Real time travel information is often a deciding factor in making your next commuting decision. An increasing amount of smart phone applications provide instantaneous information on when the next bus, subway or train is coming. Accurate real time technology not only reduces commuting stress, but allows users to consider additional options. This is especially true around commuter rail stations where trains are less frequent. Countdown clocks have become more commonplace at transit stations across the city. Programs such as Nextbus, CooCoo, and Bus Time are effective examples and should continue to expand.<sup>8</sup> Real time transit schedules should be accessible by all users through an easy to understand platform.

Time coordinated schedules to connect subways and buses with Metro-North is difficult and less necessary due to the frequency of service. However announcements, schedules or countdown clocks at subway and bus exit points adjacent to Metro-North stations provides riders with a feeling of continuity between modes.

### FARES

Wherever possible, fare coordination should be implemented. Major gaps in connections to mass transit at the end or beginning of these commutes, known as the “last mile” should be identified. Programs such as Hudson Raillink, which is operated by Metro-North, provides service from the Riverdale neighborhood to the Metro-North stations.<sup>9</sup> Tickets for the service can be purchased at a discount in unison with Metro-North weekly and monthly passes or by swiping a Metro Card. The service eases the commute to Riverdale passengers where there is a lack of connecting transit options and a steep grade to climb. Similar programs could be operated by private entities or major employment centers where businesses can partner to provide connecting service for employees.

### SIGNAGE

Wayfinding signage guides users and allows them to map out a route for their commute to local amenities. Consistent signage is identified with a transit agency or mode and serves as a visual cue for users to look out for and trust. Signage should be located on pedestrian level at entry and exit points and indicate transit connections, station amenities, local attractions, schedule and fare.

## STATION DESIGN & AMENITIES

Many of the Metro-North stations examined in this study are plagued by minimal and inconvenient ac-

**FIGURE 5** | (Left) The former station on Melrose Station; the active use provided amenities to passengers and local residents. (Right) Current view across from stairway to platform; the empty space provides not streetscape amenities and breaks up the street wall of the retail corridor.

Source: @ The Museum of the City of New York



cess points, sparse amenities, and a perception of being unsafe. This contributes to community members under-utilizing this transit resource, and generally being unaware of the location, frequency and extent of Metro-North service. A convenient, pleasant and secure station is one with features such as comfortable waiting areas, vendors selling refreshments and periodicals, adequate lighting, and clean washrooms. Commuter rail passengers are likely to spend more time in stations compared to subway passengers. While many rail passengers in suburban communities have schedules committed to memory and thus may not spend much time waiting for trains, passengers who are unfamiliar with schedules, or transferring from other modes of transit may spend considerable time waiting in transit stations. According to research done by the Victoria Transport Policy Institute, approximately 10-30% of travel time for a typical transit trip is spent waiting.<sup>10</sup> With up to 1/3 of their journey spent waiting in stations, passengers can be particularly sensitive to the environment where they wait.

New York City transit riders are generally used to stations located along busy pedestrian pathways with multiple access points. Pedestrian access from multiple points integrates the stations into the fabric of the neighborhood, provides convenience and a sense of safety. Many Metro-North stations are by-products of the rail corridor they sit upon. Whether the route is below-grade, at-grade, or along the waterfront will have large effects on how a station can negotiate access both to the platform and the neighborhood. The following elements should be considered for urban commuter rail stations: ease of access, design, comfort and safety, and integration into the local surroundings.

## INTEGRATION INTO LOCAL ENVIRONMENT

Commuter rail stations should blend cleanly into the urban environment which surrounds it. An ideal situation can be seen at a station like Grand Central Terminal where the rail runs underground and connects seamlessly to a multimodal access point. For over 50 blocks north of the terminal, the Metro-North rail cut is decked over, and above, Park Avenue lends its name to some of the most expensive real estate in the world. The decking of the rail cut not only facilitates the reconnection of the grid and urban fabric, it significantly bolstered land values by capping the negative externalities associated with intensely used train corridors. Retail amenities and residential uses are not affected by the rail line, and can facilitate a pleasant walking experience to the terminal.

In the Bronx, the Metro-North Corridor runs mostly below or at grade and is generally an open cut. Decking over the rail line entirely can be prohibitively expensive or impossible. However, as land values continue to increase, air rights over rail lines could become an unutilized asset not being used to its potential. In the interim, targeted opportunities to reconnect streets and provide access to pedestrians over rail corridors should be examined specifically where stations are located.

Where the rail cut is below-grade, partial decking over the rail line can allow for a larger, more prominent station house to front along an existing retail corridor, and could allow for additional amenities to be provided, such as retail, or public open space. Multiple entrances to the platform can be provided without the need to cross busy intersections. Mixed development can continue without the nuisance of a rail line, but with the benefit of easy transit access. This can be seen around the Fordham Metro-North station where current redevelopment of the public plaza, which sits above rail line, will allow for retail vendors, public open space, and direct connections to multiple bus lines.

Along Tremont Avenue, for example, where station access points are located along a rail overpass, which sits at a prominent location within the neighborhood, opportunities should be studied to construct decking over the rail cut in order to facilitate continuity with the streetscape character on blocks adjacent to the station. The rail overpass and associated open rail cut, disrupts the retail corridor and discourages walkability. Partially decking over the rail cut, especially at portions adjacent to the sidewalk, can provide an opportunity for a more prominent station (with more passenger amenities), a more continuous street wall, and opportunities where retail and transit supportive uses can be located in proximity to the station entrance.

In other locations, where the Metro-North rail corridor is relatively close to grade level in the Bronx, at-grade crossings are unusual and vehicular overpasses and underpasses are limited. This results in large stretches of streetscape without pedestrian access to the other side of the tracks. Since pedestrian crossings are a costly option to connect a neighborhood, it is imperative that when built these walkways are designed in a manner that ensures free-flowing and safe access for pedestrians and potential riders. More pedestrian crossings will better knit together neighborhoods on opposite sides of the tracks, and will help to alleviate the harsh conditions cre-



**FIGURE 6 |** Klyde Warren Park in Dallas, Texas. The popular 5.2 acre park's innovative design was created by decking over the Woodall Rodgers Freeway, connecting two previously fragmented areas of the downtown.

ated by the rail line, but the design of these crossings is essential to their success. The clear path must be wide enough, 15 or 20 feet ideally, to allow groups of people to pass; the sides must be visually porous so that users are visible to those outside; there must be lighting; and the bridge must be aesthetically pleasing. Gradual ascents leading up to pedestrian bridge are critical to maintain sightlines, and to improving accessibility. Allowing people to see up and down elevation changes increase perceptions of safety.

## DESIGN

MTA subway stations are an iconic symbol which is identified with mass transit. The globe lanterns at station entrances in particular, are a renowned, easily recognizable fixture to the urban environment which, despite their small size, can be seen from a considerable distance. New York City bus stops now have a sleek modern design which patrons are coming to recognize with a more efficient bus system. Consistent and recognizable design, in this case by world-renowned architect Nicholas Grimshaw, has improved the waiting experience for bus riders. Additionally, through a contract with the Spanish ad-

vertising company Cemusa, the shelters have been designed, installed, and manufactured at no cost to city in exchange for advertising rights.<sup>3</sup> Commuter rail stations should have similar high standard and recognizable designs which can be associated with its service. Innovative funding programs (like the bus shelter program) that procure high-quality capital investments for little taxpayer money should be explored. Continuity amongst stations provides visual cues to announce their presence.

Elements of this should include:

- The use of high quality and durable materials which are complementary to the surrounding area, yet functional and identifiable.
- Appropriately scaled and well integrated amenities which are sensitive to local context.
- Landscaping or streetscaping in and around the station, where appropriate, which is well maintained and attractive.
- Design which considers how color, sightlines, lighting and acoustics can enhance user experience and usability. For example, subtle reinforcements of the color of the Metro-North line

- (blue for Harlem, green for Hudson, red for New Haven) help with station and service recognition. Lighting and improved sightlines improves station functionality as well as perceptions of safety, and acoustic controls improve passenger comfort while waiting.
- Open air design, which allows natural light and emphasizes transparency.
  - Considering interesting form or iconic design where feasible.

## ACCESS

- Station entrances should be oriented toward to the pedestrian pathway and located in areas that maximize connections between activity centers and intermodal transit routes.
- Multiple entrances provide a wider pedestrian coverage and enhanced flow in and out of station.
- Access paths and platforms should be wide and unobstructed to accommodate passenger flow during peak hours.

## STATION AMENITIES & SAFETY

All stations should include:

- Comfortable seating that allows for a range of users and is located at several points along the platform or within the station house.
- Consistent and well placed wayfinding which provides information beyond the footprint of the station.
- Sheltered waiting areas should include seating, transparency, heat and lighting.
- Trash and recycling bins should be provided at several points along the platform and within the station.
- Schedules and ticket machines should be included in visible areas both inside and at station entranceways.
- High quality lighting, transparency and sightlines that allow for visibility at all points of the station.
- A standard kiosk which includes information on connecting transportation, local map, and area attractions.

As station typologies move towards transit hubs with higher ridership, increased intermodal transit connections, commercial and employment centers, and regional attractions additional amenities should

be considered to support commuter needs that include:

- A well designed station house with informational, newspaper or refreshment kiosks.
- Security cameras which are linked to local authorities.
- A station agent and/or security service during station hours.
- Restrooms and water fountains that are accessible during station hours.
- Additional retail and shopping that supports transit users and surrounding uses.

## CONCLUSION

New York City's extensive transit network provides multiple options for commuters, creating seamless connections between these modes will improve usage, access and overall quality of life. Metro-North commuter rail corridors will continue to play a larger role in the scheme of available transportation options, especially as existing routes continue to build capacity; alternative transportation choices grow with the addition of ferries, bike share, and rapid bus service; and technological advances provide instantly accessible information. Integrating these assets into the transportation network will increase the access for Bronx residents to new job centers and streamline existing commutes. Reconnecting these corridors will increase livability, opportunities and create more complete neighborhoods.

## SOURCES

- <sup>1</sup>Transportation, PlaNYC. <http://www.nyc.gov/html/planyc2030/html/theplan/transportation.shtml>
- <sup>2</sup>"Recapturing Global Leadership in Bus Rapid Transit." [http://www.itdp.org/documents/20110526ITDP\\_USBRT\\_Report-HR.pdf](http://www.itdp.org/documents/20110526ITDP_USBRT_Report-HR.pdf)
- <sup>3</sup>Coordinated Street Furniture. <http://www.nyc.gov/html/dot/html/infrastructure/streetfurniture.shtml>
- <sup>4</sup>New York City Bicycle Screenline Counts. <http://www.nyc.gov/html/dot/downloads/pdf/2012-nyc-bicycle-screen-count.pdf>
- <sup>5</sup>"Comprehensive Citywide Ferry Study." <http://www.nycedc.com/resource/comprehensive-citywide-ferry-study>
- <sup>6</sup>Census, 2010.
- <sup>7</sup>Zip Car. <http://www.zipcar.com/nyc/find-cars>
- <sup>8</sup>Schedule Programs. <http://www.nextbus.com/homepage/> | <http://www.coocoo.com/> | <http://bustime.mta.info/>
- <sup>9</sup>Rail Link. <http://web.mta.info/mnr/html/railink/railinkpage.htm>
- <sup>10</sup>"Transportation Cost and Benefit Analysis." <http://www.vtpi.org/tca/tca0502.pdf>