



M86 Select Bus Service Progress Report



Executive Summary

The 86th Street crosstown corridor connects the dense and vibrant Manhattan neighborhoods of the Upper East Side and Upper West Side. Although bus ridership on the M86 bus route serving the corridor had the highest per-mile ridership in New York City, in recent years the ridership had been dropping due to rising travel times and declining reliability. This made the route a strong candidate for Select Bus Service (SBS) conversion.

Through targeted street treatments at problem intersections, the introduction of off-board fare payment, and an array of bus customer amenities and safety upgrades, the NYC DOT and MTA NYC Transit have worked to improve this underperforming route.

Since launching in July 2015, the M86 SBS route has shown improvement across the board, including:

- 7% growth in ridership
- 8-11% decrease in travel time
- 10% improvement in reliability
- 96% customer satisfaction rating

The improvements along this corridor serve as a model for similar short, high-ridership crosstown routes, with the M79 along 79th Street scheduled for SBS implementation in spring 2017.

It should be noted that the Second Avenue Subway **Q** service began operation a year and a half after the start of the M86 SBS. It is expected that the **Q** will have an effect on M86 SBS ridership, and MTA NYCT will monitor possible ridership changes in the coming months.

Introduction

About Select Bus Service

Select Bus Service (SBS) is a joint program between MTA New York City Transit (NYCT) and the New York City Department of Transportation (NYC DOT), to provide improved transit service through the application of Bus Rapid Transit (BRT) principles to New York City's busiest bus routes. This is achieved through the implementation of techniques and technologies such as dedicated bus lanes, off-board fare payment, transit signal priority, improved passenger information, and enhanced station designs.

As of May 2017, MTA NYCT and NYC DOT have launched 13 Select Bus Service Routes in all five boroughs of New York City.



Map 1: SBS routes in New York City

86th Street Corridor and M86 Bus Route

M86 Route

The M86 Bus Route travels from W 87th Street and West End Avenue on the west to E 92nd Street and York Avenue on the east. The route offers customers a connection to 1 4 5 6 B C trains as well as twelve MTA NYCT bus routes including the M15 SBS.



Map 2: M86 route

Prior to SBS, the M86 carried over 24,000 daily passengers, making the M86 the second-busiest crosstown bus route (second to the M14A/D) in Manhattan with the highest per-mile ridership in the city.

Project Planning

Outreach

Community outreach was an important part of the project, as it provided local knowledge and feedback to the planning and implementation process. Given the short length of the route and the limited scope of implementation work, outreach was done primarily through the Transportation Committees of Manhattan Community Boards 7 and 8.

M86 SBS Introduction Presentations:

- Community Board 7 – October 14, 2014
- Community Board 8 – October 1, 2014

M86 SBS Implementation Plan Presentations:

- Community Board 7 – February 10, 2015
- Community Board 8 – October 4, 2015

Bus Speed and Delay Analysis

NYC DOT and MTA NYCT collected detailed information about how buses, traffic, and pedestrians use the 86th Street corridor. Data on parking and commercial loading was also collected. This information was carefully analyzed to ensure that the street changes would result in improved conditions for bus riders and maintenance of traffic flow for all other vehicles on the street, while maintaining curb and property access along the corridor.

Analysis of bus speeds found that the M86 was particularly slow entering and leaving Central Park. As a result, street design focused on facilitating bus movements across this stretch.

The mixed use and high density of major destinations has created an active pedestrian environment along the 86th Street corridor. However, several intersections have poor safety records resulting in classification as Vision Zero and Safe Routes to School priorities. To address these safety issues, treatments to improve pedestrian visibility and shorten street crossing distances were planned. Additionally, the westbound left turn at E 86th Street onto Lexington Avenue was banned in order to improve pedestrian safety at this busy intersection that has an entrance to one of Manhattan's busiest subway stations – the 86th Street 4 5 6 station.

Service Planning and SBS Station Siting

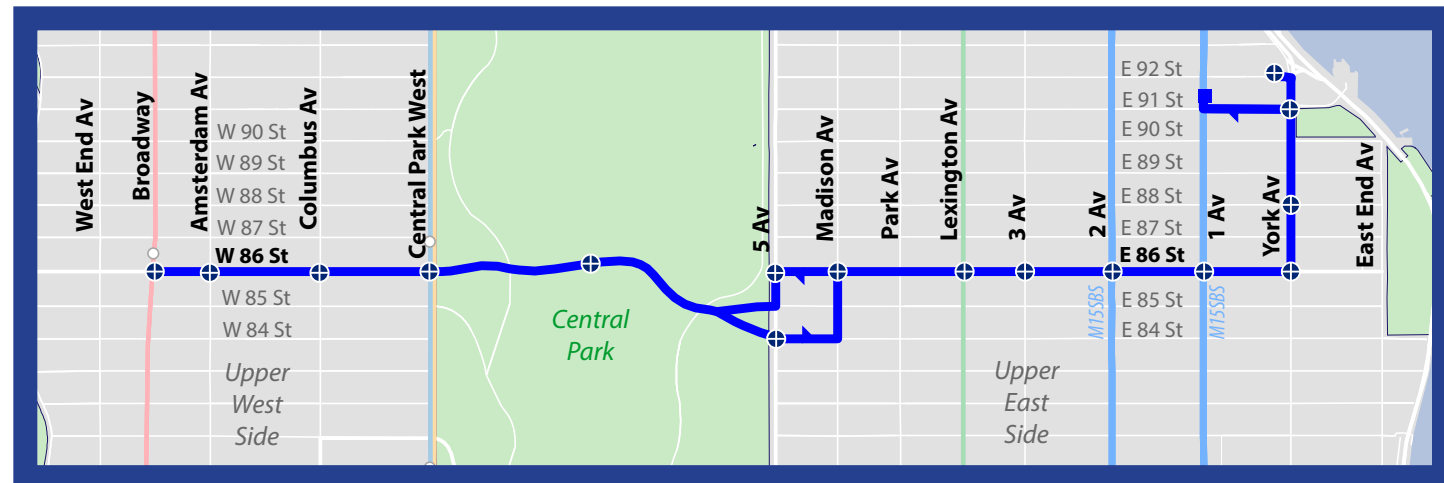
Given the short length of the route, it was determined early in the planning process that all of the service on the M86 would become SBS. Also, given how the M86 serves parts of the far East Side far from the subway, providing connections to major north-south subway lines and a much needed transit link across Central Park, it was determined that the existing route should be maintained.

Existing M86 stops were evaluated for performance and spacing with few location changes considered. Planners proposed the consolidation of the first two westbound stops at York Av & E 92 Street and York Avenue and E 91 Street, as well as the elimination of the Central Park Transverse Road stop.

Input at a Community Board 8 meeting indicated that the York Avenue stop consolidation was not desired. Feedback from both community boards in addition to NYPD Central Park Precinct indicated that the stop in the middle of Central Park is regularly used by community members attending monthly Community Council meetings as well as NYPD employees using the stop daily to access the precinct house.

As a result of this feedback, these stops were ultimately maintained in the M86 SBS route, resulting in no changes to stops for the route with the exception of a stop that has been temporarily suspended:

The M86 SBS layover near the southwest corner of Broadway and W 86th Street has been temporarily relocated to the northeast corner of the intersection due to building construction. When the construction is complete, the M86 SBS will resume its normal operation, with eastbound buses laying over on the south side of W 86th Street, west of Broadway.



Map 3: M86 SBS route and stations

Select Bus Service Elements

Queue Jump Bus Lanes

Short sections of bus lanes were implemented at key intersections to provide bus priority. In the westbound direction, a queue jump was added along E 86th Street at the westbound approach to 5th Avenue. In the eastbound direction, queue jump lanes were added to the approach of W 86th Street and Central Park West entering the Transverse Road and exiting the park at E 84th Street and 5th Avenue.

The queue jump lane at E 86th Street at the approach to 5th Avenue was intended to provide buses turning left better positioning in the right hand curb lane, and better placement in the queue, on the approach to the turn onto the Transverse Rd crossing Central Park. The design of the lane created channelization that reduced the general travel lanes to a single lane to further prioritize bus movements.

Analysis backed up by field observations found that queues along W 86th Street approaching Central Park West during peak hours often prevented the bus from accessing the stop in one signal cycle. The addition of the curbside queue jump allowed the bus to bypass the waiting queue and enter the stop much more easily. The narrow width of the curb lane also meant that a bus in the stop could block general traffic in the adjacent lane. As part of the project, lane widths were adjusted to provide a full-width and two general traffic lanes approaching Central Park West.

Continuing east across Central Park, lane delineation along the Transverse Road approaching 5th Avenue was worn and unclear. New markings provided for a through traffic lane, a bus queue jump lane, and the addition of a right turn lane to better define lane assignments.



Photo 1: Queue Jump Lane on Eastbound E 86th Street at Central Park West



Photo 2: Queue Jump Lane on Eastbound Transverse Road at 5th Avenue



Photo 3: Queue Jump Lane at Westbound E 86th Street at 5th Avenue

Off-board Fare Payment

With off-board fare payment, customers pay their fare before boarding, using MetroCard or coin fare machines located at each station to obtain a ticket.

When the bus arrives, customers can then board the bus through any of the three doors and typically do not need to interact with the bus operator. The bus can therefore load and leave significantly faster.

NYCT security personnel are responsible for enforcing the payment system through random fare inspection. The fare inspectors patrol the SBS route in teams and ask riders to show their proof-of-payment ticket. Any rider without a valid ticket is subject to a summons for fare evasion.

All M86 SBS stations offer off-board fare payment except westbound W 86th Street & Broadway and eastbound E 91 St & 1 Ave – where these next-to-last stops serve primarily drop-offs – and Central Park Transverse Road – where passengers are asked to pay their fare when they exit the bus.

Real Time Passenger Information & Wayfinding Signage

The M86 SBS includes real time passenger information and wayfinding totems at SBS stations, making it the first SBS route to have them installed at multiple locations during the initial SBS launch. These signs feature a static wayfinding map listing site-specific transit connections and local institutions. Above the static map, an LED screen displays the estimated arrival time for upcoming buses based on NYCT's Bus Time GPS-based bus monitoring.



Photo 4: Real Time Passenger Information & Wayfinding Totem

These signs were installed at the following locations:

Westbound:

- York Avenue & E 87th Street
- Fifth Avenue
- Central Park West
- Columbus Avenue

Eastbound:

- Amsterdam Avenue
- Columbus Avenue
- Central Park West
- Madison Avenue
- First Avenue



Shelters & Benches

The M86 route previously had bus shelters installed where site conditions allowed. Existing shelters were updated with SBS branding. While no new shelters were implemented as a part of the launch, shelters will be added at Lexington and Third Avenues as part of the bus bulb construction capital project (see Next Steps).

Similar to shelters, City Bench seating is prevalent throughout the 86th Street corridor. As part of the SBS project, one bench was added at the westbound E 86 St & Fifth Avenue stop.

SBS Launch



The M86 SBS launched on Monday, July 13, 2015 after several weeks of SBS station construction and updated road markings installation. As part of the launch, DOT and MTA NYCT employees served as customer ambassadors—familiarizing passengers with the off-board fare payment

system and all-door boarding procedures. The customer ambassador program covered two shifts—6:00 am - 1:00 pm and 1:00 pm - 8:00 pm—over the course of two weeks. Ambassadors were also deployed at select stops the following September 8th - 11th to ensure students returning to school were familiar with the new system.

Project Results

Bus Ridership

The M86 route has the highest ridership per mile of any bus route in the city. Ridership had declined from an average of 26,028 weekday customers in 2010 to 23,846 in 2014, an 8% decrease in the 5 years preceding SBS implementation.

Since the introduction of the SBS service, ridership has seen significant increases month-to-month in comparison to 2014/2015 numbers. Ridership grew by an average of 7% in the first 14 months of SBS service. Note that the ridership measured in August and September 2015, and March and April 2016, was impacted by fare machines at some major stops being out of service due to construction and power outages. Without these outages, the ridership growth as measured by fares paid would likely have been larger.

Average Weekday Ridership Comparison August 2014 - September 2016

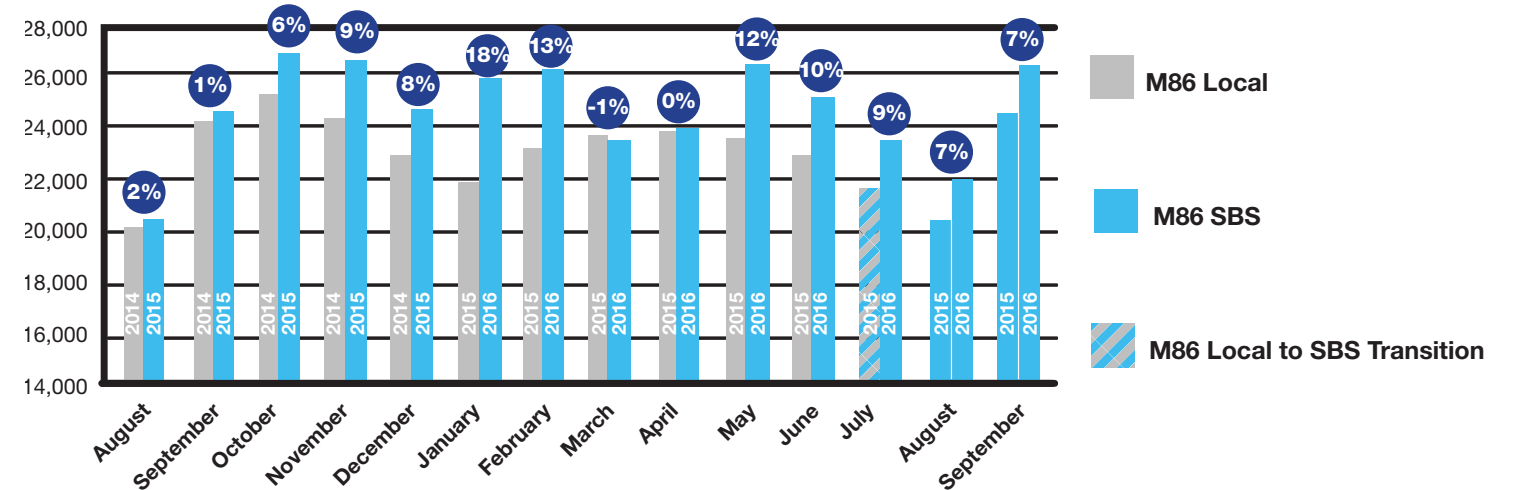


Figure 1: Average M86 Weekday Ridership

Effects of Second Avenue Subway on Ridership

On December 31, 2016, the Second Avenue Subway **Q** service began operation. With a stop at 86 St, the Second Avenue Subway may have an effect on M86 SBS ridership. MTA NYCT will monitor ridership and bus stop usage on the M86 SBS to see what influences the Second Avenue Subway may have over time.

Rider Satisfaction

In a July 2016 survey of customer perceptions of the M86 SBS service, riders gave the service high marks, with a 96% satisfaction for overall service. Over three-quarters of surveyed riders stated that the new SBS is an improvement over the previous local service, **with 96% of riders satisfied with the speed of the ride.**

The leading reason for the improved perception was shorter wait times and faster trips, with 92% satisfaction rate for wait times – up from 73% before SBS implementation.

Wait Times

The reliability of the M86 has improved with SBS, as measured by the Wait Assessment percentages for the route. Wait Assessment is defined as the percent of actual intervals between buses that are no more than three minutes over the scheduled interval during weekday peak hours, and no more than five minutes over the scheduled interval during weekday off-peak hours. The higher the percentage, the closer the route adheres to its scheduled frequency.

Figure 3 shows the percentage of M86 Local buses meeting the Wait Assessment criteria in October 2014 and the percentage of M86 SBS buses meeting the Wait Assessment criteria in October 2016. Also provided for comparison is the Manhattan borough-wide Wait Assessment in both October 2014 and October 2016.

In all measured time periods except overnight, the

“It’s good. I mean, it’s just a good service. And quite frankly, it’s almost as good as taking the subway in terms of time.”

– Gerald L.

M86 SBS exceeded the Wait Assessment of both the former M86 Local service and Manhattan bus service as a whole. From 3:00 pm to midnight, the M86 SBS surpassed both the old M86 Local and the Manhattan average by over 10%.

Bus Travel Time

Components of Bus Travel Time

During each trip, a bus spends some time moving, some time stopped in traffic or at red lights, and some time at bus stops. Figure 2 shows how these components of total travel time have changed before and after the implementation of SBS. All parts of the bus trip are shorter, with a half a minute reduction in moving time, and 8/10 of a minute less of both time stopped in traffic and time spent at bus stops. This shows how the queue jump lanes and new fare payment system have worked together to make the M86 faster with SBS.

Components of Bus Travel Time (in minutes)

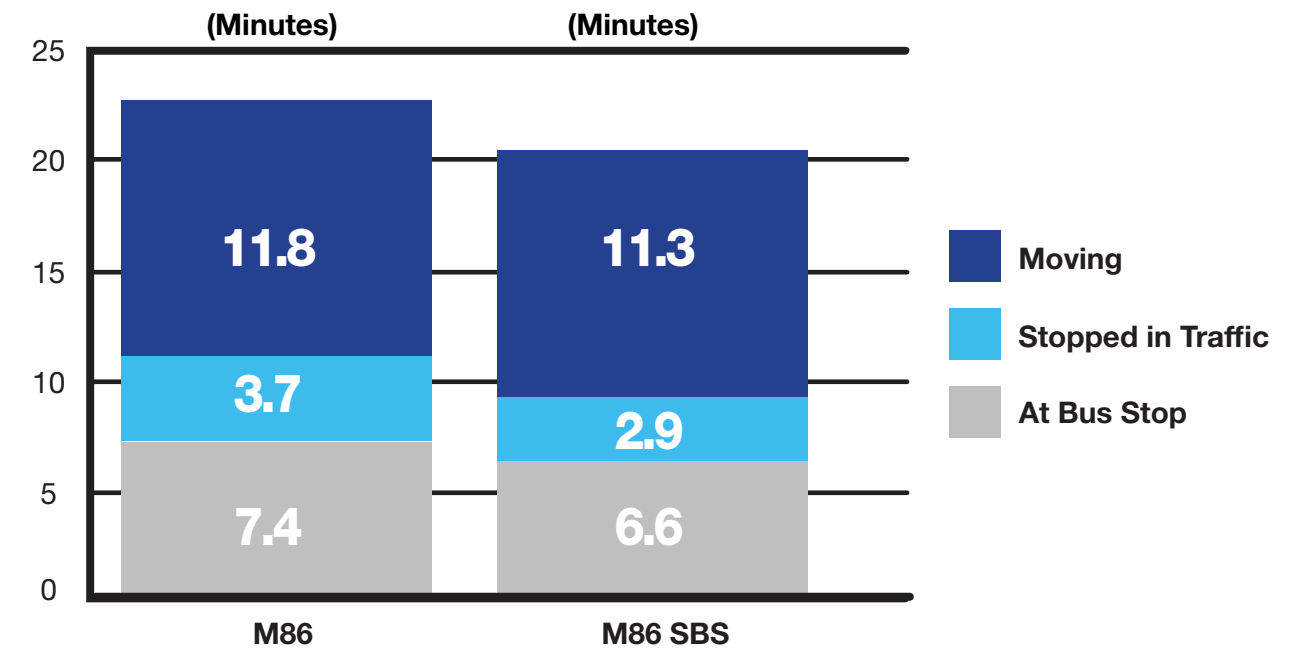


Figure 2: Bus Travel Time Components Comparison between M86 local and M86 SBS

Queue Jump Lane Effect on Travel Times

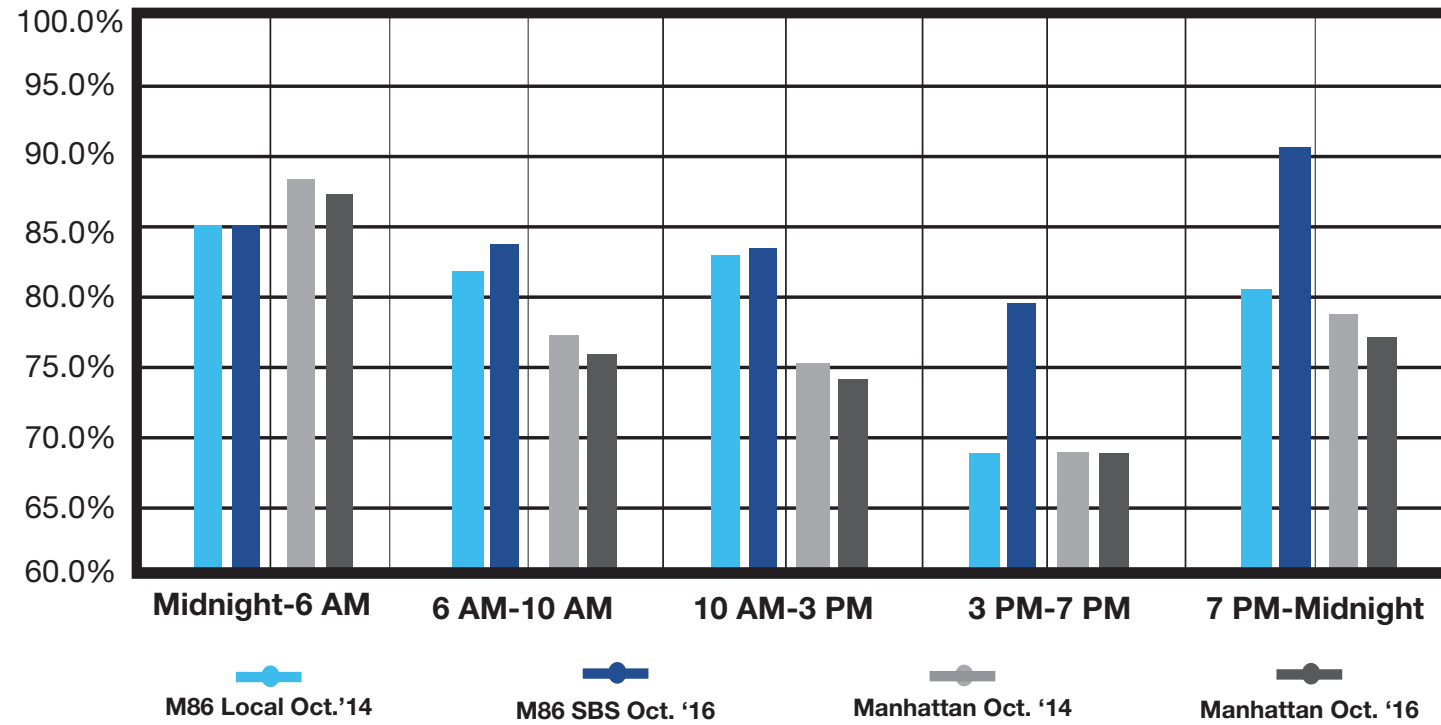
The three queue jump lanes were implemented ahead of off-board fare payment and the formal SBS launch. As a result, NYC DOT was able to study their effect as an independent component of the overall SBS project.

In comparing the time the M86 spent stopped in traffic before and after queue jump lanes, there was a 7% reduction in the westbound direction and a 30% reduction in the eastbound direction, which had more extensive queue jump treatments. (See Figure 4.)



Percentage of Buses Meeting Wait Assessment Guidelines on M86 and All Manhattan Local Buses, by Time Period, October 2014 vs. October 2016

Figure 3: Wait Assessment on M86 Local vs. M86 SBS



Bus Travel Time with Full SBS Build-out

The M86 SBS operates 8 to 11% faster than the previous M86 service. In comparing February 2015 M86 run times to average February 2016 run times, eastbound travel time was reduced 11% from 23.7 minutes to 21.1 minutes. In the westbound direction, travel times dropped 8% from 22.0 minutes to 20.3 minutes.

Travel Time in Minutes (6:00 am - 7:00 pm)

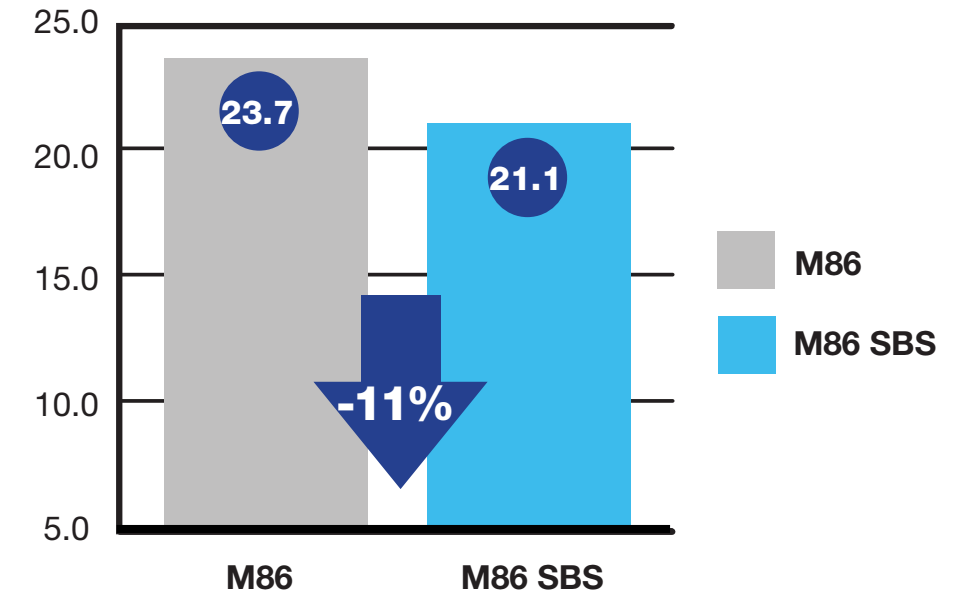


Figure 5: Eastbound Travel Times

Comparison of Time Stopped in Traffic (in minutes)

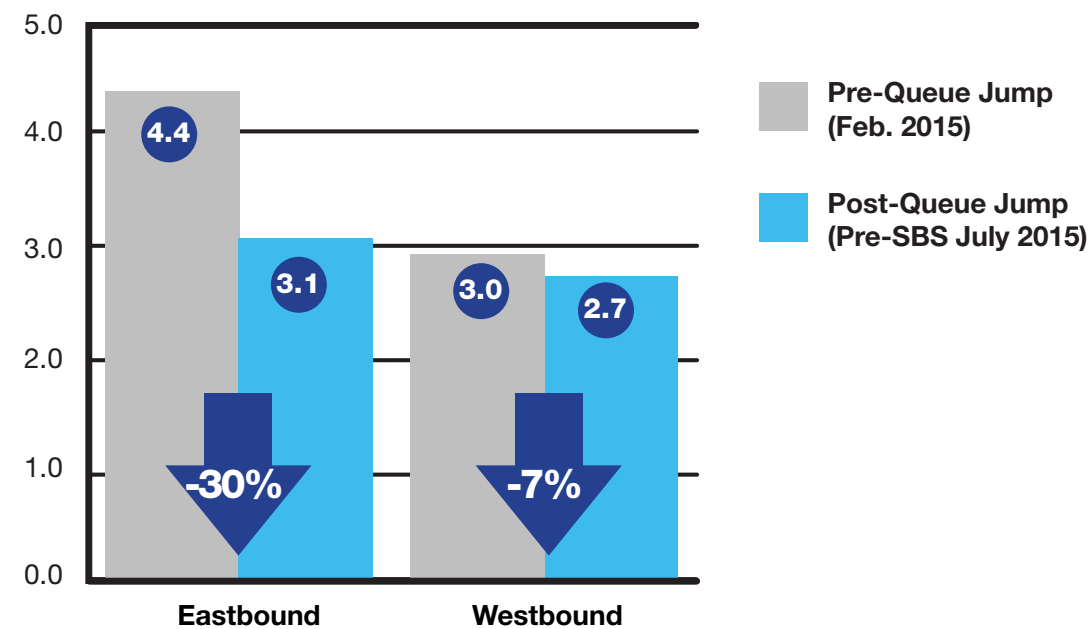


Figure 4: Dwell Time Comparison with only queue jump lanes in place

Travel Time in Minutes (6:00 am - 7:00 pm)

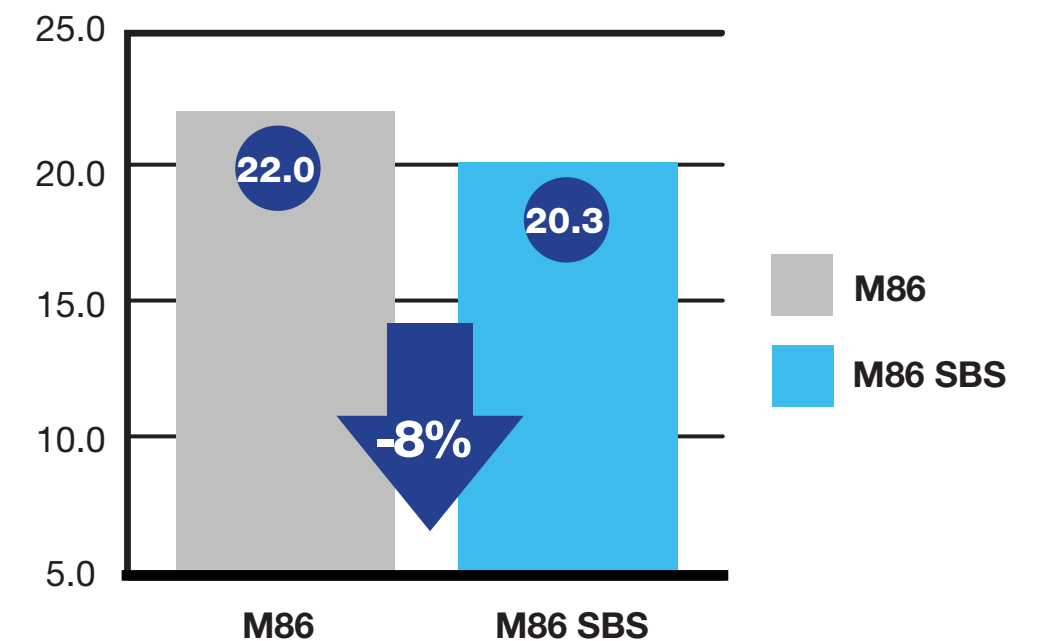


Figure 6: Westbound Travel Times

The percentage of time the M86 spent moving at a 'crawling' speed – traveling under 5mph – dropped by an average of 13%. Conversely, the time spent traveling at 15mph+ increased by 14%. This rise can be associated with the queue jump lanes giving buses priority approaching and leaving Central Park where speeds trend higher when not blocked by long queues.

Average Travel Speed

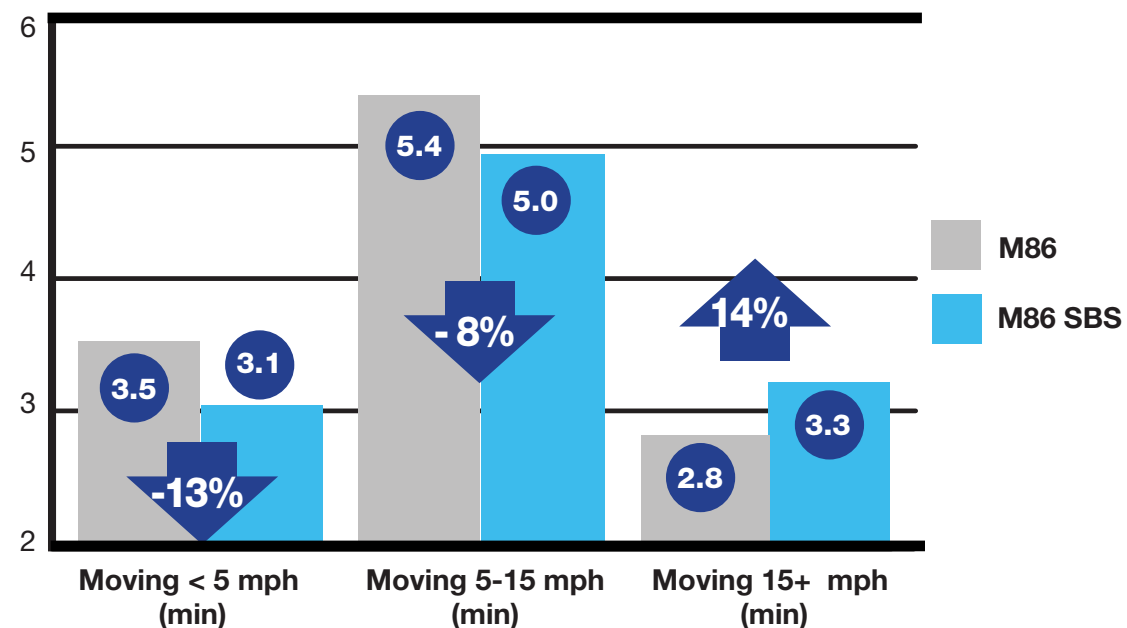


Figure 7: Average Travel Speed (in minutes)

Dwell Time at Stops

Off-board fare payment – along with boarding from multiple doors – has led to decreased delays at bus stops. Dwell time – or the time spent boarding passengers – fell 11% from February 2015 to February 2016 as a result of off-board fare payment. While this is a substantial gain, there would likely have been an even greater improvement if it were not for the temporary movement of the high-ridership stops at

Lexington and 3rd Avenues to the nearside of their respective intersections to accommodate ongoing capital construction. As bus operators are held at red lights at these “near side” stops, customers continue boarding and thus the bus is prevented from leaving when the light turns green. Dwell times are expected to further decrease after these stops are returned to the far side of the intersection once capital work is complete.

Crosstown Traffic

Peak hour traffic volumes were collected at all access points to the Central Park Transverse Road. Volumes were analyzed during the peak hours of 7:45 am-8:45 am and 5:15 pm-6:15 pm both before and after installation of the queue jump lanes.

With the post-implementation volumes collected in March 2016, traffic remained relatively constant compared to pre-implementation volumes collected in January 2015 despite the addition of bus queue jump lanes.

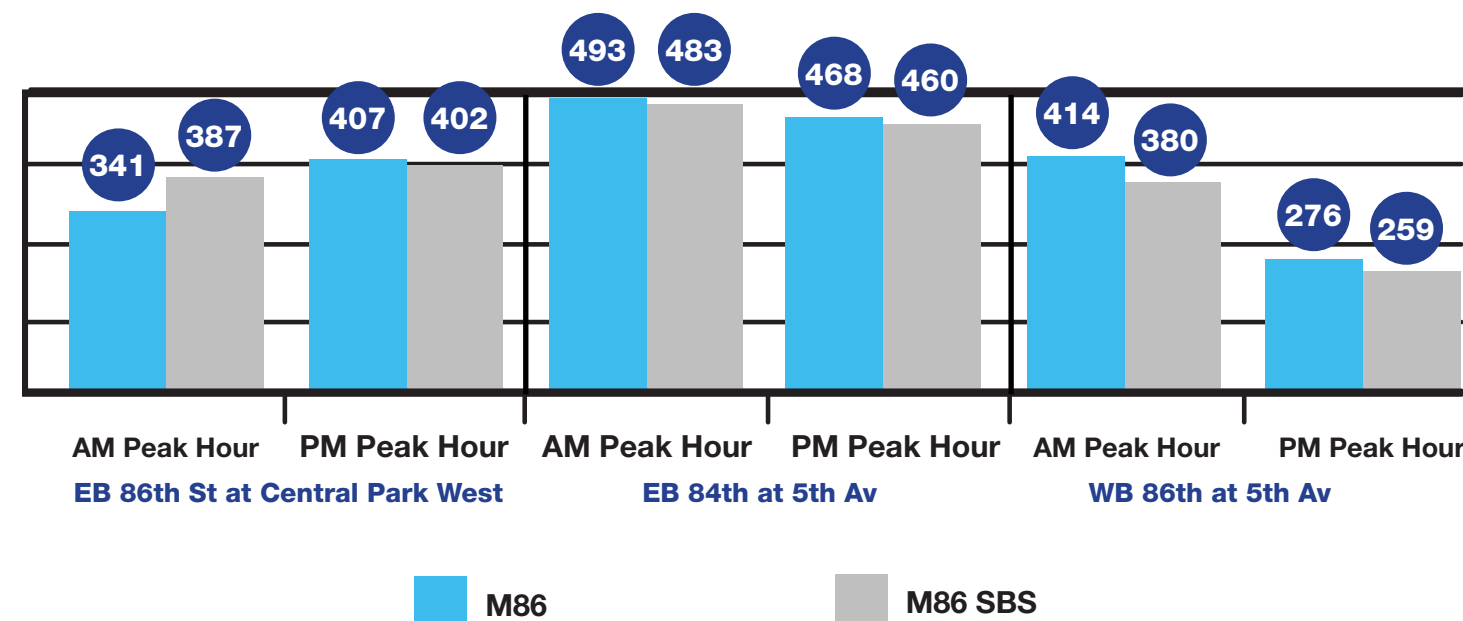
On W 86th Street at Central Park West, the previous substandard curb lane at the bus stop led to the buses regularly blocking the adjacent through lane. The redesign gave more space to the bus and improved channelization of the through movements. As a result, the through movement increased by 13% during the pm peak hour and was basically even during the pm peak hour.

Exiting Central Park eastbound, the Transverse Road approach to 5th Avenue was redesigned with a single through lane, bus-only lane and dedicated right-turn lane. Despite the apparent loss of one through lane, traffic volumes also remained essentially unaffected.

A queue jump lane was added to the E 86th Street westbound approach to 5th Avenue providing the ability for buses to reach the curb even with short-to-moderate vehicular queues. The lane also provides the benefit of priority positioning for buses when traffic makes the left onto 5th Avenue and eliminates the likelihood of three lanes of turning movement (the previous design had two dedicated lefts with buses often beginning their turn movements from the curb lane). Changes to peak hour traffic volumes after this redesign were minimal.

Before/After Peak Hour Volumes

Figure 8: Before/After Peak Hour Volumes at Intersections with Queue Jump Bus Lanes





Taxi Trips

With traffic volumes remaining essentially unaffected by the implementation of SBS, the use of taxis dropped 30% from June 2015 (before) to June 2016 (after). This is much greater than the citywide average of a 9% decrease for the same time period. While many factors likely affect the drop in taxi usage, such a significant change — in addition to the growth in bus ridership — points towards SBS implementation as a major contributor.

Yellow Taxi Monthly Pick-Ups and Drop-Offs on 86th Street, Weekdays, 6 am - 8 pm

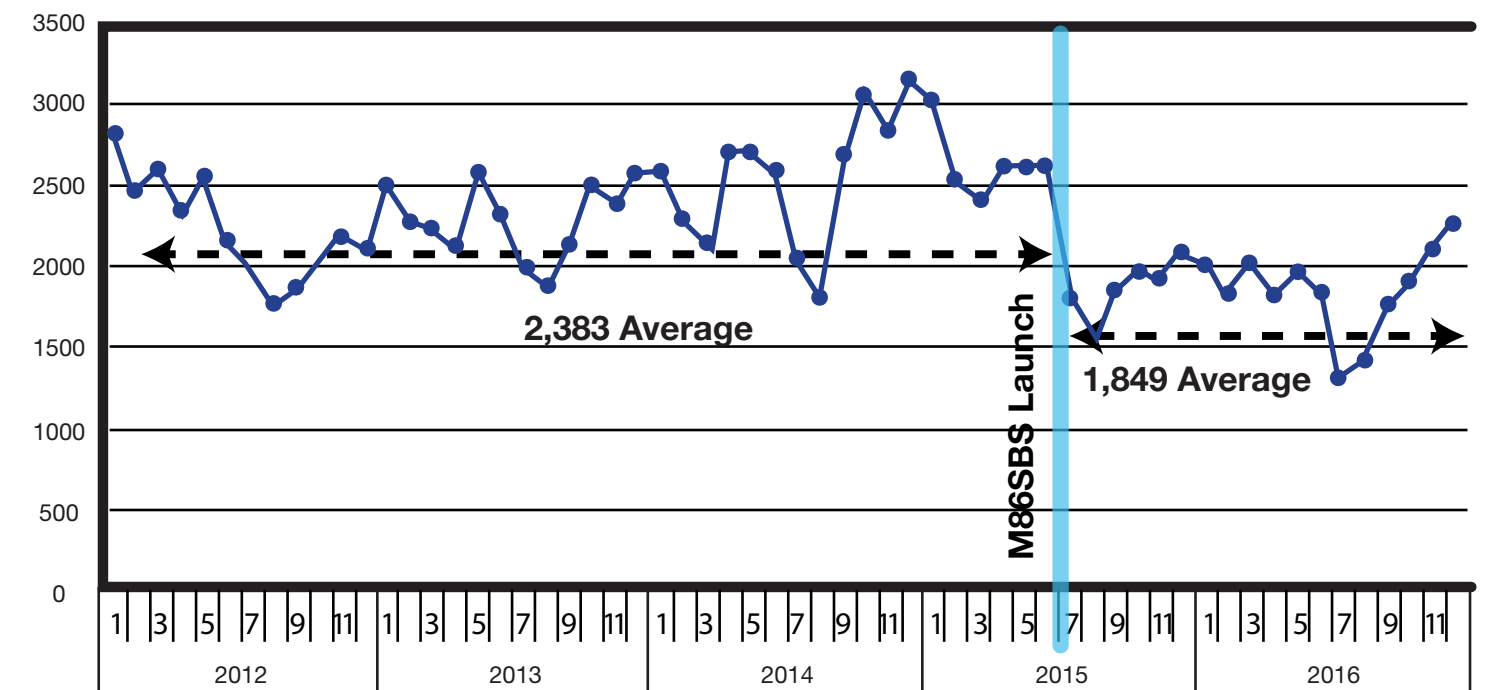


Figure 9: Trips between ½ to 2 miles. Reduction of trips may also be attributed to turn bans implemented as part of the project.



Next Steps

Pedestrian Improvements



Photo 5: E 86th Street and 3rd Avenue

Six neckdowns and four bus bulbs are being added for pedestrian safety along the M86 SBS route as part of the capital construction portion of the project.

Neckdowns are an expansion of the curb line into the lane of the roadway adjacent to the curb in the crosswalk area in order to reduce the pedestrian crossing distance. Six neckdowns are included in the M86 SBS project.

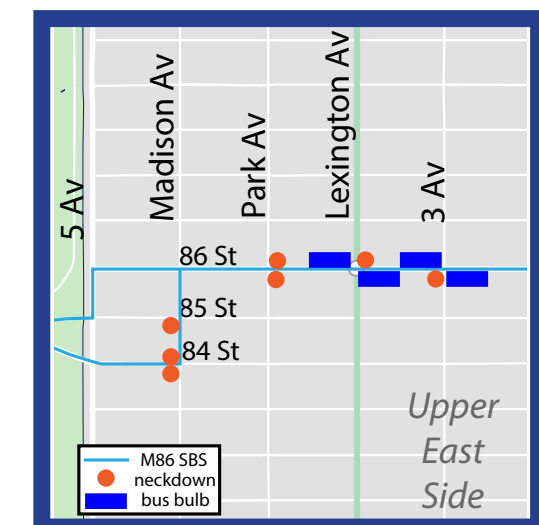
Bus Bulbs are curb extensions at a bus stop that prevents the need for buses to pull in and out of the moving lane to pick up and discharge passengers. Bus bulbs may also be designed to better support bus passengers through the inclusion of higher curbs, bus shelters, seating,

79th Street Corridor

Taking lessons from the success of the M86 SBS, DOT and MTA NYCT are planning to convert the M79 along 79th Street in Manhattan to SBS as well. While ridership on the M79 is not as high as that of the M86 SBS, the route faces similar but surmountable problems. Planning for this route began in 2016 with a tentative launch date of spring 2017.

off-board fare payment equipment, plantings, and other bus- and customer-supportive facilities. Four bus bulbs are included in the M86 SBS project, in both directions at Lexington and 3rd Avenues.

After several delays the construction of the pedestrian safety neckdowns and bus bulbs began in June of 2016. The work is being performed by NYC Department of Design and Construction (DDC) and is anticipated to be completed in summer of 2017.



Map 4: Location of neckdowns and bus bulbs