Massachusetts Avenue Bus Priority Pilot

Evaluating Success in Arlington, MA: MBTA Data Results
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Goals & Data Collection
Goals of Pilot

1. Improve Traffic Flow
2. Reduce Travel Time
3. Increase Reliability
Data Collection

Data for analysis was collected from the MBTA across 3 time frames: pre-pilot, pilot, and post-pilot.

**Pre-pilot** data was collected from September 9 to October 8

**Pilot** data was collected from October 9 to November 9

**Post-pilot** data* was collected from November 10 to December 14

*All of the bus-priority pilot treatments remained permanent after the pilot except the dedicated lane
Route performance and BRT impacts were measured by assessing running time, on time performance, and travel time collected from AVL and APC data obtained from the MBTA.

AVL – Automatic Vehicle Location
- Geographic locator data at various points along a transit route

APC – Automated Passenger Count
- Provides data on dwell time and time between stops
- Passenger count data
Full Route Observations
Route 79 – Overall Route 50th Percentile (Median)

From 6 to 7 a.m., the overall route’s running time decreased 6% (1 minute faster).

From 7 to 8 a.m., the overall route’s running time decreased 7% (2 minutes faster).

From 8 and 9 a.m., the route operated almost 10 minutes faster during the pilot running time.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 79, September 9 – December 14, 2018
Route 79 – Overall Route 90th Percentile

The 90th percentile suggests the system performance on a typical bad day or bus run.

Between 7 and 8 a.m., the BRT pilot decreased the 90th percentile by 25%, or 11 minutes.

Between 8 and 9 a.m., operating times decreased 35% and saved 14 minutes.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 79, September 9 – December 14, 2018
Route 77 – Overall Route 50th Percentile (Median)

Route 77 experienced a 10% decrease in overall route running time at 7 a.m., saving just over 5 minutes.

Between 8 and 9 a.m., the BRT pilot decreased the median running time by 3 minutes, or 6%.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 77, September 9 – December 14, 2018
Route 77 – Overall Route 90th Percentile

The BRT pilot reduced Route 77’s 90th percentile by 1 minute, or 4% at 6 a.m.

Between 7 and 8 a.m., the 90th percentile dropped 10%, speeding up the route by 6 minutes.

At 8 a.m., the route ran 6% faster and saved 3 and a half minutes.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 77, September 9 – December 14, 2018
The median running time of Route 350 decreased 8% and saved 3 and a half minutes at 6 a.m.

A 19% shorter running time between 7 and 8 a.m. saved just over 10 minutes.

And between 8 and 9 a.m., riders experienced a 2 minute shorter ride (4% faster).

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 350, September 9 – December 14, 2018
Route 350’s 90th percentile operated significantly faster at all hours of the peak commute while the pilot was in place.

Between 6 and 7, the 90th percentile running time decreased 15%, saving almost 10 minutes.

Between 7 and 8, the running time decreased 13% and saved 9 minutes.

The smallest improvement was seen between 8 and 9 am when the total running time improved by 9% and decreased 6 minutes.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 350, September 9 – December 14, 2018
On-Time Performance—Route 79

During the pilot and peak-morning rush hour, Route 79 operated on-schedule 22% more of the time (inbound).

49% OTP Inbound Before Pilot

71% OTP Inbound During Pilot

22% INCREASE

After the BRT pilot ended in November, OTP increased slightly to 72%.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 79, September 9 – December 14, 2018
After the BRT pilot ended in November, OTP continued to increase to 75%.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 79, September 9 – December 14, 2018
On-time performance improved 11% during the pilot, morning peak-hours (7 a.m. – 10 a.m.) for inbound service.

After the pilot concluded, on-time performance measured at 69%—higher than before the pilot, but slightly lower than during the implementation.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 350, September 9 – December 14, 2018
On-Time Performance—Route 350

On-time performance improved during the pilot implementation 14% for outbound Route 350 service during peak morning rush hour (7 a.m. – 10 a.m.)

After the BRT pilot ended in November, OTP continued to increase to 60%.

Source: Massachusetts Bay Transportation Authority, AVL Data—MBTA Route 350, September 9 – December 14, 2018
Pilot Corridor Observations
Routes 79 and 350—Pilot Area Travel Time: 50th Percentile (Median), 6 a.m. to 9 a.m. [towards Alewife]

During peak morning commute hours, the pilot contributed to lowering median travel times by 28% at 7 a.m. and 41% at 8 a.m.

<table>
<thead>
<tr>
<th>Time</th>
<th>Before Pilot</th>
<th>During Pilot</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00</td>
<td>6.4 minutes</td>
<td>6.5 minutes</td>
<td>0.1 minutes</td>
</tr>
<tr>
<td>7:00</td>
<td>13.4 minutes</td>
<td>9.7 minutes</td>
<td>3.7 minutes</td>
</tr>
<tr>
<td>8:00</td>
<td>16.3 minutes</td>
<td>9.6 minutes</td>
<td>6.7 minutes</td>
</tr>
</tbody>
</table>

28% faster during pilot
41% faster during pilot

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA Routes 79 and 350, September 9 – November 9, 2018
Routes 79 and 350—Pilot Area Travel Time: 90th Percentile, 6 a.m. to 9 a.m. [towards Alewife]

During peak morning commute hours, the pilot contributed to lowering the worst case scenario travel times by 34% at 7 a.m. and 45% at 8 a.m.

Before Pilot: 7.5 minutes
During Pilot: 7.9 minutes
34% faster during pilot

Before Pilot: 21.2 minutes
During Pilot: 14 minutes

Before Pilot: 23.9 minutes
During Pilot: 13.2 minutes
45% faster during pilot

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA Routes 79 and 350, September 9 – November 9, 2018
Routes 77—Pilot Area Travel Time: 50th Percentile (Median), 6 a.m. to 9 a.m. [towards N. Cambridge]

During peak morning commute hours, the pilot contributed to lowering median travel times by 41% at 7 a.m. and 53% at 8 a.m.

**Before Pilot**

- 6:00: 3.2 minutes
- 7:00: 8.3 minutes
- 8:00: 10.9 minutes

**During Pilot**

- 6:00: 3.2 minutes (No Change)
- 7:00: 4.9 minutes (41% faster during pilot)
- 8:00: 5.1 minutes (53% faster during pilot)

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA Route 77, September 9 – November 9, 2018
During peak morning commute hours, the pilot contributed to lowering the worst case scenario travel times by 47% at 7 a.m. and 57% at 8 a.m.

- **6:00**: Before Pilot: 4.1 minutes, During Pilot: 4.1 minutes (No Change)
- **7:00**: Before Pilot: 15 minutes, During Pilot: 8 minutes (47% faster during pilot)
- **8:00**: Before Pilot: 17.1 minutes, During Pilot: 7.3 minutes (57% faster during pilot)

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA Route 77, September 9 – November 9, 2018
Lake Street Observations
In general, median travel times in the Lake St Corridor declined after the stop was moved to the curb after the traffic signal...especially during the peak morning commute hours. *(For this analysis, the travel time is the time it takes for the bus to travel from the stop before Lake Street to the stop after Lake Street.)*

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA, September 9 – December 14, 2018
Results & Reliability
More Consistent, Faster Running Times

Buses did not just run faster, they consistently ran faster and reliability increased. Reliable service is attractive to more riders.

Prior to the pilot, differences between the 50th and 90th percentiles ranged as high as 16 minutes (Route 79 total running time, 7 am). These 16 minutes were **reduced to 7 minutes** during the pilot—**a 56% decrease**!

The variability during rush hour in the pilot area fell to **below 5 minutes**, for all routes (see figures on next slides).

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA, September 9 – December 14, 2018
Route 77 – Difference Between Median and 90th Percentile

The difference between the median and the 90th percentile travel time in the pilot area decreased by more than half between 7 and 9 a.m.

Between 7 and 8 a.m., variability decreased 54% and reduced to only 3 minutes.

Between 8 and 9 a.m., variability decreased 64%—the difference during the pilot was only 2 minutes and 20 seconds!

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA, September 9 – December 14, 2018
Route 79 and 350 also experienced great decreases in its variability between 7 and 9 a.m.

Between 7 and 8 a.m., variability decreased 44% and reduced to only 4 minutes and 20 seconds.

Between 8 and 9 a.m., variability decreased 52%—the difference during the pilot was only 3 minutes and 3 seconds!

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA, September 9 – December 14, 2018
Conclusions
BRT Pilot in Arlington Saved Buses Time

Both the overall route and the pilot corridor saw shorter overall running times while the BRT pilot was in effect—even at the 90th percentile. The biggest changes were seen between 7 and 9 a.m.

After the pilot ended, travel times increased, but on-time performance remained improved.

The move of the Lake St. bus stop led to shorter running times along the corridor between 260 Massachusetts Ave and Massachusetts Ave at Milton St.

*Buses consistently ran faster. When service is more reliable and meets the demand, it is a better experience for more riders.*

Source: Massachusetts Bay Transportation Authority, APC Data—MBTA, September 9 – December 14, 2018