



# Greater Boston Bus Experiments: From Pilots to Permanent Impacts

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Institute for Transportation and Development Policy (ITDP)

November 6th, 2019

**BOSTON**  
**BRT**

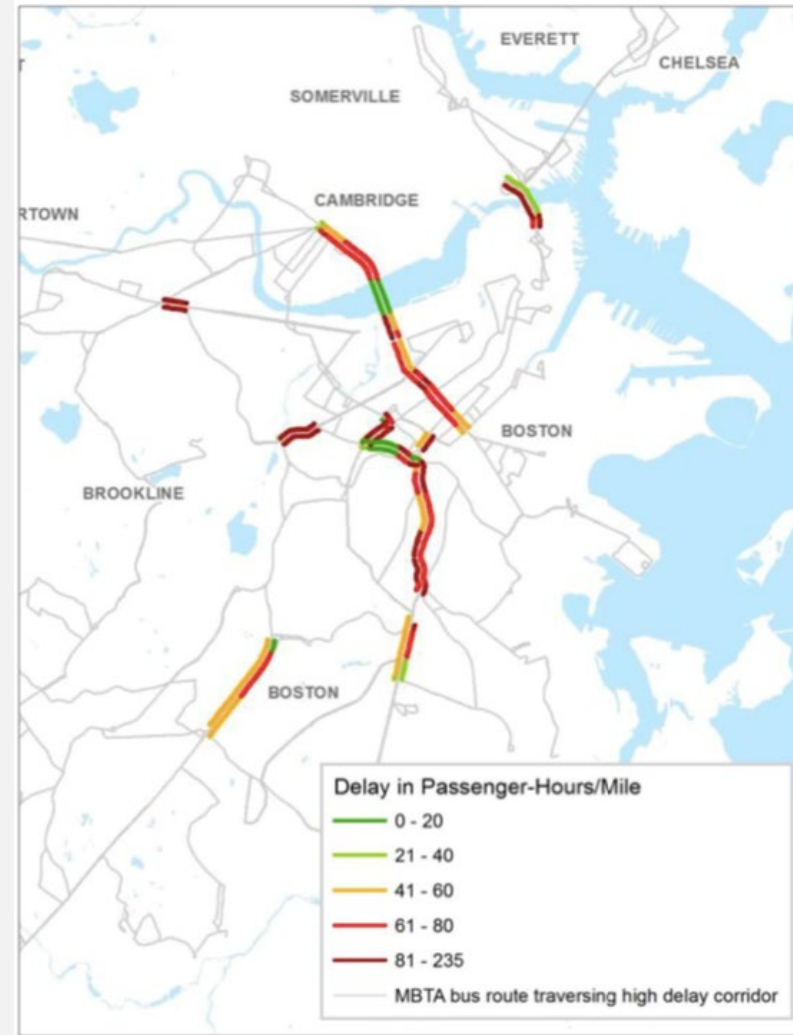
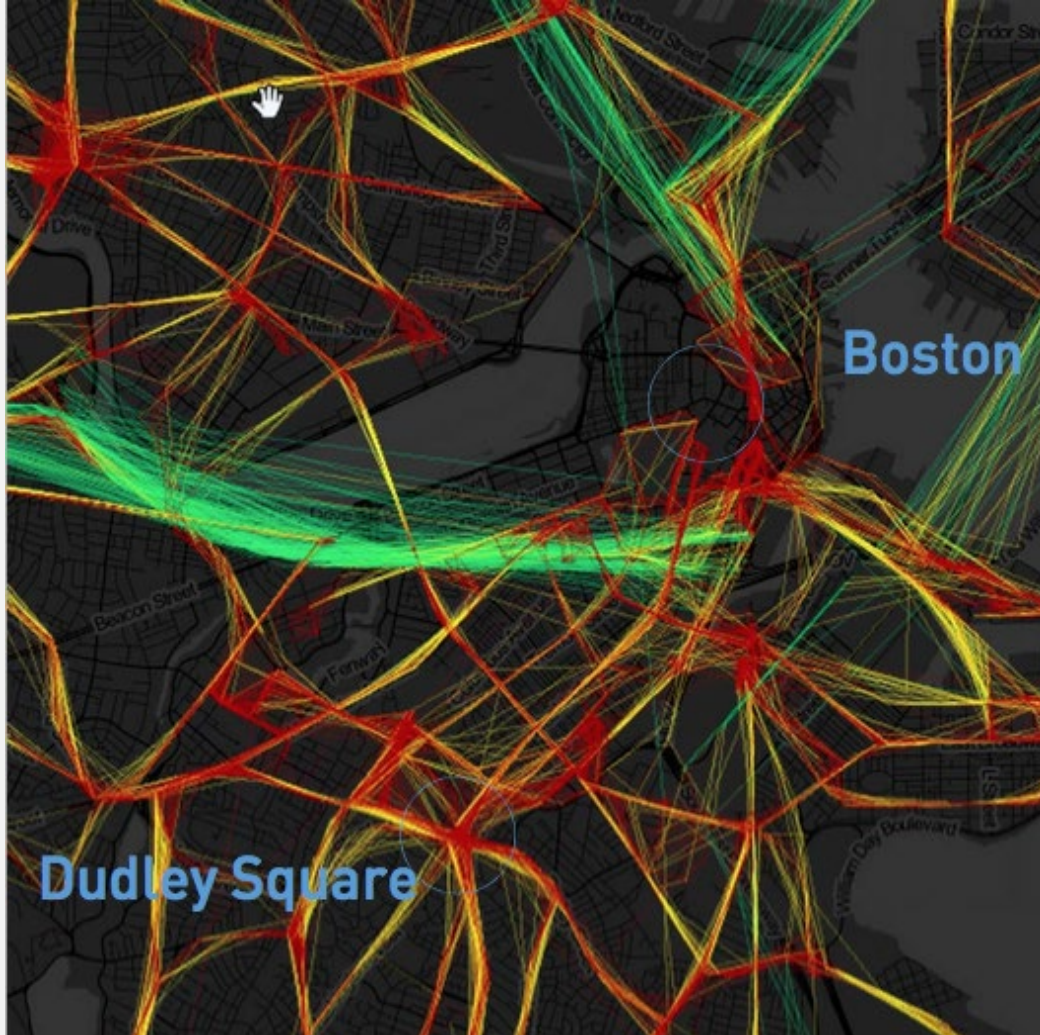
# Why Are Buses Important for Boston?



- Buses carry **450,000 people** daily throughout Greater Boston
- Bus riders make up **30% of MBTA users** but bus reliability lags far behind both the commuter rail and subway lines, where trains arrive on schedule at a rate approaching **90%**
- Buses meet the MBTA's own reliability targets of 75% just **14% of the time** with “non-key” routes meeting targets only 9% of the time.
- Boston was recently named the **most congested city in the US** during rush hour (#CongestionChamps) and is ranked **7th most congested city in the world**.
- Approximately **7 miles of Boston streets** are holding back more than **1/5 of all MBTA bus riders**.
- Black riders spend **64 hours\*** more per year on MBTA buses relative to white riders (\*MAPC Regional Indicators Report, 2014)

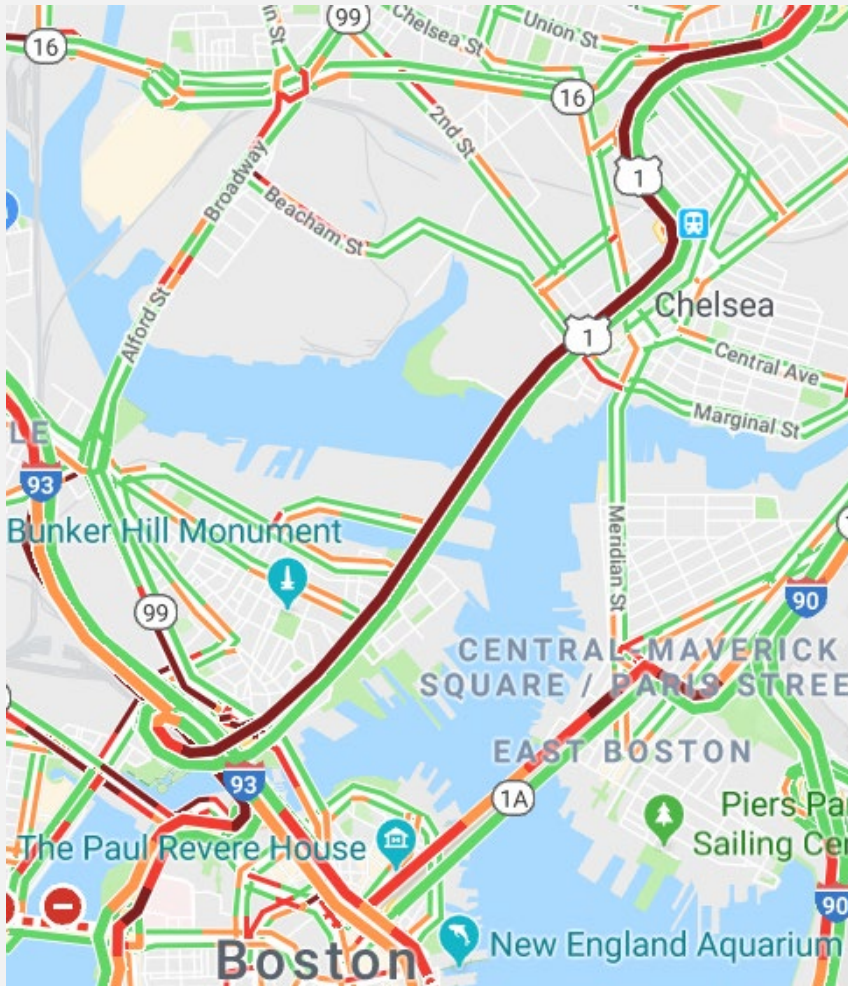


# Buses Experience a lot of Delays



**Red** = delays during  
rush hour

# Boston's Traffic Takes a Toll on Bus Riders



- MBTA buses stuck in traffic increase operating costs for the agency and decrease service reliability for riders
- The #111 bus, the sixth-busiest bus line in the MBTA system, regularly takes 25-45 minutes to travel the 2.7 miles from Chelsea to downtown Boston (average of ~6mph)



# Buses are Stuck at the Station

Dudley to Downtown Current Sources of Delay

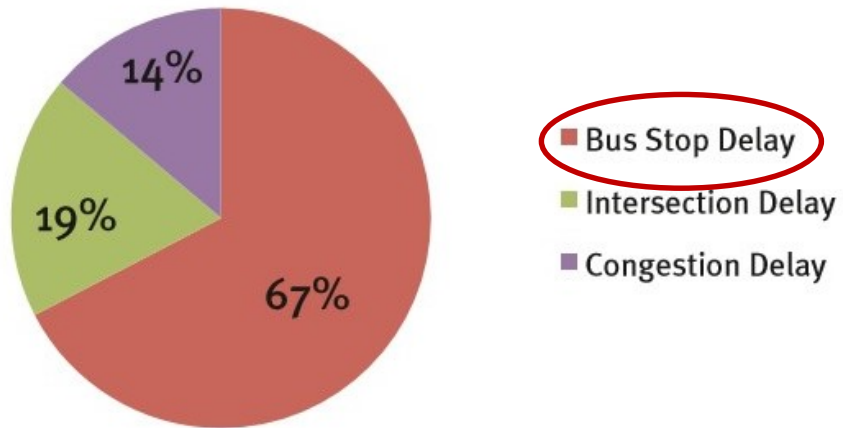


Figure 10: Dudley to Downtown: current sources of delay by percentage

Mattapan to Dudley Sources of Delay

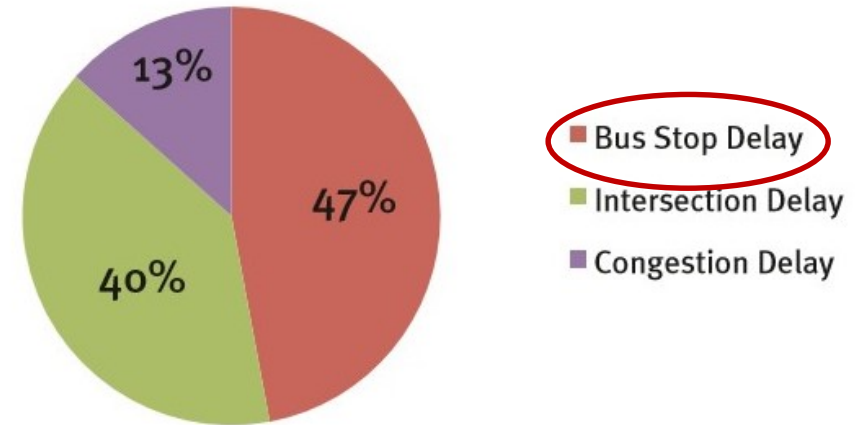


Figure 11: Mattapan to Dudley: current sources of delay by percentage

# Bus Riders Face Poor, Inequitable Conditions



## Annual Travel Time Disparity Compared to White Riders



Black Riders **+64** hours



Latinx Riders **+10** hours

*Source: MAPC Regional Indicators, 2014*

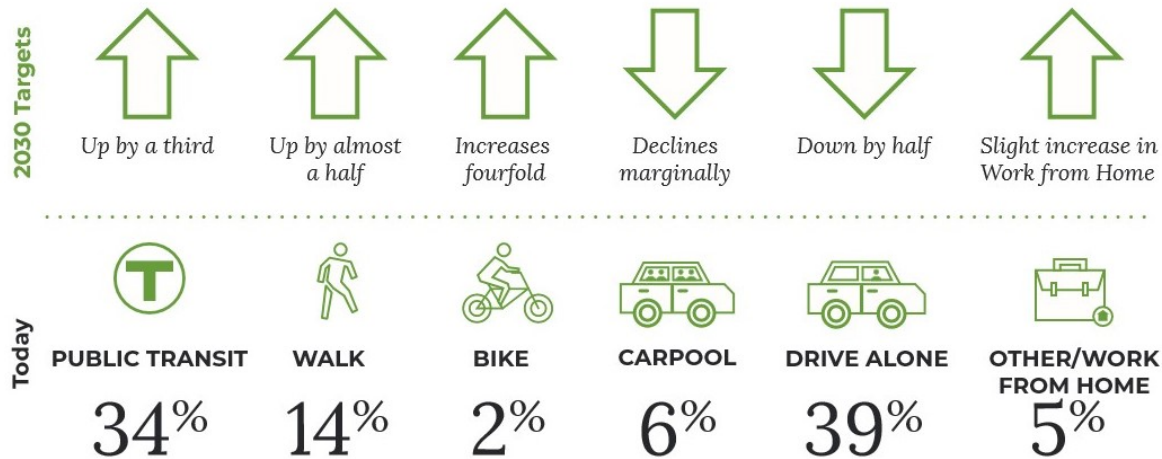


# Can We Do Better?



# Boston Has Big Goals to Meet

## Go Boston 2030 Mode Shift Targets



- ✓ Cut citywide greenhouse gas emissions by 50% by 2030 and statewide by 80% by 2050

## Mayor Walsh's Climate Plan: City Must Cut Car Use In Half By 2030

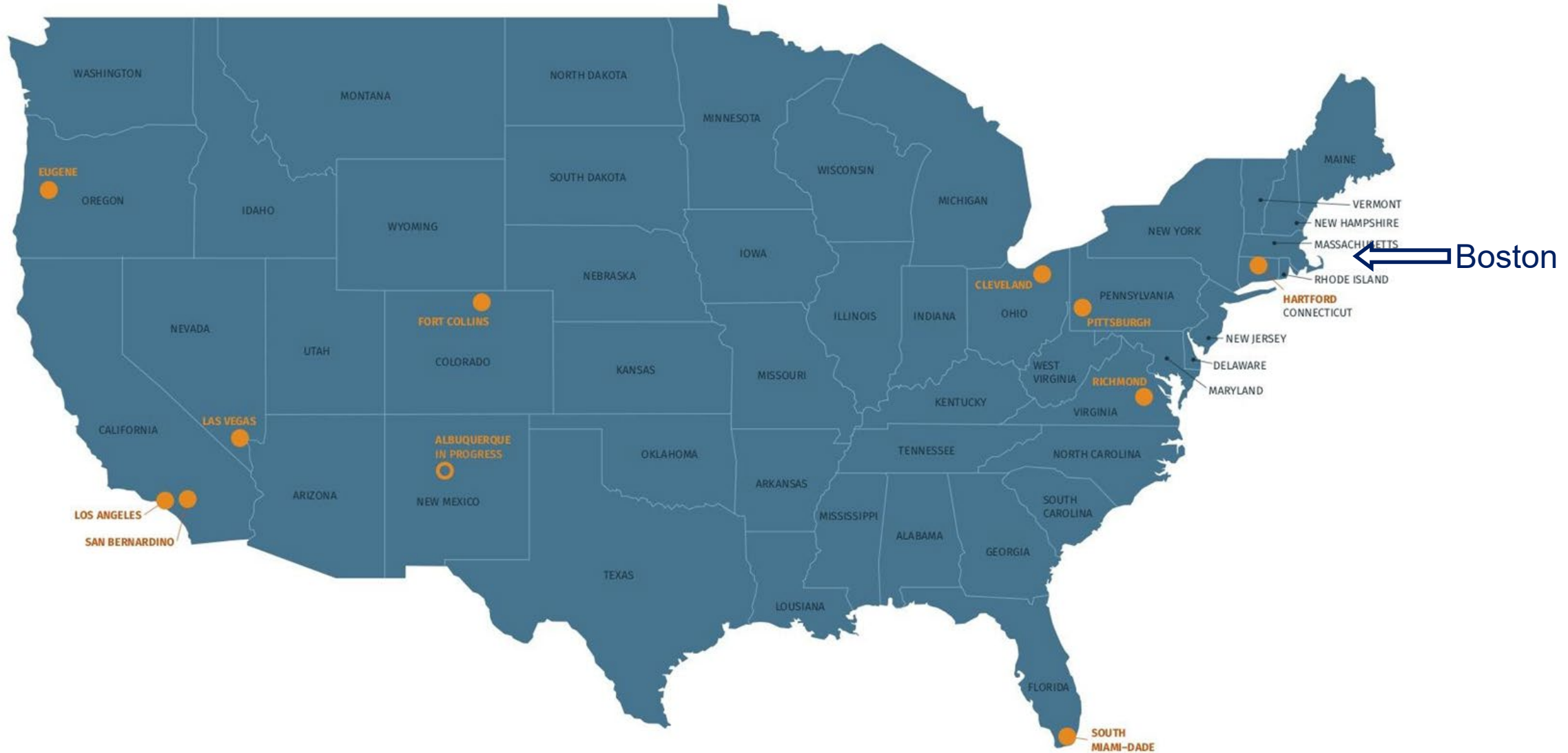
By Christian MilNeil | Oct 11, 2019 | 3 COMMENTS



Boston Mayor Marty Walsh.



# BRT as a Solution for US Cities



# Can BRT Work in Boston?

## BETTER RAPID TRANSIT FOR GREATER BOSTON



*The Potential for  
Gold Standard Bus Rapid Transit  
Across the Metropolitan Area*

**BOSTONBRT**

The Greater Boston BRT Study Group  
Spring 2015

## 5 PRIME CORRIDORS FOR BRT IN GREATER BOSTON

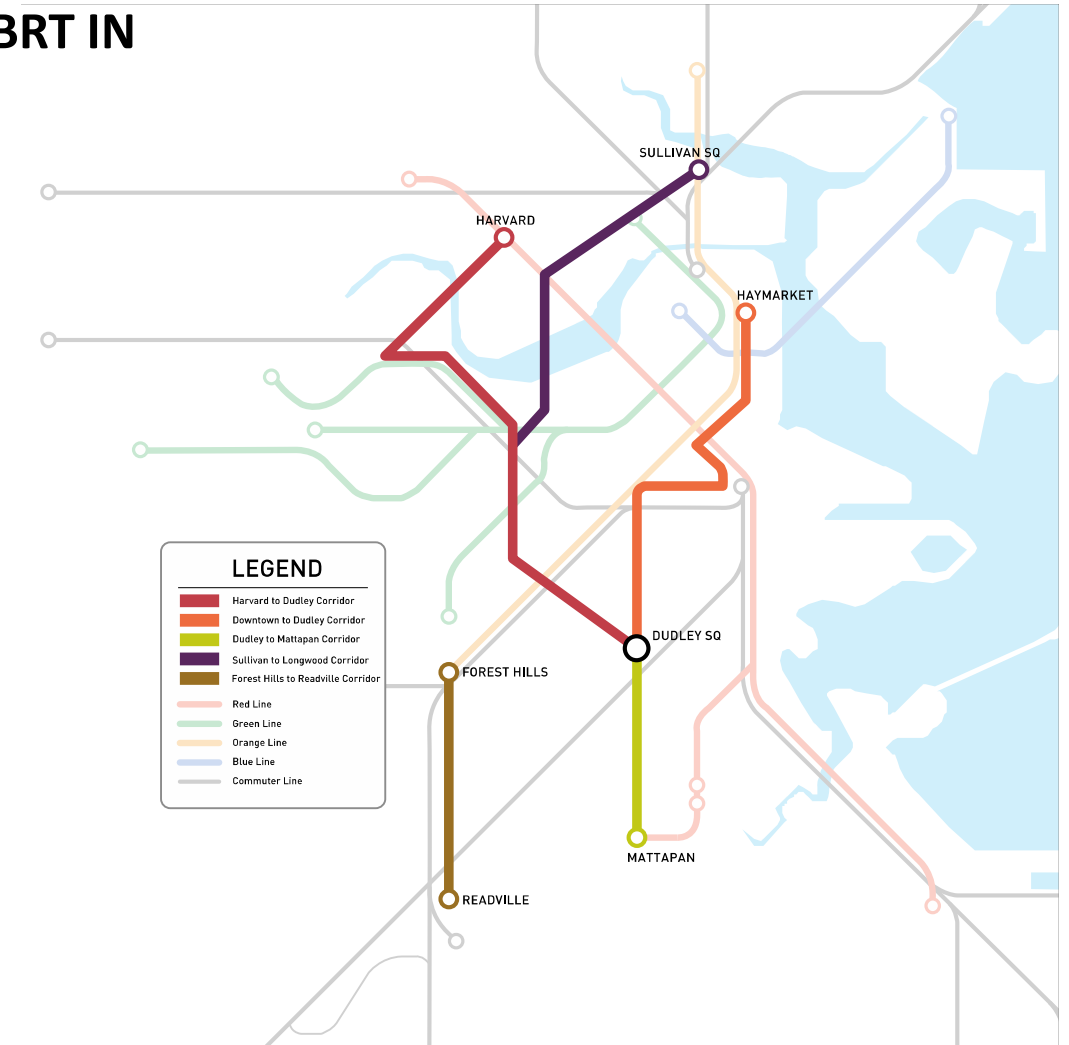
Dudley to Downtown  
(Haymarket)

Harvard to Dudley

Readville to Forest Hills

Dudley to Mattapan

Sullivan to Ruggles





# BRT Would Cut Bus Travel Times by 20-45%

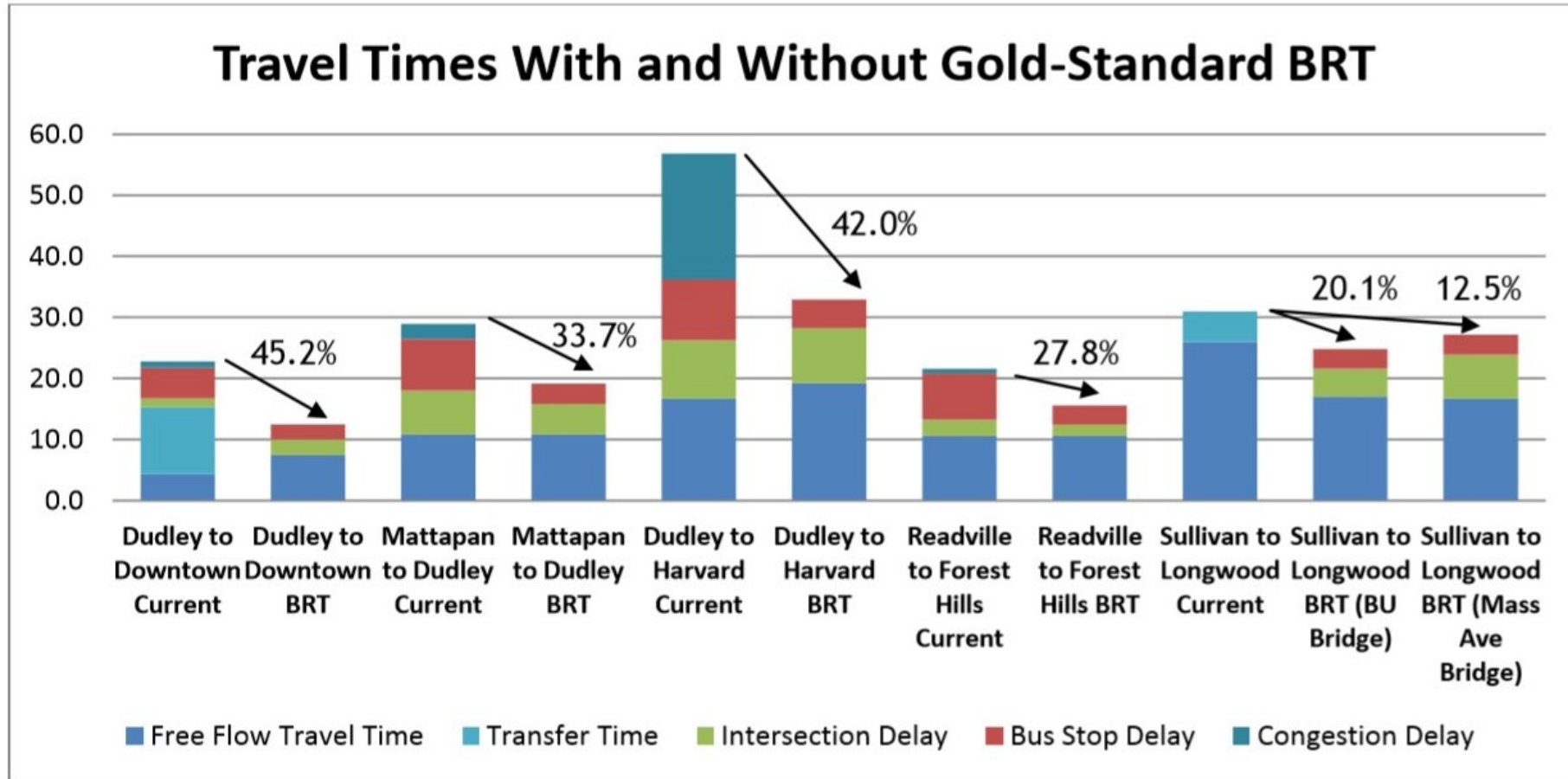


Figure 11: Travel time savings by corridor based on each element Gold Standard BRT

# “Quick Build” Bus Lane Pilots on the Rise



Source: *Fast Tracked: A Tactical Urban Transit Study*, TRB 2019



# Bus Lane Pilots → Permanent Improvements



Top: **Massachusetts  
Ave, Arlington**  
Top Right: **Broadway,  
Everett**  
Right: **Washington  
St, Boston**



**Mount Auburn Street,  
Cambridge/Watertown**

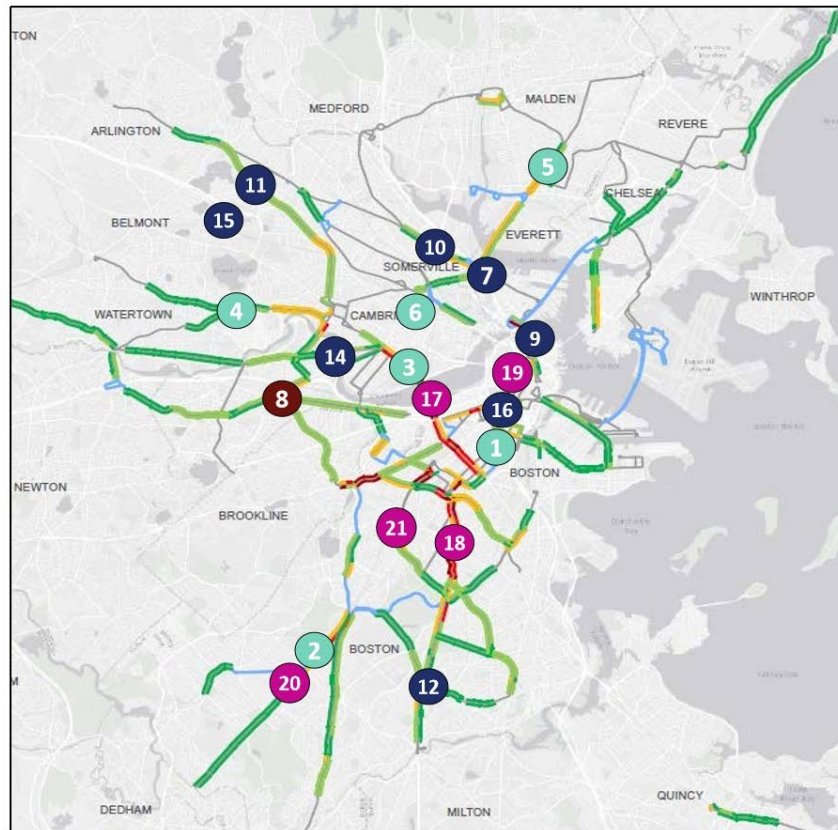


# Bus Lanes Pilots → Permanent Investments

Better Bus Project

On Street Infrastructure

## Bus Lane Project Investments



Complete	Pre-2019 Bus Lane Investments:		Completed in 2019:	
	1	Boston: Essex/Washington St.	7	Boston/MBTA: Sullivan Sq.
Planned	2	Boston: Washington St. (Roslindale)	8	Boston: Brighton Ave.
	3	Cambridge: South Mass Ave.	9	Boston: N. Washington St.
	4	Cambridge: Mt. Auburn St.	10	Somerville: Broadway
	5	Everett: Broadway		
	6	Somerville: Prospect St.		
Planned	Planned in 2019:		In Planning for Early 2020:	
	11	Arlington: Mass Ave.	17	Boston/Cambridge/MassDOT/DCR: Mass Ave. Bridge
	12	Boston/MassDOT: Morton St.	18	Boston: Warren St.
	14	Boston/MassDOT/DCR: Soldiers Field Rd.	19	Boston: Essex St.
	15	Cambridge/MassDOT: Alewife access ramp	20	Boston: Roslindale
	16	Boston: Washington St.	21	Boston: Columbus Ave.
Total	Pre-2019:		6.78 miles	
	2019:		3.74 miles	
	Early 2020:		4.19 miles	



# BostonBRT: Local Pilots 2018

*(grant funded by the Barr Foundation)*



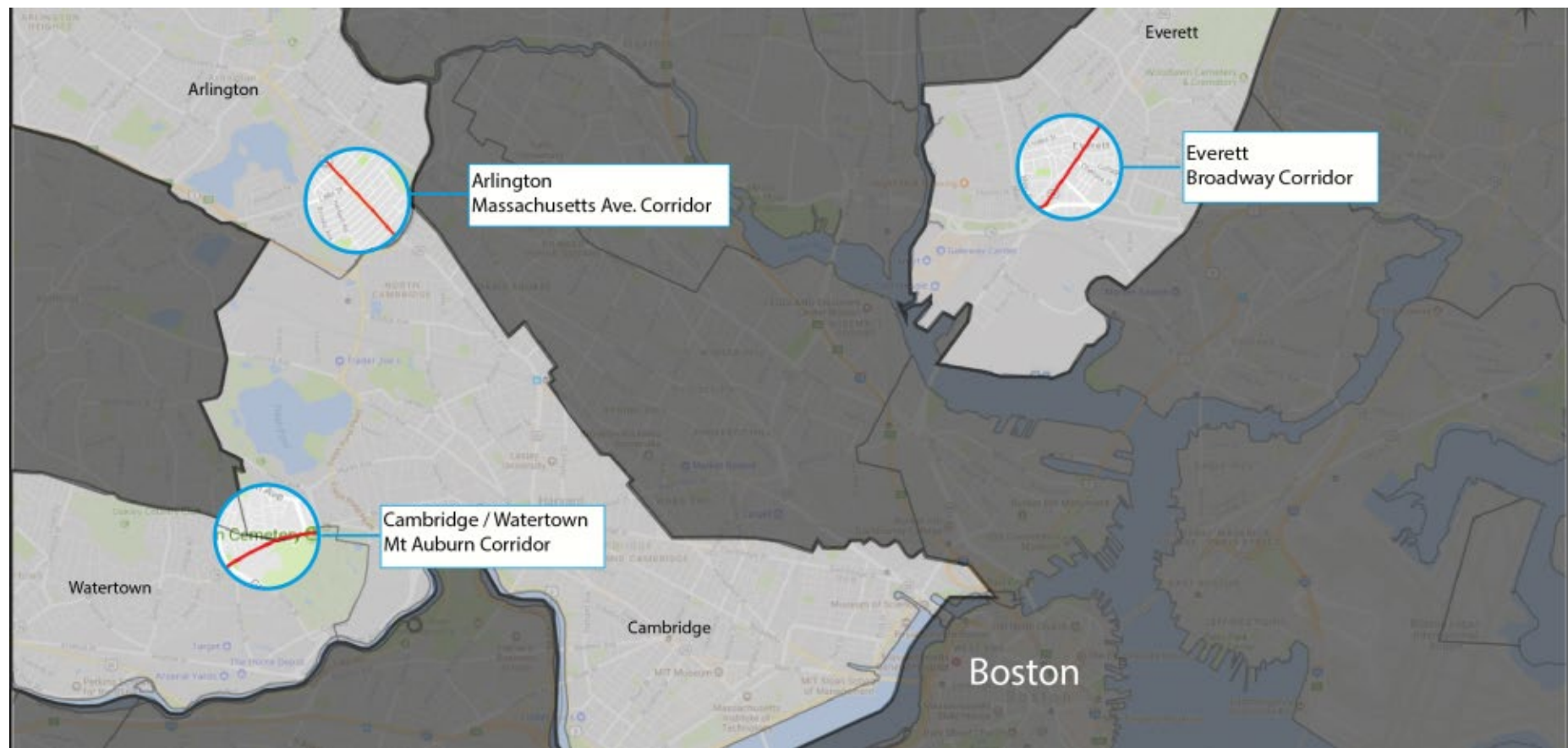
Everett BRT



Arlington BRT



Cambridge Watertown BRT





# Program Goals

- ✓ Testing **elements of BRT** on **high ridership, high capacity corridors** with significant delays

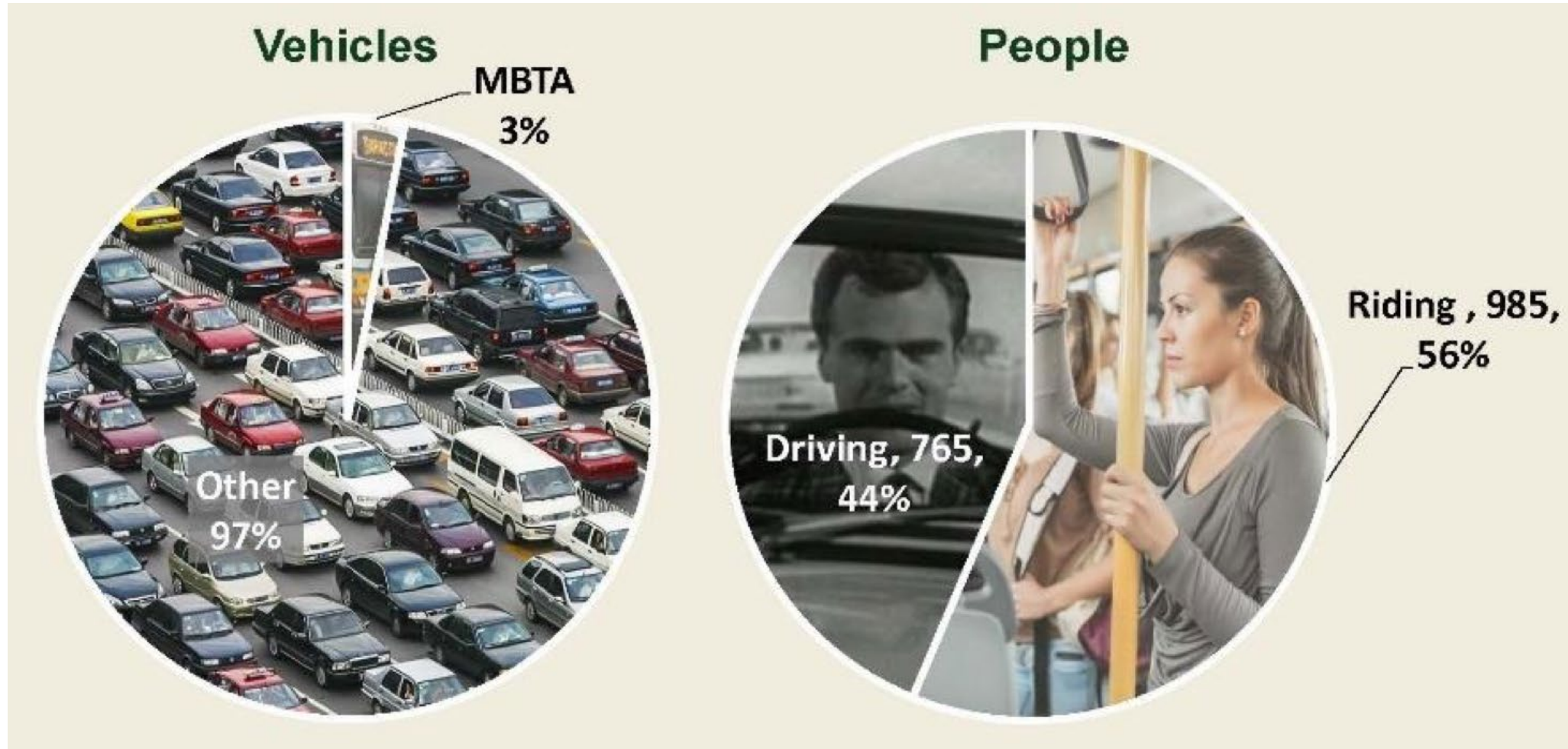


Elevate the  
Experience

Accelerate  
the Service



# Moving More People in Fewer Vehicles



Source: City of Cambridge, Mount Auburn Street

# Unique Branding System



BOSTON  
BRT



CAMBRIDGE  
WATERTOWN  
BRT



EVERETT  
BRT

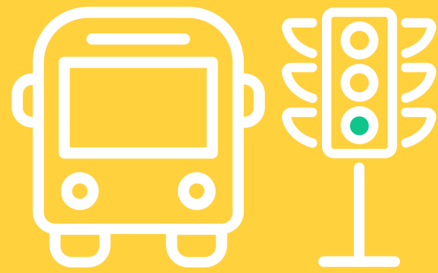


ARLINGTON  
BRT





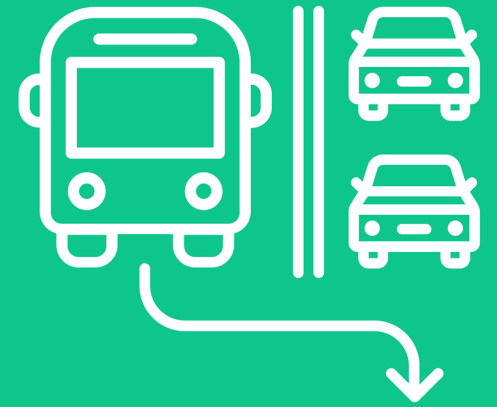
Dedicated Lanes



Signal Priority



Level Boarding



Queue Jump Lanes

# Transit Agency + Municipalities Working in Collaboration







# Massachusetts Avenue

## Bus Priority Pilot

Arlington, Massachusetts

- ✓ One month duration
- ✓ Only during morning commute (6-9 am)
- ✓ Eastbound (inbound) direction only
- ✓ No permanent construction
- ✓ Extensive business & community
- ✓ Tied to local sustainability goals





# Design Approach

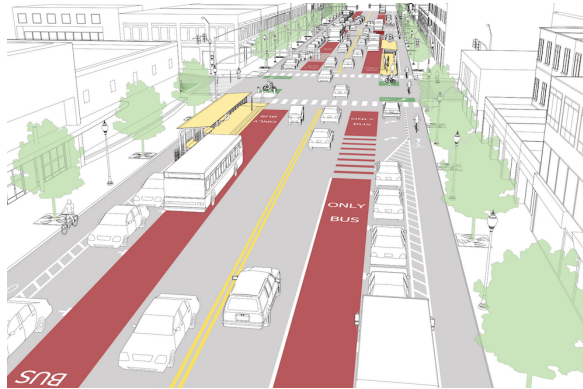
Break Study Area Into Three Manageable Areas



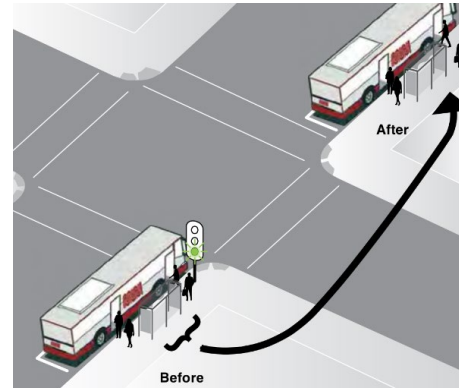


# Design Elements

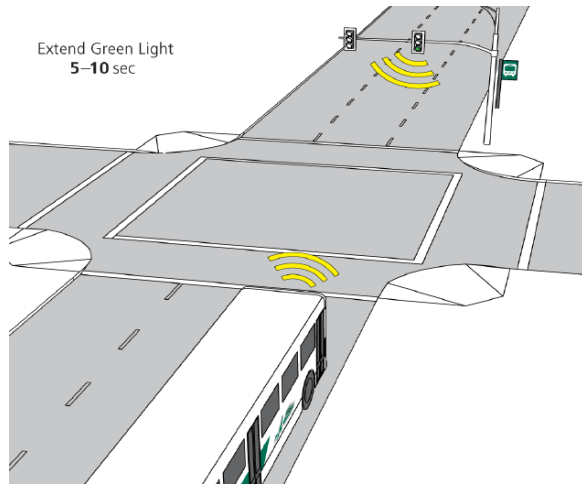
## Focus on Four Design Elements



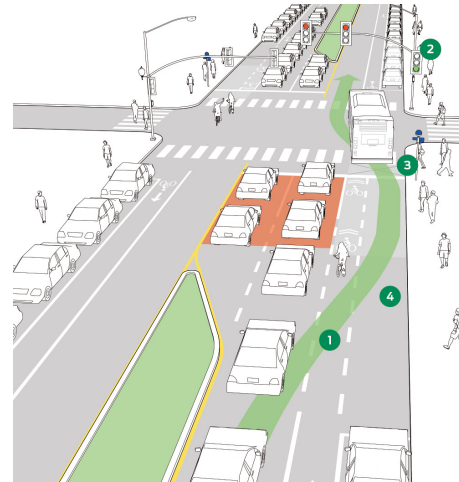
Exclusive  
Bus  
Lane



Bus  
Stop  
Relocation



Transit  
Signal  
Priority



Queue  
Jump  
Lanes



# Final Design

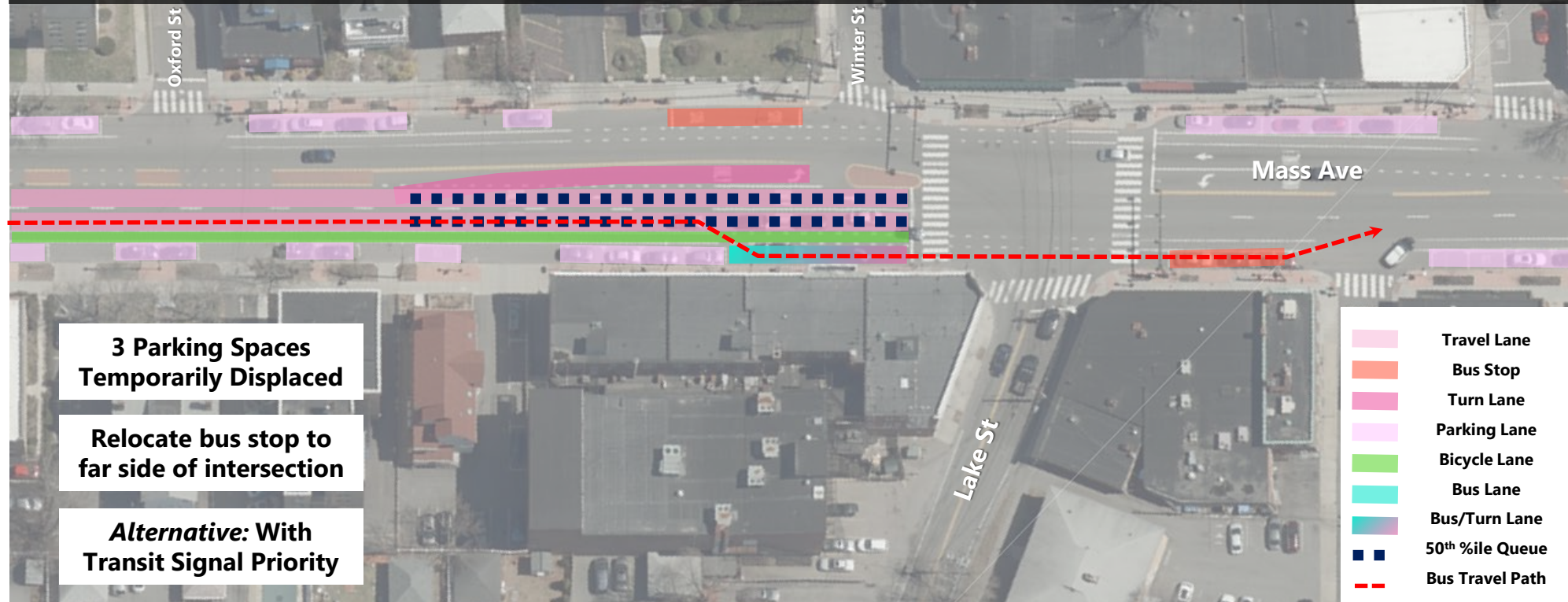
## Mass Ave at Lake Street

### Relocate Bus Stop to Far Side of Intersection/Add TSP



ARLINGTON  
BRT

Location: Massachusetts Avenue from Lake Street to Alewife Brook Parkway  
Duration: One Month Only  
Timeframe: Weekday Morning Peak Period Only (6-9 AM)  
Direction: Eastbound Direction Only

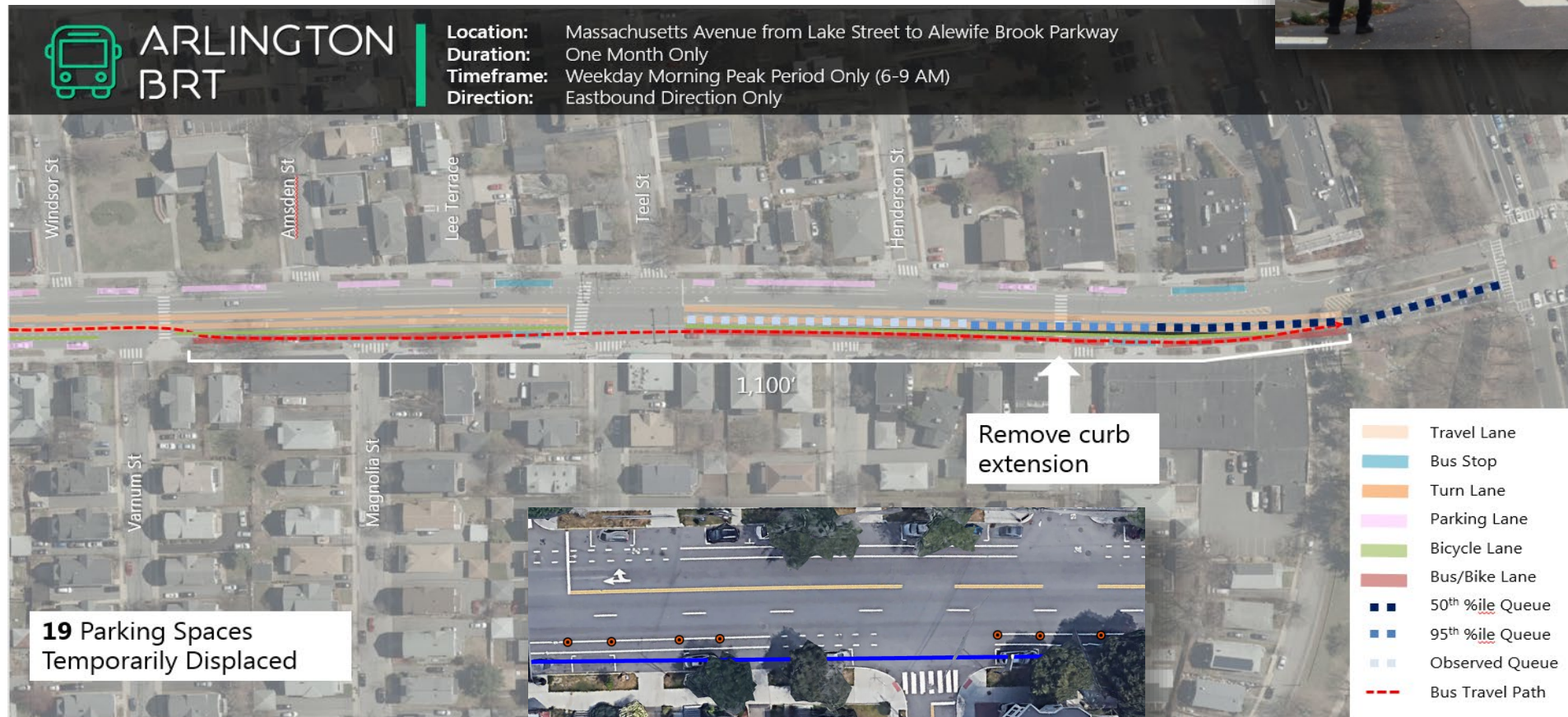




# Final Design

## Mass Ave Running Way

### Provide Curbside Bus Lane from Varnum Street to Alewife Brook Parkway

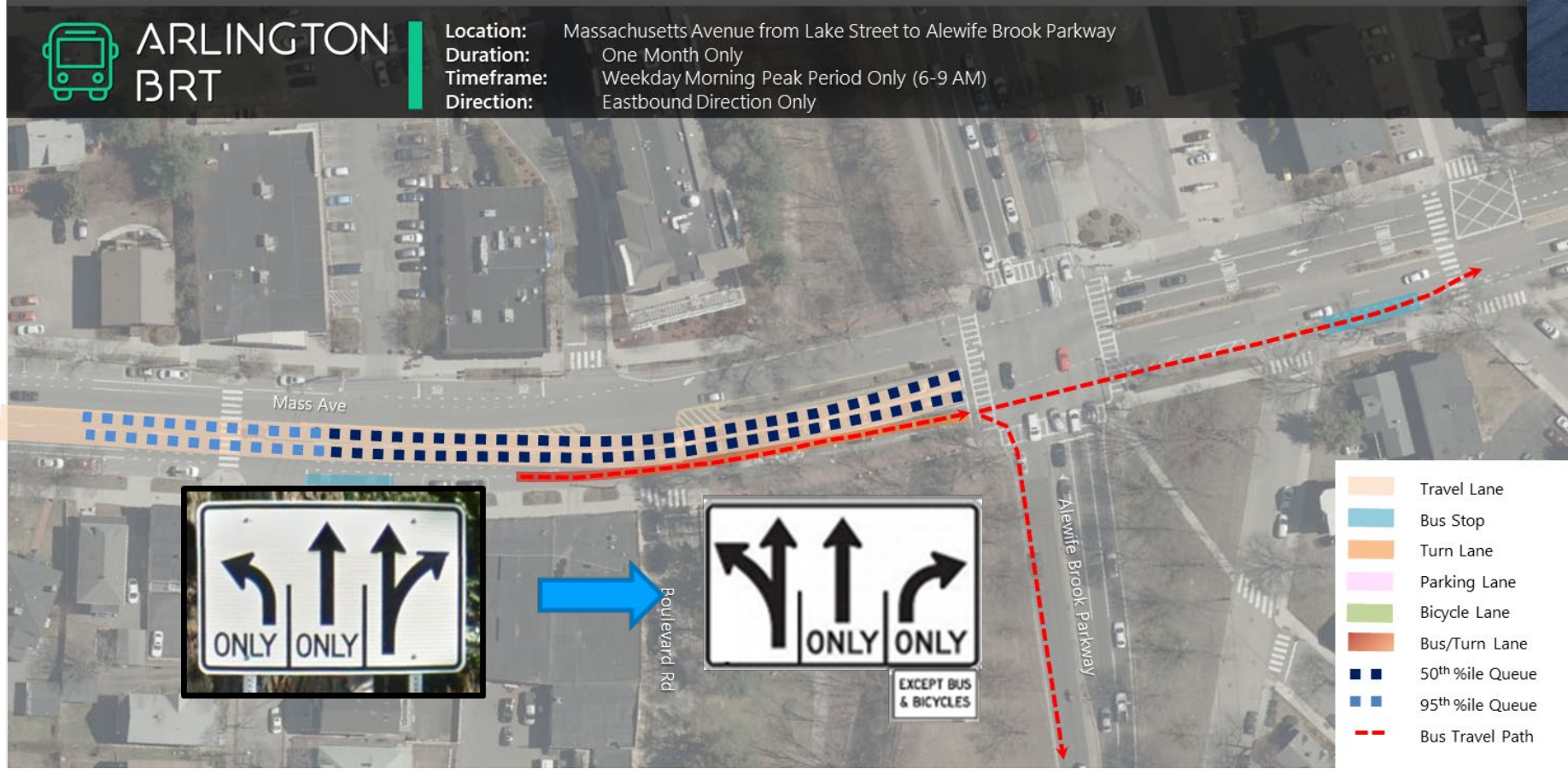




# Final Design

## Mass Ave at Alewife Brook Parkway

### Split Phase on EB Approach with Shared Left-Through Movement





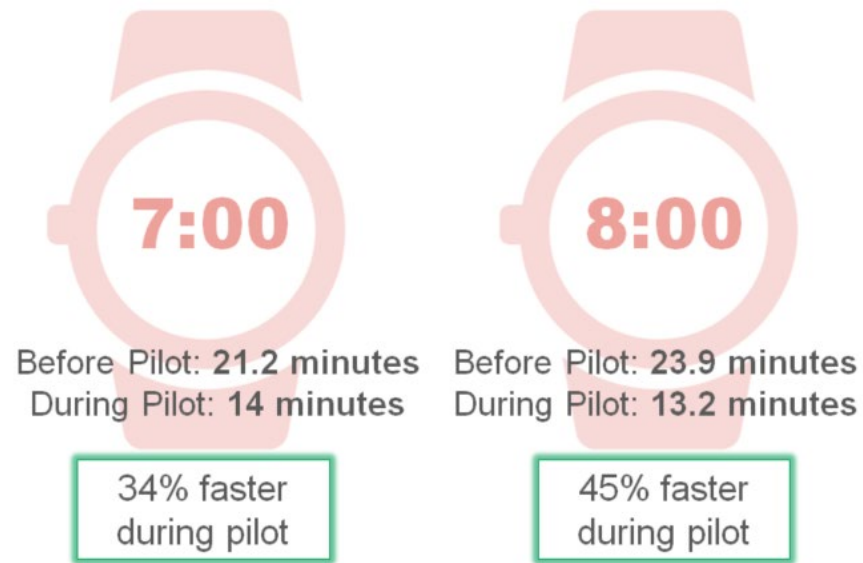
# Partnership with local Artists: “ArtBRT”



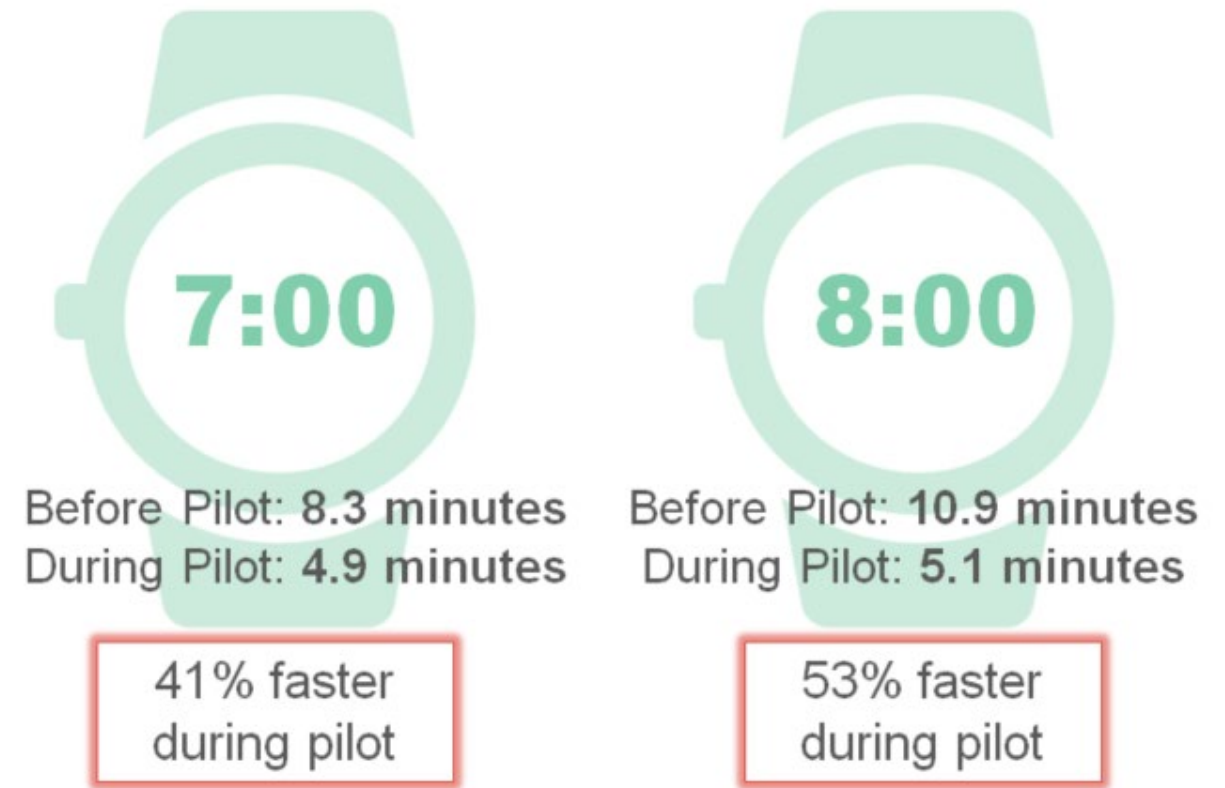


# Pilot Outcomes: Buses Ran Faster

- Buses ran 5 minutes faster on **average** through the pilot corridor especially during 7:00-8:00 a.m. and 8:00-9:00 a.m.



**Route 79/350 Median Travel Time, Inbound**

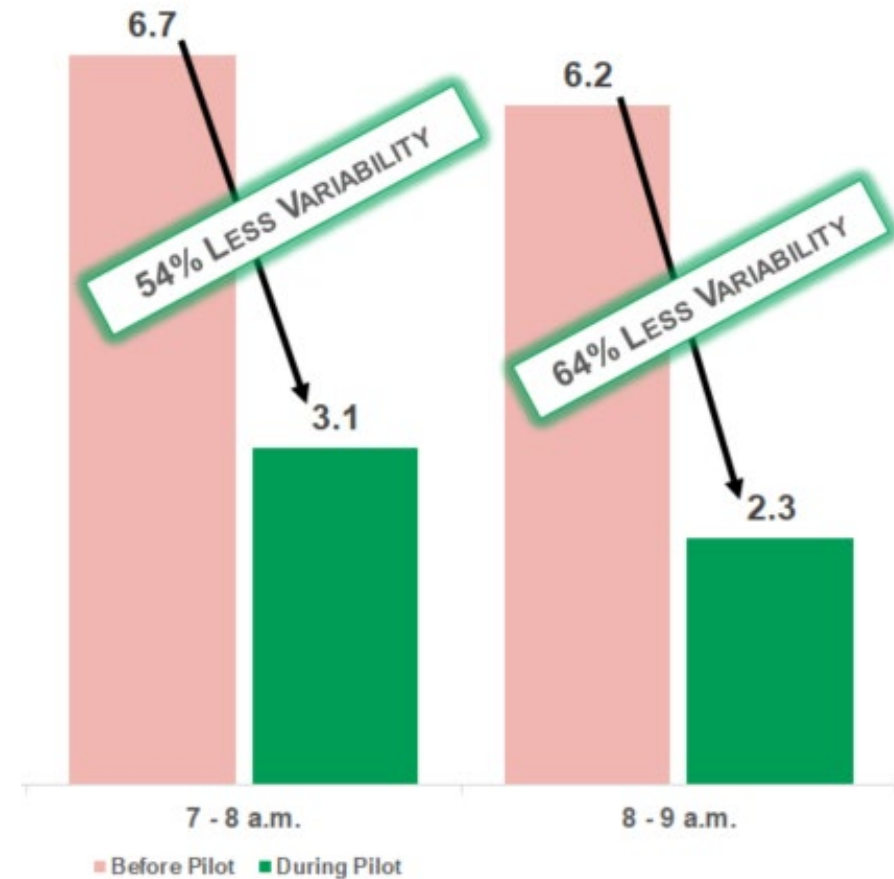


**Route 77 Median Travel Time, Inbound**

*Source: Massachusetts Bay Transportation Authority, APC Data—MBTA Route 77, September 9 – November 9, 2018*

# Pilot Outcomes: Buses Were More Consistent

- MBTA Buses ran consistently faster and reliability increased – variability fell below 5 minutes for all routes
- Travel time in pilot corridor 8:00-9:00 a.m. for Route 77 before pilot: 11-17 minutes; during pilot: 5-7 minutes



**Route 77 Difference Between Median and 90<sup>th</sup> Percentile**

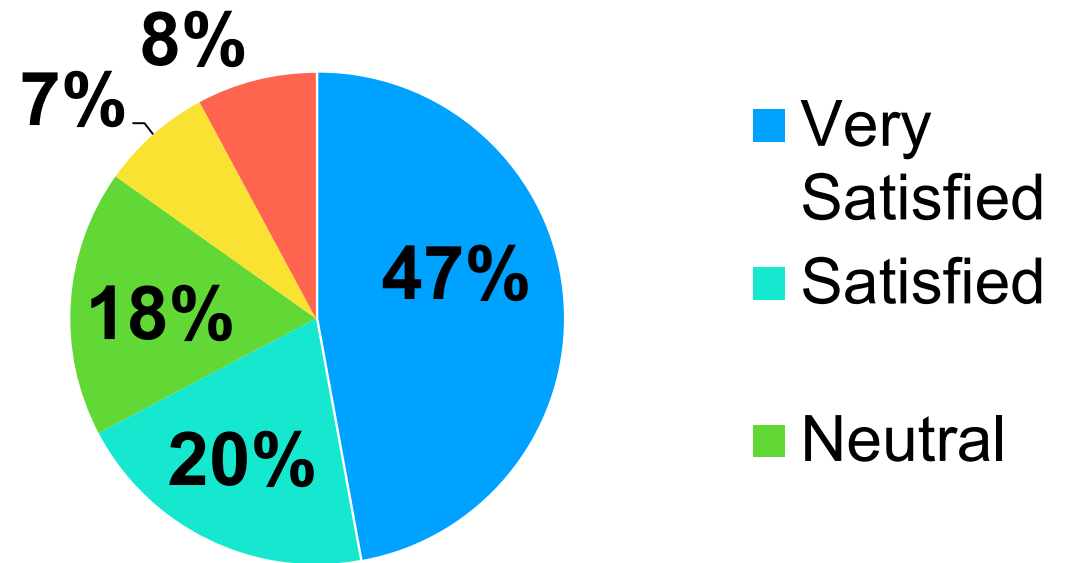
*Source: Massachusetts Bay Transportation Authority, APC Data—MBTA Route 77, September 9 – November 9, 2018*



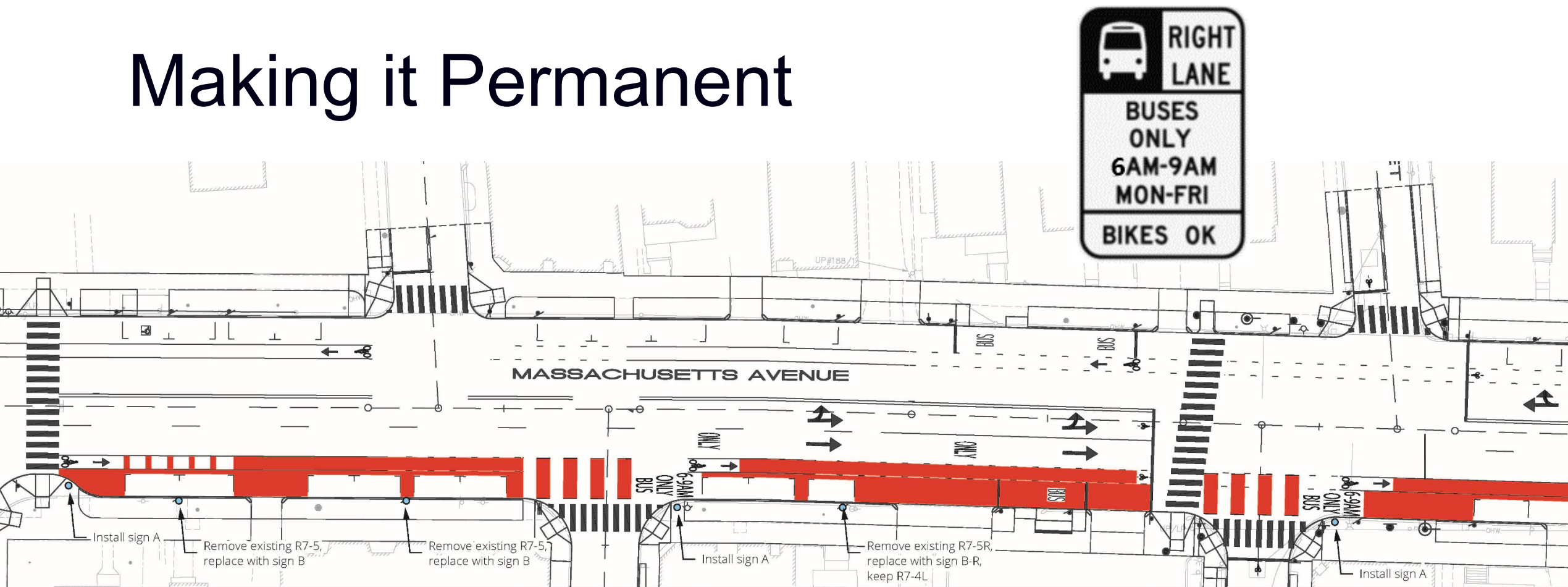
# Pilot Outcomes: People Approved

- 3 surveys totaling 970 responses; post-pilot survey received 382 responses
- Respondents: drivers (43%), bus riders (36%), cyclists (14%), walkers (4%)
- 73% said the dedicated bus lane should remain; 58% said dedicated lane should be extended to Lake Street

**Post-pilot survey: Based on your experience in your most common mode of travel, how satisfied are you with the BRT Pilot on Mass Ave?**



# Making it Permanent



## Section 1:

Trapezoidal area: 174sf  
Dashed bike lane: 4.7'W x 20'L  
(5 dashes, each 4.7'W x 2'L (47sf)  
Bike lane: 4.7'W x 106.5'L (500.55sf)  
Solid dividing line: 1.5'W x 146.7'L (220.05sf)  
Parking gap 1: 8'W x 27'L (216sf)  
Parking gap 2: 8'W x 4.8'L (38.4sf)  
Parking gap 3: 8'W x 6'L (48sf)

## Paint area:

Red: 1,244sf

## Signs:

Sign A: refer to sign spec sheet  
Sign B: refer to sign spec sheet

## Section 2:

5' skip striping with 1:1 skip  
to stripe ratio  
Wide stripes: 4 lines, 15'L x 5'W  
White edge line:  
8 lines, 5'L x 6'W  
Lettering: 6' tall letters,  
1'-6" gap between lines

## Paint area:

Red: 300 sf  
White: 20 sf

## Section 3:

Dividing line: 1.5'W x 109'L (163.5sf)  
Bike lane: 4.7'W x 146.2'L (687.14sf)  
Parking gap 4: 8'W x 4.8'L (38.4sf)  
Parking gap 5: 8'W x 52.4'L (419.2sf)  
Bus stop: 263.62sf  
Parking gap 6: 9.5'W x 23'L (218.5sf)

## Paint area

Red: 1,790.36sf

## Signs:

Sign A: refer to sign spec sheet  
Sign B-R: refer to sign spec sheet

## Section 4:

5' skip striping with 1:1 skip  
to stripe ratio  
Wide stripes: 4 lines, 15'L x 5'W  
White edge line:  
8 lines, 5'L x 6'W  
Lettering: 6' tall letters,  
1'-6" gap between lines

## Paint area:

Red: 300 sf  
White: 20 sf

## Section 5:

Described on Part 2 of 3

## Signs:

Sign A: refer to sign spec sheet



# Making it Permanent

- Coordination of and communication among multiple parties/ stakeholders
- Competitive procurement for lane painting as an add/alt for standard lane marking contract
- Use TNC funds from Lyft/Uber surcharge as funding source



## Public Info Session



7 – 8 pm

## What's happening:

The Mass Ave Bus Priority lane is becoming permanent **the week of October 7!** The Town of Arlington will install a permanent bus priority lane eastbound on Mass Ave between Varnum Street and the Cambridge Line. The lane will serve MBTA routes 77, 79, and 350 from 6 - 9 am on weekdays. For more information, please attend our upcoming public info session on October 2.

## Where

**Fox Library Main Level**  
175 Mass Ave. Arlington

## Bus priority features:

- Two travel lanes for cars heading toward Cambridge
- Shared bus and bike lane during hours of operation (6-9AM)
- Bike lane and on-street parking will remain for all other hours



TOWN OF ARLINGTON  
730 Mass Ave, Arlington, MA 02476

For more information:  
[ARLINGTONMA.GOV/PROJECTS](https://arlingtonma.gov/projects)



# CAMBRIDGE WATERTOWN BRT

Mount Auburn St. Bus Priority Pilot

**October 2019- Present**

- ✓ No end date
- ✓ All day bus lanes coupled with permanent pedestrian safety improvements
- ✓ Extensive public & neighborhood engagement
- ✓ Multi-stakeholder collaboration



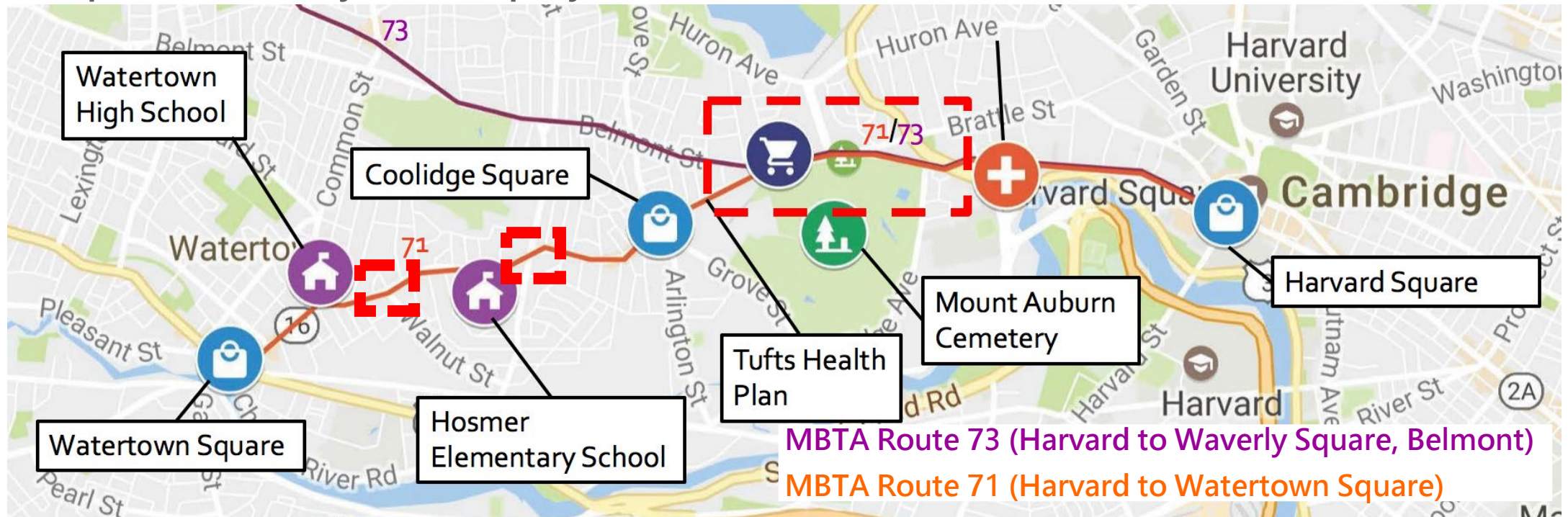


# Mount Auburn St. project area

Mount Auburn Street is typically two lanes in each direction and carries up to 19,000 vehicles per day. The area is mainly residential with neighborhood commerce and offices. Bus routes connect important regional centers – Watertown and Harvard Squares.

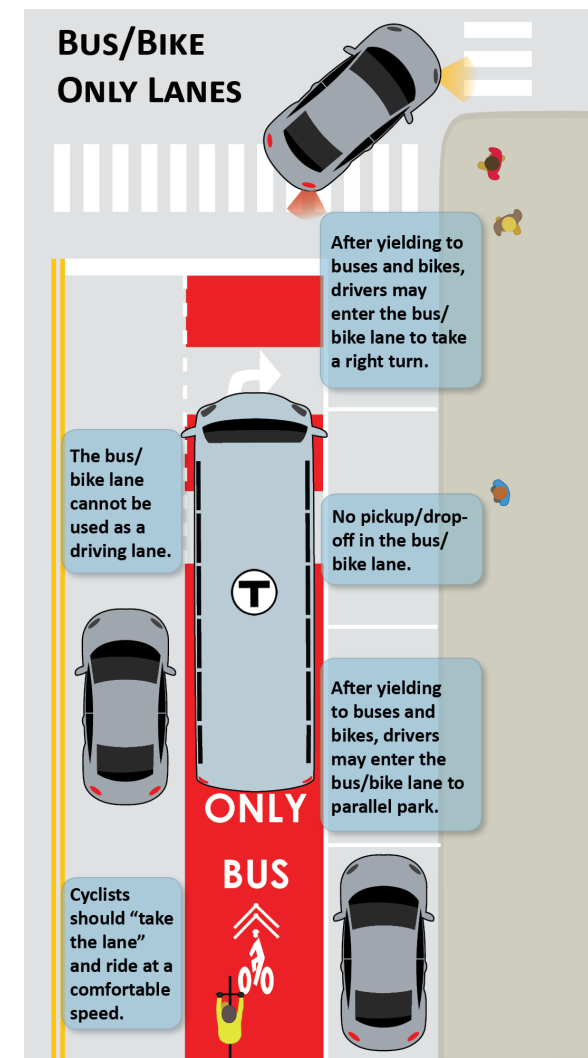
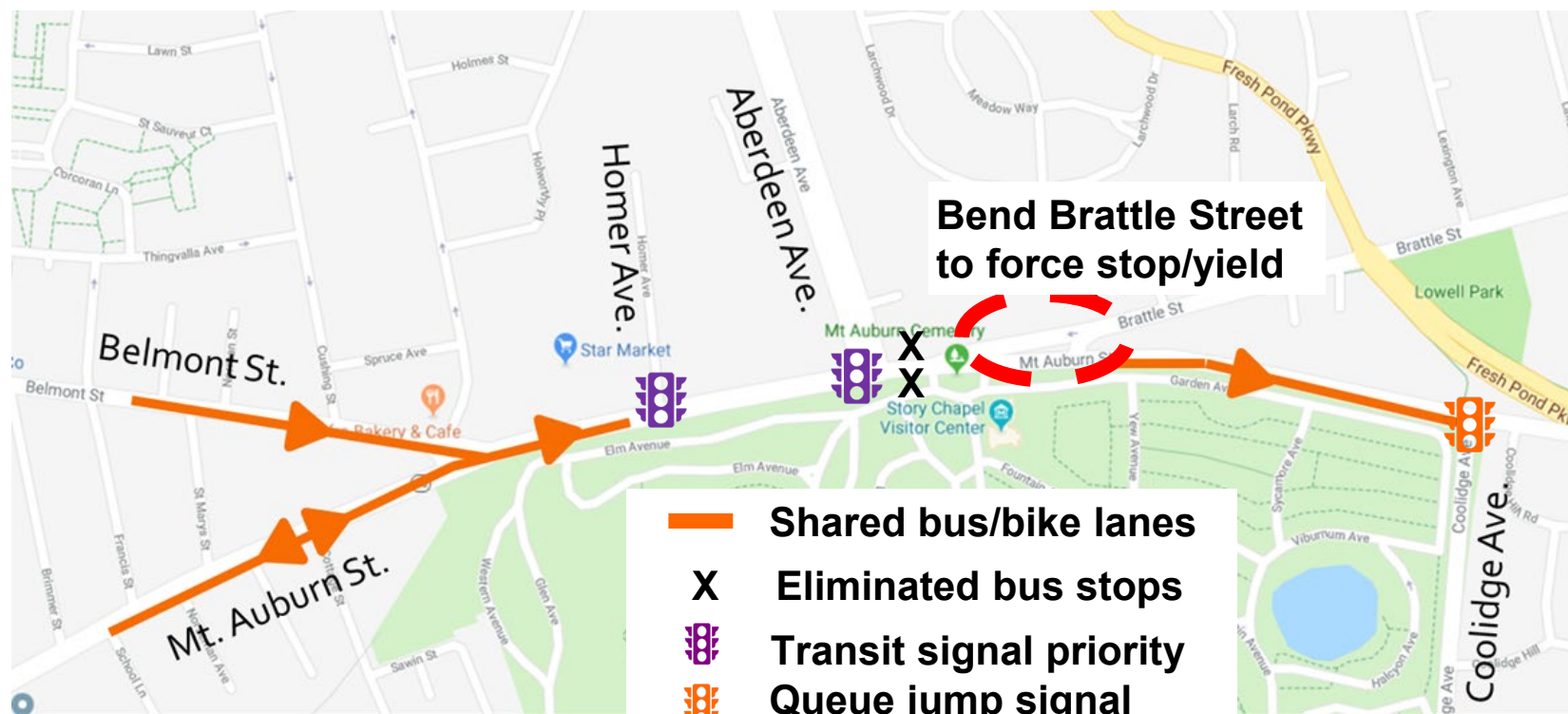
MBTA Route **71** and **73**: 12,000 weekday daily passenger trips combined.

Hospital university and employer shuttles



# Project elements

- Little to no construction: flexposts, paint, signal changes, and signs
- No specific end date: to test, evaluate, develop a long-term plan
- Education and enforcement during and immediately after implementation



\*Queue jumps in Watertown at Grove St. and School St.



# Partnership was key

2016 - 2017

DCR Mt. Auburn Street  
Corridor Study

2018

DCR Short Term  
Design Implementation

2018

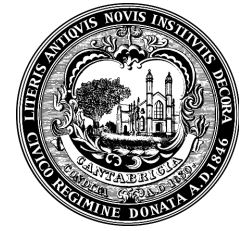
Cambridge BostonBRT Mt.  
Auburn St. Bus Priority Pilot

2018 - 2021

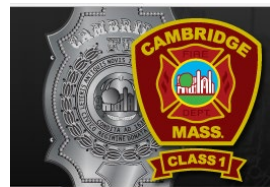
Cambridge Belmont St.  
Design and Construction

2022

Watertown Mt. Auburn St.  
Complete Street Project



dcr  
Massachusetts



Massachusetts Bay  
Transportation Authority





# Street design elements

- Shared bus/bike-only lanes eastbound, bicycle lane westbound
- Transit signal priority and queue jump signals
- Queue jump lanes in Watertown
- Bent side street approach to Mount Auburn St. with safer pedestrian crossings



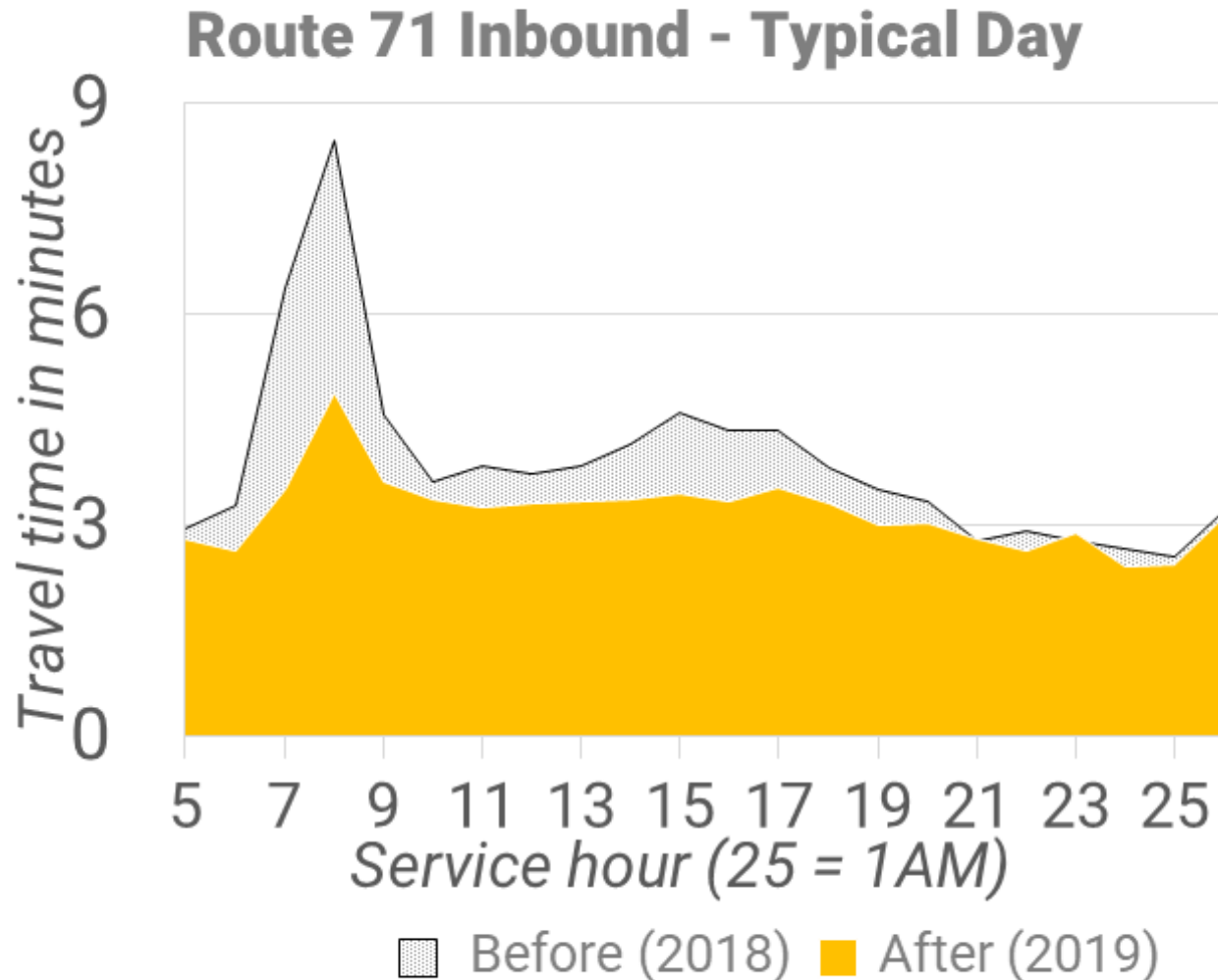


# Improved pedestrian crossings

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# Outcomes: Buses Ran Faster

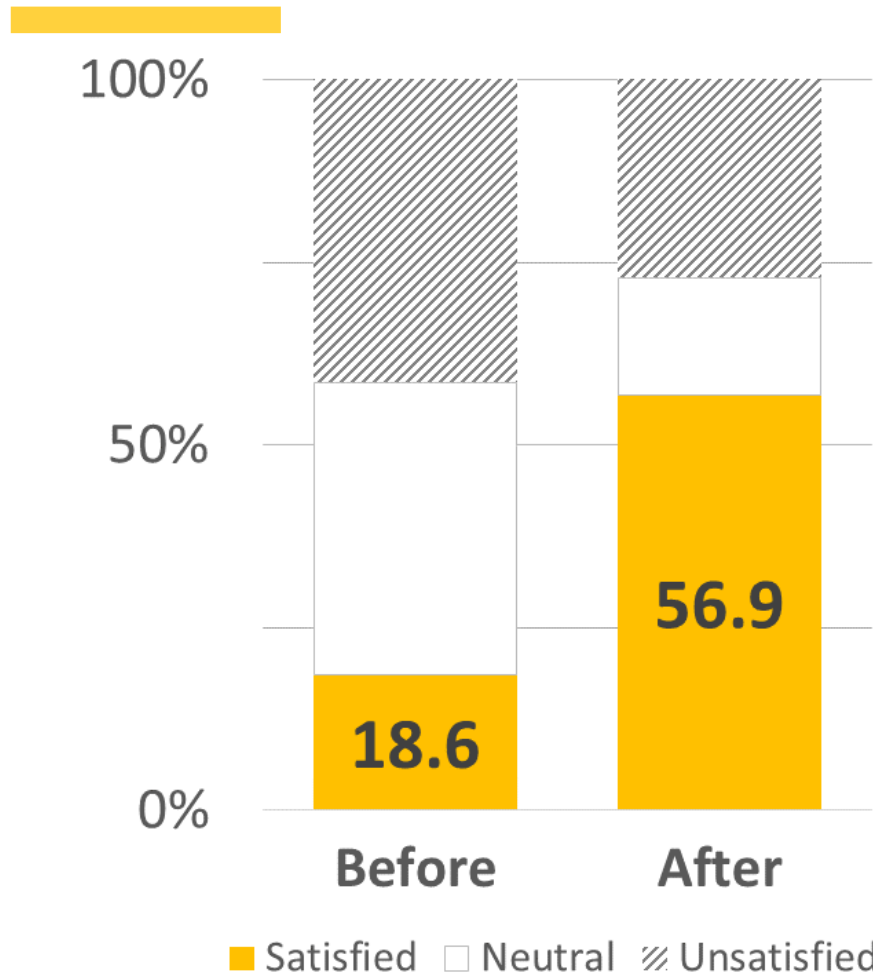


People on MBTA buses save  
**36,000 hours,**  
cumulatively in a year.

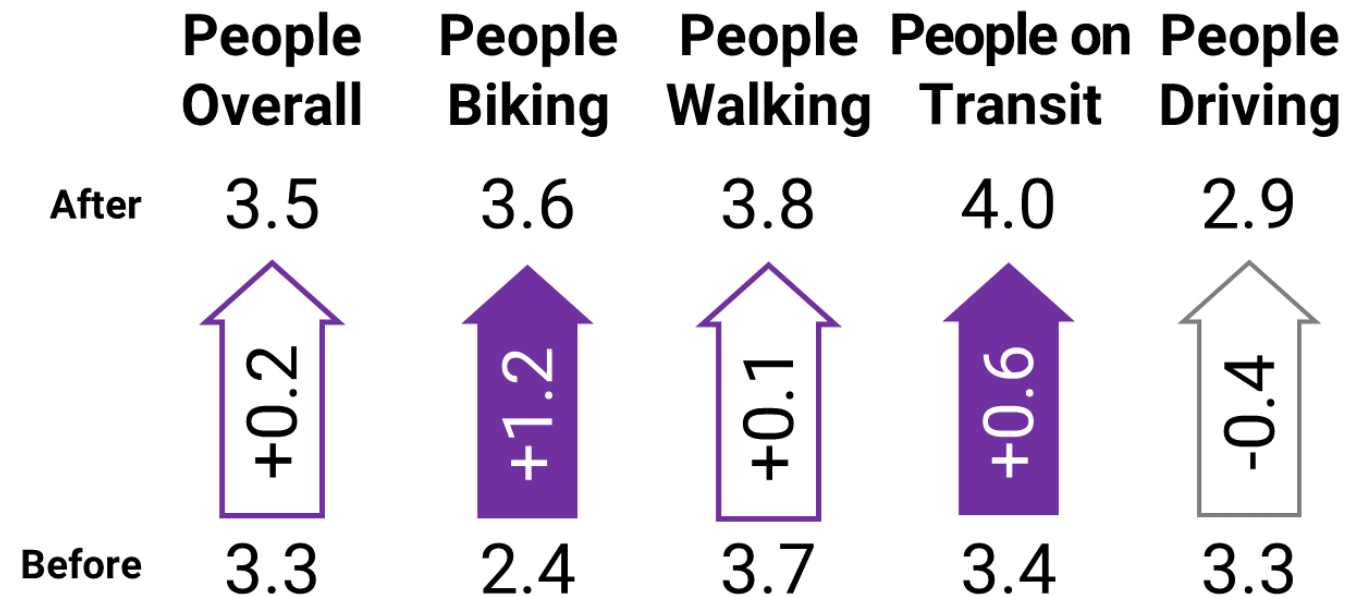
With no measurable impacts to  
travel time for people driving.



# Outcomes: People Approved



**All respondents:** How satisfied are you with the design of Mount Auburn St.?



**All respondents:** How comfortable would you rate Mount Auburn Street on a scale of 1 to 5?

# Outcomes

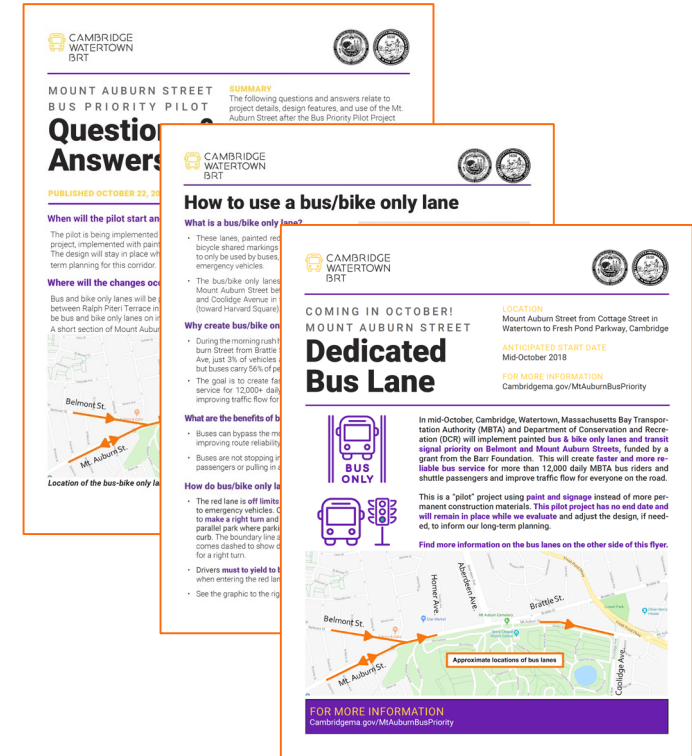
- “It has **completely changed my commute** and given me back precious time. My commute is shorter 25 to 30 minutes each day.”
- “I can't say enough about how much better this dedicated bus lane makes my daily commute. It has **improved my quality of life!**”
- “I think this project might be too successful. The bus service has improved so much that I think **there are many other passengers like myself who have started taking this bus route** because it's so much faster.”





# Keys to success

- Coordinate frequently with partner agencies and orgs
- Invest in as much outreach, education, and evaluation as possible
- Improve in a way that benefits more than one mode
- Be flexible during implementation – “make lemonade”
- Explore unconventional sources of data – e.g. Google API





Thank you!

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