# Designing a Transit Network for the People

## Scott Hamwey, MassDOT
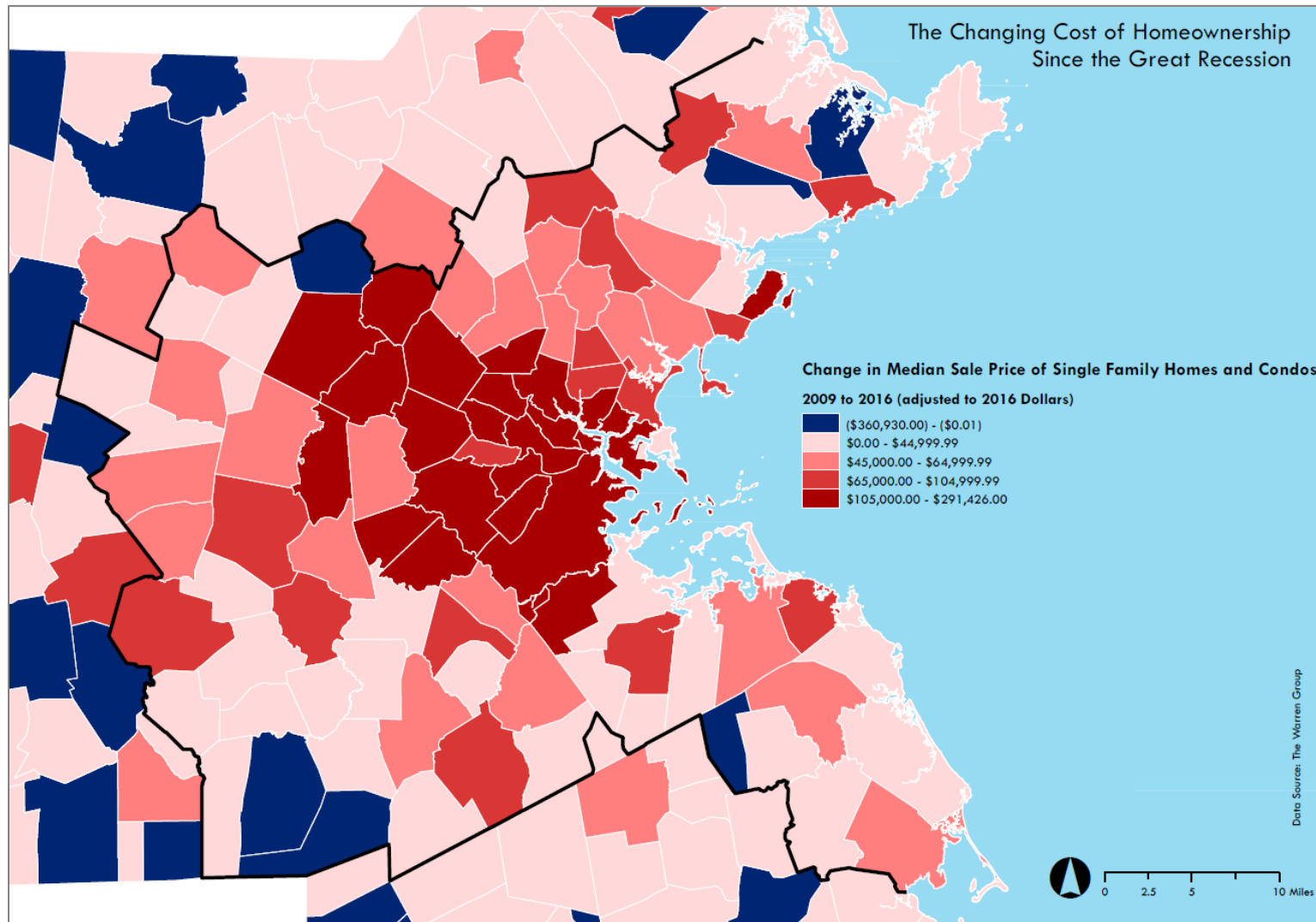


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# Planning is happening in the context of tremendous change and uncertainty

# Where will Millennials Live?

# Will Housing Prices Continue to Rise in the Core?



The Changing Cost of Homeownership Since the Great Recession

Change in Median Sale Price of Single Family Homes and Condos
2009 to 2016 (adjusted to 2016 Dollars)

- ($360,930.00) - ($0.01)
- $0.00 - $44,999.99
- $45,000.00 - $64,999.99
- $65,000.00 - $104,999.99
- $105,000.00 - $291,426.00

Data Source: The Warren Group

Source: MAPC

# Will Ridesharing Continue to Grow?



Source: MAPC
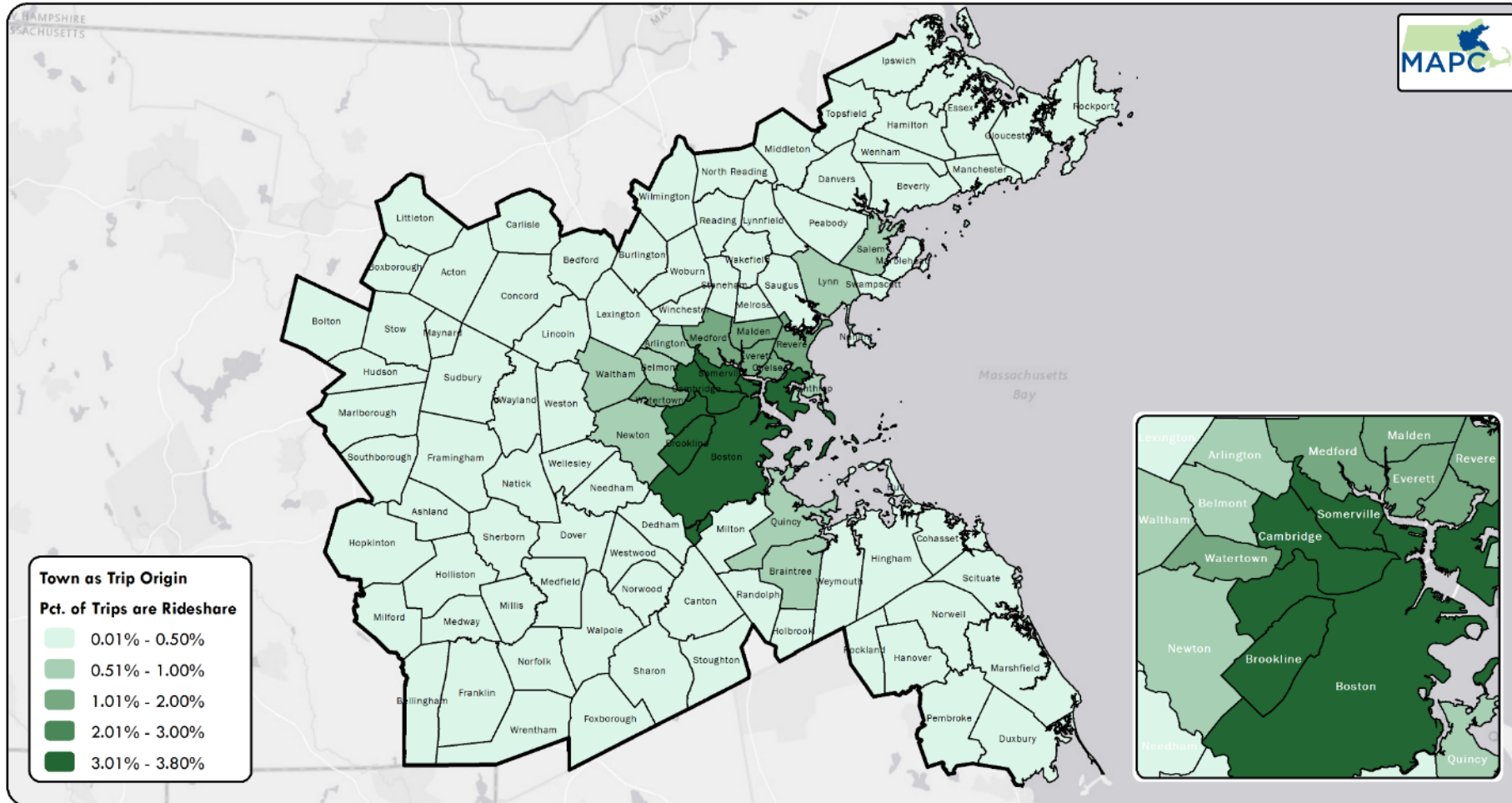
# Will Bike-Sharing be Widely Utilized?



Photo Source: Blue Bikes

# How will Autonomous Vehicles Impact Congestion and Mobility?



Photo Source: The Aspen Institute

# Will Micro-Transit be Adopted?

# Will the Region be Prepared for Increasing Impacts of Climate Change?



Photo Source: Boston Public Library

In response to emerging trends, the MBTA is currently pursuing several reimagining exercises:

- ✓ **Focus40**
- ✓ **Rail Vision**
- ✓ **Bus Network Redesign**

# Focus40 Outreach
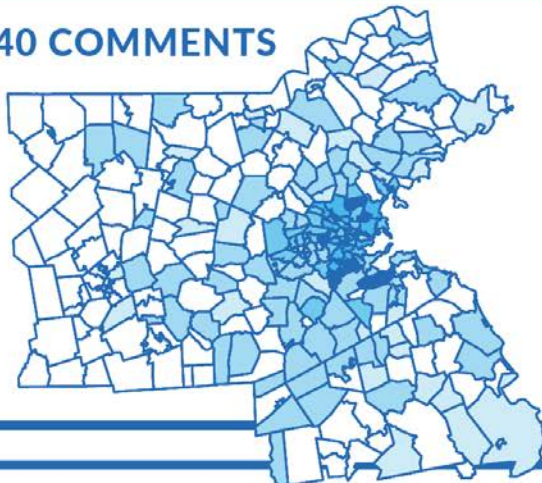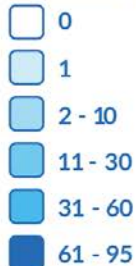
# What we Heard
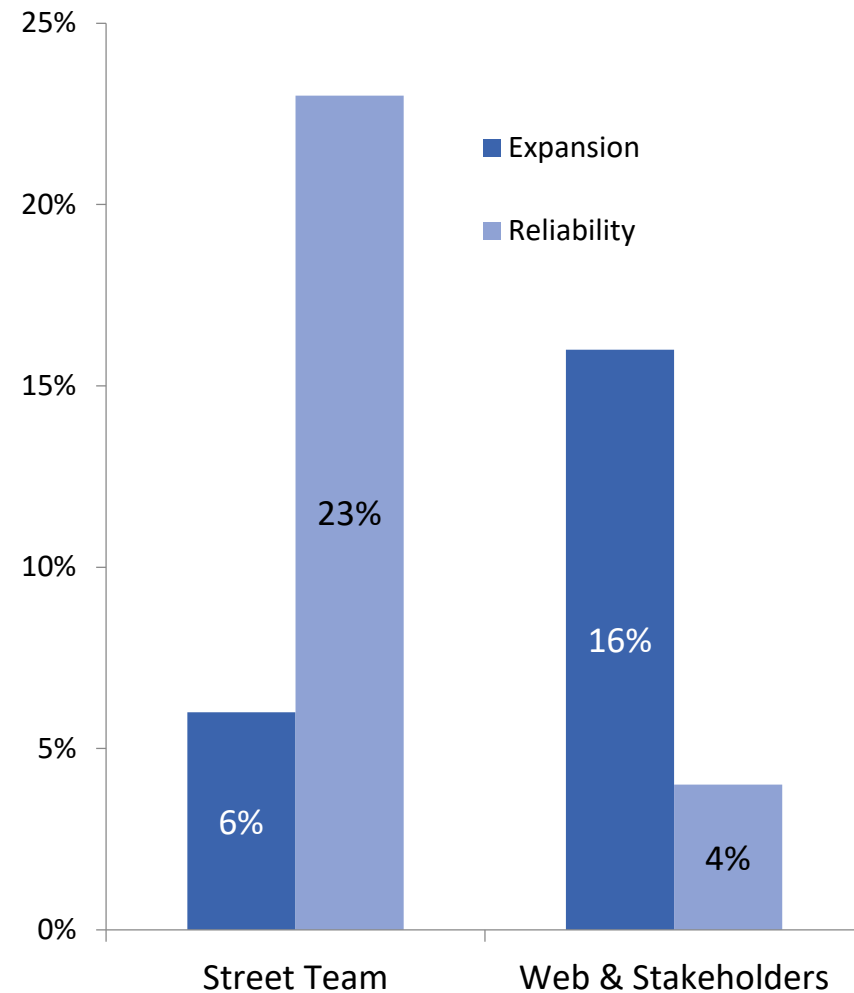


"Focus investments on improvements to the existing system"

"Make buses faster, more reliable, and on time!"

"I want to see better reliability and on-time service across the system"

# Where to Favor Transit: Dedicated Bus Lanes Prioritization

Focus40 identified priority corridors for on-street transit accommodation based on:

- Transit **ridership** by corridor

- Traffic **congestion**

- **Share of roadway users** already on transit



Delay in Passenger-Hours/Mile

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 235
- MBTA bus route
- INRIX speed data not available

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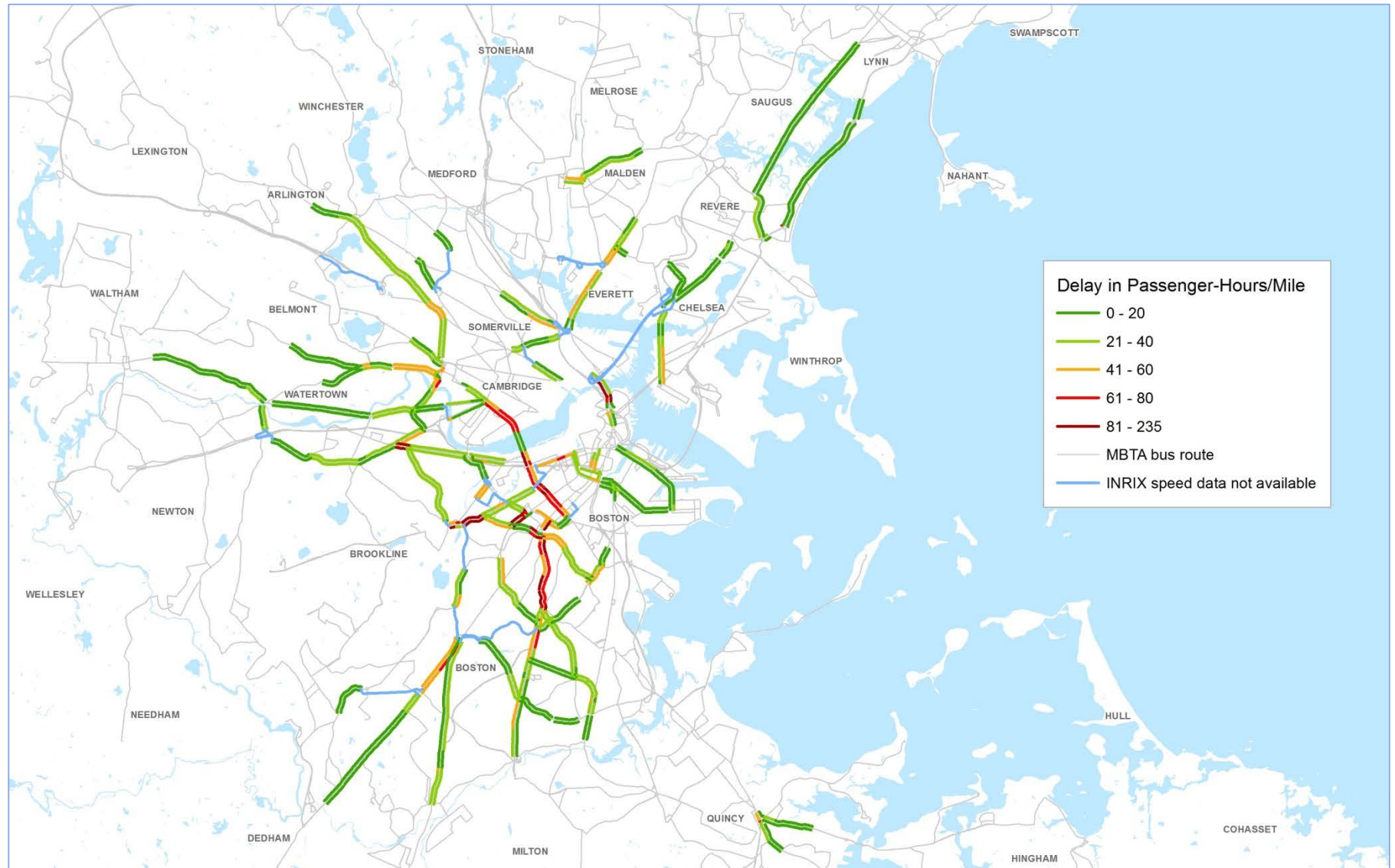
# Where to Focus Future Investment: Focus40 Priority Places

- **Major employment districts** (Kendall, LMA, Seaport, Logan)

- **Inner core communities lacking rapid transit** (Everett, Chelsea, Revere, Roxbury, Dorchester, Mattapan, South Boston, Roslindale)

- **Urban Gateways** (Lynn, Salem, Waltham, Brockton, Lowell, Lawrence)
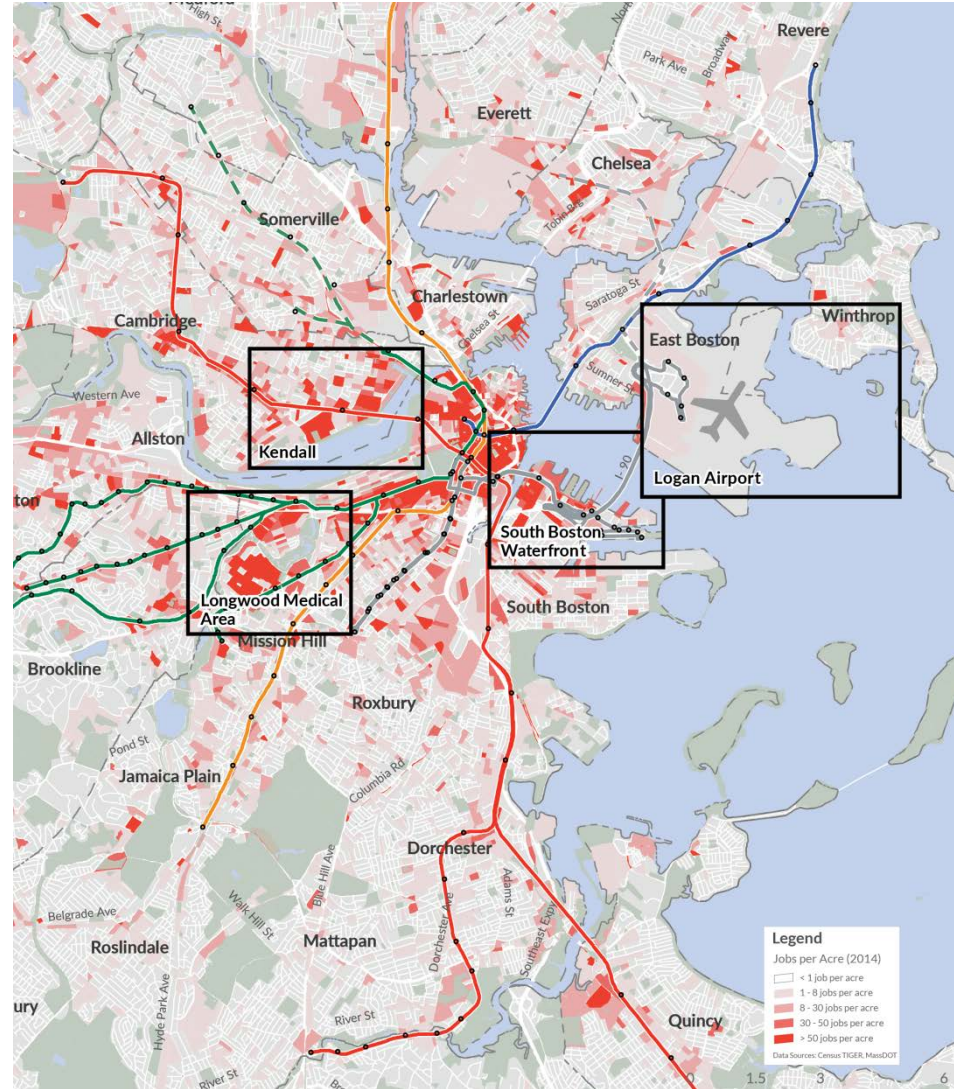
# Rail Vision – What is the Purpose of MBTA Rail Service?

Doing all of these = $$$$

Prioritizing some trip types over others = *Tradeoffs*

1. Reduce highway congestion, auto emissions, and VMT by focusing on long-distance trips?

2. Provide service in the inner core that operates more like rapid transit?

3. Enable access to Boston's employment pool for job clusters beyond the inner core by focusing on reverse commutes?

4. Support economic development in the Gateway Cities and other urban areas outside of the inner core by focusing on schedules/ service levels on needs of those communities?



Shaded Area = 7,325 square miles

0  5  10      20 Miles

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# Commuter Rail and MBTA System Overview



|  | Commuter Rail | Red Line | Orange Line | Blue Line | Green Line |
|---|---|---|---|---|---|
| Weekday Ridership | 129,075 | 272,684 | 203,406 | 63,225 | 227,645 |
| Route Miles | 388 | 21 | 11 | 6 | 23 |
| Routes | 14 | 2 | 1 | 1 | 2 |
| Communities Served | 175 | 7 | 8 | 4 | 8 |
| One-Way Trips | 500 | 438 | 324 | 354 | 1,117 |
| Parking | 25,977 | 8,595 | 2,720 | 3,013 | 2,019 |
| Stations | 138 | 22 | 19 | 12 | 13 |
| Passenger Miles | 729,585,705 | 604,916,804 (combined) | | | 168,749,849 |

Source: MBTA Ridership and Service Statistics, 2014.
National Transit Database: 2013 Transit Profiles.

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# Comparing Rail Vision Alternatives

**Station Typologies**



Inner Core Stations | Key Stations | Outer Stations
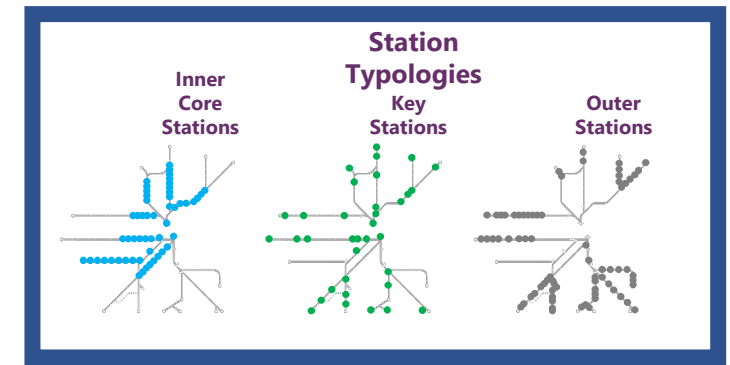
Evaluating relative benefits and costs across the seven alternatives will provide the foundation to build one or more Visions for the future of commuter rail, which may combine features from multiple alternatives to maximize the effectiveness of the MBTA rail network.

| | 1: Higher Frequency Commuter Rail | 2: Regional Rail to Key Stations (Diesel) | 3. Regional Rail to Key Stations (Electric) | 4: Urban Rail (Diesel) | 5. Urban Rail (Electric) | 6. Full Transformation | 7. Hybrid System |
|---|---|---|---|---|---|---|---|
| **Typical Frequency (Peak/Off-Peak)** | | | | | | | |
| Key Stations | 30/60 | 15/15 (North Side) 30/30 (South Side) | 15/15 | 30/60 | 30/60 | 15/15 | 30/60 |
| Inner Core | 30/60 | 30/60 | 30/60 | 15/15 | 15/15 | 15/15 | 15/30 |
| Outer Stations | 30/60 | 30/60 | 30/60 | 30/60 | 30/60 | 15/30 | 30/60 |
| **Fully Accessible High-Level Platforms** | | | | | | | |
| Key Stations | Existing or Programmed Upgrades Only | ✓ | ✓ | - | - | ✓ | ✓ |
| Inner Core | | - | - | ✓ | ✓ | ✓ | ✓ |
| Outer Stations | | - | - | - | - | ✓ | - |
| **Electrification** |  |  |  |  |  |  |  |
| **Major Expansions** |  |  |  |  |  |  |  |

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***Note***: The alternatives as described above are subject to change during the modeling process. All text and maps describe a typical application at the system level but may vary to some extent at the line, station, or segment levels.

# Station Typologies Shape Alternatives

**Demographics and land use characteristics** surroundings stations directly shape the level of **frequency**, investments in **high-levels boarding platforms**, and other elements of service alternatives.
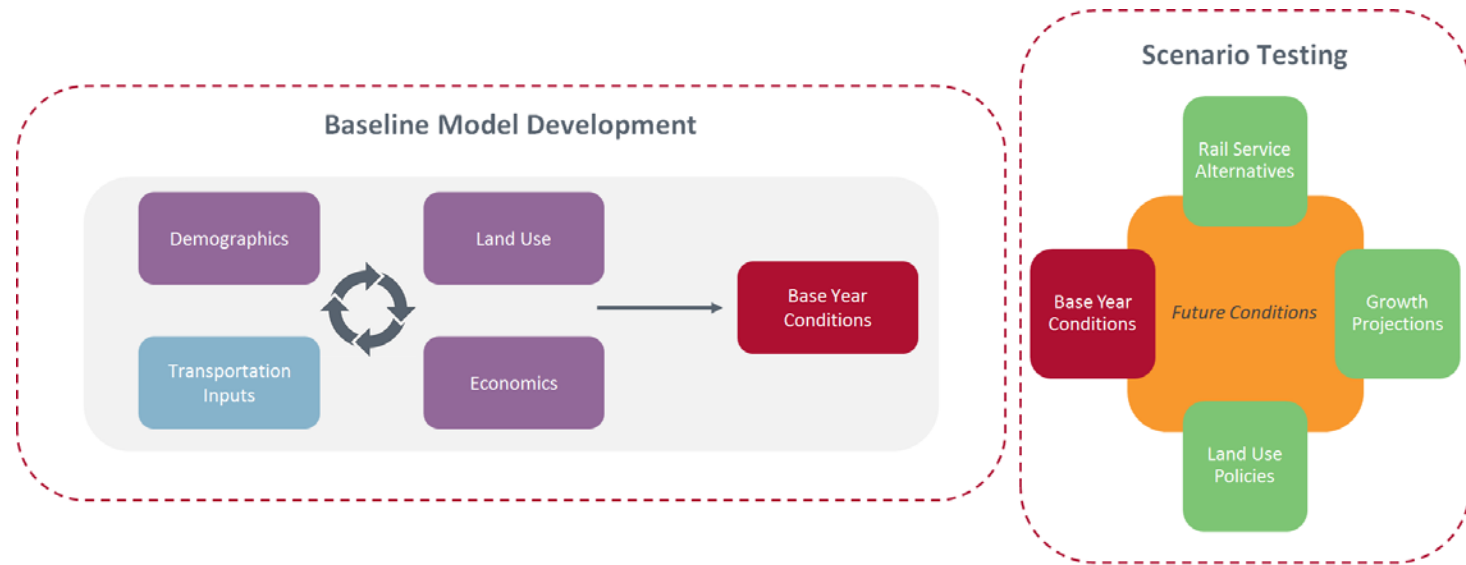
Alternatives identify three station types:

- Key stations

- Inner core stations

- Outer stations



**Density**
Stations in Gateway Cities, downtown areas, town centers, and high-density locations can support frequent service.

**Regional Access**
Proximity to the roadway network with sufficient parking allows stations to draw passengers from across the region.

**Ridership**
Currently one of the 5 highest ridership stations on the line or branch.

**Transit Connections**
Stations improve transfers to/from public transportation, increasing connectivity to and within the MBTA system.

# Modeling Dynamic Land Use and Population Changes

**Transformative transportation investments** can drive individuals' decisions about **where to live** and work and influence employers' decisions about **where to locate**.

The Regional Dynamic Model (RDM) – a **strategic simulation** model focused on how transportation, land-use, population, and employment interact – will help us understand how populations and employers may shift as a result of different Rail Vision Alternatives.



**Baseline Model Development**

- Demographics
- Land Use
- Transportation Inputs
- Economics
- Base Year Conditions

**Scenario Testing**

- Rail Service Alternatives
- Base Year Conditions
- Future Conditions
- Growth Projections
- Land Use Policies

### Legend

- ⬛ Inputs from CTPS
- ⬛ Inputs from CTPS, MAPC & others
- ⬛ RDM Internal Outputs
- ⬛ Inputs for Scenario Testing
- ⬛ RDM Model Outputs

**The MBTA bus network carries 1/3 of our customers but has not changed drastically since mid-20th century.**

Since that time:

- Demographics have shifted
- New destinations have emerged and many communities have transformed
- Travel patterns have changed alongside new mobility options such as ridesharing and bike share
- Traffic congestion has increased
- Ridership has declined

In order to respond to this changing context, the Network Redesign will recommend a new network that meets today's regional needs.

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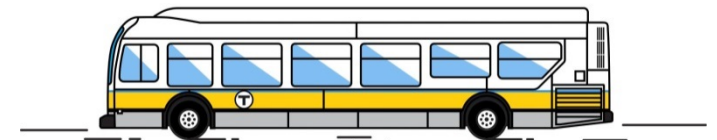
# Using Location Based Data To Reimagine The Bus System



Daily Trip Origins - Public Transit (TAP) vs Total (LBS)
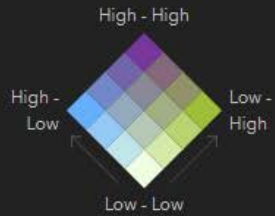LACMTA NextGen Initiative, 2019

Source: LA Metro NextGen Study
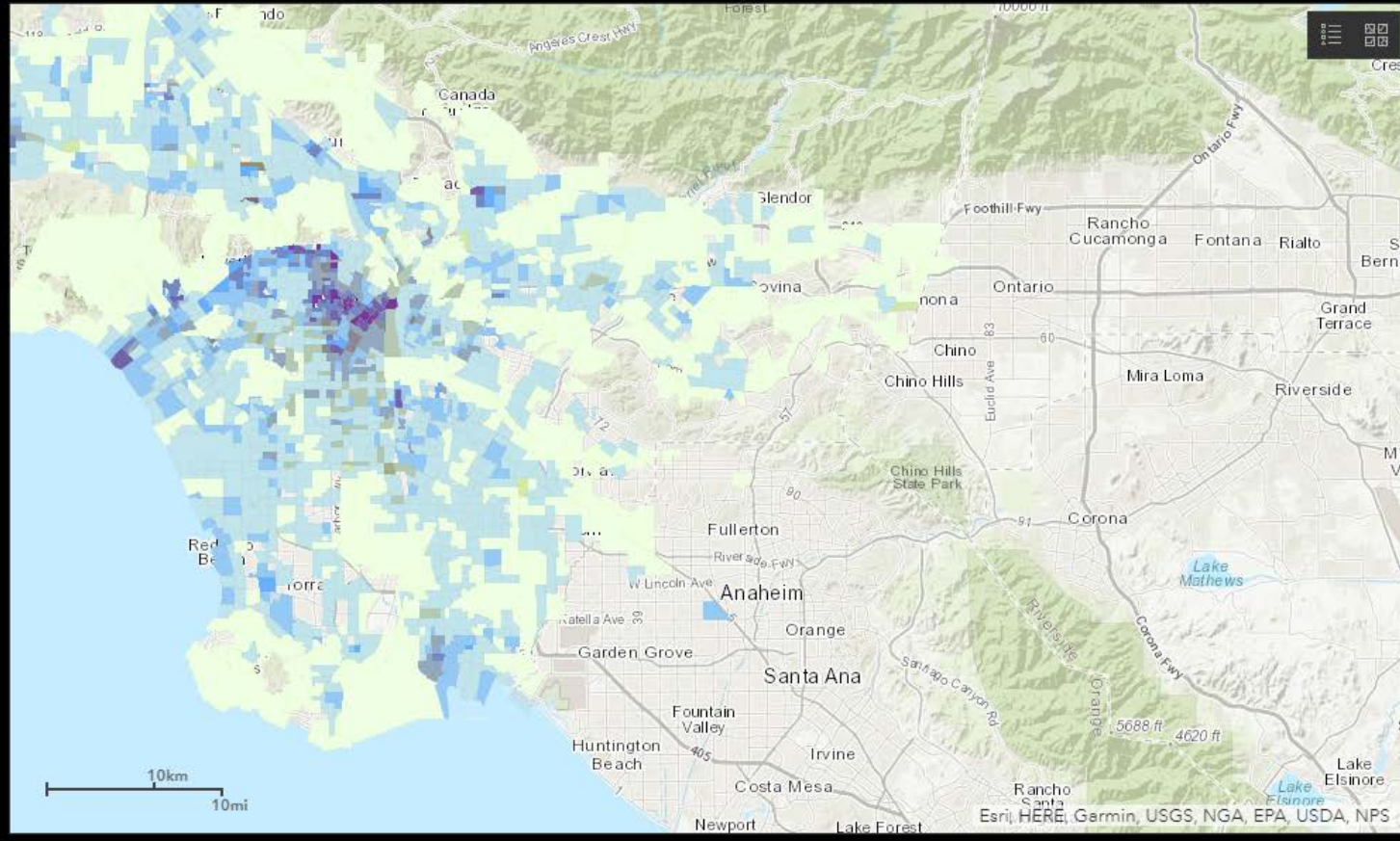
# Approach To Developing Metrics
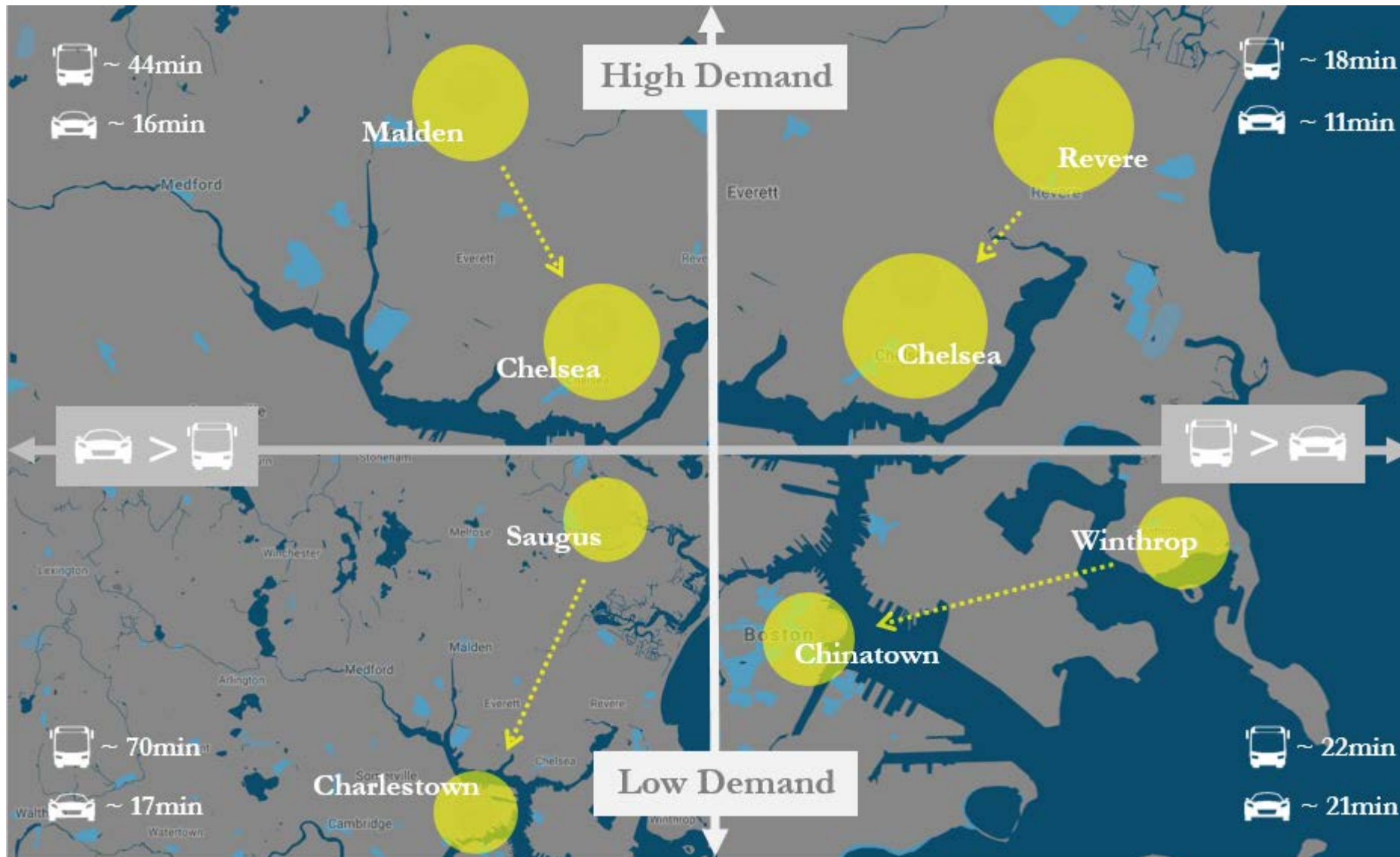


Note: Competitiveness in this graphic is just focused on travel time

# Approach To Developing Metrics

**Regional connectivity** needs to define two components of access: for whom and to what?
**Serving demand** means making transit a viable option for any trip we choose to serve

**Through the last three years of engaging with stakeholders, we have identified the following factors of making transit a viable option:**

- Trip time
- Frequency
- Cost
- Span of service
- Reliability
- Comfort
- Simplicity of Network
- Transfers
- First/Last Mile Connections; Coverage
- Communications

**Connectivity for whom and to what:**
**Existing riders**
- Riders that previously used the system but no longer do today
- Environmental Justice communities
- People with mobility issues

**Potential riders**
- People who do not use the system but could given proximity to MBTA
- People whose tripmaking patterns are not served by MBTA

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