



## ***TECHNICAL MEMORANDUM***

**DATE:** April 23, 2026  
**TO:** David Perry, Massachusetts Bay Transportation Authority  
**FROM:** Sophie Fox and Rosemary McCarron, Boston Region Metropolitan Planning Organization Staff  
**RE:** 2025 Ferry Service Equity Analysis

When introducing a new service, the Massachusetts Bay Transportation Authority (MBTA) evaluates the equity impacts of the proposed service changes. At the request of the MBTA, the Central Transportation Planning Staff (CTPS), which serves as staff to the Boston Region Metropolitan Planning Organization (MPO), examined the equity impacts of introducing new ferry routes that will operate seasonally:

- F3: East Boston
- F5: Lynn
- F6: Winthrop/Quincy<sup>1</sup>

As a recipient of federal funds, the MBTA is subject to Title VI of the Civil Rights Act of 1964, which protects people from discrimination based on race, color, and national origin. The MBTA's Service and Fare Change Equity Policy documents how the agency evaluates the impacts of proposed fare and major service changes on low-income populations and populations protected on the basis of race or ethnicity relative to other groups in compliance with the Federal Transit Administration's (FTA) Title VI Circular 4702.1B.

This document fulfills the MBTA's responsibility to conduct a service equity analysis, as required by Title VI. The objective of this analysis was to determine if the addition of new ferry service would result in disparate impacts for populations protected on the basis of race or ethnicity or disproportionate burdens for low-income populations. CTPS compared the impacts of the service change on

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<sup>1</sup> For the period subject to analysis, ferry service to Winthrop and Quincy was provided together in a single route, Route F6. Recent service changes made possible by the MBTA's acquisition of two additional ferry boats have allowed the separation of Winthrop-Boston and Quincy-Boston service, with additional daily trips on each route. Quincy-Boston service is now provided as Route F7.

**Civil Rights, nondiscrimination, and accessibility information is on the last page.**

revenue-vehicle hours (RVH) and service coverage on populations classified as protected on the basis of race or ethnicity and classified as low-income. CTPS applied the MBTA's disparate-impact and disproportionate-burden policies. Based on this analysis, the introduction of these new ferry routes provides a marginally greater benefit to non-protected populations than protected populations as measured by RVH. There was no disproportionate burden identified for low-income populations.

## 1 REQUIREMENTS

Title VI of the Civil Rights Act of 1964 prohibits discrimination, either intentionally or unintentionally, by recipients of federal financial assistance based on race, color, or national origin. To comply with Title 49 of the Code of Federal Regulations (CFR) Section 21.5(b) (2), 49 CFR Section 21.5(b) (7), and Appendix C to 49 CFR Part 21, the MBTA must evaluate any and all service changes that exceed the transit provider's major service change threshold to determine if the proposed changes would have a discriminatory effect. The FTA provides guidance for conducting service equity analyses in FTA Circular 4702.1B, Section IV.7.a. The MBTA must analyze available information to understand whether populations protected on the basis of race or ethnicity and/or low-income populations would be disproportionately affected by the service change. In addition, the MBTA must describe the datasets and collection methods used in its analysis.

Under Title VI and other directives, the FTA requires that transit agencies develop a policy to assess whether a major service change would have a disparate impact on populations protected on the basis of race or ethnicity or disproportionate burden on low-income populations. The FTA Title VI guidelines define disparate impact as "a facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the recipient's policy or practice lacks a substantial legitimate justification and where there exists one or more alternatives that would serve the same legitimate objectives, but with less disproportionate effects on the basis, of race, color, or national origin."<sup>2</sup> The guidelines define disproportionate burden as "a neutral policy or practice that disproportionately affects low-income populations more than non-low-income populations."

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<sup>2</sup> Federal Transit Administration, "Title VI Requirements and Guidelines for Federal Transit Administration Recipients." FTA Circular 4702.1B (2012).  
[https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA\\_Title\\_VI\\_FINAL.pdf](https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf)

## 2 MBTA SERVICE AND FARE CHANGE EQUITY POLICY

### 2.1 Policy Thresholds

For service equity analyses, the MBTA evaluates whether a major service change has occurred, and then analyzes any material change in RVH and/or applicable geographic coverage. The MBTA Service and Fare Change Equity Policy explains the methodology to be used for service equity analyses.<sup>3</sup>

According to the policy, “The MBTA defines a Major Service Change as any addition, reduction, suspension or change in service lasting longer than 12 months consecutive and meeting one or more of the following criteria:

- A change of at least 10% in Revenue Vehicle Hours (RVH) per week by mode;
- A change of at least 25% in RVH per week by route; or
- A change of at least 0.30% of the population covered by the entire network according to the base coverage standard established in the MBTA’s Service Delivery Policy.”

For a major service change, a disparate impact would be found if:

Percent change in weekly RVH or base coverage for the population protected on  
the basis of race or ethnicity <  
80% × Percent change in weekly RVH or base coverage for the non-protected  
population

A disproportionate burden would be found if:

Percent change in weekly RVH or base coverage for the low-income population <  
80% × Percent change in weekly RVH or base coverage for the non-low-income  
population

The Service and Fare Change Equity Policy also describes the steps the MBTA will take when disparate impacts or disproportionate burdens are identified.

## 3 ANALYSIS

This analysis follows the guidelines outlined in the MBTA Service and Fare Change Equity Policy to determine whether the new ferry services introduce

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<sup>3</sup> Massachusetts Bay Transportation Authority, “MBTA Service and Fare Change Equity Policy” (2023). <https://cdn.mbta.com/sites/default/files/2023-10/2023-10-Service-Fare-Change-Equity-Policy-English-Accessible.pdf>.

adverse effects that will have a disparate impact or disproportionate burden on protected populations.

### 3.1 Data

In this analysis, we primarily used the General Transit Feed Specification (GTFS) pre-rating recap files published by the MBTA for summer 2024, which include a weekday schedule for June 25, a Saturday schedule for June 29, and a Sunday schedule for June 30.<sup>4</sup> From the GTFS data, we identified the two scenarios to compare for the service equity analysis.

#### ***Baseline Scenario***

For the baseline scenario, we curated a list of MBTA trips and stop times for a typical weekday, Saturday, and Sunday. These data were filtered to remove any trips that are part of any of the three introduced ferry routes.

#### ***Build Scenario—New Ferry Service***

For the build scenario, the list of MBTA trips and stop times is unedited from the initial GTFS files.

#### ***Additional Data***

Demographics were calculated at the census tract level with US Census Data.<sup>5</sup> Low-income populations were defined in the service equity policy as those in which the median household income is less than 80 percent of the median household income for the MBTA service area (approximately \$82,000).

Table 1 below shows the increase in the population that has access to the service as a result of the three new ferry routes.

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<sup>4</sup> MBTA Office of Performance Management and Innovation (OPMI), “GTFS Pre-Rating Recaps.” <https://mbta-massdot.opendata.arcgis.com/datasets/9ab1dc7ea2bf4ad7b7e25cc6b941b39a/about>

<sup>5</sup> US Census Bureau, “2020 United States Decennial Census” (2021); US Census Bureau, “2019–2023 American Community Survey (ACS) 5-Year Estimates” (2024).

**Table 1**  
**Change in Access: Baseline vs. Build Scenario**

<b>Population Group</b>	<b>Population with access after introduction of new ferries (thousands)</b>
Protected	1.2
Non-Protected	4.4
Low-Income	0.8
Non-Low-Income	1.6

Low-income households are those with an annual income of less than \$82,000.  
Sources: MBTA schedule files as processed by CTPS and 2020 US Census and 2019-23 American Community Survey.

### 3.2 Major Service Change

#### *Major Service Change Methods*

The following steps detail the methodology for determining whether introduction of the new ferry services meets the definition of a major service change:

1. Calculate the study area for base coverage by generating a half-mile walkshed around each stop in the 2024 GTFS schedule using the Open Street Map (OSM) walking network.
2. Calculate the study area for RVH by creating circular buffers of various radii around each stop. The buffer radius for a stop is determined by the type of stop/station, its location in the region, and other characteristics provided by the MBTA. Table 2 details the buffer radius for each stop or station in the MBTA system.

**Table 2**  
**Buffer Radii for each MBTA Stop/Station**

Buffer Radius (miles)	Type of Stop
0.25	Logan Airport and Georges Island ferry stops
0.5	Local bus, downtown express bus, rapid transit (including Silver Line), most of the ferry stops surrounding Boston, and commuter rail stations in Zone 1A
1.5	Winthrop and Quincy ferry stops
3	Non-terminal commuter rail stops outside of Zone 1A.
5	Terminal commuter rail stops outside of Zone 1A and the Lynn, Hingham, and Hull ferry stops

Note: Capeflyer stations are not included in this analysis.

3. For the baseline and build scenarios, extract the route, trip, and stop information from the GTFS file for the study areas for each metric.
  - a. According to the policy, to identify a major service change, the coverage metric only considers stops served by the MBTA and excludes stops in municipalities served by regional transit authorities (RTAs). For this analysis, we only included MBTA stops that are within one of 63 municipalities that we deemed as not covered by an RTA.
  - b. The RVH metric considers all MBTA stops in the GTFS schedule.
4. Calculate the change in RVH by mode and by route. Calculate the change in coverage for the total population in the study area. Base coverage is defined as the percent of the total population in the non-RTA municipalities that live within 0.5 miles of an MBTA stop or station.

### Major Service Change Determination

The results of the major service change determination are shown in Table 3.

**Table 3**  
**Major Service Change Determination**

<b>Metric</b>	<b>Threshold</b>	<b>Result</b>	<b>Change</b>
Mode-level RVH	10%	Ferry service increased by 37.3%	Major service change
Route-level RVH	25%	Three new routes	Major service change
Coverage	0.3%	Overall coverage increased by 0.04%	No major service change

RVH = revenue-vehicle hours.

Sources: MBTA schedule files as processed by CTPS and 2020 US Census and 2019-23 American Community Survey.

Since at least one of the criteria was met, the new ferry service is classified as a major service change.

### 3.3 Disparate Impact/Disproportionate Burden Evaluation

Because the new ferry service met the definition of a major service change based on the change in RVH, equity ratios for the change in RVH were calculated.

#### RVH Methods

The following steps detail the methodology for calculating disparate impact and disproportionate burden ratios for RVH:

1. For each tract in the RVH study area, find the protected and low income populations and percentages.
  - a. “Percent protected” is defined as the percent of individuals in a census tract who report as not being “White alone, not Hispanic or Latino.”
  - b. “Percent low-income” is defined as the percent of occupied households that report an annual household income below \$82,000.

2. Assign portions of RVH to different population groups based on the percentage of each route’s buffer that is made up of each population.
3. Determine the percent change values for protected and non-protected populations. Calculate the disparate impact and disproportionate burden ratios from these values.

**Change in Weekly Revenue-Vehicle Hours**

The results of the RVH metric calculation are shown in Table 4.

**Table 4  
Net Change in Weekly Revenue-Vehicle Hours by Population Group**

Population Group	Existing RVH (thousands)	Net Change in RVH (thousands)	Percent Change
Protected	24.1	0.052	0.21%
Non-protected	25.3	0.083	0.33%
Low-Income	21.2	0.053	0.25%
Non-Low-Income	28.2	0.082	0.29%

Low-income households are those with an annual income of less than \$82,000.

RVH = revenue-vehicle hours.

Sources: MBTA schedule files as processed by CTPS and 2020 US Census and 2019-23 American Community Survey.

For protected versus non-protected populations:

$$\frac{\% \text{ change for protected population}}{\% \text{ change for non-protected population}} = \frac{0.21\%}{0.33\%} = 0.65 < 0.8$$

A ratio of 0.65 indicates that the service change introduces a disparate impact on populations protected on the basis of race or ethnicity.

For low-income versus non-low-income populations:

$$\frac{\% \text{ change for low-income population}}{\% \text{ change for non-low income population}} = \frac{0.25\%}{0.29\%} = 0.85 > 0.8$$

A ratio of 0.85 indicates that the service change does not introduce a disproportionate burden on low-income populations.

## 4 DISCUSSION

The introduction of the East Boston, Lynn, and Winthrop/Quincy ferry lines results in very small changes to RVH and coverage. Based on the analysis laid out in the MBTA Service and Fare Change Equity Policy, the introduction of these new ferry routes results in a disparate impact in increased revenue-vehicle hours that disproportionately benefits populations not protected on the basis of race or ethnicity. The introduction of the new ferry routes does not disproportionately impact low-income populations.

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