MBTA
Title VI Program

DISPARATE IMPACT AND DISPROPORTIONATE BURDEN ANALYSIS

TITLE: Better Bus Project

TYPE: Service

DATE COMPLETED: May 1st, 2019

DATE ACCEPTED BY FMCB:

TECHNICAL MEMORANDUM

DATE: May 1, 2019
TO: Steve Poftak, General Manager
CC: John Lozada, Manager of Federal Programs, Office of Diversity and Civil Rights and Marie Breen, General Counsel
FROM: Kat Benesh, Chief of Operations Strategy, Policy, & Oversight
RE: Better Bus Project Title VI Service Equity Analysis

This memorandum details the results of a Title VI service equity analysis performed on the entire package of the Massachusetts Bay Transportation Authority's (MBTA) Better Bus Project service change proposals. The Central Transportation Planning Staff (CTPS) conducted the analysis for the Massachusetts Bay Transportation Authority's (MBTA) Better Bus Project, and applied the MBTA's Disparate Impact and Disproportionate Burden Policy to the results.

The results of the service equity analysis indicate that implementation of the Better Bus Project proposals will not result in disparate impacts to minority populations, disparate benefits to nonminority populations, disproportionate burdens to low-income populations, or disproportionate benefits to non-low-income populations.

This memorandum reviews the details of the service change, the requirements of a service analysis, and the results of the analysis, which the MBTA has reviewed and accepted.

1 INTRODUCTION

In the spring of 2018, the MBTA launched its Better Bus Project to improve bus service by developing a package of suggested near-term changes to the agency's bus network. During the Better Bus Project, planners evaluated the existing bus services, developed profiles of the existing bus routes, and created a market analysis. The MBTA held public meetings in Boston, Cambridge, Quincy, Lynn, Somerville, and Chelsea to get insight from the riders about existing conditions. The MBTA also invited riders and other interested parties to provide comments via a feedback form on the project's website.[1]

[1] blog.mass.gov/transportation/mbta/mbta-launches-the-better-bus-project-schedules-regional-public-meetings/

Following the analysis and public process, the MBTA developed an initial set of near-term proposals for 63 of the MBTA's approximately 170 bus routes. The MBTA held public meetings about the initial proposals in Boston, Cambridge, Quincy, Lynn, Chelsea, and Watertown.[2] After reviewing public comments about the initial proposals, the MBTA developed an updated set of service change proposals, which affect 45 routes.

Further, as part of the Better Bus Project, the MBTA is planning to hire 45 new full-time bus operators beginning in fall 2019. The MBTA plans to use these operators to improve the off-peak service on the routes (or corridors) with the highest weekly ridership and to improve bus reliability.

This document serves as the requisite service equity analysis for the final set of proposals from the Better Bus Project.

1.1 The Better Bus Project Proposals

Each Better Bus Project proposal was intended to improve service in one or more specific ways, including by improving connectivity, redistributing resources, reducing travel time, simplifying service, and improving off-peak service. The proposals would benefit the following bus routes:

Improve Connectivity:
Routes 34, 60, 65, 70/70A, 72, 75, 95, 120, 225/226, and 350

Redistribute Resources:
Routes CT1 into 1, 5 into 16, 34E into 34, 448/449 into 441/442, and 459 into 455

Reduce Travel Time:
Routes 4, 9, 35, 74, 90, 111, 120, 220, 222, 411, 424, 501, 502, 504, and SL2 (742)

Simplify Service:
Routes 36, 37, 44, 52, 59, 70/70A, 89, 92, 201, 202, 220, and 435

Improve Off-Peak Service:
Routes 1, 7, 9, 15, 16, 21, 22, 23, 28, 31, 32, 34/34E, 35/36/37, 39, 44, 47, 57/57A, 66, 70/70A, 71, 73, 77, 86, 87, 88, 89, 93, 101, 104, 109, 110, 111, 116/117, 220/221/222, 441/442, SL1 (741), SL2 (742), SL3 (743), SL4 (751), and SL5 (749)

[2] mbta.com/projects/better-bus-project/update/mbta-community-meetings

Appendix A contains a summary of the initially proposed changes for each route, with notes about items that were changed in the final proposal. Appendix B contains maps provided by the MBTA showing the detailed changes and impacts of the initial proposals with notes about modifications in the final proposals. Detailed changes about the off-peak service improvements are shown in Table 13.

1.2 The MBTA's Disparate Impact/Disproportionate Burden Policy

The Federal Transit Administration's (FTA) Title VI Circular 4702.1B, issued in October 2012, under the authority of Title VI of the Civil Rights Act of 1964 (Title VI), directs transit providers to study proposed major service changes and all fare changes for possible disparities in impacts on minority and low-income riders or communities.

This requirement is part of the MBTA's Title VI assurance that no person shall, on the basis of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving Federal financial assistance.

The MBTA's Disparate Impact/Disproportionate Burden (DI/DB) Policy describes the general procedure for conducting service and fare equity analyses. Appendix C contains the full text of the current January 30, 2017, version of the MBTA's DI/DB Policy.[3] This service equity analysis was performed using the information contained in the DI/DB Policy.

1.3 The Need to Conduct a Service Equity Analysis

The MBTA must conduct a service equity analysis when it is proposing a major service change. The MBTA defines a "major service change" in its DI/DB Policy as a service change that meets one or more of the following conditions:

- A change in revenue vehicle hours (RVH) per week of at least 10 percent by mode
- For routes with at least 80 RVH per week, a change in RVH per week of at least 25 percent
- For all routes, a change in route length of at least 25 percent or three miles

Major service changes also include elimination of existing routes or the addition of new routes. If there is a major service change on any route in a package of

[3] mbta.com/policies/fairness

changes, the equity analysis must consider all concurrently proposed changes in the aggregate.

The MBTA's Better Bus Project proposals are considered a major service change.

2 EVALUATION OF ADVERSE IMPACTS

The MBTA defines adverse effects as changes to

- the amount of service scheduled, by route and by mode, as measured by changes to weekly RVH; and
- access to the service, by route, as measured by changes to route length.

In accordance with the DI/DB Policy, the MBTA analyzes the changes to RVH and route length as relative and absolute changes. The relative change and another measure, which compares the protected population group's share of the net benefit or burden relative to its existing share of the metric, account for the existing share of RVH and route miles. However, the absolute change does not take into account the existing allocation of service between protected and nonprotected population groups.

As a result, when a protected population group makes up a small share of a population, broad-reaching positive changes would be shown, on an absolute basis, to benefit the protected population less than the nonprotected group. For example, if a protected population group represented 40 percent of riders and a transit agency distributed 200 RVH based on the existing share of riders, the protected population group would receive 40 percent of the hours, or 80 RVH. The nonprotected population group would receive 120 hours. While each group received a proportional amount of service, the protected population group received only 67% (80/120) of the absolute benefit given to the nonprotected population group.

Similarly, were service levels to decrease, protected population groups that make up a small share of the population would be, on an absolute basis, burdened less than the nonprotected population group. If the agency from the previous example removed 20 miles of route length proportionately from each group, the protected population group would lose 8 miles of service while the nonprotected population group would lose 12 miles of service. While each group lost a proportional amount of service, the protected population group lost only 67 percent (8/12) of the absolute miles lost by the nonprotected population group.

In each of these examples, the transit agency must determine if the adverse impact to the protected population group indicates a potential risk of wrongful bias or if the disproportionality is a function of how absolute changes are measured. If the agency determines that real bias would result from the proposal, the agency must consider how to mitigate the identified adverse impact, and would engage with executive leadership and the public toward alternatives that would reduce the risk of bias to the extent practicable, consistent with FTA guidance.

2.1 Analysis Framework

Demographic Datasets

FTA guidance allows agencies to conduct a service equity analysis using either census data or survey data, depending on the specific changes an agency is proposing. If an agency is making both headway (or in this case, RVH) changes and alignment changes, the latter of which require use of census data, the agency is not required to use different data sources to evaluate each type of change. In either case, FTA requires the agency to document the reason the data source was chosen.[4]

Central Transportation Planning Staff (CTPS) used the US Census Bureau's American Community Survey (ACS) dataset instead of the 2015-17 MBTA Systemwide Passenger Survey because the MBTA is proposing both changes in RVH and the alignment of bus routes. Riders who participated in the survey on the MBTA's existing network may not represent the riders of the proposed network. Further, survey sample sizes associated with sections of routes that are likely candidates for elimination are generally small—these sections tend to be the less utilized parts of routes, and thus more likely to be cut.

The 2010-14 ACS's five-year estimates provided demographic information about the people living near bus routes. The 2010 US Census Summary File 1 (Table P001001: total population) provided the total population for each census tract. The 2010 US Census Summary File 1 (Table H003002: total occupied housing units) provided the total number of households for each census tract. CTPS opted to use the demographics of census tracts rather than block groups or other smaller geometries because the census tract estimates are more precise.

Appendix D contains maps showing the existing route alignments, proposed alignments, and demographic data for each route with proposed changes. Appendix E shows the same for routes that will benefit from additional RVHs from the new operators.

Definitions of Minority and Low-Income Populations

CTPS used the 2010 Census Summary File 1 Table P005003 (Hispanic or Latino origin by race: not Hispanic or Latino, white alone) and Table B01001001 (total population) to assign minority status to people living in census tracts. Residents who were classified as "white alone, not Hispanic or Latino" were classified as nonminority residents; all others were classified as minority residents.

[4] FTA C 4702.1B Chapter 4.7.a.1.f: Assessing Service Impacts.

CTPS used the 2010-14 ACS Tables B19001002-B19001017 (household income in the past 12 months) and the associated Table B19001001 (total households) to assign low-income status to households in census tracts. Households were classified as low-income if they earned less than 60 percent of the median household income for the MBTA service area (a threshold of $44,152).[5]

Using ACS Data to Assign Demographics to Routes

CTPS used the following methodology to estimate the demographics attributable to a given route alignment:

Determine the geographic area.

1) Create a 400-meter buffer (approximately a quarter mile) around all of the variations of a route traveling in the same direction (for example, inbound).
2) Dissolve the buffer such that overlapping segments are not double-counted.

Calculate proportions of each census tract in the buffer.

3) For each census tract that is included in the buffer, calculate the length of roads within the buffer.
4) For each census tract that is included in the buffer, calculate the total length of roads in the census tract.
5) Calculate the percentage of total road length within the buffer in each census tract.

Calculate demographics within the buffer.

6) For each census tract, multiply the percentage of road length within the buffer by the number of people (or households) in each population group (minority, nonminority, low-income, and non-low-income).
7) Sum the number of people (or households) in each population group within the buffer for all census tracts near the route.
8) Repeat for the other direction of the route.
9) Sum the number of people (or households) in each population group for both directions.
10) Calculate the percentage of people (or households) in each population group for the route.

[5] Households in the census category "$40,000 to $44,999" were separated into each population group by multiplying the number of households in that category by 0.83, a value derived by the following equation: ($44,152 – 40,000) / (44,999 – 40,000) = 83%. The equation distributes the households in the category based on how far the threshold extends into the category. The equation assumes household incomes are distributed equally within the category.

When calculating the length of roads in a census tract or buffer, only roads in the walkable network were counted; highways, on-ramps, and other limited-access roads were excluded. The total number of residents in each population group in a census tract was obtained by multiplying the total population in each tract from the 2010 US Census by the percentage of the households in each population group as derived from the 2010-14 ACS. The total number of people in each minority status-based population group in a census tract was obtained from the 2010 US Census.

The Comparison Population

In this analysis, the comparator is the amount of each metric, RVH, and route miles of service, attributed to each population.

2.2 Change in Weekly Revenue Vehicle Hours

The MBTA must evaluate the implications of its proposed changes on RVH. CTPS distributed the number of RVH by the proportion of the residents in each population group that are attributable to a route. For example, if a route operated with 10 RVH and 30 percent of the route was classified as low-income, three RVH were attributed to the low-income population group.

In some cases, the MBTA is proposing to shift resources from one route to another route (for example, eliminating Route CT1 and adding the resources to Route 1). In these cases, the MBTA provided information about the change in RVH for each route affected by the change. The MBTA provided the daily number of service hours per route. CTPS multiplied weekday RVH by five and added Saturday and Sunday RVH to calculate the weekly number of RVH. The impacts of these changes in aggregate are shown in Table 1.

In other cases, the MBTA is proposing to make changes to the alignments of routes that will result in different populations having access to RVH of service. CTPS used shapefiles provided by the MBTA to estimate the demographics of people living near the existing and proposed alignments using the methodology described in the previous section. These demographics were used to distribute a route's RVH between population groups. The impacts of these changes are shown in Table 2.

The MBTA is also proposing to use 30 of 45 planned new full-time equivalent bus operators to improve off-peak service.[6] The MBTA provided an estimate of the

[6] An additional 15 full-time equivalent bus operators will be used to decrease the number of dropped trips and improve reliability. While these operators will increase reliability, they will not increase scheduled RVH.

distribution of these hours for weekdays, Saturdays, and Sundays. The impacts of these changes are shown in Table 3.

Table 4 presents the combined impacts of all three types of RVH changes. The DI/DB analysis for change in RVH is based on the numbers in this table.

Tables 9, 10, 11, 12, and 13 present detailed RVH changes by route.

Table 1
Gain, Loss, and Net Change in Weekly Revenue Vehicle Hours for Each Population Group based on Shifting Resources

Population Group	Gain of Hours	Loss of Hours	Net Change	Percent Change
Minority	338.2	-312.7	25.5	0.12%
Nonminority	535.6	-521.1	14.5	0.06%
Low-Income	349.4	-325.4	24.0	0.13%
Non-Low-Income	524.4	-508.4	16.0	0.06%

Sources: MBTA route alignments and shapefiles. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 2
Gain, Loss, and Net Change in Weekly Revenue Vehicle Hours for Each Population Group based on Alignment Changes

Population Group	Gain of Hours	Loss of Hours	Net Change	Percent Change
Minority	70.1	-20.6	49.5	0.2%
Nonminority	20.6	-70.1	-49.5	-0.2%
Low-Income	31.8	-10.4	21.5	0.1%
Non-Low-Income	10.4	-31.8	-21.5	-0.1%

Sources: MBTA route alignments and shapefiles. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 3
Gain in Weekly Revenue Vehicle Hours for Each Population Group based on New Operators

Population Group	Gain of Hours	Percent Change
Minority	590.3	2.8%
Nonminority	584.7	2.3%
Low-Income	503.8	2.6%
Non-Low-Income	671.2	2.4%

Sources: MBTA proposed operator distribution plan. MBTA route alignments and shapefiles. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 4
Gain, Loss, and Net Change in Weekly Revenue Vehicle Hours for Each Population Group based on All Types of Change

Population Group	Existing Hours	Share of Existing	Gain of Hours	Loss of Hours	Net Change	Share of Net Change	Percent Change
Minority	21,238.4	45%	998.6	-333.3	665.3	55%	3.1%
Nonminority	25,592.0	55%	1,140.9	-591.2	549.7	45%	2.1%
Low-Income	19,102.2	41%	884.9	-335.7	549.2	45%	2.9%
Non-Low-Income	27,728.2	59%	1,206.0	-540.3	665.8	55%	2.4%

Sources: MBTA daily revenue vehicle hour spreadsheets as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Weekly Revenue Vehicle Hours: Disparate Impact/Disproportionate Burden Analysis

Table 5 summarizes the results of the service equity analysis relating to RVH changes. As shown in Table 5, the results do not indicate a disparate benefit to nonminority populations or a disproportionate benefit to non-low-income populations.

Table 5
Summary of DI/DB Results Relating to Revenue Vehicle Hour Changes

Analysis Method	Impacts on Minority Populations	Impacts on Low-Income Populations
Absolute Change (Protected / Nonprotected)	**No Disparate Benefit** Ratio: 665 / 550 > 80%	**No Disproportionate Benefit** Ratio: 549 / 666 > 80%
Relative Change (Protected / Nonprotected)	**No Disparate Benefit** Ratio: 3.1% / 2.1% > 80%	**No Disproportionate Benefit** Ratio: 2.9% / 2.4% > 80%
Protected Share of Change / Protected Share of Existing	**No Disparate Benefit** Ratio: 55% / 45% > 80%	**No Disproportionate Benefit** Ratio: 45% / 41% > 80%

Source: CTPS.

Supplemental Analysis: Impacts of New Operators using Survey Data

CTPS chose to use census data in the prior analysis because some of the Better Bus Project proposals include route alignment changes and survey data only exists for the current route alignments. The recent MBTA Systemwide Passenger Survey may no longer represent riders of the altered (or new) routes. Further, the alignment changes also affect the access to RVH (as shown in Table 2). An analysis of the change in access to RVH based on survey data would likely be unreliable given the low sample sizes at the sub-route level, especially on the less utilized sections of the system.

However, when adding additional operators (and the corresponding additional RVH) to high-ridership routes, most of which are not undergoing significant alignment changes, survey data may be a more appropriate data source. Although the service equity analysis must be completed in aggregate using one demographic data source, CTPS performed a supplemental analysis on the RVH impacts of the new operators using survey data. This analysis acts as a valuable check on the previous analysis performed using census data. Table 6 presents a modified version of Table 3 based on survey data instead of census data.[7] Table 14 presents a detailed summary.

[7] CTPS used data from the MBTA's 2015-17 Systemwide Passenger Survey. Respondents were classified as having minority status if they self-identified as a race other than white and/or were Hispanic or Latino/a/x. Respondents who indicated their household income was less than $43,500 were classified as low income. More information about the survey may be found at https://www.ctps.org/apps/mbtasurvey2018/#.

Table 6
Gain in Weekly Revenue Vehicle Hours for Each Population Group based on New Operators Using Survey Data

Population Group	Gain of Hours	Share of Change
Minority	563.2	49%
Nonminority	587.2	51%
Low-Income	500.5	44%
Non-Low-Income	649.9	56%

Note: The "share of existing" values published here will not match the "share of population" values published in the MBTA Systemwide Passenger Survey. The "share of existing" values are weighted based on revenue vehicle hours instead of ridership. The additional hours (24.6) for Route SL3 were not assigned to population groups because the route did not exist at the time of the survey. The route operates between Chelsea and South Station.

Sources: MBTA revenue vehicle hours spreadsheets as processed by CTPS. 2015-17 MBTA Systemwide Passenger Survey.

Comparing Table 6 to Table 3, we can determine that the two methods produce similar results. Using survey data, the minority population group and the low-income population group receive 49 percent and 44 percent of the total additional RVH, respectively. Using census data, these values are 50 percent and 43 percent. The absolute changes are also similar.

2.3 Change in Route Length

The MBTA must evaluate the implications of its proposed changes on route length. CTPS used shapefiles provided by the MBTA to evaluate the length of the routes operating each day.

When using census data to estimate the equity impacts of the changes, CTPS calculated the change in route length accounting for the change in the demographics of nearby residents. If multiple variations of a bus route travel over a given roadway segment in a given direction, the segment was only counted once. A roadway segment was counted two times if the route traveled over the same segment in multiple directions. To estimate the miles attributable to a population group, CTPS multiplied the route length by the proportion of nearby residents in a population group. For example, if a route was 10 miles long, and 30 percent of the route was classified as low-income, three route miles were attributed to the low-income population group.

Table 7 shows the total change in weekly route length for each population group. Tables 15, 16, and 17 present detailed route mile changes by route for weekday, Saturday, and Sunday service, respectively.

Table 7
Gain, Loss, and Net Change in Route Length for Each Population Group

Population Group	Existing Miles	Share of Existing	Gain of Miles	Loss of Miles	Net Loss	Share of Net Loss	Percent Loss
Minority	6,812.3	40%	21.1	-448.9	-427.9	39%	-6.3%
Nonminority	10,136.6	60%	95.1	-763.7	-668.6	61%	-6.6%
Low-Income	6,535.4	39%	34.9	-460.9	-426.0	39%	-6.5%
Non-Low-Income	10,413.5	61%	81.1	-751.6	-670.5	61%	-6.4%

Note: The values here weight weekday route lengths by "5" and Saturday and Sunday route lengths by "1."

Source: MBTA spreadsheets as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Route Length: Disparate Impact/Disproportionate Burden Analysis

Table 8 summarizes the results of the service equity analysis relating to route length changes. The changes in route length do not result in a disparate impact or disproportionate burden.

Table 8
Summary of DI/DB Results Relating to Route Length Changes

Analysis Method	Impacts on Minority Populations	Impacts on Low-Income Populations
Absolute Change (Protected / Nonprotected)	**No Disparate Impact** Ratio: -428 / -669 < 120%	**No Disproportionate Burden** Ratio: -426 / -671 < 120%
Relative Change (Protected / Nonprotected)	**No Disparate Impact** Ratio: -6.3% / -6.6% < 120%	**No Disproportionate Burden** Ratio: -6.5% / -6.4% < 120%
Protected Share of Change / Protected Share of Existing	**No Disparate Impact** Ratio: 39% / 40% < 120%	**No Disproportionate Burden** Ratio: 39% / 39% < 120%

Source: CTPS.

Enclosures:

Appendix A: Better Bus Service Proposals, Executive Summary of Proposed Route Changes (Note: Routes with changes from the original proposal are noted in red.)

Appendix B: Better Bus Service Proposals, Detailed Proposed Route Changes (Note: Routes with changes from the original proposal are identified in red, and the changes are described at the bottom of the page.)

Appendix C: Disparate Impact/Disproportionate Burden (DI/DB) Policy, January 30, 2017

Table 9
Shifting of Service Hours by Route Pairs

Route	DOW	Weekly Hours	Minority Pct.	Low-Inc. Pct.	Minority Hours	Nonmin. Hours	Low-Inc. Hours	Non-Low-Inc. Hours
1	WD	163.4	45%	45%	72.9	90.5	74.3	89.1
CT1	WD	-163.4	43%	46%	-70.5	-92.9	-75.0	-88.4
16	WD	28.3	74%	55%	20.9	7.3	15.5	12.8
16	SA	5.7	74%	55%	4.2	1.5	3.1	2.6
5	WD	-28.3	23%	34%	-6.4	-21.9	-9.7	-18.5
5	SA	-5.7	23%	34%	-1.3	-4.4	-2.0	-3.8
226	WD	93.2	14%	31%	13.2	80.0	29.1	64.1
226	SA	2.5	14%	31%	0.3	2.1	0.8	1.7
225	WD	-93.2	24%	37%	-22.7	-70.5	-34.4	-58.7
225	SA	-2.5	24%	37%	-0.6	-1.9	-0.9	-1.5
442	WD	-34.8	39%	42%	-13.4	-21.3	-14.4	-20.3
448	WD	-3.8	42%	47%	-1.6	-2.2	-1.8	-2.0
441	WD	78.3	43%	47%	33.7	44.5	37.0	41.2
449	WD	-39.8	39%	41%	-15.6	-24.2	-16.4	-23.3
455	WD	200.8	48%	49%	95.9	105.0	98.4	102.4
459	WD	-200.8	48%	46%	-97.4	-103.5	-92.0	-108.8
70	WD	165.4	35%	33%	58.2	107.2	54.0	111.4
70	SA	23.1	35%	33%	8.2	15.0	7.6	15.6
70A	SU	11.6	32%	30%	3.7	7.9	3.5	8.1
70A	WD	-125.4	33%	31%	-41.9	-83.5	-38.3	-87.1
70A	SA	-23.1	33%	31%	-7.7	-15.4	-7.1	-16.1
70	SU	-11.6	35%	33%	-4.1	-7.5	-3.8	-7.8
75	WD	87.9	26%	26%	23.3	64.6	22.6	65.4
75	SA	13.7	26%	26%	3.6	10.0	3.5	10.2
72	WD	-87.9	29%	29%	-25.6	-62.3	-25.7	-62.2
72	SA	-13.7	29%	28%	-3.9	-9.7	-3.9	-9.8
Total					**25.5**	**14.5**	**24.0**	**16.0**

DOW = Day of the week. Nonmin. = Nonminority. Non-Low-Inc. = Non-Low-Income. Pct. = Percent.
WD = Weekday. SA = Saturday. SU = Sunday.

Source: MBTA revenue vehicle hour spreadsheets as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 10
Change of Weekly Revenue Vehicle Hours based on Alignment Changes (Weekday)

Route	Existing Hours	Proposed Hours	Change	Existing Pct. Min.	Existing Pct. Low-Inc.	Proposed Pct. Min.	Proposed Pct. Low-Inc.	Change in Hours Minority	Change in Hours Nonminority	Change in Hours Low-Income	Change in Hours Non-Low-Income
1	166.6	166.6	0.0	44%	45%	45%	45%	0.4	-0.4	0.3	-0.3
4	14.5	14.5	0.0	21%	30%	21%	30%	0.0	0.0	0.0	0.0
9	119.2	119.2	0.0	27%	31%	27%	31%	0.0	0.0	0.0	0.0
35	48.1	48.1	0.0	37%	31%	38%	31%	0.1	-0.1	0.0	0.0
36	56.9	56.9	0.0	36%	29%	36%	29%	0.1	-0.1	0.0	0.0
37	32.4	32.4	0.0	35%	28%	35%	28%	0.0	0.0	0.0	0.0
44	61.4	61.4	0.0	80%	66%	80%	66%	0.0	0.0	0.0	0.0
52	26.2	26.2	0.0	21%	22%	20%	22%	-0.2	0.2	0.1	-0.1
59	35.3	35.3	0.0	20%	20%	20%	20%	0.0	0.0	0.0	0.0
60	43.2	43.2	0.0	34%	41%	34%	42%	0.1	-0.1	0.2	-0.2
64	46.1	46.1	0.0	41%	39%	42%	40%	0.3	-0.3	0.8	-0.8
70	111.8	111.8	0.0	35%	33%	35%	33%	0.0	0.0	0.0	0.0
72	26.8	26.8	0.0	29%	29%	29%	29%	0.0	0.0	0.0	0.0
74	23.4	23.4	0.0	29%	25%	29%	26%	0.1	-0.1	0.1	-0.1
75	14.4	14.4	0.0	28%	26%	26%	26%	-0.2	0.2	0.0	0.0
90	27.4	27.4	0.0	31%	30%	31%	30%	-0.2	0.2	0.0	0.0
92	35.5	35.5	0.0	23%	32%	20%	31%	-1.0	1.0	-0.3	0.3
95	36.7	36.7	0.0	31%	34%	30%	33%	-0.5	0.5	-0.4	0.4
106	50.2	50.2	0.0	40%	36%	47%	40%	3.4	-3.4	1.6	-1.6
111	169.7	169.7	0.0	48%	40%	50%	40%	2.7	-2.7	-0.5	0.5
120	49.8	49.8	0.0	64%	45%	63%	45%	-0.3	0.3	-0.2	0.2
134	49.8	49.8	0.0	22%	29%	22%	29%	-0.1	0.1	-0.1	0.1
220	47.2	47.2	0.0	22%	39%	22%	39%	0.0	0.0	0.0	0.0
222	40.5	40.5	0.0	21%	39%	22%	40%	0.4	-0.4	0.2	-0.2
225	69.8	69.8	0.0	24%	37%	28%	38%	2.5	-2.5	1.1	-1.1
350	55.2	55.2	0.0	23%	27%	23%	27%	0.0	0.0	0.0	0.0
411	24.7	24.7	0.0	42%	42%	42%	42%	0.0	0.0	0.0	0.0
424	6.6	6.6	0.0	53%	43%	54%	46%	0.1	-0.1	0.2	-0.2

Route	Existing Hours	Proposed Hours	Change	Existing Pct. Min.	Existing Pct. Low-Inc.	Proposed Pct. Min.	Proposed Pct. Low-Inc.	Change in Hours Minority	Change in Hours Nonminority	Change in Hours Low-Income	Change in Hours Non-Low-Income
428	6.6	6.6	0.0	38%	37%	38%	37%	0.0	0.0	0.0	0.0
435	28.6	28.6	0.0	40%	46%	39%	46%	-0.4	0.4	0.3	-0.3
441	34.4	34.4	0.0	42%	47%	42%	47%	0.0	0.0	0.0	0.0
442	48.8	48.8	0.0	43%	47%	43%	47%	0.0	0.0	0.0	0.0
455	47.7	47.7	0.0	48%	49%	48%	49%	0.0	0.0	0.0	0.0
34/34E	143.5	143.5	0.0	33%	32%	36%	33%	2.9	-2.9	1.2	-1.2
70A	44.6	44.6	0.0	33%	31%	32%	30%	-0.6	0.6	-0.2	0.2
SL2 (742)	70.0	70.0	0.0	30%	30%	30%	30%	0.0	0.0	0.0	0.0
Daily Total								**9.7**	**-9.7**	**4.3**	**-4.3**
Weekly Total								**48.5**	**-48.5**	**21.5**	**-21.5**

Pct. = Percent. Min. = Minority. Low-Inc. = Low-Income.

Sources: MBTA revenue vehicle hour spreadsheets as processed by CTPS. MBTA shapefiles as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 11
Change of Weekly Revenue Vehicle Hours based on Alignment Changes
(Saturday)

Route	Existing Hours	Proposed Hours	Change	Existing Pct. Min.	Existing Pct. Low-Inc.	Proposed Pct. Min.	Proposed Pct. Low-Inc.	Change in Hours Minority	Change in Hours Nonminority	Change in Hours Low-Income	Change in Hours Non-Low-Income
1	152.0	152.0	0.0	44%	45%	45%	45%	0.4	-0.4	0.2	-0.2
9	58.3	58.3	0.0	27%	31%	27%	31%	0.0	0.0	0.0	0.0
35	27.9	27.9	0.0	37%	31%	38%	31%	0.0	0.0	0.0	0.0
36	32.6	32.6	0.0	36%	29%	36%	29%	0.1	-0.1	0.0	0.0
44	47.6	47.6	0.0	80%	66%	80%	66%	0.0	0.0	0.0	0.0
59	12.9	12.9	0.0	19%	20%	20%	20%	0.1	-0.1	0.0	0.0
60	34.0	34.0	0.0	34%	42%	34%	42%	0.0	0.0	0.1	-0.1
64	19.9	19.9	0.0	40%	40%	40%	40%	0.0	0.0	0.0	0.0
70	84.8	84.8	0.0	35%	33%	35%	33%	0.0	0.0	0.0	0.0
74	12.1	12.1	0.0	29%	25%	29%	26%	0.1	-0.1	0.0	0.0
75	11.4	11.4	0.0	28%	26%	26%	26%	-0.1	0.1	0.0	0.0
90	14.8	14.8	0.0	31%	30%	31%	30%	-0.1	0.1	0.0	0.0
92	23.9	23.9	0.0	23%	32%	20%	31%	-0.7	0.7	-0.2	0.2
95	26.7	26.7	0.0	32%	35%	31%	33%	-0.5	0.5	-0.3	0.3
120	30.7	30.7	0.0	64%	45%	63%	45%	-0.2	0.2	-0.1	0.1
201	14.6	14.6	0.0	53%	36%	57%	37%	0.6	-0.6	0.2	-0.2
202	10.2	10.2	0.0	53%	37%	60%	38%	0.7	-0.7	0.1	-0.1
220	31.2	31.2	0.0	22%	39%	22%	39%	0.2	-0.2	0.2	-0.2
225	29.5	29.5	0.0	24%	37%	28%	38%	1.1	-1.1	0.4	-0.4
350	31.6	31.6	0.0	23%	27%	23%	27%	0.0	0.0	0.0	0.0
34/34E	89.8	89.8	0.0	36%	33%	36%	33%	-0.2	0.2	-0.2	0.2
70A	36.8	36.8	0.0	33%	31%	32%	30%	-0.5	0.5	-0.2	0.2
SL2 (742)	37.1	37.1	0.0	30%	30%	30%	30%	0.0	0.0	0.0	0.0
Daily Total								**1.0**	**-1.0**	**0.2**	**-0.2**

Pct. = Percent. Min. = Minority. Low-Inc. = Low-Income.

Sources: MBTA revenue vehicle hour spreadsheets as processed by CTPS. MBTA shapefiles as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 12
Change of Weekly Revenue Vehicle Hours based on Alignment Changes (Sunday)

Route	Existing Hours	Proposed Hours	Change	Existing Pct. Min.	Existing Pct. Low-Inc.	Proposed Pct. Min.	Proposed Pct. Low-Inc.	Change in Hours Minority	Change in Hours Nonminority	Change in Hours Low-Income	Change in Hours Non-Low-Income
1	103.5	103.5	0.0	44%	45%	45%	45%	0.3	-0.3	0.2	-0.2
9	37.0	37.0	0.0	27%	31%	27%	31%	0.0	0.0	0.0	0.0
35	10.1	10.1	0.0	37%	31%	37%	31%	0.0	0.0	0.0	0.0
36	32.2	32.2	0.0	36%	29%	36%	29%	0.1	-0.1	0.0	0.0
44	19.3	19.3	0.0	80%	66%	80%	66%	0.0	0.0	0.0	0.0
59	11.3	11.3	0.0	19%	20%	20%	20%	0.0	0.0	0.0	0.0
60	16.1	16.1	0.0	34%	42%	34%	42%	0.0	0.0	0.0	0.0
64	10.7	10.7	0.0	40%	40%	40%	40%	0.0	0.0	0.0	0.0
70	79.1	79.1	0.0	35%	33%	35%	33%	0.0	0.0	0.0	0.0
89	15.3	15.3	0.0	33%	33%	31%	32%	-0.3	0.3	-0.2	0.2
90	7.7	7.7	0.0	31%	30%	31%	30%	0.0	0.0	0.0	0.0
95	11.2	11.2	0.0	32%	35%	31%	33%	-0.2	0.2	-0.1	0.1
120	19.3	19.3	0.0	64%	45%	63%	45%	-0.1	0.1	-0.1	0.1
201	7.2	7.2	0.0	56%	36%	57%	37%	0.1	-0.1	0.1	-0.1
202	4.0	4.0	0.0	55%	36%	60%	38%	0.2	-0.2	0.1	-0.1
350	19.6	19.6	0.0	23%	27%	23%	27%	0.0	0.0	0.0	0.0
34/34E	59.0	59.0	0.0	38%	34%	37%	34%	-0.2	0.2	-0.2	0.2
SL2 (742)	35.0	35.0	0.0	30%	30%	30%	30%	0.0	0.0	0.0	0.0
Daily Total								**0.0**	**0.0**	**-0.2**	**0.2**

Pct. = Percent. Min. = Minority. Low-Inc. = Low-Income.

Sources: MBTA revenue vehicle hour spreadsheets as processed by CTPS. MBTA shapefiles as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 13
Change of Daily Revenue Vehicle Hours from the Addition of 30 Full-Time Bus Operator Equivalents

Route	WD Increase (RVH)	SA Increase (RVH)	SU Increase (RVH)	WD: Pct. Min	WD: Pct. Low-Inc.	SA: Pct. Min	SA: Pct. Low-Inc.	SU: Pct. Min	SU: Pct. Low-Inc.	WD: Min. Increase	WD: Nonmin. Increase	WD: Low-Inc. Increase	WD: Non-Low-Inc. Increase	SA: Min. Increase	SA: Nonmin. Increase	SA: Low-Inc. Increase	SA: Non-Low-Inc. Increase	SU: Min. Increase	SU: Nonmin. Increase	SU: Low-Inc. Increase	SU: Non-Low-Inc. Increase
1	4.1	6.9	4.1	45%	45%	45%	45%	45%	45%	1.9	2.3	1.9	2.3	3.1	3.8	3.2	3.8	1.8	2.3	1.9	2.2
7	0.7	0.4	NA	17%	27%	17%	27%	NA	NA	0.1	0.6	0.2	0.5	0.1	0.4	0.1	0.3	NA	NA	NA	NA
9	1.9	2.0	2.2	27%	31%	27%	31%	27%	31%	0.5	1.4	0.6	1.3	0.5	1.5	0.6	1.4	0.6	1.6	0.7	1.5
15	11.6	16.4	9.2	82%	57%	81%	55%	81%	55%	9.5	2.1	6.6	5.0	13.2	3.2	9.1	7.3	7.4	1.8	5.1	4.1
16	1.9	0.5	3.0	74%	55%	78%	53%	78%	53%	1.4	0.5	1.1	0.9	0.4	0.1	0.2	0.2	2.4	0.7	1.6	1.4
21	3.5	2.3	0.3	82%	46%	82%	46%	82%	46%	2.9	0.6	1.6	1.9	1.9	0.4	1.0	1.2	0.2	0.0	0.1	0.1
22	6.1	7.6	4.8	81%	60%	81%	60%	81%	60%	5.0	1.2	3.7	2.4	6.1	1.4	4.6	3.0	3.9	0.9	2.9	1.9
23	4.6	5.1	6.3	84%	61%	84%	61%	84%	61%	3.9	0.7	2.8	1.8	4.3	0.8	3.1	2.0	5.3	1.0	3.8	2.5
28	7.1	2.0	5.9	88%	64%	88%	64%	88%	64%	6.3	0.9	4.6	2.6	1.7	0.2	1.3	0.7	5.1	0.7	3.7	2.1
31	1.8	0.7	0.2	85%	49%	85%	49%	85%	49%	1.5	0.3	0.9	0.9	0.6	0.1	0.3	0.4	0.1	0.0	0.1	0.1
32	4.3	2.7	0.5	67%	37%	66%	37%	67%	37%	2.9	1.4	1.6	2.7	1.8	0.9	1.0	1.7	0.3	0.2	0.2	0.3
34/34E	5.1	2.0	0.9	36%	33%	36%	33%	37%	34%	1.8	3.3	1.7	3.4	0.7	1.3	0.7	1.4	0.4	0.6	0.3	0.6
35	2.4	0.7	4.3	38%	31%	38%	31%	37%	31%	0.9	1.5	0.7	1.6	0.3	0.5	0.2	0.5	1.6	2.7	1.3	3.0
36	2.4	0.7	4.3	36%	29%	36%	29%	36%	29%	0.8	1.5	0.7	1.7	0.3	0.5	0.2	0.5	1.6	2.7	1.3	3.0
37	2.4	0.7	NA	35%	28%	36%	29%	NA	NA	0.8	1.5	0.7	1.7	0.3	0.5	0.2	0.5	NA	NA	NA	NA
39	6.6	7.8	7.1	36%	41%	36%	41%	36%	41%	2.4	4.2	2.7	3.9	2.8	5.0	3.2	4.6	2.6	4.6	2.9	4.2
44	0.6	1.1	0.5	80%	66%	80%	66%	80%	66%	0.5	0.1	0.4	0.2	0.9	0.2	0.7	0.4	0.4	0.1	0.4	0.2
47	7.4	2.3	3.3	49%	52%	49%	52%	49%	52%	3.6	3.8	3.9	3.5	1.1	1.2	1.2	1.1	1.6	1.7	1.7	1.6
57	2.5	1.8	0.1	34%	46%	34%	46%	34%	46%	0.9	1.6	1.1	1.4	0.6	1.2	0.8	1.0	0.0	0.1	0.0	0.0
66	15.0	3.7	6.1	42%	46%	42%	46%	42%	46%	6.4	8.6	6.8	8.2	1.6	2.1	1.7	2.0	2.6	3.5	2.8	3.3
70	1.8	1.7	1.0	35%	33%	35%	33%	35%	33%	0.6	1.2	0.6	1.2	0.6	1.1	0.5	1.1	0.3	0.6	0.3	0.7
70A	1.8	1.7	1.0	32%	30%	32%	30%	32%	30%	0.6	1.2	0.5	1.3	0.5	1.1	0.5	1.2	0.3	0.7	0.3	0.7
71	5.5	6.4	20.3	25%	26%	25%	26%	25%	25%	1.4	4.2	1.4	4.1	1.6	4.8	1.6	4.7	5.0	15.3	5.2	15.1
73	5.1	4.5	16.2	25%	27%	25%	27%	24%	27%	1.2	3.8	1.4	3.7	1.1	3.4	1.2	3.3	4.0	12.2	4.3	11.9
77	4.5	1.6	2.2	24%	27%	24%	27%	24%	27%	1.1	3.4	1.2	3.3	0.4	1.2	0.4	1.2	0.5	1.7	0.6	1.6
86	1.4	4.9	1.6	33%	39%	33%	39%	33%	39%	0.5	0.9	0.5	0.8	1.6	3.3	1.9	3.0	0.5	1.1	0.6	1.0
87	1.5	0.6	0.3	25%	30%	25%	30%	26%	30%	0.4	1.1	0.5	1.0	0.2	0.5	0.2	0.4	0.1	0.2	0.1	0.2
88	0.3	0.5	1.0	27%	31%	27%	31%	27%	31%	0.1	0.2	0.1	0.2	0.1	0.4	0.2	0.3	0.3	0.7	0.3	0.7
89	1.1	0.6	2.8	31%	32%	31%	32%	31%	32%	0.4	0.8	0.4	0.8	0.2	0.4	0.2	0.4	0.9	1.9	0.9	1.9
93	2.7	2.0	0.9	24%	32%	23%	32%	23%	32%	0.6	2.0	0.9	1.8	0.5	1.6	0.6	1.4	0.2	0.7	0.3	0.6
101	2.5	3.5	12.5	39%	37%	39%	37%	39%	37%	1.0	1.6	0.9	1.6	1.4	2.2	1.3	2.2	4.8	7.7	4.7	7.9
104	3.6	2.1	7.1	49%	42%	49%	42%	49%	42%	1.7	1.8	1.5	2.1	1.0	1.1	0.9	1.2	3.5	3.7	3.0	4.2
109	7.8	1.7	6.6	44%	41%	44%	41%	44%	41%	3.4	4.3	3.2	4.6	0.7	0.9	0.7	1.0	2.9	3.7	2.7	3.9
110	1.9	3.0	7.5	46%	45%	46%	45%	46%	45%	0.9	1.0	0.8	1.0	1.4	1.6	1.3	1.6	3.5	4.1	3.4	4.1
111	7.3	0.5	1.9	50%	40%	50%	40%	50%	40%	3.6	3.7	2.9	4.4	0.2	0.2	0.2	0.3	1.0	1.0	0.8	1.2

Route	WD Increase (RVH)	SA Increase (RVH)	SU Increase (RVH)	WD: Pct. Min	WD: Pct. Low-Inc.	SA: Pct. Min	SA: Pct. Low-Inc.	SU: Pct. Min	SU: Pct. Low-Inc.	WD: Min. Increase	WD: Nonmin. Increase	WD: Low-Inc. Increase	WD: Non-Low-Inc. Increase	SA: Min. Increase	SA: Nonmin. Increase	SA: Low-Inc. Increase	SA: Non-Low-Inc. Increase	SU: Min. Increase	SU: Nonmin. Increase	SU: Low-Inc. Increase	SU: Non-Low-Inc. Increase
116	5.6	4.3	6.7	65%	47%	65%	47%	65%	47%	3.6	2.0	2.6	2.9	2.8	1.5	2.0	2.3	4.3	2.4	3.2	3.6
117	5.6	4.3	6.7	56%	42%	56%	42%	56%	42%	3.1	2.4	2.3	3.2	2.4	1.9	1.8	2.5	3.8	2.9	2.8	3.9
220	0.5	2.0	0.9	22%	39%	22%	39%	22%	39%	0.1	0.4	0.2	0.3	0.4	1.5	0.8	1.2	0.2	0.7	0.3	0.5
221	0.5	NA	NA	26%	42%	NA	NA	NA	NA	0.1	0.4	0.2	0.3	NA	NA	NA	NA	NA	NA	NA	NA
222	0.5	2.0	0.9	22%	40%	22%	40%	22%	40%	0.1	0.4	0.2	0.3	0.4	1.5	0.8	1.2	0.2	0.7	0.3	0.5
441	2.3	1.9	2.9	42%	47%	37%	46%	37%	46%	1.0	1.3	1.1	1.2	0.7	1.2	0.9	1.1	1.1	1.8	1.3	1.6
442	2.3	1.9	2.9	43%	47%	38%	45%	43%	47%	1.0	1.3	1.1	1.2	0.7	1.2	0.9	1.1	1.3	1.7	1.4	1.5
SL1	3.6	0.5	3.0	32%	30%	32%	30%	32%	30%	1.1	2.5	1.1	2.5	0.2	0.3	0.1	0.3	1.0	2.1	0.9	2.1
SL2	1.6	1.3	2.1	30%	30%	30%	30%	30%	30%	0.5	1.1	0.5	1.1	0.4	0.9	0.4	0.9	0.6	1.5	0.6	1.5
SL3	3.4	3.1	4.3	66%	41%	66%	41%	66%	41%	2.3	1.2	1.4	2.0	2.1	1.0	1.3	1.9	2.9	1.5	1.8	2.6
SL4	2.3	2.2	1.9	60%	50%	60%	50%	60%	50%	1.4	0.9	1.2	1.1	1.3	0.9	1.1	1.1	1.2	0.8	1.0	1.0
SL5	2.6	6.5	4.7	59%	50%	59%	50%	59%	50%	1.6	1.1	1.3	1.3	3.8	2.6	3.2	3.2	2.8	1.9	2.3	2.4
Total										**87**	**85**	**74**	**98**	**69**	**64**	**59**	**74**	**85**	**98**	**74**	**109**
Weekly										**436**	**423**	**371**	**488**	**69**	**64**	**59**	**74**	**85**	**98**	**74**	**109**

Notes: NA indicates that there is no scheduled service for the given route-day of the week pair. Hours added to routes in corridors (such as the 441/442) were evenly split between the routes in the corridor (for example, 50 percent of the 4.6 weekday hours provided to the 441/442 corrdidor were attributed to Route 441).

WD = Weekday. SA = Saturday. SU = Sunday. Pct. = Percent. Min. = Minority. Low-Inc. = Low-Income.

Sources: MBTA revenue vehicle hour spreadsheets as processed by CTPS. MBTA shapefiles as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 14
Change of Daily Revenue Vehicle Hours from the Addition of 30 Full-Time Bus Operator Equivalents (Based on Survey Data)

Route	Value in Survey (if different)	WD Increase (RVH)	SA Increase (RVH)	SU Increase (RVH)	Pct. Min	Pct. Low-Inc.	WD: Min. Increase	WD: Nonmin. Increase	WD: Low-Inc. Increase	WD: Non-Low-Inc. Increase	SA: Min. Increase	SA: Nonmin. Increase	SA: Low-Inc. Increase	SA: Non-Low-Inc. Increase	SU: Min. Increase	SU: Nonmin. Increase	SU: Low-Inc. Increase	SU: Non-Low-Inc. Increase
1		4.1	6.9	4.1	37%	34%	1.5	2.6	1.4	2.7	2.5	4.4	2.4	4.6	1.5	2.6	1.4	2.7
7		0.7	0.4	NA	9%	6%	0.1	0.6	0.0	0.6	0.0	0.4	0.0	0.4	NA	NA	NA	NA
9		1.9	2.0	2.2	11%	15%	0.2	1.7	0.3	1.6	0.2	1.8	0.3	1.7	0.2	1.9	0.3	1.9
15		11.6	16.4	9.2	75%	67%	8.8	2.9	7.8	3.8	12.3	4.0	11.0	5.4	6.9	2.3	6.2	3.0
16		1.9	0.5	3.0	74%	50%	1.4	0.5	1.0	1.0	0.3	0.1	0.2	0.2	2.2	0.8	1.5	1.5
21		3.5	2.3	0.3	87%	48%	3.1	0.5	1.7	1.8	2.0	0.3	1.1	1.2	0.2	0.0	0.1	0.1
22	22 and 29	6.1	7.6	4.8	91%	70%	5.6	0.6	4.3	1.9	6.9	0.7	5.3	2.3	4.3	0.4	3.3	1.4
23		4.6	5.1	6.3	85%	59%	3.9	0.7	2.7	1.9	4.3	0.8	3.0	2.1	5.4	1.0	3.7	2.6
28		7.1	2.0	5.9	92%	65%	6.6	0.6	4.6	2.5	1.8	0.2	1.3	0.7	5.4	0.5	3.8	2.0
31		1.8	0.7	0.2	93%	58%	1.7	0.1	1.0	0.8	0.6	0.1	0.4	0.3	0.2	0.0	0.1	0.1
32		4.3	2.7	0.5	76%	43%	3.3	1.1	1.8	2.5	2.1	0.7	1.2	1.6	0.3	0.1	0.2	0.3
34/34E		5.1	2.0	0.9	42%	37%	2.1	3.0	1.9	3.2	0.8	1.2	0.7	1.3	0.4	0.6	0.3	0.6
35		2.4	0.7	4.3	33%	24%	0.8	1.6	0.6	1.8	0.2	0.5	0.2	0.6	1.4	2.9	1.0	3.3
36		2.4	0.7	4.3	37%	33%	0.9	1.5	0.8	1.6	0.3	0.5	0.2	0.5	1.6	2.7	1.4	2.9
37		2.4	0.7	NA	32%	31%	0.8	1.6	0.7	1.6	0.2	0.5	0.2	0.5	NA	NA	NA	NA
39		6.6	7.8	7.1	36%	27%	2.4	4.2	1.8	4.8	2.8	5.0	2.1	5.6	2.6	4.6	2.0	5.2
44	42 and 44	0.6	1.1	0.5	91%	66%	0.6	0.1	0.4	0.2	1.0	0.1	0.7	0.4	0.5	0.0	0.4	0.2
47		7.4	2.3	3.3	33%	26%	2.4	5.0	2.0	5.5	0.8	1.6	0.6	1.7	1.1	2.2	0.9	2.4
57		2.5	1.8	0.1	28%	43%	0.7	1.8	1.1	1.4	0.5	1.3	0.8	1.1	0.0	0.1	0.0	0.0
66		15.0	3.7	6.1	40%	40%	6.0	9.0	6.0	9.0	1.5	2.2	1.5	2.2	2.5	3.7	2.5	3.7
70	70/70A	1.8	1.7	1.0	35%	36%	0.6	1.2	0.6	1.1	0.6	1.1	0.6	1.1	0.3	0.6	0.3	0.6
70A	70/70A	1.8	1.7	1.0	35%	36%	0.6	1.2	0.6	1.1	0.6	1.1	0.6	1.1	0.3	0.6	0.3	0.6
71		5.5	6.4	20.3	24%	21%	1.3	4.2	1.2	4.4	1.5	4.8	1.3	5.0	4.9	15.4	4.3	16.0
73		5.1	4.5	16.2	19%	21%	1.0	4.1	1.0	4.0	0.9	3.6	0.9	3.6	3.2	13.0	3.3	12.9
77		4.5	1.6	2.2	24%	35%	1.1	3.5	1.6	3.0	0.4	1.2	0.6	1.0	0.5	1.7	0.8	1.4
86		1.4	4.9	1.6	26%	36%	0.4	1.0	0.5	0.9	1.3	3.6	1.7	3.1	0.4	1.2	0.6	1.0
87		1.5	0.6	0.3	22%	25%	0.3	1.2	0.4	1.1	0.1	0.5	0.2	0.5	0.1	0.3	0.1	0.3
88	88 and 90	0.3	0.5	1.0	25%	24%	0.1	0.2	0.1	0.2	0.1	0.4	0.1	0.4	0.2	0.7	0.2	0.7
89		1.1	0.6	2.8	25%	24%	0.3	0.8	0.3	0.9	0.1	0.4	0.1	0.4	0.7	2.1	0.7	2.2
93	92 and 93	2.7	2.0	0.9	23%	30%	0.6	2.1	0.8	1.9	0.5	1.6	0.6	1.4	0.2	0.7	0.3	0.6
101		2.5	3.5	12.5	31%	40%	0.8	1.7	1.0	1.5	1.1	2.4	1.4	2.1	3.9	8.6	5.1	7.5
104		3.6	2.1	7.1	56%	56%	2.0	1.6	2.0	1.6	1.2	0.9	1.2	0.9	4.0	3.1	4.0	3.1
109		7.8	1.7	6.6	38%	61%	3.0	4.8	4.8	3.0	0.6	1.0	1.0	0.6	2.5	4.1	4.0	2.6
110		1.9	3.0	7.5	51%	43%	0.9	0.9	0.8	1.1	1.5	1.5	1.3	1.7	3.8	3.7	3.2	4.3
111		7.3	0.5	1.9	63%	60%	4.6	2.7	4.4	2.9	0.3	0.2	0.3	0.2	1.2	0.7	1.2	0.8

Route	Value in Survey (if different)	WD Increase (RVH)	SA Increase (RVH)	SU Increase (RVH)	Pct. Min	Pct. Low-Inc.	WD: Min. Increase	WD: Nonmin. Increase	WD: Low-Inc. Increase	WD: Non-Low-Inc. Increase	SA: Min. Increase	SA: Nonmin. Increase	SA: Low-Inc. Increase	SA: Non-Low-Inc. Increase	SU: Min. Increase	SU: Nonmin. Increase	SU: Low-Inc. Increase	SU: Non-Low-Inc. Increase
116	114, 116, and 117	5.6	4.3	6.7	60%	55%	3.3	2.2	3.1	2.5	2.6	1.7	2.4	1.9	4.0	2.7	3.7	3.0
117	114, 116, and 117	5.6	4.3	6.7	60%	55%	3.3	2.2	3.1	2.5	2.6	1.7	2.4	1.9	4.0	2.7	3.7	3.0
220	220 and 221	0.5	2.0	0.9	28%	43%	0.2	0.4	0.2	0.3	0.6	1.4	0.8	1.1	0.2	0.6	0.4	0.5
221	220 and 221	0.5	NA	NA	28%	43%	0.2	0.4	0.2	0.3	NA	NA	NA	NA	NA	NA	NA	NA
222		0.5	2.0	0.9	34%	40%	0.2	0.3	0.2	0.3	0.7	1.3	0.8	1.2	0.3	0.6	0.3	0.5
441		2.3	1.9	2.9	47%	68%	1.1	1.2	1.6	0.7	0.9	1.0	1.3	0.6	1.4	1.5	2.0	0.9
442		2.3	1.9	2.9	38%	54%	0.9	1.4	1.3	1.1	0.7	1.2	1.1	0.9	1.1	1.8	1.6	1.3
SL1	SL1/SL2 Waterfront	3.6	0.5	3.0	24%	14%	0.9	2.7	0.5	3.1	0.1	0.4	0.1	0.4	0.7	2.3	0.4	2.6
SL2	SL1/SL2 Waterfront	1.6	1.3	2.1	24%	14%	0.4	1.2	0.2	1.4	0.3	1.0	0.2	1.2	0.5	1.6	0.3	1.8
SL3	No Data	3.4	3.1	4.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SL4	SL4/SL5 Washington St.	2.3	2.2	1.9	61%	36%	1.4	0.9	0.8	1.5	1.3	0.9	0.8	1.4	1.2	0.8	0.7	1.2
SL5	SL4/SL5 Washington St.	2.6	6.5	4.7	61%	36%	1.6	1.0	0.9	1.7	3.9	2.5	2.3	4.1	2.9	1.9	1.7	3.0
Total							**84**	**85**	**74**	**94**	**66**	**64**	**57**	**72**	**79**	**99**	**72**	**106**
Weekly							**418**	**424**	**371**	**471**	**66**	**64**	**57**	**72**	**79**	**99**	**72**	**106**

Notes: NA indicates that there is no scheduled service for the given route-day of the week pair. Route SL3 did not exist at the time of the systemwide survey. Its values are noted with NS (No Survey). Hours added to routes in corridors (such as the 441/442) were evenly split between the routes in the corridor (for example, 50 percent of the 4.6 weekday hours provided to the 441/442 corrdidor were attributed to Route 441).

WD = Weekday. SA = Saturday. SU = Sunday. Pct. = Percent. Min. = Minority. Low-Inc. = Low-Income.

Sources: MBTA revenue vehicle hour spreadsheets as processed by CTPS. 2015-17 MBTA Systemwide Passenger Survey.

Table 15
Change of Route Miles (Weekday)

Route	Existing Length	Proposed Length	Change	Existing Pct. Min.	Existing Pct. Low-Inc.	Proposed Pct. Min.	Proposed Pct. Low-Inc.	Change in Length Minority	Change in Length Nonminority	Change in Length Low-Income	Change in Length Non-Low-Income
1	9.5	9.1	-0.4	44%	45%	45%	45%	-0.2	-0.3	-0.2	-0.2
4	11.2	11.1	-0.2	21%	30%	21%	30%	0.0	-0.1	-0.1	-0.1
5	6.6	X	-6.6	23%	34%	X	X	-1.5	-5.1	-2.3	-4.3
9	8.5	8.0	-0.5	27%	31%	27%	31%	-0.1	-0.4	-0.1	-0.3
16	16.8	16.9	0.0	74%	55%	74%	55%	0.0	0.0	0.0	0.0
35	12.7	12.4	-0.3	37%	31%	38%	31%	-0.1	-0.2	-0.1	-0.2
36	10.4	10.1	-0.3	36%	29%	36%	29%	-0.1	-0.2	-0.1	-0.2
37	11.2	11.2	0.0	35%	28%	35%	28%	0.0	0.0	0.0	0.0
44	8.1	7.7	-0.4	80%	66%	80%	66%	-0.3	-0.1	-0.2	-0.1
52	29.3	20.6	-8.7	21%	22%	20%	22%	-2.0	-6.7	-1.9	-6.8
59	21.4	21.5	0.0	20%	20%	20%	20%	0.0	0.0	0.0	0.0
60	13.2	11.4	-1.8	34%	41%	34%	42%	-0.6	-1.3	-0.7	-1.1
64	13.4	11.4	-2.0	41%	39%	42%	40%	-0.7	-1.2	-0.6	-1.4
70	22.0	21.9	-0.1	35%	33%	35%	33%	0.0	-0.1	0.0	-0.1
72	5.1	5.1	0.0	29%	29%	29%	29%	0.0	0.0	0.0	0.0
74	9.0	7.8	-1.2	29%	25%	29%	26%	-0.3	-0.9	-0.3	-0.9
75	9.6	8.8	-0.8	28%	26%	26%	26%	-0.3	-0.4	-0.2	-0.5
90	11.5	8.8	-2.6	31%	30%	31%	30%	-0.9	-1.7	-0.8	-1.8
92	7.9	5.9	-2.0	23%	32%	20%	31%	-0.6	-1.4	-0.7	-1.3
95	13.4	16.0	2.7	31%	34%	30%	33%	0.6	2.0	0.8	1.9
106	17.5	12.0	-5.5	40%	36%	47%	40%	-1.4	-4.1	-1.6	-3.9
111	13.7	11.4	-2.3	48%	40%	50%	40%	-0.9	-1.4	-1.0	-1.3
120	9.1	9.0	-0.1	64%	45%	63%	45%	-0.1	0.0	-0.1	0.0
134	27.4	25.6	-1.8	22%	29%	22%	29%	-0.5	-1.3	-0.6	-1.2
220	19.1	17.8	-1.3	22%	39%	22%	39%	-0.3	-1.0	-0.5	-0.8
222	19.2	15.8	-3.3	21%	39%	22%	40%	-0.6	-2.8	-1.2	-2.1
225	19.9	12.0	-7.9	24%	37%	28%	38%	-1.5	-6.4	-2.7	-5.1
226	NS	12.90	12.90	NS	NS	14%	31%	1.8	11.1	4.0	8.9

Route	Existing Length	Proposed Length	Change	Existing Pct. Min.	Existing Pct. Low-Inc.	Proposed Pct. Min.	Proposed Pct. Low-Inc.	Change in Length Minority	Change in Length Nonminority	Change in Length Low-Income	Change in Length Non-Low-Income
350	29.4	29.5	0.1	23%	27%	23%	27%	0.0	0.1	0.0	0.1
411	21.3	21.3	0.0	42%	42%	42%	42%	0.0	0.0	0.0	0.0
424	20.4	16.1	-4.3	53%	43%	54%	46%	-2.0	-2.3	-1.4	-2.9
428	31.0	27.3	-3.7	38%	37%	38%	37%	-1.2	-2.5	-1.2	-2.4
435	34.4	29.9	-4.6	40%	46%	39%	46%	-2.2	-2.3	-1.8	-2.8
441	27.8	27.8	0.0	42%	47%	42%	47%	0.0	0.0	0.0	0.0
442	26.8	26.9	0.1	43%	47%	43%	47%	0.0	0.0	0.0	0.0
448	41.8	X	-41.8	39%	42%	X	X	-16.2	-25.7	-17.4	-24.5
449	40.9	X	-40.9	39%	41%	X	X	-16.1	-24.9	-16.9	-24.0
455	27.1	27.1	0.1	48%	49%	48%	49%	0.0	0.0	0.0	0.0
459	41.8	X	-41.8	48%	46%	X	X	-20.3	-21.5	-19.2	-22.6
34/34E	42.2	30.1	-12.1	33%	32%	36%	33%	-3.5	-8.7	-3.6	-8.5
70A	31.0	10.4	-20.6	33%	31%	32%	30%	-7.0	-13.6	-6.3	-14.3
CT1	6.81	X	-6.8	43%	46%	X	X	-2.9	-3.9	-3.1	-3.7
SL2 (742)	4.8	4.5	-0.3	30%	30%	30%	30%	-0.1	-0.2	-0.1	-0.2
Daily Total								**-81.9**	**-129.4**	**-82.1**	**-129.1**
Weekly Total								**-409.3**	**-646.9**	**-410.6**	**-645.6**

Pct. = Percent. Min. = Minority. Low-Inc. = Low-Income. NS = New Service. X = Eliminated Service.

Sources: MBTA shapefiles as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 16
Change of Route Miles (Saturday)

Route	Existing Length	Proposed Length	Change	Existing Pct. Min.	Existing Pct. Low Inc.	Proposed Pct. Min.	Proposed Pct. Low-Inc.	Change in Length Minority	Change in Length Nonminority	Change in Length Low-Income	Change in Length Non-Low-Income
1	9.5	9.1	-0.4	44%	45%	45%	45%	-0.2	-0.3	-0.2	-0.2
5	6.6	X	-6.6	23%	34%	X	X	-1.5	-5.1	-2.3	-4.3
9	8.5	8.0	-0.5	27%	31%	27%	31%	-0.1	-0.4	-0.1	-0.3
16	11.4	11.4	0.0	78%	53%	78%	53%	0.0	0.0	0.0	0.0
35	12.7	12.4	-0.3	37%	31%	38%	31%	-0.1	-0.2	-0.1	-0.2
36	9.2	8.7	-0.5	36%	29%	36%	29%	-0.1	-0.4	-0.1	-0.4
44	8.1	7.7	-0.4	80%	66%	80%	66%	-0.3	-0.1	-0.2	-0.1
59	18.3	21.5	3.1	19%	20%	20%	20%	0.7	2.4	0.7	2.5
60	12.0	11.4	-0.6	34%	42%	34%	42%	-0.2	-0.4	-0.2	-0.3
64	10.7	9.9	-0.8	40%	40%	40%	40%	-0.3	-0.5	-0.3	-0.4
70	22.0	20.0	-1.9	35%	33%	35%	33%	-0.7	-1.3	-0.6	-1.3
74	9.0	7.8	-1.2	29%	25%	29%	26%	-0.3	-0.9	-0.3	-0.9
75	9.6	8.8	-0.8	28%	26%	26%	26%	-0.3	-0.4	-0.2	-0.5
90	11.5	8.8	-2.6	31%	30%	31%	30%	-0.9	-1.8	-0.8	-1.8
92	7.9	5.9	-2.0	23%	32%	20%	31%	-0.6	-1.4	-0.7	-1.3
95	11.1	13.6	2.6	32%	35%	31%	33%	0.6	2.0	0.7	1.9
120	9.1	9.0	-0.1	64%	45%	63%	45%	-0.1	0.0	-0.1	0.0
201	11.2	6.6	-4.6	53%	36%	57%	37%	-2.2	-2.4	-1.6	-3.0
202	12.2	6.4	-5.8	53%	37%	60%	38%	-2.7	-3.1	-2.1	-3.8
220	17.8	15.1	-2.7	22%	39%	22%	39%	-0.5	-2.2	-1.0	-1.7
225	19.9	12.0	-7.9	24%	37%	28%	38%	-1.5	-6.4	-2.7	-5.1
226	NS	12.9	12.9	NS	NS	14%	31%	1.8	11.1	4.0	8.9
350	29.4	29.5	0.1	23%	27%	23%	27%	0.0	0.1	0.0	0.1
34/34E	30.6	30.1	-0.6	36%	33%	36%	33%	-0.3	-0.3	-0.3	-0.3
70A	31.0	10.4	-20.6	33%	31%	32%	30%	-7.0	-13.6	-6.3	-14.3
SL2 (742)	4.8	4.5	-0.3	30%	30%	30%	30%	-0.1	-0.2	-0.1	-0.2
Daily Total								**-16.8**	**-25.6**	**-14.9**	**-27.5**

Pct. = Percent. Min. = Minority. Low-Inc. = Low-Income. NS = New Service. X = Eliminated Service.

Sources: MBTA shapefiles as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.

Table 17
Change of Route Miles (Sunday)

Route	Existing Length	Proposed Length	Change	Existing Pct. Min.	Existing Pct. Low Inc.	Proposed Pct. Min.	Proposed Pct. Low-Inc.	Change in Length Minority	Change in Length Nonminority	Change in Length Low-Income	Change in Length Non-Low-Income
1	9.5	9.1	-0.4	44%	45%	45%	45%	-0.2	-0.3	-0.2	-0.2
9	8.5	8.0	-0.5	27%	31%	27%	31%	-0.1	-0.4	-0.1	-0.3
35	12.1	11.7	-0.3	37%	31%	37%	31%	-0.1	-0.2	-0.1	-0.2
36	9.2	8.7	-0.5	36%	29%	36%	29%	-0.1	-0.4	-0.1	-0.4
44	8.1	7.7	-0.4	80%	66%	80%	66%	-0.3	-0.1	-0.2	-0.1
59	18.3	21.5	3.1	19%	20%	20%	20%	0.7	2.4	0.7	2.5
60	12.0	11.4	-0.6	34%	42%	34%	42%	-0.2	-0.4	-0.2	-0.4
64	10.7	9.9	-0.8	40%	40%	40%	40%	-0.3	-0.5	-0.3	-0.4
70	22.0	20.0	-1.9	35%	33%	35%	33%	-0.7	-1.3	-0.6	-1.3
89	7.1	8.4	1.4	33%	33%	31%	32%	0.3	1.1	0.3	1.0
90	11.5	8.8	-2.6	31%	30%	31%	30%	-0.9	-1.8	-0.8	-1.8
95	11.1	13.6	2.6	32%	35%	31%	33%	0.6	2.0	0.7	1.9
120	9.1	9.0	-0.1	64%	45%	63%	45%	-0.1	0.0	-0.1	0.0
201	9.1	6.6	-2.5	56%	36%	57%	37%	-1.3	-1.2	-0.8	-1.7
202	10.6	6.4	-4.3	55%	36%	60%	38%	-2.1	-2.2	-1.5	-2.8
350	29.1	29.5	0.4	23%	27%	23%	27%	0.1	0.3	0.1	0.3
34/34E	26.1	25.5	-0.6	38%	34%	37%	34%	-0.3	-0.3	-0.3	-0.3
70A	NS	10.4	10.4	NS	NS	32%	30%	3.3	7.1	3.1	7.3
SL2 (742)	4.8	4.5	-0.3	30%	30%	30%	30%	-0.1	-0.2	-0.1	-0.2
Daily Total								**-1.7**	**3.8**	**-0.6**	**2.6**

Pct. = Percent. Min. = Minority. Low-Inc. = Low-Income. NS = New Service.

Sources: MBTA shapefiles as processed by CTPS. 2010-14 American Community Survey five-year estimates. 2010 US Census.