



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Frank DePaola, Acting MassDOT Secretary and CEO and MPO Chairman
Karl H. Quackenbush, Executive Director, MPO Staff

MEMORANDUM

DATE December 18, 2014
TO Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush
CTPS Executive Director
RE Work Program for: MBTA Study of Passenger Noninteraction with
Automated-Fare-Collection Equipment

Action Required

Review and approval

Proposed Motion

That the Boston Region Metropolitan Planning Organization, upon the recommendation of the Massachusetts Department of Transportation, vote to approve the work program for the MBTA Study of Passenger Noninteraction with Automated-Fare-Collection Equipment presented in this memorandum

Project Identification

Unified Planning Work Program Classification

Technical Support/Operations Analysis

CTPS Project Number

11391

Clients

Massachusetts Department of Transportation

Project Supervisors: Clinton Bench and Sreelatha Allam

CTPS Project Supervisors

Principal: Annette Demchur

Manager: Steven Andrews

Funding

MassDOT §5303 Contract #78924

Impact on MPO Work

The MPO staff has sufficient resources to complete this work in a capable and timely manner. By undertaking this work, the MPO staff will neither delay the completion of nor reduce the quality of any work in the UPWP.

Background

Fare evasion is a problem for many public transit agencies. Fare evasion siphons revenue away from transit agencies, fosters a sense of unfairness among fellow passengers, and leads to questions about accountability when agencies state the need for more funding to maintain or expand service. An understanding of the specifics of fare evasion is critical for identifying strategies to combat revenue loss and maintain positive public relations.

While anecdotal evidence about fare evasion has been reported, the amount of hard data is limited. The Massachusetts Bay Transportation Authority (MBTA), through the ongoing National Transit Database (NTD) data collection effort managed by the Central Transportation Planning Staff (CTPS), collects data about the percentage of passengers who do not interact with the automated-fare-collection (AFC) equipment. As a part of this effort, CTPS categorizes these passengers based on the reasons they do not interact with the AFC equipment—fare evasion is only one of several reasons that an individual boarding a transit vehicle may not interact with the AFC equipment. The noninteraction categories include children aged 11 or younger, who are not required to pay a fare when riding with an adult; MBTA employees who are waved onto vehicles or otherwise bypass the AFC equipment; passengers whom MBTA employees allow to enter the paid area of a station; passengers who show an operator their pass rather than interacting with the farebox; passengers who board certain vehicles via the rear door; and passengers who simply do not pay a fare (not all of these categories apply to each mode).¹ Fare evasion and, in some cases, rear-door boarding, represents unauthorized noninteraction; the other types of noninteraction are authorized noninteraction.

CTPS collects noninteraction data for NTD reporting for the bus, trackless trolley (Routes 71, 72, 73, and 77A), heavy rail (Red, Orange, and Blue lines), and light rail (the Green Line and the Mattapan High-Speed Line) systems. When collecting noninteraction data, CTPS does not currently differentiate between various types of fare evasion (including piggybacking, climbing over the faregate, tripping the sensor on the other side of the faregate, and holding the faregate open for passengers).

¹ An employee may allow a passenger to pass through a faregate because the passenger paid with a monthly pass on a CharlieTicket and the machine failed to read the ticket; because the passenger entered the wrong side of the station (for example, the inbound side, instead of the outbound side); or for other reasons.

While the sample size employed by CTPS to collect noninteraction data is sufficient for NTD reporting and for estimating revenue loss, the results are not as reliable when viewed at a highly disaggregate (detailed) level. In order to identify current fare evasion trends, a larger sample size is required.

As part of this project, CTPS will utilize the noninteraction data collected for NTD reporting over the years to conduct a “meta-analysis” of pooled results of past CTPS studies to obtain data on as many observations as possible. By increasing the number of observations of noninteraction events, CTPS may be able to achieve the sample sizes required for drawing conclusions about fare noninteraction at more disaggregate levels.

Objectives

The objectives of this project are to obtain the data and perform the analysis required for answering the following questions about the MBTA system:

1. To what degree does fare evasion reduce the revenue that is collected by the MBTA?
2. Under what conditions does fare evasion thrive?
3. What can the MBTA do to decrease the amount of revenue lost due to fare evasion and what is the cost of recovering that revenue?
4. How does the MBTA compare to other agencies with regard to fare evasion levels, the amount of lost revenue, and other fare evasion issues?
5. When and where is authorized noninteraction most prevalent? Does this have any policy implications?

Work Description

The work required to accomplish the project objectives will be carried out in six tasks, programmed to occur over a nine-month period.

Task 1 Review the Literature

CTPS will complete a literature review to determine other agencies' experiences with fare evasion. The literature review will focus on answering the following questions:

- What fare evasion rates are experienced by other transit agencies?
- How much revenue do other agencies lose due to evasion?
- What methods do other agencies use to collect data about fare evasion?

The literature review will include resources such as other agencies' financial audits and research projects, and Transit Cooperative Research Program reports.

CTPS will also review the available NTD noninteraction data, as well as the collection methods used and other information relevant to the data.

Products of Task 1

A technical memorandum summarizing the literature review and the review of the data that CTPS will use for the meta-analysis

Task 2 Analyze the Noninteraction Data

CTPS will analyze the existing noninteraction data to the extent possible using the following criteria:

- Weather
- Season
- Type of station or route: transfer-heavy, walk-up-heavy, Key Route, and other categories
- Day of the week
- Hour of the day
- Proximity to secondary schools and colleges
- Crime level of the station or surrounding area
- Type of noninteraction

Because the existing data may be insufficient to permit all of these analyses, CTPS staff may need to obtain additional data. For example, because tabulator reports might not include the weather associated with each noninteraction assignment, coupling the time and date of the observation with a weather data source might enable an analysis of the effects of weather on noninteraction. Further, CTPS will need to obtain data on crime in the MBTA's service area.

CTPS will develop statistical measures of the precision of the results, and will graph, tabulate, or map, the data when feasible, to facilitate comprehension of the results. The analysis will include an estimate of the amount of fare revenue lost due to fare evasion.

Products of Task 2

Analysis and supporting materials (including tables, graphs, and maps, where needed) describing the data collected in Task 2. The analysis and supporting materials will be included in the final document

Task 3 Assess the Gaps in Existing Data

CTPS will determine the adequacy of existing data and whether it would be necessary to collect additional data to address the objectives of this study. The data may be insufficient for various reasons, including: some data are missing, the sample size is too small, or data were not collected for a service or category (as is the case for the commuter rail system). CTPS will work with MassDOT to determine whether additional data collection is warranted and will determine the best methods for obtaining the needed data.

Product of Task 3

Technical memorandum summarizing the assessment of the sufficiency of the existing data, the benefits of acquiring additional data, and the effort required to address the need for additional data

Task 4 Review the MBTA's Current Practices Related to Fare Evasion and Enforcement

CTPS will examine the existing fare-collection enforcement practices of the MBTA and its police force and will compare them to those of other agencies, based on the information obtained in Task 1. CTPS staff will contact MBTA transit police to determine the data they maintain on their operations, and to request data on the number of warnings, citations, and arrests, and the circumstances in which these actions were taken. Data will be obtained for the most recent fiscal year for which they are available; if available, historical data will also be obtained. Depending on the depth and quality of the data, staff will examine the relationship between different methods of enforcement and the number of citations written in a given time period. Representatives from the transit police force may be interviewed to give context to the results.

CTPS staff will request data on the revenue generated from paid citations to determine the amount of revenue losses offset by paid fines.

Product of Task 4

A written narrative of the existing enforcement practices related to fare evasion. The collected data and resulting analysis of the current enforcement efforts of the MBTA Transit Police will be included in the final document. The product of this task will be contingent on the amount and quality of the data the MBTA Transit Police are able and willing to provide.

Task 5 Use Fare Evasion Trends to Inform Enforcement and Policy Decisions

Based on the information gathered in previous tasks, CTPS staff will determine which methods could be most useful for decreasing the revenue loss attributable to fare evasion and for increasing the revenue recovered from citations. To the extent possible, CTPS staff will provide recommendations about where and how to focus enforcement efforts. The cost of recovering additional revenue will be factored into this analysis.

Product of Task 5

An analysis showing how the net revenue losses attributable to fare evasion might be mitigated; estimating the cost of recovering lost revenue; and summarizing the possible effects on transit operations of implementing the recommendations. This analysis will be included in the final document.

Task 6 Produce a Final Memorandum or Report

CTPS staff will produce a final document based on findings of the previous tasks. The final document will contain results of the literature review (Task 1); a discussion of the existing fare evasion trends and estimated revenue losses (Task 2); a discussion of the existing fare enforcement policies and related data (Task 4); and a discussion about changes that could be made to the MBTA's operations and policies to cost-effectively recover more fare revenue (Task 5).

Product of Task 6

A final document

Estimated Schedule

It is estimated that this project will be completed nine months after work commences. The proposed schedule, by task, is shown in Exhibit 1.

Estimated Cost

The total cost of this project is estimated to be \$57,892. This includes the cost of 22.7 person-weeks of staff time and overhead at the rate of 91.82 percent. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/spa

Exhibit 1

ESTIMATED SCHEDULE

MBTA Study of Passenger Noninteraction with Automated-Fare-Collection Equipment

| Task | Month | | | | | | | | |
|---|-------|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1. Review the Literature | █ | | | | | | | | |
| 2. Analyze the Noninteraction Data | | █ | | | | | | | |
| 3. Assess the Gaps in Existing Data | | | | | █ | | | | |
| 4. Review the MBTA's Current Practices | | | | | █ | | | | |
| 5. Use Fare Evasion Trends to Inform Enforcement and Policy Decisions | | | | | █ | | | | |
| 6. Produce a Final Memorandum or Report | | | | | | █ | | | |

Exhibit 2**ESTIMATED COST****MBTA Study of Passenger Noninteraction with Automated-Fare-Collection Equipment**

| | |
|-----------------------------------|-----------------|
| Direct Salary and Overhead | \$57,892 |
|-----------------------------------|-----------------|

| Task | Person-Weeks | | | | | Direct Salary | Overhead (91.82%) | Total Cost |
|---|--------------|-----|-----|------|-------|---------------|-------------------|------------|
| | M-1 | P-5 | P-4 | P-3 | Total | | | |
| 1. Review the Literature | 1.5 | 0.0 | 0.2 | 2.0 | 3.7 | \$5,102 | \$4,684 | \$9,786 |
| 2. Analyze the Noninteraction Data | 0.2 | 1.0 | 0.4 | 3.5 | 5.1 | \$6,492 | \$5,961 | \$12,453 |
| 3. Assess the Gaps in Existing Data | 0.5 | 0.5 | 0.4 | 1.5 | 2.9 | \$3,937 | \$3,615 | \$7,552 |
| 4. Review the MBTA's Current Practices | 0.4 | 0.0 | 0.0 | 2.0 | 2.4 | \$2,906 | \$2,668 | \$5,575 |
| 5. Use Fare Evasion Trends to Inform Enforcement and Policy Decisions | 0.4 | 0.0 | 0.2 | 2.0 | 2.6 | \$3,170 | \$2,911 | \$6,081 |
| 6. Produce a Final Memorandum or Report | 3.0 | 0.0 | 0.0 | 3.0 | 6.0 | \$8,573 | \$7,872 | \$16,445 |
| Total | 6.0 | 1.5 | 1.2 | 14.0 | 22.7 | \$30,181 | \$27,712 | \$57,892 |

| | |
|---------------------------|------------|
| Other Direct Costs | \$0 |
|---------------------------|------------|

| | |
|-------------------|-----------------|
| TOTAL COST | \$57,892 |
|-------------------|-----------------|

Funding

MassDOT §5303 Contract #78924