



## BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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Arnold J. Soolman  
Director, MPO Staff

The Boston Region MPO,  
the federally designated  
entity responsible for  
transportation decision-  
making for the 101 cities  
and towns in the MPO  
region, is composed of:

MassDOT Office of Planning and Programming  
City of Boston  
City of Newton  
City of Somerville  
Town of Bedford  
Town of Braintree  
Town of Framingham  
Town of Hopkinton  
Metropolitan Area Planning Council  
Massachusetts Bay Transportation Authority Advisory Board  
Massachusetts Bay Transportation Authority  
MassDOT Highway Division  
Massachusetts Port Authority  
Regional Transportation Advisory Council (nonvoting)  
Federal Highway Administration (nonvoting)  
Federal Transit Administration (nonvoting)

### MEMORANDUM

DATE January 7, 2010  
TO Transportation Planning and Programming Committee  
of the Boston Region Metropolitan Planning Organization  
FROM Arnold J. Soolman, CTPS Director  
RE Work Program for: Strategic Visioning for MBTA Bus Service

### ACTION REQUIRED

Review and approval

### PROPOSED MOTION

That the Transportation Planning and Programming Committee of the Boston Region Metropolitan Planning Organization, upon the recommendation of the Massachusetts Bay Transportation Authority, vote to approve the work program for Strategic Visioning for MBTA Bus Service in the form of the draft dated January 7, 2010.

### PROJECT IDENTIFICATION

**Unified Planning Work Program Classification**  
Technical Support/Operations Analysis Projects

**CTPS Project Number**  
11363

**Client**  
Massachusetts Bay Transportation Authority  
Project Supervisor: Joseph Cosgrove

**CTPS Project Supervisors**  
Principals: Elizabeth Moore and Efi Pagitsas  
Manager: Mark Abbott

**Funding**  
Future MBTA Contract

## 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 other work in the UPWP.

## BACKGROUND

The MBTA has identified fifteen Key Routes that are the busiest bus routes in the system and carry approximately 40% of all bus passengers. The MBTA is currently collaborating with MassDOT and CTPS on a Key Routes Initiative to develop bus improvement strategies for six of the fifteen Key Routes. These strategies generally apply elements of rail rapid transit to bus service to reduce bus travel time, improve the quality of service for existing customers, and make bus service a more attractive option for potential new customers. Typical bus improvement strategies include segregating rights-of-way for buses; establishing procedures for pre-paid boarding; instituting traffic signal priority (TSP) for buses; enhancing frequency; and consolidating, eliminating, and relocating some bus stops.

The first phase of this work, which was funded by the Commonwealth, has focused on Routes 1, 15, 23, 28, 66, and 111. For five of these six routes,<sup>1</sup> CTPS has identified bus stops for consolidation, elimination, and relocation; analyzed travel-time data; and developed conceptual plans for transit signal priority (including queue jumps, green extension, and early green). For each route, CTPS has documented the results of these analyses in a technical memorandum.

CTPS has also collected traffic counts at selected intersections for further analysis as work moves into final design and engineering. Using this data, the second phase of the Key Routes Initiative will include in-depth signal priority evaluations of intersections along each route alignment and development of final recommendations for improvement strategies that should move forward on each route. This work program will cover intersection analyses for Routes 15, 66, and 111. The rest of the six Key Routes will be evaluated under separate contracts.

When planning for the first six Key Routes has been completed, the MBTA may wish to evaluate the same types of strategies for the remaining Key Routes in the system (Routes 22, 32, 57, 71, 73, 77, and 116/117)<sup>2</sup> and possibly other individual routes or the entire bus network, to further improve the quality of bus service.

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<sup>1</sup> Evaluation of Route 23 is being completed by an outside consultant.

<sup>2</sup> Two Key Routes already have bus improvement strategies in place (Silver Line) or are undergoing evaluation through a separate process (Route 39).

## OBJECTIVES

The purpose of this work program is to support the second phase of the Key Routes Initiative through completion of more-in-depth traffic analyses on Key Routes 66, 15, and 111.

In addition, if time and budget allow, and if a decision is made to expand the analysis, CTPS may initiate conceptual planning for additional Key Routes and possible other individual bus routes or corridors in the MBTA system, as directed.

## WORK DESCRIPTION

### Task 1 Assess TSP Strategies at Intersections along Routes 66, 15, and 111

In the first phase of the Key Routes Initiative, CTPS, based on field observations and analysis of bus ridership data, made preliminary recommendations for intersections that could be potential candidates for implementation of some form of TSP.

Under this work program, CTPS will complete more in-depth intersection analyses along bus Routes 66, 15, and 111 to evaluate signal priority strategies for buses. This analysis will demonstrate which intersections could realistically support TSP strategies, such as queue jumps, green extension, and early green, without having a significant negative impact on general-purpose traffic, parking, and side streets.

To this end, staff will focus on three analysis emphasis areas:

- First, staff will convene planning and engineering staff from MassDOT, MBTA, the cities of Boston, Cambridge, and Chelsea, and the Town of Brookline.<sup>3</sup> The purpose of these meetings would be to discuss the Key Routes Initiative and receive input from municipal staff in general terms as well as ideas specific to the implementation of TSP strategies at identified locations along the bus corridors.
- Following interactions with municipal officials, staff will devise screening tools (intersection performance measures) and displays (lists, tables, or maps) to prioritize route locations for bus priority based on intersection traffic demand, performance, operational characteristics, and likely implementation feasibility as viewed by municipal officials. This screening would yield the intersections for which, from an implementation point of view, further analysis would be practical to pursue.
- For each intersection, the analysis will include existing conditions analysis using SYNCHRO or VISSIM software and at least one TSP strategy. Analysis will be performed for the AM and PM peak hour. Bus Route 66 will be analyzed first; analysis of Routes 15 and 111 will follow. The results of the analysis will include:

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<sup>3</sup> The overwhelming majority of traffic signals along MBTA Bus Routes 15, 66, and 111 are maintained and operated by the cities of Boston, Cambridge, and Chelsea, and the Town of Brookline. The location of bus stops is also largely controlled by municipalities.

traffic signal design modifications to reflect bus priority; identification of impacts to bus travel time, level of service, queues, delays, parking, and side street traffic; and queue jump characteristics, including, width and length.

### ***Product of Task 1***

A technical memorandum describing the methodology and the results of assessing the impacts of TSP strategies for locations along Routes 66, 15, and 111

## **Task 2 Provide Additional Ongoing Support for Bus Service Improvement**

Upon completion of Task 1, if time and budget are available, CTPS may provide ongoing support to the MBTA and MassDOT to plan improvements at a conceptual level on a limited number of additional Key Bus routes, individual other MBTA bus routes, or corridors in which more than one bus route currently operates. The conceptual plans developed under this task would mirror those produced by CTPS for five routes in phase one of the Key Routes Initiative. Work on this task would be accomplished through field observations and analysis of MBTA bus run-time data and stop locations.

### ***Potential Products of Task 2***

If time and budget allow, products under Task 2 might include:

- A list of additional bus routes that could potentially benefit from the bus improvement strategies used on Key Routes
- A technical memorandum for each route studied that discusses, at a conceptual level, the potential capital and operational improvements that might be implemented

## **ESTIMATED SCHEDULE**

It is estimated that this project will be completed five months after the notice to proceed is received. The proposed schedule, by task, is shown in Exhibit 1.

## **ESTIMATED COST**

The total cost of this project is estimated to be \$99,987. This includes the cost of 53.7 person-weeks of staff time and overhead at the rate of 88.99 percent. A detailed breakdown of estimated costs is presented in Exhibit 2. Please note that Exhibit 2 represents one possible distribution of costs between Tasks 1 and 2. Depending on the number of intersections analyzed and the complexity of the analysis undertaken in Task 1, more resources may be used on this task and fewer on Task 2 or vice versa.

**Exhibit 1**  
**ESTIMATED SCHEDULE**  
Strategic Visioning for MBTA Bus Service

Task	Months				
	1	2	3	4	5
1. Assess TSP Strategies					A
2. Provide Additional Ongoing Support				B	

Products/Milestones

A: Technical Memorandum on TSP Strategy Assessment

B: Technical Memorandum on Potential Additional Ongoing Support

**Exhibit 2**

**ESTIMATED COST**

**Strategic Visioning for MBTA Bus Service**

Direct Salary and Overhead								\$99,787			
Task	Person-Weeks							Direct Salary	Overhead (@ 88.99%)	Total Cost	
	M-1	P-5	P-4	P-3	P-2	P-1	Temp				
1. Assess TSP Strategies	4.0	3.5	0.5	7.5	17.0	2.2	11.0	45.7	\$42,063	\$37,432	\$79,496
2. Provide Additional Ongoing Support	1.0	2.0	4.0	1.0	0.0	0.0	0.0	8.0	\$10,736	\$9,554	\$20,291
Total	5.0	5.5	4.5	8.5	17.0	2.2	11.0	53.7	\$52,800	\$46,986	\$99,787

  

Other Direct Costs								\$200		
Travel								\$200		

  

TOTAL COST								\$99,987		
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**Funding**

*Future MBTA Contract*