



## **BOSTON REGION METROPOLITAN PLANNING ORGANIZATION**

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Stephanie Pollack, MassDOT Secretary and CEO and MPO Chair  
Karl H. Quackenbush, Executive Director, MPO Staff

### ***WORK PROGRAM***

## **RAIL VISION PROJECT SUPPORT**

JANUARY 17, 2019

### **Proposed Motion**

The Boston Region Metropolitan Planning Organization (MPO) votes to approve this work program.

### **Project Identification**

Unified Planning Work Program (UPWP) Classification

Boston Region MPO Planning Studies and Technical Analyses

Project Number 22214

Client

Massachusetts Department of Transportation (MassDOT)

Project Supervisors

*Principal:* Scott A. Peterson

*Manager:* Edward Bromage

Funding Source

MassDOT §5303 Funds

### **Schedule and Budget**

**Schedule:** 10 months after work commences

**Budget:** \$210,500

Schedule and budget details are shown in Exhibits 1 and 2, respectively.

### **Relationship to MPO Work**

This study is supported in full with non-MPO funding. Committing MPO staff to this project will not impinge on the quality or timeliness of MPO-funded work.

## Background

MassDOT and the MBTA are embarking upon a long-term study to identify current and future needs of the commuter rail system. This effort is called the Commuter Rail Vision study. The study will identify cost-effective strategies to transform the MBTA's existing commuter rail system to improve mobility and enhance economic competitiveness in the Boston region. Commuter rail customers and other interested stakeholders will have many opportunities to offer their perspectives on how to improve the MBTA's rail service. Their input, along with an analysis of the existing system and lessons learned from domestic and international peer agencies, will help the MBTA identify as many as twelve alternative visions for the future system. A thorough evaluation of the costs, ridership potential, and operational feasibility of these alternatives, as well as a broad public conversation in 2019, will inform the ultimate vision for the future of the MBTA rail system.

For this study, MassDOT has requested technical assistance and modeling expertise from the Central Transportation Planning Staff (CTPS). CTPS anticipates that the work described in this work program will support MassDOT's project team for the duration of the Rail Vision study. The project team consists of staff of MassDOT's Office of Transportation Planning and the MBTA, consultants, and numerous stakeholders.

## Objectives

MassDOT has requested that CTPS assist the project team with the analysis and development of metrics to support the examination of as many as twelve alternative visions for the commuter rail system. The major objectives are as follows:

- Coordinate with the project team and examine factors identified by the team that may affect transportation and the market for MBTA commuter rail service (such as population growth or the emergence of autonomous vehicles on the region's roadways).
- Work with the project team to refine improvements to the alternatives for the MBTA rail system and develop metrics that will be informative to the team and stakeholders.
- Examine as many as twelve build alternatives that range from those that require less capital intensive operational strategies to those that require major infrastructure upgrades and new technologies, and/or that reflect possible socio-economic growth due to a better transportation system.
- Support the project team's evaluation of the alternatives using the travel demand model to test service plans and land-use changes.
- Engage with stakeholders to ensure that the recommended vision has been developed based on a variety of ideas and opinions.

## Work Description

The five tasks in this work program are described below.

### Task 1 Coordinate with Project Team

CTPS will provide modeling support to the project team over a ten-month period to develop ridership estimates and assess the benefits and burdens associated with the objectives described above. In the event of project delays beyond the control of CTPS, the timing of project deliverables will be consistent with the revised schedules developed in collaboration with the project team.

#### *Products of Task 1*

- Coordination with the project team
- Attendance at as many as 20 internal meetings
- Attendance at as many as five external meetings
- Document reviews

### Task 2 Perform Base-Year Model Calibration for the Study Area

CTPS will perform a base-year model calibration for the study area. This task consists of refining and enhancing the Boston region model set for all of eastern Massachusetts, which is the market area for the commuter rail system. Specific attention will be paid to the urban core area and stations that currently have high ridership or are projected to have high ridership in the future.

The results of running the base-year model will be summarized in sufficient detail to provide systemwide statistics, such as daily boardings and alightings by line and for groupings of stations on the commuter rail line during the AM peak period (6:00 AM to 9:00 AM) and PM peak period (3:00 PM to 6:00 PM). CTPS will also perform calibration and summarization of traffic volumes on the regional highway networks, focusing in on interstates, divided roadways, and screenline locations for which vehicle count information is available.

#### *Product of Task 2*

- Calibrated base-year model
- Graphic and tabular summaries of the relevant roadway and transit data

### Task 3 Analyze a 2040 No-Build Scenario and Multiple Build Alternatives

#### *Subtask 3.1 Model a 2040 No-Build Scenario*

CTPS will model a 2040 No-Build scenario based upon the transportation network in the Boston Region MPO's Long-Range Transportation Plan (LRTP), *Destination 2040*, which is now in development. The assumptions underlying the 2040 No-Build scenario will be consistent with those in the LRTP and MassDOT's Capital Investment Plan, and/or other major investment projects under the direction of the project team.

*Products of Subtask 3.1*

- No-Build scenario
- Tabular summaries of trip generation and distribution results
- Mode share summaries
- Fare, parking lot, and toll revenue by mode
- Tabular summaries of boardings for the system by mode, by line, and for key stations
- Tabular summaries of traffic volume on key roadways
- Tabular summaries of travel patterns by transit corridor

*Subtask 3.2 Model 2040 Build Scenarios*

CTPS will examine as many as twelve 2040 Build alternatives. The service plans for these alternatives will be developed by the project team and provided to CTPS in a format to be determined by CTPS. CTPS will perform detailed analyses of the model results, closely examining the travel time associated with different scenarios and origin-destination pairs. CTPS will also monitor traffic volumes on key roadways in the study area to gauge the effect the scenarios may have on highways and congestion. A crowding analysis will also be performed to gauge the effect on the commuter rail lines and on major transit services.

The consultant will supply CTPS with all assumptions regarding transit operating plans, station locations, fare and parking lot fees, and alignments associated with the twelve proposed alternatives at least two weeks prior to the modeling of the alternatives. Four of the twelve alternatives will be crafted so that CTPS can perform a sensitivity test to examine parking constraints in the system, fare structure, and land-use changes associated with the different alternatives.

*Products of Subtask 3.2*

- A many as twelve build scenarios
- Tabular summaries of trip generation and distribution results
- Mode share summaries
- Fare, parking lot, and toll revenue by mode
- Tabular summaries of boardings for the system by mode, by line, and for key stations
- Tabular summaries of traffic volumes on key roadways
- Tabular summaries of travel patterns by transit corridor

*Subtask 3.3 Examine Screening Analysis and Employment Growth*

CTPS will work with the project team to examine the approach, assumptions, and results of the Tier II screening process of the Regional Dynamic Model (RDM), which the consultant used to evaluate a number of alternatives prior to selecting the ones to be studied in this work program. This task will be done to understand how the alternatives were developed, the assumptions that influenced the

results, the metrics produced, and any differences between the results. One of the outputs of the RDM is an estimate of the number of jobs in the study area; CTPS will reconcile the employment figures from the RDM with the inputs to the Boston region's travel demand model. The project team will coordinate with CTPS to determine what increase in population and households could be added to the region to support the projected employment growth. This growth land-use scenario will be one of the twelve alternatives examined in task 3.2.

*Products of Subtask 3.3*

- Internal documentation on the RDM model, RDM assumptions, and the alternatives that were examined

**Task 4 Support Air Quality and Environmental Justice Analyses**

CTPS will perform air quality and environmental justice analyses consistent with work completed for the LRTP. The air quality analysis will compare the alternatives with the no-build scenario and report emissions by region for several key pollutants, including carbon monoxide, volatile organic compounds, nitrogen oxide, carbon dioxide, and particulate matter. The environmental justice analysis will examine access to jobs, education, and healthcare by market segment.

*Products of Task 4*

- Tabular summaries of the results of air quality and environmental justice analyses consistent with what has been produced for the most recent LRTP

**Task 5 Prepare a Final Memorandum or Report**

CTPS will produce a final memorandum or reports that will summarize the assumptions utilized, the methodology developed for the analysis, and lastly document the findings of the study.

*Product of Task 5*

- Memorandum or report

**Exhibit 1**  
**ESTIMATED SCHEDULE**  
**RAIL VISION PROJECT SUPPORT**

Task	Month									
	1	2	3	4	5	6	7	8	9	10
1. Coordinate with Project Team	[Task duration bar from Month 1 to Month 10]									
2. Perform Base-Year Model Calibration for the Study Area	[Task duration bar from Month 1 to Month 2]									
3. Analyze a 2040 No-build Scenario and Multiple Build Alternatives			[Task duration bar from Month 2 to Month 7]							
4. Support Air Quality and Environmental Justice Analyses					[Task duration bar from Month 4 to Month 8]					
5. Prepare a Final Memorandum or Report							[Task duration bar from Month 6 to Month 10]			

**Exhibit 2**  
**ESTIMATED COST**  
**RAIL VISION PROJECT SUPPORT**

**Direct Salary and Overhead** **\$210,500**

Task	Person-Weeks					Direct Salary	Overhead (99.00%)	Total Cost
	M-1	P-5	P-4	P-3	Total			
1. Coordinate with Project Team	3.0	3.8	1.8	1.6	10.1	\$17,393	\$17,219	\$34,612
2. Perform Base-Year Model Calibration for the Study Area	1.5	2.0	2.1	1.7	7.3	\$11,809	\$11,691	\$23,500
3. Analyze a 2040 No-build Scenario and Multiple Build Alternatives	2.5	9.0	10.5	11.8	33.8	\$51,974	\$51,454	\$103,428
4. Support Air Quality and Environmental Justice Analyses	0.5	2.0	3.5	2.5	8.5	\$12,967	\$12,838	\$25,805
5. Prepare a Final Memorandum or Report	2.0	1.6	2.6	1.0	7.1	\$11,636	\$11,519	\$23,155
Total	9.5	18.3	20.4	18.7	66.9	\$105,779	\$104,721	\$210,500

**Other Direct Costs** **\$0**

**TOTAL COST** **\$210,500**

**Funding**  
 MassDOT 5303 Funds