BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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

MEMORANDUM

DATE November 16, 2017

TO Boston Region Metropolitan Planning Organization

FROM Karl H. Quackenbush, Executive Director

RE Work Program for Review of and Guide to Implementing Transit Signal Priority in the MPO Region

Action Required

Review and approval

Proposed Motion

That the Boston Region Metropolitan Planning Organization (MPO) votes to approve the work program for the *Review of and Guide to Implementing Transit Signal Priority in the MPO Region*, presented in this memorandum

Project Identification

Unified Planning Work Program Classification

Planning Studies

CTPS Project Number

13289

Client

Boston Region MPO

CTPS Project Supervisors

Principal: Annette Demchur
Manager: Thomas J. Humphrey

Funding

MPO Planning Contract #101725
MPO §5303 Contract #102088

Impact on MPO Work

This is MPO work and will be carried out in conformance with the priorities established by the MPO.

Background

Transit Signal Priority (TSP), an operational strategy that facilitates the movement of transit vehicles through traffic-signal-controlled intersections, can improve transit schedule adherence and travel time. Municipalities and transit operators in the Boston region have expressed interest in investigating TSP as a method to enhance regional mobility by increasing the attractiveness of transit as an alternative to single-occupant-vehicle travel. In addition, the MBTA has initiated a TSP pilot program at six intersections in four corridors in Boston, Brookline, and Cambridge, and plans to expand this program to 50 additional intersections in these corridors in the next calendar year. The MBTA has identified a strong municipal partnership as one of the key requirements for implementing a successful program.

Many types of TSP systems and technologies are available to the municipalities and agencies that own traffic-signal systems in the Boston region, and implementation of TSP is likely to involve multiple stakeholders. Therefore, the increased interest in TSP in the Boston region has created the need for guidance concerning the interagency coordination required between local transportation, traffic, and/or public works departments, and transit agencies during the planning, implementation, operation, and evaluation phases of a TSP system.

Objectives

The goal of this study is to develop a guidebook for use in planning and evaluating potential TSP treatments in the Boston region. This guidebook will be an analysis tool that the MPO staff can use to assist municipalities and transit operators that are considering implementing such treatments.

Work Description

This work will be completed in the eight tasks described below:

Task 1 Review the State-of-the-Art Transit Signal Priority Systems

The MPO staff will conduct a review of state-of-the-art technologies for providing TSP to transit vehicles and gather information on the extent to which such systems are currently in use, their capabilities and limitations, the methods used to predict their performance, and their actual performance. Staff will consult with the transit agencies serving the Boston region to identify technologies currently in use. Staff will also investigate the institutional issues faced when implementing TSP and strategies for success.

Products of Task 1

- Technical memorandum summarizing the current state-of-the-art TSP systems with respect to technology, implementation experience, and applicability to the Boston region
- Inventory of TSP technologies currently employed in the Boston region

Task 2 Review Interagency Cooperation Structure in the Boston Region

Staff will survey municipalities in the Boston region, the Department of Conservation & Recreation (DCR), and the Massachusetts Port Authority (Massport) to

- investigate the decision-making processes used by municipalities with respect to traffic signal implementation or modification;
- explore interest in partnering for TSP implementation; and
- identify potential stakeholders and issues with interagency cooperation.

Product of Task 2

- Summary of the decision-making processes used by the municipalities, DCR, and Massport for traffic signal installation or modification and their interest in partnering for TSP, and potential issues with interagency coordination

Task 3 Compile Existing Information about Traffic Signals on Boston Region Bus Routes

Staff will update existing traffic signal inventories for the roadways where bus routes operate in the Boston region. For each signalized intersection, staff will identify the bus routes and stops affected by the signal and, when available, whether the stops are near-side or far-side stops. Staff will document existing information about the equipment currently used for these signals and, when sufficient information is available, assess compatibility with local transit operator vehicle fleets and existing TSP technologies.

Products of Task 3

- Inventory of traffic signal locations on transit routes in the Boston region
- List of the documented signal technologies used on bus routes in the Boston region and their adaptability for TSP

Task 4 Conduct Comprehensive Inventory of Traffic Signals and Technologies on Selected Bus Routes

Because existing signal inventories have limited current information about the equipment in place, and it is costly to collect these data, staff will conduct a

comprehensive inventory on a limited selection of routes or route segments. The number of routes or route segments reviewed will be limited by the amount of existing signal equipment data.

Staff will coordinate with the MBTA and other regional transit authorities (RTA) operating in the Boston region to identify routes or route segments that may benefit from TSP technology. Since the MBTA plans to expand its pilot by choosing from the routes identified in a previous CTPS study, *Dedicated Bus Lanes,* as high-ridership routes that experience high rates of delay, MPO staff expects to include some of the routes or route segments identified in that study.

For the selected routes or route segments, staff will survey the relevant municipalities to

- confirm the locations of traffic signals on the selected routes or route segments;
- confirm that the information is current for signal equipment listed in existing inventories;
- conduct field visits to identify the capabilities of the existing signal equipment where the equipment is unknown and to confirm whether the bus stops at the signals are near-side or far-side stops; and
- assess the compatibility of the existing signal equipment with local transit operator vehicle fleets and existing TSP technologies.

Staff will draw upon the experience from this review to support the effort to develop a TSP guidebook.

Products of Task 4

- Comprehensive, updated inventory of traffic signal locations, equipment, and potential adaptability for TSP on selected transit routes
- Summary of the process used to obtain information about the signal equipment on these routes

Task 5 Develop Transit Signal Priority Evaluation Criteria

In this task, staff will develop criteria for identifying locations where TSP technology will be most beneficial to bus riders. The evaluation will consider both technological and institutional issues, and may include metrics for the following criteria:

- the rate of delay that bus riders experience
- the expected travel-time savings from TSP implementation

- the expected impact on cross-street traffic
- the presence of a modern traffic control device with space for additional hardware
- existing plans for installing new signals
- the presence and location (near-side or far-side) of bus stops at the intersection

Using the criteria identified, staff will develop a TSP implementation ranking matrix.

Product of Task 5

TSP implementation ranking matrix

Task 6 Review Post-Implementation Performance Metrics

Staff will review performance metrics that may be used to evaluate the outcomes of implementing TSP technologies. Measuring and documenting the realized benefit of a TSP system is an important part of determining whether such an upgrade has the intended effect.

Product of Task 6

List of potential performance metrics

Task 7 Develop a Transit Signal Priority Implementation Guidebook

Staff will develop a guidebook for evaluating the potential of TSP treatment projects in the Boston region. The guidebook will include relevant material from the previous tasks, and procedures for coordinating with operators of the transit services that would be affected by TSP implementation. Those affected may include the MBTA, RTAs, locally sponsored transit networks, or operators of private-carrier buses.

The guidebook will lay out a broad vision for a TSP implementation in the Boston region and a path to attain that vision through local actions, both related to implementation of technology and coordination among stakeholders.

Product of Task 7

TSP Guidebook

Task 8 Present Findings to the Boston Region MPO

Staff will present the findings of the study and the guidebook to the Boston Region MPO.

Product of Task 8

Presentation to the MPO board

Estimated Schedule

It is estimated that this project will be completed 9 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 $65,000. This includes the cost of 18.1 person-weeks of staff time and overhead at the rate of 105.66 percent. A detailed breakdown of estimated costs is presented in Exhibit 2.

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Exhibit 1
ESTIMATED SCHEDULE
Review of and Guide to Implementing Transit Signal Priority in the MPO Region

Task	Month 1	2	3	4	5	6	7	8	9
1. Review the State-of-the-Art Transit Signal Priority Systems	A								
2. Review Interagency Cooperation Structure in the Boston Region									
3. Compile Existing Information about Traffic Signals on Boston Region Bus Routes									
4. Conduct Comprehensive Inventory of Traffic Signals and Technologies on Selected Bus Routes									
5. Develop Transit Signal Priority Evaluation Criteria							B		
6. Review Post-Implementation Performance Metrics									
7. Develop a Transit Signal Priority Implementation Guidebook									C
8. Present Findings to the Boston Region MPO									D

Products/Milestones

A: Technical memorandum
B: TSP implementation ranking matrix
C: TSP Guidebook
D: Presentation to Boston Region MPO
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Exhibit 2
ESTIMATED COST
Review of and Guide to Implementing Transit Signal Priority in the MPO Region

Direct Salary and Overhead	**$64,900**

Task	Person-Weeks					Direct Salary	Overhead (105.66%)	Total Cost
	M-1	P-5	P-4	P-3	Total			
1. Review the State-of-the-Art Transit Signal Priority Systems	0.4	0.8	0.0	0.0	1.2	$2,266	$2,394	$4,661
2. Review Interagency Cooperation Structure in the Boston Region	0.4	1.0	0.0	1.0	2.4	$3,872	$4,091	$7,963
3. Compile Existing Information about Traffic Signals on Boston Region Bus Routes	0.1	0.6	0.0	0.5	1.2	$1,941	$2,050	$3,991
4. Conduct Comprehensive Inventory of Traffic Signals and Technologies on Selected Bus Routes	1.0	1.4	0.0	0.0	2.4	$4,523	$4,779	$9,302
5. Develop Transit Signal Priority Evaluation Criteria	0.1	1.2	0.0	1.5	2.8	$4,308	$4,552	$8,860
6. Review Post-Implementation Performance Metrics	0.1	0.6	0.0	0.0	0.7	$1,291	$1,364	$2,655
7. Develop a Transit Signal Priority Implementation Guidebook	1.5	4.0	0.5	0.0	6.0	$11,098	$11,726	$22,824
8. Present Findings to the Boston Region MPO	0.1	0.6	0.6	0.0	1.4	$2,259	$2,386	$4,645
Total	3.7	10.2	1.1	3.0	18.0	$31,557	$33,343	$64,900

Other Direct Costs	**$100**
Travel	$100

TOTAL COST	**$65,000**

Funding

MPO Planning Contract #101725
MPO §5303 Contract #102088