WORK PROGRAM

GREEN LINE CORRIDOR STUDY SUPPORT

MARCH 1, 2018

Proposed Motion

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

Project Identification

Unified Planning Work Program (UPWP) Classification

Agency and Other Client Transportation Planning Studies and Technical Analyses

Project Number 22210

Client

Massachusetts Department of Transportation, Office of Transportation Planning
Client Supervisor: Jennifer Slesinger

Project Supervisors

Principal: Scott Peterson
Manager: Bruce Kaplan

Funding Source

MassDOT §5303 Contract #100762

MassDOT SPR Contract TBD

Schedule and Budget

Schedule: Nine months from notice to proceed

Budget: $160,100

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

The Massachusetts Department of Transportation (MassDOT) and the Massachusetts Bay Transportation Authority (MBTA) are presently conducting extensive work to understand the rapid transit system's short- and long-term capacity and demand needs. Although efforts are underway to address capacity issues on the Red and Orange Lines, the Green Line also presents current and future capacity challenges. Furthermore, significant physical limitations exist on the Green Line that preclude expanding capacity by merely upgrading cars or adding cars to train sets. The MBTA is currently evaluating a variety of capital investments aimed at overcoming these capacity limitations in its Green Line Capacity Analysis study. MassDOT's Green Line Corridor study will build upon the work of MassDOT's Focus40 study, which identified anticipated Green Line capacity constraints in 2040. This corridor study will consist of a finer-grained analysis, refined projections for the Green Line corridor, and a more focused look at the best type of improvements that could complement planned investment in core Green Line assets. It is intended to complement MassDOT and the MBTA's other technical work by the following means:

- Developing a nuanced understanding of existing and long-term potential demand for the Green Line network based on projected population and employment growth to provide insights on the number of train sets needed and how other modifications to transit on the corridor can better serve projected demand
- Fostering relationships between the MBTA, MassDOT, and partner organizations along the Green Line corridor to develop and advance policies, mechanisms, and strategies to make the Green Line more attractive to travelers and improve east-west connectivity
- Developing, evaluating, and recommending innovative ideas to better serve Green Line demand

The client, MassDOT, has requested that Central Transportation Planning Staff (CTPS) assist MassDOT and its study team with this work. With the completion of this study and the Green Line Capacity Analysis study, the MBTA will be well-positioned to implement a strategic improvement plan that will satisfy existing and future demand for transit along the Green Line corridor.

Objective(s)

The objectives of this work program are to support MassDOT and its project team in the execution of the Green Line Corridor study by the following means:

1. Collecting data about current Green Line use, service levels, and competing modes

2. Assisting in the development of transit service planning scenarios
3. Using the Boston Region MPO regional travel demand model set to assess the existing Green Line conditions and to analyze various proposed land use and transit scenarios for the horizon year of 2040
4. Updating the Green Line Simulation Tool (GLST) and using it to examine operational questions

Work Description

The work required to accomplish the objectives will be carried out in nine tasks, described below.

Task 1 Coordinate with Project Team and Stakeholders

CTPS will coordinate with the project team and participate in no more than one internal meeting each week over a nine-month period. CTPS will also coordinate with MassDOT, the MBTA, and any external stakeholders that MassDOT feels are needed to support the analysis. In the event of project delays beyond CTPS's control, the project team and CTPS will revise the schedules to be consistent with the timing of project deliverables.

Products of Task 1

Communication with the project team and stakeholders, consisting of phone calls and internal and external meetings

Task 2 Data Gathering to Support the Analysis

CTPS will support the project team by obtaining, collecting, and sharing data on transit service operational characteristics, transit usage, and demographics along the Green Line corridor.

Products of Task 2

A consistent data set that can be used for anticipated demand modeling and micro-simulation work

Task 3 Calibrate 2016 Base-Year Travel Demand Model

CTPS will perform a base-year model calibration for the study area. This task consists of refining and enhancing the Boston Region MPO's model set to accurately represent the region's inner core area, which is the market area for the Green Line. CTPS will summarize the results from a calibrated base-year model in sufficient detail to provide system wide statistics, such as daily boardings and alightings during the AM peak period (6:00 AM to 9:00 AM), PM peak period (3:00 PM to 6:00 PM), and daily ridership, in addition to line-specific information on the Green Line. CTPS will work with the project team to identify outputs from the travel demand model that

will be able to support a micro-simulation model that can examine finer temporal and spatial patterns of Green Line service.

Products of Task 3

Calibrated base-year model set

Relevant graphic and tabular outputs from the calibrated model

Task 4 Model 2040 No-Build Scenario

CTPS will model a 2040 No-Build scenario based upon the transportation network and adopted land use in the Boston Region MPO's Long-Range Transportation Plan (LRTP), *Charting Progress to 2040*. CTPS will summarize the results in the same manner as in Task 3. The assumptions underlying the 2040 No-Build scenario will be consistent with those in the LRTP, MassDOT's Capital Investment Plan, and other major investment projects under the direction of the project team. A crowding analysis will be one of the outputs of the analysis.

Products of Task 4

No-Build 2040 scenario

Graphic and tabular outputs of relevant modeled transit data, including crowding analyses, to support project team analysis

Task 5 Assist Project Team with Transit Service Plan Development

MassDOT and the project team, working with CTPS, will develop up to seven transit service plans for improving Green Line operations based upon a variety of ideas capable of being represented in the travel demand model. These ideas may potentially involve service and/or operational changes to Green Line stations as well as some minor land use reallocations along the Green Line corridor. CTPS will translate these ideas into the appropriate inputs for use in its modeling tools.

Products of Task 5

Transit service plans for up to seven alternatives

Refined land use data for use in modeling tools

Task 6 Test Alternatives and Analyze Results

The scenarios developed in Task 5 (the Build alternatives) will be modeled using the adopted socio-economic data in the Boston Region MPO's LRTP and a maximum of two land use scenarios that slightly differ from these data, while retaining the LRTP's municipal control totals. CTPS will also perform a crowding analysis to gauge the effect that the project ideas will have on the Green Line and other parallel transit services.

Products of Task 6

Up to seven Build alternatives utilizing the service plans described in Task 5 and the land use scenarios described above

Graphic and tabular outputs of relevant modeled transit data, including crowding analyses, to support project team analysis

Task 7 Update GLST

CTPS's GLST evaluates the effects of varying operating strategies and demand levels on the number of trains that can be run through the Green Line Central Subway in a given time interval. In addition, it tests the amount of time it takes for the trains to travel between selected timing points. CTPS needs to update the model to current software versions and calibrate it using current data and reflecting current conditions.

Product of Task 7

An updated GLST

Task 8 Apply the GLST to Operational Questions

CTPS will use the GLST to examine up to three alternatives examined in Task 6 using outputs from the modeling work.

Product of Task 8

Outputs from the GLST for up to three alternatives

Task 9 Document Assumptions, Methodology, and Results

CTPS will produce a final memorandum to summarize the assumptions, methodology, and results of the study.

Products of Task 9

Technical Memorandum

Exhibit 1
ESTIMATED SCHEDULE
Green Line Corridor Study Support

Task	Month 1	2	3	4	5	6	7	8	9
1. Coordinate with Project Team and Stakeholders									
2. Data Gathering to Support the Analysis									
3. Calibrate 2016 Base-Year Travel Demand Model									
4. Model 2040 No-Build Scenario									
5. Assist Project Team with Transit Service Plan Development									
6. Test Alternatives and Analyze Results									
7. Update Green Line Simulation Tool (GLST)									
8. Apply the GLST to Operational Questions									
9. Document Assumptions, Methodology, and Results									

Exhibit 2
ESTIMATED COST
Green Line Corridor Study Support

Direct Salary and Overhead	**$160,100**

Task	Person-Weeks					Direct Salary	Overhead (105.66%)	Total Cost
	M-1	P-5	P-4	P-3	Total			
1. Coordinate with Project Team and Stakeholders	1.5	1.5	1.0	0.0	4.0	$7,035	$7,433	$14,467
2. Data Gathering to Support the Analysis	0.5	0.0	0.0	2.5	3.0	$3,991	$4,217	$8,209
3. Calibrate 2016 Base-Year Travel Demand Model	0.2	2.2	0.0	1.0	3.4	$5,878	$6,211	$12,088
4. Model 2040 No-Build Scenario	0.2	2.0	0.0	0.0	2.2	$4,272	$4,514	$8,786
5. Assist Project Team with Transit Service Plan Development	1.0	2.2	0.0	0.0	3.2	$6,046	$6,388	$12,435
6. Test Alternatives and Analyze Results	1.2	10.3	0.0	0.0	11.6	$22,023	$23,270	$45,294
7. Update Green Line Simulation Tool (GLST)	0.5	5.0	0.0	0.0	5.5	$10,448	$11,039	$21,488
8. Apply the GLST to Operational Questions	0.5	1.5	2.5	1.0	5.5	$8,484	$8,964	$17,448
9. Document Assumptions, Methodology, and Results	1.5	0.5	2.5	2.0	6.5	$9,669	$10,217	$19,886
Total	7.2	25.2	6.0	6.5	45.0	$77,847	$82,253	$160,100

Other Direct Costs	**$0**

TOTAL COST	**$160,100**

Funding

MassDOT §5303 Contract #100762
MassDOT SPR Contract TBD