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and MPO Chairman

Karl H. Quackenbush
Acting 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 September 22, 2011
TO Transportation Planning and Programming Committee
of the Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush, CTPS Acting Director
RE Work Program for: Interstate 495 and Route 9 Interchange
Improvement Study: Support

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 Department of Transportation, vote to approve the work program for Interstate 495 and Route 9 Interchange Improvement Study: Support in the form of the draft dated September 22, 2011.

PROJECT IDENTIFICATION

Unified Planning Work Program Classification

Planning Studies

CTPS Project Number

95051

Client

Massachusetts Department of Transportation

Project Supervisor: Callida Cenizal

CTPS Project Supervisors

Principal: Karl Quackenbush

Manager: Scott Peterson

Funding

MassDOT SPR Contract #68456

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

Over the past twenty years, the communities along the Interstate 495 (I-495) corridor from Interstate 290 (I-290) to Interstate 90 (I-90/MassPike) have experienced rapid population and employment growth. This growth has brought a tremendous increase in traffic to the I-495 corridor and its surrounding neighborhood: the annual average weekday traffic (AWDT) is approximately 111,000 on the I-495 mainline north of the MassPike at Westborough. It has also resulted in ongoing capacity issues at several interchanges, specifically the interchange of I-495 and Route 9 and the interchange of I-495 and I-90 in the towns of Westborough and Southborough. The short weaving distance between the on- and off-ramps at these interchanges and the spillover impact from delays at the interchange of I-495 and I-90 appear to be the primary causes of congestion.

The study area of this project is shown in Exhibit 1. It extends from Route 30 south to Route 135 and from Route 135 east to Route 85. It includes the MBTA commuter rail stations in the towns of Westborough and Southborough.

OBJECTIVES

The purpose of this project is to support MassDOT in conducting a study that will evaluate and address transportation issues concerning the interchange of I-495 and Route 9 and the interchange of I-495 and I-90 in the towns of Westborough and Southborough and the surrounding area. The MassDOT study will focus on the analysis of a number of roadway improvements, including their air quality and environmental justice aspects. The objectives of the CTPS support project are twofold:

1. To provide general technical assistance, as needed, and attend stakeholder meetings
2. To evaluate the travel patterns under existing conditions, estimate the future-year no-build conditions, and estimate the changes in traffic conditions under the future-year build alternatives associated with various proposed construction plans for the I-495 mainline and its interchanges

WORK DESCRIPTION

This project consists of six tasks:

1. License plate survey data will be collected at multiple locations on I-495 and in the vicinity of the I-495 and Route 9 interchange.
2. The model set will be calibrated to a base year (2009) using traffic counts, transit information, congested speeds, and toll revenue.
3. CTPS will develop and model a no-build scenario for the 2035 forecast year and analyze the model results. This scenario will incorporate known developments in the vicinity of the study area in addition to the land use in the MPO's Long-Range Transportation Plan (LRTP).
4. Using the no-build model set, CTPS will test up to a maximum of three build alternatives which will be determined based on input from MassDOT and the project team. CTPS will examine the results at multiple roadway locations.
5. CTPS will provide support to MassDOT and project stakeholders for up to one year from the start of this project.
6. The methodology and results of the analysis will be documented in a technical memorandum.

Task 1 Conduct License Plate Survey

CTPS will conduct a license plate survey at up to six locations along I-495 and Route 9 in the AM peak period. The purpose of this is to obtain a sample of the trip origins of vehicles using I-495 and Route 9 and to review the percentage of the traffic coming from outside the CTPS model area. It should be noted that only selected lanes will be included in the survey. The trip origin information for vehicles using I-90 will be provided by MassDOT from the turnpike toll transaction data. The information from the license plate survey will be used to validate the model's estimated traffic patterns.

Products of Task 1

Tabular summaries of results from license plate survey

Task 2 Develop and Calibrate Base-Year (2009) Model

CTPS will develop a 2009 base-year model and calibrate it to highway and transit data in the study area. This task consists of examining and refining the roadway network of the regional model along the I-495 corridor so that it will accurately replicate the base-year (2009) network conditions in the project area. It should be noted that CTPS will not expand the zone structure of the regional model for either base-year or future-year

models. The calibrated base-year model will then be utilized to develop future-year no-build and build scenarios. The calibration efforts will focus on the following locations:

- I-495 / Route 9 interchange
- I-495 mainline between Route 9 and I-90
- I-495 / I-90 interchange

CTPS will provide a brief memorandum on the results of the base-year model calibration.

Products of Task 2

- A calibrated and validated base-year model set by time period
- Tabular and graphical summaries of highway assignment results for the study area
- Tabular and graphical summaries of turning movements for the two interchanges
- Tabular summaries of transit ridership and boardings for selected transit lines and stations
- A brief memorandum on the results of the base-year model calibration

Task 3 Model Future-Year No-Build Scenario for 2035

CTPS will identify the known proposed developments in the vicinity of the study area (for example, the EMC campus on Route 9 in Westborough/Southborough). In this task, the proposed developments will be integrated with the LRTP land use to create the land use for the 2035 no-build scenario. CTPS will prepare data for the multimodal travel demand model based on the proposed developments and other land use. The number of jobs and number of residential units generated by the proposed future uses and gross estimates of square footage will be converted into the data format required for the trip generation process of the model. CTPS will also provide guidance and support to the project team pertaining to adjustment of the socioeconomic data for Westborough and Southborough. The adjustment will be based on control totals for households, population, and employment from the LRTP.

A 2035 no-build multimodal network will be created, based on the LRTP. Limited changes will be added to the LRTP network to provide accessibility to the known proposed developments. The outputs of the no-build model run will be used as the basis for analyzing the impacts of the build scenarios described in Task 4.

Products of Task 3

- Revised land use data in tabular form for the multimodal regional model in the required format
- A 2035 no-build model set
- Highway and transit trip tables to use as inputs to the build scenarios
- Tabular and graphic summaries corresponding to those produced in Task 2 for the base year

Task 4 Develop and Model Multiple Build Alternatives and Analyze Results

CTPS will modify the no-build multimodal network to reflect up to a maximum of three build scenarios identified by the project team. The build scenarios will utilize the same land use assumptions as the no-build scenario. The traffic operations under each build scenario at the study interchanges will be examined qualitatively to determine the likely impact of the scenario's roadway network changes. The results of this modeling will be analyzed, comparing traffic conditions under the baseline scenario to conditions under each of the proposed alternatives. The comparisons will focus on peak volumes, turning movements, vehicle-miles traveled (VMT), vehicle-hours traveled (VHT), emissions, and linked and unlinked transit trips by mode in the study area.

When a preferred smart growth land use plan developed in the I-495 Corridor/MetroWest Development Compact: Land Use Study is selected by the project team, CTPS will conduct a sensitivity study to examine the impacts of that smart growth land use scenario on traffic volumes and travel patterns under the preferred build alternative.

CTPS will work in coordination with the project team on air quality analyses and environmental justice analyses based on the model results. CTPS will also assist in economic development analyses and provide data as needed.

Products of Task 4

- Tabular and graphic summaries comparing each build scenario with the no-build in terms of traffic volumes, turning movements, VMT, VHT, and transit ridership
- Tabular and graphic summaries comparing sensitivity study with a selected build scenario in terms of traffic volumes, turning movements, VMT, VHT, and transit ridership
- Tabular summaries of emissions in the study area for the air quality study
- Tabular summaries of environmental justice analysis

Task 5 Coordinate with Project Team and Provide Ongoing Technical Assistance

CTPS will work with the project team for up to one year from the start date of this project. The work will consist of attending up to a maximum of seven internal meetings as well as three meetings with stakeholders. CTPS will fulfill any data requests from the project team, when the data are readily available, and educate the stakeholders about any of the work included in this scope. CTPS will coordinate as needed with other project teams that are involved in any major transportation or land use studies that are taking place in the study area, such as the I-495 Corridor/MetroWest Development Compact: Land Use Study.

Products of Task 5

Coordination with the project team, attendance at meetings, data provided to the project team, and memos and presentations as needed

Task 6 Produce Technical Memorandum

Prepare technical memorandum documenting the work done and comparing the model results for the three build scenarios with the baseline scenario results.

Product of Task 6

A technical memorandum with tabular and graphical summaries of results and documentation of the methodology used in the analysis

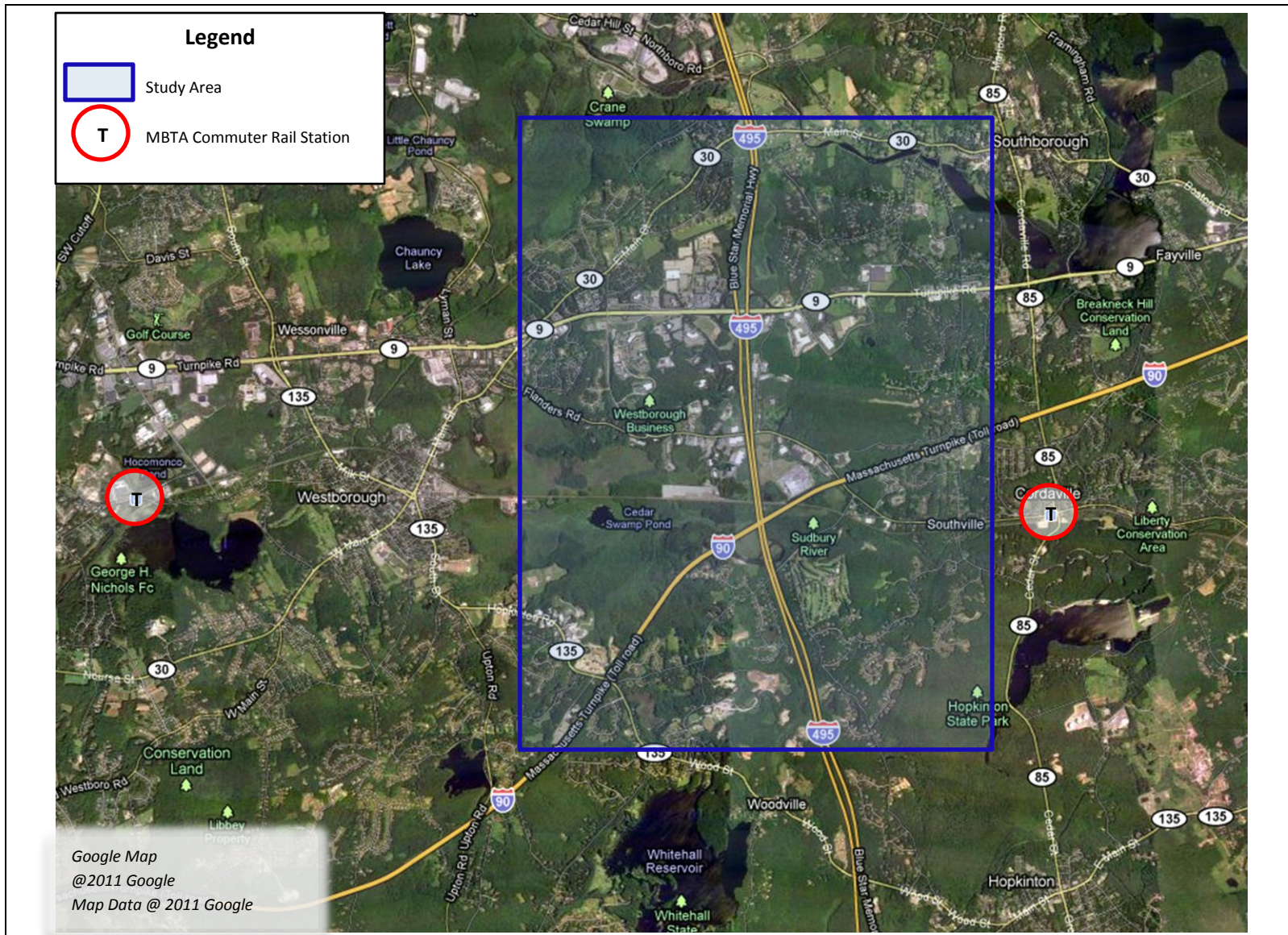
ESTIMATED SCHEDULE

It is estimated that this project will be completed 10 months after the notice to proceed is received. The proposed schedule, by task, is shown in Exhibit 2.

ESTIMATED COST

The total cost of this project is estimated to be \$86,500. This includes the cost of 38.5 person-weeks of staff time, overhead at the rate of 94.57 percent, travel, and other direct costs. A detailed breakdown of estimated costs is presented in Exhibit 3.

KQ/SAP/YB/yb

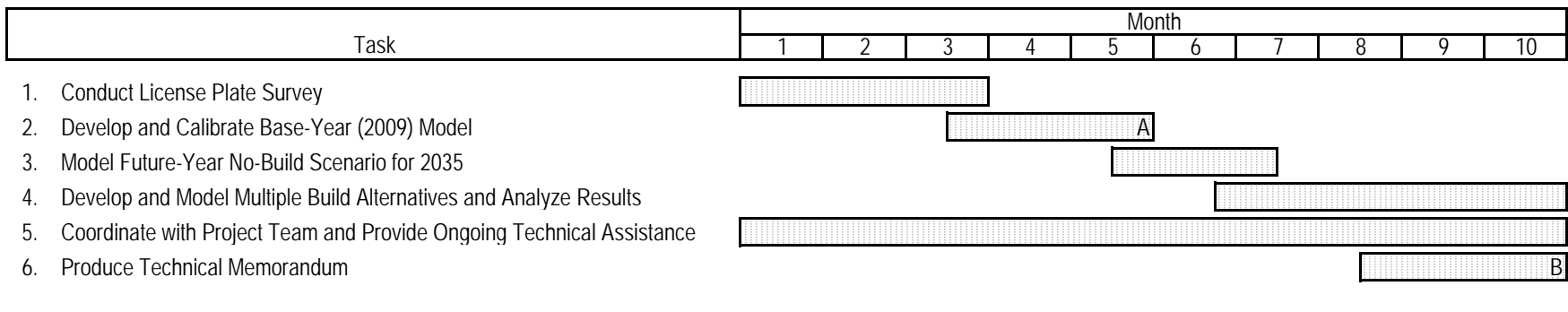


CTPS

**Exhibit 1
 Project Study Area**

Interstate 495 and
 Route 9 Interchange
 Improvement Study:
 Support

Exhibit 2
 ESTIMATED SCHEDULE
 Interstate 495 & Route 9 Interchange Improvement Study: Support



Products/Milestones

A: Brief technical memorandum with tabular and graphical summaries of results of base year model calibration

B: Technical memorandum with tabular and graphical summaries of results and documentation of the methodology used in the analysis.

Exhibit 3

ESTIMATED COST

Interstate 495 & Route 9 Interchange Improvement Study: Support

Direct Salary and Overhead	\$85,300
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Task	Person-Weeks						Direct Salary	Overhead (@ 94.57%)	Total Cost
	M-1	P-5	P-4	P-3	Temp	Total			
1. Conduct License Plate Survey	0.5	1.5	0.0	2.0	8.0	12.0	\$9,200	\$8,700	\$17,900
2. Develop and Calibrate Base-Year (2009) Model	0.5	1.5	2.5	1.5	0.0	6.0	\$7,863	\$7,436	\$15,300
3. Model Future-Year No-Build Scenario for 2035	0.8	1.0	1.2	1.5	0.0	4.5	\$5,962	\$5,638	\$11,600
4. Develop and Model Multiple Build Alternatives and Analyze Results	1.0	2.0	2.0	3.5	0.0	8.5	\$10,947	\$10,353	\$21,300
5. Coordinate with Project Team and Provide Ongoing Technical Assistance	0.8	0.0	0.6	1.1	0.0	2.5	\$3,186	\$3,013	\$6,200
6. Produce Technical Memorandum	1.0	1.0	1.6	1.4	0.0	5.0	\$6,681	\$6,318	\$13,000
Total	4.6	7.0	7.9	11.0	8.0	38.5	\$43,839	\$41,459	\$85,300

Other Direct Costs	\$1,200
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Travel	\$200
video camera rentals, videotapes, batteries	\$1,000

TOTAL COST	\$86,500
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Funding

MassDOT SPR Contract #68456