



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

MEMORANDUM

DATE December 1, 2011
TO Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush
CTPS Executive Director
RE Work Program for: TIP Project Impacts Before-After
Evaluation, FFY 2012

ACTION REQUIRED

Review and approval

PROPOSED MOTION

That the Boston Region Metropolitan Planning Organization vote to approve the work program for TIP Project Impacts Before-After Evaluation, 2012 in the form of the draft dated December 1, 2011.

PROJECT IDENTIFICATION

Unified Planning Work Program Classification

Technical Support/Operations Analysis Projects

CTPS Project Number

12202

Client

Boston Region Metropolitan Planning Organization

CTPS Project Supervisors

Principal: Efi Pagitsas

Manager: Mark Abbott

Funding

MPO Planning Contract #69965

MPO §5303 Contract #70172

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Executive Director, MPO Staff

The Boston Region MPO is composed of:

Massachusetts Department of
Transportation

Metropolitan Area Planning Council

Massachusetts Bay Transportation
Authority Advisory Board

Massachusetts Bay Transportation
Authority

Massachusetts Port Authority

Regional Transportation Advisory
Council

City of Boston

City of Beverly

City of Everett

City of Newton

City of Somerville

City of Woburn

Town of Arlington

Town of Bedford

Town of Braintree

Town of Framingham

Town of Lexington

Town of Medway

Town of Norwood

Federal Highway Administration
(nonvoting)

Federal Transit Administration
(nonvoting)

IMPACT ON MPO WORK

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

BACKGROUND

This will be a pilot study to identify the effectiveness of selected TIP projects. Measuring project effectiveness is important in order to know whether the employed strategies work well and are, therefore, suitable for application in similar situations.

To this end, staff will select TIP projects that were constructed in Federal Fiscal Years 2010 and 2011. This would allow users at the newly implemented project to become familiar with the operations and for user demand to normalize in the area. The “before” data and relevant measures of effectiveness will be gathered from existing functional design reports or traffic studies. The “after” data will be collected by MPO staff in the field and the measures of effectiveness will be calculated from this data.

The “before” and “after” data and associated performance measures that will be calculated depend on the type of project and improvements that are considered for assessment, and also the primary objective of the TIP project. Typically, for intersection improvement projects, intersection operations and safety will be evaluated using turning movement counts, operational performance measures, and crash data. Staff will compare the two sets of data and draw conclusions on changes in performance.

OBJECTIVE

This pilot study will help identify if certain improvement strategies work well and are therefore suitable to propose for other project locations in the Boston Region MPO area. Up to six projects could be evaluated as part of this study.

WORK DESCRIPTION

Task 1 Select Projects

This task will initially identify up to six project locations throughout the region listed in previous TIPs and MassDOT project files that have available functional design reports, and traffic, or other studies and that have also been recently reconstructed based upon the recommended improvements found in the reports and/or studies. Staff will determine this group of projects by employing a variety of strategies:

- Review past MPO TIP and MassDOT projects to identify prospective locations that have been reconstructed.
- Review locations with the Massachusetts Department of Transportation (MassDOT) to obtain reports or studies.
- Give priority to project locations that have an MBTA or other bus route passing through the project.
- Priority will also be given to projects that have a less traditional design improvement (i.e. Roundabout, signal coordination, etc.).

Project list could include isolated signalized intersection reconstruction, group of intersections along a reconstructed corridor, interchange reconstruction projects, and/or bike-pedestrian accommodations. Criteria for selecting a particular project from the list will include:

- Construction completed in the last couple years
- Availability of Functional Design Reports or traffic/other studies that can provide “Before” data
- Selection consideration will be given to urban and suburban environments

Product of Task 1

A table listing up to six projects throughout the region, selected as described above. The table will include information explaining why the projects were chosen and the type of improvements that were implemented.

Task 2 Perform Field Reconnaissance and Collect “After” Data

Once the projects have been selected, staff will collect detailed “After” data and information pertaining to each location in the project. This will involve visiting each site and inventorying all relevant geometric, land use, and operational features. For example, for intersection projects, data may include:

- Manual turning movement counts (MTMCs)
- Bicycle counts
- Pedestrian counts
- Transit vehicle counts
- Signal timing data (phases, timing lengths)
- Queue lengths
- Geometric data (lanes, curb cuts, sidewalks, crosswalks, pedestrian buttons, transit amenities)
- Land use and zoning information
- Jurisdictional and administrative responsibilities
- Crash Data

Note that crash data for the “After” safety evaluation may not be complete, since a 5-year or 3-year crash data history, the standard period for which safety data is required, would not be available since construction completion. Analysis may be qualitative and somewhat limited, based on information gathered from local police departments from the time of construction completion until present.

Products of Task 2

Depending on the type of project evaluated, products may include summaries of traffic counts, signal information, queues, geometric data, land use and jurisdictional information, or other relevant performance data for the final group of selected projects will be provided.

Task 3 Evaluate Selected Projects

Staff will evaluate each project using various types of analysis. Also, the analysis will depend on the type of project being evaluated. The following pertain largely to intersection projects. First, counts such as turning movements, Automatic Recorder Counts, pedestrian counts or bicycle counts will be compared to determine if traffic growth has occurred as expected. Second, the area will be examined for any land developments since the “before” data were collected to enable staff to differentiate traffic impacts from the improvement and increased development. Third, the crash data for each location will be analyzed with regard to crash type and severity and whether bicycles or pedestrians were involved in the crashes. Fourth, a capacity analysis will be performed in order to determine the operational level of service at each intersection. Particular attention will be given to the evaluation of existing pedestrian signal phases, if any, or the need for them. Fifth, field observations will be performed to gain a full understanding of safety levels and of the operations of vehicles, bicycles, and pedestrians at each location. For example, the following measures of effectiveness (MOEs) will likely be used in evaluating the project, if it involves intersections:

- Level of service (LOS)
- Traffic volumes
- Pedestrian and bicycle activity
- Intersection and approach delay
- Queue length
- Comparison of “before” and “after” crash data: number of crashes and crash types
- Crash rates (if a minimum of three years of recent MassDOT crash data are available for the reconstructed intersection)
- Air quality assessment; fuel usage, economy, and emissions (if data are available from FDRs or traffic reports)

Products of Task 3

Summaries of “before” and “after” performance measures for the selected projects, including (for intersection projects) level of service, incidence and

types of crashes, and an overall assessment of how safe or unsafe it is and how well or how poorly traffic and other modes, including buses, are processed through it

Task 4 Document All Findings

Staff will document all study tasks in a technical memorandum. The memorandum will provide information related to the type of project improvement and a comparison of the “before” and “after” analysis to identify if a particular improvement or parts of it would be useful to apply in future projects to improve operations or safety.

Product of Task 4

A technical memorandum documenting Tasks 1 through 3, including documentation of any conclusions based upon the “before” and “after” analysis. A summary of the types of improvements, along with the positive or negative of the improvement will be provided.

ESTIMATED SCHEDULE

It is estimated that this project will be completed 16 weeks 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 \$30,000 MPO Planning funds. The total cost includes 10.5 person-weeks of staff time, overhead at the rate of 94.57 percent, and travel. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/EP/ma

Exhibit 2
 ESTIMATED COST
 TIP Project Impacts Before-After Evaluation, FFY 2012

Direct Salary and Overhead	\$29,858
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Task					Direct Salary	Overhead (@ 94.57%)	Total Cost
	M-1	P-5	Temp	Total			
1. Select Intersections	0.1	1.0	0.0	1.1	\$1,799	\$1,701	\$3,501
2. Perform Field Reconnaissance and Collect Data	0.1	0.4	1.6	2.1	\$1,591	\$1,505	\$3,096
3. Evaluate Selected Intersections	0.1	3.2	0.0	3.3	\$5,394	\$5,101	\$10,495
4. Document all Findings	1.5	2.5	0.0	4.0	\$6,561	\$6,205	\$12,766
Total	1.8	7.1	1.6	10.5	\$15,346	\$14,512	\$29,858

Other Direct Costs	\$142
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Travel	\$142
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TOTAL COST	\$30,000
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Funding

MPO #5303 Contract #70172; MPO 3C Planning Contract #69965