



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Frank DePaola, Acting MassDOT Secretary and CEO and MPO Chairman
Karl H. Quackenbush, Executive Director, MPO Staff

MEMORANDUM

DATE December 18, 2014
TO Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush
CTPS Executive Director
RE Work Plan for: Congestion Management Process: FFY 2015

Action Required

Review and approval

Project Identification

Unified Planning Work Program Classification

Planning Studies

CTPS Project Number

11123

Client

Boston Region Metropolitan Planning Organization

CTPS Project Supervisors

Principal: Mark Abbott

Manager: Ryan Hicks

Funding

MPO Planning Contract #84053

MPO §5303 Contract #78922

MPO §5303 Contract #84080

Impact on MPO Work

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

Background

Purpose

The Congestion Management Process (CMP) is an integral part of the metropolitan transportation-planning process. The purpose of the CMP is to apply a systematic, performance-driven approach to measuring and identifying congested and mobility-deficient locations, corridors, and services to assess safety and mobility concerns and their causes.

Findings from the CMP are used to propose mitigation projects and strategies to be included in the MPO's Long-Range Transportation Plan (LRTP). Projects funded by the MPO's TIP are evaluated through the CMP. The CMP utilizes data to evaluate the effectiveness of strategies that have been implemented. In addition, the CMP recommends appropriate detailed follow-up studies and prioritizes them for funding in the MPO's Unified Planning Work Program (UPWP).

Synopsis of the Boston Region MPO's CMP Program

The MPO began its CMP program in 1995 through the federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) legislation. Moving Ahead for Progress (MAP-21), which is the current federal transportation legislation, expanded the CMP role. New legislative requirements include monitoring congestion reduction and system reliability. The national goal of congestion reduction is "to achieve a significant reduction in congestion on the national highway system." The national goal of system reliability is "to improve the efficiency of the surface transportation system."¹

As a result of CMP monitoring, numerous studies have been included in the UPWP, and many projects have been included in the LRTP and TIP for construction funding. CMP products can be viewed on the Boston Region MPO's website, under Plans and Programs. A small sampling of current and past work conducted by MPO staff that was based on recommendations originating from CMP monitoring includes:

- Needs Assessments for the LRTP
- Roadway Speeds and Travel Time Monitoring using INRIX data

¹ MAP-21 – Moving Ahead for Progress in the 21st Century: Performance Management, September 2013.

- *Boston Region MPO Congestion Management Process: Performance-Based Planning for Efficiency, Mobility, and Safety (2013 CMP report)*²
- Routes 127A/127 Subregional Priority Roadway Study in Gloucester and Rockport (2014)
- Route 3A Subregional Priority Roadway Study in Cohasset and Scituate (2014)
- Priority Corridors for the LRTP Needs Assessment: Traffic Signal-Retiming Study for Route 2 in Concord and Lincoln (2014)
- Priority Corridors for the LRTP Needs Assessment: Route 30 Study (Route 30 Arterial Segment Study in Framingham and Natick, 2013)
- Route 114 in Danvers, Interstate 95 to the Peabody City Line: Safety, Operations, and Access Management Study (2012)
- Route 203 (Gallivan Boulevard and Morton Street): Safety, Mobility, and Access Management (2012)
- Federal fiscal year (FFY) 2011 and FFY 2012 Safety and Operations Analyses at Selected Intersections
- Low-Cost Improvements to Bottleneck Locations, Phase I (2011)
- Low-Cost Improvements to Bottleneck Locations Phase II (2012)
- Improving Pedestrian and Bicycle Access to Selected Transit Stations (2005)
- 2012–13 Inventory of Park-and-Ride Lots at MBTA Facilities
- 2012 Inventory of Bicycle Parking Spaces and Number of Parked Bicycles at MBTA Stations
- Arterial and Freeway Average Travel Speed Maps
- Lists of the Most Congested Intersections
- MassDOT Park-and-Ride Lot Capacity and Utilization Monitoring
- HOV Monitoring
- Freeway Speed and Travel Time Monitoring

² *Boston Region MPO Congestion Management Process: Performance-Based Planning for Efficiency, Mobility, and Safety*, January 2013.

In 2013, the Boston Region MPO purchased pre-collected roadway travel-time data for 2012 from INRIX, which enabled the CMP to increase the scope of its performance monitoring.

CMP: Management and Operations (M&O)

The CMP is one of the major avenues for planning management and operations (M&O) strategies, including Intelligent Transportation Systems (ITS) projects. M&O strategies generally include non-capital-intensive solutions that typically require no right-of-way takings and usually include incident management, traffic signal management, and other types of improvements that may depend on technology instead of lane additions to effect congestion, safety, and mobility improvements. When planning for operations through the CMP, a strategic and informed approach is used to address recurring congestion through short- and medium-range solutions. These transportation strategies seek to optimize existing capacity rather than providing new capacity.

Objectives

The mission of the Boston Region MPO's CMP is to:

Support sustainable growth in economic activity, sustain livability in the region, prevent the increase in congestion, and improve mobility, efficiency, and safety for people, goods, and services by encouraging programs that reduce single-occupant-vehicle use, including transportation systems management and operations, travel demand management, and technology.

The objectives of this work plan are:

- Continue to support and coordinate with the MPO's CMP Committee in CMP program guidance
- Recommend strategies for improving mobility and access and reducing congestion at specific intersections and transit stations in the region's transportation system
- Identify, evaluate, and select strategies to include in the LRTP, TIP, and UPWP
- Monitor the effectiveness of congestion management strategies implemented through the TIP
- Determine innovative ways to communicate the results of the analysis of the recently purchased INRIX data to public officials and the general public

- Determine if there is variability in the duration or extent of congestion by individual roadway facilities
- Ensure that the Boston Region MPO's CMP conforms to MAP-21 standards
- Establish and refine measures to understand the performance of the transportation system

Work Description

Task 1 Support for the CMP Committee and Additional CMP Staff Activities

The Boston Region Metropolitan Planning Organization Congestion Management Committee was formed in January 2012. The purpose of the Congestion Management Committee is to assist with implementation of the recommended solutions from the most recent CMP report,³ the LRTP, the TIP, and corridor studies.

The CMP Committee will meet approximately eight times during federal fiscal year 2015. In order to support the CMP Committee, staff will organize and attend meetings. Meeting preparation includes creating agendas, meeting minutes, and presentation materials, and ensuring that the meetings are ADA accessible.

Some additional CMP-related activities include monitoring the progress of the TIP's Intersection Improvement Program, enhancing the CMP's Express-Highway Performance Dashboard and Arterial Performance Dashboard, and evaluating the projects that were submitted for the FFY 2016–19 TIP for CMP screening.

Subtask 1.1 Prepare Materials for CMP Committee Meetings

Staff will prepare materials for each CMP Committee meeting. This subtask requires the creation of CMP Committee agendas, meeting minutes, and presentation materials.

Subtask 1.2 Monitor TIP Intersection Improvement Program

\$750,000 has been allocated for the Intersection Improvement Program for FFY 2014 and FFY 2015. Staff are responsible for initiating communication with prospective municipalities. Staff will send letters to municipal staffs to solicit interest in the Intersection Improvement Program. Staff will also provide progress updates to the CMP Committee.

³ *Boston Region MPO Congestion Management Process: Performance-Based Planning for Efficiency, Mobility, and Safety*, January 2013.

Subtask 1.3 Finalize and Launch the Express-Highway Performance Dashboard and the Arterial Performance Dashboard

Over the past few months, MPO staff have been constructing an online visualization tool that will depict congestion along freeways and arterial roadways in the Boston region. These visualization tools are called the Express Highway Performance Dashboard and the Arterial Performance Dashboard. The dashboards use performance measures to monitor the duration, extent, intensity, and reliability of congestion on roadways.

These dashboards will be finalized and made available to the general public. The Boston Region MPO has received some minor comments on the dashboards, which will be addressed by staff.

Subtask 1.4 Evaluate FFY 2016-19 TIP Projects through the CMP

Every year, projects are submitted to the MPO for the TIP. In order for a project to appear in the TIP, it must meet certain CMP criteria. Projects that are submitted for the TIP are evaluated to determine if they are located in a congested area and if the project would relieve congestion.

Subtask 1.5 Ensure that the CMP Is Compliant with MAP-21 and Refine Performance Measures

Staff will ensure that the Boston Region MPO's CMP continues to comply with all federal requirements. Staff will keep abreast of upcoming MAP-21 legislation to determine if additional performance measures are suitable for the Boston Region MPO. CMP staff will work closely with the CMP Committee and the Certification Activities Group on this task.

Products of Task 1

- Materials for CMP Committee meetings
- Letters to communities that solicit interest in participating in the Intersection Improvement Program
- The Express-Highway Performance Dashboard and Arterial Performance Dashboard will be posted to the Boston Region MPO website
- List of TIP projects that passed CMP evaluation
- Revised list of performance measures, if applicable

Task 2 Create Roadway Congestion Scans

The Boston Region MPO has acquired vehicle-monitoring data from INRIX, which is a third-party vendor for travel-time information. INRIX provides travel-speed data for every minute of 2012 for most major roadways in the Boston

Region MPO area. A useful analytical technique for measuring the extent of congestion is creating congestion scans. A congestion scan is a visualization technique used to display the extent of congestion, which is the element that is currently missing from the Express Highway Performance Dashboard and Arterial Performance Dashboard. A congestion scan shows in detail the location, intensity, and longevity of congestion within a specific corridor. Congestion scans enable commuters, planners, and engineers to visualize where and at what time of the day the corridor is congested. Congestion scans also show how peak periods vary by roadway facility and location. The speed Index, which is determined by dividing the average speed by the posted speed limit, is the performance metric that is represented on congestion scans.

The FFY 2015 budget provides enough funding for 33 congestion scans. The congestion scans can be created for 11 freeways and up to 22 priority arterials. On the draft list of roadways considered for a congestion scan, all of the freeways will be selected for the creation of congestion scans, but only the arterials that have an average annual daily traffic count of 35,000 or greater will be selected for the creation of congestion scans. The freeways that will be analyzed and the arterials being considered for analysis are listed below.

Freeways to Be Analyzed

- I-290
- I-495
- I-90
- I-93
- I-95
- Route 128
- Route 2
- Route 24
- Route 3 South
- Route 1
- Route 3 North

Arterials to Be Considered for Analysis

- Route 1 – northernmost section
- Route 114
- Route 4/225
- Route 20
- Route 9
- Route 109
- Route 1 South
- Route 138
- Route 3A

- Route 28 South
- Route 203
- Storrow Dr.
- Memorial Drive/Fresh Pond parkway
- Route 28 North
- Route 99
- Route 16
- Route 60
- Route 1A North
- VFW Parkway/Providence Highway
- Route 62
- Middlesex Turnpike
- Route 126

The CMP Committee will provide input and make the final selection of arterials for which congestion scans will be created.

Subtask 2.1: Create Congestion Scans for Freeways

Congestion scans will be created for the 11 major freeways in the Boston Region MPO area. The congestion scans will show the speed index in five-minute increments for a 24-hour period. Each congestion scan will display both directions of travel.

Subtask 2.2: Create Congestion Scans for Arterials

After consultation with the CMP Committee, staff will create congestion scans for 22 arterials in the Boston Region MPO area that are located on the CMP roadway network and have annual average daily traffic (AADT) of more than 35,000. The congestion scans will show five-minute increments for a 24-hour period. Each congestion scan will display both directions of travel.

Subtask 2.3: Write a Memorandum That Details the Findings from the Congestion Scans

Write a memorandum that describes congestion scans, including the methodology used in the study, and summarizes the findings from the congestion scans. The memorandum will also list the variations in peak periods between corridors.

Products of Task 2

- Congestion scans for each of the roadways listed above
- Technical memorandum that describes the findings from the congestion scans

Task 3 Analyze the Regional Economic Costs of Congestion Using INRIX and Other Data

The Boston Region MPO will produce a white paper that will calculate the cost of the time that is lost due to traffic congestion. For this effort, staff will use INRIX data, combined with data from other sources. The methodology for calculating the cost of delay will be tailored to the current land-use and transportation characteristics in the MPO region. The findings of this white paper may be used to develop future evaluation criteria for the CMP or for the TIP.

Subtask 3.1: Research Current Methodologies for Calculating the Cost to the Boston Region of Congestion

There have already been several studies on this topic, including reports from organizations such as the Texas Transportation Institute and CEOs for Cities.⁴ Research using all of the methods for calculating congestion and economic loss will be conducted to determine the best way to proceed with the analysis of the Boston region.

Subtask 3.2: Develop a New Process for Accurately Calculating the Economic Costs of Congestion in the Boston Region

From the results of the research completed in Subtask 3.1, staff will develop a process that will enable the economic analysis to be performed. This process will be derived from several methodologies that fit with the land-use and transportation characteristics of the Boston Region MPO area. These methods will take into account the fact that Boston is a compact region with multimodal transportation.

Subtask 3.3: Prepare a White Paper or Memorandum that Describes the Relationship between Congestion and Economics in the Boston Region

Prepare a memorandum that summarizes the findings of the economic analysis, including statistics about congestion and the economic burdens imposed by congestion in the Boston Region MPO area.

Product of Task 3

- Technical memorandum

⁴ CEOs for Cities is a nonprofit organization composed of urban leaders that focuses on making cities more connected and innovative.

Estimated Schedule

It is estimated that this project will be completed in FFY 2015. The proposed schedule, by task, is shown in Exhibit 1.

Estimated Cost

The total cost of this project is estimated to be \$92,000. This includes the cost of 40.5 person-weeks of staff time and overhead at the rate of 91.82 percent. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/RH/rh

Exhibit 1
ESTIMATED SCHEDULE
Congestion Management Process: FFY 2015

Task	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Support the CMP Committee												
2. Create Roadway Congestion Scans												
3. Analyze the Regional Economic Costs of Congestion												

Exhibit 2
ESTIMATED COST
Congestion Management Process: FFY 2015

Direct Salary and Overhead							\$92,000	
Task	Person-Weeks				Direct Salary	Overhead (91.82%)	Total Cost	
	M-1	P-5	P-3	Total				
1. Support the CMP Committee	0.9	0.3	3.9	5.1	\$6,404	\$5,881	\$12,285	
2. Create Roadway Congestion Scans	1.1	0.3	23.1	24.5	\$27,912	\$25,628	\$53,540	
3. Analyze the Regional Economic Costs of Congestion	1.1	1.4	8.4	10.9	\$13,646	\$12,529	\$26,175	
Total	3.1	2.0	35.4	40.5	\$47,962	\$44,038	\$92,000	
Other Direct Costs							\$0	
TOTAL COST							\$92,000	

Funding

- MPO Planning Contract #84053
- MPO §5303 Contract #78922
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