



## BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Richard A. Davey, MassDOT Secretary and CEO and MPO Chairman  
Karl H. Quackenbush, Executive Director, MPO Staff

### MEMORANDUM

**DATE** December 20, 2012  
**TO** Boston Region Metropolitan Planning Organization  
**FROM** Karl H. Quackenbush  
CTPS Executive Director  
**RE** Work Program for: Regional HOV-Lane Systems Planning Study,  
Phase II

#### Action Required

Review and approval

#### Proposed Motion

That the Boston Region Metropolitan Planning Organization vote to approve the work program for the Regional HOV-Lane Systems Planning Study, Phase II, in the form of the draft dated December 20, 2012.

#### Project Identification

Unified Planning Work Program Classification

Planning Studies

CTPS Project Number

13256

Client

Boston Region Metropolitan Planning Organization

CTPS Project Supervisors

*Principal:* Efi Pagitsas

*Manager:* William S. Kuttner

Funding

MPO 3C Planning Contract #75086

MPO §5303 Contract #75364

## Impact on MPO Work

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

## Background

Since the 1970s a small number of express highway lanes reserved for high-occupancy vehicles (HOVs) have been placed in service on highways within and near Boston. These facilities have proved successful in several respects. By offering a mostly congestion-free lane for buses and autos with multiple occupants, the number of persons passing through these congested corridors has been significantly increased without widening the highway. Other benefits attributed to these facilities include reduced delay in the general-purpose lanes, reduced congestion on surface roadways, and efficient additional capacity to accommodate future travel growth.

These HOV facilities were built individually in response to the planning circumstances at the time of their development, and their differing designs, operating practices, and lack of key connections have prevented them from being viewed as a cohesive regional system. Starting in 2010, the Boston Region MPO has sponsored two studies that explore how the current operating HOV facilities might be extended and become the nucleus of a regional HOV system. The work program *HOV Lane and I-93 Access Improvements in the South Bay/Savin Hill Area* was approved on May 20, 2010, and the work program *Regional HOV Lane System Planning Study* was approved on August 18, 2011. This second study is referred to as the Phase I study, upon which this proposed work program will build.

Two HOV facilities separated by a two-mile gap have been operating on the Southeast Expressway since the completion of the Central Artery/Tunnel (CA/T) project. The *HOV Lane and I-93 Access Improvements* study explored how these two HOV facilities might be connected. The final report, *Improving the Southeast Expressway: A Conceptual Plan*, was completed in February 2012.

*Improving the Southeast Expressway* recognized that the question of how to design an HOV lane connecting the two existing facilities, and how lane eligibility rules are made and enforced, are two distinct questions. The physical design of a new lane in no way precludes operating authorities from establishing any of a number of eligibility rules, such as willingness to pay, ultra-low emissions, or the traditional criterion of occupancy. This study characterized future facilities as “preferential lanes,” acknowledging the growing number of options that will be available to operating authorities in the future.

The Phase I study also assumed that the future operating authority, presumably MassDOT, would consider more than one eligibility option. The final report of the

Phase I findings, *Screening Regional Express Highways for Possible Preferential Lane Implementation*, is now complete.

The Phase I study evaluated all express highways in eastern Massachusetts for suitability for preferential lane implementation, which would require reconstruction of the highway to include a single, reversible lane between the two directions of general-purpose lanes. The key determinant of suitability was a requirement that any preferential lane implementation confer benefits on general traffic, as well as an even higher level of benefits on preferential lane users. This higher level of benefits to preferential lane users would provide an incentive to pay a toll, form a carpool, or take a bus. Implementation of a new “zipper” lane system was ruled out in virtually all instances because the loss of an opposing lane would make traffic in that direction even worse than the original congestion in the direction being improved.

Screening by user benefits and other criteria indicates that the implementation of preferential lanes was shown to be unsuitable for most express highways in eastern Massachusetts. The most compelling cases for preferential lane implementation were found on sections of Interstate I-93 and parts of several connecting express highways. The previously studied Southeast Expressway section and some sections of highways feeding into the current HOV facility at the Braintree Split easily met these criteria, as did the I-93 corridor between Boston and New Hampshire and I-95/Route 128 between I-93 in Woburn and the Winter Street/Totten Pond Road exit in Waltham.

Both earlier studies assumed that any preferential lane implementations would be in the form of a single, reversible lane, with the required additional width for breakdowns and enforcement. The pronounced AM and PM directional traffic flows showed clearly that the single reversible lane, with its associated construction economies, would serve well as the standard for an emerging preferential lane system. While narrower than a complete, two-way preferential lane system, implementing an appropriately sized reversible lane would require widening and modifying almost any express highway.

This study will concentrate on the sections of I-93 north of Boston that were identified in Phase I to be suitable for preferential lane implementation. Critical system design issues that were only mentioned in the Phase I study will more fully be evaluated, especially the optimal placement of preferential lane entry-exit sections. Implementation of a reversible, preferential lane would require extensive reconstruction of I-93, and this study will identify and describe the conceptual reconstruction efforts that would be required to implement the envisioned system.

## Objectives

The principal objectives of this work program are:

1. To describe an option for implementing a new HOV-lane or preferential lane system in the I-93 corridor north of Boston that is feasible from a traffic flow perspective and consistent with the findings of the Phase I study, and to describe qualitatively associated constructability and environmental issues.
2. To identify and describe major construction efforts and likely land takings that would be required to implement the new preferential lane system.
3. To gather and organize documents and other materials which can be used, along with this study's products, in support of further planning and design efforts.

## Work Description

### Task 1 Develop a Conceptual Geometric Design

Specific preferential lane elements between New Hampshire and the current HOV lane entrance in Medford will be defined and characterized schematically, reflecting Phase I findings. Entrance and exit areas will be specified, and general-purpose lane volumes will be estimated. Where peak-period use of the shoulders is permitted, it is assumed that these so-called "managed lanes" will be upgraded to full travel lanes with adjacent full-service breakdown lanes. Select-link estimates from the MPO's regional travel demand model set assignments will ascertain that the entrance/exit areas are serving major regional peak-period traffic flows.

#### *Product of Task 1*

A conceptual description of interconnected preferential lane system elements along I-93 north between a northern terminus north of the Merrimack River and the existing HOV lane in Somerville, with proposed entrance and exit sections and estimated peak-period traffic flows.

### Task 2 Describe Required I-93 Corridor Modifications

The envisioned preferential lane system would require some degree of highway widening over most of its extent. It is also anticipated that some bridges would require reconstruction, depending to some degree on the recommended placement of the required entry/exit sections. The primary purpose of this task is to describe the types of physical modifications that would likely be required for full preferential lane implementation. Issues of land ownership and environmental sensitivity may be referenced in passing, but will not be the subject of a comprehensive inventory.

### *Products of Task 2*

- Detailed analysis of corridor modifications necessary for implementation of the recommended preferential lane system
- Other projects planned or envisioned in the corridor will be reviewed and referenced as appropriate in this analysis.

### **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 \$59,968. This includes the cost of 19.3 person-weeks of staff time, overhead at the rate of 96.58 percent, travel, and other direct costs. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/WSK/wsk

**Exhibit 1**  
**ESTIMATED SCHEDULE**  
**Regional HOV-Lane Systems Planning Study, Phase II**

Task	Month									
	1	2	3	4	5	6	7	8	9	
1. Develop a Conceptual Geometric Design	1								3	
2. Describe Required I-93 Corridor Modifications				2					4	

**Products/Milestones**

- 1: Internal technical memorandum describing conceptual preferential lane geometric design
- 2: Internal technical memorandum describing corridor modifications necessary for preferential lane implementation
- 3: Final technical memorandum describing conceptual preferential lane geometric design
- 4: Final technical memorandum describing corridor modifications necessary for preferential lane implementation

**Exhibit 2**  
**ESTIMATED COST**  
**Regional HOV-Lane Systems Planning Study, Phase II**

<b>Direct Salary and Overhead</b>	<b>\$59,718</b>
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Task	Person-Weeks						Direct Salary	Overhead (96.58%)	Total Cost
	M-1	P-5	P-4	P-3	P-2	Total			
1. Develop a Conceptual Geometric Design	1.5	6.5	0.5	0.5	0.6	9.6	\$15,126	\$14,609	\$29,735
2. Describe Required I-93 Corridor Modifications	1.5	6.5	0.6	0.5	0.6	9.7	\$15,252	\$14,731	\$29,983
Total	3.0	13.0	1.1	1.0	1.2	19.3	\$30,378	\$29,339	\$59,718

<b>Other Direct Costs</b>	<b>\$250</b>
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Travel	\$250
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<b>TOTAL COST</b>	<b>\$59,968</b>
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**Funding**

MPO 3C Planning Contract #75086  
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