



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Jamey Tesler, Acting MassDOT Secretary and CEO and MPO Chair
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WORK PROGRAM

INTERSECTION IMPROVEMENT PROGRAM

APRIL 29, 2021

Proposed Motion

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

Project Identification

Unified Planning Work Program (UPWP) Classification

Boston Region MPO Planning Studies and Technical Analyses

Project Number 13305

Client

Boston Region MPO

Project Supervisors

Principal: Mark Abbott

Manager: Casey Claude

Funding Source

MPO Planning Contract 112310

Schedule and Budget

Schedule: Six months after work commences

Budget: \$75,000

Schedule and budget details are shown in Exhibits 1 and 2, respectively.

Relationship to MPO Goals

The Boston Region MPO elected to fund this study with its federally allocated metropolitan planning funds during federal fiscal year (FFY) 2021. The work completed through this study will address the following goal areas established in the MPO's Long-Range Transportation Plan: safety, system preservation, capacity management and mobility, clean air and clean communities, transportation equity, economic vitality.

Background

In 2014, the Boston Region MPO participated in an intersection improvement program with the Massachusetts Department of Transportation (MassDOT) Highway Division to provide low-cost, small scale, and quickly implementable improvements, including signal retiming, signing, and pavement markings. The program was funded in the Transportation Improvement Program (TIP) with Congestion Mitigation and Air Quality dollars. The primary goal of the program was to identify low-cost improvements that would help alleviate congestion at problem intersections. These types of improvements, known as transportation system management or management and operations, enjoy a high benefit-to-cost ratio. Through the Congestion Management Process (CMP), MPO staff selected candidate intersections and contacted the relevant municipalities. A consulting firm then visited 35 intersections around the region, implemented signal timing improvements, and proposed other low-cost improvement recommendations that municipalities could implement.

The Intersection Improvement Program for this FFY will primarily select a set of municipality-owned intersections based on CMP performance metrics, bicycle and pedestrian travel metrics, equity considerations while consulting with representatives from the respective communities to validate the poor operations and safety issues at the selected locations. Staff will then study the selected intersections, develop recommendations for low-cost improvements, and present the safety and traffic operation recommendations to the relevant municipality. The municipalities can use the recommendations to develop an implementation plan that the municipality would be responsible for funding.

Objective(s)

The primary objectives of this study are to

- identify as many intersection locations as budget allows for study. The identified intersections will not necessarily be the worst in the region, as it may not be possible to correct the worst intersection locations by implementing low-cost improvements alone; and
- recommend low-cost, high-benefit improvements for the selected intersection locations. The recommendations will be based on analyses of transportation metrics, field observations, and the projected service performance associated with the potential improvements at each location.

Work Description

Task 1 Inventory and Selection of Candidate Locations

This task will compile a list of intersection locations throughout the Boston Region MPO that experience poor traffic operations and high crash rates where low-cost improvements could suitably correct the intersection problems. Identified locations

that are not selected for this current iteration of the Intersection Improvement Program will serve as a database of locations with study potential for future projects. MPO staff will generate this list of intersections by

- reviewing the most recent crash data from MassDOT's Registry of Motor Vehicles Division;
- reviewing CMP travel-time and delay data for consecutive intersections that have spillover queues;
- reviewing transit travel-time CMP data for buses going through the locations identified via the CMP;
- reviewing TIP projects from the conceptual and pre-TIP categories;
- reviewing public feedback received via the MPO's outreach program;
- reviewing intersections that impact higher proportions of equity populations than regional averages; and
- soliciting selection recommendations—in coordination with the Metropolitan Area Planning Council (MAPC)—from MAPC subregions and individual cities and towns that declare their commitment to shepherding the recommended improvements through to design and implementation.

The intersections selected for consideration will be based on criteria in the following categories:

- Safety concerns
- Operations concerns
- Multimodal significance (supporting or needing to support transit, bicycle, pedestrian, or heavy-vehicle activities)
- Implementation potential and support by the municipality and stakeholders for following up with implementation
- Geographic equality (study locations distributed throughout the MAPC subregions over time)
- Locations where low-cost, short-term recommendations are viable

Locations that would potentially require major geometry redesigns, such as grade separation or adding travel or turn lanes on an arterial roadway, will not be selected.

Finally, staff will discuss level of interest with municipal officials in following up with implementation of the study recommendations. This input will be in addition to the input solicited from municipalities during the process of selecting candidate locations. Staff will then select as many intersections as budget allows for detailed study.

Products of Task 1

A database of intersection locations with study potential for future projects; a summary of the selection process, including a table listing selected locations

Task 2 Collect and Gather Data

Once the locations have been selected, staff will collect detailed data pertaining to each location. This will involve visiting each site and creating an inventory of all relevant geometric, land use, and signal features. Data will include:

- Turning movement counts
- Bicycle and pedestrian counts
- Adjacent pedestrian and bicycle networks and their connectivity to the study sites
- Crash data and police crash reports
- Transit vehicle counts and performance
- Signal equipment and timing information
- Geometric data (lanes, curb cuts, sidewalks, crosswalks, transit amenities)
- Land use and zoning information
- Jurisdictional and administrative information

Products of Task 2

A summary of count, signal, and geometric data for the selected locations

Task 3 Evaluate Selected Locations

Staff will evaluate each intersection using various types of analysis. First, the crash data for each intersection will be analyzed regarding crash type, severity, and whether bicycles or pedestrians were involved in the crashes. Second, capacity analysis will be performed to determine the operational level of service at each intersection. Particular attention will be given to evaluating existing pedestrian signal phases (if any) or the need for them. Third, field observations will be performed to yield a complete understanding of safety levels and the operations of vehicles, bicycles, and pedestrians at each location. In addition to the analysis on safety and operations, this evaluation will be based on goals and principals of the statewide

pedestrian and bicycle plans, and guidelines from the municipal resource guides for walkability and bikeability.¹²³⁴

Products of Task 3

A summary of each selected intersection's frequency and type of crashes, its operational level of service, and an overall assessment of the location's safety and traffic flow

Task 4 Develop Improvement Recommendations

Based on the evaluation performed in Task 3, staff will develop potential low-cost, short-term improvement recommendations. The recommendations will include improvements for pedestrians, bicyclists, motorists, and transit service. The recommendations will primarily involve signal timing improvements, signing, and pavement marking modifications. Staff will contact municipal officials in each of the communities involved to discuss the intersection summaries, receive input on the analyses and findings, and discuss potential recommendations.

Products of Task 4

A summary of potential recommendations discussed with municipal officials

Task 5 Document Findings and Recommendations

Staff will produce technical memoranda for each of the municipalities involved in the study describing the analysis and recommendations for the intersection locations in that municipality.

Products of Task 5

Draft technical memoranda for each municipality involved in the study, including documentation of correspondence with municipal officials

Task 6 Finalize Study and Prepare for MPO Presentation

After receiving comments on the draft memoranda from municipal officials, MPO staff will address these comments and finalize the study. The final study results will be presented to the MPO.

Products of Task 6

Final technical memoranda and MPO presentation

¹ Massachusetts Pedestrian Transportation Plan, MassDOT, May 2019.

² Massachusetts Bicycle Transportation Plan, MassDOT, May 2019.

³ Municipal Resource Guide for Walkability, MassDOT, May 2019.

⁴ Municipal Resource Guide for Bikeability, MassDOT, May 2019.

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Boston, MA 02116
civilrights@ctps.org
857.702.3700 (voice)
617.570.9193 (TTY)

Exhibit 1
ESTIMATED SCHEDULE
Intersection Improvement Program

Task	Month					
	1	2	3	4	5	6
1. Inventory and Selection of Candidate Locations	A					
2. Collect and Gather Data						
3. Evaluate Selected Locations						
4. Develop Improvement Recommendations				B		
5. Document Findings and Recommendations					C	
6. Finalize Study and Prepare for MPO Presentation						D

Products/Milestones

- A: List of Suggested Intersection Study Locations
- B: Improvement Recommendations
- C: Draft Technical Memos
- D: Final Project Deliverables

Exhibit 2
ESTIMATED COST
Intersection Improvement Program

Direct Salary and Overhead	\$74,707
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Task	Person-Weeks						Direct Salary	Overhea (106%)	Total Cost
	M-1	P-5	P-4	P-3	P-2	Total			
1. Inventory and Selection of Candidate Locations	0.1	1.0	1.0	2.0	2.0	6.2	\$7,995	\$8,475	\$16,470
2. Collect and Gather Data	0.1	1.0	1.0	1.9	0.0	4.0	\$5,725	\$6,068	\$11,793
3. Evaluate Selected Locations	0.1	1.0	1.0	1.9	0.0	4.0	\$5,725	\$6,068	\$11,793
4. Develop Improvement Recommendations	0.1	1.0	1.0	1.9	0.0	4.0	\$5,725	\$6,068	\$11,793
5. Document Findings and Recommendations	0.5	0.8	0.0	2.0	0.0	3.3	\$4,679	\$4,960	\$9,638
6. Finalize Study and Prepare for MPO Presentation	1.7	0.0	0.5	1.8	0.5	4.5	\$6,417	\$6,802	\$13,220
Total	2.8	4.8	4.5	11.5	2.5	26.1	\$36,265	\$38,441	\$74,707

Other Direct Costs	\$293
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Travel	\$293
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TOTAL COST	\$75,000
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Funding
MPO Planning Contract #112310