



# A1

# AMENDMENT ONE TO CHARTING PROGRESS TO 2040

## OVERVIEW

The Boston Region Metropolitan Planning Organization (MPO) is proposing an amendment to its current Long-Range Transportation Plan (LRTP), *Charting Progress to 2040*, which was endorsed by the MPO in July 2015. This document explains the proposed amendment, whose primary purpose is to provide consistency between the MPO's LRTP and the Federal Fiscal Years (FFYs) 2016–20 Transportation Improvement Program (TIP) and its amendments, the proposed FFYs 2017–21 TIP, and the Massachusetts Capital Investment Program (CIP).

The LRTP amendment includes additional projects, or a change in funding of five major infrastructure projects (defined as projects that add capacity to the transportation system and/or that cost more than \$20 million). These include:

- 1. Green Line Extension (GLX) Project:** The FFYs 2016–20 TIP Amendment Four includes transfer of funding programmed for the Green Line Extension (GLX) from College Avenue to Route 16 in Medford (GLX Phase 2) to the first phase of the GLX project from Lechmere Station in Cambridge to College Avenue in Medford (GLX Phase 1). This action was carried forward into the draft FFYs 2017–21 TIP, which currently is out for public review. This action requires that the transfer of funding to GLX Phase 1 project be included in the LRTP, along with removal of funding for GLX Phase 2. In addition, the completion schedule for GLX Phase 1 has been pushed back from its original date of 2020. (MPO Target Funds)
- 2. Ramp Construction on Interstate 95 Northbound and Improvements to Canton Street and Dedham Street:** This project was included in the previous LRTP, *Paths to a Sustainable Region*, endorsed by the MPO in 2011. The value of this project changed because of increases in construction materials. Additional statewide funding of \$16.8 million has been added for this project. (Statewide Funds)
- 3. Melnea Cass Boulevard:** Reconstruction of Melnea Cass Boulevard was funded in the draft FFYs 2017–21 TIP. Because this project costs more than \$20 million, it must be included in the LRTP. (MPO Target and Federal Earmark Funds)

- 4. State Funded Projects:** Two regionally significant projects located in the Boston Region MPO area are included in the Massachusetts CIP and must be listed in the Boston Region MPO LRTP. The projects include **reconstruction of Interstate 90 and Interstate 495 interchange in Hopkinton** and **Westborough and a new connection from Burgin Parkway over the MBTA in Quincy**. (Statewide Funds)

The Melnea Cass Boulevard project in Boston and the two CIP projects are new major infrastructure projects to the LRTP and are described below. A description of the GLX Phase 1 project is included in Charting Progress to 2040 ([http://www.ctps.org/data/pdf/plans/lrtp/charting/2040\\_LRTP\\_Chapter5\\_final.pdf](http://www.ctps.org/data/pdf/plans/lrtp/charting/2040_LRTP_Chapter5_final.pdf)). A description of the Ramp Construction on Interstate 95 Northbound and Improvements to Canton Street and Dedham Street are included in the previous LRTP, Paths to a Sustainable Region ([http://www.ctps.org/data/pdf/plans/LRTP/paths/2035\\_LRTP\\_Chapter8.pdf](http://www.ctps.org/data/pdf/plans/LRTP/paths/2035_LRTP_Chapter8.pdf)).

Table A.1 lists the highway projects funded under the major infrastructure program, as well as other investment programs established for Operation and Maintenance projects, their costs, and the period in which they are projected to be programmed. Operation and Maintenance projects are those that do not need to be listed in the LRTP (non-major infrastructure projects) before they are programmed in the Transportation Improvement Program and include Complete Streets projects, intersection improvement projects, bicycle and pedestrian projects, and community transportation/parking/clean air and mobility projects. The list also includes additional funding for the GLX Phase 1 transit project, which is using highway funds flexed to transit, and other cost changes to projects and programs currently programmed in the LRTP.

**TABLE A.1**  
**Major Infrastructure Projects Programmed with Highway Funding in the Recommended Plan with Costs**

Project Name	Investment Category	Current Cost	FFY				MPO Funding	Non-MPO Funding
			2016-2020	2021-2025	2026-2030	2031-2035		
Route 128 Additional Lanes (Needham & Wellesley)	MI	\$50,725,206	\$50,725,206				\$50,725,206	
Ramp Construction on I-95 (NB) and Improvements on Canton St/Dedham St (Canton, Norwood, Westwood)	MI	\$68,864,034	\$16,837,538					\$16,837,538
Middlesex Turnpike Improvements from Crosby Dr North to Manning Rd, Phase III (Bedford & Billerica)	MI	\$36,735,100	\$28,296,348				\$28,296,348	\$8,438,700
Reconstruction of Melnea Cass Boulevard (Boston)	MI	\$25,297,838	\$7,853,499				\$7,853,499	\$17,444,339
Reconstruction of Rutherford Ave, from City Sq to Sullivan Sq (Boston)	MI	\$109,967,000	\$7,000,000	\$113,066,906			\$120,066,906	\$8,578,930
Intersection Improvements at Rte 126 & Rte 135/MBTA & CSX Railroad (Framingham)	MI	\$115,000,000		\$184,118,700			\$184,118,700	
Reconstruction of I-90 and I-495 Interchange (Hopkinton & Westborough)	MI	\$270,000,000	\$270,000,000					\$270,000,000
Route 4/225 (Bedford St) and Hartwell Ave (Lexington)	MI	\$23,221,000	\$30,557,000				\$30,557,000	
Bridge Replacement, Rte 27 (North Main St) over Rte 9 (Worcester St) and Interchange Improvements (Natick)	MI	\$25,793,370	\$33,942,300				\$33,942,300	
Reconstruction of Highland Ave, Needham St & Charles River Bridge, from Webster St to Rte 9 (Newton & Needham)	MI	\$14,297,606	\$15,464,292				\$15,464,292	

**TABLE A.1 (Cont.)**  
**Major Infrastructure Projects Programmed with Highway Funding in the Recommended Plan with Costs**

Project Name	Current Cost	Investment Category	FFY 2016–	FFY 2021–	FFY 2026–	FFY 2031–	FFY 2036–	MPO	Non-MPO
			2020	2025	2030	2035	2040	Funding	Funding
Construction of New Connection from Burgin Parkway over the MBTA (Quincy)	\$9,300,000	MI		\$9,300,000					\$9,300,000
McGrath Boulevard Project (Somerville)	\$56,563,000	MI			\$90,559,000			\$90,559,000	
Green Line Extension Project (Phase 1), Lechmere Station to College Ave/ Union Sq (Somerville & Cambridge)	\$190,000,000	MI	\$158,000,000	\$32,000,000				\$190,000,000*	
Green Line Extension Project (Phase 2), College Ave to Mystic Valley Parkway/Rte 16 (Somerville to Medford)	\$190,000,000	MI	\$158,000,000	\$32,000,000				\$190,000,000	
Reconstruction & Widening on Rte 18 (Main St) from Highland Pl to Rte 139 (Weymouth & Abington)	\$81,812,268	MI	\$45,281,758					\$45,281,758	\$36,530,510
Reconstruction of Montvale Ave. from I-93 Interchange to Central St (Woburn)	\$4,225,256	MI	\$4,752,838					\$4,752,838	
Bridge Replacement, New Boston St over MBTA (Woburn)	\$17,784,392	MI		\$17,784,392				\$17,784,392	
Complete Street Program (Regionwide)		CS		\$137,760,390	\$177,609,859	\$321,301,910	\$268,037,266	\$904,709,425	
Bicycle/Pedestrian Program (Regionwide)		B/P		\$23,751,791	\$30,622,389	\$55,396,881	\$46,213,322	\$155,984,384	
Intersection Improvement Program (Regionwide)		INT		\$66,505,016	\$85,742,690	\$155,111,267	\$129,397,301	\$436,756,274	
Community Transportation/ Parking/Clean Air Mobility Program (Regionwide)		CT/ PK/ CA		\$9,500,717	\$12,248,956	\$22,158,752	\$18,485,329	\$62,393,753	

**TABLE A.1 (Cont.)  
Major Infrastructure Projects Programmed with Highway Funding in the Recommended Plan with Costs**

Project Name	Investment Category	Current Cost	FFY 2016–	FFY 2021–	FFY 2026–	FFY 2031–	FFY 2036–	MPO	Non-MPO
			2020	2025	2030	2035	2040	Funding	Funding
Total Available Regional Highway Target Funds			\$441,648,114	\$464,868,512	\$580,901,594	\$657,770,110	\$708,605,218	\$2,853,793,548	\$367,130,017
Total Programmed Regional Highway Target Funds			\$317,373,941	\$464,868,512	\$580,901,594	\$553,968,810	\$462,133,218	\$2,379,246,075	
Regional Highway Target Funds Available			\$124,274,173**	\$0	\$0	\$103,801,300	\$246,472,000	\$474,547,473	
Percentage of Funding Allocated			72%	100%	100%	84%	65%	83%	
Major Infrastructure			\$317,373,941	\$227,350,598	\$274,677,700	\$0	\$0	\$819,402,239	
Complete Street			\$0	\$137,760,390	\$177,609,859	\$321,301,910	\$268,037,266	\$904,709,425	
Bicycle and Pedestrian			\$0	\$23,751,791	\$30,622,389	\$55,396,881	\$46,213,322	\$155,984,384	
Intersection Improvement Program			\$0	\$66,505,016	\$85,742,690	\$155,111,267	\$129,397,301	\$436,756,274	
Community Transportation			\$0	\$9,500,717	\$12,248,956	\$22,158,752	\$18,485,329	\$62,393,753	
Unallocated Funds			\$124,274,173**	\$0	\$0	\$103,801,300	\$246,472,000	\$474,547,473	
<b>Total</b>			<b>\$441,648,114</b>	<b>\$464,868,512</b>	<b>\$580,901,594</b>	<b>\$657,770,110</b>	<b>\$708,605,218</b>	<b>\$2,853,793,548</b>	
% Major Infrastructure			72%	49%	47%	0%	0%	29%	
% Complete Street			0%	30%	31%	49%	38%	32%	
% Bicycle and Pedestrian			0%	5%	5%	8%	6%	5%	
% Intersection Improvement Program			0%	14%	15%	24%	18%	15%	
% Community Transportation			0%	2%	2%	3%	3%	2%	
% Unallocated Funds			28%**	0%	0%	16%	35%	17%	
<b>% Total</b>			<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	

Added Project	Project name	MI	\$1,000
Deleted Project	Project name	MI	\$1,000
Change in Cost	Project name	MI	\$1,001

- MI - Major Infrastructure Program
- CS - Complete Streets Program
- B/P - Bicycle/Pedestrian Program - Assabet River Rail Trail will be funded under this program
- INT - Intersection Improvement Program
- CT/PK/CA - Community Transportation/Parking/Clean Air and Mobility Program

\* Flexing \$152 million federal portion to FTA, match provided by local contribution  
 \*\* Funding in the 2016-2020 time band is allocated for non-major infrastructure projects through the TIP process.

# NEW PROJECT DESCRIPTIONS

## *Boston: Melnea Cass Boulevard (\$23,389,274)*

### PROJECT DESCRIPTION

The Melnea Cass Boulevard project would reconstruct the street in order to serve not only drivers but also pedestrians, cyclists, and transit riders more equitably, and to improve safety for all roadway users. The project specifically aims to strengthen neighborhood connections for pedestrians and cyclists. The proposed improvements would better integrate future developments and land use, on both sides of the street, with the roadway design.

The corridor is approximately 0.9 miles long and extends from Massachusetts Avenue to Columbus Avenue in the South End of Boston. The existing corridor provides two lanes in each direction with additional left turn lanes at Tremont Street, Washington Street, Harrison Avenue, Hampden Street, and Massachusetts Avenue. The corridor serves almost 40,000 vehicles daily and numerous bus routes, including Routes #8, #19, #47, and CT3.

### PROJECT CONTEXT AND POSSIBLE IMPACTS BY MPO GOAL

#### *Capacity Management/Mobility*

##### Roadways:

The proposed design includes maintaining two travel lanes in each direction with additional turning lanes where necessary; however, there will no longer be a continuous concrete center median separating the directions of travel between Tremont Street and Hampden Street.

##### Transit:

New traffic signal equipment will be installed at each of the nine intersections along the corridor. Improvements to signal timing and phasing will be made to all study area intersections to improve operations, which would benefit the numerous bus routes operating within the corridor.

##### Pedestrians/Bicycles:

The proposed design provides two-way cycle tracks and sidewalks along both sides of Melnea Cass Boulevard. The proposed cycle tracks, part of the Boston Bike 5-Year and 30-Year Action Plans, will provide an important link within the planned bicycle network, which includes expanding accommodations to Massachusetts Avenue, Shawmut Avenue, Malcolm X Boulevard, Albany Street, and Hampden Street. The two-way cycle tracks will be 10 feet wide. The minimum width of the sidewalks will be seven feet, although in some locations they will be wider. The sidewalks generally will be buffered from the cycle tracks by landscaping that will vary in width throughout most of the length of the project area. Two-way marked bicycle crossings will be provided across all crossroads intersecting Melnea Cass Boulevard to provide additional safety. Also, the majority of pedestrian crossings across Melnea Cass Boulevard will be shortened as a result of the proposed design.



## Safety

There is no Highway Safety Improvement Program crash cluster in the project area.

## System Preservation

Nearly four lane-miles of substandard pavement will be improved as part of this project.

## Economic Vitality

This new vision of Melnea Cass Boulevard is consistent with the goals expressed in the Roxbury Master Plan; it will provide the improvements and accommodations that the planned developments require in order to be successful.

## Transportation Equity

This project site is located entirely within in an environmental justice area.



## *Hopkinton and Westborough: Reconstruction of Interstate 90 and Interstate 495 (\$270,000,000)*

### PROJECT DESCRIPTION

This project proposes to improve the interchange of Interstate 90 and Interstate 495. A number of alternatives are being developed and evaluated in the current feasibility study. Modifications to the existing ramp alignments, widening, and bridge improvements, as well as construction of new ramps and associated bridges, are under consideration. This interchange has been identified both in a joint study by the Boston Region and Central Massachusetts Metropolitan Planning Organizations (MPOs) and by elected officials in central Massachusetts as a critical linkage in need of redesign and reconstruction. The Massachusetts Department of Transportation (MassDOT) performed a planning study in 2012 and 2013 and a feasibility study in 2014. An environmental notification form was filed on March 2, 2015.

### PROJECT CONTEXT AND POSSIBLE IMPACTS BY MPO GOAL

#### *Capacity Management/Mobility*

##### Roadways:

In 2015, MassDOT traffic counts found average weekday traffic on Interstate 495 north of Interstate 90 to be approximately 101,100 vehicles, and 99,700 vehicles south of Interstate 90. Ramp volumes ranged from 13,100 to 18,100 vehicles depending on direction. Historically, congestion at this interchange has been associated with the toll plazas. The implementation of the All Electronic Toll System is slated for July 2016; however, the removal of the toll plazas is not expected to eliminate the congestion and safety issues. Several of the ramps currently operate at level of service “D” or worse, and will be significantly improved with the proposed changes. This is a limited-access interchange, so no pedestrian or bicycle use is allowed.

#### *Safety*

This location has been identified in the MassDOT Highway Safety Improvement Program as a hazardous road location and includes a crash cluster that ranks within the top five percent of the MPO. Sharp curves on both ramps have led to numerous accidents, including rollovers of large trucks. The project will also eliminate conflicts as a result of weaving movements.

#### *System Preservation*

The current interchange geometry is substandard, and the geometric modifications will be a substantial improvement. In addition, there will be improvements to the existing bridges, including bridge deck replacement, rehabilitation, and bridge replacement, as well as significant reconstruction.

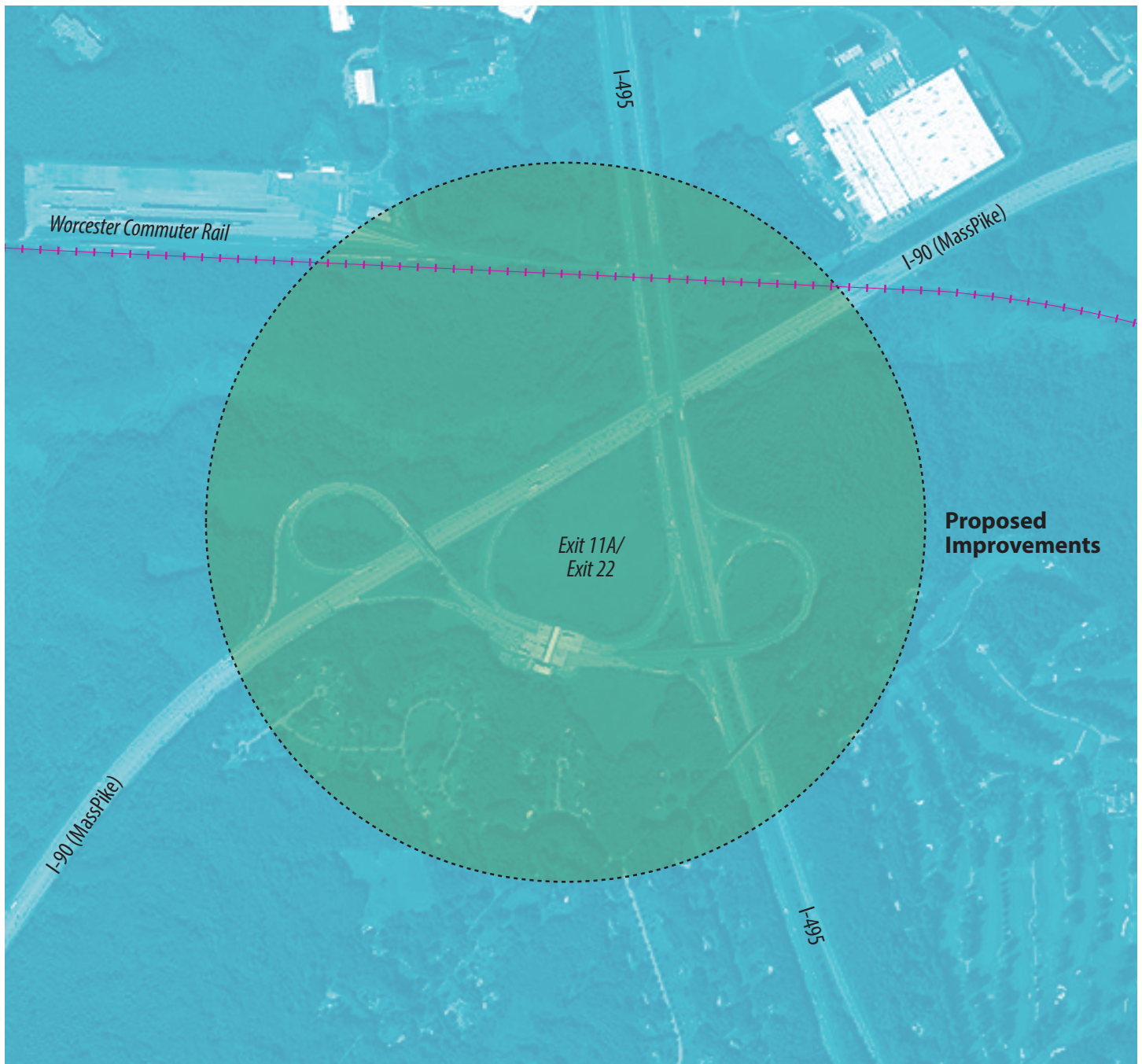


## Economic Vitality

This project will provide substantial opportunities for economic development in the region. In a planning document sponsored by the Executive Office of Housing and Economic Development, the region surrounding the interchange was identified as a Priority Development Area.

## Transportation Equity

This project is not within an Environmental Justice area.



## Quincy:

### *Construction of a New Connection from Burgin Parkway over the MBTA (\$9,300,000)*

#### PROJECT DESCRIPTION

This project will construct a new bridge, referred to as the Burgin Parkway Access Bridge, over the Massachusetts Bay Transportation Authority (MBTA) railroad alignment in order to connect a proposed street on the east side and Burgin Parkway on the west side. The bridge location is approximately midway between Concourse Street and Granite Street. The proposed roadway will include two 11-foot-wide travel lanes, one in each direction, with 5-foot-wide shoulders and 5- to 6-foot-wide sidewalks on each side.

Reconstruction of Burgin Parkway is required to accommodate a raised profile to obtain vertical clearance for the bridge. Burgin Parkway reconstruction will include:

- New sidewalks on Burgin Parkway on both sides of the roadway; the sidewalk on the east side to the north of the new bridge will tie into existing sidewalks
- Bicycle shoulders
- Raised median

#### PROJECT CONTEXT AND POSSIBLE IMPACTS BY MPO GOAL

##### *Capacity Management/Mobility*

##### Roadways:

No traffic studies have been performed to date; however, building this bridge will provide another means of access to the Quincy Center redevelopment area. The roadway has been designed for 6,000 vehicles per day.

##### Transit:

The bridge will be built over the MBTA railroad alignment but it will not provide access to an existing station. The new connection is located between the Quincy Center and Quincy Adams Red Line stations. No information is available regarding potential bus usage on this new roadway connection.

##### Pedestrians/Bicycles:

New sidewalks will be constructed on the new roadway and continue on both sides of the bridge on Burgin Parkway. The sidewalk will tie into existing sidewalks on Burgin Parkway to the north and taper down to match the existing cross-section with no sidewalks to the south. An alternative has been included to construct a sidewalk along Burgin Parkway to the south to comply with Massachusetts Department of Transportation's (MassDOT's) Healthy Transportation Directive. In addition, the new roadway will include 5-foot-wide shoulders that will allow for bicycle travel. Bicycle shoulders will be provided on Burgin Parkway.

## Safety

There is no recent crash history at the project location. Safety benefits may be realized at other locations adjacent to the project area that have less traffic. The raised median on Burgin Parkway will provide for safer conditions in that area.

## System Preservation

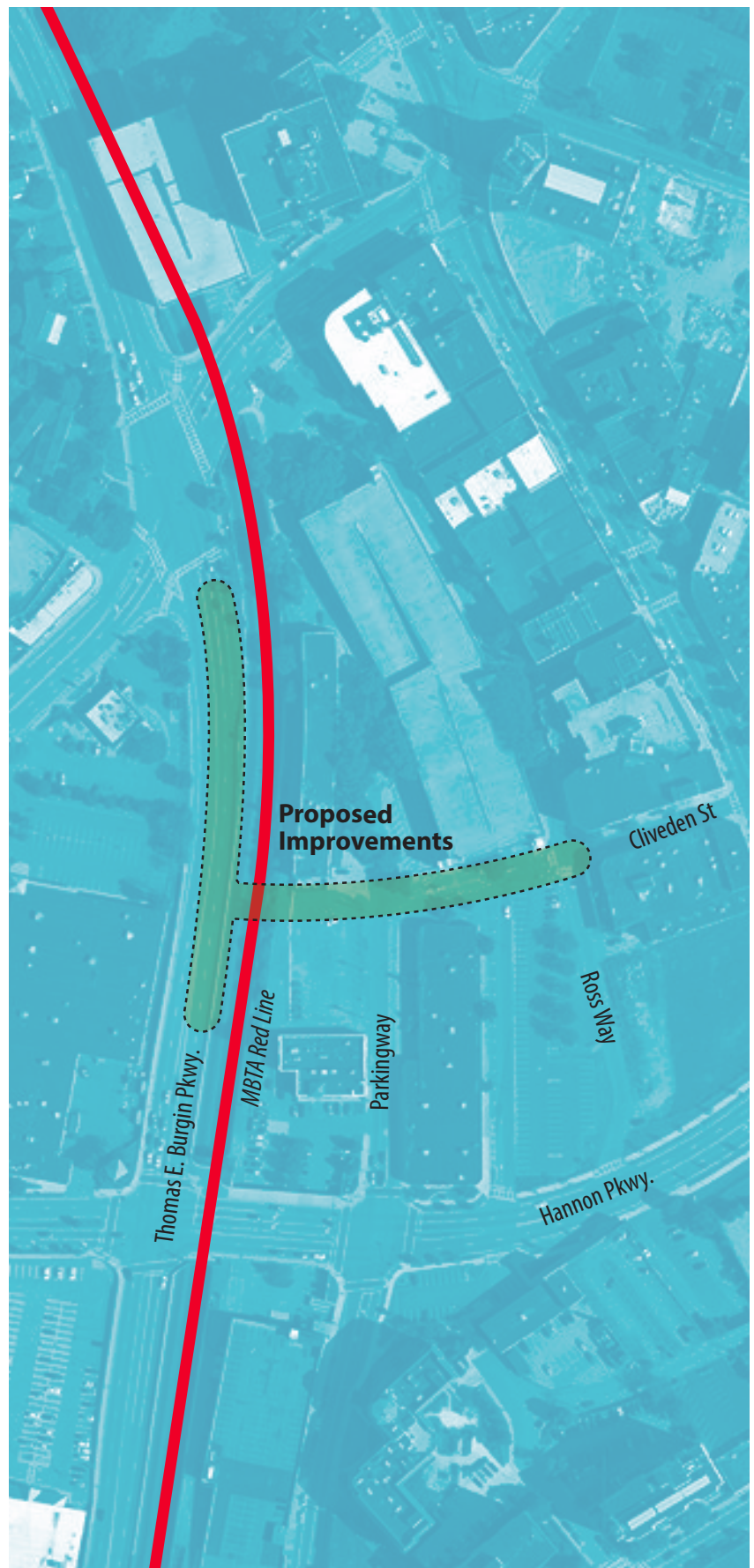
This is a new connection to the transportation system.

## Economic Vitality

This project is part of the Quincy Center Redevelopment Project, which involves a multiphase, multiuse rejuvenation of a major portion of Quincy Center. The development includes new office, retail, residential, and parking facilities that will be constructed in phases over several years. The project will provide a new connection to the transportation system and improve traffic flow in the redevelopment area.

## Transportation Equity

This project is not within an Environmental Justice area.





# AIR QUALITY CONFORMITY DETERMINATION

## *Background*

The Commonwealth of Massachusetts is classified as “unclassifiable/attainment” for the ozone standard with the exception of Dukes County. Therefore, the Boston Region MPO does not have to perform a conformity determination for ozone for its LRTP or TIP.

In addition, on April 1, 1996, the cities of Boston, Cambridge, Chelsea, Everett, Malden, Medford, Quincy, Revere, and Somerville were classified as “attainment” for carbon monoxide (CO) emissions. As part of past LRTPs, an air-quality conformity analysis was required for these communities, as they had a carbon monoxide maintenance plan approved as part of the Massachusetts State Implementation Plan (SIP). As of April 1, 2016, the 20-year maintenance period for this CO maintenance area expired and transportation conformity is no longer required for CO in these municipalities. This is documented in a letter from the United States Environmental Protection Agency dated May 12, 2016.

As of April 22, 2002, the community of Waltham was re-designated as being in attainment for CO, with an EPA-approved limited-maintenance plan. In areas that have approved limited-maintenance plans, federal actions requiring conformity determinations under the transportation conformity rule are considered to satisfy the “budget test” (as budgets are not treated as being constraining in these areas for the length of the initial maintenance period). Any requirements for future “project-level” conformity determinations for projects located within this community will continue to use a “hot-spot” analysis to ensure that any new transportation projects in this CO attainment area do not cause or contribute to CO nonattainment.

Therefore, the MPO is not required to perform modeling analyses for a conformity determination for ozone or CO; it is only required to provide the statement in the paragraph above regarding the Waltham attainment area. However, it still is required to provide a status report on the timely implementation of transportation control measures included as part of the SIP. This status report is provided below.

## *Timely Implementation of Transportation Control Measures*

Transportation control measures (TCMs) were required in SIP revisions submitted to the EPA in 1979 and 1982, and in those submitted as part of the Central Artery/Tunnel (CA/T) project. The TCMs included in the 1979 and 1982 submissions were accomplished through construction or implementation of ongoing programs.

The TCMs submitted as part of the CA/T project mitigation have been included in the LRTP as recommended or completed projects, except for the following three projects:

- Completion of a final design of the Red Line-Blue Line Connector from the Blue Line at Government Center to the Red Line at Charles Station

- Fairmount Line Improvements
- Enhanced Green Line extended beyond Lechmere Station to Medford Hillside and Union Square

MassDOT worked with the Massachusetts Department of Environmental Protection (DEP) to address these projects, and continues to keep the Boston Region MPO informed of their status through monthly reports at the MPO's regularly scheduled meetings. The Boston Region MPO will continue to include these projects in the LRTP and TIP until the TCMs described above have been completed, assuming that any interim projects or programs would provide equal or better emissions benefits. When the process has been completed, the MPO will amend the LRTP and future TIPs and their conformity determinations to include any changes (including any interim projects or programs).

### *Status Report of the Uncompleted SIP Projects*

The status of the SIP projects has been updated using the *SIP Transit Commitments Status Report*, submitted by MassDOT to DEP in May 2016. Highlights of the report are presented below. For a detailed description of these projects' status, please visit the MassDOT website at:

<https://www.massdot.state.ma.us/planning/Main/PlanningProcess/StateImplementationPlan/SIPTransitCommitmentSubmissions.aspx>

### **RED LINE-BLUE LINE CONNECTOR - FINAL DESIGN - SIP REQUIRED COMPLETION BY DECEMBER 2011**

#### *Project Status*

MassDOT initiated a process to amend the SIP to permanently and completely remove the obligation to perform a final design of the Red Line-Blue Line Connector. To that end, MassDOT officially sought approval from DEP to support a SIP amendment process. MassDOT did not propose to substitute any new projects in place of the Red Line-Blue Line Connector commitment, given the absence of any air-quality benefits associated with that project (final design only). Correspondence from MassDOT to DEP to initiate the amendment process formally was submitted on July 27, 2011, and is posted on the MassDOT website.

On September 13, 2012, DEP held two hearings to take public comment on MassDOT's proposed amendments to 310 CMR 7.36, "Transit System Improvements," including eliminating the requirement to complete the final design of the Red Line-Blue Line Connector. Between the two hearings, there were 16 attendees, 10 of whom gave oral testimony. All who spoke at the hearings were not in favor of DEP removing the commitment. DEP accepted written testimony until September 24, 2012.



On August 23, 2013, EPA sent a letter to the Federal Highway Administration (FHWA) to provide an update on Massachusetts Air Quality Conformity. In that letter, EPA noted that the Red Line-Blue Line Connector Design project had not met its completion date of December 2011, but that MassDOT was not obligated to implement interim emission-reduction projects because no emission reductions are associated with the design of the project.

On October 8, 2013, the DEP approved a request made by MassDOT in July 2011 to revise 310 CMR 7.36 to remove the requirement that MassDOT complete the design of the Red Line-Blue Line Connector. The Commonwealth of Massachusetts submitted the revision on November 6, 2013 for approval by EPA. The text of the revision is available on the MassDOT website at:

<http://www.massdot.state.ma.us/Portals/17/docs/sip/October13UpdatedSIPReg.pdf>.

On December 8, 2015, the EPA published a final rule in the Federal Register that approved the SIP revision and removed the commitment to design the Red Line-Blue Line Connector project.

### *Funding Source*

This commitment has been nullified.

## FAIRMOUNT LINE IMPROVEMENTS PROJECT - SIP REQUIRED COMPLETION BY DECEMBER 2011

### *Project Status*

The Four Corners and Newmarket Stations opened for service on July 1, 2013. All change orders have been paid and the project is officially closed out. The Talbot Avenue Station opened in November 2012.

A station at Blue Hill Avenue has been the subject of significant community controversy during the past seven years. Redesign of the station reached 100 percent, with plans submitted in March 2016. While the community still has concerns, the project team is now advancing with the understanding that continued coordination with the community is paramount. Construction is scheduled to begin in winter 2016, and the station is to open in summer 2018.

MassDOT and the MBTA prepared a Petition to Delay and an Interim Emission Offset Plan to be implemented for the duration of the delay of the Fairmount Line Improvements project. MassDOT estimated the reduced emissions that are expected to be generated by implementing the new Fairmount Line station and, with input from Fairmount Line stakeholders, proposed offset measures. MassDOT estimated that the potential offset measures would meet emissions-reduction targets. The measures include shuttle bus

service from Andrew Square to Boston Medical Center and increased service on bus Route 31, which serves Dorchester and Mattapan. These measures were implemented on January 2, 2012, and currently are in place.

## *Funding Source*

### The Commonwealth

## GREEN LINE EXTENSION TO SOMERVILLE AND MEDFORD PROJECT – SIP REQUIRED COMPLETION BY DECEMBER 2014

### *Project Status*

State-level environmental review (Massachusetts Environmental Policy Act (MEPA)) was completed in July 2010. Federal-level environmental review (National Environmental Policy Act (NEPA)) documents were submitted to the Federal Transit Administration in September 2011, and a public hearing was held on October 20, 2011. A Finding of No Significant Impact (FONSI) was issued by the Federal Transit Administration (FTA) on July 9, 2012.

On January 5, 2015, the US Secretary of Transportation and the MBTA signed the Full Funding Grant Agreement (FFGA) for the Green Line Extension project (GLX), approving \$996,121,000 of FTA New Starts funding to support design and construction of the project. Execution of the FFGA was the result of many years of planning, design and pre-construction efforts by MassDOT and the MBTA, in collaboration with the FTA and its Project Management Oversight Consultant. Federal funding is scheduled to be paid between federal fiscal years (FFYs) 2015 and 2022. As noted in the MassDOT Capital Investment Plan (CIP) for fiscal year 2016, MassDOT and the MBTA will use Commonwealth funds in addition to federal funding to support design and construction activities.

As the project proceeded, it was later found that the project scope as defined in the Full Funding Grant Agreement could not be built for the \$1.992 billion project cost established in January 2015. It was projected that the total project cost could range between \$2.7 billion and \$3.0 billion. The Commonwealth's share of overall project costs would then be between \$1.7 billion and \$2.0 billion, rather than the currently budgeted \$996 million.

With the federal contribution capped at \$996 million and the Commonwealth responsible for all project cost increases, MassDOT and the MBTA had no choice but to re-evaluate the GLX project in order to recommend to the Commonwealth if and how the project should proceed.

MassDOT and the MBTA are now working to identify opportunities to value engineering elements of the project in order to bring costs of the overall project closer to the original anticipated costs.

The MBTA Fiscal and Management Control Board and the MassDOT Board were briefed on August 24, 2015 and September 9, 2015, respectively, about these developments.

Before seeking additional state funding, MassDOT and the MBTA considered:

- All available options to reduce costs
- All available options to identify additional funding from sources other than the Commonwealth
- Whether or not to proceed with the Green Line Extension project

MassDOT and the MBTA actively sought stakeholder and public input on, as well as staff analysis of, options including the following:

*Option 1 - Reduce the Project Scope and Project Costs*

Downsize, delay, or eliminate planned vehicle maintenance and storage facility

*Option 2 - Find Additional Sources of Funds, Other than State Bonds*

This could include:

- Reallocate \$158 million programmed by the Boston Region MPO for a future Route 16 extension to the core GLX project (the MPO endorsed this action in Amendment Four of the 2016–20 TIP)
- Work with municipal partners (Cambridge and Somerville committed \$75 million towards the project)
- Obtain institutional and private contributions
- Seek any additional federal funding in cooperation with the Congressional delegation

*Option 3 - Change Procurement Method*

Halt Construction Manager/General Contractor process and rebid project—in smaller contract packages—using a more traditional procurement method

*Option 4 - Mothball or Cancel the Project*

On May 9, 2016, the MBTA Fiscal and Management Control Board and the MassDOT Board voted to advance a scaled-down version of the project by submitting the redesign to federal regulators and continuing with plans for financing the project.

MassDOT will provide an update to DEP and the public as soon as it has determined the impact of this delay on the overall project schedule.

Prior to the cost increase, the project had been moving forward, with MassDOT and MBTA implementing a four-phased project-delivery plan.

*Phase 1* used the traditional design-bid-build approach to deliver the contract for widening the Harvard Street and Medford Street railroad bridges and demolishing the 21 Water Street building. The MBTA also added some retaining wall construction to the Phase 1 contract that had previously been programmed for Phase 4 in that area. This contract is completed.

*Phase 2/2A* will extend service from the (new) Lechmere Station to the Washington Street and Union Square Stations and relocate the bus facility and vehicle storage at Lechmere Station.

*Phase 3* will construct the vehicle-maintenance facility and storage facility.

*Phase 4* will provide service from Washington Street Station (completed as part of Phase 2, above) to College Avenue Station.

*New Green Line Vehicles:* The MBTA Vehicle Procurement contract to purchase 24 Type 9 Vehicles was awarded to CAF USA Inc. in an amount not to exceed \$118,159,822 at the MassDOT Board Meeting held on May 14, 2014. The NTP for this contract was issued on September 4, 2014.

CAF is in the process of developing drawing packages for the Preliminary Design; and the MBTA Project Team and CAF continue to hold technical working sessions and project meetings. In addition, weekly project management meetings are held between MBTA and CAF to discuss project status, short-term schedules and priorities; and monthly project status meetings are held to review and discuss all project issues, including schedules, deliverables, and milestones.

The first vehicle is to be delivered no later than 36 months from the notice to proceed. The pilot car delivery is scheduled for September 2017. The pilot car will receive comprehensive testing for six months followed by delivery of the remaining 22 vehicles, with the last car to be delivered by July 2018. All vehicles are expected to be in service in early 2019.

*Somerville Community Path:* Originally the Green Line Extension project included just the design of the extension of the Somerville Community Path from south of Lowell Street to the Inner Belt area of Somerville. In May 2014, MassDOT and the City of Somerville announced an agreement to add construction of the Community Path, including a connection to the Cambridge/Northpoint area, to the scope of the program. The Path Extension is not part of the SIP commitment and is currently being re-evaluated by the MBTA Fiscal and Management Control Board and the MassDOT Board.

## SIP Requirement Status

By filing an Expanded Environmental Notification Form, procuring multiple design consultants, and publishing Draft and Final Environmental Impact Reports, MassDOT met the first four interim milestones associated with the Green Line Extension project. MassDOT—which has committed substantial resources to the Green Line Extension project, a top transportation priority of the Commonwealth and the largest expansion of the MBTA rapid transit system in decades—has transitioned the project from the planning and environmental review phases to design, engineering, and eventual construction, coupled with the tasks associated with applying for New Starts funding.

In the 2011 SIP Status Report, MassDOT reported that the Green Line Extension project would not meet the legal deadline of December 31, 2014.

Although the goal of the phased project delivery approach is to complete components in an incremental way, the timeline for overall project completion listed above represents a substantial delay beyond the current SIP deadline of December 31, 2014; this triggered the need to provide interim emission reduction offset projects and measures for the period of the delay (beginning January 1, 2015). Working with the Central Transportation Planning Staff, MassDOT and the MBTA calculated the reductions of non-methane hydrocarbon, carbon monoxide, and nitrogen oxide—reductions equal to or greater than those projected for the Green Line Extension itself, as specified in the SIP regulation—that will be required for the period of the delay.

In June 2012, MassDOT released a list of potential mitigation ideas received from the public that could be used as offset measures. In the summer and fall of 2012, MassDOT solicited public comments on these potential measures. The MBTA created an internal working group to determine a final portfolio of interim mitigation measures to implement by December 31, 2014, the legal deadline for implementation of the Green Line Extension.

This work resulted in a recommendation to implement the following three interim mitigation measures, which collectively would meet the emissions-reduction target for the project:

- Additional off-peak service along existing routes serving the GLX corridor, including the Green Line, and bus routes 80, 88, 91, 94, and 96
- Purchase of 142 new hybrid electric vehicles for THE RIDE
- Additional park-and-ride spaces at the Salem and Beverly intermodal facilities

The Petition to Delay, submitted to DEP on July 22, 2014, which expands further on the analysis and determination of the interim offset measures, is available on MassDOT's website. These measures went into effect at the beginning of 2015.

## *Funding Source*

The Commonwealth



## RUSSIA WHARF FERRY TERMINAL

### *Project Status*

Former MassDOT Secretary Richard Davey approved construction of the permitted ferry facility and a \$460,000 ferry-service startup subsidy in October 2012. The 2005 facility plans and specifications were revised to meet the latest MassDOT Highway Division standards. The bid package was issued in fall 2013. A contractor was selected and the Notice to Proceed was issued in April 2014. Pre-construction activities progressed, but contractual issues associated with the project design led MassDOT to decide to rebid the contract. There is no regularly scheduled passenger water transportation service in this area, nor are there any plans to provide such service.

The City of Boston, however, is undertaking design and engineering work to address the Old Northern Avenue Bridge, which will allow for ferry vessel-clearance. The city received a grant in 2012 to purchase two ferry vessels for Inner Harbor use, which could include this ferry terminal as a destination. The Massachusetts Convention Center Authority has agreed to take over that grant and will purchase the vessels. Procurement could occur in calendar year 2016.

### *Funding Source*

The Commonwealth

### *Changes in Project Design and Construction Schedule since the Last Conformity Determination Analysis*

The Commonwealth requires that any changes in the mix of projects, project designs, or construction schedules from the previous conformity determination for the region be identified. The last conformity determination was performed for the Boston Region MPO's current LRTP, *Charting Progress to 2040*, in July 2015. The mix of projects included in the conformity determination for this LRTP remains the same, except for the following:

- Completion of the GLX Phase 1 project to College Avenue and Union Square has been delayed; the project was scheduled to be completed after 2020, and now is included in the 2040 analyses only
- The GLX Phase 2 project from College Avenue to Mystic Valley Parkway/Route 16 has been removed
- Two regionally significant projects that are included in the MassDOT CIP and funded with state funding have been listed in this LRTP Amendment
  - Reconstruction of Interstate 90 and Interstate 495 in Hopkinton and Westborough

- Construction of a new connection from Burgin Parkway over the MBTA in Quincy
- Reconstruction of Melnea Cass Boulevard has been listed in this LRTP Amendment
- Status of uncompleted SIP projects has been updated

## GLOBAL WARMING SOLUTIONS ACT TRANSPORTATION STATUS: FUTURE CARBON DIOXIDE EMISSIONS REDUCTIONS

### Background

The Global Warming Solutions Act of 2008 (GWSA) requires statewide reductions in greenhouse gas (GHG) emissions of 25 percent below 1990 levels by the year 2020, and 80 percent below 1990 levels by 2050. As part of the GWSA, the Executive Office of Energy and Environmental Affairs developed the Massachusetts Clean Energy and Climate Plan (CECP), which outlines programs to attain the 25 percent reduction by 2020—including a 7.6 percent reduction from the transportation sector.

The Commonwealth's 13 metropolitan planning organizations (MPOs) are integrally involved in helping to achieve greenhouse gas reductions mandated under the GWSA. The MPOs work closely with MassDOT and other involved agencies to develop common transportation goals, policies, and projects that would help to reduce GHG emission levels statewide, and meet the specific requirements of the GWSA regulation – *Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation (310 CMR 60.05)*. The purpose of this regulation is to assist the Commonwealth in achieving its adopted GHG emission-reduction goals by requiring:

- MassDOT to demonstrate that its GHG reduction commitments and targets are being achieved
- Each MPO to evaluate and track the GHG emissions and impacts of both its LRTP and TIP
- Each MPO, in consultation with MassDOT, to develop and utilize procedures to prioritize and select projects in its LRTP and TIP based on factors that include GHG emissions and impacts

The Commonwealth's MPOs are meeting the requirements of this regulation through the transportation goals and policies contained in their 2016 LRTPs, the major projects planned in the LRTPs, and the mix of new transportation projects that are programmed and implemented through the TIP.

The GHG tracking and evaluation processes enable the MPOs and MassDOT to identify the anticipated GHG impacts of the planned and programmed projects, and to use GHG impacts as criteria to prioritize transportation projects. This approach is consistent with the greenhouse-gas reduction policies of promoting healthy transportation modes through prioritizing and programming an appropriate balance of roadway, transit, bicycle and pedestrian investments; as well as supporting smart-growth development patterns by creating a balanced multi-modal transportation system. All of the Commonwealth's MPOs and MassDOT are working toward reducing greenhouse gases with "sustainable" transportation plans, actions, and strategies that include, but are not limited to:

- Reducing emissions from construction and operations
- Using more fuel-efficient fleets
- Implementing and expanding travel demand management programs
- Encouraging eco-driving
- Providing mitigation for development projects
- Improving pedestrian, bicycle, and public transit infrastructure and operations (healthy transportation)
- Investing in higher-density, mixed-use, and transit-oriented developments (smart growth)

## ***Regional Tracking and Evaluation in Long Range Transportation Plans***

MassDOT coordinated with the Boston Region MPO and regional planning agencies to implement GHG tracking and evaluation in developing all MPOs' 2012 LRTPs, which were adopted in September 2011. This collaboration continued for the MPOs' 2016 LRTPs, 2016–19 TIPs, and 2017–21 TIPs. This information is now being updated and included in the Boston Region MPO's Amendment One to the 2016 LRTP, *Charting Progress to 2040*. Working together, MassDOT and the MPOs have attained the following milestones:

- As a supplement to the 2016 LRTPs and the Boston Region MPO Amendment One to *Charting Progress to 2040*, the MPOs have completed modeling and long-range statewide projections for GHG emissions resulting from the transportation sector. Using the Boston Region MPO's travel demand model and the statewide travel demand model for the remainder of the state, the MPOs have projected GHG emissions for 2020 no-build (base) and build (action) conditions, and for 2040 no-build (base) and build (action) conditions.

- All of the MPOs have addressed GHG emissions-reduction projections in their LRTPs, discussed climate change, and included a statement of MPO support to reduce GHG emissions as a regional goal.

MassDOT’s statewide estimates of CO<sub>2</sub> emissions resulting from the collective list of all recommended projects in all the Massachusetts LRTPs and Amendments combined are presented below. Emissions shown in Table A.2 have been estimated using the new (2014) MOVES model, and incorporate the latest planning assumptions including updated socio-economic projections for the Commonwealth.

**TABLE A.2**  
**Massachusetts Statewide CO<sub>2</sub> Emissions Estimates**  
**(all emissions in tons per summer day)**

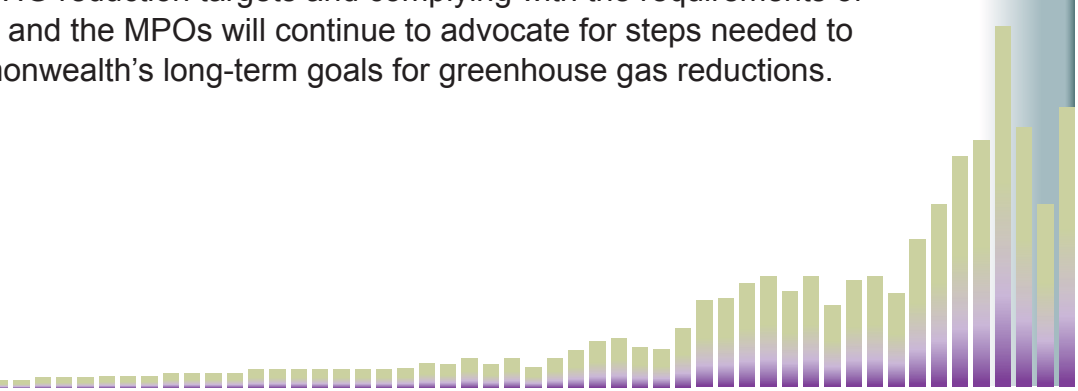
Year	CO <sub>2</sub> Action Emissions	CO <sub>2</sub> Base Emissions	Difference (Action – Base)
2020	136,567.8	136,597.1	-29.3
2040	69,646.8	69,673.6	-26.8

This analysis measures only projects that are included in the travel demand models. Many other types of projects that cannot be accounted for in the model (such as bicycle and pedestrian facilities, shuttle services, intersection improvements, etc.), are covered in the regional TIPs with either “qualitative” assessments of likely CO<sub>2</sub> change, or actual quantitative estimates listed for each project.

Tables A.3 and A.4 list the regionally significant projects that are included in the travel demand greenhouse gas analysis for the Boston Region MPO’s Amendment One to *Charting Progress to 2040*.

As shown above, collectively, all projects in the LRTPs in the 2020 Action scenario provide a statewide reduction of more than 29 tons of CO<sub>2</sub> per day compared to the base case. The 2040 Action scenario estimates a reduction of nearly 27 tons of CO<sub>2</sub> emissions compared to the base case.

These results demonstrate that the transportation sector is expected to make positive progress in meeting GHG reduction targets and complying with the requirements of the GWSA. MassDOT and the MPOs will continue to advocate for steps needed to accomplish the Commonwealth’s long-term goals for greenhouse gas reductions.



**TABLE A.3**  
**Regionally Significant Projects Included in the Regional Transportation Models for the Boston Region MPO Recommended LRTP Projects: Projects under Construction**

<b>Analysis Year</b>	<b>Municipality</b>	<b>Project Name</b>
2020	Needham and Wellesley	Rehabilitation/Replacement of 6 Bridges on I-95/ Rte 128 (Add-a-Lane – Contract V)
2020	Canton, Norwood, and Westwood	Ramp Construction on I-95 Northbound and Improvements on Canton St and Dedham St
2040	Somerville and Cambridge	Green Line Extension Project (Phase 1), Lechmere Station to College Ave/Union Sq

**TABLE A.4**  
**Regionally Significant Projects Included in the Regional Transportation Models for the Boston Region MPO Recommended LRTP Projects: Recommended Projects**

<b>Analysis Year</b>	<b>Municipality</b>	<b>Project Name</b>
2020	Boston	Reconstruction of Melnea Cass Blvd
2020	Bedford and Billerica	Middlesex Tpk Improvements, from Crosby Dr North to Manning Rd, Phase III
2020	Newton and Needham	Reconstruction of Highland Ave, Needham Str and Charles River Bridge, from Webster St to Rte 9
2020	Weymouth and Abington	Reconstruction and Widening on Rte 18 (Main St) from Highland Pl to Rte 139
2020	Woburn	Reconstruction of Montvale Ave, from I-93 Interchange to Central St
2040	Boston	Reconstruction of Rutherford Ave, from City Sq to Sullivan Sq
2040	Framingham	Intersection Improvements at Rte 126 and Rte 135/MBTA and CSX Railroad
2040	Lexington	Rte 4/225 (Bedford St) and Hartwell Ave
2040	Hopkinton and Westborough	Reconstruction of I-90 and I-495 Interchange
2040	Natick	Bridge Replacement, Rte 27 (North Main St) over Rte 9 (Worcester St) and Interchange Improvements
2040	Quincy	Construction of a New Connection from Burgin Pkwy over the MBTA
2040	Somerville	McGrath Blvd Project
2040	Woburn	Bridge Replacement, New Boston St over MBTA



## TRANSPORTATION EQUITY ANALYSES RESULTS

MPO staff used the travel demand model to perform two types of equity analyses (discussed below) to determine whether this LRTP Amendment would have a disproportionately high adverse effect on minority and low-income populations. Both types of equity analyses calculated differences between the 2040 No-Build and 2040 Build alternatives for “equity analysis zones” (minority transportation analysis zones (TAZs) and low-income TAZs), and for non-equity analysis zones (nonminority TAZs and non-low-income TAZs). For each analysis, the ratio of change from No-Build to Build alternatives was compared for minority versus nonminority TAZs to determine whether there was a disparate impact, and for low- versus non-low-income TAZs to determine whether there was a disproportionate burden.

Thresholds in the MPO’s draft Disparate Impact Policy were used to measure whether this Amendment resulted in disparate impacts or disproportionate burdens. Staff first used this policy to analyze equity in the LRTP in 2015, and it has not been finalized. Because the requirement to analyze disparate impacts is relatively new, MPO staff will continue to examine the draft policy before bringing it to the MPO for approval.

Results of this analysis show that there are no disparate impacts or disproportionate burdens on minority and low-income populations, except for a disparate impact for congested vehicle-miles of travel (VMT), which also was found in the current LRTP, *Charting Progress to 2040*. However, the change in this measure does show a decrease from the No-Build to Build conditions for both low-income and non-low-income populations, suggesting that the projects will improve congestion for everyone.

### *Accessibility Analysis Results*

For the purpose of this analysis, accessibility was defined as ‘the ability to reach desired destinations and the ease of doing so.’ This analysis investigated the number of employment opportunities, health-care facilities, and higher-education facilities that people could reach from equity analysis zones and non-equity analysis zones, along with average transit and highway travel times to these destinations. Analysis of transit travel times included destinations within a 40-minute transit trip, while analysis of highway travel times included destinations within a 20-minute auto trip.

The accessibility analysis first compared the change in transit and highway travel times to various types of employment from the 2040 No-Build to Build alternatives for low-income, non-low-income, minority, and nonminority TAZs, respectively.

The second part of the accessibility analysis compared the ratio of change from the 2040 No-Build to Build alternative for low-income versus non-low-income TAZs to determine whether there was a disproportionate burden, and for minority versus nonminority TAZs to determine whether there was a disparate impact for each type of employment evaluated.

# Mobility, Congestion, and Air Quality Analysis Results

## MOBILITY AND CONGESTION RESULTS

For the purpose of this analysis, mobility is defined as ‘the ability to move from place to place,’ and congestion is defined as ‘the level at which transportation system performance becomes unacceptable because of traffic congestion.’ The MPO’s mobility and congestion analysis focused on the average door-to-door travel time and average VMT under congested conditions.

The mobility and congestion analyses first compared the change in average door-to-door travel time, congested VMT, and VMT per square mile for all transit and highway trips produced in, or attracted to, equity analysis zones from the 2040 No-Build to Build alternatives for low-income, non-low-income, minority, and nonminority TAZs, respectively.

The second part of the mobility and congestion analysis compared the ratio of change from the 2040 No-Build to Build alternatives for low- versus non-low-income TAZs to determine whether there was a disproportionate burden, and for minority versus nonminority TAZs to determine whether there was a disparate impact for each of the factors evaluated.

## AIR QUALITY ANALYSIS RESULTS

The air quality-analysis focused on carbon monoxide, a pollutant that results primarily from incomplete combustion of fossil fuels and accumulates in localized areas, creating hot spots that negatively affect human health.

Carbon monoxide emissions show essentially no change from the 2040 No-Build to Build alternatives for all zones.

## Equity Analysis Conclusions

The MPO is continuing to monitor transportation equity burdens and impacts in the region, and is taking steps to address them through the TIP process. The MPO is programming 14 new projects through 2021 under the Complete Streets, intersection improvement, and multi-use path programs in transportation equity areas in Ashland, Boston, Brookline, Everett, Gloucester, Lynn, Marlborough, Salem, and Somerville. These projects will improve safety and provide benefits to those who walk and bike that are not captured in this analysis.

In addition, MPO staff will continue to work on finalizing its equity analysis process and draft Disparate Impact Policy. For example, how do we capture improvements to

safety and non-motorized mobility, and how do we ensure that our policy thresholds reflect meaningful changes? Some of this work will be completed through a project funded in the FFY 2016 UPWP: Systemwide Title VI/Environmental Justice Assessment of TIP Projects. The purpose of this project is to develop best practices for the Boston Region MPO's systemwide analysis of the benefits and burdens of TIP investments for environmental justice/Title VI populations. Although this project is focused on the TIP, the methodologies that staff develop will be applicable to the LRTP as well. Continued refinement of the draft Disparate Impact Policy will occur under the MPO's ongoing Transportation Equity Program.

