appendix A

Universe of Investment Programs and Projects

INTRODUCTION

One of the primary outcomes of the Long-Range Transportation Plan (LRTP) process is to create a set of investment programs and a list of major infrastructure projects for implementation during the next 20 years. Thus, the Metropolitan Planning Organization (MPO) created the Universe of Projects and Investment Programs lists to identify all potential projects and investment programs that could be considered for *Destination 2040*. This appendix contains these lists for both highway and transit investment programs and projects. Each project is associated with one of the six established MPO investment programs:

- Intersection Improvements
- Complete Streets
- Bicycle Network and Pedestrian Connections
- Community Connections (formerly known as Community Transportation/Parking/ Clean Air and Mobility)
- Transit Modernization Program
- Major Infrastructure

The MPO drew from the Universe lists to develop its draft list of recommended projects and investment programs for public review and the final list to include in this LRTP. During implementation of the LRTP and development of subsequent Transportation Improvement Programs (TIP) and Unified Planning Work Programs, the MPO and MPO staff will use the investment programs and project types when communicating with municipalities, the Massachusetts Department of Transportation (MassDOT), or other entities that can advance projects for funding consideration in the TIP.

UNIVERSE OF INVESTMENT PROGRAMS

Lower Cost Investment Programs

The investment programs in the Universe of Programs list are presented in five categories (the Major Infrastructure program is presented in section A.2.2) with detailed descriptions of which types of projects should be included in each category. The investment programs listed in Table A-1 support projects that cost less than $20 million and do not add capacity to the existing transportation network. For each program, MPO staff has listed the types of projects that the MPO is already funding through these programs (existing) and other types of projects that the MPO could fund through these programs (new). As part of LRTP development, MPO staff also proposed a new investment program for transit projects that were not accommodated under existing programs.

Overall, MPO staff identified these investment programs and related project types based on data analysis and public outreach conducted as part of the LRTP Needs Assessment.

Table A-1
Existing and Proposed Lower Cost Investment Programs for Consideration in *Destination 2040*

Investment Program	Existing/ New	Types of Projects*	Safety	System Preservation	Capacity Management and Mobility	Clean Air/ Sustainable Communities	Transportation Equity	Economic Vitality
Intersection Improvements	Existing	Signal improvements (modernize existing signals, add new signals, or implement transit signal priority)	X	X	X	X	X	X
NA	Existing	Intersection geometry improvements (addition of turning lanes, shortened crossing distances for pedestrians, sidewalk improvements and curb cuts, and striping and lighting for bicyclists)	X	X	X	X	X	X
Complete Streets	Existing	Modernize roadway corridors (continuous sidewalks and bicycle lanes, cycle tracks, and other bicycle facilities, updated signals at multiple intersections along a corridor, or improvements to bridges, drainage, pavement, and roadway geometry)	X	X	X	X	X	X

Investment Program	Existing/ New	Types of Projects*	Safety	System Preservation	Capacity Management and Mobility	Clean Air/ Sustainable Communities	Transportation Equity	Economic Vitality
NA	New	Construction of dedicated bus lanes and associated roadway improvements			X	X	X	X
NA	New	Climate resiliency improvements, including storm water management improvements		X			X	X
Bicycle Network and Pedestrian Connections	Existing	Expansion of bicycle and pedestrian networks, including new off-road bicycle or multi-use paths, improved bicycle and pedestrian crossings, new sidewalks, traffic calming improvements, sidewalk network expansion, and enhanced signage and lighting	X	X	X	X	X	X
Community Connections (formerly Community Transportation/ Parking/ Clean Air and Mobility)	Existing	Transit Operations: Projects that close gaps in the transit network (first-mile/last-mile shuttles, partnerships with transportation network companies, transit enhancements, and technology updates)			X	X	X	X
NA	Existing	Parking Management: Additional parking for automobiles and bicycles, and leasing off-site parking near transit stations with shuttles connections			X	X	X	X
NA	Existing	Bicycle and Pedestrian Improvements: Bicycle and pedestrian improvements for transit access, improvements to nonautomotive transportation infrastructure for travelers with mobility impairments, and training and equipment for bicycles on transit			X	X	X	X
NA	Existing	Education and Wayfinding: Projects include travel instruction, training on new technologies, signage, and pilot or demonstration projects			X	X	X	X

Investment Program	Existing/ New	Types of Projects*	Safety	System Preservation	Capacity Management and Mobility	Clean Air/ Sustainable Communities	Transportation Equity	Economic Vitality
NA	New	Connect Elderly Adults with Transportation: Connect elderly adults with transportation options, such as transportation network companies			X	X	X	
Transit Modernization Program	New	Flex MPO discretionary funding to transit modernization projects such as station or facility improvements or climate resiliency projects to improve transit infrastructure	X	X	X	X	X	X

* The MPO will encourage municipalities, MassDOT, and other entities to incorporate climate resiliency into the design of any project submitted to the MPO for consideration, and the MPO will consider climate resiliency as part of project evaluation and selection.
MassDOT = Massachusetts Department of Transportation. MPO = Metropolitan Planning Organization. NA = not applicable.
Source: Boston Region MPO.

Major Infrastructure Investment Program

Table A-2 outlines project types within the MPO's Major Infrastructure investment program, which includes any project that costs more than $20 million and/or adds capacity to the transportation network. Projects that meet one or both of these criteria must be identified specifically in an LRTP before they can be programmed in the TIP. MPO staff has listed types of Major Infrastructure projects that the MPO has recently programmed using its Regional Target Funds (existing) and other types of projects that the MPO could fund (new). MPO staff has included the new category for Major Infrastructure project types—interchange modernization—that is not currently being funded because of the MPO's policy of not funding the high-cost projects. As part of LRTP development, MPO staff identified these Major Infrastructure project types based on data analysis and public outreach conducted as part of the Needs Assessment.

Table A-2
Major Infrastructure Project Type Categories for Consideration in *Destination 2040*

Investment Program	Existing/ New	Types of Projects*	Safety	System Preservation	Capacity Management and Mobility	Clean Air/ Sustainable Communities	Transportation Equity	Economic Vitality
Major Infrastructure	Existing	**Transit expansion/ modernization**, such as funding for rail extensions or facility or station improvements	X	X	X	X	X	X
NA	Existing	**Large Complete Streets projects** (programmed projects of this scale include Highland Avenue/ Needham Street in Newton and Needham, and Melnea Cass Boulevard in Boston)	X	X	X	X	X	X
NA	New	**Interchange modernization** (for example, I-95/I-95 Canton, I-95/I-95 Woburn, or the Braintree Split)	X	X	X	X	NA	X

* The MPO will encourage municipalities, MassDOT, and other entities to incorporate climate resiliency into the design of any project submitted to the MPO for consideration, and the MPO will consider climate resiliency as part of project evaluation and selection.
I = Interstate. MassDOT = Massachusetts Department of Transportation. MPO = Metropolitan Planning Organization. NA = not applicable.
Source: Boston Region MPO.

UNIVERSE OF HIGHWAY AND TRANSIT PROJECTS

Tables A-3 through A-7 list the highway and transit projects in the Universe of Projects that are under consideration for inclusion in *Destination 2040* that cost more than $20 million and/or add capacity to the transportation network.

Active MassDOT Major Infrastructure Highway Projects

The highway projects listed in Table A-3 are active MassDOT projects (meaning the MassDOT Project Review Committee has approved them) that are estimated to cost more than $20 million and/or add capacity to the transportation network. These projects are included in the federal fiscal year (FFY) 2020–24 TIP Universe of Projects; however, MPO staff did not actively consider these projects for programming in the FFYs 2020–24 TIP because they were not listed in the LRTP at the time of TIP development.

Table A-3
Active MassDOT Major Infrastructure Projects

Municipality	Project Proponent	Project Name	PROJIS/ TIP ID	Design Status	Cost Estimate	MAPC Subregion	MassDOT Highway District	TIP/LRTP Evaluation Score[1]	LRTP Status
Somerville	Somerville	McGrath Boulevard Project	607981	PRC approved	$82,500,000	ICC	4	68/13	FFYs 2026–30
Boston	Boston	Improvements along Commonwealth Avenue (Route 30), from Alcorn Street to Warren/Kelton Streets (Phase 3 and Phase 4)	608449	25% design	$31,036,006	ICC	6	66/0	N/A
Saugus	MassDOT	Interchange Reconstruction at Walnut Street and Route 1, includes S-05-016 (Phase II)	601513	75% design	$19,581,123	ICC	4	46/9	N/A
Boston	MassDOT/ Boston	Bridge Rehabilitation, B-16-184, Northern Avenue over Fort Point Channel	606265	PRC approved	$55,000,015	ICC	6	NS	N/A
Boston	MassDOT	Replacement of Allston I-90 Elevated Viaduct, B-16-359, including Interchange Reconstruction Beacon Park Yard Layover and West Station	606475	PRC approved (2011)	$936,100,000 to $1,200,000,000	ICC	6	NS/15	N/A
Lynn, Revere	MassDOT	Bridge Reconstruction, L-18-015=R-05-008, Route 1A over Saugus River	608396	PRC approved	$74,750,000	ICC	4	NS	N/A
Lynn	Lynn	Reconstruction of Western Avenue (Route 107)	609246	Pre-PRC; PRC-approval expected December 2018	$36,205,000	ICC	4	NS	N/A
Malden, Revere, Saugus	MassDOT	Reconstruction and Widening on Route 1, from Route 60 to Route 99	605012	PRC approved	$172,500,000	ICC	4	NS/12	N/A
Lexington	Lexington	Route 4/225 (Bedford Street) and Hartwell Avenue	N/A	N/A	$30,557,000	MAGIC	4	NS/14	FFYs 2021–25
Concord	Concord	Improvements and Upgrades to Concord Rotary (Routes 2/2A/119)	602091	25% design	$103,931,250	MAGIC	4	NS/11	N/A
Concord	MassDOT	Reconstruction and Widening on Route 2, from Sandy Pond Road to Bridge over MBTA/B&M Railroad	608015	PRC approved (2014)	$8,000,000	MAGIC	4	NS	N/A
Natick	MassDOT	Bridge Replacement, Route 27 (North Main Street) over Route 9 (Worcester Street) and Interchange Improvements	605313	25% design	$25,793,370	MWRC	3	58/13	FFYs 2021–25

Municipality	Project Proponent	Project Name	PROJIS/ TIP ID	Design Status	Cost Estimate	MAPC Subregion	MassDOT Highway District	TIP/LRTP Evaluation Score[1]	LRTP Status
Framingham	Framingham	Intersection Improvements at Route 126/135/MBTA and CSX Railroad	606109	PRC approved (2010)	$115,000,000	MWRC	3	NS/11	FFYs 2026–30
Southborough, Westborough	MassDOT	Improvements at I-495 and Route 9	607701	PRC approved (2013)	$35,000,000	MWRC	3	NS/10	N/A
Woburn, Reading, Stoneham, Wakefield	MassDOT	Interchange Improvements to I-93/I-95	605605	PRC approved (2009)	$276,708,768	NSPC	4	NS/13	N/A
Peabody	MassDOT	Mainline Improvements on Route 128 (Phase II)	604638	100% design	$24,031,419	NSTF	4	36/10	N/A
Beverly	Beverly	Interchange Reconstruction at Route 128/Exit 19 at Brimbal Avenue (Phase II)	607727	PRC approved (2014)	$23,000,000	NSTF	4	NS/8	N/A
Beverly	MassDOT	Bridge Replacement, B-11-001, Bridge Street over Bass River (Hall-Whitaker Drawbridge)	608514	PRC approved	$34,500,000	NSTF	4	NS	N/A
Beverly, Salem	MassDOT	Drawbridge Replacement/ Rehabilitation, B-11-005=S-01-013, Kernwood Avenue over Danvers River	605276	PRC approved	$47,750,300	NSTF	4	NS	N/A
Salem	MassDOT	Reconstruction of Bridge Street, from Flint Street to Washington Street	5399	25% design	$24,810,210	NSTF	4	NS/9	N/A
Bellingham	MassDOT	Ramp Construction and Relocation, I-495 at Route 126 (Hartford Avenue)	604862	PRC approved (2006)	$13,543,400	SWAP	3	NS	N/A
Canton, Dedham, Norwood	MassDOT	Interchange Improvements at I-95/I-93/University Avenue/I-95 Widening	87790	25% design	$ 202,205,994	TRIC	6	45/12	N/A
Lynn, Salem	MassDOT	Reconstruction of Route 107	608927	PRC approved	$ 38,155,000	ICC, NSTF	4	NS	N/A

Note: Bridges included in this list have been noted as local priorities during TIP contact outreach.
[1]The LRTP Evaluation scores listed here are from the project evaluations completed as part of the previous LRTP, *Charting Progress to 2040*
Abbreviations: FFY = federal fiscal year. I = Interstate. LRTP = Long-Range Transportation Plan. MAPC = Metropolitan Area Planning Council. MassDOT = Massachusetts Department of Transportation. MBTA = Massachusetts Bay Transportation Authority. N/A = not applicable. NS = not scored. PRC = MassDOT Project Review Committee. PROJIS = MassDOT Project Information System. TIP = Transportation Improvement Program.
Subregions: ICC = Inner Core Committee. MAGIC = Minuteman Advisory Group on Interlocal Coordination. MWRC = MetroWest Regional Collaborative. NSPC = North Suburban Planning Council. NSTF = North Shore Task Force. SWAP = South West Advisory Planning Committee. TRIC = Three Rivers Interlocal Council.
Source: Boston Region MPO.

Conceptual Major Infrastructure Highway Projects

The highway projects listed in Table A-4 include projects that are conceptual and anticipated to cost more than $20 million and/or add capacity to the transportation network. MPO staff identified the projects through studies, the LRTP Needs Assessment, or from public comment. The projects with project information numbers, also known as PROJIS numbers, have had some planning work done in the past.

Table A-4
Conceptual Major Infrastructure Highway Projects

Project Type	Investment Program	PROJIS	Proponent(s)	Project Name	LRTP Status - Evaluation Score[a]	CTPS Study	Estimated Cost
Inner Core							
Major Highway	Major Infrastructure	608128	MassDOT	Boston–Southeast Expressway Modification (Southampton Interchange)	Conceptual-12	N/A	$143,750,000
Major Highway	Interchange	N/A	CTPS Study	Newton Corner Rotary (Interchange 17) Improvements	Conceptual-8	2009	$4,000,000
Major Highway	Interchange	N/A	Newton	New Route 128 Ramp to Riverside Station	Conceptual-7	N/A	N/A
Major Highway	Bridge	N/A	Boston/ South Boston Transportation Study	Northern Avenue Bridge Reconstruction	Conceptual-N/A	N/A	N/A
Major Highway	Bottleneck	N/A	CTPS Study	Extend I-93 High-Occupancy Vehicle Lane into the City (Somerville)	Conceptual-N/A	2006	N/A
Freight	Freight Movement	N/A	Boston	Charlestown Haul Road	Conceptual-N/A	N/A	N/A
Freight	Freight Movement	N/A	Boston	Conley Rail Service	Conceptual-N/A	N/A	N/A
Arterial and Intersection	Intersection Improvements	N/A	South Boston Transportation Study	Cypher Street Extension from D Street to E Street and Reconstruct and Extend E Street from Cypher Street to Summer Street	Conceptual-10	2015	$9,700,000
Arterial and Intersection	Intersection Improvements	N/A	South Boston Transportation Study	New Summer Street North/ South Connector to Northern Avenue/Haul Road/Drydock Avenue	Conceptual-N/A	2015	N/A
Arterial and Intersection	Intersection Improvements	N/A	Winn Resort/ Everett	Improvements Associated with Winn Development	Conceptual-N/A	2017	N/A
Arterial and Intersection	Interchange	N/A	Boston	Boardman Street at Route 1A	Conceptual-10	1990	$13,686,000
Arterial and Intersection	Interchange	N/A	Revere (MassDOT)	Mahoney Circle Grade Separation	Conceptual-10	N/A	$60,000,000

Project Type	Investment Program	PROJIS	Proponent(s)	Project Name	LRTP Status - Evaluation Score[a]	CTPS Study	Estimated Cost
Arterial and Intersection	Interchange	N/A	Revere (MassDOT)	Route 1/Route 16 Connector	Conceptual-9	N/A	N/A
Arterial and Intersection	Interchange	N/A	Revere (MassDOT)	Route 1A/Route 16 Connector	Conceptual-8	N/A	N/A
Arterial and Intersection	Complete Streets	N/A	Boston	Multimodal Improvements along Blue Hill Avenue/ Warren Street, from River Street to Dudley Street	Conceptual-N/A		$80,000,000
Arterial and Intersection	Complete Streets	N/A	Boston	Multimodal Improvements along Columbia Road, from Blue Hill Avenue to Kosciuszko Circle	Conceptual-N/A		$45,000,000
Arterial and Intersection	Complete Streets	N/A	Boston	Multimodal Improvements along Summer Street, from Boston Wharf Road to First Street	Conceptual-N/A		$21,000,000
Arterial and Intersection	Complete Streets	N/A	CTPS Study	Lynn–Route 1A/Lynnway/ Carroll Parkway	Conceptual-N/A	2015	N/A
Arterial and Intersection	Complete Streets	N/A	Public Comment	Everett–Sweetser Circle (Route 16 and Route 99)	Conceptual-N/A	N/A	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Medford–Route 60	Conceptual-N/A	2018	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Arlington, Cambridge–Routes 2A/16	Conceptual-N/A	2018	N/A
Arterial and Intersection	Interchange	N/A	Medford	Improvements to Route 16/28 Intersection	Conceptual		N/A
Bicycle and Pedestrian	Bicycle and Pedestrian	NA	Cambridge	Alewife Bicycle/Pedestrian/ Transit Connection to Potential Future Commuter Rail Station	Conceptual		N/A
Bridge	Bridge	605527	Cambridge	Bridge Rehabilitation of River Street and Western Avenue Bridges	Pre-TIP		N/A
Minuteman Advisory Group on Interlocal Coordination							
Major Highway	Interchange	603345	Hudson, Marlborough (MassDOT)	Reconstruction on I-290 and I-495 and Bridge Replacement	Pre-TIP-9	N/A	$100,000,000
Major Highway	Bottleneck	N/A	CTPS Study	Route 2 Capacity Improvements (Acton to Lexington)	Conceptual-N/A	2006	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Bolton–Route 117	Conceptual-N/A	2018	N/A
MetroWest Regional Collaborative							
Arterial and Intersection	Major Infrastructure	N/A	CTPS Study	Route 30 (Cochituate Road) in Framingham and Natick	Conceptual-N/A	2013	N/A
Arterial and Intersection	Complete Streets	N/A	CTPS Study	Marlborough–Reconstruction of Route 20 East	Conceptual-N/A	2017	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Weston–Route 20	Conceptual-N/A	2018	N/A

Project Type	Investment Program	PROJIS	Proponent(s)	Project Name	LRTP Status - Evaluation Score[a]	CTPS Study	Estimated Cost
North Shore Task Force							
Major Highway	Bottleneck	N/A	CTPS Study	Route 128 Capacity Improvements (Lynnfield to Peabody)	Conceptual-N/A	2006	$24,634,000
North Suburban Planning Council							
Major Highway	Major Infrastructure	N/A	Lynnfield to Reading	I-95 Capacity Improvements	Conceptual-9	N/A	$198,443,000
Major Highway	Interchange	N/A	Wilmington	I-93/Route 125/Ballardvale Road	Conceptual-N/A	N/A	N/A
Major Highway	Bridge	N/A	Woburn	Bridge Replacement and Related Work, Washington Street over I-95 Bridge	Conceptual-N/A	N/A	$12,200,000
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Burlington–Route 3A	Conceptual-N/A	2018	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Wilmington–Routes 38 and 129	Conceptual-N/A	2018	N/A
South Shore Coalition							
Major Highway	Major Infrastructure	N/A	MassDOT	Route 3 South Widening	Conceptual-11	N/A	$800,000,000
Major Highway	Interchange	N/A	Braintree (MassDOT)	I-93/Route 3 Interchange (Braintree Split)	Previous LRTP-12	2006	$53,289,000
Major Highway	Bottleneck	N/A	CTPS Study	I-93 Capacity Improvements (Boston to Braintree)	Conceptual-N/A	2006	N/A
Arterial and Intersection	Major Infrastructure	N/A	Abington, Weymouth, Rockland	Improvements Associated with the Completion of the South Weymouth Naval Air Station	Conceptual-N/A	N/A	N/A
South West Advisory Committee							
Arterial and Intersection	Major Infrastructure	N/A	Milford	Veteran's Memorial Drive/ Alternate Route	Conceptual-N/A	N/A	N/A
Three Rivers Interlocal Council							
Major Highway	Interchange	N/A	Randolph	I-93/Route 24 Interchange	Conceptual-N/A	N/A	N/A
Major Highway	Bottleneck	N/A	CTPS Study	I-95 Capacity Improvements (Canton to Foxborough)	Conceptual-N/A	2006	N/A
Major Highway	Bottleneck	N/A	CTPS Study	Route 24 Capacity Improvements (Taunton to Randolph)	Conceptual-N/A	2006	N/A
Arterial and Intersection	Complete Streets	N/A	MassDOT	Route 1 Intersection Signalization (Corridor-wide)	Conceptual-N/A	N/A	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Canton–Route 128	Conceptual-N/A	2018	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Norwood, Westwood, Walpole–Route 1	Conceptual-N/A	2018	N/A

Project Type	Investment Program	PROJIS	Proponent(s)	Project Name	LRTP Status - Evaluation Score[a]	CTPS Study	Estimated Cost
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Medfield–Routes 109 and 27	Conceptual-N/A	2018	N/A
Multiple Subregions							
Major Highway	Bottleneck	N/A	CTPS Study	Interstate 93 Capacity Improvements (Somerville to Woburn) (ICC and NSPC)	Conceptual-13	2006	$550,000,000
Major Highway	Bottleneck	N/A	CTPS Study	I-495 Capacity Improvements (Littleton to Wrentham) (MAGIC, MWRC, and SWAP)	Conceptual-N/A	2006	N/A
Major Highway	Bottleneck	N/A	CTPS Study	Route 128 HOV (Wellesley to Woburn) (MWRC, MAGIC, and NSPC)	Conceptual-N/A	2006	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Quincy, Weymouth, Hingham–Route 3A (SWAP and ICC)	Conceptual-N/A	2018	N/A
Arterial and Intersection	Bottleneck	N/A	Brookline to Framingham	Route 9 Capacity Improvements (MWRC and ICC)	Conceptual-N/A	N/A	N/A
Arterial and Intersection	Bottleneck	N/A	Needs Assessment	Wellesley, Sherborn, Holliston–Route 16 (MWRC and SWAP)	Conceptual-N/A	2018	N/A

[a] The LRTP Evaluation scores listed here are from the project evaluations completed as part of the previous LRTP, *Charting Progress to 2040*

Abbreviations: CTPS = Central Transportation Planning Staff. HOV = high-occupancy vehicle lane. I = Interstate. LRTP = Long-Range Transportation Plan. MassDOT = Massachusetts Department of Transportation. N/A = not applicable. PROJIS = MassDOT Project Information System. TIP = Transportation Improvement Program.
Subregions: ICC = Inner Core Committee. MAGIC = Minuteman Advisory Group on Interlocal Coordination. MWRC = MetroWest Regional Collaborative. NSTF = North Shore Task Force. NSPC = North Suburban Planning Council. SWAP = South West Advisory Planning Committee.
Source: Boston Region MPO.

Transit Projects: Massachusetts Bay Transportation Authority's (MBTA) *Focus40* Next Priorities Through 2040

The transit projects and initiatives listed in Table A-5 are the core pieces of the MBTA's *Focus40* investment strategy through 2040. These projects are intended to be prioritized for planning and design work and phased in through the MassDOT/MBTA's rolling five-year Capital Investment Plan development process. All projects in this *Focus40* category are included to provide a more complete picture of proposed transportation projects in the Boston region. Rows highlighted in light blue indicate projects or initiatives for which the MPO may be able to provide financial or analytical support.

Table A-5
Transit Projects: MBTA *Focus40* Next Priorities through 2040

Transit Investment - Type	Service	Proponent(s)	Project Name	TIP/ LRTP Status	Potential MPO Action
Resiliency	Assessments	MassDOT/ MBTA	Incremental Implementation of Systemwide Climate Change Vulnerability Assessments	Conceptual	Provide MPO funds for implementing resiliency projects at specific locations in Boston region municipalities, particularly those related to recommendations identified in municipal vulnerability assessments and resiliency plans.
Resiliency	Blue Line	MassDOT/ MBTA	Blue Line Resiliency Phase 2: Further Implementation	Conceptual	N/A
Resiliency	Power Supply	MassDOT/ MBTA	Resilient Power Supply	Conceptual	N/A
Transit Capacity	Blue Line	MassDOT/ MBTA	Blue Line Capacity and Reliability Improvements–Signals and Power	Conceptual	N/A
Transit Capacity	Blue Line/Red Line	MassDOT/ MBTA	Downtown Pedestrian Connection Between Red and Blue Lines	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Capacity	Bus	MassDOT/ MBTA	Bus Fleet Expansion to Serve Bus and Bus Rapid Transit Network	Conceptual	N/A
Transit Capacity	Bus	MassDOT/ MBTA	Priority Bus Rapid Transit Corridors	Conceptual	Provide MPO funds for implementation through a Dedicated Bus Lane Program.
Transit Capacity	Bus/Place-based Additions	MassDOT/ MBTA	Better Bus Project Phase 3: Implementation of Network Redesign	Conceptual	Fund studies of potential routes through the MPO's UPWP or provide staff analytical support for studies funded by MassDOT/MBTA. Provide MPO funds for implementation through a Dedicated Bus Lane Program.
Transit Capacity	Commuter Rail	MassDOT/ MBTA	Regional Multimodal West Station and Midday Train Layover	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Capacity	Commuter Rail	MassDOT/ MBTA	Commuter Rail Double and Triple Tracking to Add Capacity	Conceptual	N/A
Transit Capacity	Commuter Rail	MassDOT/ MBTA	Commuter Rail Station Investments (Infill Stations, Connections to Rapid Transit)	Conceptual	Fund feasibility studies through the MPO's UPWP or provide staff analytical support for studies funded by MassDOT/ MBTA. Provide MPO funds to create infill stations.
Transit Capacity	Customer Experience	MassDOT/ MBTA	System Access Improvements (Parking and Other)	Conceptual	Fund feasibility studies or technical assistance through the MPO's UPWP or provide staff analytical support for studies funded by MassDOT/ MBTA. Provide MPO funds for implementation through the Community Connections.
Transit Capacity	Green Line	MassDOT/ MBTA	Green Line Transformation Phase 2: New Fleet, Upgraded Infrastructure and Maintenance Facilities	Conceptual	N/A

Transit Investment Type	Service	Proponent(s)	Project Name	TIP/ LRTP Status	Potential MPO Action
Transit Capacity	Green Line	MassDOT/ MBTA	Green Line Transformation Phase 3: Expanded Capacity on D and E Branches	Conceptual	N/A
Transit Capacity	Green Line	MassDOT/ MBTA	Reservation and Right-of-Way Expansion for Surface Green Line	Conceptual	N/A
Transit Capacity	Orange Line	MassDOT/ MBTA	Orange Line Additional Capacity Improvements (3-minute headways)	Conceptual	N/A
Transit Capacity	Place-based Additions	MassDOT/ MBTA	Place-based Service Expansions Based on Pilots and Transit Action Plans	Conceptual	Fund related studies of potential routes through the MPO's UPWP or provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Capacity	Red Line	MassDOT/ MBTA	Red Line Strategic Track Reconfiguration to Address Bottlenecks	Conceptual	N/A
Transit Capacity	Silver Line	MassDOT/ MBTA	Silver Line Next Generation Vehicles and Maintenance Facility	Conceptual	N/A
Transit Extension	Commuter Rail	MassDOT/ MBTA	Phase 2: Commuter Rail South Coast Rail	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Extension	Customer Experience	MassDOT/ MBTA	Partnerships for Improved First-Mile/Last-Mile Connections	Conceptual	Fund feasibility studies or technical assistance through the MPO's UPWP or provide staff analytical support for studies funded by MassDOT/ MBTA. Provide MPO funds for implementation through the Community Connections Program.
Transit Extension	Silver Line	MassDOT/ MBTA	Silver Line Bus Rapid Transit to Everett	Conceptual	Provide MPO funds for supportive roadway investments through a Dedicated Bus Lane Program.
Transit Extension	Water Transportation	MassDOT/ MBTA	Phase 1: Expanded and Better Integrated Multi-Operator Water Transportation Network	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Modernization	Accessibility	MassDOT/ MBTA	Accessibility Improvements at Surface Green Line Stops	Conceptual	Provide MPO funds for implementing accessibility improvements at surface level Green Line stops.
Transit Modernization	Accessibility	MassDOT/ MBTA	Plan for Accessible Transit Service Phase 2: Implementation of Mid-term Recommendations	Conceptual	Provide MPO funds for implementing accessibility improvements for specific stops, stations, or corridors in MPO municipalities.
Transit Modernization	Accessibility	MassDOT/ MBTA	The RIDE Service Reimagining	Conceptual	Fund related studies through the MPO's UPWP or provide staff analytical support for studies funded by MassDOT/ MBTA.
Transit Modernization	Bus	MassDOT/ MBTA	Phased Conversion to Zero-Emission Fleets	Conceptual	N/A

Transit Investment Type	Service	Proponent(s)	Project Name	TIP/ LRTP Status	Potential MPO Action
Transit Modernization	Customer Experience	MassDOT/ MBTA	Station Modernization, including Implementation of Platform Barriers and Doors	Conceptual	Provide MPO funds for implementing modernization improvements at specific stations in Boston region municipalities.
Transit Modernization	Red Line	MassDOT/ MBTA	Mattapan High-Speed Line Phase 2: Implementation of Reimagining	Conceptual	N/A
Transit Modernization	Silver Line	MassDOT/ MBTA	Infrastructure Upgrade in Silver Line Tunnel	Conceptual	N/A

LRTP = Long-Range Transportation Plan. MassDOT = Massachusetts Department of Transportation. MBTA = Massachusetts Bay Transportation Authority. MPO = Metropolitan Planning Organization. N/A = not applicable. TIP = Transportation Improvement Program. UPWP = Unified Planning Work Program.
Source: Boston Region MPO.

Transit Projects: MBTA *Focus40* Big Ideas

The transit projects in *Focus40's* Big Ideas category (Table A-6) are included to provide a more complete picture of proposed transportation projects in the Boston region. However, these projects are distinct from the projects in the Next Priorities for 2040 category because the MBTA needs to better understand the feasibility, benefits, and costs of these projects before determining how to move forward. The MBTA may consider advancing the planning work for these projects as it makes progress on implementing the investments in the Next Priorities for 2040 category. Rows highlighted in light blue indicate projects or initiatives where the MPO may be able to provide financial or analytical support.

Table A-6
Transit Projects: MBTA *Focus40* Big Ideas

Transit Investment Type	Service	Proponent(s)	Project Name	TIP/ LRTP Status	Potential MPO Action
Resiliency	Assessments	MassDOT/MBTA	Full Systemwide Climate Resilience	Conceptual	Provide MPO funds for implementing resiliency projects at specific locations in Boston region municipalities, particularly those related to recommendations identified in municipal vulnerability assessments and resiliency plans.
Transit Capacity	Blue Line/Red Line/Place-based	MassDOT/MBTA	Blue Line Connection to Red Line and Beyond	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Capacity	Commuter Rail/ Orange Line/Silver Line	MassDOT/MBTA	Sullivan Square Superstation	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Capacity	Blue Line/Red Line/ Green Line/ Orange Line	MassDOT/MBTA	Downtown Superstation	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Capacity	Green Line	MassDOT/MBTA	Green Line Transformation Phase 4, Expanded Capacity on B and C Branches	Conceptual	N/A
Transit Capacity	Commuter Rail	MassDOT/MBTA	MBTA's Rail Vision will examine various service models for rail transportation. Analysis topics may include urban and regional rail, reverse commutes needs, and system electrification.	Conceptual	Fund supportive studies through the MPO's UPWP or provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Extension	Blue Line/Place-based	MassDOT/MBTA	Blue Line Extension to Lynn	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Extension	Green Line/Place-based	MassDOT/MBTA	Green Line Extension to Hyde Square	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Extension	Green Line/Place-based	MassDOT/MBTA	Green Line Extension (GLX) to Mystic Valley Parkway, Somerville/Medford	Conceptual	This project was included in *Charting Progress to 2040* before it was removed in Amendment 1 to transfer funds to GLX Phase 1. The MPO could fund GLX Phase 2 through its Major Infrastructure program.
Transit Extension	Orange Line/ Place-based	MassDOT/MBTA	Orange Line Extension to Roslindale	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Extension	Orange Line/ Place-based	MassDOT/MBTA	Orange Line Extension to Everett	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.

Transit Investment Type	Service	Proponent(s)	Project Name	TIP/ LRTP Status	Potential MPO Action
Transit Extension	Water Transportation	MassDOT/MBTA	Phase 2: Full Implementation of an Expanded, Comprehensive, Multi-Operator Network	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Extension	Silver Line	MassDOT/MBTA	Silver Line Tunnel Extension Under D Street in the Seaport	Conceptual	Provide staff analytical support for studies funded by MassDOT/MBTA.
Transit Modernization	Accessibility	MassDOT/MBTA	Full Systemwide Accessibility	Conceptual	Provide MPO funds for implementing accessibility improvements at specific locations in Boston region municipalities.
Transit Modernization	Bus	MassDOT/MBTA	Autonomous Bus Shuttles	Conceptual	N/A
Transit Modernization	Customer Experience	MassDOT/MBTA	Comprehensive and Cutting-edge Digital MBTA	Conceptual	N/A

GLX = Green Line Extension. LRTP = Long-Range Transportation Plan. MassDOT = Massachusetts Department of Transportation. MBTA = Massachusetts Bay Transportation Authority. MPO = Metropolitan Planning Organization. N/A = not applicable. TIP = Transportation Improvement Program. UPWP = Unified Planning Work Program
Source: Boston Region MPO.

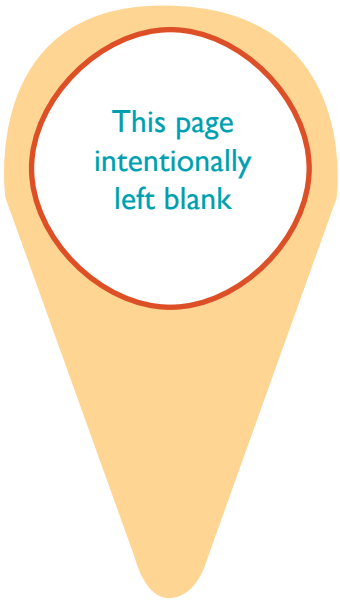
Other Transit Ideas

The projects in Table A-7 were included in the MPO's previous LRTP, *Charting Progress to 2040* project universe. While these projects are not currently planned for in the MBTA's *Focus40*, they are projects and ideas that MPO staff learned about through public outreach conducted during development of this LRTP. Rows highlighted in light blue indicate projects or initiatives where the MPO may be able to provide financial or analytical support.

Table A-7
Other Transit Ideas for Consideration in *Destination 2040*

Transit Investment Type	Service	Proponent(s)	Project Name	TIP/ LRTP Status	Potential MPO Action
Transit Capacity	Commuter Rail	MassDOT/ MBTA	South Station Expansion Project	Conceptual	N/A
Transit Extension	Commuter Rail	Public Input	Improved Connections between North and South Station	Conceptual	Provide staff analytical support for studies funded by MassDOT/ MBTA or other entities.
Transit Extension	Water Transportation	South Boston Transportation Study	New Ferry Service in Boston Harbor	Conceptual	Fund a feasibility study through the MPO's UPWP or provide staff analytical support for studies funded by MassDOT/MBTA or other entities.
Transit Extension	Silver Line	South Boston Transportation Study	Extension of Silver Line to Dudley Square: Silver Line service to Dudley Square via a new tunnel connecting South Station with the Orange Line at Chinatown and the Green Line at Boylston (Silver Line Phase 3)	Conceptual	Provide staff analytical support for studies funded by MassDOT/ MBTA or other entities.
Transit Extension	Bus	Merrimack Valley Planning Commission	Bus on Shoulder	Conceptual	CTPS study completed in 2014. Further action would include coordination with Merrimack Valley Planning Commission.
Transit Extension	Commuter Rail	Cambridge	Grand Junction Passenger Transit	Conceptual	
Transit Station	Commuter Rail	Cambridge	Commuter Rail Transit Station at Alewife	Conceptual	

CTPS = Central Transportation Planning Staff. LRTP = Long-Range Transportation Plan. MassDOT = Massachusetts Department of Transportation. MBTA = Massachusetts Bay Transportation Authority. MPO = Metropolitan Planning Organization. N/A = not applicable. TIP = Transportation Improvement Program. UPWP = Unified Planning Work Program.
Source: Boston Region MPO.


This page
intentionally
left blank

appendix B

Destination 2040 Project Evaluation Methodology

INTRODUCTION

The major infrastructure projects evaluated for the *Destination 2040* Long-Range Transportation Plan (LRTP) were selected from the Universe of Projects list (Appendix A) that was presented to the Boston Region Metropolitan Planning Organization (MPO) in December 2018. This list includes all major infrastructure projects (projects that add capacity to the transportation system or those that cost over $20 million) that were considered for funding by the MPO. A major infrastructure project must be listed in the LRTP before it can be funded in the Transportation Improvement Program.

MPO staff developed a detailed spreadsheet on each of the Massachusetts-approved projects and a select number of conceptual projects where enough information was available from the Universe of Projects list. At the time of LRTP evaluation, a project can range from the 25 percent design level to an idea of a project location and how it will improve the project area. With the planning horizon to 2040, even projects with a design already prepared can undergo significant changes, redesign, or rethinking before construction actually begins.

For these reasons, the evaluated projects are compared using a limited number of broad quantitative measurements. These measurements examine the level of detail on what is known about existing conditions in the proposed project area. The effectiveness with which a project will address future project area deficiencies must be estimated by applying professional judgement to consider extremely preliminary project concepts. Cost estimates, in most instances developed by other agencies other than the MPO, are similarly preliminary.

The projects were evaluated in four of the six MPO goal areas and the criteria are based on the objectives within each goal area. These criteria will help to determine if the project will address the needs identified in the *Destination 2040* Needs Assessment. The four MPO goal areas chosen were:

1. Safety
2. System Preservation and Modernization
3. Capacity Management and Mobility
4. Economic Vitality

The Transportation Equity and Clean Air and Sustainable Communities goals were not included in the evaluation. Since many of these projects are conceptual and are at the pre-25 percent design, there is not enough information to perform transportation equity or air quality analyses. MPO staff could have noted if the project was located in an equity area but that does not indicate how the project would affect equity populations. However, once projects are selected, they are included in the transportation equity and air quality analyses performed for the overall plan.

This appendix describes the six scores developed by MPO staff for each proposed major infrastructure project. The data available to inform each score is described and the formation of these data into indices is discussed. In addition, the specific points in the scoring process where the use of judgement is required are identified.

Scores are prepared for six benefit categories:

- Safety
- System preservation and modernization
- Capacity management and mobility: automobiles
- Capacity management and mobility: buses
- Capacity management and mobility: pedestrians and bicycles
- Economic vitality

For each of these six categories, the evaluated projects are divided into three groups characterized as generating project benefits that are high, medium, or low. These ratings are given a value of three, two, or one respectively, which were then combined to provide a single numeric score.

Assessing how well projects would address the MPO's goals and objectives helped the MPO identify priority projects for its MajorInfrastructure program. Table B-1 shows the detailed major infrastructure project evaluations and Table B-2 provides a summary of the evaluated projects.

SAFETY

The development of the safety scores is shown in the left-most section of Table B-1. The final safety score for each project is shown first, in the most saturated or darkest color. The calculations that determined the safety score are grouped in columns with medium color saturation. Additional data not used directly in scoring, but that informs and corroborates the safety score, are shown with the lightest color saturation.

The safety score is developed by considering the project area's number and severity of crashes, number of vehicles, expected project cost, and nature of the roadway improvement proposed. Characterizing the nature of the proposed improvements is the scoring aspect that is most dependent on judgement.

Crashes and Crash Severity (shown as EPDO in Table B-1)

The Massachusetts Department of Transportation (MassDOT) maintains a database of statewide crashes that is updated annually. Crash data from 2016 is now available and crashes over the 2014–16 period were used in developing safety scores. Crashes range widely in severity and crash experience at a particular location over a period of time and are usually measured using the concept of equivalent property damage only (EPDO).

The EPDO formula used in the evaluations has recently been revised. The formula is recommended by the MPO's state and federal partners. It uses crash weighting which was aligned with calculated crash costs based on a 2017 Federal Highway Administration report, *Crash Costs for Highway Safety Analyses*. The EPDO formula used in this evaluation counts all accidents over the three-year period within the project corridor and then adds to that number, the number of accidents involving bodily injury multiplied by 20.

Crash Risk (Risk Group)

Crash risk is calculated by comparing the EPDO with the number of vehicles that enter the project area during an average weekday. Project area traffic volumes are estimated using recent traffic studies by the Central Transportation Planning Staff, project development proponents, MassDOT's online traffic count database, or the MPO's travel demand model.

Taking the EPDO per year and dividing it by vehicles per year is a measurement of risk (but a very small number.) This fraction is usually multiplied by 100,000,000 to give EPDO per hundred million vehicles. The evaluated projects are then divided into two equal-sized groups, high-risk (score=1) and low-risk (score=2), based solely on this risk calculation.

Cost per EPDO (Cost/Benefit Group)

The second scoring index is project cost divided by the project area EPDO. This quotient resembles a cost-benefit ratio, but its meaning is more limited. A large EPDO value implies some degree of obsolete or deficient roadway design in the project area. Any reconstruction activity is required to meet current design and safety standards so it is assumed that the project will improve safety.

There is no expectation that bringing the project area up to current design standards will eliminate all crashes, but the EPDO serves as a proxy for potential safety improvement. A low cost per EPDO implies that the proposed investment that will bring the entire project area up to current standards will improve safety and will help to reduce a comparatively large number of crashes. The evaluated projects are divided into two equal-sized groups; low cost per EPDO (score=1) and high cost per EPDO (score=2).

Characterizing Project Improvements (Project Impact Group)

The third scoring measurement is achieved by characterizing the expected impact of the project. For instance, demolishing a cloverleaf interchange that was designed during the 1950's and replacing it with a new interchange with larger turning radii and longer acceleration lanes, conforming with modern standards, would be expected to have a significant safety impact. Reconstructing an arterial roadway within its existing right-of-way would be assumed to have a smaller impact. Some investments, such as adding a highway on-ramp where one currently does not exist, may improve mobility but do not necessarily improve safety in the project area even if adhering to modern design standards.

Each of the evaluated projects were placed in one of three groups based on the types of physical improvements proposed:

- Group 1: Grade separation or totally new alignment
- Group 2: Reconstruction or modernization in current alignment
- Group 3: Low-impact improvements

Placing projects in these groups requires judgement and often knowledge of the project area and its planning history. As mentioned above, descriptions of projects planned for future

decades can be conceptual and MPO staff must predict the types of improvements likely to appear in plans as the project gets closer. Defining a project area, necessary for calculating the EPDO, also requires this type of judgement.

Scoring

Evaluated projects can get a "one" or "two" for risk based on whether they are in the high-risk or low-risk group; a "one" or "two" for cost per EPDO based on whether they are in the high cost/benefit or low cost/benefit group; and a "one," "two," or "three" for expected project impact. Projects scoring two or three "one" scores are rated as high. Projects scoring one "one" score are rated as medium, and projects receiving no scores in the top group are rated as low.

Corroborating Data

Some Massachusetts locations are eligible for project funding through the Highway Safety Improvement Program (HSIP). Eligibility of projects for HSIP funding is determined by MassDOT outside of the MPO process. However, almost all HSIP locations, located in evaluated project areas, were located in project areas that scored high under this criteria. HSIP locations were identified for total crashes, bicycle-involved crashes, and pedestrian-involved crashes.

SYSTEM PRESERVATION AND MODERNIZATION

Maintenance Needs

In Table B-1, the second goal area evaluated is the development of the system preservation scores. The system preservation score for each project is shown first in the most saturated color. The calculations that determined this score are grouped in columns with medium color saturation. Several intermediate calculations were required to develop the key scoring metric, the cost per index point. Data from these intermediate calculations are shown with the lightest color saturation.

Ongoing expenditures in routine maintenance, refurbishment, and total reconstruction are necessary to preserve the safety and efficiency of transportation systems. Projects are evaluated using available data on current project area conditions in order to place them into the high, medium, and low groups used to compare projects for incorporation into the LRTP. Three rating groups were used based on available data: pavement condition, resiliency, and bridge condition.

Calculating Pavement Condition Deficiency (Weighted Deficiency Index)

Determining a score in this category first requires the calculation of the weighted deficiency index (shown in the lightest color saturation). MassDOT maintains a pavement condition database; the latest data is from 2017. The condition of pavement of state numbered routes is measured regularly with measurements expressed using the International Roughness Index (IRI). MPO staff calculated an average IRI for the lane-miles in each project area, shown in Table B-1 as weighted IRI.

Average project area IRIs ranged from 45 (best project area pavement) to 282 (worst). The average IRI of each project was adjusted downwards by 45 and then multiplied by the number of project area lane-miles. This gave staff an estimate of the total amount of project area pavement deficiency, shown in Table B-1 as weighted deficiency index.

Estimating Cost-Effectiveness (Cost per Index Point Adjusted for Resiliency)

This analysis assumes that at the completion of a project, the total pavement deficiency calculated above will be eliminated. Dividing the total project cost by the total project area pavement deficiency index gives a preliminary estimate of system preservation cost-effectiveness (not shown in Table B-1).

The preliminary estimate can be considered an oversimplification because structures unrelated to pavement such as bridges and culverts may also need to be replaced. Two adjustments are made to the initial cost-effectiveness estimate in determining the final score. One adjustment accounts for flood hazard resiliency and a second adjustment reflects deficient bridges.

The pavement condition database also indicates whether sections of roadway are within the 100-year flood zone. MPO staff calculated the portion of project-area roadway located within this area. It is assumed that any future roadway reconstruction in this flood-hazard area will be done in accordance with resiliency standards in effect at the time of construction.

In this analysis, the total cost of a project has been reduced by the percentage, if any, of the project in a 100-year flood zone. This adjustment can improve a project's cost-effectiveness to reflect the fact that part of the project addresses two MPO objectives: system preservation and climate resiliency. The cost per index point shown in Table B-1 incorporates this resiliency adjustment.

Final Rank Order and Scores (Adjusted for Structurally-Deficient Bridges)

The last part of the analysis adjusts for structurally-deficient bridges but starts with sorting projects from the lowest cost per pavement deficiency point (adjusted for resiliency) to the highest. Natural break points in the rank order are used to divide high, medium, and low groups.

Once the high, medium, and low groups are established, bridge information is added to the evaluation. The MassDOT Bridge Section maintains a database of detailed information from periodic inspections of all bridges in Massachusetts. Bridges can be characterized as structurally deficient. Structurally deficient bridges need to be inspected more frequently and if a bridge is in danger of failure, it is closed.

If there are one or more structurally deficient bridges in a project area, the project score can be increased one level, for example, from low to medium or from medium to high. After reassigning selected projects to higher groups, new scoring groups of roughly equal size are designated. This is an extremely simplistic adjustment and only reflects that a substantial portion of the project costs are expected to be used for bridge replacement or refurbishment.

CAPACITY MANAGEMENT AND MOBILITY: AUTOMOBILES

Estimating project benefits for vehicular traffic using the region's roadway system depends on data entirely derived from the MPO's travel demand model. The model is developed and calibrated using directly observed traffic at a large sample of regional locations, but only the model can provide a region-wide snapshot of all important roadways at critical time periods. The travel demand model can also generate a region-wide traffic snapshot for a future year, in this case 2040.

The most useful metric for evaluating regional capacity management issues is the volume over capacity ratio (V/C) on roadways during the AM and PM peak periods. Each model roadway segment has an estimated capacity in vehicles per hour based on current traffic engineering standards. The model estimates volumes for the AM, PM, midday, and night periods and the V/C is calculated by dividing these volumes by the capacity. In the MPO's travel demand model, the AM peak period is defined as 6:00 AM to 9:00 AM and the PM peak period is 3:00 PM to 6:00 PM.

The analysis begins by identifying for each directional link whether AM or PM has the higher V/C. For reference, two-way roads are considered to be two links. Almost invariably, if one direction has its highest V/C in the AM, the reciprocal direction will have its highest V/C in the PM.

The base year (2016) and future year (2040) V/C were estimated and depicted graphically on a region-wide basis. Together, the AM and PM periods indicated both commuting patterns and bottlenecks in a single graphic. Locations with regionally significant congestion problems were easily identified by inspection. Congestion at these locations was characterized as severe, moderate, or inconsequential by balancing the V/C value with the length of the congested segments.

Projects that include roadways in the severe category were scored as high, projects with moderately congested roadways were scored medium, and all other projects were scored as low. The projects at these locations are anticipated to reduce congestion within the project areas.

CAPACITY MANAGEMENT AND MOBILITY: BUSES

Project benefits for buses were estimated by calculating the number of local and regional buses that travel through a project area with scheduled service on a typical weekday. These numbers were developed from published schedules. Projects with bus routes are assumed to either improve traffic flow or improve the streetscape, allowing better pedestrian access to local buses.

Projects were ranked by the combined total of local and regional buses, including the Logan Express. Break points were designated to divide projects into groups with high, medium, or low benefits for bus users. Ridership was known for the local buses but not for the regional buses. Local bus ridership was one of the factors used to designate break points.

CAPACITY MANAGEMENT AND MOBILITY: PEDESTRIANS AND BICYCLES

Investments sufficiently large to be classified as major investments for MPO planning purposes tend to have extended project areas and involve some level of improvement or refurbishment benefiting both motorized and nonmotorized modes. Often the name of the project reflects primarily the roadway improvements and unless more detailed descriptions have been prepared by proponents, the nature of ancillary improvements to nonmotorized modes can only be surmised.

MPO staff evaluated each project using available project descriptions and supplemented these sources using sketch planning analysis. In this approach, staff considered project area geography and current infrastructure configuration and condition to anticipate what types of improvements for nonmotorized modes would likely be incorporated into future plans as they develop. Points were awarded on these bases:

- 2 points: Adds or substantially improves an existing pedestrian route
- 1 point: Improves an existing pedestrian route
- 2 points: Adds or substantially improves an existing bicycle route
- 1 point: Improves an existing bicycle route
- 1 point: Improves access to transit for nonmotorized modes

Scores using this system can range from zero to five. Projects getting a zero score are in the low benefit group. Scores of one and two are in the medium group, and scores of three or more are in the high group.

ECONOMIC VITALITY

The last group of Table B-1 concerns economic vitality. Economic vitality scores result from a point system with "zero" or "one" point being low, "two," "three," or "four" points being medium, and "five," "six," or "seven" points being high. The columns with the final score and the point count are shown in the most saturated color. The columns with medium color saturation are points awarded solely on the basis of the proposed project's location. The columns with the lightest color saturation have points awarded on the basis of an assessment of proposed transportation improvements.

While any major transportation improvement can be expected to contribute to economic vitality, the ratings in this category reflect to what degree the improvements support the land use objectives embraced by the MPO. A candidate project can support these objectives if it:

- **Serves an existing area of concentrated development**: High population and employment density for the type of community
- **Facilitates new development:** Transportation project is tied to new development proposals
- **Provides access to target development area:** Vehicle, transit, bicycle, or pedestrian access improvements

Serves Concentrated Development

A project could receive one or two points for serving an area of concentrated development, depending on whether the project was entirely or only partially located within an area with this designation.

Facilitates New Development

A project could be awarded a point if progress on a nearby development is contingent upon the implementation of the transportation improvement.

Provides Access to Targeted Development Areas

A project could be awarded up to four points for improving access to designated targeted development areas for specific modes with one point awarded to each mode with improved access. The four modes are motor vehicles, transit, bicycle, and pedestrian

Table B-1

Evaluated Major Infrastructure Projects for the *Destination 2040* LRTP

			SAFETY SCORING											SYSTEM PRESERVATION SCORING								CAPACITY MANAGEMENT SCORING																ECONOMIC VITALITY SCORING							
Project Name	Estimated Project Cost (2018 Dollars)	Annual Average Daily Traffic	Safety	EPDO	EPDO per 100,000,000 vehicles (Risk)	Cost per EPDO (Cost/Benefit)	Risk Group	Cost/Benefit Group	Project Impact Group	Top 200 Crash Location (Total EPDO)	HSIP Cluster (Total EPDO)	HSIP Bicycle Cluster (Bike-involved EPDO)	HSIP Pedestrian Cluster (Ped-involved EPDO)	System Preservation and Modernization	Cost per Index Point (000s)	Percent Resilience Related	Structurally Deficient Bridges	Weighted IRI	Total Project Roadway-miles	Total Project Lane-miles	Weighted Deficiency Index	Capacity Management and Mobility (Autos)	MPO-identified Express Highway Bottleneck Location	MPO-identified Arterial Bottleneck Location	Capacity Management and Mobility (Buses)	Regional and Local Bus Trips (Daily)	Total Regional Bus Trips (Daily)	Total Local Bus Trips (Daily)	Number of Regional Bus Routes Served	Number of Local Bus Routes Served	Capacity Management and Mobility (Peds/Bikes)	Nonmotorized Total	Pedestrian Improvements	Bicycle Improvements	Improves Transit Access	Economic Vitality	Total points	Mostly Serves Existing Area of Concentrated Development	Partly Serves Existing Area of Concentrated Development	Facilitates New Development	Provides Vehicle Acess to Target Development Area	Provides Transit Acess to Target Development Area	Provides Bicycle Acess to Target Development Area	Provides Pedestrian Acess to Target Development Area
Route 60 Improvements (Medford, Arlington) est	$40,000,000	20,400	high	3360	16637	$11,905	1	1	2		2		5	high	$12	0.3		252	8.2	16.3	3374	medium		moderate	high	508		508		8	high	4	2	1	1	medium	2					1		1
Improvements to Sweetser Circle (Routes 16/99) (Everett) est	$22,000,000	45,000	high	641	1439	$34,321	1	1	2					high	$18	0	1	274	1.7	5.4	1237	medium		moderate	high	497		497		8	medium	1	1			high	7	2		1	1	1	1	1
Widening on Route 1 (Malden, Revere, Saugus)	$172,500,000	115,000	high	2063	1812	$83,616	1	2	1					medium	$34	0.3		191	8.7	34.8	5081	high	severe		high	168	168		4		medium	2	1	1		medium	4	2		1	1			
Southeast Expressway Modification (Southampton) (Boston)	$143,750,000	225,000	high	4662	2093	$30,834	1	1	1				1	medium	$59	0		121	4.5	31.8	2417	high	severe		high	464	250	214	6	4	low					medium	2	2						
Reconstruction of Route 107 (Western Avenue) (Lynn)	$36,205,000	18,400	high	4660	25582	$7,769	1	1	2	4	10		7	medium	$42	0		259	2.0	4.0	856	low			high	202		202		7	high	3	2	1		medium	3	2		1				
Route 4/225 (Bedford Street) and Hartwell Avenue (Lexington)	$30,557,000	40,200	high	2335	5867	$13,087	1	1	2		4			high	$19	2.5		185	4.5	11.1	1554	low			medium	48		48		1	high	5	2	2	1	medium	2		1	1				
I-90/Interchange 17 (Newton)	$14,000,000	141,000	medium	1641	1176	$8,531	2	1	2					high	$35	0		121	2.8	5.3	403	high		severe	high	673		673		12	medium	1	1			low	1		1					
Improvements at Routes 16 and 2A (Arlington, Cambridge) est	$14,000,000	66,000	low	179	274	$78,212	2	2	2		1			medium	$88	15.95		167	.3	1.1	134	high		severe	high	359		359		3	medium	1	1			high	7	2		1	1	1	1	1
Improvements to Route 30 (Framingham, Natick) est	$14,000,000	42,000	high	868	2088	$16,129	1	1	2		3			high	$10	0.41		229	2.1	7.4	1362	low			medium	106	106		2		medium	2	1	1		high	6		1	1	1	1	1	1
McGrath Boulevard (Somerville)	$66,170,710	38,000	low	536	1425	$123,453	2	2	3	1	1	1	1	high	$66	0	2	218	1.3	5.8	1003	low			high	329		329		4	high	5	2	2	1	high	7	2		1	1	1	1	1
Replacement of Allston I-90 Elevated Viaduct (Boston)	$1,200,000,000	174,000	low	1246	723	$963,082	2	2	2		1	1		medium	$370	0	1	142	8.4	33.4	3240	low			high	542	112	430	3	10	high	3	1	1	1	high	7	2		1	1	1	1	1
I-93 and I-95 (Woburn)	$276,708,768	373,000	high	8202	2221	$33,737	1	1	1		2			low	$156	0		61	24.2	111.0	1776	high	severe		high	194	177	17	5	1	low					medium	3		1	1	1			
I-93/Route 3 Interchange (Braintree Split)	$53,289,000	282,000	high	4559	1633	$11,689	1	1	2	1	1			medium	$68	2.5		63	7.8	42.2	760	high	severe		high	250	250		6		low					low	1		1					
Route 1A/16 Connector (Revere)	$73,080,000	36,700	high	1285	3537	$56,872	1	2	1					low	$163	0		259	.5	2.1	449	high		severe	medium	85		85		6	medium	1	1			medium	3	2			1			
Bridge Replacement Route 27 over Route 9 (Natick)	$25,793,370	80,000	medium	1102	1391	$23,406	2	1	2					high	$97	0	1	137	1.6	2.9	267	low			medium	18		18		2	high	5	2	2	1	medium	2	2						
Boardman Street at Route 1A (Boston)	$13,686,000	59,500	medium	100	170	$136,860	2	2	1					low	$204	0		179	.2	.5	67	high		severe	high	124		124		7	medium	2	1		1	medium	2		1		1			
Interchange Improvements I-95/I-93 (Canton, Dedham, Norwood)	$202,205,994	240,000	medium	1309	551	$154,474	2	2	1					medium	$235	1.3	1	61	12.4	53.0	848	medium	moderate		medium	24	24		2		high	3	1	1	1	medium	3		1	1	1			
Improvements at Route 126/135/MBTA (Framingham)	$115,000,000	35,400	high	533	1521	$215,760	1	2	1		2	1	1	low	$1133	0		248	.2	.5	102	low			medium	40		40		5	medium	2	1		1	high	7	2		1	1	1	1	1
Route 128/I-95 Improvements, exits 37 to 40 (Reading to Wakefield)	$38,488,347	164,000	medium	2223	1369	$17,314	2	1	2					high	$41	0	1	72	6.0	34.7	937	high	severe		low						low					medium	2		1		1			
Route 1/Route 16 Connector (Chelsea, Revere)	$7,360,000	40,200	high	764	1920	$9,634	1	1	3					high	$7	62.9		153	1.5	3.8	410	low			medium	60		60		2	low					medium	4	2			1	1		
Route 128 Mainline Improvements (Danvers, Peabody)	$24,031,419	102,000	high	1546	1531	$15,544	1	1	2	1	1			high	$20	5	1	127	3.4	13.8	1132	medium	moderate		low						low					low	1		1					
Mahoney Circle Grade Separation (Revere)	$60,000,000	56,000	medium	823	1484	$72,904	1	2	1					low	$166	0		258	.5	1.7	362	low			high	333		333		11	medium	2	1	1		medium	3		1		1	1		

			SAFETY SCORING											SYSTEM PRESERVATION SCORING								CAPACITY MANAGEMENT SCORING												ECONOMIC VITAILITY SCORING							
Project Name	Estimated Project Cost (2018 Dollars)	Annual Average Daily Traffic	Safety	EPDO	EPDO per 100,000,000 vehicles (Risk)	Cost per EPDO (Cost/Benefit)	Risk Group	Cost/Benefit Group	Project Impact Group	Top 200 Crash Location (Total EPDO)	HSIP Cluster (Total EPDO)	HSIP Bicycle Cluster (Bike-involved EPDO)	HSIP Pedestrian Cluster (Ped-involved EPDO)	System Preservation and Modernization	Cost per Index Point (000s)	Percent Resilience Related	Structurally Deficient Bridges	Weighted IRI	Total Project Roadway-miles	Total Project Lane-miles	Weighted Deficiency Index	Capacity Management and Mobility (Autos)	MPO-identified Express Highway Bottleneck Location	MPO-identified Arterial Bottleneck Location	Capacity Management and Mobility (Buses)	Regional and Local Bus Trips (Daily)	Total Regional Bus Trips (Daily)	Total Local Bus Trips (Daily)	Number of Regional Bus Routes Served	Number of Local Bus Routes Served	Capacity Management and Mobility (Peds/Bikes)	Nonmotorized Total	Pedestrian Improvements	Bicycle Improvements	Improves Transit Access	Economic Vitality	Total points	Mostly Serves Existing Area of Concentrated Development	Partly Serves Existing Area of Concentrated Development	Facilitates New Development	Provides Vehicle Access to Target Development Area	Provides Transit Acess to Target Development Area	Provides Bicycle Acess to Target Development Area	Provides Pedestrian Acess to Target Development Area
I-95 Capacity Improvements (Lynnfield, Reading)	$10,500,000	157,000	medium	2149	1383	$4,886	2	1	2					high	$8	3.1		60	14.9	89.4	1341	medium	moderate		low						low					medium	3		1	1	1			
Reconstruction of Bridge Street (Salem)	$24,810,210	17,800	medium	255	1447	$97,295	1	2	2					medium	$57	50.8		282	.4	.9	213	low			medium	85		85		6	medium	2	1		1	medium	4	2			1			1
Walnut Street and Route 1 Interchange (Saugus)	$19,581,123	136,000	medium	679	504	$28,838	2	1	2					medium	$24	0		200	1.7	5.2	806	low			medium	42		42		1	medium	2	1		1	low	1		1				
Cypher St Extension (Boston)	$9,700,000	3,000	medium	69	2323	$140,580	1	2	2					medium	$51	0		205	.7	1.2	192	low			low						medium	2	1	1		medium	3	2		1				
I-495 and Route 126 (Hartford Avenue) Interchange (Bellingham)	$22,000,000	36,000	high	850	2385	$25,882	1	1	1		1			low	$248	0		82	1.8	2.4	89	low			low	6		6		1	medium	2	2			medium	4		1		1		1	1
Route 3 South Widening (Braintree to Weymouth)	$800,000,000	159,000	medium	5114	3249	$156,433	1	2	3					medium	$191	1	3	87	24.2	98.7	4145	low			medium	50	50		1		low					low	1		1					
Sumner Tunnel Refurbishment (Boston)	$126,544,931	40,000	low	393	992	$321,997	2	2	3					low	$151	36.46		276	1.2	2.3	531	low			medium	20		20		1	low					high	6	2		2	1	1		
Concord Rotary (Concord)	$103,931,250	48,000	high	850	1789	$122,272	1	2	1					low	$142	4.4		172	2.1	5.5	699	low			low	2	2		1		medium	1	1			low	1		1					
128 Capacity Improvements (Peabody)	$24,634,000	110,000	medium	618	567	$39,861	2	1	2					medium	$24	0		127	3.2	12.6	1033	medium	moderate		low						low					low	1		1					
Washington Street Bridge Replacement (Woburn)	$12,200,000	38,800	medium	268	698	$45,522	2	1	3					low	$3389	0		63	.1	.2	4	medium		moderate	low						medium	1	1			low	1		1					
Route 2 Widening (Concord)	$8,000,000	70,000	medium	277	400	$28,881	2	1	3					high	$11	0		112	3.0	10.5	704	low			low	2	2		1		low					low	1			1				
Route 128/Riverside Ramp (Newton)	$10,000,055	23,500	low	65	279	$153,847	2	2	3					low	$206	0		142	.3	.5	49	low			medium	20		20		1	low					medium	3		1	1	1			
New Summer Street/Haul Road Connector (Boston)	$9,700,000	4,000	low	39	985	$248,718	2	2	3					medium	$101	0		205	.3	.6	96	low			low						low					medium	3	2			1			
I-290/495 Reconstruction (Hudson, Marlborough)	$125,000,000	162,500	medium	1714	1065	$72,929	2	2	1					low	$1351	1.4		61	2.7	5.7	91	low			low						low					low	0							
Route 128/Brimbal Ave, Phase II (Beverly)	$23,000,000	73,500	low	209	287	$110,048	2	2	3					low	nm	0		45	1.4	1.8	0	low			low						low					medium	3		1	1	1			

EPDO = Equivalent Property Damage Only. est = estimated cost. HSIP = Highway Safety Improvement Program. I = Interstate. IRI = International Roughness Index. LRTP = Long-Range Transportation Plan. MBTA = Massachusetts Bay Transportation Authority. MPO = Metropolitan Planning Organization.
Source: Boston Region MPO.

Table B-2

Summary of Evaluated Major Infrastructure Projects for the *Destination 2040* LRTP

Location	Project Name	Estimated Project Cost (2018 Dollars)	Annual Average Daily Traffic	Safety	System Preservation	Capacity Management/Mobility (Autos)	Capacity Management/Mobility (Buses)	Capacity Management/Mobility (Peds/Bikes)	Economic Vitality	Total Rating	5 or more low ratings	4 low ratings	3 low ratings	2 low ratings	2 high ratings	3 or more high ratings
Arlington, Medford	Route 60 improvements	$40,000,000	20,400	3	3	2	3	3	2	16						X
Everett	Improvements to Sweetser Circle (Routes 16 and 99)	$22,000,000	45,000	3	3	2	3	2	3	16						X
Malden, Revere, Saugus	Reconstruction and Widening on Route 1, from Route 60 to Route 99	$172,500,000	115,000	3	2	3	3	2	2	15						X
Boston	Southeast Expressway Modification (Southampton Interchange)	$143,750,000	225,000	3	2	3	3	1	2	14						X
Lynn	Reconstruction of Route 107 (Western Avenue)	$36,205,000	18,400	3	2	1	3	3	2	14						X
Lexington	Route 4/225 (Bedford Street) and Hartwell Avenue	$30,557,000	40,200	3	3	1	2	3	2	14						X
Newton	I-90/Interchange 17	$14,000,000	141,000	2	3	3	3	2	1	14						X
Arlington and Cambridge	Improvements to intersection of Routes 16 and 2A (Alewife Brook Parkway and Massachusetts Avenue)	$14,000,000	66,000	1	2	3	3	2	3	14						X
Framingham and Natick	Improvements to Route 30 (Cochituate Road)	$14,000,000	42,000	3	3	1	2	2	3	14						X
Somerville	McGrath Boulevard Project	$82,500,000	38,000	1	3	1	3	3	3	14				X		X
Boston	Replacement of Allston I-90 Elevated Viaduct	$1,200,000,000	174,000	1	2	1	3	3	3	13				X		X
Reading, Stoneham, Wakefield, Woburn	Interchange Improvements to I-93/I-95 (Bridge Replacement and Related Work)	$276,708,768	373,000	3	1	3	3	1	2	13				X		X
Braintree	I-93/Route 3 Interchange (Braintree Split)	$53,289,000	282,000	3	2	3	3	1	1	13				X		X
Revere	Route 1A/Route 16 Connector	$73,080,000	36,700	3	1	3	2	2	2	13					X	
Natick	Bridge Replacement, Route 27 (North Main Street) over Route 9 (Worcester Street)	$25,793,370	80,000	2	3	1	2	3	2	13					X	
Boston	Boardman Street at Route 1A	$13,686,000	59,500	2	1	3	3	2	2	13					X	
Canton, Dedham, Norwood	Interchange Improvements at I-95/I-93/University Avenue/I-95 Widening	$202,205,994	240,000	2	2	2	2	3	2	13						
Framingham	Intersection Improvements at Route 126/135/MBTA	$115,000,000	35,400	3	1	1	2	2	3	12				X	X	
Reading, Stoneham, Wakefield	Improvements along Route 128/95—from north of Interchange 37 to Interchange 40	$38,488,347	164,000	2	3	3	1	1	2	12				X	X	
Chelsea and Revere	Route 1/Route 16 Connector	$7,360,000	40,200	3	3	1	2	1	2	12				X	X	
Danvers and Peabody	Mainline Improvements on Route 128 (Phase II)	$24,031,419	102,000	3	3	2	1	1	1	11		X			X	

Location	Project Name	Estimated Project Cost (2018 Dollars)	Annual Average Daily Traffic	Safety	System Preservation	Capacity Management/Mobility (Autos)	Capacity Management/Mobility (Buses)	Capacity Management/Mobility (Peds/Bikes)	Economic Vitality	Total Rating	5 or more low ratings	4 low ratings	3 low ratings	2 low ratings	2 high ratings	3 or more high ratings
Revere	Mahoney Circle Grade Separation	$60,000,000	56,000	2	1	1	3	2	2	11				X		
Lynnfield and Reading	I-95 Capacity Improvements, Lynnfield to Reading	$10,500,000	157,000	2	3	2	1	1	2	11				X		
Salem	Reconstruction of Bridge Street, from Flint Street to Washington Street	$24,810,210	17,800	2	2	1	2	2	2	11						
Saugus	Interchange Reconstruction at Walnut Street and Route 1 (Phase II)	$19,581,123	136,000	2	2	1	2	2	1	10				X		
Boston	Cypher Street Extension	$9,700,000	3,000	2	2	1	1	2	2	10				X		
Bellingham	Ramp construction and relocation, I-495 at Route 126 (Hartford Avenue)	$22,000,000	36,000	3	1	1	1	2	2	10			X			
Braintree to Weymouth	Route 3 South Widening	$800,000,000	159,000	2	2	1	2	1	1	9			X			
Boston	Sumner Tunnel roadway, ceiling, and wall reconstruction, and new systems installation	$126,544,931	40,000	1	1	1	2	1	3	9		X				
Concord	Improvements and Upgrades to Concord Rotary (Routes 2/2A/119)	$103,931,250	48,000	3	1	1	1	2	1	9		X				
Peabody	Route 128 Capacity Improvements: Exit 26 to Exit 28	$24,634,000	110,000	2	2	2	1	1	1	9			X			
Woburn	Bridge Replacement and Related Work, W-43-028, Washington Street over I-95	$12,200,000	38,800	2	1	2	1	2	1	9			X			
Concord	Reconstruction and widening on Route 2 from Sandy Pond Road to bridge over MBTA rail line	$8,000,000	70,000	2	3	1	1	1	1	9		X				
Newton	New Route 128 Ramp to Riverside Station	$10,000,055	23,500	1	1	1	2	1	2	8		X				
Boston	New Summer Street north/south connection to Haul Road and Northern and Drydock Avenues	$9,700,000	4,000	1	2	1	1	1	2	8		X				
Hudson and Marlborough	Reconstruction on Routes I-290 and 495 and Bridge Replacement	$125,000,000	162,500	2	1	1	1	1	1	7	X					
Beverly	Interchange Reconstruction at Route 128/Exit 19 at Brimbal Avenue (Phase II)	$23,000,000	73,500	1	1	1	1	1	2	7	X					

I = Interstate. MBTA = Massachusetts Bay Transportation Authority. LRTP = Long-Range Transportation Plan.
Source: Boston Region MPO.

appendix C

Draft Disparate Impact and Disproportionate Burden Policy for the Long-Range Transportation Plan

FEDERAL REQUIREMENT

The Federal Transit Administration's (FTA) Title VI Circular 4702.1B, issued October 2012, under the authority of Title VI of the Civil Rights Act of 1964, directs metropolitan planning organizations (MPOs) to analyze the impacts of the distribution of state and federal funds in the aggregate and to identify any disparate impacts on the basis of race, color, or national origin (for example,. impacts to minority populations). FTA's Environmental Justice (EJ) Circular 4703.1, issued August 2015, further directs MPOs to identify and address disproportionately high and adverse effects (referred to as disproportionate burdens) of its activities on minority populations and low-income populations. The Federal Highway Administration's (FHWA) *Environmental Justice Reference Guide*, issued in April 2015, also contains the same requirements for MPOs related to identifying disparate impacts and disproportionate burdens.

PURPOSE OF THE POLICY

As a recipient of federal funding from FTA and FHWA, the Boston Region MPO complies with both agencies' Title VI and EJ requirements. The MPO's Disparate Impact and Disproportionate Burden (DI/DB) Policy allows the MPO to identify potential regionwide future disparate impacts on minority populations and disproportionate burdens on both minority populations and low-income populations in the MPO region (collectively referred to as protected populations) that may result from the set of investment decisions in its Long-Range Transportation Plan (LRTP). DI/DBs are defined by FTA and FHWA as follows.

- **Disparate Impact:** A facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the policy or practice lacks a substantial legitimate justification and where there exists one or more alternative policies or practices that would serve the same legitimate objectives but with less disproportionate effect on the basis of race, color, or national origin.

- **Disproportionate Burden:** A neutral policy or practice that disproportionately affects low-income populations more than non-low-income populations. A finding of a disproportionate burden requires the evaluation of alternatives and mitigation of burdens where practicable. (Note that although EJ guidance covers minority populations as well, disproportionate burdens only address those impacts to low-income populations as minority populations are covered by the more stringent definition of a disparate impact.)

While neither FTA nor FHWA require MPOs to have a DI/DB policy, the policy will allow the MPO to make those determinations in a clear and consistent manner and clearly convey the findings to the public.

This policy is a draft that reflects completion of the first phase of the MPO's development of a DI/DB policy. The MPO will begin phase two in federal fiscal year 2020, which will consist of developing thresholds for metrics that indicate when projected impacts to protected populations are significantly greater than those to non-protected populations. The MPO will incorporate the findings into this policy when that work is complete.

SCOPE

This policy applies to the analysis of the projected impacts of the set of major infrastructure projects that would have funding programmed in the LRTP for construction over the next 20 years—called the LRTP program of projects. These projects are analyzed for impacts as one group; individual projects are not analyzed for disparate impacts or disproportionate burdens under this policy. Major infrastructure projects are considered by the MPO to be those that cost at least $20 million and/or increase the capacity of the transportation network. The MPO reserves funds for these projects in the LRTP's Major Infrastructure Program and also sets aside funding in several other investment programs as described in the LRTP. The actual projects funded through these other programs in the near-term (the next five years) are defined in the Transportation Improvement Program (TIP). These projects will be included in the equity analysis that is completed for the projects programmed in the TIP.

COMPARISON POPULATIONS

Per FTA and FHWA requirements, the analysis to identify disparate impacts and disproportionate burdens (DI/DB analysis) compares the projected impacts on the entire protected population in the MPO region to the projected impacts on the entire non-protected population in the MPO region. Analyzing and comparing impacts on these populations at the neighborhood and municipal scale is not part of this policy as impacts of the program of projects are only identified at the regional population level. Thus, the projected impacts on the minority population in the MPO region are compared to those on the nonminority population, and the projected impacts on the low-income population in the MPO region

are compared to those on the non-low-income population. According to FTA and FHWA, the definitions of these populations are as follows:

- **Minority:** People who identify as Black or African American, Asian, American Indian or Alaska Native, or Native Hawaiian or other Pacific Islander, and/or Hispanic or Latino/a/x
- **Nonminority:** All other people
- **Low-income:** Households for which the median household income is equal to or less than 60 percent of the region's median, which is $45,392
- **Non-low-income:** All other households[1]

IDENTIFYING DISPARATE IMPACTS AND DISPROPORTIONATE BURDENS

The MPO staff use a travel demand model to analyze the projected impacts of the LRTP program of projects over the 20-year horizon on the regionwide minority, nonminority, low-income, and non-low-income populations. Two scenarios projecting to the horizon year of the LRTP are analyzed to assess these impacts: the no-build scenario (in which the program of projects is not implemented) and the build scenario (in which the program of projects is implemented). The results are assessed as weighted regionwide averages.

To identify potential future DI/DBs, the MPO staff analyzes several metrics for both scenarios and compares the results. Based on input from the public, the MPO selected metrics related to accessibility, mobility, and the environment. Due to the evolving nature of the analytical process, the specific metrics used to identify DI/DBs may be updated. The MPO staff has identified each metric's forecasting error—expressed as an absolute value—for minority, low-income, nonminority, and non-low-income populations. The forecasting error accounts for the uncertainty in the travel demand forecasting process and helps to ensure that outcomes are not incorrectly labeled as potential DI/DBs that are likely due to model forecasting error. The forecasting error is distinct for each population because each populations' size, geographic distribution, and projected travel behavior differs.

For each population and metric, the applicable forecasting errors are compared to the model output to determine whether the impact likely would be caused by the implementation of the LRTP program of projects or forecasting error. According to the MPO's policy, any impact that is projected to adversely affect the protected population more than the non-protected population, and where the MPO can be confident that this is not due to model uncertainty, would indicate a potential future DI/DB. Adverse impacts can either be the denial of benefits or the imposition of burdens. For some impacts (such as average travel time) an increase from the no-build to build scenarios will indicate a burden and a decrease will indicate a benefit, while for other impacts the reverse will be true (such as access to jobs).

[1] Minority status is derived from the 2010 Decennial Census. Household income is derived from the 2010–14 American Community Survey.

Upon completion of the second phase of developing the DI/DB Policy, additional thresholds will be incorporated into the policy that will allow the MPO to determine when an impact on the protected population is significantly greater than the impact on the non-protected population, per federal guidance.

The following is an example of how the DI/DB analysis is conducted, using hypothetical outputs of average regionwide travel time.

1. The travel demand model reports the projected results for each metric. Table 1 shows results of a hypothetical analysis of travel time, where the third column shows the model outputs and the fourth column shows the projected change between the no-build and build scenarios.

Table C-1
Example of Projected Average Travel Time

Population	Scenario	Average Travel Time (Minutes)	No-build/Build Change (Minutes)
Regionwide minority population	No-build	10.0	
	Build	12.0	+2.0
Regionwide nonminority population	No-build	20.0	
	Build	22.0	+2.0

Source: Boston Region MPO.

2. Next, for each population the no-build scenario output is subtracted from the build scenario output resulting in the projected impact of the LRTP program of projects on each population. The absolute value of the projected impact is compared to the absolute value of the forecasting error for that population. If the absolute value of the projected impact is greater than the absolute value of the forecasting error, there likely would be an impact to that population.
   To continue with the travel time example in Table 1, the following calculations would be done for each population:

   Minority Population

   Where the forecasting error is ± 1 minute:

   - *Travel time impact = Build scenario – No-build scenario*
     example: 12 minutes – 10 minutes = +2 minutes
   - *Comparison of the absolute value of the travel time impact* |2 minutes| *to the absolute value of the forecasting error* |1 minute|
     |2 minutes| > |1 minute|
   - *Result: Since 2 minutes is greater than 1 minute, there likely would be an impact.*

Nonminority Population

Where the forecasting error is ± 3 minutes:

- *Travel time impact = Build scenario – No-build scenario*
  example: *22 minutes – 20 minutes = +2 minutes*

- *Comparison of the absolute value of the travel time impact* |2 minutes| *to the absolute value of the forecasting error* |3 minutes|
  |2 minutes| < |3 minutes|

- *Result: Since 2 minutes is less than 3 minutes, there likely would not be an impact.*

3. Finally, the regionwide projected impacts on the protected population are compared to the regionwide projected impacts on the non-protected population to determine if there would likely be a DI/DB. There would be a DI/DB if
   - the MPO region's protected population is projected to receive less of a benefit than the MPO region's non-protected population; or

   - the MPO region's protected population is projected to experience a greater burden than the MPO region's non-protected population.

   In the example above, the MPO's regionwide minority population would be likely to experience an increase in travel time (a burden), whereas the MPO's regionwide non-minority population would not. Therefore, the minority population would be projected to experience, on average, a greater burden than the nonminority population. This would indicate a potential future disparate impact.

ADDRESSING DISPARATE IMPACTS AND DISPROPORTIONATE BURDENS

If the DI/DB analysis for a given program of projects results in a finding of a potential future disparate impact for at least one metric, the MPO staff will determine whether there is a substantial, legitimate justification for implementing the program of projects as proposed, as required by federal regulations, and present the conclusion to the MPO board. Staff will also determine whether there are one or more alternatives to the program of projects that meet the same goals of the original projects but that have fewer disparate impacts. If there are, staff will present the alternatives to the MPO board. Any proposed alternative(s) will be subject to the same DI/DB Policy and analysis.

Similarly, if the DI/DB analysis indicates that there is a potential future disproportionate burden for at least one metric, the MPO staff will recommend to the MPO board steps to take to avoid, minimize, or mitigate these impacts, where practicable.

For both potential DI/DBs, alternatives may include a mixture of strategies to mitigate, minimize, or otherwise avoid these impacts. Because the LRTP is a long-term planning document and the projected impacts are likely to occur 20 years into the future, these strategies will likely involve programming future TIP projects in order to mitigate the disparate impact(s) and/or disproportionate burden(s). The MPO board also intends to use this policy during the development of future LRTPs, when conducting scenario planning or making decisions about project programming, to avoid DI/DBs prior to project selection.

PUBLIC PARTICIPATION

Members of the public have had, and will continue to have, opportunities to provide input throughout the revision and implementation of this policy. This current draft DI/DB Policy, as well as the metrics that are analyzed for DI/DBs, reflect public input from outreach conducted in 2018. During the development of future LRTPs, the public will also have the chance to review and comment on the results of the application of the DI/DB Policy to any scenario planning or other project selection process. The MPO board will also provide a meaningful opportunity for public comment on any proposed alternatives recommended by the MPO staff. Finally, MPO staff will conduct further public outreach to support future updates to this policy.

appendix D

Public Outreach for *Destination 2040*

INTRODUCTION

Boston Region Metropolitan Planning Organization (MPO) staff conducted outreach activities throughout the development of the *Destination 2040* Long-Range Transportation Plan (LRTP). Outreach began in October 2017 with the development of the Needs Assessment and continued through the 30-day public comment period for the draft LRTP in July and August 2019. This appendix summarizes the outreach activities and public input received during the different phases of LRTP development: Needs Assessment, vision, goals and objectives revisions, and project and program selection. It concludes with the comments received during the formal 30-day public comment period for the draft LRTP.

The MPO engaged a wide variety of individuals in the development of *Destination 2040*, including:

- Regional Transportation Advisory Council (Advisory Council)
- Municipalities
- Transportation agencies, including the Massachusetts Department of Transportation (MassDOT), the Massachusetts Bay Transportation Authority (MBTA), and regional transit authorities
- Professional groups (for example, planners, and engineers, etc.)
- Community organizations
- Transportation equity groups
- Economic development and business organizations
- Transportation and environmental advocates

MPO staff used a variety of communication and engagement methods to engage the public and solicit feedback from the community which included:

- In-person meetings with the Advisory Council, the Metropolitan Area Planning Council (MAPC) subregional groups, stakeholder organizations, and partner events
- MPO-sponsored events including MPO meetings, Office Hours, and Open Houses
- LRTP website content
- Electronic notifications including emails, social media, MPO blogs, and the MAPC monthly newsletters

The following sections summarize the input received during the development of *Destination 2040*.

DESTINATION 2040 NEEDS ASSESSMENT OUTREACH

Public outreach was conducted to gather input from the public to identify the transportation needs in the Boston Region MPO that were used to develop the *Destination 2040* Needs Assessment. This section provides a summary of the outreach conducted for the Needs Assessment. A more detailed discussion of the public outreach process is included in Appendix D of the *Destination 2040* Needs Assessment document.

Table D-1 summarizes the in-person meetings, webpage content, emails, social media, and other electronic means that were used in the process. Through in-person and online outreach, MPO staff received more than 2,000 ideas about needs and opportunities for improving the transportation system. MPO staff summarized the comments and included the information by goal area in the Stakeholders/Public Input sections in Chapters 4 through 9 of the Needs Assessment.

Table D-1
Summary of Communication and Engagement Activities for the Needs Assessment

Type of Outreach	Date	Event
MPO Meetings	2016 through 2018	Presented work plan, travel demand model results, demographic projections process and results, and draft Needs Assessment recommendations
Regional Transportation Advisory Council Meetings	2018	Gathered input, provided updates, and presented draft recommendations
MAPC Subregional Group Meetings	2017 and 2018	Gathered input on transportation needs and presented draft recommendations
Stakeholder Group Meetings	2017 and 2018	Gathered transportation needs
Partner Events	2017 and 2018	Gathered transportation needs
Office Hours	2017 and 2018	Gathered transportation needs
Open Houses	2018	Gathered transportation needs
Webpage	2017 and 2018	Provided timeline of Needs Assessment development, surveys, and draft recommendations
Electronic Notification	2017 and 2018	Notified stakeholders of milestones and participation opportunities
Emails	2017 and 2018	Notified interested parties about opportunities for engagement
Tweets	2017 and 2018	Followed by transportation advocates, community groups, and government agencies
Electronic Surveys and Comments	2018	Published surveys seeking input on transportation needs

MAPC = Metropolitan Area Planning Council. MPO = Metropolitan Planning Organization.
Source: Boston Region MPO.

DESTINATION 2040 VISION, GOALS, AND OBJECTIVES OUTREACH

Public input from the outreach process for the Needs Assessment was used to revise the vision, goals, and objectives that were included in the previous LRTP *Charting Progress to 2040*. Most of the goals and objectives established in *Charting Progress to 2040* were broad enough to cover the topics and concerns identified from public comments and results from analyses conducted for *Destination 2040*. Several changes were made in order to achieve greater clarity on resilience, transportation modernization, and their relationship to the MBTA's *Focus40* plan. Other changes were made to better align the objectives with the roles and responsibilities of the MPO and to incorporate new planning requirements.

MPO staff published an online survey to seek public feedback on the proposed revisions to the *Destination 2040* vision, goals, and objectives. Table D-2 summarizes the comments received and responses MPO staff provided to the commenters. More detailed information on the revised vision, goals, and objectives can be found in Appendix E in the *Destination 2040* Needs Assessment.

Table D-2
Summary of Comments and MPO Responses for *Destination 2040* Vision, Goals, and Objectives

LRTP Goal/Topic	Comment Summary	MPO Staff Response
Economic Vitality	Objective should cross-reference *Focus40* and add criteria for investments that serve locations like the Longwood Medical Area	Staff proposed change to Economic Vitality objective to prioritize transportation investments that serve "Priority Places" identified in MBTA's *Focus40* plan.
System Preservation	More details are needed in the Modernization category. There should be more emphasis on resiliency.	Staff will consider details when reviewing evaluation criteria and performance measures.
Capacity Management and Mobility	There should be more emphasis on multi-person vehicles such as carpooling/vanpooling	Non-single-occupant vehicle travel options are supported in the Capacity Management and Mobility goal for the roadway objective.
Technical Assistance	Include a specific objective to assist communities with regional negotiation of rail trail or other trail acquisition work	Details are covered in the Technical Assistance Program.
Performance Measures	Include a metric to measure emerging technologies	Details are considered when reviewing evaluation criteria and performance measures.

LRTP = Long-Range Transportation Plan. MBTA = Massachusetts Bay Transportation Authority. MPO = Metropolitan Planning Organization.
Source: Boston Region MPO.

DESTINATION 2040 UNIVERSE OF PROGRAMS AND PROJECTS OUTREACH

In addition to the survey focusing on visions, goals, and objectives, MPO staff also created a survey designed to gauge public opinion on the content of the Universe of Programs and Projects for *Destination 2040*. The survey helped the MPO to understand how well respondents felt the proposed Universe of Programs and Projects helps to accomplish the MPO's goals and aligns with its vision for the future. Table D-3 summarizes the questions

asked in the survey and what types of programs were important to respondents. Table D-4 shows projects that respondents advocated for as part of the MPO's existing investment programs. The projects are categorized using the six MPO program categories. More detailed information on the Universe of Programs and Projects can be found in Appendix A of this *Destination 2040* document.

Table D-3
Summary of Comments for *Destination 2040* Universe of Programs

Survey Questions	Survey Results and Summary of Comments
How important are the existing and proposed investment programs to you?	• More than 70 percent of the respondents think that the proposed Transit Modernization program is important, followed by Bicycle Network and Pedestrian Connections Program and Major Infrastructure Program (Approximately 60 percent). • Almost 100 percent of the respondents think that Intersection Improvements are important or somewhat important.
The MPO is considering adding the following proposed project types to those eligible for funding under the existing investment programs. How important are the proposed project types to you?	• More than 60 percent of the respondents think that flexing MPO discretionary funding to transit modernization projects is important, followed by construction of dedicated bus lanes and associated roadway improvements. • More than half of the respondents believe that climate resiliency improvements are important.
Please rank all the project types below in order of importance to you	• Transit expansion and modernization projects costing more than $20 million and/or adding capacity to the network ranked the highest among all. • Complete Streets elements such as bicycle and pedestrian network improvements and connections to transit are ranked the second highest. • Flexing MPO discretionary funding to transit modernization projects and parking management are relatively less important. • Education and wayfinding improvements ranked the lowest among all.
Additional feedback regarding advocating for programs and project types	• The majority of respondents advocated for increased transit, Complete Streets, and safe and protected bicycle and pedestrian facilities. • The majority of respondents advocated for implementation of Bus Rapid Transit and other bus-priority measures and climate resiliency. • A few respondents advocated for congestion pricing program and an implementation of a Regional Rail vision for the MBTA commuter rail. • The idea of adding capacity should be broader to consider large-scale maintenance projects that increase throughput and decrease congestion. • Investments should be put in Mattapan/Hyde Park, East Cambridge/East Somerville, and Brighton/Allston to better connect communities to the core of Downtown Boston. • Increase in parking should be paid by user fees and not through the federal funding process.

MBTA = Massachusetts Bay Transportation Authority. MPO = Metropolitan Planning Organization.
Source: Boston Region MPO.

Table D-4
Summary of Comments for *Destination 2040* Universe of Projects

Investment Program Categories	Advocated Projects from the Public
Complete Streets Program	• Beverly to Middleton: Complete Streets improvements on Route 62 and Route 1A from multimodal transit station in Beverly to downtown Middleton • Revere to Salem: Complete Streets redesign and construction of Highland Avenue (Route 107) from Salem to Lynn and Revere to Wonderland Blue Line Station • Boston: Complete Streets upgrades on Columbia Road, Martin Luther King Boulevard, Dorchester Avenue, Warren Street, and Blue Hill Avenue
Bicycle and Pedestrian Program	• Arlington: Improvements and additions to the Minuteman Bikeway and Route 16 • Salem to Danvers: Resurfacing, protected bike lanes, and bus shelters on Route 114 from Salem multimodal transit station to Danvers • Department of Conservation and Recreation or former DCR roadways: Bike paths on DCR roadways including Morrissey Boulevard, Arborway, VFW Parkway, West Roxbury Parkway/Unquity Road/Turtle Pond Parkway/ Neponset Valley Parkway, Gallivan Boulevard/Morton Street, Hammond Pond Parkway, Quincy Shore Drive, Furnace Brook Parkway, Blue Hills Parkway/Unquity Road, Revere Beach Parkway, Mystic Valley Parkway, Fellsway • Regionwide: Rail-trail projects including Grand Junction, Mass Central, Dedham (Dedham Square to Readville), Newton Highlands to Needham, and West Roxbury to Needham and Dover • Boston: Charlesgate/Bowker Overpass connecting Muddy River and Charles River Paths
Transit Projects by Investment Program	• Transit Modernization Program • Regionwide: Level boarding and Americans with Disabilities Act improvements to MBTA Commuter Rail stations in Newton • Dedicated Bus Lanes or BRT Projects • Regionwide: High-Occupancy Vehicle/Bus Priority/BRT on Interstates 90 and 93/Route 9, BRT on Route 128, Urban Ring Busway • Major Infrastructure Program • Framingham: Diesel multiple unit operation along spur from downtown Framingham to future Massachusetts Bay Community College campus, Framingham State University campus, Framingham Business Park, and Westborough Business Park • Framingham to Clinton: Commuter rail on the Fitchburg Line • Boston: Orange Line extension to West Roxbury, Red Line extension to Mattapan

BRT = Bus Rapid Transit. DCR = Department of Conservation and Recreation. MBTA = Massachusetts Bay Transportation Authority. MPO = Metropolitan Planning Organization. VFW = Veterans of Foreign Wars.
Source: Boston Region MPO.

During discussions regarding the Universe of Projects and Programs and during the selection of projects and programs for the Recommended Plan, the MPO received comment letters from proponents and the public regarding a number of projects being considered for the LRTP. These projects included the following:

- Interstate 93/Interstate 95 Interchange in Canton (17 letters supporting this project)
- Interstate 93/Interstate 95 Interchange in Woburn, Reading, Stoneham, and Wakefield (three letters supporting this project)
- Concord Rotary in Concord (one letter supporting this project)
- Green Line Extension Phase 2 (three letters opposing the extension of the Green Line to Medford with an additional 152 signatures on a petition also opposing the extension)
- Route 4/225 and Hartwell Avenue in Lexington (two letters supporting this project)
- New Boston Street Bridge in Woburn (three letters supporting this project)
- Washington Street Bridge in Woburn (three letters supporting this project)
- McGrath Boulevard in Somerville (one letter supporting the this project)
- Interchange Reconstruction at Route 128, Exit 19 at Brimbal Avenue in Beverly (three letters supporting this project)

ADDITIONAL ONGOING OUTREACH ACTIVITIES FOR *DESTINATION 2040*

Engaging Organizations that Work with Seniors and People with Disabilities

MPO staff developed the *Coordinated Public Transit-Human Services Transportation Plan* (*Coordinated Plan*) with the participation of public, private, and nonprofit transportation representatives, human services providers, and with members of the public that coincided with public outreach undertaken for the *Destination 2040* LRTP. MPO staff determined that additional public engagement was needed specifically around the *Coordinated Plan* focused on getting input from organizations that work primarily with seniors and people with disabilities. With a larger aging and immigrant population, there is an increase in demand for public transit options and accommodations for people with non-English language needs. Table D-5 summarizes the public comments received during in-person public outreach events with organizations in the Regional

Coordinating Councils[1] and follow-up online surveys. The comments are summarized using eight unmet transportation need categories. The percentage next to each category represents the percentage of comments received relating to that category. The majority of the comments are related to transportation service improvements, which contributed to 35 percent of the total comments. The second largest share is infrastructure improvements and inter-agency coordination, which contributed to almost 20 percent of the total comments.

Table D-5
Comments from Outreach with Regional Coordinating Council Organizations

Unmet Transportation Needs Category	Summary of Comments	Strategies and Potential Priorities
Addressing New Technologies (3 percent)	Expressed difficulties using TNC applications to access the service	Pursue public-private collaborations to provide more reliable and affordable services
Customer Service (5 percent)	• Better access to information about available transportation services • More non-English transit service announcements • Better signage and audios	• Use technology to provide customers better access to real-time information, such as through applications or at transit stops • Provide on-demand transportation services that do not require smart phones
Education (5 percent)	• More travel training to help seniors and people with disabilities to use the public transit system • More assistance using applications and other web-based tools to find the transportation services	• Provide trainings for adult drivers who are giving up their cars to help them transition to using public transit • Provide travel training for seniors and people with disabilities to teach them which transportation services are available and how to use them • Raise the profile of available transportation services for seniors and people with disabilities through innovative advertising
Infrastructure Improvements (19 percent)	Better pedestrian infrastructure and amenities at bus stops and transit stations	• Improve accessibility and comfort at transit stations • Ensure that sidewalks and street crossings leading to bus stops are safe and fully ADA compliant • Remove snow, provide clearer signage and wayfinding at bus stops • Complete incomplete sidewalk networks • Build dedicated bus lanes
Inter-Agency Coordination (18 percent)	Improve coordination of transit services between municipalities and transit services providers	• Coordinate with RTAs and other transit provider schedules to reduce transfer times • Develop collaborations between municipalities, COA, and TNCs • Develop more efficient transfer points between RTAs • Improve regional coordination between paratransit providers • Integrate scheduling among transit and paratransit providers

[1] Regional Coordinating Councils (RCC) are voluntary coalitions of transportation providers, human service organizations, advocates, and planners who collaborate to identify and address regional community transportation needs. Each RCC provides an open forum for the exchange of information and sets its own priorities based on member interests and regional needs. More information about RCCs can be found at https://www.mass.gov/service-details/regional-coordinating-councils-for-community-transportation.

Unmet Transportation Needs Category	Summary of Comments	Strategies and Potential Priorities
Transportation Service Improvements (35 percent)	• Expand the commuter rail, bus, and paratransit network • More first-mile and last-mile connections between transit stations and the passenger's destination or home • More reliable employment transportation for people with disabilities • Longer operating hours for senior transportation in the evening • Better access to medical facilities in nearby communities • Better alignment of schedules between transit providers	• Provide dedicated transit service that brings seniors and people with disabilities to and from non-medical amenities • Provide direct transit service between senior centers and medical centers • Provide longer operating hours for COA and senior centers • Provide bus service to and from commuter rail and subway stations • Provide transit services for medical trips • Provide first-mile and last-mile transit service between major transit stations and final destinations • Align schedules of bus and commuter rail and subway services to reduce transfer times • Provide public transit that connects senior centers and senior living facilities and train stations • Add more bus stops at senior housing • Provide east-west transit service and between municipalities • Provide more transit service to both Boston-area hospitals and hospitals in the suburbs • Pursue public-private partnerships to provide on-call transportation (such as with TNCs) to provide for same-day transportation needs • Provide more frequent bus service in suburban communities
Vehicle Improvements (5 percent)	More vehicles (taxis, trains, buses, paratransit, and TNCs) that are accessible to all types of assistive mobility devices	• Assign more space on public transit vehicles specifically for seniors and people with disabilities • Design public transit vehicles so that they are easier to get in and out of • Have more wheelchair-accessible vehicles available in taxi and TNC fleets
Others (10 percent)	• More affordable transportation options • Coordinate with transportation and land use planning and development	

ADA = Americans with Disabilities Act. COA = Councils on Aging. MPO = Metropolitan Planning Organization. RTA = regional transit authorities. TNC = transportation network companies.
Source: Boston Region MPO.

Other Public Outreach Events

MPO staff organizes and participates in ongoing public outreach activities to inform the public about ways to get involved in the MPO's planning process, including the development of the *Destination 2040* LRTP. This section describes the public outreach activities that MPO staff organized and participated in during the development of *Destination 2040,* and

comments received with regard to transportation needs. Table D-6 details the activities conducted and summarizes the comments received in those outreach events.

Wake Up the Earth Festival

The *Wake Up the Earth Festival* began in 1979 as a group of activists stopping the Interstate 95 expansion into Jamaica Plain. It continues today as a celebration of diverse traditions, cultures, ages and beliefs. MPO staff attended this event on May 4, 2019, to increase public awareness and input for the MPO's certification documents, including the LRTP, the Transportation Improvement Program (TIP), and the Unified Planning Work Program (UPWP).

Boston's National Bike to Work Day

The *Bike to Work Day* celebrates people who ride in Boston by creating a fun and open atmosphere for bike commuters. MPO staff set up a table at this event on May 17, 2019, to engage conversations on bike connections and gaps. In addition, MPO staff also encouraged public input by informing people about the public comment period for the TIP, UPWP, and the upcoming LRTP.

MassDOT Capital Investment Plan (CIP) Meeting

MassDOT organized ongoing CIP meetings through June 7, 2019, to seek public comments on MassDOT's 2020–24 CIP, which guides investments in the transportation system. MPO staff also participated at the May 21, 2019 meeting at the State Transportation Building.

Table D-6
Summary of Other Activities and Comments Received

Outreach Events	Activities	Summary of comments
Wake up the Earth Festival	• Transportation Needs survey • Interactive map activity: Asked people to indicate their favorite places in Jamaica Plain on a neighborhood map and tell us why, and the transportation mode they take to get there. • Game for children: Pin the "T" on the T (as known as the MB**T**A) • Distributed bookmarks with LRTP and contact information	Transportation Needs survey • The majority of the respondents care most about transit (32 percent) and Complete Streets (28 percent), followed by multi-use paths (24 percent). • The majority of the respondents indicated that they would like to be more involved in transportation issues in their community, but feel they are not able to (39 percent). • The majority of the respondents indicated that if they were able to find more information about transportation issues, they would be more involved (47 percent). • Respondents would prefer to have meetings held in their neighborhood (26 percent). Interactive map activity • People appreciate the close proximity to parks and public space in Jamaica Plain (Franklin Park, Arnold Arboretum) that provides them with opportunities to bike and walk to places • Connection between Jamaica Pond and Arnold Arboretum

Outreach Events	Activities	Summary of comments
Bike to Work Day	• Interactive map activity: Asked people to indicate any missing bicycle connections on a map of the Greater Boston area • Distributed Bicycle Report Cards and instructions to bikers to collect their opinions on bicycle and pedestrian segments evaluation • Distributed bookmarks with comment period and contact information for the MPO documents	Interactive map activity • Improve connections between Cambridge and Downtown Boston, especially on Cambridge Street • Connect the gaps on the Mystic River Path • Connect the Northern Strand and Gateway Park Path • Extend the Minuteman Trail to downtown Boston • Improve safety on the bike lane along the Emerald Necklace to Fenway • Improve connection on Massachusetts Avenue to south of Melnea Cass Boulevard • Bike lanes on the Massachusetts Avenue Bridge • Connect Everett Bridge to Assembly Row • Improve connections on Dorchester Avenue in South Boston • Connect Morrissey Boulevard south of UMass Boston
MassDOT Capital Investment Plan Meeting	• Boston Region MPO map • Distributed UPWP and TIP projects booklet • Distributed bookmarks with comment period and contact information for the MPO documents	• People asked about the responsibilities of the MPO and details regarding the certification process (LRTP, TIP, UPWP)

LRTP = Long-Range Transportation Plan. MassDOT = Massachusetts Department of Transportation. MPO = Metropolitan Planning Organization. TIP = Transportation Improvement Program. UMass = University of Massachusetts. UPWP = Unified Planning Work Program.
Source: Boston Region MPO.

COMMENTS RECEIVED DURING THE FORMAL PUBLIC COMMENT PERIOD FOR *DESTINATION 2040*

Table D-7 summarizes the comments received during the 30-day public review and comment period for the *Destination 2040* LRTP. This formal public review and comment period began on July 19, 2019, and closed on August 19, 2019.

Table D-7
Summary of Written Public Comments Received During the Official Comment Period from July 19, 2019, to August 19, 2019

Table will be added following the 30-day public comment period.