

appendix **A**

Universe of Investment Programs and Projects

INTRODUCTION

One of the primary outcomes of the Long-Range Transportation Plan (LRTP) process is 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 Investment Programs and Projects lists to identify all potential investment programs and projects 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
- 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 the next section) 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). Table A-1 also identifies the MPO goal areas that each program will address. 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
	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
	New	Construction of dedicated bus lanes and associated roadway improvements			X	X	X	X
	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
	Existing	Parking Management: Additional parking for automobiles and bicycles, and leasing off-site parking near transit stations with shuttles connections			X	X	X	X
	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
	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
	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. It also identifies the MPO goal areas that the projects will address. 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
	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
	New	Interchange modernization (for example, I-95/I-95 Canton, I-95/I-95 Woburn, or the Braintree Split)	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.

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	68/14	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	46/10	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/13	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/15	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/9	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/12	FFYs 2026–30
Southborough, Westborough	MassDOT	Improvements at I-495 and Route 9	607701	PRC approved (2013)	\$35,000,000	MWRC	3	NS/NS	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	36/9	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/7	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/11	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	45/13	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.
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 L RTP 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	L RTP Status - Evaluation Score ^a	CTPS Study	Estimated Cost
Inner Core							
Major Highway	Major Infrastructure	608128	MassDOT	Boston–Southeast Expressway Modification (Southampton Interchange)	Conceptual-14	N/A	\$143,750,000
Major Highway	Interchange	N/A	CTPS Study	Newton Corner Rotary (Interchange 17) Improvements	Conceptual-14	2009	\$4,000,000
Major Highway	Interchange	N/A	Newton	New Route 128 Ramp to Riverside Station	Conceptual-8	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-13	1990	\$13,686,000
Arterial and Intersection	Interchange	N/A	Revere (MassDOT)	Mahoney Circle Grade Separation	Conceptual-11	N/A	\$60,000,000

Project Type	Investment Program	PROJIS	Proponent(s)	Project Name	L RTP Status - Evaluation Score ^a	CTPS Study	Estimated Cost
Arterial and Intersection	Interchange	N/A	Revere (MassDOT)	Route 1/Route 16 Connector	Conceptual-12	N/A	N/A
Arterial and Intersection	Interchange	N/A	Revere (MassDOT)	Route 1A/Route 16 Connector	Conceptual-13	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	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	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	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	N/A
Bicycle and Pedestrian	Bicycle and Pedestrian	NA	Cambridge	Alewife Bicycle/Pedestrian/ Transit Connection to Potential Future Commuter Rail Station	Conceptual	N/A	N/A
Bridge	Bridge	605527	Cambridge	Bridge Rehabilitation of River Street and Western Avenue Bridges	Pre-TIP	N/A	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-7	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	L RTP 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-11	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-9	N/A	\$800,000,000
Major Highway	Interchange	N/A	Braintree (MassDOT)	I-93/Route 3 Interchange (Braintree Split)	Previous LRTP-13	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	L RTP 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-NS	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

Abbreviations: CTPS = Central Transportation Planning Staff. HOV = high-occupancy vehicle lane. I = Interstate. L RTP = 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/ L RTP 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/ L RTP 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/ L RTP 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 <i>Charting Progress to 2040</i> 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/ L RTP 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.

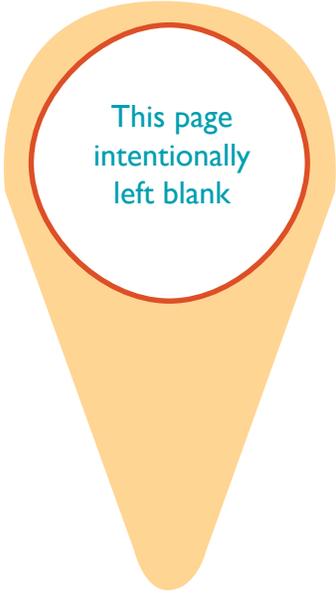
Other Transit Ideas

The projects in Table A-7 were included in the project universe of the MPO’s previous LRTP, *Charting Progress to 2040*. 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	N/A
Transit Station	Commuter Rail	Cambridge	Commuter Rail Transit Station at Alewife	Conceptual	N/A

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.



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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 more than \$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 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 than the MPO, are similarly preliminary.

The projects were evaluated according to four of the six MPO goal areas and evaluation criteria based on the objectives within each goal area. These criteria 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 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 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, and 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 Major Infrastructure 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 are measured using the concept of equivalent property damage only (EPDO).

The EPDO formula used for the evaluations has recently been revised. 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 crashes that occurred in a project area over the three-year period and adds the number of crashes involving bodily injury multiplied by 20.

Crash Risk (Risk Group)

Crash risk is calculated by comparing the EPDO value 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.

Dividing the EPDO value by vehicles per year is a measurement of risk. 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 score "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. However, almost all HSIP locations were located in project areas that scored high under the three scoring criteria (risk, cost-benefit, and project impact.) 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 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 on 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 per index point was adjusted 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. Projects are sorted based on the lowest cost per pavement deficiency point (adjusted for resiliency) to the highest. Natural break points in the ranking 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. Structurally deficient bridges must be inspected 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 with data on directly observed traffic at a large sample of regional locations. 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 the V/C is higher in the AM or PM. 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 analyses. 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 can range from zero to five. Projects with 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

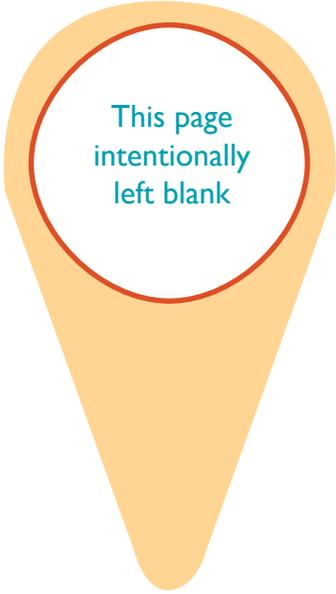
A project could receive one or two points for serving an area of concentrated development, depending on whether the project was entirely or only partially located within an area with this designation.

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.



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Project Name	Estimated Project Cost (2018 Dollars)	Annual Average Daily Traffic	SAFETY SCORING							SYSTEM PRESERVATION SCORING						CAPACITY MANAGEMENT SCORING							ECONOMIC VITALITY SCORING																		
			Safety	EPDO	EPDO per 100,000 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
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				
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			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		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



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 households¹

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: $12 \text{ minutes} - 10 \text{ minutes} = +2 \text{ minutes}$
- *Comparison of the absolute value of the travel time impact |2 minutes| to the absolute value of the forecasting error |1 minute|*
 $|2 \text{ minutes}| > |1 \text{ minute}|$
- *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: $22 \text{ minutes} - 20 \text{ minutes} = +2 \text{ minutes}$
 - *Comparison of the absolute value of the travel time impact |2 minutes| to the absolute value of the forecasting error |3 minutes|*
 $|2 \text{ minutes}| < |3 \text{ minutes}|$
 - *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



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:

- 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

L RTP Goal/Topic	Comment Summary	MPO Staff Response
Economic Vitality	Objective should cross-reference <i>Focus40</i> 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 <i>Focus40</i> 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.

L RTP = 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?	<ul style="list-style-type: none"> • 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?	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	Public Advocacy for Projects
Complete Streets Program	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 • Transit 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 and follow-up online surveys.¹ The comments are sorted according to 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 (35% of the total). 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)	<ul style="list-style-type: none"> Better access to information about available transportation services More non-English transit service announcements Better signage and audios 	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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 the network. 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	<ul style="list-style-type: none"> • 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 (otherwise known as the MBTA) • Distributed bookmarks with LRTP and contact information 	<p>Transportation Needs survey</p> <ul style="list-style-type: none"> • 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). <p>Interactive map activity</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> 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 	<p>Interactive map activity</p> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Boston Region MPO map Distributed UPWP and TIP projects booklet Distributed bookmarks with comment period and contact information for the MPO documents 	<ul style="list-style-type: none"> 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.

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

The MPO voted to release the draft LRTP for public comment on July 25, 2019, for a 30-day public comment period. The comment period ended on August 23, 2019. The public was notified of the availability of the LRTP on the MPO’s website through MPOinfo, Twitter, and a blog article in *TransReport*. In addition, the public was notified about outreach events and the availability of a survey on the LRTP.

The following sections provide a summary of the comments received on *Destination 2040* during the 30-day public comment period:

- Written comments submitted to the MPO
- Comments received at outreach events
- Responses to the LRTP survey

Written Comments Received During the Formal Public Comment Period

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 25, 2019, and closed on August 23, 2019.

Table D-7
Summary of Written Public Comments Received During the Official Comment Period from July 25, 2019, to August 23, 2019

Table will be added following MPO review.

Outreach Events Conducted During the Formal Comment Period

During the LRTP public comment period, staff participated in a variety of outreach activities to notify the public of the availability of *Destination 2040* and solicit feedback on the document. The goal was to connect with new community members and participating stakeholders. To accomplish this, staff conducted in-person outreach and online engagement to solicit feedback throughout the region including to equity populations.

Staff attended a variety of events, which included the following:

- Regional Transportation Advisory Council meetings
- Dewey Square and Brighton Farmers' Markets in Boston and Framingham Farmers' Market in Framingham. All three accept payment from The Special Supplemental Nutrition Program for Women, Infants, and Children (known as WIC), the Supplemental Nutrition Assistance Program (known as SNAP), and Senior Farmers' Market Nutrition Program (known as senior coupons). Staff used new outreach material and an interactive Complete Streets design game to encourage people to talk with staff.
- Civic engagement meetings through Union Capital Boston (a nonprofit civic engagement group).

- MAPC MetroWest subregional group and transportation advocacy groups.
- Stakeholder groups in one-on-one meetings to talk about the MPO process and to encourage them to share comments on *Destination 2040*.

Staff created a new *Destination 2040* brochure that described the vision, goals, and types of projects and investment programs included in the draft LRTP. This brochure was translated into the six most common languages spoken in the region, and shared them at the outreach events. In addition, staff developed a survey, also available in the six most common languages, which was posted on the MPO website. The digital flyer and survey were sent directly to stakeholder organizations.

Many of the people at the outreach events were neither familiar with the MPO nor the LRTP. Staff explained the regional planning process and ways in which they could become involved. Since many were new to the process, there were not many specific comments on *Destination 2040*. However, many said that they supported funding directly for dedicated bus lanes, transit modernization, and first- and last-mile connections.

Regional Transportation Advisory Council

Staff attended the Regional Transportation Advisory Council's 3C Documents Committee meeting on August 7, 2019, and the full committee's monthly meeting on August 14, 2019. Staff presented information on *Destination 2040*, distributed the outreach flyer, and asked members to provide feedback and to take the survey. MPO staff answered questions and provided information that helped the Advisory Council draft its formal comment letter.

MBTA Ridership Oversight Committee

Staff presented *Destination 2040* and its Needs Assessment to the MBTA Ridership Oversight Committee on July 23, 2019. Staff distributed the *Destination 2040* flyer, which included information on how to provide feedback on the document.

MetroWest Regional Collaborative Subregional Group

Staff attended the MetroWest Regional Collaborative Group meeting on July 25, 2019, to connect with subregional group members and community members from local advocacy groups. Staff presented information on *Destination 2040*, distributed the outreach flyer, and asked members to provide feedback and to take the survey.

Dewey Square Farmers' Market

Staff exhibited at a table at the Dewey Square Farmers' Market on July 30, 2019, to solicit input in a high pedestrian traffic area. The market is located next to South Station and was open

from 11:00 AM to 6:00 PM. This allowed staff to be available during lunchtime and at the end of the work day. Staff spoke with residents from around the region and listened to feedback. Staff also encouraged visitors to take the *Destination 2040* survey.

Brighton Farmers' Market

Staff exhibited at a table at the Brighton Farmers' Market on August 7, 2019, to solicit input in an area that serves a large transportation equity population. It is also adjacent to minority Transportation Equity Zones (TEZ) with low-income, limited-English proficiency (LEP), and carless households. This event provided an opportunity to get feedback about the LRTP goals, vision, projects, and investment programs through in-person comments and survey responses.

Alliance for Business Leadership—No Agenda Network Night

Staff attended the Alliance for Business Leadership (ABL) networking event on August 8, 2019. One of ABL's priorities is advocating for transportation infrastructure. Staff attended the event to connect interested people to the regional transportation planning process and solicit feedback on *Destination 2040*. Staff spoke to attendees including other transportation advocacy organizations.

Union Capital Boston

Union Capital Boston (UCB) is a nonprofit that works to activate volunteerism and civic engagement to build a more resilient and successful community network. The nonprofit uses a mobile loyalty rewards program and network of community leaders to connect community members to resources and facilitate engagement. UCB hosts recurring Networking Nights in Jackson Square, Grove Hall, Maverick Square, and Mattapan as opportunities for community members to meet, build relationships, and engage in meaningful conversations.

UCB provides a free meal and childcare to make it easier for people to participate. The Network Night begins with dinner, then moves into small group discussions hosted by different speakers called Table Talks, and then the larger group reconvenes to share news and resources. Staff attended Network Nights during the comment period in Maverick Square on August 12, 2019, Grove Hall on August 14, 2019, and Mattapan on August 20, 2019, to speak about *Destination 2040*. Staff distributed outreach flyers in multiple languages and encouraged participants to provide feedback and take the survey. Network Nights take place in minority, low-income, LEP, youth, and carless household TEZs and are adjacent to elderly TEZs.

Transportation and Climate Initiative

Staff attended the Transportation and Climate Initiative community event in Chelsea on August 13, 2019. MassDOT and the Massachusetts Department of Environmental Protection

hosted this event. Staff distributed *Destination 2040* flyers, discussed the regional planning process, and participated in the small group discussions with participants.

Framingham Farmers' Market

Staff exhibited at the Framingham Farmers' Market on August 15, 2019, after hosting the MPO Meeting at Framingham City Hall. Using the interactive Complete Streets design game to encourage people to visit the MPO table, staff spoke to more than 45 people about *Destination 2040* and the work of the MPO. Visitors included those familiar with the MPO process and others that had not heard of the MPO's work but were interested in learning more about the MPO's investment programs.

Allston Brighton Health Collaborative Transportation Committee

Staff presented information to the Allston Brighton Health Collaborative Transportation Committee about the MPO process and *Destination 2040* on August 15, 2019. Participants asked detailed questions about the MPO process, LRTP, TIP, and UPWP, and how the process and documents relate to community advocacy, specifically in Allston-Brighton. Community leaders, a state representative, and two members of the Interstate 90 Taskforce attended the meeting.

Table D-8 summarizes the comments received during staff's outreach at these events.

Table D-8
Summary of Outreach Event Comments Received During the Official Comment Period from July 25, 2019, to August 23, 2019

Outreach Events	Activities	Summary of comments
MetroWest Regional Collaborative	<ul style="list-style-type: none"> Briefed group members on <i>Destination 2040</i> vision, goals, and objectives Encouraged attendees to provide comments and take survey 	<ul style="list-style-type: none"> Support for expanding rail trails in the region
Dewey Square Farmers' Market	<ul style="list-style-type: none"> Distributed LRTP flyer Discussed <i>Destination2040</i> 	<ul style="list-style-type: none"> Support for congestion mitigation and carbon emission reduction Want more reliable and safe transit
Brighton Farmers' Market	<ul style="list-style-type: none"> Distributed LRTP flyer Discussed <i>Destination2040</i> 	<ul style="list-style-type: none"> Many visitors had not heard about the MPO or the LRTP but were interested in learning more and continuing to stay involved Some were concerned with safety of the transportation network. Would like the system to be safer and less congested

Outreach Events	Activities	Summary of comments
Union Capital Boston Network Night–East Boston	<ul style="list-style-type: none"> • Distributed LRTP flyer • Participated in Table Talk focus group 	<ul style="list-style-type: none"> • Many participants use buses as their primary mode of transportation but find them unreliable throughout the week. Need to take two to three buses to commute to jobs
Stakeholder Meetings	<ul style="list-style-type: none"> • MassBike • North Shore CDC 	<ul style="list-style-type: none"> • Support for more Complete Streets funding and Dedicated Bus Lanes • Interest in Corridor Studies and Bike Crash Cluster Study
Union Capital Boston Network Night–Grove Hall	<ul style="list-style-type: none"> • Distributed LRTP flyer • Participated in Table Talk focus group 	<ul style="list-style-type: none"> • Want less speeding, larger sidewalks, and safer streets for children • Concerned with canopy coverage and accessible sidewalks • Primarily use MBTA buses, including the Silver Line, and want more reliability and less traffic • Want less bus crowding • Appreciate that there is more effort to involve marginalized communities in the planning process but feel like it is due to demographic changes in the community. Don't trust it as much and feel like they haven't been listened to in the past.
Framingham Farmers' Market	<ul style="list-style-type: none"> • Played Complete Streets Design game with market visitors • Distributed LRTP flyer • Showed MetroWest projects in the LRTP document 	<ul style="list-style-type: none"> • Concerned about Massachusetts Turnpike project and want more transit to make up for loss of lane • Support more biking options and protected bike lanes • Want more Complete Streets in MetroWest to increase walkability, bikeability, and safety in the subregion • Support the 126/135 project • Want priority bus lanes and more frequent train/bus service • Want cross-region options, expanded hours, and North-South Rail Link
Allston-Brighton Health Collaborative Transportation Committee	<ul style="list-style-type: none"> • Hosted discussion on LRTP and MPO process 	<ul style="list-style-type: none"> • Support for Dedicated Bus Lane funding • Interest in increased community engagement in regional transportation planning process and MPO activities

Outreach Events	Activities	Summary of comments
Union Capital Boston Network Night–Mattapan	<ul style="list-style-type: none"> • Distributed LRTP flyer • Participated in Table Talk focus group 	<ul style="list-style-type: none"> • Want more reliable buses • Support for safer streets (Complete Streets) but concerned about losing driving lanes in already highly congested streets • Support for bicycle infrastructure but also concerned about the high numbers of cyclists in the Mattapan area • Worried about losing a driving lane and making it more difficult for firefighters to get to house fires

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

Results from the Survey Conducted During the Formal Comment Period

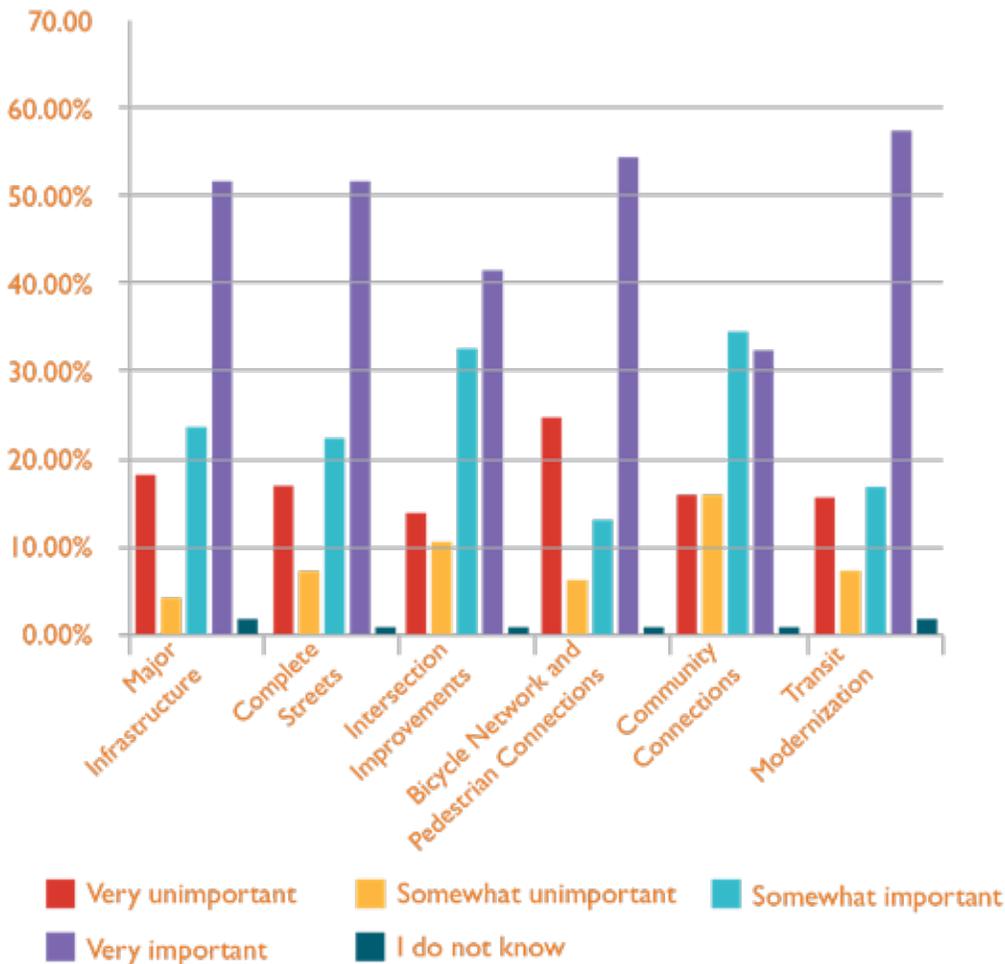
MPO staff created a survey of 15 questions, of which seven were demographic questions. The survey was conducted to gauge respondents’ opinions on the content of the draft *Destination 2040* LRTP, its proposed investment programs, and existing MPO outreach and communication strategies. MPO staff received 95 completed surveys. The survey was posted online through the end of the public comment period that ended on August 23, 2019. The following is a summary of the results.

Destination 2040 Questions

How important is each of the investment programs?

The majority of the respondents believe the investment programs are very important for the Boston Region. The majority indicated that the Bicycle Network and Pedestrian Connections and Transit Modernization Programs are the most important among all investment programs. Nearly 60 percent chose “Very Important” for Transit Modernization program and more than 50 percent chose “Very Important” for Bicycle Network and Pedestrian Connections program. However, it is also interesting to see that the Bicycle Network and Pedestrian Connections investment program also has the highest percentage of respondents choosing “Very Unimportant” as well.

Figure D-1
How important is each of the Investment Programs?

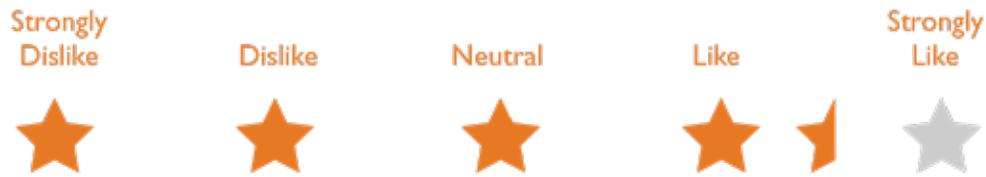


Source: Boston Region MPO.

Destination 2040 proposes to increase funding for the Complete Streets investment program to accommodate dedicated bus lanes. What do you think of this proposed addition to the Complete Streets investment program?

Most responded positively to the increase of funding for dedicated bus lanes. There were only a few respondents that favored bicycle and pedestrian infrastructure more than dedicated bus lanes. Details of the comments are expounded upon in the next question.

Figure D-2
What do you think of the addition of dedicated bus lanes to the Complete Streets investment program?



Source: Boston Region MPO.

Why do you like or dislike the proposal to increase funding for the Complete Streets investment program to accommodate dedicated bus lanes? Please write your response below.

Most respondents voiced support for the increase of funding for the dedicated bus lanes in the Complete Streets investment program. They think that the existing heavy/light rail network is insufficient, especially for low-income neighborhoods. Some respondents also think that dedicated bus lanes are low capital investments that have high impact on mobility. Some cited the Arlington pilot bus priority project as one of the successful projects that could be replicated in other areas. From a more technical point of view, some respondents stated that it is important to quantify the benefits of dedicated bus lanes by determining the appropriate length of bus lanes. Some respondents are concerned that the addition of dedicated bus lanes would encourage more vehicular traffic as opposed to more bicycle- and pedestrian-friendly traffic. Some believe that as both dedicated bus lanes and protected bike lanes are important, increasing dedicated bus lanes should not compromise protected bike lanes. The list of the comments is provided below.

- Dedicated bus lanes will encourage more people to use the bus as they will get to their destination faster than the cars, which must wait in traffic.
- It's the best way to clear the roads for more efficient travel.
- Dedicated bus lanes have shown to be a reliable and nearly as quick of a substitute for the train system as well as prioritizing an important transportation mode for those not near a train station.
- If the train is going to break down fairly regularly or unpredictably, we need buses to fill in.
- We NEED dedicated bus lanes! It shows commitment to equitably moving people.

- We should have protected bike lanes and wheelchair-accessible entrances to businesses on as many streets as possible to reduce congestion and pollution from automobiles and be inclusive of everyone.
- In order to get more people to feel comfortable using bikes, the streets need to be safer.
- Buses increase transit equity across communities and can greatly reduce congestion and greenhouse gas emissions by taking single-occupant vehicles off the road, even more if the buses are electric. I work in Needham—a high-income community—and have low-income co-workers who are dependent upon MBTA buses or Uber/Lyft. My employer has a continual struggle finding employees, because we're open hours outside of the bus/commuter rail schedule.
- Anything that helps people get around without cars is good. Taking space back from cars for pedestrians and bikes is great. Taking space back from cars for dedicated bike lanes is great.
- Buses carry so many more people than cars, which are often carrying only one or two people at a time. It makes sense to prioritize bus travel since they carry more people. It increases the efficiency of the transportation system and also encourages drivers to switch to transit.
- I feel this will aide in a better traffic flow during increased rush hour traffic times.
- Not enough funding for major improvements.
- Arlington ran a successful bus priority pilot that became permanent in 2019. We would like to invest in further bus lanes and believe that other communities should follow suit.
- Dedicated bus lanes are a highly efficient use of space that are a win-win-win for drivers, riders, and cyclists. They need financial support from the state to incentivize municipalities to invest.
- Dedicated bus lanes in the greater Boston area have been successful, so when considering complete streets, if it makes sense for the context, bus lanes show that more people can be moved faster.
- Because dedicated bus lanes have been empirically proven to significantly decrease commute times. This will result in more bus ridership and fewer single occupancy car trips, reducing traffic for everyone.
- Improving bus efficiency and increasing bus utilization would be an overall improvement to communities' transportation.
- What is the real value of a few blocks of dedicated bus lanes? The municipality should

be required to quantify the benefits and costs to get the money. Why not increase the Complete Streets money in general to help pedestrians and cyclists?

- Our bus system is ineffective when buses are stuck in single-occupant vehicles traffic. Free the buses with bus lanes! Get more people on buses!
- Dedicated bus lanes markedly improve travel time and should make bus routes more appealing to transit users (or would-be users).
- Not practical in my area.
- Dedicated bus lanes will allow for bus routes to operate more efficiently and reliably, which will lead to increased ridership. Furthermore, dedicated bus lanes may increase property values like trolley lines do in a way that traditional bus routes do not.
- Bus Rapid Transit is a cost effective way to move a lot of people.
- Buses are getting slower, more crowded, and less reliable because of increasing traffic congestion. For many, they are also their only public transit option. We need to make buses work better so that more people can use and depend on them!
- Bus lanes are worthwhile if they're long enough to speed the passenger trip significantly, but if they're too short, the grief involved in removing parking isn't worth the gain. Also, accessibility of bus stops to all users, able-bodied and disabled, remains a big problem, particularly in winter, when many bus stops become basically unusable for months once snow banks have accumulated and become frozen.
- Bus lanes can be low cost but require significant planning to get right. This will be a good use of funding.
- Dedicated bus lanes will reduce roads for car traffic.
- A better plan would be to reduce truck traffic and make more use of train traffic.
- In the bike advocacy space, we have some concerns that in places where conditions still warrant dedicated, separated bike lanes, the answer will transform to be "put a bus lane on it," and bikes will fail to get their own space at the expense of bus lanes. We want to be sure that there are measures of success for having dedicated bus lanes, shared bus/bike lanes, and solely separated bike lanes. And, where both are needed but separation is needed to make the more vulnerable road users feel safe, that the solution isn't to pit bus and bike advocates and users against one another, but the answer is how to take more space away from private automobiles. Dedicated bus lanes and improving bus service IS very important to providing accessible and well-functioning public transportation (and often bike riders use buses as complementary to one another).
- Group transportation should be given priority over car traffic. I bike and take the

bus on a daily basis. Bus delays are frequent, which has a chilling effect on people's willingness to take public transport.

- Dedicated bus lanes can have a bigger bang for the buck in terms of people throughput.
- It allows communities to focus on pedestrians, bikes, transit, and safety and not strictly vehicle-based paving and related work that other local and state fund (Chapter 90) tend to focus on because they are underfunded.
- Faster bus service = more economic access for more people.
- Dedicated bus lanes provide a quicker commute time, thereby encouraging more folks to leave their cars at home. They also provide more separation of other uses as well, so it is possible that on a road without a bike lane, cyclists are able to take advantage of extra space and have a safer commute. My only concern is that this does not affect the developing suburbs that have no public transportation. The Complete Streets program should modernize to allow more flexibility in design standards, for example to allow narrower bike lanes and travel lanes, or to alter scoring so that speed feedback signage is funded more frequently in areas where enforcement is limited. Complete Streets and transportation safety simply looks different in a developing suburb or rural area than in an urban area—using the same rubric to provide grants for construction is not desirable.
- It will improve mass transit and possibly reduce commuter traffic.
- A single bus can get 50 cars off the road. I think buses should get priority to encourage ridership, and we NEED BUSES from SUDBURY to BOSTON/CAMBRIDGE! IDEA: put flashing lights on buses and require cars to pull to side of road to let them pass (like with fire/police/ambulance). Because there may not be room/funding to add dedicated bus lanes in places.
- Transit improvements are crucial to sustain the region, and failing other improvements (which are longer term) dedicated bus service is something that can help in the short term.
- This also needs to include opportunities to upgrade traffic signals to allow for bus priority and for pedestrian lead interval and bicycle signals.
- Money should first be spent to electrify the commuter rail, change the fleet from diesel, and change all bus fleets from diesel. Electrifying bus fleets would be a better thing too.
- Dedicated bus lanes will decrease travel time, making transit (bus) more efficient, on time, and more attractive to travelers. This will help change their behavior to take the bus and decrease emissions and congestion.

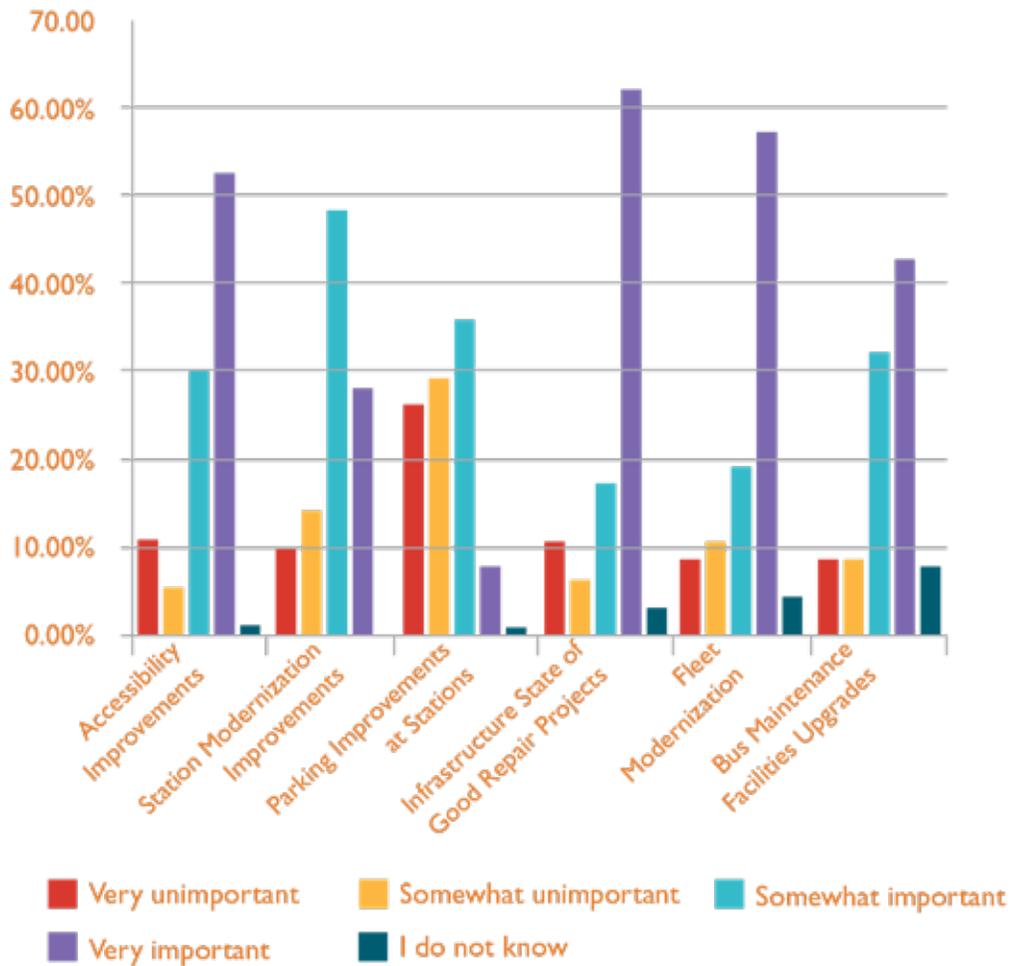
- Buses are (and may always be) the only public transit for some areas. Dedicated bus lanes will encourage transit use by reducing the ride time relative to other traffic. I would like it but parking is a big problem and there is very little space to put cars. Also they just might park in bus lanes illegal parking is rampant.
- Better for the environment and reduce congestion.
- It would be a legacy. I'll be 89 in 2040 so probably won't be here but would like people to have it.
- I LIKE that it requires accessible pedestrian/bike friendly improvements. I do NOT like that it pays for adding lanes to accommodate more car traffic. We should be REDUCING lanes, and let people sit in traffic. I'd rather have them sit in traffic and make ALL new infrastructure investment for walkers and bikers. NO NEW LANES!
- Bus routes allow more flexibility when transportation changes and dedicated lanes make bus routes more efficient.
- Not enough funding for other projects in current complete streets program. This addition will exacerbate the problem spreading funding thinner.
- Greater Boston is chock full of spaces that were never built for autos, yet cars and trucks have been shoehorned into them. The recent successes of dedicated bus lane pilots, cycle tracks included in street reconstruction, and more pedestrian- (and bike-) friendly infrastructure is far and away a good use of public funds, and really helps create an actual urban environment.
- Dedicated bus lanes serve as both traffic calming and improve the experience for bus riders.
- The MBTA's light rail network is insufficient. It has frequent outages and delays and has sub-par coverage over the urban area of metro Boston. Short of expanding the network to increase coverage and improving the system to increase its frequency and reduce downtime, buses are the only way to enhance the T. Adding dedicated bus lanes will help increase the frequency, speed, and reliability of bus service, which is a much-needed supplement to the T. That said, this is a band aid solution, as traffic, pedestrians, stoplights, etc. will always inhibit truly rapid bus transit. The only long-term solution is to fix the T.
- Bus lanes are the future of transit—lower capital investment and high impact
- Dedicated bus lanes are critical.
- Better public transit means fewer people will want to drive, lowering the terrible traffic congestion in Boston.

- I am a regular transit rider and I think the only way to get my fellow Boston residents to transition to transit is to make the commute time more reliable and preferable to driving.
- Dedicated bus lanes and protected bike lanes are the cheapest, fastest, most efficient way to solve our mobility crisis.
- Dedicated bus lane will allow increased frequency and speed for buses; will provide smoother and more efficient commute.
- Bus networks are often very common in low-income communities and communities of color. Rarely do faster transportation options such as heavy rail or light rail traverse these communities. Prioritizing public transit in these communities would allow for these often under-resourced communities to have access to better, faster, and more reliable transit.
- I like public transportation.
- Bus lanes decrease potential traffic on bus routes and increases reliability.
- This solution applies only to those areas lucky enough to already have bus service; benefits accrue to a limited area.
- Climate response; prioritizes moving people over moving cars; important step towards VisionZero
- We need dedicated bus lanes to speed high-capacity public transportation along our city streets, increasing its reliability and ridership and reducing single occupancy vehicles. Complete Streets are the future of road design, and all modes need to be accommodated in every project.
- Dedicated bus lanes offer a faster, less expensive improvement to the transportation network than investment in other transit options, and will help to improve the appeal of riding a bus (especially over driving). With improvements to dedicated bus lanes, we may even see additional investment in more buses, thereby offering greater frequency of service. All good things.
- I am not a bus user, but I would like to be able to ride my e-bike for commuting without worrying about car traffic.

Destination 2040 also proposes to set aside a portion of the MPO’s capital funding for a new Transit Maintenance and Modernization investment program to include the types of projects listed below. Please tell us how important each project type is to you by checking the appropriate circles below.

Respondents think that Infrastructure State of Good Repair projects and Fleet Modernization projects are the most important, followed by Accessibility improvements. More than 60 percent of the respondents believe that State of Good Repair projects are “Very Important,” while nearly 60 percent of respondents think that Fleet Modernization or Accessibility improvements are “Very Important.”

Figure D-3
How important is each project type?

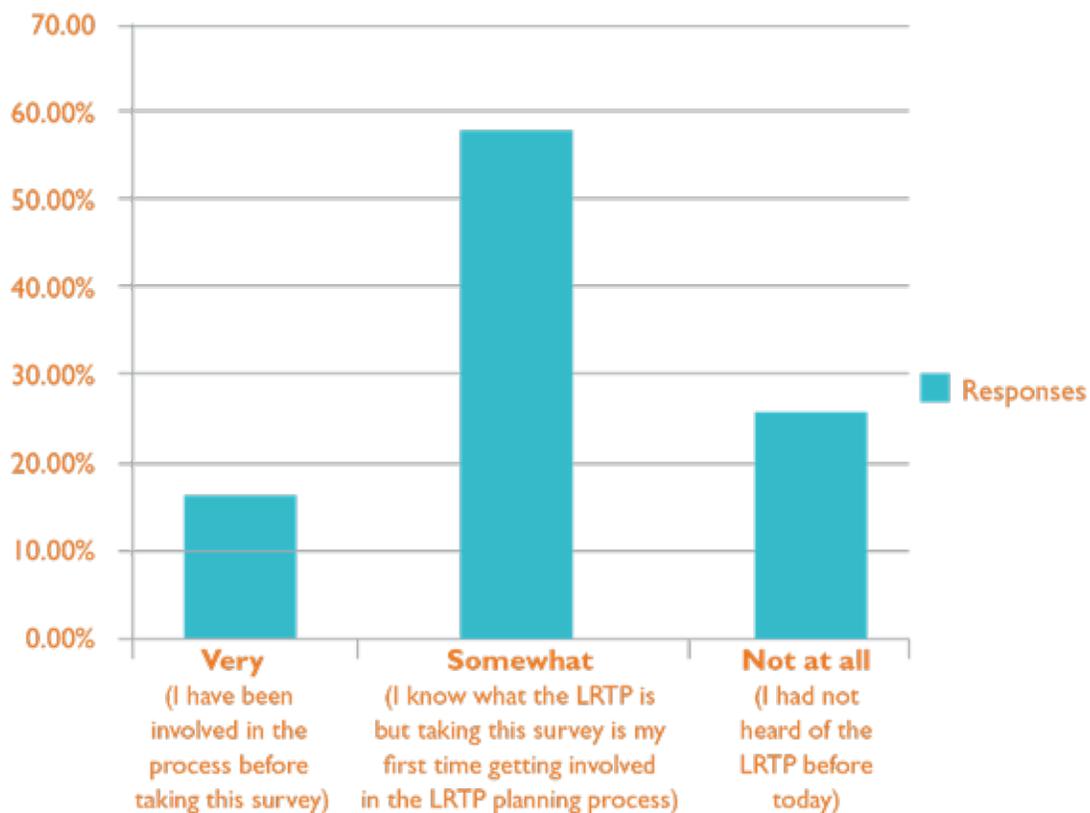


Source: Boston Region MPO.

How involved have you been with the planning process of *Destination 2040*?

Most respondents have some knowledge of the planning process of *Destination 2040* as nearly 60 percent of respondents indicated that they have been “somewhat involved.” It is important to note that among these respondents, taking the survey is the first time they have been involved in the MPO planning process. This indicates that the survey provided a new channel to a group of people who care about the LRTP but were not involved in the process previously.

Figure D-4
How involved have you been with the planning process of *Destination 2040*?

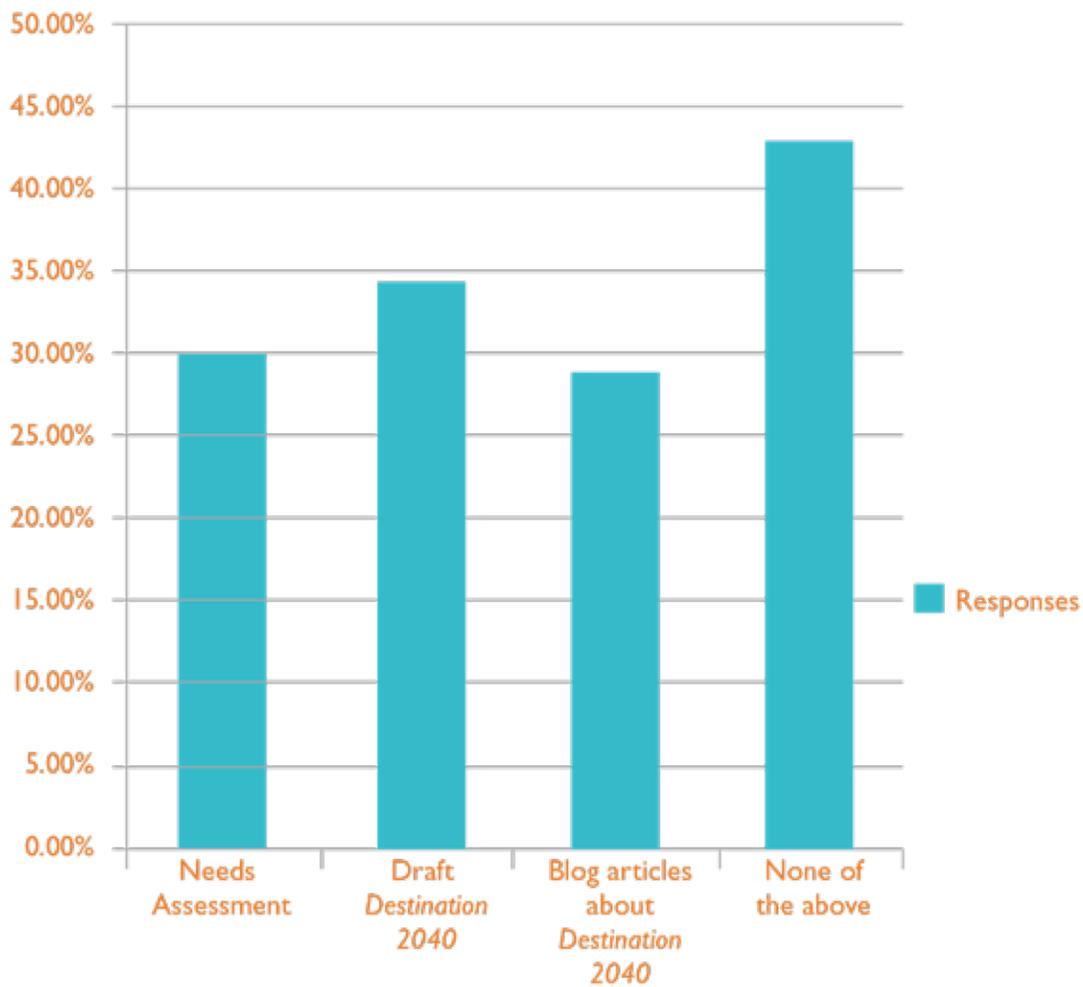


Source: Boston Region MPO.

Did you review the Needs Assessment, draft *Destination 2040*, or blog articles about *Destination 2040* to become more familiar with the MPO’s long-range planning process? Check all that apply.

The majority of respondents indicated that they did not read any of the materials related to *Destination 2040* before taking the survey (nearly 45 percent). On average, 35 percent of respondents reviewed the Needs Assessment, draft *Destination 2040*, or the blog post about *Destination 2040* before completing the survey.

Figure D-5
Did you review materials on *Destination 2040* to become more familiar with the MPO’s long-range planning process?

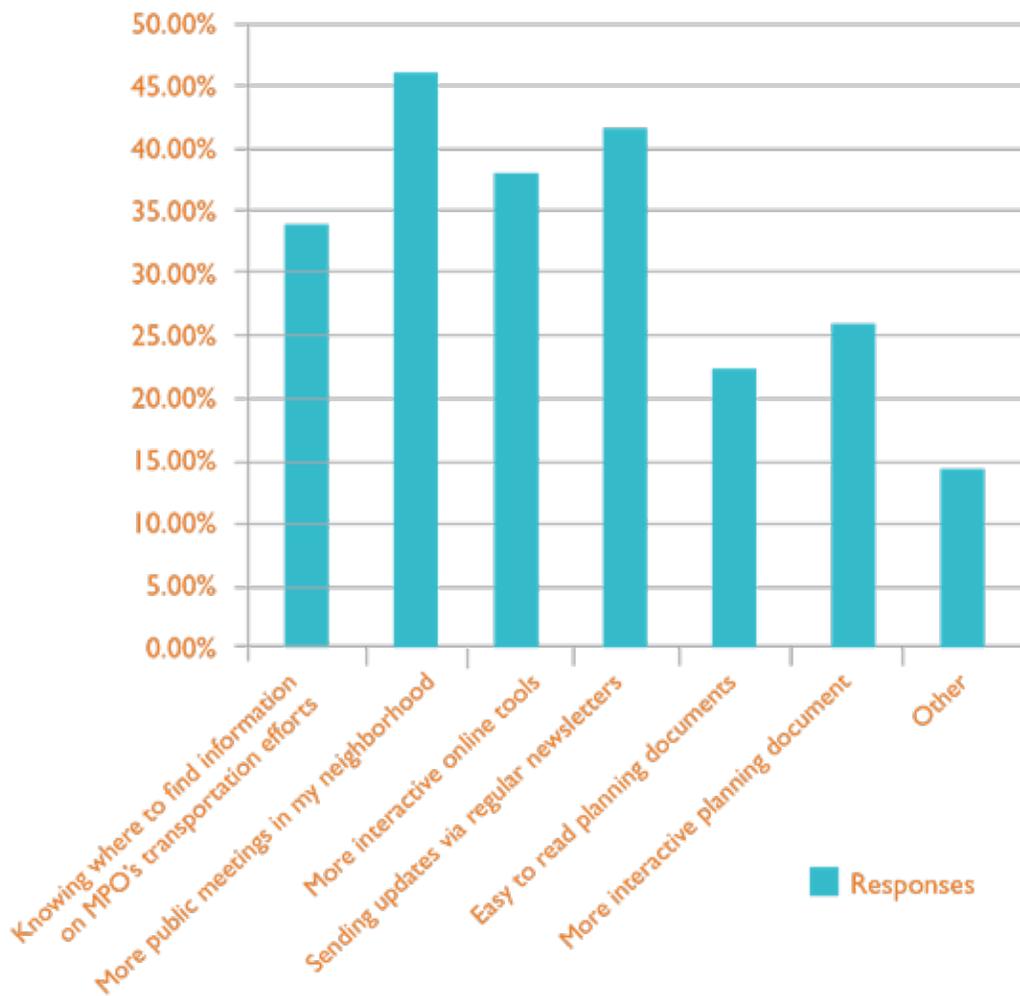


Source: Boston Region MPO.

What would make it easier for you to participate in the *Destination 2040* public review process and other regional transportation planning efforts? Check all that apply.

Respondents listed public meetings held in their neighborhood (more than 45 percent) as the most important factor to get involved. The majority of the respondents also think that it would make it easier to participate in the *Destination 2040* public review process and other regional transportation planning efforts if they received regular newsletters with updates on the MPO’s work (more than 40 percent). Respondents also expressed interests in more interactive online tools for participation (approximately 40 percent). This provided valuable input for future outreach by MPO staff.

Figure D-6
What would make it easier for you to participate in the *Destination 2040* public review process and other regional transportation planning efforts?



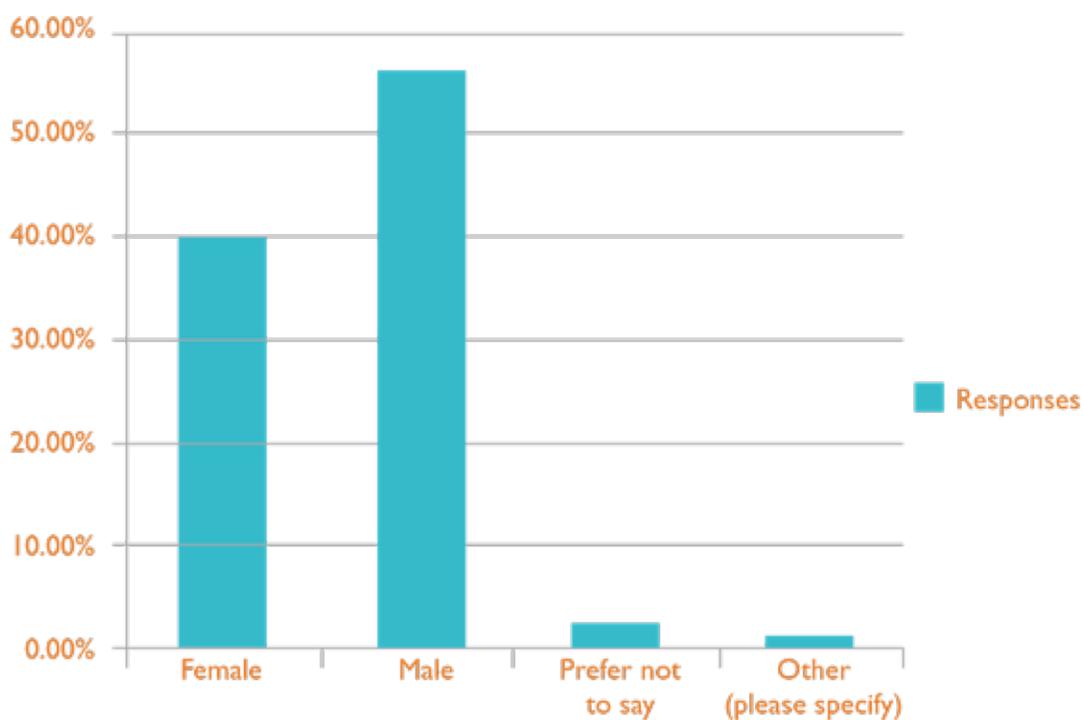
Source: Boston Region MPO.

Demographic Questions

What is your sex or gender?

The gender breakdown of the respondents is relatively even. Of the respondents, 40 percent are female while approximately 55 percent are male.

Figure D-7
What is your sex or gender?

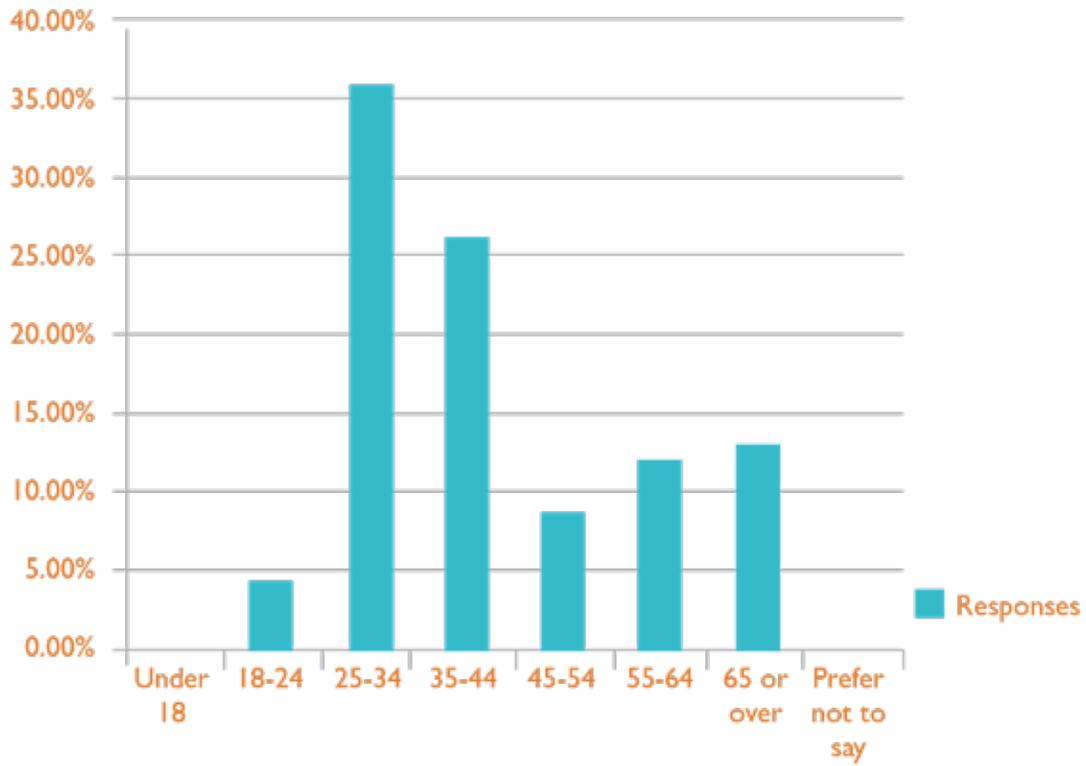


Source: Boston Region MPO.

What is your age?

The majority of the respondents were between 25 and 44 years old.

Figure D-8
What is your age?

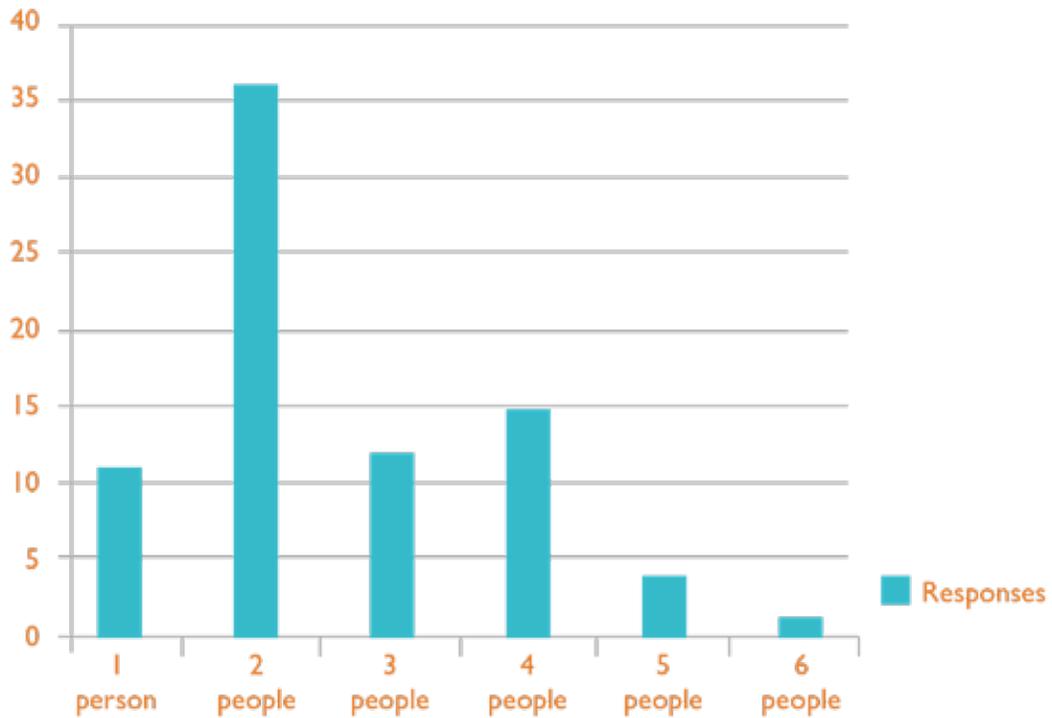


Source: Boston Region MPO.

How many people live in your household, including yourself?

The majority of respondents live in households with two people, including themselves.

Figure D-9
How many people live in your household, including yourself?

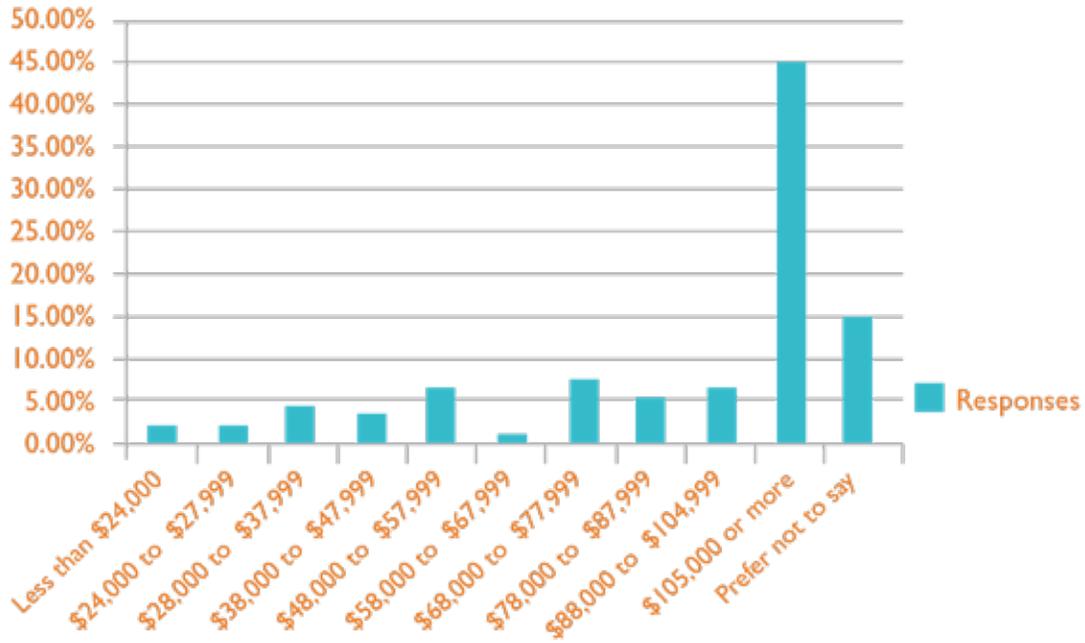


Source: Boston Region MPO.

What is your annual household Income?

The majority of respondents responded that their household income is \$105,000 or more.

Figure D-10
What is your annual household Income?

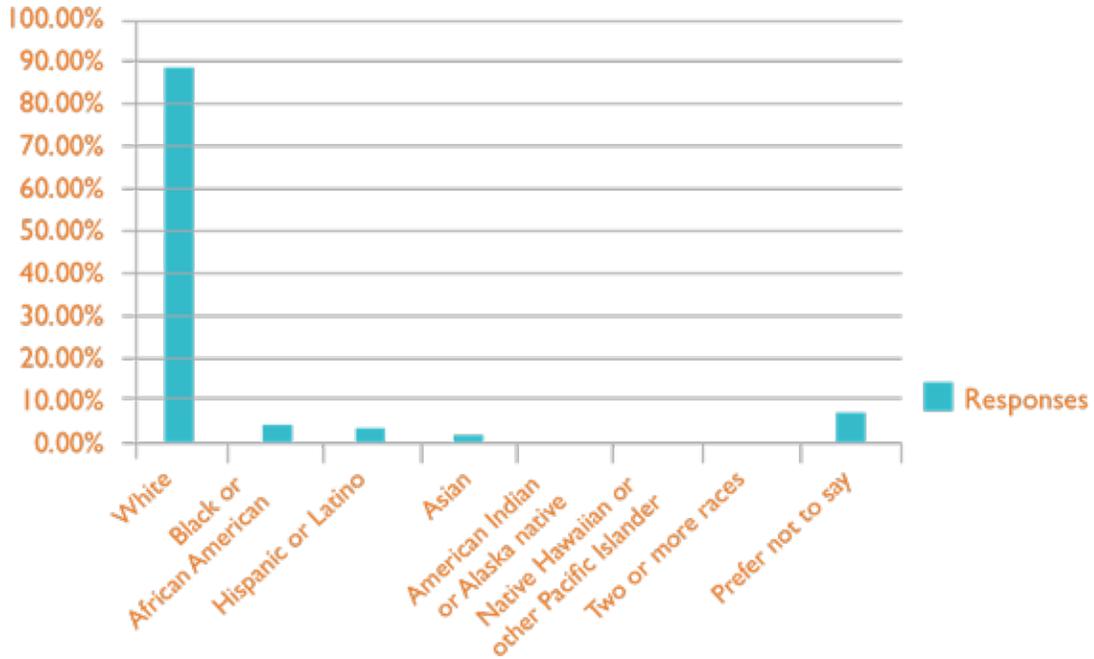


Source: Boston Region MPO.

How do you self-identify by race? Check all that apply.

The majority of the respondents self-identified as white (approximately 90 percent).

Figure D-11
How do you self-identify by race?

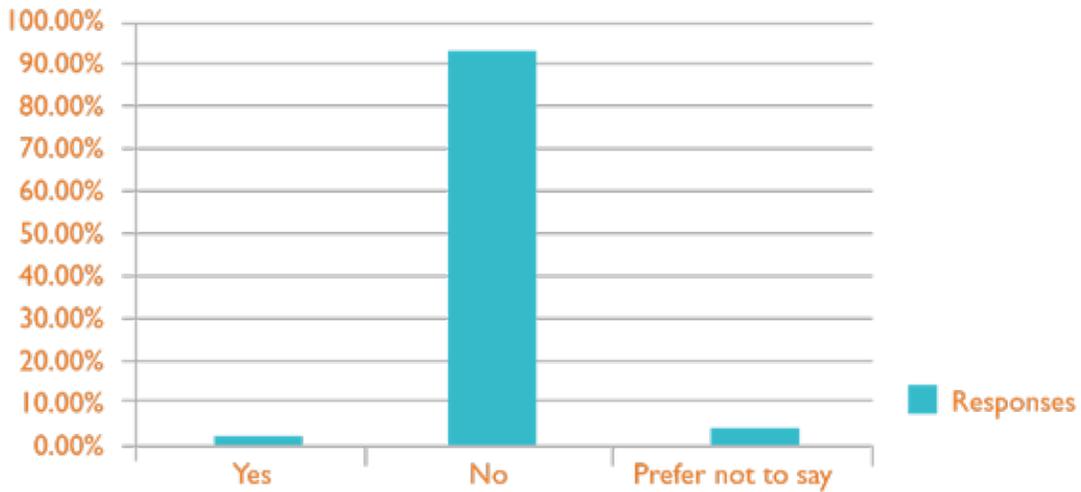


Source: Boston Region MPO.

Are you Latino/a/x?

The majority of the respondents do not self-identify as Latino/a/x (more than 90 percent).

Figure D-12
Are you Latino/a/x?

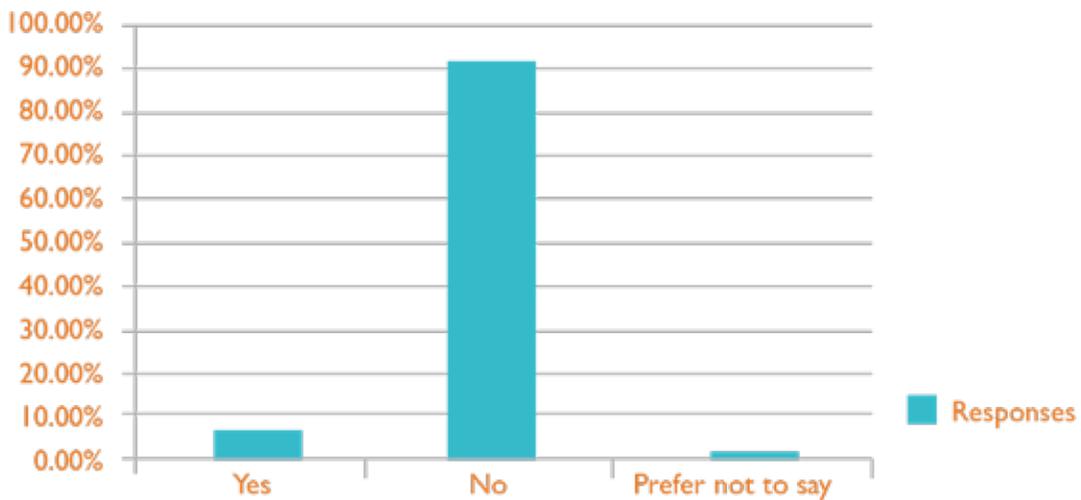


Source: Boston Region MPO.

Do you have a disability?

The majority of respondents do not have a disability (approximately 90 percent).

Figure D-13
Do you have a disability?

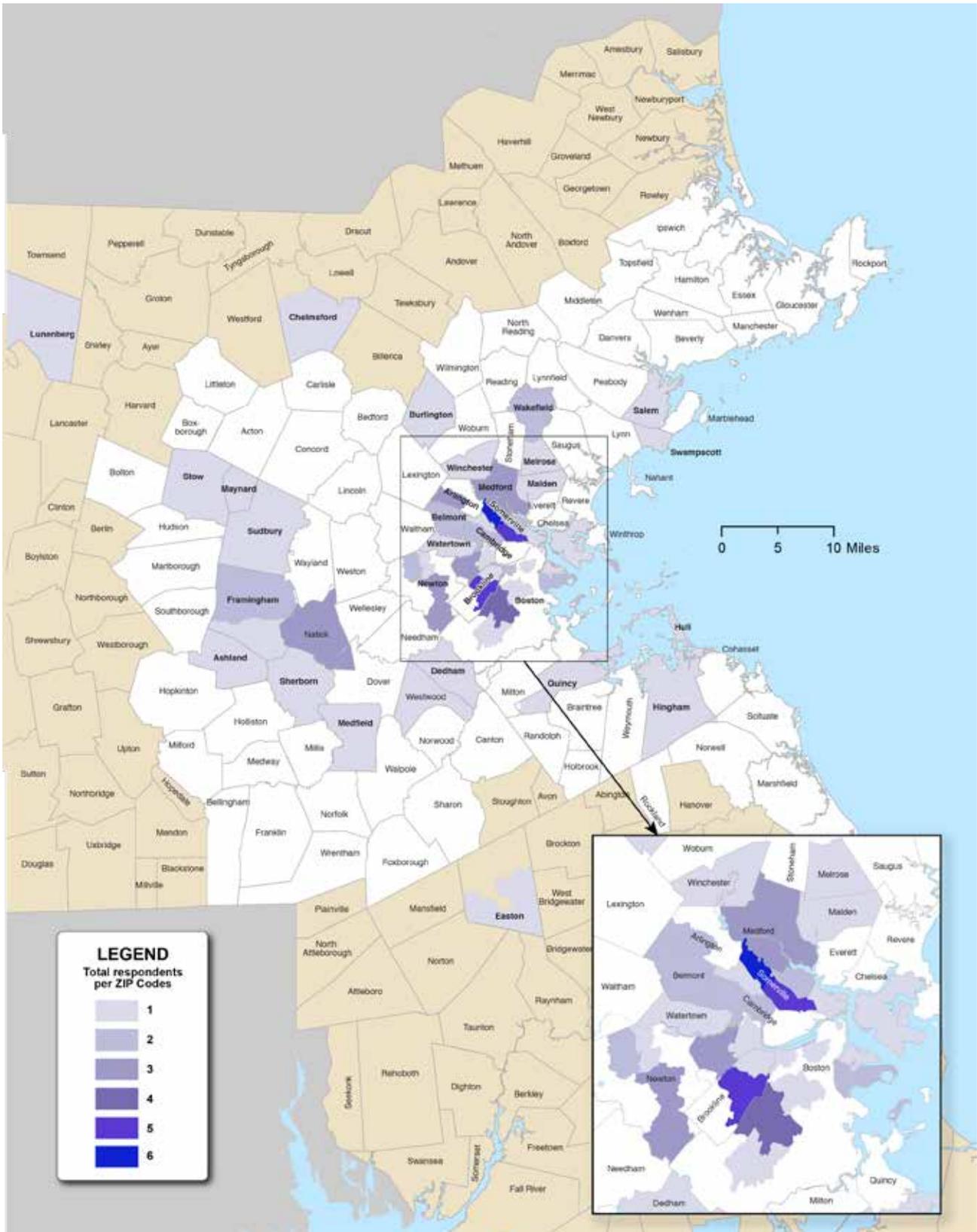


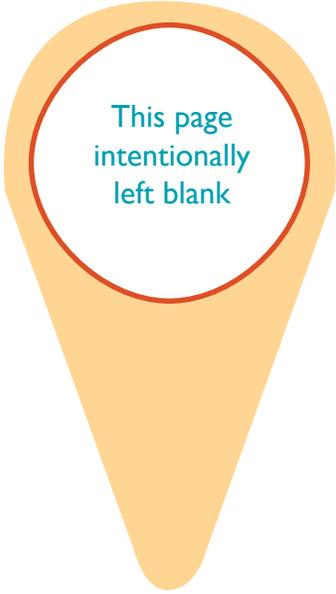
Source: Boston Region MPO.

What is your home zip code? (Total number of respondents: 88)

The majority of the respondents live in the inner core of the Boston Region; however, as shown on the map, responses were received from throughout the region. Among those municipalities, Somerville, Boston, and Brookline have the highest number of survey participants. The high number of participants from these municipalities could be a result of the outreach events attended by MPO staff, namely the Dewey Square Farmers' Market and the Brighton Farmers' Market in Boston. MPO staff attended the Framingham Farmers' Market, which would also account for survey responses in the MetroWest region. Figure D-14 shows the detailed geographical breakdown of respondents.

Figure D-14
What is your home zip code?





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