



5

WEST CORRIDOR

DESCRIPTION OF THE CORRIDOR

The West Corridor extends from Massachusetts Avenue in Boston to the vicinity of Interstate 495. It is anchored in the east by the Boston neighborhoods of Allston, Brighton, and Fenway, which are home to several academic and medical institutions, and the town of Brookline and city of Newton. Eighteen of the municipalities in the corridor are located within the Boston Region MPO area; in addition to the city, town and neighborhoods already mentioned, they are (proceeding west) Needham, Wellesley, Weston, Dover, Natick, Wayland, Sherborn, Framingham, Sudbury, Ashland, Holliston, Hopkinton, Southborough, Marlborough, and Hudson.

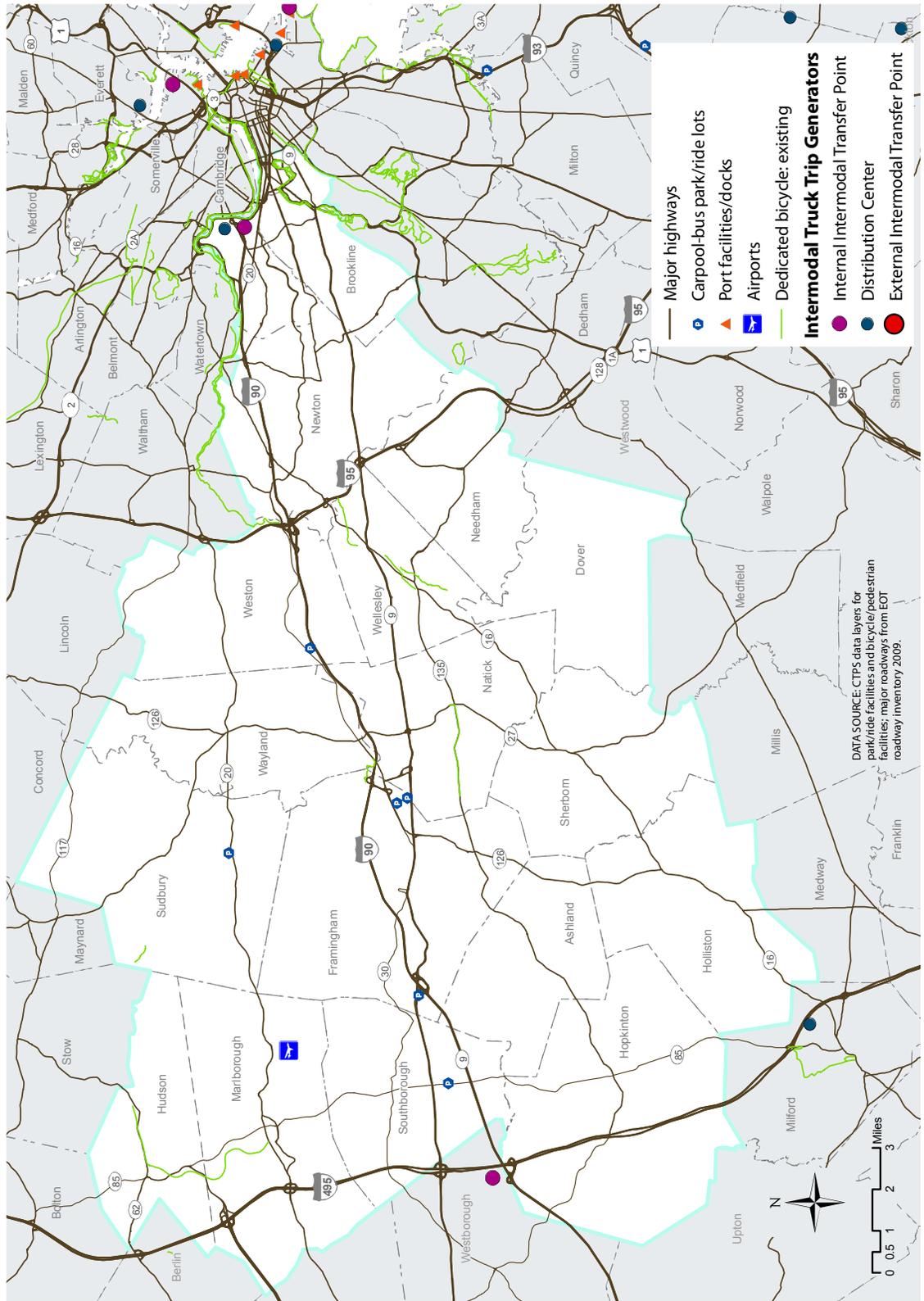
This needs assessment addresses only the needs of the municipalities in the Boston Region MPO portion of the corridor. In doing so, however, it must take into consideration conditions and travel activity in other portions of the corridor. This is reflected in the discussion. The portions of the corridor outside of the Boston Region MPO area are not shown in most of the maps.

Eight corridor municipalities all located in the western part of this corridor, are outside of the Boston Region MPO area: Berlin, Boylston, Northborough, Shrewsbury, Westborough, Grafton, Upton, and Northbridge, which are all in the Central Massachusetts MPO area.

EXISTING TRANSPORTATION FACILITIES

The major transportation facilities and services in the West Corridor, broken down by mode, are described here. Although this assessment considers the needs in the Boston Region MPO area only, existing transportation facilities outside of that area but within the West Corridor are included in this section for informational purposes.

FIGURE 5-1
EXISTING HIGHWAY TRANSPORTATION FACILITIES - WEST CORRIDOR



Highway

The major roadways in this corridor are (see Figure 5-1):

- North–south travel: Interstate 495, Interstate 95, Route 85, Route 126, and Route 27
- East–west travel: Interstate 90, Interstate 290, Route 9, Route 20, Route 135, Route 16, Route 30, and Route 117

There are 2,190 centerline miles in the corridor:

- State-owned – 132 centerline miles (6%)
- Locally owned – 1,906 centerline miles (87%)
- Privately owned – 151 centerline miles (7%)

When looking at lane miles (as opposed to centerline miles) in the corridor, there are a total of 2,927 lane miles. Of the total lane miles, 36% or 1,067 lane miles are federal aid eligible.

There are 472 bridges in the corridor:

- State-owned – 386 (82%)
- Locally owned – 76 (16%)
- Other – 10 (2%)

Of the 472 bridges, 195 (41%) accommodate pedestrians as well as motorists, 29 (6%) are for bicyclists and pedestrians only, 48 (10%) are railroad bridges over highways or water, and 2 (less than one percent) are closed.

Park-and-ride facilities that are not connected with a public transit station are located in Newton, Weston, and Framingham (inside of the Boston Region MPO area), and Berlin, Westborough, and Grafton (outside of the Boston Region MPO area). They are operated by MassDOT.

Transit

Transit in the corridor includes a variety of modes: commuter rail, intercity rail, rail rapid transit, bus, and paratransit (provided by the MBTA's THERIDE program and the MetroWest Regional Transit Authority); see Figure 5-2. A description of the transit services is provided below.

Commuter Rail and Intercity Rail

Three MBTA commuter rail lines run through the corridor. One provides service into North Station in Boston. The other two provide service into South Station in Boston. The stations on the lines, along with their numbers of park-and-ride spaces and average utilization rates, and other selected information as applicable, are:

- Fitchburg Line, with three stations in the corridor¹:

¹ Other stations on the line are located in the Northwest corridor.



- Kendall Green (Weston) – 57 park-and-ride spaces (75% utilization rate)
- Hastings (Weston) – 6 park-and-ride spaces (43% utilization rate)
- Silver Hill (Weston) – No parking
- Framingham/Worcester Line, with 15 stations in the corridor:
 - Yawkey – No parking
 - Newtonville – 53 park-and-ride spaces (68% utilization rate)
 - West Newton – 45 park-and-ride spaces (71% utilization rate); bus connections
 - Auburndale – 35 park-and-ride spaces (91% utilization rate); bus connections
 - Wellesley Farms – 199 park-and-ride spaces (62% utilization rate); bicycle parking also
 - Wellesley Hills – 51 park-and-ride spaces (93% utilization rate)
 - Wellesley Square – 224 park-and-ride spaces (63% utilization rate)
 - Natick – 71 park-and-ride spaces (66% utilization rate)
 - West Natick – 178 park-and-ride spaces (85% utilization rate); bicycle parking also
 - Framingham – 166 park-and-ride spaces (65% utilization rate); bicycle parking also
 - Ashland – 678 park-and-ride spaces (29% utilization rate)
 - Southborough – 364 park-and-ride spaces (62% utilization rate)
 - Westborough – 443 park-and-ride spaces (56% utilization rate); bicycle parking also
 - Grafton – 373 park-and-ride spaces (47% utilization rate); bicycle parking also
 - Worcester/Union Station – 500 park-and-ride spaces (60% utilization rate); bus hub, intercity rail, bicycle parking also
- Needham Line, with four stations in the corridor:
 - Hersey – 322 spaces (60% utilization rate); bicycle parking also
 - Needham Junction – 175 spaces (95% utilization rate); bicycle parking also; bus connections
 - Needham Center – 36 spaces (92% utilization rate); bicycle parking also; bus connections
 - Needham Heights – 243 spaces (34% utilization rate); bicycle parking also; bus connections





MBTA Rail Rapid Transit

The four branches of the Green Line operate in this corridor:

- The Boston College Line (B) runs through the Boston neighborhoods of Allston and Brighton and has 18 surface stops, none of which has parking. Seven stops have at least one bus connection. This line generally serves local neighborhoods.
- The Cleveland Circle Line (C), with 13 stops primarily serves Brookline. Four stops have at least one bus connection. There is no designated MBTA parking.
- The Riverside Line (D) with 13 stops, runs through a portion of the Fenway, the Longwood Medical area, Brookline and Newton. The line also serves as a connection to other corridors at its Riverside terminal which is located near ramps to I-95 and I-90 and has a parking lot with 925 spaces. The Woodland station also attracts people from other corridors as it has a parking garage with 548 spaces and is easily accessible from I-95 and Washington Street (Route 16). Three other stations have smaller MBTA parking lots. Eight stations have at least one bus connection.
- The Heath Street Line (E) with 10 stops and no parking primarily serves locations in the immediate vicinity of Huntington Avenue in Boston.
- Kenmore station, located near the junction of Beacon Street, Brookline Avenue, and Commonwealth Avenue serves the B, C, and D branches of the Green Line. Several bus routes stop here. No MBTA parking is available.

Bus

Numerous public bus services operate in or through the corridor:

- MBTA express buses (12 routes) – These routes serve Waltham, Newton, and Brighton and terminate at points in Boston Proper.
- MBTA local buses (29 routes) – Some of the local bus routes offer circumferential connections to destinations in the Northwest and Southwest Corridors. Other local routes operate primarily in the Southwest corridor but serve Orange Line stations on the border between corridors.
- MetroWest Regional Transit Authority (MWRTA) (11 routes) – MWRTA operates a network of bus routes that serve West Corridor communities west of Route 128 - Ashland, Framingham, Holliston, Hopkinton, Marlborough, Natick, Sherborn, Southborough, Sudbury, Wayland, and Weston.
- Logan Express provides service from Framingham to Logan Airport.

- Worcester Regional Transit Authority (WRTA) (29 routes) – WRTA routes, eight of which make intermediate stops at Union Station in Worcester are centered on downtown Worcester.
- Private bus carriers provide service within the corridor. Peter Pan provides weekday commuter service between Boston, Worcester, and Framingham. Cavalier Coach provides express bus service during weekday commuting hours between Boston and Weston, Wayland, Sudbury, Marlborough, Northborough, Framingham, and Southborough.

Intermodal Facilities (Passenger)

There are no intermodal passenger facilities within the Boston Region MPO area in the West Corridor. However, Union Station is located at Worcester Square in downtown Worcester. Transportation services at this facility are MBTA commuter rail (the Worcester/Framingham Line) to North Station in Boston, Amtrak service to Albany, New York with connections to Chicago, WRTA bus routes, intercity Peter Pan and Greyhound bus routes, park-and-ride spaces, and bicycle parking.

Connections to MBTA Service from Other Regional Transit Authorities' Services

The two regional transit authorities (RTAs) that serve the corridor along with the MBTA provide connections to MBTA services. The MWRTA Green Line Shuttle provides a connection to the Woodland station on the Riverside Green Line. Currently, seven WRTA routes make intermediate stops at Union Station which is the terminal of the Worcester/Framingham MBTA commuter rail line, which provides service into Boston.

Transportation Management Associations

The following Transportation Management Associations (TMAs) provide service in the corridor:

- The Route 128 Business Council operates the Needham Shuttle which connects the Newton Highlands Station on the MBTA's Green Line with member companies in Needham's New England Business Center. The Council also operates the Southside Shuttle which connects Riverside Station on the Green Line with several locations in Waltham.
- The Medical Academic and Scientific Community Organization Inc. (MASCO) offers the following shuttle services:
 - Fenway, Wentworth, Crosstown, and M6 (Park-and-Ride) shuttles for employees who park in one of the off-site MASCO-managed facilities.
 - The Longwood Medical Area (LMA)–Harvard Medical School Shuttle (M2) connects the LMA and Harvard University in Cambridge.
 - The Landmark/Longwood Shuttle provides service between the Landmark Center and the Harvard School of Public Health via Vanderbilt Hall,



Monday through Friday, from 9:00 AM to 5:00 PM.

- The Shuttle All-Ride Program allows employees and students of all Longwood Medical Area medical institutions to ride many of the shuttles servicing Longwood but operated by institutions other than their own.

Freight

Truck Freight

Trucks are the dominant freight mode in the Boston Region MPO area. They operate on all roadways in the region to transport goods and make deliveries. In this analysis, trucks include three categories of vehicle: tankers, large trucks, and business pickup trucks and vans. The analysis of Interstate 495 took advantage of actual MassDOT vehicle classification count data, which is available for a limited number of locations in the region. The following is a list of the highways in the West Corridor with the highest current volumes of truck traffic:

- Interstate 495 from Berlin to Milford with 10,000 to 17,000 trucks per day
- Interstate 95 from Waltham to the vicinity of Route 9, with volumes ranging from 9,000 to 13,000 trucks per day
- Interstate 90 from the vicinity of interchange 17 to Massachusetts Avenue, with volumes ranging from 9,000 to 13,000 trucks per day
- Interstate 95 from south of Route 9 to Dedham, with volumes ranging from 9,000 to 11,000 trucks per day
- Interstate 90 from Interstate 495 to Interstate 95, with volumes ranging from 5,000 to 11,000 trucks per day

Rail Freight



CSX operates in the corridor along its Boston Line and secondary lines. The Boston Line runs from the CSX classification yard in Selkirk, New York to the Beacon Park Yard intermodal facility in Allston. It handles more than 10 million tons of freight annually, making it the highest volume rail corridor for freight into and out of New England. Much of the freight destined for CSX yards in Massachusetts, Pan Am Railways' northern New England customers, and many New England short line railroads enters the state through the Boston Line. Finished automobiles also enter New England on the Boston Line.

Beacon Park Yard in Allston is a major freight yard in the corridor serving many functions. The yard handles intermodal freight including containers and trailers, general merchandise freight, and commercial waste that is transferred in sealed containers from truck to rail. The yard also houses the TRANSFLO facility that handles mostly sweeteners and edible oils. Additionally, the facility handles locomotive servicing and freight car running repairs.

CSX maintains multiple yards in Framingham. North Yard and Nevins Yard support local freight distribution in Eastern Massachusetts. CP Yard is used for storage and also supports the facility where autos can be transferred from auto carriers to trucks for distribution. CSX also has an auto facility just outside of the MPO area in Westborough that is currently inactive. CSX affiliate TRANSFLO is planning to locate a transfer facility for bolt goods at this site. Also outside of the MPO area, but in the West Corridor, is the North Grafton Yard. It is a small yard for CSX interchange with the Grafton and Upton Railroad and for transload operations.

Massachusetts and CSX are progressing with a transaction that will transfer the Boston Line between Worcester and Framingham to the Commonwealth. The Commonwealth and the railroad are working to allow second generation double stack container clearance from the New York State line to Westborough as part of the agreement that transfers certain CSX rail properties to the Commonwealth. The Commonwealth is planning for additional commuter rail service on the Boston Line between Worcester and Boston. CSX plans to relocate its Beacon Park Yard operation to yards in Worcester and West Springfield.

Marine Freight

There are no marine facilities in the West Corridor.

Air Freight

The Marlboro Airport occasionally handles freight. However, there are no substantial air freight operations in the West Corridor.

Intermodal Freight Facilities

The intermodal facilities located in the Boston Region MPO portion of the West Corridor are shown in Figure 5-1 and listed below:

- CSX Beacon Park Yard, Allston
- RoMar Distribution Center, Allston

There is one intermodal facility located in the West Corridor outside of the Boston Region MPO area:

- CSX Westborough Yard, Westborough

Air

The Marlboro Airport is the only airport in the West Corridor. It is a private, public use airport located in Marlborough.



Bicycle

Bicycle Paths

The corridor has two major bicycle trails, the Assabet River Rail Trail, that runs 5.1 miles between Lincoln Street in Marlborough and Wilkins Street in Hudson, and 2 miles of the Emerald Necklace Trails in Brookline.² These are shown in Figure 5-1, along with other minor facilities used by bicyclists and pedestrian in the corridor.

The Emerald Necklace Trails are existing bicycle facilities of the Merrimack River Corridor of MassDOT's Bay State Greenway Plan. Currently, 22 of 60 miles of the proposed Merrimack River Corridor have been constructed. The Assabet River Rail Trail and the Mass Central Rail Trail (outside the MPO region) are existing bicycle facilities of the Mass Central Corridor of MassDOT's Bay State Greenway Plan. Currently, 52 of 150 miles of the proposed Mass Central Corridor have been constructed.

On-Road Bicycle Accommodations

Table 5-1 shows the percentage of roadways in each of the Boston Region MPO municipalities in the corridor that have on-road bicycle accommodations, defined as roadways with bicycle lanes or shoulders of four feet or greater. Allston-Brighton and Fenway are not included in this table but are included in Chapter 8, Central Area.

TABLE 5-1

PERCENTAGE OF ROADWAYS WITH BICYCLE ACCOMMODATIONS

MUNICIPALITY	TOTAL NON-INTERSTATE CENTERLINE MILES	CENTERLINE MILES WITH BICYCLE LANES	CENTERLINE MILES WITH FOUR-FOOT SHOULDERS	PERCENTAGE OF CENTERLINE MILES WITH BICYCLE ACCOMMODATIONS
Ashland	79	0.0	0.0	0.0%
Brookline	105	2.2	0.6	2.6%
Dover	62	0.0	0.0	0.0%
Framingham	236	0.0	7.2	3.0%
Holliston	92	0.0	0.0	0.0%
Hopkinton	117	0.0	4.5	3.8%
Hudson	91	0.0	1.9	2.1%
Marlborough	159	0.0	0.1	0.1%
Natick	154	0.0	3.5	2.3%
Needham	134	0.0	0.3	0.2%
Newton	303	0.0	0.5	0.2%
Sherborn	56	0.0	1.7	3.0%
Southborough	80	0.0	1.3	1.7%
Sudbury	146	0.0	0.4	0.3%
Wayland	94	0.0	2.7	2.9%
Wellesley	129	0.0	0.2	0.2%
Weston	108	0.0	0.9	0.9%
TOTAL	2,143	2.2	26.0	1.3%

² The Emerald Necklace Trails are also part of the East Coast Greenway that aims to develop a trail system between Canada and Key West.

The bicycle accommodation coverage in the West Corridor is low and predominately consists of four-foot shoulders on roadways. The bicycle coverage varies from no coverage in Ashland, Dover, and Holliston to almost 4% coverage in Hopkinton. Overall, the West Corridor ranks below the regional average of 1.7%.

Bicycle Parking

The MBTA provides bicycle parking at various commuter rail and rapid transit stations in the corridor (see lists of rail stations in the Transit section). According to the MBTA, over 95% of stations now have bicycle parking. Also, the MBTA has secured funding for bike racks on all MBTA buses; therefore, the riders in this corridor will be able to take their bicycles on the bus. The Boston Region MPO has a program funding the installation of bicycle racks in participating municipalities. Municipalities in the corridor that recently installed bike racks funded by the Boston Region MPO are:

- Brookline
- Framingham
- Holliston
- Hopkinton
- Hudson
- Marlborough
- Newton
- Sherborn
- Southborough
- Wellesley
- Weston

Municipalities planning bike rack installations are:

- Dover
- Natick
- Needham
- Wayland

Pedestrian

Table 5-2 shows the percentage of roadways in each of the Boston Region MPO municipalities in the corridor that have sidewalks on at least one side. Allston-Brighton and Fenway are not included in this table but are included in Chapter 8, Central Area.



TABLE 5-2

PERCENTAGE OF ROADWAYS WITH SIDEWALKS

MUNICIPALITY	TOTAL NON-INTERSTATE CENTERLINE MILES	CENTERLINE MILES WITH SIDEWALKS ON AT LEAST ONE SIDE	PERCENTAGE OF CENTERLINE MILES WITH SIDEWALKS
Ashland	79	25	32%
Brookline	105	94	89%
Dover	62	1	2%
Framingham	236	117	49%
Holliston	92	30	33%
Hopkinton	117	42	36%
Hudson	91	41	45%
Marlborough	159	82	51%
Natick	154	85	55%
Needham	134	103	77%
Newton	303	251	83%
Sherborn	56	11	19%
Southborough	80	21	26%
Sudbury	146	11	8%
Wayland	94	8	8%
Wellesley	129	65	51%
Weston	108	20	19%
TOTAL	2,143	1,007	47%

The West Corridor’s sidewalk coverage of 47% ranks slightly below the regional average of 50% coverage. Coverage varies widely from less than two percent coverage in Dover to 89% coverage in Brookline.

LAND USE AND DEMOGRAPHICS

Demographics

Population

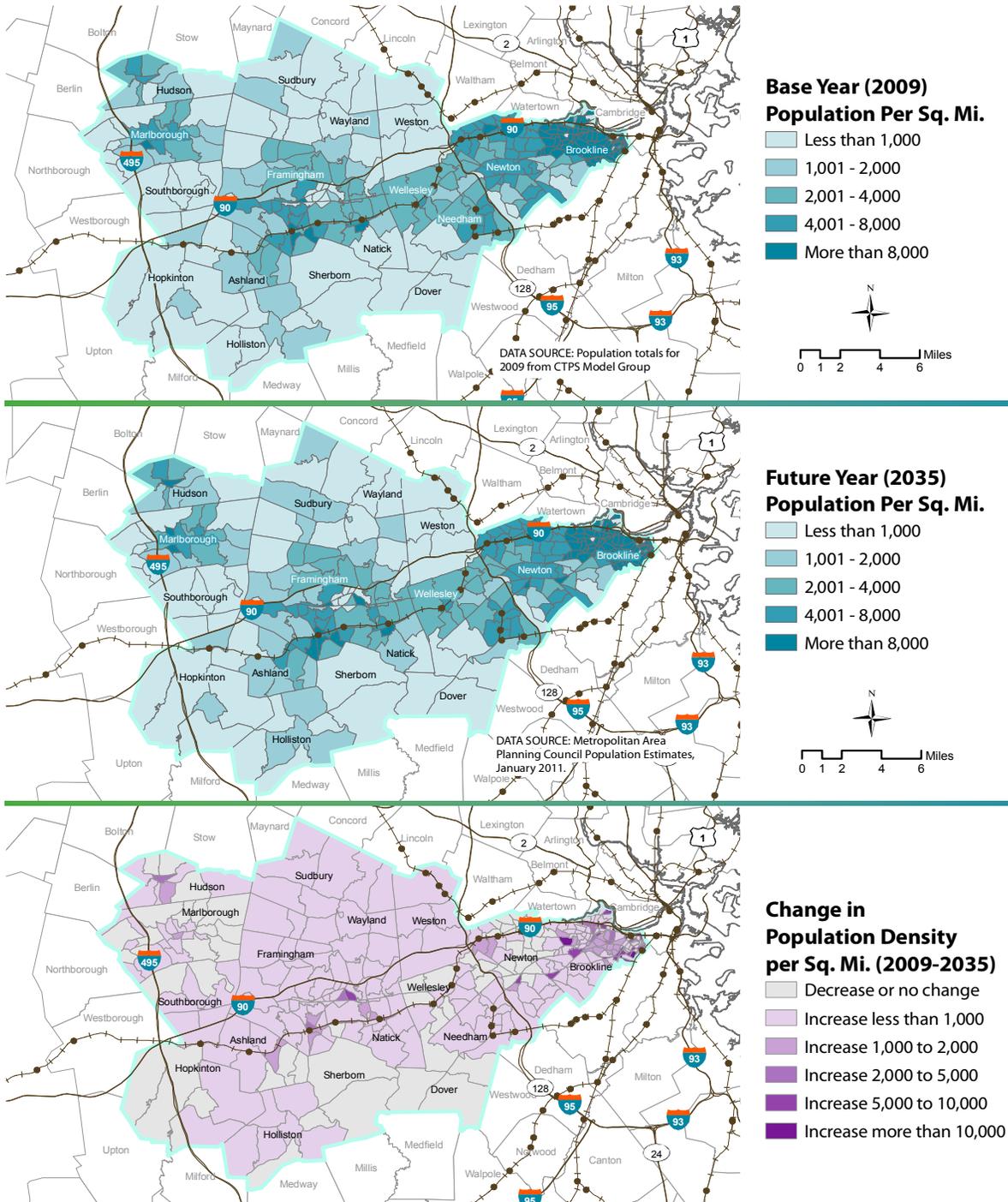
The largest densely populated areas in the West Corridor are within Brookline, Newton, Wellesley, and Framingham. The areas that are projected to become more densely populated between 2009 and 2035 include already-developed areas along the Green Line and commuter rail. In general, population is projected to remain relatively stable, with most municipalities experiencing moderate gains or losses (see Figure 5-3).

According to U.S. census data (updated annually at the town level), the corridor’s 2009 population was 452,500. In the Metropolitan Area Planning Council’s (MAPC’s) MetroFuture forecasts, the corridor’s population increases by 8%, to 490,760 by 2035 (MetroFuture is described briefly below). The municipalities projected to have the largest absolute growth are Natick, Framingham, and Brookline.

Figure 5-4 shows, by community for 2009, total elderly (age 70 or higher) population.

FIGURE 5-3

**POPULATION DENSITY BY TRANSPORTATION ANALYSIS ZONE
WEST CORRIDOR**



This information can be used to assess the types of transportation services needed now and in the future. As shown in Figure 5-4, Newton, Brookline, Needham, Natick, and Framingham currently have the highest population of elderly residents.

Land Use, Housing, Sustainable Transportation

As of the year 2000, there were 171,600 households in the West Corridor. Newton, Framingham, Brookline, and Marlborough comprise 54% of the year 2000 population and 55% of 2009 employment. The highest population densities (2009 data) are



found along the Green Line in Brookline and Newton, where densities range from 3,500 residents per square mile (Chestnut Hill) to 35,000 residents per square mile (Washington Square, Brookline). Along the commuter rail lines, the highest population densities are at the Framingham and West Natick stations, both of which have more than 9,500 residents per square mile in the surrounding area. In contrast, the lowest densities around commuter rail stations are in Southborough and Weston, where there are fewer than 1,600 residents per square mile in the station area. The highest densities of transit-adjacent employment are at the Hawes, St. Mary's, Longwood, and Kent Street stops on the Green Line near both Longwood Medical Center and Boston University. There are more than 30,000 jobs per square mile in the area surrounding these

stations. Along the commuter rail, the highest concentration of jobs is in downtown Framingham, where there are more than 11,700 jobs per square mile.

Figure 5-5 shows transit service and catchment areas with population density in the West Corridor; it includes commuter rail and rapid transit stations along with bus stops. For rapid transit and commuter rail stations, a half-mile catchment area for walk access is assumed, while the catchment area for bus stops is a quarter mile. This figure shows that higher-density areas in parts of Brookline, Newton, Needham, Framingham, Marlborough, and Hudson do not have direct access to MBTA transit services, however, Framingham, Natick, and Marlborough are served by the MetroWest Regional Transit Authority (MWRTA).

From 2000 to 2009, West Corridor municipalities issued building permits for 9,706 new housing units (according to the U.S. Census Bureau), representing housing unit growth of 5.7%. Newton and Marlborough led the way with over 1,300 housing units permitted, more than 28% of the total. Three municipalities reported permitting fewer than 200 housing units over the past ten years: Sherborn, Dover, and Wayland.

In 2007 and again in 2010, MAPC surveyed municipalities about recent and

FIGURE 5-4

ELDERLY POPULATION BY TOWN, 2009
WEST CORRIDOR

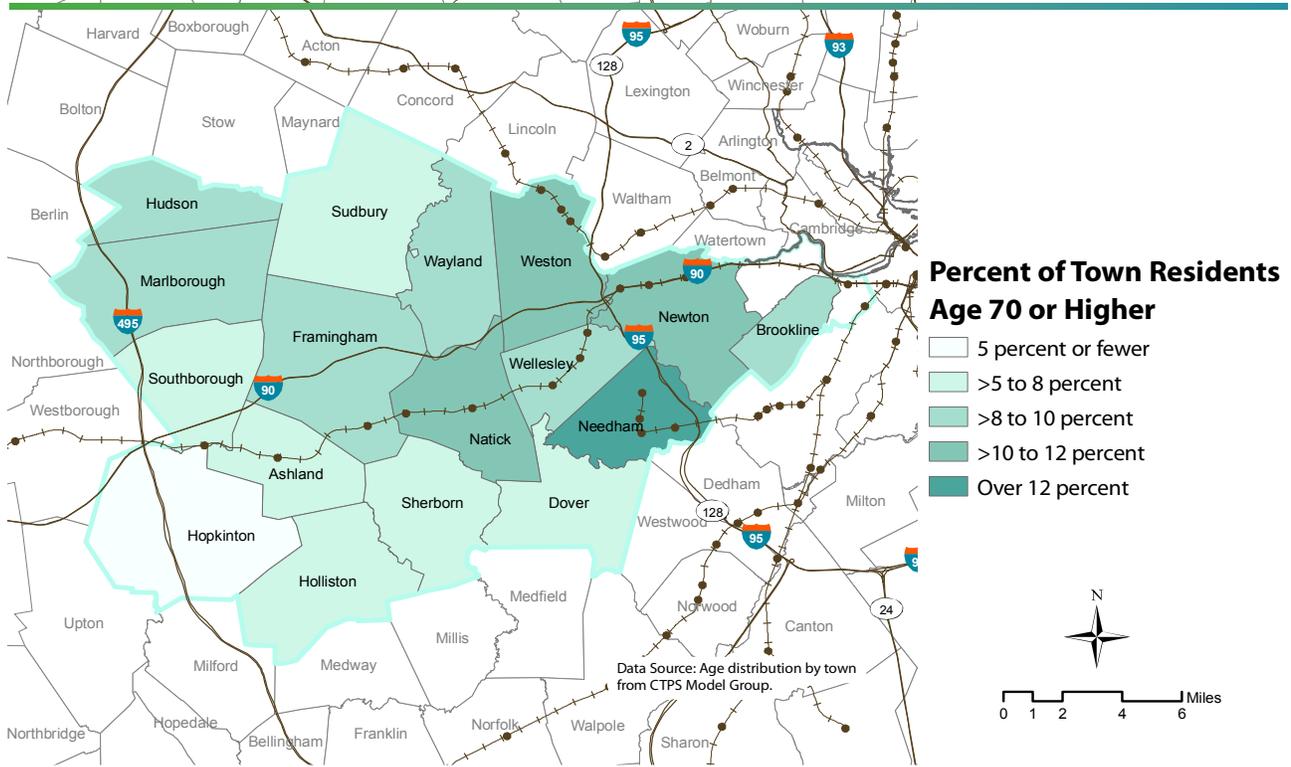
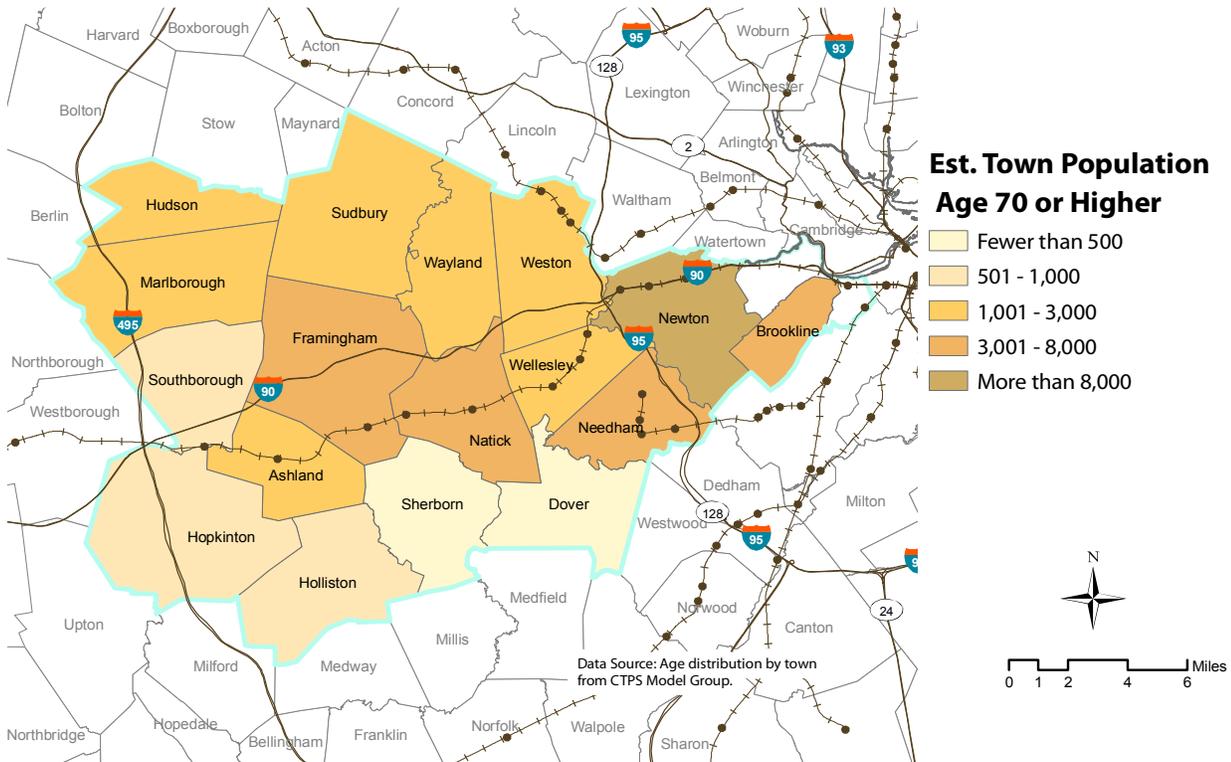
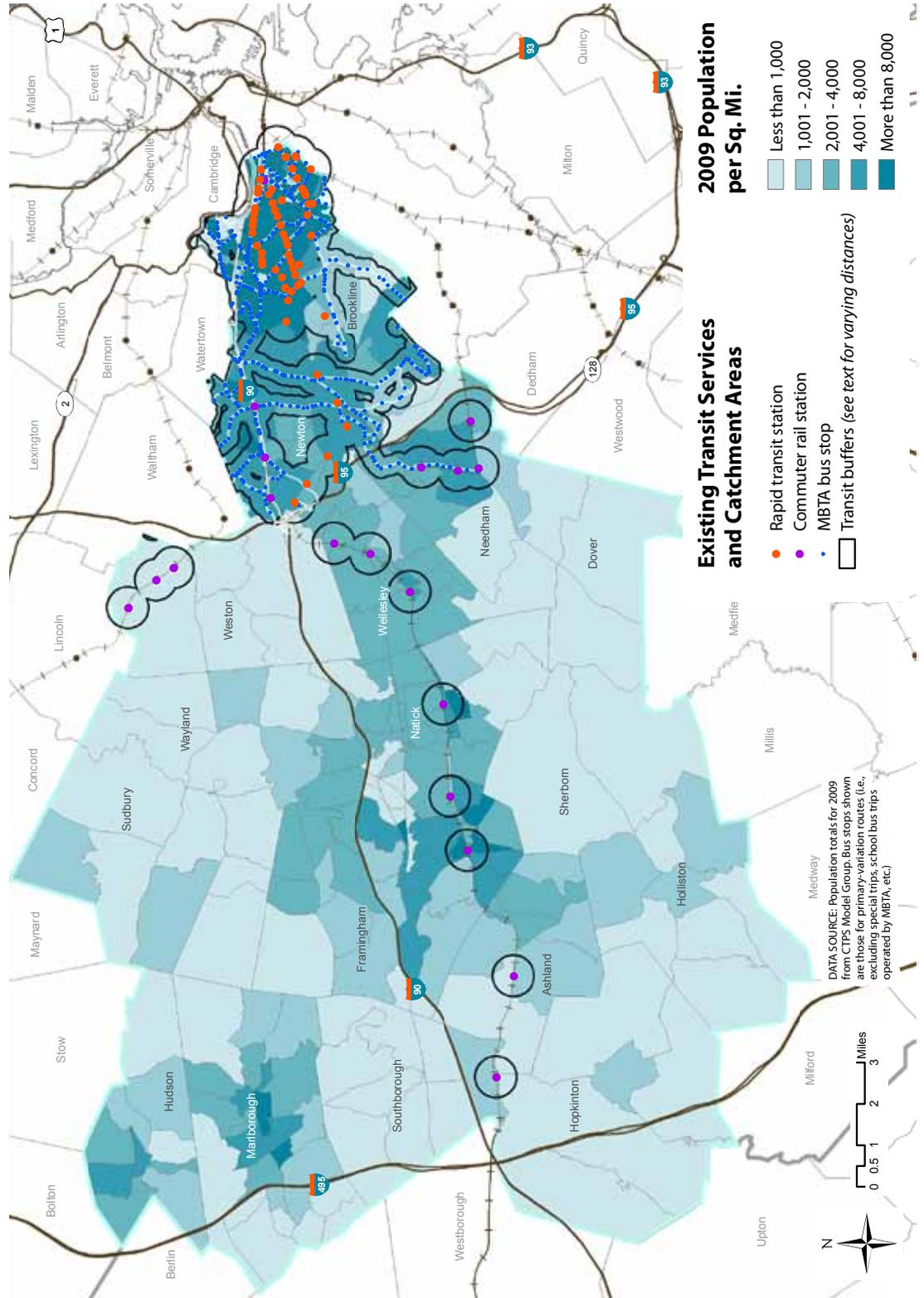


FIGURE 5-5

TRANSIT SERVICES CATCHMENT AREAS - WEST CORRIDOR



2009 Population per Sq. Mi.

Existing Transit Services and Catchment Areas

anticipated development. The largest residential developments recently completed in the corridor include Charles River Landing in Needham, a 350-unit 40B development; Nouvelle Condominiums and Cloverleaf Apartments in Natick (398 units combined); and the Avalon Bay and Arbor Point developments in Newton (384 units total). Hudson also experienced three developments of 140 units or more, totaling 448 units. The largest developments currently under construction include Village of the Americas in Ashland (528 units plus 21,000 square feet of retail space) and South Natick Hills (a 268 unit 40B). The largest developments currently planned in the corridor are redevelopment of the Weston Nurseries property into nearly 1,000 housing units and 450,000 square feet of office and retail space; the 500-unit Jefferson at Ashland development near the Ashland commuter rail station; and 407 units in a high rise development in Natick. The largest commercial developments planned in the corridor include the Hopping Brook Business Park, the development of a new EMC campus in Southborough and Westborough; the previously described Weston Nurseries development; and Framingham Tech Park.

Corridor-wide, auto ownership is higher than the regional average, at 1.8 autos per household; the average household drives 54.8 miles per day, well above the regional average of 46.7 miles per day. These rates vary widely across the corridor. In Brookline, the average household owns only one car and drives fewer than 25 miles per day; Newton's driving patterns are similar to the regional average. Meanwhile, households in Southborough, Hopkinton, Sudbury, Holliston, and Dover own more than 2.2 cars on average and drive more than 75 miles per day.

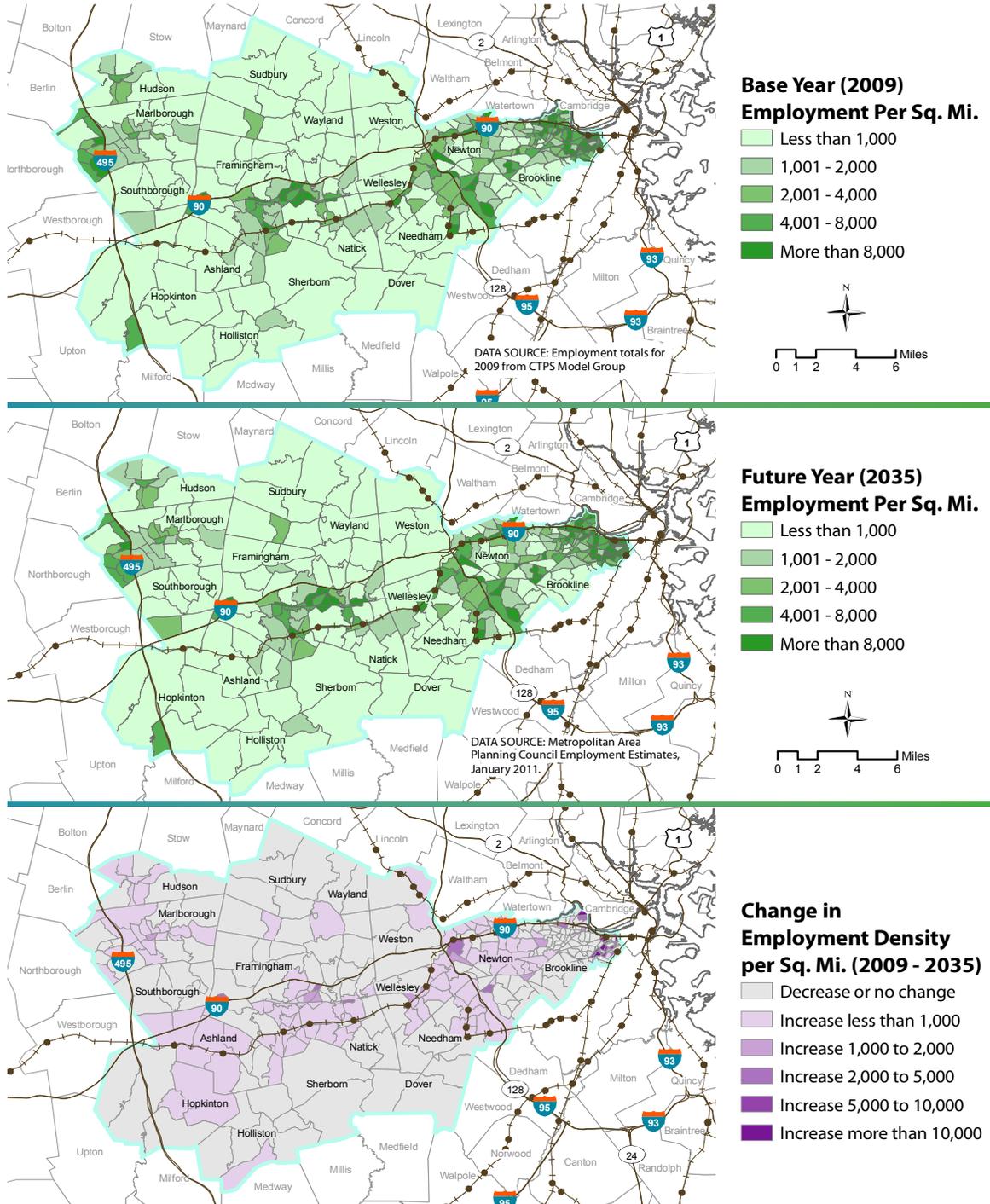
Employment

According to the Executive Office of Labor and Workforce Development, the number of jobs in the West Corridor in 2009 was 247,600. 49% of this employment is in Newton, Framingham, or Marlborough. Natick, Needham, and Wellesley are also major employment centers, with more than 17,000 jobs each. Marlborough residents also have the longest commute distances in the corridor; the average employee travels more than 25 miles round trip to his or her work location in Marlborough, and only 4.8% of commute miles are accomplished by transit, walking, or biking. As a result, Marlborough generates more than 217,000 auto commuting miles daily. Conversely, the average round trip commute distance for employees in Newton is less than 11 miles, and more than 15% of those miles are traveled by transit, walking, or biking. As a result, Newton comprises 20% of corridor employment but generates only 8% of the corridor's auto commute miles.

MAPC's MetroFuture forecasts show employment increasing by 3%, to 265,400 by 2035, with some municipalities experiencing modest growth in absolute terms. The largest gains are expected in Framingham, Marlborough, Southborough, and Newton. Smaller employment gains (10% or less of the corridor total) are projected for Hudson, Natick, Needham, and Wellesley.

FIGURE 5-6

**EMPLOYMENT DENSITY BY TRANSPORTATION ANALYSIS ZONE
WEST CORRIDOR**



MetroFuture Plan

MetroFuture is a long-range plan for land use, housing, economic development, and environmental preservation in the Boston region comprising both a vision for the region's future and a set of strategies to achieve that future. The MetroFuture land use plan and associated socioeconomic projections are used in the MPO's travel demand model. MetroFuture seeks to create a more sustainable future for the region by focusing growth in areas where development already exists in order to make better use of existing infrastructure and reduce the need for new highways, interchanges, and other infrastructure.

MetroFuture classified municipalities into four distinct community types based on existing conditions and potential for sustainable development. The West Corridor includes two Inner Core communities (Brookline and Newton) and two Regional Urban Centers (Framingham and Marlborough). The remaining towns are Maturing Suburbs and Developing Suburbs.

The MetroFuture land use vision for the West Corridor is built around continued redevelopment and reuse of commercial and industrial land proximate to Green Line and commuter rail stations and in traditional downtowns and town centers in Framingham, Marlborough, Hudson, Natick, Needham, and Newton. In these locations, new households will have the greatest access to transit and the highest proximity to common household destinations.

Economic development along the light rail and commuter rail stations will also create more options for commuters, especially if transit service is structured to serve reverse commutes from the Inner Core to suburban job locations near transit. In locations more distant from transit, MetroFuture recommends land use, design, and transportation demand strategies that facilitate transit and bicycle or pedestrian access. For example, MAPC will soon be working with the Town of Framingham to explore options for new infill and redevelopment of the Framingham Tech Park that will support the creation of new transit and other infrastructure to promote the use of alternative modes for both existing and new employees.

Municipal Planning

Most municipalities in the corridor have adopted or opted in to contemporary planning initiatives and other planning activities that promote economic development, smart growth, healthy transportation, and greenhouse gas (GHG) emission reductions. Participating municipalities along with their programs and municipality designations, are shown in Table 5-3. A description of these programs is provided in Appendix B.

The MPO does not have direct control over land use decisions; land use is controlled by local municipalities through zoning. However, the MPO can use the information presented here in its decision making when choosing projects to fund in the LRTP and Transportation Improvement Program (TIP). Projects can be ranked based on how well the community is implementing the smart growth and healthy transportation initiatives in addition to whether a project reduces GHG emissions.



TABLE 5-3

MUNICIPAL PLANNING: COMMUNITY CHECKLIST

MUNICIPALITY	ECONOMIC DEVELOPMENT			SMART GROWTH								LAND USE			PUBLIC HEALTH			CLIMATE CHANGE	
	PWED	Approved 43D Site	TMA	TOD & Housing Support	Approved 40R District	Regional Hub	Suburban Center	Urban Center	Maturing Suburb	Growth Districts Initiative	District Local Tech. Asst.	TOD District	Mixed-Use Zoning District	Comm. Preservation Act	Mass In Motion	Safe Routes to School	WCW	ICLEI Member	Green Community
Ashland			•		•	•			•		•		•	•					
Brookline															•	•		•	
Dover																			
Framingham	•		•	•		•		•			•	•	•		•	•			
Holliston	•		•								•		•	•					
Hopkinton	•		•				•				•		•	•			•		•
Hudson	•		•		•		•				•		•	•		•	•		
Marlborough	•		•		•	•		•			•				•				•
Natick		•	•			•			•		•	•	•		•			•	•
Needham			•				•		•		•		•		•	•			
Newton			•								•		•		•				•
Sherborn			•			•					•								
Southborough			•			•			•		•		•		•				
Sudbury			•						•				•	•					•
Wayland			•						•		•		•		•	•			•
Wellesley			•						•		•		•				•	•	
Weston			•						•		•		•						

TRAVEL CHARACTERISTICS

Travel into Boston Proper from the West Corridor (Highway and Transit)

The most recent count information for highway and transit travel into Boston Proper from the West Corridor is shown in Table 5-4. Also included is the same information from the travel demand model showing projected future 2030 No-Build conditions. Highway and transit trips were assigned to the corridor from which they enter Boston Proper, rather than assigning them to the corridor in which they originate. Boston Proper is the area with the following boundaries:

- Charles River on the north
- Massachusetts Avenue to Interstate 93 on the west and south
- Interstate 93 to South Station on the east

TABLE 5-4

AVERAGE DAILY HIGHWAY AND TRANSIT PERSON-TRIPS INTO BOSTON PROPER FROM THE WEST CORRIDOR: 2008 AND 2030 NO-BUILD

	2008 PERSON-TRIPS	2030 NO-BUILD PERSON-TRIPS
Highway	124,890	119,950
Transit	68,740	77,550
Total	193,630	197,500
Highway percentage	65%	61%
Transit percentage	35%	39%
Corridor's share of total person-trips into Boston	20%	19%

Table 5-5 gives the modal breakdown of the transit trips.

TABLE 5-5

AVERAGE DAILY TRANSIT PERSON-TRIPS BY MODE INTO BOSTON PROPER FROM THE WEST CORRIDOR: 2008 AND 2030 NO-BUILD

	2008 PERSON-TRIPS	2030 NO-BUILD PERSON-TRIPS
Bus	3,850	4,900
Rapid transit	55,400	60,150
Commuter rail	9,430	12,500
Contracted bus service	60	n/a
Ferry	0	0
TOTAL	68,740	77,550
Corridor's share of total transit trips into Boston	19%	20%

Inbound congestion levels on each of the three major modes of transit entering Boston Proper from the West Corridor were calculated via two methods: by comparing the ridership loads to the seating capacity and by comparing them to the planning capacity (planning capacity is the seating capacity plus standing capacity). The 2008 congestion levels for each transit mode are shown in Table 5-6.

TABLE 5-6

AVERAGE DAILY CONGESTION LEVELS ON TRANSIT MODES WITH SERVICE INTO BOSTON PROPER FROM THE WEST CORRIDOR (2008)

MODE	BY SEATING CAPACITY	BY PLANNING CAPACITY
Bus	53%	38%
Rapid transit	55%	25%
Commuter rail	77%	65%

More detailed information on both highway and transit congestion is included in the Identified Transportation Issues section under Mobility.

West Corridor Travel Patterns

Figure 5-7 presents data, for both the base year 2008 and the projected 2030 No-Build scenario, on the person-trips (highway and transit combined for all types of travel: work-based, school-based, shopping, etc.) that originate in and are destined to the inner West Corridor – the corridor communities that are not part of the Central Area. The 2030 No-Build assumes the realization of the projected MetroFuture population and employment with the existing transportation network. This information was developed using the travel demand model.

As shown, 66% of person-trips in the 2008 base year and 66% of person-trips in the 2030 No-Build scenario remain in the inner West Corridor (municipalities within the Boston Region MPO that are not part of the Central Area). The other top origins and destinations for person-trips in the West Corridor are the Northwest and Southwest corridors, and the Central Area.



The Central Area is the region's most prominent population and employment area, and it includes the West Corridor municipalities of Brookline and the Boston neighborhoods of Allston, Brighton, and Fenway. In comparing 2008 base-year and 2030 No-Build travel, the latter includes slightly more travel from the Northwest Corridor. The share of person-trips destined for the Central Area is expected to slightly decline. Travel within the West Corridor and between it and the previously listed corridors accounts for 92% of all person-trips associated with the West Corridor. The remaining 8% of person-trips travel to the remaining corridors.

The information above discusses person trips for all purposes (work-based, school-based, shopping, etc.). When looking at the 2000 census Journey-to-Work data for the West Corridor, only 49% of the work-based trips (compared to 66% of all trips) remain within the West Corridor, while about 24% of the work-based trips (compared to 9% of all trips) are destined to the Central Area.

Truck Travel

Daily truck trip-ends per square mile are shown in Figure 5-8 along with the locations of freight intermodal facilities. This figure shows that the highest concentrations of 2008 daily truck activity occur around Interstate 90 and Route 9 in Brookline, Beacon Park Yard in Allston, the Fenway section of Boston near Boston Proper, between Route 9 and Interstate 90 in Framingham and Natick, along Interstate 95 in Needham and Wellesley, and along Interstate 495 in Marlborough and Hopkinton.

FIGURE 5-7

TRAVEL ASSOCIATED WITH THE WEST CORRIDOR
(2008 AND 2030 PERSON-TRIPS)

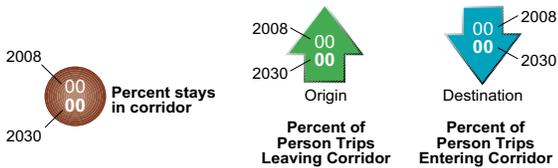
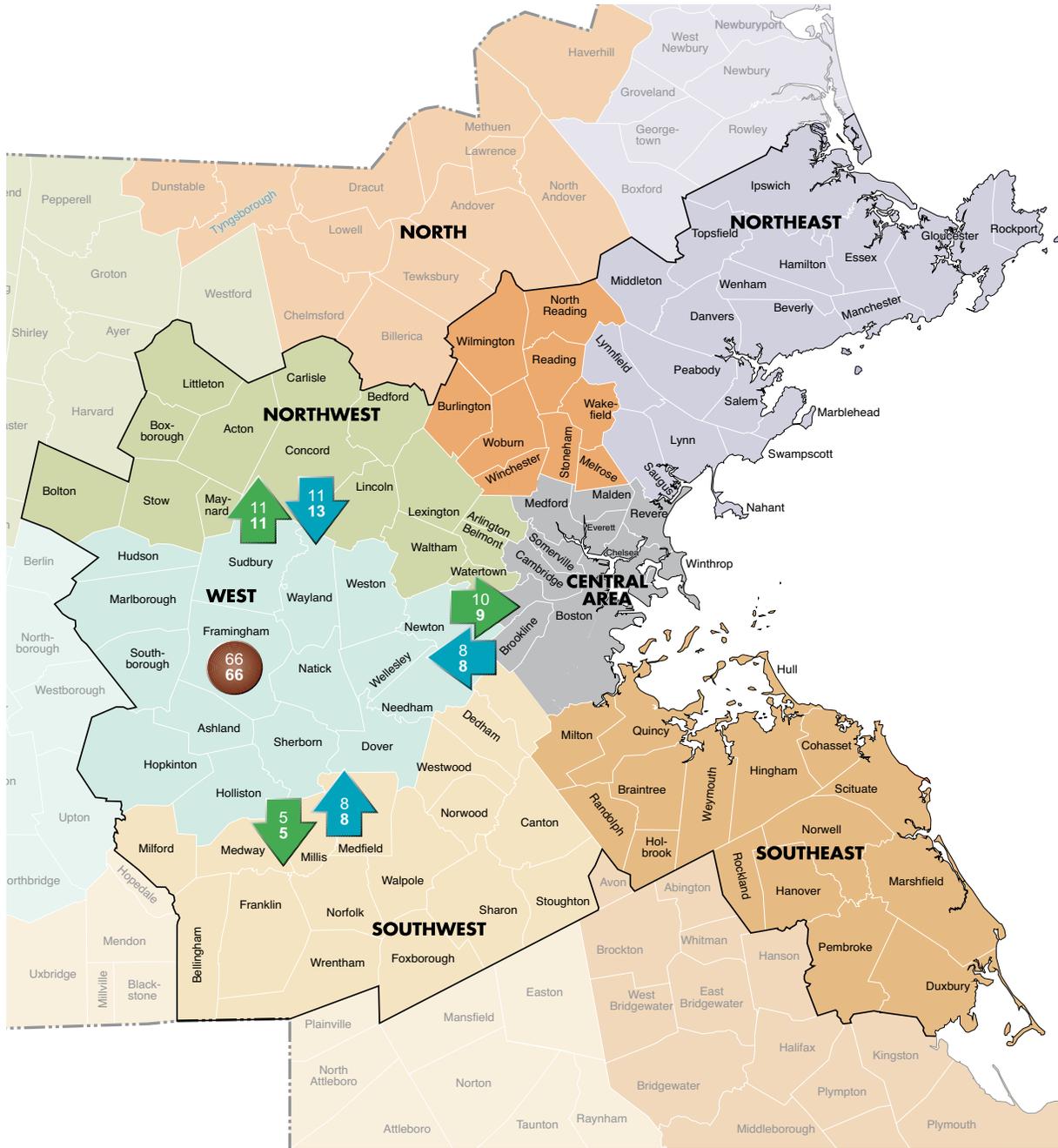
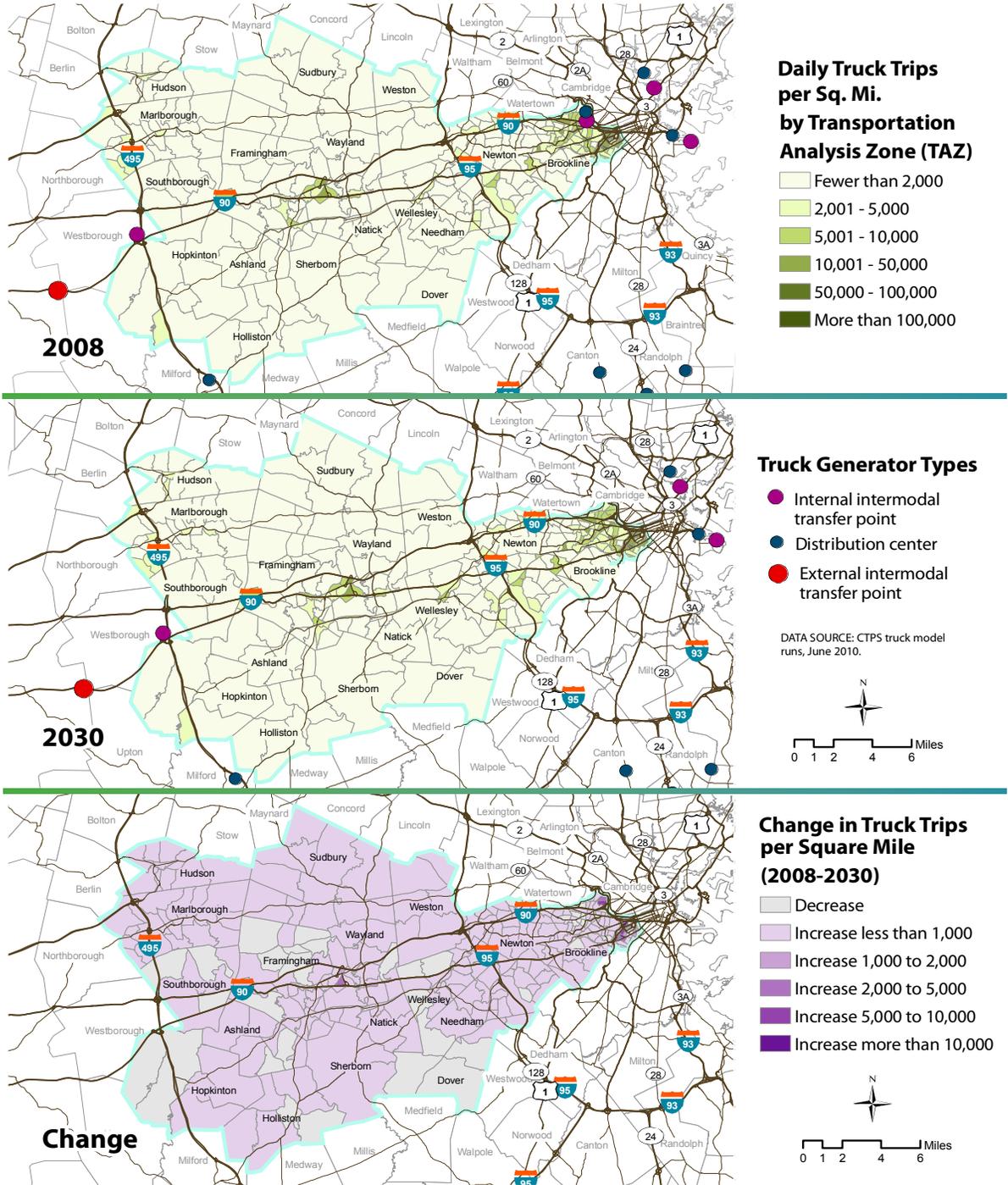


FIGURE 5-8

**DAILY TRUCK TRIPS BY TRANSPORTATION ANALYSIS ZONE
WEST CORRIDOR**



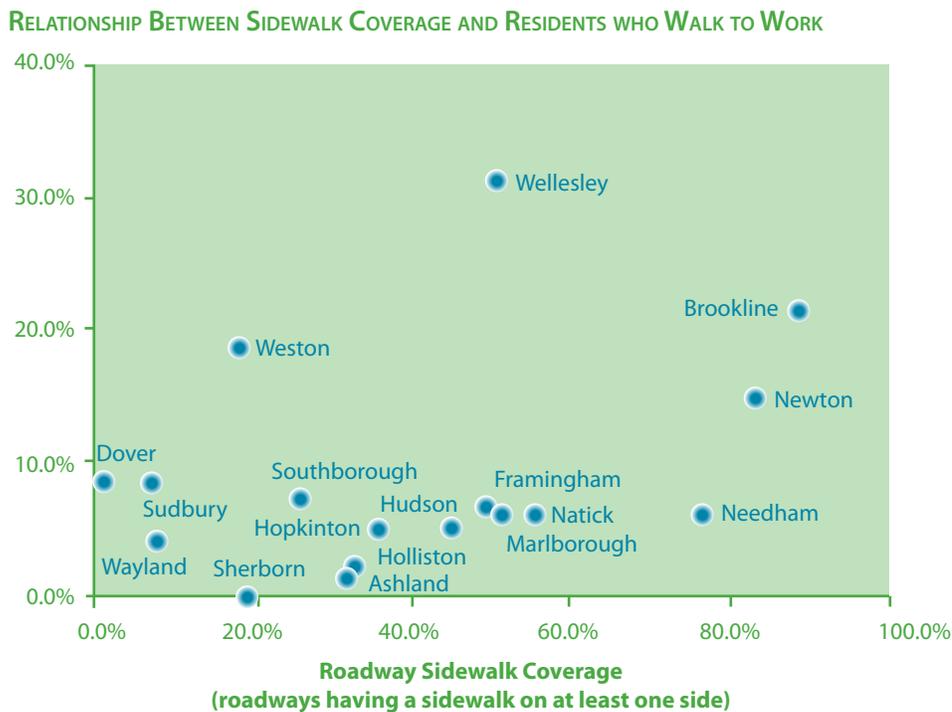
Between 2008 and 2030 (No-Build scenario), the truck model predicts that the largest increases in truck travel will occur in areas along Interstate 90 in the Allston and Fenway neighborhoods of Boston, and in areas along Route 9 and Interstate 90 near the border of Natick and Framingham.

Bicycle and Pedestrian Travel

There are limited bicycle facilities and bicycle travel in the West Corridor. Less than 2% of the non-interstate centerline miles provide bicycle accommodations. Similarly, less than 1% of West Corridor residents bicycle to work (data derived from 2000 census Journey-to-Work data).

Walking conditions vary from poor to very good in the West Corridor. Table 5-7 shows the relationship between roadway sidewalk coverage (roadways having a sidewalk on at least one side) and percentage of residents that walk to work by community. (Walk-to-work data are derived from 2000 census Journey-to-Work data.³) This table indicates that sidewalk coverage ranges from less than 2% in Dover to 89% in Brookline, and in walk share ranges from less than one percent in Sherborn to over 30% in Wellesley.

TABLE 5-7



³ It should be noted that these percentages are estimates based on a U.S. Census Bureau questionnaire. Only workers over 16 years of age are included. All students, including those over 16, are excluded. The data were collected in early spring, when, according to metropolitan Boston counts, bicycle volumes are about one quarter of the peak-season volumes. It is not known what the seasonal variations are for pedestrians, but pedestrian volumes are assumed to be less variable than bicycle volumes. Another factor to consider is that the census questionnaire asks for the mode used for the longest part of the trip to work. A trip comprising a two-mile bicycle trip to a rail station, a five-mile train trip, and a half-mile walk to the workplace, for example, would be classified as a rail trip.

Bicyclists and pedestrians have been counted at several on-road and off-road facilities in the West Corridor. Table 5-8 contains the top counted locations by average AM weekday, PM weekday, and daily weekend peak user volumes. Users are classified as bicyclists or pedestrians (people walking, jogging, skating, using wheelchairs, and pushing strollers).

TABLE 5-8

AVERAGE PEAK-HOUR USER VOLUMES

FACILITY NAME	AM WEEKDAY PEAK-HOUR VOLUMES		
	BICYCLISTS	PEDESTRIANS	TOTAL
Longwood Avenue (Brookline)	93	486	579
Emerald Necklace Path (Brookline)	34	48	82
Commonwealth Avenue (Newton)	14	53	67
Washington St. (Wellesley)	6	37	43
Washington St. (Hudson)	3	21	24
FACILITY NAME	PM WEEKDAY PEAK-HOUR VOLUMES		
	BICYCLISTS	PEDESTRIANS	TOTAL
Assabet River Rail Trail (Hudson)	31	50	81
Concord St. (Framingham)	18	12	30
FACILITY NAME	DAILY WEEKEND PEAK-HOUR VOLUMES		
	BICYCLISTS	PEDESTRIANS	TOTAL
Assabet River Rail Trail (Hudson)	38	68	106

IDENTIFIED TRANSPORTATION ISSUES

System Preservation and Modernization Issues

Highway

Roadways

The Boston Region MPO area is the most densely populated MPO area in the state. The condition of its roadways is under constant pressure from high traffic volumes and harsh weather conditions. Because of this and the advanced age of much of the infrastructure, the roadways require significant preservation activities. Pavement needs were not calculated at the corridor level but have been calculated for the MPO region as a whole. That information is provided in Chapter 10.

Bridges

Condition: In Massachusetts, the condition of bridges is categorized through a nationally adopted rating system based on a number of standards, including structural adequacy, safety, serviceability, traffic, and public use. The system assigns one of three classification to a bridge, based on its condition: 1) meeting standards, 2) functionally obsolete, and 3) structurally deficient. Functionally obsolete means that the bridge fails to meet current traffic demands or highway standards on bridge

width, traffic volume, or condition of approach roadways. Inclusion in this category does not necessarily mean there is an imminent safety concern. Structurally deficient means that deterioration has reduced the load-carrying capacity of the bridge and is an indication that reconstruction may be necessary. Of the 472 bridges in the West Corridor, 142 (30%) are classified as functionally obsolete, and 50 (11%) are classified as structurally deficient.

Vertical Clearance: The desired vertical clearance for trucks on highways as outlined in the 2006 Massachusetts Highway Department Project Development and Design Guide is 16 feet and 6 inches. This allows for the larger truckloads that are becoming more prevalent. There are 196 bridges in the corridor that should meet this vertical clearance for trucks. Of these bridges, 172 (88%) do not meet this standard.

Highway Bridge Weight Restrictions: Closed bridges and weight-restricted bridges cost truckers time and money due to increased fuel consumption, longer delivery times, and other inefficiencies. There are 35 (7%) weight-restricted bridges in the West Corridor.

Transit: Universe of Transit Preservation and Modernization Needs Identified for the West Corridor in the MBTA's Program for Mass Transportation

The MBTA's Program for Mass Transportation (PMT) approved in December 2009 provides information on current and proposed transit needs. Some of the major transit needs or issues regarding system preservation and modernization in the West Corridor are as follows:

State-of-Good-Repair Projects

A number of system preservation projects must be undertaken in the short- to mid-term to bring the system into a state of good repair and to ensure the safety of passengers and reliability of service.

On the commuter rail system, one bridge on the Needham Line is rated as structurally deficient. Lighting fixtures at three stations on the Framingham/Worcester Line are in need of replacement.

On the Green Line, power substations and power transmission and distribution lines at several locations are in need of upgrading or replacement. On the D Branch, one bridge rated as structurally deficient is in need of repair, and the signal system needs to be replaced. Tie replacement is needed on the B and C Branches. At-grade crossings of streets need to be reconstructed or rehabilitated at 37 locations on the surface Green Line branches.

Infrastructure Enhancements

In order to continue to maintain and improve service quality as demand grows and as technologies and materials improve, the MBTA will need to continually invest in infrastructure enhancements.

ADA Accessibility

Some gaps remain in providing ADA accessibility. The following stations are not accessible:

- Natick, Wellesley Square, Wellesley Hills, Wellesley Farms, Auburndale, West Newton and Newtonville (Framingham/Worcester Line)
- Blandford Street, BU West, St. Paul Street, Packard's Corner, Pleasant Street, Babcock Street, Griggs Street/Long Avenue, Allston Street, Warren Street, Sutherland Road, Chiswick Road, Chestnut Hill Avenue, South Street (Green Line B Branch)
- Hawes Street, Kent Street, St. Paul Street, Summit Avenue, Brandon Hall, Fairbanks Street, Tappan Street, Dean Road, Englewood Avenue (Green Line C Branch)
- Beaconsfield, Chestnut Hill, Newton Highlands, Eliot, Waban (Green Line D Branch)

Freight

Weight-Restricted Tracks

The Boston Line can handle up to 315,000 pound rail cars. All other tracks in the corridor can handle less than 286,000 pounds, which has become the industry standard. This increases costs for all shippers who need more cars to move their freight than they would in areas with 286,000-pound tracks.

Truck Rollover Crashes

A high percentage of the lane-departure crashes in the MPO region are truck rollovers occurring at the Interstate 495/Interstate 290/Route 85 interchange in Marlborough.

Mobility

Highway Bottlenecks: Method for Identifying Them

A highway bottleneck is defined as a location where a constraint impedes the flow of traffic. The constraint at a bottleneck can be caused by, among other things, close spacing of intersections operating near or at capacity, a lane drop, or the confluence of large volumes of traffic at an interchange connecting two major highways. The types of roadway included in this bottleneck analysis are:

1. Express highways, which are multilane, divided highways with fully controlled limited access
2. Class I and II arterials, which are defined as higher-speed arterials (those with some degree of limited access) and partially limited-access highways
3. The remainder of the arterial roadway network, which is classified as Urban Street Class III

Bottlenecks on express highways and arterials can be identified using a number of methods. For identifying those in the West Corridor, three types of data that the Boston Region MPO collects or produces for express highways and arterials have been used:

- Travel speed index during peak periods (existing conditions for express highways and Class I and II arterials)
- Volume-to-capacity ratio during peak periods (existing and future conditions for express highways and all arterials)
- Intersections given priority by the Congestion Management Process (CMP) for improvement (existing conditions for Class III arterials)

Information of each type for the West Corridor is presented in the following three subsections. Based on that information, the worst bottlenecks in the corridor were identified; these are listed in the subsequent section.

Travel Speed Index (from the CMP)

Congestion thresholds have been established for express highways and Class I and II arterials using existing travel speed index data and are used in this identification of bottlenecks. The speed index is the ratio of observed speed to the posted speed limit. The locations on express highways and Class I and II arterials that have the worst speed indexes are shown in Table 5-9 for the AM peak period and Table 5-10 for the PM peak period, and also in Figures 5-9 and 5-10. Note that the tables include only Class I and II arterials; however, Figure 5-10 also shows Class III arterials. Many of the locations shown in Figure 5-10 with a travel speed index below 40% are CMP priority intersections on Class III arterials and are also discussed below in the CMP Priority Intersections section and shown in Figure 5-15. The AM and PM peak periods referred to in the tables and figures are defined as follows. For express highways, the AM peak period is from 6:00 AM to 10:00 AM, and the PM peak period is from 3:00 PM to 7:00 PM. For arterials the AM peak period is from 6:30 AM to 9:30 AM, and the PM peak period is from 3:30 PM to 6:30 PM. The travel speed index information is provided for existing conditions only.

TABLE 5-9

**TRAVEL SPEED INDEX (FROM THE CMP):
WORST LOCATIONS* IN AM PEAK PERIOD**

EXPRESS HIGHWAYS	SPEED INDEX
I-90 at I-95 (Weston)	0.59 to 0.71
I-90 eastbound from I-95 to Center St. (Newton)	0.63 to 0.69
I-90 eastbound at the Allston Tolls (Boston)	0.65
I-95 at Rte. 9 (Wellesley)	0.79
I-95 northbound from Recreation Rd. to I-90 (Weston)	0.85 to 0.89
I-95 northbound from Highland Ave./Needham St. to Rte. 9 next right sign (Needham)	0.90
CLASS I & II ARTERIALS	SPEED INDEX
Rte. 9 eastbound, Tully St. to Hammond St. (Brookline)	0.33
Rte. 9 eastbound from Rte. 85 to Breakneck Hill Rd. (Southborough)	0.38
Rte. 9 eastbound from Chestnut St. to Elliot St. (Newton)	0.45
Storrow Drive from the Memorial Dr. sign to the Soldiers Field Rd. sign (Boston)	0.46
Rte. 9 eastbound from the Apple Hill Mall to Overbrook Dr. (Natick)	0.46
Rte. 9 eastbound from Cypress St. to the Rte. 1 overpass (Brookline)	0.37 to 0.70
Rte. 9 westbound Rte. 1 to Washington St. (Brookline)	0.50 to 0.57

*Where multiple communities are listed for a roadway, they are in descending order of severity.

TABLE 5-10

**TRAVEL SPEED INDEX (FROM THE CMP):
WORST LOCATIONS* IN PM PEAK PERIOD**

EXPRESS HIGHWAYS	SPEED INDEX
I-90 at I-95 (Weston)	0.66 to 0.83
I-90 from Allston Tolls to exit 17 (Boston, Watertown)	0.61 to 0.75
I-95 southbound between Rte. 30 and Highland Ave./Needham St. (Needham, Wellesley, Newton, Weston)	0.67 to 0.89
CLASS I & II ARTERIALS	SPEED INDEX
Rte. 9 eastbound from Tully St. to Hammond St. (Brookline)	0.23
Rte. 9 westbound from the St. James pedestrian signal to Oak St. (Natick, Wellesley)	0.33 to 0.39
Rte. 9 westbound from Rte. 30/Edgell Rd. to Temple St. (Framingham)	0.37
Rte. 9 westbound from Hammond Pond Pkwy to Langley Rd. (Newton)	0.42
Rte. 9 westbound from the Centre St. off-ramp to Elliot St. (Newton)	0.48
Rte. 9 eastbound from Chestnut St. to Elliot St. (Newton)	0.50
Storrow Dr. eastbound from the Memorial Dr. sign to the Soldier's Field Rd. sign (Boston)	0.53
Rte. 9 Washington St. to Rte. 1 (Brookline)	0.27 to 0.67

*Where multiple communities are listed for a roadway, they are in descending order of severity.

FIGURE 5-9

**EXPRESS HIGHWAY TRAVEL SPEED INDEX (EXISTING CONDITIONS) – AM AND PM :
WEST CORRIDOR**

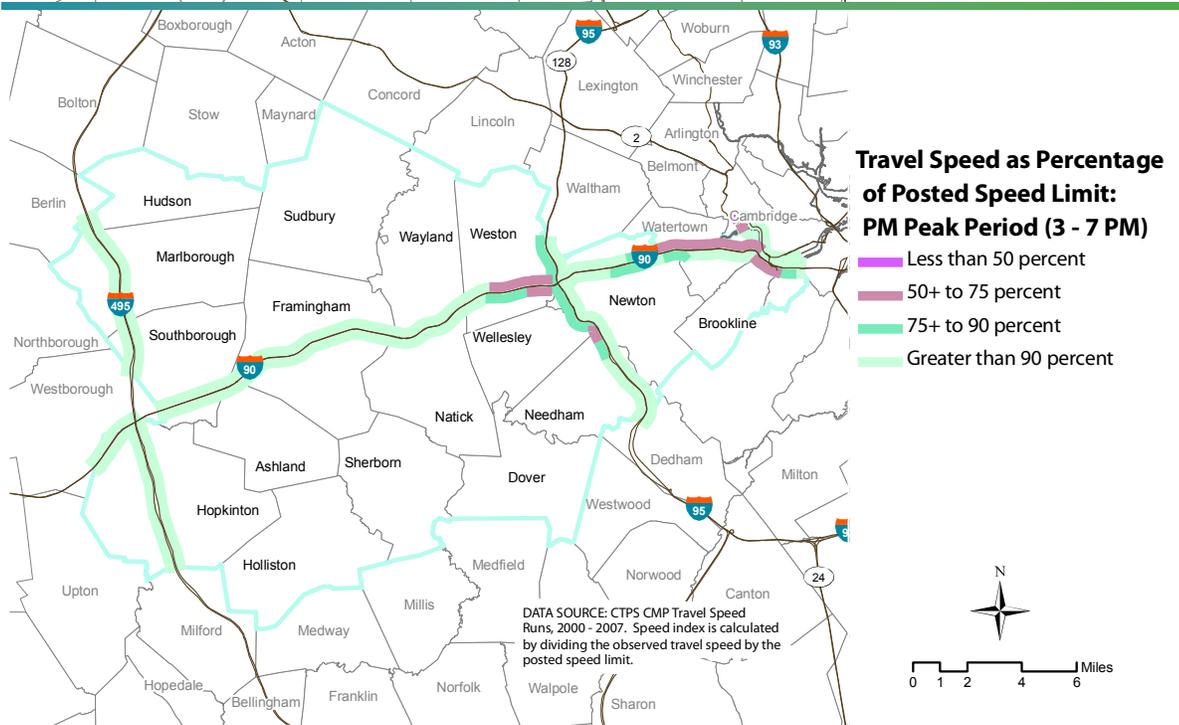
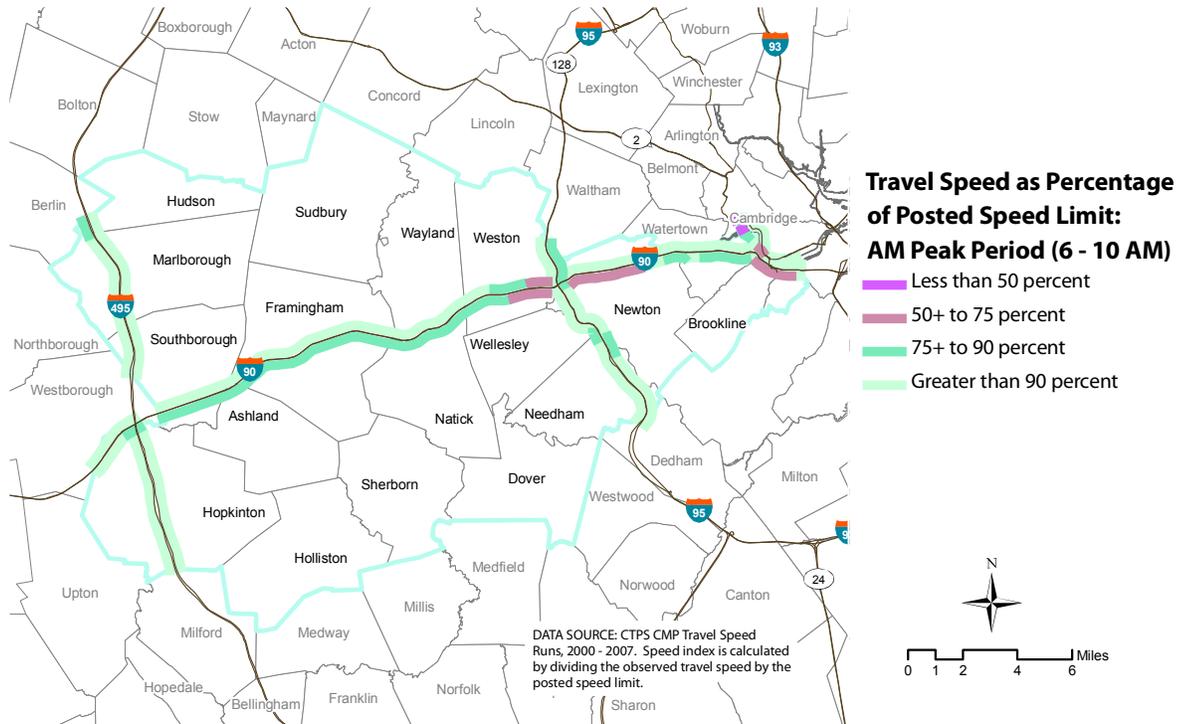
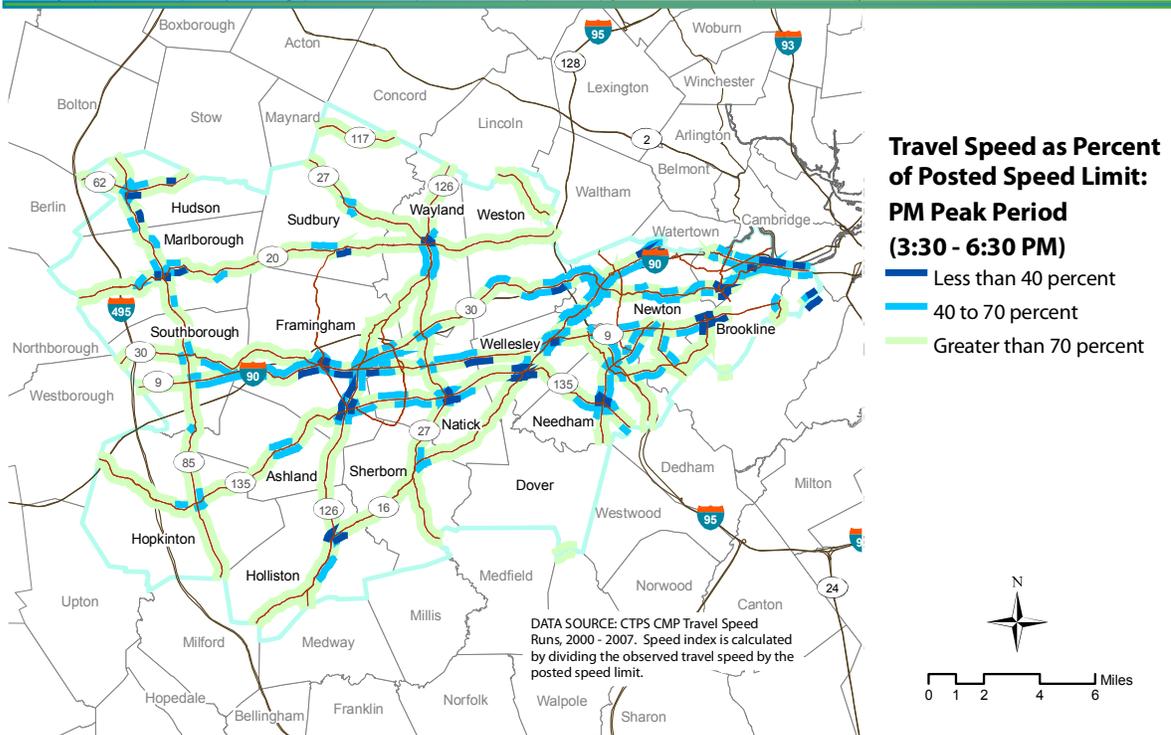
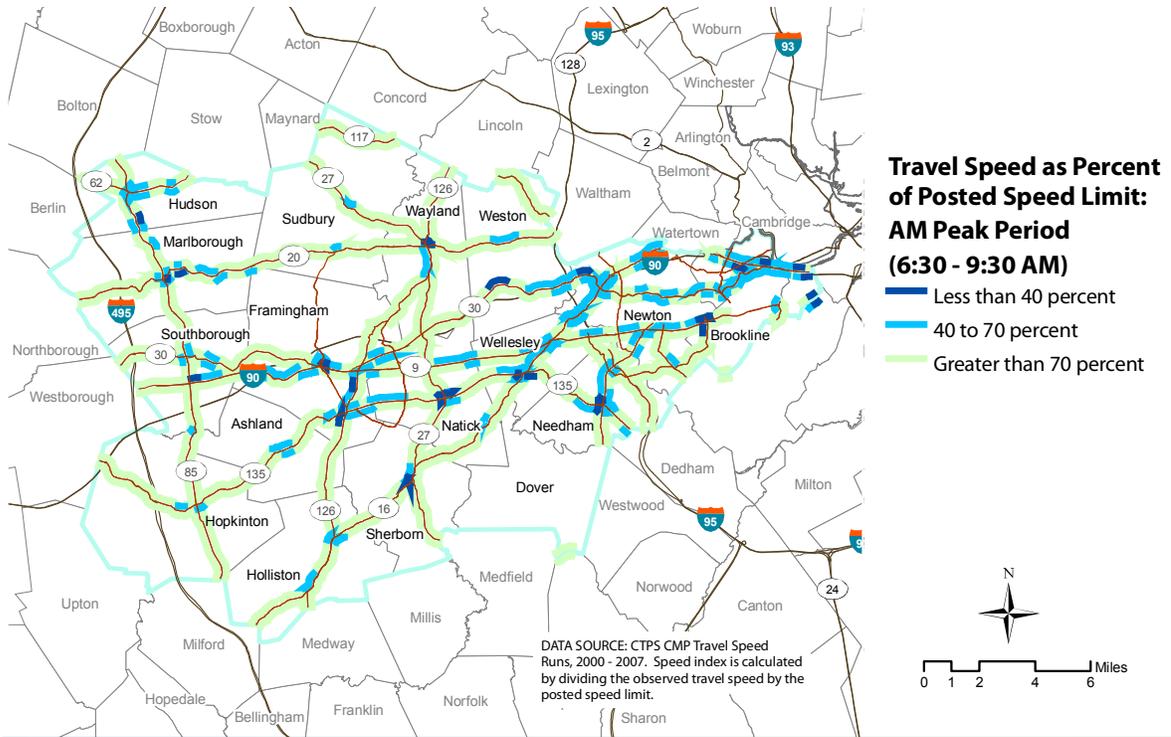


FIGURE 5-10

ARTERIAL TRAVEL SPEED INDEX (EXISTING CONDITIONS) – AM AND PM:
WEST CORRIDOR



Volume-to-Capacity Ratio

The existing volume-to-capacity ratios (V/Cs) of express highways and arterial segments in the West Corridor were calculated using the roadways' existing traffic volumes and capacities. The V/C is an indication of the operational quality of a roadway segment. A roadway is reaching capacity as the V/C begins to approach 1.

Table 5-11 and Figures 5-11 and 5-12 present the segments of roadways in the West Corridor with the highest V/Cs during the AM peak period, listed in descending order of severity. Table 5-12 and Figures 5-11 and 5-12 present the same information for the PM peak period. Order of severity was determined based on all data points and is therefore not always reflected in the ranges shown in the tables. In these tables and figures, for both the express highways and arterials, the AM peak period is from 6:00 AM to 9:00 AM, and the PM peak period is from 3:00 PM to 6:00 PM.

TABLE 5-11
VOLUME-TO-CAPACITY RATIO (V/C):
WORST LOCATIONS IN AM PEAK PERIOD, 2008

EXPRESS HIGHWAYS	V/C
I-95 northbound from the Rte. 135 interchange in Dedham to the Rte. 16 interchange in Newton	0.84 to greater than 1
I-90 eastbound from Rte. 16 to Newton Corner (Newton)	0.86
I-90 eastbound just before the I-95 overpass (Weston)	0.86
I-95 southbound from the Rte. 20 interchange to the Rte. 30 interchange (Waltham and Weston)	0.80 to 0.81
ARTERIALS	V/C
Rte. 16 from the I-90 interchange to the intersection with Summer St. (Newton to Holliston)	0.69 to greater than 1
Rte. 20 as it approaches I-495 (Marlborough)	0.80 to greater than 1
Rte. 126 Concord St., Hollis St., and Pond St. corridor (Framingham to Holliston)	0.70 to 0.98
Rte. 9 (Southborough to Newton)	0.69 to 0.95
Rte. 135/Waverly-West Central St. corridor (Framingham to Natick)	0.69 to greater than 1

FIGURE 5-11

EXPRESS HIGHWAY VOLUME-TO-CAPACITY RATIO – 2008, AM AND PM:
WEST CORRIDOR

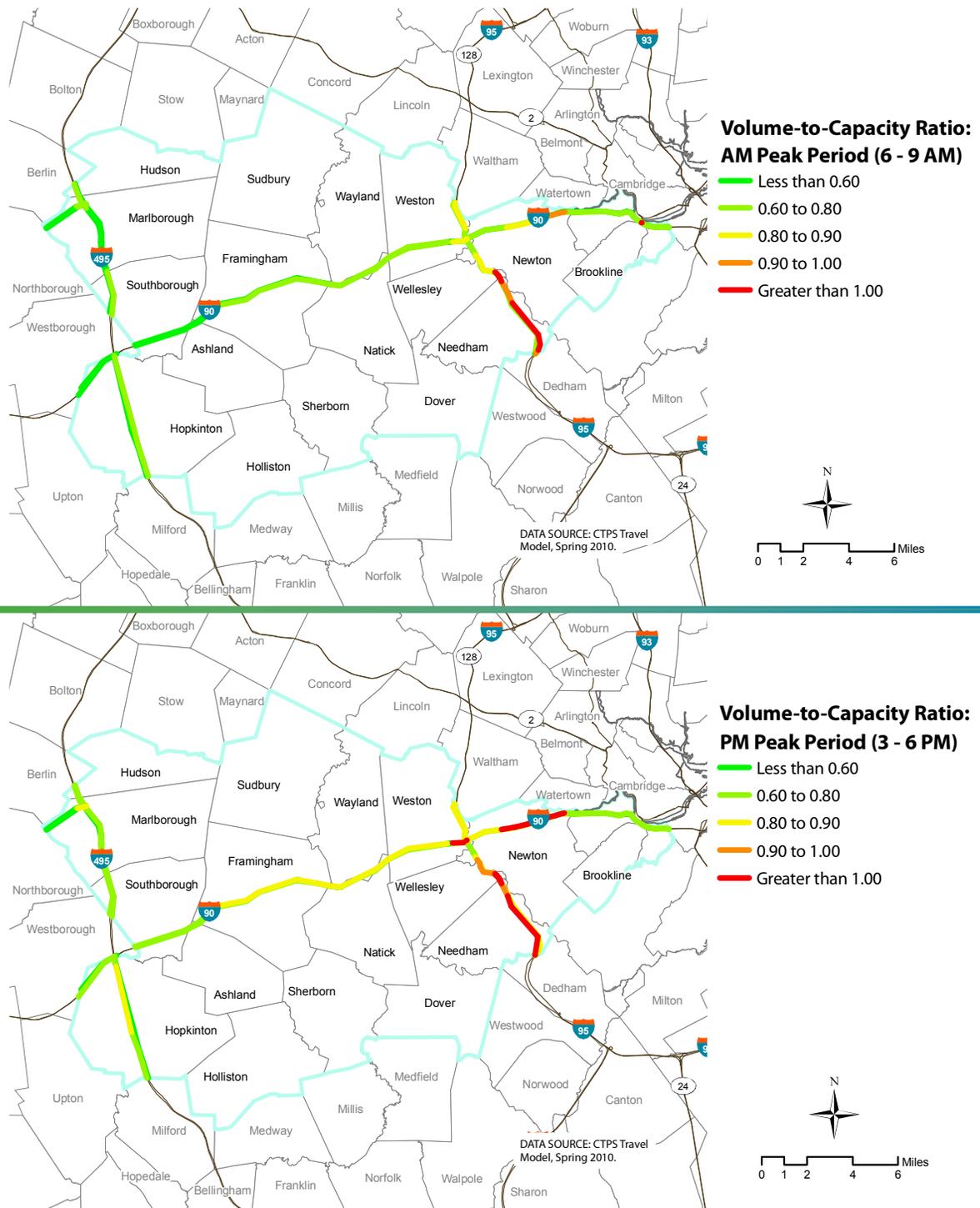


FIGURE 5-12

ARTERIAL VOLUME-TO-CAPACITY RATIO – 2008, AM AND PM:
WEST CORRIDOR

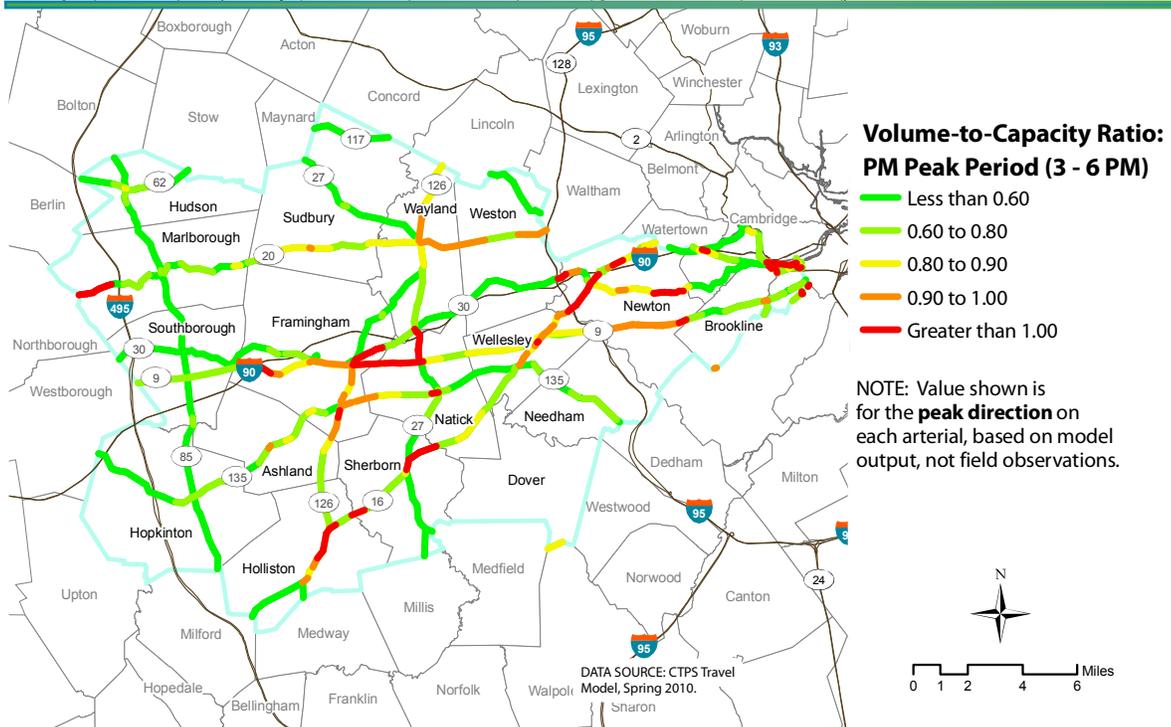
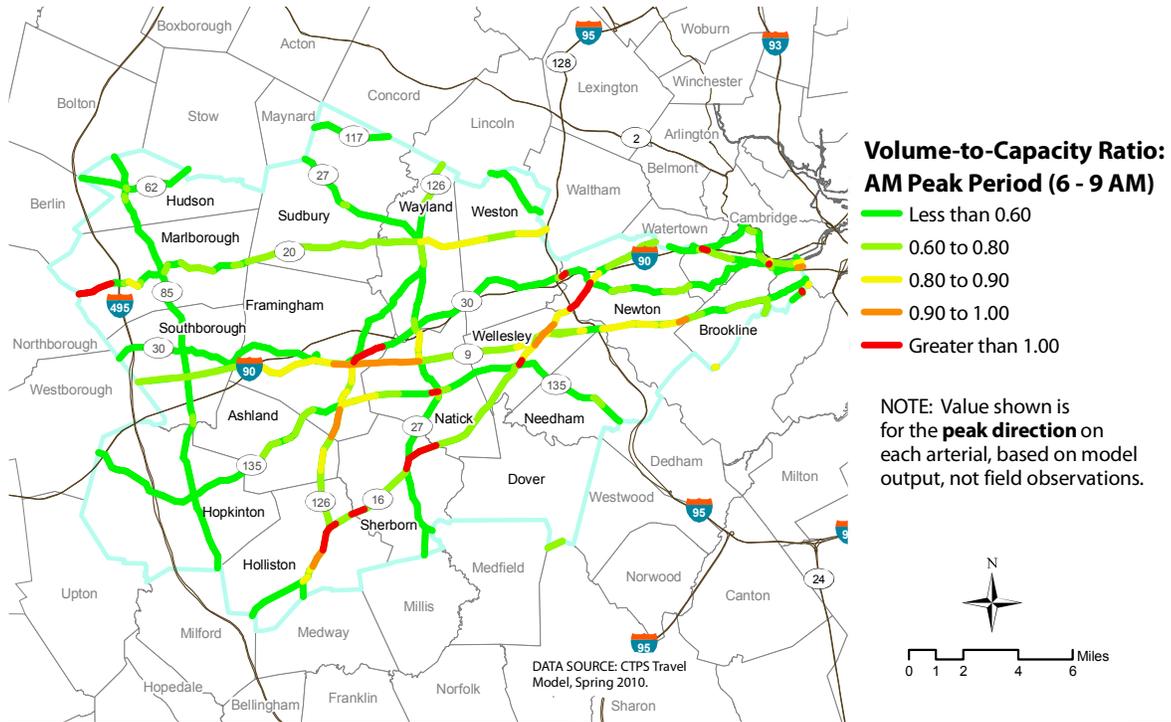


TABLE 5-12

**VOLUME-TO-CAPACITY RATIO (V/C):
WORST LOCATIONS IN PM PEAK PERIOD, 2008**

EXPRESS HIGHWAYS	V/C
I-90 westbound from Newton Corner to the Rte. 30 interchange (Newton to Framingham)	0.89 to greater than 1
I-95 southbound from the Rte. 16 interchange to the Great Plain Avenue interchange (Newton and Needham)	0.91 to greater than 1
I-95 northbound at the Rte. 9 interchange (Wellesley)	Greater than 1
I-95 southbound at the I-90 interchange (Weston)	0.88 to 0.89
ARTERIALS	V/C
Rte. 16 (Newton to Holliston)	0.84 to greater than 1
Rte. 9 (Framingham to Brookline)	0.84 to greater than 1
Rte. 20 (Sudbury to Waltham)	0.82 to greater than 1
Rte. 30 between I-90 and Rte. 9 (Framingham)	0.85 to greater than 1
Rte. 30 (Newton)	0.8 to greater than 1

In addition, the Boston Region MPO’s travel demand model was used to determine V/C for roadways under 2030 No-Build conditions. Table 5-13 and Figures 5-13 and 5-14 present the segments of roadways in the West Corridor with the highest AM peak period V/Cs under the 2030 No-Build, again listing them in descending order of severity. Table 5-14 and Figures 5-13 and 5-14 present the same information for the PM peak period. Order of severity was determined based on all data points and is therefore not always reflected in the ranges shown in the tables. In the V/C analysis, arterials are not broken down by classification.

TABLE 5-13

**VOLUME-TO-CAPACITY RATIO (V/C):
WORST LOCATIONS IN AM PEAK PERIOD, 2030 NO-BUILD**

EXPRESS HIGHWAYS	V/C
I-95 northbound from the Rte. 135 (West St.) interchange to the Rte. 16 (Washington St.) interchange (Dedham, Needham, Wellesley, and Newton)	0.88 to greater than 1
I-90 eastbound from Rte. 16 to Newton Corner (Newton)	0.93 to 0.98
I-495 northbound from the W. Main St. interchange to the I-90 interchange (Hopkinton)	0.88 to 0.95
I-95 southbound from the Rte. 20 interchange to the Rte. 30 interchange (Waltham and Weston)	0.87 to 0.90
ARTERIALS	V/C
Rte. 16 from the I-90 interchange to the intersection with Summer St. (Newton to Holliston)	0.75 to greater than 1
Rte. 16 (Wellesley, Newton)	0.76 to greater than 1
Rte. 126, Concord St., Hollis St., Pond St. corridor (Framingham to Holliston)	0.75 to greater than 1
Rte. 9 (Southborough to Newton)	0.76 to greater than 1
Rte. 20 (Sudbury to Waltham)	0.76 to 0.97

FIGURE 5-13

EXPRESS HIGHWAY VOLUME-TO-CAPACITY RATIO – 2030 No-BUILD, AM AND PM:
WEST CORRIDOR

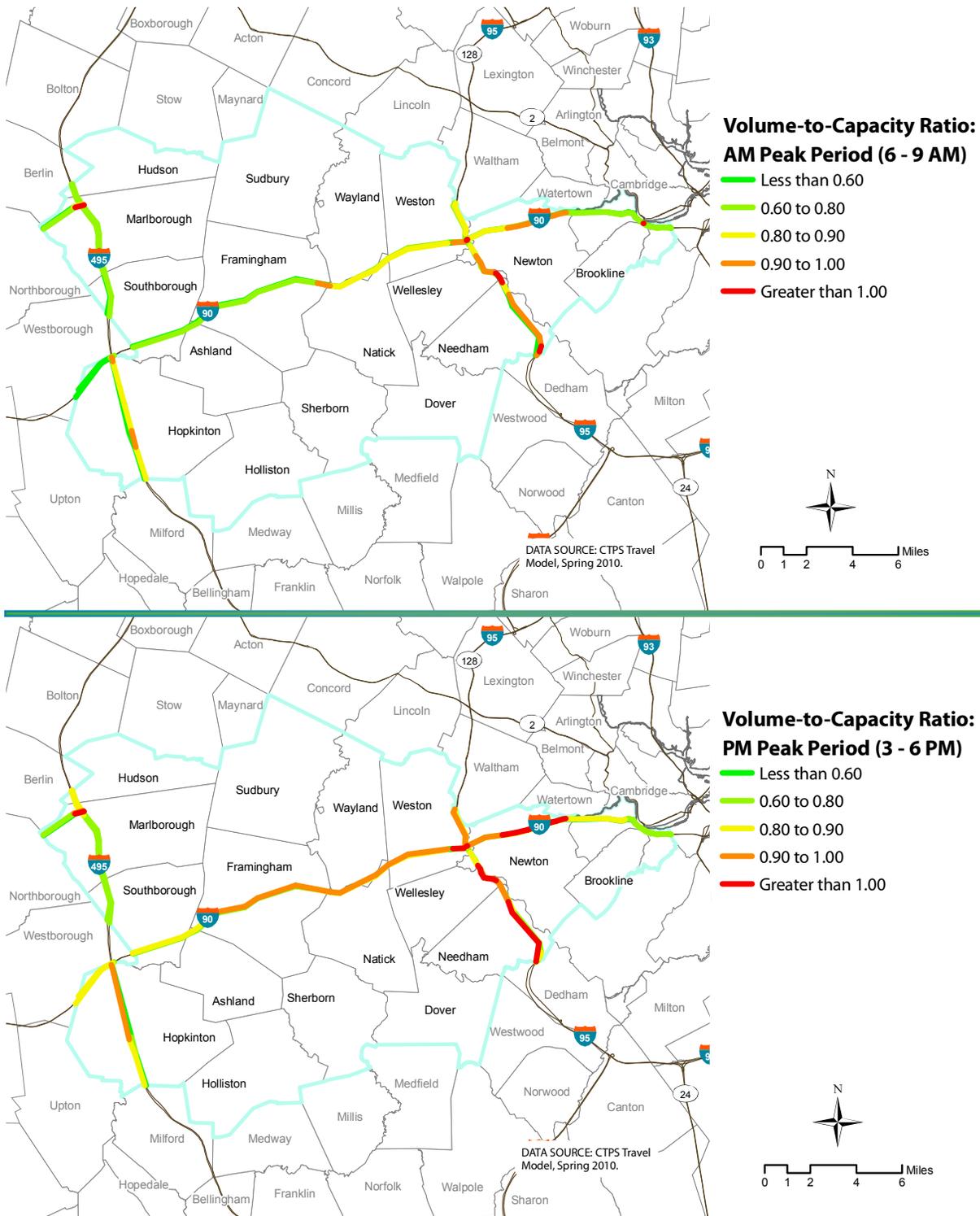


FIGURE 5-14

ARTERIAL VOLUME- TO-CAPACITY RATIO – 2030 No-BUILD, AM AND PM:
WEST CORRIDOR

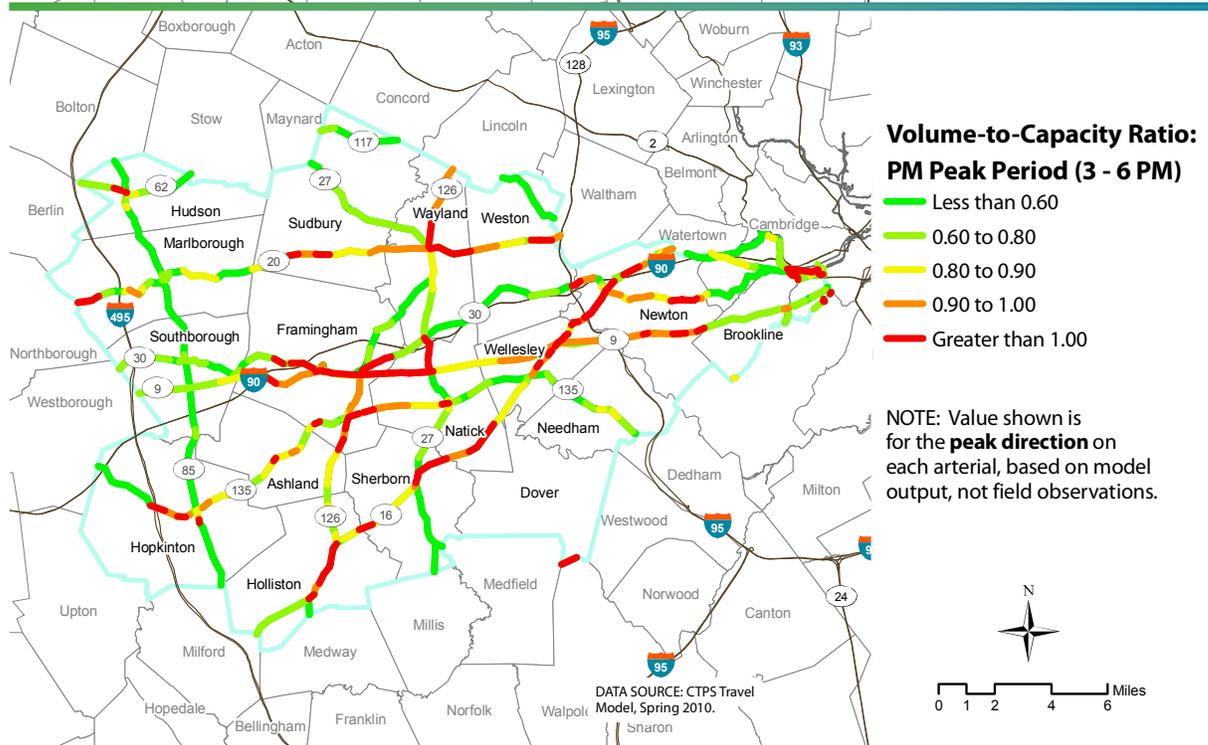
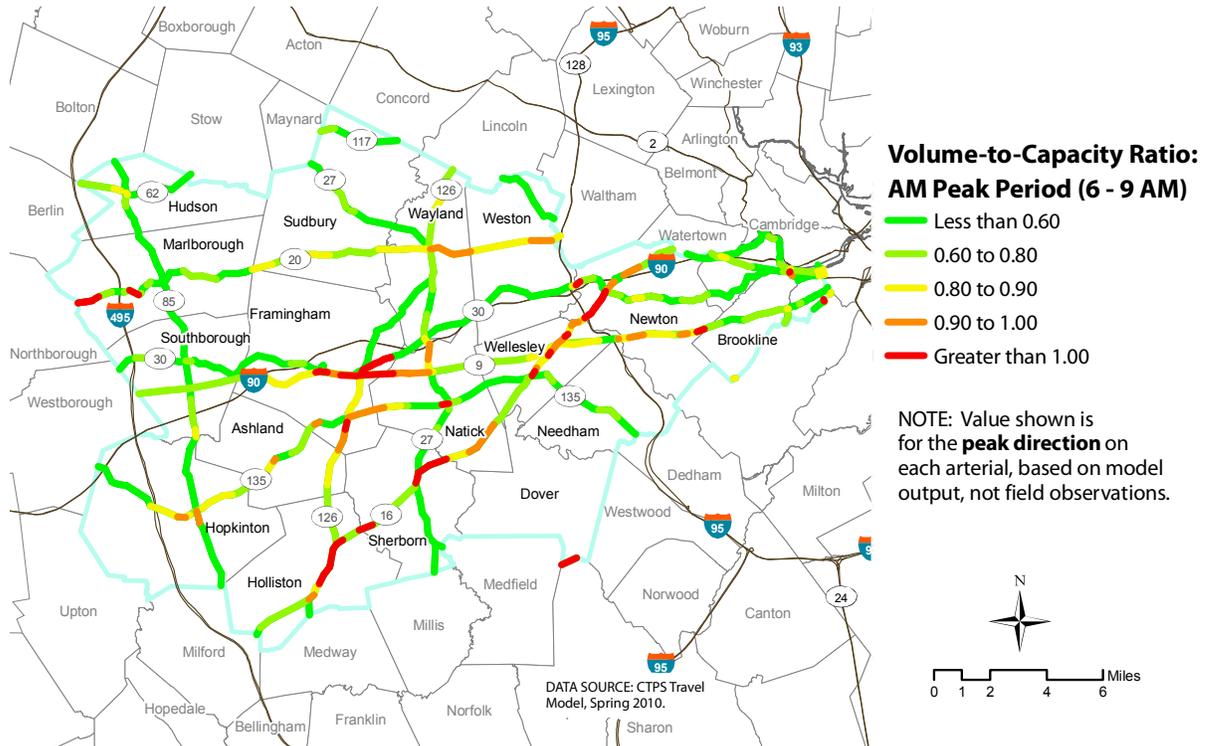


TABLE 5-14

**VOLUME-TO-CAPACITY RATIO (V/C):
WORST LOCATIONS IN PM PEAK PERIOD, 2030 NO-BUILD**

EXPRESS HIGHWAYS	V/C
I-90 westbound from Newton Corner to the Rte. 30 interchange (Newton to Framingham)	0.99 to greater than 1
I-95 northbound at the Rte. 9 interchange (Wellesley)	0.99 to greater than 1
I-95 southbound from the Rte. 16 interchange to the Great Plain Ave. interchange (Newton, Wellesley, and Needham)	Greater than 1
I-495 from the W. Main St. interchange to the I-90 interchange (Hopkinton)	0.8 to 0.95
ARTERIALS	V/C
Rte. 16 (Natick to Holliston)	0.93 to greater than 1
Rte. 9 (Framingham to Brookline)	0.89 to greater than 1
Rte. 30 between I-90 and Rte. 9 (Framingham)	0.88 to greater than 1
Rte. 16 (Wellesley, Newton)	0.89 to greater than 1
Rte. 20 (Sudbury to Weston)	0.90 to greater than 1
Rte. 30 (Newton)	0.8 to greater than 1

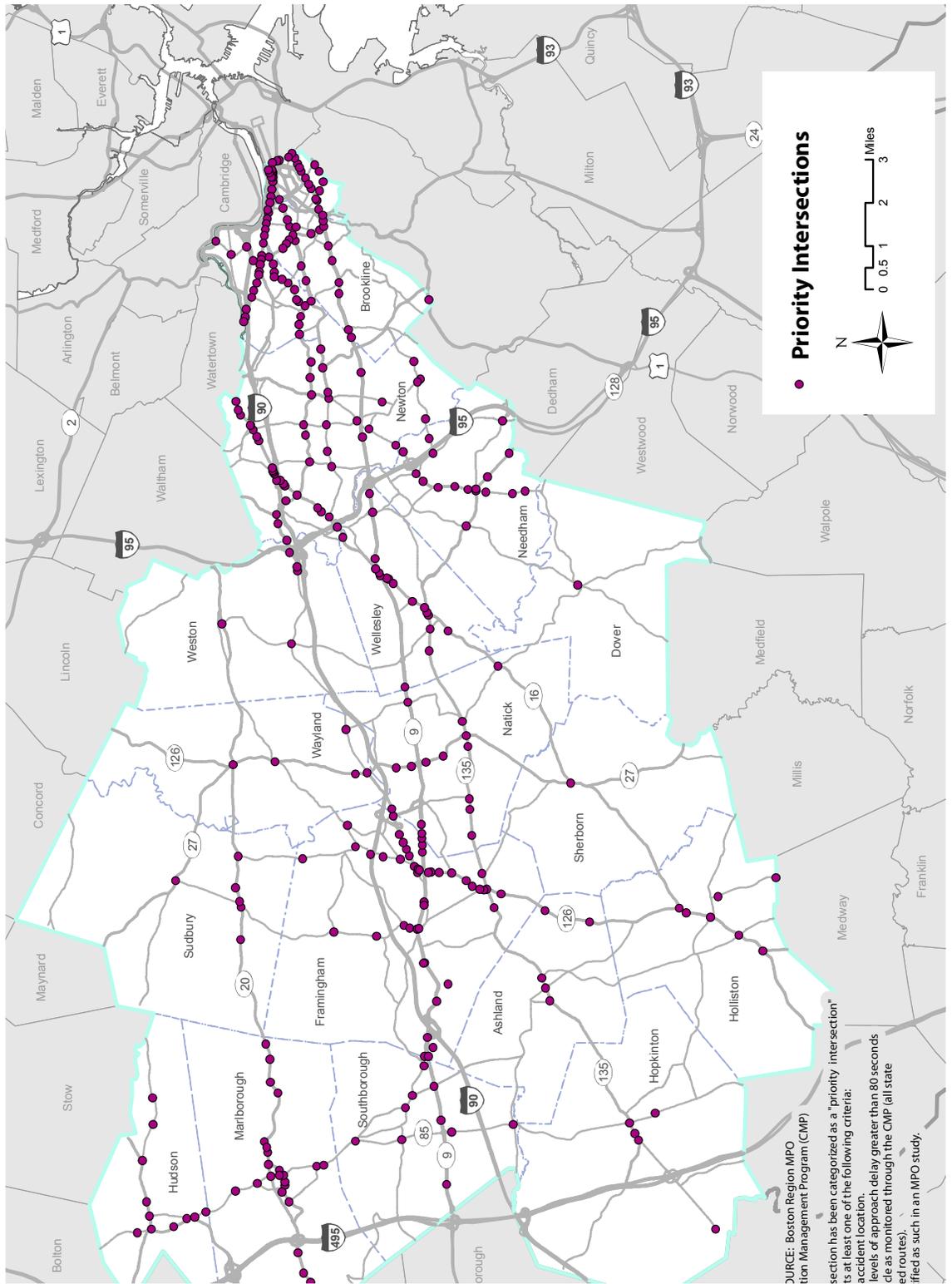
CMP Priority Intersections

The CMP identifies the intersections in the region that, on the basis of certain criteria, should be given priority for receiving improvements. An intersection is categorized as a priority if it meets at least one of the following criteria: it has a high incidence of crashes, the average delay on its major approaches is greater than 80 seconds per vehicle as monitored by the CMP (all state-numbered routes are monitored), or it has been identified in an MPO study as needing improvement.

The West Corridor intersections that have been given priority by the CMP are shown in Figure 5-15. The roadways in the corridor that have clusters of priority intersections are (in roughly geographical order):

- Route 30 (Commonwealth Avenue in Boston and Newton), Framingham
- Storrow Drive/Soldiers Field Road, Boston
- Route 9 between Boston and Southborough
- Harvard Street in Brookline
- Route 16 in Newton, Wellesley, and Holliston
- Beacon Street in Boston, Brookline, and Newton
- Route 135 between Needham and Hopkinton
- Route 126 in Framingham and Holliston
- Route 20 in Sudbury and Marlborough
- Route 62 in Hudson
- Route 85 in Hudson and Marlborough

FIGURE 5-15
CMP PRIORITY INTERSECTIONS, WEST CORRIDOR



SOURCE: Boston Region MPO
Traffic Management Program (CMP)
This section has been categorized as a "priority intersection"
if it meets at least one of the following criteria:
- accident location,
- levels of approach delay greater than 80 seconds
- delay as monitored through the CMP (all state
- identified routes),
- identified as such in an MPO study.

Many of the clusters of priority intersections are on Class III arterials with the worst travel speed indexes (as determined by the CMP).

Worst Highway Bottlenecks in the West Corridor

Table 5-15 shows the locations that have been identified as the worst bottlenecks in the West Corridor based on the three types of information presented above. This table indicates the criteria by which the location was identified as a bottleneck.

TABLE 5-15

WORST BOTTLENECK LOCATIONS

EXPRESS HIGHWAYS	SPEED INDEX	VOLUME TO CAPACITY	PRIORITY INTERSECTIONS
I-90 from Newton Corner to the Rte. 30 interchange (Newton to Framingham)	•	•	
I-95 (Dedham to Weston)	•	•	
I-495 northbound from the W. Main St. interchange to the I-90 interchange (Hopkinton)		•	
ARTERIALS			
Rte. 9 (Boston to Southborough)	•	•	•
Storrow Dr./Soldiers Field Rd. (Boston)	•		•
Rte. 16 (Newton, Wellesley, Hopkinton)		•	•
Beacon St. (Boston, Brookline, and Newton)			•
Harvard St. (Brookline)			•
Rte. 20 (Marlborough to Weston)		•	•
Rte. 30 (Boston, Newton, Framingham)		•	•
Rte. 62 (Hudson)			•
Rte. 85 (Hudson, Marlborough)			•
Rte. 126 (Framingham, Holliston)		•	•
Rte. 135 (Needham to Hopkinton)		•	•

Transit Mobility Needs Identified by the MBTA for the West Corridor⁴

Various factors affect transit mobility, including capacity issues related to vehicle loads, service reliability, infrastructure and/or vehicle condition, and parking availability. Also affecting mobility is connectivity among modes and with other RTAs, private-carrier services, and TMA shuttles.

Vehicle Load and Service Reliability Issues

The ratio of passenger to seats on a vehicle is an indication of whether or not additional capacity is needed on a rail line or bus route. The MBTA’s *Service Delivery Policy* defines acceptable vehicle loads by mode and by time period. The maximum allowable ratio of riders to seats on buses is 140% during peak travel periods and

⁴ This section includes MBTA need only. It does not address the needs of the MetroWest Regional Transit Authority.

100% during the off-peak. For light and heavy rail, the peak and off-peak maximum ratios of riders to seats varies according to the configuration of the various types of cars. For the Green Line, the off-peak ratios also vary based on whether the trains are operating on the surface or in the subway. For commuter rail, the vehicle load standard is set for peak periods at 110% and for the off-peak at 100%.⁵

According to the most recent passenger counts available, the part of the Green Line that operates in the West Corridor meets the vehicle load standard of an average of fewer than 101 passengers per car at the peak load points during the AM and PM peak. However, during some off-peak hours, trains on the B, C, and D branches have average loads above the off-peak service standard of fewer than 45 passengers per car.

Recent data show that none of the commuter rail trips on the Framingham/Worcester, Needham, and Fitchburg lines exceed the vehicle load standards. Tables 5-16, 5-17, and 5-18 show the peak period vehicle load ratios for the Framingham/Worcester, Needham, and Fitchburg lines respectively.

TABLE 5-16

FRAMINGHAM/WORCESTER LINE VEHICLE LOADS

INBOUND AM PEAK							
Arrive South Station	6:31 AM	7:08 AM	7:46 AM	8:11 AM	8:23 AM	8:56 AM	9:08 AM
Assigned Seats	750	948	1128	1128	1374	750	684
Peak Load	302	835	803	830	1374	709	537
Peak Load/Seats	40%	88%	71%	74%	100%	95%*	79%
OUTBOUND PM PEAK							
Depart South Station	4:05 PM	4:27 PM	5:00 PM	5:15 PM	5:35 PM	6:15 PM	6:30 PM
Assigned Seats	750	570	1374	750	1128	948	684
Peak Load	722	473	1486	609	924	722	426
Peak Load/Seats	96%	83%*	108%	81%*	82%	76%	62%*

* Framingham short-turn trains

5 For bus, light rail and heavy rail, the vehicle load standard is based on the ratio of passengers to seated capacity at maximum load for each trip, averaged over 30 minutes during the peaks and 60 minutes during off-peak periods. For commuter rail and ferry services, the load standard is based on the ratio of boarding passengers per vehicle to seated capacity.

TABLE 5-17

NEEDHAM LINE VEHICLE LOADS

INBOUND AM PEAK					
Arrive South Station	6:50 AM	7:30 AM	8:15 AM	8:42 AM	9:13 AM
Assigned Seats	684	750	816	684	816
Peak Load	272	546	733	545	324
Peak Load/Seats	40%	73%	90%	80%	40%
OUTBOUND PM PEAK					
Depart South Station	4:00 PM	4:40 PM	5:20 PM	5:55 PM	6:25 PM
Assigned Seats	948	1128	816	684	750
Peak Load	203	413	718	565	437
Peak Load/Seats	21%	37%	88%	83%	58%

TABLE 5-18

FITCHBURG LINE VEHICLE LOADS

INBOUND AM PEAK						
Arrive North Station	7:17 AM	7:44 AM	8:00 AM	8:25 AM	8:54 AM	
Assigned Seats	570	570	684	684	570	
Peak Load	436	453	514	640	405	
Peak Load/Seats	76%	79%	75%	94%	71%	
OUTBOUND PM PEAK						
Depart North Station	4:00 PM	4:40 PM	4:50 PM	5:20 PM	5:40 PM	6:20 PM
Assigned Seats	684	570	570	684	684	570
Peak Load	210	580	427	565	357	279
Peak Load/Seats	31%*	102%	75%	83%	52%	49%

* South Acton short-turn trains

The buses with the highest ridership that operate primarily in the West Corridor are:

- Route 66 (Harvard Square - Dudley Station via Brookline) - 14,700 average daily boardings
- Route 39 (Forest Hills Station - Back Bay Station) - 14,400 average daily boardings
- Route 1 (Harvard - Dudley Station via Massachusetts Avenue) - 12,300 average daily boardings
- Route 57 (Watertown Square - Kenmore Square) - 11,500 average daily boardings

Table 5-19 presents data on the performance of the West Corridor bus routes. As shown by the routes' maximum load ratios (based on recent ridership counts) some of the routes in the West Corridor fail the load standard, Routes 39, 57, 65, and 66. Service adjustments have been made to all of these routes, and the MBTA Service Planning Department is monitoring them to evaluate whether additional changes

need to be made. Table 5-19 also shows the number of trips and percent of scheduled trips on each bus route serving the West Corridor that were operated during the month of October 2010. These columns give an indication of which routes operate with a high frequency of service and the degree to which scheduled trips are not run.

In addition, Table 5-18 lists the percent of timepoints on each route (for all trips operated during October) at which the buses were on time, and gives an indication of whether or not the route might pass the schedule adherence standard. In the Service Delivery Policy, the schedule adherence standard establishes a two-step process. First, the standard measures whether or not the bus is on time at various timepoints along the route. The definition of “on time” at any given timepoint on a route varies by time period and by the frequency of service and depends on whether the timepoint is at the beginning of the route, mid-route, or at the end of the route. Second, a requirement that 75% of trips be “on time” is applied to individual time periods, and a route fails the standard if it fails during any time period during the day.

In Table 5-18, the 75% threshold has been applied to all timepoints on all trips operated during the month of October 2010, and so the result is not an official schedule adherence designation. It does, however, give an idea of how well individual routes are performing and provides a comparative indication of which routes have the worst problems and are most in need of operational improvements. The MBTA now employs various types of monitoring systems, including real-time vehicle locators and electronic passenger counters, to generate data that can be used to improve service reliability. MBTA Service Planning is currently using automatic vehicle locator (AVL) data to refine bus schedules to better represent actual running times. This should improve on-time performance.

TABLE 5-19

PERFORMANCE OF BUS ROUTES

BASED ON ALL TRIPS OPERATED DURING OCTOBER 2010								
TYPE	ROUTE	ROUTE NAME	VEHICLE LOAD STANDARD	MAXIMUM LOAD RATIOS	% TIME-POINTS ON TIME	SCHEDULE ADHERENCE STANDARD	% TRIPS OPERATED	# TRIPS OPERATED
Local	CT1	Central Sq. - by Medical Center		140%	64%	Fail	100.0%	722
Local	CT2	Sullivan Sq. Sta. - Ruggles Sta.		105%	57%	Fail	99.9%	1,335
Local	1	Harvard - Dudley Sta. via Mass. Ave.	Fail	146%	71%	Fail	99.4%	2,343
Local	8	Harbor Point /U Mass - Kenmore Sta.		102%	54%	Fail	99.4%	1,001
Local	14	Roslindale Sq. - Heath St. Sta.		80%	57%	Fail	100.0%	410
Local	15	Kane Sq. - Ruggles Sta.		131%	68%	Fail	99.0%	2,028
Local	19	Fields Corner Sta. - Kenmore Sta.	Fail	148%	52%	Fail	99.0%	713
Local	22	Ashmont Sta. - Ruggles Sta. via Jackson		120%	71%	Fail	99.2%	1,870
Local	23	Ashmont Sta. - Ruggles Sta. via Washington St.	Fail	144%	73%	Fail	99.4%	2,648
Local	28	Mattapan Sta. - Ruggles Sta. via Dudley		140%	69%	Fail	99.7%	2,331
Local	29	Mattapan Sta. - Jackson Sq. Sta.		105%	56%	Fail	99.0%	823

(CONT.)

TABLE 5-19 (CONT.)

PERFORMANCE OF BUS ROUTES

BASED ON ALL TRIPS OPERATED DURING OCTOBER 2010								
TYPE	ROUTE	ROUTE NAME	VEHICLE LOAD STANDARD	MAXIMUM LOAD RATIOS	% TIME-POINTS ON TIME	SCHEDULE ADHERENCE STANDARD	% TRIPS OPERATED	# TRIPS OPERATED
Local	39	Forest Hills Sta. - Back Bay Sta.	Fail	179%	73%	Fail	98.9%	2,668
Local	41	Centre & Elliot Sts. - JFK/UMass Sta.		85%	57%	Fail	99.9%	764
Local	43	Ruggles Sta. - Park & Tremont Sts.		102%	64%	Fail	99.1%	1,430
Local	44	Jackson Sta. - Ruggles Sta. Via Seaver St.		100%	67%	Fail	99.6%	1,261
Local	45	Franklin Park - Ruggles Sta. via Blue Hill		116%	63%	Fail	99.3%	1,361
Local	47	Central Sq. - Broadway Sta.	Fail	154%	67%	Fail	99.8%	983
Local	48	Jamaica Plain Loop - Jackson Sq. Sta.		13%	57%	Fail	99.8%	262
Local	51	Reservoir - Forest Hills Sta.		102%	65%	Fail	99.8%	608
Local	52	Dedham Mall - Watertown Sq.		98%	59%	Fail	99.8%	440
Local	55	Queensberry St. - Park & Tremont Sts.		140%	74%	Fail	100.0%	704
Local	57	Watertown Sq. - Kenmore Sq.	Fail	145%	65%	Fail	97.9%	2,580
Local	59	Needham Junction - Watertown Sq.		73%	55%	Fail	99.6%	525
Local	60	Chestnut Hill - Kenmore Sta.		85%	69%	Fail	99.6%	760
Local	64	Oak Sq. - University Pk. Cambridge		119%	65%	Fail	99.9%	788
Local	65	Brighton Ctr. - Kenmore Sta.	Fail	159%	71%	Fail	99.7%	712
Local	66	Harvard Sq. - Dudley Sta. via Harvard St.	Fail	162%	70%	Fail	99.4%	1,968
Local	70	Cedarwood - University Pk., Cambridge		134%	59%	Fail	99.3%	1,572
Local	86	Sullivan Sta. - Cleveland Circle		113%	57%	Fail	99.7%	1,150
Express	170	Oak Park - Dudley Sta.		30%	63%	Fail		*
Express	500	Riverside Sta. - Federal & Franklin Sts.		55%	60%	Fail	100.0%	137
Express	501	Brighton Ctr. - Federal & Franklin Sts. via MassPike		110%	56%	Fail	99.4%	964
Express	502	Watertown Sq. - Copley Sq.		101%	63%	Fail	98.3%	597
Express	503	Brighton Ctr. - Copley Sq.		99%	62%	Fail	99.3%	269
Express	504	Watertown Sq. - Federal & Franklin Sts.		93%	60%	Fail	99.6%	1,031
Express	505	Waltham Ctr. - Federal & Franklin Sts.		91%	51%	Fail	99.8%	638
Express	553	Roberts - Federal & Franklin Sts.		102%	45%	Fail	99.5%	313
Express	554	Waverley Sq. - Federal & Franklin Sts.		117%	57%	Fail	100.0%	294
Express	555	Brighton Ctr. - Federal & Franklin Sts. via Newton		0%	55%	Fail	100.0%	95
Express	556	Waltham Highlands - Federal & Franklin Sts.		100%	52%	Fail	99.8%	315
Express	558	Riverside - Federal & Franklin via Auburndale		102%	46%	Fail	100.0%	221

*Route 170 operates only two AM outbound and two PM inbound trips per day

Bus schedule adherence can be affected by various factors, most notably the level of traffic on the roadway. However, the size and condition of the fleet also affect service reliability and capacity. A sufficient number of vehicles must be available to operate the regular service with spare vehicles to cover breakdowns and other unusual events. The generally accepted industry standard for spare vehicles is 20% of the active bus fleet. Currently, the spare ratio for buses systemwide and at the Cabot and Albany garages (out of which most of the bus routes in the corridor operate) meet this spare ratio standard. The current bus fleet is fairly new and in good condition, as is indicated by the measure of mean miles between vehicle failures. The MBTA's November 2010 ScoreCard (which reports on performance during the months of June through October 2010) shows the mean miles between failures for the bus fleet to be 12,437 in October. This greatly exceeded the goal of 6,000.

The MBTA's ScoreCard does not report monthly on-time performance for the Green Line, because, as light rail, it uses a different train tracking technology than is used for heavy rail. However, Green Line schedule adherence was evaluated for the 2008 Service Plan, using data from randomly selected days in January through April, 2008. Table 5-20 below shows the on-time performance of all four branches of the Green Line and the central subway⁶ when measured against the schedule adherence standards for light rail. These standards require that at least 85 percent of all trips be operated within 1.5 scheduled headways on surface routes and that 95 percent of all service be operated with headways less than 5 minutes in the central subway over the entire service day. In addition, 95 percent of trips must be operated within 5 minutes of the scheduled trip time over the entire service day.

TABLE 5-20

GREEN LINE SCHEDULE ADHERENCE

	B BRANCH	C BRANCH	D BRANCH	E BRANCH	CENTRAL SUBWAY
Percent of trips meeting the headway standard	85%	91%	86%	90%	93%
Percent of trips meeting the running time standard	63%	79%	91%	89%	

The MBTA has implemented a number of schedule changes since the Service Plan to enhance Green Line performance.

The November 2010 ScoreCard shows that the average daily vehicle availability on the Green Line was slightly above the required level of 150 cars in June through October, 2010, but the mean miles between failures were below the target level of

⁶ The thirteen Central Subway stations include Lechmere, Science Park, North Station, Haymarket, Government Center, Park Street, Boylston, Arlington, Copley, Prudential, Symphony, Hynes, and Kenmore.

5,500 in June through October. In the Draft FY2012 to 2016 Capital Investment Program the MBTA proposes funding for a mid-life overhaul of the 112 No. 7 Green Line cars and the upgrade of various components of the 95 low-floor Green Line (No. 8) cars. These projects should improve the performance of the fleet.

For commuter rail, the November 2010 ScoreCard shows that none of the three commuter rail lines that operate in the corridor passed the schedule adherence standard in October. For locomotives, the average daily vehicle availability meets the minimum requirement to operate the scheduled service, and the mean miles between failures are well below acceptable levels (4,705 vs. the goal of 10,200). The MBTA is currently in the process of procuring 75 new bi-level commuter rail coaches and 22 locomotives. This should improve capacity and reliability in the West Corridor and systemwide.

Mobility Issues Identified in the Program for Mass Transportation (PMT)

In addition, the MBTA's PMT approved in December 2009 identified the following specific transit capacity needs and other issues regarding mobility in the West Corridor:

- By 2030 the largest growth in intracity trips is projected for Framingham, Marlborough, and Natick. Local transit service is provided in Marlborough by the Worcester Regional Transit Authority (WRTA), and in Framingham and Natick by the MetroWest Regional Transit Authority (MWRTA). Of the remaining cities and towns outside of Boston that are not served by another RTA and that have limited or no existing local bus service, Needham and Wellesley have the largest numbers of current and projected intracity trips in the corridor.
- The Green Line Central Subway is currently operating at capacity, constraining the ability of the system to meet growth in demand for service within the West Corridor. In addition, by 2030 ridership demand on the Green Line's C, D, and E Branches, as well as in the Central Subway, is projected to exceed capacity if two-car trains are still in use.
- By 2030, modeling projections suggest that four bus routes in the West Corridor (Routes 64, 65, 66, and 503) may have passenger-crowding levels that would trigger the need for additional service.
- The tracks on which the Framingham/Worcester Line operates are owned by CSX Transportation, which runs freight service and controls train dispatching for both freight and commuter rail. On-time performance has been problematic on this line, primarily due to conflicts with freight service and lack of MBTA control over dispatching on the line. In addition, by 2030 this line is projected to be operating at close to capacity. (Since completion of the PMT, MassDOT has come to an agreement with CSX to purchase the tracks.)
- Fenway/Longwood Medical and Academic Area is both a prominent tourist/cultural destination and a growing center for employment in the Boston region. Congestion of the transportation system in this area constrains growth and economic development potential.

- Bus Route 57 is a heavily used Key Route between Watertown and Kenmore Square.
- Harvard and Boston Universities are planning major development adjacent to the Worcester commuter rail line.

Transit Station Parking Issues

- The current park-and-ride inventory shows that the following stations are utilized at 85% of capacity or greater:
 1. Needham Junction, Needham Center (Needham Line)
 2. Auburndale, West Natick, and Wellesley Hills (Framingham/Worcester Line)
 3. Waban, Eliot, Chestnut Hill (Green Line D Branch)
- For some customers, access to rail services is constrained by the lack of bicycle parking.

Connections with Other Regional Transit Authorities' Services

Both the Worcester Regional Transit Authority (WRTA) and the Metrowest Regional Transit Authority (MWRTA) serve the West Corridor; however, current schedules provide few close connections between RTA and MBTA services. In general, RTA bus routes do not function well as commuter rail feeders, as they serve different purposes and populations. Most RTA routes provide local service on even headways, while commuter rail provides long-distance commuter service and operates on uneven headways due to a number of equipment and operational constraints. In addition, because RTA routes have frequent stops and many do not provide direct service to stations, using them to access stations is much slower than driving.

Freight Mobility Issues

Transport of Hazardous Materials by Trucks

There is a long-standing prohibition against trucks carrying hazardous cargoes traveling in tunnels. The expressway segments impacted by this prohibition include



Interstate 90 from the Prudential Center to Logan Airport, Interstate 93 through the Tip O'Neill Tunnel, including the Zakim Bridge, and Route 1 passing under City Square in Charlestown and over the Tobin Bridge. The process of establishing alternate routes involves federal, state, and municipal regulations, and the alternate route system is undergoing review as of this writing. The route designation that emerges from this process can have a material impact on the costs and efficiencies of regional fuel transportation. Restrictions have an effect on regional trucking patterns.

Vertical Clearance of Railroad Bridges

The desired vertical clearance for bridges over rail lines is 20 feet 8 inches. This allows double-stack trains to operate on the tracks. Of the 92 bridges over rail lines in the corridor, 84 (91%) do not meet this desired height.

Railcar movement of containers stacked two high, also known as double stack, is currently prevented in the Boston region on the CSX Boston Line due to bridge height restrictions. The Commonwealth and the railroad are working to allow second generation double stack container clearance from the New York State line to Westborough as part of the agreement that transfers certain CSX rail properties to the Commonwealth.

Relocation of CSX Terminal Facility

MassDOT and CSX recently announced an agreement to relocate and consolidate the Beacon Park intermodal yard, in conjunction with planning to provide second generation (20'8") double stack capability between Worcester and the New York State border. This agreement is likely to enhance freight rail opportunities to Worcester with expanded passenger rail between Worcester and Boston.



Bicycle and Pedestrian Mobility Issues

According to the Regional Bicycle Plan, 66% of all transportation trips in the region are under five miles. Thus, there is potential to increase the percentage of short trips by bicycle. However, in order for more trips by bicycle to occur, users need safe access. According to

the Regional Bicycle Plan, 76% of respondents to MAPC's bicycle survey rated the bicycling conditions in their community as "fair" or "poor" and 45% indicated that they would bicycle more often if provided with a safer route as their top response.

Currently, gaps in the West Corridor's bicycle network limit users' ability to safely connect to their destinations. The West Corridor has some bicycle access into Boston through the Emerald Necklace Path and bicycle lanes on Commonwealth Avenue and Brookline Avenue, but lacks circumferential connections to facilities in nearby corridors. There is a gap in the Mass Central Corridor of MassDOT's Bay State Greenway Plan between the Dr. Paul Dudley White Path (also known as the Charles River Bike Path) and the Assabet River Rail Trail. The limited bicycle network also prevents users from accessing activity generators, including transit stations, schools, recreation destinations, and commercial areas.

Although providing bicycle parking at stations and racks on buses encourages riders to access transit services by bicycle, poor or unsafe access to stations can limit their

utilization. Currently, bicycle lanes on Commonwealth Avenue and Brookline Avenue provide good bicycle access to some of the Green Line Stations of the B and C branches. In addition, the Emerald Necklace Path provides good access to the Longwood Avenue and Fenway Stations of the Green Line D branch. However, there is poor access to some of the Green Line Stations and most of the Worcester Line Stations of the commuter rail system, including Framingham and Natick Stations.

Similar to the bicycle network, the West Corridor's pedestrian network varies significantly. Sidewalk coverage in the corridor ranges from less than two percent coverage in Dover to 89% coverage in Brookline. Gaps in the pedestrian network limit users from accessing activity generators, including transit stations, schools, recreation destinations, elderly services, and commercial areas. The West Corridor has very good pedestrian access to rapid transit stations, and generally has good pedestrian access to commuter rail stations. Pedestrian access to commuter rail stations varies from poor access at Ashland Station to very good access at Wellesley Hills Station. Some of the issues limiting pedestrian access at stations are associated with sidewalks, crosswalks, and station signage.

Safety Issues

MassDOT identifies “crash clusters” based on crash reports provided by its Registry of Motor Vehicles. The clusters are ranked based on the sum of the Equivalent Property Damage Only (EPDO) values of the crashes within the clusters. EPDO values are calculated by giving a crash a 10 if it involves a fatality, a 5 if a personal injury is involved, and a 1 if the crash results in property damage only. MassDOT applies a spatial algorithm to generate the clusters. EPDO values are used by the MPO in selecting locations for safety-based studies and in the LRTP and TIP project selection process.

Figure 5-16 identifies the top crash cluster locations in the West Corridor. It shows that the locations in this corridor with the highest EPDO values are located on Interstates 90 and 95, and Routes 9, 27, 30, 126, and 135. Specifically, the locations with the highest EPDO values (shown in parentheses below) are:

- Route 9 at Route 27, Natick (346)
- Route 9 at Route 30, Framingham (272)
- Interstate 90 at Interstate 95, Weston (239)
- Interstate 95 at Route 9, Wellesley (224)
- Route 126 at Route 135, Framingham (209)

Environmental Issues

Figures 5-17 through 5-19 provide an overview of environmental constraints in the West Corridor. They include:

- Department of Environmental Protection–designated wetlands
- FEMA flood zones

FIGURE 5-16

TOP FIVE PERCENT OF CRASH CLUSTER LOCATIONS – WEST CORRIDOR

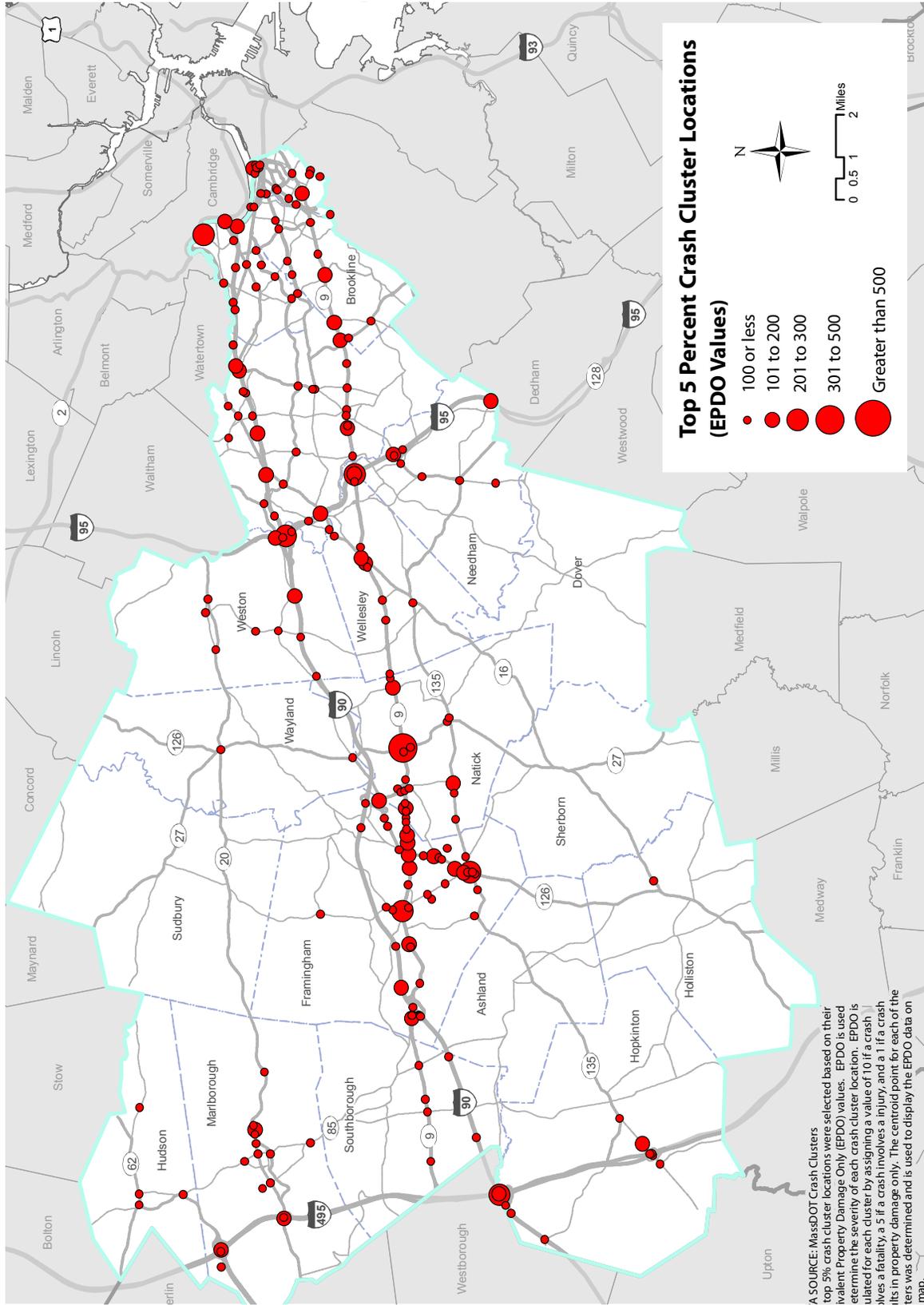


FIGURE 5-18

PUBLIC WATER SUPPLY/SURFACE WATER PROTECTION AREAS - WEST CORRIDOR

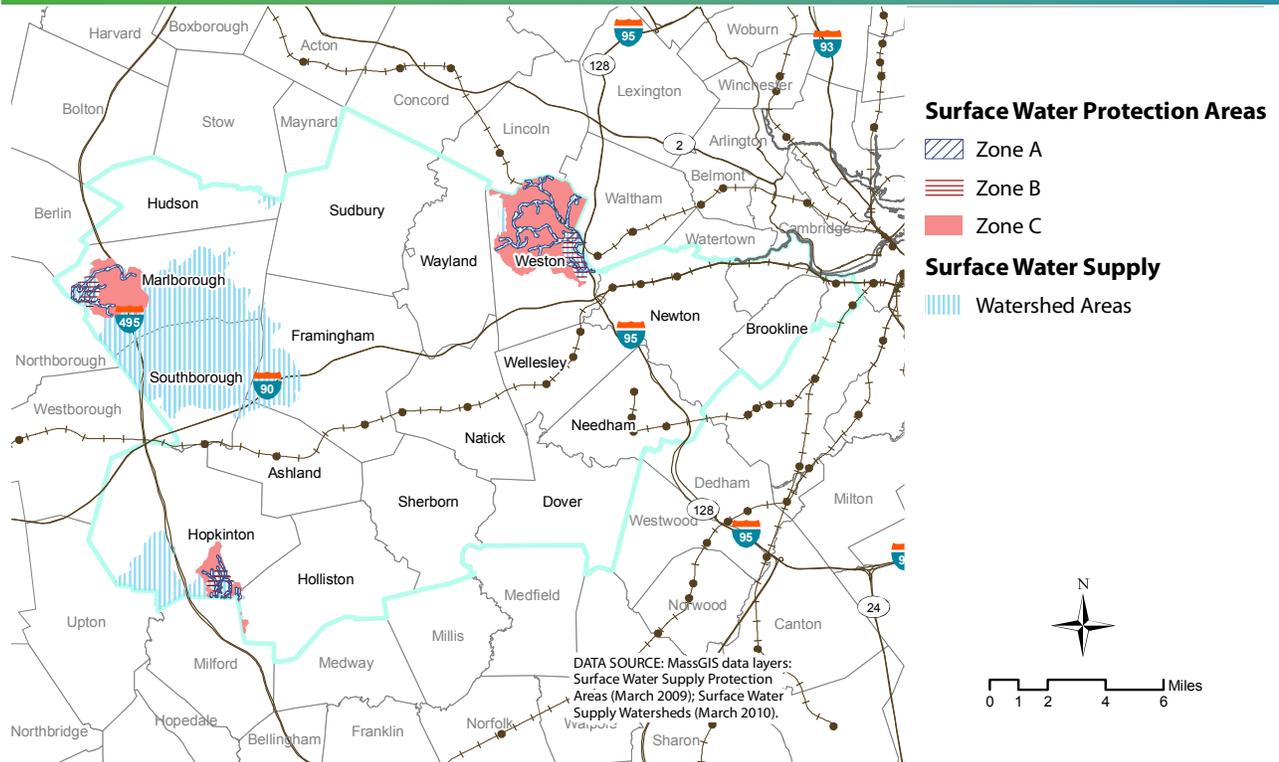
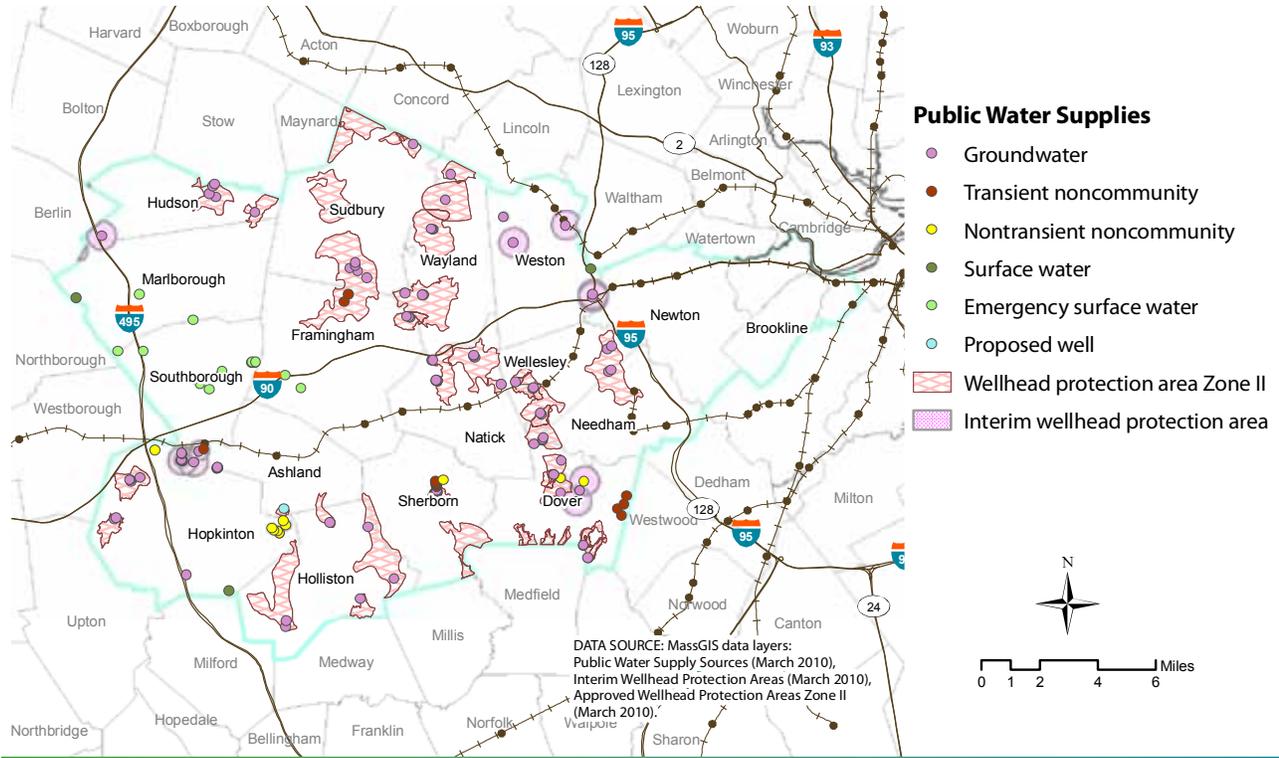
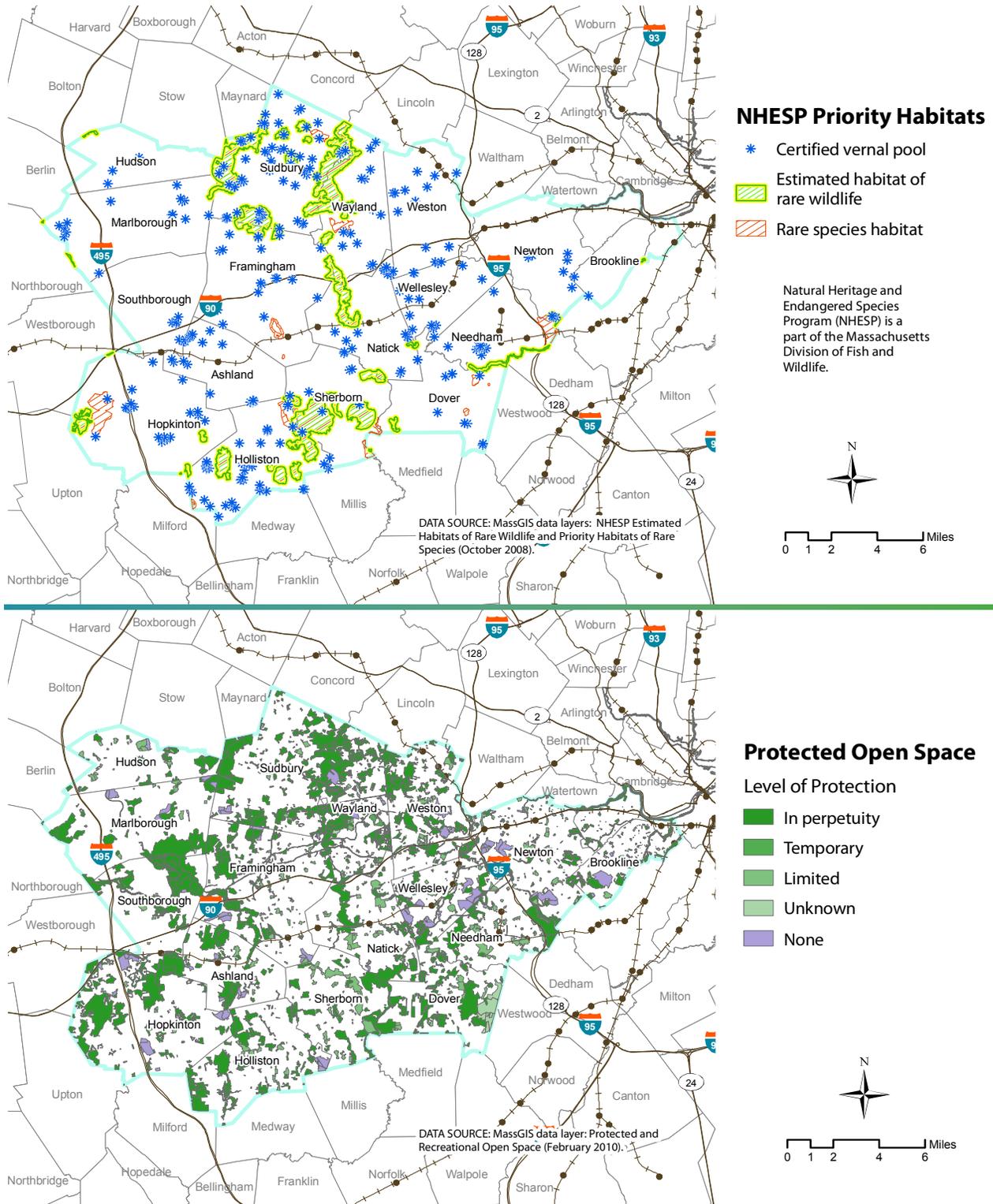


FIGURE 5-19

NHESP HABITATS/PROTECTED OPEN SPACE - WEST CORRIDOR



- Public water supplies
- Surface Water Protection Areas
- Natural Heritage and Endangered Species Program Priority Habitats
- Protected open space

The West Corridor has two Areas of Critical Environmental Concern (ACEC):

- Cedar Swamp, located in Hopkinton and Westborough. Cedar Swamp has 1,650 acres and was designated in 1975.
- Miscoe, Warren, and Whitehall Watersheds located in Grafton, Hopkinton, and Upton. Miscoe, Warren, and Whitehall Watersheds has 8,700 acres and was designated in 2000.

The locations of projects being considered for inclusion in the LRTP are overlaid on these environmental constraint maps. This information is then used during the project selection process. These environmental constraints are further addressed during project design and mitigation.

Transportation Equity Issues

The MPO's transportation equity program considers the needs of persons in environmental justice areas. The MPO defines these areas as those that have both a population that is over 50% minority and a median household income at or below 60% of the region's median income (at or below \$33,480). The environmental justice areas located in the Boston Region MPO portion of the West Corridor include areas in Allston, Brighton, Fenway, and Framingham. MPO staff meet with social service and community contacts and conduct surveys to identify needs within these environmental justice areas. Organizations from these MPO communities have not identified issues or needs under the current program.

SUMMARY OF WEST CORRIDOR NEEDS

The preceding sections have laid out the corridor's existing transportation infrastructure, land use conditions, travel characteristics and patterns, and transportation-related needs. This section summarizes the corridor's needs that are the most pressing as assessed in light of the MPO's visions established for *Paths to a Sustainable Region* and the available information on the needs. Many needs identified in the preceding sections stand out. In addition to passenger transportation needs by mode, this summary includes issues related to freight transportation, land use, and transportation equity.

Paths to a Sustainable Region envisions a system that is well maintained, has less congestion and fewer accidents on its roadways, offers attractive alternatives to driving, produces very little of the emissions that cause climate change and health problems, offers easy connections between nonmotorized modes and transit, efficiently moves freight, and supports development in areas where it already exists as a strategy to encourage alternatives to driving and to preserve open space.

Highway

Paths to a Sustainable Region envisions a highway system that is well maintained and has less congestion and fewer severe crashes. The West Corridor needs assessment identifies bridge and roadway maintenance needs and significant bottleneck and crash locations. The identified needs and problems listed below will promote the realization of the vision:

- Of the 472 bridges in the West Corridor, 142 (30%) are considered functionally obsolete (do not meet current traffic demands or highway standards), and 50 (11%) are considered structurally deficient (deterioration has reduced the load-carrying capacity of the bridge).
- Highway bottlenecks cause congestion and accidents and result in higher emissions of pollutants. The express highway and arterial bottleneck locations listed below were identified by at least two of the three methods described in the highway mobility section of this chapter:
 - Interstate 90 between Newton and Framingham
 - Interstate 95 between Dedham and Weston
 - Route 9 between Boston and Southborough
 - Route 16 in Newton, Wellesley, and Hopkinton
 - Route 20 from Marlborough to Weston
 - Route 30 in Boston, Newton, and Framingham
 - Route 126 in Framingham and Holliston
 - Route 135 between Needham and Hopkinton
 - Storrow Drive/Soldiers Field Road in Boston
- The top crash locations in the North Corridor were identified by the weighted Equivalent Property Damage Only (EPDO) index, which takes into consideration fatalities, injuries, and property damage. The top crash locations, in descending order of severity, are:
 - Route 9 at Route 27, Natick (346)
 - Route 9 at Route 30, Framingham (272)
 - Interstate 90 at Interstate 95, Weston (239)
 - Interstate 95 at Route 9, Wellesley (224)
 - Route 126 at Route 135, Framingham (209)

Transit

Paths to a Sustainable Region envisions a transit system that, like the envisioned highway system, is safe and maintained in a state of good repair. However, unlike

the vision for the highway system, the vision for transit calls for more use in order to reduce auto dependency and emissions causing climate change. In addition to projects that will bring the system into a state of good repair, addressing the needs and problems identified below will promote the realization of the vision:

- One bridge on the Needham Line and one bridge on the D Branch of the Green Line are rated as structurally deficient.
- On the Green Line, power substations and power transmission and distribution lines at several locations are in need of upgrading or replacement. Tie replacement is needed on the B and C Branches and the signal system needs to be replaced on the D Branch. At-grade crossings of streets need to be reconstructed or rehabilitated at 37 locations on the surface branches.
- The Green Line Central Subway is currently operating at capacity, constraining the ability of the system to meet growth in demand for service within the West Corridor.
- Transit reliability throughout the West Corridor is poor. None of the 41 bus routes or three commuter rail lines meet the MBTA's schedule adherence standards.
- By 2030, modeling projections suggest that four bus routes in the West Corridor (Routes 64, 65, 66, and 503) may have passenger-crowding levels that would trigger the need for additional service.
- Seven commuter rail stations and 27 Green Line stations in the corridor are not ADA accessible.
- Five commuter rail stations and three Green Line D Branch station park-and-ride lots in the corridor are utilized at 85% of their capacity or greater.

Issues to watch:

- Higher transit demand resulting from the implementation of the MetroFuture land use plan will require investments to increase capacity. Harvard and Boston Universities are planning major development adjacent to the Worcester commuter rail line.
- The tracks on which the Framingham/Worcester Line operates are owned by CSX Transportation, which runs freight service and controls train dispatching for both freight and commuter rail. On-time performance has been problematic on this line, primarily due to conflicts with freight service and lack of MBTA control over dispatching on the line. This should improve when MassDOT takes control of the tracks.
- The Fenway/Longwood Medical and Academic Area is both a prominent tourist/cultural destination and a growing center for employment in the Boston region. Congestion of the transportation system in this area constrains growth and economic development potential.

- Higher density areas in parts of Brookline, Newton, Needham, Framingham, Marlborough, and Hudson do not have direct access to MBTA transit services, however, Framingham, Natick, and Marlborough are served by the MetroWest Regional Transit Authority (MWRTA).

Freight

Paths to a Sustainable Region envisions a transportation system in which all freight modes operate efficiently. Addressing the needs and problems identified below will promote the realization of this vision:

- The interchange of Interstate 495, Interstate 290, and Route 85 in Marlborough needs to be improved in order to reduce the number of truck rollover crashes occurring at the location.

Issues to watch:

- CSX plans to move its terminal facility from Allston to Worcester, which will change some regional trucking patterns.
- As demand for rail freight increases, branch lines carrying freight in the West Corridor may need to be upgraded to accommodate the industry standard of 286,000 pounds. Currently the capacity is 263,000 pounds. This restriction increases costs for shippers.
- The desired vertical clearance is not met by 88% of highway bridges nor by 91% of railroad bridges.

Bicycle/Pedestrian

Paths to a Sustainable Region calls for linking bicycle, pedestrian, and transit facilities in a network; increasing the use of sustainable modes; and improving transportation options and accessibility for all modes of transportation. Addressing the needs and problems identified below will promote the realization of this vision:

- There are no on-road bicycle facilities connecting to some Green Line and most Worcester Line stations.
- Few roads (less than 2%) in the West Corridor provide bicycle accommodations.
- About 53% of the non-interstate roads in the West Corridor do not have a sidewalk on at least one side of the roadway.
- The West Corridor lacks major bicycle connections for circumferential travel.

Transportation Equity

Paths to a Sustainable Region envisions a transportation system that provides affordable transportation options and accessibility to people of all incomes, ages, races, and language backgrounds and does not inequitably burden any particular group.

Issues to watch:

- The transportation system will need to address the needs of the elderly population, which is expected to grow substantially during the time horizon of *Paths to a Sustainable Region*.
- The elderly population is expected to grow substantially between now and 2035. Meeting their mobility needs will be an important issue to address during this time period.

Land Use

Paths to a Sustainable Region shares the MetroFuture vision of a region in which new development is focused in developed areas already well served by infrastructure. As the work toward realization of this vision proceeds, issues to watch include:

- Areas expected to grow the most between now and 2035 are those along the Green Line branches and commuter rail lines. Transit capacity may need to increase in order to handle service demands.
- The three largest residential developments planned in the corridor are the redevelopment of the Weston Nurseries (1,000 units), the Jefferson at Ashland development near Ashland Station (500 units), and a high rise In Natick (407 units). The largest planned commercial developments include the Hopping Brook Business Park in Holliston, the development of a new EMC campus in Southborough and Westborough, the Weston Nurseries, and the Framingham Tech Park.