Catalyst for Regional Progress
PVPC

2020

Regional Transportation Plan

For the Pioneer Valley Metropolitan Planning Organization

APPENDIX

If information is needed in another language, please contact the PVPC Title VI Specialist by phone at (413) 781-6045.

Casoestainformaçãosejanecessáriaem outro idioma, favor contar o EspecialistaemTítulo VI do PVPC pelofone 413-781-6045."

Si necesitainformaciónenotrolenguaje, favor contactar al especialista de MassDOTdelTítulo VI al 413-781-6045.

如果需要使用其它语言了解信息，请联系马萨诸塞州交通部（PVPC）《民权法》第六章专职人员，电话413-781-6045

如果需要使用其它語言了解信息，請聯系馬薩諸塞州交通部（PVPC）《民權法》第六章專職人員，電話413-781-6045

2020 Update

to the

Regional Transportation Plan

Appendix

Final Report – July 23, 2019

Prepared by the
Pioneer Valley Planning Commission

For the Pioneer Valley
Metropolitan Planning Organization

Pioneer Valley MPO Members

Name	**Title**
Stephanie Pollack	Secretary and CEO of the Massachusetts Department of Transportation
Jonathan L. Gulliver	Administrator of the Massachusetts Department of Transportation Highway Division
Walter Gunn	Chair of the Pioneer Valley Executive Committee
Mayor David Narkewicz	Chair of the Pioneer Valley Transit Authority Advisory Board
Mayor Richard Kos	Mayor of Chicopee
Mayor Alexander Morse	Mayor of Holyoke
Mayor Brian P. Sullivan	Mayor of Westfield
Mayor Nicole LaChapelle	Mayor of Easthampton
Carmina Fernandes	Ludlow Board of Selectmen
Roger Fuller	Chesterfield Board of Selectmen
Richard Sullivan	Economic Development Council of Western Massachusetts
Alternates	
Mayor Domenic Sarno	Mayor of Springfield
Mayor William C. Reichelt	Mayor of West Springfield
John Martin	Southampton Board of Selectmen
Ex-Officio (Non-Voting)	
Jeff McEwen	Federal Highway Administration
Peter Butler	Federal Transit Administration
Sandra Sheehan	Administrator of the Pioneer Valley Transit Authority
James Czach	Chair – Pioneer Valley Joint Transportation Committee

Prepared in cooperation with the Massachusetts Department of Transportation, the U.S. Department of Transportation - Federal Highway Administration and Federal Transit Administration, and the Pioneer Valley Transit Authority. The views and opinions of the Pioneer Valley Planning Commission expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation.

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WHAT IS THE RTP?

The Pioneer Valley Regional Transportation Plan (RTP) outlines the direction of transportation planning and improvements for the Pioneer Valley through the year 2040. It provides the basis for all state and federally funded transportation improvement projects and planning studies.

The long range plan concentrates on both existing needs and anticipated future deficiencies in our transportation infrastructure, presents the preferred strategies to alleviate transportation problems, and creates a schedule of regionally significant projects that are financially constrained - in concert with regional goals and objectives and the Fixing America's Surface Transportation Act (FAST Act) legislation.

WHY IS THIS IMPORTANT?

In the Pioneer Valley region, major transportation improvement projects such as:

- Restoration of Springfield's Union Station
- Repairs to the Interstate I-91 Viaduct
- Expansion of regional passenger rail service
- Westfield's Columbia River Greenway Trail
- Pleasant/Conz Street roundabout in Northampton
- State of the art electric buses at the Pioneer Valley Transit Authority

All advanced through a conforming RTP.

Catalyst for Regional Progress
pvpc

Pioneer Valley Planning Commission
60 Congress Street
Springfield, MA 01104
Phone (413) 781-6045
Fax (413) 732-2593
www.pvpc.org

2020 Update to the RTP

Pioneer Valley Regional Transportation Plan

PIONEER VALLEY MPO

ABOUT THE PIONEER VALLEY

The Pioneer Valley Region is comprised of 43 communities and is home to over 620,000 people based on the results of the 2010 census. Located in the Midwestern section of Massachusetts and bisected by the Connecticut River, the region is the fourth largest metropolitan area in New England, covering an area of 1,179 square miles. The region is extremely diverse in that it is comprised of a mixture of urban, suburban and rural communities.
Some highlights include:

- Over 4300 roadway miles
- 678 bridges
- 43 fixed transit routes and shuttles
- Over 50 miles of shared use paths
- Passenger Rail service connecting to New Haven, CT
- ValleyBike Share Program

RTP VISION

The Pioneer Valley region strives to create and maintain a safe, dependable, environmentally sound and equitable transportation system. We pledge to advance performance based strategies and projects that promote sustainable development, healthy and livable communities, provide for the efficient movement of people and goods and advance the economic vitality of the region.

RTP EMPHASIS AREAS

Five emphasis areas were identified to assist in the achievement of the RTP vision and goals.

1. Safety and Security
2. The Movement of People
3. The Movement of Goods
4. The Movement of Information
5. Sustainability

RTP DEVELOPMENT

Staff at the Pioneer Valley Planning Commission (PVPC) are currently working on the 2020 Update to the RTP. Over the next few months, draft versions of the RTP will be available for public review and comment. This process will begin in November with the convening of focus groups and continue into May of next year when a draft plan will be available for public review and comment. A complete schedule of RTP activities is available on PVPC's website: **www.pvpc.org**.

PUBLIC PARTICIPATION

Gathering public input is an important part of the development of the RTP. PVPC staff collects, analyzes and summarizes all comments and responses received throughout the RTP planning process. This information helps to refine the plan and ensure that it reflects community values and interests.

The continued growth of shared mobility services, maintenance needs of roadways and bridges, impact of self-driving vehicles, and expansion of bicycle and pedestrian infrastructure are just a few of the transportation issues that must be addressed in the latest update to the RTP for the Pioneer Valley.

For more information and to submit comments on the RTP, please visit:

www.pvpc.org

2020 RTP SURVEY

2020 Update to the Regional Transportation Plan

The Pioneer Valley Metropolitan Planning Organization (MPO) is seeking your input as part of its efforts to update the Regional Transportation Plan (RTP). The MPO covers the 43 cities and towns in the Hampden and Hampshire county areas of Massachusetts. The RTP is the Pioneer Valley's blueprint for maintaining a safe and efficient transportation system for all modes of travel. It is updated every four years and identifies the region's goals, strategies, and projects to both enhance and maintain our transportation system. Your feedback is an important part of this process and will provide guidance on the future transportation improvements that could be funded over the next 20 years. For more information on the RTP please visit www.pvpc.org.

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Caso esta informação seja necessária em outro idioma, favor contar o Especialista em Título VI do PVPC pelo fone 413-781-6045.
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如果需要使用其它語言了解信息，請聯系馬薩諸塞州交通部（PVPC）《民權法》第六章專職人員，電話 413-781-6045.
Если Вам необходима данная информация на любом другом языке, пожалуйста, свяжитесь со специалистом по Титулу VI Департамента Транспорта штата Массачусетс (PVPC) по тел: 413-781-6045.
Si yon moun vle genyen enfòmasyon sa yo nan yon lòt lang, tanpri kontakte Espesyalis PVPC Title VI la nan nimewo 413-781-6045
Nếu quý vị cần thông tin này bằng tiếng khác, vui lòng liên hệ Chuyên viên Luật VI của PVPC theo số điện thoại 413-781-6045.

* 1. What type of projects are important to you. Please rank from 1 to 9 with 1 being the most important.

- Projects that improve the roadway surface. (ex. paving streets)
- Projects that enhance the movement and connectivity of pedestrians and bicycles (ex. on road bike lanes and sidewalks)
- Projects that expand or enhance transit. (ex. express bus service and improved bus stops)
- Projects that reduce Traffic Congestion and Travel Time. (ex. signal timing improvements)
- Projects that promote responsible Economic Growth and Development. (ex. multi-modal transportation centers)
- Projects that improve Safety. (ex. improvements that reduce accidents)
- Projects that protect or enhance Environmental Resources such as Wetlands, Streams, Wildlife, and Air Quality. (ex. upgrades to culverts)
- Projects that preserve Existing Regional Assets such as Parks, Historic Areas, and Farms. (ex. off road bike paths and trails)
- Bridge Projects (ex. repairing bridges with structural deficiencies and/or weight restrictions)

2. Please explain why you chose your #1 response.

* 3. What are the top 3 future transportation improvement projects that should be included in the RTP?

- [ ] A new Massachusetts Turnpike Interchange between Exits 2 and 3.
- [ ] Enhanced east/west passenger rail options to connect the Pioneer Valley to Boston
- [ ] Improvements to enhance traffic flow in the vicinity of I-91 in Springfield
- [ ] Adequate funding to operate and maintain the regional transit system
- [ ] Improved connectivity and amenities for bicycles and pedestrians (i.e. CT Riverwalk and Bikeway connections)
- [ ] Adequate funding for the maintenance of roadways
- [ ] Other (please specify)

* 4. What is the zip code for the Town/City you live in?

ZIP:

* 5. What is your primary mode of transportation?

- ( ) Car
- ( ) Bus
- ( ) Train
- ( ) Walking
- ( ) Bicycle
- ( ) Other (please specify)

* 6. What is your desired mode of transportation?

- Car
- Bus
- Train
- Walking
- Bicycle
- Other (please specify)

* 7. Would you like to provide a comment on what the term "regional transportation" means to you?

- Yes (Please include your definition in the comment box in question #8)
- No
- I do not know what the term "regional transportation" means.

8. Please provide your comments on what "regional transportation" means to you here.

9. Please list any other areas that are important to you that were not covered in the survey.

Thank you for taking the time to fill out this short survey, please visit www.pvpc.org for additional information regarding transportation projects in the region.

Done

RTP PROJECT LISTING – MAP KEY

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
1	V_07	I-91 Viaduct Improvements - Pref. Alt (No Build)	Agawam Rotary Improvements	Visionary	0	0	$156,600,000.00
2	V_05	I-91 Viaduct Improvements - Pref. Alt (No Build)	Bikeway Forest Park to Springfield Riverwalk	Visionary	0	0	$19,750,000.00
3	V_02	New I-90 Interchange (currently under study)	Alternative 2 Blandford Maintenance Facility	Visionary	0	0	$29,500,000.00
4	V_03	New I-90 Interchange (currently under study)	Alternative 3 Blandford Service Plaza	Visionary	0	0	$34,000,000.00
5	V_04	I-91 Viaduct Improvements - Pref. Alt (No Build)	Longmeadow Curve Improvements (Peanut)	Visionary	0	0	$212,750,000.00
6	V_14	I-91 Viaduct Improvements - Pref. Alt (No Build)	Route 5 Shared Use Path Laurel Hill Road to Forest Glenn Road	Visionary	0	0	$300,000.00
7	V_12	I-91 Viaduct Improvements - Pref. Alt (No Build)	South End Bridge/River Road Bike/Ped Connection	Visionary	0	0	$2,000,000.00
8	V_15	I-91 Viaduct Improvements - Pref. Alt (No Build)	Springfield Downtown Pedestrian Improvements	Visionary	0	0	$100,000.00
9	V_01	Regionwide - Transit	UMass Maintenance Facility- Articulated buses	Visionary	0	0	$19,600,000.00
10	V_13	I-91 Viaduct Improvements - Pref. Alt (No Build)	BBHOF Riverfront Bridge Ped Improvements	Visionary	0	0	$100,000.00
11	V_11	I-91 Viaduct Improvements - Pref. Alt	Enhanced Riverfront Bike/Ped Connections	Visionary	0	0	$1,000,000.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
12	V_10	I-91 Viaduct Improvements - Pref. Alt (No Build)	Enhanced Under-Viaduct Pedestrian Plazas	Visionary	0	0	$500,000.00
13	V_09	I-91 Viaduct Improvements - Pref. Alt (No Build)	Plainfield Street Improvements	Visionary	0	0	$76,000,000.00
14	V_06	I-91 Viaduct Improvements - Pref. Alt (No Build)	South End Bridge Upgrades	Visionary	0	0	$206,250,000.00
15	Paratransit	Regionwide	SAT\CO Retrofit to Paratransit	Transit			$2,750,000.00
16	608787	Williamsburg	CONSTRUCTION OF THE "MILL RIVER GREENWAY" SHARED USE PATH	Bike	0	29	$14,400,000.00
17	608236	Northampton	NORTHAMPTON- RECONSTRUCTION OF DAMON ROAD, FROM ROUTE 9 TO ROUTE 5, IONSTRUNCLUDES DRAINAGE SYSTEM REPAIRS & SLOPE STABILIZATION AT THE NORWOTTUCK RAIL TRAIL (old#180525)	PM		66.5	$10,043,653.00
18	400103	Westfield	WESTFIELD- BRIDGE REPLACEMENT, W-25-006, ROUTE 10/202 (SOUTHWICK ROAD) OVER THE LITTLE RIVER	Bridge			$9,000,000.00
19	600935	Holyoke	HOLYOKE- BRIDGE REPLACEMENTS, H-21-014, ROUTE 141 (APPLETON STREET) OVER SECOND LEVEL CANAL & H-21-020 OVER FIRST LEVEL CANAL	Bridge			$9,545,000.00
20	601701	Wales	WARE- BRIDGE REPLACEMENT, W-05-003, MASS CENTRAL RR OVER ROUTE 9 & 32 (EAST MAIN STREET)	Bridge			$10,532,000.00
21	603024	Southampton	SOUTHAMPTON- BRIDGE REPLACEMENT, S-19-024, VALLEY ROAD OVER MOOSE BROOK	Bridge			$1,352,400.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
22	601504	Palmer	RECONSTRUCTION OF ROUTE 32, FROM 765 FT. SOUTH OF STIMSON STREET TO 1/2 MILES SOUTH OF RIVER STREET (PHASE I) (1.63 MILES) (TFPC $6,134,080) HPP Earmark $2,500,000	PM	0	18	$3,570,304.00
23	604212	Ware	WARE- BRIDGE REPLACEMENT, W-05-004, ROUTE 9 (EAST STREET) OVER THE WARE RIVER	Bridge			$1,725,000.00
24	602911	Chicopee	CONNECTICUT RIVERWALK & BIKEWAY CONSTRUCTION, FROM BOAT RAMP NEAR I-90 TO NASH FIELD (2.5 MILES) INCL NEW BRIDGE OVER OVERFLOW CHANNEL	Bike	75	27	$3,122,734.00
25	602912	Chicopee	CHICOPEE RIVER RIVERWALK MULTI-USE PATH CONSTRUCTION, FROM GRAPE STREET TO FRONT STREET (NEAR ELLERTON STREET) (1 MILE)	Bike	25	21.5	$4,000,000.00
26	604049	Hadley	HADLEY- BRIDGE REPLACEMENT, H-01-017, NORTH HADLEY ROAD OVER ROUTE 116	Bridge			$3,864,000.00
27	604136	Monson/Palmer	MONSON- PALMER- BRIDGE REPLACEMENT, M-27-007=P-01-007, STATE AVENUE OVER THE QUABOAG RIVER	Bridge			$3,784,000.00
28	604155	Southwick	RESURFACING & RELATED WORK ON ROUTE 10/202, COLLEGE HIGHWAY (NORTHERLY SECTION) FROM THE WESTFIELD/SOUTHWICK T.L. TO TANNERY ROAD (1.4 MILES)	PM	0	18.5	$3,600,000.00
29	604434	Chicopee	RECONSTRUCTION & RELATED WORK ON FULLER ROAD, FROM MEMORIAL DR (RTE 33) TO SHAWINIGAN DR (2.0 MILES)	PM	25	48.5	$8,034,211.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
30	604445	Westfield	RECONSTRUCTION ON ROUTE 187, INCLUDES REPLACEMENT OF W-25-002, SHERMAN'S MILL BRIDGE OVER GREAT BROOK AT PONTOOSIC ROAD	Bridge			$6,250,000.00
31	604653	Southampton	REHABILITATION OF EAST STREET - FROM COLLEGE HIGHWAY EASTERLY TO COUNTY ROAD (2.6 MILES)	PM	25	31.5	$5,022,200.00
32	604746	West Springfield	BRIDGE REPLACEMENT, W-21-006, CSX RAILROAD OVER UNION STREET	Bridge	0	21	$12,403,054.00
33	605048	Northampton	IMPROVEMENTS ON ROUTE 5 (MOUNT TOM ROAD) - FROM BRIDGE E-5-4 OVER THE MANHAN RIVER TO 850' SOUTH OF I-91 NB EXIT 18 RAMP (0.85 MILES)	PM	25	40	$1,923,075.00
34	605126	Wales	WARE- BRIDGE REHABILITATION, W-05-015, ROUTE 32 (PALMER ROAD) OVER THE WARE RIVER	Bridge			$3,846,323.00
35	606141	Southwick	RECONSTRUCTION OF FEEDING HILLS ROAD (ROUTE 57), FROM COLLEGE HIGHWAY TO THE AGAWAM T.L	PM	0	42.5	$4,080,000.00
36	606552	Northampton	NORTHAMPTON– BRIDGE REPLACEMENT, N-19-059, I-91 OVER US ROUTE 5 AND B&MRR, BRIDGE REPLACEMENT, N-19-060, I-91 OVER HOCKANUM ROAD AND IMPROVEMENTS TO I-91/INTERCHANGE 19	Bridge			$56,891,767.00
37	607430	Longmeadow	RESURFACING & RELATED WORK ON LONGMEADOW STREET (ROUTE 5), FROM THE CT S.L. TO CONVERSE STREET	PM	0	44.5	$2,394,860.00
38	607646	Westfield	WESTFIELD- SUPERSTRUCTURE REPLACEMENT, W-25-021, LOCKHOUSE ROAD OVER PVRR	Bridge			$1,725,000.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
39	607688	Monson	MONSON- BRIDGE REHABILITATION, M-27-022, BRIMFIELD ROAD (US 20) OVER THE QUABOAG RIVER	Bridge			$10,092,316.00
40	607526	West Springfield	WEST SPRINGFIELD- BRIDGE RECONSTRUCTION, W-21-011, PROSPECT AVENUE OVER PVRR	Bridge			$660,625.00
41	607443	West Springfield	WEST SPRINGFIELD- BRIDGE REHABILITATION, BRIDGE W-21- 27, ROUTE 20 (PARK AVENUE) OVER ROUTE 5	Bridge			$3,719,240.00
42	605669	Wales	PEDESTRIAN ACCESS IMPROVEMENTS & RELATED WORK ON ROUTE 19	Ped	0	9	$312,500.00
43	607886	Hadley	RESURFACING AND RELATED WORK ON ROUTE 47 FROM COMINS DRIVE TO OLD RIVER DRIVE, INCLUDES CULVERT REPLACEMENT AT RUSSELVILLE BROOK	PM	0	16.5	$2,100,000.00
44	607317	Agawam	AGAWAM- RECONSTRUCTION OF ROUTE 187, FROM ALLISON LANE TO THE WESTFIELD CITY LINE (1.69 MILES - PHASE III)	PM	0	33.8	$7,589,668.00
45	607316	Agawam	RECONSTRUCTION OF ROUTE 187, FROM SOUTHWICK/SPRINGFIELD STREET TO ALLISON LANE (1.29 MILES - PHASE II)	PM	0	33.8	$5,562,610.00
46	606450	Holyoke	TRAFFIC SIGNAL UPGRADES AT 15 INTERSECTIONS ALONG HIGH & MAPLE STREETS	Int	25	63	$9,152,450.00
47	603372	Agawam	RECONSTRUCTION ON ROUTE 5 CONNECTOR TO ROUTE 57, INCLUDES A-05-013 & A-05-014	PM	0	53	$11,670,939.00
48	606895	Granby	Route 202 Intersection Improvements 2 Locations @ 5 Corners and @ School Street	Int	25	42	$2,588,655.00
49	606156	Holyoke	RECONSTRUCTION OF I-91 INTERCHANGE 17 & ROUTE 141	Int	0	53	$6,735,389.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
50	607502	Northampton	INTERSECTION IMPROVEMENTS AT KING STREET, NORTH STREET & SUMMER STREET AND AT KING STREET & FINN STREET	Int	25	65	$3,384,309.00
51	607372	Palmer	PALMER- RECONSTRUCTION OF ROUTE 32, FROM 1/2 MILE SOUTH OF RIVER STREET TO THE WARE T.L. (PHASE II) (2.1 MILES)	PM	0	14	$8,476,770.00
52	607823	Southampton	GREENWAY RAIL TRAIL CONSTRUCTION, FROM COLEMAN RD TO ROUTE 10	Bike	0	19.5	$6,810,409.00
53	608073	Westfield	WESTFIELD RIVER LEVEE MULTI-USE PATH CONSTRUCTION, FROM CONGRESS ST TO WILLIAMS RIDING WAY (NEAR MEADOW ST) (2MILES)	Bike	0	36	$4,801,730.00
54	608089	Hadley	INTERSECTION, BICYCLE AND PEDESTRIAN IMPROVEMENTS @ ROUTES 9, 116 & WESTGATE CENTER DRIVE	Int	0	25.5	$1,544,720.00
55	608084	Amherst	AMHERST - IMPROVEMENTS & RELATED WORK ON ROUTES 9 & 116, FROM UNIVERSITY DRIVE TO SOUTH PLEASANT STREET (0.8 MILES)	PM	25	53.5	$3,892,738.00
56	608163	Wales	WALES- RECONSTRUCTION & IMPROVEMENTS ON MONSON ROAD, FROM THE MONSON T.L. TO REED HILL ROAD (1.5 MILES)	PM	25	39.5	$3,737,346.00
57	608577	Easthampton	EASTHAMPTON- IMPROVEMENTS AND RELATED WORK ON UNION STREET (ROUTE 141) FROM PAYSON AVENUE TO HIGH STREET (0.36 MILES)	PM	0	62	$3,284,450.00
58	608157	Springfield	SPRINGFIELD- MCKNIGHT COMMUNITY TRAIL CONSTRUCTION, FROM ARMORY STREET TO HAYDEN AVENUE (1.5 MILES)	Bike	0	36.5	$4,300,000.00
59	603608	Hatfield	HATFIELD- BRIDGE REPLACEMENT, H-11-025, ELM STREET OVER THE B&M R.R.	Bridge			$497,628.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
60	606469	Longmeadow/Springfield	LONGMEADOW- SPRINGFIELD- RETAINING WALL REPLACEMENT/REHABILITATION ON I-91 (SB)	Bridge			$6,143,750.00
61	607645	Chicopee	CHICOPEE- BRIDGE PRESERVATION, C-13-027, I-291 OVER SR 141 & CHICOPEE RIVER	Bridge			$2,340,000.00
62	607644	Longmeadow/Springfield	LONGMEADOW-SPRINGFIELD- STRUCTURAL STEEL GIRDER PAINTING, S-24-042, S-24-043, A-05-001=S-24-005 & L-14-001, US 5 OVER I-91, RAMP C OVER RAMP A & I-91, US 5 OVER CT RIVER & AMTRAK & I-91 OVER EMERSON ROAD	Bridge			$2,420,940.00
63	604209	Holyoke / West Springfield	REHABILITATION OF ROUTE 5 (RIVERDALE ROAD), FROM I-91 (INTERCHANGE 13) TO MAIN STREET IN HOLYOKE & FROM ELM STREET TO NORTH ELM STREET IN WEST SPRINGFIELD (3.2 MILES)	PM	25	49	$14,489,928.00
64	608413	Northampton	NORTHAMPTON- ROCKY HILL GREENWAY MULTI-USE TRAIL, FROM THE MANHAN RAIL TRAIL TO ROCKY HILL ROAD (0.4 MILES)	Bike	25	32	$812,026.00
65	608374	West Springfield	RECONSTRUCTION OF MEMORIAL AVENUE (ROUTE 147), FROM COLONY ROAD TO THE MEMORIAL AVENUE ROTARY (1.4 MILES)	PM	25	70	$22,545,121.00
66	608719	Amherst / Belchertown	AMHERST- BELCHERTOWN- NORWOTTUCK RAIL TRAIL RESURFACING, FROM STATION ROAD IN AMHERST TO WARREN WRIGHT ROAD IN BELCHERTOWN (1.5 MILES)	Bike	0	12	$1,083,220.00
67	608460	Hadley	HADLEY- BRIDGE REPLACEMENT, H-01-005, BAY ROAD (ROUTE 47) OVER THE FORT RIVER	Bridge			$7,189,338.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
68	608423	Easthampton/ Southampton	IMPROVEMENTS AND RELATED WORK ON TWO SECTIONS OF ROUTE 10 IN EASTHAMPTON AND SOUTHAMPTON	PM	0	28.5	$2,799,540.00
69	608553	Hatfield	HATFIELD- RESURFACING AND RELATED WORK ON ROUTES 5 &10, FROM 350 FEET NORTH OF CHURCH AVE TO THE WHATELY TOWN LINE (3.2 MILES)	PM	0	6.5	$3,124,760.00
70	608631	Westhampton	WESTHAMPTON- BRIDGE REPLACEMENT, W-27-005, KINGS HIGHWAY OVER N BRANCH MANHAN RIVER	Bridge			$1,937,318.00
71	608487	Westfield	WESTFIELD- RESURFACING AND RELATED WORK ON ROUTE 10 AND 202	PM	0	29	$2,760,000.00
72	608489	Wilbraham	WILBRAHAM- RESURFACING AND RELATED WORK ON ROUTE 20	PM	0	36	$9,441,500.00
73	608473	South Hadley	SOUTH HADLEY- RESURFACING AND RELATED WORK ON ROUTE 116	PM	0	43.5	$5,885,003.00
74	608727	Holland	HOLLAND- RESURFACING & RELATED WORK ON BRIMFIELD ROAD, FROM WALES ROAD TO STURBRIDGE STREET (0.9 MILES - PHASE II)	PM	0	27.5	$1,051,476.00
75	608718	Springfield	SPRINGFIELD- INTERSECTION IMPROVEMENTS AT BERKSHIRE AVENUE, COTTAGE AND HARVEY STREETS	Int	0	41.5	$2,280,751.00
76	608717	Springfield	SPRINGFIELD- RECONSTRUCTION OF SUMNER AVENUE AT DICKINSON STREET AND BELMONT AVENUE (THE "X")	Int	0	70.5	$10,062,663.00
77	608575	Include	CHICOPEE TO HOLYOKE- GUIDE AND TRAFFIC SIGN REPLACEMENT ON I-391	PM	0	0	$1,705,644.00
78	605032	Hadley	HADLEY- RECONSTRUCTION ON ROUTE 9, FROM MIDDLE STREET TO MAPLE/SOUTH MAPLE STREET	PM	25	50	$23,893,982.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
79	608785	South Hadley	MAIN STREET ROAD IMPROVEMENT PROJECT	PM	0	38.5	$3,089,720.00
80	608782	Springfield	SPRINGFIELD- INTERSECTION IMPROVEMENTS AT COTTAGE STREET, ROBBINS ROAD AND INDUSTRY AVE	Int	0	46.5	$2,748,389.00
81	608847	Wales	WALES- BRIDGE REPLACEMENT, W-02-002, HOLLAND ROAD OVER WALES BROOK	Bridge			$540,096.00
82	608560	Springfield	IMPROVEMENTS ON ST. JAMES AVENUE AT TAPLEY STREET	Int	25	0	$1,589,420.00
83	608869	Northampton	NORTHAMPTON- BRIDGE REPLACEMENT, N-19-068, OLD SPRINGFIELD ROAD OVER THE MILL RIVER	Bridge			$3,981,000.00
84	608881	Longmeadow / Springfield	RESURFACING AND INTERSECTION IMPROVEMENTS ON LONGMEADOW STREET (ROUTE 5) AND CONVERSE STREET (0.84 MILES)	PM	0	57.5	$5,228,168.00
85	608565	Springfield	IMPROVEMENTS ON ST. JAMES AVENUE AT ST. JAMES BOULEVARD AND CAREW STREET	Int			$2,400,000.00
86	609051	Amherst / Pelham	RESURFACING AND RELATED WORK ON BELCHERTOWN ROAD (ROUTE 9) FROM SOUTH EAST STREET TO THE BELCHERTOWN T.L. (2.1 MILES)	PM			$7,055,628.00
87	609061	Chicopee	CHICOPEE - INTERSECTION RECONSTRUCTION, MONTGOVERY ROAD AT GRANBY ROAD AND MCKINSTRY AVENUE, AND MONTGOMERY ROAD AT TURNPIKE ACCESS ROAD	Int			$6,000,000.00
88	609065	Holyoke	RESURFACING AND RELATED WORK ON CABOT STREET AND RACE STREET (CENTER CITY CONNECTOR)	PM	0	53.5	$5,125,070.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
89	606547	Hadley	PEDESTRIAN SIGNAL INSTALLATION AT 2 LOCATIONS ALONG ROUTE 9 NEAR WEST ST	Ped	0	14.5	$134,600.00
90	607773	Westfield	WESTFIELD- IMPROVEMENTS & RELATED WORK ON ROUTE 20, COURT STEET & WESTERN AVENUE, LLOYDS HILL ROAD TO HIGH STREET/MILL STREET INTERSECTION (PHASE II) Eastern Section	PM	25	52.5	$8,153,565.00
91	608466	Belchertown / Granby	BELCHERTOWN- GRANBY- RESURFACING AND RELATED WORK ON ROUTE 202	PM	0	17	$4,491,288.00
92	609286	Northampton	NORTHAMPTON- DOWNTOWN COMPLETE STREETS CORRIDOR AND INTERSECTION IMPROVEMENTS - MAIN STREET (ROUTE 9)	Int	0	67.5	$7,654,605.00
93	609395	Belchertown / Ware	PAVEMENT PRESERVATION AND RELATED WORK ON ROUTE 9	PM	0	0	$8,298,350.00
94	608251	Include	HOLYOKE- SYSTEMATIC BRIDGE MAINTENANCE ON H-21-047 AND H-21-049	Bridge	0	0	$2,057,782.00
95	602888	Goshen	Route 9 reconstruction	PM	0	25	$7,500,000.00
97	605207	Chester	CHESTER- BRIDGE BETTERMENT, C-11-033, ROUTE 20 OVER WALKER BROOK,	Bridge			$268,750.00
98	606197	Amherst	AMHERST- BRIDGE REPLACEMENT, NORWOTTUCK RAIL TRAIL OVER SNELL STREET (DCR P10-2631-C5A)	Bridge			$500,000.00
99	606200	Hadley	HADLEY - BRIDGE REHABILITATION (H-01-026) OF NORWOTTUCK RAIL TRAIL OVER CONNECTICUT RIVER (DCR CONTRACTS P-10-2731-D1A & P12-2769-D1A)	Bridge			$750,000.00
100	606598	Brimfield/Palmer	BRIMFIELD- PALMER- BRIDGE PRESERVATION, P-01-055, I-90 OVER ROUTE 67 (BOSTON ROAD) & B-24-061=P-01-048, I90 OVER WASHINGTON ROAD	Bridge			$6,670,000.00
101	606797	Cummington	Route 9 Retaining Wall	PM	0	8	$1,660,000.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
102	606886	Montgomery/ Russell	MONTGOMERY- RUSSELL- BRIDGE PRESERVATION, M-30-008=R-13-018 (4GT), I-90 OVER US 20, WESTFIELD RIVER & CSX RR	Bridge			$39,168,540.00
103	606892	Chicopee	CHICOPEE- SLOPE PROTECTION IMPROVEMENTS AT I-391 BRIDGE OVER THE CONNECTICUT RIVER	Bridge			$538,580.00
104	606912	Worthington	WORTHINGTON- RECONSTRUCTION & RELATED WORK ON ROUTE 143 (PHASE I) COLD STREET TO CHESTERFIELD TOWN LINE	PM	75	41.5	$8,548,000.00
105	607231	Williamsburg	WILLIAMSBURG- RECONSTRUCTION OF HIGH STREET AND MOUNTAIN STREET	PM	0	18	$7,033,957.00
106	607675	Williamsburg	WILLIAMSBURG- BRIDGE REPLACEMENT, W-36-011, BRIDGE STREET OVER THE MILL RIVER	Bridge			$5,411,670.00
107	606499	Russell	RUSSELL- BRIDGE REHABILITATION, R-13-002, BRIDGE STREET OVER THE WESTFIELD RIVER (AKA - STRATHMORE MILL BRIDGE)	Bridge			$9,494,400.00
108	607690	West Springfield/Westfield	WEST SPRINGFIELD-WESTFIELD- BRIDGE DECK & JOINT REPAIRS ON 10 BRIDGES ON I-90, FROM EAST MOUNTAIN ROAD TO RIVERDALE ROAD (ROUTE 5)	Bridge			$3,006,800.00
109	606615	Chicopee/Ludlow	CHICOPEE- LUDLOW- BRIDGE PRESERVATION ON 16 BRIDGES ON I-90 (MM 50.9 TO MM 56.9)	Bridge			$5,428,000.00
110	607691	Chicopee	CHICOPEE- BRIDGE DECK & JOINT REPAIRS ON 12 BRIDGES ON I-90, FROM GRANGER STREET TO SHERIDAN STREET	Bridge			$3,601,800.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
111	607692	West Springfield	WEST SPRINGFIELD- WESTFIELD- CLEANING & PAINTING STRUCTURAL STEEL ON 10 BRIDGES CARRYING I-90 OVER PVRR, LOCKHOUSE ROAD, EAST MOUNTAIN ROAD, PVRR & MORGAN ROAD (FROM MM 40.0 TO 44.1)	Bridge			$4,000,000.00
112	608736	Granville	GRANVILLE- RECONSTRUCTION OF ROUTE 57	PM	0	29	$7,000,000.00
113	608846	Monson	MONSON- BRIDGE REPLACEMENT, M-27-015, OLD WALES ROAD OVER CONANT BROOK	Bridge			$1,742,782.00
114	608848	Springfield	SPRINGFIELD- BRIDGE REPLACEMENT, S-24-016, ARMORY STREET OVER CSX MAINLINE	Bridge			$5,723,440.00
115	608853	Springfield	SPRINGFIELD- BRIDGE REPLACEMENT, S-24-026, ARMORY STREET OVER CSX	Bridge			$3,948,640.00
116	608886	Chesterfield	RECONSTRUCTION OF NORTH ROAD AND DAMON POND ROAD	PM	0	10	$4,441,000.00
117	608928	Huntington	HUNTINGTON- SYSTEMATIC BRIDGE MAINTENANCE, H-27-019, ROUTE 112 OVER SYKES BROOK	Bridge			$526,506.00
118	608945	Russell	RUSSELL- RESURFACING & RELATED WORK ON ROUTE 20	PM	0	14	$6,500,000.00
119	609120	Ludlow	LUDLOW- BRIDGE REPLACEMENT, L-16-026, PINEY LANE OVER BROAD BROOK	Bridge			$598,560.00
120	609406	Goshen	GOSHEN- RESURFACING AND RELATED WORK ON ROUTE 112	PM	0	0	$1,486,225.00
121	609429	Palmer / Ware	PALMER- WARE- RESURFACING OF ROUTE 32	PM	0	0	$3,168,886.00
122	SPFLD NHVN Commute	Regionwide	Commuter Rail - Springfield to New Haven - Capital	Rail	0		$30,000,000.00

Map #	SID	Municipality	Name and Description	Project Type	Design	TEC Score	Estimated Cost
123	SPFLD GFLD Commute	Regionwide	Commuter Rail - Springfield to Greenfield - Capital	Rail	0		$10,000,000.00
124	606886	Montgomery/ Russell	MONTGOMERY- RUSSELL- BRIDGE PRESERVATION, M-30-008=R-13-018 (4GT), I-90 OVER US 20, WESTFIELD RIVER & CSX RR	Bridge			$39,168,540.00
125	607210	Becket/ Chester/ Middlefield	BECKET- CHESTER- MIDDLEFIELD- REHABILITATION OF B-03-017=M-19-017 & B-03-018=M-19-018, OLD "WESTERN RAILROAD" KEYSTONE ARCH BRIDGES OVER THE WESTERN BRANCH OF WESTFIELD RIVER	Bridge			$2,500,000.00
126	East_West_Rail	Regionwide	East/West high speed rail Capital entire system -Boston to Springfield to Vermont/Canada Line	Rail	0		$785,000,000.00
127	DTWN INTER MODE	Northampton	Downtown bus, rail, intermodal station	Rail			$14,000,000.00
128	TRACK EXPAND	Palmer	Track Expansion Palmer Ind Park	Rail	0		$570,000.00

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Photo: North Pleasant Street, Amherst, MA

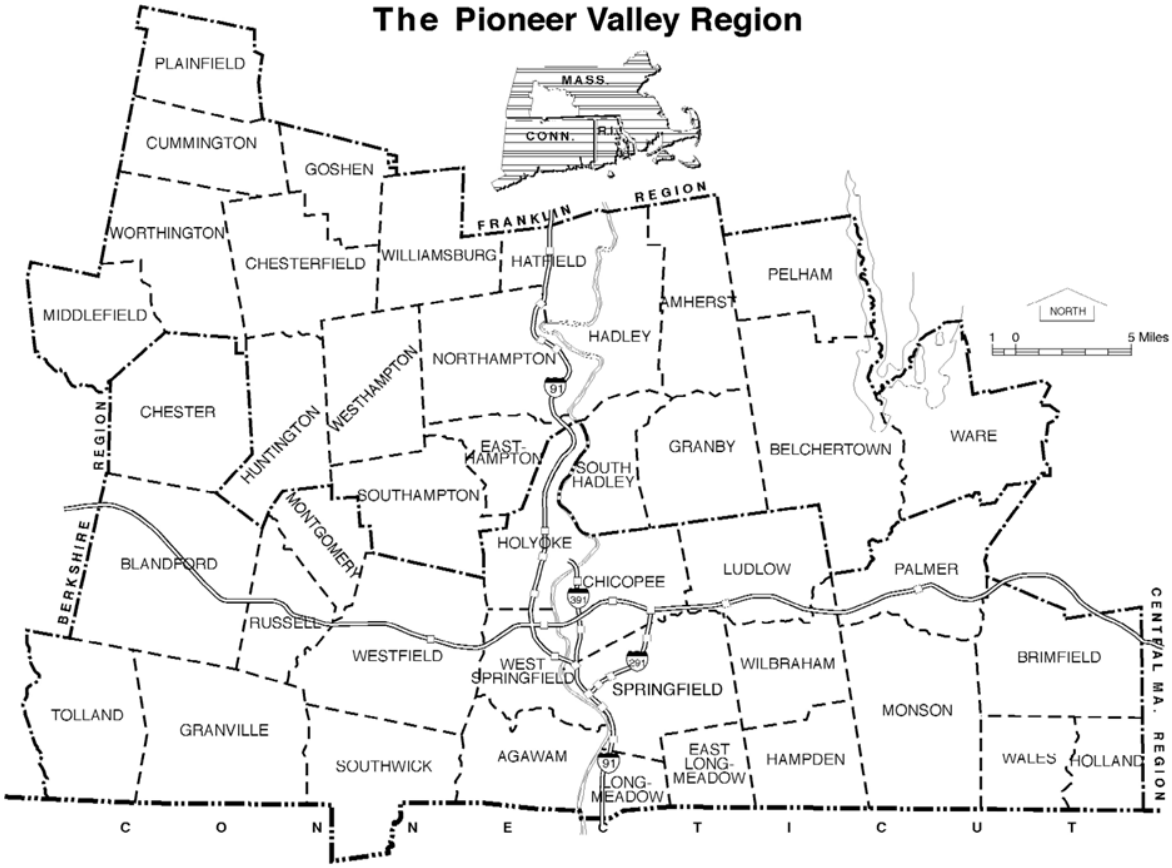
CHAPTER 5 - REGIONAL PROFILE APPENDIX

Social and economic trends can have significant implications on transportation planning. This chapter presents a profile of the region's physical, socioeconomic, demographic and environmental characteristics as they relate to transportation planning and construction.

A. PHYSICAL CHARACTERISTICS

The Pioneer Valley Region is located in the Midwestern section of Massachusetts. Encompassing the fourth largest metropolitan area in New England, the region covers 1,179 square miles. The Pioneer Valley is bisected by the Connecticut River and is bounded on the north by Franklin County, on the south by the State of Connecticut, on the east by Quabbin Reservoir and Worcester County and on the west by Berkshire County.

Figure 5-1 – Pioneer Valley Region Map



The Pioneer Valley Region, which is comprised of the 43 cities and towns within the Hampden and Hampshire county areas, is home to more than 608,000 people. Hampden County, the most populous of the four western counties of Massachusetts, is approximately 635 square miles. Hampden County is made up of 23 communities including the Springfield-Chicopee-Holyoke urbanized area. Hampshire County is situated in the middle of Western Massachusetts and includes an area of 544 square miles.

The third largest city in Massachusetts, Springfield is the region's cultural and economic center. Springfield is home to several of the region's largest employers, including Massachusetts Mutual Life Insurance Company, Baystate Medical Center, Mercy Hospital Incorporated, Smith & Wesson Company, and the MGM Casino. Major cultural institutions include the Springfield Symphony, MassMutual Center, Quadrangle Museums, the Basketball Hall of Fame, and the Dr. Seuss National Memorial Sculpture Garden.

The cities of Chicopee and Holyoke were the first planned industrial communities in the nation. Merchants built an elaborate complex of mills, workers' housing, dams, and canal systems that evolved into cities. While

many historic mills and industries are now gone, a number of 19th and 20th century structures are maintained and improved through municipal preservation and revitalization initiatives.

Unique within the Commonwealth of Massachusetts, the Pioneer Valley region contains a diverse economic base, internationally known educational institutions, and limitless scenic beauty. Dominant physical characteristics include the broad fertile agricultural valley formed by the Connecticut River, the Holyoke Mountain range that traverses the region from Southwick to Pelham, and the foothills of the Berkshire Mountains. Prime agricultural land, significant wetlands, and scenic rivers are some of the region's premier natural resources. Choices in lifestyle range from contemporary downtown living to stately historic homes, characteristic suburban neighborhoods, and rural living in very small communities—a variety that contributes to the diversity and appeal of the region. Its unique combination of natural beauty, cultural amenities, and historical character make the Pioneer Valley region an exceptional environment in which to live and work.

B. HIGHWAY

1. Access

The Pioneer Valley area is considered the crossroads of transportation in Western Massachusetts. Situated at the intersection of the area's major highways, Interstate 90 (Massachusetts Turnpike) traveling east-west and Interstate 91 traveling north-south, the region offers easy access to all markets in the Eastern United States and Canada. Major southern New England population centers are accessible within hours.

Table 5-1 – Driving Distance and Time from Springfield

Destination	Distance	Time
Albany, NY	85 miles	1.5 hours
Boston, MA	91 miles	1.5 hours
New York City, NY	140 miles	3.0 hours
Philadelphia, PA	260 miles	5.0 hours
Montreal, Quebec	301 miles	5.5 hours
Washington DC	400 miles	8.0 hours

The interstate expressways (I-90/I-91) link most of the major urban centers in the region. The basic highway network including interstate highways, U.S. numbered routes and state routes, along with other traffic arteries, provides access to all municipalities in the region, both urban and rural. The pattern of principal arterial highways in the region is radial, extending outwards from

each of the region's major centers, a consequence of development and topographic influences.

Table 5-2 – Regional Interstate Highways

Interstate Highways	Principal Orientation	# of In- Region Interchanges	In-Region Mileage	Toll Road?
I-90	East/West (Mass. Turnpike)	6	46.08	Yes
I-91	North/South	22	31.17	No
I-291	Connector (Springfield to I-90)	6	5.44	No
I-391	Connector (I-91 to Chicopee/Holyoke)	6	3.82	No

The highway network is composed of various facilities that are separated into systems within the federal-aid highway program by the Massachusetts Highway Department on the basis of their functional classification which takes into account the various functions and uses of the roads. The federal-aid highway program in Massachusetts is a state administered program. The program consists of three separate federal aid systems, the National Highway System (NHS), the Interstate System and the Surface Transportation Program.

The Federal-Aid highway system in the Pioneer Valley region consists of approximately 1,360 miles, of which approximately 446 miles are on the National Highway System (NHS), and approximately 900 miles belong to the Surface Transportation Program (STP). The STP is a block grant type program that includes NHS roadways which primarily consist of Interstate routes and a large percentage of urban and rural principal arterials. The Federal-Aid highway system consists of any roadway that is not functionally classified as a rural minor collector or local roadway. Local roads constitute approximately 69% of the total roadway system.

The roadway mileage in the Pioneer Valley has remained fairly consistent over the last several years, since the construction of Interstate 391. New roadway construction has become more difficult in recent years as a result of rising construction costs and the requirements of the Clean Air Act Amendments of 1990. The last major new roadway to be constructed in the region occurred in 1996 when a portion of Route 57 was relocated in Agawam. This project extended the existing limited access portion of Route 57 out to Route 187.

2. Functional Classification

The Federal-Aid Highway Act of 1973 required the use of functional highway classification to update the Federal-Aid Highway system and identify the National Highway System. Both of these highway systems are used as

inventory mechanisms and funding eligibility criteria for our nation's roadway network.

In 1992, the PVPC, under the direction of the Massachusetts Department of Transportation (MassDOT), began the reclassification process to update the federal-aid network in the Pioneer Valley Region. The region's roadways were grouped into classes according to the service they are intended to provide. The region's urbanized area is updated as a result of the 2010 census. In 2005, the PVPC solicited information on roadway classification changes from local officials in order to identify existing roadways that have been permanently closed to through traffic in response to enhanced regional security or changes in local traffic flow and develop a proposed new functional classification scheme to maintain a comprehensive and continuous network of functionally classified roadways in the region.

The seven functional classifications adopted by Massachusetts are summarized below:

Interstate - Freeways service as principal arterials providing service to substantial statewide and interstate travel.

Rural Principal Arterials - Major highways that serve corridor movements having trip length and travel density characteristics that indicate substantial statewide or interstate travel. Principal Arterials include the Interstate system.

Rural Minor Arterial - Roadways with statewide significance that link cities and large towns forming an integrated network of intracounty importance.

Rural Major Collectors and Urban Minor Arterials - Those roads that provide service to cities, towns and other traffic generators not served by the arterial system; roads that link these places with the arterial system; and roads that serve the more important intracounty travel corridors.

Rural Minor Collectors and Urban Collectors - Roads that bring traffic from local roads to collector roads; roads that provide service to small communities and link local traffic generators to the rural areas.

Local Roads - Roads that provide access to adjacent land; roads that provide service to relatively short distances. Local roads include all roads not classified as part of the principal arterial, minor arterial, or collector system.

Other Urban Principle Arterials - Roadways with significance that service access to and within the urbanized area. Connections to interstate and rural principle arterials are typical.

After local and state reviews, a final federal-aid network was completed for the Pioneer Valley Region. Table 5-3 summarizes the roadway mile by

functional classification for each community. The functional classification of a roadway may be upgraded or downgraded based on changes in land use, population, and vehicular volume. Communities can request a change in the functional classification through a written request to the PVPC. If PVPC concurs, that a change is warranted, the request is submitted to MassDOT Planning for their approval. Once approved by MassDOT, the change requires endorsement by both the MPO and the FHWA before the functional classification can be officially changed.

Table 5-3 – Miles of Roadway by Community and Functional Classification

		Functional Classification					
Community	**Total**	**Interstates**	**Urban Arterials**	**Rural Arterials**	**Urban Collectors**	**Rural Collectors**	**Local Roads**
Agawam	153.3	0.0	29.2	0.0	27.8	0.0	96.4
Amherst	137.8	0.0	41.3	0.0	5.1	1.6	89.8
Belchertown	162.8	0.0	25.9	7.5	9.4	8.7	111.3
Blandford	89.0	8.5	0.0	0.0	0.0	33.7	46.9
Brimfield	79.0	3.0	0.0	8.9	0.0	17.0	50.1
Chester	67.3	0.0	0.0	6.5	0.0	22.0	38.8
Chesterfield	58.5	0.0	0.0	7.8	0.0	15.6	35.1
Chicopee	261.1	11.4	38.5	0.0	15.5	0.0	195.6
Cummington	61.2	0.0	0.0	13.0	0.0	9.4	38.7
East Longmeadow	100.6	0.0	21.4	0.0	9.4	0.0	69.8
Easthampton	91.6	0.5	25.7	0.0	5.0	0.0	60.5
Goshen	42.1	0.0	0.0	5.5	0.0	8.2	28.4
Granby	68.8	0.0	16.9	1.0	12.3	6.0	32.7
Granville	73.0	0.0	0.0	8.9	0.0	17.3	46.7
Hadley	79.2	0.0	18.5	0.3	4.3	14.7	41.5
Hampden	55.1	0.0	5.8	0.0	2.5	7.3	39.5
Hatfield	59.4	3.8	4.4	0.0	0.0	10.2	41.0
Holland	38.3	0.1	0.0	0.0	0.0	12.0	26.2
Holyoke	176.8	9.9	38.3	0.0	20.9	0.0	107.7
Huntington	54.7	0.0	0.0	11.3	0.0	12.0	31.5
Longmeadow	99.7	3.3	14.3	0.0	5.0	0.0	77.3
Ludlow	137.2	5.8	25.0	0.0	10.0	1.6	94.9
Middlefield	38.3	0.0	0.0	0.0	0.0	7.5	30.9
Monson	110.0	0.0	13.1	3.3	0.9	16.9	75.8
Montgomery	31.2	0.1	0.0	0.0	0.0	8.2	22.9
Northampton	180.8	6.0	48.4	0.0	16.1	0.0	110.3
Palmer	118.1	7.5	30.8	1.6	7.1	9.1	62.0
Pelham	45.8	0.0	2.7	5.7	0.0	8.4	29.0
Plainfield	48.1	0.0	0.0	0.0	0.0	17.7	30.4
Russell	35.8	3.9	7.8	0.0	1.3	6.8	16.1
South Hadley	104.0	0.0	17.8	0.0	10.2	0.0	76.1
Southampton	76.9	0.0	9.3	0.0	7.9	1.4	58.3
Southwick	90.1	0.0	16.3	2.8	10.8	7.7	52.6
Springfield	504.5	11.0	99.4	0.0	46.6	0.0	347.5
Tolland	41.6	0.0	0.0	5.7	0.0	5.3	30.6
Wales	28.5	0.0	0.3	0.0	0.0	12.5	15.6
Ware	115.4	0.0	13.8	4.8	9.0	5.5	82.3
West Springfield	144.6	6.3	30.9	0.0	8.9	0.0	98.6
Westfield	250.3	6.7	47.2	0.0	20.1	0.0	176.4
Westhampton	47.3	0.0	0.2	0.0	0.0	22.0	25.1
Wilbraham	113.8	1.1	20.5	0.0	12.4	4.6	75.2
Williamsburg	50.5	0.0	2.7	7.0	0.0	12.9	27.8
Worthington	65.1	0.0	0.0	10.3	0.0	10.6	44.3
Pioneer Valley Region	**4,387.0**	**88.6**	**666.4**	**111.8**	**278.1**	**354.2**	**2,888.0**

Source: MassDOT

3. Jurisdiction

There are over 4,387 miles of road in the region. As of 2017, city and town governments administered 81 percent of the road miles and the MassDOT was responsible for approximately eight percent. The Massachusetts Turnpike Authority, the Department of Conservation and Recreation, the Federal Government, various park systems and the state colleges and universities administered a small number of roadway miles. Table 5-4 gives an inventory of the region's roadway miles according to the governmental unit responsible for maintaining them.

Table 5-4 – Miles of Roadway by Community and Administrative Unit

Community	Total	Mass DOT	City/ Town Accepted	DCR	State Park	State Institutional	County Institutional	Unaccepted	Combined Federal
Agawam	153.3	14.2	122.3	0.0	4.1	0.0	0.0	12.7	0.0
Amherst	137.8	4.6	99.9	0.0	0.0	8.4	0.0	24.8	0.0
Belchertown	162.8	15.3	127.4	8.0	0.0	2.0	0.0	10.1	0.0
Blandford	89.0	18.2	63.3	0.0	3.5	0.0	0.0	3.9	0.0
Brimfield	79.0	14.7	63.9	0.0	0.0	0.0	0.0	0.3	0.0
Chester	67.3	6.5	56.8	0.0	1.1	0.0	0.0	2.8	0.0
Chesterfield	58.5	0.1	53.1	0.0	0.3	0.0	0.0	5.1	0.0
Chicopee	261.1	16.4	190.6	0.0	1.6	0.0	0.0	36.5	16.0
Cummington	61.2	9.7	48.5	0.0	0.0	0.0	0.0	2.3	0.7
East Longmeadow	100.6	0.0	98.1	0.0	0.0	0.0	0.0	2.5	0.0
Easthampton	91.6	2.9	82.6	0.0	2.3	0.0	0.0	3.8	0.0
Goshen	42.1	7.2	24.9	0.0	4.9	0.0	0.0	5.1	0.0
Granby	68.8	7.7	58.0	0.2	0.0	0.0	0.0	2.9	0.0
Granville	73.0	0.1	64.1	0.0	1.2	0.0	0.0	7.6	0.0
Hadley	79.2	8.3	64.4	0.0	1.7	3.1	0.0	1.6	0.0
Hampden	55.1	0.0	53.9	0.0	0.0	0.0	0.0	1.1	0.0
Hatfield	59.4	7.7	50.0	0.0	0.0	0.0	0.0	1.7	0.0
Holland	38.3	0.1	35.9	0.0	0.0	0.0	0.0	2.4	0.0
Holyoke	176.8	17.0	133.1	0.0	5.3	1.9	0.0	19.5	0.0
Huntington	54.7	11.8	36.6	0.0	0.0	0.0	0.0	2.7	3.6
Longmeadow	99.8	3.3	84.2	0.0	0.0	0.0	0.0	12.3	0.0
Ludlow	137.2	6.1	123.2	0.1	0.4	0.9	0.0	6.7	0.0
Middlefield	38.3	0.0	38.3	0.0	0.0	0.0	0.0	0.0	0.0
Monson	110.0	7.1	100.2	0.02	0.0	0.7	0.0	2.0	0.0
Montgomery	31.2	0.1	30.4	0.0	0.0	0.0	0.0	0.7	0.0
Northampton	180.8	13.8	152.3	0.0	0.0	1.4	0.0	11.5	1.8
Palmer	118.1	23.4	86.9	0.0	0.0	0.0	0.0	7.8	0.0
Pelham	45.8	5.7	22.8	14.6	0.8	0.0	0.0	1.9	0.0
Plainfield	48.1	0.0	47.3	0.0	0.0	0.0	0.0	0.8	0.0
Russell	35.8	13.4	22.3	0.0	0.0	0.0	0.0	0.1	0.0
South Hadley	104.0	8.8	84.3	0.0	0.6	0.0	0.0	10.4	0.0
Southampton	76.9	5.4	67.5	0.0	0.0	0.0	0.0	4.1	0.0
Southwick	90.1	7.2	71.1	0.0	0.0	0.0	0.0	11.9	0.0
Springfield	504.5	12.7	437.7	0.0	6.7	1.6	0.0	45.8	0.0
Tolland	41.6	0.2	39.3	0.0	1.6	0.0	0.0	0.5	0.0
Wales	28.5	5.1	23.4	0.0	0.0	0.0	0.0	0.0	0.0
Ware	115.5	11.1	84.9	16.4	0.0	0.0	0.0	3.1	0.0
West Springfield	144.6	15.2	117.4	0.0	0.0	0.0	0.0	12.0	0.0
Westfield	250.3	16.4	187.5	0.0	0.0	0.4	0.0	46.0	0.0
Westhampton	47.3	0.01	43.8	0.0	0.0	0.0	0.0	3.5	0.0
Wilbraham	113.8	6.2	99.5	0.0	0.0	0.0	0.0	8.1	0.0
Williamsburg	50.5	5.8	42.1	0.0	0.0	0.0	0.0	2.6	0.0
Worthington	65.1	6.0	57.6	0.0	0.2	0.0	0.0	1.4	0.0
Pioneer Valley Region	**4387.04**	**335.5**	**3,591.3**	**39.2**	**36.2**	**20.3**	**0.0**	**342.4**	**22.1**

Source: MassDOT

4. Bridges

Among the existing transportation facilities in the Pioneer Valley Region major bridge crossings remain a focal point for regional transportation concerns, as many streets and highways converge into a limited number of crossings over the Connecticut, Westfield and Chicopee Rivers. Table 5-5 lists the bridges by community according to the governmental unit responsible for maintaining them. Additional information on bridge condition is available in Chapter 6.

Table 5-5 – Number of Bridges by Community and by Administrative Unit

Municipality	Municipal	State	Municipality	Municipal	State
Agawam	1	17	Middlefield	9	0
Amherst	10	5	Monson	13	10
Belchertown	8	4	Montgomery	4	1
Blandford	6	6	Northampton	21	23
Brimfield	17	10	Palmer	8	22
Chester	16	9	Pelham	3	0
Chesterfield	7	3	Plainfield	2	0
Chicopee	5	45	Russell	4	11
Cummington	6	7	South Hadley	4	7
Easthampton	10	9	Southampton	9	2
East Longmeadow	0	0	Southwick	1	2
Goshen	2	2	Springfield	13	48
Granby	7	1	Tolland	0	0
Granville	4	3	Wales	1	0
Hadley	4	6	Ware	9	7
Hampden	8	0	West Springfield	0	26
Hatfield	5	10	Westfield	13	25
Holland	2	0	Westhampton	11	1
Holyoke	9	40	Wilbraham	2	2
Huntington	2	6	Williamsburg	10	7
Longmeadow	0	4	Worthington	10	5
Ludlow	8	15	**Grand Total**	**284**	**401**

5. Vehicle Miles Traveled

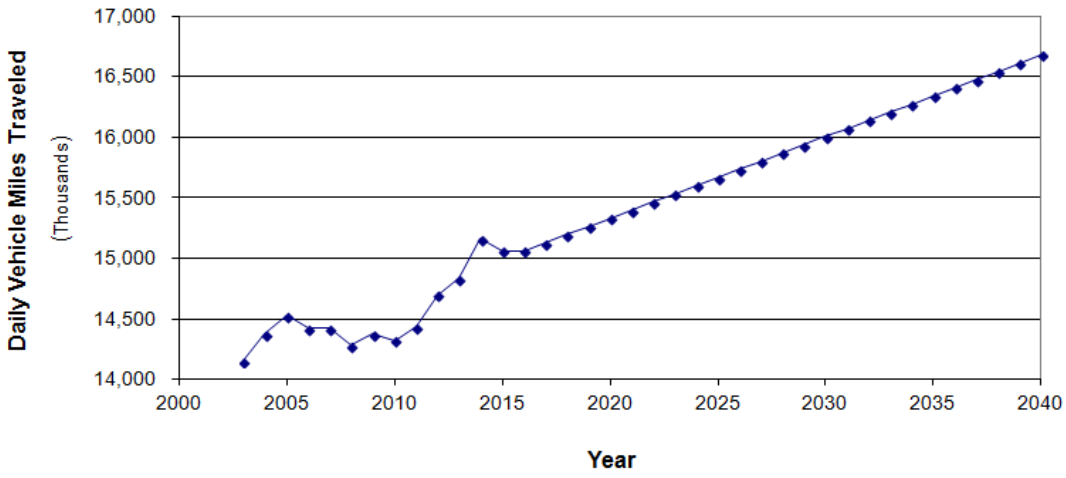
Traffic on the region's roadways has been increasing, in general. In the period between 2003 and 2015, the estimated number of daily vehicle miles traveled (DVMT) in the Pioneer Valley Region experienced periods of fluctuation between increase and decline. However, there was an overall increase of 914,000 vehicle miles per average weekday between 2003 and 2015. A small decrease of 3000 in DVMT was estimated in 2016 followed by a steady

increase in DVMT going forward. The expected increase in DVMT in future years was projected using growth rates from the statewide travel demand model.

The total DVMT values presented in Table 5-6 come from MassDOT's latest and recently revised VMT projections. The projections are based on improved software and traffic volume data collection and processing methods in place as of the year 2015. Projections are made out to the year 2040 based on statewide, regional and county growth rates from the statewide travel demand model. For VMT values for 2014 and earlier, MassDOT applied "retrocast" proportional adjustments that now better reflect true VMT for those years – VMT that they would have captured had they had their improved data collection and processes in place. These adjustments eliminate what was essentially an artificial spike in VMT in recent years.

While these numbers are significantly different from previous VMT estimates, they do not include the new socioeconomic projections included as part of Chapter 13 of this RTP. Changes in total DVMT from 2003 – 2040 are displayed in Figure 5-2.

Figure 5-2 – Estimated Daily Vehicle Miles Traveled



The increase in DVMT is the result of several growth trends identified in the Pioneer Valley as well as other areas of the state and nation. Vehicle ownership is on the rise while vehicle occupancy rates decline resulting in more single occupant vehicles on our roadways. A steady annual increase in traffic volume of 0.44% per year is estimated to occur over the next five years from 2019 to 2023. This projected increase in annual DVMT is estimated to gradually decline in the future. Increases in DVMT from 2036 to 2040 were projected at 0.41% per year.

Table 5-6 – 2000 - 2012 Estimated Urban Daily Vehicle Miles of Travel in the Pioneer Valley (in thousands)

Year	Interstate Highway	Other Urban Principle Arterials	Urban Principal Arterials and Rural Minor Arterials	Urban Minor Arterials and Rural Major Arterials	Urban Collectors and Rural Minor Collectors	Local Roads	Total
2003	4,143	763	3,308	3,301	802	1,834	14,150
2004	4,210	775	3,361	3,354	815	1,863	14,377
2005	4,253	783	3,396	3,388	823	1,883	14,526
2006	4,223	777	3,372	3,364	817	1,869	14,422
2007	4,223	777	3,372	3,364	817	1,869	14,423
2008	4,182	770	3,339	3,331	809	1,851	14,282
2009	4,210	775	3,361	3,353	815	1,863	14,377
2010	**4,193**	**772**	**3,348**	**3,340**	**811**	**1,856**	**14,321**
2011	4,226	778	3,374	3,367	818	1,871	14,434
2012	4,303	792	3,436	3,428	833	1,905	14,696
2013	4,343	800	3,468	3,460	840	1,922	14,834
2014	4,439	817	3,544	3,536	859	1,965	15,161
2015	4,411	812	3,522	3,514	854	1,952	15,064
2016	4,410	812	3,521	3,513	853	1,952	15,061
2017	4,430	815	3,537	3,529	857	1,961	15,129
2018	4,449	819	3,553	3,545	861	1,969	15,196
2019	4,469	823	3,568	3,560	865	1,978	15,263
2020	**4,489**	**826**	**3,584**	**3,576**	**869**	**1,987**	**15,331**
2021	4,509	830	3,600	3,592	872	1,996	15,398
2022	4,528	834	3,616	3,608	876	2,004	15,466
2023	4,548	837	3,631	3,623	880	2,013	15,533
2024	4,568	841	3,647	3,639	884	2,022	15,600
2025	4,588	844	3,663	3,655	888	2,030	15,668
2026	4,607	848	3,679	3,670	892	2,039	15,735
2027	4,627	852	3,694	3,686	895	2,048	15,803
2028	4,647	855	3,710	3,702	899	2,057	15,870
2029	4,667	859	3,726	3,718	903	2,065	15,937
2030	**4,686**	**863**	**3,742**	**3,733**	**907**	**2,074**	**16,005**
2031	4,706	866	3,757	3,749	911	2,083	16,072
2032	4,726	870	3,773	3,765	914	2,092	16,140
2033	4,745	874	3,789	3,780	918	2,100	16,207
2034	4,765	877	3,805	3,796	922	2,109	16,274
2035	4,785	881	3,820	3,812	926	2,118	16,342
2036	4,805	884	3,836	3,828	930	2,127	16,409
2037	4,824	888	3,852	3,843	934	2,135	16,477
2038	4,844	892	3,868	3,859	937	2,144	16,544
2039	4,864	895	3,883	3,875	941	2,153	16,611
2040	**4,884**	**899**	**3,899**	**3,890**	**945**	**2,162**	**16,679**

Sources: Massachusetts State HPMS (Highway Performance Monitoring System) Submittals to FHWA, Massachusetts Road Inventory Data, Massachusetts Statewide Travel Demand Model

6. Average Daily Traffic Counts

The Pioneer Valley Planning Commission (PVPC) monitors traffic levels throughout the Region. Conducting close to 150 roadway segment counts annually as well as compiling counts from various local traffic studies; the PVPC continuously expands the data base. This information is used to measure Average Daily Traffic (ADT), Daily Vehicle Miles Traveled (DVMT), and identify seasonal, daily and hourly trends related to vehicle travel.

In addition to the selective ground counts conducted throughout the region, there are fourteen permanent monitoring stations maintained by MassDOT. The MassDOT locations collect counts hourly, 365 days a year. These permanent count locations are shown in Table 5-7.

Table 5-7 – MassDOT Permanent Count Stations in the Pioneer Valley

Location ID	Community	Roadway	Location
26	Longmeadow	I-91	S/O Springfield City Line
33	Chicopee	I-391	S/O I-90 at Route 116
37	Chicopee	I-391	N/O I-90
2163	Chicopee	I-391	@ Connecticut River Bridge
2252	Chicopee	I-391	N/O I-91
11	Northampton	Route 5/10	S/O Hatfield Town Line
2405	Northampton	I-91	N/O King Street Interchange
2425	Northampton	I-91	BTW. Route 9 & Damon Road
2436	Northampton	I-91	BTW. Rts. 5 & 9
31	Springfield	I-291	S/O Roosevelt Avenue
2251	Springfield	I-291	@Chicopee C.L.
2248	Springfield	I-291	W/O Saint James Avenue
3329	Brimfield	Route 20	.8 km E/O Holland Road
280	West Springfield	Route 5	at the Holyoke City Line
2797	West Springfield	I-91	N/O Route 5
130	Huntington	Route 112	S/O Route 66/112
2164	Goshen	Route 112	0.6 km S/O Ashfield Town Line
1180	Russell	Route 20	1.0 km W/O Route 23
2396	Hatfield	I-91	N/O Chestnut Street

Source: mhd.ms2soft.com

Table 5-8 provides information on the percent change in traffic volumes at the above mentioned interstate locations. By examining the change in traffic volumes at the permanent count stations, information can be developed on the amount of growth occurring at specific locations throughout the region. Locations have been grouped by the functional classification of the roadway and are shown in Figures 5-3 through 5-7. The functional classification of the roadway is an indication of the type and amount of traffic a roadway is expected to serve.

Table 5-8 – Percent Change in Interstate Highway Traffic Volumes

Community	Roadway	Location	Range	% Change
Longmeadow	I-91	S/O Springfield City Line	2006-2016	8.04%
Northampton	I-91	N/O King Street Interchange	2006-2016	-11.47%
Northampton	I-91	BTW. Route 9 & Damon Road	2006-2016	4.74%
Northampton	I-91	BTW. Rts. 5 & 9	2006-2016	-1.32%
West Springfield	I-91	N/O Route 5	2006-2016	2.18%
Hatfield	I-91	N/O Chestnut Street	2006-2016	3.80%
Springfield	I-291	S/O Roosevelt Avenue	2006-2016	11.58%
Springfield	I-291	@Chicopee C.L.	2006-2016	22.59%
Springfield	I-291	W/O Saint James Avenue	2006-2016	15.24%
Chicopee	I-391	S/O I-90 at Route 116	2006-2016	7.99%
Chicopee	I-391	@ Connecticut River Bridge	2006-2016	12.61%
Chicopee	I-391	N/O I-90	2006-2014	15.83%
Chicopee	I-391	N/O I-91	2004-2014	6.48%

Figure 5-3 – Average Annual Traffic for I-91

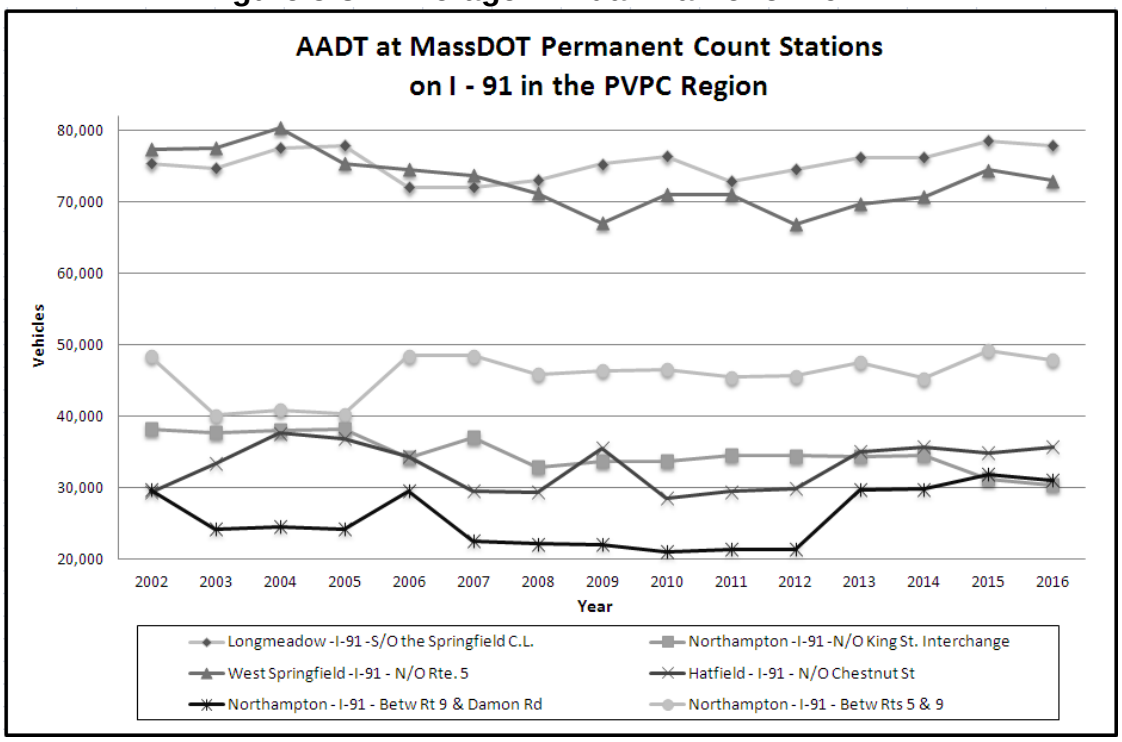


Figure 5-4 – Average Annual Traffic for I-391

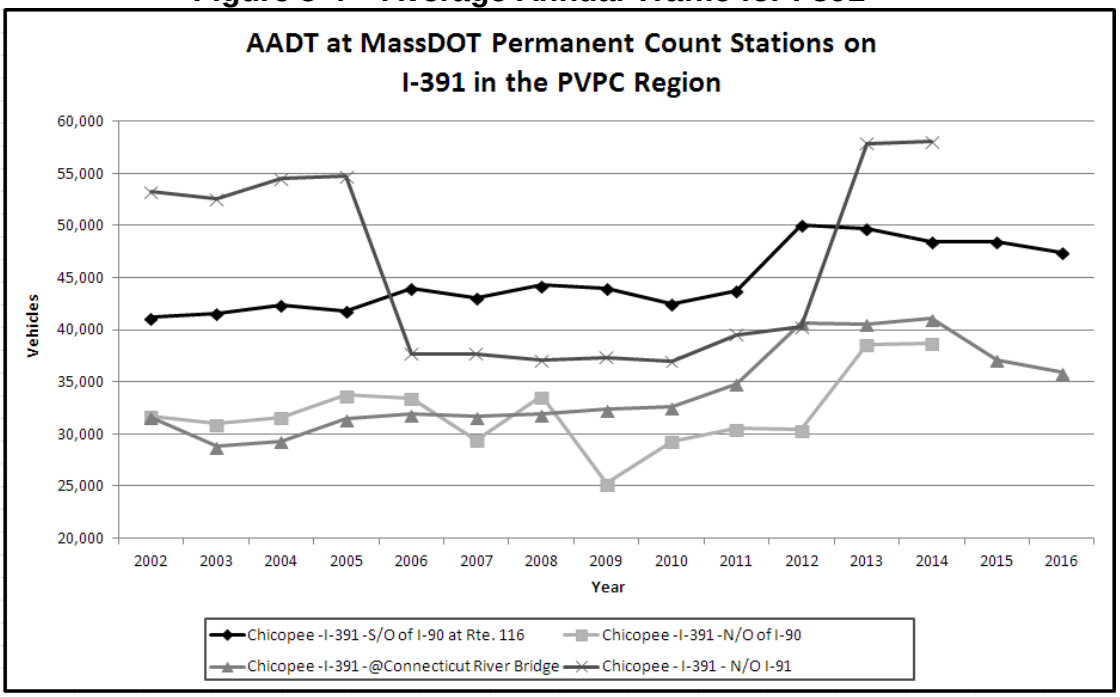


Figure 5-5 – Average Annual Traffic for I-291

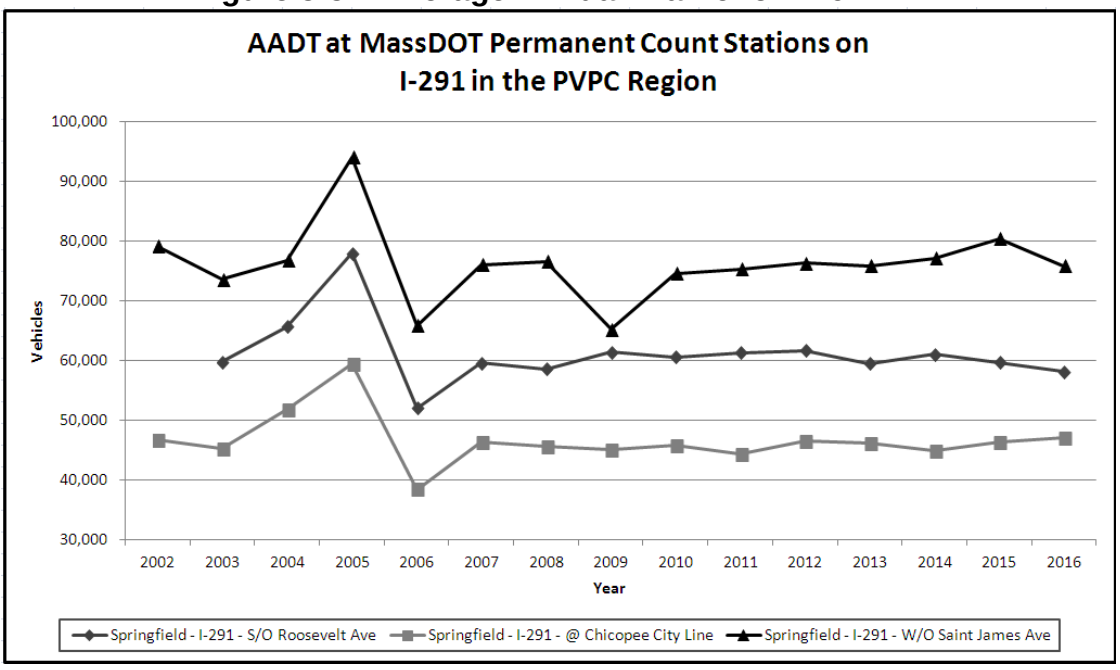


Figure 5-6 – Average Annual Daily Traffic for Arterial Roadways

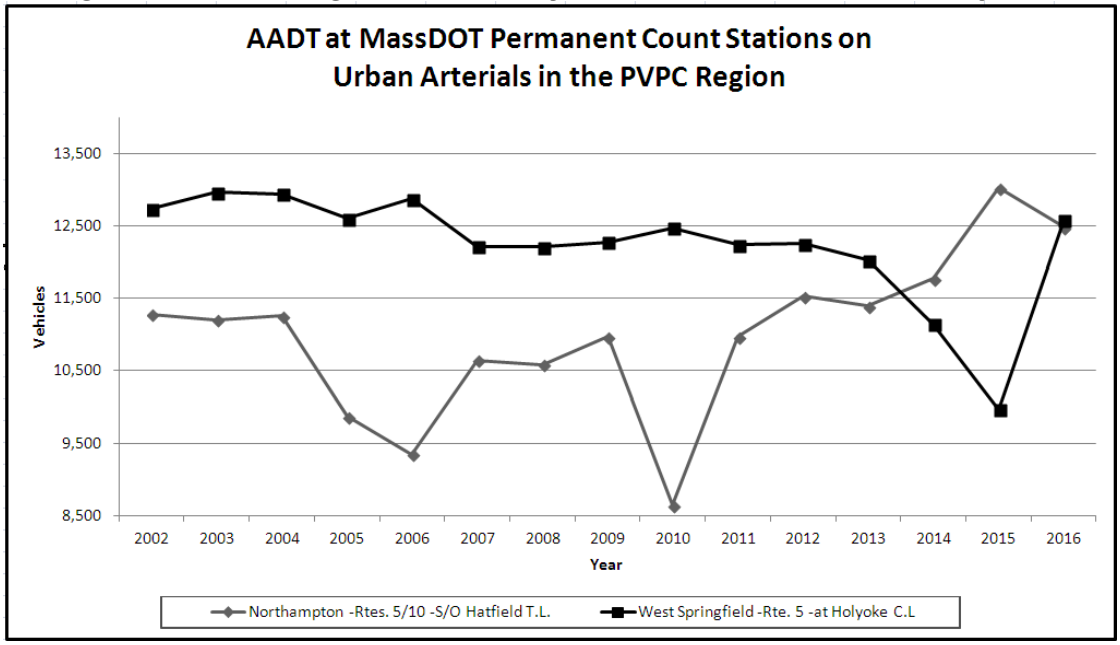
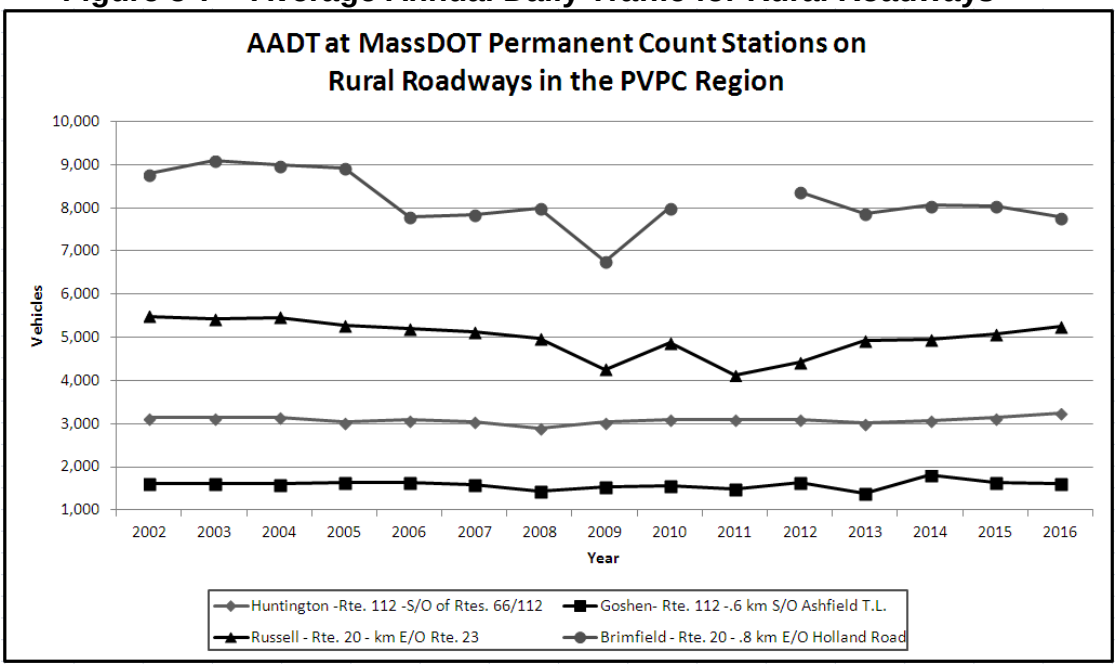


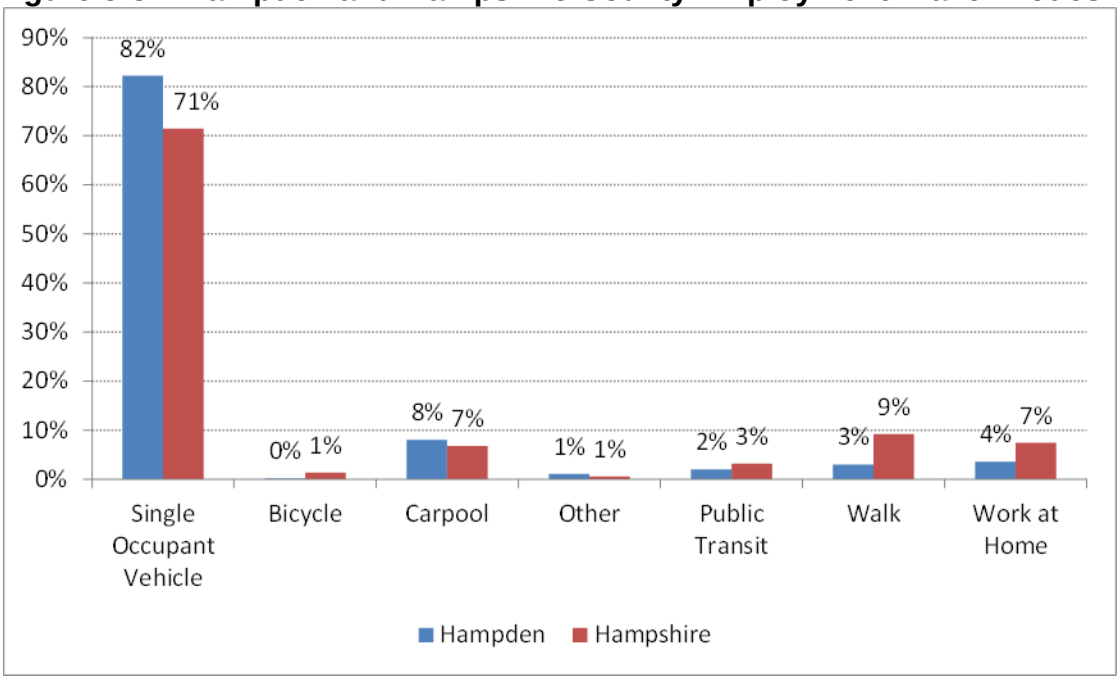
Figure 5-7 – Average Annual Daily Traffic for Rural Roadways



7. Mode Share

Information on mode share data was obtained from the Pioneer Valley Data Portal at http://pioneervalleydata.org/. This data is based on the 2017 American Community Survey (ACS) data and reflects the 5 year average of commuting trends for employment purposes. The data is broken down by county and shown in Figure 5-8.

Figure 5-8 – Hampden and Hampshire County Employment Travel Modes



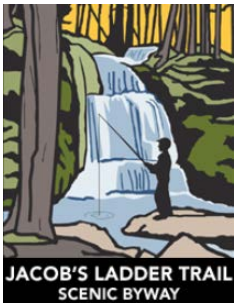
The mode share differences between Hampden and Hampshire Counties are significant but both skew towards single occupant vehicles. Approximately 82% of commuters in Hampden County drive alone to work while only 5% walk, bicycle or take public transit. In contrast, 71% of commuters in Hampshire County drive alone to work while 13% walk, bicycle or take public transit. One reason may be a result of the commuting patterns of the students and faculty that attend the University of Massachusetts in Amherst who may have more travel options.

8. Scenic Byways

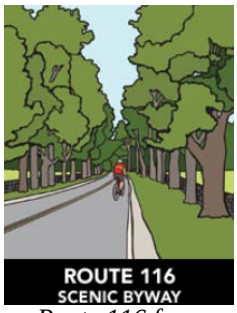
The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration. The program is a collaborative effort to help recognize, preserve and enhance selected roads throughout the United States. Projects included in this program focus on the betterment of the services and facilities that attract and please the traveling public. Over the last fifteen years, the PVPC has taken an active role in the development of planning studies and project development to support the

preservation of scenic roadways in the Pioneer Valley region. There are currently four designated scenic byways in the Pioneer Valley Region.

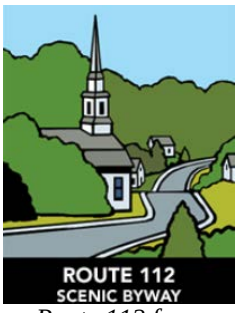
Figure 5-9 – Scenic Byways in the Pioneer Valley Region



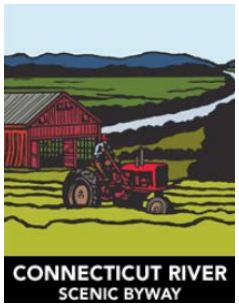
Route 20 from Russell to Lee



Route 116 from Sunderland to Adams



Route 112 from Huntington to the Vermont State Line



Route 47 and 63 from South Hadley to the Vermont State Line

More information on scenic byways, including an interactive mapping tool, in the Pioneer Valley region is available at: http://www.bywayswestmass.com/.

C. PASSENGER TRANSPORTATION

The Pioneer Valley provides an extensive transit system that offers many different modes of public transportation. Intra-county and Intercity buses, van service for seniors and disabled riders, ridesharing, and park and ride lots are all vital to the mobility of the regions residents. What follows is a summary of these services.

- Public buses operating on fixed routes and schedules
- Vans for disabled residents and senior citizens better known as Paratransit
- Commercial scheduled bus service within the region, as well as to destinations beyond the region
- Commercial and non-profit van shuttles, charter buses and taxis
- Passenger rail

1. Pioneer Valley Transit Authority (PVTA) Bus and Paratransit Service

PVTA is the largest regional transit authority in the state. PVTA's service area begins at the Connecticut state line and stretches north to Leverett, MA. PVTA has 42 scheduled or fixed bus routes and on-demand paratransit van service in 24 communities with a total population of 561,952 (2017 U.S. Census estimate).

Funding for PVTA comes from several sources: federal, state and local governments; passenger fares; and advertising. The authority's operating

budget in FY18 is $46.8 million. Member cities and towns contribute an annual assessment to PVTA based on the level of service that operates in their community. Passenger fares cover about 16% of the total cost of the service. Funds for capital improvements are received through various state and federal grant programs.

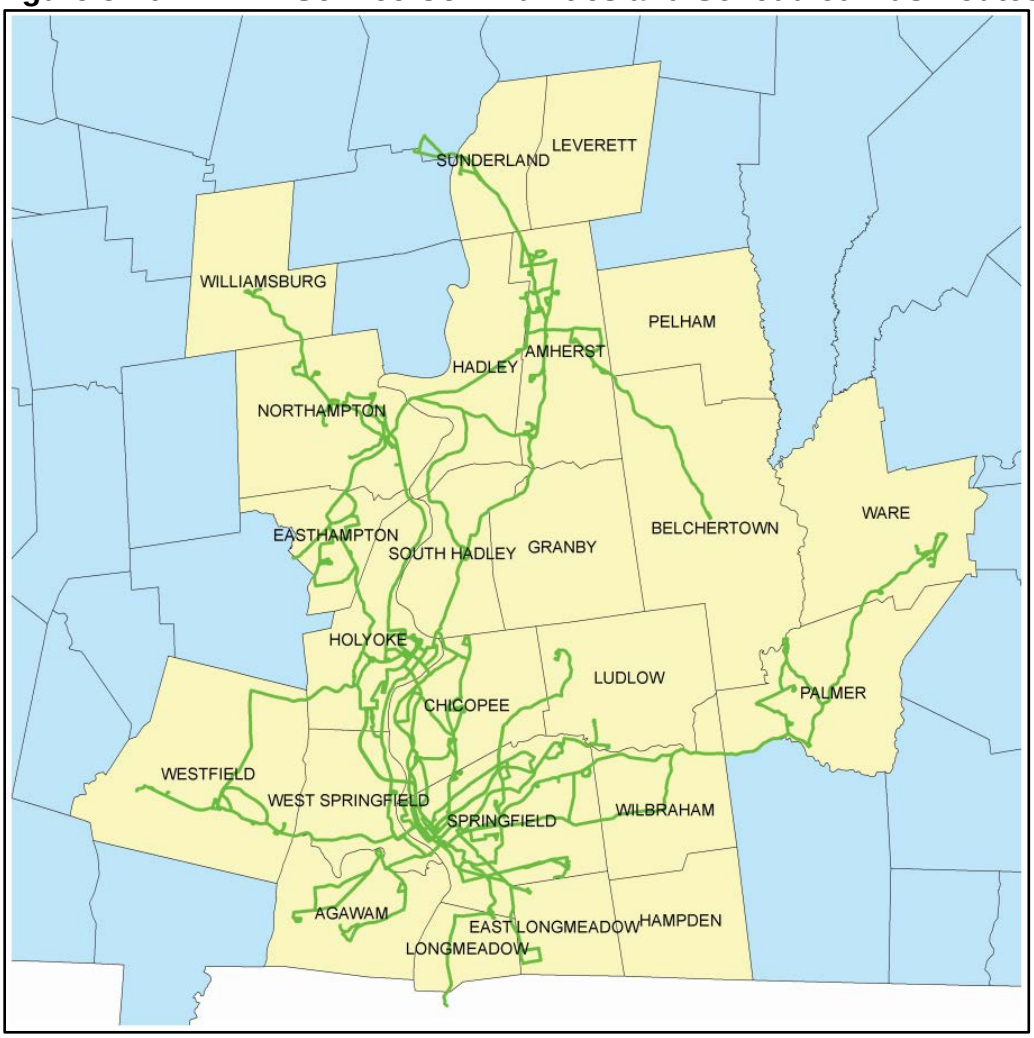
MGL Chapter 161b prohibits PVTA from directly operating transit services so they contract with four private management companies:

- **First Transit** operates fixed bus routes based in Springfield and Northampton
- **UMass Transit Services** operates fixed bus routes based at the University of Massachusetts serving the Amherst area
- **Hulmes Transportation** operates community mini-bus shuttles in Easthampton, Palmer, and Ware
- **NEXT** operates all paratransit van services.

PVTA's basic fare is $1.50 per ride. Transfers cost an extra 25 cents and are good for 90 minutes from time of purchase. Reduced fares of 75 cents per ride are offered for elderly and disabled customers, as well as Medicaid card holders (transfers are 10 cents). The fare for children age 6 to 12 is 90 cents; children younger than age 6 ride free with an adult. Monthly unlimited ride passes are $54, with a discounted price of $26 for elderly, disabled, and Medicaid card holders. PVTA also offers 1-day unlimited ride passes for $3.50 and 7-day passes for $15.

Fares for routes serving the University of Massachusetts are collected under a "proof of payment" system in cooperation with the University and other Five Colleges institutions (Smith, Mount Holyoke, Hampshire and Amherst Colleges). Instead of onboard collection, fares on these routes are collected through activity fees that are paid by students, as well as subsidies from the institutions. Students, faculty and staff of these institutions must be prepared to show their current school ID cards as proof of fare payment when riding the bus. Riders who are not affiliated with the 5 Colleges must purchase multi-ride passes or single ride tickets. Cash is not collected aboard UMass Transit buses in the Amherst area.

Figure 5-10 – PVTA Service Communities and Scheduled Bus Routes



The following cities and towns make up PVTA's service area:

Agawam	Granby	Ludlow	Sunderland
Amherst	Hadley	Northampton	Ware
Belchertown	Hampden	Palmer	West Springfield
Chicopee	Holyoke	Pelham	Westfield
Easthampton	Leverett	South Hadley	Wilbraham
E. Longmeadow	Longmeadow	Springfield	Williamsburg

a) PVTA Bus Riders

A 2015/16 passenger survey found that 55.1% of PVTA riders use the bus to commute to work or school. The remaining trip purposes surveyed were

shopping (12%), medical appointments (10.4%), attending social and recreational events (7.8%), and unspecified (14.8%). A total of 71.5% of riders report earning less than $20,000 per year; 51.5% of riders report no cars available at their household; and 68% of riders say they have no other way to make their trip other than using PVTA.

Table 5-9 – PVTA Bus Route Ridership

Fiscal Year	Passenger Trips	% Change
2008	9,677,076	2.49%
2009	9,896,940	2.22%
2010	9,745,869	-1.55%
2011	10,152,538	4.01%
2012	10,766,142	5.70%
2013	11,128,713	3.26%
2014	11,415,923	2.52%
2015	12,074,280	5.45%
2016	12,154,880	0.66%
2017	11,466,527	-5.66%
2018	10,902,207	-4.92%

Fiscal year: July 1 through June 30 Source: PVTA

b) PVTA Bus Fleet

PVTA's bus fleet consists of 189 vehicles from three manufacturers: 115 Gillig low-floor clean diesel vehicles manufactured after 2006, 67 standard and 4 articulated New Flyer buses, and 3 Proterra battery-electric buses. All buses provide comparable passenger amenities: all are air conditioned and equipped with wheelchair lifts or ramps. PVTA's buses are based at three garages, as shown in Table 5-10.

Table 5-10 – PVTA Bus Fleet

Bus Model	Springfield Garage (Southern Area)	Northampton Garage (Northern Area)	UMass Garage (Northern Area)	**Totals**
Gillig	86	11	18	**115**
New Flyer	45	7	15	**67**
New Flyer (Articulated)	0	2	2	**4**
Proterra	3	0	0	**3**
Totals	**134**	**20**	**35**	**189**

Pictures of the PVTA Gillig low-floor bus, New Flyer standard and articulated buses, and the Proterra battery-electric bus

c) PVTA Paratransit Service

Paratransit is demand response door-to-door van service that is scheduled by the rider. PVTA's fleet consists of 142 vans. These vans are equipped with wheelchair lifts and other special equipment to insure the safety of disabled riders. As the average age of the region's residents continues to rise, the need and demand for paratransit services will increase substantially. Paratransit fares typically cover only about 10% of the service cost.

This section describes the two types of paratransit van service that PVTA provides to residents of its 24 member communities. Total ridership for the service is presented below.

Table 5-11 – PVTA Annual Paratransit Ridership

Fiscal Year	Annual Rides	% Change
2008	308,787	3.00%
2009	308,369	-0.14%
2010	317,733	2.95%
2011	318,869	0.36%
2012	316,208	-0.84%
2013	312,015	-1.34%
2014	304,998	-2.30%
2015	310,133	1.66%
2016	333,830	7.10%
2017	297,627	-12.16%
2018	291,932	-1.91%

Fiscal year July 1 through June 30 Source: PVTA

The ridership numbers for FY 2012 and 2013 are actually going down while the number of seniors using the service is going up. A possible explanation for why ridership is going down is that the PVTA discovered that they were counting the "primary care attendants" (PCA's) as passengers when in fact they should not have been counted. They have since discontinued the counting of PCA's as riders.

- **Americans with Disabilities Act (ADA) Service --** Federal law requires that public transit providers offer paratransit service that is comparable to their fixed route bus service to disabled customers who are unable to use regular buses. Customers must be eligible to use the service, and an application and approval process is required. Trips must be scheduled at least one day in advance. ADA paratransit service is available only within three-quarters of a mile of a fixed bus route, and the trip must start and be completed during the same hours that the nearest regular bus route operates. The fare is $3.00, $3.50, $4.00, or $5.00 per ride, depending on pickup and drop off locations.
- **Senior Dial-A-Ride Service --** PVTA also provides van service to people age 60 and over in its 24 member communities. This service is operated on a space-available basis Monday through Friday from 8:00 AM to 4:30 PM. Fares are $3.00, $3.50, $4.00, or $5.00 per ride, depending on the pickup and drop off locations. Tickets are available from local senior centers and the PVTA Information Center in $0.50 or $3.00 denominations and discounts are often available.

PVTA conducts quarterly Paratransit rider meetings. Meetings are held in both the southern and northern regions – usually within a day or two of each other. PVTA provides free rides to those who wish to attend these meetings. PVTA uses these meetings to pass on any new information to their

Paratransit riders and to get feedback from them regarding any issues they may have with the service.

Councils on Aging (COAs) and Senior Centers in the PVTA service area also provide transportation to their senior residents. Below is a table showing the level and type of service provided by each COA.

Table 5-12 – PVTA Service Area Councils on Aging and Senior Centers

City or Town	Transportation Provided?	# of Vehicles	Hours of Service
Agawam	Yes	2 vans	varies, M-F
Amherst	Yes	No vans - volunteers	Varies
Belchertown	Yes	1 van	8:00 - 3:30 M-Th 8:00 - 1:00 F
Chicopee	Yes	2 cars, 2 vans	8:30-3:30
East Longmeadow	Yes	1 van	9:00 - 3:00
Easthampton	Yes	1 van, 2 shuttles - volunteers	8:00 - 4:00
Granby	Yes	2 vans	9:00 3:00
Hadley	Yes	1 van	Thursday only
Hampden	Yes	1 van	9:00 - 3:00
Holyoke	Yes	3 cars	8:15 - 3:30
Leverett	No		
Longmeadow	Yes	1 van	varies
Ludlow	Yes	2 vans	8:00 - 4:00
Northampton	Yes	1 van - volunteers	varies
Palmer	Yes	2 vans	8:00 - 3:30
Pelham	info not available		
South Hadley	Yes	1 van	9:00 - 3:00 in town
Springfield	No		
Sunderland	No		
Ware	Yes	1 van	9:00 - 12:00
West Springfield	Yes	1 van	8:00 - 4:30
Westfield	Yes	No vans - volunteers	varies
Wilbraham	Yes	1 van	varies
Williamsburg	Yes	No vans - volunteers	8:30-1:30 M-Th

2. Franklin Regional Transit Authority (FRTA) Paratransit Service

There are 14 additional towns in the PVPC region that are not members of PVTA and instead contract with the Franklin Region Transit Authority (FRTA), based in Greenfield, for paratransit service. These towns are: Blandford, Chester, Chesterfield, Cummington, Goshen, Huntington, Middlefield, Montgomery, Plainfield, Russell, Southampton, Southwick, Westhampton, and Worthington.

Because these communities are located in the furthest western and southern portions of the PVPC region, they are not within the ¾ mile buffer of any fixed route bus service in the region and therefore no ADA paratransit service is available. Senior dial-a-ride service is offered for persons age 60 and older through municipal senior centers. In some cases, pre-certification of eligibility

is required. Days, hours of operations, fares and service frequency vary by town. The FRTA paratransit fare varies by route. It is double the fare for the fixed route service.

3. Regional Coordinating Councils

Massachusetts enacted Executive Order 530 in 2011 to enhance the efficiency of community and paratransit transportation services in the Commonwealth. The order seeks to align the paratransit needs of the Commonwealth with current levels of service and assess if the current services conform with federal and state requirements. A major product of Executive Order 530 was the Community, Social Service and Paratransit Transportation Commission Report. This report recommended the formation of Regional Coordinating Councils (RCC) to identify and address existing service gaps at the local level. RCCs are voluntary advisory bodies that seek to:

- Identify unmet service needs
- Develop regional priorities
- Coordinate existing services to serve more people at the local level
- Report unmet needs to the appropriate government agency (i.e. MassDOT)
- Raise awareness of the important role community transportation services play for all

More information on both RCC's in the Pioneer Valley region is provided in Table 5-13.

Table 5-13 – Regional Coordinating Councils in the Pioneer Valley

RCC	Coverage Area	Contact
Pioneer Valley	Agawam, Amherst, Chicopee, East Longmeadow, Easthampton, Granby, Hadley, Hampden, Hatfield, Holyoke, Longmeadow, Ludlow, Monson, Northampton, South Hadley, Springfield, West Springfield, Westfield, Wilbraham	Jennifer Lee, Stavros
Hilltown	Becket, Blandford, Chester, Chesterfield, Cummington, Dalton, Florida, Goshen, Granville, Haydenville, Hinsdale, Huntington, Middlefield, Williamsburg	Kate Bavelock, Hilltown CDC
Quaboag Valley	Belchertown, Brimfield, Brookfield, Charlton, Dudley, East Brookfield, Hardwick, Holland, Monson, New Braintree, North Brookfield, Oxford, Palmer, Spencer, Southbridge, Sturbridge, Wales, Ware, Warren, West Brookfield	Gail Farnsworth French, Quaboag Valley CDC

4. Commercial Scheduled Bus Service

The Pioneer Valley is served by two major commercial bus passenger carriers that provide scheduled service to destinations within the region, as well as cities and towns throughout New England and North America. These carriers serve three bus terminals and other stops in the region.

a) Bus Terminals and Service Locations

- **Springfield Union Station –** Located at 55 Frank B Murray Street in downtown Springfield, this terminal is the regional hub for bus and rail service. The station is owned by Springfield Redevelopment Authority and managed by Appleton Corporation. It has 25 boarding gates, 17 of which are leased to PVTA while 8 are used by intercity buses (Peter Pan and Greyhound). There are waiting areas, a ticket counter and concession vendors for passengers, and a concourse connecting to Amtrak services on Lyman Street. The upper floors are used for office space. On an average day, over 4,000 PVTA customers board at Union Station.
- **Northampton Bus Terminal –** This three-story building at One Roundhouse Plaza behind City Hall accommodates two intercity buses and includes an enclosed waiting area (PVTA service is available one block west at the Academy of Music). Approximately 10 trips per day depart this terminal. The building also contains commercial offices and a restaurant. The terminal was built in 1984 as a project of Peter Pan Bus Lines and the former Western Mass Bus Lines. Today, it is operated by Peter Pan and is also served by Greyhound.
- **Holyoke Transportation Center –** This transit hub is located at 206 Maple Street in downtown Holyoke. It replaced the old Veterans Park location. The center opened in September 2010 and has seven bus bays for PVTA and Peter Pan vehicles. PVTA has 8 routes servicing the Holyoke Transportation Center. On an average weekday, over 850 passengers board at this terminal. It has an enclosed waiting area and a ticket and information desk. It is a joint project of PVTA, Peter Pan and the City of Holyoke. Community and education facilities are located on the upper floors.
- **Olver Transit Pavilion –** This transit hub is located at 10 Arnold Street in Westfield. The pavilion opened in April 2017 with four bus bays for PVTA vehicles, served by 3 PVTA routes. On an average weekday, over 160 passengers board at this terminal. It has an enclosed waiting area with vending machines and real-time departure information.
- **Other Commercial Bus Service Locations –** Service provided by Peter Pan (5 trips per day) is available from the University of Massachusetts and Amherst Center via the Northampton Bus Terminal. Daily service is available to South Hadley and Hampshire College.

b) Commercial Carriers

The commercial bus passenger market in New England is highly competitive. In the Pioneer Valley, there are two intercity carriers. These are described below.

- **Peter Pan Bus Lines** has served the region for more than 75 years. The company carries the most commercial passengers in the region, providing frequent service to destinations within and outside the Pioneer Valley. The carrier has two primary routes with hourly service: Amherst to Boston (via Springfield), and Springfield to New York City. An average of 13 buses per day run in each direction on these two routes. Peter Pan also operates east-west service between Boston and Albany, New York. Travelers can obtain convenient connections from Amherst, Northampton, Springfield, Worcester, and Boston. Peter Pan also operates 7 nonstop trips per day between Springfield and Hartford, Connecticut via I-91, with a travel time of 35 minutes. Service is also provided to Foxwoods Casino in Ledyard, Connecticut and Washington DC.
- **Greyhound Lines, Inc.,** based in Dallas, Texas, serves approximately 3,700 destinations in North America. Greyhound is owned by the Scottish company FirstGroup. Greyhound acquired Vermont Transit Lines of Burlington, Vermont in 2008 and now operates those routes as part of its network. Greyhound offers service from the following locations in the region: Northampton and Springfield.

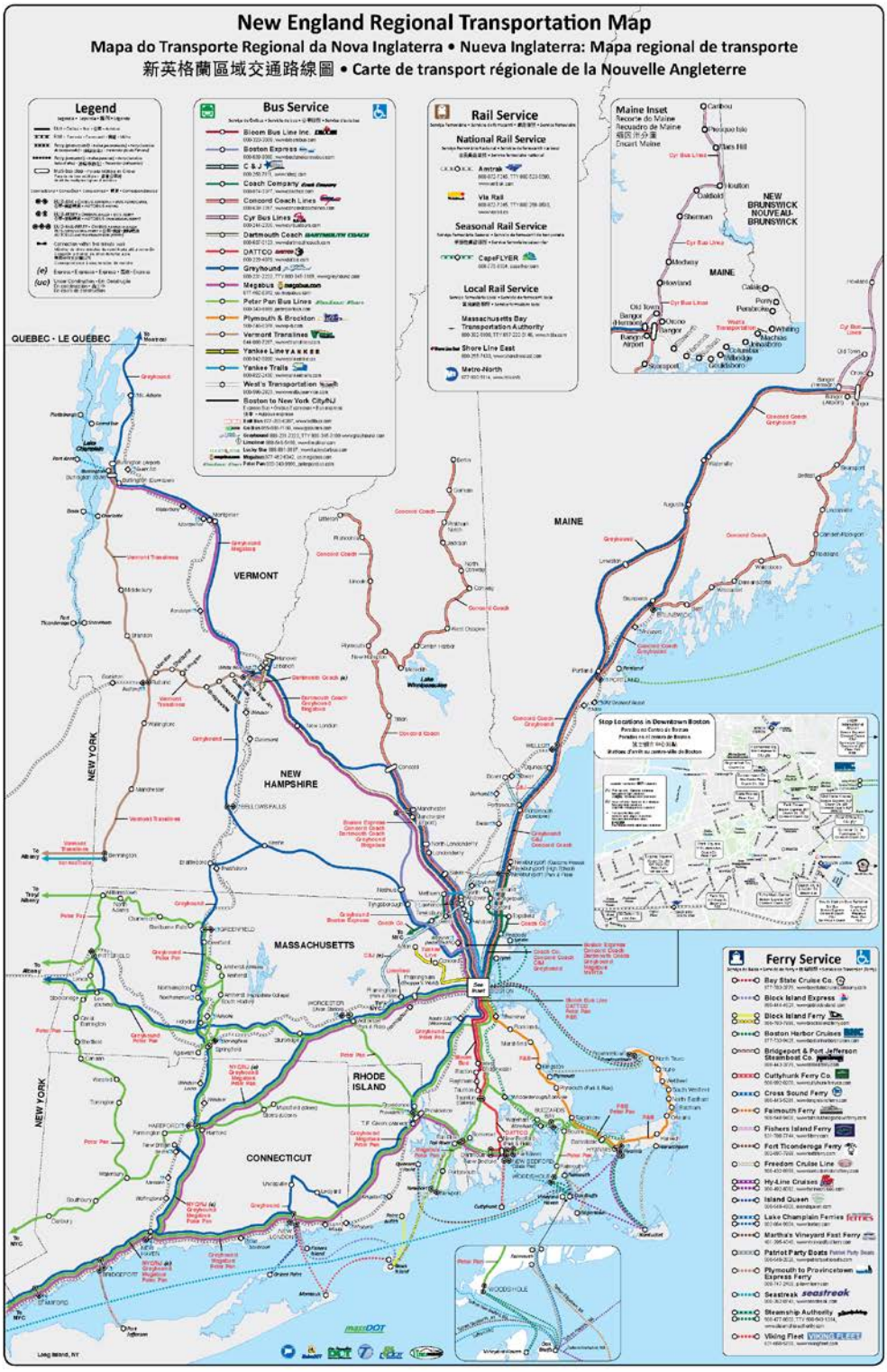
5. Shuttles, Charters and Taxis

There are a variety of transportation services in the region that are geared to help people make trips for tourism, recreation or other special purposes. These are summarized below.

a) Shuttles

Van shuttles serve an important segment of the region's transportation market by serving destinations for which demand maybe relatively frequent; or involve passengers with special needs or schedule requirements. Commercial shuttle operators include Valley Transporter, which focuses on service to and from airports and rail stations in New England, and VanGo, which connects Boston to the Five Colleges. Service to Bradley International Airport is provided hourly from most locations the Pioneer Valley. Service to Boston, Providence, and New York is also provided, though not on a scheduled basis. Non-profit organizations also operate shuttles, typically for their clients. Examples include municipal councils on aging, day care providers and social service agencies.

Figure 5-11 – Intercity Bus Routes Serving the Pioneer Valley



b) Charters and Tours

Charter and tour bus services in the region provide special trips for tourism and other purposes within and outside the region. Commercial companies offer package trips and private party excursions to many attractions throughout the Pioneer Valley, including Yankee Candle Company in South Deerfield, Basketball Hall of Fame in Springfield, MGM Springfield as well as gambling casinos in Connecticut, Six Flags Amusement Park in Agawam, senior tours to Atlantic City, and other recreational trips. Major charter and tour providers in the region include Peter Pan Bus Lines, King Ward Coach Lines and Laidlaw, Inc.

c) Taxis

There are 14 taxi companies operating in the region. All total, 3 of these companies are based in Springfield, with another 4 operating in Northampton, 4 in Amherst, and one company each in Easthampton, Holyoke, and West Springfield. Taxi companies provide a vital link in the transportation system by offering mobility during times and at locations where other transportation is not available.

d) Uber / Lyft

Uber and Lyft are ridesharing applications available in many major cities in the United States. Drivers register with the companies and advertise their availability to provide rides through the respective smartphone apps. Similarly, people looking for a ride can request one through the apps. The pricing structure is similar to metered taxis, but is billed completely through credit cards via the apps. Uber became available for communities in western Massachusetts in 2015, and Lyft in 2017.

6. Ridesharing

The Pioneer Valley has a number of facilities, organizations and programs to help people share rides, either on public transportation or by private autos.

Ride sharing is increasingly popular as more facilities and programs for it become available and the price of auto fuel fluctuates. There are several opportunities for ride sharing in the Pioneer Valley. These are summarized below.

- **Bay State Commute** offers rewards to people who take greener trips. It provides ride matching services for people that would like to carpool to similar destinations. MassDOT's sponsorship of Bay State Commute will end on June 30, 2019 and the service will then be sponsored by Agile Mile, Inc.
- **UMASS Rideshare** helps University of Massachusetts employees and students form carpools, use the bus, or find other ways to get to

campus. The goal of the program is to reduce the number of private cars on campus; UMass has approximately 11,000 on campus parking spaces (not including metered spaces), but 12,000 to 15,000 vehicles come to campus each day. The service is free to employees and students and includes carpool matching, reduced parking fees, preferred parking spaces, free one-day passes, guaranteed rides home, and information on alternative commuter options.

- **Carpooling matching services** in the area help people find fellow travelers who are traveling to similar destinations so they may share rides—either for regular daily commutes within the region, or for one-time long distance trips. An example of this service is RideBuzz (www.ridebuzz.org); many other people use online bulletin boards, such as Craigslist, to find carpooling partners.
- **Commercial car sharing** provides a much needed alternative for private vehicle ownership to people desiring to live car free either by choice or necessity. While rural public transit provides its users with mobility through the Pioneer Valley, it faces limitations in frequency and access to outlying areas. Nationwide, car-sharing companies are considering partnerships with local organizations and community centers to help meet the needs of the low-income population. In our region, car sharing has been established in partnerships with academic institutions to mainly serve their student population and reduce demand for parking on college campuses. The car sharing program in our region is offered by Zipcar, a Massachusetts based car rental company. Currently their local fleet includes 32 vehicles scattered about the Pioneer Valley with the majority located within the Five Colleges area in Hampshire County. Zipcar vehicles are currently available in Amherst, Northampton, South Hadley, Holyoke, and Springfield. Depending on vehicle availability, members can rent by the hour or by the day. The Zipcar Company maintains a policy which gives its members access to any car available in their system at any location in the United States, Canada, and select cities around the world. Members can access the reservation system through a variety of ways including phone, internet, and text messaging.

7. Park and Ride

In the Pioneer Valley, there are several officially designated and “informal” park and ride lots. Those using these lots may be leaving their cars to board a PVTA bus for a local trip, catch a Peter Pan bus for an intercity trip, or join a carpool for a local or long distance trip. These lots are described below.

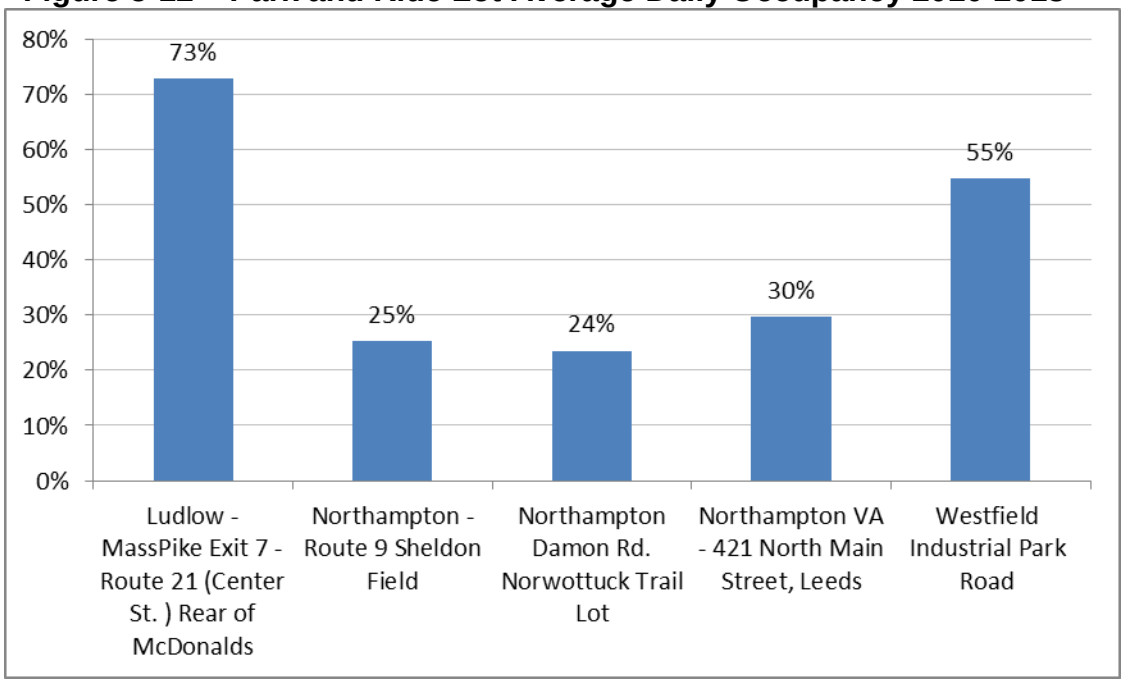
- **Northampton Sheldon Field Lot**—Bridge Street at Day Street. Connection with PVTA B43, M40 and 39. Designated by City of Northampton.

- **Northampton Norwottuck Rail Trail Lot**—Damon Road near Bridge Street (Route 9). Mainly used for carpooling; no convenient PVTA stop. Informal.
- **Northampton Veterans Administration Lot**—421 N. Main St. Leeds. Designated by City of Northampton. Connection with PVTA R42, R44.
- **Springfield Trolley Park Lot**—Main Street at Boylston Street. Connection with PVTA G1, G2, B4, G19, P20, P21). This lot is also near the intersection of I-91 and I-291, making it attractive for regional commuters who may not wish to drive in downtown Springfield. The lot is designated by City of Springfield but is currently closed and used as a construction staging area.
- **Ludlow MassPike Exit 7**—Center Street (Route 21) at Cherry Street near MassPike (I-90) Exit 7. Two lots near the rear and center areas of the McDonalds parking lot. Used principally for carpooling and those parking to ride Peter Pan buses to Boston. Rear lot is formally designated; center lot is informal.
- **I-91 Exit 24**— Median area in Whately near South Deerfield Center. Connection with PVTA Route 46. Formally designated but not counted by PVPC.

There are also numerous “informal” park and ride lots, often at shopping malls and commercial businesses near major highway access points.

A summary of average weekday park and ride usage at known lots is presented below:

Figure 5-12 – Park and Ride Lot Average Daily Occupancy 2010-2018



8. Passenger Rail

The Springfield Union Station is currently served by 24 trains daily providing service in the northeastern U.S. and connections nationwide. Passenger rail service is provided on both East-West routes and North-South routes in the region.

a) Southbound Services

Most trains in Springfield operate south to New Haven as either Amtrak or CTRail trains. There are 11 departures and 11 arrivals on weekdays on this route, of which 4 are CTRail services, 6 are Amtrak Regional services, and 1 is the Amtrak Vermonter service. Amtrak provides daily through service on the Vermonter between Springfield and Washington D.C., with major stops at Hartford, New York City and Philadelphia.

b) Northbound Services

The Vermonter travels once a day in each direction between Washington D.C. and St. Albans Vermont. Northbound trains from Springfield stop at Holyoke, Northampton and Greenfield, following the restoration of passenger rail service on this corridor in late 2014. This expansion of intercity passenger rail has the potential to be a major component in producing economic revitalization, spurring job creation, improving air quality, increasing overall mobility and reducing vehicular traffic congestion. The highest ridership origin-destination pair along Amtrak's entire Vermonter route in now Northampton to New York City averaging over 900 riders per year.

c) Future Commuter Rail

The relocation of the Amtrak service to the Connecticut River Line through Holyoke, Northampton and Greenfield has proven very successful with annual ridership in FY 2017 approaching 28,000 riders. This represents a doubling of ridership compared to 2014 when the Vermonter stopped only in Amherst. Based off the success of this service, four additional trips per day are planned between Greenfield and Springfield. This new service will debut as a pilot program in the summer of 2019.

d) East - West Service

In addition to the Northeast Corridor service, there is also a long distance train that serves the region. The *Lake Shore Limited* serves Springfield by providing daily service between Chicago and Boston.

The Pioneer Valley's East-West service is limited by a situation common to many Amtrak routes. Amtrak leases the tracks it must use from a local freight railroad. Amtrak owns the trains but does not own the track and physical infrastructure that they travel on. The track and ultimate control over trains is

held by the host freight railroad. Here in the Pioneer Valley, CSX is the host freight railroad. Since CSX runs its own freight trains over tracks that are also used by Amtrak, opportunities for expanding service on the East-West line may be limited.

Despite the obstacles, in December of 2018, the Massachusetts Department of Transportation (MassDOT) began a study to examine the costs, benefits, and investments necessary to implement passenger rail service from Boston to Springfield and Pittsfield, with the speed, frequency, and reliability necessary to be a competitive option for travel along this corridor. The study will assess up to six alternatives, which will feature a range of approaches including high speed rail and potential infill stations. Members of an Advisory Committee comprised of the host railroad and civic and legislative members from the region and beyond, are working with MassDOT and a consultant team to advance this project.

D. INTELLIGENT TRANSPORTATION SYSTEMS

Intelligent Transportation Systems (ITS) utilizes technology in traffic control, communications, computer hardware and software to improve the performance of an existing transportation system. Through the dissemination of real-time travel information many benefits can be realized including increased safety, more efficient travel, and reduced congestion levels.

The Intelligent Transportation Systems (ITS) Strategic Deployment Plan for the Metropolitan Springfield and Pioneer Valley Region was completed in 1998. In March of 2005, the Commonwealth of Massachusetts developed a Regional Intelligent Transportation Systems Architecture for Western Massachusetts. This Regional ITS Architecture identifies the existing and planned ITS components in the region and how they will interface. An update to the regional architecture was completed in 2010. MassDOT completed a status report on the deployment of ITS equipment in April 2014.

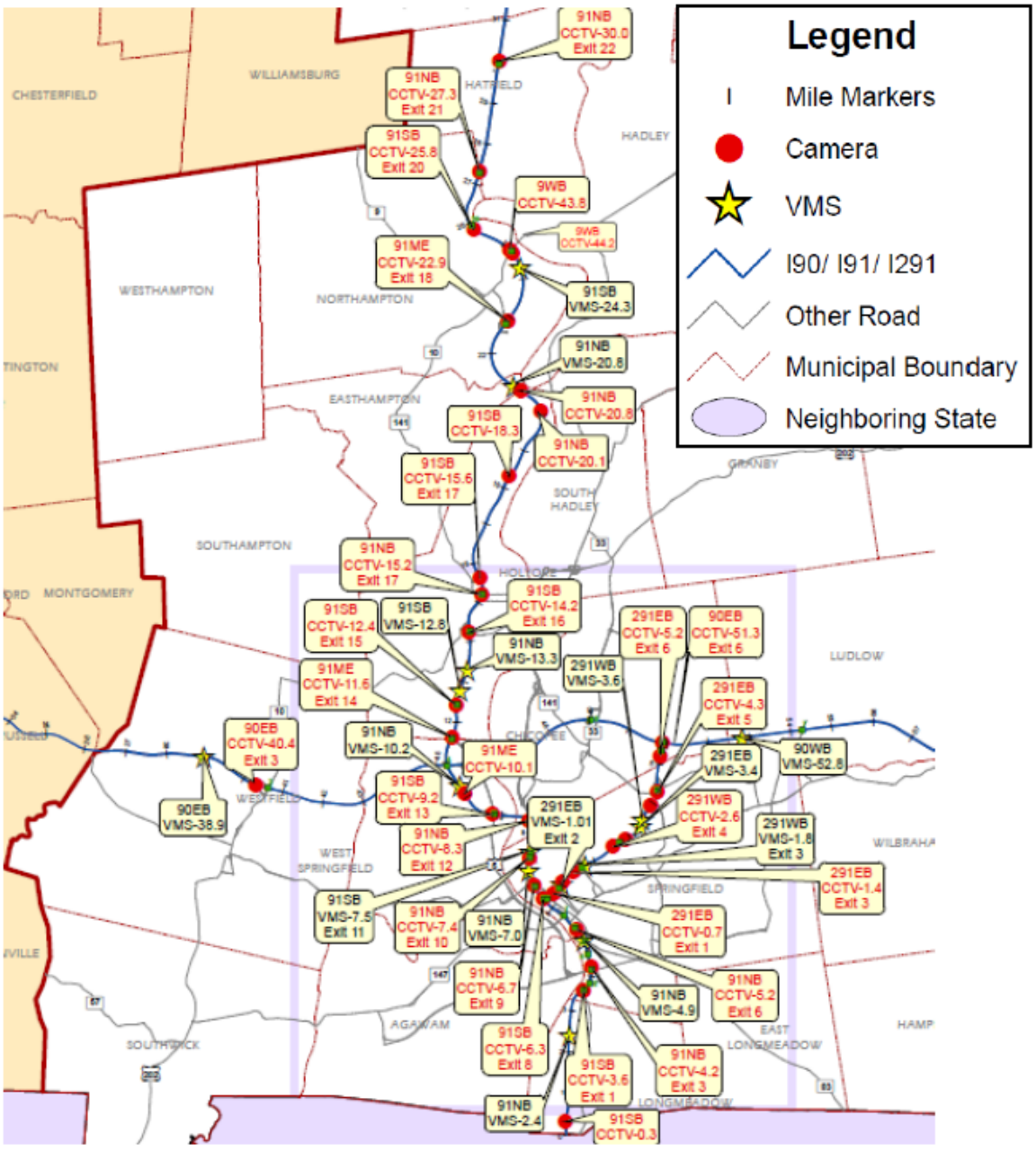
1. I-91 ITS Project

MassDOT initiated a project to design and deploy a communications infrastructure and Intelligent Transportation System (ITS) along the entire length of Interstate 91 and portions of Interstate 291. This project was completed in 2011 and includes:

- 33 closed circuit television cameras (CCTV) and 17 Variable Message Signs
- A fiber-optic communications network connecting the field devices to the District Traffic Operations Center (DTOC) in MassDOT District 2 Headquarters, and to the Statewide Traffic Operations Center (TOC) in Boston,

- I-91 camera monitoring equipment in the State Police facilities in Springfield, Northampton and Shelburne,
- The development of additional capacity to address the needs of regional stakeholders via the installation of 4 empty conduits within the communications network, and
- Communications shared resource infrastructure to support future private telecommunications initiatives.

Figure 5-13 – ITS Equipment Along I-91 in the Pioneer Valley



2. Pioneer Valley Transit Authority ITS Equipment

All PVTA vehicles are equipped with a mobile data terminal, global positioning system (GPS) locator, data radio and emergency alarm. Paratransit vans also have audible and visual navigation assistance. Significant features of PVTA vehicles as a result of ITS technology include:

- Automatic audio and visual stop announcements
- Automatic passenger counters
- Video and audio monitoring

PVTA provides real time information on each bus route through the following website: http://bustracker.pvta.com/infopoint/

3. 511

Access to 511 services for Massachusetts residents is available free of charge at: https://mass511.com/map#camera. Mass511.com allows drivers to set up custom travel alerts and receive real-time traffic information for all major routes. The website also includes a map with live-traffic conditions, planned construction events, and traffic incident updates.

4. Real Time Traffic Management

MassDOT implemented a real time traveler information system called the Real Time Traffic Management (RTTM) system. The system calculates travel time between two or more points along the roadway and displays these live travel times in one minute updates on roadside variable message signs placed at key interchanges and decision points. The purpose of the RTTM system is to inform drivers of the distance and number of minutes it will likely take to travel from the message sign to their destination. This information is available from the following website: https://www.mass.gov/info-details/massachusetts-traffic-map

5. Smart Work Zone Management

MassDOT utilizes ITS devices to monitor, measure and evaluate traffic conditions to provide real-time information to the public and control operations within active work zones. This equipment enables MassDOT personnel to gauge the impact of construction on existing traffic and enhance the safety and efficiency of the work zones. The use of SWZ technology is determined on a project-by-project basis.

6. EZDriveMA

EZDriveMA is MassDOT's all electronic tolling system. The system opened on opened October 28, 2016 and is available in the Pioneer Valley region on

the Massachusetts Turnpike. All tolls are assessed electronically at a series of gantries via an approved transponder or by “Pay by Plate” license plate recognition. For more information see: https://www.ezdrivema.com/.

E. NON-MOTORIZED TRANSPORTATION

Bicycling and walking are inextricably linked to quality of life in our communities. The Pioneer Valley region affords some of the best environments for walking and bicycling in the Commonwealth. An expanding network of off-road trails, vibrant downtowns laced with sidewalks and scenic shared-use roadways create an unmatched potential. As a destination or as a place to call home, the Pioneer Valley offers a wide range of transportation choices. A focus of this plan is on the design and construction of projects and the implement programs that improve safety and encourage bicycling and walking people of all ages and abilities.

Interest and enthusiasm for walking and bicycling is reshaping many of our communities and not just through traditional infrastructure improvements. 2019 marks the 20th year for Bike Week in the Pioneer Valley. Valley Bike will launch a second season in 2019 with 55 stations and a goal of 540 bikes. Currently, 83 schools in the Pioneer Valley activity participate in the Massachusetts “Safe Routes to School Programs” and a walking school bus is a reality at Springfield’s Rebecca Johnson School where parents and the administrator have implemented a “Safe Routes to School” program. Students and faculty at Southampton William E. Norris School have a new shared used path and improved sidewalk connections to their school while middle school students at Montessori School of Northampton can access their school through the new MassCentral Rail Trail tunnel off of Woodmont Road under the active Amtrak line. As of April 2019, 38 communities have participated in complete streets training through Baystate Roads.

The most significant challenge for advancing regional goals for bicycling and walking is funding. While new funding opportunities exist in a revised Safe Routes to School infrastructure program, the MassTrails Program, and Complete Streets Program many communities struggle to find the resources to plan, design, implement and maintain shares use paths, sidewalks, and bike lanes. The Massachusetts Heathy Design Directive and other state guidelines support bicycle and walking and federal programs are recognizing the importance of “context sensitive design” in transportation; infrastructure needs are growing while funding options leave communities struggling to keep up. The most dramatic impact has been at the municipal level. Many of our communities have serious transportation funding gaps. Sidewalks, bridges and locally maintained roads have fallen into disrepair and gaps in funding for the maintenance of this infrastructure is significant. Because

bicycling and walking is inherently dependent on short local trips the lack of maintenance is a real threat.

Several national trends are negatively impacting walking and bicycling in the Region. The reliance on personal handheld devices has expanded rapidly. In Massachusetts (with the exception of those under 18) cell phone use is allowed as long as one hand is on the steering wheel. Distracted driving contributes significantly in bicycle and pedestrian fatalities. The Massachusetts legislature is currently (2019) reviewing revisions to the laws to help address this significant issue.

Another trend has been the increase in the use of sport utility vehicles. The larger vehicles are increasingly seen as a contributing to bicycle and pedestrian fatalities and more information is need. While the region's population remained fairly stable the preference for SUVs has grown.

While many communities such as Springfield and Amherst have very "walkable" downtown areas, the traffic volumes in and around suburban communities continue to create significant obstacles and challenges for those bicycling or walking. The most perplexing challenge has been the regulation of traffic speeds. Travel speed on our streets should be set at a rate that is in the best interest of the public's and enforceable by police. In 2017 MassDOT adopted new procedures for speed zoning that allows municipalities to adopt statutory speed limits. As of 2019 the communities of Springfield, Chicopee and Holyoke have adopted statutory speed limits. The 2017 provision also allows communities to establish "safety zones" at a speed limit of 20 mph in accordance with the MassDOT Procedures for Speed Zoning.

To support the increasing number of people who walk and bike, the Pioneer Valley Metropolitan Planning Organization (MPO) has adopted this update to the RTP that includes policy-related actions and physical projects that local, state, federal and regional partners can collaborate on to improve conditions for pedestrians and bicyclists. The plan includes recommendations for bicycle and pedestrian features in the design and reconstruction of roadway projects, sets goals for bicycle and pedestrian safety, and promotes bicycling and walking through "Complete Street" initiatives.

The Pioneer Valley land use plan "Valley Vision" includes zoning and community development tools to foster environments that support bicycling and walking. Valley Vision lays out a detailed strategy to promote bicycling and walking through compact, mixed use growth in and around urban, town, and village centers.

1. Complete Streets

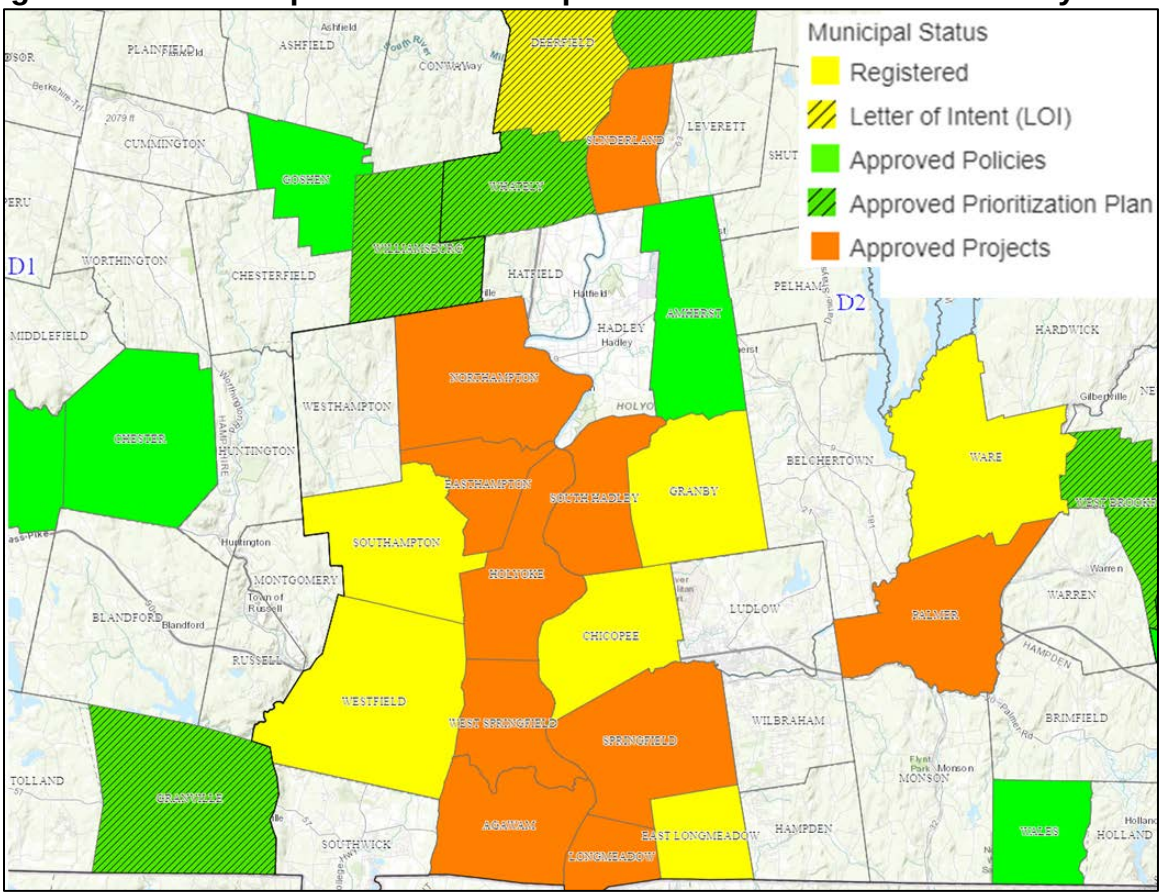
In 2016 MassDOT launched the Complete Street Funding Program to incentivize municipal best practice in Complete Streets policy and implementation. To date, 38 communities have participated in MassDOT sponsored Complete Streets training and 18 communities have actively participated in the Complete Streets Program. Through the program our communities have initiated projects to make local streets safer and more inviting for people to walk, run, and bike. These efforts will improve the health of Pioneer Valley residents through improved opportunities stay active, reducing chronic disease. As of 2019, 12 communities: Williamsburg, Amherst, South Hadley, Holyoke, Easthampton, Northampton, Holyoke, West Springfield, Agawam, Springfield, Longmeadow, and Granville have adopted Complete Streets Policies.

Locally, many Pioneer Valley communities have followed MassDOT's lead by incorporating "Complete Streets" concepts into the planning and design of local road projects. The Cities of Holyoke, Northampton and Springfield have adopted a Complete Streets Bicycle and Pedestrian Plan. Similarly, the Towns of Amherst and South Hadley also have adopted bicycle and pedestrian plans.

Streets are a vital part of livable, attractive communities. Regardless of age, ability, income, race, or ethnicity, everyone is served by safe, comfortable, and convenient access to community destinations and public places–whether walking, driving, bicycling, or taking public transportation. Complete Streets integrates people and place in the planning, design, construction, operation, and maintenance of our transportation networks.

In 2006 MassDOT completed an overhaul of the state's highway design manual and with the new "Project Development and Design Guide" the Commonwealth instituted a comprehensive shift in policy. The "Design Guide' has become a national model for developing better road and bridge projects through a "Complete Streets" approach that balances the need for access and mobility through context sensitive design solutions. The manual "ensures that the safety and mobility of all users of the transportation system (pedestrians, bicyclists and drivers) are considered equally through all phases of a project so that even the most vulnerable (e.g. children and the elderly) can feel and be safe within the public right of way."

Figure 5-14 – Municipal Status of Complete Streets in the Pioneer Valley



2. Bicycle Facilities and Initiatives

Currently seventeen communities provide over 90 miles of bicycle lanes, multi-use paths or “rail trails” in the region, while several communities have similar projects in the design phase.

The Pioneer Valley has much to offer for bicycling including; bike lanes, shared use paths, sidepaths, striped shoulders, wide curb lanes, bike racks on transit, bike lockers, bike parking racks, employer sponsored shower facilities, bike repair shops, maps and online rider resources, community bike share programs, bike rentals, organized rides, and sponsored races. Not far from the region’s urban core, the rural roads of Western Massachusetts offer a vast array of quite scenic New England country roads that can be explored for days on end. At the same time, our communities face challenges in meeting public expectations in expanding and connecting the Region’s bikeway network. Many of the off-road and on-road facilities are disconnected are hampered by pinch points that include bridges.

a) On-road Infrastructure

Massachusetts law requires that bicyclists and pedestrians be accommodated on all roadways except limited access or express state highways. Currently there are 45 miles of designated on-road bicycle facilities. These include bike lanes and designated bike lanes and bike routes in Agawam, Amherst, Brimfield, Granby, Holland, Holyoke, Monson, Northampton, South Hadley, Springfield, and Wales. Many more of these bicycle design treatments are in the planning stages as communities work to implement “complete street” approaches to design.

A major concern for pedestrians and bicyclists are the many bridges in the region. While most new or reconstructed bridge projects have followed state and federal guidelines for improving pedestrian and bicycle access, many bridges still lack sidewalks, and adequate shoulder width. The design and maintenance of these bridges directly influences the ability of people to walk or bicycle.

b) Bicycle Compatibility Index

PVPC frequently uses the FHWA Bicycle Compatibility Index (BCI) to evaluate road conditions for bicyclists. The BCI uses data collected on the roadway including travel lane width, shoulder width, vehicle speed, traffic volume and parking along each roadway segment. The FHWA analysis tool assigns an alphanumeric score to each roadway segment ("A" through "F"). "A" roads represent "perfect" roads for bicycling and "F" is the least favorable. In the Pioneer Valley Region data has been collected for all the federal aid roadways. The BCI data is a useful tool for bicycle coordinators, transportation planners, traffic engineers, and others to evaluate existing facilities in order to determine what improvements may be required as well as determine the geometric and operational requirements for new facilities to achieve the desired level of bicycle service.

The BCI model has been used for the following applications in the Region:

- Springfield Complete Streets Bicycle and Pedestrian Plan
- South Hadley Bicycle and Pedestrian Plan
- Granby Master Plan
- Southampton Route 10 Corridor Study
- Pioneer Valley Regional Bicycle Map

c) Bicycle Parking Improvements

The PVPC has worked with local communities to upgrade and expand existing opportunities for bicycle parking. Through a series of Transportation Demand Management funding commitments, PVPC has worked with local

communities to install parking for more than 700 bicycles. Parking racks have included “U” style racks, ribbon racks, “rib” racks and bicycle lockers. In 2014 PVPC purchased institutional bicycle racks for several “Save Routes to School” partner schools in Springfield. In 2015 PVTA initiated a bike rack purchase program to locate bike racks at high frequency bus stop locations. PVPC also coordinated the purchase of bike lockers for use at park-and-ride facilities.

To assist in the installation of bike racks PVPC created a series of training videos. These and other videos are available on the PVPC YouTube page: https://www.youtube.com/watch?v=um6oagL7bfk

d) Existing Bike Share and Bike Rental Programs

Bike sharing programs are increasingly popular in North America and around the world. PVPC received $87,000 a local technical assistance grant for a feasibility study and preparation in 2016 and 2017. The Pioneer Valley MPO supported $1.3 million in funding from the federal Congestion Mitigation and Air Quality program in 2017 for the creation of ValleyBike, a docked system in Northampton, Holyoke, South Hadley, Springfield, and Amherst (including the University of Massachusetts). ValleyBike officially launched on June 28th, 2018 and remained open until November 30th hosting a total of 26,353 rides. An average of 167 bikes were available at any given time throughout the season at 43 stations. The ValleyBike program is designed to have 500 bikes available at 50 stations throughout the region. Twenty-six stations were opened at the launch in June and 17 more opened in July and August. The remaining seven stations should be opened in Year Two.

There are roughly 535 bike-sharing programs globally, with an estimated fleet of 517,000 bicycles. In addition to ValleyBike, several bike share and rental programs are in operation in the Pioneer Valley. While these programs have different cost structures, equipment, and rental times than a public bike share system, they demonstrate that Pioneer Valley residents and visitors are interested in the convenience of using bicycles without having to make a permanent purchase. Current programs include:

- Private rental companies – Two bicycle shops in the Pioneer Valley offer bike rentals. Northampton Bicycle offers rental of town bikes for $25 for 1 day, $50 for 3 days, and $90 for 7 days, and road bike rentals for $35 for 1 day, $70 for 3 days, $130 for 7 days. Hampshire Bicycle Exchange in Amherst offers rentals of $35 for 1 day or $70 for 7 days if the bicycle has a price less than $350. For bicycles that cost greater than $350, the cost is 10 percent of the price per day, or 25 percent of the cost of the bike per week. Because the Hampshire Bicycle Exchange both buys and sells used bicycles, it is possible to “rent” a

bicycle for a few months by purchasing and selling it back to the store. Both shops provide a lock and helmet with the cost of the rental.

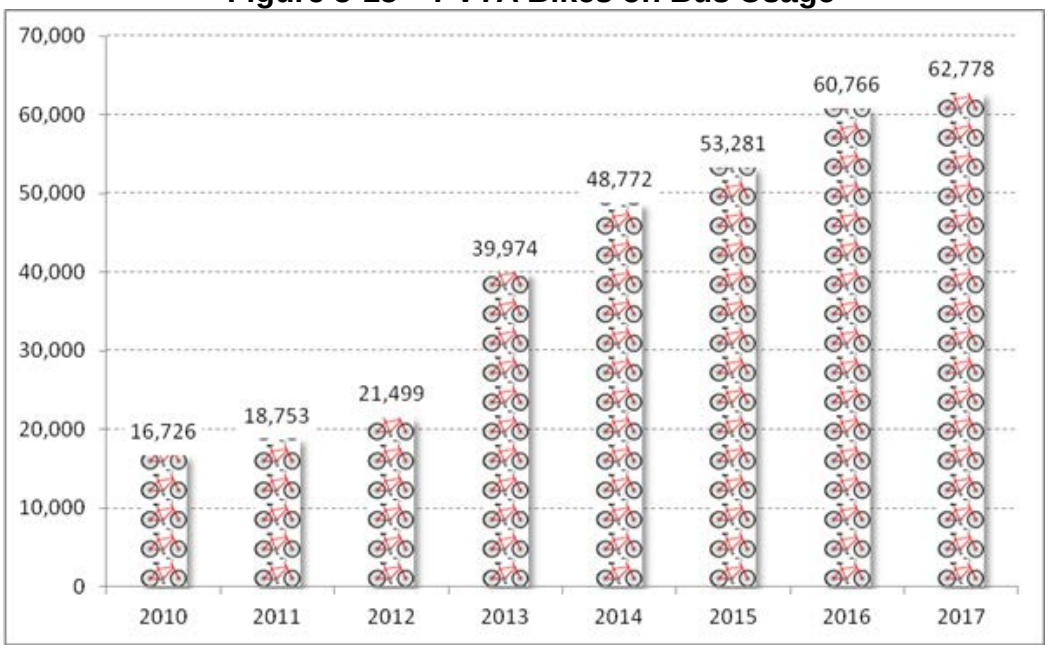
- Smith College Bike Kitchen – the Bike Kitchen, open since 2005, offers Smith students and faculty with maintenance service, bike rentals, and safety education. Rentals are available for $20 per semester and include a lock and helmet. The program's 40 bicycles are in high demand and there is a waitlist to use the program.
- Pioneer Valley Riverfront Club – The PVRC offers children and adult bicycle rentals for $5 per hour. Because the rentals are on an hourly basis, they are primarily meant for short-term, recreational use on the Connecticut River Walk, which is adjacent to the PVRC. Three-wheeled bicycles are also available for those who cannot ride a bike.

e) Bicycle Accommodations on Transit

The Pioneer Valley Transit Authority supports a popular "Rack and Roll" bikes-on-buses program to the entire region. All fixed route buses in the PVTA fleet (40 routes/180 busses) are equipped with racks, allowing cyclists to transport their bikes on public service transit lines throughout much of Hampden and Hampshire County. In 2017 the PVTA bike racks were used 62,778 times (excluding UMass shuttle trips).

Installation of a bicycle on a PVTA bus

Figure 5-15 – PVTA Bikes on Bus Usage



The Pioneer Valley Transit Authority's bikes on bus program "Rack and Roll" has dramatically improved access for bicyclists to transit and given thousands of people another choice in their mode of travel. Increased marketing and promotion for the service included an instructional video to acclimate new users. The video is available online in English and in Spanish at: https://www.youtube.com/watch?v=pNcW-ZaoEfg

f) Off-road Infrastructure (Shared Used and Multi-use Trails/Paths)

Off-road facilities include shared-use paths, sidepaths, rail with trail, traditional bikepaths, and rail trails are popular in the region for a number of reasons. These facilities allow new users to be introduced to the benefits of walking and bicycling while isolating them from potential conflicts with motorized traffic. These facilities provide economic benefits through bicycle tourism and downtown retail and restaurants through foot traffic while reducing dependence on motor vehicle parking. Our strongest downtown business districts are in census blocks groups with the highest levels of walking and bicycling.

The Norwottuck Branch of the MassCentral Rail Trail is one example of the region's commitment to bicycling and walking. The ten-mile Norwottuck Trail links the communities of Northampton, Hadley, Amherst, and Belchertown, and facilitates travel to and from educational institutions, downtown commercial areas, major employment centers and residential neighborhoods. Weekend traffic counts show an average of 1,200 people per day utilize the Trail during the peak season which includes when local colleges and the

University of Massachusetts, Amherst are in session. The Massachusetts Department of Conservation and Recreation (DCR) and Massachusetts Department of Transportation (MassDOT) reconstructed the original 1992 “Norwottuck Rail Trail” (now part of the MassCemtral Rail Trail) in June 2015 after 2 years of construction. The reconstructed path is wider in most places, incorporate a number of accessibility and intersection improvements including re-decked the bridges.

In 2018 construction was completed on a MassDOT tunnel project by Northern Construction Services. The $4.4 million tunnel under the active north-south Amtrak rail corridor provides significant connection between the MassCentral Rail Trail and the New Haven and Northampton Canal Greenway and the Manhan Rail Trail.

In 2019 the Town of West Springfield opened the newest section of the Connecticut River addresses a need for visual access to the river while providing improved access to canoe launch.

The popularity of share use paths in the Pioneer Valley has brought new challenges and opportunities to those that use and manage these facilities. Interest in year round use has pushed many communities to explore options for snow removal, and while recreation use still dominates trail activity many residents increasingly use the facilities for non-recreational trips. In 2018 PVPC commissioned a study of at-grade crossing on shared-use-paths to better understand the safety challenges that these unique intersections present.

Table 5-14 – Existing On and Off-road Infrastructure in the Pioneer Valley Region (draft)

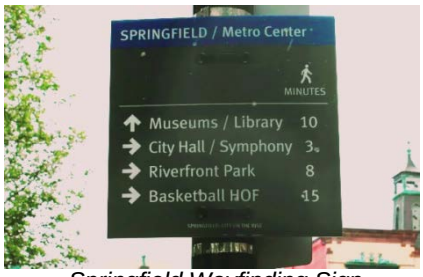
Pioneer Valley Bicycle Facility	Communities	on/off road	Length (in miles)	Date Opened
CT. River Riverwalk and Bikeway	Agawam	off	1.50	9/17/04
Amherst Bike Route	Amherst	on	1.00	
Amherst Bikeway (Route 116)	Amherst	off	3.50	
Five College Bikeway	Amherst	on	6.00	
South Pleasant St. Bike Lanes	Amherst	on	0.25	7/15/01
UMass Connector Bikeway	Amherst	off	1.90	5/15/03
Norwottuck Belchertown Extension	Amherst/Belchertown	off	1.20	5/12/00
Chicopee Center Canal Walk	Chicopee	off	0.20	5/21/10
Redstone Rail Trail	East Longmeadow	off	1.57	9/9/10
Manhan Rail Trail	Easthampton	off	4.20	6/19/04
Dwight Street Bike Lanes	Holyoke	on	0.50	6/12/05
Hampden Street Bike Lanes	Holyoke	on	0.60	5/13/04
Route 5 Bike Lanes	Holyoke	on	1.20	7/8/06
Holyoke Canalwalk	Holyoke	off	0.30	6/25/10
Route 5 Bike Route	Holyoke/Northampton	on	8.00	6/25/86
Springfield (Ludlow) Reservoir Trail	Ludlow	off	3.10	
MBW Trail	Monson, Brimfield, Wales	on	17.00	6/10/98
Elm Street Bike Lanes	Northampton	on	0.80	6/15/00
New Haven and Northampton Canal Rail Trail	Northampton	off	2.10	7/1/05
MassCentral Rail Trail	Northampton	off	2.50	6/6/84
Rocky Hill Trail	Northampton	off	0.50	
Norwottuck Damon Road to Woodmont	Northampton	off	0.80	5/1/08
Norwottuck Look Park Extension to Grove St	Northampton	off	2.00	7/1/05
South Street Bike Lanes	Northampton	on	1.10	9/10/03
Northampton Canal/MassCentral Rail Trail	Northampton	off	1.00	9/26/89
Norwottuck Rail Trail	Northampton/Hadley/Amherst	off	8.50	5/15/93
Southwick Rails to Trails Phase I	Southwick	off	3.14	5/3/10
CT. River Riverwalk and Bikeway	Springfield	off	3.70	7/18/03
Westfield Riverwalk	Westfield	off	2.00	4/16/98
116 Five College Bike Lane Extension	Granby/South Hadley	on	.25	4/25/15
Columbia Greenway (segment 2, 3)	Westfield	off		
Tunnel MassCentral Manhan Rail Trail	Northampton	off	.10	2018
CT. River Riverwalk and Bikeway	West Springfield	off		2019
Ludlow Mills Riverwalk	Ludlow	off		
Agawam Connector Loop Bikeway	Agawam	on/off		
East Hadley Road Sidepath	Amherst	off		2019
Route 116 Sidepath	Amherst	off		
Total Mileage			**90.56**	

Table 5-15 – Proposed Bikepaths for the PVPC Region (draft)

Pioneer Valley Bicycle Facility	Communities	on/off road
North Campus Bikeway Extension	Amherst	on/off
Amherst Bike Route	Amherst	on
Five College Bikeway (including Notch)	Amherst, Granby, South Hadley	on/off
Brimfield Trail Expansion	Brimfield	on/off
CT. River Riverwalk and Bikeway	Chicopee	off
Chicopee Center Canal Walk	Chicopee	off
Redstone Rail Trail Extension	East Longmeadow	off
Route 47 Scenic Farm Bikeway	Hadley, South Hadley	on
CT River Greenway (Damon Rd. to Elm Court)	Hatfield/Northampton	off
Appleton Street Bikeway Improvements	Holyoke	on
Holyoke Canalwalk (segments 2 and 3)	Holyoke	off
Holyoke Canalwalk Route 5 extension	Holyoke/Northampton	on/off
Elm Street Bikeway Extension	Northampton	on/off
Manhan Route 10 Spur to Burts Pit Rd	Northampton	off
Village Hill to Northampton High School	Northampton	off
Damon Road bicycle lanes and sidewalks	Northampton	on
Southampton Greenway	Southampton	off
McKnight Neighborhood Trail	Springfield	off
Ware River Valley Rail Trail	Ware	on/off
CT. River Riverwalk and Bikeway extension	West Springfield	off
Columbia Greenway (segment X)	Westfield	off
Western Avenue Bikeway	Westfield	on/off

g) Bicycle Signage Projects

The Pioneer Valley Planning Commission in collaboration with the City of Springfield, and other Live Well Springfield partners installed new map signs on the Connecticut Riverwalk and Bikeway in Springfield. In partnership with WalkBoston and with funding through Mass-in-Motion 151 pedestrian wayfinding signs with distance markers were installed in Springfield, Belchertown and Northampton.



Springfield Wayfinding Sign

Manhan Trail Guide Sign

PVPC has worked with MassDOT and local partners to install bike route signs along Route 5 in Holyoke, install “share the road” signs in on many popular cycling routes, installed directional signs in Northampton, and installed signs on the Connecticut Riverwalk and Bikeway.

PVPC also partnered with MassDOT and DCR on the installation of “Bay State Greenway” signs on the Manhan Rail Trail, the Southwick Rail Trail, Norwottuck Rail Trail and sections of Route 9 in Williamsburg.

h) Pioneer Valley Share the Road Program

Share the Road video screen capture

The Pioneer Valley Planning Commission in collaboration with with the Franklin Regional Council of Governments to produce a series of public service announcement and informational video on bicycling and bicycle safety entitled “Enjoy the Ride: Share the Road in the Connecticut River Valley” The effort is part of a promotional campaign to encourage bicycling instead of driving. The FRCOG and PVPC received $150,000 in funding to enhance bicycling in the regional, increase accessibility and awareness for commuting by bicycle in Franklin, Hampshire, and Hamden Counties. The goal of the project is to reduce the number of automobile trips by encouraging transportation by bicycle instead.

The videos were aired annually on local cable access channels during Bay State Bike Week and can be viewed here: https://youtu.be/b_0aJ61T8Ug https://www.youtube.com/watch?v=3Eiye4XHMh8&feature=youtu.be

i) Massachusetts Bicycle Plan

The Massachusetts Bicycle Plan was updated by MassDOT in 2019. The Massachusetts Bicycle and Pedestrian Advisory Board in coordination with MassDOT began the process of revising and updating both the Bicycle Plan and the Pedestrian Plan. The plan prioritizes on- and off-road bicycling improvements and identifies a statewide bicycling network. The network improves multi-modal transportation generally and bicycle transportation specifically, as well as recreation, tourism, and economic vitality. Priority corridor such as the MassCentral and New Haven Northampton Canal Line Greenway are The Bay State Greenway are identified in the plan.

j) Walking and Older Adults

In the Pioneer Valley Region, people over 65 the fastest growing age group. Older individuals are more likely to be injured while walking. Access to transit, and mobility can be significant challenges for seniors.

k) Mass-in-Motion

Mass in Motion is a statewide program that “promotes opportunities for healthy eating and active living in the places people live, learn, work and play.” Sixty communities across the state are Mass in Motion communities.

Eight of those are in the Pioneer Valley Region and include Amherst, Belchertown, Northampton and Williamsburg (working under the name, Healthy Hampshire), Holyoke, Springfield, and West Springfield and Palmer. The City of Northampton is the lead agency for the four 'Healthy Hampshire' communities, and the cities of Holyoke and Springfield secured funds directly from the Massachusetts Department of Public Health (MDPH). The Pioneer Valley Planning Commission collaborated with the health agents in Palmer and West Springfield, to help these communities become Mass in Motion communities.

These cities and towns are actively working toward health in all policies, increasing awareness of walking and bicycling opportunities in the community, improving safety for walkers and bicyclists, and working to increase access to healthy food through community gardens, working with local restaurants to assure healthy dining options and working with corner stores to assure healthy food options throughout each community.

3. Pedestrian Circulation

Pedestrian access and circulation are typically better in town or city centers due to the physical design of such places. Shops, offices, restaurants and other amenities are generally clustered together and connected by a pedestrian network which is often more accessible and efficient than the vehicle network. The central business districts of Amherst, Northampton and Springfield offer good examples of downtowns sensitive to pedestrian circulation and access. Sidewalks and walkways are extensive; crosswalks are signalized and access points for persons with disabilities are incorporated.

Sidewalks are the most common infrastructure feature devoted to pedestrian circulation. Whether or not sidewalks are provided in a community can influence the area's overall character and function. In addition to the sidewalks themselves, crosswalks and points of access for persons with disabilities can influence the degree to which these pedestrian networks facilitate circulation. The provision of sidewalks in the region varies with respect to location, quality and function. Many communities in the Pioneer Valley have realized the benefit of encouraging walking through infrastructure improvements. The Town of Ludlow constructed sidewalks within a mile of every elementary school. With children walking to school the town revamped its crossing guard program and saved money on busing. With local funding sources in short supply, many communities have had to “get smart” when it comes to pedestrian improvements. To lower costs, East Longmeadow developed a prioritized sidewalk infrastructure improvement plan and began incorporating the cost of sidewalk improvements into larger roadway re-

construction projects. In the Forest Park neighborhood of Springfield, public works officials replaced painted crosswalks with new long wearing thermoplastic designs. While more expensive initially, the new crosswalks will last 5 times as long as painted crosswalks.

a) Safe Routes to School

The Massachusetts Safe Routes to School program promotes healthy alternatives for children and parents in their travel to and from school. The program aims to reduce congestion, air pollution, and traffic conflicts near participating schools, while improving health and mobility of school-aged children population. Safe Routes to School is a national movement to create safe, convenient, and fun opportunities for children to bicycle and walk to and from schools. The program's goal is to reverse the decline in children walking or biking to schools. Nationally, only 15 percent of schoolchildren walk or bike to school compared to 50 percent in the 1950's. The vast majority of parents prefer to drop their children off at school using their personal automobile. The result is often increased congestion and higher vehicle emissions around the schools.

83 schools in the Pioneer Valley activity participate in the Massachusetts "Safe Routes to School Programs promoting healthy alternatives for children and parents in their travel to and from school. The program educates students, parents and community members on the value of walking and bicycling and provides funding for sidewalks, crosswalks, and traffic calming measures. Funding for construction projects is also available through the Safe Routes to School Program. School that have participated in this program in the past include the William E. Norris School in Southampton, Jackson Street School in Northampton, Doering and Robinson Park Schools in Agawam, Blueberry Hill School in Longmeadow, and Bridge Street School in Northampton. The "revised" Safe Routes to School program also includes funding for painting and markings in the "lines and signs" part of the program.

Massachusetts Safe Routes to School logo

PVPC purchased bike racks through the Live Well Springfield Community Transformation Grant to support the "The Safe Routes to School Program" in Springfield. The Springfield Safe Routes to School program is coordinated by the Springfield Safe Routes to School Alliance and is supported by the Springfield Housing Authority, the Talk/Read/Succeed program, Baystate Health Safe Kids program and Brightwood Health Center, the state Department of Public

Health, Springfield Health and Human Services, Mass in Motion, Partners for a Healthier Community, the YMCA of Greater Springfield and other groups.

Statewide the Massachusetts Safe Routes to School program supports a number of initiatives. These initiatives include “Walking School Bus”, “Footloose Fridays”, “Fuel up to Play” and several educational campaigns.

The Massachusetts Safe Routes to School Program is a central source of Safe Routes services to all interested schools in the state and currently provides services to 43% of public K-8 schools. The program provides safety trainings, classroom visits, presentations to parents and community members, special events, encouragement programs, free promotional items, infrastructure improvements and summer programs.

Three communities in the Pioneer Valley received funding as part of the 2019 Massachusetts Safe Routes to School Program. Funding was awarded to the Robinson Park School and Roberta Doering School in Agawam, Blueberry Hill Elementary School in Longmeadow, and Bridge Street Elementary School in Northampton.

4. Advocacy and Local Organizing Committees

The Pioneer Valley has a long history of strong support and advocacy for bicycling. RadSpringfield is a volunteer-run bike shop in Springfield. Springfield is the largest city in New England without a commercial bike shop and RadSpringfield fills for the purchase of bikes, skill development and community.

Photo of RadSpringfield

Several communities in the Pioneer Valley have established bike advocacy or trails groups that volunteer their time and expertise to promote and improve bicycle facilities while supporting strong bicycle culture. Some of these include, Williamsburg Mill River Greenway Committee, Holyoke Bike/Walk Committee, Walk/Bike Springfield, UMass Cycling Club, Pioneer Valley NEMBA, Friends of the Belchertown Greenway, Brimfield Trail Association, MassCentral Rail Trail Coalition, East Quabbin Land Trust, Mill River Greenway Initiative Group, Northampton Cycling Club, Springfield Cyclonauts, MassBike Pioneer Valley, Friends of the Columbia Greenway Trail, WalkBike Springfield, Friends of the Manhan Rail Trail, Friends of Northampton Trails and Greenways to name just a few.

5. Recreational Activities

Nestled among the forests, farmland, and mountains on the banks of the Connecticut River, the Pioneer Valley is ideally suited for recreational hiking and biking. Our small towns and larger city neighborhoods are where you find great coffee shops, historically preserved buildings, fun music, crowds of young and the young at heart, a strong local food movement, first-rate museums and art galleries, eccentric shops, eclectic restaurants, and residents eager to get outdoors in any season.

a) Regional Hiking Trail Map and Other Guides

The popularity of bicycling in the Pioneer Valley has led to the creation of a several guidebooks specific to the region including the Rubel Bike Map to Western Massachusetts, Bicycle Touring in the Pioneer Valley (Nancy Jane), Bicycling the Pioneer Valley (Marion Gorhan), Touring Jacob's Ladder by Bicycle or Car (PVPC) and Jacob's Ladder Trail Western Region Off-road Bicycle and Trail Guide (PVPC).

The “Pioneer Valley Trails: A Hiking and Biking Guide,” was released for sale at area book stores and outdoor recreation retailers in 2010. The guide shows the locations of many hiking and biking trails in Hampden and Hampshire counties. The guide features a map on one side, showing the locations of 47 trails. The reverse side includes descriptions of each of the trails, including their location, whether they are paved or off-road, the length, types of permitted uses, and parking information. The guide is available many bookstores throughout the region and also available online at http://www.pvpc.org/sites/default/files/2010-trail-hike-guide-sml.pdf)

b) Tourism and Commerce

The growing support of regional cycling businesses is testimony to the unique quality and growing popularity of bicycling in the Pioneer Valley. The region is also home to a local fixed base touring companies such as River's Edge Cycling and hosts nationally ranked races such as the Verge Northampton International Cyclocross.

Local bicycle shops provide a critical supporting role and many are active advocates and partners in the community and many such as New Horizons Bikes in Westfield have hosted numerous events, annual rides, and activities during bike week. Joe’s Garage in Haydenville, Competitive Edge, Northampton Bicycle, Full Circle Bike Shop, Peak Performance Bicycles, Pro Bike, FJ Roberts, Valley Bike & Ski Werks, Hampshire Bicycle Exchange, New England Bicycle, Custom Cycle Bike Shop and Laughing Dog Bicycles are just a few of the many bike shops that play a critical role in supporting a vibrant cycling economy.

6. Massachusetts Pedestrian Plan

The Massachusetts completed an update to Pedestrian Plan in 2019. The plan identifies a set of initiatives and related actions to address identified needs. The six initiatives include:

- Initiative 1: Promote pedestrian safety, accessibility, and connectivity in investment decision-making and project development.
- Initiative 2: Establish a set of prioritized pedestrian projects on MassDOT-owned roadways and bridges to address critical safety, accessibility, and connectivity gaps.
- Initiative 3: Slow vehicle speeds and improve visibility of people walking.
- Initiative 4: Improve pedestrian accessible paths of travel to transit.
- Initiative 5: Launch a year-round maintenance and operations plan for MassDOT-owned pedestrian facilities and support municipalities to do the same.
- Initiative 6: Invest in data collection to inform initiatives 1-5 and to track progress.

In addition to the Plan, a companion document was created, called the Municipal Resource Guide for Walkability. The purpose of the guide is to support cities and towns in their efforts to improve walkability.

7. MassDOT's ADA/Section 504 Transition Plan

MassDOT completed a comprehensive evaluation of its policies, programs, services and facilities to determine the extent to which individuals with disabilities may be restricted in their access to these services and activities. MassDOT's ADA/Section 504 Transition Plan guides the planning and implementation of necessary program, activity and facility modifications over the next several years, which will expand on previous work. This work has included an extensive inventory of sidewalk ramps on jurisdictional roadways (over 35,000 ramps) as part of the ADA/Section 504 Self Evaluation and Prioritization. The data from this inventory is available on Cartegraph's VersaView.

F. AVIATION

The Pioneer Valley is well served by air transportation facilities located within or adjacent to the region. Most air travel from the region goes through Bradley International Airport in Windsor Locks, Connecticut situated 15 miles south of the City of Springfield.

Within the Pioneer Valley there are also a number of airports, the largest of which is the Westover Air Reserve Base and Metropolitan Airport facility in Chicopee and Ludlow. The second largest airport in the region is Westfield-Barnes Airport located and operated by the City of Westfield. It is the third busiest airport in Massachusetts, a general aviation facility home of the Air National Guard 104th Tactical Fighter Group.

The remaining airport in the region, the Northampton Airport, is privately owned and operated with much smaller and less sophisticated facilities. This airport serves both business and recreational uses.

1. Public Airports

a) Bradley International Airport

Bradley Airport located in Windsor Locks, Connecticut, is a state-owned facility that is operated by the Connecticut Airport Authority (CAA). It is New England's second largest airport, serving Connecticut, Massachusetts, New York, Vermont and New Hampshire, and was designated as a medium hub airport by the Civil Aeronautics Board. The airport opened as an Army Air Corps Base in 1941. After World War II it was taken over by the State of Connecticut and was converted to a commercial facility under the name Bradley Field. The name was changed to Bradley International Airport in the 1960s after a 9,500 foot paved runway was opened to accommodate jet aircraft. There are currently three runways and 17 taxiways. The total land area of the airport is approximately 2,000 acres.

The airport, located 15 miles south of the City of Springfield, is the principal commercial airport serving people traveling to and from the Pioneer Valley Region.

The nine major airlines that currently serve Bradley Airport are Aer Lingus, Air Canada, American Airlines, Delta Air Lines, Frontier Airlines, Jet Blue Airways, Southwest Airlines, Spirit, and United Airlines. Bradley provides regular International service to two cities in Canada; Montreal and Toronto, as well as international flights to Dublin, Ireland; Cancun, Mexico; and, San Juan, Puerto Rico.

Approximately 256 (2016) daily flights make Bradley the second busiest New England Airport Behind Logan International Airport in Boston (1,062). The

airport served 4,977,062 travelers in 2018 which is 3.9% higher than the 4,791,884 travelers served in 2017. There are no landing/takeoff limitations or nighttime operational curfews. The airport can handle all types of commercial aircraft including Boeing 747,and the Russian-built Antonov, the largest passenger aircraft in the world.

Table 5-16 – Bradley Airport Operational Statistics

Aircraft Based on Field	64	Aircraft Operations: Average Per Day	256*
Single Engine Airplanes	4	Commercial	61%
Multi Engine Airplanes	2	Air Taxi	21%
Jet Airplanes	31	Transient General Aviation	15%
Helicopters	7	Military	3%
Military Aircraft	20	Local General Aviation	<1%
		* for 12-month period ending 1 March 2016	

Source: http://www.airnav.com/airport/KBDL

The State of Connecticut employs approximately 100 people at Bradley Airport. Salaries are paid through the Bradley Enterprise Fund, which does not use taxpayer funds. Approximately 27,000 jobs are directly or indirectly dependent on airport operations. Bradley Airport generates 4 billion in economic activity yearly with $1.2 billion being in the form of wages.

Bradley Airport is well located to provide easy air access to both the Springfield and Hartford metropolitan areas. For more information on the airport please visit their website http://www.bradleyairport.com/index.shtml.

b) Westfield-Barnes Municipal Airport

Westfield-Barnes is a public airport operated by the City of Westfield and is the home base for the Massachusetts Air National Guard 104th Fighter Wing. The Region's second largest airport is located within the boundaries of the City of Westfield, north of Westfield's central business district and adjacent to the Massachusetts Turnpike (I-90). The airport is also within minutes of I-91. A total of about 1200 acres are owned by the facility. Approximately 600 acres are presently developed with pavement, hangers and airport buildings.

The airport is classified by the Massachusetts Airport System Plan as a general aviation airport providing general aviation service. It serves virtually all aircraft, including commercial jet liners and large, heavy and wide body aircraft. It is capable of handling precision instrument approach operations. The airport consists of two asphalt runways: 02/20 and 15/33. Runway 15/33 is a visual runway that is 5,000 feet long and 100 feet wide. It is equipped with medium intensity runway lights. The primary runway 02/20 is 9,000 feet long and 150 feet wide and equipped with high intensity runway lighting and precision instrument approaches.

Table 5-17 – Barnes Airport Operational Statistics

Aircraft Based on Field	129	Aircraft Operations: Average Per Day	113*
Single Engine Airplanes	100	Transient General Aviation	49%
Multi Engine Airplanes	6	Local General Aviation	34%
Jet Airplanes	4	Military	16%
Military Aircraft	18	Air Taxi	2%
Helicopters	1	Commercial	<1%
		* for 12-month period ending 31 December 2016	

Source: www.airnav.com/airport/KBAF

Land-side development is concentrated in three quadrants: The Southwest quadrant, houses general aviation functions as well as fixed-base operators, based aircraft storage facilities, transient aircraft parking, and airport and Federal Aviation Administration administrative facilities.

The Northwest quadrant consists of the land leased to the Massachusetts Air National Guard (MANG) and Army Aviation Services. Located within this quadrant are the MANG facilities, aircraft parking aprons, alert facilities, hangars, operations buildings, and office space. The F-15's on base now have a 24/7 air sovereignty alert mission. An industrial park is also planned for this area of the airport. In addition, the army aviation support facility operates here with two large hangars, 6 Blackhawk helicopters and 2 operations buildings.

Up until September 2007, the 131st Fighter Squadron (131 FS), 104th Fighter Wing (104 FW) of the Massachusetts Air National Guard at Westfield, operated 25 A-10 Thunderbolt II aircraft until they were realigned through the Department of Defense Base Realignment and Closure (BRAC) of 2005. The 104th changed its mission from Close Air Support to Air Superiority, and its A-10 aircraft were redistributed to other fighter units as a result of BRAC. The 104 FW has now received 15 F-15 Eagles from the former 102nd Fighter Wing.

The Northeast quadrant is the home of General Dynamics Aviation Services, a subsidiary of Gulfstream, which provides a full service maintenance facility to corporate aircraft with its four hangars and one support facility.

For more information on the airport please visit their website http://www.barnesairport.com

c) Westover Air Reserve Base and Metropolitan Airport

Westover is a Joint-use Civilian and Military airport. Located in the City of Chicopee the Westover Airport is strategic to the State and Federal aviation systems. Situated in the heart of the "Knowledge Corridor" in Western

Massachusetts, with a population of 600,000 within a thirty-mile radius, Westover Airport is a unique public use airport. While Westover's main runway is large enough to have been on the list of backup locations for landing the Space Shuttle, the airfield remains spacious enough for virtually any type of aircraft. It is also flexible enough to welcome the emergence of the Very Light Jet era and all other General Aviation air traffic.

Opened originally in 1940 as a World War II training base geographically positioned for European missions, the airport is one of the nation's most successful Joint-use, Civilian and Military facilities. Westover continues its Military use as home to the Air Force Reserve's 439th Airlift Wing. Under the Joint-use agreement the US Air Force retains the responsibilities for the runways, two Instrument Landing Systems (ILS), and a state-of-the-art air traffic control tower. The Westover Airport (civilian) has responsibility for 3 taxiways, its 13 large hangars, a fully equipped passenger terminal and overall civilian aviation operations.

Westover Airport is a navigational hub, located between Boston, Albany and the greater New York City region. By air, all major North American and Western European cities easily reached within hours. The global marketplace is within easy reach of the Westover Airport. Westover Airport proudly demonstrates daily its importance to our region's economy and the State's transportation system.

Table 5-18 – Westover Airport Operational Statistics

Aircraft Based on Field	36	Aircraft Operations: Average Per Day	54*
Single Engine Airplanes	14	Military	73.16%
Multi Engine Airplanes	5	Civilian	26.84%
Jet Airplanes	6		
Helicopters	1		
Glider Airplanes	2		
Military Aircraft	8	* for 12-month period ending 31 December 2017	

Source: http://www.airnav.com/airport/KCEF

Westover Airport runway system is long enough to accommodate all types of aircraft. Its primary runway 5-23 is 11,597 feet long by 300 feet wide and includes two Instrument Landing Systems. The Airport's second runway, 15-33, is 7,081 feet long by 150 feet wide. These runways provide pilots with a safe approach during variable wind and weather.

The Westover Metropolitan Development Corporation (WMDC) is the Civil Airport Authority holds the FAA Part 139 Airport Operating Certificate. The WMDC organized in 1974 to facilitate the conversion of former Military property at Westover to constructive Civilian re-use. It is a public non-profit corporation governed by an autonomous nine member Board of Directors.

Over the past forty years, WMDC has successfully developed three industrial Air Parks in both the Town of Ludlow (Air Park East) and the City of Chicopee (Air Parks/North & West). The three Air Parks have more than 55 industries employing over 4,000 skilled workers. A new Air Park consisting of 88 acres of land owned by WMDC and located south of the airport is currently in the early stages of site development.

The Westover Airport facilities include a Passenger Terminal with adjacent parking lots for 260 vehicles with plenty of room for expansion. On the airfield side of the terminal building there is a reinforced concrete apron over five acres in size to handle aircraft parking for arrivals and departures. In addition, there are 13 large aircraft hangars, ranging in size from 28,600 to 31,500 square feet with 28 foot high doors to accommodate based aircraft and transients.

The WMDC has proactively initiated efforts to protect the air space around Westover through participation in a FAA Part 150 Noise Study Program. A Noise Exposure map has identified the properties most impacted by aircraft noise and the program gives those eligible property owners the option to participate in the voluntary acquisition of their property. A total of 62 parcels and over 223 acres have been acquired through 2017. The funding of the program is provided by the FAA, MassDOT Aeronautics Division and a local matching share from WMDC. WMDC plans to continue the Noise Program into the future, which may have a sound insulation component.

For more information on the airport please visit their website at http://www.westoverairport.com/

2. Private Airports

a) Northampton Airport

The Northampton Airport, operating under the names of both Paradise City Aviation and Pioneer Valley Balloons in the past, is privately owned and operated. In August 2004, a local corporation, Seven Bravo Two, LLC purchased the assets of the airport. Along with this purchase, a new flight school/fixed-based operator office was established at the airport know as Northampton Aeronautics, Inc. The airport has been running since the early 1920's and became an official airport on April 1, 1929. It is classified as a Basic Utility II airport that serves general aviation uses, both business and recreational. Located in the City of Northampton, the airport covers 55 acres, has one asphalt runway 3,365 feet long and 50 feet wide with variable high intensity, pilot operated runway lighting. Northampton Airport has an estimated 85 flights per day and estimated 60 based aircraft. The runway underwent a $1.2 million reconstruction in 2000. In spring of the 2010 the

ramp in front of the maintenance hangar was expanded allowing for more operating space. A new hangar was built in 2010. Northampton Airport offers 24 hour self service fueling, and minor and major maintenance service. The airport is closed to aircraft and helicopters with a gross operating weight in excess of 12,500 lbs. Seaplanes can operate on the Connecticut River, which is parallel to the runway.

Table 5-19 – Northampton Airport Operational Statistics

Aircraft Based on Field	89	Aircraft Operations: Average Per Day	85*
Single Engine Airplanes	80	Local General Aviation	95%
Multi Engine Airplanes	8	Transient General Aviation	4%
Ultralights	1	Military	1%
		Air Taxi	<1%
		* for 12-month period ending 08 August 2016	

Source: http://www.airnav.com/airport/7B2

The Northampton Airport normally employs between 15 and 17 employees with as many as 30 during the peak summer months. Besides its large commercial business the airport has chartered flights flying 24 hours a day, 7 days a week to destinations all over the country. It also has an FAA approved part 141 flight school, which is the largest flying school in Western Massachusetts.

For more information on the airport please visit their website at http://www.northamptonairport.com/

G. TRANSPORTATION OF GOODS

The major interstates and rail lines in the Pioneer Valley Region enable the quick delivery of goods to some of the world's largest economies of New York, Boston, and Philadelphia. The regions economics are also influenced by the surrounding mid sized cities such as Albany, Hartford, Worcester, and New Haven. The proximity of these major and middle sized cities allows goods from the Pioneer Valley to be quickly transported to competitive markets.

Freight is moved in and out of the Pioneer Valley primarily by truck with rail, air and pipeline carrying the remaining goods. Freight shipments within, from, and to the state of Massachusetts are summarized in Table 5-20 by domestic mode share for 2007, 2012 and 2015. Truck continues to be the dominate mode for transporting freight. For more information on the transportation of goods, please refer to the Massachusetts Freight Plan: https://www.mass.gov/lists/massachusetts-freight-plan-documents

Table 5-20 – Shipments Within, From, and To Massachusetts by Domestic Mode Share

		within			From			To		
Trade	Mode	2007	2012	2015	2007	2012	2015	2007	2012	2015
Domestic	Truck	98.98%	98.98%	99.61%	79.84%	79.58%	91.24%	72.20%	71.39%	74.29%
	Rail	0.09%	0.09%	0.27%	4.90%	4.31%	0.67%	6.99%	7.06%	0.00%
	Water	0.00%	0.00%	0	0.05%	0.05%	0.00%	0.23%	0.24%	7.71%
	Air (include truck-air	0.00%	0.00%	0	0.08%	0.09%	0.31%	0.13%	0.13%	0.42%
	Multiple modes & mail	0.12%	0.12%	0.11%	2.30%	2.23%	2.49%	2.55%	2.44%	3.77%
	Pipeline	0.00%	0.00%	0.01%	11.65%	12.58%	5.29%	16.99%	17.86%	13.81%
	Other and unknown	0.81%	0.81%	0.00%	1.18%	1.16%	0.00%	0.91%	0.89%	0.00%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.01%	100.00%
Import	Truck	70.08%	69.79%	83.43%	95.60%	94.91%	55.45%	70.24%	71.58%	56.11%
	Rail	0.00%	0.01%	6.17%	0.13%	0.14%	19.72%	23.25%	20.90%	30.32%
	Water	0.00%	0.00%	6.21%	0.01%	0.01%	22.29%	0.00%	0.00%	5.47%
	Air (include truck-air	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.07%	0.04%	0.78%
	Multiple modes & mail	0.10%	0.14%	0.74%	4.00%	4.60%	1.75%	5.25%	6.13%	7.33%
	Pipeline	29.01%	29.15%	3.40%	0.00%	0.00%	0.70%	0.00%	0.00%	0.00%
	Other and unknown	0.81%	0.92%	0.04%	0.26%	0.34%	0.03%	1.19%	1.36%	0.01%
Total		100.00%	100.01%	100.00%	100.00%	100.00%	100.00%	100.00%	100.01%	100.00%
Export	Truck	66.82%	67.48%	80.28%	80.15%	80.40%	74.51%	68.07%	68.28%	79.62%
	Rail	0.06%	0.06%	1.43%	5.83%	6.10%	6.00%	2.31%	2.23%	8.51%
	Water	0.00%	0.00%	0.47%	0.03%	0.04%	10.87%	0.00%	0.00%	6.50%
	Air (include truck-air	0.00%	0.00%	0.00%	0.26%	0.22%	1.40%	0.02%	0.02%	0.90%
	Multiple modes & mail	3.45%	3.51%	2.07%	8.35%	8.76%	7.10%	23.37%	23.45%	4.48%
	Pipeline	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Other and unknown	29.68%	28.95%	15.75%	5.37%	4.49%	0.12%	6.23%	6.02%	0.00%
Total		100.01%	100.00%	100.00%	99.99%	100.01%	100.00%	100.00%	100.00%	100.00%

Source: FAF Version 3.5

1. Trucking

Trucking is the dominant mode for moving freight in the Pioneer Valley. The majority of private carriers in the region are small, short haul carriers handling feeder and distribution traffic. They provide both full truckload and less than truckload deliveries. This mode has the ability to transport goods to the northeastern United States and southeastern parts of Canada by overnight service. These freight companies carry goods for a variety of industries outside Hampden and Hampshire County. The future competitiveness of the industry hinges on the investment in the maintenance and development of interstate, state and local roadways, multimodal facilities and all related infrastructure.

Major trucking routes tend to follow Interstate 91 and Interstate 90 in the region. While the interstate routes carry the highest amount of truck traffic, trucks typically provide the final trip between freight terminals, manufacturers or distributors. As a result it is important to maintain efficient freight corridors to assist in the transportation of goods in the Pioneer Valley.

a) Critical Freight Corridors

The National Highway Freight Network (NHFN) is defined by FHWA to prioritize routes critical to interstate commerce. Critical Urban and Rural Freight Corridors (CRFCs and CUFCs) provide connectivity to the NHFN for manufacturers and consumers. The Pioneer Valley MPO is responsible for designating public roads for the CRFCs and CUFCs in accordance with the FAST Act. The CRFCs and CUFCs for the Pioneer Valley were designated by the MPO on May 23, 2017 and summarized in Table 5-21.

Table 5-21 – Critical Freight Corridors in the Pioneer Valley MPO

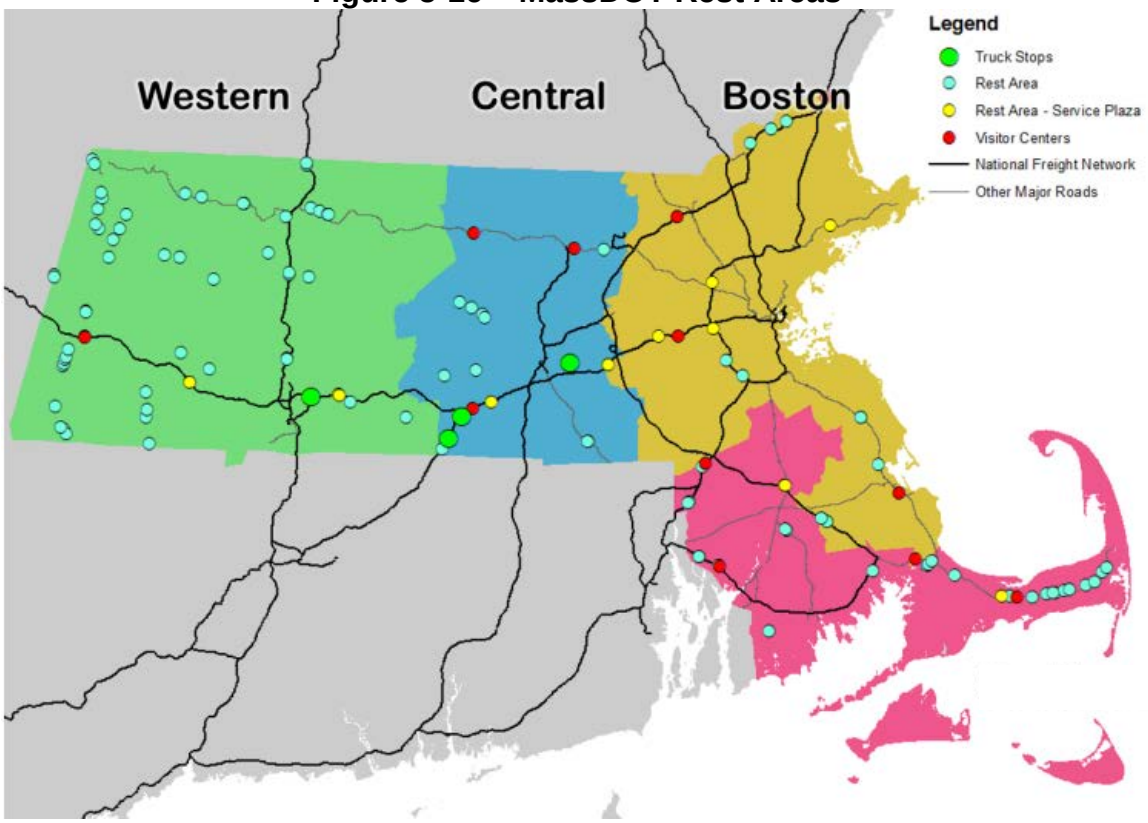
Critical Rural Freight Corridors					
Route Number	**Street Name**	**Town**	**Start**	**End**	**Length**
Route 5	West Street	Hatfield	Church Avenue	Plain Road	2.25
Route 112	Worthington Road	Huntington	County Road	Route 20	2.02
Route 32	Ware Road	Palmer	Old Warren Road	Old Belchertown Road	4.41
Route 202	Daniel Shays Highway	Belchertown	Allen Road	Shutesbury Town Line	8.12
Route 20	Huntington Road/Russell Road	Russell/Huntington	Route 112	Route 23	6.12
				TOTAL	**22.92**
Critical Urban Freight Corridors					
Route Number	**Street Name**	**Town**	**Start Point**	**End Point**	**Length**
Route 10/202	Southampton Road	Westfield	Route 202 North Apremont Way	I-90 Exit 3	2.93
	South Street	Ware	Benham Avenue	Route 9/32	0.62
	Damon Road	Northampton	King Street	Interstate I-91 Exit 19/Route 9	0.98
	Cottage Street	Springfield	Roosevelt Avenue	Berkshire Avenue	1.53
	Garden Street	Agawam	Bowles Road	Route 57	0.55
	Roosevelt Avenue	Springfield	Bay Street	Page Boulevard	0.89
Route 5	West Street/North King Street	HatfieldNorthampton	Elm Street	Linseed Road/Church Avenue	0.71
Route 20/32/181	N. Main/Thorndike Streets	Palmer	Holbrook Street	I-90 Exit 8	1.2
	Burnett Road	Chicopee	New Lombard Road	I-90 Exit 6	0.29
				TOTAL	**9.7**

b) Rest Stops

Drivers of commercial motor vehicles must follow strict hours of service regulations established by the Federal Motor Carrier Safety Administration (FMCSA). As a result, safe, convenient rest areas are important for long-haul drivers to meet hours of service regulations. MassDOT rest areas in the Pioneer Valley region are show in Figure 5-16.

In addition, the Pride Traveler Center is located on Burnett Road in the City of Chicopee off Massachusetts Turnpike Exit 6. Another private truck stop with an associated rest area is located in the City of Westfield off Massachusetts Turnpike Exit 3. PVPC staff has started to document usage of regional truck rest stops. These truck rest stops are described below:

Figure 5-16 – MassDOT Rest Areas



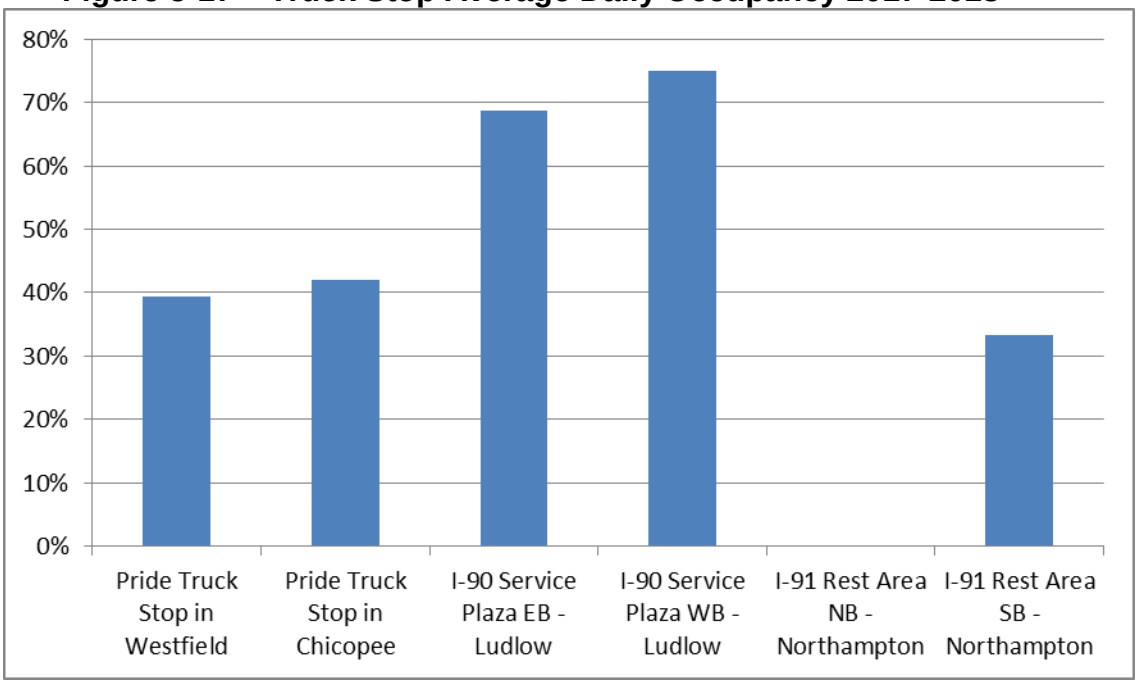
Source: MassDOT

- **Pride Truck Stop in Chicopee**—Located directly off of Exit 6 for the Massachusetts Turnpike, this privately operated facility features a gas station, restaurant, and weigh station. There are a total of 157 parking spaces. There is a fee for parking after 3 hours.
- **Pride Truck Stop in Westfield**—Located directly off of Exit 3 for the Massachusetts Turnpike, this lot has a total of 38 parking spaces. Parking is free but signs restrict overnight parking to no more than 3 consecutive nights.
- **Pride Truck Stop in Springfield**—Located directly off of Interstate 91 Exit 9B on Route 20, this privately operated facility features a gas station, convenience store, and weigh station.
- **Massachusetts Turnpike Service Plazas in Ludlow**—A total of 8 truck parking spaces are provided at both Massachusetts Turnpike Service Plaza in Ludlow, MA. Many trucks also park in unmarked spaces along the guardrail in these areas.
- **I-91 Rest Areas in Northampton**—Trucks are allowed to parking in both of these small rest areas but there are no formally marked spaces. No other services are provided.

There are also numerous “informal” lots, often large retail parking areas near major highway access points. A summary of average weekday usage of

known truck rest areas in the Pioneer Valley is presented below. No trucks were observed to park in the I-91 NB Rest Area in Northampton.

Figure 5-17 – Truck Stop Average Daily Occupancy 2017-2018



2. Rail

Five rail carriers provide freight service in the Pioneer Valley Region: CSX Transportation, Pan Am Southern, New England Central, Pioneer Valley Railroad, and MassCentral Railroad.

a) CSX Transportation

In June 1999 the assets of Conrail were split between CSX and Norfolk Southern. CSX took over Conrail's operation in Massachusetts and now owns and operates the east-west mainline between Selkirk, New York and Boston. CSX also owns and operates a spur line between Springfield and Ludlow.

b) Pan Am Southern Railways

In 2008, the Surface Transportation Board approved the merger between Pan Am Railways and Norfolk Southern Railway creating a new joint venture railroad consisting of a portion of Pan Am Railways in New York, Vermont, Massachusetts, and New Hampshire. Pan Am Southern Railways now owns the Boston & Maine Railroad (B&M) and its subsidiary Springfield Terminal Railway Company (STRC). B&M is the region's second largest rail carrier, operating a north-south mainline along the Connecticut River from Springfield, to East Deerfield. Pan Am Southern also owns secondary lines that run from

Chicopee to Chicopee Falls and from Holyoke to Westover Industrial Airpark in Chicopee. Lying north of the region, but also important to the region's rail system is the B&M east-west mainline. This Pan Am Southern line is now known as the Patriot Corridor and provides Norfolk Southern the opportunity to compete with CSX for New England Traffic.

c) New England Central

The New England Central Railroad (NECR) is owned by Genesee and Wyoming Railroad Services, Inc. and offers freight service between St. Albans, Vermont and New London, Connecticut via the eastern portion of the Pioneer Valley region. Although the line is not heavily traveled, it has been rehabilitated and operates profitably. In December of 2018 it was announced that NECR would be receiving $10.8 million in Better Utilizing Investments to Leverage Development (BUILD) funding along with $9.6 million from MassDOT. NECR will be investing $9.6 million as well for a total of $30 million to upgrade the 60 miles of track in Massachusetts to accommodate 286,000 lb. freight car standards.

d) Pioneer Valley Railroad

The Pioneer Valley Railroad (PVRR) is owned by the Pinsly Company and provides short line service on tracks formerly owned by Conrail. The PVRR took over two lines in 1982, each approximately 15 miles long, connecting Westfield with Holyoke and Northampton. The PVRR can accommodate intermodal transfers at the ends of each route, has 48-state motor carrier authority, and directly connects to both CSX and the B&M railroads.

e) MassCentral Railroad

MassCentral (Massachusetts Central Railroad Corporation) is an independent firm based in Palmer, Massachusetts. The operation of the railroad is managed by the Finger Lakes Railroad. Like PVRR, MassCentral Railroad provides short line service on a former Conrail line. Since 1979 this railroad has operated the former Ware River secondary line, which runs 24 miles from Palmer, through Ware, to North Barre, Massachusetts. MassCentral connects with CSX in Palmer. After abandonment by Conrail, the line was purchased and rehabilitated by the Commonwealth of Massachusetts. The Commonwealth maintains ownership of the majority of the line and leases the tracks to MassCentral.

f) Yards Terminals

The region's major freight and intermodal yard is located in West Springfield (CSX). CSX is currently making significant infrastructure improvements to the West Springfield facility. Another major freight and switching yard important to the region but located outside the region, is B&M's East Deerfield Yard in

Franklin County. Within the Pioneer Valley other smaller freight yards are located in Holyoke, Palmer, and Westfield.

g) Services

Much of the freight moved in Massachusetts is interstate traffic with either Selkirk, New York (CSX) or Mechanicville, New York (Pan Am Southern) providing connections to long haul lines. In addition to traditional general freight (boxcar) service, all of the region's railroads offer contract rates for volume shipments, consultation services for custom-designed transportation packages, and intermodal freight facilities allowing the transfer of goods from rail to truck and vice versa. The geographic location of the Pioneer Valley at the crossroads of interstate highways (I-90 and I-91) and long-haul rail lines (CSX and B&M) creates a strategic and attractive location for businesses and industry participating in the local or international marketplace.

3. Air Freight

Air freight can be sent in two different methods. The first option would be to transport air freight by companies which own and maintain their own all-cargo aircraft fleet, such as AirNet or DB Schekner. The second option is via scheduled passenger aircraft for which the shipper places the cargo with a freight forwarding (pooling) company. The forwarder contracts for blocks of space on commercial airlines for specific routes. According to the U.S. Department of Transportation, for identification purposes, air freight services are categorized into whether goods are time sensitive, or less time sensitive; whether they are sent by integrated or nonintegrated providers; or by the major type of cargo carrier, which are identified as being one of the following: express carrier, scheduled, mail or chartered air service providers.

Currently there are no major air freight facilities in the region. This lack of this particular regional shipment method does not limit the air freight and package services options for Pioneer Valley residents. Air freight inbound or outbound of the region typically travels through these airports: Bradley International Airport in Windsor Locks, Connecticut, Logan Airport in Boston, or New York City’s metropolitan airports. Westover Metropolitan Airport in Chicopee, MA seldom has automotive or large machine parts shipments. This limited amount of freight is not tracked or reported by the airport.

Bradley International Airport is a medium-hub airport located 15 miles southwest of Springfield, MA, in Windsor Locks, CT. Bradley’s convenient location near Interstate 91, and air cargo facilities, make it the primary choice for the regions shippers. In 2012, more than 122,000 tons of air cargo enplaned or deplaned at Bradley International. Airport choice for air cargo transport is dependent on a number of factors, including destination

coverage/schedule factors, tariff structure, logistical and contractual considerations, and access time and distance of individual airports. Therefore, some of the region's shippers may choose Boston's Logan airport, or one of New York City's metropolitan airports for air cargo services.

4. Pipeline

There are presently three pipelines serving the Pioneer Valley. One provides natural gas, while the other two provide petroleum products. Pipeline goods are critical to the national and regional economy. These lines provide energy resources for buildings, motor vehicles and power plants to maintain the economy and existing infrastructure.

a) Natural Gas

Natural gas pipelines, owned by Kinder Morgan, Inc. run along the region's southern edge. The system's trunk lines originate in the southern Louisiana/Texas/Gulf of Mexico area, travels northeast through the country and region, divides in Hopkinton, Massachusetts, and terminates in Gloucester, Massachusetts, Providence, Rhode Island and Concord, New Hampshire. The main lines cut through ten area communities from Tolland in the west to Holland in the east. These mainlines are 24-inch and 30-inch diameter pipelines.

A lateral line also runs north from Southwick to Northampton. This lateral is 8-inch diameter pipeline and becomes a 12-inch diameter pipeline north of Cook Road in Easthampton. This lateral serves Berkshire Gas, Holyoke Gas, Westfield Gas and Bay State Gas Companies. Additionally, two lateral pipelines originate from a compressor station in Agawam, MA: a 10-inch lateral that feeds Bay State Gas in Agawam, MA and an 8-inch lateral that feeds the Berkshire Power plant located in Agawam, MA.

There are several natural gas distribution companies in the Pioneer Valley providing service to the region's communities via their own network of pipelines. Identification of these individual pipeline networks is outside the scope of this report. All, however, are fed by the main trunk line.

b) Jet Fuel

Buckeye Pipeline Company is a common carrier of petroleum products within the states of Connecticut and Massachusetts. Buckeye Pipeline Company is a wholly owned subsidiary of Buckeye Partners, L.P. (NYSE: BPL). Buckeyes' local office is located in East Hartford, Connecticut, but management control is directed from Brenigsville, Pennsylvania.

The Buckeye Pipeline Company system includes a trunk line of approximately 111 miles in length. Of this, 93 miles are 12-inches in diameter, 7 miles are

10-inches in diameter, and 11 miles are 8-inches in diameter. There are also a number of spur lines to individual shippers that vary in length and diameter. Petroleum products enter the system at Buckeye Pipeline Company's New Haven Harbor receiving terminals. The trunk line terminates in Ludlow, Massachusetts. Delivery locations for the line in the Pioneer Valley include Springfield, Ludlow and the Westover Air Reserve Base in Chicopee.

c) Gasoline, Kerosene, Distillates

Mobil Pipeline Company, Inc. operates a petroleum product pipeline between Providence, Rhode Island and Springfield, Massachusetts. The pipeline located in the Pioneer Valley is 6-inches in diameter and managed by the company's main headquarters in Houston, Texas.

H. INTERNET INFRASTRUCTURE

The availability of reliable, high-speed internet service is important to enhance the connectivity and economic vitality of the Pioneer Valley region. The Massachusetts Broadband Institute (MBI) works to make affordable, high-speed internet available to all residents, businesses, schools, and other public entities in Massachusetts.

1. Last Mile Program

On April 3, 2017, the Commonwealth and the Executive Office of Housing & Economic Development launched a new grant making program for unserved towns. The Last Mile Infrastructure Grant program provides funding for eligible towns for municipally-owned broadband networks. MBI defines 9 unserved communities in the Pioneer Valley: Blandford, Chesterfield, Cummington, Goshen, Middlefield, Montgomery, Plainfield, Tolland and Worthington. The MBI supports broadband access projects that provide access to minimum speed requirements, demonstrate funding and financing plans, and achieve operating sustainability.

2. Middle Mile Program

Middle Mile describes the network infrastructure that connects local networks (last mile) to other service providers. MBI completed construction of an open-access, middle mile fiber-optic network in early 2014. The network consists of approximately 1,200 miles of fiber, connecting 123 communities in western and north central Massachusetts. The system is operated by KCST USA.

I. POPULATION

1. Trends

While the population in the Pioneer Valley region grew at a modest rate during the 1980s—increasing 3.6% to 602,878 residents—population growth slowed to a trickle in the 1990s. Between 1990 and 2000, the region's population grew by 0.9 percent, reaching 608,479 persons. This is compared to a 5.5 percent increase for the Commonwealth of Massachusetts and a 13.2 percent increase for the nation as a whole. Between 2000 and 2010, the region's population grew by 2.4%. Population growth has remained steady since 2010.That the population of the Pioneer Valley region grew at all is a direct result of foreign immigration. Every year of the 1990s the region experienced a net loss in domestic migration (more people moved away to other parts of the country than moved into the region from other parts of the country). Apart from the arrival of 16,025 foreign born persons in the 1990s, the region would have experienced a 1.7 percent loss in population during the decade. Table 5-22 shows the region's population in the last seven decades. While population grew in the early part of the 2000s to reach 627, 125 in 2009, almost 4,000 people had left by 2010, for an effective growth rate of 2.4%. Massachusetts growth rate for this same period of time was higher at 3.4%.

Table 5-23 shows the shift of population from urban areas to suburban and rural areas over the past 50 years. Suburbanization of the region became prominent in the 1950's when the communities adjacent to the urban core cities experienced unprecedented rates of growth. In the 1990's, with ongoing expansion, the highest rates of growth were found at the edges of the traditional suburbs, in the region's rural communities. Belchertown, for example, which has the largest land area of any community in the region had a population increase of 22.6 percent between 1990 and 2000.

Suburban growth has continued in the 2000s in towns like Belchertown and East Longmeadow, which grew by 12.9 percent and 11.7 percent respectively. More rural towns such as a Goshen, Montgomery and Tolland have also seen significant population increases (16.6%, 28.2% and 13.3 %). Interestingly, since 2000 urban core communities have seen more modest growth; Springfield and Holyoke have seen increases of 1.06% and 1.03% respectively. Northampton's population has declined slightly. The population of Amherst, on the other hand, has grown by 11.6%. These trends have continued since 2000 with communities such as Montgomery, Belchertown, Brimfield, Southampton, and Granville experiencing sizable population change between 2000-2017 (up 22.3 percent, 14.9 percent, 11.5 percent, 13 percent, and 9.1 percent respectively).

Table 5-22 – Pioneer Valley Region Population Change

	1950	1960	1970	1980	1990	2000	2010	2017
Agawam	10,166	15,781	21,717	26,271	27,323	28,144	28,438	28,748
Amherst	10,856	13,781	26,331	33,229	35,228	34,873	37,819	39,880
Belchertown	4,487	5,186	5,936	8,339	10,579	12,968	14,649	14,906
Blandford	597	636	863	1,038	1,187	1,214	1,233	1,259
Brimfield	1,182	1,414	1,907	2,317	3,001	3,339	3,609	3,724
Chester	1,292	1,155	1,025	1,123	1,280	1,306	1,337	1,529
Chesterfield	496	556	704	1,000	1,048	1,201	1,222	1,303
Chicopee	49,211	61,553	66,676	55,112	56,632	54,653	55,298	55,778
Cummington	620	550	562	657	785	1,004	872	860
East Longmeadow	4,881	10,294	13,029	12,905	13,367	14,100	15,720	16,156
Easthampton	10,694	12,326	13,012	15,580	15,537	15,994	16,053	16,051
Goshen	321	385	483	651	830	903	1,054	1,096
Granby	1,816	4,221	5,473	5,380	5,565	6,132	6,240	6,318
Granville	740	874	1,008	1,204	1,403	1,521	1,566	1,660
Hadley	2,639	3,099	3,750	4,125	4,231	4,793	5,250	5,301
Hampden	1,322	2,345	4,572	4,745	4,709	5,171	5,139	5,193
Hatfield	2,179	2,350	2,825	3,045	3,184	3,249	3,279	3,305
Holland	377	561	931	1,589	2,185	2,407	2,481	2,510
Holyoke	54,661	52,689	50,112	44,678	43,704	39,838	39,880	40,362
Huntington	1,256	1,392	1,593	1,804	1,987	2,192	2,180	1,977
Longmeadow	6,508	10,565	15,630	16,301	15,467	15,633	15,784	15,876
Ludlow	8,660	13,805	17,580	18,150	18,820	21,209	21,103	21,331
Middlefield	295	315	288	385	392	580	521	464
Monson	6,125	6,712	7,355	7,315	7,776	8,359	8,560	8,803
Montgomery	157	333	446	637	759	656	838	802
Northampton	29,603	30,058	29,664	29,286	29,289	28,978	28,549	28,548
Palmer	9,533	10,358	11,680	11,389	12,054	12,497	12,140	12,237
Pelham	579	805	937	1,112	1,373	1,403	1,321	1,277
Plainfield	228	237	287	425	571	576	648	668
Russell	1,298	1,366	1,382	1,570	1,594	1,655	1,775	1,330
South Hadley	10,145	14,956	17,033	16,399	16,685	17,196	17,514	17,737
Southampton	1,387	2,192	3,069	4,137	4,478	5,387	5,792	6,090
Southwick	2,855	5,139	6,330	7,382	7,667	8,835	9,502	9,711
Springfield	162,399	174,463	163,905	152,319	156,983	152,082	153,060	154,613
Tolland	107	101	172	235	289	428	485	666
Wales	497	659	852	1,177	1,566	1,737	1,838	2,009
Ware	7,517	7,517	8,187	8,953	9,808	9,708	9,872	9,863
West Springfield	20,438	24,924	28,461	27,042	27,537	27,899	28,391	28,671
Westfield	20,962	26,302	31,433	36,465	38,372	40,072	41,094	41,667
Westhampton	452	583	793	1,137	1,327	1,468	1,607	1,819
Wilbraham	4,003	7,387	11,984	12,053	12,635	13,473	14,219	14,553
Williamsburg	2,056	2,186	2,342	2,237	2,515	2,427	2,482	2,481
Worthington	462	597	712	932	1,156	1,219	1,156	1,253
Pioneer Valley	**456,059**	**532,708**	**583,031**	**581,830**	**602,878**	**608,479**	**621,570**	**630,385**
Massachusetts	**4,691,000**	**5,149,000**	**5,689,170**	**5,737,037**	**6,016,425**	**6,349,097**	**6,547,629**	**6,789,319**

Source: U.S. Census Bureau

Table 5-23 – Rate of Population Change by Community

	1950 to 1960	1960 to 1970	1970 to 1980	1980 to 1990	1990 to 2000	2000 to 2010	2010 to 2017
Agawam	55.2%	37.6%	21.0%	4.0%	3.0%	2.1%	1.1%
Amherst	26.9%	91.1%	26.2%	6.0%	(1.0%)	14.4%	5.4%
Belchertown	15.6%	14.5%	40.5%	26.9%	22.6%	14.9%	1.8%
Blandford	6.5%	35.7%	20.3%	14.4%	2.3%	3.7%	2.1%
Brimfield	19.6%	34.9%	21.5%	29.5%	11.3%	11.5%	3.2%
Chester	(10.6%)	(11.3%)	9.6%	14.0%	2.0%	17.1%	14.4%
Chesterfield	12.1%	26.6%	42.0%	4.8%	14.6%	8.5%	6.6%
Chicopee	25.1%	8.3%	(17.3%)	2.8%	(3.5%)	2.1%	0.9%
Cummington	(11.3%)	2.2%	16.9%	19.5%	27.9%	(14.3%)	(1.4%)
East Longmeadow	110.9%	26.6%	(1.0%)	3.6%	5.5%	14.6%	2.8%
Easthampton	15.3%	5.6%	19.7%	(0.3%)	2.9%	0.4%	(0.0%)
Goshen	19.9%	25.5%	34.8%	27.5%	8.8%	21.4%	4.0%
Granby	132.4%	29.7%	(1.7%)	3.4%	10.2%	3.0%	1.3%
Granville	18.1%	15.3%	19.4%	16.5%	8.4%	9.1%	6.0%
Hadley	17.4%	21.0%	10.0%	2.6%	13.3%	10.6%	1.0%
Hampden	77.4%	95.0%	3.8%	(0.8%)	9.8%	0.4%	1.1%
Hatfield	7.8%	20.2%	7.8%	4.6%	2.0%	1.7%	0.8%
Holland	48.8%	66.0%	70.7%	37.5%	10.2%	4.3%	1.2%
Holyoke	(3.6%)	(4.9%)	(10.8%)	(2.2%)	(8.8%)	1.3%	1.2%
Huntington	10.8%	14.4%	13.2%	10.1%	10.3%	(9.8%)	(9.3%)
Longmeadow	62.3%	47.9%	4.3%	(5.1%)	1.1%	1.6%	0.6%
Ludlow	59.4%	27.3%	3.2%	3.7%	12.7%	0.6%	1.1%
Middlefield	6.8%	(8.6%)	33.7%	1.8%	48.0%	(20.0%)	(10.9%)
Monson	9.6%	9.6%	(0.5%)	6.3%	7.5%	5.3%	2.8%
Montgomery	112.1%	33.9%	42.8%	19.2%	(13.6%)	22.3%	(4.3%)
Northampton	1.5%	(1.3%)	(1.3%)	0.0%	(1.1%)	(1.5%)	(0.0%)
Palmer	8.7%	12.8%	(2.5%)	5.8%	3.7%	(2.1%)	0.8%
Pelham	39.0%	16.4%	18.7%	23.5%	2.2%	(9.0%)	(3.3%)
Plainfield	3.9%	21.1%	48.1%	34.4%	0.9%	16.0%	3.1%
Russell	5.2%	1.2%	13.6%	1.5%	3.8%	(19.6%)	(25.1%)
South Hadley	47.4%	13.9%	(3.7%)	1.7%	3.1%	3.1%	1.3%
Southampton	58.0%	40.0%	34.8%	8.2%	20.3%	13.0%	5.1%
Southwick	80.0%	23.2%	16.6%	3.9%	15.2%	9.9%	2.2%
Springfield	7.4%	(6.1%)	(7.1%)	3.1%	(3.1%)	1.7%	1.0%
Tolland	(5.6%)	70.3%	36.6%	23.0%	48.1%	55.6%	37.3%
Wales	32.6%	29.3%	38.1%	33.1%	10.9%	15.7%	9.3%
Ware	0.0%	8.9%	9.4%	9.5%	(1.0%)	1.6%	(0.1%)
West Springfield	21.9%	14.2%	(5.0%)	1.8%	1.3%	2.8%	1.0%
Westfield	25.5%	19.5%	16.0%	5.2%	4.4%	4.0%	1.4%
Westhampton	29.0%	36.0%	43.4%	16.7%	10.6%	23.9%	13.2%
Wilbraham	84.5%	62.2%	0.6%	4.8%	6.6%	8.0%	2.3%
Williamsburg	6.3%	7.1%	(4.5%)	12.4%	(3.5%)	2.2%	(0.0%)
Worthington	29.2%	19.3%	30.9%	24.0%	5.4%	2.8%	8.4%
Pioneer Valley Region	**16.8%**	**9.4%**	**(0.2%)**	**3.6%**	**0.9%**	**3.6%**	**1.4%**
Massachusetts	**9.8%**	**10.5%**	**0.8%**	**4.9%**	**5.5%**	**6.9%**	**3.7%**

Source: U.S. Census Bureau

2. Ethnic and Racial Diversity

The Pioneer Valley region's ethnic and racial diversity continues to grow. Continuing an established trend, the region's Hispanic and Latino population grew by 62.5% between 2000 and 2017, a rate of growth that was significant, though slightly lower than that of the state and slightly higher than the national rate. While the rate of growth in the Hispanic and Latino population has been slightly slower than that of the state, at approximately 19.2% of the total population, the Hispanic and Latino population is actually slightly higher than that of the nation. In this sense, the Pioneer Valley region looks less like the rest of the state as a whole and more like nation-wide demographics.

While the proportion of people who identify as White (of any ethnicity) in the Pioneer Valley region is now just over 80%, slightly higher than that of Massachusetts as a whole, the breakdown of people who identified as races other than White were varied somewhat.

The Pioneer Valley region was nearly identical to the state in the proportion of people who identify as African Americans (7.25% vs. 7.4%), Native Americans or Pacific Islander (0.2%), about 3% lower in the proportion of people who identify as an Asian race (3.0%) and .3% higher in the proportion of people who consider themselves a race other than the main five classifications recognized by the U.S. Census Bureau (4.4% of the region's population identify this way).

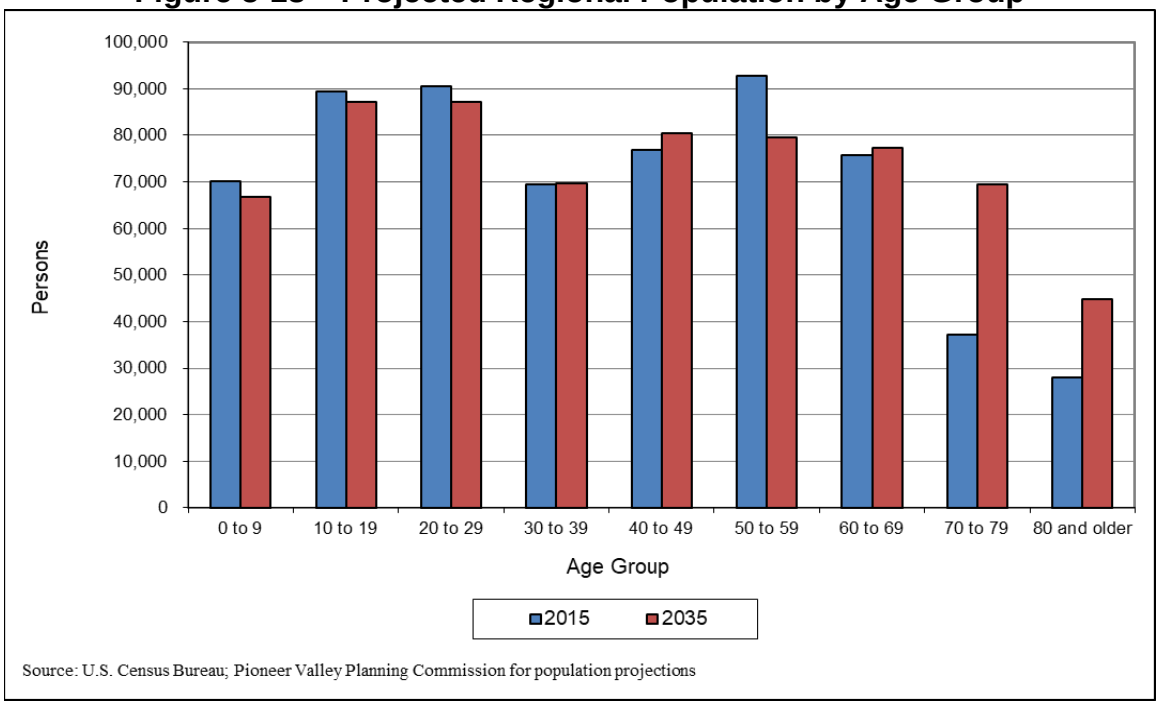
The region's populations who identify as other than white and non-Hispanic continue to be concentrated in either the urban core area or its surrounding communities. With the region's population increase attributed primarily to growth in minority groups, it can be inferred that the bulk of new residents are located in or around the Springfield-Chicopee-Holyoke urbanized area. Given that the core cities diminished in population, this implies a significant out-migration of white people from the urban core. In addition, the average annual income for persons of color is, generally, less than that for white persons. Combined, these factors indicate that the region's urban area may experience an increase in demand for transit service.

3. Age

Reflecting a national trend, the Pioneer Valley region's population is aging. In 1990, the region's median age was 32.8, had risen to 35.9 in 2000, and reached 38 in 2017. This trend is projected to continue for the next several decades because fertility rates are low and baby boomers are becoming seniors. Figure 5-18 shows the actual 2015 population and the projected 2035 population by age group. All three age groups over age 60 show increases in population between 2015 and 2035.

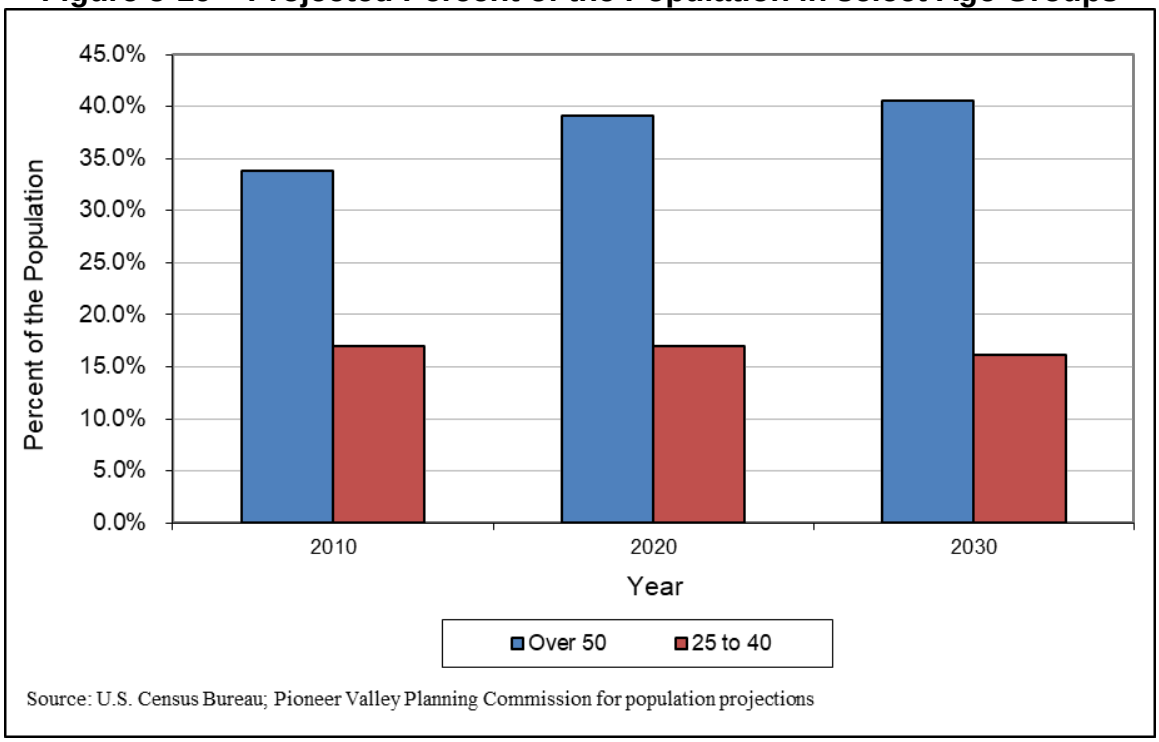
Decreases in the size of the region's young adult population are also expected to continue. Figure 5-19 contrasts the change in the elder population with that of the 25 to 40 year old population.

Figure 5-18 – Projected Regional Population by Age Group



Source: U.S. Census Bureau; Pioneer Valley Planning Commission for population projections

Figure 5-19 – Projected Percent of the Population in select Age Groups



Source: U.S. Census Bureau; Pioneer Valley Planning Commission for population projections

J. HOUSING

1. Household Growth

Population growth of 2.4 percent between 2000 and 2010 also resulted in an increase in the number of households in the Pioneer Valley. Between 2000 and 2010, the number of households increased from 231,430 to 238, 629, a 3.1 percent rise. Households are defined as persons who occupy a housing unit in which the occupants live and eat separately from any other persons in the building and they have direct access to the unit from outside of the building or through a common hall. Between 2000 and 2010, Montgomery and Westhampton had the largest percentage increase in households (28.4 percent and15.6 percent respectively), while Holyoke and Northampton experienced more modest increases of 2.4 percent and 1.2 percent. Springfield experienced the greatest decrease during this time of .7 percent. . (See Table 5-24).

2. Size

While the number of households has declined and the population has grown, the average size of households in the region has remained relatively stable between 2000 and 2010 (See Table 5-25). Household size has been decreasing throughout the nation over the past forty years. In 1970, 47 percent of households had one or two people, by 2000 this number increased to 60.1 percent of all households. Large households (5 or more people) decreased from 20.1 percent of all households in 1970 to 7.6 percent of all households in 2017.

The trend toward more and smaller households (particularly single person households), and increased development in the region's rural areas, indicates increases in the total number of commuters as well as those inclined to commute alone, the number of vehicles, and the number of vehicle miles traveled. Table 5-26 shows the number of households in each community by type (family, non-family) and person size.

Another important factor in housing size is the number of dwelling units per household. The communities of the region represent a wide range of situations. In the urban areas, such as Springfield and Holyoke, there is a high density of multi-family dwellings, while some rural and suburban communities are almost exclusively single family homes. Of the total housing units in the region, 156,753, or 61%, are single family and 93,606, or 37.7% are multi-family. The communities of Amherst and Northampton are an exception to the pattern described above. These communities have high college student populations which results in a disproportionate concentration of multi-family homes.

Table 5-24 – Total Households, 1980-2017

	Total Households				Percent Change		
	1990	2000	2010	2017	1990 to 2000	2000 to 2010	2010 to 2017
Agawam	10,432	11,271	11,543	11,750	8.0%	2.4%	1.8%
Amherst	8,477	9,150	9,105	9,382	7.9%	(0.5%)	3.0%
Belchertown	3,825	4,904	5,442	5,558	28.2%	11.0%	2.1%
Blandford	424	460	457	541	8.5%	(0.7%)	18.4%
Brimfield	1,078	1,252	1,323	1,465	16.1%	5.7%	10.7%
Chester	464	490	538	585	5.6%	9.8%	8.7%
Chesterfield	360	446	453	504	23.9%	1.6%	11.3%
Chicopee	22,625	23,115	22,863	22,987	2.2%	(1.1%)	0.5%
Cummington	317	406	414	430	28.1%	2.0%	3.9%
East Longmeadow	4,670	5,236	5,677	5,978	12.1%	8.4%	5.3%
Easthampton	6,170	6,859	7,233	7,205	11.2%	5.5%	(0.4%)
Goshen	301	368	428	448	22.3%	16.3%	4.7%
Granby	1,939	2,259	2,578	2,475	16.5%	14.1%	(4.0%)
Granville	483	542	578	608	12.2%	6.6%	5.2%
Hadley	1,633	1,895	1,977	2,316	16.0%	4.3%	17.1%
Hampden	1,620	1,823	1,937	1,976	12.5%	6.3%	2.0%
Hatfield	1,266	1,378	1,531	1,557	8.8%	11.1%	1.7%
Holland	791	900	1,059	951	13.8%	17.7%	(10.2%)
Holyoke	15,850	15,000	16,108	15,403	(5.4%)	7.4%	(4.4%)
Huntington	703	813	870	789	15.6%	7.0%	(9.3%)
Longmeadow	5,360	5,738	5,590	5,694	7.1%	(2.6%)	1.9%
Ludlow	6,957	7,666	7,753	8,086	10.2%	1.1%	4.3%
Middlefield	146	219	176	216	50.0%	(19.6%)	22.7%
Monson	2,642	3,099	3,123	3,473	17.3%	0.8%	11.2%
Montgomery	250	257	291	322	2.8%	13.2%	10.7%
Northampton	11,164	11,863	11,783	11,406	6.3%	(0.7%)	(3.2%)
Palmer	4,781	5,090	5,189	4,936	6.5%	1.9%	(4.9%)
Pelham	492	537	542	524	9.1%	0.9%	(3.3%)
Plainfield	209	247	259	283	18.2%	4.9%	9.3%
Russell	557	598	636	531	7.4%	6.4%	(16.5%)
South Hadley	5,884	6,584	6,983	6,727	11.9%	6.1%	(3.7%)
Southampton	1,543	1,966	2,226	2,422	27.4%	13.2%	8.8%
Southwick	2,713	3,312	3,737	3,750	22.1%	12.8%	0.3%
Springfield	57,769	57,178	56,229	56,331	(1.0%)	(1.7%)	0.2%
Tolland	108	183	198	277	69.4%	8.2%	39.9%
Wales	550	660	774	815	20.0%	17.3%	5.3%
Ware	3,836	4,020	4,352	4,192	4.8%	8.3%	(3.7%)
West Springfield	11,485	11,866	11,761	11,971	3.3%	(0.9%)	1.8%
Westfield	13,823	14,798	15,270	15,276	7.1%	3.2%	0.0%
Westhampton	442	539	608	666	21.9%	12.8%	9.5%
Wilbraham	4,474	4,941	5,091	5,225	10.4%	3.0%	2.6%
Williamsburg	933	1,031	1,124	1,108	10.5%	9.0%	(1.4%)
Worthington	412	471	528	574	14.3%	12.1%	8.7%
Pioneer Valley Region	**219,958**	**231,430**	**236,337**	**237,713**	**5.2%**	**2.1%**	**0.6%**

Source: U.S. Census Bureau

Table 5-25 – Household Size, 1960 to 2017

	Number of Households						
Year	**1 Person**	**2 People**	**3 People**	**4 People**	**5 People**	**6 or more**	**Total**
1960	21,425	42,454	31,047	28,406	18,306	15,232	156,870
	13.7%	27.1%	19.8%	18.1%	11.7%	9.7%	
1970	32,998	50,799	31,071	27,378	17,644	18,092	177,982
	18.5%	28.5%	17.5%	15.4%	9.9%	10.2%	
1980	47,036	62,661	35,616	31,060	15,514	10,393	202,280
	23.3%	31.0%	17.6%	15.4%	7.7%	5.1%	
1990	55,863	68,760	39,324	34,276	14,429	7,306	219,958
	25.4%	31.3%	17.9%	15.6%	6.6%	3.3%	
2000	65,759	73,290	37,960	32,613	14,334	7,474	231,430
	28.4%	31.7%	16.4%	14.1%	6.2%	3.2%	
2010	71,605	76,223	36,954	32,743	12,600	6,212	236,337
	30.3%	32.3%	15.6%	13.9%	5.3%	2.6%	
2017	69,686	78,660	39,604	31,661	11,713	6,389	237,713
	29.3%	33.1%	16.7%	13.3%	4.9%	2.7%	

Table 5-26 – Number of Households by Type and Size, 2017

	Family Households by Size							Nonfamily Households by Size								Total All Households
	2 People	3 People	4 People	5 People	6 People	7 or more People	Total	1 Person	2 People	3 People	4 People	5 People	6 People	7 or more People	Total	
Agawam	3,278	1,858	1,477	426	101	94	7,234	3,720	707	43	27	0	19	0	4,516	11,750
Amherst	2,042	986	1,008	383	77	57	4,553	2,599	890	549	706	50	17	18	4,829	9,382
Belchertown	1,768	840	1,115	364	78	0	4,165	1,022	329	14	28	0	0	0	1,393	5,558
Blandford	204	114	58	18	0	0	394	122	25	0	0	0	0	0	147	541
Brimfield	467	326	145	44	26	32	1,040	332	93	0	0	0	0	0	425	1,465
Chester	175	111	88	39	7	3	423	119	30	13	0	0	0	0	162	585
Chesterfield	144	82	92	6	6	9	339	145	20	0	0	0	0	0	165	504
Chicopee	6,247	3,503	2,784	959	344	135	13,972	7,442	1,468	66	34	5	0	0	9,015	22,987
Cummington	152	43	28	16	0	0	239	157	28	6	0	0	0	0	191	430
East Longmeadow	1,703	829	964	442	144	27	4,109	1,580	289	0	0	0	0	0	1,869	5,978
Easthampton	2,073	1,009	650	150	147	0	4,029	2,383	684	55	40	0	14	0	3,176	7,205
Goshen	171	51	74	17	0	7	320	102	26	0	0	0	0	0	128	448
Granby	707	568	302	107	28	47	1,759	617	53	34	12	0	0	0	716	2,475
Granville	220	130	93	31	19	3	496	84	25	3	0	0	0	0	112	608
Hadley	814	380	149	47	0	32	1,422	691	189	0	14	0	0	0	894	2,316
Hampden	649	445	292	64	43	8	1,501	400	68	7	0	0	0	0	475	1,976
Hatfield	517	287	107	44	0	0	955	481	106	0	5	10	0	0	602	1,557
Holland	366	152	129	83	12	0	742	183	26	0	0	0	0	0	209	951
Holyoke	3,453	2,572	2,004	733	324	231	9,317	4,865	1,008	186	18	0	9	0	6,086	15,403
Huntington	247	146	82	38	10	13	536	193	56	4	0	0	0	0	253	789
Longmeadow	1,900	1,167	1,031	304	81	0	4,483	1,083	128	0	0	0	0	0	1,211	5,694
Ludlow	2,472	1,578	1,109	411	119	42	5,731	2,009	281	29	36	0	0	0	2,355	8,086
Middlefield	110	22	19	8	0	0	159	54	3	0	0	0	0	0	57	216
Monson	1,168	515	463	182	14	17	2,359	797	248	47	0	22	0	0	1,114	3,473
Montgomery	118	65	41	12	4	1	241	66	15	0	0	0	0	0	81	322
Northampton	2,609	1,530	1,225	384	14	34	5,796	4,224	1,046	236	95	9	0	0	5,610	11,406
Palmer	1,102	847	587	299	72	0	2,907	1,447	499	83	0	0	0	0	2,029	4,936
Pelham	192	63	78	22	9	0	364	129	24	7	0	0	0	0	160	524
Plainfield	114	25	23	21	6	0	189	71	17	6	0	0	0	0	94	283
Russell	197	77	80	24	3	3	384	123	21	3	0	0	0	0	147	531
South Hadley	2,110	988	745	222	77	0	4,142	2,027	501	57	0	0	0	0	2,585	6,727
Southampton	815	318	460	90	17	28	1,728	505	189	0	0	0	0	0	694	2,422
Southwick	1,295	644	475	247	25	50	2,736	841	173	0	0	0	0	0	1,014	3,750
Springfield	13,974	9,266	7,183	3,489	1,462	904	36,278	16,983	2,517	286	225	22	0	20	20,053	56,331
Tolland	119	31	28	13	4	0	195	62	11	2	0	7	0	0	82	277
Wales	289	101	97	35	36	0	558	228	29	0	0	0	0	0	257	815
Ware	1,104	855	444	143	70	36	2,652	1,343	184	13	0	0	0	0	1,540	4,192
West Springfield	2,780	1,506	1,338	753	239	121	6,737	4,537	638	59	0	0	0	0	5,234	11,971
Westfield	4,567	2,306	2,078	596	293	144	9,984	4,263	750	151	76	17	0	35	5,292	15,276
Westhampton	277	113	101	34	22	0	547	79	35	5	0	0	0	0	119	666
Wilbraham	1,657	927	890	230	186	46	3,936	1,060	187	42	0	0	0	0	1,289	5,225
Williamsburg	381	159	155	23	0	0	718	340	34	6	10	0	0	0	390	1,108
Worthington	185	57	44	18	4	10	318	178	78	0	0	0	0	0	256	574
Pioneer Valley Region	**64,932**	**37,592**	**30,335**	**11,571**	**4,123**	**2,134**	**150,687**	**69,686**	**13,728**	**2,012**	**1,326**	**142**	**59**	**73**	**87,026**	**237,713**

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

K. EMPLOYMENT

1. Type

The region's economic base continues to demonstrate the transition from the manufacturing to the service industry. Manufacturing once dominated the Valley's economy, employing over 28 percent of the work force in 1980. By 1990, nearly one-quarter of those manufacturing jobs had been lost or relocated out of the Region. This trend continued into the 1990s as the number of manufacturing jobs decreased by 25.3 percent between 1990 and 2000. By 2017, manufacturing accounted for only 7.6 percent of jobs in the region. At the same time service employment has increased. Today, services employ more of the region's work force than manufacturing, with services comprising more than half of all jobs in 2017. Table 5-27 shows employment in the region's communities by employment sector, total payroll, and average wage for 2017. At $54,340, Springfield has one of the highest average annual wages within the region because it is home to many of the region’s largest and most successful employers.

Several important implications for transportation can be derived from this information. First, the shift from primarily manufacturing jobs to high paying service jobs means that during that period the average annual income for many of the region's residents was increasing. This, in turn, has improved residential flexibility and choice for residents. Since the cost of housing in urban areas is typically less than that for suburbs or outlying areas, residents with increased incomes can afford to live outside the urban core and commute. This was clearly shown in Census 2000 data as population decreases in the urban core are accompanied by increases in outlying suburbs and rural towns. The trend is beginning to reverse, as higher gasoline prices and the 2008-09 recession encouraged workers to live closer to employment centers by the 2010 Census.

Finally, increases in the number of two-income households and the number of women in the work force indicate increases in the number of vehicles and vehicle miles traveled. Often the workers in a two income household are unable to share a commute due to the distance or time inconveniences. Therefore, the number of vehicles and miles traveled increases. In addition to more trips to and from work, the number of incidental or side trips also increases (particularly during rush hour) as children are taken to and from day care facilities and errands are combined with the commute. Due to the need to access child care, retail and business facilities during the workday, the single occupant vehicle remains the primary choice for transportation of the region's work force. Employer-based childcare facilities could enhance the opportunity for many people to use an alternative to the single occupant

vehicle. Likewise, the provision of retail and business establishments near employment centers (such as drug stores, banks, restaurants) could reduce the need for all employees to have cars in order to take care of personal business during the work day.

2. Growth

As Figure 5-20 illustrates, the early 1990s saw sharp decreases in employment levels across the Pioneer Valley region, largely the result of economic recession. Consequently, people began leaving the region, provoking a steep drop in the size of the region's labor force between 1990 and 1996. This had potential to be disastrous for growth in the region as employers grew frustrated at the lack of qualified workers to fill open positions. However, declines in employment and labor force size leveled off in the second half of the 1990s and, beginning in 2000, both measures appeared to be sharply increasing. About a year after the March 2001 return of recession, employment levels in the Pioneer Valley began to fall again, and then more extremely during the 2008-2009 recession. Neither employment levels nor the labor force have recovered fully from the recession, though they do seem to be headed in the right direction now. While the unemployment rate has dropped since 2009, it remains elevated close to 7%,

The recession of 2008-09 resulted in a net decrease in employment between 2000 and 2010. Sectors that managed to grow included state and local government (8.9 percent), education (31.8 percent) and health care (29 percent). Projected growth will likely take place in the health care, education and construction industries as the economy recovers (BLS, Employment Projections, Table 2. Employment by Major Industry Sector, 2012 - national) [Manufacturing employment will most likely continue to decrease, though perhaps not as quickly as it has in the last two decades.]

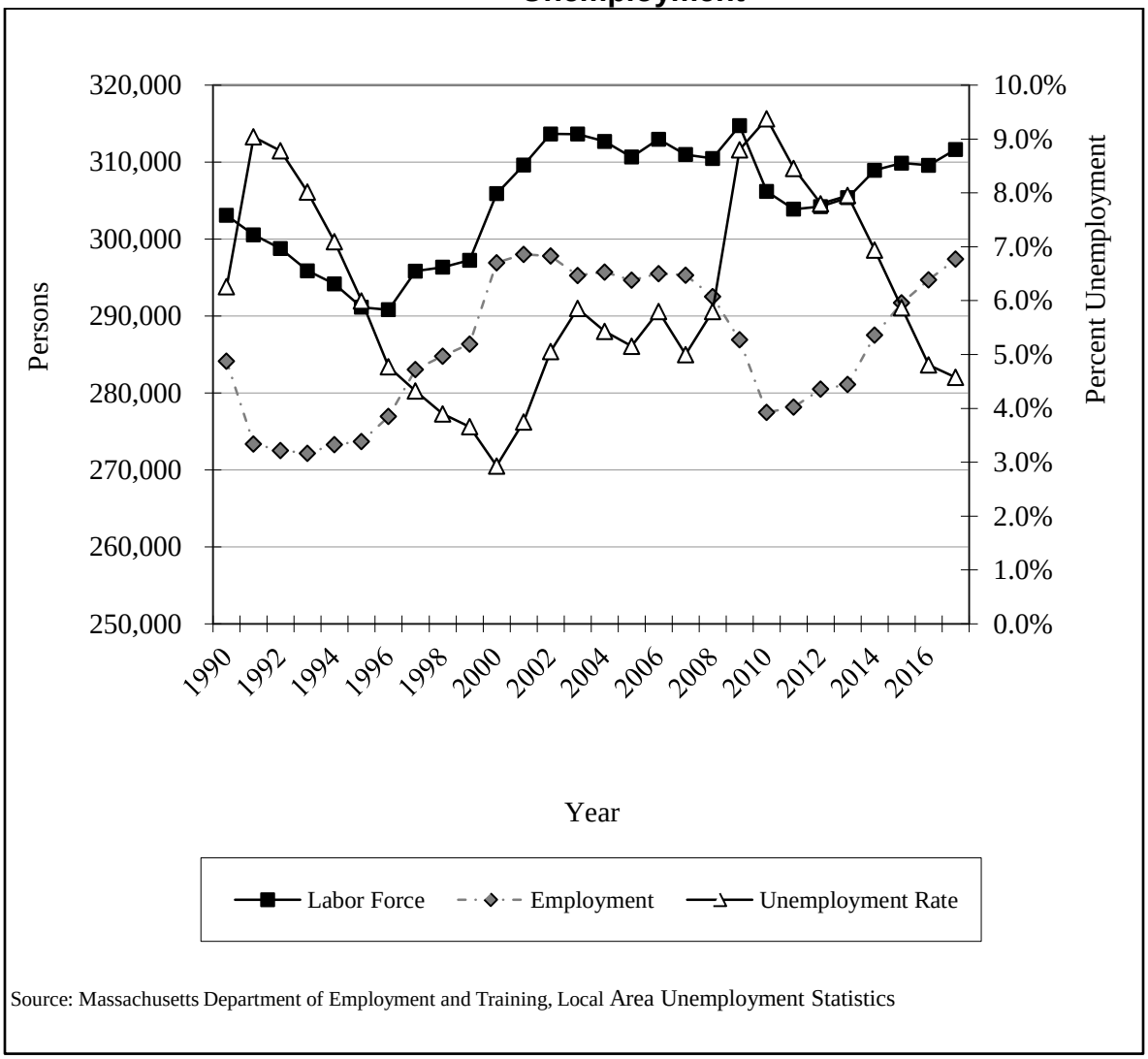
Table 5-27 – Pioneer Valley Regional Employment by Industrial Sector, 2017

	Agriculture, Forestry, & Fishing	Utilities	Con-struction	Manufact-uring	Whole-sale Trade	Retail Trade	Transport & Ware-housing	Inform-ation	Finance & Insurance	Real Estate and Rental/ Leasing	Prof-essional & Technical Services	Manage-ment of Companies and Enterprises	Adminis-trative & Waste Services	Edu-cational Services	Health Care and Social Assistance	Arts, Entertain-ment, & Recreation	Accomo-dation & Food Services	Other Services	Public Adminis-tration	Total Employ-ment	Establish-ments	Average Annual Wage	Average Weekly Wage
Agawam		287	679	2,164	766	925	250	41	245	98	633	47	663		1,600	1,402	834	376		12,166	897	$46,748	$899
Amherst	56		174	42	41	895	136	199	155	254	313		212	10,254	1,835	547	1,540	436	386	17,508	924	$51,740	$995
Belchertown			109	63	188	253	520	15	56	28	81		88		417		252	74	205	2,819	326	$38,532	$741
Blandford			9								11									199	23	$17,940	$345
Brimfield			66		6	39	46		11		3		32		28		23	16		526	90	$41,132	$791
Chester															10					111	21	$28,340	$545
Chesterfield			44												24					155	21	$31,200	$600
Chicopee			1,550	2,999	1,170	2,655	749	382	366	280	230	141	567	2,047	2,715	201	2,047	571	1,171	19,991	1,691	$45,240	$870
Cummington			9				13													285	34	$36,712	$706
East Longmeadow			297	1,782	259	803	184	120	225	109	367	27	203	662	1,715	222	570	353		8,034	640	$47,528	$914
Easthampton			406	652	49	380	81	20	213	43	149		115	671	714	42	555	248		4,587	495	$41,756	$803
Goshen			18												38					173	33	$31,460	$605
Granby			112		56	90		7	15		36		58	213	84	7	98	24		890	142	$41,236	$793
Granville			20	8											14			5		159	34	$29,380	$565
Hadley	210		176	47	104	1,878	33	81	317	35	307		119	1,108	467	117	939	180	287	6,498	376	$39,000	$750
Hampden			83	22	2	56	16		16		50		110		154		166	17		1,059	147	$39,364	$757
Hatfield	27		89	65	1,069	104	69	69		4	16		130		206	13	80	23		2,138	131	$47,112	$906
Holland			8			16									8					219	32	$21,320	$410
Holyoke		772	552	1,740	470	3,523	147	65	498	334	329	274	522	2,488	7,552	249	1,509	529	775	22,329	2,167	$45,292	$871
Huntington			13			23									94		31			396	49	$37,492	$721
Longmeadow			112		32	389		36	136	39	85		256	1,101	1,099	183	335	83		3,997	401	$43,316	$833
Ludlow			755	616	209	614	144	14	144	52	196		487		850	64	619	180		6,885	560	$46,228	$889
Middlefield																				50	9	$25,584	$492
Monson			148	174	45	109	95				27		62		131		95	47		1,435	205	$43,056	$828
Montgomery			14																	43	11	$24,492	$471
Northampton			639	774	675	2,149	146	357	405	75	750	298	756	2,778	6,067	285	1,827	752	1,045	19,873	1,293	$52,052	$1,001
Palmer			382	629	111	541	129	110	56	44	228	127	164	428	1,045	42	397	124	188	4,749	463	$46,384	$892
Pelham			12								20				17					148	32	$30,732	$591
Plainfield															6					57	19	$20,072	$386
Russell			13												7					143	37	$41,964	$807
South Hadley	12		353	177	142	345	105	33	104	28	85		199	1,714	531	29	428	166	159	4,661	401	$44,616	$858
Southampton			171		25	295	15	10		12	47		15		74		115	32		926	130	$38,532	$741
Southwick	110		139	414	53	428	239	18	54	32	6				198	101	325	113		2,801	291	$38,376	$738
Springfield		474	1,509	3,760	1,490	5,481	3,387	1,049	5,275	848	1,993	1,538	3,627	8,179	30,848	693	4,860	3,017	3,437	81,462	7,519	$54,340	$1,045
Tolland*																				42	7	$32,916	$633
Wales			9												14					167	46	$31,980	$615
Ware			118	276	70	777	59	18			36		75		420	9	268	60		2,699	283	$43,576	$838
West Springfield		27	919	1,273	726	3,477	748	319	474	396	549		1,419		2,962	346	1,951	596		17,652	1,382	$42,744	$822
Westfield	13		984	2,693	578	2,006	1,810	264	207	246	764		373	2,569	2,861	242	1,141	613	1,090	18,668	1,192	$48,724	$937
Westhampton			24										20		14			13		332	46	$41,288	$794
Wilbraham			163	383	76	777		31	116	26	229		88	763	762	91	391	116		5,586	403	$38,740	$745
Williamsburg			103	49		92	20	3			31		18		18		78	19		578	87	$32,812	$631
Worthington															72					180	33	$31,408	$604
Pioneer Valley Region	**428**	**1,560**	**10,981**	**20,802**	**8,412**	**29,120**	**9,141**	**3,261**	**9,088**	**2,983**	**7,571**	**2,452**	**10,378**	**34,975**	**65,671**	**4,885**	**21,474**	**8,783**	**8,743**	**273,376**	**23,123**	**$47,879**	**$921**

Source: Massachusetts Department of Unemployment Assistance, 2017

Note: Blanks indicate that the data is suppressed to preserve confidentiality.

Figure 5-20 – Pioneer Valley Region Labor Force, Employment, and Unemployment



Source: Massachusetts Department of Employment and Training, Local Area Unemployment Statistics

3. Median Household Income

The recession negatively affected wages also; median household incomes decreased between 2000 and 2010 by an average of 12.9% throughout the Pioneer Valley region. Hampden County suffered a more significant drop than Hampshire County, a trend that appears to be continuing between 2010 and 2017.

Though median household income has declined, per capita income (see Figure 5-21) in the Pioneer Valley region, except for slight losses between 1989 and 1993, had been increasing steadily since 1980. Despite two recessions in the 2000s, per capita wages continue to increase. Overall, declining household income coupled with rising average wages and per capita income is likely indicating that there are fewer wage earners per household now than in the past. This conclusion is also supported by our finding of shrinking average household sizes.

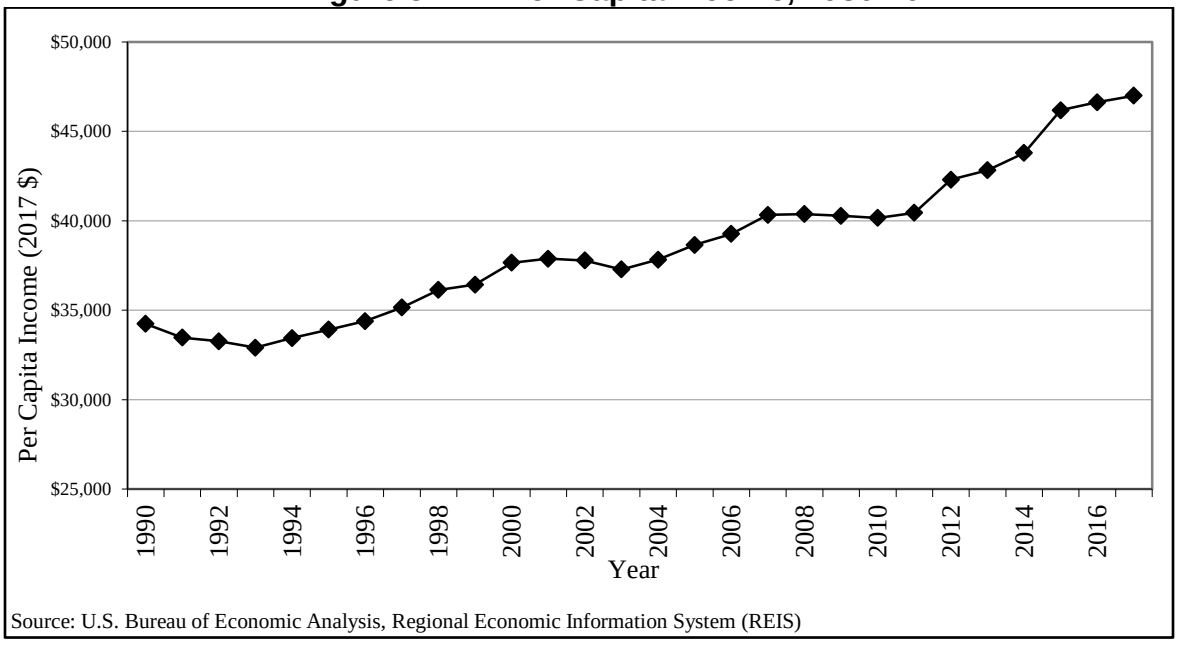
Table 5-28 – Median Household Income

	Median Household Income (2017 Dollars)			Percent Change	
	2000	**2010**	**2017**	**2000 to 2010**	**2010 to 2017**
Hampden County	$56,695	$53,771	$51,726	(5.2%)	(3.8%)
Hampshire County	$65,802	$67,045	$67,989	1.9%	1.4%
Pioneer Valley Region*	**$58,897**	**$57,030**	**$55,666**	(3.2%)	(2.4%)

Source: U.S. Census Bureau

* Median household income for the region is a weighted average based on the number of households.

Figure 5-21 – Per Capita Income, 1980-2017



Source: U.S. Bureau of Economic Analysis, Regional Economic Information System (REIS)

L. VEHICLE REGISTRATION AND OWNERSHIP

Based on information available from 2015, a total of 489,999 vehicles were registered in the Pioneer Valley region. This translates into approximately 0.78 vehicles per person and is a decrease of 4.9 percent from 2000. Most of this decrease can be attributed to significantly fewer registered automobiles. Between 2000 and 2015, automobile registrations dropped by over 23 percent. Automobile registrations appear to have peaked in 2008, at 304,425. Despite record-high gasoline prices between 2008-2012, light trucks and SUVs continue to comprise over one-third of registered vehicles.

This decrease in automobile ownership is notable. The decrease in car ownership may be a result of the reduced workforce, and families not needing a second car. Alternatively, car owners may opt to use public transit to reduce transportation expenses, and avoid car maintenance costs altogether.

The City of Springfield has the most registered vehicles with 90,493 recorded in 2015. This translates to 18.5 percent of registered vehicles in the region. Outlying communities—including Belchertown, Brimfield, Chesterfield, Goshen, Holland, Plainfield, Tolland and Westhampton—had the largest increase in registered vehicles between 2000 and 2015. However, in the light truck and SUV category, the region's wealthiest town, Longmeadow, had the largest increase in registrations at 58.1 percent followed closely by East Longmeadow at 57.7%. Tables 5-29 and 5-30 summarize the number of registered motor vehicles in the Pioneer Valley by community and type of vehicle for 2000 and 2015. Table 5-31 highlights the percent change in registrations between 2000 and 2015 by type of vehicle and community.

Table 5-29 – Registered Motor Vehicles in the Pioneer Valley – 2000

	Automobiles	Trailers	Light Trucks (& SUVs)	Heavy Trucks	Motorcycles	Other	Total
Agawam	16,485	1,611	6,836	659	362	237	27,953
Amherst	12,378	508	3,294	151	168	242	18,331
Belchertown	6,599	948	3,769	201	261	191	12,650
Blandford	627	128	485	19	36	15	1,369
Brimfield	1,763	322	1,198	94	99	75	3,719
Chester	646	116	576	31	48	19	1,483
Chesterfield	525	95	507	26	34	23	1,253
Chicopee	30,092	2,210	10,480	878	653	460	47,050
Cummington	523	76	367	22	26	31	1,101
East Longmeadow	8,452	806	3,495	258	187	216	14,439
Easthampton	8,944	675	3,851	165	291	191	14,819
Goshen	467	97	352	29	27	14	1,034
Granby	3,189	573	1,999	117	131	98	6,407
Granville	806	160	624	71	56	26	1,840
Hadley	2,768	357	1,435	124	53	76	5,110
Hampden	2,816	455	1,584	123	99	69	5,530
Hatfield	1,984	444	1,120	236	52	70	4,161
Holland	1,249	180	825	22	70	25	2,469
Holyoke	18,562	751	5,438	280	325	290	26,992
Huntington	1,034	165	805	48	58	39	2,212
Longmeadow	9,600	368	2,929	44	103	70	15,205
Ludlow	10,771	1,104	4,984	430	306	182	18,809
Middlefield	236	45	229	11	22	14	578
Monson	4,095	714	2,799	206	217	119	8,520
Montgomery	380	100	345	19	21	13	917
Northampton	15,629	882	5,282	340	335	261	24,541
Palmer	6,751	837	3,485	307	274	168	12,314
Pelham	785	99	359	24	17	24	1,437
Plainfield	319	48	241	10	16	11	683
Russell	822	127	560	24	36	20	1,648
South Hadley	9,050	903	3,605	287	192	147	15,133
Southampton	2,878	542	1,818	114	109	89	5,816
Southwick	4,837	792	3,022	241	196	130	9,721
Springfield	73,874	3,030	20,792	1,767	1,259	1,557	108,803
Tolland	222	40	183	21	20	10	519
Wales	919	154	608	37	65	24	1,865
Ware	4,740	530	2,678	138	220	94	8,737
West Springfield	16,003	1,219	5,951	576	316	232	25,987
Westfield	19,721	2,147	9,515	713	472	403	34,752
Westhampton	702	115	568	32	38	22	1,547
Wilbraham	7,773	843	3,305	239	202	147	13,700
Williamsburg	1,450	189	915	68	37	42	2,876
Worthington	627	124	526	30	24	24	1,415
Pioneer Valley Region	**312,093**	**25,629**	**123,739**	**9,232**	**7,533**	**6,210**	**515,445**

Source: Massachusetts Department of Revenue

Table 5-30 – Registered Motor Vehicles in the Pioneer Valley – 2015

	Automobiles	Trailers	Light Trucks (& SUVs)	Heavy Trucks	Motorcycles	Other	Total
Agawam	13,182	1,682	9,288	791	639	1,638	27,220
Amherst	8,825	531	3,985	179	166	792	14,478
Belchertown	6,402	1,186	5,669	281	449	938	14,925
Blandford	455	132	602	42	60	97	1,388
Brimfield	1,544	402	1,487	137	170	354	4,094
Chester	484	130	620	31	67	97	1,429
Chesterfield	483	143	586	28	56	95	1,391
Chicopee	22,975	2,312	15,441	875	1,025	2,161	44,789
Cummington	385	61	381	30	52	79	988
East Longmeadow	7,190	974	5,511	396	334	794	15,199
Easthampton	7,547	807	5,084	188	396	919	14,941
Goshen	431	107	449	72	43	85	1,187
Granby	2,685	677	2,576	185	209	368	6,700
Granville	653	215	756	75	94	103	1,896
Hadley	2,418	476	1,830	156	122	345	5,347
Hampden	2,269	549	2,189	174	182	320	5,683
Hatfield	1,617	398	1,370	311	104	311	4,111
Holland	1,097	258	995	36	125	208	2,719
Holyoke	13,224	722	8,452	300	426	1,151	24,275
Huntington	786	229	963	60	94	167	2,299
Longmeadow	7,342	475	4,632	176	156	700	13,481
Ludlow	8,885	1,436	7,098	706	545	1,030	19,700
Middlefield	156	58	248	15	16	48	541
Monson	3,461	923	3,581	319	363	507	9,154
Montgomery	338	127	423	26	50	65	1,029
Northampton	12,573	907	6,380	358	398	1,232	21,848
Palmer	5,334	967	4,546	420	420	660	12,347
Pelham	639	89	419	22	37	60	1,266
Plainfield	298	53	307	20	20	50	748
Russell	634	180	728	32	76	120	1,770
South Hadley	7,151	990	5,144	345	310	844	14,784
Southampton	2,663	711	2,575	177	225	431	6,782
Southwick	4,185	891	3,836	324	354	617	10,207
Springfield	49,558	2,462	31,078	1,467	1,465	4,463	90,493
Tolland	200	71	250	23	29	37	610
Wales	766	177	780	45	73	120	1,961
Ware	3,662	650	3,620	174	301	499	8,906
West Springfield	12,319	1,257	8,238	835	459	1,217	24,325
Westfield	15,648	2,411	12,821	874	920	2,227	34,901
Westhampton	671	160	776	65	64	147	1,883
Wilbraham	6,674	892	5,104	305	333	848	14,156
Williamsburg	1,225	169	942	80	76	149	2,641
Worthington	503	144	558	29	59	114	1,407
Pioneer Valley Region	**239,537**	**28,191**	**172,318**	**11,184**	**11,562**	**27,207**	**489,999**

Source: Massachusetts Department of Revenue

Table 5-31 – Percent Change in Registered Motor Vehicles, 2000-2015

	Automobiles	Trailers	Light Trucks (& SUVs)	Heavy Trucks	Motorcycles	Other	Total
Agawam	(20.0%)	4.4%	35.9%	20.0%	76.5%	591.1%	(2.6%)
Amherst	(28.7%)	4.5%	21.0%	18.5%	(1.2%)	227.3%	(21.0%)
Belchertown	(3.0%)	25.1%	50.4%	39.8%	72.0%	391.1%	18.0%
Blandford	(27.4%)	3.1%	24.1%	121.1%	66.7%	546.7%	1.4%
Brimfield	(12.4%)	24.8%	24.1%	45.7%	71.7%	372.0%	10.1%
Chester	(25.1%)	12.1%	7.6%	0.0%	39.6%	410.5%	(3.6%)
Chesterfield	(8.0%)	50.5%	15.6%	7.7%	64.7%	313.0%	11.0%
Chicopee	(23.7%)	4.6%	47.3%	(0.3%)	57.0%	369.8%	(4.8%)
Cummington	(26.4%)	(19.7%)	3.8%	36.4%	100.0%	154.8%	(10.3%)
East Longmeadow	(14.9%)	20.8%	57.7%	53.5%	78.6%	267.6%	5.3%
Easthampton	(15.6%)	19.6%	32.0%	13.9%	36.1%	381.2%	0.8%
Goshen	(7.7%)	10.3%	27.6%	148.3%	59.3%	507.1%	14.8%
Granby	(15.8%)	18.2%	28.9%	58.1%	59.5%	275.5%	4.6%
Granville	(19.0%)	34.4%	21.2%	5.6%	67.9%	296.2%	3.0%
Hadley	(12.6%)	33.3%	27.5%	25.8%	130.2%	353.9%	4.6%
Hampden	(19.4%)	20.7%	38.2%	41.5%	83.8%	363.8%	2.8%
Hatfield	(18.5%)	(10.4%)	22.3%	31.8%	100.0%	344.3%	(1.2%)
Holland	(12.2%)	43.3%	20.6%	63.6%	78.6%	732.0%	10.1%
Holyoke	(28.8%)	(3.9%)	55.4%	7.1%	31.1%	296.9%	(10.1%)
Huntington	(24.0%)	38.8%	19.6%	25.0%	62.1%	328.2%	3.9%
Longmeadow	(23.5%)	29.1%	58.1%	300.0%	51.5%	900.0%	(11.3%)
Ludlow	(17.5%)	30.1%	42.4%	64.2%	78.1%	465.9%	4.7%
Middlefield	(33.9%)	28.9%	8.3%	36.4%	(27.3%)	242.9%	(6.4%)
Monson	(15.5%)	29.3%	27.9%	54.9%	67.3%	326.1%	7.4%
Montgomery	(11.1%)	27.0%	22.6%	36.8%	138.1%	400.0%	12.2%
Northampton	(19.6%)	2.8%	20.8%	5.3%	18.8%	372.0%	(11.0%)
Palmer	(21.0%)	15.5%	30.4%	36.8%	53.3%	292.9%	0.3%
Pelham	(18.6%)	(10.1%)	16.7%	(8.3%)	117.6%	150.0%	(11.9%)
Plainfield	(6.6%)	10.4%	27.4%	100.0%	25.0%	354.5%	9.5%
Russell	(22.9%)	41.7%	30.0%	33.3%	111.1%	500.0%	7.4%
South Hadley	(21.0%)	9.6%	42.7%	20.2%	61.5%	474.1%	(2.3%)
Southampton	(7.5%)	31.2%	41.6%	55.3%	106.4%	384.3%	16.6%
Southwick	(13.5%)	12.5%	26.9%	34.4%	80.6%	374.6%	5.0%
Springfield	(32.9%)	(18.7%)	49.5%	(17.0%)	16.4%	186.6%	(16.8%)
Tolland	(9.9%)	77.5%	36.6%	9.5%	45.0%	270.0%	17.5%
Wales	(16.6%)	14.9%	28.3%	21.6%	12.3%	400.0%	5.1%
Ware	(22.7%)	22.6%	35.2%	26.1%	36.8%	430.9%	1.9%
West Springfield	(23.0%)	3.1%	38.4%	45.0%	45.3%	424.6%	(6.4%)
Westfield	(20.7%)	12.3%	34.7%	22.6%	94.9%	452.6%	0.4%
Westhampton	(4.4%)	39.1%	36.6%	103.1%	68.4%	568.2%	21.7%
Wilbraham	(14.1%)	5.8%	54.4%	27.6%	64.9%	476.9%	3.3%
Williamsburg	(15.5%)	(10.6%)	3.0%	17.6%	105.4%	254.8%	(8.2%)
Worthington	(19.8%)	16.1%	6.1%	(3.3%)	145.8%	375.0%	(0.6%)
Pioneer Valley Region	**(23.2%)**	**10.0%**	**39.3%**	**21.1%**	**53.5%**	**338.1%**	**(4.9%)**

Source: Massachusetts Department of Revenue

CONGESTION APPENDIX

Understanding where and why traffic congestion is happening is an important step toward reducing it. The Pioneer Valley Congestion Management Process (CMP) works toward identifying the major traffic congested locations within the Pioneer Valley Region. This information is essential in advancing future transportation improvements that will reduce traffic congestion and improve the overall safety and efficiency of our transportation network.

1. Recurring and Non-Recurring Congestion

There are two types of congestion: recurring and non-recurring. Recurring congestion can be expected to occur at the same time every weekday as a result of high volumes of commuter traffic traveling on roadways that are at or near their carrying capacity. Non-recurring congestion occurs as a result of an unexpected or non-typical event. Some causes of non-recurring congestion include: vehicular crashes, vehicle breakdowns, roadway construction, inclimate weather, and additional traffic resulting from special events.

Previous versions of the Pioneer Valley CMP only included the impacts of recurring congestion. In the past, travel time data that was thought to have been influenced by unexpected events such as roadway improvement projects or vehicle breakdowns was not used. The CMP now incorporates all regional travel time data regardless of the cause of congestion or its perceived severity. A number of new performance measures have also been developed to include the impacts of non-recurring congestion in the CMP.

a) Travel Time Data Collection

Travel time data collection on the 73 CMP corridors is facilitated by a four-year data collection cycle. A data collection year is scheduled to correspond with an average academic school year beginning in early September and ending in late May. Data collection is restricted by factors to include but not limited to inclement weather, federally observed holidays, and school vacations. The data is collected for each corridor on multiple days and in both directions during the AM and PM peak hours (7:00 AM - 9:00 AM and 4:00 PM - 6:00 PM). Drivers are instructed to travel with the flow of traffic but not exceed the posted speed limit for each 2 hour data collection period.

A. REGIONAL ROADWAY CONGESTION SEVERITY

The PVPC reviewed each of the ongoing performance measures with respect to their impacts on congestion severity. In previous versions of the CMP,

congestion severity was defined solely by the total delay and congestion ratio calculated for each CMP corridor. As new performance measures are integrated into the CMP it becomes more difficult to quantify congestion as each corridor has a number of different factors that contribute to congestion.

A Regional Congestion Severity formula was developed to assist in our goal of developing an objective driven, performance based congestion management process that incorporates both recurring and non-recurring congestion. This formula is intended to be a dynamic metric that can be modified to incorporate Immediate and Future performance measures as data becomes available. A number of variations of this formula were tested. Each variation attempted to incorporate a variety of performance measures that considered the impacts of a variety of transportation modes on regional congestion. The current version of the formula includes data from six performance measures and integrates the impacts of non-recurring congestion, roadway geometry, and bridge conditions in addition to travel time data.

$$\text{Regional Congestion Severity} = \text{AVG}\left(\text{Inverse Ranking of: } \text{Travel Time Index} + \text{Travel Time Delay} + \text{Congestion Ratio}\right) + 5 \times \left(\frac{\text{\# High Crash Locations}}{\text{Length of Corridor}}\right) + \left(3 \times \text{Structurally Deficient Bridge Total}\right) + \left(2 \times \text{Functionally Obsolete Bridge Total}\right)$$

1. Methodology

Currently, there are a total of 73 CMP corridors with available travel time data. Travel time data for each CMP corridor was ranked based on the inverse value of each of the travel time performance measures. The ranking scheme ranges from 1 to 73 with a value of 73 indicating the highest level of congestion and 1 indicating the lowest level of congestion. A weighted average was performed of the inverse rankings of each performance measures and the average values were again inversely ranked. Priority on corridors that had the same rank was given to the corridor with the higher Travel Time Index. This total was added to the number of high crash locations, structurally deficient bridges and functionally obsolete bridges along each of the CMP corridors. Additional information on the six performance measures currently used in the Regional Congestion Severity formula is provided below.

- Travel Time Index is the ratio of the average peak travel time to a free-flow travel time. Index values can be described as an indicator of the length of extra travel time spent during a trip. A travel time index of 1.0

represents free-flow travel conditions in which there are no delays. Any congestion increases the travel time index.

- Travel Time Delay is defined as the difference between the second worst and second best travel time in seconds per mile.
- Travel Time Congestion Ratio is defined as the second worst travel time divided by the second best travel time.
- High Crash Locations as defined in the Top 100 High Crash Intersections in the Pioneer Valley Region report were plotted along each of the CMP corridors. The number of high crash locations was divided by the distance of the corridor in miles, thus placing a greater emphasis on the concentration of crashes rather than total experience. This figure was then multiplied by a factor of 5 to increase its weight in the regional congestion severity formula.
- Structurally deficient and functionally obsolete bridges occasionally require vehicles to travel alternate routes, create bottlenecks due to lane elimination or lack of exclusive turning lanes, and influence driver confidence resulting in deceleration. Each structurally deficient bridge and functionally obsolete bridge located within a corridor was multiplied by the value of 3 and 2 respectively.

2. Congestion Severity Descriptions

The values produced for each corridor by the Regional Congestion Severity formula are ranked to create a congestion severity table ranging from the most to the least congestion. For analytical and evaluative purposes, four descriptive levels of congestion were created. The corridors were grouped into 21 severely congested corridors, 17 seriously congested corridors, 23 moderately congested corridors, and 12 minimally congested corridors based on their calculated severity value. Each Level is explained below.

a) Severe Congestion

Severe congestion is characterized by a condition of heavy traffic congestion resulting in significantly slower traveling speeds, longer trip times, significant queuing and high side-street delay. Contributing factors include vehicle volume, pedestrian volumes, multi-purpose lane utilization, multi-modal utilization and availability, functionally obsolete and structurally deficient bridges, vehicle crashes and uncoordinated signalized intersections. These corridors will greatly benefit from further study to identify recommendations useful in relieving congestion. These corridors are operating above capacity and driving conditions are highly unstable.

b) Serious Congestion

Serious congestion is characterized by a condition of medium traffic congestion approaching unstable flow caused by slower travel speeds,

queuing and increased levels of delay. Contributing factors include vehicle volumes, pedestrian volumes and the number of signalized and unsignalized intersections along the corridor. These corridors operate at or near capacity.

c) Moderate Congestion

Moderate congestion is characterized by a condition of stable traffic congestion and flow, non-sporadic travel speeds and reasonable trip times. Contributing factors include reasonable traffic volume and opportunities for non-recurring congestion. These corridors may have small pockets of congestion, but generally operate at posted speed limits.

d) Minimal Congestion

Minimal congestion is characterized by a condition of ideal traffic congestion operating at desired travel speeds, with reasonable trip times and little to no queuing or delay. These corridors are ideal for commuting purposes and operate at free-flow travel speeds.

3. Findings

The results of the Regional Congestion Severity formula are summarized in Tables 8-1 – 8-4 and Figure 8-1. Based on the new rankings, 21 of the 73 corridors are classified as severe, 17 as serious, 23 corridors as moderate, and 12 corridors as minimal. The regional congestion severity rank has been color coded for map readability. The rankings have been defined as follows; Severe Congestion is color coded red, Serious Congestion is color coded orange, Moderate Congestion is color coded yellow, and Minimal Congestion is color coded green. The column tilted Previous Rank is the Rank for each corridor based on the 2010 CMP update.

Of the 15 corridors ranked as Severe Congestion in 2010, 8 of the corridors are still listed as severe, but 3 of the 15 are now ranked as serious congestion and 4 are ranked as moderate Congestion. This is likely a result of now having updated travel time data for all 73 corridors (6 previously un-scored corridors are now classified as having severe congestion) and completed transportation improvement projects.

Table 8-1 – Corridors with Severe Congestion

Severity Rank	Previous Rank	Corridor	Community	Route Name	Congestion Severity Total
1	12	84	Springfield/Chicopee	St, James St from State St to Broadway (Chicopee)	77.78
2	NA	78	Springfield Chicopee	Beginning Main St at Center St (Chicopee City Line) travel southbound on Main St ending at State St	74.02
3	13	25	Springfield	Sumner Ave - Longhill Road to East Longmeadow TL	73.43
4	1	69	Holyoke	AM Run Hampden St. from Route 202 Rotary to I-91, PM Run Dwight Street from I-91 to Route 202 Rotary	73.21
5	NA	58	Ware	Beginning at the intersection of Route 32 (Palmer Road) and Bacon Road traveling northbound to Route 9 (Main St), continuing eastbound ending at the intersection of Route 9 and Knox Ave	72.67
6	2	75	Chicopee	Chicopee St from Florence St to Front St, Front St to Cabot St, Cabot St to Exchange St, Exchange St to Center St, Center St to Front St Front to Grove St, Grove St to Main St, Main St to East Main St ending at Maple St.	71.06
7	NA	70	Holyoke	Beginning at the intersection of Dwight St and Linden St traveling southbound on Dwight St ending at the intersection of Dwight St and South Main St	70.67
8	11	79	Springfield	E. Columbus Ave - From Bruno Street to Liberty Street	65.88
9	6	74	Chicopee	McKinstry St. from Arcade St to Granby Rd, Granby Rd to Westover Rd ending at Bernice St	65.82
10	23	12	Springfield	Rt 21(Parker St) - N. Branch PKWY to East St.	63.22
11	26	31	Westfield	Rt. 20 - E. Mountain Rd. to Elm St.	62.01
12	NA	83	Springfield	Dickinson St, Maple St, and Chestnut St from the X to Dover St Dwight St, Maple St, and Dickinson St from Dover St ending at the X	60.83
13	NA	68	Holyoke South Hadley	Beginning at the intersection of Main Street (Holyoke) and Route 5 (Ingleside St) travel eastbound on Main St to Race St to Canal St northbound on Route 116 (Vietnam Veterans Memorial Bridge) to Bridge St (South Hadley) Lamb St. (Route 116) ending at the intersection of Lamb St and Gaylord St	59.47
14	15	77	Springfield	Liberty St - From West Columbus Ave to Amory St, Armory St north to Atwater Ter	57.67
15	NA	57	South Hadley Granby	Beginning at the exit to the Route 202 Rotary and Purple Heart Dr traveling eastbound on Route 202 (Granby Rd) into Granby ending at the Five Corners (Pleasant/Amherst St intersection)	57.01
16	18	80	Springfield	W. Columbus Ave - From Clinton Street to South Street	55.33
17	8	66	Agawam	Route 75 from Long Brook Estates to Colony Road	54.33
18	NA	61	Ludlow	Beginning at the intersection of Chapin St and Holyoke St traveling eastbound on Chapin St through Ludlow into Wilbraham on Cottage Street ending at the intersection of Cottage St and Boston Road (Wilbraham)	54.33
19	54	11	Longmeadow	Route 5 - Mill Rd. to I-91	53.67
20	47	41	Hadley/Northampton	Bay Rd. - From Atkins corner to Route 9	53.00
21	28	8	E. Longmeadow / Springfield	Rt. 83, Springfield st. - Sumner Ave.. to Quaryhill Rd.	51.61

Table 8-2 – Corridors with Serious Congestion

Severity Rank	Previous Rank	Corridor	Community	Route Name	Congestion Severity Total
22	5	42	Holyoke	Maple Street from Lyman to Route 5 via South Street	49.60
23	20	67	Amherst	Snell Street from Route 116 north to University Drive, East on Mass Ave, South on N Pleasant St., North on East Pleasant ending at Eastmen Lane.	49.00
24	19	52	Springfield	Bay St. from Boston Rd to State St.	48.88
25	NA	7	Chicopee	I-291, Burnett Rd - Exit 5 to Holyoke St (Ludlow) to Chapin to Fuller to West Ave.	48.33
26	4	71	Holyoke	Appleton Street from Dwight to North Canal Street	48.24
27	NA	65	Agawam	Beginning on Route 159 (Main Street) from Ct Stateline traveling northbound on Route 159 to Springfield Street ending at the intersection of Springfield St and Columbus St.	46.67
28	NA	63	Longmeadow East Longmeadow	Beginning at the intersection Converse St and Route 5 (Longmeadow St) traveling Eastbound to Dwight Street southbound on Dwight St to Chestnut St (East Longmeadow) travel eastbound on Chestnut St to Shaker Rd then northbound on Shaker Rd to Elm St ending at the intersection of Elm St and Taylor St.	46.33
29	34	23	Springfield	Rt. 20A - From East St to Page, Page to Paco to Boston Road, Start and end @ St. James and Carew	46.18
30	50	36	Wilbraham	Main St - Tinkham Rd/Main to Cottage/Boston Rd	46.00
31	39	15	Northampton	Rt. 9 - Florence St. to Day Ave	44.00
32	40	14	Hadley/Northampton	Bridge St at Route 9 to Damon Road -Damon Rd to Bridge/Main to Rt. 9 Aqua Vita	41.67
33	17	18	Springfield	Main St., Locust St., Belmont Ave. - State/Main to Belmont (The X)	41.67
34	14	22	Springfield	Roosevelt Av. - Sumner to East St.	41.44
35	29	21	Springfield/Chicopee	Liberty St - From I-291(Go thru rotary) to Broadway (Chicopee) to I-90 Exit 5	41.00
36	NA	55	Springfield	Beginning at the intersection of Parker St and the North Branch Parkway traveling southbound on Parker St to Cooley St continue southbound on Cooley St ending at the East Longmeadow T.L.	40.88
37	NA	62	Chicopee Ludlow	Beginning at the intersection of Fuller Rd and Route 33 Memorial Dr eastbound on Fuller Rd to Shawinigan Drive to West Ave ending at the intersection of West Ave and Center Street (Ludlow)	40.31
38	51	20	West Springfield/ Springfield/Chicopee	North Boulevard to South Boulevard to Rotary to Plainfield Street to Carew Street ending at East Main Street (Chicopee)	40.18

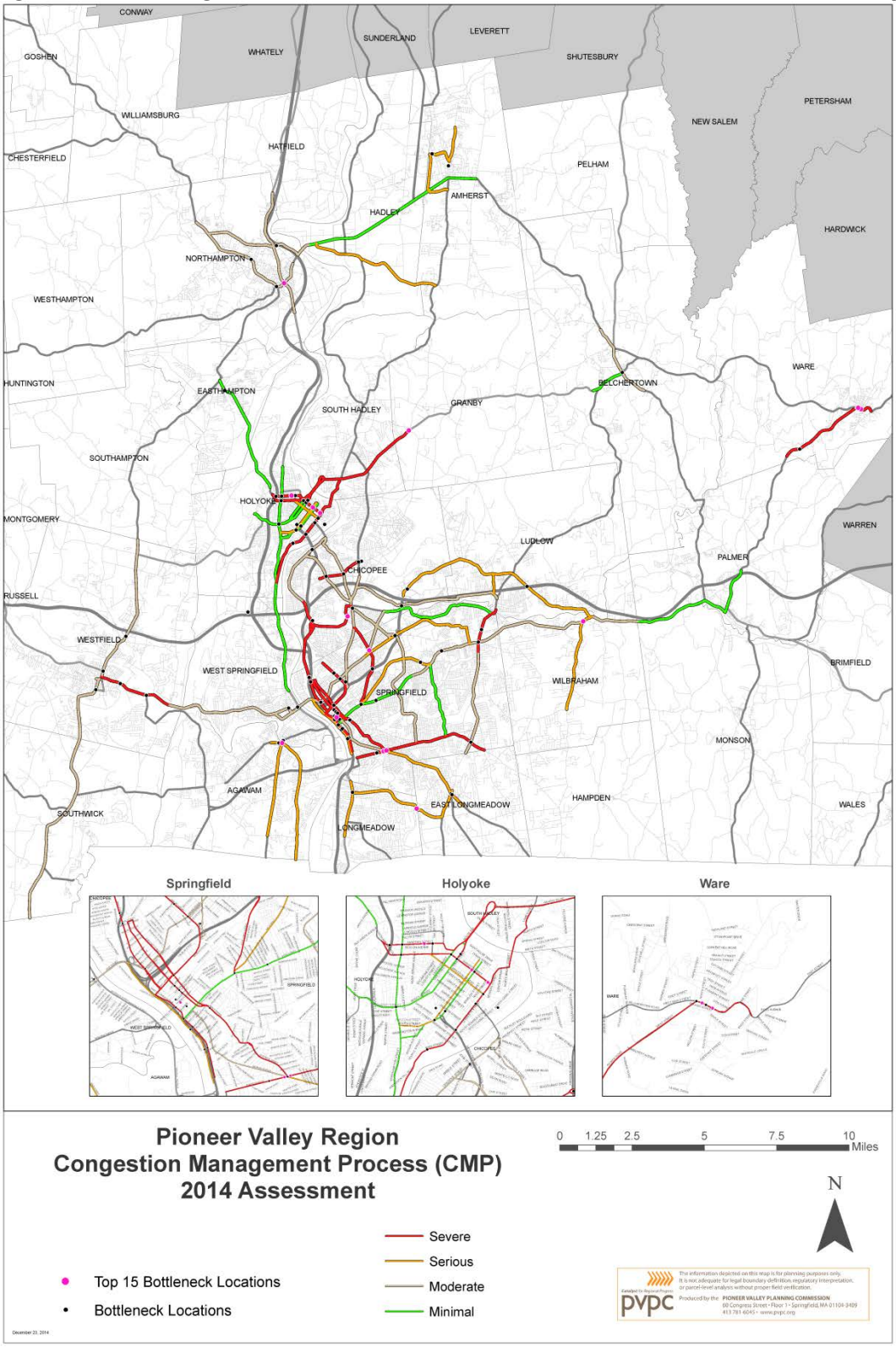
Table 8-3 – Corridors with Moderate Congestion

Severity Rank	Previous Rank	Corridor	Community	Route Name	Congestion Severity Total
39	16	51	Northampton	Route 5 Exit 18 to MassHighway District 2 Building	39.85
40	46	39	Belchertown	Route 9/181 Federal St from Bay to Route 181n at Jensen Road (Belchertown)	39.00
41	7	72	Chicopee	Chicopee St from Willamansett Bridge to Yelle St, Yelle St to Montgomery Street, Montgomery St to Memorial Dr (Route 33)	37.21
42	42	49	Springfield/Wilbraham	Rt. 20 / Boston Raod - All of Boston Road	36.88
43	36	33	Westfield/Southwick	Rt. 10/202 - CT Line to Washington St. (Law Offices)	36.00
44	3	30	Westfield	Rt 10/202/, N. Elm St. from Southampton T.L. to Main St.	34.68
45	21	73	Chicopee	Grattan St from Chicopee St (Route 116) to Memorial Dr (Route 33)	34.67
46	22	28	West Springfield	Rt. 20 - East Mountain Road to Elm Street to Park Street to North End Rotary.	33.04
47	33	86	Springfield/Chicopee	East Main St (Chicopee) to Worcester St (Springfield) to Main St (Indian Orchard) to River Rd ending at Weston St.	32.67
48	10	9	Holyoke	Laurel St to Brown St to South St to High Street ending at Lyman St.	32.09
49	27	85	Springfield	Bradley Rd from Sumner Ave to Boston Rd	31.85
50	41	50	Easthampton	Route 141 from Route 10 to I-91	31.67
51	NA	59	Belchertown	Beginning at the intersection of Route 202 (State St) and Underwood St traveling eastbound and then northbound on Route 202 (Maple St and Main St) ending at the intersection of Route 202 (North Main St) and Sargent St	30.33
52	9	44	Holyoke	Jarvis St/ Beech St. - from George Frost Dr to Rt 202 Rotary and back up Linden St to Georg Frost Dr	29.67
53	35	27	West Springfield / Holyoke	Rt. 5 - E. elm St to Providence Hospital	28.98
54	44	53	Palmer	Route 32 from High St. to Route 20 to Boston Rd.	27.67
55	32	24	Springfield	State St. - Columbust Ave. to Boston rd	26.84
56	24	37	Holyoke	Rt. 5 - River Terrace to Providence Hospital	26.77
57	49	56	Hadley	Route 9 from Aquavita Rd to Belchertown Road (Amherst)	26.67
58	30	82	Springfield	Springfield Street from Center at Chicopee to Chestnut to Main to Bernie end at West Street	24.00
59	25	2	Agawam	Springfield St - Mill Street (Agawam) to Memorial Ave (West Springfield) to Main St (Springfield)	23.57
60	57	48	West Springfield	Dewey, Pease, Morgan, Birnie - Dewey/Rt 20 to Birnie/Prospect	23.33
61	NA	54	Springfield	Beginning at the Intersection of Wilbraham Rd and State St traveling eastbound on Wilbraham Rd, Wilbraham Rd turns into Springfield St (Wilbraham) ending at the intersection of Springfield St and Main St	22.98

Table 8-4 – Corridors with Minimal Congestion

Severity Rank	Previous Rank	Corridor	Community	Route Name	Congestion Severity Total
62	NA	64	Longmeadow East Longmeadow	Beginning at the intersection of Bliss St and Route 5 (Longmeadow St) traveling eastbound on Bliss St to Williams St eastbound on Williams St to Maple St (East Longmeadow) eastbound on Maple St to Pleasant Street ending at the intersection of Pleasant St and Taylor St.	20.67
63	NA	19	Springfield Longmeadow	I-91 Exit 12 to CT Exit 49	19.67
64	38	40	Chicopee	Memorial Dr. Rt. 33 - From Rout 202 to I-90	19.67
65	31	35	Wilbraham	Stony Hill Rd. - Tinkham Rd to River Rd to Route 21	18.47
66	53	16	Northampton/Easthampton	Rt. 10 - Donais St. to Route 9	17.33
67	55	1	Agawam	Rt. 57 - Rt. 5 on Ramp to end of Rt 57, N on RT 187, West of old 57 to Southwick T.L.	15.31
68	45	13	Ludlow	Center St. and East St. - Rood Street to Owens Way	15.26
69	37	10	Holyoke	Lower Westfield Rd., Homestead Ave - Elbert Dr. to Holyfamily Rd.	13.22
70	52	5	Amherst	Meadow St., Pine St., Bridge St., and Market Hill - Market and South Hills to Meadow and Roosevelt	10.00
71	NA	60	Amherst	Beginning at the intersection of Main St and Poets Corner Rd traveling westbound on Main st St to Amity St ending at the intersection of Rocky Hill Rd and North Pleasant St in Hadley.	9.33
72	48	3	Agawam	Route 75 from Mill Street to Main Street	7.00
73	56	4	Agawam	Route 187 - From Route 20 (Westfield) to Springfield St (Agawam), Springfield St to Mill ST.	6.85

Figure 8-1 – Congested Corridors and Bottlenecks in the Pioneer Valley



4. Transit Congestion Severity Ranking

PVPC is in the process of developing a transit congestion severity ranking. This measure will help quantify the number of transit users being impacted by delays on the PVPC CMP corridors.

In order to develop a Transit Severity Ranking PVPC will overlay PVTA's fixed routes on the CMP corridors in order to identify locations were bus occupancy and on time performance can be measured against the results of the regional roadway congestion severity analysis (see Figures 8-2 and 8-3). By doing this we can identify the number of transit users, number of buses, and the number of routes being influenced by congestion. This analysis may also help identify correlations between automobile delay and transit OTP. By including ridership we can then calculate the number of transit travelers being impacted by congestion.

For the RTP we will be including two routes for this analysis. The full system analysis will be completed at a later date as part of the CMP update. The routes being looked at are the Northampton portion of the Blue 43, this transit route corresponds to CMP corridor 15 (Route 9 in Northampton). The second route being looked at is the G1, this transit route corresponds with CMP corridor 78 (Main Street in Springfield). These two CMP corridors were selected based on their high congestion severity ranking. The two transit routes selected also experience high ridership.

Table 8-5 – Transit Severity Data

Transit Route	Average Ridership	Maximum Riders	Alights	Boardings	Number of buses	Number of Trips	Corridor 78 Main Street - Springfield	
G1 NB am	12	28	150	89	7	5	Severity Rank (Score)	2 (74.02)
G1 SB am	15	27	116	141		6	Delay	434.21
G1 NB pm	13	36	163	116	13	6	Ratio	7
G1 SB pm	19	38	105	188		13	Index	2.03
Average	**14.75**	**32.25**	**133.5**	**133.5**	**10**	**7.5**		
Transit Route	**Average Ridership**	**Maximum Riders**	**Alights**	**Boardings**	**Number of buses**	**Number of Trips**	**Corridor 15 Route 9 - Northampton**	
B43 EB am	8	22	6	90	4	6	Severity Rank (Score)	31(44)
B43 WB am	7	15	30	1		5	Delay	156.71
B43 EB pm	12	25	38	107	6	6	Ratio	1.97
B43 WB pm	11	24	57	0		5	Index	1.5
Average	**9.5**	**21.5**	**32.75**	**49.5**	**5**	**5.5**		

Table 8-5 shows the different types of data available to for analysis; for PVTA's fixed routes and how it can be matched up with our CMP data. The data is summarized by direction of travel and time period (AM = 7-9, PM = 4-6). The data can also be broken out by stop or stops to better correspond with the segmentation of our CMP corridors. More in-depth analysis will be done as part of our next CMP update.

Table 8-5 also shows the average ridership by direction for both AM and PM peak periods, as well as the maximum number of riders on the bus while the bus was traveling on the CMP corridor. A significant number of alightings and boardings were recorded on the G1 in Springfield; this was due to transfers at the Springfield Bus Terminal. The table also includes information on how many buses travel the route during the peak hours as well as how many trips were made.

By overlaying the transit data over our CMP data we are able to see that the portion of the G1 route experiences a severe congestion with a congestion severity ranking of 2. The B43 route also experience serious congestion with a congestion severity ranking of 31. As we advance this process we anticipate being able to identify points along our corridors where congestion directly impacts the transit experience.

B. PIONEER VALLEY REGION BOTTLENECKS

1. Introduction

The CMP "Bottlenecks" analysis further refines the existing CMP methodology and evaluates individual roadway segments along each corridor. Segments are determined on a corridor by corridor basis and vary in length and physical characteristics. As a result, the degree of congestion severity can vary significantly along a given corridor.

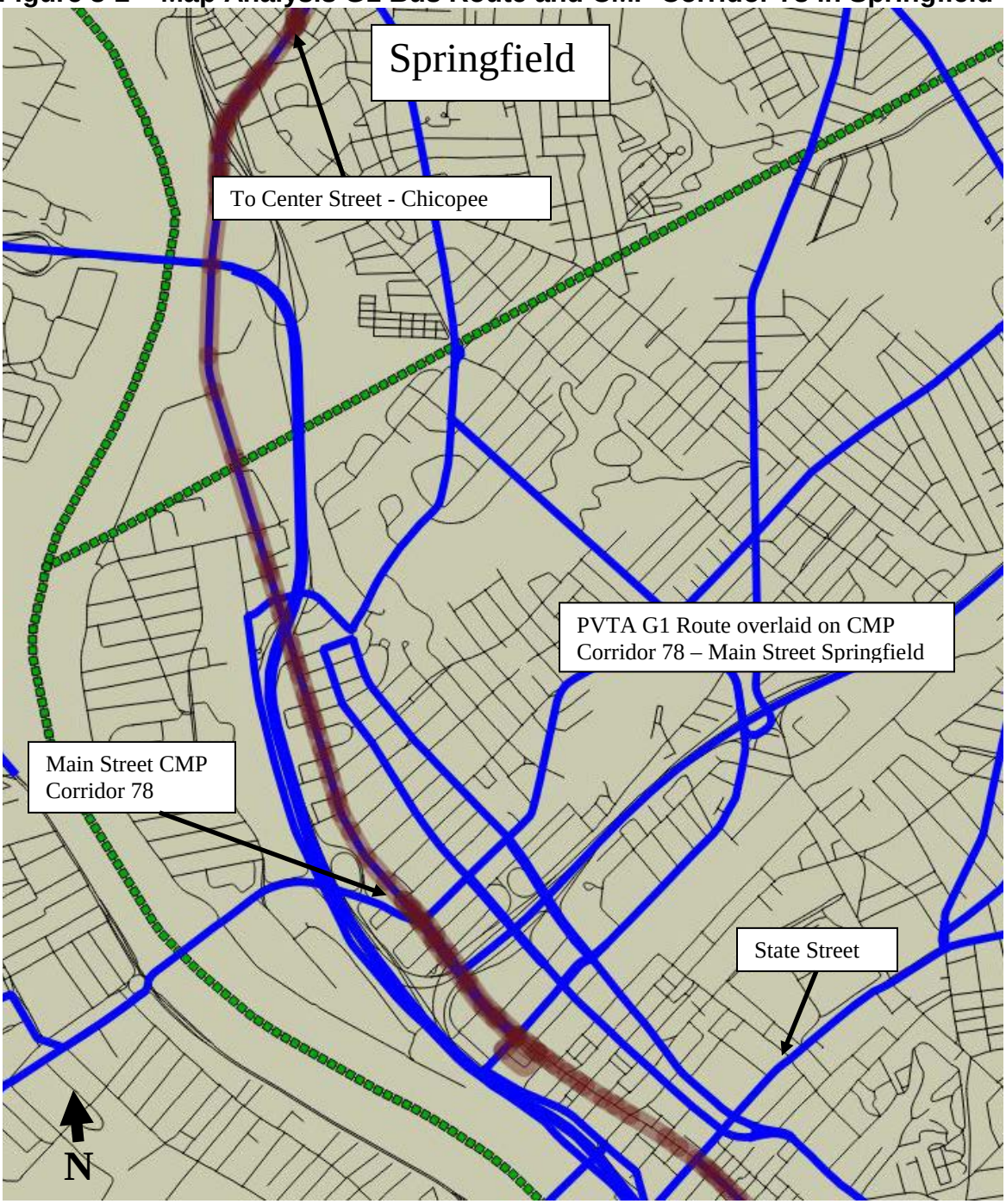
The Federal Highway Administration (FHWA) defines a congestion bottleneck as "A localized section of highway that experiences reduced speeds and inherent delays due to a recurring operational influence or a nonrecurring impacting event"[1]. If congestion occurs along an entire corridor, then the corridor is considered congested. Likewise, if the corridor is experiencing congestion only at a specific location, then the corridor is considered a congestion bottleneck.

2. Analysis

Each roadway segment was ranked based on the inverse value of each of the travel time performance measures. Currently, there are a total of 456 roadway segments with travel time data available. The ranking scheme ranges from 1 to 456 with a value of 4456 indicating the highest level of congestion and 1 indicating the lowest level of congestion. For segments that had the same rank, priority was given to the corridor with the higher Travel Time Index. PVPC used this process to identify the top 15 congested segments in the region to identify the top bottlenecks in the Pioneer Valley Region. The results of the analysis are presented in Table 8-6.

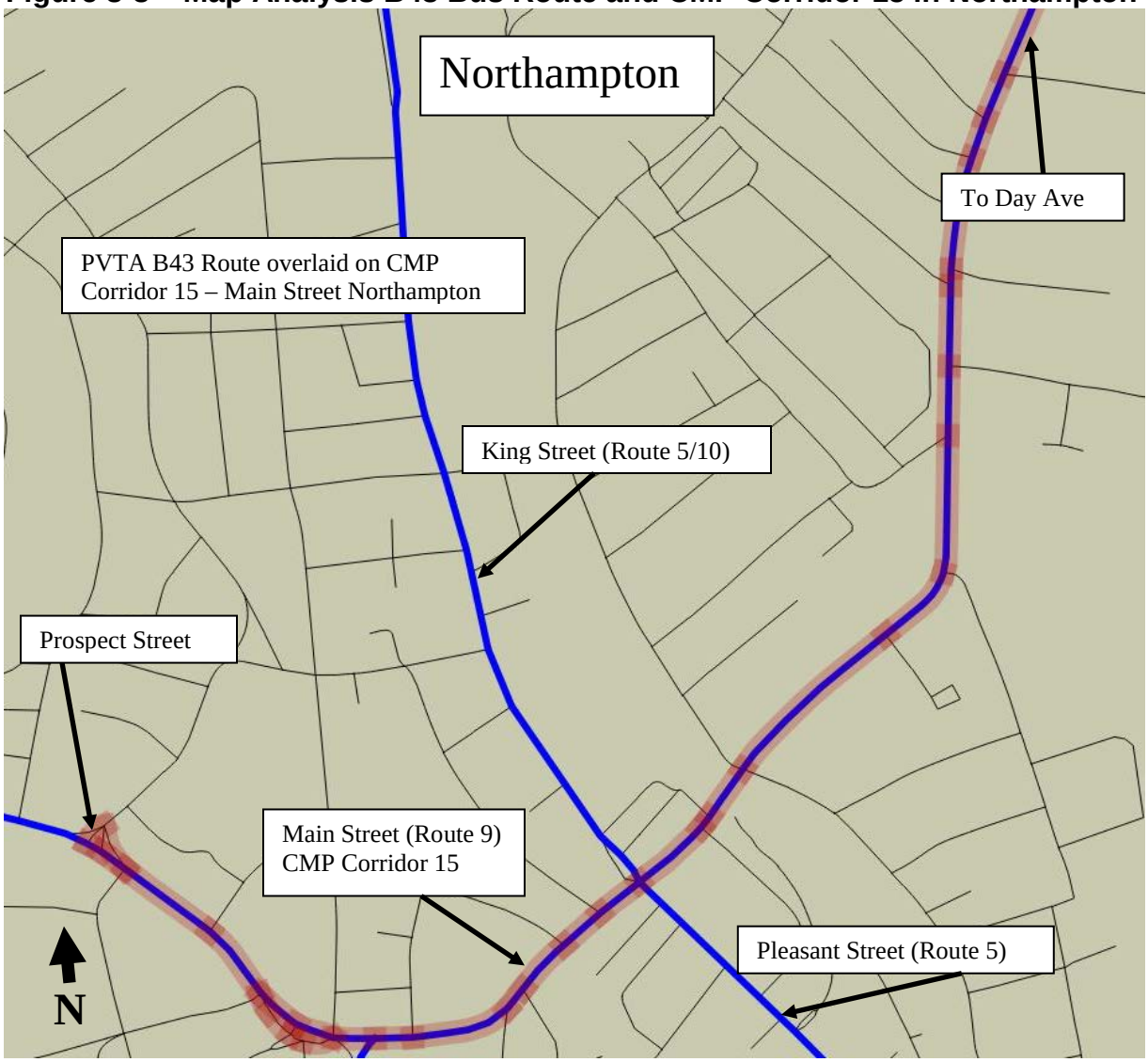
[1] http://www.ops.fhwa.dot.gov/bn/lbr.htm#g3

Figure 8-2 – Map Analysis G1 Bus Route and CMP Corridor 78 in Springfield



Map Key: Blue line indicates CMP corridor
Red highlight indicates transit route
Green Doted Line indicates municipal boundary
Black lines represent roads

Figure 8-3 – Map Analysis B43 Bus Route and CMP Corridor 15 in Northampton



Map Key: Blue line indicates CMP corridor
Red highlight indicates transit route
Green Doted Line indicates municipal boundary
Black lines represent roads

Table 8-6 – Congestion Bottlenecks in the Pioneer Valley Region

Rank	Municipality	Bottleneck Location	Score
1	Chicopee	Grove Ave/Front Street @ Grove Street - Chicopee	452
2	Springfield	Carew Street @ Saint James Avenue - Springfield	450
3	Holyoke	Dwight @ Race Street to Dwight at Maple Street- Holyoke	448
4	Ware	Main Street @ South Street/Church Street to Main Street @ North Street- Ware	447
5	Springfield	Main Street @ Boland Way/Harrison Ave - Springfield	444
6	Springfield	Sumner Ave @ The "X" - Springfield	444
7	Granby	West State Street @ Pleasant Street (5 Corners) - Granby	443
8	Agawam / West Springfield	Memorial Ave @ River Street to Suffield Street @ Main / Springfield Street including Walnut Street - Agawam / West Springfield	441
9	Longmeadow	Dwight @ Maple/Williams - Longmeadow	439
10	Wilbraham	Main Street @ Boston Road - Wilbraham	438
11	Holyoke	Hampden Street (141) @ Nonotuck Street - Holyoke	438
12	Northampton	Main Street (Route 9) @ Pleasant /King Street - Northampton	436
13	Hadley / Amherst (UMass)	Massachusetts @ Commonwealth Ave - UMass	432
14	Chicopee	I-291 @ Exit 6 - Chicopee	430
15	Chicopee	Westover Road @ Bernice Street - Chicopee	428

LIVABILITY AND CLIMATE CHANGE APPENDIX

A. MEPA REQUIREMENT FOR GHG EMISSIONS ASSESSMENT

The Massachusetts Environmental Policy Act (MEPA) requires that all major projects proposed in the Commonwealth that have state involvement (in the form of state permits, land transfers, or financial assistance, for example) undertake an assessment of project impacts and alternatives in an effort to avoid, minimize, and mitigate damage to the environment to the maximum extent feasible. Building on this general requirement, the MEPA GHG Policy requires that certain projects undergoing review by the MEPA office quantify their GHG emissions and identify measures to avoid, minimize, and mitigate such emissions. In addition to quantifying project-related GHG emissions, the MEPA GHG Policy also requires proponents to evaluate project alternatives that may result in lower GHG emissions, and to quantify the impact of proposed mitigation in terms of emissions and energy savings. The MEPA GHG Policy is primarily applied to commercial and residential real estate development projects, but also applies to industrial and energy generation projects. Clean Energy Economy Impacts: By requiring project proponents to evaluate all feasible measures to reduce their GHG emissions, such as energy efficiency upgrades, fuel switching, incorporation of renewable energy measures, and reduction of vehicle miles traveled, the MEPA GHG Policy supports the development of industries and jobs to supply these technologies. In addition, the avoided fuel and electricity use, due to enhanced efficiency of projects, reduce long-term operational costs of the projects. Rationale: The principal purpose of the MEPA GHG Policy is to require project proponents to undertake a thorough analysis of a project's primary sources of GHG emissions at an early stage of project planning, and to examine all feasible alternatives that may have lower GHG emissions potential. By conducting this early-stage impacts and alternatives analysis, project proponents can integrate directly into project planning sustainable design considerations that will allow the project to achieve GHG emissions reductions in the most economical manner. Policy Design and Issues: For the majority of projects subject to the MEPA GHG Policy, the Policy requires comparison of emissions associated with the proposed project design to the emissions that would result from construction of an identical building code-compliant project. In this way, the MEPA GHG Policy is closely related to issues surrounding the adoption of Advanced Building Energy Codes and other energy efficiency improvements for buildings. Similarly, where the MEPA GHG Policy encourages adoption of renewable energy components, it is closely related to issues involved in the implementation of incentives for generating renewable energy (see the Developing a Mature Market for Renewable Thermal Technologies policy). The MEPA GHG Policy also aims to reduce vehicle miles traveled in coordination with other state policies. GHG Impact: To date, more than 200 projects have initiated review in accordance with the MEPA GHG Policy, and more than 100 projects have

completed MEPA review with a finding that their completed GHG analysis was consistent with the MEPA GHG Policy. Projects that had completed review have achieved an average reduction of 19 percent in stationary source GHGs below an equivalent code-compliant project and an average reduction of 5% APPENDIX 108 percent in mobile sources. In total, the MEPA GHG Policy has resulted in commitments to reduce GHG emissions by over 190,000 metric tons of CO2e per year. However, reductions associated with the MEPA GHG Policy may be duplicative of the reductions achieved by other state policies designed to increase efficiency, encourage renewable energy generation, and reduce vehicle miles traveled. Costs: The upfront costs of incorporating GHG reduction measures will vary widely depending upon the project, and many costs will be offset through energy savings. Because the MEPA GHG Policy does not mandate a specified level of reductions, but rather asks project proponents to adopt ”feasible" measures, measures that are considered infeasible from a cost perspective may be eliminated from consideration. Experience in Other States: The MEPA GHG Policy is a nation-leading policy. Other states, including California and New York, have adopted similar policies, and the White House Council on Environmental Quality, which oversees implementation of the National Environmental Policy Act (NEPA) by federal agencies, has also released a draft policy concerning consideration of GHG emissions as part of the NEPA review of individual projects. Legal Authority: The Global Warming Solutions Act specifically amended the MEPA statute to provide that: In considering and issuing permits, licenses, and other administrative approvals and decisions, the respective agency, department, board, commission, or authority shall also consider reasonably foreseeable climate change impacts, including additional GHG emissions, and effects, such as predicted sea level rise. See M.G.L. c. 30, §61. The MEPA GHG Policy was introduced and is being applied through MEPA review to address the Commonwealth’s obligations under the GWSA. Implementation Issues: The MEPA GHG Policy has become a routine part of the environmental impact review process. For real estate development projects, the assessment and review of a project’s GHG analysis has become generally accepted by the regulated industry and the public

B. MUNICIPAL VULNERABILITY PREPAREDNESS UPDATED CLIMATE PROJECTIONS / RESILIENCE ANALYSIS

The Massachusetts Climate Change Projections - Statewide and for Major Drainage Basins: Temperature, Precipitation, and Sea Level Rise Projections project was developed by NE CASC with funding by the Commonwealth of Massachusetts. In Sept. 2016 Governor Baker signed a Comprehensive Executive Order committing the administration to work across the state to plan and prepare for the impacts of climate change. The goal of this project was to develop down scaled projections for changes in temperature, precipitation, and sea level rise for the Commonwealth of Massachusetts. The Executive Office of Energy and Environmental Affairs has

provided support for these projections to enable municipalities, industry, organizations, state government and others to utilize a standard, peer-reviewed set of climate change projections that show how the climate is likely to change in Massachusetts through the end of this century.

a) Temperature and Precipitation

The down-scaled, or localized, temperature and precipitation projections are based on simulations from the latest generation of climate models from the International Panel on Climate Change and scenarios of future greenhouse gas emissions. The models were carefully selected from a larger ensemble of climate models based on their ability to provide reliable climate information for the Northeast U.S., while maintaining diversity in future projections that capture some of the inherent uncertainty in modeling climate variables like precipitation. Both annual and seasonal projections are available at the statewide and major drainage basin geographic scales.

b) Sea Level Rise

Future sea level projections are provided for the Massachusetts coastline at established tide gauge stations with long-term records at Boston Harbor, MA, Nantucket, MA, Woods Hole, MA, and Newport, RI. The projections are adjusted to each station's mean sea level and converted to the North American Vertical Datum of 1988 (NAVD88). The sea level projections are based on a methodology which provides complete probability distributions for different scenarios of future greenhouse gas emissions. The methodology for developing these projections closely follows the approach utilized for the recent city of Boston's sea level rise projections in 2016 and similar analyses for the states of California and New Jersey.

c) Hydrological Assessment

The flow of a stream represents an integrated basin response to climatic variables, especially precipitation and temperature. Changes over time in the seasonal flow of streams that drain unregulated basins with stable land use generally reflect changes in climatic variables and can be used as indicators of climate change. This work concluded that March mean stream flows increased significantly over time, by 76 percent to 185 percent at the seven stream flow gaging stations with the longest continuous record in areas of New England. May mean stream flows significantly decreased at 10 stations in northern or mountainous sections of Maine and New Hampshire, and May mean flows decreased by 9 to 46 percent at the seven stations with the longest continuous records. This aligns with the assessment by the Intergovernmental Panel on Climate Change that annual temperatures and precipitation in New England increased in the 20th century.

The results from this study can be seen on the Baker-Polito Administration Resilient MA Climate Clearinghouse: http://www.resilientma.org/data/data

Photo: PVTA Loop Shuttle

CHAPTER 13 - FUTURE FORECASTS APPENDIX

Air quality conformity regulations related to the latest planning assumptions require a consistent approach to estimate future population, household and employment data used in the regional transportation plan. This data is input into the regional transportation model to estimate future traffic volumes in the region which can in turn be used to analyze the effects of transportation improvement projects, identify areas where congestion could occur in the future, and perform an air quality conformity determination for the region.

The MassDOT Office of Transportation Planning (OTP) led the effort of developing forecasts for future population and employment for Massachusetts and each MPO region. This was a collaborative effort between MassDOT's Office of Transportation Planning (OTP), the Metropolitan Area Planning Commission (MAPC), and the UMass Donahue Institute (UMDI). These three entities, in consultation with the thirteen regional planning agencies, acted as the Projections Advisory Committee (PAC) tasked with estimating the

potential for future growth and decline across the state over 30 years from 2010 to 2040.

Data sources used in developing the demographic forecasts are listed in Table 13-1. Procedures and preliminary estimates were reviewed by the PVPC through the PAC. Control totals were allocated to the 43 communities in the Pioneer Valley region based on current trends and the potential for future growth. Household projections were calculated based on population projections derived from the Census estimates from the five-year American Community Survey (ACS).

Table 13-1 – Data Sources of Forecasts for the Pioneer Valley Region

UMass Donahue Institute Long-term Population Projections for Massachusetts Regions and Municipalities update V2015 launch re-set, November 2017.
Census 2011-2015 ACS Five Year Estimates used by UMass Donahue Institute.
RPA inputs to MAPC's MassBuilds development database, August 2017 - July 2018.
MAPC Labor Force Projections, January 2018.
Public Use Micro Data Sample (PUMS) 2008-2012 and 2012-2016 used by MAPC.
MAPC Household Projections, May 2018.
Local Area Unemployment Statistics (LAUS) monthly unemployment data by city/town from 1990 to 2017 sourced from the Massachusetts Executive Office of Labor and Workforce Development.
Census tract-level commuting pattern data from the Census Bureau's LEHD (Longitudinal Employer-Household Dynamics) Origin-Destination Employment Statistics (LODES), 2011-2015.
Office of Labor and Workforce Development (EOLWD) tables titled Employment and Wages (ES-202) for Hampshire and Hampden counties compiled by PVPC staff.
UMass Donahue Institute Employment Projections, October 2, 2018.
MassDOT Planning Projections Final for RTPs, 18 November 2, 2018.
PVPC Planning staff adjustments and calculations: January 2018 - January 2019.

Long-term population projections were updated from the values estimated in 2015 by UMDI staff. The previous methodology used was modified to include a new migration modeling methodology. The updated population projections were used to develop demographically-based projections for households and labor force. UMDI created a feedback loop between population, households, labor force, and jobs to ensure smooth relationships between factors and conformity to long-term historic trends.

Household projections considered the following variables: group quarter population, age of householder by type of household, rates of household formation by type of household, housing production, headship rates, and jobs.

Labor force projections considered current projections by UMDI for working age and labor force. Additional variables incorporated into the projections included labor force participation rates (LFPRs) by age group and region.

Jobs projections and employment, considered fluctuations from economic cycles. Job growth was constrained by findings from labor force projections and labor force participation rates. Other considerations included the long-term relationship between payroll, jobs, working age, and labor force as well as non-employer job trends.

Initial municipal population and employment projection estimates were provided by MassDOT. Thereafter, PVPC staff adjusted the values by reallocating growth among each community based on current trends and local staff knowledge of the opportunity for additional growth and major development planned throughout all forecast years. The resulting forecasts for population, households and employment are shown in Tables 13-2 – 13-4. An alternate regional specific scenario for employment estimates in the 2020 forecast year was subsequently developed by the PVPC. A description of the forecast process and summary of the calculation methods follows.

A. POPULATION

The Population Projections Model developed by UMDI provided population projections by age and sex. Race shares were applied from MAPC's 2014 projections. Compound annual growth rates (CAGR) by regional area were compared from historic trends between 1980-2000 and 2000-2016 then the net population change was calculated between 1980 and 2015.

A college fix was applied to the population of regions with a high percentage of college students. Typically, the college population does not age or migrate, while non-college population ages forward and is subject to rates of migration. A new college population was determined by share of U.S. cohort from data of the 2007-2011 ACS. The newer methodology recognized that a percentage of the college population may age in place and join the non-college population. This college fix was applied to population projections in Hampshire County in the Pioneer Valley region.

Historic trends for the share of foreign-born population were also analyzed and percentages by county were calculated. Population change was also impacted by domestic migration, international migration, and natural

increases due to births. These components of population change were estimated between the years of 2000-2016 by UMDI.

These rates were multiplied by the launch population and resulting values of birth and migrations were added to the launch population while deaths were subtracted from it. Finally, the statewide population projections were distributed across the regional planning areas. The updated launch year used Census V2016 county estimates for the year 2015.

Each community in the Pioneer Valley was reviewed in great detail with regards to population projections. PVPC staff examined past trends, growth allocations used in past projections, and historic building permit activity. A recent rise in building permit activity was viewed as an indicator for potential growth. Adjustments were made to projections based on past growth patterns, land use changes, economic development, and transportation trends while maintaining the regional control total developed by MassDOT.

B. HOUSEHOLDS

The Household Model developed by MAPC utilized the UMDI population projections. The portion of the population in households was calculated by subtracting those living in group quarters based on Census 2010 rates by age and municipality. Living arrangements were then categorized by applying region-specific rates of household type and householder status from the 2008-2012 Public Use Microdata Sample (PUMS) data. Three household type categories were used: single person, household with child under 18, and all other households. Finally, the number of household were calculated by multiplying the rates derived from the PUMS data by the population projected by UMDI as categorized by age and sex for the 2010 Census year and 2015 new base year, as well as subsequent projected future years.

The UMDI allocated the total population projections into community level projections for the Commonwealth using 2015 values as a base year for future projections. The 13 planning agencies were asked to identify any changes in group quarters between the 2010 Census Year and the new 2015 base year. The total number of people living in group quarters in each of the communities was then subtracted from the total population of that community to arrive at the population in households. Group quarter rates were based on 2010 rates by age and municipality and adjusted using data from the American Community Survey (ACS) 2008-2012.

PVPC staff divided the total number of households allotted to each of its communities into the various Transportation Analysis Zones (TAZs) for the region. This information was shared with MassDOT for use in their statewide model.

C. EMPLOYMENT

MAPC generated labor force projections (rooted, in turn, by UMDI's population projections) by RPA for historical years 2010 and 2015 as well as future years 2020, 2030, and 2040. These labor force projections form the basis of UMDI's employment analysis and take into account changes in Massachusetts' overall population, the aging of the present population into older age cohorts with lower levels of labor force participation (relative to the core 25-64 core workforce), and educational attainment levels. Massachusetts is trending towards higher educational attainment which increases labor force participation rates.

1. Labor Force Model Development Overview

Rates of education level specific to each regional planning areas were obtained from PUMS data for 2008-2012 period for model year 2010 and from 2012-2016 for base year 2015 and beyond. Labor Force Participation Rates were then created for each regional planning area by age, sex, and education level. These rates were derived from an average of the 2007-2011 and 2012-2018 labor force estimates by age from the ACS data. Labor force participation rates were multiplied by the population projected earlier for 2010, 2015, and future years to come up with the total Labor Force in each year.

2. Employment Projections Overview

Employment in Massachusetts was projected for the Commonwealth and divided into the regional planning areas. Labor Force estimates were incorporated into the employment projections to estimate future employment base and unemployment rates. The average unemployment rate by region was calculated from the average of historic monthly levels. It was assumed that the Pioneer Valley region would have a steady 6% average unemployment rate during future years. The employment base was calculated by subtracting the number of unemployed people from the labor force.

People that commute into and out of the region for employment were projected using the Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) data. The LODES commuter data was used to convert employment data from place-of residence to place-of-work. Employment by industry type was developed using the Economic Modeling Specialists Intl. (EMSI) data. This was aggregated into three sectors: Retail, Service, and Basic employment.

The MassDOT employment projections were reviewed by the PVPC and allocated across each community for the RTP analysis years. This information was forwarded to MassDOT for use in the statewide transportation model for air quality conformity purposes.

Table 13-2 – Population Forecast for the Pioneer Valley Region

	Population 2010	Population 2020	Population 2030	Population 2040
Agawam	28,438	28,577	29,267	29,707
Amherst	37,819	40,002	40,546	40,995
Belchertown	14,649	15,388	15,760	15,996
Blandford	1,233	1,205	1,234	1,252
Brimfield	3,609	3,727	3,817	3,875
Chester	1,337	1,313	1,293	1,273
Chesterfield	1,222	1,176	1,138	1,101
Chicopee	55,298	56,395	57,806	58,674
Cummington	872	841	828	816
East Longmeadow	15,720	16,485	17,320	17,936
Easthampton	16,053	16,091	16,480	16,727
Goshen	1,054	1,085	1,111	1,128
Granby	6,240	6,235	6,280	6,267
Granville	1,566	1,555	1,574	1,559
Hadley	5,250	5,773	6,053	6,308
Hampden	5,139	5,025	5,146	5,224
Hatfield	3,279	3,233	3,311	3,360
Holland	2,481	2,504	2,534	2,547
Holyoke	39,880	40,626	41,815	42,770
Huntington	2,180	2,112	2,070	2,029
Longmeadow	15,784	15,384	15,461	15,307
Ludlow	21,103	21,005	21,512	21,835
Middlefield	521	490	469	410
Monson	8,560	8,613	8,821	8,953
Montgomery	838	930	952	967
Northampton	28,549	28,604	29,295	29,735
Palmer	12,140	12,111	11,979	11,764
Pelham	1,321	1,257	1,287	1,306
Plainfield	648	652	668	678
Russell	1,775	1,795	1,839	1,866
South hadley	17,514	17,802	18,091	18,424
Southampton	5,792	5,941	6,421	6,482
Southwick	9,502	9,715	9,950	10,099
Springfield	153,060	155,995	161,277	165,016
Tolland	485	504	516	523
Wales	1,838	1,879	1,924	1,953
Ware	9,872	9,867	9,935	9,628
West Springfield	28,391	28,952	29,302	29,596
Westfield	41,094	41,665	42,113	42,493
Westhampton	1,607	1,629	1,772	1,828
Wilbraham	14,219	14,379	14,726	14,947
Williamsburg	2,482	2,433	2,496	2,534
Worthington	1,156	1,062	1,088	1,104
Pioneer Valley	**621,570**	**632,012**	**647,277**	**656,992**

Table 13-3 – Household Forecast for the Pioneer Valley Region

	Households 2010	Households 2020	Households 2030	Households 2040
Agawam	11,664	12,373	13,183	13,518
Amherst	9,259	11,409	11,955	11,980
Belchertown	5,595	6,370	6,953	7,185
Blandford	492	528	577	616
Brimfield	1,429	1,643	1,826	1,942
Chester	543	585	624	653
Chesterfield	511	530	557	590
Chicopee	23,739	24,946	26,048	26,735
Cummington	404	413	429	457
East Longmeadow	5,851	6,442	7,025	7,360
Easthampton	7,224	7,632	8,175	8,508
Goshen	416	446	477	490
Granby	2,374	2,478	2,598	2,644
Granville	608	666	713	714
Hadley	2,107	2,340	2,479	2,607
Hampden	1,898	2,002	2,171	2,248
Hatfield	1,483	1,555	1,671	1,731
Holland	994	1,101	1,176	1,202
Holyoke	15,361	16,481	17,491	18,202
Huntington	868	925	977	1,019
Longmeadow	5,741	5,957	6,333	6,324
Ludlow	8,080	8,561	9,239	9,633
Middlefield	230	233	241	220
Monson	3,279	3,527	3,771	3,886
Montgomery	330	389	406	411
Northampton	12,000	12,448	13,234	13,576
Palmer	5,099	5,361	5,516	5,538
Pelham	549	546	570	578
Plainfield	269	294	328	349
Russell	656	695	738	747
South hadley	6,793	7,088	7,504	7,658
Southampton	2,249	2,473	2,801	2,867
Southwick	3,710	4,145	4,466	4,669
Springfield	56,753	59,867	62,896	64,996
Tolland	197	219	224	220
Wales	736	819	870	869
Ware	4,120	4,408	4,722	4,772
West Springfield	12,124	12,795	13,228	13,531
Westfield	15,335	16,512	17,314	17,770
Westhampton	623	669	763	792
Wilbraham	5,309	5,719	6,116	6,264
Williamsburg	1,118	1,169	1,258	1,328
Worthington	510	567	650	695
Pioneer Valley	**238,630**	**255,326**	**270,293**	**278,094**

Table 13-4 – Employment Forecast for the Pioneer Valley Region

	Employment 2010	Employment 2020	Employment 2030	Employment 2040
Agawam	11,668	10,830	10,777	10,801
Amherst	14,733	15,433	15,358	15,392
Belchertown	2,619	2,629	2,616	2,622
Blandford	223	184	183	184
Brimfield	540	471	468	469
Chester	110	113	112	113
Chesterfield	123	135	134	134
Chicopee	19,003	17,921	17,834	17,874
Cummington	208	137	136	136
East Longmeadow	7,927	7,365	7,329	7,346
Easthampton	4,341	4,469	4,447	4,457
Goshen	158	155	154	154
Granby	753	894	889	891
Granville	157	163	162	163
Hadley	5,307	6,145	6,115	6,129
Hampden	821	879	875	877
Hatfield	1,965	1,806	1,797	1,801
Holland	147	118	117	117
Holyoke	21,164	20,849	20,747	20,794
Huntington	420	403	401	402
Longmeadow	3,376	3,483	3,466	3,473
Ludlow	6,431	6,510	6,478	6,493
Middlefield	39	41	41	41
Monson	1,295	1,246	1,240	1,242
Montgomery	26	37	37	37
Northampton	18,130	17,782	17,696	17,735
Palmer	4,986	4,498	4,476	4,486
Pelham	155	133	132	132
Plainfield	40	37	37	37
Russell	182	151	150	150
South hadley	4,441	4,274	4,253	4,262
Southampton	1,085	1,119	1,114	1,116
Southwick	2,533	2,520	2,507	2,513
Springfield	74,927	87,255	86,830	87,025
Tolland	37	35	35	35
Wales	150	151	150	150
Ware	2,728	2,457	2,445	2,451
West Springfield	16,922	15,612	15,536	15,571
Westfield	16,736	17,149	17,065	17,103
Westhampton	291	306	305	306
Wilbraham	4,510	4,913	4,889	4,900
Williamsburg	555	555	552	553
Worthington	194	168	167	167
Pioneer Valley	**252,156**	**261,527**	**260,253**	**260,838**

3. Summary of Regional Demographic Projections

The statewide projections for the Pioneer Valley region show a change in demographics with an overall growth over the 30 year period in population, households and employment. The change occurring each decade fluctuates in magnitude but declines in the second decade for employment as presented in Table 13-5.

Table 13-5 – Projected Change in Pioneer Valley Region

Pioneer Valley	Change 2010-2020	Change 2020-2030	Change 2030-2040	Change 2010-2040
Population	1.7%	2.4%	1.5%	5.7%
Households	7.0%	5.9%	2.9%	16.5%
Employment	3.7%	-0.5%	0.2%	3.4%

D. REGIONAL EMPLOYMENT SCENARIO

PVPC developed an in-house scenario for regional employment for use in the regional transportation model and RTP. This scenario results in an additional 23,105 employees for the 2020 analysis year. It was developed based on the following assumptions:

1. Employment growth out to 2020 largely mirrors that from 2010 – 2015.
2. Based on conversations with the Environment and Land Use department staff, 24 growth communities in the region were identified - Agawam, Amherst, Belchertown, Brimfield, Chicopee, E. Longmeadow, Easthampton, Granby, Hadley, Hatfield, Holyoke, Ludlow, Monson, Northampton, Palmer, South Hadley, Southampton, Southwick, Springfield, Ware, West Springfield, Westfield, Wilbraham, Williamsburg.
3. Growth communities received additional growth based on the actual growth in employment from 2010 – 2015 and current development trends.
4. Non-growth communities (with the exception of Longmeadow) were allocated growth based on the actual growth rate calculated from 2010 - 2015 for that community.
5. 2030 and 2040 employment estimates mirrored the projections developed by MassDOT in conjunction with UMDI.

This alternate employment scenario was developed to reflect current regional trends and is presented in Table 13-6. This alternate regional employment scenario will be used in the regional transportation model but not in the statewide transportation model for air quality conformity purposes.

Table 13-6 – PVPC Scenario for Projected Employment Change

	Census Employment 2010	Actual Employment 2015	PV Scenario Employment 2020	PV Scenario Employment 2030	PV Scenario Employment 2040
Agawam	11,668	12,040	12,642	12,580	12,609
Amherst	14,733	16,725	18,986	18,894	18,936
Belchertown	2,619	2,771	2,979	2,964	2,971
Blandford	223	194	169	168	168
Brimfield	540	496	546	543	544
Chester	110	119	129	128	128
Chesterfield	123	142	164	163	164
Chicopee	19,003	19,257	20,220	20,121	20,167
Cummington	208	144	100	99	99
East Longmeadow	7,927	7,764	8,152	8,112	8,131
Easthampton	4,341	4,711	5,113	5,088	5,099
Goshen	158	163	168	167	168
Granby	753	942	1,178	1,173	1,175
Granville	157	172	188	188	188
Hadley	5,307	6,478	7,126	7,091	7,107
Hampden	821	927	1,047	1,042	1,044
Hatfield	1,965	1,904	1,999	1,989	1,994
Holland	147	124	105	104	104
Holyoke	21,164	22,237	23,364	23,251	23,303
Huntington	420	425	430	428	429
Longmeadow	3,376	3,671	3,708	3,690	3,698
Ludlow	6,431	6,862	7,322	7,286	7,303
Middlefield	39	43	47	47	47
Monson	1,295	1,313	1,411	1,405	1,408
Montgomery	26	39	59	58	58
Northampton	18,130	19,116	20,157	20,059	20,104
Palmer	4,986	4,741	5,097	5,072	5,083
Pelham	155	140	126	126	126
Plainfield	40	39	38	38	38
Russell	182	159	139	138	139
South hadley	4,441	4,505	4,730	4,707	4,718
Southampton	1,085	1,180	1,283	1,277	1,280
Southwick	2,533	2,656	2,785	2,771	2,778
Springfield	74,927	79,547	85,513	85,096	85,288
Tolland	37	37	37	37	37
Wales	150	159	169	168	168
Ware	2,728	2,590	2,720	2,706	2,712
West Springfield	16,922	16,907	17,752	17,666	17,706
Westfield	16,736	18,471	19,949	19,852	19,896
Westhampton	291	323	359	357	358
Wilbraham	4,510	5,179	5,593	5,566	5,579
Williamsburg	555	585	673	669	671
Worthington	194	177	161	161	161
Pioneer Valley	**252,156**	**266,174**	**284,632**	**283,245**	**283,882**

In reviewing the information the regional employment projections for the Pioneer Valley, MAPC calculated a total 2020 labor force of 280,357 after unemployment and commuting trends are factored in. UMDI then reduced this total to 261,527 in an attempt to conservatively reflect the aging population trends and high student population in the region. PVPC estimated a total of total of 284,632 workers in 2020. This aligns well with MAPC's initial estimate for the region. The additional 4,275 employees could be explained by a decrease of 1 – 1.5% in unemployment or a change of 1 – 1.5% in the number of workers that currently leave the Pioneer Valley for jobs in Connecticut. This scenario is also more reflective of the recent development trends in the region. A large portion of the proposed 5,966 additional employees in the City of Springfield in the 2020 analysis year have already been realized through the completed casino, railcar factory, and hotel development projects in the city.

1. Summary

The regional employment scenario presented in Table 13-6 does not align with the employment projections presented in Table 13-4. A regional specific employment scenario was developed to place a greater weight on recent development trends such as the MGM Casino in Springfield, MA and to reflect the growing employment trends that have occurred since 2015 in many communities in the region. This regional scenario also assumes a positive impact on population and employment as a result of expanded passenger rail service along the Knowledge Corridor line.

The employment projections included in Table 13-4 are included in the statewide regional transportation model and will be used for air quality conformity purposes. The regional employment projections included in Table 13-6 are included in the PVPC regional transportation model and will be used for project level analysis for this RTP and future regional transportation studies.

E. REGIONAL TRAVEL DEMAND MODEL

Travel demand forecasting is a major step in the transportation planning process. By simulating the current roadway conditions and travel demand, deficiencies in the transportation system are identified. This is an important tool in planning future network enhancements and analyzing proposed improvement projects.

Travel demand models are developed to simulate actual travel patterns and existing demand conditions. Networks are constructed using current roadway inventory files containing data for each roadway within the network. Travel demand is generated using socioeconomic data such as household size,

automobile availability and employment data. Once the existing conditions are evaluated and adjusted to satisfactorily replicate actual travel patterns and vehicle roadway volumes, the model inputs are then altered to project future year conditions.

There are four basic steps in the traditional travel demand forecasting process: trip generation, trip distribution, modal choice, and trip assignment. There is also a preliminary step of network and zone development and a subsequent step of forecasting future conditions. PVPC uses the TransCAD software to perform a 3-step process for forecasting near and future conditions including trip generation, trip distribution and trip assignment.

1. Network and Zone Development

a) Highway Network

The preliminary step in the development of a travel demand model is identifying the network and dividing the area into workable units. The highway network is composed of nodes and lines. Nodes represent intersections or centroids. Centroids are used to identify the center of activity within a zone and connect the zone to the highway network. Lines represent roadway segments or centroid connectors. Centroid connectors represent the path from a centroid to the highway network and typically represent the local roads and private driveways within the centroid. General information required for network developments include system length, demand, service conditions and connections to zones.

b) Transportation Analysis Zones

A Transportation Analysis Zone (TAZ) is the basic geographic unit representing tabulated data on households and business establishments aggregated for a region. The activity center of a zone is represented by a centroid. The centroid is not necessarily the geographic center of a zone, but rather the point that best represents the average trip time in and out of a zone. A centroid connector links the zone with the roadway network. It often represents local streets that carry traffic out of or into a zone. Centroid connectors generally connect to adjacent collector or arterial roads.

1. Trip Generation

Trip generation is the first step in the modeling process. The goal is to identify the number of person trips that are made to and from each TAZ. Trip generation analysis estimates the number of trips that are produced by each TAZ and the number of trips attracted to each TAZ for each of the three trip purposes:

- Home-Based Work (HBW) - trips from home to work;

- Home-Based Non-Work (HBNW) - trips from home to other destinations other than work; and
- Non-Home Based (NHB) - trips from a place other than home.

Households generally produce trips, while employment and other activity centers generally attract trips. Estimates of household based trips are affected by socioeconomic factors such as auto ownership and household size. Employment based trips depend on employment type and size. The trip generation model uses forecasted demographic and employment data associated with a zone to calculate person trips. Subsequently, total trips produced are balanced with the total trips attracted to reconcile inconsistencies between them. Consistency is reached by holding either trip productions or trip attractions constant and then redistributing the other category of tips.

3. Trip Distribution

Trip distribution determines the destination of the vehicle trips produced in each zone and how they are divided among all the other zones in the area. A relationship is developed between the number of trips produced by and attracted to zones and the accessibility of zones to other zones in terms of time and distance.

A basic trip distribution model is the gravity distribution model. In the gravity model, trips between zones are calculated based on the origin zone size; possible destinations size; and, the distance to neighboring zones. A friction factor is used in the gravity model to relate travel time to zone attractiveness. Travel time between two zones is based on the travel route selected and the speed on each road along the travel route. In a typical gravity model:

- Zone size is measured in terms of total population and total employment.
- Distance is measured in terms of travel time.
- A computerized assignment program calculates the shortest route between each pair of zones and selects the best travel route.

4. Mode Usage

This step in the development of the travel model estimates the distribution of previous trips to various alternative mode choices. Mode choices may include a personal vehicle, transit, walking, bicycling, etc. Several factors affect a traveler's decision regarding the travel modes available. These include the characteristics of the person making the trip, the characteristics of the trip, and the characteristics of the transportation system.

5. Trip Assignment

Trip assignment is used to estimate the flow of traffic on a network. The trip assignment model takes as input a matrix of flows that indicate the volume of traffic between origin and destination pairs. The flows for each origin and destination pair are loaded on the network based upon the travel time or impedance of the alternative paths that could carry this traffic.

6. Forecasts

The preparation of a future year socioeconomic database is the last step in the travel demand forecast process. Forecasts of population and socioeconomic data as well as the attributes affecting travel are used to determine the number of trips that will be made in the future. The basic future year forecasts include total regional population, total number of households, and total number of jobs. The forecasted values are then divided by community in a region and subsequently divided into the various TAZs. The zone-level estimates that forecasts provide are direct inputs in the travel demand forecasting model. Once travel demand is known and deficiencies identified, alternative transportation systems may be developed.

F. 2010 BASE YEAR MODEL

The regional travel demand model is made up of three major components: a roadway network, transportation analysis zones, and socioeconomic data. Each of these components add a critical contribution to the development of a working transportation simulation model. Initial 2010 base year model efforts included using 2010 socioeconomic data in a Quick Response trip generation model to calculate the home-based work trips (HBW), and the home-based non work trips (HBNW) productions per housing unit. The non home-based trips (NHB) were calculated per retail employee, non-retail employee, and household. Standard vehicle occupancy rates were used to convert personal trips into vehicle trips before conducting the trip assignment process. This model continues to be updated based on guidance from MassDOT.

1. Network

A roadway network represents the regional transportation system in the regional travel demand model. A highway network was developed based on the federal functional classification of roadways. All roadways in the region classified as interstate, principal arterial and collector were included in this highway network. Local roads carrying minimal through traffic were represented only as centroid connectors to areas of traffic activity in a TAZ.

The characteristics of a roadway were coded as attributes and tabulated in a regional database for each line representing the roadway. Generally, speed

and capacity attributes were based on the functional classification of a roadway and determined from the state roadway inventory files for the region. Adjustments were made to these attributes based on field observations, examination of aerial photographs, and review of regional and local traffic studies. Adjustments to these inputs were also made to better replicate regional travel activity in the model simulation. Out of the 45,722 roadway links in the Pioneer Valley regional network, a third (15,476) are included in the model.

2. Transportation Analysis Zones

Transportation Analysis Zones are geographic divisions of a region into analysis units that allow linking tabulated data to a physical location serviced by the roadway network. Attributes of a TAZ include socioeconomic data which would impact the generation of trips in a zone either by spurring the production of trips or the attraction of trips to that zone. The current TAZ's size and location is based on the 2010 Census because it is the most comprehensive, current, and readily available source of socioeconomic and demographic information. The Pioneer Valley area is divided by the census into units of geographic areas called blocks containing the socioeconomic and demographic information and aggregated into block groups. The 2010 TAZ's geographic boundaries match the 2010 census block group boundaries for the most part except for certain urban areas warranting further detail due to a concentration of activity. The Pioneer Valley region 2010 base year model has 462 internal zones, and 62 external zones that represent external stations.

3. Socioeconomic Data

Basic socioeconomic data for the 2010 base year model came from the 2010 Census at the block level. Detailed socioeconomic data was obtained from the American Community Survey (ACS) 2009-2013 five year estimates at the tract level. The socio economic data included the following list of variables: population, number of households, population in households, population in group quarters, auto availability, income, and number of workers.

The employment data for each of the communities in the region was obtained from the department of labor. The total number of workers in a community was then distributed into the various zones in that community according to their ratios in the ACS survey. After breaking down the number of jobs by job types they were aggregated into three categories: Basic, Retail, and Service.

To build the 2010 Census block / TAZ and 2010 Census tract / TAZ lookup tables used to generate the demographic tables, the following steps were performed by MassDOT planning staff:

- The original TAZ shapefile based on the 2000 Census geographies was overlayed with 2010 Census block polygon features from the 2012 TIGER base map (ArcGIS identity tool). The quality of the 2012 TIGER is much better than that of earlier generations, and the features align quite well with those of other datasets in our spatial database as well as with aerial imagery.
- The resulting polygon attributes were edited to ensure that TAZs nest completely within a single town.
- Attributes were edited to ensure that 2010 Census blocks are not split among multiple TAZs.
- The resulting block / TAZ lookup table was used to estimate total population, household population and group quarters population by TAZ from 2010 Census Summary File 1 block level statistics. This block / TAZ lookup was also used to generate the various factors in the 2010 Census tract / TAZ lookup table.
- The tract / TAZ lookup table was used to generate the tables of household statistics (vehicles, workers, income) from the 2010 American Community Survey 5-year Summary File. Tract statistics were used to generate these tables due to high margins of error among block group estimates. The ACS household statistics were adjusted at the tract level to match 2010 Census total households before applying the tract / TAZ factors to generate the TAZ summaries.
- The employment data was extracted from the AASHTO Census Transportation Planning Products (CTPP) web query tool. This data is published at the tract level and was allocated to each TAZ based on the percentage of the land area of a tract that is contained in each of one or more TAZs. The CTPP employment estimates (collected between 2006 and 2010) were then adjusted so that town totals match the ES-202 totals published by the Massachusetts Executive Office of Labor and Workforce Development.

4. Regionally Significant Projects

Only “regionally significant” projects are required to be included in travel demand modeling efforts. The final federal conformity regulations define regionally significant as follows:

> **Regionally significant:** a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sport complexes, etc., or transportation terminals as well as most terminals themselves) and would be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel.

“Non-Exempt” projects add capacity to the existing transportation system and must be included as part of the air quality conformity determination for the RTP. Examples of “Non-Exempt” projects include those defined as regionally significant in addition to projects expected to widen roadways for the purpose of providing additional travel lanes.

Projects considered regionally significant were included as part of the 2010 Baseline model network and subsequent future model networks based on the project's expected construction date. These projects include non exempt system expansion projects that were financially constrained.

The 2010 base year roadway network includes the following:

- Hadley: Widening Route 9 from two lanes to four lanes from West Street to Coolidge Bridge.
- Hadley/Northampton: Rehabilitation of the Coolidge Bridge with lane additionand widening from three lanes to four lanes.
- Springfield: Reverse the direction of four existing I-91 ramps.
- Westfield: Route 10/202 Great River Bridge project.
- Holyoke: Commercial Street extension project from the I-391 ramp to Appleton Street.
- Chester: Maple Street Bridge one way northbound, connecting Route 20 to Main Street.

The 2020 model network will include the following regionally significant projects:

- Wilbraham: Boston Road reconstruction. Currently one lane in each direction, will become two lanes in each direction. Project starts at the Springfield City Line and continues east to Stony Hill Road (0.28 miles), but does not include Stony Hill Road. Expected in 2016.
- Passenger Rail Service from Hartford, CT to Greenfield, MA. (Currently in operation but not modeled.)
- Extension of the North South Passenger Rail Service from Springfield to serve stations in Holyoke, Northampton and Greenfield. (Anticipated to begin this year.)
- Reduction from 2 lanes of travel to one lane of travel in each direction along Route 116 (Chicopee Street) in the City of Chicopee from Meadow Street to Springfield Street (Davitt Bridge). This occurred in 2018.

The 2030 model network will include the following regionally significant projects:

- Hadley -Route 9 widening from Middle Street to Maple Street from one lane in each direction to two lanes in each direction. Expected in 2026.

The 2040 model network does not include any regionally significant projects:

Visionary Projects are discussed in Chapter 15 of the RTP and may be included as part of the 2040 model network for analysis purposes as follows:

- MassDOT I-91 Viaduct Recommendations:
  - Interstate I-91 and South End Bridge improvements
  - The installation of collector-distributor roads alongside I-91 mainline and roundabouts at the South End Bridge and U.S. Route 5; reduction in on/off ramps; realignment of I-91; and elimination of existing lane drops in the vicinity of the South End Bridge.
  - Replacement of the Agawam Rotary with modified diamond interchange; replacement of the South End Bridge and Westfield River bridge to provide two travel lanes in each direction and a new shared-use path; new acceleration and deceleration lanes and proper left and right shoulders on both bridges; access to/from Meadow Street.
  - Replacement of the Plainfield Street bridges over I-91 and the existing railroad tracks with a third westbound travel lane.
  - Relocation of the existing left side on ramp from I-291 to I-91 SB to a more traditional right side on ramp.
- A potential new Turnpike Exit in Blandford, pending the results of a current study by MassDOT.
- East/West Passenger Rail Service to Boston pending the outcome of the current MassDOT study.

Figure 13-1 – Preferred Alternative Identified by the I-91 Viaduct Study

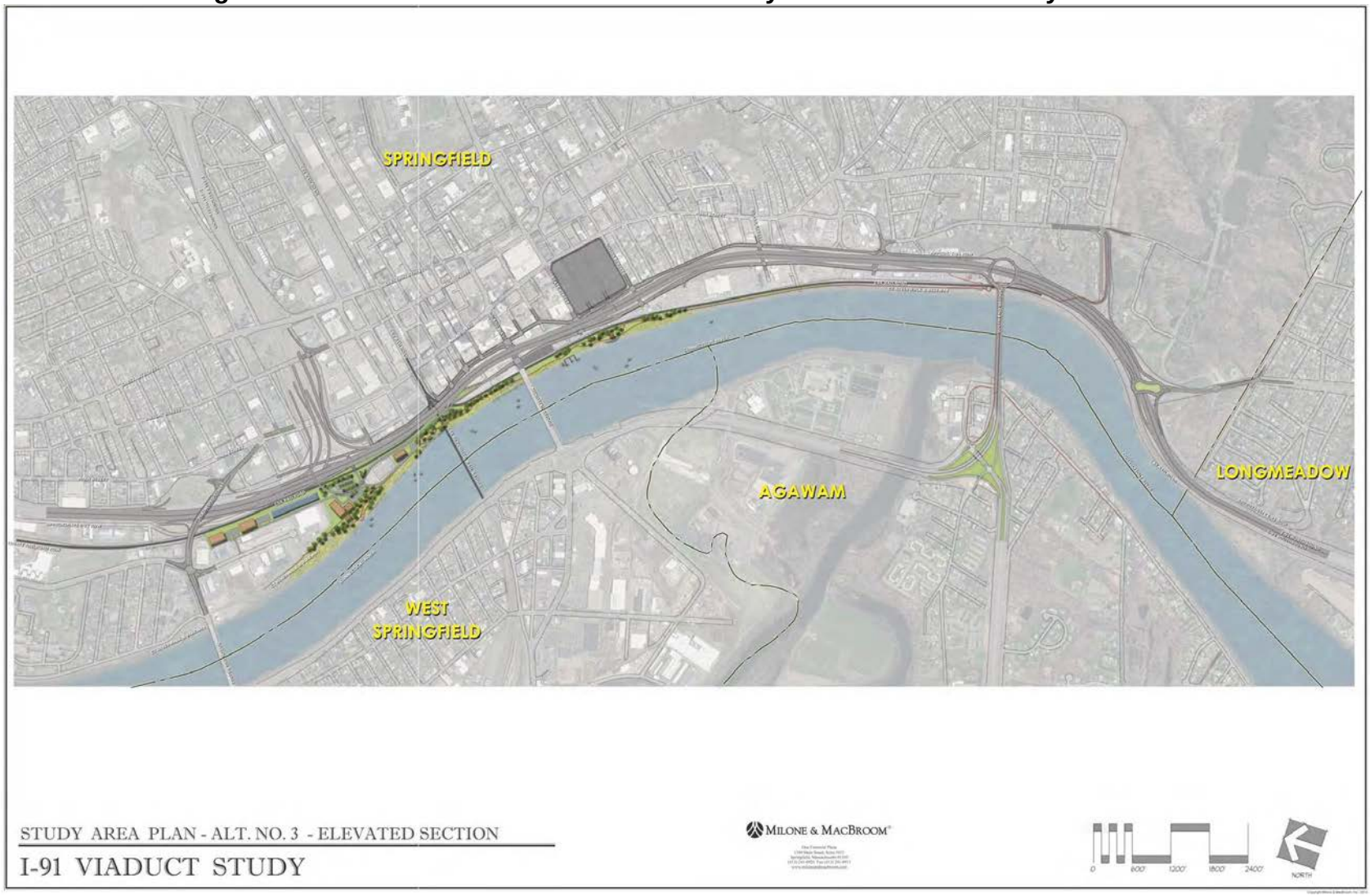


Figure 13-2 – Near- and Mid-Term I-91 Improvements (South Section)

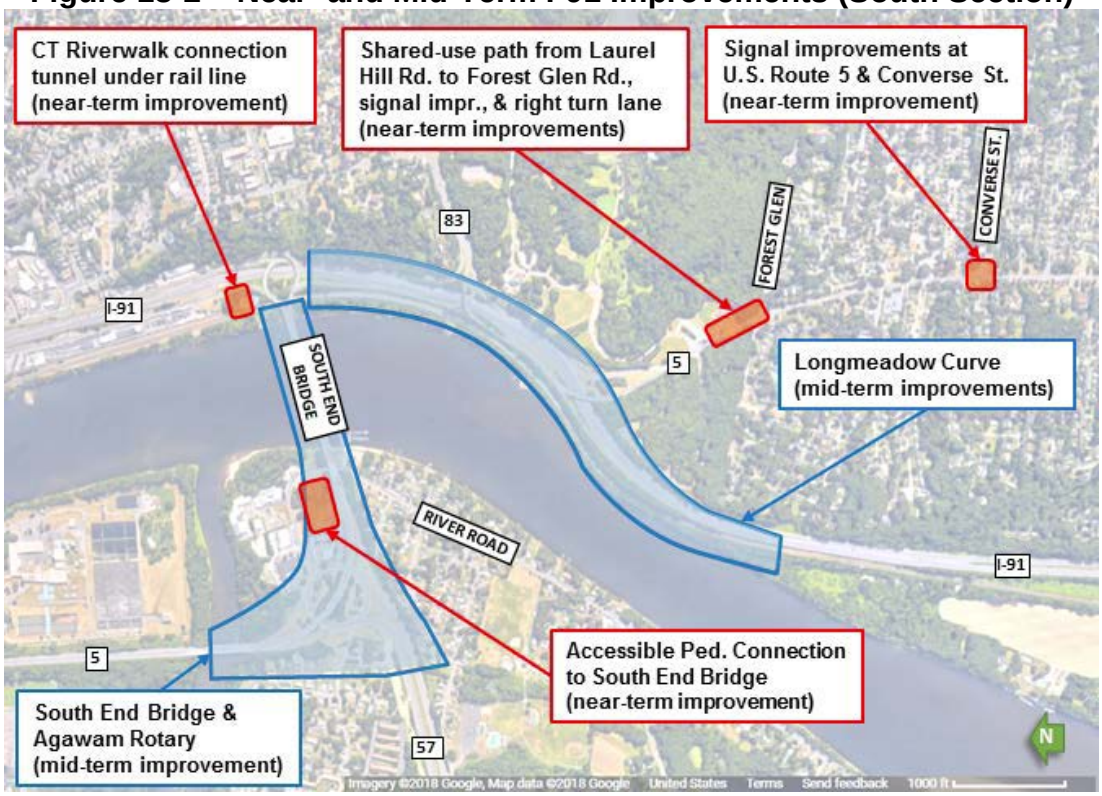


Figure 13-3 – Longmeadow Curve Mid-Term Improvements of I-91

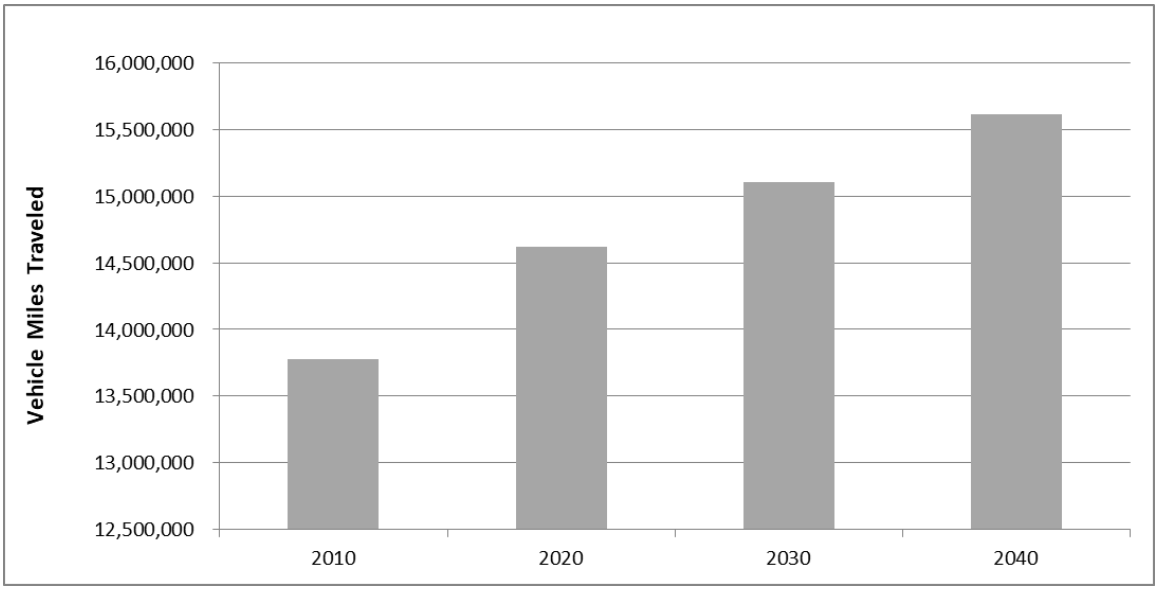
Figure 13-4 – Agawam: Modified Diamond Interchange Improvements

Figure 13-5 – Springfield: Plainfield Street Improvements

5. Estimated Regional Vehicle Miles Traveled

The total Vehicle Miles Traveled (VMT) was estimated for the model years of 2010, 2020, 2030, and 2040. The total VMT is shown in Figure 13-6. The total VMT is projected to increase by an average of 0.6% per year from 2010 to 2020 and 0.3% per year from 2020 to 2040.

Figure 13-6 – Estimated Future VMT



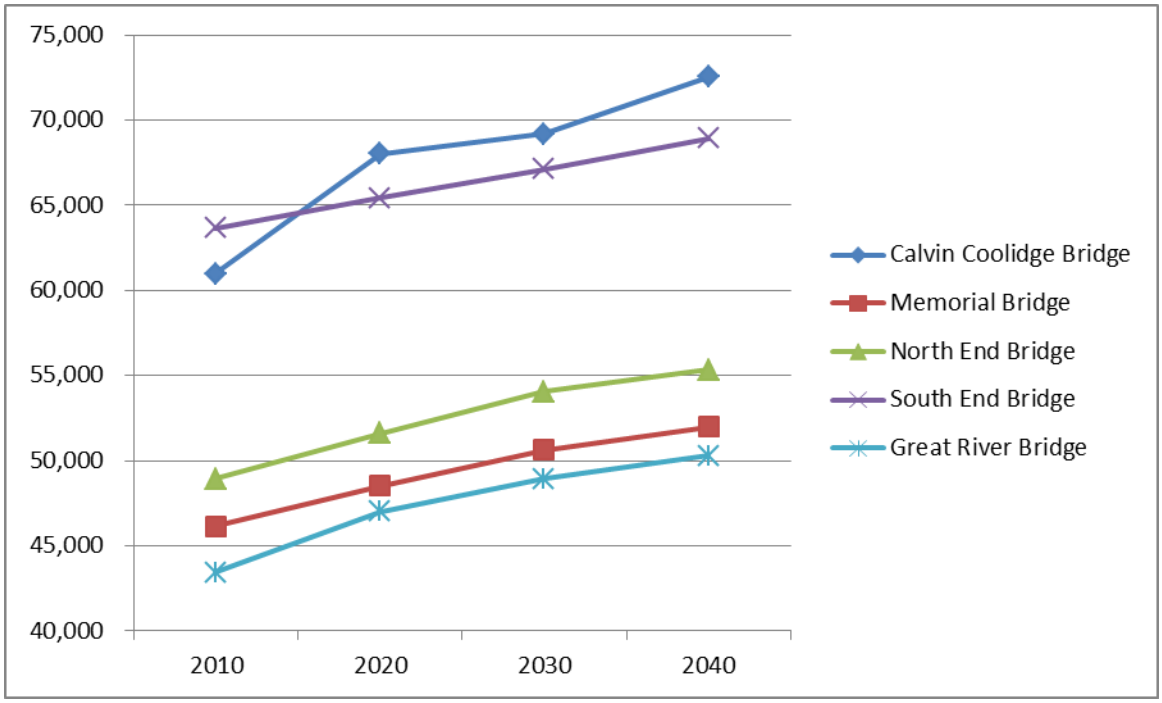
6. Future Traffic Volume Projections

a) Bridges

The estimated Average Daily Traffic (ADT) on some of the regional bridges was projected for all four analysis years. The area bridges include the South End Bridge, Calvin Coolidge Bridge, Memorial Bridge, North End Bridge, and Great River Bridge. This information is shown in Figure 13-7.

As shown in Figure 13-7, the ADT on the Calvin Coolidge Bridge is projected to significantly increase from 2010 to 2020 and again between 2030 and 2040. This is likely the result of forecasted growth in employment along the Route 9 corridor. In addition, the Route 9 widening project from one lane to two lanes through Hadley from Middle Street to Maple Street facilitates more traffic moving through the area. These roadway changes are incorporated into the roadway network of the 2030 and 2040 future year travel demand models.

Figure 13-7 – Projected Average Daily Traffic on Area Bridges



b) Interstate 90 (Massachusetts Turnpike)

Within the Pioneer Valley region, traffic volumes on Interstate 90 (I-90) are projected to steadily increase between exits 4 and 8 from 2010 to 2040, as shown in Figure 13-8.

c) Interstate 91 (I-91)

The Average Daily Traffic (ADT) on I-91 was projected at five points along its south/north path for the five model years as shown in Figure 13-9. These points include North of the Connecticut State line in the town of Longmeadow, South of I-291 in the City of Springfield, South of I-391 in City of Springfield, South of Lower Westfield Road in the City of Holyoke, and North of Exit 20 in City of Northampton.

Traffic volumes are projected to steadily increase along I91 within the Pioneer Valley region in general. Traffic volumes along I-91 remain fairly steady South of I-291 and South of I-391 in Springfield, and South of Lower Westfield Road near Exit 15 in Holyoke.

The exception to the steady pattern of growth occurs at both ends of the region. The future model year 2030 shows a decrease in traffic volumes on I-91 North of Exit 20 in Northampton and at the Connecticut State line. Growth in traffic volumes is estimated to return to these two locations in model year 2040.

Figure 13-8 – Projected Average Daily Traffic on the Massachusetts Turnpike

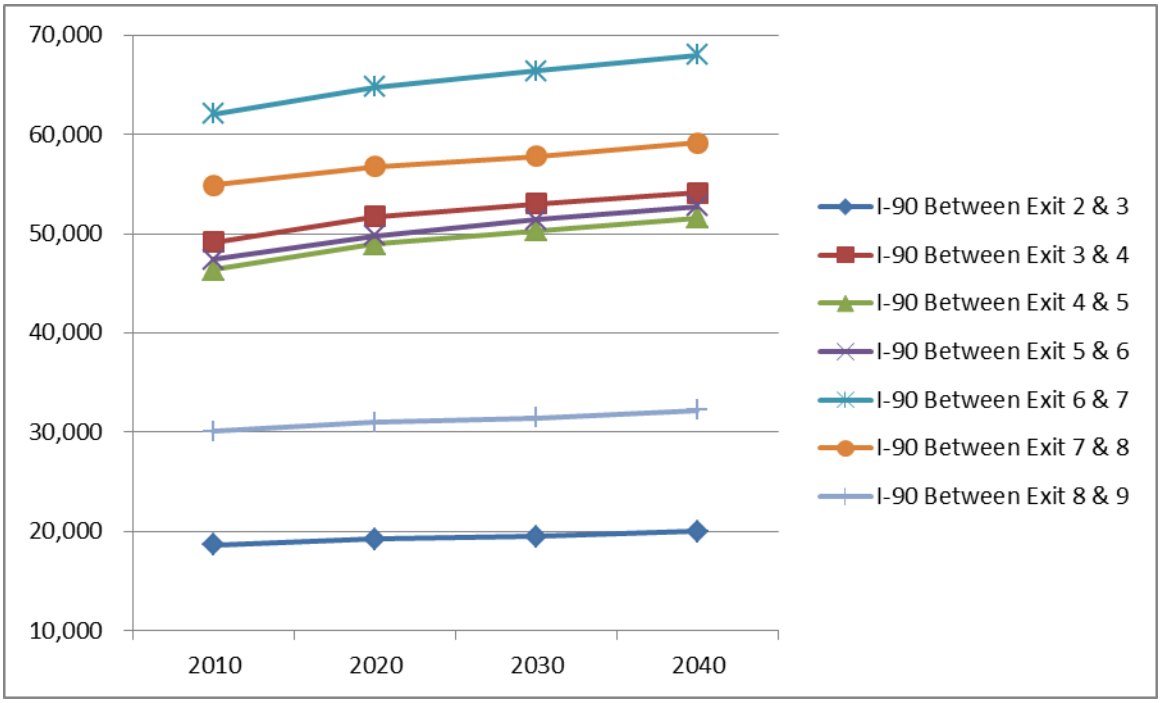
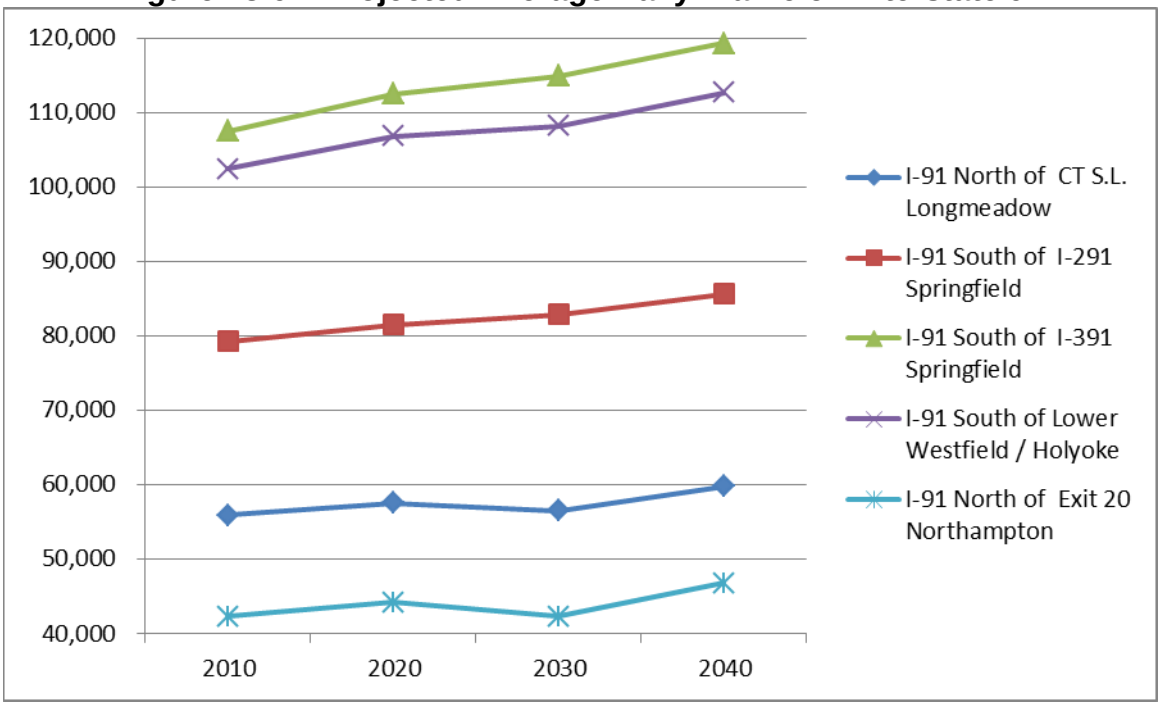


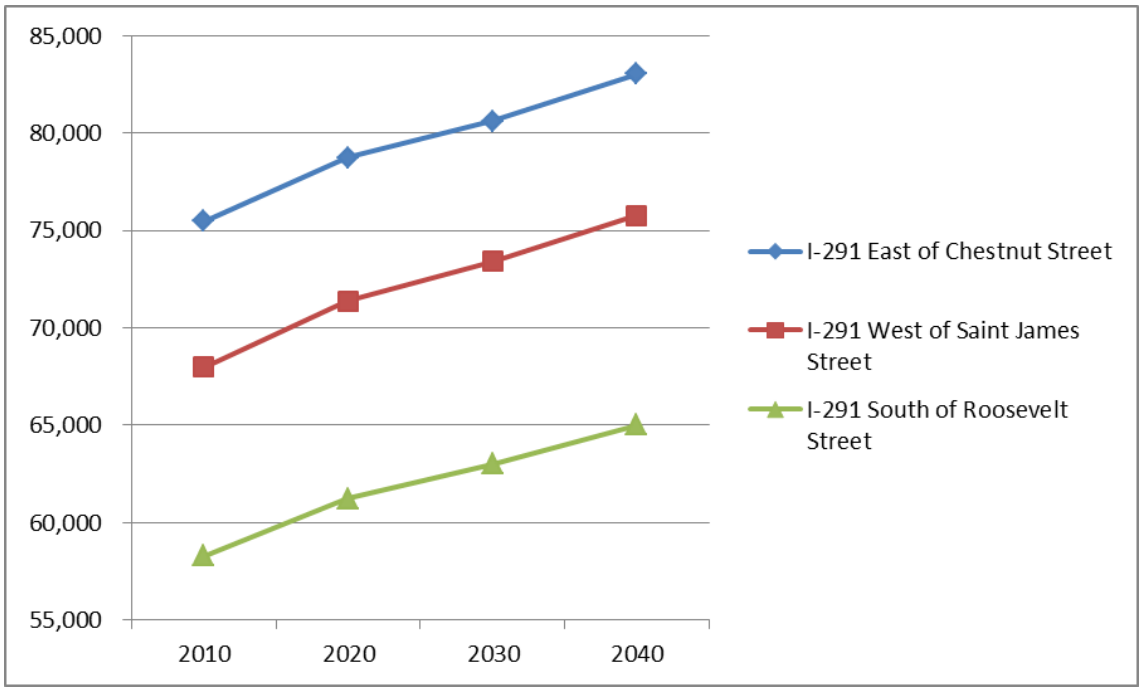
Figure 13-9 – Projected Average Daily Traffic on Interstate 91



d) Interstate 291 (I-291)

Figure 13-10 shows the projected traffic volumes for three locations in Springfield on I-291. Steady increases in traffic volumes are projected for all three locations.

Figure 13-10 – Projected Average Daily Traffic on Interstate 291



e) Interstate 391

Traffic volumes for Interstate 391 (I-391) are shown in Figure 13-11 at three points along the highway in the City of Chicopee. Moderate increases in traffic volumes are projected for this highway.

f) Arterials

Traffic volumes for major arterial roadways in the region are shown in Figures 13-12 through 13-15. The following arterials are included in this analysis:

- Northeast - Route 9, Route 116, Route 202, and Route 181.
- Northwest - Route 5, Route 141, and Route 66.
- Southeast - Route 33, Route 83, Route 21, and Route 20.
- Southwest - Route 10/202, Route 20, and Route 57.

Most arterial roadway are expected to increase moderately in volume over the next 30 years. The highest increase in traffic volumes is expected to occur along Route 9 in Hadley near the Amherst Town Line and also along Route 10/202 over the Little River Bridge in Westfield.

Figure 13-11 – Average Daily Traffic on Interstate 391

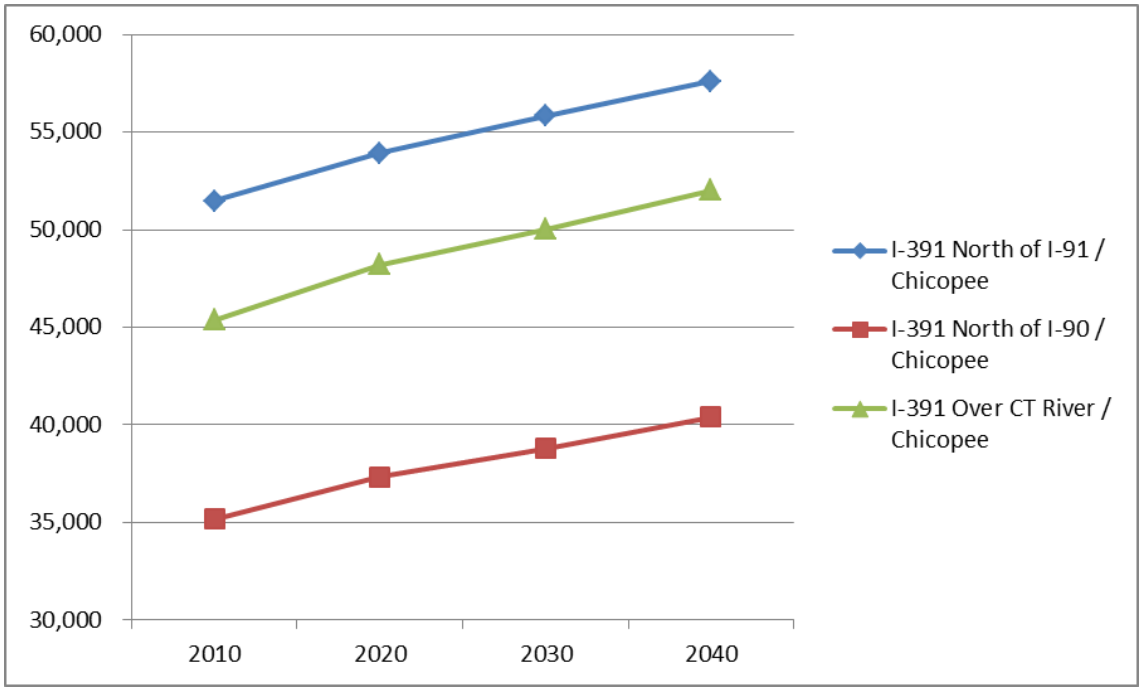


Figure 13-12 – Projected Arterial Traffic Volumes in the Northeast Region

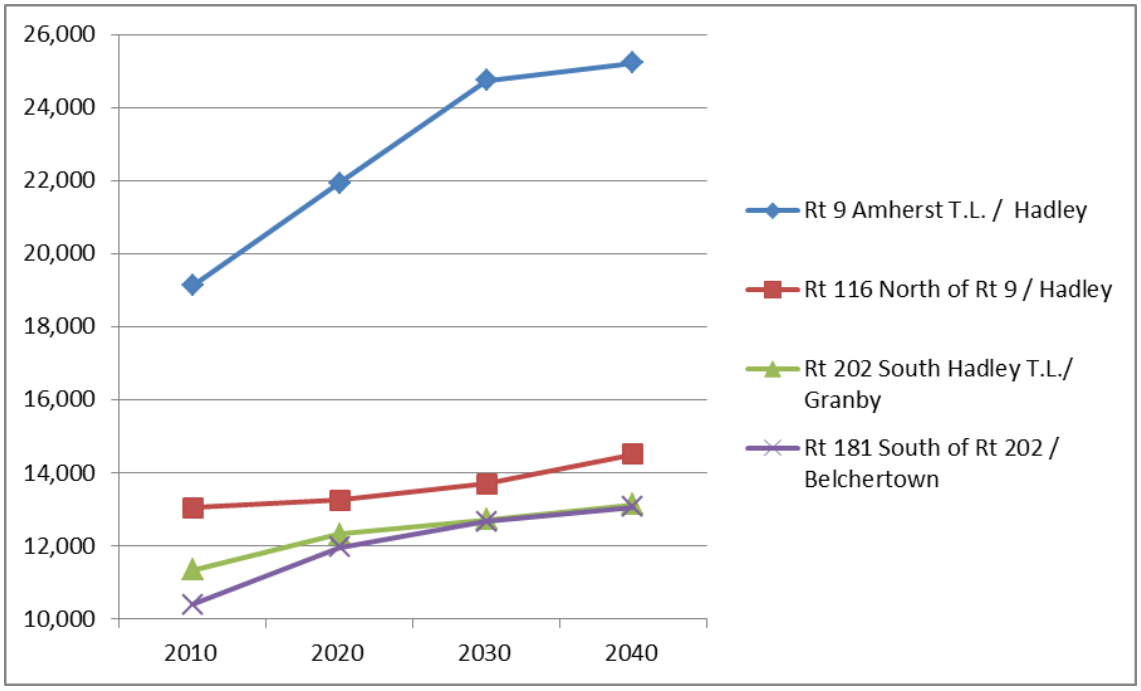


Figure 13-13 – Projected Arterial Traffic Volumes in the Northwest Region

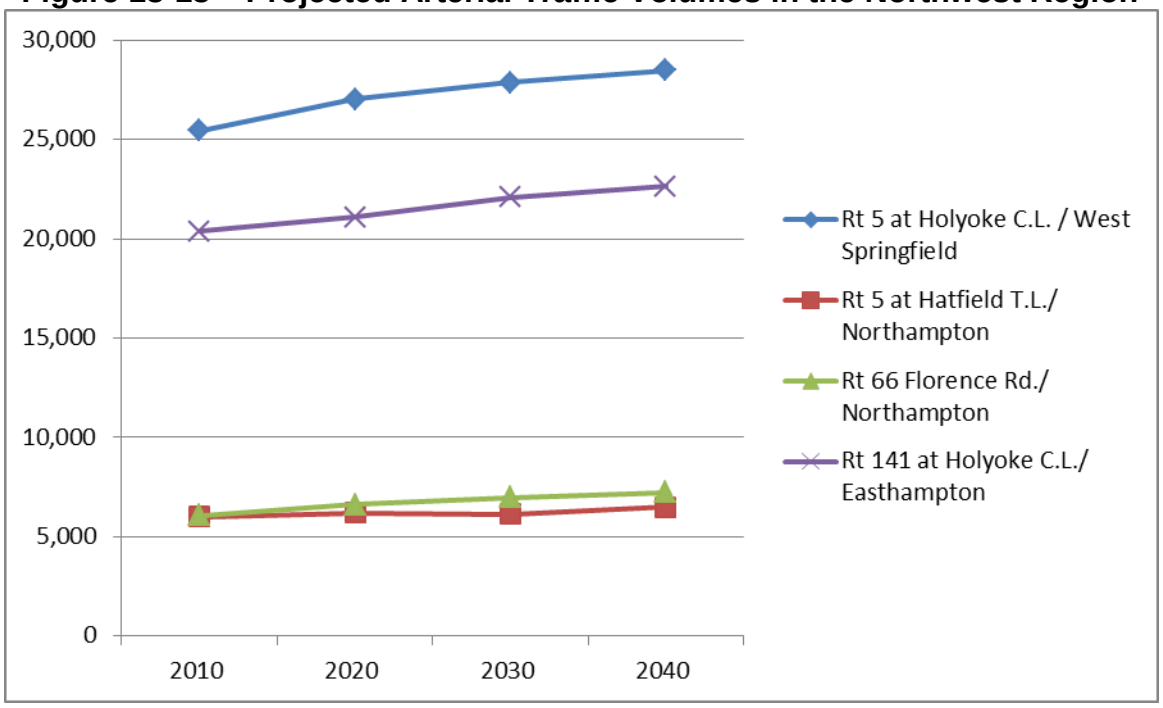


Figure 13-14 – Projected Arterial Traffic Volumes in the Southeast Region

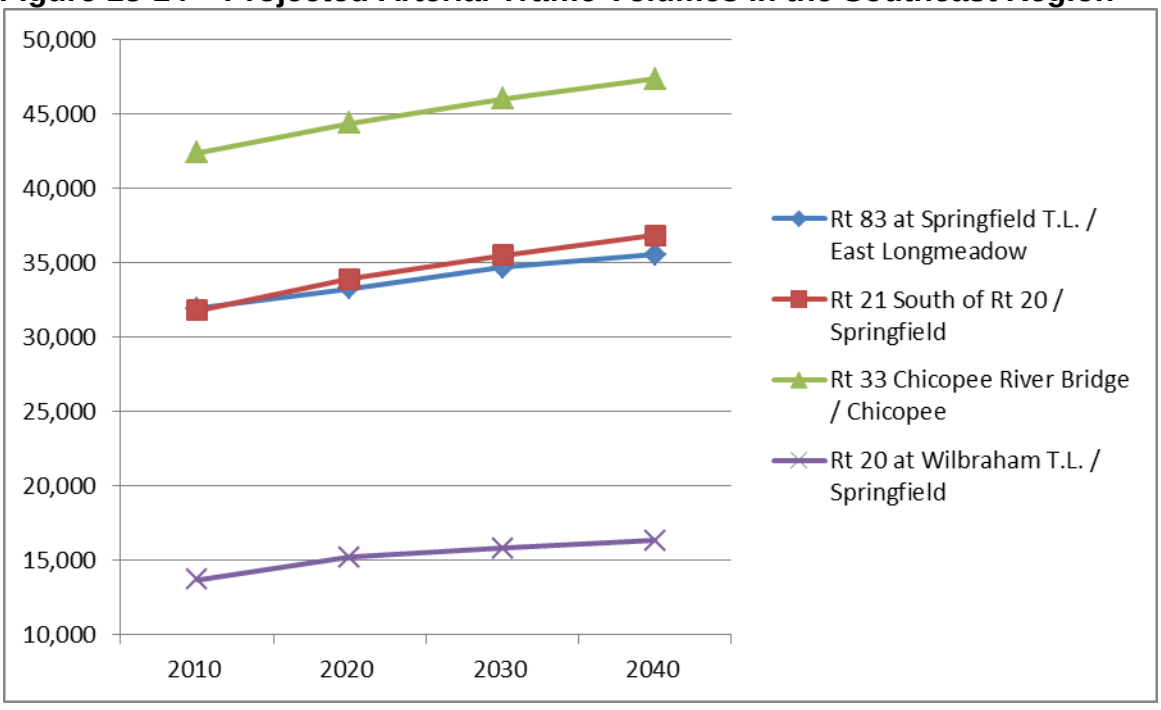
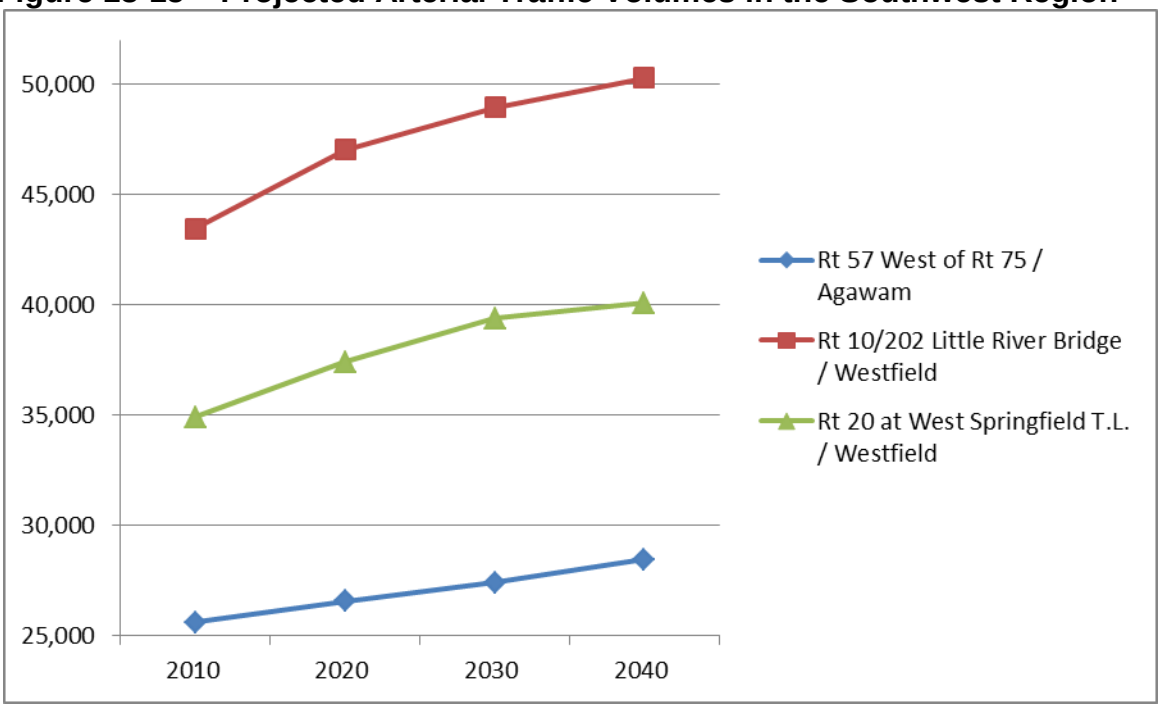


Figure 13-15 – Projected Arterial Traffic Volumes in the Southwest Region



PIONEER VALLEY PROJECT UNIVERSE

Draft TIP	Municipality	SID	Project Name and Description	Design	TEC Score	TEC Rank	Estimated Cost	CMAQ	HSIP	Jurisdiction	EJ	CIP	DPH
	Agawam	607316	RECONSTRUCTION OF ROUTE 187, FROM SOUTHWICK/SPRINGFIELD STREET TO ALLISON LANE (1.29 MILES - PHASE II)	0	33.8	26	$ 5,562,610			Municipal	N		N
	Agawam	607317	AGAWAM- RECONSTRUCTION OF ROUTE 187, FROM ALLISON LANE TO THE WESTFIELD CITY LINE (1.69 MILES - PHASE III)	0	33.8	26	$ 7,589,668			Municipal	N		N
2021	Amherst	608084	AMHERST- IMPROVEMENTS & RELATED WORK ON ROUTES 9 & 116, FROM UNIVERSITY DRIVE TO SOUTH PLEASANT STREET (0.8 MILES)	25	53.5	10	$ 3,892,738			MassDOT	Y		N
2021 SW	Amherst / Belchertown	608719	AMHERST- BELCHERTOWN- NORWOTTUCK RAIL TRAIL RESURFACING, FROM STATION ROAD IN AMHERST TO WARREN WRIGHT ROAD IN BELCHERTOWN (1.5 MILES)	0		19	$ 1,083,220	Pending		DCR			
	Amherst / Pelham	609051	RESURFACING AND RELATED WORK ON BELCHERTOWN ROAD (ROUTE 9) FROM SOUTH EAST STREET TO THE BELCHERTOWN T.L. (2.1 MILES)	0	30.5	28	$ 7,055,628			Municipal			N
2022 SW	Belchertwon / Granby	608466	BELCHERTOWN- GRANBY- RESURFACING AND RELATED WORK ON ROUTE 202	0	17	38	$ 4,491,288			MassDOT			N
	Chesterfield	608886	RECONSTRUCTION OF NORTH ROAD AND DAMON POND ROAD	0	10	42	$ 4,441,000			Municipal			N
2020	Chicopee	604434	RECONSTRUCTION & RELATED WORK ON FULLER ROAD, FROM MEMORIAL DR (RTE 33) TO SHAWINIGAN DR (2.0 MILES)	75	49.5	13	$ 8,034,211	Approved	Yes	Municipal	N		Y
	Chicopee	609061	CHICOPEE - INTERSECTION RECONSTRUCTION, MONTGOMERY ROAD AT GRANBY ROAD AND MCKINSTRY AVENUE, AND MONTGOMERY ROAD AT TURNPIKE ACCESS ROAD	0	46.5	15	$ 6,000,000	Pending	Pending	Municipal			N
Removed	Chicopee	602912	CHICOPEE- CHICOPEE RIVER RIVERWALK MULTI-USE PATH CONSTRUCTION, FROM GRAPE STREET TO FRONT STREET (NEAR ELLERTON STREET) (1 MILE)	25	33.0	15	$ 4,000,000	Approved		Municipal			
2020 SW	Chicopee	602911	CHICOPEE- CONNECTICUT RIVERWALK & BIKEWAY CONSTRUCTION, FROM BOAT RAMP NEAR I-90 TO NASH FIELD (2.5 MILES), INCLUDES NEW BRIDGE C-13-060 OVER OVERFLOW CHANNEL	100	30.5	16	$ 3,041,445	Approved		Municipal			
	Cummington	606797	ROUTE 9 RETAINING WALL	0	8.0	44	$ 1,660,000			MassDOT D1	N		N
2022	Easthampton	608577	EASTHAMPTON- IMPROVEMENTS AND RELATED WORK ON UNION STREET (ROUTE 141) FROM PAYSON AVENUE TO HIGH STREET (0.36 MILES)	25	60.0	8	$ 3,284,450			Municipal			N
	Easthampton/ Southampton	608423	IMPROVEMENTS AND RELATED WORK ON TWO SECTIONS OF ROUTE 10 IN EASTHAMPTON AND SOUTHAMPTON	0	28.5	30	$ 2,799,540			MassDOT			N
	Goshen	602888	ROUTE 9 RECONSTRUCTION	0	25.0	33	$ 7,500,000			MassDOT D1	N		N
2023	Granby	606895	ROUTE 202 INTERSECTION IMPROVEMENTS 2 LOCATIONS @ 5 CORNERS AND @ SCHOOL STREET	25	42.0	19	$ 2,588,655	Pending	Yes	MassDOT	N		Y
	Granville	608736	GRANVILLE- RECONSTRUCTION OF ROUTE 57	0	29.0	29	$ 7,000,000			Municipal			N
2021/2022	Hadley	605032	HADLEY- RECONSTRUCTION ON ROUTE 9, FROM MIDDLE STREET TO MAPLE/SOUTH MAPLE STREET	25	61.0	7	$ 23,893,982		Yes	MassDOT	N		N
	Hadley	608089	INTERSECTION, BICYCLE AND PEDESTRIAN IMPROVEMENTS @ ROUTES 9, 116 & WESTGATE CENTER DRIVE	0	25.5	32	$ 1,544,720			MassDOT	N		N

Draft TIP	Municipality	SID	Project Name and Description	Design	TEC Score	TEC Rank	Estimated Cost	CMAQ	HSIP	Jurisdiction	EJ	CIP	DPH
	Hadley	607886	RESURFACING AND RELATED WORK ON ROUTE 47 FROM COMINS DRIVE TO OLD RIVER DRIVE, INCLUDES CULVERT REPLACEMENT AT RUSSELVILLE BROOK	0	16 (2.88)	39	$ 2,100,000			Municipal	N		N
	Hadley	606547	PEDESTRIAN SIGNAL INSTALLATION AT 2 LOCATIONS ALONG ROUTE 9 NEAR WEST ST	0	14.5	40	$ 134,600			MassDOT	N		N
	Hatfield	608553	HATFIELD- RESURFACING AND RELATED WORK ON ROUTES 5 &10, FROM 350 FEET NORTH OF CHURCH AVE TO THE WHATELY TOWN LINE (3.2 MILES)	0	6.5	45	$ 3,124,760			MassDOT			N
	Holland	608727	HOLLAND- RESURFACING & RELATED WORK ON BRIMFIELD ROAD, FROM WALES ROAD TO STURBRIDGE STREET (0.9 MILES - PHASE II)	0	27.5	31	$ 1,051,476			Municipal			N
2022 STP / SW CMAQ	Holyoke	606450	TRAFFIC SIGNAL UPGRADES AT 15 INTERSECTIONS ALONG HIGH & MAPLE STREETS ($4,789,307 in statewide funding)	25	63.0	6	$ 9,152,450	Pending	Yes	Municipal	Y		N
	Holyoke	609065	RESURFACING AND RELATED WORK ON CABOT STREET AND RACE STREET (CENTER CITY CONNECTOR)	0	53.5	10	$ 5,125,070			Municipal			N
2023 SW	Holyoke	606156	RECONSTRUCTION OF I-91 INTERCHANGE 17 & ROUTE 141	0	53.0	11	$ 6,013,740	Pending	Yes	MassDOT	Y		N
2022 SW	Holyoke / West Springfield	604209	REHABILITATION OF ROUTE 5 (RIVERDALE ROAD), FROM I-91 (INTERCHANGE 13) TO MAIN STREET IN HOLYOKE & FROM ELM STREET TO NORTH ELM STREET IN WEST SPRINGFIELD (3.2 MILES)	25	49	14	$ 11,075,240	Pending	Yes	MassDOt	Y		N
	Longmeadow	607430	RESURFACING & RELATED WORK ON LONGMEADOW STREET (ROUTE 5), FROM THE CT S.L. TO CONVERSE STREET (2.88 MILES)	0/25	44.5	16	$ 2,394,860			Municipal	N		N
2024	Longmeadow / Springfield	608881	RESURFACING AND INTERSECTION IMPROVEMENTS ON LONGMEADOW STREET (ROUTE 5) AND CONVERSE STREET (0.84 MILES)	0	57.5	9	$ 5,228,168			Municipal			N
2020	Northampton	608236	NORTHAMPTON- RECONSTRUCTION OF DAMON ROAD, FROM ROUTE 9 TO ROUTE 5, INCLUDES DRAINAGE SYSTEM REPAIRS & SLOPE STABILIZATION AT THE NORWOTTUCK RAIL TRAIL	PS&E	66.5	4	$ 10,043,653	Pending	Yes	MassDOT	Y		Y
2020	Northampton	607502	INTERSECTION IMPROVEMENTS AT KING STREET, NORTH STREET & SUMMER STREET AND AT KING STREET & FINN STREET	25	65.0	5	$ 3,384,309	Pending		Municipal	Y		Y
	Northampton	605048	IMPROVEMENTS ON ROUTE 5 (MOUNT TOM ROAD) - FROM BRIDGE E-5-4 OVER THE MANHAN RIVER TO 850' SOUTH OF I-91 NB EXIT 18 RAMP (0.85 MILES)	25	40.0	22	$ 1,923,075			MassDOT	Y		N
	Northampton	609286	NORTHAMPTON- DOWNTOWN COMPLETE STREETS CORRIDOR AND INTERSECTION IMPROVEMENTS ON MAIN STREET (ROUTE 9)	0	67.5	3	$ 7,654,605	Pending		Municipal			N
2021 SW	Northampton	608413	NORTHAMPTON- ROCKY HILL GREENWAY MULTI-USE TRAIL, FROM THE MANHAN RAIL TRAIL TO ROCKY HILL ROAD (0.4 MILES)	25	34.0	14	$ 780,794	Pending		Municipal			
2020	Northampton	PV0001	NORTHAMPTON, AMHERST, CHICOPPE, EASTHAMPTON, HADLEY, HOLYOKE, SOUTH HADLEY, SPRINGFIELD, and WEST SPRINGFIELD: ValleyBike share (phase II)	Contract	35.5	12	$ 1,210,000	Pending					
	Palmer	601504	RECONSTRUCTION OF ROUTE 32, FROM 765 FT. SOUTH OF STIMSON STREET TO 1/2 MILES SOUTH OF RIVER STREET (PHASE I) (1.63 MILES)	0	23.0	34	$ 6,134,080			MassDOT	N		N
	Palmer	607372	PALMER- RECONSTRUCTION OF ROUTE 32, FROM 1/2 MILE SOUTH OF RIVER STREET TO THE WARE T.L. (PHASE II) (2.1 MILES)	0	23.0	34	$ 8,326,770			MassDOT	N		N
	Russell	608945	RUSSELL- RESURFACING & RELATED WORK ON ROUTE 20	0	14.0	41	$ 6,500,000	No	No	MassDOT D1			

Draft TIP	Municipality	SID	Project Name and Description	Design	TEC Score	TEC Rank	Estimated Cost	CMAQ	HSIP	Jurisdiction	EJ	CIP	DPH
2020 SW	South Hadley	608473	SOUTH HADLEY- RESURFACING AND RELATED WORK ON RTE 116	25	43.5	17	$5,885,003			MassDOT			N
	South Hadley	608785	MAIN STREET ROAD IMPROVEMENT PROJECT	0	38.5	24	$3,089,720			Municipal			N
	Southampton	604653	REHABILITATION OF EAST STREET - FROM COLLEGE HIGHWAY EASTERLY TO COUNTY ROAD (2.6 MILES)	25	31.5	27	$ 5,022,200			Municipal	N		N
2022 SW	Southampton	607823	SOUTHAMPTON- GREENWAY RAIL TRAIL CONSTRUCTION, FROM COLEMAN ROAD TO ROUTE 10 (3.5 MILES)	0	19.5	18	$ 6,080,722	Pending		Municipal			
	Southwick	606141	RECONSTRUCTION OF FEEDING HILLS ROAD (ROUTE 57), FROM COLLEGE HIGHWAY TO THE AGAWAM T.L	0	42.5	18	$ 4,080,000			Municipal	N		N
	Southwick	604155	RESURFACING & RELATED WORK ON ROUTE 10/202, COLLEGE HIGHWAY (NORTHERLY SECTION) FROM THE WESTFIELD/SOUTHWICK T.L. TO TANNERY ROAD (1.4 MILES)	0	19.5	36	$ 3,600,000			MassDOT	N		N
2024	Springfield	608717	SPRINGFIELD- RECONSTRUCTION OF SUMNER AVENUE AT DICKINSON STREET AND BELMONT AVENUE (THE "X")	25	70.5	1	$ 10,062,663		Yes	Municipal			N
2021	Springfield	608782	SPRINGFIELD- INTERSECTION IMPROVEMENTS AT COTTAGE STREET, ROBBINS ROAD AND INDUSTRY AVE	25	46.5	15	$ 2,748,386		Yes	Municipal			N
2020	Springfield	608718	SPRINGFIELD- INTERSECTION IMPROVEMENTS AT BERKSHIRE AVENUE, COTTAGE AND HARVEY STREETS	25	41.5	20	$ 2,280,751		Yes	Municipal			20-Mar
2020 SW	Springfield	608560	IMPROVEMENTS ON ST. JAMES AVENUE AT TAPLEY STREET	25		46	$1,589,420			MassDOT			N
2021 SW	Springfield	608565	IMPROVEMENTS ON ST. JAMES AVENUE AT ST. JAMES BOULEVARD AND CAREW STREET	0		47	$ 2,400,000			MassDOT			N
2022 SW	Springfield	608157	SPRINGFIELD- MCKNIGHT COMMUNITY TRAIL CONSTRUCTION, FROM ARMORY STREET TO HAYDEN AVENUE (1.5 MILES)	0	36.5	11	$ 4,300,000	Pending		Municipal			
2024	Wales	608163	WALES- RECONSTRUCTION & IMPROVEMENTS ON MONSON ROAD, FROM THE MONSON T.L. TO REED HILL ROAD (1.5 MILES)	25	39.5	23	$ 3,737,346			Municipal			N
	Wales	605669	PEDESTRIAN ACCESS IMPROVEMENTS & RELATED WORK ON ROUTE 19	0	9.0	43	$ 312,500			MassDOT	N		N
2022/2023	West Springfield	608374	RECONSTRUCTION OF MEMORIAL AVENUE (ROUTE 147), FROM COLONY ROAD TO THE MEMORIAL AVENUE ROTARY (1.4 MILES)	25	70.0	2	$ 22,545,121	Pending	Yes	Municipal			N
	West Springfield	604746	BRIDGE REPLACEMENT, W-21-006, CSX RAILROAD OVER UNION STREET	0	21.0	35	$ 12,403,054			MassDOT	Y		N
2021	Westfield	607773	WESTFIELD- IMPROVEMENTS & RELATED WORK ON ROUTE 20, COURT STEET & WESTERN AVENUE, LLOYDS HILL ROAD TO HIGH STREET/MILL STREET INTERSECTION (PHASE II) Eastern Section	25	52.5	12	$ 8,153,565		Yes	Municipal	Y		N
2021 SW	Westfield	608487	WESTFIELD- RESURFACING AND RELATED WORK ON ROUTE 10 AND 202	0	29	29	$ 2,760,000			MassDOT			N
	Westfield	608073	WESTFIELD- WESTFIELD RIVER LEVEE MULTI-USE PATH CONSTRUCTION, FROM CONGRESS STREET TO WILLIAMS RIDING WAY (NEAR MEADOW STREET) (2 MILES)	0	36	13	$ 4,801,730	Pending		Municipal			
2021 SW	Wilbraham	608489	WILBRAHAM- RESURFACING AND RELATED WORK ON ROUTE 20	0	36.0	25	$ 9,441,500			MassDOT	-		N
	Williamsburg	607231	RECONSTRUCTION OF HIGH AND MOUNTAIN STREET	25	18.0	37	$ 7,033,957			Municipal	N		N
	Williamsburg	608787	WILLIAMSBURG- CONSTRUCTION OF THE "MILL RIVER GREENWAY" SHARED USE PATH	0	29.0	17	$ 14,400,000	Pending		Municipal			
2024	Worthington	609287	ROUTE 143 RECONSTRUCTION (PHASE II) PERU TOWN LINE TO COLD STREET	75	41.0	21	$ 8,584,000			Municipal	N		Y
			61 Total Projects				**$ 342,132,443**						