Forecasting

FORECASTING

Introduction

This chapter predicts population, household, and employment growth or decline in the municipalities of the Montachusett MPO (MMPO) region as well as the region as a whole. The forecast in this RTP cover a 25-year time period that covers years 2010 through 2035 which were developed by the MassDOT Office of Transportation Planning (OTP).

Forecasting is critical to regional transportation planning as it helps to determine the changing travel demands on the transportation system in the future. The demographic forecasts provided below have been derived for the purpose of informing the development of the Montachusett Transportation Improvement Program (TIP) to determine if the projects listed in the TIP adequately address the travel demands in the future.

General Assumptions and Notes for All Forecasts to 2035

This section provides an overview of the methods used by OTP to forecast population, household, and employment variables for Massachusetts and each MPO region and presents the finalized variables. Before the forecasts are finalized, OTP distributes the methods and the preliminary forecasts to the regional planning agencies (RPAs) for review and comment. After adjustments to the preliminary forecasts are finalized, the forecasts are then utilized as inputs into the statewide travel demand model. The model estimates changes in future traffic volume based on proposed improvements to the statewide transportation infrastructure and to determine if future federal air quality standards will be met.

- As in the 2007 RTP projections, OTP advocates a “top down’ approach to forecasting the variables. This approach considers state and national trends combined with analyses of regional shares
- The overriding factor in determining these forecasts is that statewide population and employment have entered a period of slow growth
- Census data is the most comprehensive and reliable of all population data sources and is used wherever possible. Census data as far back as 1970 is being utilized in this RTP
- Generally, forecasts cover a 25-year period at 5-year intervals beginning with 2010. Forecasts were completed for years 2016, 2020, 2025, 2030, and 2035. Forecasts were not completed for 2015 but instead were completed for 2016 because statewide air quality conformity determination must be completed for that year

Population Forecast

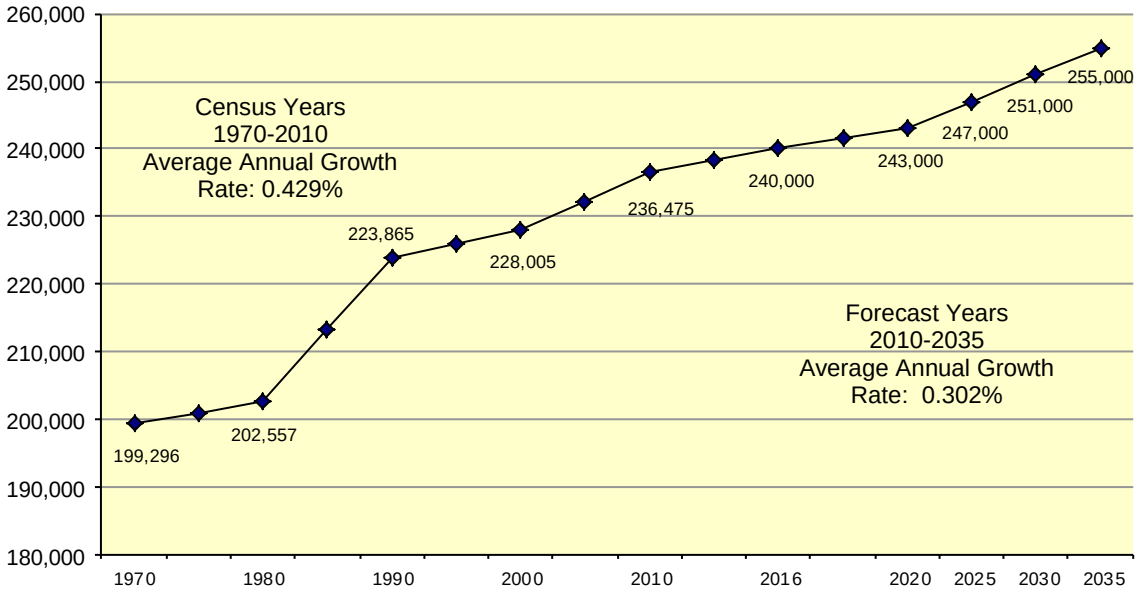
General Assumptions and Notes

- Population forecasts begin with the latest 2010 U.S. Census and forecasts
- Since U.S. Census forecasts extend only to 2030 OTP built the 2035 forecast based upon population growth between 2020 and 2030
- The 2010 municipal shares, or percentages, of the MPO total regional population are held constant in all future forecast years
- The long term trend shows that the state has entered a period of slow population growth. The current economic recession is a contributing factor

Regional and Municipal Population Forecast

The forecasted slowing of population growth in Massachusetts is reflected in the MMPO regional population forecast shown in **Figure 1** below. Over the next 25-years the population is expected to grow from 236,475 to 255,000 persons. There will be a net increase of approximately 18,525 persons which is an increase of 7.8% over the 2010 population for an average annual growth rate (AAGR) of 0.302%. This is a decrease in AAGR of -0.187% when compared to the growth that took place during the 40-year period from 1970-2010. During that 40-year period the population grew from 199,296 to 236,475 for a net increase of 37,179 persons which was an increase of 18.7% over the 1970 population for an AAGR of 0.429%.

FIGURE 1: HISTORIC AND FORECASTED REGIONAL POPULATION GROWTH



Fitchburg and Leominster will each see their population increase by approximately 3,100-3,200 persons or 17-17.3% of the 2035 regional population for each municipality. **Table 1** below summarizes the forecasted population growth for municipalities by grouping them into population ranges.

Table 1

Municipalities	RANGES OF POPULATION GROWTH	PERCENT OF REGION POPULATION (each municipality)
FITCHBURG, LEOMINSTER	3,100-3,200	17 to 17.3%
GARDNER	1,500-1,600	8 to 9%
ATHOL, CLINTON, GROTON, LUNENBURG, TOWNSEND, WINCHENDON	700-1,100	>3.5 to 6%
AYER, LANCASTER, SHIRLEY, STERLING, TEMPLETON, WESTMINSTER	550-650	>3 to <3.5%
ASHBURNHAM, ASHBY, HARVARD, HUBBARDSTON	230-520	>1 to <3%
PETERSHAM, PHILLIPSTON, ROYALSTON	100-130	0.5 to <1%

Table 2 below shows the municipal population forecast for each forecasted year to 2035.

Table 2

POPULATION FORECAST TO 2035							
	2000	2010	2016	2020	2025	2030	2035
Ashburnham	5,546	6,081	6,170	6,250	6,350	6,450	6,560
Ashby	2,845	3,074	3,120	3,160	3,210	3,260	3,310
Athol	11,299	11,584	11,760	11,900	12,100	12,300	12,490
Ayer	7,287	7,427	7,540	7,630	7,760	7,880	8,010
Clinton	13,435	13,606	13,800	13,980	14,210	14,440	14,670
Fitchburg	39,102	40,318	40,920	41,430	42,120	42,800	43,480
Gardner	20,770	20,228	20,530	20,790	21,130	21,470	21,800
Groton	9,547	10,646	10,800	10,940	11,120	11,280	11,480
Harvard	5,981	6,520	6,620	6,700	6,810	6,920	7,030
Hubbardston	3,909	4,382	4,450	4,500	4,580	4,650	4,730
Lancaster	7,380	8,055	8,180	8,280	8,410	8,550	8,690
Leominster	41,303	40,759	41,370	41,900	42,570	43,260	43,930
Lunenburg	9,401	10,086	10,240	10,360	10,530	10,710	10,880
Petersham	1,180	1,234	1,250	1,270	1,290	1,320	1,340
Phillipston	1,621	1,682	1,700	1,730	1,750	1,790	1,810
Royalston	1,254	1,258	1,280	1,300	1,320	1,350	1,370
Shirley	6,373	7,211	7,320	7,400	7,530	7,650	7,780
Sterling	7,257	7,808	7,920	8,020	8,160	8,290	8,420
Templeton	6,799	8,013	8,130	8,230	8,370	8,510	8,640
Townsend	9,198	8,926	9,060	9,170	9,320	9,470	9,630
Westminster	6,907	7,277	7,390	7,480	7,600	7,720	7,850
Winchendon	9,611	10,300	10,450	10,580	10,760	10,930	11,100
Total	228,005	236,475	240,000	243,000	247,000	251,000	255,000

Household Forecast

General Assumptions and Notes

- Household forecasts to 2035 are based on U.S. Census data beginning from 1970 and are based on changes in group quarters population, population in households and average household size
- The trend of decreasing household size is expected to continue, but not at the dramatic rates experienced between 1970 through 2000. The trend will be tempered by the 2008 Massachusetts average household size of 2.53 (Source: American Community Survey) which is an increase from 2.51 in the 2000 U.S. Census. This has occurred as a result of factors such as instability in the housing market and the current recession
- The percentage of group quarters population to total population is forecasted to remain unchanged to 2035 and will be held constant to year 2010 levels. For comparison, the 2000 Census ratio of each municipality's group quarters population to each municipality's total population is provided in **Table 3** below

Table 3

YEAR 2000 MUNICIPAL HOUSEHOLD AND GROUP QUARTERS POPULATIONS (U.S. Census 2000)

	GQP	HHP	%GQP	HH	AHHS
Ashburnham	18	5,528	0.32%	1,929	2.87
Ashby	14	2,831	0.49%	978	2.89
Athol	248	11,051	2.19%	4,487	2.46
Ayer	452	6,835	6.20%	2,982	2.29
Clinton	129	13,306	0.96%	5,597	2.38
Fitchburg	1,745	37,357	4.46%	14,943	2.50
Gardner	1,278	19,492	6.15%	8,282	2.35
Groton	75	9,472	0.79%	3,268	2.90
Harvard	807	5,174	13.5%	1,809	2.86
Hubbardston	22	3,887	0.56%	1,308	2.97
Lancaster	644	5,738	10.1%	2,049	2.80
Leominster	394	40,909	0.95%	16,491	2.48
Lunenburg	3	9,398	0.03%	3,535	2.66
Petersham	93	1,087	7.88%	438	2.48
Phillipston	0	1,621	0.00%	580	2.79
Royalston	0	1,254	0.00%	449	2.79
Shirley	2,095	5,276	28.4%	2,067	2.55
Sterling	1	7,256	0.01%	2,573	2.82
Templeton	270	6,529	3.97%	2,411	2.71
Townsend	0	9,198	0.00%	3,110	2.96
Westminster	4	6,903	0.06%	2,529	2.73
Winchendon	129	9,482	1.34%	3,447	2.75
Totals	8,421	219,584	3.69%	85,262	2.58

GQP = **G**roup **Q**uarters **P**opulation
HH = **H**ouse**H**old HHP = **H**ouse**H**old **P**opulation AHHS = **A**verage **HH** **S**ize

Regional and Municipal Household Forecast

The forecasted slowing population growth will also be reflected in the forecasted slowing growth in the number of households in the MMPO region. Over the next 25-years the number of households is expected to grow from 92,500 to 102,600 which is a net increase of approximately 10,100 households, an increase of about 11% over the 2010 number of households for an AAGR of about 0.41%. Leominster will see their number of households increase by approximately 1,950 households which is about 19% of the 2035 regional total. Regional household size is expected to decrease from 2.53 in 2010 to 2.44 in 2035. MMPO regional and municipal household forecasts are shown in the **Table 4** below.

Table 4

FORECASTS TO 2035 FOR: HOUSEHOLD POPULATION, GROUP QUARTERS POPULATION, NUMBER OF HOUSEHOLDS, AND AVERAGE HOUSEHOLD SIZE

	2010				2016				2020			
Municipalities	**GQP**	**HHP**	**HH**	**AHHS**	**GQP**	**HHP**	**HH**	**AHHS**	**GQP**	**HHP**	**HH**	**AHHS**
ASHBURNHAM	19	6,062	2,148	2.82	19	6,151	2,190	2.81	19	6,231	2,240	2.78
ASHBY	15	3,059	1,105	2.77	15	3,105	1,130	2.75	15	3,145	1,150	2.73
ATHOL	264	11,320	4,656	2.43	267	11,493	4,750	2.42	269	11,631	4,850	2.40
AYER	398	7,029	3,118	2.25	404	7,136	3,180	2.24	408	7,222	3,250	2.22
CLINTON	23	13,583	5,831	2.33	25	13,775	5,950	2.32	26	13,954	6,080	2.30
FITCHBURG	1,859	38,459	15,165	2.54	1,882	39,038	15,490	2.52	1,896	39,534	15,800	2.50
GARDNER	1,361	18,867	8,224	2.29	1,378	19,152	8,400	2.28	1,388	19,402	8,570	2.26
GROTON	158	10,488	3,753	2.79	159	10,641	3,830	2.78	160	10,780	3,910	2.76
HARVARD	1,269	5,251	1,893	2.77	1,280	5,340	1,930	2.77	1,287	5,413	1,970	2.75
HUBBARDSTON	23	4,359	1,566	2.78	23	4,427	1,600	2.77	23	4,477	1,630	2.75
LANCASTER	1,752	6,303	2,409	2.62	1,775	6,405	2,460	2.60	1,789	6,491	2,510	2.59
LEOMINSTER	420	40,339	16,767	2.41	425	40,945	17,130	2.39	428	41,472	17,480	2.37
LUNENBURG	3	10,083	3,835	2.63	3	10,237	3,920	2.61	3	10,357	4,000	2.59
PETERSHAM	99	1,135	493	2.30	100	1,150	500	2.30	101	1,169	510	2.29
PHILLIPSTON	0	1,682	633	2.66	0	1,700	640	2.66	0	1,730	660	2.62
ROYALSTON	0	1,258	498	2.53	0	1,280	510	2.51	0	1,300	520	2.50
SHIRLEY	1,442	5,769	2,264	2.55	1,458	5,862	2,310	2.54	1,467	5,933	2,360	2.51
STERLING	0	7,808	2,810	2.78	0	7,920	2,870	2.76	0	8,020	2,930	2.74
TEMPLETON	288	7,725	2,882	2.68	292	7,838	2,940	2.67	294	7,936	3,000	2.65
TOWNSEND	0	8,926	3,240	2.75	0	9,060	3,310	2.74	0	9,170	3,380	2.71
WESTMINSTER	5	7,272	2,716	2.68	5	7,385	2,770	2.67	5	7,475	2,830	2.64
WINCHENDON	137	10,163	3,810	2.67	139	10,311	3,890	2.65	140	10,440	3,970	2.63
Totals	9,535	226,940	89,816	2.53	9,649	230,351	91,700	2.51	9,718	233,282	93,600	2.49

	2025				2030				2035			
Municipalities	**GQP**	**HHP**	**HH**	**AHHS**	**GQP**	**HHP**	**HH**	**AHHS**	**GQP**	**HHP**	**HH**	**AHHS**
ASHBURNHAM	20	6,330	2,300	2.75	20	6,430	2,350	2.74	20	6,540	2,400	2.73
ASHBY	16	3,194	1,180	2.71	16	3,244	1,210	2.68	16	3,294	1,240	2.66
ATHOL	273	11,827	4,980	2.37	277	12,023	5,100	2.36	281	12,209	5,200	2.35
AYER	416	7,344	3,330	2.21	424	7,456	3,410	2.19	432	7,578	3,480	2.18
CLINTON	28	14,182	6,230	2.28	30	14,410	6,380	2.26	33	14,637	6,510	2.25
FITCHBURG	1,925	40,195	16,220	2.48	1,953	40,847	16,600	2.46	1,982	41,498	16,940	2.45
GARDNER	1,410	19,720	8,790	2.24	1,430	20,040	9,000	2.23	1,452	20,348	9,180	2.22
GROTON	161	10,959	4,010	2.73	162	11,118	4,100	2.71	164	11,316	4,190	2.70
HARVARD	1,302	5,508	2,030	2.71	1,315	5,605	2,070	2.71	1,329	5,701	2,110	2.70
HUBBARDSTON	24	4,556	1,670	2.73	24	4,626	1,710	2.71	25	4,705	1,750	2.69
LANCASTER	1,818	6,592	2,570	2.56	1,846	6,704	2,640	2.54	1,875	6,815	2,700	2.52
LEOMINSTER	435	42,135	17,930	2.35	440	42,820	18,350	2.33	450	43,480	18,720	2.32
LUNENBURG	3	10,527	4,100	2.57	3	10,707	4,200	2.55	3	10,877	4,280	2.54
PETERSHAM	103	1,187	520	2.28	104	1,216	540	2.25	106	1,234	550	2.24
PHILLIPSTON	0	1,750	670	2.61	0	1,790	690	2.59	0	1,810	700	2.59
ROYALSTON	0	1,320	530	2.49	0	1,350	550	2.45	0	1,370	560	2.45
SHIRLEY	1,486	6,044	2,430	2.49	1,505	6,145	2,480	2.48	1,524	6,256	2,530	2.47
STERLING	0	8,160	3,000	2.72	0	8,290	3,080	2.69	0	8,420	3,140	2.68
TEMPLETON	298	8,072	3,080	2.62	302	8,208	3,150	2.61	307	8,333	3,220	2.59
TOWNSEND	0	9,320	3,460	2.69	0	9,470	3,550	2.67	0	9,630	3,620	2.66
WESTMINSTER	5	7,595	2,900	2.62	5	7,715	2,970	2.60	5	7,845	3,030	2.59
WINCHENDON	142	10,618	4,070	2.61	144	10,786	4,170	2.59	146	10,954	4,250	2.58
Totals	9,865	237,135	96,000	2.47	10,000	241,000	98,300	2.45	10,150	244,850	100,300	2.44

Employment Forecast

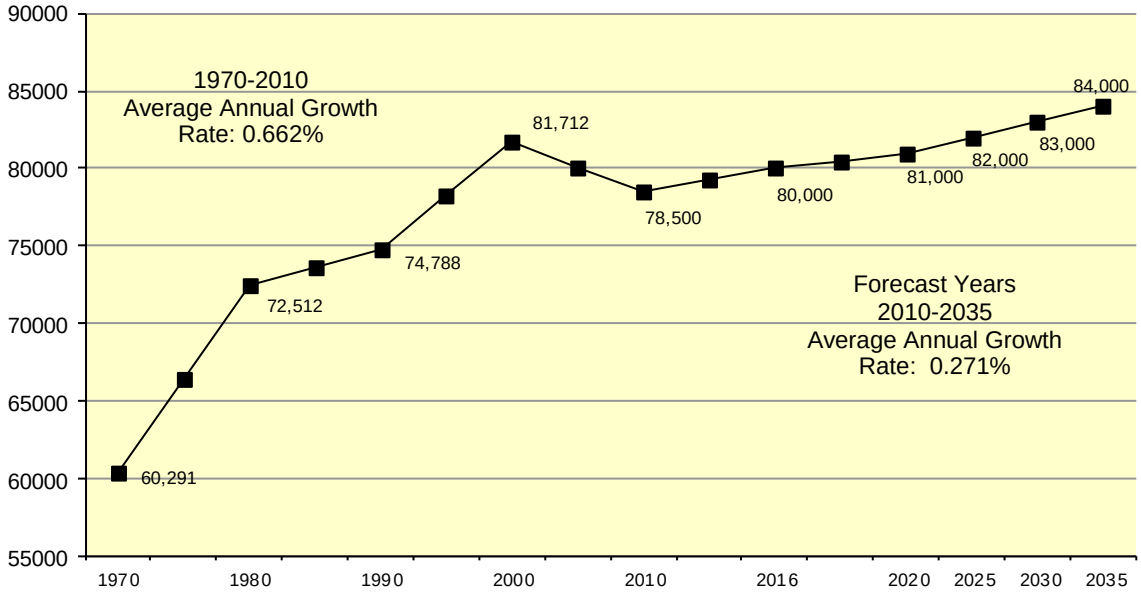
General Assumptions and Notes

- Employment forecasts are based on historic ES-202 annual municipal employment figures from the Massachusetts Department of Workforce Development and Training. The recently released 2009 ES-202 figures were utilized for this forecast. The 2009 figures provide a more accurate accounting of the negative effects on employment by the current recession
- The 2010 employment figures are an estimate based on the 2009 figures and the first half of the 2010 ES-202 figures
- The long term trend shows that the state has entered a period of slow employment growth. The current economic recession is a contributing factor
- Potential labor supply is persons 16 years and older
- The average annual unemployment rate for the forecast period will be 5.5%
- The number of net non-residential commuters is held constant as a same share of the 2000 total employment
- The only forecast of labor force participation used for Massachusetts is a national one by the U.S. Bureau of Labor Statistics (BLS)

Regional and Municipal Employment Forecast

Historically, as shown in **Figure 2** below, decade to decade employment from 1970-2010 has been quite volatile in the MMPO region. However, based on the long term trend, employment is expected to grow but the region has entered a period of slower growth. By 2020 employment is expected to return to approximately the 2000 level. Over the next 25-years employment in the MMPO region is expected to grow from 78,500 to 84,000 employees. There will be a net increase of approximately 5,500 employees which is a 7% increase over the 2010 employment level for an average annual growth rate (AAGR) of 0.271%. This is a decrease in AAGR of -0.39% when compared to the growth that took place during the 40-year period from 1970-2010. Employment grew from 60,291 to 81,712 for a net increase of 21,421 employees which was an increase of 36% over the 1970 employment for an AAGR of 0.662%.

FIGURE 2: HISTORIC AND FORECASTED REGIONAL EMPLOYMENT GROWTH



Of the 2035 MMPO region total, Leominster will see the largest increase in employment with between 1,100-1,300 new employees (or about 23%) and Fitchburg will see the second largest with between 800-900 new employees (or about 18%). Combined, Leominster and Fitchburg account for 41% of the new employees. **Table 5** below summarizes the forecasted employment growth for municipalities by grouping them into ranges.

Table 5

Municipalities	RANGES OF EMPLOYMENT GROWTH	PERCENT OF REGION EMPLOYMENT (each municipality)
LEOMINSTER	1,100-1,300	23%
FITCHBURG	800-900	18%
AYER, CLINTON, GARDNER	300-600	6 to 10.5%
ATHOL, WESTMINSTER	150-275	4 to 5%
GROTON, LANCASTER, LUNENBURG, TEMPLETON, TOWNSEND, SHIRLEY, STERLING, WINCHENDON	100-250	2-3.5%
ASHBURNHAM, ASHBY, HARVARD, HUBBARDSTON, PETERSHAM, PHILLIPSTON, ROYALSTON	0-80	0.2-1.5%

Table 6 below shows the municipal employment forecast for each forecasted year to 2035.

Table 6

EMPLOYMENT FORECAST TO 2035								
	2000*	2009**	2010***	2016	2020	2025	2030	2035
Ashburnham	1,006	1,012	1,020	1,040	1,050	1,060	1,080	1,090
Ashby	229	285	290	290	300	300	300	310
Athol	3,704	3,474	3,490	3,560	3,600	3,650	3,690	3,740
Ayer	6,003	8,366	8,410	8,570	8,680	8,780	8,890	8,990
Clinton	4,878	4,337	4,360	4,440	4,500	4,550	4,610	4,660
Fitchburg	14,723	12,503	12,570	12,810	12,960	13,130	13,290	13,450
Gardner	8,425	8,311	8,350	8,510	8,620	8,730	8,830	8,940
Groton	2,978	3,266	3,280	3,350	3,390	3,430	3,470	3,510
Harvard	1,035	909	910	930	940	950	970	980
Hubbardston	597	501	500	510	520	530	530	540
Lancaster	2,816	2,111	2,120	2,160	2,190	2,220	2,240	2,270
Leominster	18,875	17,905	17,990	18,340	18,570	18,800	19,030	19,260
Lunenburg	2,384	2,271	2,280	2,330	2,360	2,380	2,410	2,440
Petersham	141	128	130	130	130	130	140	140
Phillipston	175	168	170	170	170	180	180	180
Royalston	156	119	120	120	120	130	130	130
Shirley	2,116	2,127	2,140	2,180	2,210	2,230	2,260	2,290
Sterling	2,058	2,417	2,430	2,470	2,500	2,540	2,570	2,600
Templeton	1,690	1,727	1,740	1,770	1,790	1,810	1,830	1,850
Townsend	2,245	2,127	2,140	2,180	2,210	2,230	2,260	2,290
Westminster	3,637	2,402	2,410	2,460	2,490	2,520	2,550	2,580
Winchendon	1,841	1,641	1,650	1,680	1,700	1,720	1,740	1,760
Totals	81,712	78,107	78,500	80,000	81,000	82,000	83,000	84,000

*ES-202 2000 figures from the MA Dept of Workforce Development and Training
**ES-202 2009 figures from the MA Dept of Workforce Development and Training
***Estimate based upon ES-202 2009 figs, & first half of 2010, from the MA Dept of Workforce Development and Training

Conclusions

Under a no-build scenario by 2035, the forecasted 7.8% increase in population and 7% increase in employment over 2010 figures will lead to an increased number of people using the MMPO region's transportation infrastructure in the following manner:

- The populations of the five primarily urbanized municipalities - Fitchburg, Leominster, Gardner, Clinton, and Ayer will absorb approximately 52% (9,550 people) of the population increase and 66% (3,620 employees) of the new employees.

  This should lead to a significant increase in vehicle miles traveled and increased usage of the public transit system which will increase the strain on the transportation infrastructure which will most likely be unsustainable over time in these urbanized municipalities.

- The populations of eleven partially urbanized municipalities - Athol, Groton, Harvard, Lancaster, Lunenburg, Shirley, Sterling, Templeton, Townsend, Westminster, and

Winchendon will absorb approximately 41% (7,560 people) of the population increase and 31% (1,720 employees) of the new employees.

However due to the smaller increases the strain on the transportation infrastructure should be significantly less than what the urbanized municipalities will experience. The results will be a moderate increase in vehicle miles traveled and a moderate increase in public transit ridership which will be more sustainable over time for the transportation infrastructure in these semi-urbanized municipalities than in the urbanized municipalities.

- The populations of six primarily rural municipalities – Ashburnham, Ashby, Hubbardston, Petersham, and Royalston will absorb approximately 7.6% (1,400 people) of the population increase and 2.9% (160 employees) of the new employees.

  This should lead to the lowest increase in vehicle miles traveled and lowest increase in usage of the public transit system when compared to what will occur on the transportation infrastructure in the urbanized and semi-urbanized municipalities. In these rural municipalities, the strain on the transportation infrastructure will be the least therefore the increase will be the most sustainable over time.