Chapter 16 - FINANCIAL ANALYSIS

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Chapter 16 – Financial Analysis

Introduction

Federal regulations regarding Regional Transportation Plans require that a financial analysis be included that examines the anticipated needs of the Region with reasonably expected federal and state funds. This chapter outlines the development of those funding estimates and determines if the Montachusett RTP is fiscally constrained.

Expected Highway Funding

To assist in the development of this financial component of the RTP, the Office of Transportation Planning (OTP) of the Massachusetts Department of Transportation (MassDOT) developed highway and transit funding estimates for the life span of the document, i.e. to the year 20405.

Federal and state highway fund estimates were developed by MassDOT in five year increments. Data was provided for the entire Commonwealth as well as for each particular MPO. Assumptions used in compiling this data were as follows:

- Federal funding (Obligation Authority (OA) and redistribution) and state match for the period of 2016 – 2019 reflect current TIP allocations and funding for FFY 2020 is assumed to be equal to estimates for FFY 2019.
- Beginning in 2021 and each year thereafter federal funding is assumed to grow at a rate of 1.5% per year.
- Deductions for statewide items that cannot be allocated individually to the MPOs - GANs repayments, Planning, and Extra Work Orders/Cost Adjustments - are taken from total available funding, leaving an amount of available in federal funding to be allocated in the regional plans.
- Assumed funding for Statewide Interstate Maintenance, National Highway System (NHS), Bridge, Infrastructure and other remaining Statewide Programs mirrors the assumptions made for federal funding, i.e. 2016-2019 reflect STIP amounts, and thereafter programs are adjusted by a rate of 1.5% per year.
- The Balance Available for Statewide Programs is a function of the other assumptions made in the financial plan and represents federal funding after deducting statewide line items and GANS repayments. GANs repayment will end in 2026 and is no longer deducted from anticipated federal funding from 2027 to 2040.
- The Non-Federal Aid Program is based upon the existing program and held constant at current amounts for 2016 - 2020. Beginning in 2021 and thereafter, NFA funding is adjusted at a rate of 1.5% per year.

The following Table 16-1 provides the statewide federal and state funding estimates developed by MassDOT for various programs.

Table 16-1
Massachusetts Funding Estimates FFY 2016-2040

MassDOT Financials - FFY 2016 - 2040										
FFY	Federal Funding	GANS Repayment	Funding Less GANS Repayment	Funding w/ Non-Federal Match	Statewide Infrastructure, Bridge & Other Items	Interstate Maintenance	National Highway System	Statewide Bridges	Statewide Infrastructure	Remaining Statewide Programs
2016	$600,000,000	$44,440,000	$555,560,000	$694,450,000	$519,875,000	$75,934,289	$26,700,000	$148,729,824	$17,500,000	$164,455,906
2017	$600,000,000	$59,150,000	$540,850,000	$676,062,500	$469,487,500	$70,544,016	$43,665,000	$149,172,983	$7,000,000	$176,981,944
2018	$600,000,000	$68,463,700	$531,536,300	$664,420,375	$448,845,375	$66,992,127	$38,750,000	$148,079,233	$7,000,000	$175,066,667
2019	$600,000,000	$73,525,150	$526,474,850	$658,093,563	$442,518,563	$72,058,080	$35,000,000	$146,006,530	$0	$184,870,619
2020	$600,000,000	$77,951,600	$522,048,400	$652,560,500	$436,985,500	$66,360,317	$34,460,385	$141,554,691	$7,532,194	$187,077,913
2016-20										
2021	$620,000,000	$82,588,050	$537,411,950	$671,764,938	$449,845,703	$68,313,259	$35,474,532	$145,720,555	$7,753,862	$192,583,496
2022	$629,300,000	$94,420,950	$534,879,050	$668,598,813	$447,725,516	$67,991,288	$35,307,336	$145,033,753	$7,717,317	$191,675,822
2023	$638,739,500	$114,931,804	$523,807,696	$654,759,620	$438,458,135	$66,583,950	$34,576,516	$142,031,728	$7,557,577	$187,708,363
2024	$648,320,593	$138,111,750	$510,208,843	$637,761,053	$427,075,088	$64,855,329	$33,678,857	$138,344,366	$7,361,371	$182,835,165
2025	$658,045,401	$144,321,750	$513,723,651	$642,154,564	$430,017,191	$65,302,114	$33,910,869	$139,297,415	$7,412,083	$184,094,709
2021-25										
2026	$667,916,082	$167,280,246	$500,635,836	$625,794,796	$419,061,913	$63,638,453	$33,046,943	$135,748,622	$7,223,250	$179,404,644
2027	$677,934,824		$677,934,824	$847,418,530	$567,471,690	$86,175,860	$44,750,439	$183,823,673	$9,781,347	$242,940,371
2028	$688,103,846		$688,103,846	$860,129,807	$575,983,765	$87,468,498	$45,421,696	$186,581,028	$9,928,067	$246,584,476
2029	$698,425,404		$698,425,404	$873,031,755	$584,623,522	$88,780,525	$46,103,021	$189,379,744	$10,076,988	$250,283,243
2030	$708,901,785		$708,901,785	$886,127,231	$593,392,875	$90,112,233	$46,794,567	$192,220,440	$10,228,143	$254,037,492
2026-30										
2031	$719,535,312		$719,535,312	$899,419,139	$602,293,768	$91,463,917	$47,496,485	$195,103,746	$10,381,565	$257,848,054
2032	$730,328,341		$730,328,341	$912,910,426	$611,328,174	$92,835,875	$48,208,933	$198,030,303	$10,537,289	$261,715,775
2033	$741,283,266		$741,283,266	$926,604,083	$620,498,097	$94,228,413	$48,932,067	$201,000,757	$10,695,348	$265,641,512
2034	$752,402,515		$752,402,515	$940,503,144	$629,805,569	$95,641,840	$49,666,048	$204,015,768	$10,855,778	$269,626,134
2035	$763,688,553		$763,688,553	$954,610,691	$639,252,652	$97,076,467	$50,411,038	$207,076,005	$11,018,615	$273,670,526
2031-35										
2036	$775,143,881		$775,143,881	$968,929,852	$648,841,442	$98,532,614	$51,167,204	$210,182,145	$11,183,894	$277,775,584
2037	$786,771,040		$786,771,040	$983,463,799	$658,574,063	$100,010,603	$51,934,712	$213,334,877	$11,351,653	$281,942,218
2038	$798,572,605		$798,572,605	$998,215,756	$668,452,674	$101,510,763	$52,713,733	$216,534,900	$11,521,927	$286,171,351
2039	$810,551,194		$810,551,194	$1,013,188,993	$678,479,465	$103,033,424	$53,504,439	$219,782,924	$11,694,756	$290,463,922
2040	$822,709,462		$822,709,462	$1,028,386,828	$688,656,656	$104,578,925	$54,307,005	$223,079,668	$11,870,178	$294,820,881
2036-40										
2016-2040				*$20,339,360,755*	*$13,697,549,896*	*$2,080,023,179*	*$1,075,981,826*	*$4,419,865,678*	*$235,183,205*	*$5,760,276,788*

The available statewide figures for each program were then allocated to the various MPO's in the Commonwealth based upon the following assumptions:

- Interstate Maintenance distribution was based on the percent of Interstate lanes miles per MPO region.
- NHS distribution was based on the percentage of NHS lane miles per MPO region.
- Statewide Bridge funds were allocated to each MPO based upon the percentage of bridges contained within each jurisdiction.
- Statewide Infrastructure and the remaining Statewide Programs were distributed to each MPO based upon the existing Massachusetts Association of Regional Planning Agencies (MARPA) (a working group comprised of the 13 MA RPA's) TIP targets percentages.

Additionally, available Non-Federal Aid Preservation (bridges and roadways) funding was also distributed to the MPO regions based upon the MARPA formula in five year blocks.
The resulting fund estimates for the Montachusett MPO based upon the above assumptions and allocations are as follows:

Table 16-2
Montachusett Funding Estimates 2016-2040

Montachusett MPO 2016 - 2040 Funding Program Estimates									
FFY	MPO Funding	Interstate Maintenance	National Highway System	Statewide Bridges	Statewide Infrastructure	Remaining Statewide Programs	*Federal Programs Totals*	Non-Federal Aid Preservation (Bridges & Roadways)	**Federal and Non-Federal Totals**
2016	$7,785,347	$1,510,490	$1,476,306	$12,209,628	$780,430	$7,334,076	*$31,096,277*		
2017	$9,212,419	$1,403,266	$2,414,342	$12,246,008	$312,172	$7,892,687	*$33,480,894*		
2018	$9,613,783	$1,332,612	$2,142,580	$12,156,219	$312,172	$7,807,273	*$33,364,639*		
2019	$9,613,783	$1,433,384	$1,935,233	$11,986,065	$0	$8,244,490	*$33,212,955*		
2020	$9,613,783	$1,320,044	$1,905,397	$11,620,602	$335,906	$8,342,927	*$33,138,659*		
2016-20	**$45,839,114**	**$6,999,796**	**$9,873,857**	**$60,218,523**	**$1,740,680**	**$39,621,452**	**$164,293,423**	**$22,298,000**	**$186,591,423**
2021	$9,896,710	$1,358,892	$1,961,471	$11,962,589	$345,791	$8,588,454	*$34,113,907*		
2022	$9,850,066	$1,352,487	$1,952,226	$11,906,208	$344,161	$8,547,975	*$33,953,123*		
2023	$9,646,181	$1,324,492	$1,911,818	$11,659,763	$337,038	$8,371,042	*$33,250,334*		
2024	$9,395,751	$1,290,107	$1,862,184	$11,357,058	$328,288	$8,153,717	*$32,387,105*		
2025	$9,460,478	$1,298,994	$1,875,012	$11,435,296	$330,549	$8,209,888	*$32,610,217*		
2021-25	**$48,249,186**	**$6,624,972**	**$9,562,712**	**$58,320,914**	**$1,685,827**	**$41,871,075**	**$166,314,685**	**$22,632,470**	**$188,947,155**
2026	$9,219,460	$1,265,900	$1,827,244	$11,143,966	$322,128	$8,000,730	*$31,779,428*		
2027	$12,484,509	$1,714,216	$2,474,358	$15,090,576	$436,209	$10,834,169	*$43,034,037*		
2028	$12,671,777	$1,739,929	$2,511,473	$15,316,934	$442,752	$10,996,681	*$43,679,546*		
2029	$12,861,854	$1,766,028	$2,549,146	$15,546,688	$449,393	$11,161,632	*$44,334,741*		
2030	$13,054,781	$1,792,519	$2,587,383	$15,779,889	$456,134	$11,329,056	*$44,999,762*		
2026-30	**$60,292,381**	**$8,278,593**	**$11,949,604**	**$72,878,053**	**$2,106,617**	**$52,322,267**	**$207,827,513**	**$22,966,940**	**$230,794,453**
2031	$13,250,603	$1,819,406	$2,626,193	$16,016,587	$462,976	$11,498,992	*$45,674,757*		
2032	$13,449,362	$1,846,698	$2,665,586	$16,256,836	$469,921	$11,671,477	*$46,359,880*		
2033	$13,651,103	$1,874,398	$2,705,570	$16,500,688	$476,970	$11,846,549	*$47,055,278*		
2034	$13,855,869	$1,902,514	$2,746,154	$16,748,199	$484,124	$12,024,247	*$47,761,107*		
2035	$14,063,707	$1,931,052	$2,787,346	$16,999,422	$491,386	$12,204,611	*$48,477,524*		
2031-35	**$68,270,644**	**$9,374,068**	**$13,530,850**	**$82,521,731**	**$2,385,377**	**$59,245,875**	**$235,328,545**	**$23,301,410**	**$258,629,955**
2036	$14,274,663	$1,960,017	$2,829,156	$17,254,413	$498,757	$12,387,680	*$49,204,686*		
2037	$14,488,783	$1,989,418	$2,871,594	$17,513,229	$506,238	$12,573,495	*$49,942,757*		
2038	$14,706,114	$2,019,259	$2,914,667	$17,775,928	$513,832	$12,762,098	*$50,691,898*		
2039	$14,926,706	$2,049,548	$2,958,387	$18,042,566	$521,539	$12,953,529	*$51,452,275*		
2040	$15,150,607	$2,080,291	$3,002,763	$18,313,205	$529,362	$13,147,832	*$52,224,060*		
2036-40	**$73,546,873**	**$10,098,533**	**$14,576,568**	**$88,899,341**	**$2,569,729**	**$63,824,634**	**$253,515,676**	**$23,635,880**	**$277,151,556**
2016-2040	***$296,198,197***	***$41,375,962***	***$59,493,591***	***$362,838,562***	***$10,488,230***	***$256,885,304***	***$1,027,279,843***	***$114,834,700***	***$1,142,114,542***

Funding estimates under the above category labelled "MPO Funding" (Table 16-2) represent what are typically called "Target" funds that are utilized in the development of the annual Transportation Improvement Program (TIP). By providing these "Target" funding levels, the MPO are able to develop fiscally constrained TIP's for each Federal Fiscal Year (FFY). These funds are also considered discretionary in that the MPO has direct say and input into the types of projects that are funded. The funding available can be allocated to operating, maintaining, and improving the transportation system. In addition to road projects, this may include bicycle and pedestrian projects, site specific intersection projects, congestion relief projects, safety improvement projects (specifically through the Highway Safety Improvement Program (HSIP)),

projects with air quality benefits (through the Congestion Mitigation Air Quality (CMAQ) program) or any other project for which federal highway funding is eligible.

In order to establish operating and maintenance funding levels in each of the various categories under the Regional Discretionary Funding, or MPO Funding, category, past projects were examined in order to develop a historical trend based upon their anticipated major benefit. Prior RTP information was the initial starting point and additional data was collected from TIP's from 2012 to 2015. Projects were categorized as a safety improvement, an intersection/geometric improvement, a maintenance project, a congestion improvement project, a pedestrian/bicycle project and air quality related project or other project (i.e. ITS, bridge, etc.). In many cases a project has cross purposes, i.e. a congestion project has air quality benefits as well or an intersection improvement project will have safety benefits. The funding source for the reviewed projects, i.e. CMAQ, HSIP, etc. served as the major determinant of the projects benefit. Based upon this analysis, the following percentage breakdown for each category was developed.

Table 16-3
Regionwide Discretionary Funding Allocation Historical Trend

Safety Improvements	7%
Intersection/Geometric Improvements	4%
Maintenance Projects	70%
Congestion improvement Projects	10%
Pedestrian/Bicycle Projects	1%
Air Quality Related Projects	3%
Other (Discretionary) Projects	5%

Carrying these percentages through for 2016 to 2040, the following, Table 16-4, illustrates the distribution of total MPO Discretionary funds across all subcategories.

Table 16-4
Montachusett MPO Funding Allocation - Discretionary Funding Based on Historic Trends - 2016-2040

	2016-20	2021-25	2026-30	2031-35	2036-40	***2016-2040***
Safety	$3,208,738	$3,377,443	$4,220,467	$4,778,945	$5,148,281	***$20,733,874***
Intersections Improvements	$1,833,565	$1,929,967	$2,411,695	$2,730,826	$2,941,875	***$11,847,928***
Maintenance	$32,087,380	$33,774,430	$42,204,667	$47,789,451	$51,482,811	***$207,338,739***
Congestion	$4,583,911	$4,824,919	$6,029,238	$6,827,064	$7,354,687	***$29,619,819***
Pedestrian/Bicycle	$458,391	$482,492	$602,924	$682,706	$735,469	***$2,961,982***
Air Quality Related	$1,375,173	$1,447,476	$1,808,771	$2,048,119	$2,206,406	***$8,885,946***
Other	$2,291,956	$2,412,459	$3,014,619	$3,413,532	$3,677,344	***$14,809,910***
Totals	***$45,839,114***	***$48,249,186***	***$60,292,381***	***$68,270,644***	***$73,546,873***	***$296,198,197***

Regional Transportation Needs

In order to determine fiscal constraint, the needs of the region's transportation network must be estimated. Based upon the analysis conducted and outlined in this RTP, this need has been estimated in the following manner.

Highway Needs

Estimating the Cost

In order to establish the magnitude of regional needs, cost estimates for various improvement strategies were developed. These estimates were then used to establish potential project costs for the identified recommendations within the RTP. MassDOT Highway was consulted regarding several project improvement strategies for input on current cost trends.

Based upon this information, Table 16-5 lists the estimates that were utilized as part of the cost estimation procedure for identified improvements:

Table 16-5
Generalized Unit Costs For Projects

Improvement	Unit Cost
New Signalized Intersection with minor curbwork and paving (no geometrics)	$200,000 - 250,000 / intersection
Geometric Improvements	
- Urban	$750,000 - 1,000,000 / intersection
- Rural	$500,000 - 850,000 / intersection
New Highway (w/o ROW costs, bridges or interchanges)	$2,000,000 - 4,000,000 / lane / mile
Add a lane to existing highway (w/o ROW costs, bridges or interchanges)	$4,000,000 - 5,000,000 / lane / mile
Add an HOV lane (concurrent flow, no bridges)	$1,500,000 - 2,000,000 / lane / mile
Highway resurfacing	
- Interstate	$250,000 / lane / mile
- Non-interstate	$150,000 / lane / mile
(including average associated drainage work, striping improvements, etc.)	
New Bridge	
- < 2,000 sq ft	$350 - 1,200 / sq ft
- 2,000 - 5,000 sq ft	$300 - 1,100 / sq ft
- 5,000 - 10,000 sq ft	$250 - 660 / sq ft
- > 10,000 sq ft	$230 - 1,000 / sq ft
- Highway approach work	Calculate total, then add 10%
- Contingencies	Add 35% to running total
Bridge Restructuring/Rehabilitation	60% of final cost calculation for new bridge
New Bike Path (w/o ROW costs, lighting or crossings)	$600,000 - $1,500,000 / mile
Pavement Repair Strategies	
- Routine Maintenance	$0.75 / sq. yard
- Preventative Maintenance	$8.50 / sq. yard
- Rehabilitation	$18 / sq. yard
- Reconstruction	$45 / sq. yard

Source: MassDOT Highway Division

Inflation Factor

One area of concern expressed by FHWA related to inflation over the life of the plan and the effect it would have on project costs and estimates. MassDOT has adjusted federal funding estimates by 1.5% per year to develop the Transportation Plan Funding figures. To address the issue of inflation on the developed project estimates, FHWA has developed a "Year of Expenditure" (YOE) policy. This policy addresses potential inflationary issues by adjusting costs for projects programmed in years 2017 to 2040 of the document by a 4 percent per year factor.

Pavement Maintenance

The region contains a mix of state and local jurisdiction roads. In addition, those roads classified as NHS are eligible for Interstate Maintenance (IM) and NHS funding. Those roads are under the purview of MassDOT and are assumed to be funded from statewide NHS/IM allocations. These are approximately 157 miles (or 23%) of the total regional federal aid roads in this category. That leaves approximately 77%, or 523 miles, of eligible roads that are eligible to be funded with regional discretionary, or target, funding.

Within the region's 680 miles of roads, their pavement condition has been identified as Excellent, Good, Fair or Poor.

Table 16-6
Federal Aid Road Miles by Pavement Condition in the Montachusett Region

Condition	Total Regional Miles	Total Regional NHS Miles	Percent of Total Miles	Total Regional Other Fed Aid Miles	Percent of Total Reg. Miles	Percent of Reg. Other Fed Aid Miles
Excellent	168.22	73.64	10.82%	94.59	13.90%	18.09%
Good	205.11	22.43	3.30%	182.69	26.85%	34.94%
Fair	155.07	41.38	6.08%	113.69	16.71%	21.74%
Poor	151.92	19.95	2.93%	131.97	19.40%	25.24%
Total	680.33	157.40	23.14%	522.93	76.86%	100.0%

If "target" maintenance funds for the region are allocated based on these same condition percentages listed in the last column (Percent of Regional Other Fed Aid Miles) in Table 16-6, the following 5 year period allotment amounts are available to address these roads.

Table 16-7
Available MPO Maintenance Funds by Pavement Condition by 5 Year Funding Period

Condition	Total Regional Other Fed Aid Miles	Percent of Miles by Condition	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	***2016-2040***
Excellent	94.59	18.09%	$5,803,959	$6,109,113	$7,633,972	$8,644,147	$9,312,201	***$37,503,393***
Good	182.69	34.94%	$11,209,746	$11,799,118	$14,744,226	$16,695,274	$17,985,551	***$72,433,914***
Fair	113.69	21.74%	$6,975,822	$7,342,588	$9,175,328	$10,389,465	$11,192,404	***$45,075,607***
Poor	131.97	25.24%	$8,097,985	$8,523,750	$10,651,313	$12,060,762	$12,992,866	***$52,326,675***
Total	***522.93***	***100.00%***	***$32,087,380***	***$33,774,430***	***$42,204,667***	***$47,789,451***	***$51,482,811***	***$207,338,739***

To determine if enough funds are available to address these needs, and to account for inflation over the life of this RTP, an initial pavement need estimate of $139,667,985 was calculated. This number was determined by multiplying the Repair Strategy Cost, as seen in Table 16-5 above (Routine Maintenance, Rehabilitation, etc.) associated with each pavement condition, i.e. Excellent roads need Routine Maintenance; Good roads need Preventative Maintenance; Fair roads need Rehabilitation; and Poor roads need Reconstruction, with the total number of miles within the Region for those roads eligible for Other Federal Aid funding. As an example, there are 94.59 miles of Other Federal Aid road miles in the region classified as excellent condition (Table 16-6) multiplied by a Preventative Maintenance repair cost of $0.75/square yard (Table 16-5) results in a total Routine Maintenance cost of $1,060,090. Continuing this for each condition category results in an estimated total pavement repair need of $139,667,985 in 2016 dollars. This cost is adjusted upwards by 4.0 percent for each subsequent yea out to 2040. Refer to Table 16-8 below rows identified as Year 1, Year 2, etc. At the end of each five year period, an average estimated need is calculated. The available MPO Maintenance line item for that same five year period, as previously identified in Tables 16-4 and 16-7, is then deducted from the average need leaving us with a new starting estimated need entering the next five year period, and so on. Refer to Table 16-8. Following through on this assumption, the original needs can likely be addresses within the life of this RTP sometime in the 2036 to 2040 time span.

Table 16-8
Estimated Regional Pavement Funding Needs vs. Available Maintenance Funds

		2016-20	2021-25	2026-30	2031-35	2036-40
Est Pavement Need Per Year w/ Inflation Factor	Year 1	$139,667,895	$123,978,290	$104,547,926	$73,890,327	$33,543,451
	Year 2	$145,254,611	$128,937,422	$108,729,843	$76,845,940	$34,885,189
	Year 3	$151,064,795	$134,094,919	$113,079,037	$79,919,777	$36,280,596
	Year 4	$157,107,387	$139,458,715	$117,602,198	$83,116,569	$37,731,820
	Year 5	$163,391,683	$145,037,064	$122,306,286	$86,441,231	$39,241,093
Average Est Need Over 5 Years		$151,297,274	$134,301,282	$113,253,058	$80,042,769	$36,336,430
Regional Maintenance Available Funds		-$32,087,380	-$33,774,430	-$42,204,667	-$47,789,451	-$51,482,811
Balance at End of 5 Year Period		$119,209,894	$100,526,852	$71,048,391	$32,253,318	-$15,146,381

However, it must be noted that pavement conditions as well as repair costs are continually changing variables based on many different factors. As one road is repaired, additional sections can be overlooked and quickly fall into disrepair requiring more extensive rehabilitation needs and costs. These allocations can quickly be overrun resulting in maintenance needs outstripping available funds. A robust pavement management program is one way to better project road needs and stretch maintenance dollars by utilizing more routine and preventative maintenance. Therefore, this analysis should be viewed as illustrative of the continuing infrastructure problem.

Bridge Maintenance

The region currently contains 25 bridges rated as "structurally deficient", or "SD", that are not currently on the state's bridge repair program. In addition, some 59 are rated as "Functionally Obsolete (FO)". While important to the movement of vehicles throughout the region, they are not as critical as those with serious structural problems.

Structurally Deficient - a bridge not necessarily unsafe but one that has deteriorated to a point where it must be closely monitored and inspected or repaired.

Functionally Obsolete - a bridge not necessarily unsafe but may

To estimate bridge repair needs, an average repair cost of $2,900,000 in 2016 dollars was developed based upon a historical review of past projects in the region. For FO bridges, this estimate was reduced to an even $1,500,000 in 2016 dollars. Adjusting for inflation to the repair cost, by the year 2021 the average repair would increase to $3,528,293 for a SD bridge and $1,824,979 for a FO bridge. By the year 2040, this average repair cost would be $7,433,582 and $3,844,956 per SD and FO bridge, respectively. Again, these costs were increased by an inflation factor of 4% per year from 2017 to 2040.

Assuming that the state repairs on average two (2) SD bridges and three (3) FO bridges each year from 2021 to 2040 within the region, all 25 SD bridges could be repaired by 2030 and all 59

FO bridges could be addressed in some manner by 2040. Assuming this level of commitment from 2021 to 2040 (repairs to 2 SD and 3 FO bridges per year), the estimated financial need would be a total of $270,867,992 ($111,679,812 for SD bridges and $159,188,180 for FO bridges). Allocation estimates for the region developed by MassDOT indicate some $302,620,039 in Statewide Bridge funding for the region during the same 2021-2040 period.

Table 16-9
Bridge Repair Conditions in the Montachusett Region

Bridge Condition	No. of Bridges	Est Repair Needs 2021-2040	Available Statewide Bridge Funds 2021-2040
Structurally Deficient	25	$111,679,812	-
Functionally Obsolete	59	$159,188,180	-
	Totals	***$270,867,992***	***$302,620,039***

It must be noted that these assumptions do not take into account current bridges that may fall into a state of disrepair/degradation, i.e. become SD or FO, during this time period. Any potential available funds outlined in the table above can easily be overwhelmed if a continued maintenance program is not maintained and monitored by the state. It is essential that in order to maintain a program that is proactive instead of reactive that a long range maintenance plan is continued that tries to address issues before they become critical and thus more expensive.

Major Infrastructure Projects

Through the development of this RTP, several projects or needs were identified. Some of these are relatively large in terms of scope, design or possibly cost. These have been identified as "Major Infrastructure" projects. They will likely entail several years of study, public outreach and design before implementation. For the Montachusett region these projects are as follows:

- ***Twin City Rail Trail*:** A planned trail connection between the downtowns of Fitchburg and Leominster along an abandoned rail line that parallels Route 12. This trail has been in discussions for a number of years but he inability to negotiate an agreeable price for the right-of-way between the cities and the rail line has been a major stumbling block. However, MassDOT has initiated a project for the trail for inclusion in FFY 2019 of the 2016-2019 Montachusett Transportation Improvement Program (TIP) for $11,642,342 of statewide CMAQ funds. Estimated cost in 2016 dollars - $11,642,342.
- ***Wachusett Station Transportation Network Improvements*:** Wachusett Station is a new commuter rail parking lot and train station on the Fitchburg Commuter Rail Line. Built to house over 400 vehicles, this station will become when completed in 2016 the new start and end point for this line into Boston. Located just off Route 2, it is expected to draw users from points west of Fitchburg. A smart growth study conducted by the MRPC identified many key transportation improvements that would enhance the usability of the station. Chief among these is a solution to the current railroad

underpass on Route 31 located just north of the station. An improvement to the difficult geometrics would produce better access for vehicles, pedestrians and bicyclists as well as a major safety upgrade. Estimated cost in 2016 dollars - $15,000,000.

- ***Route 2 at South Athol Road*:** The town of Athol has presented a project to construct a new interchange with Route 2 at South Athol Road. This new interchange would help the town improve access to Route 2 for commercial and passenger vehicles, thus relieving congestion on smaller local roads, extending those roads pavement life, expand the town's economic base and provide quicker emergency response times. Estimated cost in 2016 dollars - $17,000,000.
- ***Route 2 Expansion to Four Lanes from Phillipston to Athol*:** Along with the proposed new interchange, the town has proposed the need to expand Route 2 from its current two lane configuration (starting in Phillipston) to four lanes to approximately Route 202 near the Athol/Orange town line. This expansion would address what is considered a serious safety problem with numerous severe and often fatal crashes. Due to the size, complexity and likely environmental impacts of this type of project, it assumed that construction will span multiple years and therefore funding is stretched across two 5 year time periods. This is of course dependent on the project limits, conditions and starting time frame but given the overall goal of the project, a construction period of more than 5 years is possible. Estimated cost in 2016 dollars - $90,000,000.
- ***Route 2 at Mt. Elam Road Access and Safety Improvement*:** For a number of years, the state has tried to address a safety, access and environmental issue along Route 2 in the vicinity of Mt Elam Road. Bordering the Notown Reservoir, the state must address an environmental issue related to runoff into the city of Leominster's drinking supply. Additionally, a traffic signal currently exists at the Route 2/Mt Elam Road intersection that is the site of many vehicular crashes. The state has yet to find an agreeable design that will address all issues. Estimated cost in 2016 dollars - $26,000,000.

For planning purposes, it is assumed that funding will be derived from the estimated allocations to the region from various statewide categories (i.e. Interstate Maintenance, NHS, Infrastructure, Remaining Statewide Programs and Non-Federal Aid Preservation) as identified in Table 16-2 and provided by MassDOT to the MPO that are spread out over the life of the RTP, i.e. from 2016 to 2040. Please note that the figures listed in the table below were calculated based on their estimated 2016 cost adjusted to account for inflation and their anticipated year of expenditure. In addition, these major projects assume state approval and participation in the funding of the project. Some of the projects however, are in need of further study (Route 2 at South Athol Road; Route 2 Expansion; and Route 2 at Mount Elam Road) before final determination on size, scope, applicability and expenditure can be fully determined.

Table 16-10
Major Infrastructure Projects vs. Funding Years

Major Infrastructure Project	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2016-2040
Route 2 at South Athol Road - New Interchange & Bridge			$25,164,153			$25,164,153
Route 2 Expansion				$81,042,458	$81,042,458	$162,084,916
Route 2 at Mount Elam Road - 2 Miles					$56,969,202	$56,969,202
Twin City Rail Trail	$11,642,342					$11,642,342
Wachusett Station Transportation Network Improvements		$18,249,794				$18,249,794

Remaining Regional Needs

The remaining project needs identified in this RTP include various safety improvements at intersections or along corridors, congestion improvements, pedestrian/bicycle improvements, etc. The funding for these are assumed to be derived from the statewide funding allocated to the Montachusett region as well as through the discretionary MPO Funding ("Target") amounts.

Projects include but are not limited to those listed in the various chapters of this RTP. The following table seeks to summarize the specific locations for projects that include geometric improvements, safety audits and improvements, traffic control devices, trail development and corridor improvements. In some cases, further study is required in order to determine potential solutions for the location. Using funding estimates listed in Table 16-5 an estimated project cost was determined. These estimates are in 2016 dollars and have not been adjusted for inflation.

Table 16-11
Montachusett RTP Projects and Recommendations with Estimated Costs

Community	Project/ Recommendation	2016 Est. Cost
Ashburnham	Route 101 at Willard Rd; Route 101 at Cashman Hill Rd; Route 101 at South Main St; Route 101 (Water St.) at Main St; Route 101 (Central St.) at Main St; Ashburnham Rail Trail	$5,541,000
Athol	S Main Street (Rt 2A) at Brookside Road; Millers River Greenway	$1,000,000
Ayer	Park St. at Bishop Rd; Park St. at Main St; Snake Hill Rd; Sandy Pond Rd./Westford St./Willow Rd; Main St./ Park St. to Littleton TL	$2,160,000
Clinton	Sterling St. at Brook St; Sterling St. at Greeley St; Union St. at Chestnut St; Union St. at Mechanic St	$4,000,000
Fitchburg	Electric Avenue at Rollstone Road; Electric Avenue at Mount Elam Road; John Fitch Highway (Midblock); John Fitch Highway at Summer Street; John Fitch Highway at North Street; Clarendon Street at Pratt Road; Saint Joseph Avenue at Pratt Road; Water Street (Rt 12) at Central Plaza; Wanoosnoc/Bemis Rd at Water Street (Rt 12); Water Street (Rt 12) at Carey Street; Water Street (Rt 12) at Abbott Avenue; Water Street (Rt 12) at Laurel Street (Rt 2A); Water Street (Rt 12) (Midblock); Water Street (Rt 12) at Benson Street; Main Street (Rt 2A) at North Street; Main Street (Rt 31) at Mechanic Street (Rt 31); Main Street (Rt 2A) at Lunenburg Street (Rt 2A); Main Street (Rt 2A) (Midblock); Main Street (Rt 2A) / Water Street (Rt 2A); Main Street (Rt 2A) at Blossom Street; River Street (Rt 2A) at Wallace Road; Princeton Road (Rt 31) at Westminster Street (Rt 2A); Westminster Street (Rt 2A) at Ashburnham Street (Rt 12); Whalon Street at Pierce Avenue; South Street at Wanoosnoc Road; South Street at Old South Street; Airport Road at Bemis Road; Infrastructure upgrades in traffic signals and traffic signal coordination	$28,250,000
Fitchburg/ Leominster	Rte. 2 (Exit 30)/Merriam Ave./Whalon St	$1,500,000
Gardner	Pearson Boulevard; Elm Street Gateway Project; Betty Spring Road; Uptown Square/Greenwood Rotary redesign; Route 68 (Timpany Boulevard); Green Street; Route 101; Route 101 (Parker Street); Downtown Gardner Infrastructure Improvement Plan; Gardner Bike Trail Extension Phase VII; Main Street (Rt 68) at Emerald Street; Main Street (Rt 68) at Willow Street; Route 2, Exit 22 / Ramp-Rt 2 WB To Rt 68; Route 2, Exit 23 / Ramp-Pearson Blvd - Rt 2; American Legion Cir (Rt 68) at Timpany Blvd (Rt 68)	$31,000,000
Groton	Main St. (Rte. 119,Rte. 225)/Lowell Rd. (Rte. 40)/Broadmeadow Rd; Main St. (Rte. 119,Rte. 225) at Fitch's Bridge Rd	$1,500,000
Groton/ Townsend	Squannacook River Rail Trail - Trail Development	$6,500,000
Harvard	Route 110 (Still River Rd.) from Bolton T.L. to Route 110/111 Intersection; Route 2, Exit 38 / Ayer Road (Rt 110); Ayer Rd. Corridor Improvements	$1,250,000
Lancaster	High St. at Mill St; Main St. at Mill St; Rte. 110 (High St. Ext.) at Mill St; Route 2, Exit 37 / Jackson Road; Route 2, Exit 35 / Ramp-Rt 2 EB to Old Turnpike Rd; Route 117 intersections with Lunenburg Road and with Main Street and Seven Bridge Road; Rte. 70, Sterling Rd., Mill St; Lunenburg Rd. at Fort Pond Rd; Nashua River Bikeway	$3,750,000
Leominster	North Main Street (Rt 12) at Lindell Ave/Hamilton St; North Main Street (Rt 12) at Fruit St/Nelson St; North Main Street (Rt 12) (Midblock); North Main Street (Rt 12) at Dettling Place; Monument Square at Main Street (Rt 12); North Main Street (Rt 12) at Nichols Street; North Main Street (Rt 12) at Erdman Way; Main Street (Rt 12) at Columbia Street; North Main Street (Rt 12) at State Street; North Main Street (Rt 12) at Moore Street; Route 2, Exit 30 / Merriam Avenue; Route 2, Exit 32 / Mead Street; Route 2, Exit 32 / Ramp-Rt 2 EB To Haws St; Interstate 190, Exit 8 / Route 2, Exit 33; Mill Street at Haws Street; Leominster Connector At Nashua Street; Interstate 190, Exit 7 / Ramp-Rt 190 SB To Rt 117; West Street at Park Street; Main Street (Rt 13) at Mooreland Avenue; Nashua Trail at Searstown - Enhancement	$21,000,000

Table 16-11
Montachusett RTP Projects and Recommendations with Estimated Costs (cont.)

Lunenburg	Massachusetts Ave (Rt 2A) at Chase Road (Rt 13); Massachusetts Ave (Rt 2A) at Electric Avenue (Rt 13); Chase Rd. (Rte. 13) at West Townsend Rd;	$2,000,000
Phillipston	Rte 2A/Highland Ave./Athol Rd; Rte. 2 (Exit 19)/Rte. 2A/Rte 202	TBD
Shirley	Leominster Rd. at Catacunemaug Rd; Main St. at Harvard Rd; Harvard Rd. at Shaker Rd; Lancaster Rd./Main St./Leominster Rd./Center Rd; Leominster Rd. at Main St; Walker Rd./Front St./Patterson Rd; Catacunemaug Rd; Center Rd; Davis St./Front St; Leominster Rd	$4,000,000
Sterling	Various improvements along Rte 140 recommended in Corridor Profile; Rte. 62 at Chocksett Rd; Rte. 62 at Leominster Rd; Rte. 62 at Rte 12 North; Leominster Road (Rt 12) at North Row Road	$11,900,000
Templeton	Rte 101/Rte 2A/N. Main St./S. Main St; Rte. 2 (Exit 21)/Patriots Rd. (Rte 2A)	$1,000,000
Townsend	Rte 13 at Rte 119; Rte 13/Highland St./School St; Rte 13/Highland St./Brookline St; Main St. (Rte. 119)/ West Elm St./ Canal St	$4,000,000
Westminster	Various improvements along Rte. 140 recommended in Corridor Profile; Rte. 2 (Exit 27)/Depot Rd./Narrows Rd; State Rd. East (Rte. 2A)/ Depot Rd./ Bartherick Rd; Route 2, Exit 26/Ramp-Rt 2 EB To Village Inn Rd; Route 2, Exit 25/Ramp-Rt 2 WB & EB To Rts 2A/140; Route 2, Exit 24/Ramp-Rt 2 Eb to W Main St (Rt 140)	$18,500,000
Winchendon	Rte. 12/Central St./Front St. (Blair Sq.); Rte. 12/River St./School St./Front St. (Tannery Sq.); Glenallen St. (Route 202); Spring Street (R 12) at Gardner Road (Rt 140); Spring St. (Rte. 12)/ Glenallan St	$8,750,000
Regionwide	Installation of Gates and advanced warning signs/Pavement markings at 23 RR Grade Crossing; ITS Recommendations	$2,595,000
	Estimated Projects Total Cost in 2016 Dollars	***$160,196,000***

A fiscal constraint analysis was conducted on the identified recommended projects listed in Table 16-11 to determine if the anticipated MPO Funding Allocation - Discretionary, Table 16-4, would be sufficient to meet these needs. The analysis included FFY 2020 to 2040 due to the assumption that FFY 2016-2019 would be allocated through the TIP process, i.e. projects have been identified for these years in the current FFY 2016-2019 TIP to be endorsed by the MPO on July 30, 2015. Therefore, beginning in 2020, Discretionary Funds have not been allocated to specific projects and are available to address the RTP recommended projects. Additionally, the following assumptions regarding these projects were made as part of the analysis:

- Recommended projects were prioritized across the 2020-2040 time frame based on geographical equity with an emphasis on safety and maintenance.
- Project estimated costs were adjusted by a Year of Expenditure (YOE) factor of 4% per year based upon a project year of implementation. This YOE adjustment therefore accounts for inflation across the 2020 to 2040 time frame of the RTP.
- Total project costs were then summarized across the same five year band periods as utilized in Table 16-4.

The results are listed in Table 16-12 below.

Table 16-12
Analysis Results of RTP Recommended Projects

TOTAL AVAILABLE FUNDING	2020	2021-25	2026-30	2031-35	2036-40	2020-2040
MPO Funding (Discretionary Funding)	$9,613,783	$48,249,186	$60,292,381	$68,270,644	$73,546,873	$259,972,867
Safety	$672,965	$3,377,443	$4,220,467	$4,778,945	$5,148,281	$18,198,101
Intersections Improvements	$384,551	$1,929,967	$2,411,695	$2,730,826	$2,941,875	$10,398,915
Maintenance	$6,729,648	$33,774,430	$42,204,667	$47,789,451	$51,482,811	$181,981,007
Congestion	$961,378	$4,824,919	$6,029,238	$6,827,064	$7,354,687	$25,997,287
Pedestrian/Bicycle	$96,138	$482,492	$602,924	$682,706	$735,469	$2,599,729
Air Quality Related	$288,413	$1,447,476	$1,808,771	$2,048,119	$2,206,406	$7,799,186
Other	$480,689	$2,412,459	$3,014,619	$3,413,532	$3,677,344	$12,998,643
RTP RECOMMENDED PROJECTS EST COSTS	$9,338,000	$47,157,896	$59,411,042	$66,557,354	$66,396,602	$248,860,894
DIFFERENCE	$275,783	$1,091,290	$881,339	$1,713,290	$7,150,271	$11,111,973

Projects and recommendations listed are anticipated to be funded through the Region's MPO Funding Allocation (Target funds) as detailed in Table 16-4. Funding estimates for the Montachusett MPO for the RTP from 2020 to 2040 are listed at $259,972,867. Recommended projects are estimated at $248,860,894 with YOE inflation adjustments. The continued development of these projects along with the maximization of allocated target funds each year through the Transportation Improvement Program (TIP) should allow for their implementation within the fiscal constraints of this RTP.

Transit Needs

Expected Transit Funding

MassDOT Transit also developed and provided each MPO and Regional Transit Authority with funding estimates for transit planning purposes using the following assumptions:

- Federal funding and state match for the period of 2016 – 2019 reflect current TIP allocations and funding for FFY 2020 is assumed to grow at a rate of 1.5% per year estimates from FFY 2019.
- Beginning in 2021 and each year thereafter federal funding is assumed to grow at a rate of 1.5% per year.

The following table provides estimates for the Montachusett Regional Transit Authority (MART).

Table 16-13
Montachusett Regional Transit Authority Federal Fiscal Year 2016 – 2040

TRANSIT PROGRAM		UZA	FFY 2016-2020	FFY 2021-2025	FFY 2026-2030	FFY 2031-2035	FFY 2036-2040	Total
SECTION 5307								
	MART	Worcester	$305,758	$329,389	$354,845	$382,269	$411,812	***$1,784,073***
	MART	Boston	$876,850	$944,617	$1,017,621	$1,096,267	$1,180,990	***$5,116,345***
	MART	Massachusetts	$15,649,208	$16,858,641	$18,161,545	$19,565,141	$21,077,214	***$91,311,749***
SECTION 5307								
	MART		$16,831,817	$18,132,647	$19,534,010	$21,043,677	$22,670,016	***$98,212,167***
		TOTAL 5307	***$33,663,633***	***$36,265,293***	***$39,068,021***	***$42,087,354***	***$45,340,033***	***$196,424,334***

TRANSIT PROGRAM		UZA	FFY 2016-2020	FFY 2021-2025	FFY 2026-2030	FFY 2031-2035	FFY 2036-2040	Total
SECTION 5339								
	MART	Worcester	$11,634	$12,533	$13,502	$14,545	$15,669	***$67,884***
SECTION 5339								
	MART		$11,634	$12,533	$13,502	$14,545	$15,669	***$67,884***
		TOTAL 5339	***$23,268***	***$25,067***	***$27,004***	***$29,091***	***$31,339***	***$135,768***

TRANSIT PROGRAM		UZA	FFY 2016-2020	FFY 2021-2025	FFY 2026-2030	FFY 2031-2035	FFY 2036-2040	Total
RTACAP								
	MART		$2,100,517	$2,262,853	$2,437,736	$2,626,134	$2,829,092	$12,256,***332***
		TOTAL RTACAP	***$2,100,517***	***$2,262,853***	***$2,437,736***	***$2,626,134***	***$2,829,092***	***$12,256,332***

TRANSIT PROGRAM		UZA	FFY 2016-2020	FFY 2021-2025	FFY 2026-2030	FFY 2031-2035	FFY 2036-2040	Total
SCA								
	MART		$28,411,154	$30,606,881	$32,972,304	$35,520,535	$38,265,705	$165,776,***578***
		TOTAL SCA	***$28,411,154***	***$30,606,881***	***$32,972,304***	***$35,520,535***	***$38,265,705***	***$165,776,578***

Capital & Operating Needs

The following table summarizes anticipated needs by the Regional Transit Authority over the life of this plan. Where applicable, needs are identified by funding category.

Table 16-14
Capital and Operating Needs

Federal Formula Program - MART			MART Needs			
Funding Category	Project Description	Funding Sub Category	FFY 2016-2019	FFY 2020	FFY 2021-2040	TOTAL 2016-2040
5307	Urban Assistance Formula (5307) - Urban Operating Assistance & Capital Purchase/Improvements	Operating & Capital	$21,195,500	$6,934,686	$162,760,700	$190,890,886
		Subtotal	*$21,195,500*	*$6,934,686*	*$162,760,700*	*$190,890,886*
Statewide Programs						
5311	Non-Urbanized Area Formula (5311&5340) - Operating Assistance Rural	Operating	$0	$0	$0	$0
		Subtotal	$0	$0	$0	$0
5310	Elderly & Disabled (5310) - MAP Purchases (Elderly & Disabled)	Capital	$0	$0	$0	$0
		Subtotal	*$0*	*$0*	*$0*	*$0*
Other Capital & Operating Needs - MART						
5307/5339/ Other Federal Aid	Bus and Van Procurement	Capital	$716,000	$375,000	$3,000,000	$4,091,000
		Subtotal	$716,000	$375,000	$3,000,000	$4,091,000
RTACAP		Operating & Capital	$2,054,500	$432,705	$10,155,815	$12,643,020
SCA		Capital	$7,575,000	$5,852,679	$137,365,425	$150,793,104
		Subtotal	*$9,629,500*	*$6,285,384*	*$147,521,240*	*$163,436,124*
Other Non Federal Aid	Buy Replacement 30-Ft Bus (2) (Matching FY15 5307)	Capital	$150,000	$0	$0	$150,000
	Buy Replacement Vans (12)	Capital	$420,000	$0	$0	$420,000
	Real Estate Acquisition	Capital	$88,200	$0	$0	$88,200
	Rehab/Renovate Maintenance Facility		$135,800	$0	$0	$135,800
		Subtotal	*$794,000*	*$0*	*$0*	*$794,000*
		TOTALS	***$32,335,000***	***$13,595,070***	***$313,281,941***	***$359,212,010***

MART is classified as a Small Urban Urbanized Zone Area (UZA) and as such is eligible to apply to MassDOT for 5339 funds that are specifically allocated to Small Urban UZA's each year. MassDOT has determined that since there are 3 of these UZA's in the Commonwealth, MART needs to apply for these funds on the Community Initiative Grants competitive application process. The federally allocated funds are guaranteed to go to the three UZA's in a manner befitting their need as determined by the Commonwealth. MART, through this same competitive process can also apply for 5310 funds which are apportioned to the Commonwealth each year. MART does apply each year for 5310 paratransit vans for fleet replacement as well as 5339 funds. Based upon upcoming need and historical evidence of past awards in these two funding categories the following is a breakdown of needs for these funding streams. Since these are competitive applications with no guarantee of award, the funds are not included in the final fiscal constraint analysis.

Table 16-15
Additional MART Needs Through Competitive Applications

Funding Category	Project Description	Funding Sub Category	FFY 2016-2019	FFY 2020	FFY 2021-2040	TOTAL 2016-2040
5310	Competitive Applications	Capital	$978,000	$496,000	$5,000,000	$6,474,000
5339	Competitive Applications	Capital	$716,000	$375,000	$3,000,000	$4,091,000

Comparison of Funds – Available Vs. Needs

The following table provides a comparison of available funds, as provided by MassDOT, with project needs for the Montachusett Region for both Highway and Transit.

Highway

The following table attempts to compare the anticipated funding needs of the region to maintain and preserve the efficient operation of the various networks against anticipated federal and state allocations over the life of the plan.

Table 16-16
Highway Available Funding vs. Needs Funding

Available Funding	2016-20	2021-25	2026-30	2031-35	2036-40	2016-2040
Statewide Programs	$140,752,308	$140,697,970	$170,502,074	$190,359,311	$203,604,685	$845,916,348
Interstate Maintenance	$6,999,796	$6,624,972	$8,278,593	$9,374,068	$10,098,533	$41,375,962
National Highway System	$9,873,857	$9,562,712	$11,949,604	$13,530,850	$14,576,568	$59,493,591
Statewide Bridges	$60,218,523	$58,320,914	$72,878,053	$82,521,731	$88,899,341	$362,838,562
Statewide Infrastructure	$1,740,680	$1,685,827	$2,106,617	$2,385,377	$2,569,729	$10,488,230
Remaining Statewide Programs	$39,621,452	$41,871,075	$52,322,267	$59,245,875	$63,824,634	$256,885,303
Non-Federal Aid Preservation (Bridges & Roadways)	$22,298,000	$22,632,470	$22,966,940	$23,301,410	$23,635,880	$114,834,700
MPO Funding (Discretionary Funding)	$45,839,114	$48,249,186	$60,292,381	$68,270,644	$73,546,873	$296,198,197
Safety	$3,208,738	$3,377,443	$4,220,467	$4,778,945	$5,148,281	$20,733,874
Intersections Improvements	$1,833,565	$1,929,967	$2,411,695	$2,730,826	$2,941,875	$11,847,928
Maintenance	$32,087,380	$33,774,430	$42,204,667	$47,789,451	$51,482,811	$207,338,739
Congestion	$4,583,911	$4,824,919	$6,029,238	$6,827,064	$7,354,687	$29,619,819
Pedestrian/Bicycle	$458,391	$482,492	$602,924	$682,706	$735,469	$2,961,982
Air Quality Related	$1,375,173	$1,447,476	$1,808,771	$2,048,119	$2,206,406	$8,885,946
Other	$2,291,956	$2,412,459	$3,014,619	$3,413,532	$3,677,344	$14,809,910
TOTAL AVAILABLE FUNDING	**$186,591,422**	**$188,947,156**	**$230,794,455**	**$258,629,955**	**$277,151,558**	**$1,142,114,545**

Estimated Funding Needs	2016-20	2021-25	2026-30	2031-35	2036-40	2016-2040
Statewide Programs	$42,643,034	$122,448,176	$145,337,921	$109,316,853	$65,593,025	$485,339,009
Interstate Maintenance	$17,612,774	$6,624,972	$8,278,593	$9,374,068	$10,098,533	$51,988,940
National Highway System	$1,879,150	$9,562,712	$2,671,011	$3,000,000	$3,500,000	$20,612,873
Statewide Bridges	$19,863,110	$57,331,126	$56,992,493	$42,554,454	$20,000,000	$196,741,183
Statewide Infrastructure	$1,248,000	$0	$2,106,617	$2,385,377	$2,569,729	$8,309,723
Remaining Statewide Programs	$2,040,000	$26,296,896	$52,322,267	$28,701,544	$19,424,763	$128,785,470
Non-Federal Aid Preservation (Bridges & Roadways)	-	$22,632,470	$22,966,940	$23,301,410	$10,000,000	$78,900,820
Major Infrastructure Projects	$11,642,342	$18,249,794	$25,164,153	$81,042,458	$138,011,660	$274,110,407
Route 2 at South Athol Road - New Interchange & Bridge	-	-	$25,164,153	-	-	$25,164,153
Route 2 Expansion	-	-	-	$81,042,458	$81,042,458	$162,084,916
Route 2 at Mount Elam Road - 2 Mi	-	-	-	-	$56,969,202	$56,969,202
Twin City Rail Trail	$11,642,342	-	-	-	-	$11,642,342
Wachusett Station Transportation Network Improvements	-	$18,249,794	-	-	-	$18,249,794
Statewide Plus Major Infrastructure Totals	*$54,285,376*	*$140,697,970*	*$170,502,074*	*$190,359,311*	*$203,604,685*	*$759,449,416*

Table 16-16 (cont.)
Highway Available Funding vs. Needs Funding

Estimated Funding Needs	2016-20	2021-25	2026-30	2031-35	2036-40	2016-2040
MPO Funding (Discretionary Funding)	$44,706,018	$48,249,186	$60,292,381	$68,270,644	$73,546,873	$295,065,102
Safety	$1,857,865	$3,377,443	$4,220,467	$4,778,945	$5,148,281	$19,383,001
Intersections Improvements	-	$1,929,967	$2,411,695	$2,730,826	$2,941,875	$10,014,363
Maintenance	$27,240,839	$33,774,430	$42,204,667	$47,789,451	$51,482,811	$202,492,198
Congestion	-	$4,824,919	$6,029,238	$6,827,064	$7,354,687	$25,035,908
Pedestrian/Bicycle	$419,870	$482,492	$602,924	$682,706	$735,469	$2,923,461
Air Quality Related	$5,574,444	$1,447,476	$1,808,771	$2,048,119	$2,206,406	$13,085,217
Other	$9,613,000	$2,412,459	$3,014,619	$3,413,532	$3,677,344	$22,130,954
TOTAL ESTIMATED FUNDING NEEDS	**$98,991,394**	**$188,947,156**	**$230,794,455**	**$258,629,955**	**$277,151,558**	**$1,054,514,518**

	2016-20	2021-25	2026-30	2031-35	2036-40	2016-2040
DIFFERENCE FUNDING MINUS NEEDS	**$87,600,028**	**$0**	**$0**	**$0**	**$0**	**$87,600,027**

Transit

The following table identifies state funding forecasts that are available to MART as either exclusive formula funds or through competitive statewide grants as well as estimated needs over the life of the RTP.

Table 16-17
Transit Available Funding vs. Needs Funding

Available Funds	2016-20	2021-25	2026-30	2031-35	2036-40	Total
TOTAL 5307	$33,663,633	$36,265,293	$39,068,021	$42,087,354	$45,340,033	$196,424,334
TOTAL 5339	$23,268	$25,067	$27,004	$29,091	$31,339	$135,768
TOTAL RTACAP	$2,100,517	$2,262,853	$2,437,736	$2,626,134	$2,829,092	$12,256,332
TOTAL SCA	$28,411,154	$30,606,881	$32,972,304	$35,520,535	$38,265,705	$165,776,578
AVAILABLE FUNDING	**$64,198,572**	**$69,160,095**	**$74,505,064**	**$80,263,114**	**$86,466,168**	**$374,593,013**

Estimated Funding Needs	2016-20	2021-25	2026-30	2031-35	2036-40	Total
TOTAL 5307	$28,130,186	$36,265,293	$39,068,021	$42,087,354	$45,340,033	$190,890,886
TOTAL 5339	$1,091,000	$25,067	$27,004	$29,091	$31,339	$1,203,500
OTHER FEDERAL AID	$0	$0	$0	$0	$0	$0
TOTAL RTACAP	$2,487,205	$2,262,853	$2,437,736	$2,626,134	$2,829,092	$12,643,020
TOTAL SCA	$13,427,679	$30,606,881	$32,972,304	$35,520,535	$38,265,705	$150,793,104
OTHER NON-FEDERAL AID	$794,000	$0	$0	$0	$0	$794,000
ESTIMATED FUNDING NEEDS	**$45,930,070**	**$69,160,095**	**$74,505,064**	**$80,263,114**	**$86,466,168**	**$356,324,510**

Table 16-17 (cont.)
Transit Available Funding vs. Needs Funding

	2016-20	2021-25	2026-30	2031-35	2036-40	2016-2040
DIFFERENCE FUNDING MINUS NEEDS	**$19,062,502**	**$0**	**$0**	**$0**	**$0**	**$19,062,502**

Results

Highway

Based upon the estimates outlined above, for the Montachusett Region, the Total Available Funds for the 2016 – 2040 years ($1,142,114,545) allow for the implementation of the Total Financial Needs ($1,054,514,518) identified in this RTP for the same 2016 – 2040 years. However, it should be noted that although this RTP was developed within fiscal constraint guidelines, greater funding is likely needed to continue to improve and properly maintain an acceptable level of service across all modes and networks. Additionally, in order to advance various goals and policies related to maintenance, mode shift, greenhouse gas reduction, etc. additional funding would be necessary to propel the region from being reactive to issues, such as pavement and bridge conditions, to being proactive. Finally, any anticipated available funds will likely be utilized to advance not only additional projects that are generated during the life of the RTP but towards extending the life cycles of the infrastructure and the network.

Finally, as technology continues to advance, revenue sources may not continue to provide the funding levels anticipated therefore better and more creative means are needed to insure that every available dollar can be used efficiently to expand the lifecycles of the transportation network and that less and less funding be directed towards “playing catch up” on deteriorating systems.

Transit

Based upon the estimates outlined above, for the Montachusett Region, the Total Available Funds for the 2016 – 2040 years ($374,593,013) meet the Total Financial Needs for the same 2016 – 2040 time span ($356,324,510) of those items/projects identified in the RTP.

As with the highway network, any available funds for the transit system will more than likely be utilized in an attempt to further expand options available to the regions inhabitants. Several needs have been identified within this RTP that highlight the potential to broaden the reach and use of transit to serve multiple purposes from medical to commercial.

Challenges

- How can we maintain an equitable distribution of highway and transit funds throughout the region to properly serve all individuals?
- How can we maximize the limited federal and state dollars across all mode options?

Moving Forward - Addressing the Challenges

- The MPO must continue to monitor all highway and transit projects throughout the region regarding their type, location, impacts (to both individuals and the environment), and cost to ensure that all residents are served equitably and that the projects maximize benefits. The prioritization process currently used by the MPO in the development of the Transportation Improvement Program (TIP) must continue to be reviewed and refined in order to assess highway projects on these issues and allow for equitable distribution of funds and impacts, both positive and negative. MPO staff must continue to work with and encourage the transit agencies to monitor services and populations served in order to maximize coverage. The continue review of the network and the issues of concern by its constituents will allow for the RTA to adapt and expand wherever possible.
- Outreach to communities and organizations must be maintained to insure that the project development process is understandable to all in order to maintain a supply of projects.
- The MPO must continue to encourage innovation on the state and federal level related to project development and implementation to minimize costs and delays.
- The MPO must continue to review the project selection and prioritization process on both the highway and transit side in order to identify and allocate funding to those projects and programs that will maximize benefits to as many communities and individuals as possible.

Action Items

Action	Next Steps	Outcome
Update and refine Transportation Evaluation Criteria (TEC) utilized in the TIP process	Continue inclusion in future UUPWP's.	A TEC that reflects local issues and concerns.
Monitor Highway and Transit projects and programs to evaluate equity issues and concerns.	Include as work item within Title VI, Environmental justice, TIP and Transit Development Programs (TDP).	Analysis tool of project/program distribution.
Seek to encourage projects and programs that maximize the use of available funds.	Continue outreach to communities and populations regarding the project development process and public involvement.	Potential TIP Highway and Transit projects.

The Action Items identified will be monitored through the review of Performance Measures as outlined in Chapter 2 Goals & Objectives under Goals 3 and 4 specifically related to Equitable Transportation and System Preservation & Maintenance, respectively.

Conclusion

Based upon available financial data provided by MassDOT for the development of this RTP, a fiscally constrained document has been developed. However, it is important to maximize all funds, whether highway or transit, to improve, maintain and expand the region's transportation networks. As highlighted throughout this document, the demand is apparent for increased transit options to help meet the requirements of individuals to access everything from medical, education and employment to recreational needs. While on the highway side, the need to shift from repair to preventative maintenance is a big factor in extending the life of our networks while maximizing limited funds. Continued emphasis on these goals and policies on a federal, state and regional level will help towards this end.