

**MONTACHUSETT  
METROPOLITAN PLANNING ORGANIZATION  
(MMPO)**

# **MONTACHUSETT REGIONAL PAVEMENT PROFILE 2014**

Prepared by the



Prepared by the Montachusett Regional Planning Commission in cooperation with the Massachusetts Department of Transportation and the U.S. Department of Transportation. The views and opinions of the Montachusett Regional Planning Commission expressed herein do not necessarily state or reflect those of the Massachusetts Department of Transportation or the U.S. Department of Transportation.  
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## MONTACHUSETT METROPOLITAN PLANNING ORGANIZATION SIGNATORIES

Massachusetts Department of Transportation (MassDOT) Secretary	Richard A. Davey
MassDOT Highway Division Administrator	Frank DePaola
Montachusett Regional Planning Commission (MRPC) Chairman	Victor Koivumaki
Montachusett Regional Transit Authority (MART) Chairman	Mayor Lisa Wong
Mayor City of Leominster	Mayor Dean Mazzarella
Mayor City of Gardner	Mayor Mark Hawke
Athol Board of Selectmen <i>Subregion 1</i>	Stephen R. Raymond
Townsend Board of Selectmen <i>Subregion 2</i>	Robert Plamondon
Lunenburg Board of Selectmen <i>Subregion 3</i>	Paula Bertram
Lancaster Board of Selectmen <i>Subregion 4</i>	Jennifer Leone

## MPO SUB-SIGNATORY COMMITTEE MEMBERS

David Mohler, Director OTP, MassDOT, for Secretary Mullan  
Arthur Frost, Project Development Engineer for Administrator Frank DePaola  
Glenn Eaton, Executive Director, MRPC, for Chairman Koivumaki  
Mohammed H. Khan, Administrator, MART, for Chairman Mayor Wong

## EXOFFICIO MEMBERS

Pamela Stephenson, Administrator	Federal Highway Administration
Mary Beth Mello, Region I Administrator	Federal Transit Administration

## MONTACHUSETT REGIONAL PLANNING COMMISSION (MRPC) OFFICERS

Victor Koivumaki, Chairman	Lancaster
Paula Caron, Vice Chairman	Fitchburg
Christopher Jones, Secretary	Townsend
James W. Meehan, Treasurer	Athol
Alan Pease, Asst. Treasurer	Ashby

## MONTACHUSETT JOINT TRANSPORTATION COMMITTEE (MJTC) OFFICERS

David Manugian, Chairman	Groton
Paula Caron, Vice Chairman	Fitchburg
Jon Wyman, Secretary	Westminster

## MONTACHUSETT REGIONAL PLANNING COMMISSION STAFF

Glenn Eaton, Executive Director  
Brad Harris, Transportation Project Director  
George Kahale, Transit Project Director  
John Hume, Director of Planning and Development  
Kevin Flynn, Director of Community Development  
Sam Lawton, Principal Planner  
Chantell Fleck, Regional Planner  
Linda Parmenter, Administrative/Human Resources Director  
George Snow, Principal Planner  
Sheri Bean, Transportation Planner  
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Tammy Haney, Regional Planner  
Bobbi Jo Johnson, Fiscal Director  
Jason Stanton, GIS/IT Director  
Renee Marion, GIS Analyst  
Stephanie Brow, Administrative Assistant

\*Participated in the development of this report

## MONTACHUSETT JOINT TRANSPORTATION COMMITTEE

<u>COMMUNITY</u>	<u>APPOINTED BY SELECTMEN/MAYOR</u>	<u>APPOINTED BY PLANNING BOARD</u>
Ashburnham	Greg Fagan	
Ashby	Mary Krapf	Alan Pease
Athol	Doug Walsh	
Ayer	Pauline Hamel	Peter Johnston
Clinton		
Fitchburg		Paula Caron
Gardner		
Groton	Anna Eliot	David Manugian
Harvard	Lucy Wallace	
Hubbardston	Lyn Gauthier	James Crystoff
Lancaster		Noreen Piazza
Leominster	David DiGiovanni	
Lunenburg		Robert Saiia
Petersham		
Phillipston	Ron Recos	
Royalston	John Morse	
Shirley		Robert Thurston
Sterling		Charles Hadju
Templeton	Bud Chase	
Townsend		
Westminster		Jon Wyman
Winchendon	Jim Kreidler	Fedor Berndt

### EXOFFICIO MEMBERS

Heather Hannon	Office of Transportation Planning (OTP) and Massachusetts Department of Transportation (MassDOT)
Pamela Stephenson	Federal Highway Administration (FHWA), Administrator
Mary Beth Mello	Federal Transit Administration (FTA), Region I Administrator
	Department of Environmental Protection (DEP)
Laurie Scarbrough	MassDOT Highway Division - District 2
Arthur Frost	MassDOT Highway Division - District 3
	Montachusett Regional Planning Commission (MRPC)
Mohammed Khan	Montachusett Regional Transit Authority (MART)

### ORGANIZATION MEMBERS

Al Futterman	Nashua River Watershed Association (NRWA)
Tony Salerno	Amalgamated Transit Union #690 (ATU 690)
Kit Walker	Fitchburg Airport Commission
	North Central MA Chamber of Commerce
	Fitchburg Council on Aging
	Mass Development
Peter Lowitt	Devens Enterprise Commission (DEC)

## I. INTRODUCTION

The *Pavement Management Program* at the Montachusett Regional Planning Commission (MRPC) consists of surveying all federal aid eligible roadways in the region for the purpose of collecting, maintaining and evaluating pavement condition data for use in transportation plan and project decision making.

There are approximately 644 miles of federal aid eligible roads in the Montachusett region, of which 84 miles are National Highway System (NHS) roads, and 560 miles are Surface Transportation Program (STP) roads. NHS roadways represent all Interstate roadways such as I-190, and I-495 along with a systematic network of principal arterials such as Route 2 and parts of Routes 12, 140 and 2A; NHS roads are regularly surveyed by the Massachusetts Department of Transportation (MassDOT). STP roadways, which include all other numbered routes as well as all urban arterials, urban collectors and rural arterials, will be surveyed mostly by the MRPC, MassHighway also regularly collects data on all numbered routes. A full list of all STP and NHS roads in the region is provided in the Appendix of this report.

The maps in Appendix B show all federal aid eligible miles in the Montachusett region. All roads shown on these maps will be surveyed as part of the Montachusett Regional Pavement Management System.

## **II. PAVEMENT MANAGEMENT AT MRPC**

The principal intention of having a pavement management program at MRPC is for the purpose of including the data in our transportation evaluation criteria (TEC). TEC is a data driven process that is used when putting together documents such as the Transportation Improvement Program (TIP), an annual prioritized listing of transportation and transit projects proposed for implementation during future federal fiscal years for the region. In the Montachusett region the pavement management program will help, along with other programs and data, to develop a more accurate prioritization of transportation needs, and to balance those needs with available funding.

Pavement management systems (PMS) can be viewed at both network and project levels. In a network level PMS an entire network is analyzed to determine which maintenance tasks should be funded. In a project level PMS individual projects are studied to determine to what extent the roadway needs attention. The MRPC's approach will reflect some aspects of each of these levels. Pavement data from the entire federal aid network in the Montachusett region will be maintained; this data will be gathered along with other evaluation criteria and considered when looking at project level programs such as the TIP. Although both levels will be involved and the same data will be collected and analyzed, the MRPC's use of a PMS may differ from a typical municipality's because it will take more of a project level approach as opposed to a municipality's network level approach. While a city or town Department of Public Works plays the role of a road manager, the MRPCs desire is to better understand the transportation system of the region and its needs.

### III. ROADWAY SYSTEM

Of the approximately 2,085 miles of roads in the Montachusett region, approximately 560 miles are Surface Transportation Program (STP) eligible roadways and 83 miles are National Highway System (NHS) eligible roadways. This represents 31% of the regions road miles. The remaining 1,441 miles (69%) are state and local aid eligible roads.

They are defined as follows:

National Highway System (NHS) – all interstate roadways and a systematic network of principal arterials spanning the state. In addition, roads connecting the NHS roadways to military bases (known as the Strategic Highway Network) are also considered part of the NHS network. NHS passenger and freight terminals are connected by roadways called NHS connectors.

Surface Transportation Program (STP) – comprised of any functionally classified roadway not part of the NHS network. STP funded roadways include all urban arterials, urban collectors and rural arterials. According to previous funding legislation, rural collectors are STP eligible, but have a limitation on the STP funding amount.

State and Local Aid – includes Chapter 90 and other non-Federal Aid categories. Roadways that fall under this category are comprised of roads functionally classified as local roads.

As stated above, rural collectors are STP eligible but have a funding limitation. The following table provides a breakdown of roads by community by their aid eligibility, NHS, STP or State Aid/Local. The State Aid/Local figures include those rural collector miles that may also be STP eligible

**Table 1 – Regional Road Mileage**

Community	NHS Miles	STP Miles	Total Fed Aid Miles	State & Local Aid Miles	Total Miles
Ashburnham	0.00	18.15	18.15	79.69	97.84
Ashby	0.00	11.63	11.63	53.09	64.72
Athol	5.11	27.27	32.38	78.92	111.30
Ayer	2.93	13.79	16.72	32.34	49.06
Clinton	0.00	17.60	17.60	34.03	51.63
Fitchburg	10.80	54.60	65.40	134.51	199.91
Gardner	9.00	32.62	41.62	73.30	114.92
Groton	0.00	33.81	33.81	77.18	110.99
Harvard	8.82	7.94	16.76	60.59	77.35
Hubbardston	0.00	21.52	21.52	63.13	84.65
Lancaster	6.17	24.61	30.78	38.96	69.74
Leominster	7.41	54.16	61.57	115.43	177.00
Lunenburg	0.00	33.38	33.38	61.89	95.27
Petersham	0.00	19.52	19.52	59.53	79.05
Phillipston	2.97	8.42	11.39	40.60	51.99
Royalston	0.00	20.90	20.90	51.22	72.12
Shirley	0.00	19.89	19.89	28.94	48.83
Sterling	6.65	34.16	40.81	66.00	106.81
Templeton	5.66	34.85	40.51	61.07	101.58
Townsend	0.00	23.44	23.44	72.08	95.52
Westminster	8.60	29.24	37.84	71.51	109.35
Winchendon	9.31	18.90	28.21	86.90	115.11
Totals	83.43	560.40	643.83	1,440.91	2,084.74
Percent of Total	4.00%	26.88%		69.12%	



## IV. REGIONAL PAVEMENT CONDITIONS

The structural conditions of the majority of the Federal Aid eligible roads are determined by MassDOT and MRPC pavement surveys. The condition is expressed by assigning either a Pavement Serviceability Index (PSI) number from 0 to 5 or a Pavement Condition Index number from 0 – 100 (PCI) to segments along the roadway. PSI (MassDOT method) and PCI (MRPC method) is an overall rating of the pavements condition. Conditions are rated as Excellent, Good, Fair and Poor. The following table shows a general correlation between PSI and PCI, condition, repair strategies and associated cost. This average cost has been determined from consultation with MassDOT and other Regional Planning Agencies throughout the State.

**Table 2 – Pavement Condition – Cost Breakdown**

PSI	PCI	Condition	Associated Repair	Repair Cost Per. Sq. Yard
0 - 2.29	0 - 64	Poor	Reconstruction	\$45
2.3 - 2.79	65 - 84	Fair	Rehabilitation (Mill/Overlay)	\$18
2.8 - 3.49	85 - 94	Good	Preventative Maintenance	\$8.50
3.5 - 5	95 - 100	Excellent	Routine Maintenance	\$0.75

Utilizing this information a general condition of the Montachusett Region's Federal Aid eligible roadway network can be developed. The following lists pavement condition on federal aid eligible roads by town in the region. These federal aid miles are further broken down by Local and State Jurisdiction. Please note that due to the time frame between data collection and report preparation, conditions of the roadways may change. Additionally, mileage listed in the following charts may not reflect mileage listed on the "Total Fed-Aid Miles" of Table 1 as a small percentage of roads not eligible for federal aid are included. Therefore, this information should be viewed in general terms regarding needs and condition.

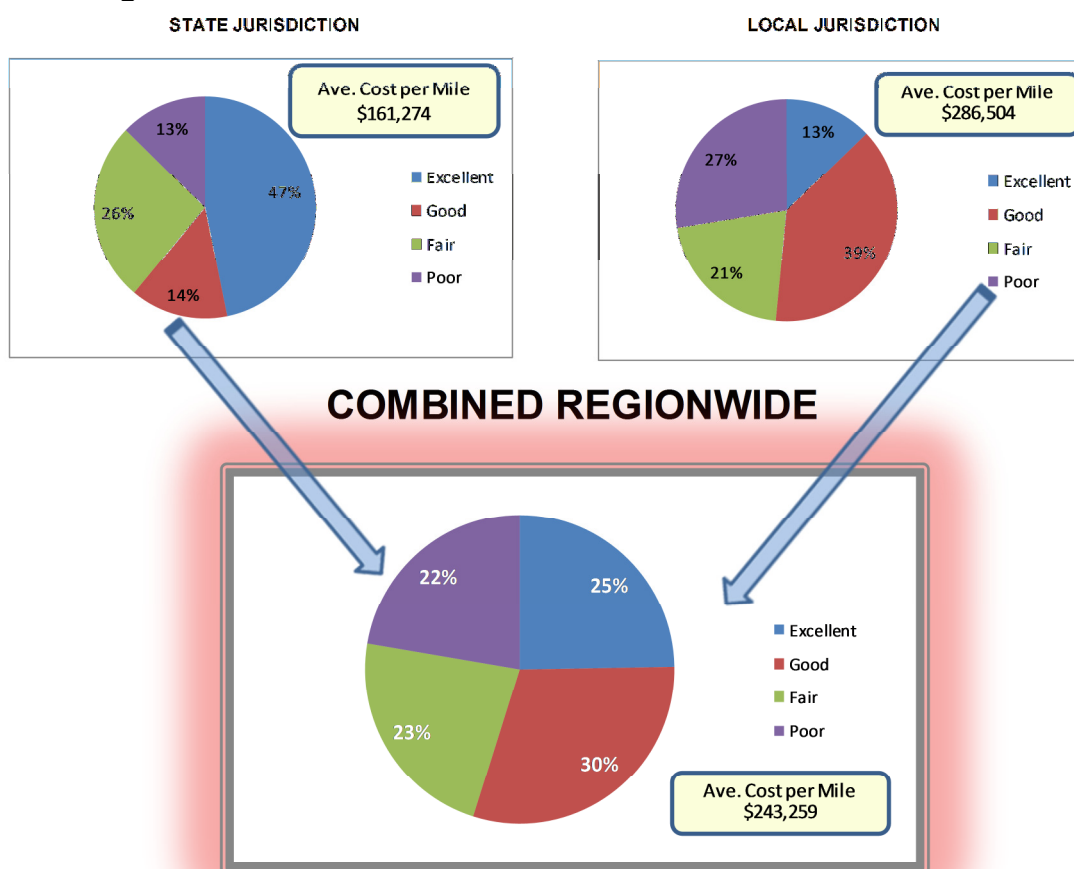
Ashburnham		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
	Excellent	0.34	4776	\$3,582	2.55	35835	\$26,876	Routine Maintenance	2.88	40611	\$30,458
	Good	0.66	9289	\$78,957	2.68	36109	\$306,927	Preventative Maintenance	3.34	45397	\$385,875
	Fair	1.52	21461	\$386,298	1.27	17720	\$327,820	Rehabilitation	2.79	39181	\$724,849
	Poor	2.92	3	\$135	1.52	20045	\$902,025	Reconstruction	4.44	20047	\$902,115
	Total	5.44		\$468,972	8.02		\$1,563,648	Total	13.46		\$2,043,296
Ashby		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
	Excellent	0.54	7486	\$5,614	0.00	0	\$0	Routine Maintenance	0.54	7486	\$5,614
	Good	2.28	31756	\$269,927	0.00	0	\$0	Preventative Maintenance	2.28	31756	\$269,927
	Fair	6.21	85468	\$1,538,419	0.00	0	\$0	Rehabilitation	6.21	85468	\$1,581,153
	Poor	2.63	39577	\$1,780,960	0.00	0	\$0	Reconstruction	2.63	39577	\$1,780,960
	Total	11.67		\$3,594,920	0.00		\$0	Total	11.67		\$3,637,654
Athol		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
	Excellent	4.39	44358	\$33,269	2.89	38639	\$28,979	Routine Maintenance	7.28	82998	\$62,248
	Good	0.74	9655	\$82,065	6.79	102502	\$871,268	Preventative Maintenance	7.53	112157	\$953,332
	Fair	5.27	74224	\$1,336,034	1.84	29063	\$537,659	Rehabilitation	7.11	103287	\$1,910,805
	Poor	1.92	27584	\$1,241,270	8.34	119939	\$5,397,269	Reconstruction	10.26	147523	\$6,638,539
	Total	12.32		\$2,692,638	19.85		\$6,835,175	Total	32.17		\$9,564,925

		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Ayer	Excellent	1.70	23926	\$17,944	2.34	37398	\$28,048	Routine Maintenance	4.04	61323	\$45,993
	Good	0.36	5327	\$45,281	3.84	66826	\$568,024	Preventative Maintenance	4.21	72154	\$613,305
	Fair	0.32	4263	\$76,742	1.61	26258	\$485,782	Rehabilitation	1.93	30522	\$564,656
	Poor	1.61	24085	\$1,083,841	0.74	11482	\$516,706	Reconstruction	2.35	35568	\$1,600,548
	Total	4.00		\$1,223,808	8.53		\$1,598,561	Total	12.53		\$2,824,501
Clinton	Excellent	0.00	0	\$0	0.51	8402	\$6,301	Routine Maintenance	0.51	8402	\$6,301
	Good	0.47	6518	\$55,406	6.94	117100	\$995,352	Preventative Maintenance	7.41	123619	\$1,050,758
	Fair	0.67	9421	\$169,577	3.84	58333	\$1,079,169	Rehabilitation	4.51	67754	\$1,253,456
	Poor	0.38	5374	\$241,845	4.53	69625	\$3,133,136	Reconstruction	4.91	75000	\$3,374,981
	Total	1.52		\$466,828	15.83		\$5,213,958	Total	17.34		\$5,685,496
Fitchburg	Excellent	8.45	122699	\$92,024	7.34	138314	\$103,735	Routine Maintenance	15.79	261012	\$195,759
	Good	1.05	14192	\$120,631	23.06	403968	\$3,433,731	Preventative Maintenance	24.11	418160	\$3,554,363
	Fair	2.21	31107	\$559,933	7.05	99192	\$1,835,048	Rehabilitation	9.26	130299	\$2,410,535
	Poor	1.27	18188	\$818,455	20.07	308698	\$13,891,424	Reconstruction	21.34	326886	\$14,709,879
	Total	12.98		\$1,591,044	57.52		\$19,263,939	Total	70.50		\$20,870,537
Gardner	Excellent	12.66	189756	\$142,317	2.89	62965	\$47,224	Routine Maintenance	15.55	252722	\$189,541
	Good	1.49	21011	\$178,591	14.45	246510	\$2,095,332	Preventative Maintenance	15.94	267520	\$2,273,923
	Fair	2.20	34740	\$625,313	6.71	123278	\$2,280,635	Rehabilitation	8.91	158017	\$2,923,317
	Poor	0.88	12629	\$568,292	5.15	87453	\$3,935,374	Reconstruction	6.04	100081	\$4,503,666
	Total	17.22		\$1,514,513	29.21		\$8,358,565	Total	46.43		\$9,890,448
Groton	Excellent	0.54	7606	\$5,705	3.61	41636	\$31,227	Routine Maintenance	4.15	49242	\$36,931
	Good	2.11	29676	\$252,246	9.90	132126	\$1,123,075	Preventative Maintenance	12.01	161802	\$1,375,321
	Fair	0.85	11968	\$215,424	7.54	104309	\$1,929,720	Rehabilitation	8.39	116277	\$2,151,128
	Poor	1.92	26979	\$1,214,041	6.34	80217	\$3,609,772	Reconstruction	8.26	107196	\$4,823,813
	Total	5.42		\$1,687,415	27.39		\$6,693,795	Total	32.81		\$8,387,194
Harvard	Excellent	13.86	215548	\$161,661	1.38	18670	\$14,003	Routine Maintenance	15.24	234218	\$175,663
	Good	1.51	18065	\$153,554	2.00	27167	\$230,921	Preventative Maintenance	3.51	45232	\$384,475
	Fair	0.07	894	\$16,100	2.29	29924	\$553,602	Rehabilitation	2.36	30819	\$570,149
	Poor	0.94	11671	\$525,202	1.19	15341	\$690,365	Reconstruction	2.13	27013	\$1,215,567
	Total	16.38		\$856,517	6.86		\$1,488,891	Total	23.24		\$2,345,855
Hubbardston	Excellent	0.00	0	\$0	2.75	38697	\$29,023	Routine Maintenance	2.75	38697	\$29,023
	Good	0.00	0	\$0	10.74	148468	\$1,261,978	Preventative Maintenance	10.74	148468	\$1,261,978
	Fair	0.00	0	\$0	5.32	68108	\$1,260,004	Rehabilitation	5.32	68108	\$1,260,004
	Poor	0.00	0	\$0	2.69	31422	\$1,413,971	Reconstruction	2.69	31422	\$1,413,971
	Total	0.00		\$0	21.50		\$3,964,975	Total	21.50		\$3,964,975
Lancaster	Excellent	11.94	168164	\$126,123	2.76	37691	\$28,269	Routine Maintenance	14.70	205856	\$154,392
	Good	0.13	1881	\$15,989	9.22	125439	\$1,066,236	Preventative Maintenance	9.35	127321	\$1,082,225
	Fair	0.21	3005	\$54,088	9.08	12265	\$2,261,893	Rehabilitation	9.29	125269	\$2,317,484
	Poor	0.04	585	\$26,313	3.72	53429	\$2,404,301	Reconstruction	3.76	54014	\$2,430,614
	Total	12.33		\$222,514	24.77		\$5,760,698	Total	37.10		\$5,984,715
Leominster	Excellent	11.87	167519	\$125,639	7.82	130711	\$98,033	Routine Maintenance	19.69	298229	\$223,672
	Good	1.26	20696	\$175,913	12.57	220890	\$1,877,566	Preventative Maintenance	13.84	241586	\$2,053,479
	Fair	4.23	55775	\$1,003,946	10.63	175189	\$3,240,992	Rehabilitation	14.85	230964	\$4,272,825
	Poor	1.97	29997	\$1,349,848	18.98	316329	\$14,234,788	Reconstruction	20.95	346325	\$15,584,635
	Total	19.32		\$2,655,345	50.00		\$19,451,379	Total	69.33		\$22,134,611
Lunenburg	Excellent	0.07	1081	\$811	7.66	112431	\$84,323	Routine Maintenance	7.73	113513	\$85,134
	Good	3.16	45180	\$384,028	8.77	117356	\$997,530	Preventative Maintenance	11.93	162536	\$1,381,558
	Fair	1.97	31194	\$561,496	2.93	41615	\$769,880	Rehabilitation	4.90	72809	\$1,346,974
	Poor	0.75	11927	\$536,723	8.47	132884	\$5,979,774	Reconstruction	9.22	144811	\$6,516,497
	Total	5.94		\$1,483,058	27.84		\$7,831,508	Total	33.78		\$9,330,163

Petersham		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	5.76	81115	\$60,836	0.00	0	\$0	Routine Maintenance	5.76	81115	\$60,836	
Good	2.64	35806	\$304,355	2.29	29288	\$248,946	Preventative Maintenance	4.94	65094	\$553,302	
Fair	3.54	47153	\$848,758	3.00	38672	\$715,437	Rehabilitation	6.54	85825	\$1,587,771	
Poor	0.45	5967	\$268,520	1.73	22338	\$1,005,191	Reconstruction	2.18	28305	\$1,273,710	
Total	12.39		\$1,482,469	7.02		\$1,969,573	Total	19.41		\$3,475,619	
Phillipston		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	2.94	24651	\$18,488	0.00	0	\$0	Routine Maintenance	2.94	24651	\$18,488	
Good	1.01	14266	\$121,260	3.06	38272	\$325,315	Preventative Maintenance	4.08	52538	\$446,575	
Fair	2.83	38613	\$695,040	0.05	583	\$10,793	Rehabilitation	2.87	39197	\$725,139	
Poor	0.21	2765	\$124,413	2.15	25714	\$1,157,117	Reconstruction	2.36	28478	\$1,281,530	
Total	6.99		\$959,201	5.26		\$1,493,225	Total	12.25		\$2,471,733	
Royalston		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	0.00	0	\$0	0.60	7574	\$5,680	Routine Maintenance	0.60	7574	\$5,680	
Good	0.00	0	\$0	1.17	14424	\$122,601	Preventative Maintenance	1.17	14424	\$122,601	
Fair	0.00	0	\$0	6.83	80260	\$1,484,801	Rehabilitation	6.83	80260	\$1,484,801	
Poor	0.00	0	\$0	12.37	155398	\$6,992,927	Reconstruction	12.37	155398	\$6,992,927	
Total	0.00		\$0	20.95		\$8,606,010	Total	20.95		\$8,606,010	
Shirley		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	3.36	47347	\$35,510	2.81	43880	\$32,910	Routine Maintenance	6.18	91227	\$68,420	
Good	0.00	0	\$0	6.46	92686	\$787,832	Preventative Maintenance	6.46	92686	\$787,832	
Fair	0.17	2358	\$42,451	3.97	59287	\$1,096,802	Rehabilitation	4.14	61645	\$1,140,432	
Poor	0.00	0	\$0	3.21	50169	\$2,257,585	Reconstruction	3.21	50169	\$2,257,585	
Total	3.53		\$77,961	16.46		\$4,175,130	Total	19.99		\$4,254,271	
Sterling		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	6.56	92404	\$69,303	0.46	5877	\$4,407	Routine Maintenance	7.02	98281	\$73,711	
Good	2.39	34035	\$289,294	15.94	194917	\$1,656,796	Preventative Maintenance	18.34	228952	\$1,946,090	
Fair	13.81	194824	\$3,506,841	4.36	59762	\$1,105,605	Rehabilitation	18.17	254587	\$4,709,858	
Poor	2.31	30201	\$1,359,061	3.73	44674	\$2,010,339	Reconstruction	6.04	74876	\$3,369,400	
Total	25.07		\$5,224,500	24.50		\$4,777,147	Total	49.57		\$10,099,059	
Templeton		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	14.06	197969	\$148,477	2.00	28156	\$21,117	Routine Maintenance	16.06	226125	\$169,594	
Good	3.59	51041	\$433,850	7.35	117245	\$996,584	Preventative Maintenance	10.93	168286	\$1,430,434	
Fair	2.88	40560	\$730,085	3.00	39230	\$725,752	Rehabilitation	5.88	79790	\$1,476,116	
Poor	2.86	40325	\$1,814,620	10.50	143485	\$6,456,817	Reconstruction	13.35	183810	\$8,271,437	
Total	23.38		\$3,127,031	22.84		\$8,200,270	Total	46.23		\$11,347,581	
Townsend		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	0.59	7655	\$5,741	3.15	42989	\$32,242	Routine Maintenance	3.74	50644	\$37,983	
Good	0.87	11246	\$95,587	5.45	76704	\$651,981	Preventative Maintenance	6.32	87949	\$747,568	
Fair	2.81	36216	\$651,890	2.39	33610	\$621,792	Rehabilitation	5.19	69826	\$1,291,790	
Poor	2.29	29565	\$1,330,407	2.17	30487	\$1,371,908	Reconstruction	4.46	60051	\$2,702,315	
Total	6.56		\$2,083,625	13.15		\$2,677,922	Total	19.71		\$4,779,655	
Westminster		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	11.42	158867	\$119,151	1.04	14393	\$10,795	Routine Maintenance	12.46	173260	\$129,945	
Good	3.37	46340	\$393,893	15.50	205497	\$1,746,724	Preventative Maintenance	18.87	251837	\$2,140,617	
Fair	4.09	52248	\$940,467	2.92	34246	\$633,558	Rehabilitation	7.01	86495	\$1,600,149	
Poor	3.56	49643	\$2,233,936	2.27	32272	\$1,452,253	Reconstruction	5.83	81915	\$3,686,190	
Total	22.44		\$3,687,447	21.73		\$3,843,330	Total	44.17		\$7,556,901	
Winchendon		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	0.51	7253	\$5,440	2.09	35334	\$26,501	Routine Maintenance	2.60	42587	\$31,940	
Good	4.04	58365	\$496,099	4.34	61231	\$520,466	Preventative Maintenance	8.39	119596	\$1,016,564	
Fair	7.72	112838	\$2,031,091	4.35	68416	\$1,265,689	Rehabilitation	12.07	181254	\$3,353,199	
Poor	1.31	18409	\$828,390	1.83	22464	\$1,010,861	Reconstruction	3.14	40872	\$1,839,251	
Total	13.58		\$3,361,019	12.60		\$2,823,517	Total	26.19		\$6,240,955	
Regionwide		State Jurisdiction			Local Jurisdiction			Combined			
		Miles	Square Yards	Cost	Miles	Square Yards	Cost	Repair Category	Miles	Square Yards	Total
Excellent	111.57	1570180	\$1,177,635	56.65	879591	\$659,694	Routine Maintenance	168.22	2449772	\$1,837,329	
Good	33.98	476516	\$4,254,268	171.13	2556339	\$21,906,079	Preventative Maintenance	205.12	3032855	\$26,171,077	
Fair	62.70	876161	\$15,682,651	92.37	1327710	\$24,201,538	Rehabilitation	155.07	2203870	\$40,317,617	
Poor	30.22	385473	\$17,346,271	121.70	1773865	\$79,823,904	Reconstruction	151.92	2159336	\$97,170,129	
Total	238.48		\$38,460,825	441.85		\$126,591,214	Total	680.33		\$165,496,152	

In 2010 the Federal Highway Administration (FHWA) recommended that Regional Planning Agencies such as the MRPC undertake a study to establish the cost of maintaining the federal aid eligible roadway system, particularly those federal aid eligible roads in which maintenance and repairs are the responsibility of the cities and towns in the region (Local Jurisdiction). Comparing the conditions between Local and State Jurisdiction federal aid eligible roads it is clear that those federal aid roads routinely maintained by cities and towns are in worse condition than those routinely maintained by the state (State Jurisdiction). In fact the average repair need of \$161,274 per mile on State Jurisdiction roads is 56% less than the \$286,504 per mile average repair need for Local Jurisdiction roads. The Figure below displays the roadway condition averages of both Local and State Jurisdiction federal aid eligible roadways in the region.

**FIGURE 1: Regional Conditions**



## V. FUNDING PROJECTS REGIONWIDE

The difference in condition between Local and State Jurisdiction federal aid roads may mainly be a combination of two factors, the first being that federal aid roads that are State Jurisdiction are a higher Functional Classification than those that are Local Jurisdiction, giving them higher importance when prioritizing projects for funding and the second being the funding available to Municipalities for roadway maintenance (Chapter 90) lagging behind the rising price of such maintenance. Below is a chart showing the Chapter 90 allocations each community in the region received in FY 2015 along with the roadway mileage that that money must maintain.

**Table 3 – Chapter 90 Apportionment**

<b>Municipality</b>	<b>Local Jurisdiction Miles (Fed Aid and Non-Fed Aid eligible)</b>	<b>Other Jurisdiction Miles</b>	<b>FY 2014 Ch. 90 Apportionment</b>	<b>FY 2015 Ch. 90 Apportionment</b>	<b>% Change</b>
ASHBURNHAM	74.47	9.60	\$347,094	\$346,948	-0.04%
ASHBY	51.97	0.00	\$229,864	\$230,019	0.07%
ATHOL	96.41	18.19	\$501,524	\$500,869	-0.13%
AYER	33.38	12.62	\$273,808	\$244,618	-10.66%
CLINTON	47.24	15.98	\$331,865	\$329,768	-0.63%
FITCHBURG	179.68	50.07	\$1,132,263	\$1,129,125	-0.28%
GARDNER	92.57	22.82	\$601,894	\$603,714	0.30%
GROTON	99.76	28.28	\$504,768	\$506,686	0.38%
HARVARD	64.43	0.00	\$309,298	\$340,137	9.97%
HUBBARDSTON	82.98	21.51	\$363,965	\$362,808	-0.32%
LANCASTER	59.21	11.04	\$313,136	\$312,248	-0.28%
LEOMINSTER	150.54	38.55	\$1,088,720	\$1,081,766	-0.64%
LUNENBURG	83.02	27.44	\$422,130	\$420,461	-0.40%
PETERSHAM	62.25	6.75	\$256,680	\$256,048	-0.25%
PHILLIPSTON	44.76	2.72	\$190,959	\$189,796	-0.61%
ROYALSTON	69.56	20.90	\$285,922	\$285,121	-0.28%
SHIRLEY	43.68	15.98	\$252,643	\$252,873	0.09%
STERLING	84.87	12.33	\$418,357	\$418,121	-0.06%
TEMPLETON	67.73	13.45	\$342,945	\$339,865	-0.90%
TOWNSEND	86.89	16.88	\$426,174	\$425,690	-0.11%
WESTMINSTER	84.33	11.49	\$413,641	\$419,624	1.45%
WINCHENDON	91.00	27.74	\$448,188	\$447,670	-0.12%
REGIONWIDE	1,750.75	384.34	\$9,455,838	\$9,443,975	-0.13%

As part of the 2014 report and in preparation for the 2015 update to the Regional Transportation Plan, an analysis has been done of pavement related TIP projects in the region. A comparison of Local Jurisdiction vs. State Jurisdiction was made that revealed percentage of miles, cost and cost per mile on projects in each category. The list below shows all pavement related TIP projects on the current 2015 – 2018 TIP and those projects constructed and funded through the TIP in the last 15 years.

**Table 4 – Pavement Related TIP Projects**

Municipality	Project	Year Advertised	Jurisdiction	Miles	Cost	Status
ASHBURNHAM	RECLAMATION & RELATED WORK ON ROUTE 101 (ASHBY ROAD), FROM STOWELL ROAD TO ROUTE 119	2011	Local	3.0	1,619,200	Complete
ATHOL	RESURFACING & RELATED WORK ON ROUTE 32, FROM ROUTE 2 TO ROUTE 2A	2011	State	0.6	\$783,903	Complete
ATHOL	RECONSTRUCTION AND SAFETY IMPROVEMENTS, ROUTE 2A/ROUTE 32 (MAIN STREET)	2005	Local	2.2	\$6,443,173	Complete
ATHOL/PETERSHAM	RESURFACING & RELATED WORK ON ROUTE 2A, FROM ROUTE 32 TO ROUTES 2/202	2014	State	4.0	\$2,199,604	Advertised
ATHOL	RECONSTRUCTION OF WEST ROYALSTON ROAD, FROM SILVER LAKE STREET TO THE ROYALSTON T.L.	2013	Local	2.0	\$1,996,354	Under Construction
ATHOL/PETERSHAM	RESURFACING & RELATED WORK ON ROUTE 32, FROM 1 MILE NORTH OF ROUTE 101 TO ROUTE 2/ROUTE 32 BRIDGE	2012	State	4.0	\$2,464,033	Complete
CLINTON	RESURFACING & RELATED WORK ON ROUTE 110 (HIGH STREET)	2016*	Local	0.6	\$1,200,000	Design
CLINTON	RECONSTRUCTION & RELATED WORK ON WATER STREET AND BOLTON ROAD	2015*	Local	1.2	\$5,554,983	Design
FITCHBURG	RECONSTRUCTION OF NORTH STREET, FROM PEARL STREET TO ROSS STREET	2007	Local	0.3	\$1,775,680	Complete
FITCHBURG/LEOMINSTER	FITCHBURG- LEOMINSTER- IMPROVEMENTS & SIGNALIZATION OF ROUTE 12 (PHASE I & II)	2007	Local	1.7	\$8,490,034	Complete
FITCHBURG	ROADWAY RECONSTRUCTION AND RELATED WORK ON A SECTION OF SUMMER STREET	2004	Local	0.5	\$2,606,107	Complete
FITCHBURG	MILLING & RESURFACING, ROUTE 2A (LUNENBURG STREET) FROM HIGHLAND STREET TO PERKINS STREET	2004	Local/State	0.6	\$468,504	Complete
FITCHBURG/LUNENBURG/LEOMINSTER	RECONSTRUCTION OF SUMMER STREET AND NORTH STREET	2017*	Local	1.8	\$6,944,357	Design
GARDNER	RESURFACING & RELATED WORK ON ROUTE 140	2009	Local	1.6	\$1,794,959	Complete
GARDNER	RESURFACING, GREEN STREET FROM MATTHEWS STREET NORTHERLY TO ROUTE 140	2005	Local	0.8	\$632,341	Complete
GARDNER/WESTMINSTER	ROUTE 140 COLD PLANE OVERLAY, BOX WIDENING, SIGNAL RECONSTRUCTION, CHANNELIZATION GREEN ST. TO SCENIC DR.	2004	State	3.2	\$2,363,847	Complete
GARDNER	RESURFACING & RELATED WORK ON MATTHEW STREET FROM GREEN STREET TO ROUTE 140	2016	Local	1.4	\$724,662	Design
HUBBARDSTON	RECONSTRUCTION OF ROUTE 62 (OLD BOSTON TURNPIKE) FROM BARRE T.L. TO THE PRINCETON T.L.	2008	Local	4.1	\$3,551,769	Complete
HUBBARDSTON	RESURFACING AND RELATED WORK ON BURNSHIRT ROAD	2014	Local	1.8	\$1,333,179	Under Construction
LANCASTER	RESURFACING AND RELATED WORK ON ROUTE 70 (LUNENBURG ROAD) FROM ROUTE 2 TO MM 18.496	2001	Local	2.3	\$378,772	Complete
LEOMINSTER	RESURFACING AND RELATED WORK ON ROUTE 13 (MAIN STREET) FROM LUNENBURG T.L. TO PROSPECT STREET	2003	Local	2.4	\$1,762,918	Complete
LEOMINSTER	RECONSTRUCTION ON ROUTE 13, FROM HAWES STREET TO PROSPECT STREET	2016*	Local	0.6	\$3,188,763	Design
LEOMINSTER	RECONSTRUCTION OF MECHANIC STREET, FROM LAUREL STREET TO THE LEOMINSTER CONNECTOR	2015*	Local	0.8	\$3,291,840	Design
PETERSHAM	RESURFACING & RELATED WORK ON ROUTE 32, FROM BARRE T.L. TO 1 MILE NORTH OF ROUTE 101	2010	State	5.88	\$2,290,386	Complete
ROYALSTON	RECLAMATION OF ATHOL RICHMOND ROAD (ROUTE 32), FROM ELM AVENUE TO THE N.H. S.L.	2009	Local	5.3	\$3,473,902	Complete
SHIRLEY	RESURFACING & BOX WIDENING ON TOWNSEND ROAD, FROM ROUTE 225 TO TOWNSEND T.L.	2006	Local	2.0	\$3,831,089	Complete
TEMPLETON	RECONSTRUCTION OF ROUTE 101 (DUDLEY/PETERSHAM ROAD)	2005	Local	2.1	\$5,044,530	Complete
TEMPLETON	RECONSTRUCTION OF ROUTE 202, FROM PHILLIPSTON T.L. TO WINCHENDON T.L.	2006	State	4.8	\$4,341,128	Complete
TEMPLETON	RECONSTRUCTION OF BALDWINVILLE ROAD, FROM ROUTE 202/68 TO PATRIOTS ROAD	2012	Local	3.6	\$4,310,977	Complete
WESTMINSTER	ROADWAY RECONSTRUCTION ON WEST MAIN STREET FROM ROUTE 2 TO ROUTE 2A (MAIN STREET)	2001	Local	0.7	\$1,388,860	Complete
WESTMINSTER	RECONSTRUCTION ON SOUTH STREET, FROM DAWLEY STREET/CARTER ROAD TO MAIN STREET (ROUTE 2A)	2011	Local	0.5	\$2,503,721	Complete
WINCHENDON	RESURFACING AND RELATED WORK ON A SECTION OF ROUTE 140 (GARDNER ROAD)	2003	Local	2.1	\$551,410	Complete
WINCHENDON	RESURFACING & RELATED WORK ON ROUTE 12, FROM MILL STREET/BEGINNING OF STATE HIGHWAY TO NEW HAMPSHIRE STATE LINE	2017*	Local	2.5	\$1,800,000	Design
WINCHENDON	RESURFACING & IMPROVEMENTS ON ROUTE 140, FROM THE GARDNER T.L. TO TEEL ROAD	2013	Local	2.1	\$1,341,901	Complete
* :Scheduled in current TIP						Source: MassDOT



**Table 5 – Projects by Community**

<b>Community</b>	<b>Number of Projects</b>	<b>Total Cost</b>	<b>Total Miles</b>
Ashburnham	1	1,619,200	3.0
Athol	5	\$13,887,067	12.8
Clinton	2	6,754,983	1.8
Fitchburg*	5	\$20,284,682	4.9
Gardner*	4	\$5,515,809	7.0
Hubbardston	2	\$4,884,948	5.9
Lancaster	1	378,772	2.3
Leominster*	5	\$23,677,912	7.3
Lunenburg*	1	\$6,944,357	1.8
Petersham*	3	\$6,954,023	13.9
Royalston	1	\$3,473,902	5.3
Shirley	1	\$3,831,089	2.0
Templeton	3	\$13,696,635	10.5
Westminster*	2	\$6,256,428	4.4
Winchendon	3	\$3,693,311	6.8

\* = Has projects shared with other communities that are reflected in table

Region wide roughly 2/3<sup>rd</sup> of federal aid eligible roadway miles are local jurisdiction. This is comparable to the percentage local jurisdiction pavement related TIP projects from the list above. When looking at the overall amount on funds spent on Local Jurisdiction roads however, construction on state roads cost *41% less* per mile than construction on local jurisdiction roads. Again, this reflects the trend of current conditions across the region as local roads are in need of the most extensive repairs. The table and chart below is a breakdown of past projected expenditures on TIP projects through the region.



# Jurisdiction

	Miles	Cost	Cost Per Mile
<b>Local (27 Projects)</b>	49.99	\$77,535,481	1,551,020
<b>State (6 Projects)</b>	22.48	\$14,442,901	642,478
<b>Combination (1 Project)</b>	0.60	\$468,504	780,840
<b>Total (34 Projects)</b>	73.07	\$92,446,886	1,265,183

**Figure 2 – Total Mileage and Cost of Pavement Related TIP Projects**

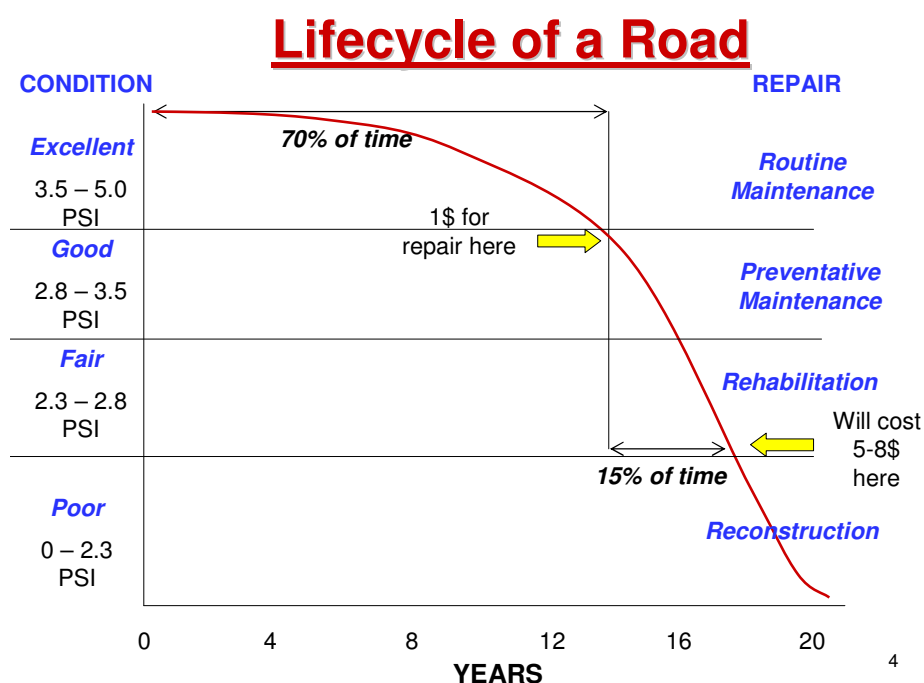


Pavements are often the single largest expense in any municipal road maintenance budget. Chapter 90 allocations often do not provide sufficient funding to maintain local roads at the current condition let alone make major improvements. Due to inadequate funding it is recommended that communities routinely target funding for federal aid eligible Local roadways through the Transportation Improvement Program (TIP). It is also encouraged that a Pavement Management Plan be implemented by communities to keep on track of maintenance needs and schedules to contribute to a cost effective approach to maintaining roadways.

## VI. PAVEMENT PERFORMANCE MEASURES IN THE MONTACHUSETT REGION

**FIGURE 3** below displays the concept of lifecycle cost. A pavements lifecycle is the time between reconstruction periods. Lifecycle cost is the total cost spent on maintenance and repairs for a particular pavement section during its life cycle. One of the main focuses of pavement management is to keep lifecycle cost low to stretch the dollar in what is commonly an ever decreasing maintenance budget.

**FIGURE 3 – Pavement Lifecycle**



In 2008 MRPC surveyed communities in the Montachusett region about their involvement in municipal Pavement Management System activities. Local municipal programs range from non-existent to basic annually maintained spreadsheets to ongoing contracts with consultants utilizing the latest Pavement Management software to analyze town roadways. Although a pavement management program does involve additional costs on top of maintenance budgets, many communities are realizing their potential to save money by making well informed decisions in the long run. The costs and benefits of utilizing a Pavement Management System should be weighed and discussed with the appropriate decision makers.

One of the main highlights of the 2015 update to the RTP will be the implementation of Performance Measures. *Performance measurement is the use of statistical evidence to determine progress toward specific defined organizational objectives* (FHWA Resource Center). Performance measures in pavement management will be included in the 2015 plan. MRPC, along with MassDOT will work over the next year to determine attainable goals for the road network involving measurable and cost effective applications.

Due to the rising cost of improvements and the declining funds for preserving existing infrastructure it is challenging to make improvements to the pavement network. Building a historical and measurable database of conditions in the Montachusett region allows for a snapshot of overall conditions which will allow us to determine how the network changes over time. As our regional program progresses it will be important to apply best practices to improve, or at the very least maintain the condition of pavements throughout the region.



## **APPENDIX A**

Surface Transportation Program (STP) and National Highway System (NHS) Roads

The following lists show all Surface Transportation Program (STP) and National Highway System (NHS) roads in the Montachusett region by municipality. Roads in bold lettering are surveyed by MassDOT, and those that are not bolded are surveyed by the MRPC and analyzed using RSMS.

City/Town	STP Roads	City/Town	STP Roads
<b>Ashburnham</b>	<b>Rte. 12 (from Westminster TL to Winchendon TL)</b>	<b>Hubbardston</b>	<b>Rte. 68 (from Princeton TL to Gardner CL)</b>
<b>Ashburnham</b>	<b>Rte. 101 (from Gardner CL to Rte. 119)</b>	<b>Hubbardston</b>	<b>Rte. 62 (from Barre TL to Princeton TL)</b>
<b>Ashburnham</b>	<b>Rte. 119 (from Ashby TL to New Hampshire SL [Rindge State Rd.])</b>	Hubbardston	Barre Rd.
Ashburnham	South Main St.	Hubbardston	Elm St.
Ashburnham	Westminster St.	Hubbardston	Brigham St.
<b>Ashby</b>	<b>Rte. 119 (from Townsend TL to Ashburnham TL)</b>	Hubbardston	New Westminster Rd.
<b>Ashby</b>	<b>Rte. 31 (From Fitchburg TL to New Hampshire SL)</b>	Hubbardston	Williamsville Rd. (from Barre TL to Burnshirt Rd.)
<b>Athol</b>	<b>Daniel Shays HWY</b>	Hubbardston	Burnshirt Rd.
Athol	Partridgeville Rd. (from Orange TL to Eagleville Rd.)	<b>Lancaster</b>	<b>Rte. 70 (from Lunenburg TL to Clinton TL)</b>
Athol	Eagleville Rd.	<b>Lancaster</b>	<b>Rte. 117 (from Leominster CL to Bolton TL)</b>
Athol	South Athol Rd.	<b>Lancaster</b>	<b>Rte. 110 (from Bolton TL to Clinton TL)</b>
Athol	Carbon St.	<b>Lancaster</b>	<b>Rte. 62 (from Sterling TL to Clinton TL)</b>
Athol	Exchange St.	Lancaster	Bolton Rd.
Athol	Hapgood St.	Lancaster	Center Bridge Rd.
Athol	Chestnut St. (from Main St. to Hapgood St.)	Lancaster	Old Common Rd.
Athol	Riverbend St.	Lancaster	Mill St.
Athol	School St.	Lancaster	Chace Hill Rd.
Athol	Traverse St.	Lancaster	Deershorn Rd.
Athol	Pleasant St.	Lancaster	Sterling Rd. (from Deershorn Rd. to Main St.)
<b>Athol</b>	<b>Rte. 32 (from Petersham TL to Royalston TL)</b>	Lancaster	South Meadow Rd. (from Clinton TL to Sterling St.)
Athol	Bridge St.	Lancaster	Parker Rd.
Athol	Chestnut Hill Ave.	Lancaster	Shirley Rd. (from Shirley TL to Fort Pond Rd.)
<b>Athol</b>	<b>Rte. 2A (from Phillipston TL to Orange TL)</b>	Lancaster	Fort Pond Rd.
Athol	North Orange Rd.	Lancaster	George Hill Rd. (from Main St. to Bolton Rd.)
Athol	Pinedale Ave.	Leominster	North St.

City/Town	STP Roads	City/Town	STP Roads
Athol	Pequoig Ave.	Leominster	Rte. 13 (from Lunenburg TL to Rte. 12)
Athol	Wellington St. (from Crescent St. to Pequoig Ave)	Leominster	Rte. 12 (from Rte 2 Exit 31 to Sterling TL)
Athol	Lenox St. (from Pinedale Ave. to Silver Lake St. [Rte. 32])	Leominster	Rte. 117 (from Central St. to Lancaster TL)
Athol	Mt. Pleasant St. (from Main St. [Rte. 2A] to North Orange Rd.)	Leominster	Lincoln St.
<b>Ayer</b>	<b>Rte 2A (from Shirley TL to rotary)</b>	Leominster	Eastern Ave
<b>Ayer</b>	<b>Rte. 111 (from Groton TL to rotary)</b>	Leominster	Industrial Rd. (from Eastern Ave to Tolman Ave.)
Ayer	Groton Shirley Rd.	Leominster	Tolman Ave. (from Main St. [Rte. 13] to Industrial Rd.)
Ayer	Washington St.	Leominster	Day St.
Ayer	West Main St.	Leominster	Joslin St.
Ayer	Central Ave.	Leominster	Pierce St. (from Joslin St. to Vista Ave./Haskell Ave.)
Ayer	Sandy Pond Rd.	Leominster	Vista Ave
Ayer	Westford Rd.	Leominster	Haskell Ave.
Ayer	Willow Rd. (from Commuter Rail tracks to Westford Rd.)	Leominster	Prospect St.
Ayer	Groton Harvard Rd.	Leominster	Harvard St.
Ayer	Old Groton Rd.	Leominster	Nashua St.
Ayer	Columbia St. (from Main St. to Central Ave.)	Leominster	Crawford St.
<b>Clinton</b>	<b>Rte. 70 (from Lancaster TL to Boylston TL)</b>	Leominster	Beacon St.
<b>Clinton</b>	<b>Rte. 62 (from Lancaster TL to Berlin TL)</b>	Leominster	Fairmont St.
<b>Clinton</b>	<b>Rte. 110 (from Lancaster TL to Sterling TL)</b>	Leominster	Mill St.
Clinton	Greeley St.	Leominster	Priest St.
Clinton	Woodlawn St. (from Rigby St. to Pine St.)	Leominster	Lindell Ave. (from Rte. 12 [N. Main St.] to Maple St.)
Clinton	Pine St. (from Woodlawn St. to New Harbor Rd.)	Leominster	Grove Ave.
Clinton	New Harbor Rd.	Leominster	Washington St.
Clinton	Franklin St.	Leominster	Walnut St.
Clinton	Beacon St.	Leominster	Abbot Ave.
Clinton	South Meadow Rd.	Leominster	Blossom St.
Clinton	Brook St.	Leominster	Merriam Ave.
Clinton	Grove St. (from Beacon St. to Chestnut St.)	Leominster	Granite St. (from West St. to Kingman Dr.)
Clinton	High St.	Leominster	Kingman Dr.
Clinton	Walnut St. (from Union St. to Water St.)	Leominster	Exchange St. (from Kingman Dr. to West St.)

City/Town	STP Roads	City/Town	STP Roads
Clinton	Church St. (from Main St. to Chestnut St.)	Leominster	Orchard St. (from Merriam Ave to West St.)
Clinton	Cameron St.	Leominster	Pond St.
Clinton	Oak St. (from Boylston St. to Berlin St.)	Leominster	Pleasant St.
Clinton	Berlin St.	Leominster	Franklin St.
Clinton	Water St.	Leominster	Union St.
Clinton	Bolton Rd.	Leominster	Litchfield St.
Clinton	Branch St.	Leominster	Willard St. (from Central St. to Lancaster St.)
Clinton	Vale St. (from Branch St. to Water St.)	Leominster	Watchusett St.
Clinton	Allen St.	Leominster	Elm St. (from Wachusett St. to Sterling TL)
Clinton	Plain St. (from Main St. to High St.)	Leominster	Viscoloid Ave.
Clinton	Highland St. (from Sterling St. to Greeley St.)	Leominster	Sixth St. (from Lancaster St. to Mechanic St.)
Clinton	Green St.	Leominster	Mechanic St.
Clinton	Rigby St. (from Greeley St. to Woodlawn St.)	Leominster	Leominster Connector
<b>Fitchburg</b>	<b>Rte. 31 (from Westminster TL to Westminster St.; from Main St. to Ashby TL) including:</b>	Leominster	Whitney St.
	<b>Princeton Rd.</b>	Leominster	Water St. (from Main St. to Whitney St.)
	<b>See NHS</b>	Leominster	West St. (from Main St. to Maple Ave.)
	<b>Mechanic St.</b>	Leominster	Maple Ave.
	<b>Ashby State Rd.</b>	<b>Lunenburg</b>	<b>Rte. 2A (from Shirley TL to Fitchburg CL)</b>
<b>Fitchburg</b>	<b>Rte. 12 (from Westminster TL to Water St.) Including:</b>	<b>Lunenburg</b>	<b>Rte. 13 (from Leominster CL to Townsend TL)</b>
	<b>Ashburnham St.</b>	<b>Lunenburg</b>	<b>Rte. 225 (West Groton Rd.)</b>
	<b>See NHS</b>	Lunenburg	Townsend Harbor Rd.
	<b>Kimball St.</b>	Lunenburg	Leominster Rd.
	<b>Laurel St. (from Kimball St. to Water St.)</b>	Lunenburg	Lancaster Ave.
<b>Fitchburg</b>	<b>Rte. 2A (from Lunenburg TL to Willow St) Including</b>	Lunenburg	Leominster-Shirley Rd.
	<b>Lunenburg St.</b>	Lunenburg	Fort Pond Rd.
	<b>Main St. (from Lunenburg St. to Willow St.)</b>	Lunenburg	Prospect St.
	<b>See NHS</b>	Lunenburg	Whalom Rd.
	<b>Laurel St. (from Water St. to Willow St.)</b>	Lunenburg	Summer St.
	<b>Kimball St.</b>	Lunenburg	Lakefront Ave.



<b>City/Town</b>	<b>STP Roads</b>	<b>City/Town</b>	<b>STP Roads</b>
Fitchburg	Pearl St.	Lunenburg	Pratt St.
Fitchburg	Coolidge Ave.	Lunenburg	West St. (from Pratt St. to Pleasant St.)
Fitchburg	Klondike Ave.	Lunenburg	Pleasant St.
Fitchburg	Boutelle St.	Lunenburg	White St.
Fitchburg	North St.	Lunenburg	West Townsend Rd.
Fitchburg	Blossom St.	Lunenburg	New West Townsend Rd.
Fitchburg	Academy St. (from Main St. to High St.)	Lunenburg	Northfield Rd. (from Chase Rd. to Highland St.)
Fitchburg	High St. (from Academy St. to Mechanic St.)	Lunenburg	Highland St.
Fitchburg	Boulder Dr. (from Main St./Snow St. intersection to Cushing St.)	Lunenburg	Main St.
Fitchburg	Summer St.	Lunenburg	Fish St.
Fitchburg	Harvard St.	<b>Petersham</b>	<b>Rte. 101 (Popple Camp Rd.)</b>
Fitchburg	Bemis Rd.	<b>Petersham</b>	<b>Rte. 32 (from Barre TL to Athol TL)</b>
Fitchburg	Wanoosnoc Rd. (from Bemis Rd. to South St.)	<b>Petersham</b>	<b>Rte. 32A (Hardwick Rd.)</b>
Fitchburg	Intervale Rd.	<b>Petersham</b>	<b>Rte. 122 (from New Salem TL to Barre TL)</b>
Fitchburg	Airport Rd.	<b>Phillipston</b>	<b>Rte. 2A (State Rd.)</b>
Fitchburg	Crawford St.	<b>Phillipston</b>	<b>Rte. 101 (from Templeton TL to Petersham TL)</b>
Fitchburg	Benson St.	Phillipston	Petersham Rd.
Fitchburg	Abbott Ave.	<b>Phillipston</b>	<b>Rte. 68 (Main Rd.)</b>
Fitchburg	Whalon St.	<b>Phillipston</b>	<b>Rte. 202 (from Templeton TL to Rte. 2)</b>
Fitchburg	South St. (from Whalon St. to Laurel St.)	<b>Royalston</b>	<b>Rte. 68 (from Templeton TL to Rte. 32)</b>
Fitchburg	Birch St. (from Water St. to Heywood St.)	<b>Royalston</b>	<b>Rte. 32 (from Athol TL to New Hampshire SL)</b>
Fitchburg	Canton St.	Royalston	Winchendon Rd.
Fitchburg	Heywood St. (from Old South St. to Birch St.)	Royalston	Athol Rd.
Fitchburg	Old South St. (from Heywood St. to Electric Ave./South St. intersection)	<b>Shirley</b>	<b>Rte. 2A (Great Rd.)</b>
Fitchburg	Electric Ave.	<b>Shirley</b>	<b>Rte. 225 (Groton Rd.)</b>
Fitchburg	Franklin Rd. (from Depot St. to Rollstone St.)	Shirley	Townsend Rd.
Fitchburg	Depot St.	Shirley	Lawton Rd.
Fitchburg	Oak Hill Rd.	Shirley	Parker Rd.
Fitchburg	Mt. Elam Rd.	Shirley	Center Rd.
Fitchburg	Rollstone St.	Shirley	Leominster Rd.
Fitchburg	Pine St.	Shirley	Main St.
Fitchburg	Pratt Rd.	Shirley	Front St.

City/Town	STP Roads	City/Town	STP Roads
Fitchburg	St. Joseph Ave.	Shirley	Lancaster Rd.
Fitchburg	Fairmount St.	Shirley	Walker Rd.
Fitchburg	Fairmount Pl.	<b>Sterling</b>	<b>Rte. 12 (from Lancaster TL to West Boylston TL)</b>
Fitchburg	Beech St.	<b>Sterling</b>	<b>Rte. 62 (from Lancaster TL to Princeton TL)</b>
Fitchburg	River St. (from Oak Hill Rd. to Daniels St.)	<b>Sterling</b>	<b>Rte. 140 (Redemption Rock Trail)</b>
Fitchburg	Daniels St. (from Clarendon St. to Kimball St.)	<b>Sterling</b>	<b>Rte. 110 (Metropolitan Rd.)</b>
Fitchburg	Reingold Ave.	Sterling	Greenland Rd.
Fitchburg	Laurel St.	Sterling	Dana Hill Rd.
Fitchburg	Putnam St.	Sterling	Muddy Pond Rd.
Fitchburg	Fifth Mass. TPK (from Oak Hill Rd. to Princeton Rd.)	Sterling	Boutelle Rd.
Fitchburg	Ashburnham St.	Sterling	Campground Rd.
Fitchburg	Ashburnham Hill Rd.	Sterling	Gates Rd.
Fitchburg	Wallace St.	Sterling	Squareshire Rd. (from Campground Rd. to Chace Hill Rd.)
Fitchburg	Main St. (from Ashburnham Hill Rd. to River St.)	Sterling	Chace Hill Rd. (from Rte 110 to Swett Hill Rd.)
Fitchburg	Richardson Rd. (from Fisher Rd. to Ashby State Rd. [Rte. 31])	Sterling	Swett Hill Rd.
<b>Gardner</b>	<b>Rte. 101 (from Ashburnham TL to Templeton TL)</b>	Sterling	Kendall Hill Rd. (from Maple St. to Swett Hill Rd.)
<b>Gardner</b>	<b>Rte. 2A (from Westminster TL to Templeton TL)</b>	Sterling	Maple St. (from Main St. to Kendall Hill Rd.)
<b>Gardner</b>	<b>Rte. 68 (from Hubbardston TL to Templeton TL)</b>	Sterling	Redstone Hill Rd. (from Clinton Rd. to Rugg Rd.)
Gardner	Matthews St.	Sterling	Meetinghouse Hill Rd. (from Main St. to Rowley Hill Rd.)
Gardner	Betty Springs Rd.	Sterling	Rowley Hill Rd. (from Meetinghouse Hill Rd. to Rte. 190 overpass)
Gardner	Green St. (from Rte. 140 to Elm St.)	Sterling	Pratts Junction Rd.
Gardner	Elm St.	Sterling	Chocksett Rd.
Gardner	Woodland Ave.	<b>Templeton</b>	<b>Rte. 202 (from Winchendon TL to Phillipston TL)</b>
Gardner	Chestnut St.	<b>Templeton</b>	<b>Rte. 68 (from Gardner CL to Phillipston TL)</b>
Gardner	Cross St.	<b>Templeton</b>	<b>Rte. 2A (Patriots Rd.)</b>
Gardner	Cross St. EXT.	<b>Templeton</b>	<b>Rte. 101 (from Gardner CL to Phillipston TL)</b>
Gardner	Lawrence St. (from Pearl St. to Cross St. EXT.)	Templeton	North Main St. (from Rte 101/2A intersection to Depot Rd.)
Gardner	Pine St.	Templeton	Depot Rd.
Gardner	Logan St.	Templeton	Baldwinville Rd.

City/Town	STP Roads	City/Town	STP Roads
Gardner	Sherman St.	Templeton	Hubbardston Rd.
Gardner	Main St. (from Pearson BLVD. to Rte. 68)	Templeton	South Main St. (from Rte. 101/2A intersection to Cross St.)
Gardner	Pearson BLVD.	Templeton	Cross Rd.
Gardner	VFW Circle	Templeton	Barre Rd.
Gardner	South Main St.	Templeton	Bridge St.
Gardner	Union St.	Templeton	Main St.
Gardner	Minott St.	<b>Townsend</b>	<b>Rte. 119 (Main St.)</b>
Gardner	Emerald St.	<b>Townsend</b>	<b>Rte. 13 (from Lunenburg TL to New Hampshire SL)</b>
Gardner	Pleasant St.	Townsend	Lunenburg Rd.
Gardner	Baker St. (from Pleasant St. to Waterford St.)	Townsend	West Elm St.
Gardner	Waterford St. (from Rte. 101 to Baker St.)	Townsend	Canal St.
Gardner	City Hall Ave.	Townsend	Mason Rd.
Gardner	Greenwood St. (from Pleasant St. to Baker St.)	Townsend	New Fitchburg Rd. (from Rte. 119 to Vinton Pond Rd./Bayberry Hill Rd. intersection)
Gardner	Elm St.	Townsend	Warren Rd.
Gardner	Park St.	Townsend	South St.
Gardner	Eaton St.	Townsend	Shirley Rd.
Gardner	Oak St.	<b>Westminster</b>	<b>Rte. 12 (Ashburnham State Rd.)</b>
Gardner	Racette Ave.	Westminster	South Ashburnham Rd.
Gardner	Sand St.	Westminster	Bacon St.
Gardner	Coleman St.	Westminster	North Common Rd. (from Bacon St. to Oakmont Ave.)
Gardner	Clark St. (from Park St. to Racette Ave.)	Westminster	Oakmont Ave.
Gardner	Nichols St. (from Parker St. [Rte. 101] to Baker St.)	<b>Westminster</b>	<b>Rte. 140 (from Princeton TL to Exit 24 on Rte. 2)</b>
Gardner	Temple St.	<b>Westminster</b>	<b>State Rd. West (Rte 2A)</b>
Gardner	Union Sq.	Westminster	Minott Rd. (from Gardner CL to intersection of Whitney St./Ellis Rd.)
Gardner	Willow St.	Westminster	South St.
<b>Groton</b>	<b>Rte. 119 (from Townsend TL to Pepperell TL)</b>	Westminster	Mile Hill Rd.
<b>Groton</b>	<b>Rte. 119 (from Pepperell TL to Littleton TL)</b>	Westminster	Gatehouse Rd.
<b>Groton</b>	<b>Rte. 111 (from Pepperell TL to Ayer TL)</b>	Westminster	East Rd.
<b>Groton</b>	<b>Rte. 225 (from Shirley TL to Westford TL)</b>	Westminster	Stonehill Rd.
Groton	<b>Rte. 40 (Lowell Rd.)</b>	Westminster	Narrows Rd.
Groton	Townsend Rd.	Westminster	Depot Rd.
Groton	Pepperell Rd.	<b>Westminster</b>	<b>Rte. 31 (Fitchburg Rd.)</b>

City/Town	STP Roads	City/Town	STP Roads
Groton	Broadmeadow Rd.	Winchendon	Spring St. (Rte. 12) from Ashburnham TL to Gardner Rd. (Rte. 140)
Groton	Old Ayer Rd.	Winchendon	Rte. 202 (from Templeton TL to New Hampshire SL)
Groton	School St.	Winchendon	Glenallan St. (from Spring St. to Rte. 202 to the New Hampshire SL)
Groton	Hollis St.	Winchendon	Elmwood Rd. (from Central St. to Glenallan St.)
Groton	Chicopee Row Rd.	Winchendon	Central St. (from Maple St. to Elmwood Rd.)
Groton	Longley Rd.	Winchendon	Hall Rd.
Groton	Nashua Rd.	Winchendon	High St. (from Central St. to Teel Rd.)
Groton	Sandy Pond Rd.	Winchendon	Teel Rd. (from High St. to Hall Rd.)
Harvard	Rte. 110 (from Bolton TL to Rte. 2)	Winchendon	River St.
Harvard	Rte. 111 (from Boxborough TL to Rte. 2)		
Harvard	Stow Rd. (from Eldridge Rd. to Codman hill Rd.)		

City/Town	NHS Roads	City/Town	NHS Roads
Athol	Rte. 2	Harvard	Rte. 2 (from Littleton TL to Lancaster TL)
Athol	Rte. 202	Harvard	Rte. 110 (from Rte. 2 to Ayer TL)
Ayer	Rte. 2A (from Littleton TL to rotary)	Harvard	Rte. 111 (from Rte. 2 to Ayer TL)
Ayer	Rte. 110 (from Littleton TL to Harvard TL)	Lancaster	Rte. 2 (from Harvard TL to Leominster CL)
Ayer	Rte. 111 (from Harvard TL to rotary)	Lancaster	Rte. 190 (from Leominster CL to Sterling TL)
Ayer	Willow Rd. (from Littleton TL to Commuter Rail tracks)	Leominster	Rte. 2
Fitchburg	Rte. 2	Leominster	Rte. 190
Fitchburg	Rte. 12 (from Leominster CL to Laurel St.; from Kimball St. to Ashburnham St.) including: Water St. (from Leominster CL to Laurel St.) See STP River St. (from Kimball St. to Ashburnham St.)	Leominster	Rte. 12 (N. Main St. from Fitchburg CL to Rte. 2 Exit 31)
Fitchburg	Rte. 2A (from Westminster TL to Kimball St.; from Laurel St. to Willow St.) including:	Phillipston	Rte. 2 (from Templeton TL to Athol TL)
		Phillipston	Rte 202 (from Rte. 2 to Athol TL)
		Sterling	Rte. 190 (from Lancaster TL to West Boylston TL)
		Templeton	Rte. 2 (from Gardner CL to Phillipston TL)

<b>City/Town</b>	<b>NHS Roads</b>	<b>City/Town</b>	<b>NHS Roads</b>
<b>Fitchburg</b>	Westminster St.	<b>Westminster</b>	Rte. 2A (State Rd. East [Fitchburg CL to Rte. 2 Exit 25])
	River St. (from Westminster St. to Kimball St.)	<b>Westminster</b>	Rte. 2 (from Fitchburg CL to Gardner CL)
	See STP	<b>Westminster</b>	Rte. 140 (West Main St. [Exit 24 on Rte. 2 to Gardner CL])
	Water St. (from Laurel St. to Main St.)	<b>Winchendon</b>	Rte. 12 (From Gardner Rd [Rte. 140] to New Hampshire SL) including:
	Main St. (from Water St. to Willow St.)	<b>Winchendon</b>	Spring St. (from Gardner Rd. [Rte. 140] to Central St.)
<b>Gardner</b>	Rte. 31 (from Princeton Rd. to Mechanic St.)	<b>Winchendon</b>	Main St. (from Central St. to School St.)
		<b>Winchendon</b>	Rte. 12 (From Gardner Rd [Rte. 140] to New Hampshire SL) including:
<b>Gardner</b>	Rte. 2 (from Westminster TL to Templeton TL)		Spring St. (from Gardner Rd. [Rte. 140] to Central St.)
<b>Gardner</b>	Rte. 140 (from Westminster TL to Winchendon TL)		Main St. (from Central St. to School St.)
			School St.
		<b>Winchendon</b>	Rte. 140 (Gardner Rd.)

## **APPENDIX B**

### Federal Aid Eligible Roads Maps

# **APPENDIX C**

## Pavement Conditions Maps