



DRAFT Transportation/Circulation Element



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DRAFT Wachusett Smart Growth Corridor Analysis

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1. Introduction

The Transportation/Circulation Element examines road, transit, bike and pedestrian transportation modes and their linkages with an emphasis on bicycle, pedestrian and transit planning. Additional analysis will focus on sustainable transportation concepts such as complete streets, intra-city transit service options, and traffic calming techniques that will improve livability (defined below). Sustainable transportation is transportation that promotes sustainable development. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development). The final report will evaluate the sustainability of the existing transportation system and projects future needs with an emphasis on non-automotive transportation along with recommendations, an implementation plan, and funding sources that can supplement train planning for the MBTA commuter rail that will be available at Wachusett Station.

The FHWA definition of Livability as it relates to Transportation

Livability is about tying the quality and location of transportation facilities to broader opportunities such as access to good jobs, affordable housing, quality schools, and safer streets and roads. The Federal Highway Administration (FHWA) supports livable communities through funding transportation related projects and sponsoring activities like Context Sensitive Solutions and public involvement that help, enable people to live closer to jobs, save households time and money, and reduce pollution.

As part of the Department of Transportation's Livability Initiative, FHWA works within the HUD/DOT/EPA Interagency Partnership for Sustainable Communities to coordinate and leverage federal housing, transportation, water, and other infrastructure policies and investments. The Partnership for Sustainable Communities developed the following principles to guide efforts:

- 1. Provide more transportation choices.*
- 2. Promote equitable, affordable housing.*
- 3. Enhance economic competitiveness.*
- 4. Support existing communities.*
- 5. Coordinate policies and leverage investment.*
- 6. Value communities and neighborhoods.*

This introduction coincides with the goals, policies, and strategies of the MRPC Regional Transportation Plan and the MassDOT GreenDOT sustainability initiative which includes Complete Streets. These plans and initiatives are described in the section thirteen below which is titled the *Role of the Regional Planning Agency*.

This Element examines the sustainability conditions of the transportation system by reviewing issues such as historic traffic counts; road safety; pavement conditions; trail inventory; bridges and

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key locations that will be used to access Wachusett Station. All past transportation studies of locations within the Corridor that remain relevant are reviewed. Other interrelated issues that will be taken into consideration will be open space to develop an interconnected bicycle and pathway system within the Corridor and connections to the adjoining towns and the region.

This Element slightly expands the 2.5 mile buffer to two locations that are just outside the buffer for the safety, recommendations and implementation sections. One is in Fitchburg and one is in Westminster. In Westminster, the interchange at Exit 25 on Route 2 is included in the study. In Fitchburg, the traffic circle at the River Street (Route 2A/31/12) / River Street (Route 2A/31) / Kimble Street (Route 12) / Daniels Street intersection is included. The interchange and the traffic circle carry a high percentage of the traffic volume into and through the Corridor.

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2. Roadway System

Existing Network

State Route 2, or the Old Mohawk Trail, is the most important roadway in the vicinity of the study area and the region, running east west through the entire region. This limited access roadway provides the area with a direct link to Boston and to the western half of the state. Route 2 connects Wachusett Station to all the region's major urban centers to the east and west.

Aside from Route 2 other major roadways within the study area are Route 12, Route 2A and Route 31, along with various other Connector and Local roads.

Functional Classification

Functional classification identifies a roadway's purpose and use as part of the highway network. The highway network consists of a hierarchy of streets and highways designed to channel traffic from location to location in a safe and efficient manner. In urban areas, streets and highways are classified into four functional highway systems: Principal Arterials, Minor Arterials, Collector Streets and Local Streets. Communities where the roadway exists can compete for limited federal aid funding to repair their Federal-Aid eligible roads listed below through the annual TIP process. A roadway classification map can be found below. The map shows roadways in the study area color coded by roadway class. Roads classified as "local" are not eligible for Federal-Aid and are maintained solely by the municipalities. Local roads are eligible for State Highway funds under Chapter 90.

Highways and roads are grouped into classes according to the type of service they are intended to provide. Classification is divided into principal arterials, minor arterials, major collector roads, minor collector roads, and local roads and streets. The table on the following page indicates the classification of some of the major roadways within the study area.

Principal Arterials: The principal arterials are multi-lane roadways that connect major activity centers. These arterials carry the highest volumes of traffic at high speed and are often entirely or partially controlled-access facilities with interchanges or grade separations at major crossings. Principal arterials not only carry a major portion of trips entering and leaving a community; they also carry a significant amount of traffic passing through the community.

Principal arterials generally carry the highest traffic volumes. In Massachusetts, traffic volumes on principal arterials usually exceed 25,000 vehicles per day. Because the function of principal arterials is mostly to provide mobility at a high level of service, service to abutting land is of secondary importance. Parking along principal arterials is usually forbidden or discouraged; driveway access

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onto principal arterials is also discouraged. Principal Arterials are eligible for Federal Aid. A federal aid eligible roads map can be found below.

Roadway Classification	
Principal Arterials	Routes 2, 2A, 12, 31
Minor Arterials	Route 31 from Route 2A to Princeton Town Line Mount Elam Rd. Electric Ave. Franklin Rd. Fairmount St.
Collectors	Oak Hill Rd. Reingold Ave. Depot Rd. Narrows Rd. Stone Hill Rd. South Ashburnham Rd. Bean Porridge Hill Rd. Fifth Mass TPK. From Route 31 to Oak Hill Rd.
Local	All other roads

Minor Arterials: Minor arterials feed into principal arterials and serve the dual function of carrying high traffic volumes and providing access to adjacent land uses. Minor arterials place more emphasis on land access; on-street parking is generally permitted but is heavily regulated in order to maximize the street's traffic-carrying capacity during peak travel periods. Minor arterials generally carry traffic volumes in the range of 10,000-40,000 vehicles. Minor arterials serve as a distribution network to geographic areas smaller than the principal arterials. Trip lengths associated with minor arterials are of a moderate length and travel is at a lower speed than on principal arterials. Minor Arterials are eligible for Federal Aid.

Collector Streets: Collector streets collect traffic from local streets and channel it into the arterial street system. The focus of collectors is more on land access than on mobility. Collector streets provide traffic circulation within neighborhoods and commercial and industrial areas. Travel speeds are generally lower and parking restrictions fewer than on minor arterial streets.

Collectors are usually two-lane roadways with minor widening at intersections with arterial streets. Collectors carry traffic volumes in the range of 3,000 to 20,000 vehicles. The higher flows are associated with collectors that are over two miles in length and where some element of through

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traffic between arterials is present. Major Collector roads are eligible for Federal Aid and Minor Collectors may be eligible for Federal Aid in some cases.

Local Road and Streets: The local streets include all the remaining streets that are not included in one of the higher systems. Local streets could be residential or industrial in character or could be access roads to recreation areas or parks. Traffic volumes on local streets are generally 4,000 vehicles or less. A great majority of residential streets have volumes of 500 vehicles or less. The high volume local streets are very long residential roadways (over one mile in length) with access to subdivisions.

Local roads' and streets' main function is to provide access to land. Travel speeds on local streets are generally the lowest and parking restrictions generally do not apply. Through travel on residential streets is often discouraged through traffic calming mechanisms. Although local streets carry relatively low traffic volumes overall, they constitute by far the greatest road mileage, accounting for 65% to 80% of roadway mileage in a typical community. Local roads and streets are NOT eligible for Federal Aid, but they are eligible for State Highway funds under Chapter 90.

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1. Roadway Classification Map

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2. Federal Aid Eligible Roads Map

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3. Traffic Volume and Congestion

For many years the MRPC and MassDOT Highway Division have taken traffic counts at numerous locations throughout the region, as part of its regional traffic count program. The traffic volume table below lists the traffic counts taken along major routes and other roads over the past 12 years within the Wachusett Corridor. The traffic count locations mentioned in the table that are shown in red on the map below have been conducted regularly for volume comparison purposes. The other locations (green) can also be seen on the map.

The counts consist of data collected during a period of at least 24 weekday hours. To reflect seasonal differences in traffic volumes, MassDOT produces seasonal adjustment factors based on data collected at more than 200 statewide locations where traffic volume data is collected 365 days of the year. The seasonal adjustment factors are then applied to the 24 hour count volume to produce an adjusted traffic volume for the location. These factors were applied to all counts listed in the table below with the exception of counts listed on Route 2. The counts on Route 2 are permanent count stations and collect data continuously throughout the year.

From this available data, the following key findings can be made

Traffic volume gradually increased at the beginning of the last decade and then starts to drop in 2005. In most cases, this is likely to be a direct result of the recession and higher energy costs. The cost of driving more than likely kept some people at home and pushed others toward public transportation. It should be noted that a similar decline has been seen throughout the Montachusett Region. Recently, however, traffic volumes are starting to increase slowly as the economy recovers.

Excluding Route 2, based on the traffic volume that principal arterials, minor arterials and collector streets generally carry (see section two above), the existing traffic volume on the roads in the Corridor listed in the table below do not meet, or do not greatly exceed, the low end of the traffic volume range for their roadway classification. Two examples are Electric Avenue and Mount Elam Road which are both minor arterials. Minor arterials carry a traffic volume in the range of 10,000-40,000 vehicles. The traffic volume for Electric Avenue in 2009 was 13,600 vehicles while Mount Elam Road carried a traffic volume of only 1,300 vehicles in 2010. Electric Avenue is discussed further immediately below.

Findings of Traffic Studies Completed in the Corridor

Electric Avenue from Franklin Road to Rollstone Road Traffic Study (Fitchburg, 2010. See section four below for more on this study): This study analyzed traffic congestion at two intersections in the Corridor: The Franklin/Clarendon at Franklin/Electric Avenue intersection which experienced

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significant delay on the minor street approaches during the AM and PM peak hours. The Rollstone at Electric Avenue intersection also experienced significant delay on the minor street approaches during the AM and PM peak hours but to a lesser extent. The intersections were also analyzed to see if traffic signals should be installed. The Franklin/Clarendon at Franklin/Electric Avenue intersection would warrant a traffic signal based on solely on the peak hour warrant while the Rollstone at Electric Avenue intersection did not pass any of the signal warrants.

Route 140 Corridor Profile (Westminster & Sterling, 2010, See section four below for more on this study): This study analyzed traffic congestion at one intersection in the Corridor: The signalized intersection of Route 2A/140 intersection which did not experience significant congestion during peak hours.

Wachusett Extension Environmental Assessment (MART, 2010): This study assessed the need to satisfy the MRPC region's (Region) current and future transit needs between the proposed Wachusett Station (Station), the Region and the Boston area. The study found that the public roadways in the area around the Station have significant capacity available to accommodate the increased traffic volume that will most likely occur as a result of the Station. Also, the Station will most likely result in a net decrease on Route 2 in vehicular emissions, fuel usage, vehicles miles traveled, and crashes.

MassDOT/Westminster Traffic Turning Movement Count request for the intersection of Route 2A and Depot/Batherick Road (2013): This count was requested for possible signalization of the intersection. The count revealed that traffic volume at this intersection is not high enough to warrant a traffic signal.

Traffic Count Request: If a Community that falls within the Wachusett Corridor is interested in having traffic counts conducted for certain street(s) or intersection(s), a chief elected official such as a mayor or a member of a board of selectmen should forward a written request to MRPC's Transportation Department.

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Table – Wachusett Corridor Traffic Volume

Street/Route	Location	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Ashburnham St (Rt. 12)	W. of River St. (Rt. 12/2A)		6,500	6,100			6,300				5,300			
Batherick Rd	N. of State Road East (Rt. 2A)									730				950
Beech St	N. of Franklin Rd.		1,800			2,000			1,800			1,700		
Causeway St	N. of School Entrance											760		
Clarendon St	N. of Franklin Rd.										3,200			
Depot Rd	S. of State Road East (Rt. 2A)									4,400				5,000
Depot Rd	N. of Fairmont St		5,400			4,700			4,400			4,000		
Depot Rd	S. of Fairmont St.								3,600					
Electric Ave.	W. of Mount Elam Rd.			13,700			14,000			13,200				
Electric Ave.	E. of Franklin Rd.									11,600				
Electric Ave.	E. of Rollstone Rd.										13,600			
Exit 26 off Ramp (EB)	W. of Wyman Rd.									1,100				
Exit 27 On/Off ramps (EB)	N. of Village Inn Rd.									2,600				
Exit 27 On/Off ramps (WB)	E. of Depot Rd.									2,600				
Exit 28 Off Ramp (WB)	E. of Princeton Rd. (Rt. 31)									2,900				
Exit 28 On Ramp (WB)	W. of Princeton Rd. (Rt. 31)									1,500				
Exit 28 On/Off Ramps (EB)	W. of Princeton Rd. (Rt. 31)									5,500				
Fairmont St.	W. of Oak Hill Rd.			850			900			800				
Fitchburg Rd. (Rt. 31)	At Princeton T.L.					2,400				2,400				
Franklin Rd.	W. of Rollstone St.	5,500			3,300			2,100			2,300			2,100
Franklin Rd.	E. of Depot St.											5,200		
Franklin Rd.	W. of Electric Ave.										5,900			
Franklin Rd.	N. of Electric Ave.										2,400			
Franklin Rd.	N. of Fifth Mass Trpk.													1,000
Mount Elam Rd On Ramp (WB)	S. of Mount Elam Rd.									370				
Mount Elam Rd	N. of Damon Rd.	810		1,200				1,100				1,100		
Mount Elam Rd.	S. of Rollstone Rd.		1,500			1,600			1,600			1,300		
Mount Elam Rd Off Ramp (WB)	E. of Mount Elam Rd.									1,600				
Mount Elam Rd On/Off (EB)	S. of Route 2 & Off Ramp									80				
Oak Hill Rd.	N. of Fifth Mass Trpk.	2,000			2,500			2,000						2,700
Oak Hill Rd.	N. of Pratt Rd.		1,300			1,400			1,600		2,700	1,400		

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Street/Route	Location	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Oak Hill Rd.	W. of Pratt Rd.											1,000		
Oak Hill Rd On/Off Ramp (WB)	S. of Fifth Mass Trpk.									1,700				
Pratt Rd.	E. of Oak Hill Rd.											690		
Princeton Rd. (Rt. 31)	S. of Westminster Rd. (Rt. 2A/31)		6,600				8,400				8,400			
Reingold Ave.	N. of School Entrance											840		
Reingold Ave.	S. of School Entrance											990		
River St. (Rt. 12/2A/31)	E. of Wallace St.		14,800			14,600				10,300				
River St. (Rt. 12/2A/31)	W. of Kimball St.	14,100		16,300				13,300				12,600		
Rollstone Rd.	S. of Electric Ave.										3,000			
Rollstone Rd.	S. of Franklin Rd.		2,400	3,100		3,800	2,900		2,800	3,100	2,900	2,700	3,300	
Rollstone Rd.	S. of School Entrance											4,400		
Rollstone Rd.	N. of School Entrance											4,600		
Route 2	E. of Rt. 2A & 140	39,362	40,923			44,400						43,000		
Route 2	E. of Oak Hill Rd.	42,500	40,923							42,700	47,900	45,600	47,245	46,134
State Road East (Rt. 2A)	W. of South Ashburnham Rd.											7,600		
State Road East (Rt. 2A)	E. of South Ashburnham Rd.		7,800				7,500							
State Road East (Rt. 2A)	E. of Batherick Rd.									9,600				9,900
State Road East (Rt. 2A)	W. of Batherick Rd.									6,200				6,400
Westminster St. (Rt. 2A/31)	W. of River St. (Rt. 2A/12/31)		13,200				14,500							
Westminster St. (Rt. 2A/31)	W. of Princeton Rd. (Rt. 31)				8,100				7,900					
Westminster St. (Rt. 2A/31)	N. of Princeton Rd. (Rt. 31)				13,800				12,900					
Westminster St. (Rt. 2A/31)	At Westminster T.L.	7,300						8,300			6,700			
Westminster St. (Rt. 2A/31)	S. of Depot Rd.		13,600					14,400						

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3. Traffic Count Locations Map

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4. Roadway Safety

Improving roadway safety is a top priority at high crash locations for those seeking to improve a roadway. It is especially true for those seeking to improve livability through Complete Street Concepts. Traffic crashes are more often than not avoidable events. Up to 90% of crashes are the result of driver error; however, driver error can be magnified by poor roadway or intersection design, or by inadequate traffic control measures. When crashes occur in high numbers at a particular location, there is probably a common reason for the crashes related to the design and/or signage of the road. These crashes can be predictable and the conditions that increase the chances for crashes are often correctable. Detailed study of crash records can identify these high-crash locations and lead to design improvements that will reduce the numbers and severity of future crashes.

MassDOT mapped crashes are the data source used to develop the crash statistics below. MassDOT obtains crash data from the Massachusetts Registry of Motor Vehicles (RMV) to create mapped crashes for each community in Massachusetts for use in traffic engineering studies, safety planning activities, and distribution to government agencies and the public. The MRPC Transportation Department has a mapped crash database for the MRPC Region that is continually updated in two ways. First, the most recent MassDOT mapped crashes for the Region that currently exist up to 2011 are added to the database. Second, crash reports for specific locations under study by the MRPC are collected from local agencies that are then analyzed and added to the crash database. The MassDOT mapped crashes are used for the purpose of creating crash statistics for the Region, the communities in the Region and specific locations in the Region. To develop crash statistics from the database, MRPC staff analyzes information such as number of crashes, crash location, and crash severity. The crash statistics are based on totaling the crash severity points of the crashes that occur at a location. Crash severity states the type of harm, or the most serious outcome of a crash. There are essentially three possible outcomes:

1. Fatal Injury crash: Is the worst type of harm that involves at least one fatality or death of a person. A fatal injury crash is given a weighted average of 10 points.
2. Non-fatal Injury crash: Is the second worst type of harm that involves at least one injury to a person. A non-fatal injury crash is given a weighted average of 5 points.
3. Property Damage Only (PDO) crash: Is the third worst type of harm that involves damage to property of any type. A PDO crash is given a weighted average of 1 point.

Roadway Safety in the Corridor

The crash statistics, as seen in the table below, were presented at the January 17th 2013 Steering Committee Meeting and they are based on the 3-year period of 2007 – 2009. The Corridor saw a total of 773 crashes occur between the years of 2007 – 2009. Of these crashes, 2 (0.25%) were fatal

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injury crashes, 197 (25.5%) were non-fatal injury crashes, and 574 (74.3%) were property damage only crashes. Please recognize that the crash statistics need to be qualified by further study based on crash data that is verifiable and the most recent 3-year period needs to be examined as the crash statistics may change by varying degrees at locations when further study is undertaken.

Roadway Safety Improvement Project Selection Report: In 2012 the MRPC completed the *Roadway Safety Improvement Project Selection Report* which identifies the top most dangerous locations in the Region, based on MassDOT crash data from 2007 – 2009. See the Priority Roadway Safety Improvement Locations map below for the geographic extent of the locations in the Corridor. There are two categories of top dangerous locations in the Region of which both are relevant to the Corridor:

1. A cluster, or group, of crashes that have occurred at a location need to have a minimum crash severity point total of 32 points in order for a location to qualify as a dangerous location.
2. A roadway where the crash severity of a minimum of three lane departure crashes resulted in fatal injury crashes, incapacitating injury crashes or a combination of the two.

The table below is a list of the twelve locations the report identifies as the top most dangerous locations in the Corridor that need further investigation to improve livability through Complete Street Concepts. 26% of the total crashes that occurred in the Corridor occurred at these locations.

Locations	Total Crashes	Injury Crashes	Severity Point Total	Comment
Non Route 2 Intersections				
Route 2A/31	13	6	37	
Route 2A/31/12*	15	4	31	1 Point below minimum
Rollstone Road / Electric Avenue	17	8	49	
Pratt Road / Clarendon Street	19	5	39	
Locations Below are Associated with Rte 2 Interchanges & Intersections				
Route 2A/140 (Exit 25 Ramp)	14	6	38	
On Route 2 at Route 2A Bridge (Exit 25)	19	8	51	
On Route 2 at Depot Road Bridge (Exit 27)	17	6	41	
On Route 2 at Route 31 Bridge (Exit 28)	34	6	58	
On Route 2 at Oak Hill Road	12	5	32	
On Route 2 at Mount Elam Road	35	8	67	
		Fatal Crashes	Incapacitating Injury Crashes	
Top Lane Departure Crash Roadways				
Route 2: Extends from Exit 25 to Palmer Road	3		3	
Franklin Road & Electric Avenue: Extends from Bilotta Way to Mount Elam Road	3	1	2	

*there is a strong possibility that further study may place this intersection in the top most dangerous location list

Electric Avenue from Franklin Road to Rollstone Road Traffic Study: In April of 2010 the MRPC completed a study titled *Electric Avenue from Franklin Road to Rollstone Road Traffic Study* for the City of Fitchburg. The study begins at the Franklin Road at Electric Ave intersection and extends to the Rollstone Road at Electric Avenue intersection, a distance of approximately 1,400 feet. The

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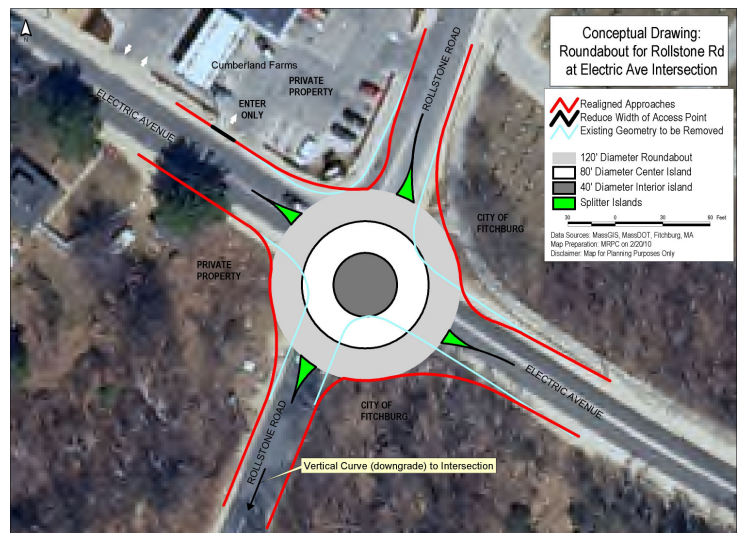
study considers the operational conditions, safety conditions, and pedestrian issues of the study area and discusses the desired improvement alternatives of the City which includes roundabouts at the intersections.

At the time this study was initiated, the Rollstone Road at Electric Avenue intersection which is currently in the top most dangerous locations list (see above) was not a dangerous location although it was close with a crash severity point total of 25 points. Now that the intersection is included in that list, the recommendations become more applicable to reaching the desired improvements of the City and the Corridor study. The improvement alternatives include:

- Convert the intersection to a roundabout (conceptualized in the drawing to the right)

The following alternatives may be considered as a set of improvements to be implemented as one project:

- Add auxiliary left turn lanes to the Electric Ave approaches
- Realign the northbound through movement to mirror the southbound lane
- Apply access management techniques to the Cumberland Farms driveways
- Install a flashing beacon over the center of the intersection
- Improve crosswalk markings
- Remove vegetation to improve sight distance
- Install all appropriate signage and pavement markings to the approaches



See the study for a full description of the alternatives and recommendations.

Study Recommendation

To improve safety at this intersection, the following long term improvement is recommended:

- The operational analyses results found in the study shows that a roundabout is feasible at this intersection as it may operate under capacity. Converting the intersection into a modern roundabout for a long term safety improvement should be considered.

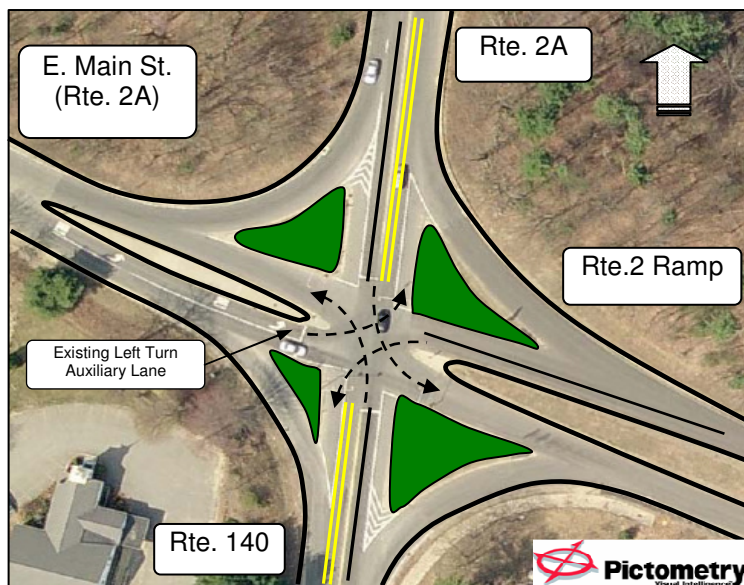
Please contact the MRPC regarding this study.

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Route 140 Corridor Profile: In December of 2010 the MRPC completed this study for the communities of Sterling, Westminster and Princeton (a Central Massachusetts Regional Planning Commission (CMRPC) community) in conjunction with the CMRPC. The study includes the signalized intersection of Route 2A/140 which is part of the Exit 25 interchange on Route 2 in Westminster. The study considers the operational conditions and safety conditions of the intersection and discusses the desired improvement alternatives of Westminster officials. Exit 25 is one of the two locations mentioned in the introduction (see section one) that were added due to their significance to the Corridor as access points.

At the time this study was initiated, the Route 2A/140 signalized intersection which is currently a **Priority Roadway Safety Improvement Location** (see above) was not a dangerous location although it was close with a crash severity point total of 27 points. However, the safety analysis completed for the study which is based on local crash reports resulted in a crash severity point total of 54 points. This result placed the intersection in the list and the recommendations were applicable to reaching the desired improvements of the Town. Some of the geometric improvement alternatives are depicted in the figure below. The improvement alternatives include:

- Add protected/permitted left turn phase to signal heads on all approaches
- Add left turn auxiliary lanes to three approaches. An auxiliary lane already exist on the eastbound approach
- Convert intersection to a roundabout



See the study for a full description of the alternatives and recommendations.

Study Recommendation

- To improve safety at this intersection protected/permitted left turn phase should be added to the traffic signals on all approaches and left turn auxiliary lanes should be added to three approaches.

Please contact the MRPC regarding this study.

Project Development Status for this Intersection

The Town of Westminster submitted a Project Need Form to MassDOT in 2012 for Route 140 that is based on the study and includes the Route 2A/140 intersection. MassDOT has a project listed on the Project Information page of their website for the intersection (Project # 607446).

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4. Priority Roadway Safety Improvement Locations Map

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5. Pavement Condition

The structural conditions of the Federal Aid eligible roads in the study area have been determined by MassDOT and MRPC pavement surveys. The condition is expressed by assigning a Pavement Condition Index (PCI) number from 0 to 100 to segments along the roadway. PCI is an overall rating of the pavements condition. Conditions are rated as Excellent, Good, Fair and Poor.

The table below shows a general correlation between PCI, condition, repair strategies and associated cost. The estimated repair cost was derived from conversations with a Pavement Management Users Group (PMUG) comprised of other Regional Planning Agencies, the MassDOT and the Federal Highway Administration (FHWA) and reflects the estimated cost to bring the pavement condition to “excellent.”

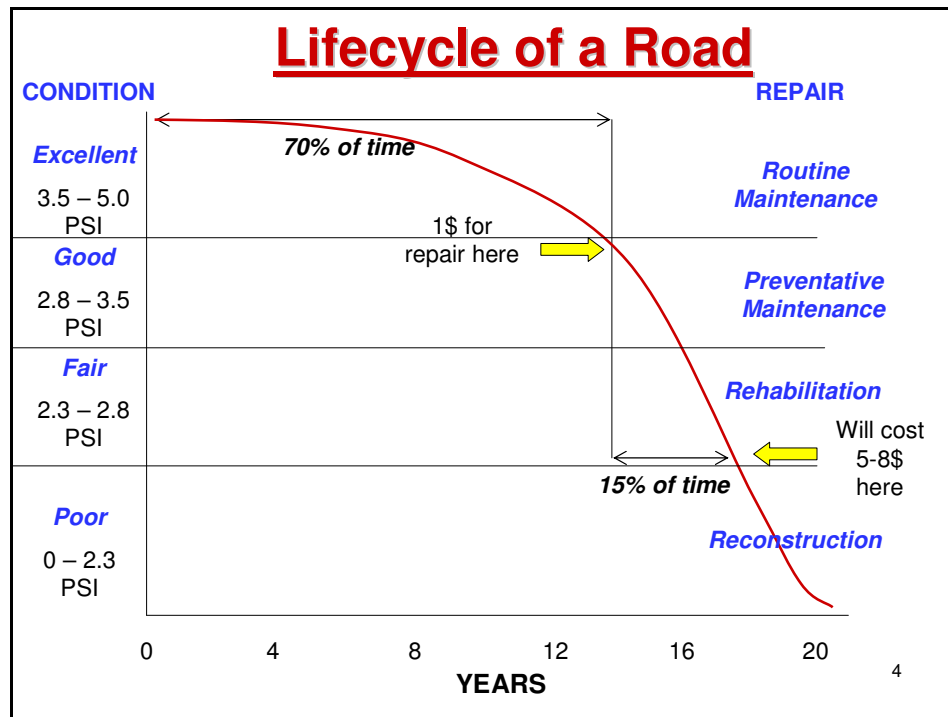
PCI	Condition	Associated Repair	Repair Cost Per. Sq. Yard
0 - 64	Poor	Reconstruction	\$45
65 - 84	Fair	Rehabilitation (Mill/Overlay)	\$18
85 - 94	Good	Preventative Maintenance	\$8.50
95 - 100	Excellent	Routine Maintenance	\$0.75

Federal Aid Eligible roads are comprised of all functionally classified as Interstate, Urban and Rural Arterial, Urban Collector and Rural Major Collector roads. These roads include all roads which are State maintained (State Jurisdiction) as well as a select number of roads which are maintained by Municipalities (Local Jurisdiction). The Pavement Conditions map below shows all Federal Aid Eligible roads and the condition of their pavement. Please note that due to the time frame between data collection and report preparation, conditions of the roadways may change. Therefore, this information should be viewed in general terms regarding needs and condition.

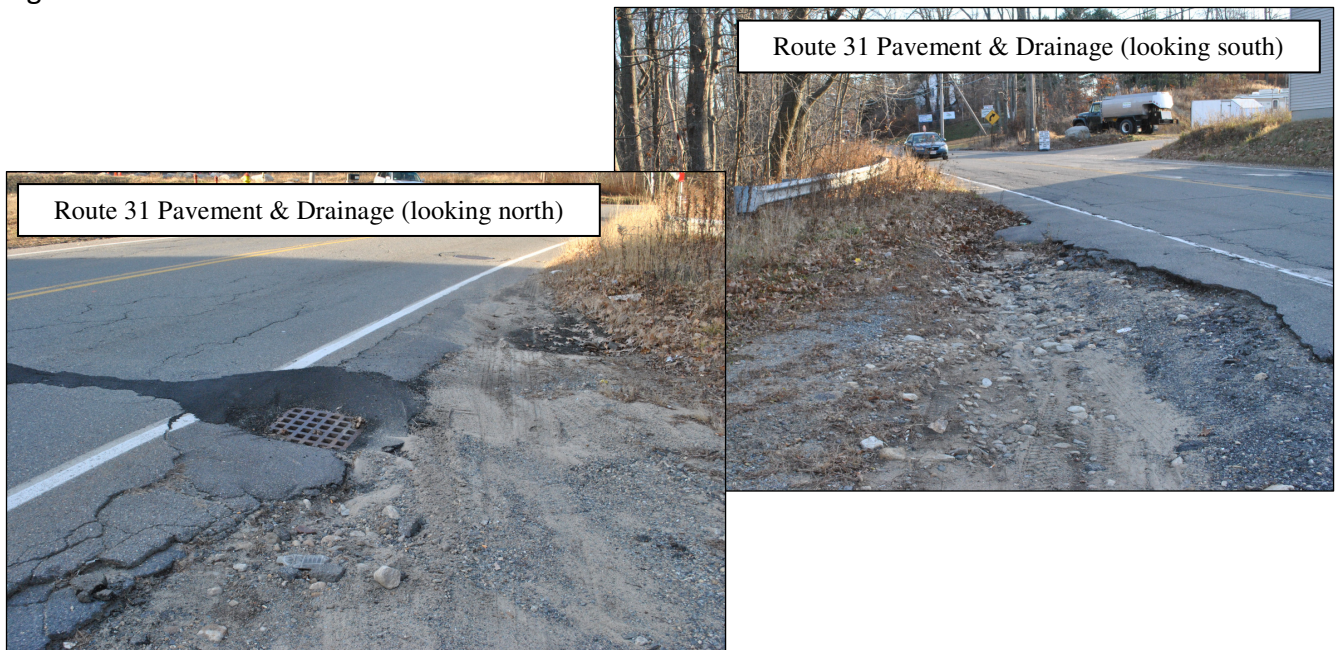
The figure below, “Lifecycle of a Road”, represents the relationship between repair cost and time, it shows that it is far more economical to preserve roads than to delay repairs and reconstruct roads. A pavements lifecycle is the time between reconstruction periods. Lifecycle cost is the total cost 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 a pavements lifecycle long while lifecycle cost is low to stretch the dollar in what is commonly an ever decreasing maintenance budget.

While it is important to preserve a pavements condition in good standing for as long as possible by implementing various preventative and routine maintenance techniques throughout its lifecycle to keep lifecycle cost low, it is a reality that budgets often do not allow for this. It is encouraged that a pavement management plan be implemented to keep on track of maintenance needs and schedules to contribute to a cost effective approach to maintaining roadways.

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Overall the pavement condition of the roads in the study area does not significantly impact Wachusett Station. However, poor conditions exist along Route 31 north of the station and Route 2A/31 east of the Princeton Road/Westminster Street intersection. These segments are maintained by the City of Fitchburg but are eligible for Federal funds. With Wachusett Station attracting additional traffic of all modes it should be a higher priority to keep major access roads pavement in good condition.



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5. Pavement Conditions Map

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6. Bridges (non-railroad)

Throughout the Montachusett region, many of its roads travel over numerous brooks, rivers and water bodies. Within the 22 communities of the Montachusett planning area, some 317 bridges are identified and rated by MassDOT as part of their inventory system. MassDOT has provided a Bridge Rating Table to the MRPC. This table includes the town where the bridge is located, the road name the bridge is located on, the bridge identification number, functional classification of the road, year built, historical significance, rebuilt date (if applicable), AASHTO (American Association of State Highway and Transportation Officials) rating, and the deficiency status of each bridge, i.e. structurally deficient or functionally obsolete.

According to the MassDOT Project Development and Design Guidebook (January 2006), structurally deficient is defined as “a bridge structure that has a defect requiring corrective action.” Functionally obsolete bridges are defined as “a bridge which has no structural deficiencies but does not meet standards to adequately serve current user demands.”

According to the 2012 Montachusett Region Transportation Plan, there are 70 bridges listed as functionally obsolete and 54 as structurally deficient throughout the MRPC region. This represents approximately 18% of the Region’s total bridges.

As of the year 2013 (based on the latest MassDOT Bridge rating testing) there are two functionally obsolete bridges and three structurally deficient bridges in the Corridor at the following locations:

CITY	OVER	UNDER	LOCATION	OWNER	FUNCTIONAL CLASS	BUILT	REBUILT	RATING	DEFICIENCY
Fitchburg	ST 2	WATER WYMAN BROOK	50 FEET WEST OF ST-31	State Highway Agency	Freeway/Expressway	1947	0	63	Structurally Deficient
Fitchburg	ST 31 WESTMNSTR RD	WATER PHILLIPS BROOK	.1 MI WEST OF STATE 12	State Highway Agency	Urban Arterial	1947	0	60	Structurally Deficient
Fitchburg	ST 2	WATER WYMAN BROOK	50 FEET WEST OF ST-31	State Highway Agency	Freeway/Expressway	1947	0	63	Structurally Deficient
Fitchburg	ST 31 PRINCETON RD	WATER WHITMANS RIVER	.1MI. SO. OF ST-2A	State Highway Agency	Urban Minor Arterial	1929	0	72	Functionally Obsolete
Fitchburg	HWY SANBORN ST	WATER PHILLIPS BROOK	.1MI STH.OF ST.12	City/Municipal Highway A	Urban Local	1931	0	29	Functionally Obsolete

The MA DOT Bridge Inventory 2012 map below shows the bridges.

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6. MassDOT Bridge Data Map

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7. Public Transit System

Fixed Route Service

The Montachusett Area Regional Transit Authority (MART) operates fixed route bus service in the Fitchburg-Leominster metropolitan area. Several routes cross the two cities providing access to several area attractions. Currently, fixed route bus service within the study area is provided via Route 11 that runs from the Intermodal transportation Center (ITC) to the Montachusett Industrial Park and the Montachusett Regional Vocational Technical High School (Monty Tech). Both of the route stops are located off of Route 2A in Fitchburg.

MART also currently runs a route called the Mount Wachusett Community College (MWCC) Express/Commuter Rail Bus. This route runs between Fitchburg, Leominster and Gardner city centers in order to provide express service between the two higher educational institutions, Fitchburg State University (FSU) and MWCC during the school year only. The Commuter Rail Bus however provides express service between Gardner and the ITC in Fitchburg in order to provide users with a connection to the MBTA Fitchburg Commuter Rail Line service to and from Boston.

A recent Transit Development Plan (TDP) update conducted for MART by the MRPC reviewed the current operating conditions of the Fitchburg-Leominster Fixed Route Bus Service in order to assess the system, its ability to serve the public and to recommend potential route and scheduling changes. The TDP included in its analysis and review the planned construction of the new Wachusett Commuter Rail Station (Wachusett Station). The planned redevelopment of the Great Wolf Lodge Resort on Route 31 just south off Route 2 was also included in the TDP analysis. As a result, changes to the current MART Route 11 were recommended. These changes include the expansion of service to the Wachusett Station and the Great Wolf Lodge Resort on Route 31. Recommendations for the MWCC Express/Commuter Rail Bus include the expansion of service to year round, increased frequency of service and the expansion of service to the Wachusett Station once completed. These changes to the current fixed route bus service would result in direct connections between the new Wachusett Station and all three Montachusett Region cities, increase commuter options and open up other areas along the routes to future commercial and/or residential development. For further information regarding the TDP, please contact the MRPC.

Commuter Rail

Commuter rail service previously existed from Gardner to Boston. The service to Gardner was drastically cut back late in 1983 and discontinued on January 1, 1987. Today, service along the Fitchburg line to North Station in Boston terminates at the Fitchburg Commuter Rail Station. As previously mentioned, the Fitchburg Commuter Rail Extension and the Wachusett Station and Layover Facility is an expansion of passenger rail service of approximately 4.5 miles west of the

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present terminus of the MBTA's Fitchburg Commuter Rail Line in downtown Fitchburg at the ITC. The Project consists of four distinct components:

- 1.** Construction of a new passenger station (Wachusett Station) with parking facilities accessed via Authority Drive, an existing industrial park roadway in the City of Fitchburg;
- 2.** Construction of a new layover facility on a current gravel pit within a proposed industrial business park in Westminster;
- 3.** Upgrades to rail infrastructure along the existing railway corridor right-of-way (ROW) owned by Pan Am Railways west of the existing terminal Fitchburg Station; and;
- 4.** A new station track within the existing railroad ROW to access the proposed station and layover facility while enabling existing freight service to continue unimpeded by passenger operations.

The planned improvements to the rail corridor will benefit both passenger rail service and freight operations by upgrading one of two main line tracks to passenger service standards. Construction of the new Wachusett Station for passenger service will also facilitate future freight access to the adjacent industrial park (known as the "231 Industrial Park" due to its location at the junction of State Routes 2 and 31) adjacent to the proposed station. The project allows for the smooth operations of both freight and commuter rail, with the freight company dispatching all service and the MBTA maintaining the shared signals and track.

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8. Other Transportation Systems

Freight Railroads

There are three railroad companies currently operating freight lines in the Montachusett region:

1. Pan Am Railways, formerly Guilford Transportation Industries (GTI) is the largest operator of freight rail lines in the Montachusett Region. It operates on a number of lines including those connecting the Moran Terminal in Charlestown to Mechanicville, New York. With the purchase of the B&M in 1983, GTI was handed control of the Springfield Terminal Railway (STR), a B&M subsidiary. In addition, GTI has controlling interest in both the Vermont and Massachusetts Railroad (V&M) and the Stony Brook Railroad (SBRR). The V&M and SBRR own one track each and they are leased to B&M. In Westminister, the Freight Main Line (Ex Fitchburg Route) is owned by the V&M with the freight operator being STR.
2. The Providence and Worcester Railroad Company (P&W) is an independent operator of freight lines. One line operates in the area from Gardner (providing a connection to the GTI system) to Hubbardston to Worcester.
3. CSX Transportation purchased Consolidated Rail Corporation (Conrail) in 1997. Conrail was previously established to acquire bankrupt railroad company lines. CSX operates one line running from Fitchburg to Clinton in the Montachusett Region.

As previously mentioned, the Fitchburg Commuter Rail Extension that includes the Wachusett Station and Layover Facility is an expansion of passenger rail service that will also benefit freight service in the area. The planned upgrade of one of two main line tracks to passenger service standards will help facilitate future freight access to the adjacent 231 Industrial Park located adjacent to Wachusett Station. The project allows for the smooth operations of both freight and commuter rail, with the freight company dispatching all service and the MBTA maintaining the shared signals and track.

Aviation

Within the Montachusett Region, there are three general aviation municipal airports, the Fitchburg Municipal Airport located in Fitchburg between Fitchburg and Leominster; the Gardner Airport in Templeton near the Gardner City Line; and the Sterling Airport in Sterling. Each of these is classified as a general aviation airport. The former Shirley Airport is no longer a public use facility. According to the Massachusetts Aeronautics Commission website (www.massaeronautics.org), "The owner/operator of Shirley Airport has decided to change the airport's status from Privately-Owned/Public-use airport to Private Restricted Landing Area, which means that effective

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immediately, the airport is closed to public use. Pilots must receive prior permission from the owner/operator to use the airport.”

The largest of the municipal airports, by far, is the Fitchburg Municipal Airport. Approximately 170 flights per day are handled on its two-runway system. (source: AirNav.com Fitchburg Municipal Airport) The airport handles the general aviation needs for the greater Fitchburg area and provides facilities for personal, corporate and air taxi services. Access to the Fitchburg Municipal Airport is through Falulah Road, which provides indirect access to Route 2 (via Hamilton Street and Routes 12 and 13), and downtown Fitchburg (via Bemis Road, Route 12 and Summer Street). Improvements to the existing highway network would benefit the airport. As of November 2013, a major reconstruction project is underway for the Route 12 bridge over Route 2. In addition, the on/off ramp configuration for Exit 31 at Route 2/Route 12 is undergoing major construction at the same time. The end result should be an improved situation in terms of congestion and safety. Commuter rail service is also available for airport users via the North Leominster Train Station on Route 13 located approximately one mile from the airport.

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9. Bicycles and Pedestrians

Bicycle Travel

The buffer (2.5 miles) that defines the Corridor study area was chosen because it is considered to be an easily bikeable distance to and from Wachusett Station. With the exception of Route 2, there has been a noticeable increase in the number of bicycles around population centers and on the highways in the MRPC region. Bicycles have found a place on the highway network by default, as have pedestrians. Bicycles mixed with motor vehicle traffic can be dangerous and create traffic delays. Safety problems involving bicycles and automobiles have become an issue in the MRPC region as evidenced by the number of bicycle-automobile crashes. It was reported in the MassDOT crash files for 2008-2010 that 209 bicycle-automobile crashes occurred in the Montachusett Region resulting in 148 injuries and six fatalities.

There is a strong support from the regional communities for designated bikeways for recreational and commuting traffic. Individual bikeway projects are being implemented in some towns within the region. Construction of bikeways will encourage cycle commuting by providing a direct, separate, and safe route between communities. Also, increasing concern for air quality and energy conservation is leading to renewed interest in development of adequate facilities for bicycles throughout the Montachusett region.

Bikeways are special routes and/or facilities established to facilitate the movement of bicycles as an energy efficient transportation and/or recreation mode of travel. There are three types of bikeways: bike paths, bike lanes, and bike routes. These have been categorized as Class I, II and III bikeways respectively. Class I bike paths are routes totally separated from automobile or pedestrian traffic. Class II bike lanes are lanes at the edge of streets marked for exclusive use of bicyclists. Class III bike routes are roadways that bikes share with cars.

Legally, a bicycle has been recognized as a vehicle in Massachusetts since 1973; subject to basically all the rights and responsibilities of an automobile. Bikeways are public rights-of-way, maintained by a responsible state or local agency, just as a municipality's streets are owned and maintained. Where the land for a proposed bike path is privately owned, an easement to permit public passage may be obtained, or the right-of-way may be purchased outright. Bikeways which parallel roads may be located within the existing publicly owned right-of-way, extending beyond the roadway itself.

Pedestrian Access

Pedestrian activity is generally limited to small areas within community centers (i.e. schools, libraries, senior centers, town halls, parks, public transit stations etc.). Sidewalks are lacking within

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the study area including the area around the new Wachusett Station. Sidewalks should be included in new roadway construction, roadway improvements, and residential and non-residential subdivision development such as the new Station. Along major arterial roadways, land should be secured for sidewalks or pathways as development occurs. Pedestrian actuated signals should be in place in densely populated areas where warranted to allow safer movement of pedestrians.

Trail Inventory

There are numerous trails that are located within the study area. The most significant trails would be the Leominster State Forest, for its recreational draw to the area, and the Burma Road and Steam Line trails, for their commuter access possibilities. The MRPC is aware of the positive effects that these trails have on the area and would like to work towards securing and making more connections, whether it is additional trail connections or roadway connections with sidewalks and/or bike lanes, between these trails and trail networks. The Trail Inventory map below shows the trails.

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7. Trail Inventory Map

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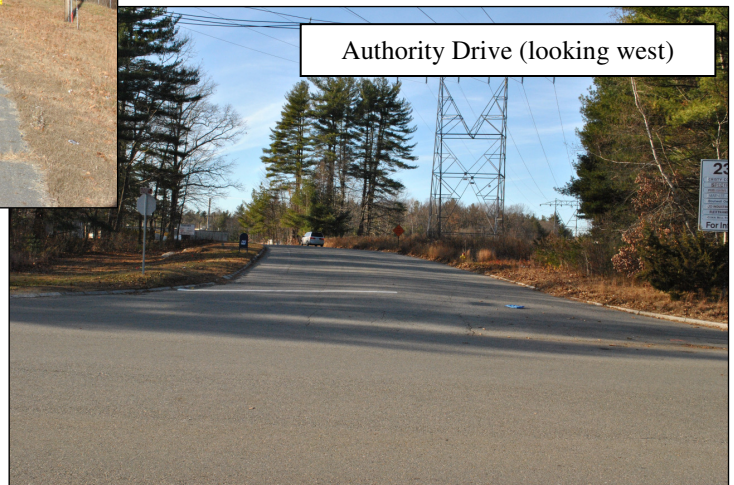
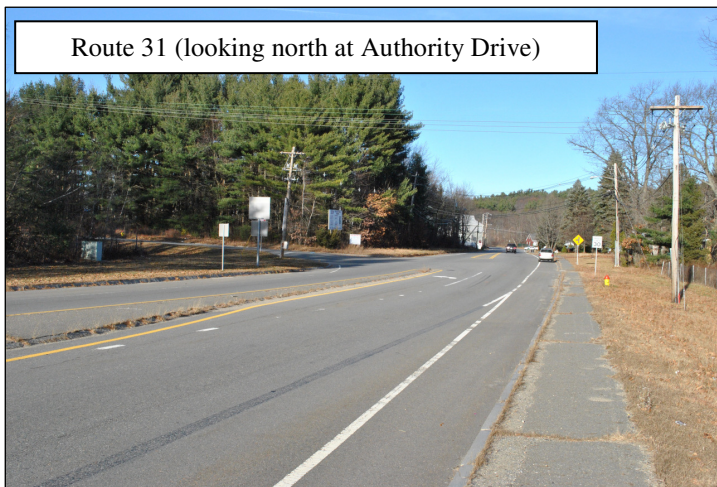
10. Special Focus: Accessing the Station

Key access points along the roadway network within the Corridor that may be used to directly access Wachusett Station are evaluated in this section. This evaluation is based on field observations of the access points and their readiness to accommodate Complete Street Concepts. See any one of the attached maps for the locations. The observations and other comments, many of which rely on previous sections, are bulleted. This evaluation seeks to answer the following question about the access points based on Complete Street Concepts:

Is the location safe, comfortable and convenient for travel via bicycle, walking, motorized and transit modes of transportation?

Intersections and Road Segments

Authority Drive and Route 31 (Princeton Road)



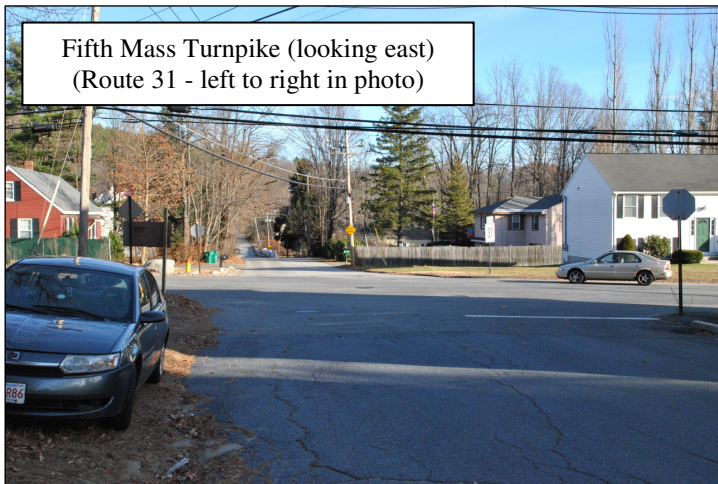
- When completed, Wachusett Station can be accessed by all transportation modes via Authority Drive. Authority Drive forms an intersection with Route 31 (Princeton Road) about an eighth of a mile to the east of what will be the Wachusett Station driveway.

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- For Route 2 traffic, Exit 28 provides the most direct access to the intersection. Exit 28 has a ***Priority Roadway Safety Improvement Location***.
- Only the ramp intersections with Route 31 and the overpass at Exit 28 are eligible for Complete Street Concepts.
- Based on the traffic volume data found in section four above for Exit 28 and Route 31, the traffic volume most likely does not produce significant traffic delay even after adjusting for growth since the traffic counts were taken.
- An auxiliary left turn lane exists on the Route 31 northbound approach from Route 2.
- The terrain is level.

Conclusion: The road widths appear to be adequate to accommodate all modes. But many design elements are needed to make the intersection safe, comfortable and convenient.

Fifth Mass Turnpike and Route 31



- Fifth Mass Turnpike forms an intersection with Route 31 about an eighth of a mile north of Authority Drive.
- Route 31 road width narrows on the northern approach to the intersection.
- Fifth Mass Turnpike east of Route 31 will collect traffic destined for Wachusett Station from Franklin Road and Oak Hill Road (locations examined below).
- Traffic will take a left turn from Fifth Mass Turnpike east of Route 31 to reach Authority Dr.

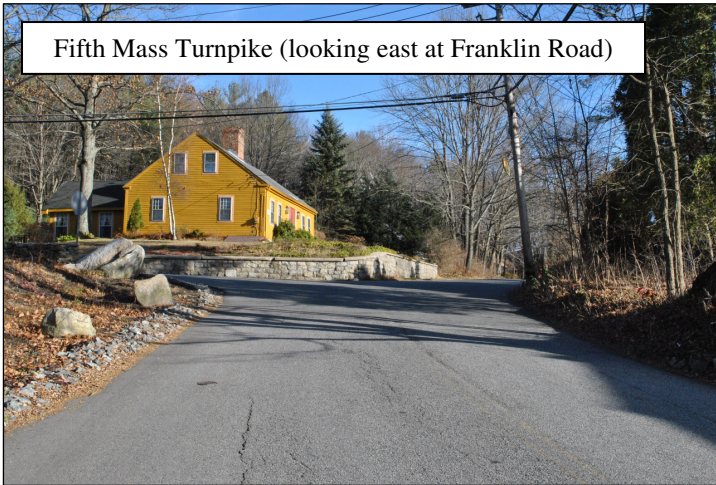
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- Fifth Mass Turnpike west of Route 31 will be a dead end street upon completion of Wachusett Station.
- The terrain is level.

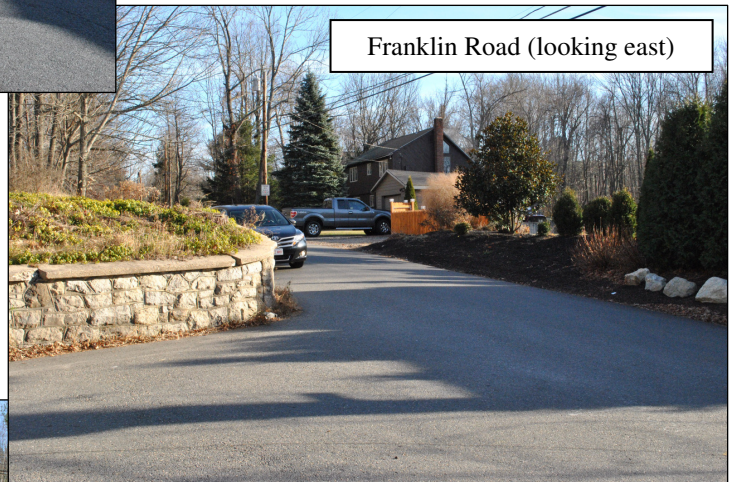
Conclusion: The road widths appear to be adequate to accommodate all modes. But many design elements are needed to make the intersection safe, comfortable and convenient.

Franklin Road and Fifth Mass Turnpike

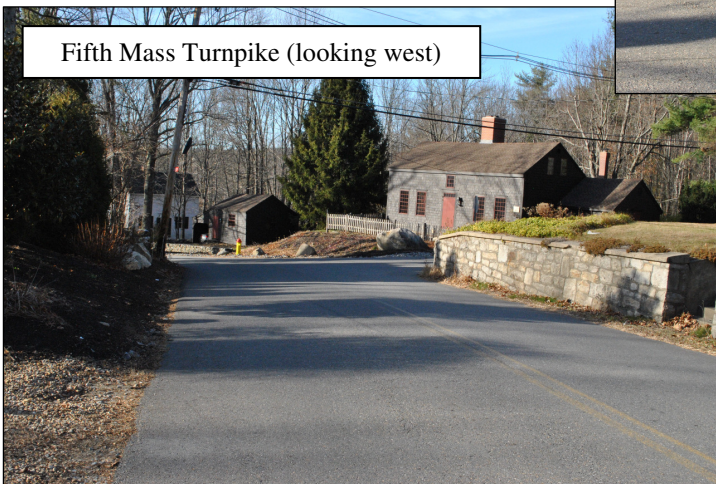
Fifth Mass Turnpike (looking east at Franklin Road)



Franklin Road (looking east)



Fifth Mass Turnpike (looking west)



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- Sight distance is severely restricted for all approaches to this intersection.
- Franklin Road forms an intersection with Fifth Massachusetts Turnpike about a quarter of a mile east of Route 31.
- Traffic destined for Wachusett Station will turn right at this intersection.
- Historic buildings exist on either side of Franklin Road.
- The terrain is mountainous going north on Franklin Road while Fifth Mass Turnpike has rolling terrain.

Conclusion: The road widths are narrow but appear to be adequate to accommodate all modes. But many design elements are needed to make the intersection safe, comfortable and convenient.

In 2006, a new bridge was constructed over Flag Brook which is about half way in between Route 31 and Franklin Road



Oak Hill Road and Fifth Mass Turnpike

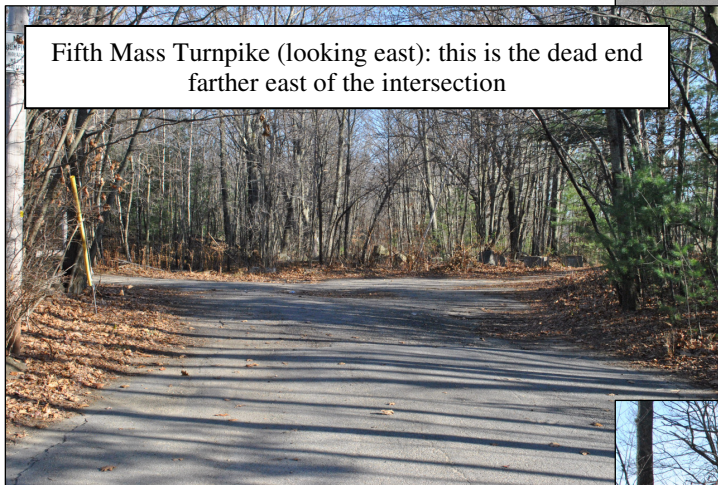


Oak Hill Road (looking north)

(photos continued next page)

- This intersection is about a half mile east of Franklin Road and an eighth of a mile north of the Oak Hill Road and Route 2 intersection which is a **Priority Roadway Safety Improvement Location**.

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- Southbound traffic destined for Wachusett Station will turn right while northbound traffic from Oak Hill Road and Route 2 intersection will turn left at this intersection.
- The terrain is mountainous going north on Oak Hill Rd while Fifth Mass Turnpike has level terrain.
- Due to Fifth Mass Turnpike being closed off as shown above, traffic east of this location destined to Wachusett Station from Rollstone Road and Mount Elam Road will have to use Route 2. The closed off section of Fifth Mass Turnpike is about .5 mile. The Mount Elam Road intersection with Route 2 is a ***Priority Roadway Safety Improvement Location***.

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Conclusion: The road widths appear to be narrow and may not be able to adequately accommodate all modes. Also, many design elements are needed to make the intersection safe, comfortable and convenient.

Route 2 and Oak Hill Road



- This intersection is about an eighth of a mile south of the Oak Hill Road and Fifth Mass Turnpike intersection and nearly a mile to the west of the Mount Elam Road and Route 2 intersection.
- Based on the traffic volume data found in section four above for this intersection, the traffic volume on Route 2 most likely produces traffic delay during peak hours for Oak Hill Road and is STOP controlled.
- The acceleration lane onto Route 2 is very narrow and the length is insufficient.
- Vehicles at a dead stop need a very large gap in traffic before entering Route 2 as it is a very high speed highway.
- The intersection is a **Priority Roadway Safety Improvement Location**.
- Traffic destined for Wachusett Station may use this intersection by taking a right turn from Route 2.
- The terrain is level.

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Conclusion: Complete Street Concepts do not apply to this intersection. Safety improvements are recommended.

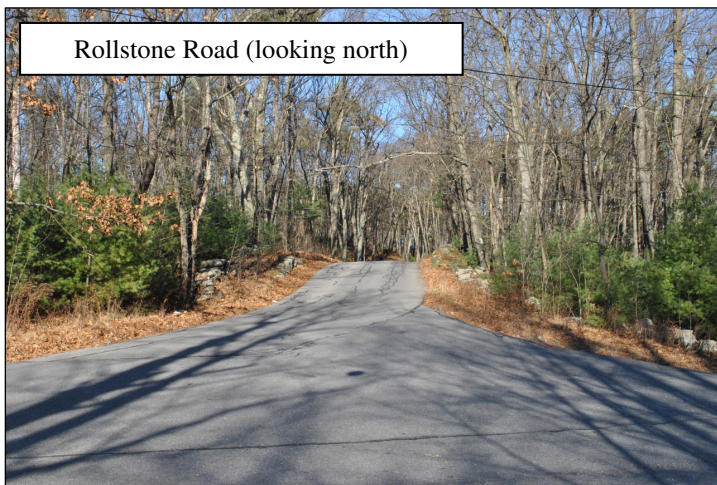


Tractor trailer turning onto Route 2 without an adequate acceleration lane has no choice but to encroach into the inner lane to avoid hitting the guardrail



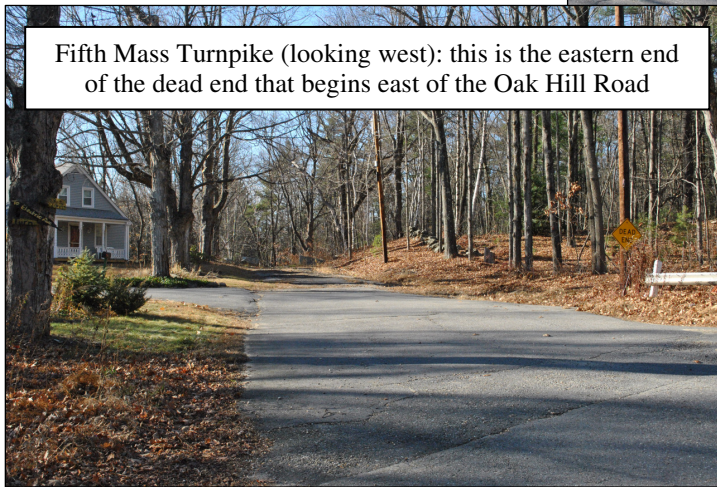
Rollstone Road and Fifth Mass Turnpike / Mount Elam Road and Fifth Mass Turnpike / Route 2 and Mount Elam Road

Rollstone Road and Fifth Mass Turnpike



(photos continued next page)

DRAFT Wachusett Smart Growth Corridor Analysis



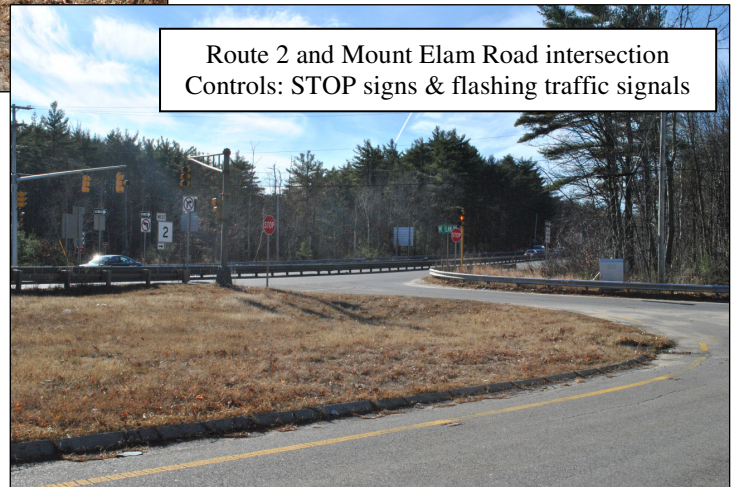
- This intersection is about a third of a mile west of the Mount Elam Road and Fifth Mass Turnpike intersection.
- Traffic destined for Wachusett Station from this intersection will turn left and travel to the Mount Elam Road and Route 2 intersection and take a right on Route 2.
- The terrain is mountainous going north on Rollstone Road while Fifth Mass Turnpike has slightly rolling terrain to the east.

Conclusion: The road widths appear to be narrow and may not be able to adequately accommodate all modes. Also, many design elements are needed to make the intersection safe, comfortable and convenient.

Mount Elam Road & Fifth Mass Turnpike / Route 2 & Mount Elam Road

- These two intersections are about a third of a mile east of the Oak Hill Road and Fifth Mass Turnpike intersection.
- There is no acceleration lane onto Route 2.
- The intersections are STOP controlled on the Fifth Mass Turnpike approaches and the southbound Mount Elam approach with Route 2 which also has a flashing red traffic.

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- Sight distance is restricted for all approaches to this intersection with the exception of the Mount Elam Road and Route 2 intersection.
- Vehicles at a dead stop need a very large gap in traffic before entering Route 2 as it is a very high speed highway with no acceleration lane.
- Based on the traffic volume data found in section four above for the Route 2 and Mount Elam Road intersection, the traffic volume on Route 2 most likely produces traffic delay during peak hours for Mount Elam Road.
- The Route 2 and Mount Elam Road intersection is a ***Priority Roadway Safety Improvement Location***.
- Traffic destined for Wachusett Station from the Route 2 and Mount Elam Road intersection will turn right onto Route 2.
- The terrain is mountainous going north on Mount Elam Road while Fifth Mass Turnpike has slightly rolling terrain to the west.

Conclusion for the Route 2 and Mount Elam Road intersection: Complete Street Concepts only apply to the eastbound Mount Elam Road approach and the southbound Fifth Mass Turnpike approach of the Mount Elam Road and Fifth Mass Turnpike intersection. Safety improvements are recommended.

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Conclusion for the Mount Elam Road & Fifth Mass Turnpike: The road widths appear to be narrow and may not be able to adequately accommodate all modes. Also, many design elements are needed to make the intersection safe, comfortable and convenient.

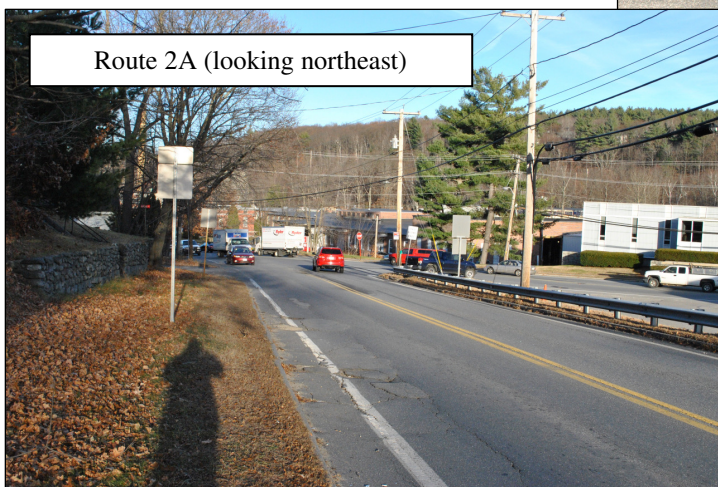
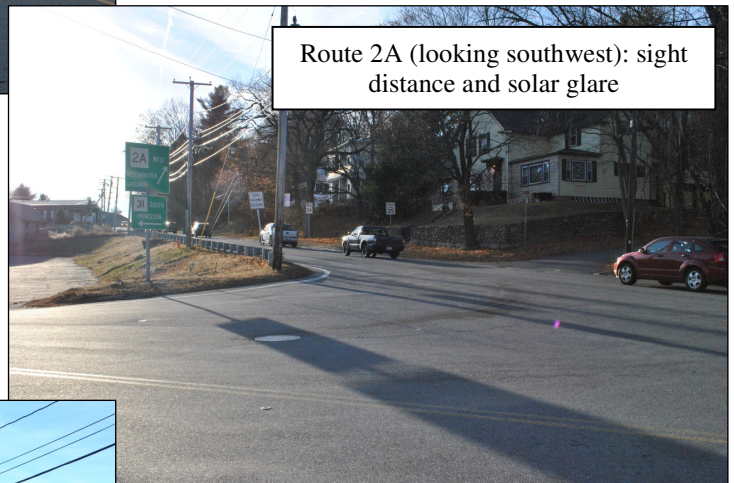
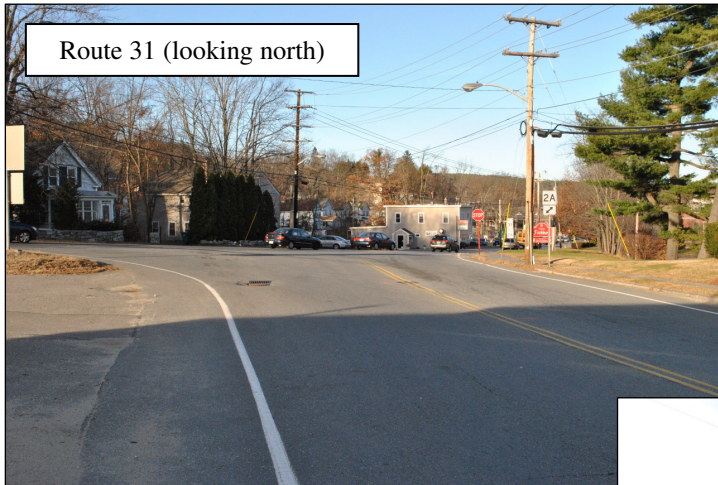
Route 2A/31 (photos below)

- This intersection is nearly a mile to the north of Authority Drive.
- The intersection is STOP controlled.
- The Route 31 approach width is excessively wide that creates many access points for traffic to exit into Route 2A and enter Route 31 from Route 2A.
- Based on the traffic volume data found in section four above for this intersection, the traffic volume on Route 2A most likely produces significant traffic delay during peak hours for Route 31.
- The intersection is a **Priority Roadway Safety Improvement Location**.
- The intersection is severely skewed on the southwest approach.
- Sight distance and solar glare from the southwest approach are factors at this intersection.
- This intersection may be the most likely choice of southbound traffic destined for the new Wachusett Station.

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- The terrain is level to the northeast but mountainous to the southwest.
- This intersection is especially hazardous for first time users trying to negotiate their way through this intersection.

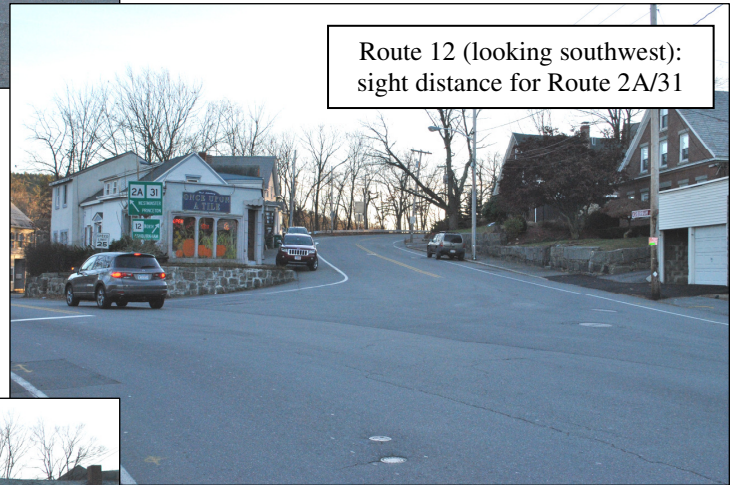
Conclusion: The road widths appear to be adequate to accommodate all modes. But many design elements are needed to make the intersection safe, comfortable and convenient.



Route 2A/31/12 (photos below)

- This intersection is nearly two miles to the north of Authority Drive.

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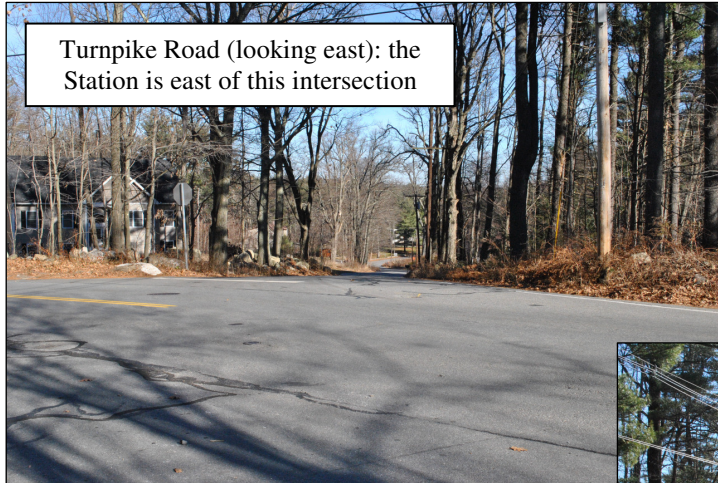
- The geometry is similar to the Route 2A/31 intersection but the road width is narrower on the Route 2A/31 approach and buildings exist close to the intersection.
- Based on the traffic volume data found in section four above for this intersection, the traffic volume on Route 12 most likely produces significant traffic delay during peak hours for Route 2A/31.
- The intersection is close to being a **Priority Roadway Safety Improvement Location**.
- The intersection is STOP controlled and is severely skewed on the southwest approach.
- Sight distance from the southwest approach can be a factor at this intersection.

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- The terrain is level to the northeast but mountainous to the southwest.

Conclusion: The road widths appear to be adequate to accommodate all modes. But many design elements are needed to make the intersection safe, comfortable and convenient.

Depot Road and Turnpike Road



- Turnpike Road forms an intersection with Depot Road about an eighth of a mile north of Exit 27 on Route 2.
- Depot Road road width narrows on the northern side of the intersection.
- Only the ramp intersections with Depot Road and the overpass at Exit 27 are eligible for Complete Street Concepts.

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- Exit 27 has a **Priority Roadway Safety Improvement Location**.
- Turnpike Road will collect traffic destined for Wachusett Station traveling on Depot Road from Exit 27, Exit 26 and Route 2A which is to the north.
- Wachusett Station is east of this intersection.
- The terrain is primarily level.
- Based on the traffic volume data found in section four above for Exit 27 and Depot Road, the traffic volume most likely does not produce significant traffic delay.

Conclusion: The road widths appear to be adequate to accommodate all modes. But many design elements are needed to make the intersection safe, comfortable and convenient.

Turnpike Road to Authority Drive West of Wachusett Station



Farther east, Curtis Road intersects with Turnpike Road (photo left) which may also be used by traffic from Route 2A destined for the Station.



Still farther east on Turnpike Road, Development Road Extension is being constructed which intersects with Turnpike Road (photo right) just after the cones.



The new Development Rd Extension (photo left) connects with the existing Development Rd farther south (photo below). Development Rd Extension will be a public road open to the public in the future.

(photos continued next page)

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This is Development Road (photo left) farther south of Development Road Extension where it intersects with Authority Drive. Wachusett Station is east of this location.

- The terrain is rolling along the length of this roadway.
- Based on the traffic volume data found in section four above for Exit 27 and Depot Road, the traffic volume most likely does not produce significant traffic delay even after adjusting for growth since the traffic counts were taken.

Conclusion: The road widths appear to be narrow on Turnpike Road and Curtis Road and may not be able to adequately accommodate all modes. Also, many design elements are needed to make the intersection safe, comfortable and convenient.

Trails

The two formal trails discussed below have potential for commuter access. The trails run parallel to each other and are approximately only eighty feet apart horizontally. However, they are substantially apart vertically and a railway lies in between the trails.

Burma Road

- This trail needs extensive development to become a viable transportation link for accessing Wachusett Station. There are many issues that need to be resolved of which

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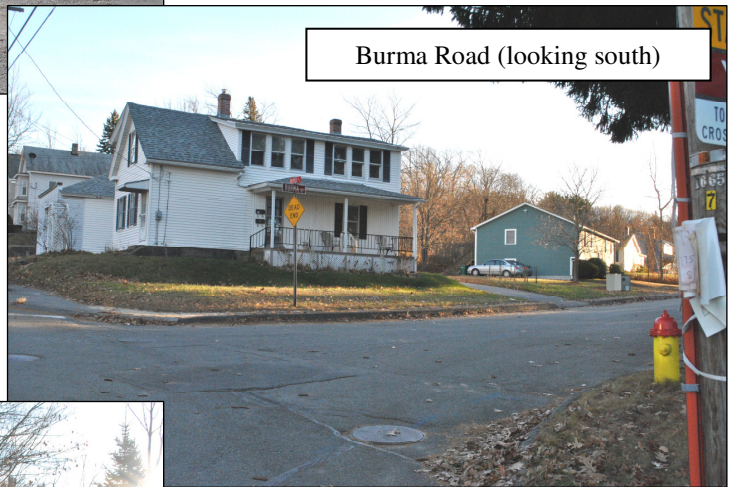
several are illustrated below. Please see *Railroad Bridges – Over Depot Road* below for the railroad bridge related issues concerning this trail.



Depot Road (looking southeast)

View of Burma Road (photo left) and the vertical curve on Depot Street from the southeast side of the Depot Road railroad bridge. Off of Depot Street at the top of the vertical curve, Burma Road is a two way road (photo below)....

.... which concludes as a dead end street farther south (photo below) where the trail begins.



Burma Road (looking south)



Burma Road trail (looking south)

Farther south, the trail is interrupted by a road that leads to a small subdivision and still farther south by a second much larger subdivision (photo right).

(photos continued next page)



trail

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The trail terminates farther south (photo left) where it intersects with Fifth Mass Turnpike. At this intersection the trail is currently being used as a driveway to a small business on the left. The trail is very uneven in this area

- The trail is approximately 1.5 miles long.
- The terrain is mountainous along the length of the trail.

Conclusion: Many design elements are needed to make the trail safe, comfortable and convenient before it can accommodate users.

Steamline Trail

- This trail needs extensive development to become a viable transportation link for accessing Wachusett Station. There are many issues that need to be resolved of which several are illustrated below. Please see *Railroad Bridges – Over Route 31 (Princeton Road)* below for the railroad bridge related issues concerning this trail.
- The trail begins on Route 2A/31 approximately one thousand feet north of the Route 2A/31 intersection.



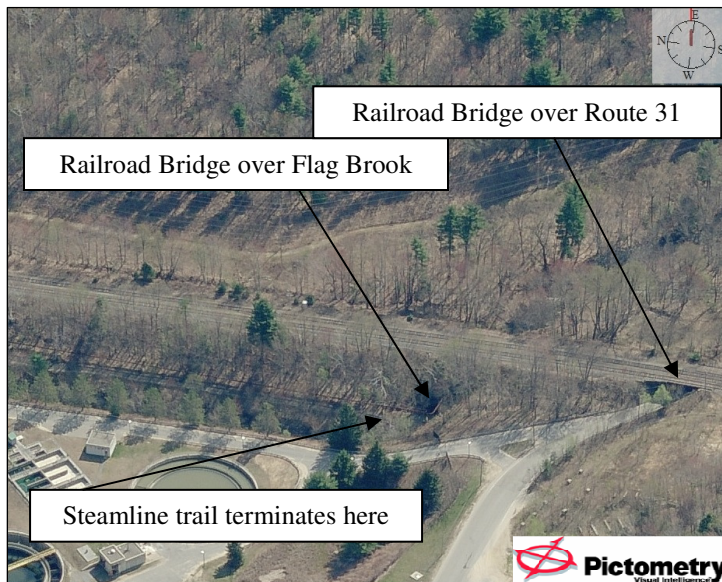
Users travel a short distance from a trail parking lot before entering the trail. Part of the trip includes traversing a paved parking lot that belongs to an abutting building. Users then travel over a wooden bridge. Users then take a left at the other end of the bridge. The full length of the trail area needs to be enhanced which can be seen in this photo as well as the photos below.

(photos continued next page)

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The pavement is in poor condition in the area beyond the bridge (photo left). The trail is not discernable. A mounted plaque draws the attention of users to guide users to the south (photo below).



The termination point of the trail is somewhere between twenty to forty feet below Route 31 over a distance of between one to two hundred feet (photo left) and does not connect to Route 31. Flag Brook runs parallel to the trail to the west, and interrupts the trail to the south.

- The trail is approximately .6 miles long.
- The terrain of the trail is level but mountainous along eastern side of the trail.

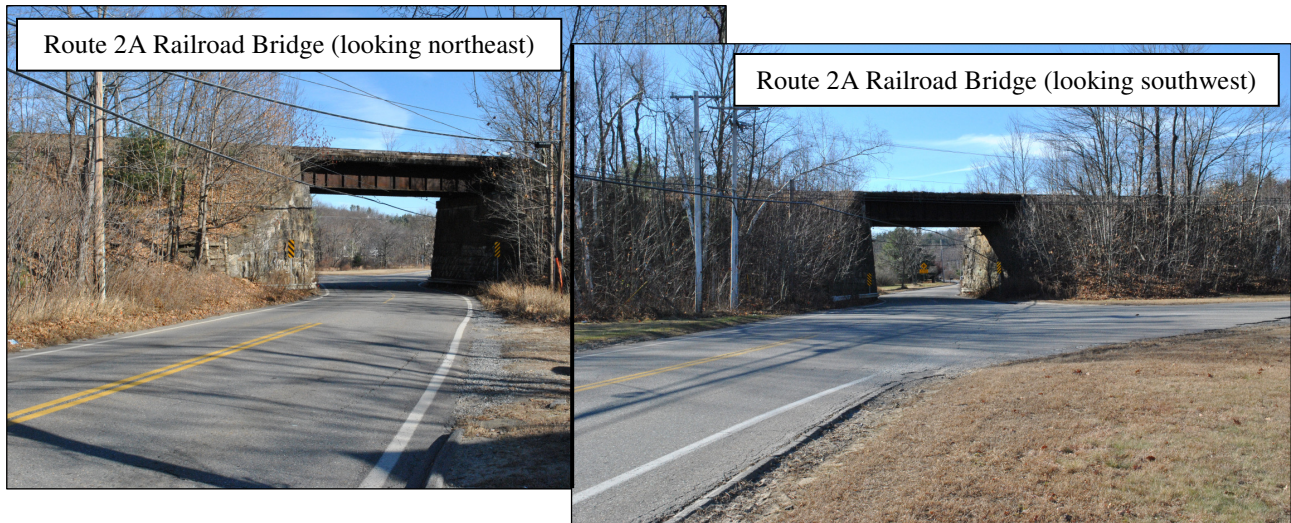
Conclusion: Many design elements are needed to make the trail safe, comfortable and convenient before it can accommodate users.

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Railway Right-of-way and Railroad Bridges

The railway right-of-way severely limits the development of livable and sustainable transportation projects in the Corridor and constrains access to Wachusett Station from northwest and north. Direct access to Wachusett Station is limited to one railroad (RR) bridge, indirect access is limited to one RR bridge and two RR bridges must be traversed that lead to roads that access the Station.

Over Route 2A (State Road East) (western most bridge)

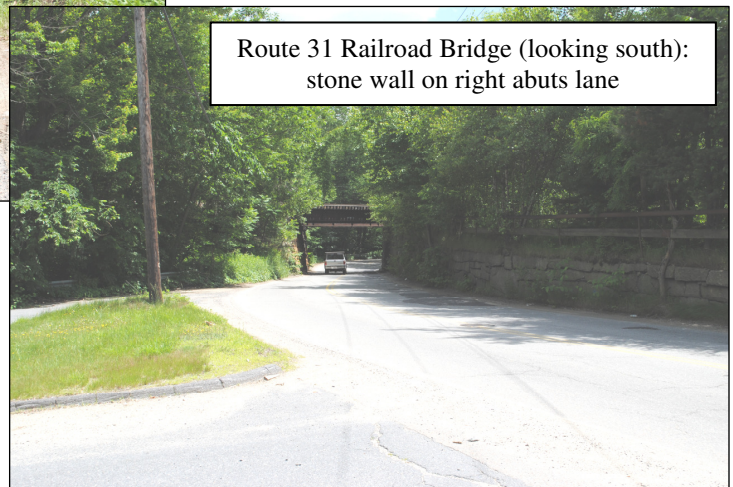


- Users seeking to access Wachusett Station must traverse this bridge to access downstream or upstream roads that provide access to the Station.
- The conditions listed below also apply to the railroad bridge over Route 2A/31/12 which is the northeastern most bridge.
- Bridge abutments abut the travel lanes that results in perceived narrow lane widths but also results in no shoulders.
- The different orientations of the bridge and Route 2A create a reverse curve. The bridge is oriented northwest/southeast while Route 2A generally oriented northeast/southeast except in the immediate area of the bridge.
- The different orientations of the bridge and Route 2A partially restrict the view of oncoming vehicles in the opposing lanes.
- The closeness of the abutments and the different orientations of the bridge and Route 2A often prompt users to move to the center of the road.
- The bridge is visible to users on both approaches despite existing vegetation on both sides of the bridge.

Conclusion: The road width underneath the bridge appears to be adequate to accommodate all modes. But many design elements are needed to make the segment under the bridge safe, comfortable and convenient.

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Over Route 31 (Princeton Road)



- This bridge provides user's direct access to Wachusett Station from the north.
- This bridge was discussed at the January 17th, 2013 Steering Committee meeting. State Representative Dinatali initiated the discussion during the review of safety conditions in the Corridor. Businesses and local officials want a safe, upgraded roadway. Other parties want facilities for other transportation modes.

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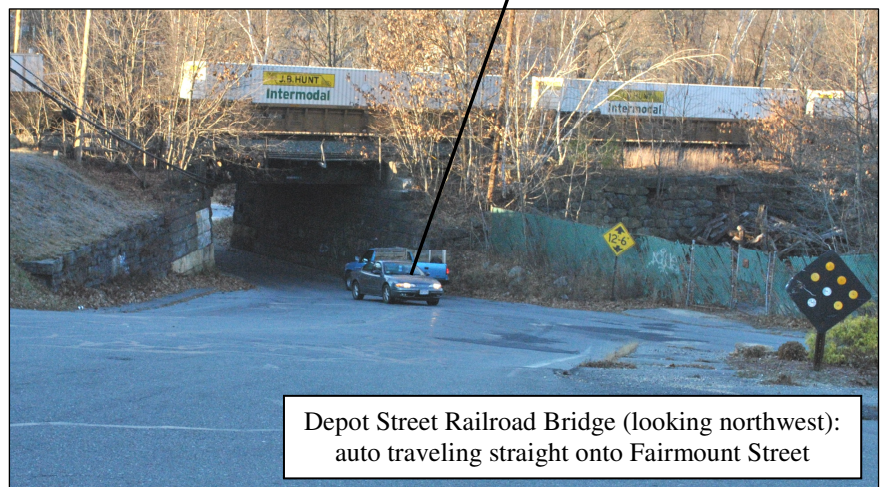
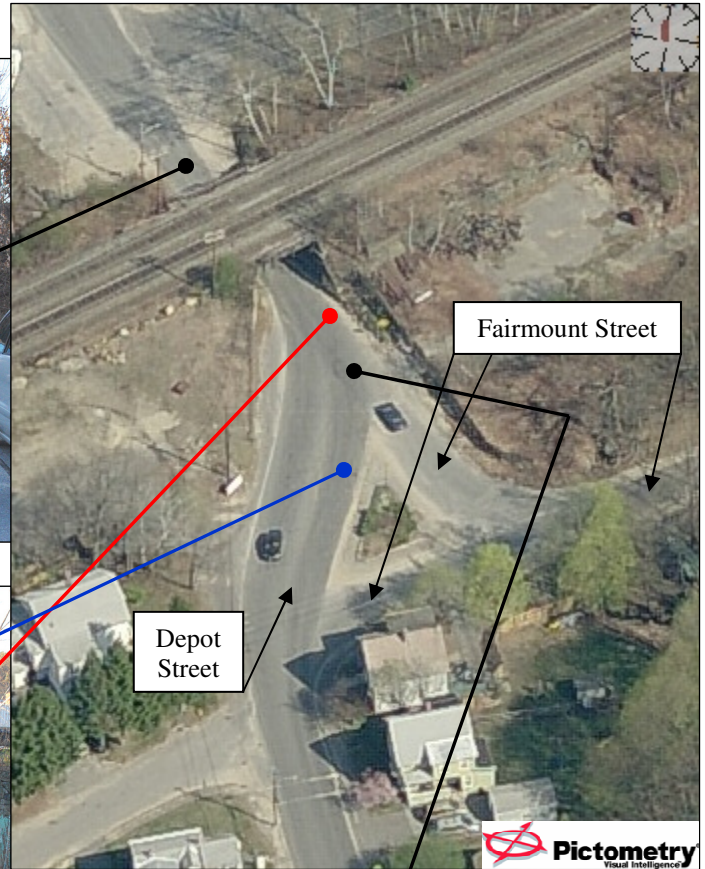
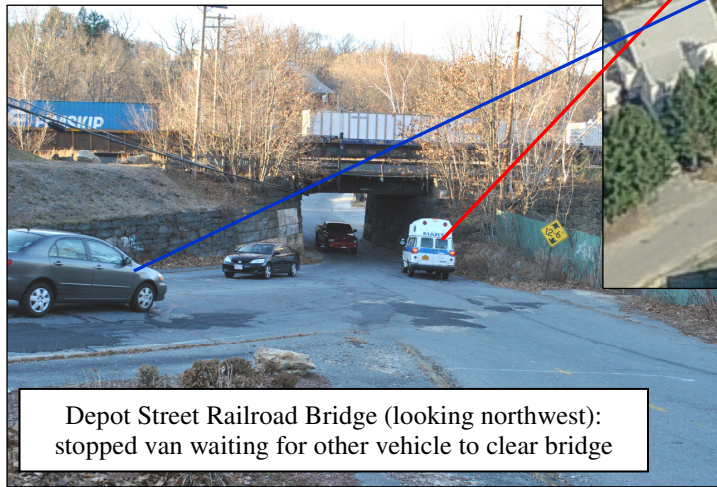
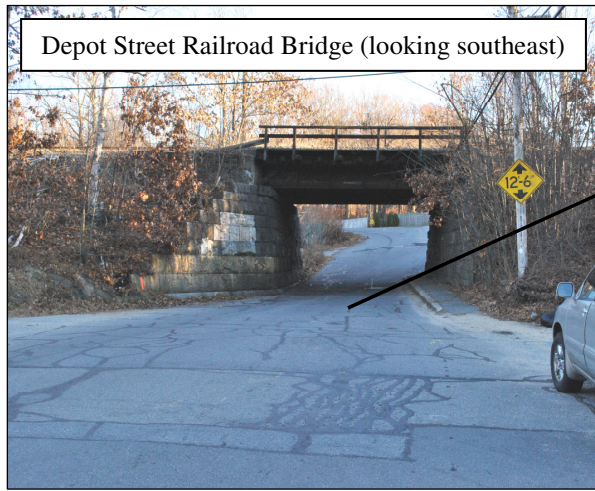
- This bridge was also discussed at the July 17th, 2013 MPO meeting.
- Due to many of the conditions listed below, Route 31 operates well under capacity that limits all types of development which includes livable and sustainable development.
- Bridge abutments abut the travel lanes, shoulders do not exist and lane widths appear to be narrow.
- The different orientations of the bridge and Route 2A create a reverse curve. The bridge is oriented northwest/southeast while Route 2A generally oriented northeast/southeast except in the immediate area of the bridge.
- Horizontal curves on both sides of the bridge, the reverse curve caused by the bridge and heavy roadside vegetation combine to restrict user view of the bridge.
- The different orientations of the bridge and Route 2A and the horizontal curves restrict the view of oncoming vehicles in the opposing lanes.
- The closeness of the abutments and the different orientations of the bridge and Route 2A combine to create a safety hazard that tends to prompt users to move to the center of the road.
- Heavy roadside vegetation creates a canopy that causes shadows and darkens the roadway.
- Steep side slopes & stone walls located close to the roadway on both sides of bridge.
- Motorists approaching the bridge often stop before proceeding under the bridge until existing vehicles under the bridge have cleared.
- The combined conditions listed above most likely tend to discourage other transportation mode users from using the facility.

Conclusion: All transportation modes cannot be accommodated at this location, the design elements will need to overcome many restrictive conditions to make the road segment under and on both sides of the bridge safe, comfortable and convenient.

Over Depot Street

- This bridge provides user's indirect access to Wachusett Station from the north. This bridge will be traversed by users on Route 2A/31 that will then proceed onto Burma Road or Franklin Road.
- Bridge abutments abut the travel lanes, shoulders do not exist and lane widths appear to be narrow and a sidewalk exists on the southwest abutment.
- Depot Street and Fairmount Street merge just before the bridge on the northwest approach to the bridge.
- After clearing the bridge, users on the southeast approach can bear right onto Depot Street or continue straight onto Fairmount Street.
- The view of Depot Street as it curves to the right on the northwest approach to the bridge is blocked to users on the southeast approach by the southwest bridge abutment.
- The view of Depot Street under the bridge is blocked to users on the Depot Street northwest approach by the southwest bridge abutment.

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- Motorists approaching the bridge stop before proceeding under the bridge until existing vehicles under the bridge have cleared.
- A positive vertical curve exits on the northwest approach to the bridge approaching from the southeast.
- The pavement on the northwest approach is expansive and has been patched many times.
- The combined conditions listed above results in many conflict points for crashes to occur and most likely tends to discourage other transportation mode users from using the facility.

Conclusion: All transportation modes cannot be accommodated at this bridge, the design elements will need to overcome many restrictive conditions to make the road segment under and on both sides of the bridge safe, comfortable and convenient.

Expanded Buffer Locations

Traffic Circle at River St (Rte 2A/31/12) / River St (Rte 2A/31) / Kimble St (Rte 12) / Daniels St intersection



This is one of the two locations mentioned in the introduction (see section one) that were added due to their significance to the Corridor as access points. This location is just outside the 2.5 mile buffer northeast of Wachusett Station.

- The terrain is level but the railroad bridge and the large building on the northern side of the traffic circle create sight distance problems.
- The intersection northwest of the railroad tracks is signalized.
- Based on the traffic volume data and the geometry of the approaches to this traffic circle, the traffic volume most likely does not produce significant traffic delay.

Conclusion: The road widths appear to be adequate to accommodate all modes. But many design elements are needed to make the intersection safe, comfortable and convenient.

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The Interchange at Exit 25 on Route 2



This is one of the two locations mentioned in the introduction (see section one) that were added due to their significance to the Corridor as access points. This location is just outside the 2.5 mile buffer southwest of Wachusett Station.

- This interchange provides access to the Corridor from downtown Westminster which is the central business district for the Town.
- Only the ramp intersections with Route 2A and Route 140 and the overpass at Exit 25 are eligible for Complete Street Concepts.
- Based on the traffic volume data for Exit 25, the traffic volumetraffic volume most likely does not produce significant traffic delay even after adjusting for growth since the traffic counts were taken.
- The terrain is level.
- There are two **Priority Roadway Safety Improvement Locations** at this interchange.

Conclusion: The road widths appear to be adequate to accommodate all modes. But many design elements are needed to make the interchange safe, comfortable and convenient.

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11. Recommendations

Transportation/Circulation Goal and Objectives

Goals:

- To achieve the creation of a smart growth multimodal transportation system that –
 - Will improve livability (see section one) for residents within the Corridor;
 - Will improve access and safety for visitors to the Corridor and enhance their experience;
 - Will contribute to the MassDOT GreenDOT (see section 14 below for more info) goal of tripling the distance traveled by users through transit, bicycling and walking by 2030;
 - Will move to improve the movement of goods for the Corridor to facilitate the improvement of the economy within the Corridor.

Objectives:

- For residents and visitors the recommendations for the Corridor which will be based on the Goals will provide –
 - Multimodal and low cost transportation solutions to access and regress:
 - Wachusett Station;
 - Job opportunities within, and a limited number of locations outside, the Corridor;
 - Residential, retail, service and recreational establishments within, and a limited number of locations outside, the Corridor;
 - Sustainable concepts that will not only improve the existing transportation network but also meet the future needs of the Corridor.
- Encourage all parties that have various interests in the Corridor to work together towards improving the movement of goods by identifying specific recommendations that will comply with the Goals.

Strategies

1. **Continue the partnership between the City of Fitchburg, the City of Leominster, the Town of Westminster, MART, REDI, FSU, FRA, Cleghorn Neighborhood Center, Three Pyramids Inc. and the Westminster Business Park (Partnership) for the purpose of implementing this plan. Consider expanding the partnership by inviting other interested entities.**

Examples include (but are not limited to):

- State Representatives and State Senators;

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- The Montachusett Regional Trails Coalition (MRTC), bicycle groups, conservation commissions, open space and recreation organizations;
- Pam Am Railways for the purpose of improving the railway right-of-way and railroad bridges to improve livability and goods movement in the Corridor;
- The North Central Massachusetts Chamber of Commerce which would bring other businesses involved in goods movement.

2. The Partnership should seek the development of off-road multi-use trail networks to add bike and pedestrian linkages to origins and destinations which includes Wachusett Station.

This strategy does not address topics such as safety education and the encouragement of bicycling and walking as modes of transportation. Rather, it will serve as a guide to entities in the Partnership to begin the development of a functional network of trail facilities to be used for transportation purposes. A conclusion that can be drawn from sections nine and ten above is that bike and pedestrian linkages need a considerable amount of project development. Currently there are only two potential off-road trails that could be used as bike and pedestrian linkages however they need substantial physical improvements before they can be utilized as such. The trails are the Steamline Trail and Burma Road.

Developing this Strategy would contribute to deemphasizing automobile use while improving roadway infrastructure sustainability and be part of a multimodal transportation system.

3. The Partnership should seek the development of Complete Street Concepts for the Corridor for all future road projects whether they are funded through the MMPO Transportation Improvement Program (TIP) or through other funding sources.

Complete Street Concepts provide for safe and accessible options for all travel modes. The modes include foot, bike, transit and automobile. The Concepts includes the idea that people of all ages and abilities, including disabilities, should have access to the roadway. The Concepts seeks to increase the role of non-motorized and transit options by providing continuous sidewalks, public transit options, bicycle lanes, or wide shoulders to create a safe, accessible environment throughout the transportation network. This increased role for pedestrians, bicyclist and transit in roadway design and operation standards are meant to ensure that safe travel options exist for all users. The MassDOT Project Development and Design Guide follows this approach to roadway design and provides guidance on how to implement Complete Street Concepts.

When compared to the automobile as a transportation mode, transit options need to be perceived as affordable, timely, provide convenient access to key locations, and be within walking distance. Some of the potential benefits that developing public transit options for the Corridor include:

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- Public transit options would be provided between key origins and destinations within, and a limited number of locations outside, the Corridor. This includes options to Wachusett Station. For underserved populations and the non-driving population this option would improve livability. Once the new Wachusett Station opens, these populations will have access to areas throughout Massachusetts and beyond and would help to decrease the amount of income they spend on transportation;
 - Increased public transit options could be operating well in advance of other Complete Street Concepts and off-road multi-use trail networks in the Corridor;
 - This option would help to mitigate the railway right-of-way constraint by bypassing the need for major construction projects involving the right-of-way.
4. **The Partnership should contact MassDOT District 3 to seek safety improvements at the Route 2 *Priority Roadway Safety Improvement Locations* in the Corridor that are presented in section four above.**
 5. **The Partnership should seek the development of a pilot project, or projects, which can work to build support locally by demonstrating the improved operation of the roadway and improved access to a location. The ability to point to a successful project will help to overcome doubt and skepticism.**

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12. Implementation

The purpose of the Implementation section is to provide the Partnership with action steps to implement the Strategies.

1. Undertake a Public and Comprehensive Transportation/Circulation (CTC) Study of the Corridor and a smaller CTC Study for a pilot project of a location within the Corridor.

The two Studies will develop the topics analyzed in sections two through eleven above by examining them in greater detail and update relevant data to the most recent available information, provide site specific recommendations, and involve public outreach. The two Studies would provide a foundation for project development (see section 13 below for more info) in the Corridor and projects would be prioritized.

The Partnership should communicate with MRPC Transportation Staff to investigate the possibility of the MRPC contributing to the two Studies through the MRPC's Unified Planning Work Program (UPWP) at no cost to the community. The UPWP is a financial programming tool developed annually as part of the federally certified transportation planning process. The document contains task descriptions of the transportation planning program of the Montachusett Metropolitan Planning Organization. The purpose of the UPWP (see section 13 below for more info) is to ensure a comprehensive, cooperative, and continuing (3C) transportation planning process in the Montachusett Region.

For multi-use trail networks, the Study should include the following:

The off-road routes that multi-use trail networks take should make sense and have buy in from the community. If a trail crosses multiple community boundaries, the routes should make sense and have buy in from all the communities. With that in mind, the Partnership should seek the creation of a citizen led multi-use trail advocacy group that is recognized by the local governments to contribute to the Study. The MRTC, or several of its members, may be key members of the group. The group should be actively engaged with planners, engineers, and elected officials.

To gain public support a conceptual multi-use trail plan and trail map should be completed. The map should identify existing features and facilities where linkages could be made. The plan should prioritize the routes while taking into consideration:

- origins and destinations, access points and road crossings;
- the topography along the trails;
- existing and recommended land uses and right-of-way issues;
- the estimated cost of each multi-use trail;
- the facilities within the community and other features as needed;

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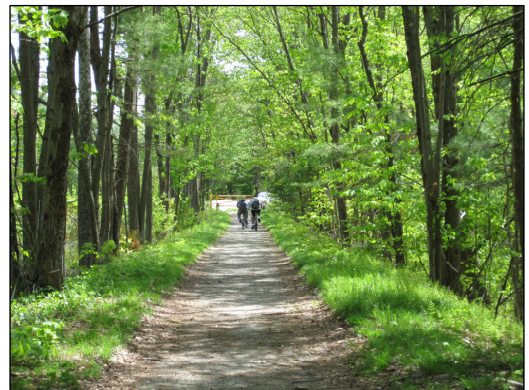
- the MRPC should be contacted about the possibility of creating the plan map;
- the needs of people with disabilities are to be included in the process;
- all of this information should then be presented to the Partnership and the communities

Responsible Entities: To initiate the Study, the primary entities would be the Mayor offices of the Cities of Fitchburg and Leominster and the Board of Selectmen of the Town of Westminster. Other Partnership entities are also encouraged to participate.

Timeframe: Up to two years for the full Corridor Study and up to one year for the pilot project study.

2. The implementation of off-road multi-use trail networks to add bike and pedestrian linkages to origins and destinations for the Corridor should include the following actions steps.

- Work with the City of Fitchburg which plans to develop a network of trails along the Nashua River that will connect to a potential trail in Leominster (Twin City Rail Trail) and trails in Westminster. The Steamline Trail is the first result of that effort. Also, work with the City to plan a trail on Burma Road and the closed off section of Fifth Mass Turnpike.
- Work with the City of Leominster and the Town of Westminster to seek the development of trail networks in their communities.
- The Open Space (OS) element of this plan addresses trails. Work with the contributing entities of the OS Element to integrate using trails for transportation as well as recreational purposes. Consider beginning the process by opening a dialogue with the MRTC.
- Make the trail network convenient and attractive by adding at trail heads improvements such as information kiosks, signs, secure bicycle parking with racks and pedestrian facilities.
- Encourage residential developments, business owners and employers to provide bicycle parking with racks for residents, employees and customers.
- Developing this recommendation would contribute to deemphasizing automobile use while improving roadway infrastructure sustainability and be part of a multimodal transportation system.



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Responsible Entity: The three primary entities to contact MRTC would be the Mayors offices of the City of Fitchburg and the City of Leominster and the Board of Selectmen of the Town of Westminster. Other entities are also encouraged to be involved.

Timeframe: to be determined.

2. **The implementation of Complete Street Concepts for the Corridor for all future roadway projects should include the following action steps.**

Transit

- Transit stops should connect and be developed near key origins and destinations. Key origins and destinations should include, but not be limited to: industrial parks and other employment centers; shopping centers; residential locations; community centers; recreational centers; and key locations in rural areas (see photos right).
- Work with MART to implement changes to the services that MART and the commuter rail provide that will take place as a result of Wachusett Station (see section eight above).
- Work with the owners and/or managers of origins/destinations to encourage their participation in developing transit options.
- When planning the transit options, the needs of people with disabilities need to be included in the process.
- Developing new public transit options should begin with various entities of the Partnership opening a dialogue with the Montachusett Area Regional Transit (MART). Discussion between these entities and MART should include relevant/current MART programs, and the possibility of starting new and expanding current commuter shuttles at various locations in the communities through existing services.
- Foster the concept of transit oriented development (TOD). According to the Federal Transit Administration (FTA), TOD is compact, mixed-use development constructed near



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transit facilities that are easily accessible by walking. Studies show that TOD leverages transit infrastructure that promotes economic development and smart growth, and it caters to shifting market demands and lifestyle preferences. TOD works to create sustainable communities where people of all ages and incomes have transportation and housing choices, increases location efficiency where people can walk, bike and take transit. Also, TOD boosts transit ridership and reduces automobile congestion and works to create a sense of community and place.



- Make transit convenient and attractive by adding improvements such as shelters with benches, information kiosks and signs, secure bicycle parking with racks, sidewalks and crosswalks for pedestrians, temporary parking spaces for drop-offs and pick-ups, and landscaping.
- Public transit facilities should be integrated into a complete street where needed.



Roadway / Intersection

Complete Street Concepts provide a community with the ability to improve a roadway that is unsafe for all users and in poor condition ...



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... to a roadway that provides a safe and organized environment with guidance for all users and stormwater runoff is properly engineered and managed to protect the environment.

The most complete Complete Street solutions include separate accommodations for each transportation mode: travel lanes for motorized vehicles, bike lanes for bicycles, sidewalks and crosswalks for pedestrians, traffic island pedestrian refuge, and crosswalk ramps for disabled pedestrians. Signs and pavement markings are also included.



At intersections, Complete Street Concepts provide a community with the ability to improve the intersection with crosswalks and ramps for the disabled, signs, bike lanes and pavement markings that provide a safe and organized environment and guidance for all users.



Roadway Bicycle Networks

- Develop continuous roadway bicycle networks that would include loop networks. Consider including the MRTC due to their off-road trail development experience.

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One possible network may link downtown Westminster to Wachusett Station:

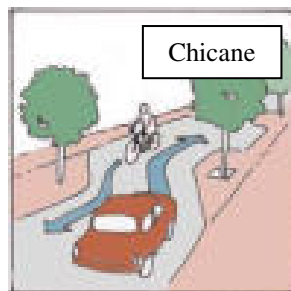
- From the Station go west on Authority Drive and continue north on the new Authority Drive extension;
- Go west on Turnpike Road then go northwest on Curtis Road;
- Continue on Depot Road then go southwest on Route 2A;
- At Exit 25, users follow Route 2A (Main Street) west into downtown Westminster.

One possible loop network could link Wachusett Station to the Coggs Hall Park trail and the Cleghorn neighborhood in Fitchburg:

- From the Station go east on Authority Drive and go north on Route 31;
- Go east on Fifth Mass Turnpike (that would include the completion of a proposed short trail link on the closed off portion of Fifth Massachusetts Turnpike);
- Go north on Mount Elam Road then go west on Electric Avenue and follow Franklin Road south to Fifth Mass Turnpike;
- Go west on Fifth Mass Turnpike to Route 31, south to Authority Drive and west on Authority Drive to the Station.

Traffic Calming

- An important element in creating complete streets is traffic calming techniques. If properly applied these geometric techniques help curb speeding and aggressive driving which benefits pedestrians and bicyclist. Roundabouts, traffic islands, curb bulb-outs and chicanes are forms of traffic calming that can provide site opportunities for bioswales, trees, and rain gardens.



- Complete Street Concepts should be applied to the three Route 2 interchange overpasses within the Corridor which are Exits 26, 27 and 28.
- Complete Street Concepts should also be applied to the overpass at the Exit 25 interchange on Route 2 in Westminster and the traffic circle at the River Street (Route

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2A/31/12) / River Street (Route 2A/31) / Kimble Street (Route 12) / Daniels Street intersection in Fitchburg. The Fitchburg traffic circle could be a candidate for conversion to a roundabout while the Route 2A and Route 140 four way signalized intersection at the Exit 25 eastbound ramp could be converted to a roundabout.

- Road safety audits should be conducted at all non-Route 2 ***Priority Roadway Safety Improvement Locations*** in the Corridor that are described in section four above.

Training Community Staff

- The staff of each community included in the Corridor that would be responsible for applying Complete Street Concepts such as planning, zoning and public works staff should have a thorough knowledge of the Concepts. Staff training may be needed. Smart Growth America offers a training opportunity. Follow the link below for more information:

<http://www.smartgrowthamerica.org/complete-streets/get-help/workshops>

Although the Baystate Roads Program is not offering complete street workshops at this time the Program may be able to offer the Partnership assistance in locating training opportunities.

Baystate Roads Program phone: (413) 577-2762

Email: info@baystateroads.org

Revise Community Project Development Process

- The incorporation of Complete Street Concepts into the Project Development Process of each community covered in the Corridor for all roadways within the Corridor. Complete Street Concepts will only be implemented fully and successfully on the roadways within the Corridor if they are incorporated into the project development review and approval process of the communities that are covered in the Corridor. Community policies and procedures should incorporate requirements for private developers to implement Complete Street Concepts. At a minimum, the planning and zoning boards of the communities should develop regulatory standards and procedures that:
 - Require bus stops for transit options at locations that are easily accessible by walking;
 - Require sidewalks and bicycle accommodations in new developments;
 - Require bike parking accommodations along with parking for automobiles;
 - Require the needs of people with disabilities to be met;
 - Require development proposals and site plans to meet complete street requirements;
 - Require off-road linkages for bikes and pedestrians between neighboring developments;

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- Limit driveway access points to provide continuous and uninterrupted sidewalks and bike lanes;
- Develop complete street signage and pavement markings standards;
- Develop standards for landscaping that would include bioswales, trees, and rain gardens for stormwater runoff.

Revise Community Planning Documents

- The revision of applicable planning documents of each community covered in the Corridor to include Complete Street Concepts. Adopt complete street goals, objectives, and strategies into the applicable elements of the Master Plan. The circulation, land use, and bike and pedestrian elements are good places to start. The interactions of transportation modes and land use should be considered together so that needs and priorities can be found and Complete Street Concepts can be retrofitted. Other types of plans that may need to be updated include redevelopment plans, neighborhood plans and corridor plans.

Responsible Entities: The three primary entities to contact MART, the MRTC, and MassDOT would be the Mayors offices of the City of Fitchburg and the City of Leominster and the Board of Selectmen of the Town of Westminster. Other entities are also encouraged to be involved.

Timeframe: to be determined.

3. The implementation of safety improvements at the Route 2 *Priority Roadway Safety Improvement Locations* in the Corridor should include the following action steps.

- Road safety audits should be conducted at all Route 2 ***Priority Roadway Safety Improvement Locations***.
- At a minimum, the acceleration and deceleration lanes on at the Mount Elam, Oak Hill Road and Palmer Road intersections with Route 2 should be widened and lengthened along with other geometric improvements where needed. Removal of the Mount Elam Road and Route 2 traffic signal should also be considered. These improvements would also help to improve tractor trailer access.

Responsible Entities: The three primary entities to contact MassDOT would be the Mayors offices of the City of Fitchburg and the City of Leominster and the Board of Selectmen of the Town of Westminster. Other entities are also encouraged to be involved.

Timeframe: to be determined.

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4. **The implementation of a pilot project, or projects, in the Corridor should include the following action steps.**

- Implementing a multi-use trail network or a standalone transit option pilot project may not be practical based on the considerable amount of planning that needs to be completed.
- Implementing a Complete Streets Concept pilot project on an existing roadway or at a standalone intersection may be practical because the roadway infrastructure already exist and would only need to be retrofitted with sidewalks, crosswalks with ramps, pavement markings, traffic calming techniques, and possibility some road widening. A location with an existing transit option should also be considered.
- The Partnership should decide the pilot project location in consultation with the MRPC and MassDOT.

Responsible Entities: The three primary entities to contact the MRPC and MassDOT would be the Mayors offices of the City of Fitchburg and the City of Leominster and the Board of Selectmen of the Town of Westminster. Other entities are also encouraged to be involved.

Timeframe: to be determined.

5. **To ensure that the proposed transportation system within the Corridor will meet the goals, objectives and recommendations listed in section eleven above, the Partnership will need to coordinate project development efforts with:**

- MassDOT;
- Montachusett Metropolitan Planning Organization (MMPO);
- MART.

Section thirteen below provides guidance for developing projects through MassDOT that would address the off-road multi-use trail networks and the non transit related Complete Street Concepts recommendations listed above.

Project development for the improving of existing public transit options and developing new transit options recommendations will need MART planning assistance. For TOD development the Mass.gov website has a toolkit that provides guidance to communities for developing a TOD in their community:

http://www.mass.gov/envir/smart_growth_toolkit/pages/mod-tod.html.

The toolkit also provides local governments with technical assistance and a model TOD bylaw.

The MMPO and project development: Decisions related to project development, prioritization, funding and scheduling are made through the metropolitan planning process of the MMPO and the MRPC serves as staff to the MMPO. Through continued and active involvement in the planning process via the MRPC, the Montachusett Joint Transportation

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Committee (MJTC) and the MMPO, issues and projects important to the Corridor can be discussed, heard and acted upon with the Partnership's input and knowledge. MRPC staff will work with the Partnership in creating and implementing a smart growth multimodal transportation system and would provide technical assistance.

Responsible Entities: To initiate project development, the primary entities would be the Mayor offices of the Cities of Fitchburg and Leominster and the Board of Selectmen of the Town of Westminster. Each entity is responsible for designating MJTC representatives who should make every effort to attend monthly MJTC meetings and communicate with MRPC transportation staff and MassDOT staff. Other Partnership entities are also encouraged to participate.

Timeframe: Ongoing until all recommended projects are completed.

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13. Funding

Montachusett Transportation Improvement Program

The Montachusett Transportation Improvement Program (TIP) is a list of highway and transit projects and their funding sources which will be discussed below. The TIP is a federally required, annually updated, prioritized listing of short-range highway construction and transit projects proposed for implementation during a four federal fiscal year cycle. It is a means of allocating scarce federal and state monetary resources across the state to projects that each region deems to be its highest priorities. The TIP must be financially constrained to projections of available federal aid. The Massachusetts Department of Transportation (MassDOT) Highway Division, moreover, is committed to funding those projects that will be ready for advertisement in Federal Fiscal Year (FFY) 2014 and beyond. To this end the regional TIP contains a financial plan showing the revenue source or sources, current or proposed, for each project, for each anticipated FFY of advertisement.

To receive Federal or State funding, a transportation project must be included in the TIP. Projects listed in the TIP must also conform to the State Implementation Plan (SIP) for Air Quality Conformity in accordance with the Clean Air Act Amendments (CAAA), giving special consideration to "regionally significant" projects. Transportation projects funded with Federal funds from other Federal agencies, or with local or private resources, should be identified in the document to reflect the integrated and intermodal nature of the metropolitan transportation planning process.

The TIP must also be consistent with the current RTP for the Montachusett Region. In addition the TIP estimates future funding sources for operating and maintaining the current transportation network as well as the costs of capital improvements. The agency responsible for implementing highway projects in the TIP, unless otherwise noted, is the MassDOT Highway Division and, for transit projects, the Franklin County or Montachusett Regional Transit Authorities.

The Montachusett TIP is the product of a comprehensive, continuing and cooperative effort (the 3C Process) to improve the regional transportation system by local officials, the Montachusett Joint Transportation Committee (MJTC), the Montachusett Regional Transit Authority (MART), the MRPC and the MassDOT. Together these organizations along with local officials comprise the signatories representing the MPO.

Description of Federal Aid Highway Programs*

On July 6, 2012, President Obama signed into law the new Federal Surface Transportation Authorization known as Moving Ahead for Progress in the 21st Century (MAP-21). Federal Aid is received by the State as reimbursement, and the State is required to contribute a matching share to most projects receiving Federal funds.

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MAP-21 has restructured core highway programs by incorporating several activities previously carried out under existing formula programs, such as the National Highway System Program (NHS), the Interstate Maintenance Program (IM) and the Highway Bridge Program, into a new core formula program structure that includes the following:

- National Highway Performance Program (NHPP)
- Surface Transportation Program (STP)
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Highway Safety Improvement Program (HSIP)
- Transportation Alternatives Program (TAP)

The TIP includes projects funded under these programs as well as potentially carried over programs from prior federal authorizations such as High Priority Program (HPP) funds.

All of the programs listed are administered by the MassDOT. A project may be initiated by MassDOT or the local community. If approved, the project is submitted to Federal Highway Administration for funding. A description of each of these programs follows:

- National Highway Performance Program (NHPP): The enhanced National Highway Performance Program (NHPP) is composed of rural and urban roads serving major population centers, international border crossings, intermodal transportation facilities, and major travel destinations. It includes the Interstate System, all principal arterials (including some not previously designated as part of the NHS) and border crossings on those routes, highways that provide motor vehicle access between the NHS and major intermodal transportation facilities, and the network of highways important to U.S. strategic defense (STRAHNET) and its connectors to major military installations. The funding split for this program is generally 80% federal 20% state.
- Surface Transportation Program (STP): MAP-21 continues the STP by providing flexible funding that may be used by the States and localities for projects to preserve or improve conditions and performance on any federal-aid highway, bridge projects on any public road, facilities for nonmotorized transportation, transit capital projects and public bus terminals and facilities. A portion of the state's allocation is set aside for the state's Transportation Alternatives Program (TAP). The funding split for this program is generally 80% federal 20% state.
- Congestion Mitigation and Air Quality (CMAQ): The CMAQ program is continued in MAP-21 to provide a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas). The funding split for this program is generally 80% federal 20% state.

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- Highway Safety Improvement Program (HSIP): MAP-21 continues the Highway Safety Improvement Program (HSIP) to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal lands. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. The funding split is 90% federal and 10% state.
- Transportation Alternatives Program (TAP): MAP-21 establishes a new program to provide for a variety of alternative transportation projects, including many that were previously eligible activities under separately funded programs. The TAP replaces the funding from pre-MAP-21 programs including Transportation Enhancements, Recreational Trails, Safe Routes to School, and several other discretionary programs, wrapping them into a single funding source. The TAP provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for the planning, design or construction of boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways. The funding split for this program is generally 80% federal 20% state.
- High Priority Projects: This program provides designated funding for specific projects identified in SAFETEA-LU. Projects are identified with a specified amount of funding over the 5 years of SAFETEA-LU. The funds designated for a project are available only for that project until expended. HPP projects are fully funded and are included on the TIP when they are expected to be “ready to go.” The funding split is 80% federal and 20% state.

MAP-21 funding information from “Moving Ahead for Progress in the 21st Century Act (MAP-21) A Summary of Highway Provisions” by the Federal Highway Administration (FHWA), Office of Policy and Governmental Affairs, July 17, 2012 and Fact and Guidance Sheets from the FHWA MAP-21 website can be found at:

www.fhwa.dot.gov/map21/factsheets.cfm and www.fhwa.dot.gov/map21/guidance/index.cfm

Description of Transit Funding Programs*

The new Federal Surface Transportation Authorization known as Moving Ahead for Progress in the 21st Century (MAP-21) significantly changed the categories of transit funding available to grantees from what was under the prior authorization known as the Safe Accountable Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). However carryover funds from SAFETEA-LU are still available as carryover funds for some projects programmed under previous TIP's.

The biggest change between MAP-21 and SAFETEA-LU is the reduction of discretionary funding. Most of the discretionary categories such as “State of Good Repair” and “Bus and Bus Facilities”

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which were formerly 5309 funds are now formula funds and have their own new 53 subsection categories (5337 and 5339 conversely). Other discretionary funding categories have been repealed under MAP-21 such as the “Clean Fuels” (5308) program. Formula grant programs are funded to States based on formulas of population. Each grant program is referred to by name and most also by a number that correlates to the section number of Chapter 53 of Title 49 of the United States Code, as Amended by MAP-21. Specific allocation of funding amounts into each category is laid out in Section 5338.

Formula Grants:

- Urbanized Area Formula Program (5307) Funds: This formula program makes funds available on the basis of a statutory formula to all urbanized areas in the country. Eligible activities are capital projects, planning and job access/reverse commute projects (JARC - formerly 5316 funds). Operating assistance is continued as an eligible expense under Section 5307. Operating assistance caps are now in place for urbanized areas over 200,000 but operating fewer than 100 buses (no rail), not just those under 200,000 (as determined by the U.S. Census Bureau), as is the case in previous law.
- Transportation for Elderly Persons and Persons with Disabilities (5310) Funds: This program provides capital funding for transportation services for elderly and disabled persons. Authorization under MAP-21 has moved the formula allocation from a single statewide allocation to an Urbanized Area allocation. The funds may go to private, non-profit organizations or to public bodies which coordinate service. Also funds available to our area are in a single allocation with two other “Small Urban” areas, therefore MassDOT has made all the apportioned funds a competitive application. No less than 55% of these funds must be used for capital projects. Upto 45% may be used for operating assistance projects that would formerly been eligible under New Freedom funds. No more than 10% may be used be a recipient for Administrative Expenses associated with a project. The Rail and Transit Division of the Massachusetts Department of Transportation through the State Transportation Bond authorization program, makes capital grants available through its Mobility Assistance Program to public agencies to purchase vehicles and related equipment for transporting elderly and disabled persons.
- Formula Grants for Other than Urbanized Areas (5311) Funds: This program provides funds on the basis of a statutory formula for rural areas using the latest available U.S. decennial census data. Its share is established at 7.07 percent of the total overall MAP-21 funding and 12% of Sections 5307 and 5311 fund combined, which is an increase over previous law. Eligible activities now included projects previously classified under JARC for rural areas.
- Job Access and Reverse Commute Program (5316) Funds: Repealed – integrated into 5307 and 5311 funds.
- New Freedom Program (5317) Funds: Repealed – integrated into 5310 funds.
- Bus and Bus Facilities (5339) Funds: This program provides capital assistance for new and replacement buses, related equipment, and facilities. It was formerly a discretionary program but is now formula based by urbanized area. As with the 5310 formula, 5339 is

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apportioned to our region via the state thru an allocation for “Small Urban,” with a statewide allocation as well. Therefore a competitive process thru MassDOT has been established for the 3 small urban and 3 rural RTA’s to obtain these funds. The Federal share of eligible capital costs is no more than 80 percent of the net capital project cost.

- State of Good Repair Formula Grants (5337): Eligible recipients are state and local government authorities in urbanized areas with fixed guideway public transportation facilities operating for at least 7 years. Although the Fitchburg-Leominster urbanized area does receive a formula allocation for these funds under MAP-21, the Montachusett Regional Transit Authority is not an eligible recipient since there is not currently any fixed guideway or high-speed motorbus operated under the authority. These funds can be transferred to the MBTA for use in rehabilitation projects related to the commuter rail which runs in our area.

Discretionary Grants:

The Federal Transit Administration and the U.S. Department of Transportation still have a few discretionary grant programs that MART is eligible to apply under. A Notice of Funding Availability (NOFA) is published in the Federal Register each year stating program amounts and instructions for applying for these Competitive grants. Please see FTA’s website for more details at <http://www.fta.dot.gov/map21.html>.

- Fixed Guideway Capital Investment Grants (“New Starts”) (5309): The Bus and Bus Related Equipment and Facilities program (Bus program) provides capital assistance for new and replacement buses, related equipment, and facilities. It is a discretionary program to supplement formula funding in both urbanized and rural areas. The Federal share of eligible capital costs is 80 percent of the net capital project cost, unless the grant recipient requests a lower percentage. The Federal share may exceed 80 percent for certain projects related to the ADA, the Clean Air Act (CAA), and certain bicycle projects.
- TIGER (USDOT): The Transportation Investment Generating Economic Recovery, or TIGER Discretionary Grant program, provides a unique opportunity for the U.S. Department of Transportation to invest in road, rail, transit and port projects that promise to achieve critical national objectives. The TIGER program enables DOT to use a rigorous process to select projects with exceptional benefits, explore ways to deliver projects faster and save on construction costs, and make investments in our Nation's infrastructure that make communities more livable and sustainable.

*Source: Montachusett Metropolitan Planning Organization Transportation Improvement Program FFY2014 – 2017.

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14. Transportation Role of the Regional Planning Agency

(this section includes key MassDOT Policies and Documents)

The Montachusett Regional Planning Commission (MRPC) acts as staff to the Montachusett Metropolitan Planning Organization (MPO) that has the responsibility of prioritizing transportation projects within the Montachusett Region. This presents municipalities with greater chances for input in setting local priorities. This shift in priority setting is intended to give municipalities a stronger role in planning transportation improvements that directly affect them. It is important to note that transportation projects and plans must be included in a regional transportation plan in order to receive federal funding for implementation. Key transportation documents include:

MRPC: Regional Transportation Plan

The Regional Transportation Plan (RTP) outlines the transportation priority needs and policies for the region. Before projects receive federal funding, they must be identified and incorporated into the policy goals and visions of the RTP. The RTP is developed through studies, discussions with local officials, boards and commissions and public comment. Each MPO in the Commonwealth of Massachusetts develops a RTP to provide guidance to local and state officials in deciding how to spend federal and state transportation funds. The RTP for the Montachusett Region identifies both short and long range projects for local roads, highways, bridges, rail, transit, bike and pedestrian trails, freight and airports as well as priorities, goals, visions and strategies.

The existing RTP prepared by the MRPC was endorsed on August 24, 2011. It should be noted that after the plan is completed and endorsed, the Montachusett MPO can still incorporate any changes through an amendment to the RTP. Information on the development of the RTP can be found on the MRPC website at www.mrpc.org.

MRPC: Transportation Improvement Program

For more on the Transportation Improvement Program (TIP) see sections 13 above.

MassDOT: Project Development Summary

Project Development is the process that takes a transportation improvement from concept through construction.

Every year the Montachusett Region receives federal and state funds for projects to improve the transportation network in local communities. These funds and projects are prioritized through the MPO, a regional advisory group that annually develops the Montachusett TIP.

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For a community to receive funds, the project must follow a multi-step review and approval process required by the MassDOT (MassDOT) Highway Division. This process is summarized in the figure below.

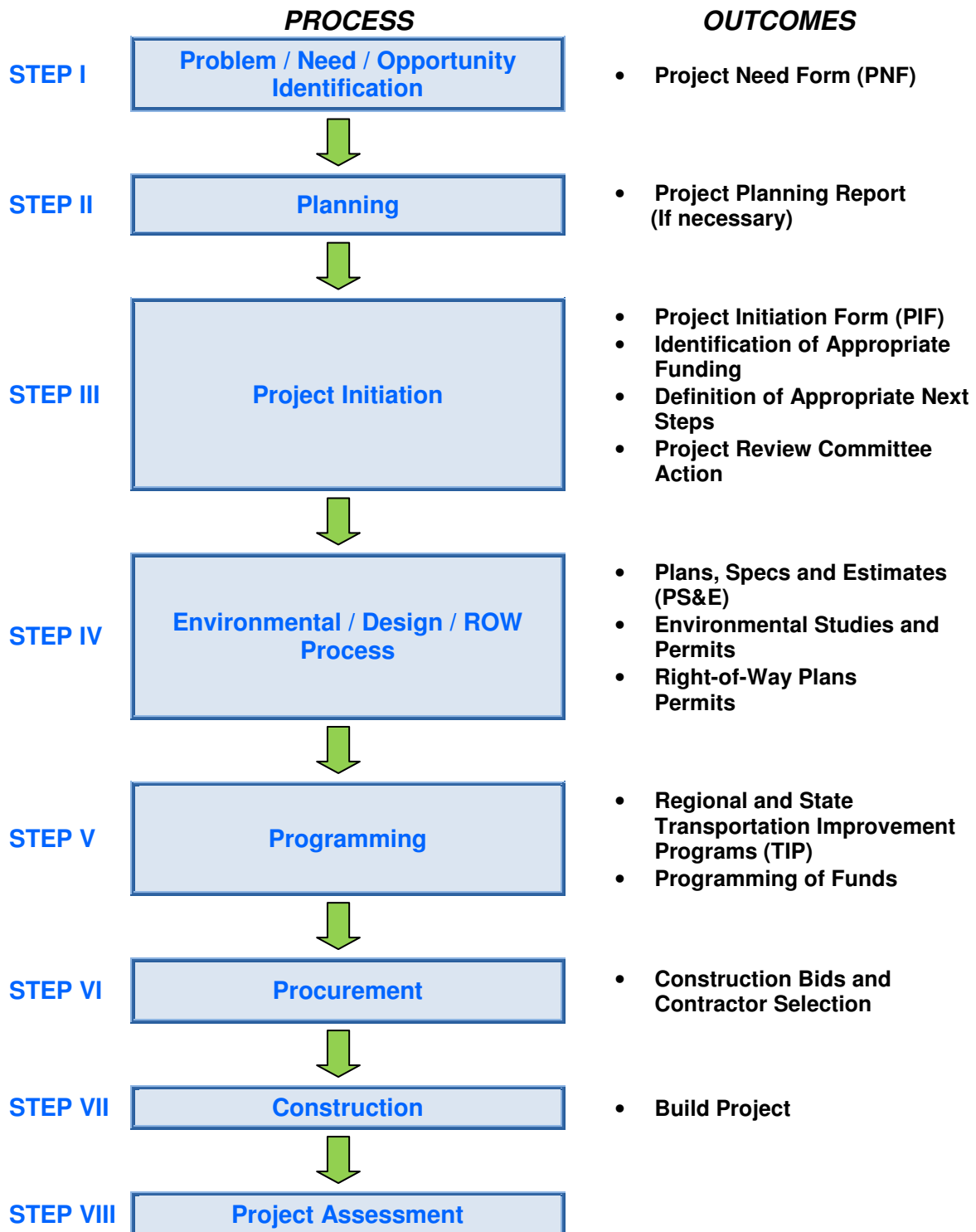
Project proponents are required to follow this process whenever MassDOT Highway Division is involved in the decision-making process. The project development procedures are, therefore, applicable to any of the following situations:

- When MassDOT is the proponent; or
- When MassDOT is responsible for project funding (state or federal-aid projects); or
- When MassDOT controls the infrastructure (projects on state highways).

Projects with local jurisdiction and local funding sources are not required to go through this review process unless the project is located on the National Highway or Federal-Aid Systems.

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Project Development Process Steps & Outcomes Flow Chart



Source: MassDOT Highway Division

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The project development process is designed to progressively narrow the projects focus in order to develop a project that addresses identified needs at that location. There should be opportunities for public participation throughout.

The eight steps in the above figure are described in detail in Chapter 2, Project Development Guide of the MassDOT Highway Division Design Guidebook:

(<http://www.mhd.state.ma.us/default.asp?pgid=content/designGuide&sid=about>)

In Summary

In summary, to get a project constructed, a community should:

1. Meet with the District Office of the MassDOT Highway Division to review and discuss the potential project. The District office can provide the community with information and feedback about the possible project's scope, cost, issues, etc.
2. Submit a Project Need Form (PNF), along with any support materials, on the potential project to the District office.
3. After review and feedback from MassDOT Highway Division on the PNF, a Project Initiation Form (PIF), again with any supporting materials, is prepared and submitted to the District office.
4. MassDOT and the Project Review Committee (PRC) act upon the PIF. If the project is approved by the PRC, the community is notified and, if applicable, initiates the design process for the project.
5. The municipality hires a design consultant and also begins work on the right of way plans as well as any permits, local approvals, etc.
6. During this phase the project is incorporated into the regional Transportation Improvement Program (TIP). Placement and prioritization of the project is based upon available funds, evaluation criteria scoring, design status and public support and comments.
7. Design public hearing is held at the 25% design phase.
8. Design progresses to 100% and all plans, specifications and estimates (PS&E) are completed. Project is then ready for advertisement by MassDOT.

MRPC: Unified Planning Work Program (UPWP)

The Unified Planning Work Program (UPWP) for the Montachusett Metropolitan Planning Organization (MPO) is a financial programming tool developed annually as part of the federally certified transportation planning process. This document contains task descriptions of the transportation planning program of the MPO, with associated budget information and funding sources for the current program year. The purpose of the UPWP is to ensure a comprehensive, cooperative, and continuing (3C) transportation planning process in the Leominster-Fitchburg

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Urbanized Area and the Montachusett Region. In addition, this document provides for the coordination of planning efforts between communities in the Montachusett Region.

MRPC: Public Participation Procedures

Public participation continues to be a vital element of the transportation planning process. Community representatives of the Montachusett Joint Transportation Committee (MJTC) meet every month on the third Wednesday to discuss transportation projects and issues of regional importance. Over the last year, the MJTC expanded its membership with the acceptance of the Montachusett Opportunity Council, Inc. (MOC) as an organizational member. It is felt that MOC will be able to expand MRPC's outreach efforts to more diverse populations, groups and agencies as the involvement of private sector participation is a major effort of this committee. In order to guide the Montachusett MPO in this outreach effort, a Public Participation Program (PPP) was developed to solicit input to the various tasks undertaken. The PPP will continue to be reviewed and refined as necessary to insure compliance with federal regulations and improve the public input process.

MRPC: Title VI

The issue of Environmental Justice and how it relates to the MRPC will continue to be reviewed. As part of this effort, the regulations and requirements of Title VI of the Civil Rights Act of 1964 will continuously be examined. Prior efforts have led to the development and adoption of a Limited English Proficiency (LEP) Access Plan for the MPO as well as submittal of annual reports indicating the work done to meet state and federal regulations. In addition, the MRPC substantially revised its web page at www.mrpc.org in order to be more informative and easier to use. The site will continue to be used to post information in order to provide an additional outlet for public awareness.

MassDOT: GreenDOT

GreenDOT is the Massachusetts Department of Transportation sustainability initiative. It is designed to support the implementation of the following state laws.

- Climate Protection and Green Economy Act (Mass. Gen. L. c. 21N)
- Green Communities Act (Chapter 169 of the Acts of 2008)
- Healthy Transportation Compact (section 33 of Chapter 25 of the Acts of 2009)
- Leading by Example (Executive Order of Governor Patrick, no. 488)
- MassDOT's weMove Massachusetts planning initiative
- The "Complete Streets" (see below) design standards of the 2006 MassDOT Highway Division Project Development and Design Guide, as amended

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The GreenDOT initiative incorporates three main goals:

1. Reduce greenhouse gas (GHG) emissions
2. Promote the healthy transportation modes of walking, bicycling, and public transit
3. Support smart growth development

Through the GreenDOT policy, MassDOT will promote sustainable economic development, protect the natural environment, and enhance the quality of life for all the Commonwealth's residents and visitors through the full range of our activities, from strategic planning to construction and system operations.

GreenDOT was designed in response to several existing state laws, Executive Orders, and MassDOT policies. These include the 2009 Transportation Reform Law that created MassDOT and established the *Healthy Transportation Compact* that promotes improved public health through active transportation; the Global Warming Solutions Act, which calls for measurable and enforceable economy-wide greenhouse gas reductions; and MassDOT's Complete Streets design approach that calls for appropriate accommodation of all transportation system users. MassDOT GreenDOT can be found at: <https://www.massdot.state.ma.us/GreenDOT.aspx>.

As part of the implementation plan for GreenDOT:

"Secretary and CEO Richard Davey in October 2012 announced MassDOT's mode shift goal to triple the distance traveled by our customers through bicycling, transit and walking. That goal now joins other goals incorporated into MassDOT's GreenDOT Implementation Plan with tasks and indicators.

MassDOT established the goal to build a more efficient transportation system where fewer of our customers depend on driving alone to get where they are going. We want to reduce greenhouse gas emissions from the transportation system and support better public health outcomes by working to give our customers more healthy travel options.

MassDOT will measure our progress on this ambitious mode shift goal using Personal Miles Traveled (PMT) - distances traveled by all our customers for bicycling, driving, transit and walking in a one year period. It also measures all the trips taken by our customers, not just work trips which are often the focus in transportation planning. Measuring the distance traveled by each mode allows MassDOT to see strategic opportunities to improve the travel options for our customers, strengthen the relationship between land use and transportation planning, and draw a link to greenhouse gas emissions.

Goal numbers are listed in the table below."

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Year	Bicycling PMT	Transit PMT	Walking PMT	Total
2010 (baseline)	150.4m	1.83b	101.1m	2.08b
2020 (benchmark)	330.0m	3.99b	223.9m	4.55b
2030 (goal year)	516.m	5.93b	333.6m	6.78b

Source: <http://transportation.blog.state.ma.us/blog/2012/12/massdot-goal-triple-bicycling-transit-walking.html>

The policies and goals of the Commonwealth, such as *GreenDOT* and *Mode Shift*, will be reviewed, considered and incorporated in all relevant MRPC planning studies. Recommendations derived from these studies will be consistent with state policies.

MassDOT: Complete Streets

The concept of Complete Streets is that all users of the road should be accommodated. Automobiles, bicyclists, public transportation vehicles and riders, and pedestrians of all ages and abilities should have equal access to roadway use. Instituting a **Complete Streets policy** ensures that transportation planners and engineers consistently design and operate the entire roadway with **all users** in mind. MRPC considers the Complete Streets as an important part of our planning process.