

13 Transportation Safety

Transportation safety is a critical component of the region's transportation planning efforts. The safety of the transportation network can strongly impact travel patterns and behaviors as well as the health of a community. Many factors influence the safety of the transportation network including the road environment, road user, and vehicle factors. The congruence of all these factors makes addressing traffic safety a dynamic task. The overall goal for traffic safety is to minimize the consequences or the probability of a vehicle being involved in a hazardous situation.¹ Reducing the frequency and severity of traffic incidents in the county is an ongoing challenge. For Franklin County, this most often results in safety treatments on existing roadways that range from routine maintenance to complete intersection redesign.

The most critical components of a safe, secure, and efficient transportation network are coordination and communication among emergency personnel, law enforcement officers, and the users of the transportation network. There are many challenges associated with the rural nature of Franklin County. Traffic incidents occurring outside of urban areas can be challenging for emergency personnel to respond to in a timely manner and can result in large travel distances between the scene of a crash and a hospital. Additionally, rural areas typically have a lower percentage of seat belt usage and higher travel speeds. Approximately 84 percent of the roadways in Franklin County are rural roads. The remaining 16 percent of roadways are located in urban clusters, or areas with higher population densities, and experience more traffic, congestion, and different crash characteristics. These urban areas often have specific challenges that typically include a wide range of roadway users and higher traffic volumes.

¹ Evans, Leonard. Traffic Safety, Science Service Society. Bloomfield Hills, Michigan. 2004.

Background

Traffic incidents have a direct impact on the safety of a community as well as the operations and security of the transportation network. Nationally, in 2008 alone, more than 37,000 people lost their lives in traffic-related incidents and over 2 million people were injured. This is the equivalent of 102 people dying each day, or one life lost every 14 minutes. Fatal traffic crashes were the leading cause of death for persons at every age from 3 to 34.

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While these statistics are ghastly, the positive news is that the national fatality rate has declined in recent years and is currently at a historic low at 1.25 per million vehicle miles traveled (VMT) in 2008. Furthermore, Massachusetts had the lowest fatality rate (per million vehicle miles traveled) in the country in 2008. A historical examination of the number of fatalities occurring in Massachusetts reveals an impressive 58 percent decrease in the number of traffic-related fatalities between 1975 and 2008 and a 76 percent decrease in the rate of fatalities (per 100 million vehicle miles traveled).² The rate of traffic fatalities (per 100 million vehicle miles traveled) for all roads in the state of Massachusetts was 0.67 in 2008. This rate continues to be among the lowest fatality rates in the nation. This rate is slightly higher for rural roads at 0.87, and lower for urban roads at 0.65.³ There are several reasons why the rate may be higher on rural roads which may include higher travel speeds, a typically lower safety belt usage in rural areas, longer distances to emergency care, and longer emergency response times. In fact, it has been estimated that it takes more than twice as long for EMS personnel to arrive at a crash scene in a rural community, as compared to an urban community –

² National Highway Traffic Safety Administration, Traffic Safety Facts, 2008.

³ National Highway Traffic Safety Administration. Traffic Safety Facts for Massachusetts: 2005-2009.

19 minutes versus 7 minutes.⁴ The additional safety challenges associated with rural roads continues to be monitored and addressed throughout the county.

Table 13-1 presents a summary of traffic-related fatalities for each county in Massachusetts, from 2004 to 2009. Franklin County ranks among the lowest (next to Nantucket and Dukes Counties) in the number of traffic-related fatalities per year. Over the six year period from 2004 to 2009, there were a total of 41 traffic-related fatalities in Franklin County. In 2009, Franklin County had one traffic-related fatality, which is a significantly lower number than previous years. From 2004 to 2009, traffic related fatalities in Franklin County varied, with the number of fatalities peaking at 10 in 2007 and plummeting to one in 2009. Across the state a similar trend can be seen with a slight increase in 2007 and declining in 2008 and 2009. The recent decline in traffic related fatalities at both the state and county levels from 2007 to 2009 denotes a positive trend that should continue to be monitored.

The number of traffic-related pedestrian fatalities in Massachusetts also varied over the five year period from 2005 to 2009. In 2005, a total of 76 pedestrians were killed in traffic crashes across the state. This number decreased in 2006 and 2007 with 61 and 66 fatalities, respectively, but rose to 76 fatalities again in 2008. This number dropped significantly, however, in 2009, with 48 traffic-related pedestrian fatalities.⁵ While this may indicate a positive change, this trend should continue to be monitored.

Table 13-1. Traffic Related Fatalities in Massachusetts by County, 2005-2009

County	Fatalities						Total
	2004	2005	2006	2007	2008	2009	
Barnstable County	8	24	21	30	17	14	114
Berkshire County	15	15	19	10	14	15	88
Bristol County	28	60	51	52	43	37	271
Dukes County	2	2	2	0	1	1	8
Essex County	24	46	35	40	29	36	210
Franklin County	6	8	9	10	7	1	41
Hampden County	20	43	28	38	29	31	189
Hampshire County	4	12	9	10	8	9	52
Middlesex County	25	69	63	61	56	66	340
Nantucket County	0	0	1	1	0	0	2
Norfolk County	24	31	48	37	27	36	203
Plymouth County	36	46	45	42	48	25	242
Suffolk County	16	26	31	39	29	21	162
Worcester County	44	58	67	64	56	42	331
Massachusetts	440	441	429	434	364	334	

Source: National Highway Traffic Safety Administration, U.S. Department of Transportation. Traffic Safety Facts for Massachusetts: 2005-2009 & 2004-2008. Fatalities (All Crashes).

Since 2005 the number of deaths of pedalcyclists (bicyclists and other cyclists) has increased for the State of Massachusetts. In 2005, five pedalcyclists were killed in traffic-related crashes and this number rose to 10 in 2008.⁶

Identification of the Most Hazardous Intersections in Franklin County

Approximately every three years the FRCOG conducts an analysis of crash data to determine high crash locations in the county. All crashes resulting in estimated property damage in excess of \$1,000, injuries, or fatalities must be reported to and recorded by local or state police. Those involved in the crash or the investigating police

⁴ National Highway Traffic Safety Administration, Traffic Crashes Take Their Toll on America's Rural Roads, 2006.

⁵ National Highway Traffic Safety Administration, Traffic Safety Facts, Massachusetts, 2005-2009.

⁶ National Highway Traffic Safety Administration, Traffic Safety Facts – (2005, 2006, 2007, 2008), Bicyclists and Other Cyclists.

officer must complete a standard report form and forward it to the Massachusetts Registry of Motor Vehicles. Based on these reports, the Registry of Motors Vehicles records each crash in a database. This data is provided to MassDOT, who distributes it to the Regional Planning Agencies.

From 2004 through 2006, 4,097 crashes were recorded in the 26 communities in Franklin County. The majority of these crashes occurred in Greenfield (1,410 crashes), Orange (466), Deerfield (472) and Montague (293). These towns are the most densely developed and/or most trafficked areas of the county. To determine the hazardousness of each intersection, a nationally recognized measure called "Equivalent Property Damage Only" (EPDO) was applied to each crash. EPDO assigns points to each crash based on its severity. There are three crash severity levels: "property damage only" which is assigned one point (1), "injury" which is assigned five points (5) and "fatality" which is assigned ten points (10). Only one point category is assigned to each crash, reflecting the most serious crash level. For example, a crash that involved three cars and resulted in property damage to all three cars and two injuries would receive an EPDO rating of 5 reflecting the injuries as a result of the crash.

Using the results of the EPDO calculation, the top fifty most hazardous intersections were ranked and the results are contained in Tables 13-2 and 13-3 and shown on a map at the end of Chapter 5 (Roadway and Bridge Infrastructure). The map shows that the vast majority of the identified intersections are located within the most populated and/or most heavily traveled corridors in the county.

The most hazardous intersection in Franklin County in this analysis has been found to be the Greenfield Rotary at Exit 26 of Interstate 91 and Route 2 with a MEV_{EPDO} rate of 7.97 and an EPDO total of 241 in 109 crashes. The Greenfield Rotary has constantly been the location where the highest number of crashes has occurred and has been listed in the top 5 of the last three hazardous intersection lists created. For these reasons, the FRCOG staff and MassDOT worked to better understand the safety

issues at this location, and in 2008 a project to retrofit the rotary with a new signage and restriping plan was implemented. This work is discussed later in this chapter.

In total, 26 (52%) of the 50 intersections are located in Greenfield, which is by far the most populated and densely developed community in the county. In addition to the Rotary, five other Greenfield intersections are included in the top ten.

Of the 50 most hazardous intersections, 37 appeared on the previous list of the top 50 most hazardous intersection in Franklin County⁷ produced from crash data from 2002 through 2004. Of those 37 intersections, 18 have a MEV_{EPDO} rate higher (marked with "▲" in the tables) than the previous top 50 list and 19 have a MEV_{EPDO} rate lower (marked with "▼" in the tables). These changes in MEV_{EPDO} rate are most likely the result of more information contained in the location descriptions being reported in the RMV database.

It is important to recognize that Franklin County is very rural and the majority of its roadways carry lower traffic volumes than the rest of the state. Therefore, they experience a lower probability of crashes. This means that inclusion of an intersection on the most hazardous intersection list for Franklin County does not necessarily mean that an intersection is experiencing a hazardous crash problem. To see how these intersections on the most hazardous list compare to those intersections statewide, they have been compared to ratings produced by MassDOT.



The intersection of Route 202 at Prescott Road, in Shutesbury (Ranking #9)

⁷ Identification of the Most hazardous Intersections in Franklin County 2002-2004, FRCOG (September 2006)

Table 13-2: Rank 1 – 25 of the Top Fifty Most Hazardous Intersections in Franklin County, 2004 – 2006

Rank	Town	Intersection	Number of Crashes	EPDO Total	MEV _{EPDO} Rate	MEV _{Crash} Rate	Type of Control
1	Greenfield	I-91/Route 2 Rotary	109	241	7.97↓	3.61	Yield
2	Greenfield	Conway St./Devens St.	11	27	7.68↓	3.13	Stop
3	Erving	Route 63/Semb Dr./Forest St.	7	19	5.28↓	1.95	Stop
4	Greenfield	Wells St./Allen St.	17	41	5.09↑	2.11	Stop
5	Greenfield	Conway St./Grove St.	7	19	5.03↑	1.85	Stop
6	Whately	Route 5&10/Christian Ln.	10	30	4.85↓	1.62	Stop
7	Greenfield	Colrain Rd./College Dr.	16	44	4.84↑	1.76	Stop
8	Greenfield	Maple St./Mountain Rd.	8	20	4.41	1.76	Stop
9	Shutesbury	Route 202/Prescott Rd.	5	17	3.86↓	1.13	Stop
10	Buckland	Route 2/Route 112 South	8	29	3.65↑	1.37	Stop
11	Montague	Route 63/North Leverett Rd.	11	23	3.42↑	1.63	Stop
12	Deerfield	Route 5&10/North Main St.	14	42	3.41↓	1.14	Stop
13	Orange	South Main St./West Main St.	23	43	3.36↑	1.80	Traffic Signal
14	Greenfield	Leyden Rd./Leyden Woods Ln.	7	15	3.26	1.52	Stop
15	Greenfield	Colrain St./Elm St.	9	21	2.99	1.28	Traffic Signal
16	Greenfield	Federal St./Silver St.	24	60	2.75↑	1.10	Traffic Signal
17	Greenfield	Main St./Federal St.	29	49	2.74↑	1.62	Traffic Signal
18	Greenfield	Conway St./Allen St.	6	18	2.63↓	0.88	Traffic Signal
19	Deerfield	Route 116 (North)/Route 5&10	25	53	2.62↑	1.23	Traffic Signal
20	Orange	Route 122/East Myrtle St.	5	17	2.59	0.76	Stop
21	Greenfield	Route 2/Big Y Plaza Driveway	23	55	2.55↓	1.07	Stop
22	Greenfield	Colrain Rd./Nash's Mill Rd.	7	15	2.54	1.18	Stop
23	Greenfield	Deerfield St./Cheapside St.	12	32	2.15↓	0.81	Stop
24	Greenfield	High St./Beacon St.	6	26	2.14↑	0.49	Stop
25	Greenfield	Route 2A/River St.	18	50	2.13↓	0.77	Traffic Signal

↑ - MEV_{EPDO} Rate higher than seen in the Top 50 Most Hazardous Intersection list (2002-2004 data)

↓ - MEV_{EPDO} Rate lower than seen in the Top 50 Most Hazardous Intersection list (2002-2004 data)

Table 13-3: Rank 26 –50 of the Top Fifty Most Hazardous Intersections in Franklin County, 2004 – 2006

Rank	Town	Intersection	Number of Crashes	EPDO Total	MEV _{EPDO} Rate	MEV _{Crash} Rate	Type of Control
26	Orange	East Main St. [Rt. 2A]/Wheeler Ave.	4	16	2.13	0.53	Stop
27	Whately	Route 116 (South)/Route 5&10	22	46	2.09↑	1.00	Traffic Signal
28	Deerfield	Route 5&10&116/Elm St.	19	43	2.08↑	0.92	Traffic Signal
29	Greenfield	River St./Laurel St.	5	17	2.03	0.60	Stop
30	Montague	Millers Falls Rd./James Ave.	3	15	2.00	0.40	Stop
31	Whately	Route 5&10&116/Neighbors Gas	12	32	1.97	0.74	Stop
32	Gill	Route 2/Main Road	20	32	1.95↑	1.22	Traffic Signal
33	Northfield	Route 10/Gill Center Rd.	5	21	1.94	0.46	Stop
34	Erving	Route 2/Prospect St.	7	19	1.91	0.70	Yield
35	Greenfield	Silver St./Country Club Rd.	8	24	1.90↓	0.63	Stop
36	Orange	East Main St./Water St.	5	17	1.87	0.55	Stop
37	Greenfield	Route 2/Adams Rd.	14	26	1.79↑	0.96	Traffic Signal
38	Orange	South Main St./East River St.	7	15	1.78↓	0.83	Traffic Signal
39	Deerfield	Route 116/River Rd.	11	39	1.78↑	0.50	Stop
40	Greenfield	High St./Maple St.	7	23	1.71↓	0.52	Stop
41	Greenfield	Main St./Conway St.	8	28	1.65↑	0.47	Stop
42	Greenfield	Federal St./Pierce St.	15	23	1.61↑	0.72	Traffic Signal
43	Greenfield	Deerfield St./Meridian St.	10	18	1.60↓	0.89	Traffic Signal
44	Shelburne	Route 2/Colrain-Shelburne Rd.	4	20	1.60↑	0.32	Stop
45	Greenfield	Route 2/Colrain Rd.	26	42	1.50↓	0.93	Traffic Signal
46	Deerfield	Route 116/Sugarloaf Street	11	27	1.33↓	0.54	Traffic Signal
47	Greenfield	Federal St./Pleasant Street	7	19	1.31↓	0.48	Stop
48	Sunderland	Route 116/Route 47	16	28	1.30↑	0.74	Traffic Signal
49	Deerfield	Route 5&10/Keets Rd.	7	15	1.30	0.61	Stop
50	Greenfield	Deerfield St./Bank Row/Mill St.	9	21	1.29↓	0.55	Traffic Signal

↑ - MEV_{EPDO} Rate higher than seen in the Top 50 Most Hazardous Intersection list (2002-2004 data)

↓ - MEV_{EPDO} Rate lower than seen in the Top 50 Most Hazardous Intersection list (2002-2004 data)

Greenfield Rotary Safety Analysis

The Greenfield Rotary is a critical node in the regional transportation network as it connects the Mohawk Trail (Route 2A to the east of the rotary and Route 2 to the west of the rotary) and Interstate 91, thus providing access to all areas of Franklin County. While this particular location faces several challenges, perhaps the most notable is the congruence of many different roadway types including the most heavily traveled roadways in Franklin County – Interstate 91 as well as Route 2. Interstate 91 provides north-south access and is characterized by high volumes and high travel speeds, serving approximately 25,000 vehicles per day. Also a significantly traveled roadway, the Mohawk Trail (Route 2) is an urban principal arterial roadway accommodating nearly 20,000 vehicles per day east of the Rotary, and is classified as a principal arterial roadway that accommodates approximately 22,500 vehicles per day to the west of the Rotary. Interstate 91 and Route 2 are the only Franklin County National Highway System (NHS) Roads, indicating their importance to the regional and statewide road network. In addition to these main roads, there are also several driveways and local roadways that intersect Route 2/2A in the immediate vicinity of the Rotary, adding to the vast array of traffic conditions, roadway conditions, and travel speeds. Adjacent land uses include a variety of commercial and retail type land uses, and residential areas.

The Greenfield Rotary has been the focus of traffic safety discussions for many years as it consistently ranked near the top of both regional and statewide high crash location lists. In fact, the Greenfield Rotary was identified by the FRCOG as the most hazardous intersection in Franklin County from 2004 to 2006 and consistently ranked in the top five from 1995 to 2004.⁹

⁹ Identification of the Most Hazardous Intersections in Franklin County 2004-2006, Franklin Regional Council of Governments, January 2009.



The Greenfield Rotary, prior to the implementation of safety improvements



The Greenfield Rotary, after the implementation of safety improvements

In response to the Rotary's position as a top crash location, FRCOG staff approached MassDOT, who has jurisdiction over the Rotary, with the idea of exploring the design and implementation of a lane marking and signing plan to channel traffic more efficiently and reduce vehicle circulating speeds in order to improve safety and traffic flow. Crash and traffic count data were collected and analyzed, and it was determined that an additional entry lane should be added to the Mohawk Trail (Route 2 and Route 2A) approaches to reduce delays and, in turn, the probability of rear-end crashes. It was thought that adding the additional lanes to these two approaches would reduce the delays on the I-91 approaches and increase the number of gaps in the circulating flow for those vehicles to enter.

MassDOT undertook the design, and the New York State Department of Transportation (NYSDOT), who had successfully implemented similar improvements to rotaries under their jurisdiction, was consulted during the design process. The bulk of the changes involved adding pavement markings and directional signage, but some minor widening was required to accommodate an additional lane on the Route 2/2A approaches. In addition to the changes to the Rotary, pedestrian improvements were incorporated into the project, including filling in the missing portions of sidewalk between the Rotary and Newton street, bringing the existing sidewalks into compliance with ADA regulations and adding pedestrian activated signals to the Newton Street and Colrain Road intersections. The improvements were completed in the Summer of 2008.

The most recent available crash data was examined to monitor the effectiveness of the improvements at the Greenfield Rotary. As demonstrated in this analysis, many of the crash characteristics (i.e. type of crashes, weather conditions, etc.) of crashes occurring at the Greenfield Rotary remain unchanged before and after the safety improvements were implemented. A comparison of crash frequency, however, shows that there was a decrease in both categories of crashes occurring at the rotary: total number of crashes; as well as, those crashes resulting in \$1,000 of property damage, injury or fatality. However, more data is needed to validate the statistical significance of these findings, and further study will be pursued in future years as additional data becomes available.

Even though crashes at the Greenfield Rotary continue to be of the same type of crashes that occurred prior to the installation of the improvements (i.e. rear-end collisions), promising early results indicate that the overall number of crashes has dropped substantially. Due to the limited availability of data and the short amount of time since the improvements were completed, it is important to continue monitoring this area so that a more statistically significant set of data can be analyzed in the future.

Roundabout at Greenfield Community College (GCC) and Colrain Road

The intersection of Colrain Road and College Drive in Greenfield is located at the entrance to Greenfield Community College (GCC) and experiences delay and safety challenges. MassDOT has been working with Greenfield to develop potential improvements to this intersection and has agreed upon the installation of a roundabout to enhance safety and improve traffic flow. The roundabout is currently under design with a projected cost of \$1.6 million.

Route 2 East Safety Improvements

Background

Route 2 (also known as the Mohawk Trail in Franklin County) has served as the primary east-west highway across the northern portion of the state since the beginning of the 20th century. Safety along Route 2 in Franklin County has been a concern for decades. It is a four-lane highway across the majority of Massachusetts, but it drops to two lanes in Phillipston close to the Franklin County border. The highway from Phillipston west is hilly and winding, has unlimited local access, and at several locations has manufacturing facilities located along it. Route 2 is part of the National Highway System (NHS).

Since the 1960s, the potential widening of the section of Route 2 between Phillipston and the Greenfield town line has been studied and debated at length. Nearly every debate centered around the irresolvable controversy of whether to widen Route 2 through Erving, which would require significant property acquisition, or to cross the Millers River into Wendell and build a new road through the Wendell State Forest. The debate continued into the early 1990s at which time MassDOT notified local officials that until there was local consensus on how to proceed they would take no action.

The 1994 Franklin County Long Range Regional Transportation Plan recommended that, for a variety of reasons, the feasibility of expanding

Route 2 from a two-lane to a four-lane highway between Phillipston and Orange should be studied. Also at that time, the Route 2 Task Force was formed in recognition that a consensus and a new approach were needed if any actions to resolve issues with the roadway were going to be undertaken. The Route 2 Task Force is comprised of Select Board representatives from each town along the corridor, as well as concerned non-profit groups and environmental advocates. The group has met on a regular, often monthly basis, since its establishment in 1994.

In 1995, the recommendation to study the feasibility of widening Route 2 from Phillipston to Orange was modified to focus on identifying and implementing safety improvements throughout the entire corridor from Phillipston to Greenfield. The Task Force was committed to developing a safety improvement plan for the entire Phillipston to Greenfield corridor that was endorsed by all of the towns along the corridor. Consequently, MassDOT, the FRCOG, the Montachusett Regional Planning Commission, and the Route 2 Task Force compiled a scope of work for such a study. In May 1996, Wilbur Smith Associates (WSA) was hired to conduct the safety improvement study with \$200,000 in funding being provided by MassDOT.

The primary goal of the *Route 2 Safety Improvement Study* was to conduct a detailed operational analysis of traffic conditions on Route 2 between Phillipston and Interstate 91 in Greenfield, and prepare recommendations for safety improvements that could be implemented in the near term. In April, 2006 MassDOT, as part of a revised environmental assessment of some portions of the safety improvements, formally stated that they were abandoning any plans to expand Route 2 to four lanes west of Phillipston due to the extreme cost of such improvements and the unsubstantiated capacity demand for them.

After completion of the Wilbur-Smith Study, MassDOT and the Route 2 Task Force grouped the corridor's recommendations into seven sections in which to concentrate the identification and implementation of specific safety improvements.

They were: Athol/Phillipston, Orange, Erving Paper Mill Corner, Erving Center, Farley, Ervingside and Gill/Greenfield. Since December 2006, significant progress has been made toward achieving these goals. The following is a break down of project status to date.

1. Relocation of Route 2 at Erving Paper Mill

The construction of this bypass around the Erving Paper Mill was the first Safety Improvement to be completed, and it now allows trucks going to the Plant to have unobstructed access to their loading docks. Previously, trucks needed to routinely stop traffic on Route 2 in order to access the docks. This created both a safety hazard and a congestion problem. In addition, workers had to cross busy Route 2 near an "S" curve in order to enter the factory since the employee parking lot was located on the other side Route 2. Finally, the business was landlocked and unable to expand, having the Millers River to its south side, and Route 2 on its north. Conducting a land swap between the Paper Mill and MassDOT allowed the relocation of Route 2 north of its existing location, providing better loading capability for trucks, safer parking for employees, room for facility expansion, and reduction of traffic and congestion. The new stretch of roadway opened to traffic in November 2006 to rave reviews.

2. Athol-Phillipston: Task Force Safety Improvements

The Athol to Phillipston safety improvements were completed in 2007. The improvements included the installation of Qwick Kurb, a median curbing to prevent vehicles from passing on a double line, improvements to Exit 17 (Route 32) in Athol, including changing acceleration and deceleration lanes to lengthen and improve radii. A truck weigh station was created on the westbound side of Route 2 between Exit 17 (Route 32) in Athol and Exit 16 (Route 202) in Orange. Improvements were also made to the eastbound and westbound ramp geometry of Exit 18 (2A) in Athol to eliminate compound curves.

3. Orange

This section of the project includes intersection and climbing lane improvements, as well as reconstruction of the Route 122 Bridge. The project received approximately \$11 million of ARRA funding in 2010, and is currently under construction.

In addition, three bridge projects in the area are also under design under separate contracts. They are:

- Lake Rohunta bridge
- Route 202 bridge
- West River Street bridge over Route 2

4. Ervingside

Improvements in the Ervingside section of Erving were developed in two stages. The first phase was the replacement of two bridges near the French King Bowling Alley and the lowering of the vertical curve between the two bridges. This phase was completed in April 2009. The second phase included the dedication of turn lanes on Route 2 to side streets, and improvements to the side streets feeding Route 2, including Route 63. These improvements entailed protected turn lanes, changes to traffic flow, and new acceleration/deceleration lanes. The cost of the second phase of the project was \$3.4 million. The project was completed in the Fall of 2009.

5. Erving Center

Safety improvements in Erving Center will focus on traffic calming and safer turning movements. The improvements will consist of spot improvements. The design contract was awarded in January 2009. The scope of work was compiled by suggestions from the public, the Route 2 Task Force, and MassDOT in 2007. The improvements include improved access, sight distance, and pedestrian access to the side streets feeding Route 2, and well as a sidewalk connecting Mountain Road with the downtown. Additional public meetings will be held to review the design. The estimated cost of the project is \$2 million, and it is approaching the 25% design stage.

6. Farley

Safety improvements in the Farley area of Erving focus on providing safer turning movements with protected turn lanes and improving sight distance in some locations. The design for the project will be reviewed at several public hearings. The estimated cost of this project is \$3 million, and it too is approaching the 25% design stage.

7. Gill-Greenfield

Safety improvements in the Gill-Greenfield area will incorporate a protected turn lane (westbound) to access Barton Cove, and provide safer turning movements for the Route 2 businesses near the Avenue A/Route 2 intersection. These improvements are not yet under design. Currently under construction, however, are improvements at the Route 2/Avenue A that are being completed as part of the work to rehabilitate the Gill-Montague Bridge. Recommendations to address the curvature of the roadway in the Factory Hollow area of Greenfield are not progressing at this time due to the extreme cost of realignment related to the presence of ledge and other geographic constraints. Task Force comments and recommendations were compiled after meeting with local residents, and forwarded to MassDOT on October 2, 2002.

During the next several years the Route 2 Task Force will continue working with MassDOT to complete implementation of these critical safety improvements.

Route 2 West Safety Study

The Route 2 West Safety Study is a multi-year study undertaken to provide a detailed review of potential safety issues along the 22-mile Route 2 corridor from and including the Greenfield Rotary west to the Charlemont/Savoy Town Line. Over the past several years, the FRCOG has been involved in a number of studies (Buckland-Shelburne Master Plan, Downtown Greenfield Circulation Study, Mohawk Trail Scenic Byway Corridor Management Plan, and the Identification of the Most Hazardous Intersections in Franklin County) that have included all or a portion of the Route 2 corridor west of Interstate 91. To date, the Greenfield Rotary

improvements mentioned above have been the primary focus of the study. A number of recommendations are currently under consideration for other sections of Route 2 West and will be reviewed to assess their feasibility with MassDOT before being finalized. The recommendations currently being considered (starting at the Greenfield Rotary) are:

- Limit left turns in and out of the Big Y Plaza Driveway onto Route 2.
- Continue two lanes on Route 2 in the westbound direction past the Home Depot driveway.
- Restripe Route 2 up Greenfield Mountain to provide a climbing lane for westbound slow traffic.
- Continue to monitor crash and traffic conditions at the Colrain-Shelburne Road intersection with Route 2 to determine the need for a dedicated right turn lane on in the westbound direction of Route 2.
- Add a protected left-turn lane to the westbound direction of Route 2 at its intersection with South Maple Street.
- Work with MassDOT District 1 and the Town of Charlemont to develop traffic calming measures and pedestrian improvements through the Village Center.
- Identify and investigate areas experiencing multiple lane departure crashes.



Westbound on Route 2, on Greenfield Mountain

Development of Safety Improvements for Hazardous Locations

The Road Safety Audit (RSA) process is an effective tool for improving traffic safety at specific locations and is a measure that has been supported for many years by MassDOT and the FHWA. For the past several years, Massachusetts has served as a Lead State in preventing run-off the road (lane departure) crashes through the RSA process. The Lead State status was developed in conjunction with the Strategic Highway Safety Plan (SHSP). To date, approximately 18 RSAs have been completed in Massachusetts focusing on lane departure crashes.

In addition to lane departure crashes, MassDOT has also expressed interest in expanding the Massachusetts RSA program to address crash locations involving non-motorized users of the transportation network, as well as intersections where safety is an issue.¹⁰ The expansion of the RSA program in Massachusetts to pedestrians and bicyclists as well as other non-motorized transportation users comes at a critical time when it seems demand for these modes of transportation are increasing. In accordance with the MassDOT plan to utilize the RSA program in the future to address pedestrian and bicycle hot spot locations, as well as intersection hot spot crash locations, the FRCOG worked to identify candidate locations in Franklin County which fall into this category.

With the intention of bringing the RSA process to Franklin County, in 2010 the FRCOG performed a study, *Development of Safety Improvements for Hazardous Locations*, to identify specific locations that would benefit most from a RSA. Several potential locations were contained in the *Identification of the Most Hazardous Intersections in Franklin County 2004-2006* report published by the FRCOG in the Summer of 2009. Starting from the top of the ranked list (the most hazardous intersection) and working down, the FRCOG identified five preliminary locations to receive a RSA.

¹⁰ MassHighway, "Road Safety Audit," <<http://www.mhd.state.ma.us>>, accessed on August 27, 2009.



A cyclist is observed during the initial site visit

The report documented the existing conditions for five preliminary RSA site locations and concluded with a recommendation to proceed with a RSA at four of these locations. As a result of this analysis, final site location recommendations included:

- **Conway Street; from the intersection of Conway Street at Grove Street to the intersection of Conway Street at Devens Street (Greenfield).** The intersections of Conway Street at Devens Street and Conway Street at Grove Street were ranked high on the top 50 most hazardous locations in Franklin County list at numbers 2 and 5, respectively. The identification of two sites located on the same roadway close to each other indicates that the problems experienced at these intersections may not be completely isolated. It was, therefore, determined that studying the two intersections, as well as the roadway which links them (Conway Street Corridor), may reveal corridor-wide issues. This site was chosen because of the high ranking of each of the two intersections, as well as the presence of pedestrians and bicyclists within the study area.
- **Wells Street at Allen Street (Greenfield).** The intersection of Wells Street at Allen Street was included in the final recommendation as a site which should receive a RSA because of its high ranking on the top fifty most hazardous locations list (ranking number 4) as well as the presence of pedestrians and bicyclists within the study area.

- **Route 5/10 at Christian Lane (Whately).** The intersection of Route 5/10 at Christian Lane is a recommended location to receive a RSA because the preliminary site visit indicated the potential for several low cost safety improvements to be made at this intersection. Furthermore, this location was ranked within the top ten (ranking number 6) on the top fifty most hazardous locations list. While there may be some larger-scale design concerns at this intersection, it has been determined that there may be potential for this location to benefit from a RSA.
- **Route 202 at Prescott Road (Shutesbury).** The intersection of Route 202 at Prescott Road is not recommended to receive a RSA at this time due to physical limitations of the design of the roadway and surrounding site conditions. The rural nature of this roadway, among several horizontal and vertical curves, as well as the lack of pedestrian or bicyclist traffic indicated that there may be very few low-cost safety improvements which can be implemented at this location. Therefore, while this location should be studied in greater detail to determine the potential for safety improvements in the future, the RSA process does not seem to be the most beneficial medium for this location.

In conclusion, preliminary site evaluations were performed for five high crash intersections in Franklin County, it was determined that four of these intersections could benefit greatly from a RSA.

Road Safety Audits

The RSA process is a formal safety examination of an existing or future roadway or intersection by an independent, multidisciplinary team to identify potential safety issues and possible opportunities for safety improvements. Identified safety improvements range from short-term, low-cost options to large scale redesign improvements. However, the majority of the improvements are focused on short and mid-term, low to mid-cost safety improvements that can elicit immediate results. The RSA process involves an audit team that

typically includes representatives from State and Local agencies, such as State Transportation Officials and local Public Safety Officers.

The FRCOG, in conjunction with MassDOT and local municipalities has performed several RSAs in Franklin County. To date, ten (10) RSAs have been performed in the communities of Deerfield, Greenfield, and Whately. The specific locations of these RSAs are:

- Route 5/10 (Greenfield Road) at Route 116 (Conway Road), Deerfield;
- Route 5/10 (Greenfield Road) at North Main Street, Deerfield;
- Route 116 (Sunderland Road) at Sugarloaf Street, Deerfield;
- Interstate 91 at Exit 25, Deerfield;
- Conway Street at Devens Street, Greenfield;
- Conway Street at Grove Street, Greenfield;
- Conway Street Corridor (between Devens Street and Grove Street), Greenfield;
- Wells Street at Allen Street, Greenfield;
- Interstate 91 at Exit 24, Whately; and
- Route 5/10 at Christian Lane, Whately.

Audit team members from the FRCOG, MassDOT, FHWA, and municipalities joined the RSA team leader, hired by MassDOT. For each location, the RSA team performed a review of background information such as traffic volumes, crash information, and operation concerns from local officials. After a review of background information was performed, the team visited each of the locations to analyze these issues in a hands-on, collaborative environment. Each RSA concluded with the audit team developing an extensive list of challenges, issues, and potential solutions for the study area. Final recommendations were provided to audit team members by the consultant, upon completion of the report.



Road Safety Audit (RSA) team members in the field

Bicycle and Pedestrian Facilities

Bicycle Facilities

With the growing number of bicycle facilities available to potential riders, there is increased use of bicycles for both transportation and recreational purposes. As a result, strategies to make use of this mode of transportation as safe as possible have been encouraged. These strategies include providing off-road facilities to separate bicycling and motorized traffic, installing signage identifying shared roadway facilities, and providing general safety education.

The location and design of Franklin County Bikeway facilities take safety into consideration. An example of a bikeway project that was able to address a specific safety concern in a community is the off-road Riverside Greenway Bikepath in Greenfield. This section of the Franklin County Bikeway was able to successfully link a dense residential area with a popular swimming and recreation area. Previously, residents, including many children, would use a discontinued road and cross the Green River as a shortcut to the recreation area. The bikepath has alleviated this potentially dangerous situation by creating a paved path and bridge over the Green River.

The Canalside Trail, which links the Towns of Montague and Deerfield, took specific precautions to address safety issues. This section of the Franklin County Bikeway is a 3.27-mile off-road bicycle path that travels along the Connecticut River Canal in Turners Falls and over a rehabilitated rail bridge into Deerfield. The bikepath incorporates fencing

along the canal, and pavement markings and signage along the roadway to identify the bicycle route.



The Canalside Trail, in Turner's Falls

The FRCOG worked in conjunction with the Pioneer Valley Planning Commission to implement a Transportation Demand Management Program project called *Share the Road in the Connecticut River Valley: An Infrastructure Improvement Project and Campaign to Promote Traveling by Bicycle*. The purpose of this project is to increase accessibility and awareness for bicycle commuting in the region. The project included the purchase, distribution and installation of the Franklin County Bikeway Logo Trailblazing Signs and Share the Road signs along the designated shared roadway routes of the Franklin County Bikeway. The sign installation was completed in December 2009. The project also included the purchase and installation of bike racks throughout the Franklin and Pioneer Valley Regions.



A Franklin County Bikeway Sign

The FRCOG has also produced four comprehensive maps depicting bicycling routes throughout the county. The four maps include the original Franklin County Bikeway map, Central Franklin County Bikeway map, Eastern Franklin County Bikeway map, and the Western Franklin County Bikeway map. The routes highlighted are ranked for rider ability and topography to encourage safety.

Pedestrian Facilities

In many cases, the sidewalks and streets in the downtowns and village centers of Franklin County were originally laid out hundreds of years ago. Since then, these locations have required some updating to adjust to modern transportation demands while also providing a safe environment for pedestrians.

The FRCOG has been a leader in several initiatives to encourage walking and providing safe connections for pedestrians. Strategies to achieve safer walking environments include creating pedestrian facilities where they previously did not exist but were needed, improving existing facilities, and providing useful information to support municipal level pedestrian planning.

The FRCOG has prepared a draft *Franklin Regional Pedestrian Plan*, that identifies the pedestrian infrastructure needs of the towns, and locations that could most benefit from increased sidewalks or new linkages. This will assist in designing pedestrian improvement projects to dovetail with highway repair/construction projects as they develop. An example of an area that could support a great deal of pedestrian activity, but is not currently conducive to walking is found at the flagship Yankee Candle Store and the other nearby tourist destinations in South Deerfield. Although the shops are located in easily walkable proximity to each other, the lack of sidewalks along Route 5/10/116, the width of this heavily traveled road, poor pedestrian connections, and the lack of a human scale development pattern encourages driving to each stop. Future efforts to address this situation are planned.

Route 116/7-11 Plaza - Sunderland

Following the tragic death in December 2004 of a pedestrian crossing Route 116 in front of the 7-11 Plaza in Sunderland, the FRCOG assisted the Town of Sunderland and MassDOT to identify measures that would be implemented in the study area to improve pedestrian, bicycle, and vehicle safety. As part of the problem identification process, extensive crash and traffic data was collected and analyzed. The final design consisted of replacing the four current marked crosswalks with one clearly marked crossing that includes in-pavement pedestrian activated lights; installation of Tyregrip roadway markings; relocated and centralized bus stops; sidewalks along both sides of the roadway; addition of exclusive left turn lanes at Old Amherst Road and Squire Village Drive; and improved roadway lighting.

The Route 116 corridor consists of a bidirectional roadway (one lane per direction) with a posted speed limit of 40 mph within the study area. The 85th percentile speed, the speed at which 85 percent of motorists travel, ranges from 45 mph to 55 mph. This speed indicates the speed that most motorists on the road consider safe and reasonable under ideal conditions. The area is characterized by multiple commercial access driveways, residential driveways, and transit bays. In 2007, data collection for the area showed approximately 35 pedestrians per hour crossing Route 116 during peak hours, and approximately 14,000 vehicles per day traveling this stretch of road at its peak location in front of the Cliffside Apartment Complex. A noticeable population of students attending the University of Massachusetts, Amherst lives within or adjacent to the study area, and commuters to the University from around the region travel the road using a combination of personal automobiles, public transit, and bicycles. Travel speeds, combined with the relatively high pedestrian demand and the mix of travel modes (e.g. transit, bicycles, etc.) contribute to the safety challenges in this area.

The effectiveness of the installed safety improvements were evaluated by FRCOG and MassDOT. Both agencies determined that the implemented safety improvements had a positive

impact on improving the safety along the corridor by decreasing crash frequency as well as crash severity. In other words, the frequency of crashes decreased and the type of crashes shifted away from the more dangerous angle type crashes to the typically less severe rear-end type crashes. While the improvements were shown to improve the safety of the area, there was still some concern that more safety improvements could be made. This need for additional safety measures was revisited when, on September 8, 2009, two pedestrians were struck while crossing in the crosswalk on Route 116. Both pedestrians survived the incident; however, one had several injuries. This crash prompted additional discussions between MassDOT, the Town, residents, and the FRCOG. The resultant solution was the installation of a traffic signal at the intersection of Squire Village Drive and Route 116, where the one crosswalk is located. The traffic signal was installed and activated on October 22, 2009.

Overview of Previously Installed Safety Improvements

- **Traffic Signal:** As mentioned, the latest incident led to the installation of a traffic signal at the intersection of Route 116 and Squire Village Drive. The traffic signal allows pedestrians to push a button and activate the signal, forcing vehicles on Route 116 to stop for their crossing. The traffic signal also allows vehicles exiting from Squire Village Drive to safely make left hand turns onto Route 116.
- **Crosswalks:** Prior to the implementation of the various safety improvements, the Route 116 corridor consisted of four mid-block pedestrian crosswalks within the study area. Consolidating the four crosswalks into one crosswalk was intended to help increase driver awareness by defining one central location to expect pedestrians, instead of four. Additionally, this consolidation is also intended to help improve traffic flow along Route 116 as vehicles should only have to slow or stop for one location.

- **Tyregrip:** Another safety improvement installed within the study area is the Tyregrip high friction surfacing system. Tyregrip is a high color contrast, textured material applied to the pavement surface to act as a median or lane marking without the installation of a raised barrier. It is intended to improve roadway safety by adding more definition to the roadway geometry, separating opposing traffic streams, and delineating the roadway.
- **Relocation of Bus Bays:** As part of the original improvements, the relocation of the PVTA bus stops was identified as an important change. The most significant change was the relocation of the northbound transit stop which was originally located just south of the Squire Village Driveway (across from the 7-Eleven Plaza). This transit stop was moved to north of the Squire Village Driveway and a more definitive bus pull out bay was created to safely remove the loading and unloading bus from the traffic stream. By moving the location of the transit stop to north of the crosswalk, a stopped bus no longer impedes the visibility of a pedestrian in the crosswalk. Additionally, the more defined bus bays provide more shelter to the buses and the pedestrians entering and exiting the buses.
- **Sidewalks and Protected Turn Lanes:** Sidewalks were installed on both sides of Route 116 within the study area, along with protected left turn lanes at Old Amherst Road and Squire Village Drive. The addition of these sidewalks was a natural solution to improving pedestrian facilities, particularly given the steady pedestrian demand. The addition of protected left turn lanes within the study area also helps improve traffic safety, as well as, traffic operations by removing the turning vehicle from the traffic stream.

- **Lighting:** Improved roadway lighting near the crosswalk improves nighttime visibility in the study area. The additional roadway lighting can also help communicate to motorists that they are entering into a different roadside environment.

The following improvements were part of the 2004 Safety Improvement Project, but were removed as part of the more recent improvements that took place in 2009. The installation of the traffic signal no longer made these improvements relevant.

- **In Pavement Warning Lights:** In-pavement flashing warning lights that were embedded into the pavement at the location of the new, consolidated crosswalk were removed.
- **Flashing Beacons & Pavement Markings:** The flashing beacons were installed to supplement the visibility of the in-pavement warning lights. With the installation of the traffic signal and removal of the in-pavement warning lights, the flashing beacons were no longer necessary.

Streetscape Projects

A number of streetscape projects have been completed in Greenfield, Conway, Shelburne Falls, Millers Falls, and Northfield. These projects have resulted in enhanced pedestrian crossings, lighting and, in turn, safety and comfort for pedestrians in these areas. Reviewing pedestrian considerations have now become a standard procedure for inclusion in any road improvement project. An excellent example of this is seen with the Greenfield Rotary Improvement project. Incorporated into that project were completion of critical missing sidewalk links and the addition of pedestrian activated signals, both of which were in the immediate area of the rotary.

Recommendations for Transportation Safety

- Design and Construct **Route 2 Safety improvements** in Erving Center, Farley, and Gill/Greenfield.

- Continue to evaluate the effectiveness of the improvements constructed at the **Greenfield Rotary**.
- Create a **climbing lane along Route 2 West** up Greenfield Mountain.
- Add a **dedicated Left Turn Lane** at the intersection of Route 2/Maple Street in **Shelburne**.
- Continue to monitor the need for and feasibility of adding a **dedicated right turn lane** at the intersection of Route 2/Colrain-Shelburne Road in **Shelburne**.
- Evaluate alternative options to **improve safety at commercial driveways** along Route 2 West in Greenfield.
- Work with MassDOT to develop and implement **traffic calming and pedestrian improvements** along Route 2 West through the Charlemont Village Center.
- Construct a **roundabout** at Investigate at the intersection of Colrain Road/Colrain Street/College Drive at Greenfield Community College in **Greenfield** to improve traffic flow and safety.
- Investigate alternative intersection treatments to **improve safety and traffic flow at** the intersection of Cushman Road/Shutesbury Road in **Leverett**.
- Continue to be involved in the process related to the **Strategic Highway Safety Plan**.
- Continue to **monitor the effectiveness of the safety improvements** implemented along Route 116 in Sunderland.
- Continue to monitor **high crash locations** and work with MassDOT and Towns to develop recommendations to improve safety.
- Work with MassDOT, Towns, and Police Departments to identify **corridors experiencing elevated numbers of “Lane Departure”** crashes. Develop strategies to mitigate this type of crash.
- Continue to **conduct Road Safety Audits** as necessary and appropriate.
- **Implement safety recommendations** from the Road Safety Audits, including the realignment and potential signalization of Exit 24 off of northbound I-91 onto Route 5/10.