CHAPTER 3

TRANSPORTATION RESOURCES

The road infrastructure of Shelburne and Buckland is comprised of two state highways and a network of roads serving the village center and outlying rural areas. Due to the rural nature of Buckland and Shelburne, cars and trucks are the primary modes of transportation for people and goods. According to the 1990 Census, 95% of Buckland households and 90% of Shelburne households own at least one vehicle. In addition, 66% of Buckland’s and 81% of Shelburne’s working population are employed outside of the town they live in. This places great importance on the road networks of both towns for commuting, particularly since neither community is well served by public transportation.

Route 2 is the main east-west route across the northern portion of Massachusetts and this highway bisects Shelburne and crosses through a small portion of Buckland. Route 112, the main North/South route in the Western half of Franklin County, bisects Buckland and crosses a small portion of Shelburne. These two routes link the commuters, services, and businesses of both towns to the interstate network. Both communities share a village center, Shelburne Falls, and have rural outlying areas. According to an analysis of the road infrastructure completed for both communities, 46% of Buckland's town maintained paved roads and 27% of Shelburne's are in poor condition. Not surprisingly, the Master Planning surveys completed by each community (conducted by Buckland in 1996 and Shelburne in 1997) revealed that road maintenance and improvements were a top priority. Roads were the top ranking category for needed town expenditures in Buckland. For Shelburne, repair and maintenance of local roads was the highest ranking category for town expenditures. The surveys can be found in Appendix I.

The roadway infrastructure is not only important to local residents, but also to tourists visiting the historic Village of Shelburne Falls or driving the scenic Mohawk Trail. According to information compiled by the Shelburne Falls Village Information Center, tourist traffic has increased since the installation of signs on I-91 for the Bridge of Flowers. This has led to a noticeable increase in traffic congestion in the village center and questions about the adequacy of parking and pedestrian facilities. Traffic counting data for both communities is limited and additional data collection is needed to document this trend.

Additional transportation infrastructure includes a limited public transit service and an active rail line. A transit route does exist between Greenfield and Charlemont, with stops located in Shelburne Falls. However, this runs only once in the morning and once in the afternoon on weekdays, during the school year. The lack of alternative transportation options is reflected in the 1990 Census commuter data, which showed that only 0.6% of Buckland’s commuters and 0.5% of Shelburne’s commuters used public transportation. The vast majority of residents drive alone. Increased usage of the rail line may occur if efforts to develop the Buckland Railyard property are successful.

The transportation section of the Master Plan will address most of the transportation issues outlined above. These issues are also reflected in the following Transportation goals and strategies. The goals and strategies were prepared by the towns based on the results of their community surveys and were adopted by Buckland and Shelburne at their respective Town Meetings. These goals and strategies will be refined by the Transportation Subcommittee and approved by the Master Planning Committee.

Goals

- To improve the condition of the road system.
- To improve the pedestrian infrastructure.
- To improve accessibility for the elderly and disabled.
- To address future parking requirements in Shelburne Falls village center.

Strategies

- Use available transportation funds judiciously to maintain and improve roads and streets.
- Pursue additional funding sources for road improvement projects, such as Public Works Economic Development (PWED) or Small Town Rural Assistance Program (STRAP) funds, as they become available.
- Strive to devote additional funding within the existing town budget to road improvements and maintenance.
- Support economic development efforts to expand Buckland's tax base through increased commercial and industrial development, appropriate for the town, so that additional funds are available for road maintenance and improvements.
- Provide or improve sidewalks in the Shelburne Falls village center.
- Explore the feasibility of providing walking trails throughout Shelburne.
- Explore the feasibility of establishing bike paths in Shelburne.
- Assist in implementing accessibility improvements for municipal and other village center buildings, which are compatible with the historic character of the business district.
- Address parking and circulation issues in the village center.

To address these Goals and Strategies the following work items are included in the Master Plan:

- A comprehensive pavement management analysis of all town maintained paved roads in Buckland and Shelburne to assess the overall condition of the road network and to estimate funding needed to improve the condition of the road system;
- Collection of traffic counts for the main roads in Buckland and Shelburne and the village center;
- Collection and analysis of accident data;
- An assessment of traffic volumes to road capacity known as Level of Service (LOS) along important roads in Buckland and Shelburne;
- Intersection assessments at critical locations along Route 2 and within the village center;
- Incorporation of the results of the parking study currently being conducted by the Franklin Regional Council of Governments for the Shelburne Falls Area Business Association (SFABA); and
- Assessment of the potential for improving the pedestrian network in the village center and for adding bicycle and pedestrian trails.

Future tasks, which are outside the Scope of Work of this Master Plan, but which may be included in regional transportation planning efforts are an analysis of existing transit services and exploration of opportunities to increase transit services for Buckland and Shelburne.

Pavement Management Analysis

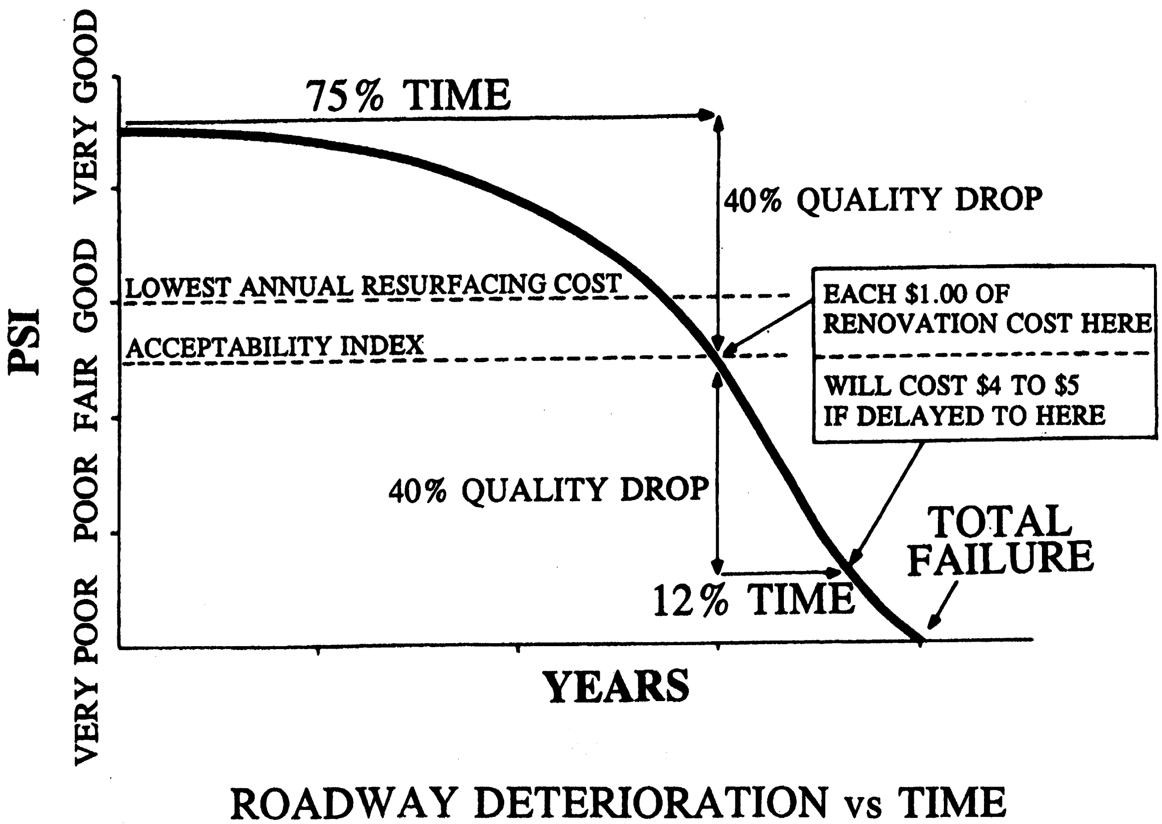
The residents of both towns expressed great concern regarding the condition of the road network. In Buckland, survey respondents made road maintenance the highest priority for the use of existing tax dollars. In Shelburne, survey respondents made road maintenance the highest priority among transportation issues, stating it was an important or very important issue to them. Based on this overwhelming concern, the FRCOG Planning Department conducted a Pavement Management Analysis of the paved road network in both towns.

A Pavement Management System (PMS), as defined by the American Public Works Association (APWA), is "a systematic method for routinely collecting, storing, and retrieving the kind of decision-making information needed (about pavement) to make maximum use of limited maintenance and construction dollars." Historically, road maintenance funds were channeled to those roads that were perceived by local highway superintendents to be in the worst condition, or where political influence dictated. Various studies have indicated that a pavement maintained in a perpetual "good" to "excellent" condition, requires one-fourth to one-fifth the investment of a pavement that is un-maintained and rehabilitated once it reaches a "poor" or "failed" condition. A PMS is designed to provide quantitative information to support repair and budget decisions which reflect this more recent thinking.

Figure 3-1 gives a graphical depiction of the general life cycle of an asphalt pavement. Under normal conditions of consistent weather and traffic patterns, a pavement will deteriorate by 40 percent in the first 75 percent of its life. During the next 12 percent of its life, the pavement will deteriorate by a further 40 percent. With proper timing of preventative maintenance measures during the first 75 percent of a pavement's life, many years can be added to the functionality of the road at a lower overall cost.

With limited availability of transportation funding, it is more important than ever to make cost-effective decisions. A formalized PMS improves on the existing practices that most highway departments already employ by enhancing professional judgement through guidelines and a standardized approach. A PMS is generally based on a piece of computer software that has been developed from years of research about pavement behavior and the effects of timed repair strategies. A PMS can help determine the most appropriate time for repair action to be taken, what the most cost-effective method is, and the cost of maintaining the roadway at a desirable condition level.

Figure 3-1: Life Cycle of Asphalt Pavement



Source: 1996 Pavement Management Program Technical Report, Mass Highway Department

The FRCOG Planning Department has been involved in pavement management since the early 1990's and recently completed a three year contract with the Massachusetts Highway Department (MHD) encompassing nearly 500 miles of Federal Aid and State Transportation Program (STP) funded roads in Franklin County. The FRCOG Planning Department utilizes the RoadManager (RM) pavement management software for its PMS studies and extracts basic geometric and administrative information about roads from the State maintained Road Inventory File (RIF). The RIF is a computerized database containing information on all public roads and highways within the Commonwealth of Massachusetts. It was originally compiled from field data collected between 1969 and 1974 and has become an important reference source for transportation planning and administration at the Federal, State and local levels.

The Pavement Management System does not address gravel roads. However, since all gravel surfaced roads are re-graded twice a year in Buckland and once a year in Shelburne, concentrating limited resources on the study of paved roadways makes sense. The methodology used for data collection and analysis was designed to maximize the effectiveness of the RM software. For each paved road, section breaks were defined based on the following criteria: after one mile in length; at a change in pavement surface type; at a pavement width change of more than five feet; or if the pavement condition changed dramatically. All data collection was conducted by a field survey. This involved driving each road twice. The first pass identified the start and end points of each section, additionally the section length and width were recorded along with the pavement type. The second pass was made at low speed (10 mph) during which the average pavement distresses were noted.

The RM software requires the identification of nine categories of distresses, which are:

1. Potholes and Non-Utility Patches
2. Travel Lane Alligatoring
3. Distortion
4. Rutting
5. Weathering/Block Cracking
6. Transverse and Longitudinal Cracking
7. Bleeding/Polished Aggregate
8. Surface Wear and Raveling
9. Corrugation, Shoving or Slippage

Distress categories 1 to 4 are known as base distresses. These distresses are caused by a failure in the pavement base and can only be repaired by reconstruction to the full depth of the road structure. Distress categories 5 to 9 are known as surface distresses. These distresses are generally caused by a failure in the pavement surface due to the result of aging and/or vehicle loading and can be repaired with relatively low cost maintenance methods such as crack sealing or overlays.

The average severity and extent of each distress was noted for each section and then input into the software. On completion of the data entry for each section, the software conducted three sets of analyses:

1. Calculation of a Pavement Condition Index
2. Assignment of a Repair Strategy
3. Calculation of a Benefit Value

The Pavement Condition Index (PCI) is based upon a scale between 100 (best) and 0 (worst). A section with no distresses will have a PCI equal to 100 and as the number, severity and extent of distresses increase the lower the PCI becomes. A general evaluation of a pavement's condition is as follows:

- **PCI between 95 and 100 means** that the pavement is in **excellent** condition and requires no immediate or short-term pavement maintenance.
- **PCI between 85 and 94** means that the pavement is in **good** condition and generally requires minor or no immediate pavement surface maintenance.

- **PCI between 65 and 84** means the pavement is in **fair** condition and will generally need minor to extensive pavement surface maintenance and/or rehabilitation.
- **PCI between 0 and 64** means the pavement is in **poor** condition and will generally need extensive rehabilitation or reconstruction.

Repair strategies are assigned to sections through a matrix, which takes into account the PCI, condition of the pavement base, the average curb height, functional class and the pavement type. Five generalized repair categories are used and each repair strategy was also assigned an average cost to reflect present market conditions in Massachusetts.

The five repair strategies are as follows:

1. **Reconstruction Or Reclamation** ($30 per sq/yd)
   Complete removal and replacement of a failed pavement and base, which may include widening, realignment, traffic control, safety hardware and major drainage work.

2. **Rehabilitation** ($10 per sq/yd)
   Full depth patching, partial depth patching, joint and crack sealing, grouting and under-sealing, grinding or milling in conjunction with overlays over 2 inches in depth.

3. **Preventative Maintenance** ($7.50 per sq/yd)
   Localized crack sealing and full/partial depth patching in conjunction with Chip sealing, or Micro Surfacing, or overlays less than 2 inches in depth.

4. **Routine Maintenance** ($2.50 per sq/yd)
   Crack sealing and localized patching.

5. **No Immediate Action** ($0 per sq/yd)
   No maintenance

The existing pavement area (section length multiplied by section width) is multiplied by the assigned repair strategy cost to provide an estimated total cost of conducting the repair.

Benefit Value

The "Benefit Value" (BV) reflects the Cost/Benefit of doing the repair and is used in the budgetary analysis to prioritize sections for repair. There is no scale for the BV, only that those sections with the highest values are more beneficial and cost effective. The following formula is used to calculate the BV.

$$\mathbf{BV} = \frac{\textbf{365 x ADT x Section Length x Estimated Life of Repair}}{\textbf{Current Cost of Repair x Pavement Condition Index}}$$

It can be seen from this formula that roads with higher Average Daily Traffic (ADT) volumes will be assigned higher BV's, which provides priority for higher volume roads. Traffic volume data was used where it was available, which generally included most of the major roads. Traffic volumes were estimated where data was not available based on road use and the number of homes and businesses along them. These traffic volumes were reviewed by the Highway Superintendents from each town.

The distress data was collected on all paved roads maintained by the town or MHD, except Route 2, during the months of November and December 1997. The following sections summarize the results of the analysis for each town. It should be noted that the information contained in the tables was created from a visual evaluation of the pavement surface in which the severity and extent of the observed distresses were estimated. The recommended repair strategies and the associated costs are not final. A more detailed engineering evaluation must be conducted before finalizing any repairs and their associated costs. The information presented here can be used as a tool for preliminary evaluation and prioritization of the paved road network as a whole.

Pavement Management Analysis Results: Buckland

Tables 3-1 and 3-2 and Figure 3-2 summarize the results of the pavement management analysis on the town maintained paved road network in Buckland. The average PCI for all the town maintained paved roads in Buckland is 68, which categorizes the overall condition of the road network at the lower end of fair condition. However, 45% of the network has been classified in poor condition based on the severity and extent of the distresses noted during the data collection. This is reflected by 15% and 34% of the network being assigned rehabilitation and reconstruction repair strategies respectively. This has contributed to a large backlog of repairs with an estimated cost of $4.8 million. This backlog of repairs provides an estimate of the investment required to bring the whole paved road network up to an excellent condition. The estimated repair cost of $4.8 million is an enormous amount compared to the annual Chapter 90 funding available to the town of approximately $150,000. Therefore, it is essential that available funding be used efficiently to ensure that maximum benefits can be achieved. The RM software prioritizes the repairs through the benefit value formula mentioned earlier and the benefit value is then translated into the PMS Rank, with the road section with highest benefit value receiving the number 1 PMS Rank.

A complete listing of all town-maintained paved road sections can be found in Appendix II. Table 3-3 lists the top ten prioritized town-maintained road sections for Buckland. Primarily the road sections with high traffic volumes that require routine maintenance are in the top-ten list. Two rehabilitation projects have been listed indicating that the traffic volumes on these sections make it more beneficial to do this repair before other sections requiring routine maintenance. It should be noted that the priority list is a recommendation and that the town may have good reasons for undertaking repairs in a different order. For instance, a road that has low volumes and is in need of reconstruction would receive a low PMS Rank, but may be of higher priority if its condition makes traveling hazardous. Unfortunately, the benefit value calculation does not allow for the inclusion of safety and social factors.

What is evident from the PMS study of Buckland's paved road network is that it requires major investment to bring a higher percentage of its roads up to a good to excellent condition. Currently, the FRCOG Planning Department and Jim Fitzpatrick (Highway Superintendent) are investigating additional sources of funding. Presently, each town in Massachusetts is allocated Chapter 90 funding from the State, based on road mileage, population, and level of employment. This money can be used for road design, construction, improvements that extend the life of the roadway, and purchases of road machinery and equipment. Additionally, roads functionally classified as a Rural

Major Collector or higher are eligible for Federal and Non-Federal Aid funding for reconstruction through the Transportation Improvement Program (TIP). The TIP is a prioritized fiscally constrained listing, which is updated annually. Towns with projects on the TIP are responsible for the design and engineering of the project. Presently, these funding sources are not sufficient to improve or even keep Buckland's roads at their present level of condition. Additional State and Federal funding is desperately needed to improve Buckland's road network.

Table 3-1: Summary of Pavement Conditions for Buckland's Town Maintained Roads

PAVEMENT CONDITION (PCI Range)	Number of Miles	Percentage of Total Mileage
Excellent (=>95)	8.09	23%
Good (85<=>94)	3.19	9%
Fair (65<=>84)	8.22	23%
Poor (<65)	16.42	45%

Total Mileage = 35.92

Figure 3-2: Summary of Pavement Conditions for Buckland's Town Maintained Roads

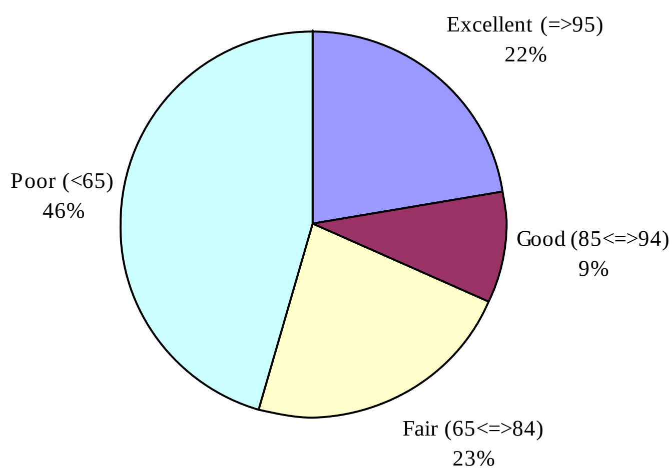


Table 3-2: Summary of Required Repairs for Buckland's Town Maintained Paved Roads

REPAIR TYPE	Number of Miles	Percentage of Total Mileage	Estimated Cost of Repairs
5. No Immediate Action	9.23	26%	$0
4. Routine Maintenance	7.89	22%	$247,124
3. Preventative Maintenance	1.08	3%	$85,547
2. Rehabilitation	5.46	15%	$663,821
1. Reconstruction	12.26	34%	$3,790,766

Total Mileage = 35.92 *Backlog of Repair = $4,787,258*

Summary of Road Mileage
Town Maintained Paved Roads = 35.92 miles (7.51 miles eligible for Federal Aid)
Town Maintained Gravel Roads = 5.82 miles
MHD District 1 Maintained Paved Roads = 6.20 miles (Route 2 and Route 112)

Table 3-3: Top 10 Prioritized Town Maintained Road Sections for Repair in Buckland

Street Name	Section ID#	Section From:	Section To:	Length (ft)	PCI	Repair Code	Estimated Cost	PMS Rank	Estimated ADT	Survey Date
State Street	5100	North Street	Mohawk Trail	3802	79	4	$31,683	1	3500	11/20/97
State Street*	5000	Clement Street	North Street	634	89	4	$5,283	2	3500	12/19/97
Conway Street*	3600	Ashfield Street	South Street	2429	80	4	$16,193	3	2050	12/19/97
North Street*	5300	Ashfield Road	State Street	4752	89	4	$31,680	4	1760	12/19/97
South Street*	3800	Conway Street	Gardner Falls Rd	1320	77	2	$32,267	5	2050	12/19/97
Conway Road*	3900	Gardner Falls Rd	Conway T.L.	5122	72	2	$147,969	6	2050	12/19/97
Ashfield Street*	3500	State Street	Conway Street	106	85	4	$2,238	7	2050	12/19/97
Upper Street*	900	Ashfield Road (North)	Children Sign NB	3969	87	4	$24,640	8	600	12/19/97
Clement Street	8400	School Street	State Street	1426	66	3	$28,520	9	540	11/20/97
Ashfield Street	9800	Conway Street	Kendrick Road	1373	83	4	$10,679	10	500	12/02/97

Street Name - Street Name. * Indicates the road section is eligible to receive Federal Aid or Non-Federal Aid for Reconstruction only.
Section From - Start point of the individual section.
Section To - End point of the individual section.
Length (ft) - The length of the section, measured in feet.
PCI - Pavement Condition Index: 95 - 100 indicates the pavement is in **excellent** condition,
85 - 94 indicates the pavement is in **good** condition;
65 - 84 indicates the pavement is in **fair** condition;
0 - 64 indicates the pavement is in **poor** condition.

Repair Code -
1. Reconstruction; ($30 sq/yd)
2. Rehabilitation; ($10 sq/yd)
3. Preventative Maintenance; ($7.50 sq/yd)
4. Routine Maintenance; ($2.50 sq/yd)
5. No Immediate Maintenance. ($0 sq/yd)

PMS Ranking - A ranking of all the sections requiring repair, based on a cost/benefit produced by the RoadManager software through the Benefit Value. The section with the highest Benefit Value has received a PMS Ranking of 1. Sections with equal Benefit Values have received the same ranking. In total there are 66 ranked sections in Buckland (A total listing of all Projects can be found in Appendix II).

Estimated ADT - Average Daily Traffic travelling on each section of road. Generally, traffic count data was available on the higher volume roads. Where data was not available, estimates were made based on the functionality of the road and the number of houses or businesses they served.

Survey Date - Date on which the pavement distress data was collected.

Pavement Management Analysis Results: Shelburne

Tables 3-4 and 3-5 and Figure 3-3 summarizes the results of the pavement management analysis on the town maintained paved road network in Shelburne. The average PCI for all the town maintained paved roads in Shelburne is 79, which categorizes the overall condition of the road network at the upper end of fair condition. An estimated 44% of the network has been classified in good to excellent condition based on the severity and extent of the distresses noted during the data collection. This is reflected by 43% of the network being assigned the "no maintenance required" repair strategy. However, 15% and 8% of the network has been assigned Rehabilitation and Reconstruction repair strategies respectively, which has contributed to the backlog of repair cost of $2.2 million. This backlog of repair provides an estimate of the investment required to bring the whole paved road network up to an excellent condition. The estimated $2.2 million is a large amount compared to the annual Chapter 90 funding available to the town of approximately $180,000. Therefore, it is essential that the money that is available be used efficiently to ensure that maximum benefits can be achieved.

A complete listing of all town-maintained paved road sections can be found in Appendix III. Table 3-6 lists the top ten prioritized town-maintained road sections for Shelburne. In general, those road sections with high traffic volumes that require routine maintenance appear in the top ten list. A reconstruction project and a rehabilitation project have been listed indicating that the traffic volumes on these sections make it more beneficial to do this repair before other sections requiring routine maintenance. It should be noted that the priority list is just a recommendation and the town may have other good reasons for undertaking repairs in a different order.

What is evident from the PMS study of Shelburne's paved road network is that it requires significant investment to bring a higher percentage of its roads up to a good to excellent condition. Overall, the Shelburne town maintained paved road network is in an acceptable condition. Much of the road mileage that is in poor condition comprises very low volume access roads to a small number of homes. The town may choose to increase the priority of these roads based on their very poor condition. The FRCOG Planning Department is investigating additional sources of funding. The town is currently utilizing two main sources of funding. The first is Chapter 90 Funding, which comes from the State and is received by all towns in the Commonwealth. This money can be used as the town sees fit for road design, construction, and repairs which extend the life of the road. The second is Federal and Non-Federal Aid through the Transportation Improvement Program (TIP), which is available for reconstruction projects on roads functionally classified as Rural Major Collectors and above. A portion of Colrain-Shelburne Road has been designed and is listed as a FY99 Federal Aid project under the Transportation Improvement Program. Current sources of funding are not sufficient to keep Shelburne's roads at their present condition levels. Additional State and Federal funding is needed to improve Shelburne's road network.

Table 3-4: Summary of Pavement Conditions for Town Maintained Roads

PAVEMENT CONDITION (PCI Range)	Number of Miles	Percentage of Total Mileage
Excellent (=>95)	10.69	28%
Good (85<=>94)	6.52	16%
Fair (65<=>84)	11.03	29%
Poor (<65)	10.42	27%

Total Mileage = 38.66

Figure 3-3: Summary of Pavement Conditions for Town Maintained Roads

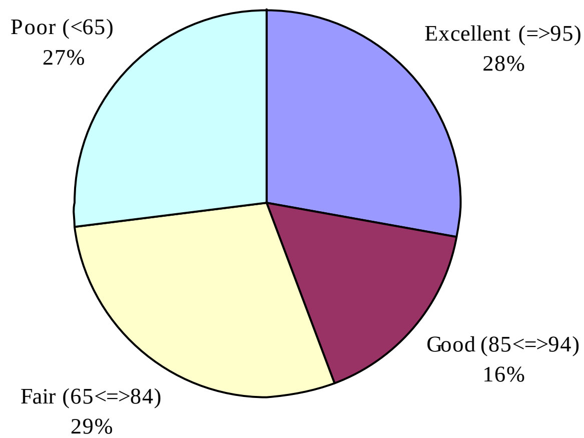


Table 3-5: Summary of Required Repairs for Town Maintained Paved Roads

REPAIR TYPE	Number of Miles	Percentage of Total Mileage	Estimated Cost of Repairs
5. No Immediate Action	16.63	43%	$0
4. Routine Maintenance	10.79	28%	$327,005
3. Preventative Maintenance	2.10	5%	$200,817
2. Rehabilitation	5.97	15%	$667,597
1. Reconstruction	3.17	8%	$1,006,857

Total Mileage = 38.66 *Backlog of Repair = $2,202,276*

Summary of Road Mileage

Town Maintained Paved Roads = 38.66 miles (7.51 miles eligible for Federal Aid)
Town Maintained Gravel Roads = 10.12 miles
MHD District 1 Maintained Paved Roads = 9.48 miles (Route 2 and Route 112)

Table 3-6: Top 10 Prioritized Town Maintained Road Sections for Repair in Shelburne

Street Name	Section ID#	Section From:	Section To:	Length (ft)	PCI	Repair Code	Estimated Cost	PMS Rank	Estimated ADT	Survey Date
Bridge Street*	2700	South Maple Street	Mechanic Street	1109	89	4	$8,318	1	4770	12/19/97
Mechanic Street	7100	Church Street	Hope Street	1584	77	4	$9,680	2	2000	12/11/97
Bridge Street*	2810	Mechanic Street	Falls Bridge	581	90	4	$7,263	3	4770	12/19/97
Church Street	2500	Maple Street	Mechanic Street	950	77	4	$5,278	4	1500	12/11/97
Mechanic Street	7000	Bridge Street	Church Street	1267	83	4	$9,854	5	2000	12/11/97
North River Rd.	2000	Colrain Road	Colrain Town Line	106	84	3	$2,120	6	2290	12/19/97
Church Street	2520	Mechanic Street	Main Street	317	79	4	$2,554	7	1500	12/11/97
Colrain-Shelburne Road*	9205	#240 Colrain Shelburne Road	Start of Guardrail	2798	41	1	$205,187	8	2240	12/19/97 `
Old Greenfield Road	8500	Mohawk Trail	Zerah Fiske Road	1056	61	2	$21,120	9	1000	12/10/97
Colrain Greenfield Road	9600	Greenfield Town Line	0.35 Miles from Town Line	1848	67	4	$11,293	10	500	12/03/97

Street Name - Street Name. * Indicates the road section is eligible to receive Federal Aid or Non-Federal Aid for Reconstruction only.
Section From - Start point of the individual section.
Section To - End point of the individual section.
Length (ft) - The length of the section, measured in feet.
PCI - Pavement Condition Index: 95 - 100 indicates the pavement is in **excellent** condition,
85 - 94 indicates the pavement is in **good** condition;
65 - 84 indicates the pavement is in **fair** condition;
0 - 64 indicates the pavement is in **poor** condition.

Repair Code -
1. Reconstruction; ($30 sq/yd)
2. Rehabilitation; ($10 sq/yd)
3. Preventative Maintenance; ($7.50 sq/yd)
4. Routine Maintenance; ($2.50 sq/yd)
5. No Immediate Maintenance. ($0 sq/yd)

PMS Ranking - A ranking of all the sections requiring repair, based on a cost/benefit produced by the RoadManager software through the Benefit Value. The section with the highest Benefit Value has received a PMS Ranking of 1. Sections with equal Benefit Values have received the same ranking. In total there are 61 ranked sections in Shelburne (A total listing of all Projects can be found in 3-B).

Estimated ADT - Average Daily Traffic travelling on each section of road. Generally, traffic count data was available on the higher volume roads. Where data was not available, estimates were made based on the functionality of the road and the number of houses or businesses they served.

Survey Date - Date on which the pavement distress data was collected.

The results of the pavement management analysis has provided both towns with a snapshot of the condition of their paved road network for which they are responsible. The data shows that overall Shelburne's roads are in a better condition than Buckland's, giving them a better base from which to continue pavement management. Buckland has a harder task ahead of them, as much of the funding they will receive will have to be used to reconstruct or rehabilitate their roads. This pavement management information now in computerized format can be updated biannually to assist with yearly decisions about spending Chapter 90 and other funds.

Roadway Level of Service (LOS) Analysis

A LOS Analysis was conducted on those roads functionally classified above Local in both Towns. This includes Route 2, Route 2A and Route 112 in both towns, Colrain-Shelburne Road, Bardwell's Ferry Road and Main Street in Shelburne, North Street, Conway Road, Charlemont Road and Upper Street in Buckland. "LOS is a qualitative measure describing operational conditions within a traffic stream, generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience and safety."[2] Simplistically for two lane roads, LOS is a function of traffic volume to capacity, with the capacity of a roadway being calculated based on geometric and environmental conditions, such as lane and shoulder widths, terrain, percentage of "no passing zones," make-up of the traffic stream and its directional split. LOS is calculated for peak flow traffic conditions and is used to identify sections of road which are at or nearing capacity, and/or experience congested conditions due to geometric parameters of the roads layout. The varying LOS levels are assigned letters A through F which have the following generalized definitions:

- LOS A - signifies a road section where motorists are able to drive at their desired speeds (approaching an average of 60 mph in ideal conditions); delays incurred by slow-moving vehicles occur less than 30 percent of the time; demand for passing is well below passing capacity; and almost no platoons of three or more vehicles are observed.
- LOS B - signifies a road section where delays incurred by slow-moving vehicles occur up to 45 percent of the time; average speeds in ideal conditions exceed 55 mph; demand for passing required to maintain desired speed approximately equals the passing capacity; and the number of platoons forming in the traffic stream increases significantly.
- LOS C - signifies a road section where delays occur 60 percent of the time; average speeds under ideal conditions exceed 52 mph; demand for passing is in excess of passing capacity; and platoons are prevalent, commonly chaining together and although the traffic flow is stable, it is becoming susceptible to congestion due to turning and slow-moving vehicles.
- LOS D - signifies a road section where the two opposing traffic streams essentially begin to operate separately as passing becomes extremely difficult; average speeds under ideal conditions approach 50 mph even though platoon sizes reach between 5 and 10 vehicles; motorists incur delays up to 75 percent of the time; and turning or slow-moving vehicles cause major shock waves in the traffic stream.
- LOS E - signifies a road section where speeds under ideal conditions drops below 50 mph and is much lower under less than ideal conditions where passing becomes virtually impossible; delays

[2] Highway Capacity Manual 1994, Transportation Research Board

are incurred greater than 75 percent of the time and "platooning" becomes intense when slower vehicles or other interruptions are encountered.

- LOS F - signifies a road section where traffic demand has exceeded capacity resulting in heavy congestion.

In general, it is desirable to maintain traffic conditions at a LOS C or better.

Table 3-7 gives the results of the LOS analysis conducted using the Highway Capacity Software. More detailed information is available in Appendix IV. It should be noted that these LOS conditions reflect the peak traffic conditions, i.e. reflecting the largest one hour recorded traffic volume on the roadway. Some of the traffic volume data used in the LOS calculations was collected in October during the week of the Columbus Day Holiday, typically the height of the fall foliage season. However, these figures have been seasonally adjusted to present an average peak condition. It should be noted that the LOS calculations do not take into account the pavement conditions of each of the road sections. This information is also illustrated on the Transportation Map.

Table 3-7: Rural Two Lane Roadway Level of Service Analysis Results

Town	Route/Road	From	To	v/c Ratio	LOS
Buckland	Route 2	Shelburne T.L.	Charlemont T.L.	0.37	D
Buckland	Route 112 South	Route 2	Ashfield T.L.	0.20	C
Buckland	Upper Street	Route 112 South	Route 112 South	0.01	A
Buckland	Charlemont Road	Upper Street	Charlemont T.L.	0.04	B
Buckland	North Street	Route 112 South	State Street	0.08	B
Buckland	State Street	North Street	Route 2	0.10	B
Buckland	Conway Street	Ashfield Street	Conway T.L.	0.09	B
Shelburne	Route 2*	Greenfield T.L.	Shelburne Center Rd.	0.70	D
Shelburne	Route 2*	Shelburne Center Rd.	South Maple Street	0.56	D
Shelburne	Route 2	South Maple Street	Buckland T.L.	0.32	C
Shelburne	Route 112 North	Hope Street	Colrain T.L.	0.06	B
Shelburne	Mechanic Street	Route 2	Hope Street	0.07	B
Shelburne	Hope Street	Mechanic Street	Colrain Road	0.07	B
Shelburne	Bardswell's Ferry Rd.	Route 2	Conway T.L.	0.01	A
Shelburne	Colrain-Shelburne Rd.	Route 2	Colrain T.L.	0.13	C

Note: T.L. – Town Line

LOS analysis was not conducted on Bridge Street and Main Street in Shelburne, and a portion of State Street in Buckland, due to the parking and pedestrian interaction with traffic flows, which would not be accounted for in the LOS evaluation.

This analysis indicates that during peak traffic conditions, portions of Route 2 in both Shelburne and Buckland are experiencing conditions with a Level of Service D. These LOS levels indicate that vehicle speeds are below the posted speed limit, large platoons are forming, and additional delays are caused due to turning and slow moving vehicles. The volume to capacity (v/c) ratio indicates that these delays are caused by geometric conditions, specifically the continual vertical and horizontal (hills and curves) alignment changes that limit passing opportunities.

Severe delays currently occur around Columbus Day Holiday. It is uncertain if this also occurs in other periods throughout the year. These portions of Route 2 will be monitored under future projects conducted in the area.

LOS C levels were recorded on Route 112 South in Buckland and on Colrain-Shelburne Road in Shelburne. These levels reflect average delay conditions and again are caused by the geometry of the road where passing opportunities are limited.

The remainder of the roads show LOS A and B, and very low v/c ratios indicating no problems relating to delays caused by traffic for users of these roads.

The LOS analysis indicates that there are delays and congestion along the Route 2 corridor even with a seasonal adjustment to the peak fall foliage numbers. If plans to extend the peak tourist season are fulfilled, conditions will worsen. The LOS Analysis has implications for the type of businesses which Shelburne may want to attract. Businesses which have low traffic generation rates should be encouraged to avoid exacerbating the already poor Level of Service.

Traffic Counts

FRCOG Transportation staff conducted traffic counts along high traffic locations in the two towns. This information was used to determine the Average Annual Daily Traffic (AADT). Traffic counts from previous years were studied, where available, and the Average Annual Growth Rate (AGR) was calculated for these locations. The results of this study are tabulated in Table 3-8 below.

Table 3-8: Traffic Count Data

Town	Street/Route	Location	Most Current Count		Past Year Count		Average AGR
			Year	AADT	Year	AADT	
Buckland	Ashfield Street	South of State Street	1998	2150	1996	1800	9.29%
Buckland	Bridge Street	On the Iron Bridge	1996	4770	-	-	-
Buckland	Charlemont Road	$^{1}/_{10}$ Mile East of Avery Road	1998	320	-	-	-
Buckland	Charlemont Road	$^{1}/_{10}$ Mile North of Avery Road	1998	240	-	-	-
Buckland	Clement Street	West of State Street, Under Rail Bridge	1996	530	-	-	-
Buckland	Conway Street	$^{1}/_{10}$ Mile East of State Street	1998	2290	1996	2060	5.43%
Buckland	Hawley Road	South of Orcutt Hill Road	1993	300	-	-	-
Buckland	North Street	$^{1}/_{10}$ Mile North of State Street	1998	1610	1996	1760	-4.36%
Buckland	Route 112	Ashfield Town Line	1996	2230	1991	2201	-0.01%
Buckland	Route 112	½ Mile North of High School	1997	4180	-	-	-
Buckland	State Street	$^{1}/_{10}$ Mile North of North Street	1998	2470	1996	2400	1.45%
Shelburne	Bardwell's Ferry Road	$^{7}/_{10}$ Mile North of Zerah Fiske Road	1998	130	-	-	-
Shelburne	Colrain-Shelburne Road	1 Mile North of Route 2	1997	1960	-	-	-
Shelburne	Colrain-Shelburne Road	Colrain/Shelburne Town Line	1997	2220	1992	2100	1.12%
Shelburne	Little Mohawk Road	West of Route 2	1993	560	-	-	-
Shelburne	Mechanic Street	South of Route 2	1997	1600	-	-	-
Shelburne	Mechanic Street	South of Hope Street	1998	970			
Shelburne	Main Street	South of Hope Street	1998	1450			
Shelburne	Route 2	West of Greenfield Town Line	1997	11300	1995	11000	1.35%
Shelburne	Route 2	At Tower Road	1997	10430	1993	9500	2.36%
Shelburne	Route 2	East of Mechanic Street	1997	6300	-	-	-
Shelburne	Route 2A (S. Maple Street)	West of Route 2	1998	3880	1997	3860	0.52%
Shelburne	Route 112	North of Route 2 Bridge	1998	1440			
Shelburne	Shelburne Center Road	South of Route 2	1997	320			

AADT – Average Annual Daily Traffic.
AGR – Annual Growth Rate

The data in Table 3-8 shows that Ashfield and Conway Streets in Buckland are exhibiting high growth rates in traffic volume. This indicates that there will be increasing pressure on the intersection of these roads at the Iron Bridge in Shelburne Falls. The present road layout is constrained by the Iron Bridge. Alternative parking configurations should be explored which may improve traffic flow through this area.

Accident Data Analysis

The accident records of the Shelburne Police Department had previously been reviewed and the reported accidents noted for the years 1994 through 1996. The accident records of the Buckland Police Department were reviewed for this study and the reported accidents noted for the years 1996 through 1998. State Police accident records will be reviewed during the Summer of 1999. A brief evaluation of the accident data follows:

Buckland – 01/01/1996 through 12/31/1998

There were a total of 43 reported accidents by the Buckland Police Department in the 3 year period analyzed. Of the 43 reported accidents, 19 (44%) occurred when the road surface was described as either wet, icy or snowy indicating that these conditions were likely a contributing factor in these accidents. Four accidents were identified as occurring at the intersection of Route 2 and State Street. All the accidents seem to be isolated occurrences. State Street from Route 2 to approximately the Iron Bridge saw a total of seven accidents. Two of the accidents involved vehicles backing out of parking spaces near the Town Hall. Six accidents were reported along North Street. Finally, Route 112 south saw eight accidents along its length, with no two accidents occurring at the same location.

Shelburne – 01/01/1994 through 12/31/1996

There were a total of 49 reported accidents by the Shelburne Police Department in the 3 year period analyzed. Due to the process used collecting this data, it is difficult to decipher the circumstance leading to the accidents. The intersection of Route 2 and Colrain-Shelburne Road experienced five accidents, three of which resulted in personal injury to at least one party involved. The intersection of Route 2 and Little Mohawk Road experienced three accidents. Twelve additional accidents were reported at various locations along the length of Route 2 in Shelburne. Ten accidents were reported at various locations along Bridge Street from South Maple, four of these accidents were noted as occurring at the intersection of Bridge Street with Water Street and Deerfield Avenue. Seven accidents were reported along Route 112 North, between Hope Street and the Colrain Town Line. Five of these accidents resulted in personal injury to one or more of the parties involved. Finally, five accidents were reported along the length of Colrain-Shelburne Road, between Route 2 and the Colrain Town Line.

Result

The accident locations and causes in the towns were diverse. However, two problem areas should be monitored. They are the intersection of Route 2 and Colrain-Shelburne Road (5 accidents) and the intersection of Bridge, Deerfield and Water Streets (4 accidents). The FRCOG will be updating the accident data for the entire county in the coming year. These results should be reevaluated once the new data is available.

Intersection Analyses

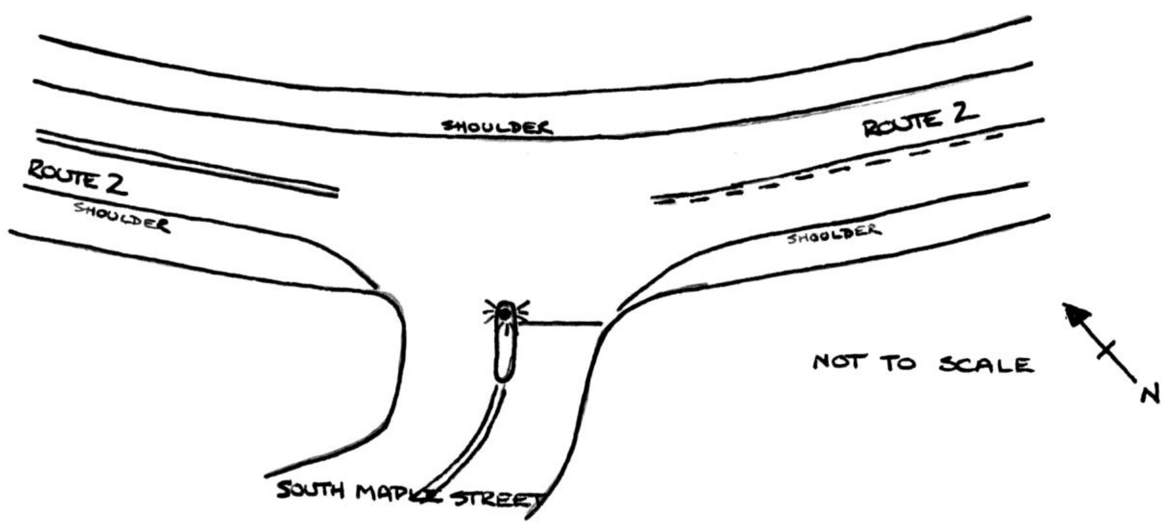
The FRCOG in conjunction with the Highway Superintendents of both towns identified four intersections that warranted review. Due to the high costs of data collection for intersection analysis, an initial site visit was made to identify problems and hazards. If it was determined that a complete analysis of the intersection would be helpful in finding a solution to the problems, then traffic volume data collection would be conducted when funding allowed. The four intersections that were identified are:

- Route 2/Route 2A (South Maple Street), Shelburne
- Route 2/Colrain-Shelburne Road, Shelburne
- Route 2/Route 2A (State Street), Buckland
- The area on the Buckland side of Shelburne Falls where Conway Street, Ashfield Street, Clement Street, the Iron Bridge and State Street all converge.

The intersection of Route 2 and Mechanic Street has already been studied by Mass Highway and improvements are expected to be made this year.

It should be noted that the comments made on each of the intersections were made following a single visit and are based on visual observations made at that time. A more detailed engineering evaluation is required before any of the suggestions should be acted upon.

Intersection of Route 2 (Mohawk Trail)/ Route 2A (South Maple Street), Shelburne



A site visit was made to this intersection during the evening traffic peak under clear and sunny weather conditions. This intersection is a "T" intersection with stop control on the minor street (South Maple Street) and provides the main access for westbound traffic to the village of Shelburne Falls. Route 2 at this point is wide with a 12 foot travel lane and approximately 12 foot paved shoulder in the westbound direction and a 12 foot travel lane and approximate 18 foot shoulder in the eastbound direction. The alignment is slightly curved with an uphill grade in the westbound direction. This section of Route 2 has a posted speed limit of 50 mph and carries approximately 8,000 vehicles per day. South Maple Street approaches Route 2 at approximately a 90 degree angle, with a curve about 100 feet back from the intersection. South Maple Street has a slight downhill grade at the stop line for traffic entering Route 2. South Maple Street flares as it approaches Route 2 allowing ample room for simultaneous left and right turning vehicles at the stop line. A raised island is located between the two lanes of South Maple Street and flashing beacons and directional signs are located here also. Yellow beacons flash to warn drivers on Route 2 of the intersection at which they should proceed with caution and stay alert. The red beacon flashes in the South Maple Street direction to inform drivers that they must stop before entering the major roadway. This section of South Maple Street carries approximately 4,000 vehicles per day.

Approximate sight distances for vehicles entering Route 2 from South Maple Street were estimated by measuring the time between a vehicle first coming into sight, and the time it passed the intersection. Sighting of the vehicles was done at a height similar to that of a driver. For vehicles travelling eastbound this time was consistently measured at around 8 seconds. Assuming each vehicle was travelling at 55 mph this computes to a sight distance of approximately 650 feet. The Mass Highway design[2] standards recommend a minimum sight distance of approximately 1100 feet for design speeds found on this section of Route 2. However, the recommendations allow for variations where the frequency of turning traffic does not justify the additional cost of realignment. The sight distance to the west was not quantified, but is well in excess of the design standards. In the three year period between 1994 and 1996 based on the Shelburne Police Department records only one accident had been recorded at this intersection and this involved a single vehicle which lost control and resulted in no injuries. Additional information is needed from the State Police accident records to determine if this intersection's accident history indicates a sight distance problem.

During the site visit the following traffic patterns were observed. Traffic was sporadic on both Route 2 and South Maple Street, with occasional periods when no traffic traversed the location. Westbound traffic on Route 2 was generally in platoons of five or more vehicles. Traffic making the left turn into South Maple Street was rarely delayed due to oncoming traffic, and when it was, the stop was momentary. Through traffic used the paved shoulder to pass left turning vehicles, resulting in no or minimal loss of speed. Eastbound traffic on Route 2 was much lighter than in the westbound direction and generally no platoons were noted. The majority of the traffic in this direction was through traffic with the very occasional right turning vehicle, which used the shoulder to slow down and did not impede through traffic. Traffic entering Route 2 from South Maple Street generally arrived at the stop line in ones and twos. The vast majority of traffic from this arm made a right turn onto Route 2. This traffic generally experienced minimal delays, with the maximum queue length noted being three vehicles, which quickly cleared.

Overall during the site visit this intersection was perceived to operate efficiently with periods of "congestion" being minimal and brief.

The following safety concerns were raised following observations made during the site visit. The sight distance for left turning traffic from Route 2 westbound onto South Maple Street is approximately 650 feet (8 seconds) which gives sufficient decision making time for the maneuver. No minimum sight distances for this movement exist in the Mass Highway Design Manual since,

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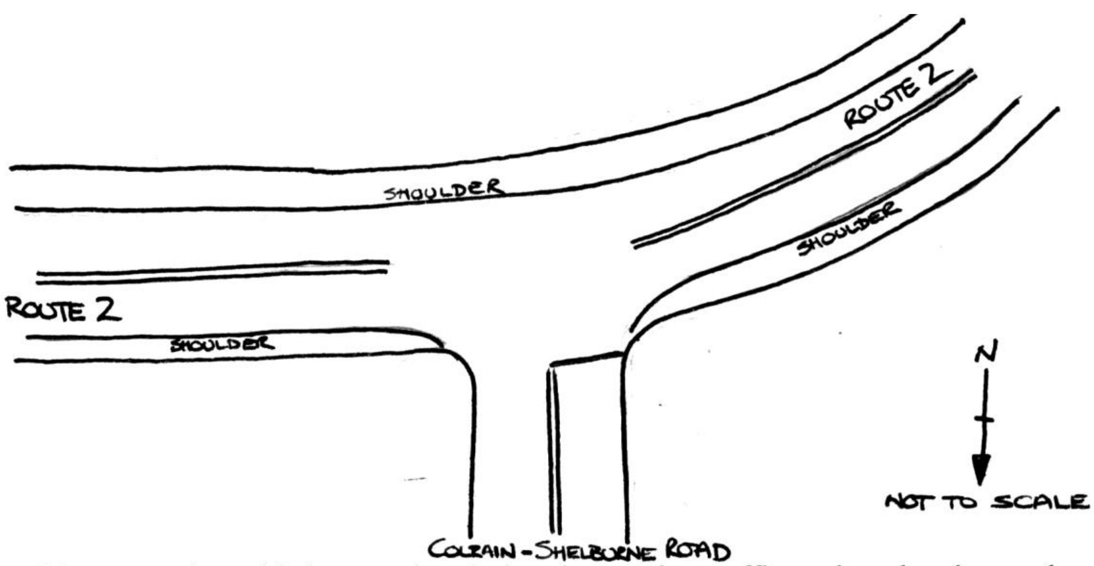
[2] Mass Highway, "Highway Design Manual 1997 Edition"

the minimum is set by the right turn movement from the minor road. On a number of occasions vehicles were noted cutting across in front of oncoming traffic, which was clearly in view by that point. These maneuvers did not require any sharp stops by the oncoming traffic, but were perceived as unsafe and unnecessary. Two possible explanations for this maneuver could be aggressiveness on the part of the left turning drivers, or fear of being hit from behind by following through traffic, especially tractor trailers. Presently, through traffic on Route 2 utilizes the break down lane when there is left turning traffic and do so generally without a reduction of speed. It can be unnerving waiting for opposing traffic to clear with platoons of fast moving traffic coming up behind and passing at high speed. Technically, use of the shoulder to pass on the right is an illegal maneuver, although it is unlikely that a citation would be issued for making the maneuver unless it resulted in an accident. Further study should be conducted to evaluate the benefits of installing separately marked left turn and through lanes in the westbound direction.

Once the State Police accident records have been reviewed it will become clearer if the shortened sight distance needs to be studied further.

Intersection of Route 2 (Mohawk Trail)/Colrain-Shelburne Road



A site visit was made to this intersection during the evening traffic peak under clear and sunny weather conditions. This intersection is a “T” intersection with stop control on the minor street (Colrain – Shelburne Road) and provides access to residences and farms in Shelburne and Colrain. It is also reported to be heavily used by recreational traffic accessing the mountains and ski areas in southern Vermont, especially on Friday and Sunday evenings. Route 2 at this point is wide with a 12 foot travel lane and approximately a 10 foot paved shoulder in the eastbound direction and a 12 foot travel lane and approximately a 7 foot shoulder in the westbound direction. Colrain-Shelburne Road intersects Route 2 where it curves with an uphill grade in the westbound direction. The crest of the hill on Route 2 is a few hundred feet to the west of the intersection with the road curving further with a slight downhill grade. This section of Route 2 has a posted speed limit of 50 mph and carries approximately 10,000 vehicles per day. Colrain–Shelburne Road approaches Route 2 at approximately a 90 degree angle. Traffic follows a steep downhill grade and comes to the stop line on a slight uphill grade. Due to the raised elevation of the intersection, a guardrail has been placed next to the pavement edge. The pavement flares slightly at the stop line allowing both right and left turning vehicles to be there simultaneously. If the queue of traffic is three or more cars or one truck then access to the stop line is cut off. This section of Colrain–Shelburne Road carries approximately 2,000 vehicles per day.

Approximate sight distances for vehicles turning onto Route 2 from Colrain–Shelburne Road were estimated by measuring the time between a vehicle first coming into sight and the time it passed the intersection. Sighting of the vehicles was done at a height similar to that of a driver. For vehicles travelling westbound on Route 2 this time was consistently around 10 seconds. Assuming each vehicle was travelling at 55 mph, this computes to a sight distance of approximately 800 feet, which is less than the Mass Highway recommended design standards of approximately 1100 feet. Sight distance at the stop line is slightly obscured by the guardrail, but clears if vehicles edge forward slightly. Vehicles travelling eastbound on Route 2, could be sighted approximately 800 feet away (10 seconds), again less than the recommended Mass Highway design length. According to the Town of Shelburne Police Department records, in the three year period between 1994 and 1996, five accidents have been recorded at this intersection. Three (two left turn and one right turn) involved vehicles turning from Colrain-Shelburne Road onto Route 2. It is unclear if the other two involved collisions related to turns into, or out of Colrain-Shelburne Road. State Police accident records will be compiled by the FRCOG later in the year. This intersection should be reviewed once additional data becomes available, after which further recommendations may be made.

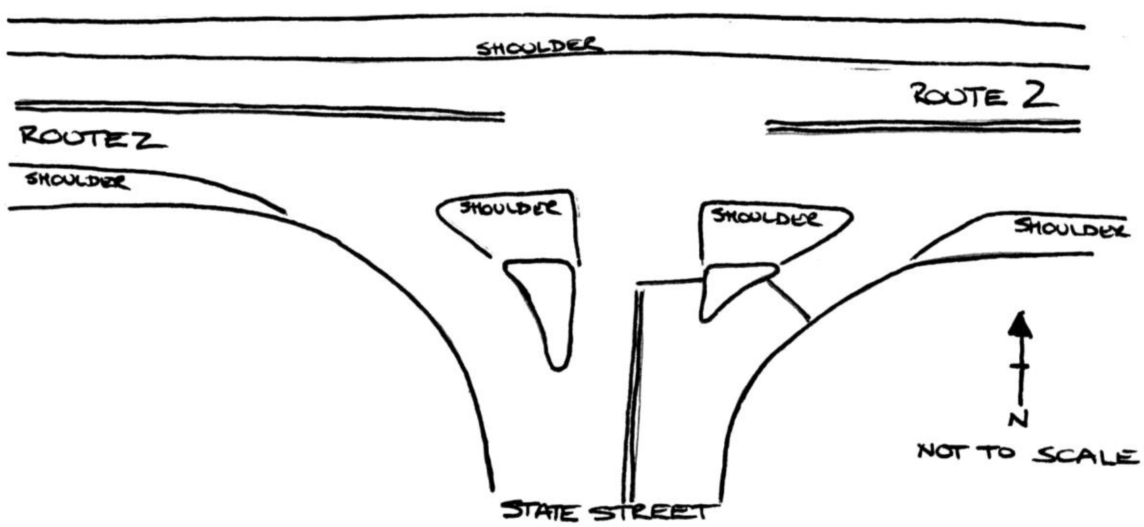
During the site visit the following traffic patterns were observed. Traffic on Route 2 in both directions was heavy and consistent with platoons of five or more vehicles common. The majority of traffic in both directions was through traffic with the occasional left turner travelling eastbound and a higher proportion of right turners travelling westbound. The eastbound left turning traffic did not impede through traffic that passed using the shoulder. The westbound right turning traffic had a greater impact on the through traffic as the shoulder is narrower than a car width and vehicles had to reduce speeds considerably to negotiate the turn onto Colrain-Shelburne Road. Traffic on Colrain-Shelburne Road was sporadic and generally arrived at the intersection in platoons of two or three vehicles. The majority of this traffic was making a left turn and often encountered a considerable delay awaiting a suitable gap in the Route 2 traffic. These delays could be seen to cause frustration to some drivers who made turning movements into less than suitable gaps, causing traffic on Route 2 to reduce their speeds. The longest observed queue was five vehicles, with delays in excess of 30 seconds on occasion.

This intersection is experiencing periods of "congestion" when delays can be considerable and queues can be relatively long. Generally these periods of "congestion" are not continuous, occurring sporadically throughout the peak period, but are significant.

The following safety concerns were raised following observations made during the site visit. The use of the shoulder by eastbound through traffic when confronted with left turning traffic in the same direction is a cause for concern for two reasons. The first is due to the width of the shoulder at 10 feet and the guardrail which is right at the pavement edge, leaving little room for error at speeds in excess of 50 mph. The second is the use of this shoulder by vehicles accessing the Shelburne Falls Coffee Roasters premises approximately 300 feet from the intersection to quickly decelerate and make the right turn. This is not a problem unless the through traffic is using the shoulder to pass a left turning vehicle, then a shock wave effect of breaking along the platoon occurs and the potential for rear end accidents increases enormously if any of the drivers are inattentive or unfamiliar with the situation.

In the westbound direction, right turning traffic makes partial use of the shoulder to decelerate and make their turn. Meanwhile through traffic passes on the left at speed. On occasion the through traffic crosses the center line to pass the turning traffic, potentially coming into conflict with eastbound through and left turning traffic. Sight distances for traffic entering Route 2 from Colrain-Shelburne Road, although less than recommended, give drivers sufficient time (10 seconds) to base decisions on whether the gap is sufficient to safely enter the traffic stream. Due to the volume of traffic traversing Route 2 during peak periods, the availability of suitable gaps for turning traffic is reduced. As driver frustration increases due to the length of delays incurred, the size of the gap they are willing to accept decreases sometimes to a point where evasive action is required by the approaching traffic. In these instances the potential for collisions increase and due to the speeds involved so does the severity. The extent of this problem will be revisited following a review of the State Police accident records.

Based on the observations made during the site visit, further traffic and geometric study is warranted. As funding becomes available, FRCOG staff will undertake a manual turning movement count and quantify the levels of delays incurred using intersection analysis software. Based on the results of this analysis, recommendations will be made to improve traffic flow and safety at this intersection.



Intersection of Route 2 (Mohawk Trail)/ Route 2A (State Street), Buckland

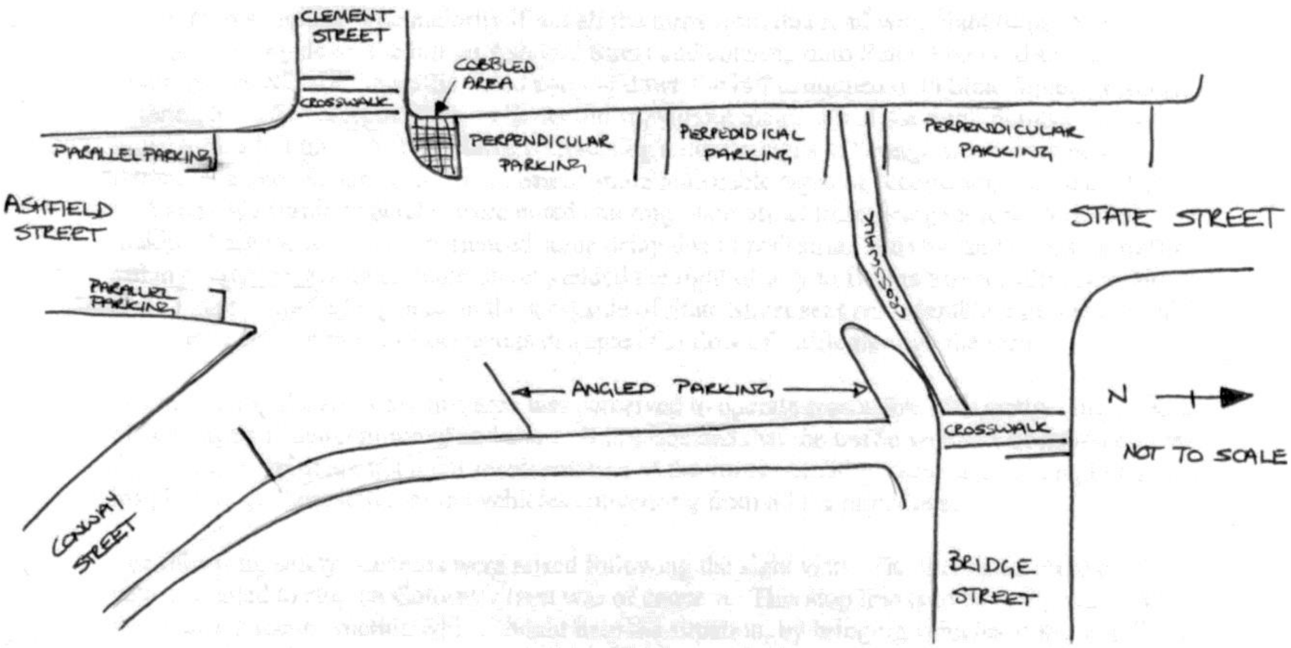
A site visit was made to this intersection during the evening traffic peak under clear and sunny weather conditions. This intersection is a “T” intersection with stop control on the minor street (State Street) and provides the first access for eastbound traffic to the village of Shelburne Falls. Route 2 at this point is wide with travel and paved shoulders in both directions. The alignment is relatively straight with an uphill grade in the westbound direction. This portion of Route 2 has a posted speed limit of 50 mph and carries approximately 4,000 to 5,000 vehicles per day. State Street approaches Route 2 at a 90 degree angle and has a slight uphill grade to the intersection. Two islands separate the turning movement lanes from and into State Street. The right turn lane exiting State Street is at approximately a 45 degree angle to Route 2. The right turn lane is separated from the left turn lane exiting State Street by an island and is perpendicular to Route 2. Both of these movements are stop controlled. The entry lane for left turning traffic from Route 2 westbound is next to the left turn lane exiting State Street. A second island separates this lane from the right turn lane from Route 2 eastbound. Approximately 2,500 vehicles exit and access Route 2 from State Street per day.

Approximate sight distances for vehicles entering Route 2 from State Street were estimated by measuring the time between a vehicle first coming into sight, and the time it passed the intersection. Sighting of the vehicles was done at a height similar to that of a driver. For vehicles travelling both east and westbound on Route 2 this time was consistently measured around 12 seconds. Assuming each vehicle was travelling at 55 mph, this computes to a sight distance of approximately 1000 feet, which comes close to the Mass Highway design standards of approximately 1100 feet. Additional accident data must be collected to determine if sight distance may be a problem.

During the site visit the following traffic patterns were observed. Traffic was sporadic on both Route 2 and State Street, with short periods where no traffic traversed the location. Westbound traffic on Route 2 was generally in platoons of three or more vehicles. The major movement on this arm was through, with the occasional left turn, which experienced minimal delays. Through traffic used the shoulder on the occasions there was a left turning vehicle to pass without reducing speed. Eastbound traffic on Route 2 was lighter, with the majority of the traffic making the through movement, with the occasional right turn. Right turning traffic generally used the shoulder to slow down and did not impede the through traffic. Traffic entering Route 2 from State Street was light, generally arriving at the stop line singly. The left turn movement saw the majority of the traffic, which occasionally produced delays of upwards of one minute due to oncoming traffic from both directions on Route 2. On these rare occasions queues of two or three vehicles would develop, but generally dispersed quickly after the first vehicle found a gap in traffic. The majority of left turning traffic experienced minimal delays. Right turning traffic quickly found acceptable gaps to enter into the Route 2 traffic flow.

Overall, during the site visit, this intersection was perceived to operate efficiently with periods of “congestion” being minimal and brief. Observations did not identify any safety or sight distance problems. Once additional accident data has been collected, further comment may be made based on the findings.

The area on the Buckland side of Shelburne Falls where Conway Street, Ashfield Street, Clement Street, Bridge Street (the Iron Bridge) and State Street converge



A site visit was made to this intersection during the afternoon peak, under clear and sunny conditions. This area sees the convergence of five different roads in the space of approximately 200 to 300 feet. State Street runs south from Route 2 and ends where Conway Street, Ashfield Street and Clement Street converge. Using a clock face to describe direction with north and State Street being 12 o'clock, Conway Street intersects at approximately 5 o'clock, Ashfield Street at 6 o'clock and Clement Street at 9 o'clock. Conway and Clement Streets operate under stop control with no control on Ashfield Street. Bridge Street intersects at 3 o'clock about 200 feet north of Ashfield Street. The section of State Street between Bridge and Ashfield Street is wide, but with perpendicular parking on the west side and angled parking on the east side the travel lanes are narrowed to no more than 12 feet each. Conway Street is relatively narrow with the retaining wall of Ashfield Street on its west side and a sidewalk and the Deerfield River on its east side. There is a slight uphill grade to the stop. The recent completion of the sidewalk reconstruction moved the stop line closer to State Street and angled it better for visibility of oncoming traffic. Ashfield Street approaches the area on a steep downhill grade and has parallel parking on both sides. Clement Street approaches the intersection on a downhill grade and has a pedestrian crossing marked in front of the stop line. Bridge Street approaches the area on the level. Both travel lanes are narrow (9 feet each), constricted by the bridge width. The stop line is set back from the intersection to accommodate a crosswalk.

Conway and Ashfield Street carry approximately 2000 vehicles a day each, Clement Street carries approximately 500 vehicles a day and Bridge Street carries approximately 5000 vehicles a day. Based on these traffic volumes, State Street in this area probably carries approximately 5000 vehicles per day.

During the site visit the following traffic patterns were observed. A number of vehicles approaching the area on Conway Street failed to stop before entering onto State Street. This could have been in part due to the construction activities, but local merchants noted that it was not an uncommon situation. The majority, if not all, of the turns from this road were right turns. Some vehicles coming down the hill on Ashfield Street and entering onto State Street did so with excessive speed. All the traffic noted coming down the hill continued onto State Street. Vehicles entering State Street from Clement Street did so without incident and the small number that were noted took a left turn. At these three intersecting roads no signs of "congestion" were noted. Around the intersection with Bridge Street, more noticeable signs of "congestion" were evident. Left and right turning vehicles were noted entering State Street from Bridge Street. Vehicles making these movements experienced some delay due to pedestrian activity and opposing traffic. Often courteous drivers on State Street yielded the right of way to Bridge Street traffic entering State Street. The parking area on the west side of State Street sees considerable turnover of vehicles which on a small number of occasions disrupted the flow of traffic through the area.

Overall during the site visit, this area was perceived to operate reasonable efficiently, with periods of "congestion" being minimal and short. It is suspected that the traffic volumes observed on the day of the site visit are not a fair representation of the worst conditions seen in this area, but give an insight into the interaction of the vehicles converging from all the directions.

The following safety concerns were raised following the site visit. The fact that a number of vehicles failed to stop on Conway Street was of concern. This stop line has recently been realigned as part of the sidewalk reconstruction. This should help the situation by bringing vehicles at the stop line to a more perpendicular angle to State Street, which means drivers approaching the intersection have to change direction (no longer straight). In addition, it brings cars closer to State Street improving the sight lines to traffic approaching from Ashfield Street. A proportion of the traffic coming down the hill on Ashfield Street did so at speeds that were perceived as excessive for the conditions they encounter in this area. Conflicts between vehicles entering and exiting parking spaces and traffic through the area occurred, but generally vehicle contact was avoided due to the generally slow speeds used by drivers travelling southbound on State Street. The parallel parking on the east side of State Street was not in use due to the construction. This area relies on slow vehicle speeds, driver awareness, and courtesy, otherwise serious safety issues would arise. There have been a number of accidents reported in this location and further study of the parking configuration and traffic flows is warranted. Recent sidewalk reconstruction has improved the safety of the pedestrian crosswalk.

The Police Chief has ask if the implementation of angled parking instead of perpendicular parking could be considered to reduce the conflicts of vehicles entering and exiting spaces on the west side of State Street. The use of angled parking is not recommended by Mass Highway due to the high accident rates associated with its use as a result of the blocked view of exiting vehicles by SUVs and vans. However, it is true these are the same problems experienced now with the perpendicular parking presently in place. The results of changing to angled parking would be a loss in the number of available spaces and vehicles could only exit in one direction, i.e. for this location, to the southbound direction. It is uncertain if this would benefit safety and additional analysis is required. Vehicles wishing to go northbound would have to reverse their direction somewhere else, the Salmon Fall parking lot would be the desirable location, but most likely a U-turn would be made at the intersection of Clement Street, which would present additional safety issues.

Further study of this area should be considered before any of the following suggestions are implemented to gage their impact on traffic flow. The installation of stop control on Ashfield Street would decrease speeds of traffic entering State Street dramatically. All vehicles entering the area would be doing so from a stop and hence would be traversing this busy intersection at low speed allowing more time for drivers to react to conflicting movements either from parked traffic or the other roads. Consideration should be given to making the intersection of Bridge and State Streets a three-way stop. Again, this would reduce traffic speeds in the area and the concept of the three-way stop has the potential to improve traffic flow out of Bridge Street. Further study would be required to determine if this type of control would have a detrimental effect on congestion from queued vehicles on State Street.

Shelburne Falls Parking Study

The Franklin Regional Council of Governments (FRCOG) was hired by the Shelburne Falls Village Partnership to conduct a parking study. The Scope of Services for the Shelburne Falls Parking Study was designed to address the following tasks: assess the current use of existing parking; assess how to increase the use of existing peripheral lots; reconfigure existing spaces within the Keystone Lot to increase capacity; and develop an implementation plan to use existing parking to its fullest capacity.

Based on two parking turnover surveys, it was established that there was not a parking capacity shortage in the Village. There remained 30% (100 spaces) unused capacity at peak occupancy. The perception that there is a shortage of parking in the Village of Shelburne Falls is likely attributed to the perception that the core parking areas account for all the available parking. Additional capacity could be obtained in core areas by removing all day parkers from these valuable spaces. The Keystone Lot was identified as an area where high turnover is desired, but 50% of its spaces are being occupied by long term parkers.

Time limit restrictions have been recommended for the Keystone Lot and other key areas to increase turnover and therefore the availability of spaces. Enforcement options have been proposed in the form of a parking enforcement officer along with a hand held computer citation device. Without enforcement the new and existing restrictions would be open for abuse. Meters and pay and display options were investigated but have been discouraged due to high implementation costs and perceived unfriendliness to visitors.

Pedestrian and Bicycle Transportation Infrastructure Assessment

This section provides a brief overview of the infrastructure for the most common types of non-motorized transportation—bicycling and walking. Primarily, infrastructure in and around the village center was assessed. Specifically, the Transportation Subcommittee suggested that the following items be generally evaluated to determine their current condition/status, and the feasibility for improving bicycle and pedestrian linkages within the village center, or between the village center and other points outside of the downtown area. The evaluations were intended to be “first cuts” to decide if the expenditure of additional time or resources to pursue the ideas was warranted. These potential improvements were intended to serve residents of the towns, as well as tourists to the area. The following areas or ideas were explored:

- Establishing a bikepath to connect the downtown area with the Mohawk Trail Regional High School via Old State Street;
- Creating a linkage between an existing Audubon Trail at High Ledges and the village center;
- Creating a pedestrian esplanade/walkway along the Deerfield River on State Street from Bridge Street to Route 2;
- Connecting the Mahican-Mohawk Trail hiking path along the Deerfield River from its current terminus approximately 1/2 mile east of the village center into the downtown area;
- Identifying other pedestrian and bicycle opportunities in and around the village center.

Bikepath between Mohawk Trail regional High School & Downtown Shelburne Falls

Creating a way for students to safely walk or bike from the village center to the Regional High School was the goal behind this suggestion. It was proposed that perhaps an off-road bikepath could be built along Old State Street, formerly a through road from State Street to the upper end of North Street. The former roadway used to cross under Boston & Maine railroad tracks (still currently active), but with the discontinuance of the road the underpass was filled. The former roadbed now ends at an earthen bank that rises approximately 15 feet to the railroad tracks above. Between the railroad tracks and North Street is private property. The property owner is opposed to public access of his land.

The steep grade at the former underpass poses the first obstacle to establishing a bikepath in this area. Another lies in the need to cross active railroad tracks in the event that an acceptable grade elevation could be achieved. Securing the approval of a railroad to cross an active line with a bicycle or pedestrian crossing is a complicated, extremely difficult and rarely successful endeavor. Likewise, reestablishing an underpass would be similarly difficult since it would involve both railroad negotiations and the fact that a good deal of land beyond the railroad tracks has also been filled. Finally, there is strong opposition by the private property owner whose land would be crossed by the bikepath. Pursing this bikepath at this time would not be the best use of resources.

An alternative bicycle/pedestrian facility could be developed as a shared roadway facility along North Street. This means that the road is configured in a way that allows bicycles to travel in a shoulder or break down lane. The primary obstacle to this option is the poor visibility and sight distance at the narrow “S” curve under the railroad tracks. Similarly, the road width may not be able to accommodate the minimum 4-foot shoulder on either side of the roadway for safe cycling.

High Ledges/Village Center Linkage

High Ledges, an Audubon conservation area located along a ridge in the northwest portion of Shelburne, contains a network of hiking and viewing trails. One trail, established in the 1970s, traverses the mountain from the High Ledges ridge to the Arms Cemetery near the Route 2/Mechanic Street intersection. It was thought that it might be possible to establish a link between the trail terminus at Arms Cemetery and the village center, creating an opportunity for residents and visitors to access both areas.

Initial research indicates that although the trail is used, its use is minimal and sporadic. More activity tends to take place in the ridge and conservation area itself. The trail was established primarily on Audubon land, however the cooperation of private landowners was necessary to complete a through trail to the cemetery. Conversations with one of the private landowners whose property is crossed by the trail revealed a willingness to continue the current arrangement of limited use, but an unwillingness to promote the trail to attract additional users. This landowner felt that neighbors whose land is also crossed by the trail would share this opinion. Therefore, this idea may be better pursued at a future date since the time needed to conduct appropriate negotiations with landowners could prove significant.

State Street Esplanade

With the completion of the attractive River Esplanade from the Iron Bridge to Lamson-Goodnow on Shelburne Falls Road/Conway Road, it was suggested that perhaps a similar facility could be constructed along State Street and the Deerfield River from the Iron Bridge toward Route 2. The original idea was to explore establishing a walkway either along the River's shore, or via a parallel supported structure similar to a boardwalk.

A field visit revealed that adequate sidewalk is present in front of the buildings immediately adjacent to the Iron Bridge and Bridge of Flowers. This sidewalk ends at the Sunoco gas station, which due to its unusual site layout and proximity of structures to the road right-of-way makes continuing the sidewalk past this business difficult. It appears that sidewalk in this area would be either located in the vehicle travel lane of State Street, or conflict with the ingress and egress to the gas pumps. Beyond the gas station is the Eagles Club and a public parking lot. At this point, the River is once again in view and parallel to State Street. The next 3/10 of a mile appears to be an excellent place to establish a River Esplanade/walkway.

Due to the steep grade from the Deerfield River shoreline to State Street above, combined with the narrowness of the shore itself, the best option for establishing an esplanade would be in the edge of the existing road right-of-way closest to the Deerfield River. There is currently approximately 36 feet of pavement available for vehicle travel in this area of State Street. Typical travel lanes are 12 feet wide, with 2-4 feet of shoulder for breakdown, etc. The existing roadway width could possibly be reconfigured to allow a 6 foot Esplanade along the Deerfield River edge from the Eagles Club to Neighbors mini-mart (3/10 of a mile), while still maintaining adequate width for vehicle travel. Such a facility could also have the additional benefit of traffic calming along this road due to a perceived reduction in width. Beyond the Neighbors mini-mart the River is less visible due to a dense cluster of buildings along the river side of State Street, and the turning of the Deerfield River away from State Street. For these reasons, the area of Neighbors mini-mart seems to be an appropriate terminus for a State Street Esplanade. A walkway continues toward Route 2 on the opposite side of the street.

Further exploration of a State Street Esplanade should be conducted. Such a facility may be possible with a minimum of construction, and would blend nicely with other plans and construction throughout the village center. The only difficulty is linking the Esplanade from the Eagles Club to the sidewalk beyond the Sunoco station. However, a narrower walkway or another design solution should be possible.

Mahican-Mohawk Trail Connection

The Mahican-Mohawk Trail is planned to be a 100-mile trail and interpretive facility from the Connecticut River to the Hudson River. It follows an original Native American travel and trade route along the Deerfield and Hoosic Rivers. The first section of this trail was complete in 1997, and stretches approximate 8 miles along the Deerfield River from Historic Deerfield to the former Franklin Nursery near the Shelburne Falls State Police Barracks. Since its current terminus is only approximately 1/2 mile from the Shelburne Falls village center, it was thought that a walking connection between the Village and the trail would benefit many users.

It was suggested by the subcommittee that a possible connection could be the bridging the Deerfield River from the trail's terminus near the Franklin Nursery to the Gardner Falls hydroelectric plant's recreational facilities off of Shelburne Falls Road/Conway Road. While this would provide an excellent link to the village center by connecting the trail to the newly constructed Esplanade and an easy walk into downtown, the significant width of the River in this area and the location of the hydroelectric generation facility make this option unlikely. Negotiations with the electric generating company would be required, and that could be time consuming. More importantly, however, erecting a bridge of the length required, and one that could withstand the changing water levels due to the hydroelectric activity, would be a significant undertaking. Pursuit of this idea may not be a good use of resources at this time.

Establishing a connection between the Mahican-Mohawk Trail and the village center is an excellent goal, however, that warrants further exploration. It may be possible to identify a different section of the trail that is adjacent to a narrower portion of the Deerfield River making it possible to more appropriately span a bridge. Similarly, there may be opportunities to extend the trail into the Village on the same side of the River. There are still several possibilities to explore in making the Trail-Village connection, and resources should be devoted to more fully exploring these options.

Other Pedestrian and Bicycle Opportunities

Due to its historic development pattern, the village center has an established pedestrian network that serves much of the downtown. Thanks to recent efforts and grants, existing pedestrian facilities are being repaired and upgraded throughout the Village. Most of the typical suggestions for improving walkways are already being carried out. However, some attention should be paid to safely connecting peripheral parking areas with the existing network. Connecting the parking lot near the Eagles Club to the Iron Bridge and downtown is important. As previously mentioned, accomplishing this will be challenging given the location of the gas station. Other pedestrian cues, such as signs to and from parking areas, will help facilitate pedestrian movement through town. Again, work is underway to identify types and locations of appropriate signs for this purpose.

Also due to its historic development pattern, bicycling in the village center can be difficult due to narrow roads and on-street parking. Roads leading into the Village, such as Shelburne Falls Road/Conway Road, Route 112, or side streets on the perimeter of town can be successfully biked. However, once a cyclist is in the Village it would be preferable if bike racks were available to park bicycles allowing patrons to walk to Village destinations. Bike rack locations might include the State Street Parking area adjacent to the eagles Club. Landscaping and benches could also be installed at this location to encourage greater use of this parking area, particularly by tourists given the lovely view of the Deerfield River. In addition, bike racks could be located at the Cross Street and Salmon Falls parking areas.

Although hilly, the roads outside of the village center in both Buckland and Shelburne offer some of the most scenic and enjoyable cycling for experienced cyclists. Loops that start and stop in the Village could be established for visitors who want to explore while in the area. Routes connecting destinations in a less circular fashion could be established for residents who would like to travel by bicycle. Possible roads include Route 112 north to Colrain and Vermont, and south to Ashfield and Routes 116 north and Route 9 west; Shelburne Falls Road and Route 116 to Conway; Bardswell's Ferry Road; this list goes on. The towns should establish a bikeway committee to more fully explore possible loops and routes for bicycle transportation throughout their towns. It is important that the road's width, condition, and volume of traffic be considered when identifying bicycling routes. A committee made up of a variety of interests including local cyclists, businesses, and transportation professionals could identify desirable routes and their feasibility. There are a variety of transportation funding sources for the establishment of bicycling facilities that could be explored if the town developed a bikeway plan and identified its priorities.

Summary

There are a number of ideas generated by the subcommittee that warrant further exploration. Namely, development of an Esplanade along State Street and the Deerfield River has the potential to improve pedestrian circulation within the village center, while at the same time creating more cohesion between this section of the village and core areas. Similarly, resources should be devoted to exploring the possibilities for connecting the Mahican-Mohawk trail with the Village. A number of options should be looked at to see if an appropriate Deerfield River crossing can be identified, or if continuing behind the State Police Barracks is feasible. Pedestrian facilities are currently being addressed, but special attention should be paid to connecting peripheral parking areas with the core areas. Bike racks should be provided in the village center to encourage both bicycling trips into the Village, and walking while there. Finally, development of a bikeway plan for the communities could be the first step in establishing transportation and recreational bicycling facilities for visitors and residents.

Recommendations

- Given the poor Level of Service (LOS) which currently exists for Route 2 in Shelburne, minimize future additions to traffic by protecting open space along the corridor, encouraging businesses with low traffic generation rates and requiring shared curb cuts and access roads for new development.

- Work with the FRCOG Transportation Planning Staff to address potential safety issues at key intersections identified by the Accident Data and Intersection Analyses.

- Implement a Local Pavement Management Program in each town building upon the work completed by the Master Plan.

- Implement the recommendations of the Shelburne Falls Parking study.

- Continue expanding the pedestrian infrastructure in Shelburne Falls.

- Establish a bikeway committee or join the Franklin County Bikeway Advisory Committee to develop a bikeway plan for Buckland and Shelburne.

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APPENDIX I

Community Surveys

APPENDIX II

Town of Buckland Pavement Management Analysis Results

Glossary of Terms for Data Format

Street Name - Street Name prefixed with the Municipalities three digit code.
* Indicates the road section is eligible to receive Federal Aid for Reconstruction.

Section From - Start point of the individual section.

Section To - End point of the individual section.

Length (ft) - The length of the section, measured in feet.

PCI - Pavement Condition Index
95 - 100 indicates the pavement is in **excellent** condition,
85 - 94 indicates the pavement is in **good** condition;
65 - 84 indicates the pavement is in **fair** condition;
0 - 64 indicates the pavement is in **poor** condition.

Repair Code -
1. Reconstruction; ($30 sq/yd)
2. Rehabilitation; ($10 sq/yd)
3. Preventative Maintenance; ($7.50 sq/yd)
4. Routine Maintenance; ($2.50 sq/yd)
5. No Immediate Maintenance. ($0 sq/yd)

PMS Ranking - A ranking of all the sections requiring repair, based on a cost/benefit produced by the RoadManager software through the Benefit Value. The section with the highest Benefit Value has received a PMS Ranking of 1. Sections with equal Benefit Values have received the same ranking. In total there are 66 ranked sections in Buckland and 61 ranked sections in Shelburne.

Estimated ADT - Average Daily Traffic travelling on each section of road. Generally, traffic count data was available on the higher volume roads. Where data was not available, estimates were made based on the functionality of the road and the number of houses or businesses they served.

Survey Date - Date on which the pavement distress data was collected.

NOTE:
The information contained in these tables was created from a visual evaluation of the pavement surface in which the severity and extent of the observed distresses were estimated. The recommended repair strategies and the associated costs are not final. A more detailed engineering evaluation must be conducted before finalizing any repairs and their associated costs. The information presented here can be used as a tool for <u>preliminary</u> evaluation and prioritization of the paved road network as a whole.

APPENDIX III

Town of Shelburne Pavement Management Analysis Results

Glossary of Terms for Data Format

Street Name - Street Name prefixed with the Municipalities three digit code.
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NOTE:
The information contained in these tables was created from a visual evaluation of the pavement surface in which the severity and extent of the observed distresses were estimated. The recommended repair strategies and the associated costs are not final. A more detailed engineering evaluation must be conducted before finalizing any repairs and their associated costs. The information presented here can be used as a tool for <u>preliminary</u> evaluation and prioritization of the paved road network as a whole.

APPENDIX IV

Level of Service Analysis Results

Methodology:
LOS analysis looks at peak traffic conditions, generally for a peak 15-minute period. This allows for an analysis of the worst conditions experienced. For the analysis of LOS for this study, 15-minute traffic volumes were not available. Additionally, average LOS conditions throughout the year were desired. Therefore, the peak hour volumes were identified from existing traffic counts. The "Peak Factor" was calculated by dividing the peak hour volume by the total daily volume. The Average Annual Daily Traffic (AADT) volume was then multiplied by the Peak Factor to obtain the Peak Hour Volume to be used in the LOS calculations.

ROUTE 2 – Greenfield T.L. to Shelburne Center Road

Terrain – 2
% No Passing – 76
Peak Factor = 0.080; AADT = 11300; Peak Observed Volume = 1283
% Trucks – 8%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 44% : 56%
Average Lane Width – 12
Average Shoulder Width – 8
CALCULATED LOS = D

ROUTE 2 – Shelburne Center Road to South Maple Street (Route 2A)

Terrain – 2
% No Passing – 82
Peak Factor = 0.085; AADT = 10430; Peak Observed Volume = 887
% Trucks – 8%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 43% : 57 %
Average Lane Width – 12
Average Shoulder Width – 7
CALCULATED LOS = D

ROUTE 2 – South Maple Street (Route 2A) to Buckland/Shelburne T.L.

Terrain – 2
% No Passing – 83
Peak Factor = 0.080; AADT = 6300; Peak Observed Volume = 504
% Trucks – 8%
% Buses – 0%
% RV's – 0%

Design Speed – 60
Directional Distribution – 41% : 59%
Average Lane Width – 12
Average Shoulder Width – 8
CALCULATED LOS = C

ROUTE 2 – Buckland/Shelburne T.L. to Buckland/Charlemont T.L.
<u>Terrain – 2</u>
% No Passing – 96
Peak Factor = 0.130; AADT = 4700; Peak Observed Volume = 611
% Trucks – 8%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 48% : 52%
Average Lane Width – 12
Average Shoulder Width – 8
CALCULATED LOS = D

ROUTE 112 – Route 2 to Ashfield T.L.
<u>Terrain – 1</u>
% No Passing – 74
Peak Factor = 0.090; AADT = 3205; Peak Observed Volume = 353
% Trucks – 8%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 49% : 51%
Average Lane Width – 12
Average Shoulder Width – 4
CALCULATED LOS = B

UPPER STREET – Route 112 to Route 112
<u>Terrain – 2</u>
% No Passing – 100
Peak Observed Volume = 32
% Trucks – 2%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 50% : 50%
Average Lane Width – 12
Average Shoulder Width – 1
CALCULATED LOS = A

CHARLEMONT ROAD – Upper Street to Charlemont T.L.

Terrain – 3
% No Passing – 100
Peak Factor = 0.090; AADT = 280; Peak Observed Volume = 25
% Trucks – 6%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 60% : 40%
Average Lane Width – 13
Average Shoulder Width – 0
CALCULATED LOS = B

NORTH STREET – Route 112 to State Street

Terrain – 1
% No Passing – 100
Peak Factor = 0.083; AADT = 1440; Peak Observed Volume = 120
% Trucks – 4.7%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 44% : 56%
Average Lane Width – 11
Average Shoulder Width – 1
CALCULATED LOS = B

STATE STREET – Conway Road to Route 2

Terrain – 1
% No Passing – 100
Peak Factor = 0.090; AADT = 2470; Peak Observed Volume = 224
% Trucks – 6.5%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 59% : 41%
Average Lane Width – 15
Average Shoulder Width – 2
CALCULATED LOS = B

CONWAY ROAD – State Street to Conway T.L.

Terrain – 1
% No Passing – 100
Peak Factor = 0.088; AADT = 2290; Peak Observed Volume = 200
% Trucks – 4%
% Buses – 0%
% RV's – 0%
Design Speed – 60

Directional Distribution – 50% : 50%
Average Lane Width – 11
Average Shoulder Width – 2
CALCULATED LOS = B

ROUTE 112 – Hope Street to Colrain T.L.

Terrain – 1
% No Passing – 94
Peak Factor = 0.084; AADT = 1440; Peak Observed Volume = 121
% Trucks – 5.4%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 60% : 40%
Average Lane Width – 12
Average Shoulder Width – 3
CALCULATED LOS = B

MAIN STREET – Hope Street to Bridge Street

Terrain – 1
% No Passing – 100
Peak Factor = 0.089; AADT = 1450; Peak Observed Volume = 130
% Trucks – 5.2%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 52% : 48%
Average Lane Width – 12
Average Shoulder Width – 0
CALCULATED LOS = B

MECHANIC STREET – Route 2 to Hope Street

Terrain – 1
% No Passing – 100
Peak Factor = 0.090; AADT = 1600; Peak Observed Volume = 144
% Trucks – 9%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 49% : 51%
Average Lane Width – 12
Average Shoulder Width – 0
CALCULATED LOS = B

HOPE STREET – Mechanic Street to Main Street

<u>Terrain – 1</u>
% No Passing – 100
Peak Observed Volume = 144
% Trucks – 9%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 49% : 51%
Average Lane Width – 12
Average Shoulder Width – 0
CALCULATED LOS = B

BARDSWELL FERRY ROAD – Route 2 to Conway T.L.

<u>Terrain – 2</u>
% No Passing – 100
Peak Observed Volume = 17
% Trucks – 2%
% Buses – 3.6%
% RV's – 0%
Design Speed – 60
Directional Distribution – 47% : 53%
Average Lane Width – 10
Average Shoulder Width – 0
CALCULATED LOS = A

COLRAIN-SHELBURNE ROAD – Route 2 to Colrain T.L.

<u>Terrain – 2</u>
% No Passing – 100
Peak Factor = 0.090; AADT = 2090; Peak Observed Volume = 188
% Trucks – 5%
% Buses – 0%
% RV's – 0%
Design Speed – 60
Directional Distribution – 31% : 69%
Average Lane Width – 11
Average Shoulder Width – 1
CALCULATED LOS = C

APPENDIX V

Funding Sources for CIP Projects