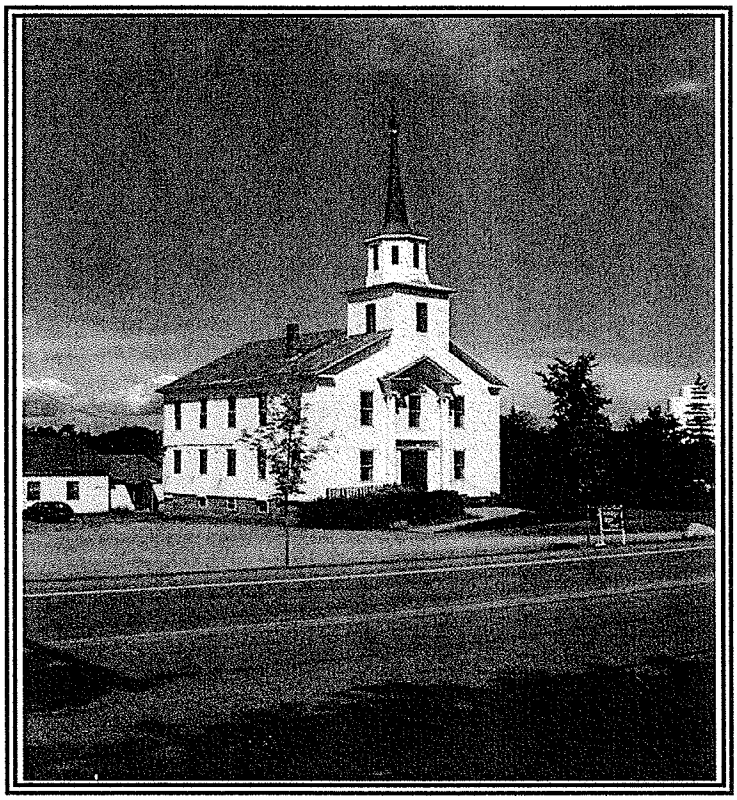
Route 116 Hinesburg Village Corridor Study
Hinesburg, Vermont



DRAFT SCOPING REPORT

June 2004

Chittenden County Metropolitan Planning Organization
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DuBois & King Inc.

EXHIBITS

APPENDICES (under separate cover)

Section 1
Executive Summary

The Route 116 Hinesburg Village Corridor Study was conducted by DuBois & King, Inc. under contract to the Chittenden County Metropolitan Planning Organization (CCMPO). The purpose of this study was to: identify and evaluate physical and functional deficiencies along a 1.5 mile Route 116 roadway corridor between Shelburne Falls Road on the north and Buck Hill Road on the south; document potential solutions and constraints; and develop base plans for further project development.

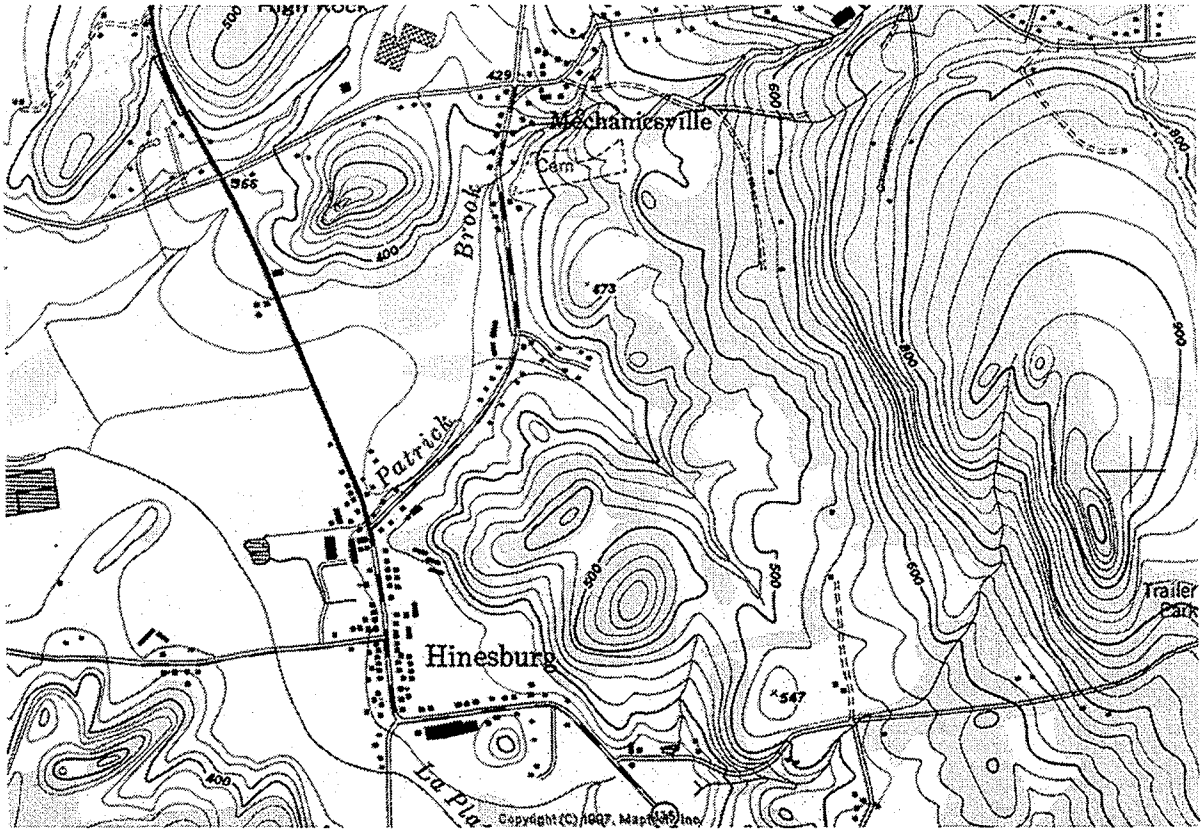


Exhibit 1- Overall Area Map
Route 116 Hinesburg Village

As detailed herein, the report has four main parts:

Section 4 - Existing Conditions: This section in the Route 116 Corridor Study focuses on traffic volumes and levels of service, roadway and bridge conditions, roadway functional classifications, safety, corridor deficiencies, pedestrian and bicycle facilities, public transit, existing land uses and character, physical features and environmental data.

Section 5 - Corridor Improvement Goals & Standards: This section uses information gathered at the public hearings and from the analysis of existing conditions to identify goals and standards for developing improvement alternatives. These improvements are presented in four groups:

Group 1: Managing Traffic
Group 2: Improving conditions along the streets
Group 3: Improving pedestrian crossing conditions
Group 4: Reducing auto dependency

Section 6 - Corridor Improvement Alternatives: This section lists viable short, intermediate, and long-term options and alternatives for addressing concerns throughout the entire corridor and at the individual intersection locations.

Section 7 - Improvement Options Evaluations: This section presents an evaluation of the improvement alternatives and their impacts.

1.A EXISTING CONDITIONS

The last 20 years have seen an annual increase of more than 3% annually in the traffic volumes along Route 116 in the Village of Hinesburg. This increase in traffic volume has developed from two sources, growth within the Town of Hinesburg and more significantly from through traffic volumes for commuting traffic. Route 116 increasingly serves as an arterial roadway for through traffic. It also serves local destination traffic from students, faculty and staff commuting to Champlain Valley Union High School and the Hinesburg Community School (elementary). As a result, vehicular congestion has increased, especially during the AM and PM peak hours for access to Route 116 from adjacent commercial driveways and intersections, and Levels of Service (LOS) from the minor street approaches at Silver Street, Charlotte Road, Mechanicsville Road, and Commerce Street have decreased.

Route 116 is a four-rod ROW (20m/66') between the Shelburne Falls Road and the Silver Street intersection. The roadway alignment is generally adequate with the exception of the tight curve at the Silver Street intersection. Several segments of uncontrolled commercial access create excessive pavement widths and uncontrolled parking adjacent to Route 116.

The segment of Route 116 from Silver Street to Buck Hill Road is a three-rod ROW. The reduced roadway width has helped to reduce vehicle speed adjacent to the Community School.

A summary of concerns within the corridor, as detailed and discussed within the report, are listed below. These include:

1.A.1 Corridor Deficiencies

a. Inadequate access management on segments between Commerce Street and Mechanicsville Road create functional and safety concerns due to wide expanses of pavement for individual commercial driveways.

b. The lack of curbing for the majority of the corridor fails to delineate the edge of pavement and define the limits of parking.

c. Pedestrian facilities (sidewalks) exist along the east side of the corridor between Mechanicsville Road and the community school. However, there are minimal pedestrian facilities on the west side of Route 116 and an inadequate number of crosswalks.

d. From Commerce Street to Silver Street the roadway shoulders are excessively wide for a village setting. The shoulder widths exceed the width requirements for bicycle lanes, encourage higher vehicle speeds, encourage vehicular passing on the right-hand side, increase pedestrian crossing widths, and degrade the village streetscape scale.

e. Wide residential and commercial accesses between Charlotte Road and Silver Street are presently utilized as uncontrolled parking areas with overflow onto the Route 116 shoulders.

f. Street lighting consists of utilitarian, non-cut off roadway fixtures that are not aesthetically pleasing, too widely spaced, and out of scale with pedestrian circulation.

g. Restricted sight distances and high vehicle speeds contribute to the Route 116/ Shelburne Falls Road intersection's listing as a high accident location.

1.A.2 Land Use Planning Issues

a. There is a need for more specific development plans and guidelines for local growth areas including Commerce Street, the area north of Commerce Street, and south of Friendship Lane. These plans should encompass traffic and access management, walkways, lighting, landscaping, signage, utilities, and bicycle and pedestrian accommodations.

b. A design review process should be initiated to: support improved pedestrian, bicycle, and transit facilities; review access management; and address aesthetics. This would supplement and enhance the current review process.

c. Improved streetscape aesthetics incorporating plantings, sidewalks and pathways, signage, lighting, and other traffic calming measures will improve roadway function and safety for all corridor users.

1.B CORRIDOR & INTERSECTION IMPROVEMENT ALTERNATIVES

Improvement alternatives have been developed to address traffic management issues and promote the use of alternative modes of transportation to better serve area businesses and residents. The intent is to achieve more of a balance between arterial and local road functions, maintain reasonable levels of service, improve aesthetics, and encourage use of walks, bikeways and public transit. Strategies for addressing these concerns include road improvements, access management, intersection improvements, additional pedestrian and bicycle facilities, and traffic calming. Improved pedestrian and bicycle facilities are of particular interest to the Town as these can provide alternatives to automobile use for residents accessing local businesses and community facilities. Sections 6 and 7 detail the specific options and evaluate the alternatives. The following is a summary of the alternatives:

1.B.1 Route 116 Corridor Improvement Alternatives

A. No Build

B. Alternative I)A: Improved Streetscape

- Reduce road width from Commerce Street to Silver Street with four foot shoulders for bike lanes.
- Install pedestrian walkways on both sides of Route 116 from Commerce Street to Friendship Lane.
- Install street trees and roadway lighting from Commerce Street to Friendship Lane.
- Install separated paths on the east side of Route 116 from Shelburne Falls Road to Commerce Street, and on the east side from Friendship Lane to Buck Hill Road.
- Install curbing for access management from Commerce Street to Friendship Lane and upgrade stormwater system. Alternatives to curbing and additional stormwater piping may be guard rails, guide posts, or breaks in the curb at regular intervals to provide roadside drainage and overland treatment.

C. Alternative I)B: Improved Streetscape with Parallel Parking

- Modify Alternative I)A with inclusion of parallel parking on both sides of Route 116 from Charlotte Road to Silver Street.

D. **Alternative I)C: Improved Streetscape with Angled Parking**
   - Modify Alternative I)B with inclusion of angled parking from Charlotte Road to Silver Street, on the west side only. Maintain parallel parking on the east side.

1.B.2 Route 116/Shelburne Falls Road Intersection Alternatives

The review of this existing signalized intersection concludes that the current Level of Service (LOS) is good, but it is a High Accident Location (HAL). Refer to section 4.C.10 and Exhibit 13 for the types of accidents occurring at this location. As a result of these accidents, proposed alternatives are geared toward safety and pedestrian improvements at this location. The following is a list of the Intersection Improvement Alternatives reviewed.

A. **No Build**
B. **Alternative II)A: Improved Sight Lines**
   - Intersection sight and visibility improvements
C. **Alternative II)B: Safety Analysis; Signal Upgrade**
   - Signal upgrade based upon detailed safety review
   - Pedestrian crossings and actuated signals

1.B.3 Route 116/Commerce Street Intersection Alternatives

The review of this unsignalized intersection concludes that with the current configuration of exclusive Route 116 left and right-turn lanes onto Commerce Street, it will continue operating at a good LOS. In addition, this intersection has the capacity for increased traffic with the existing geometry. In the future this intersection will become a four-way intersection with the proposed development on the west site of Route 116. The alternatives for this location are based upon corridor traffic calming and future traffic planning initiatives. The following is a list of the Intersection Improvement Alternatives reviewed.

A. **No Build**
B. **Alternative III)A: Roundabout**
A. **Alternative III)B: Signalized Intersection**

1.B.4 Route 116/Mechanicsville Road Intersection Alternatives

The review of this unsignalized intersection concludes that there are some operational and congestion deficiencies at this location which affect both the intersection and Mechanicsville Road. The Route 116/Mechanicsville Road intersection has a wide intersection throat allowing for northbound traffic on Route 116 to make excessively fast turns onto Mechanicsville Road. This problem of fast

turning traffic is made worse due to the high northbound traffic volumes on Route 116. In addition, a poor (F) LOS is experienced by southbound vehicles making left turns from Mechanicsville Road onto Route 116. The expressed traffic planning goals are for future development and alternatives to divert some or all of the traffic exiting onto Route 116 from Mechanicsville Road to the Commerce Street intersection. To meet this goal several traffic planning initiatives will be required based upon the chosen intersection alternative. Following is a list of the Intersection Improvement Alternatives reviewed.

A. **No Build**
B. **Alternative IV)A: Lane Upgrades**
   - Pavement marking of exclusive left and right-turn westbound lanes
   - Reduction of intersection throat width and separation from the adjacent former fire house driveway in the northeastern quadrant of the intersection
C. **Alternative IV)B: Roundabout**
D. **Alternative IV)C: Signalized Intersection**
E. **Alternative IV)D: One-way Street**
   - Closure of intersection to traffic exiting onto Route 116

1.B.5 Route 116/Charlotte Road Intersection Alternatives

The review of this unsignalized intersection concludes that the Charlotte Road approach operates at a poor (F) LOS for left-turning traffic. The recent addition of left and right-turn lanes has improved the traffic flow by increasing the available queue lengths and also allowing right-turning vehicles to bypass waiting left-turn vehicles. Due to these congested conditions, the reviews focused on capacity improvements for this location. The following is a listing and summary of the Intersection Improvement Alternatives that were reviewed.

A. **No Build**
B. **Alternative V)A: Roundabout.**
C. **Alternative V)B: Signalized Intersection**

1.B.6 Route 116/Silver Street Intersection Alternatives

The review of this unsignalized intersection concludes that there are operational and congestion deficiencies based upon the intersection geometrics and the traffic patterns. The intersection is presently configured with a "Y" approach off of Silver Street which increases the number of conflict points for vehicles within the intersection. The "Y" approach configuration benefits Silver Street right-turning traffic by allowing vehicles to bypass waiting, left-turning traffic when queues are short. However, during high volume times, this right-turn movement is blocked by vehicles queued to make left turns. Blocked traffic on the eastern leg of the Silver

Street "Y" intersection is aggravated by a traffic pattern that is to/from the north on Route 116. A poor (F) LOS is experienced by vehicles making left turns onto Route 116. The alternatives focus on this congestion, conflict points, and the close proximity of the Hinesburg Community School. The following is a listing and summary of the Intersection Improvement Alternatives reviewed.

A. **No Build**
B. **Alternative VI)A: "T"-Intersection**
C. **Alternative VI)B: Roundabout**
D. **Alternative VI)C: Signalized Intersection**

1.C CONCLUSIONS & RECOMMENDATIONS

The "Route 116 Hinesburg Village Corridor Study" and its recommended improvement alternatives is intended to be used as a guide for the Town of Hinesburg in developing its own implementation plan for the preferred Route 116 corridor improvements. Future implementation of these alternatives will be affected by several factors including public participation, project costs, project impacts, and permitting issues. The Town of Hinesburg's preferred alternatives and their estimated costs are listed below:

A. Route 116 Corridor Improvements:

Alternative I)B - Improved streetscape with parallel parking on both sides of the Route 116 from Charlotte Road to Silver Street.
Cost: $2,758,000

B. Route 116 Intersection Improvements:

1. Shelburne Falls Road: Alternative II)A and II)B - Improved sight lines; safety analysis; and signal upgrade.
   Cost: $47,500

2. Commerce Street: No-Build Alternative, due to lack of congestion in foreseeable future. Some Planning Commission members questioned the desirability of a roundabout at this location.
   Cost: N/A

3. Mechanicsville: Alternative IV)A - Lane upgrades.
   Cost: $11,100

4. Charlotte Road:	Alternative V)B - Signal. (Refer to section 6 for discussion of signal issues and the need to meet the state's standard signal warrants.) Cost: $92,500
5. Silver Street	Short Term: Alternative VI)A - "T" Intersection Cost: $154,900 Long Term: Alternative VI)B - Roundabout Cost: $207,500

Section 2
Introduction and Purpose of Study

The Chittenden County Metropolitan Planning Organization (CCMPO) is responsible for performing long and short-range transportation systems anayses for Chittenden County. CCMPO has been working with the Town of Hinesburg to evaluate a range of transportation issues associated with Vermont Route 116 through the Hinesburg Village center. The corridor study focuses on a 1.5 mile section of Route 116 between Shelburne Falls/CVU Road at the north end, and Buck Hill Road at the south end. The CCMPO contracted with DuBois & King to: prepare the Route 116 Hinesburg Village Corridor Study; review existing transportation conditions and issues; and develop corridor and intersection improvement alternatives through a public scoping process. To accomplish these, DuBois & King:

- Reviewed the findings of CCMPO's 1998 "Hinesburg Village Transportation Study"
- Created topographic survey maps
- Identified and reviewed constraints; examined physical and functional deficiencies; and considered environmental issues
- Solicited public involvement
- Developed improvement alternatives
- Prepared an implementation guide with preferred improvement alternatives and priorities for future project development and permitting

Other study objectives included:

- Identification and documentation of existing transportation conditions within the corridor, including roadway, bicycle/pedestrian, and business access.
- Documentation of existing and projected future traffic volumes for 2005 and 2015.
- Safety and level-of-service analysis for specific intersections.
- Preparation of short and long-term cost effective alternatives to address the identified concerns.
- Examination of access management strategies.
- Preparation of construction cost estimates for the corridor and intersection improvement alternatives.

During the course of this project, existing corridor data and reports were reviewed and public comments were heard in order to develop achievable alternatives for addressing functional and safety deficiencies of the corridor and exploring opportunities to improve

access management, village definition, traffic calming, and pedestrian and bicycle facilities.

Vermont Route 116 serves as a minor, north-south arterial corridor between Chittenden County and Addison County. In addition to functioning as a regional arterial, it provides access to local businesses, schools, and town offices within the Hinesburg village area.

In addition to evaluating the Route 116 corridor between Shelburne Falls Road and Buck Hill Road, DuBois & King, Inc. evaluated the principle corridor intersections listed below from north to south:

- Shelburne Falls Road
- Commerce Street
- Mechanicsville Road
- Charlotte Road
- Silver Street

Purpose and Need Statement

Purpose and Need Statements are an important means to defining and justifying any project. They briefly state problems and project goals, and make it possible to propose and evaluate alternative solutions while giving due consideration to the "no-build" alternative.

Purpose

The purpose of the Hinesburg Village Route 116 Corridor Study is to enhance mobility within the corridor and from side streets; improve safety within the village and the community school zone; enhance the corridor streetscape; and improve bicycle and pedestrian access, mobility, and safety.

Need

Mobility, access, and safety within the Route 116 corridor between Shelburne Falls Road and Buck Hill Road have degraded due to the following conditions:

- Increased through traffic volumes
- Poor intersection capacity from side streets
- Inadequate sight distances at business entrances, driveways, and side street intersections
- Vehicle speeds in excess of posted speed limits influenced by traditional roadway standards that encourage road banking and wide travel lanes
- Missing and insufficient pedestrian links

- Vague village boundaries and indistinguishable streetscape
- Indistinct and excessive business access points
- School and town facilities expansion
- Competing and sometimes conflicting uses including truck route, village center, on-street parking, business access, and school facilities access

Section 3
Public Involvement Program

Public input during the corridor study process helped facilitate corridor inventories and develop solutions for a variety of transportation-related issues within the corridor. Local citizens and businesses provided specific knowledge of the project area and helped identify concerns and opportunities. Business owners and residents are the primary stakeholders affected by decisions made regarding improvements to the corridor and implementing the recommended solutions will have a direct impact on their daily activities and livelihood. During the study, the DuBois & King team worked closely with CCMPO staff and the town of Hinesburg advisory committee to ensure that stakeholders with specific interests in the project were informed and encouraged to attend public meetings and participate in the process.

Beginning with a public forum, the Local Concerns Meeting, held after initial data collection and analysis, community members had an opportunity to respond to information collected regarding corridor conditions including roadway, bicycle/pedestrian, environmental, and safety. The Local Concerns Meeting occurred on November 29, 1999, at the Hinesburg Town offices. A slide presentation was used to review the project area, present some of the transportation and planning conditions, and stimulate questions and comments. These comments emphasized the need for objective, coordinated alternatives that:

- Improve pedestrian safety at crossings and school zone
- Incorporate aesthetics into the streetscape alternatives
- Improve access to Route 116 from side roads
- Maintain minimum width lanes to slow vehicles; wider is not necessarily better
- Review new parking alternatives including angled parking adjacent to the school
- Maintain Route 116 capacity for through traffic

Comment sheets attached to the agenda and handouts provided an opportunity for those in attendance to submit their written comments. The public could also E-mail comments to DuBois & King.

An Alternatives Presentation Meeting occurred on April 24, 2000, and included presentation and discussion of conceptual solutions and alternatives. Comments from the public during this meeting touched on a variety of issues such as:

- Support for installing a traffic signal at Charlotte Road
- Better roadway/shoulder maintenance such as sweeping by the Vermont Agency of Transportation (VTrans)

- Wetland and flood plain constraints between Charlotte Road and Silver Street that would make it difficult to construct a new bypass connector road
- Difficulty in constructing a new connector behind the cheese factory
- Improving pedestrian crossing safety throughout the corridor
- Support for general concepts of roadway width-reduction, walkways, tree plantings, and parking
- Concern that a roundabout at Silver Street would reduce vehicle gaps and make left turns from Charlotte Road more difficult
- Specific intersection priorities and preferred improvement alternatives:

Charlotte Road:	Support for a traffic signal
Commerce Street:	Support for roundabout and gateway concepts
Silver Street:	Support for traffic calming and gateway concept. Some questioning of the need for a roundabout versus the turn lane option. T-intersection supported.

Summaries of public meeting handouts and comments are included in the appendix.

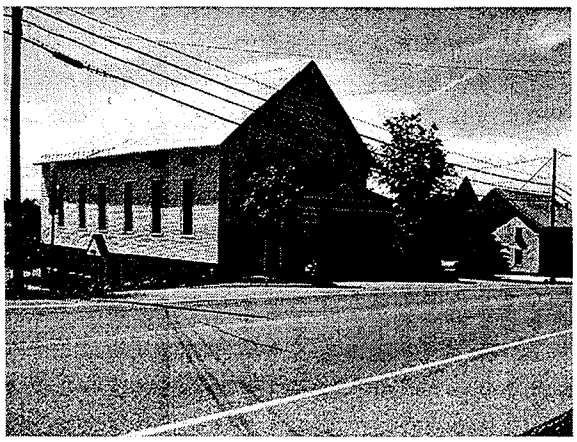
Section 4
Existing Conditions

4.A LAND USE AND COMMUNITY CHARACTER

The northern terminus for the 1.5 mile long Hinesburg Village Route 116 Corridor Study is the signalized four way intersection of Shelburne Falls Road, CVU Road, and Route 116. This area is known as "Ballards Corner" and includes a small commercial center, the town library and nearby Champlain Valley Union High School (CVU).

Continuing south, the Route 116 corridor separates the partially wooded, rolling hills to the east from the open, agricultural flats to the west.

Approaching the village from the north, the developing "Hinesburg Commerce Park" includes the new post office along with mixed commercial and light industrial development that has become a new village center. The entrance to this new village center is marked by the three-way intersection of Commerce Street and Route 116 opposite the fire station.

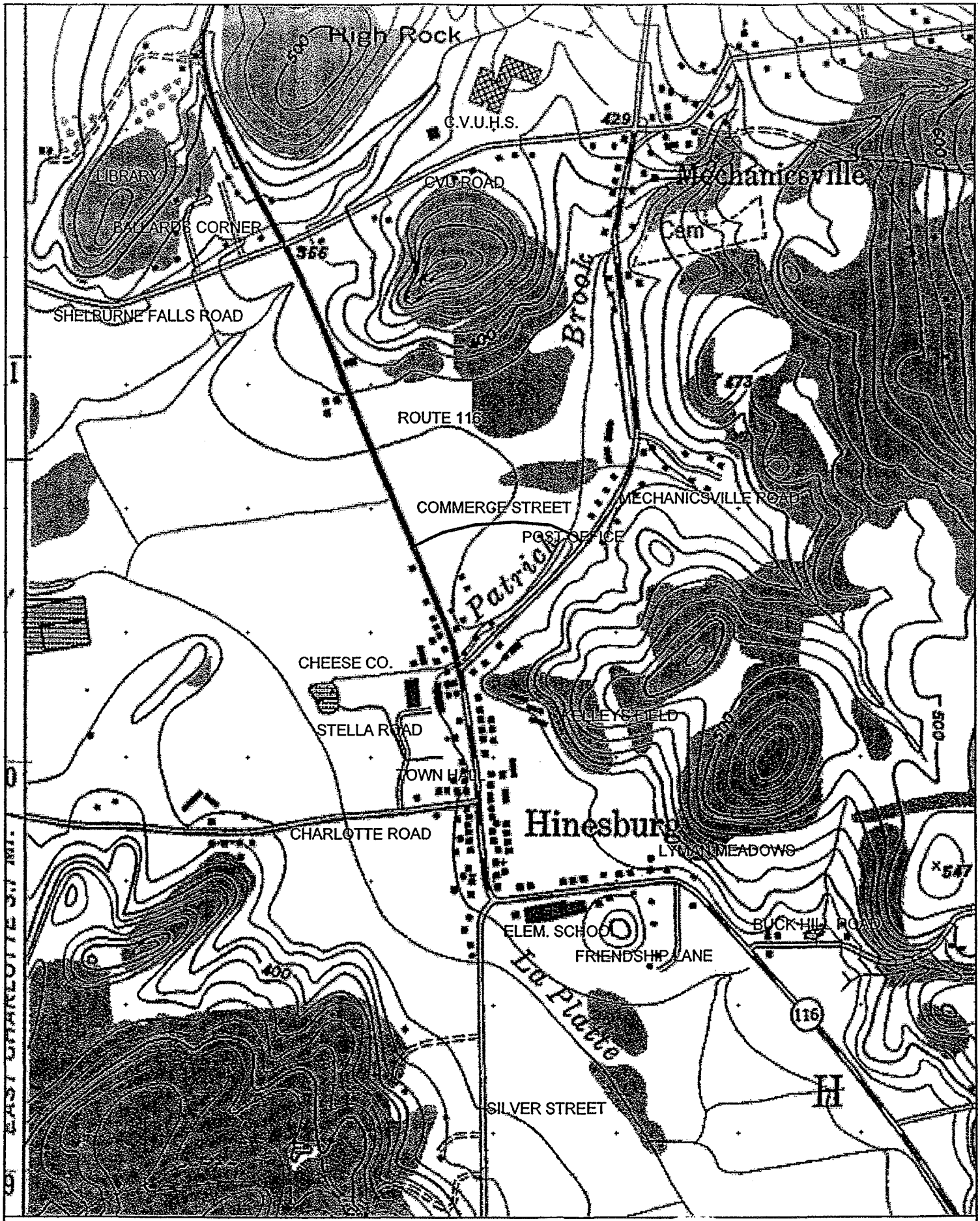


The Town Hall and other public buildings are key elements within the village area.

Commercial development continues south along both sides of Route 116 to the three way intersection at Mechanicsville Road. The creamery plant on the west side of Route 116, opposite the entrance to Mechanicsville Road, marks the end of the predominantly commercial development and the beginning of the "old village" section of the Hinesburg corridor.

The character of the old village center from Mechanicsville Road to Silver Street consists of older homes, newer senior housing, several churches, the Town Hall and a few small businesses, including Lantman's IGA opposite Charlotte Road.

The majority of the village's sidewalks lie along the east side of Route 116 beginning at Mechanicsville Road and extending to Hinesburg Community School.



Name: HINESBURG
Date: 11/4/ 02
Scale: 1 inch equals 1000 feet

Exhibit 2 - Existing Conditions

Along Mechanicsville Road, the sidewalk continues to the "Hinesburg Village Center," a small commercial/office center. Here a cross walk leads to a canal crossing and a paved path along the north side of Mechanicsville Road to the post office. This sidewalk provides valuable pedestrian access to the Kelleys Field Road senior housing.

Portions of the road corridor through the old village center are delineated with curbing, street trees and utility poles. A wide tree lawn on the east side of Route 116 begins north of Lantman's IGA and continues southward to Memorial Park and the Good Times Cafe. Across Route 116, the shoulder is less well defined and is interrupted by expansive driveway cuts and vaguely defined off-street, front yard parking areas.

At Silver Street, Route 116 curves 90 degrees to the east and continues on past the Hinesburg Community School, Lyman Meadows and Friendship Lane to Buck Hill Road, the southern terminus of the 1.5 mile long study corridor and the south edge of the village. In contrast to the continuous facades and wide tree lawn of the old village, this segment is a mix of institutional, commercial, and residential development with limited road shoulders and little sidewalk except for the community school and its designated cross walks. Northbound traffic from Buck Hill Road passes a flashing yellow signal located at the curve by Friendship Lane to warn motorists of the approaching school zone.

The Silver Street three way intersection with Route 116 presents a difficult uphill approach from Silver Street to a "Y"-intersection. Grades slope toward the south and the LaPlatte River bridge. An access from Silver Street to the community school employee parking area is located between Route 116 and the bridge.

4.B WALKWAYS & BIKEWAYS

4.B.1 Walkways

An inventory of sidewalks from north to south within the Hinesburg Village area includes:

- Commerce Street along both sides, except for a 200' break on the north side and a 325' break on the south side. There is an existing crosswalk at the west end of Commerce Street.
- West end of Mechanicsville Road from Route 116 east along the south side of Mechanicsville Road for a distance of 500 feet to the "Hinesburg Village Center"; here, a cross walk connects with a canal bridge and paved path that extends 760 feet eastward along the north side of Mechanicsville Road to Commerce Street and the post office.

- Route 116 south from Mechanicsville Road along the east side of Route 116 through Memorial Park to a crosswalk that connects to the Hinesburg Community School and on to the east end of the Hart and Mead parcel.
- Bus loading area in front of the Community School
- Route 116 south from Commerce Street along the west side for approximately 315' to the Hinesburg Fire Station.
- Route 116 south from Mechanicsville Road along the west side for approximately 250' to the Saputo Cheese access drive.
- Route 116 south on the west side from the Hinesburg Town Hall, approximately 140' south, across the Charlotte Road crosswalk and continuing along the west side of Route 116 to the Route 116 crosswalk at Lantman's IGA.
- Sidewalk to Lyman Meadow Condominiums along west side of the entrance road.

4.B.2 Bikeways

Although most of the corridor has adequate shoulder widths to accommodate bicycle lanes, there are no designated bicycle routes or bike lanes.

4.C HIGHWAY

4.C.1 Curbs & Storm Drains

Curbs exist in front of the cheese factory and the community school. The execution of parking and access management plans for the village center makes curbing desirable to define the edge of pavement, direct stormwater, and help control driveway access. Curbing typically requires an enclosed drainage system of inlets and pipes to collect and discharge stormwater runoff. Currently, the entire project area involves less than two acres of new impervious surface, and because this area discharges in to the La Platte River, a stormwater permit is not required. However, by the time the recommended improvements enter the project design phase, the new stormwater rules of July 2002 may require the Town to obtain a stormwater permit.

4.C.2 Functional Classification

The functional classification of a road identifies how it functions with regard to levels of mobility and access. "Mobility" generally refers to the ease of through movement on a road; "access" refers to the ease of getting to specific destinations along the roadway. As an example, an interstate highway offers a high degree of mobility, but very little access to adjacent, individual sites. At the other end of the spectrum, a

local residential street offers a high degree of access to individual land parcels, but a lower degree of ease of through movement.

The main classifications for roads are: local roads, collectors, arterials and limited access freeways. These may be further sub-divided as major and minor within each classification. While the function of local roads and freeways is as described above, collectors and arterials often perform a mix of functions that can result in conflicts as they try to serve both through movement and local access. Classifications for Route 116 and Silver Street include the following:

- Route 116 is classified as a rural minor arterial.
- Charlotte Road, Mechanicsville Road and Silver Street are classified as a rural major collectors.

Route 116 and Silver Street function as regional arterial highways. Route 116 also serves as a local road for a densely developed village area. Serving these multiple functions and accommodating increasing traffic volumes has resulted in the traffic conflicts that exist today along Route 116.

4.C.3 Traffic Volumes

The VTrans collects traffic volume data on a continual basis around the State. When speaking in general terms about traffic volume, highway engineering guidelines and design professionals describe traffic volumes on both a daily and an hourly basis. To denote the usage of a road, and to compare roads, the Average Annual Daily Traffic (AADT) is used. In its simplest form, the AADT represents the total traffic volume passing over the road in a year, averaged on a daily basis. Thus, AADT's are referenced by year; for example, the 1995 AADT is the average traffic passing over a road in 1995. The 2002 AADT volumes for Route 116 within Hinesburg Village corridor exceed 10,500 vehicle trips.

Because the flow of traffic is not steady throughout a 24-hour period, but rather has peak periods and periods of relatively low volumes, a second characteristic of traffic is introduced known as Design Hourly Volume (DHV). Many aspects of roadway design and analysis and how well a roadway functions are based on an hourly volume that represents a peak period during the day. This highest expected hourly volume is the Design Hourly Volume, normally taken to be the 30th highest hourly volume of the year.

4.C.4 Traffic Congestion

Congestion along the Route 116 corridor is typically due to vehicle delays at the main intersections with limited capacity and deficient Levels of Service (LOS).

Traffic congestion at intersections is evaluated using a Level of Service (LOS) analysis. As defined in the Highway Capacity Manual, Level of Service is "a qualitative measure describing operation conditions within a traffic stream and their perception by motorists." For intersections, Levels of Service are defined by vehicular delay (seconds) which are subdivided into ranges. These ranges are outlined in Exhibit 3 along with seconds of delay and a description of their effect on drivers. Transportation congestion analysis reviews the ability of a roadway to carry vehicles or people under the prevailing conditions of operation.

Exhibit 3 - Level of Service (LOS)

Level of Service	Delay	Traffic Conditions	Delay (seconds)	
			Unsignalized	Signalized
A	little or none	Free flow with individual users virtually unaffected by the presence of others in the traffic stream.	10 or less	10 or less
B	short	Stable flow with a high degree of freedom to select speed and operating conditions but with some influence from other users.	10 to 15	10 to 20
C	average	Restricted flow which remains stable but with significant interactions with others in the traffic stream. The general level of comfort and convenience declines noticeably.	15 to 25	20 to 35
D	long	High-density flow in which speed and freedom to maneuver are severely restricted and comfort and convenience have declined even though flow remains stable.	25 to 35	35 to 55
E	very long	Unstable flow at or near capacity levels with poor levels of comfort and convenience.	35 to 50	55 to 80
F	extreme	Forced flow in which the amount of traffic approaching a point exceeds the amount that can be served and queues form; travel conditions are characterized by stop-and-go waves, poor travel times, low comfort and convenience, increased accident exposure.	50 or more	80 or more

The factors affecting the vehicular congestion at an intersection include traffic volumes, intersection geometrics, and intersection controls. Traffic volumes were reviewed for existing conditions based on design hour volumes for current year 2000 and projected year 2005 and year 2015 conditions. Exhibit 4 contains Levels of Service for the study area intersections.

EXHIBIT 4
Intersection Capacity Analysis – DHV Existing Conditions and Levels of Service

Intersection	Year 2000	Year 2005	Year 2015
I. Unsignalized Intersections			
Route 116/Commerce Street			
SB (Rte 116)			
Left	A	A	A
WB (Commerce)			
Left	E	E	F
Route 116/Mechanicsville			
SB (Rte 116)			
Left	A	A	A
WB (Mechanicsville)	F	F	F
Left	F	F	F
Right	B	B	B
Route 116/Charlotte Road/Lantmans			
NB (Rte 116)			
Left	A	A	B
SB (Rte 116)			
Left	A	A	A
EB (Charlotte)	F	F	F
Left	F	F	F
Right	C	D	E
WB (Lantmans)	F	F	F
Route 116/Silver Street			
NB (Silver)	D	F	F
Left	F	F	F
Right	B	C	C
WB (Rte 116)			
Left	A	B	B
II. Signalized Intersections			
Route 116/Shelburne Rd/CVU Rd			
EB (Shelburne)	C	C	C
WB (CVU Rd)	C	C	C
NB (Rte 116)	B	B	B
SB (Rte 116)	C	F	F
Overall Intersection	C	E	F

Accepted design standards for roadways recommend that a minimum LOS-C be maintained during DHV conditions on arterial highways. On a case-by-case basis, in urban areas an LOS-D can be considered acceptable. It is typical for the "stop" controlled approach to experience poor LOS in relation to the remainder of the intersection. These approaches will need review under future conditions to determine the necessity of improvements to mitigate poor LOS.

4.C.5 Vehicle Classification

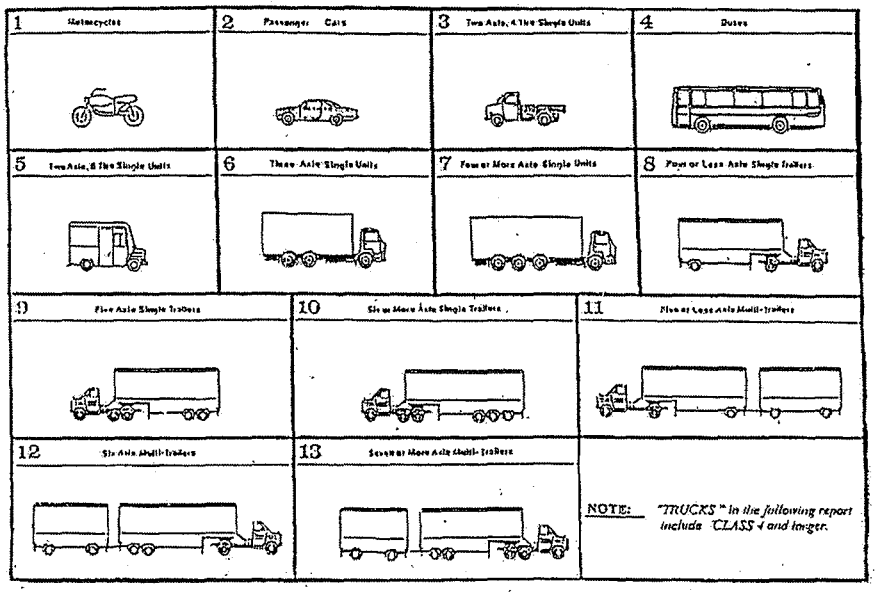
Heavier volumes of truck traffic are generally perceived as undesirable, especially when passing through more densely developed village areas.

Many different classes of vehicles use VT Route 116. The type of vehicle and its percentage of the overall traffic stream has an effect on the character of a road and on certain elements of the road's design. For example, if a road receives a large volume of truck traffic, the pavement would need to be designed to carry the heavier loads generated by the trucks.

The Federal Highway Administration (FHWA) has defined a breakdown and grouping of the different vehicle types. This allows for analysis of a particular roadway regarding the types of vehicles that are using it. The 13 FHWA vehicle classifications are as follows:

Vehicle Class	Type
1	Motorcycles
2	Passenger Cars
3	Two-Axle, 4-Tire Single Units (pickup trucks)
4	Buses
5	Two-Axle, 6-Tire Single Units (delivery trucks)
6	Three-Axle Single Units
7	Four or More Axle Single Units
8	Four or Less Axle Single Trailers
9	Five-Axle Single Trailers
10	Six or More Axle Single Trailers
11	Five or Less Axle Multi-Trailers
12	Six-Axle Multi Trailers
13	Seven or More Axle Multi-Trailers

Exhibit 5: FHWA Vehicle Classification



Trucks are grouped according to size. Medium trucks include vehicle classes 4 through 7, and heavy trucks include vehicle classes 8 through 13. VTrans conducts classification counts throughout the State and compiles the information in an annual report. The mix of traffic generally corresponds to the functional class of a particular roadway, and arterials typically carry higher volumes of truck traffic than collectors. Route 116 is classified as a rural minor arterial and Silver Street is classified as a rural major collector. Using 1998 percentages for Vermont, the most recent counts available, the average percentages of trucks for all rural minor arterials and rural major collectors were 6.87% and 5.39% respectively. The data presented in Exhibit 6 indicates that truck traffic on Route 116 is within the range generally expected for a rural minor arterial in Vermont.

Exhibit 6 – Truck Traffic Mix

Location	% Trucks	% Medium	% Heavy
STATE AVERAGES			
State Average for Rural Minor Arterials	6.87	3.94	2.93
State Average for Rural Major Collectors	5.39	3.74	1.65
STUDY AREA CONDITIONS			
Rte 116 - South of CVU Rd	5.71	4.78	0.93
Rte 116 - North of Commerce Street	5.55	4.83	0.72
Rte 116 - between Charlotte & Commerce	5.20	4.80	0.40
Rte 116 - between Charlotte & Silver	6.29	5.60	0.69
Rte 116 - East of Silver Street	9.08	8.38	0.70
Rte 116 - North of Buck Hill Rd	7.26	5.94	1.32

CCMPO Speed and Class Study Results, 1997

4.C.6 Highway Sufficiency Rating

To evaluate and compare conditions on state highways, VTrans uses a point system to calculate an overall highway sufficiency rating that ranges from 0 to 100 points. The sufficiency rating combines scores from three major categories: Structural Condition of the Roadway (50 points), Safety (25 points), and Service Provided by the Roadway (25 points). The basic rating is adjusted for flooding potential and lack of all-weather surfacing. Scores are further weighted according to the volume of traffic on a particular section of roadway. The sufficiency ratings fall into four categories:

Sufficiency Rating Points	Roadway Condition
0-40	Bad
40-60	Poor
60-80	Fair
80-100	Good

The VTrans highway sufficiency ratings for Route 116 are indicated in Exhibit 7 and summarized here:

Roadway Condition	Total Corridor Segment Miles	Percentage of Total Corridor Segment
Good	0.00	0.0%
Fair	1.02	67.6%
Poor	0.49	32.4%
Bad	0.00	0.0%

EXHIBIT 7 - Route 116 Traffic Volumes and Sufficiency Ratings

Beginning Reference		Ending Reference					
Mile Mark	Crossroad/ Geographic Reference	Mile Mark	Crossroad/ Geographic Reference	Section Length	1996 Sufficiency	1996 AADT	2000 AADT
3.95	Buck Hill	4.11	Friendship Lane	0.16	77.2	6,600	
4.11	Friendship Lane	4.41	Silver Street	0.30	61.4	6,600	
4.41	Silver Street	4.97	N Commerce St.	0.56	62.4	9,510	10,200E
4.97	N Commerce St.	5.46	Shelburne Falls	0.49	52.8	8,850	10,400E

VTrans, 1996 Sufficiency Ratings

4.C.7 Bridge Sufficiency

VTrans keeps a listing of bridges throughout the State that have spans of 20 feet or greater. For each bridge in the inventory, detailed data is recorded that documents the condition of the bridge, as well as its history, ownership, and condition of the road that is carried by the bridge. Bridges and culverts under 20 feet in span length are not inventoried and monitored by the State, but are monitored by local road officials. Exhibit 8 lists bridges located in the study area and whether they are maintained by VTrans.

Exhibit 8 – Bridge Sufficiency Ratings

Bridge #	Description	Year Inspected	Overall Sufficiency Rating	Maintenance Responsibility
27	Route 116 over Canal	1998	N/A	VTrans
28	Route 116 over stream	1998	N/A	VTrans
10	Silver Street over LaPlatte	1998	64.7	Hinesburg

N/A - VTrans does not calculate bridge sufficiency ratings for spans under 20 feet.

4.C.8 Posted Speeds

The posted speed limit along Route 116 within the study area is 40 mph north of Commerce Street and 35 mph throughout the rest of the corridor except in the vicinity of the Hinesburg Community School where a 25 mph zone is activated with a flashing yellow light during school hours. The following summary indicates varying lengths of the Route 116 study corridor and their posted speeds.

Speed	Length	Location
40 mph	0.41 miles	N of Commerce Street
35 mph	1.00 miles	S of Commerce Street
25 mph	0.10 miles	School Zone

Exhibit 9 presents field measurements of vehicle speeds along the Route 116 corridor. The listed speeds represent 85th percentile speeds in mph.

Exhibit 9 - Traffic Speed Study

Location	NB Speed	SB Speed	Speed Limit
Rte 116 - South of CVU Rd	46	45	40
Rte 116 - North of Commerce St	49	46	35
Rte 116 - between Charlotte & Commerce	40	38	35
Rte 116 - between Charlotte & Silver	36	36	35
Rte 116 - East of Silver St	39	40	35 (25)
Rte 116 - North of Buck Hill Rd	51	53	35

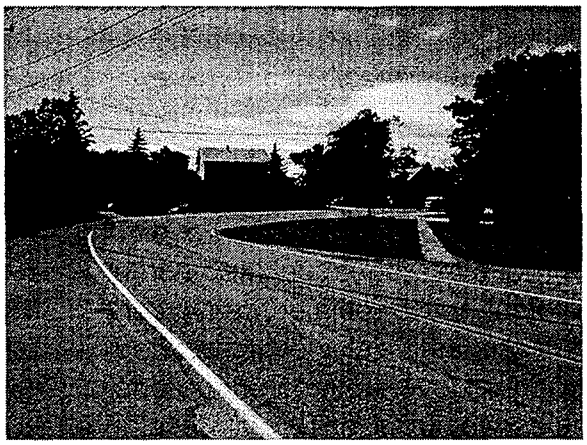
CCMPO, Speed and Class Study results, 1997

4.C.9 Geometric Sufficiency

Horizontal and vertical curvature require specific sight distances for stopping and passing. Roadway width is based on the design speed at which the roadway is expected to operate. It is reasonable to assume that the posted speed is a good indicator of the design speed for a given section of roadway.

4.C.9.a Horizontal Curves

The American Association of State Highway and Transportation Officials (AASHTO) has developed guidelines for maximum curves for given design speeds. These were developed based on how much banking (superelevation) a road has, what the side friction factor is between a vehicle's tires and the road, and on the comfort level for people riding in a vehicle. These guidelines are as follows:



The sharp curve by Silver Street utilizes a high superelevation to allow higher traffic speeds

DESIGN SPEED	MINIMUM RADIUS (MAXIMUM DEGREE OF CURVE)
25 mph	107 FT (53.50°)
30 mph	252 FT (22.75°)
40 mph	468 FT (12.25°)

Exhibit 10 – Substandard Horizontal Curves

Location	Speed (mph)	Existing Degree of Curvature (radius)
Route 116 / Silver Street	35	38.20 °(150 Ft)

The horizontal curve in Route 116 at the Silver Street intersection is nearly a 90° turn. Given existing development in the vicinity, there is little opportunity to realign this intersection. The road surface is banked (superelevated) to improve vehicle flow around this tight curve. This location has not experienced an historical high accident rate. It is adjacent to the community school where slower vehicle speeds are desirable and seemed to prevail due to the existing curve geometry. Therefore, adjustments to improve flow and vehicle speeds by increasing the curve radius are not desirable.

4.C.9.b Roadway and Shoulder Widths

Route 116 between Shelburne Falls Road and Silver Street is a 4 rod road: 20m (66'). From Silver Street to Friendship Lane the ROW narrows to 15m (49.5').

Between Friendship Lane and Buck Hill Road the ROW widens to 23m (75'). The proposed ROW improvements are located within the existing ROW width and do not require ROW acquisition.

The VTrans guide for highway geometrics includes recommendations for travel lane and shoulder widths. Travel lanes are generally between 10 and 12 feet wide, with 12-foot-wide lanes being the most common width found on higher function highways such as arterials and freeways. Eleven foot lanes are used extensively for urban and village minor arterial street designs. The 10-foot widths are appropriate in highly restricted areas having little or no truck traffic. Route 116 has 11-foot lanes throughout the study area, and its shoulders vary from 3 to 6.5 feet.

Vtrans lists numerous benefits of providing well-designed and well-maintained shoulders on rural highways, including:

- Lateral pavement support to the traveled portion of the roadway
- Additional clearance from obstacles such as signs and guardrails
- Space for snow storage and removal
- Space for emergency access, breakdown lanes, and vehicle parking
- Space for bicyclists and pedestrians

VTrans uses an absolute shoulder minimum of 2-foot offset to vertical curbs and 1-foot offset to sloped curbs that do not accommodate bicyclists.

The following are approximate Route 116 roadway lane and shoulder widths and ROW widths:

- Shelburne Falls to Commerce: 3.3 m (11 ft) lanes; 1 m (3 ft) shoulder; and 20m (66 ft) ROW
- Commerce to Mechanicsville: 3.3 m (11 ft) lanes; 1.5 m (5 ft) shoulder; and 20m (66 ft) ROW
- Mechanicsville to Charlotte: 3.3 m (11 ft) lanes; 2 m (6.5 ft) shoulder; and 20m (66 ft) ROW
- Charlotte to Silver: 3.3 m (11 ft) lanes; 2 m (6.5 ft) shoulder; and 20m (66 ft) ROW
- Silver to Buck Hill: 3.3 m (11 ft) lanes; 1 m (3 ft) shoulder; and 15m (49.5 ft) ROW

4.C.9.c Sight Distance

In roadway design, sight distance has several definitions but is generally defined as "the unobstructed distance that a driver can see in a given direction". If sight

distance is restricted, motorists are not able to adequately judge oncoming traffic when making a turn (intersection sight distance) or are not able to stop for unexpected hazards at a given speed (stopping sight distance). Stopping sight distance and intersection sight distance are both a function of the design speed of the roadway. Exhibit 11 indicates the required sight distances for each according to a range of posted speeds.

Exhibit 11 – Required Sight Distance

Speed (mph)	Speed (km/h)	Stopping Sight Distance*		Intersection Sight Distance**	
		(feet)	(meters)	(feet)	(meters)
25	40	150	45	275	83
30	48	200	61	330	100
35	56	225	68	385	117
40	64	275	83	440	134
45	72	325	97	495	150
50	80	400	122	550	167

* Table III-1 "A Policy on Geometric Design of Highways and Streets," AASHTO. Value given is for upper limit of rounded design values for wet pavements.

** VTrans Standard Sheet B-71. Values based on a gap of 7.5 seconds in the traffic stream on the highway mainline based on the highway design specs.

Intersection sight distance must be measured directly in the field for each intersecting road or driveway. Restrictions and locations of limited sight distance along the Route 116 corridor are detailed in Exhibit 12.

Exhibit 12 – Locations of Limited Sight Distance

Restriction	Location
Corner Vegetation	Intersection of Route 116 / Shelburne Falls Road on the northeast corner.

4.C.10 High Accident Locations

The study area was examined for High Accident Locations (HAL). In Vermont, the accident rate is computed as the number of accidents per million vehicle miles for roadway sections, and the number of accidents per million entering vehicles for intersections. In order to be considered a HAL, the actual intersection or roadway section accident rate must exceed the "critical accident rate." The critical accident rate is based on traffic volumes and the average rate for a specific category of highway in the State of Vermont. When the actual rate exceeds the critical rate for that category, then the location is a HAL. Accident data between 1994 and 1998 was examined for Route 116 and is presented in Exhibit 13.

EXHIBIT 13 – ACCIDENT ANALYSIS

Roadway Sections
*HAL

	BEGIN REFERENCE		END REFERENCE															
Roadway	MM	Reference	MM	Reference	# Accid	Length	'94 AADT	'95 AADT	'96 AADT	'97 AADT	'98 AADT	Five Year	MVM	Accid Rate	Avg. Rate		Crit. Rate	Crit. Fact.
Route 116	3.95	Buck Hill	4.25		2	0.30	4430	4020	4580	4630	4680	4468	2.446	0.818	0.610		1.694	0.483
Route 116*	4.25		4.55		8	0.30	9840	8930	10170	10290	10400	9926	5.434	1.472	0.610		1.382	1.065
Route 116	4.55	Charl. Rd	4.85		8	0.30	11110	10080	11480	11610	11740	11204	6.134	1.304	0.610		1.342	0.972
Route 116	4.85		5.15		3	0.30	8660	7860	8950	9050	9150	8734	4.782	0.627	0.610		1.427	0.440
Route 116	5.15		5.45	CVU Rd	2	0.30	8660	7860	8950	9050	9150	8734	4.782	0.418	0.610		1.427	0.293
Route 116*	5.45	CVU Rd	5.75		24	0.30	8700	7900	9000	9100	9200	8780	4.807	4.993	0.610		1.425	3.504

Intersections
*HAL

Intersection	MM	# Accid.	5-Yr. Vol.	Accid. Rate	Avg. Rate		Crit. Rate	Crit Factor
VT 116/Buck Hill	3.95	0		0.000	0.265		N/A	N/A
VT 116/Silver	4.41	3	11.844	0.253	0.265		0.609	0.416
VT 116/Charlotte	4.56	5	19.189	0.261	0.265		0.542	0.481
VT 116/Mechanicsville	4.78	0	19.189	0.000	0.265		N/A	N/A
VT 116/Commerce	4.95	2	19.189	0.104	0.265		0.542	0.192
VT 116/CVU*	5.46	22	23.560	0.934	0.265		0.517	1.805

As indicated in Exhibit 13, two roadway sections and one intersection have accident rates above the local critical rate. The intersection of Route 116/Shelburne Falls-CVU Road exceeds the critical accident rate. This intersection is the primary location of accidents for the road segment (mm 5.45 - 5.75) which also exceeds the critical rate. The other Route 116 section which exceeds the critical rate is located between Charlotte Road and Friendship Lane (mm 4.25 - 4.55). The type of accidents occurring at these locations include:

Route 116/Shelburne Falls-CVU Road

Type of Accident	Number
Rear End Collision	8
Angle, Turning Opp. Dir.	5
Head-On	1
Right Angle Broadside	7
Bicyclist	1
Total	22

Route 116, Charlotte Road to Friendship Lane

Type of Accident	Number
Rear End Collision	2
Hit off-road object	1
Angle, Turning Opp. Dir	2
Pedestrian	1
Sideswipe	1
Other	1
Total	8

The predominate type of accidents are rear-end collisions and angle collision associated with turns.

4.D ENVIRONMENTAL DATA

4.D.1 Natural Areas

4.D.1.a VT Agency of Natural Resources Wetlands and Water Resources

Review of Hinesburg GIS data included three categories/sources for wetlands information (see attached Appendix). Numbers 1 and 2 below discuss wetlands regulated by the VT Agency of Natural Resources. Number 3 discusses wetlands identified by UMass students. These sources yielded the following information:

No wetland areas adjacent to the intersections were readily observed during site walks. If wetlands are present, the minimal impacts due to construction of the intersection alternatives would be likely to qualify for a Corps of Engineers Statewide General Permit, Category A (less than 3,000 SF; no review required), or perhaps a Category B (3,000 SF-1 acre; moderate review required).

1. National Wetlands Inventory Maps (Class I and II): A Class II wetland area is identified between VT Route 116 and Silver Street south of the Hinesburg Community School. This wetland would likely affect the suggested road connection between Buck Hill Road and Silver Street and require a Conditional Use Determination (CUD) from the VT Agency of Natural Resources.

2. Class III Wetlands: Class III wetlands areas were identified on the west side of Route 116 across from Commerce Street, and along the LaPlatte River by the Silver Street bridge. Impacts to these identified wetlands would require a COE

Statewide General Permit, Category A or B, and a state water quality certification. Impacts to these wetlands would not require a CUD.

3. Wetlands Delineated by UMASS Students: These identified wetlands do not depict additional wetland areas which would be impacted by the suggested Route 116 improvements.

4.D.1.b U.S. Army Corp of Engineers and Class III Wetlands

Class III wetlands are regulated by the U.S. Army Corps of Engineers. Although no delineation was done for this project, Class III wetlands appear to exist along the west side of the Route 116 corridor, along the LaPlatte River. A site walkover of conceptual design alignments by a field naturalist is required to determine the location and extent of impacted Class III wetlands in the vicinity of the corridor.

4.D.1.c Flood plains

Review of Hinesburg GIS data includes two sources for flood plain mapping. These sources yielded the following information:

1. FEMA Flood plains: Floodplains are located along the LaPlatte River and along the Mechanicsville Road canal including their crossings of Route 116 and Silver Street.

2. Village Flood plains: The Flood plains depicted on this mapping are similar to Route 116 and Silver Street crossings as the above FEMA mapping.

4.D.1.d Significant Habitat

The Vermont Department of Fish and Wildlife produces a significant Habitat Map that indicates the known presence of rare, threatened or endangered species, significant natural communities and deer wintering areas. If there is a known presence of any of these resources that may be impacted by a project, coordination is required with the Vermont Department of Fish and Wildlife Nongame and Natural Heritage Program. The 1997 Significant Habitat Map for the Town of Hinesburg indicates that none of the resources shown on the map are present within the Route 116 Hinesburg Village Corridor area. (See correspondence in the appendix).

4.D.1.e Land and Water Conservation Fund Sites 6(f) Properties

The Vermont Land & Water Conservation Fund list identifies sites which have received funding for public enhancement. These sites require additional review to

ensure that the sites or specific enhancements are not adversely impacted by any of the proposed corridor improvements. The Route 116 Corridor includes three enhancement projects including 325E and 477 which were both on the Hinesburg Community School property.

4.D.1.f Surface Water Streams

The following are the stream crossings of the project roadways:

- LaPlatte River at Silver Street bridge south of Route 116
- Canal bridge crossing of Route 116 at Mechanicsville Road
- Culvert crossing of Route 116 north of Commerce Street
- Culvert crossing of Route 116 north of Shelburne Falls Road

4.D.2 Hazardous Waste Sites

The "Vermont Active Hazardous Sites List" for September 2003 describes the following active hazardous waste sites:

Number	Site Name	Project Status
911017	International Cheese	Now Saputo Cheese. Long history of on site LUSTs, several AOC's. Current phase of remediation completed. Onsite well is contaminated with MTBE
931409	Ballards Store	UST release (1993) and surface spill from dispenser (1999). Ongoing groundwater, bedrock supply well, and indoor air monitoring. Soil Vapor Extraction System installed. Next round of water quality monitoring October 2003.
931486	Hart & Mead Texaco	Sparging CAP proposed and accepted. Public Comment period finished. Installation expected Summer 2002.
961988	Lantman's IGA	Annual GW monitoring, next rd. Fall '03. Lantman and MTBE impacted Martin bedrock wells closed. Bottled water delivery discontinued w/municipal connection.
982480	Giroux Body Shop	Petroleum contamination found in front of site during waterline project. Additional investigation did not indicate that waterline is serving as

preferential pathway for contamination migration. Semi-annual groundwater monitoring will follow.

4.D.3 Archeological and Historical Resources

Historic Sites and Structures

A scoping level historic resource survey has been performed for the Route 116 Hinesburg Village Corridor Study by C.K. Quinn & Company, LLC. (See Appendix). The conclusions are summarized as follows:

"Although the Lower Village Historic District has been determined to be ineligible for the National Register as a district, a number of individual structures are potentially eligible for the National Register as individual properties. Therefore, final plans will need to be reviewed by the State historic Preservation Officer (SHPO).

> The improvement alternatives for Vermont Route 116 from the Buck Hill Road intersection through the CVU Road intersection will unlikely have a negative impact upon any of the historic buildings along the corridor, although the potential exists. As mentioned, mitigation efforts are recommended in the Conceptual Design Phase to avoid negative impacts to historic landscape features."

Archeological Resource Assessment

An Archaeological Resource Assessment of lands within the general area of potential effect (APE) was performed by Archaeology Consulting Team, Inc. (See Appendix). The conclusions are summarized as follows:

> "Based on the represented forest communities, former and existing drainages, and Hinesburg's documented history, Native American and European archaeological information is likely to exist along the project corridor. Those portions of the project corridor considered highly sensitive are shown in Figure 6. However, it is also likely that subsequent construction activities within the village have altered some of the archaeological information to the extent that its research value, or significance, has been lost. Once the extent of the APE is chosen, we recommend a field visit to determine the integrity of these potential archaeologically sensitive locations."

As such, conceptual design plans will need to be reviewed for cut/fill limits in conjunction with field visits to determine areas requiring additional research.

4.E SECONDARY SCOPE REVIEW—THREE PROJECT ALTERNATIVES

The Route 116 Corridor Study includes a brief look at three secondary study alternatives and their estimated effects on Route 116 traffic. To locate these alternatives refer to Exhibit 14-Secondary Scope Review for Three Project Alternatives.

4.E.1 Internal Bypass West of Route 116, Commerce Street to Silver Street

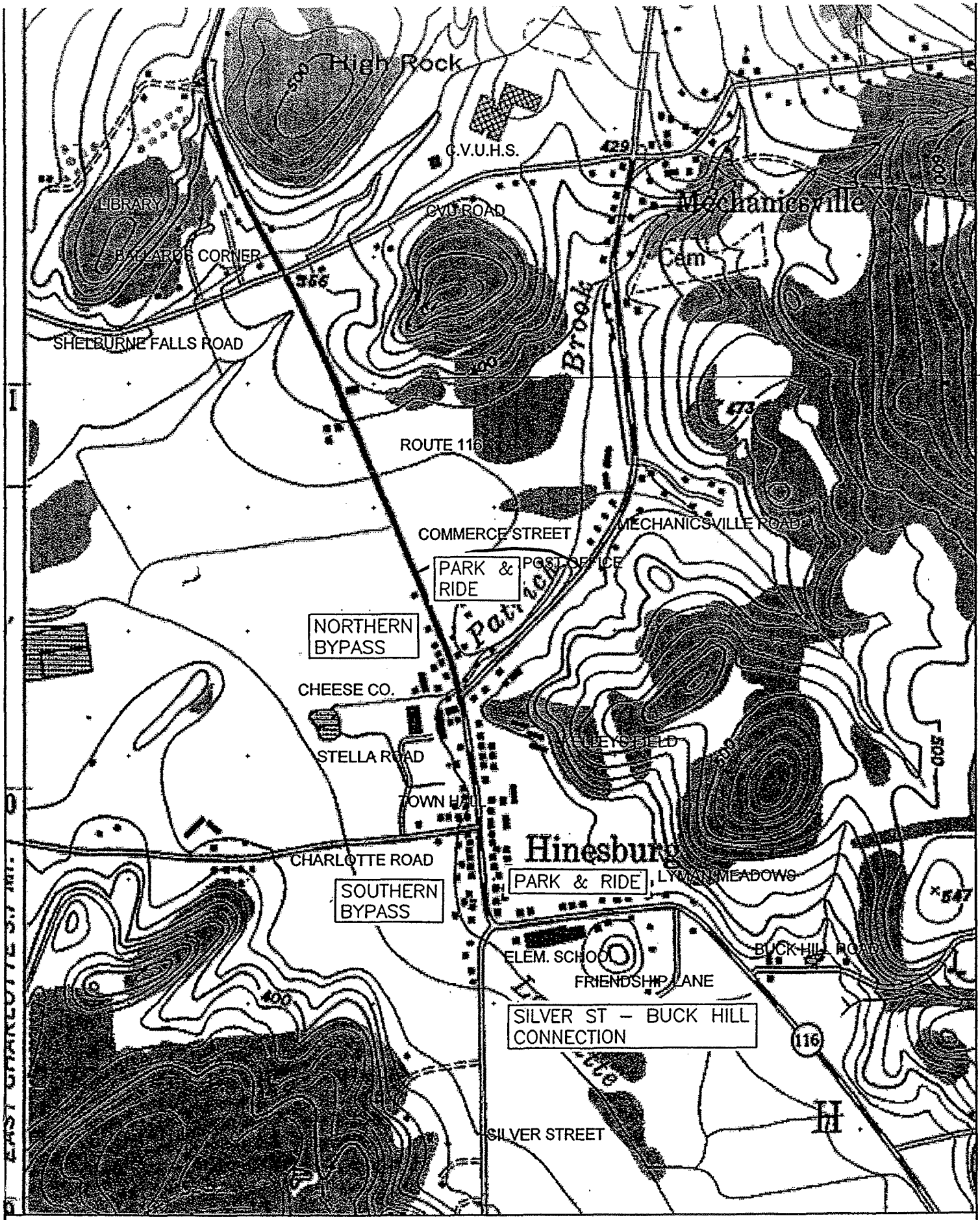
A two part parallel access road west of Route 116 from Commerce Street south to Charlotte Road, and from Charlotte Road south to Silver Street. Due to their relatively short lengths, these two adjacent roadways would not divert the main through traffic off of Route 116 but would instead provide secondary access between Route 116 and Charlotte Road.

4.E.2 Silver Street Connection to Route 116 at Buck Hill Road

The construction of a road connection from Silver Street east to the Route 116/Buck Hill Road intersection would close the existing Route 116/Silver Street intersection to through traffic. While this alternative would eliminate congestion at the present Route 116/Silver Street intersection, it would increase northbound traffic and congestion in front of the community school and inconvenience southbound traffic using Silver Street.

4.E.3 Park and Ride Lots

Park and ride lots were discussed for locations in the vicinity of Commerce Street and the "Hinesburg Commerce Park," and in the old village center. The northern site would likely be one large lot, whereas, the village center "lot" would be made up of several small parking lots designated as park and ride lots. Traffic patterns and competing interests for old village center parking suggest that the more northerly location would be a more effective park and ride lot.



Name: HINESBURG
Date: 11/4/ 02
Scale: 1 inch equals 1000 feet

Exhibit 14 -
Secondary Scope Review
Three Project Alternatives

Section 5
Corridor Improvement Goals & Standards

"Corridor Improvement Goals & Standards" uses information gathered at public hearings and from the analysis of existing conditions to identify goals and standards for developing improvement alternatives. These improvements are presented in the following four groups:

- Group 1: Managing Traffic
- Group 2: Improving Conditions Along the Streets
- Group 3: Improving Pedestrian Crossing Conditions
- Group 4: Reducing Auto Dependence

5.A GROUP 1 – MANAGING TRAFFIC

Concerns about traffic speed and volume can be addressed through effective traffic management that restricts the movement of traffic on streets. In most cases, the least restrictive method of solving a traffic management problem is the most cost effective and the easiest for all to agree on. The following options can be used to help manage traffic:

- Left turn signals
- Pedestrian refuge islands
- Raised intersections
- Roundabouts
- Signs (stop, yield, speed limit, warning)
- Traffic signals and pedestrian cycles
- Traffic signal timing
- Turn lanes

5.B GROUP 2 – IMPROVING CONDITIONS ALONG THE STREETS

Conditions along streets affect pedestrian and bicycle travel, comfort, orientation, safety, and the aesthetic quality of our streets. The following options would improve travel conditions along the Route 116 corridor:

- Reduction of wide and uncontrolled road accesses
- Asphalt walkways, bicycle lanes and paths, and designated bike routes
- Concrete sidewalks
- Consolidated and/or underground utilities
- Enclosed storm drainage
- Curbs and gutters
- Area identification signs (recreation areas, schools, park-and-ride, etc.)
- Landscape amenities including flower planters, shrubs and street trees

- Banners, fountains and outdoor art
- Architectural street and area lighting
- Street furniture including benches and other pedestrian and bicycle accommodations

5.C GROUP 3 – IMPROVING PEDESTRIAN CROSSING CONDITIONS

Pedestrian crossing conditions should support easy, safe pedestrian travel across roadways. The following options make crossing the street easier and safer for pedestrians and cyclists:

- Curb radius reduction
- Curb ramps
- Marked crosswalks
- Variations in pavement textures and colors
- Medians
- Pedestrian refuge islands
- Pedestrian traffic signals
- Roundabouts
- Traffic signals and pedestrian cycles
- Traffic signal timing
- Raised intersections
- Pedestrian Street Designation – A street designation designed to emphasize the needs of pedestrians, bicyclists and transit riders, providing them improved access among a variety of destinations
- Design Review – A process which can help influence future multi-family and commercial development where, with design direction, new development can contribute to enhanced street environments and improved conditions for pedestrians, bicyclists and motorists. The design review process is based on adopted design guidelines which provide the necessary flexibility for new development to respond to the distinctive character of its surroundings, and it helps articulate the community's design priorities.

5.D GROUP 4 - REDUCING AUTO DEPENDENCY

Long-range strategies for improving streets within the study corridor involve reducing the need to drive a car within the Village core. This includes both changes to the physical landscape as well as behavioral changes. Options in this group focus on physical improvements that help reduce automobile dependence by providing facilities and improving conditions for ride-sharing, bicyclists and pedestrians options include the following:

- Commuter park and ride areas

- Bicycle facilities and accommodations
- Pedestrian facilities and accommodations
- Design Review – A process which can help influence future multi-family and commercial development where, with design direction, new development can contribute to enhanced street environments and improved conditions for pedestrians, bicyclists and motorists. The design review process is based on adopted design guidelines which provide the necessary flexibility for new development to respond to the distinctive character of its surroundings, and it helps articulate the community's design priorities.

5.E COMMUNITY-WIDE PLANNING ALTERNATIVES

5.E.1 Land Use & Community Character

Land-use patterns influence transportation choices which, in turn, influence development patterns. In recent years, the majority of vehicle trips are made while driving alone. This often results in auto-related street designs and commercial developments that exhibit auto-oriented site layouts and land use patterns. This phenomenon is true in Hinesburg and is likely to continue unless the municipality takes positive steps to establish and improve viable, efficient transportation alternatives. This means adopting pedestrian and transit-oriented land use planning and zoning policies to encourage increased pedestrian and bicycle travel and redevelopment strategies within the village core and areas adjacent to Commerce Street that are consistent with local economic development, housing, fiscal and growth management goals.

Distance between destinations influences day to day transportation choices. When destinations are far apart, walking may not be a viable option and bicycling, ride-sharing, and public transit are usually inconvenient as well. Pedestrian improvements encourage walking and increase the likelihood that other future transit initiatives will be successful. Effective public transportation extends the mobility of the pedestrian and facilitates people commuting and taking care of basic needs without using automobiles. Communities with effective pedestrian, bicycle and transit facilities can achieve a combined pedestrian, bike and transit share of trips that is three to four times greater than communities that do not provide these facilities. Fundamentally, pedestrian-friendly environments support the use of other transportation modes including bicycling, ride-sharing and transit.

Factors to be considered in building and maintaining pedestrian-friendly streets and a sense of community include:

- Traffic speed and roadway width
- The quality of the walkway network and street intersections

- Bikeways of all types
- Amenities and street furniture that support walking, cycling and transit
- The relationship of buildings to the street
- How parking is handled

Excessive traffic speed intimidates pedestrians and shortens reaction times for drivers. Street design can send a message to drivers about appropriate speed independent of posted speed limits. Changing the characteristic of the roadway in order to slow traffic is more effective than speed limit signs and sends a message that "this roadway is a shared space" in which pedestrians and bicycles are welcomed.

Traffic slowing devices are referred to as "traffic calming". These devices vary from physical changes in the roadway to techniques that change the character of the roadway and the way it feels. Physical changes in the roadway may include roundabouts at street intersections, on street parking (parallel and angle), raised intersections and cross walks, and changes in pavement texture. Beyond the roadway section, techniques and devices which change the character of the street include:

- Gateways that define the transition between district areas within the community.
- Street trees which, when planted close to the roadway, visually narrow the apparent street width, soften a landscape often dominated by pavement, and beautify the area.
- A sidewalk network of continuous walkways and safe street crossings.
- Planting strips to provide a clear separation between pedestrian and vehicle spaces.
- Bike lanes that say "this is a shared roadway".
- Direct pedestrian routes apart from the roadway to key destinations and pathways that connect to adjoining developments.
- Pedestrian amenities and carefully located street furniture including comfortable seating, secure bike racks, accessible drinking fountains, trash receptacles, signs to orient pedestrians and effective non-glare area lighting to facilitate night-time use.

Where applicable, the above-mentioned improvements should be carried out by the municipality in compliance with the 1990 Americans With Disabilities Act (ADA). As has been pointed out in the past, facilities and amenities designed and built with the disabled in mind will in all likelihood work better for everyone. Beyond function, well designed amenities of a consistent type and style can help define the character of the town. This holds true for all types of signs including pedestrian, bicycle, traffic and commercial signs.

The design review process along with clearly articulated design standards used by many towns is a way to retain and develop the positive aspects of a community's character and facilitate pedestrians-friendly building development and site design. The process works with new construction as well as retrofitting existing buildings and sites.

One alternative to mitigate sprawling strip commercial development along Route 116 is the definition and reinforcement over time of "commercial centers" such as the Village core, Commerce Street area, and along Shelburne Falls Road. These are focal points where more intensive retail, commercial and residential uses occur and are intended to be served by a network of walkways and bikeways which connect the surrounding areas to the commercial center. The benefits of these compact centers can be realized as long as there is a definitive development plan set in place to maintain the center and prevent its being stretched out of shape.

Expansion of the sidewalk network and crossings from the Community School is critical to improved safety and accessibility for pedestrians

5.E.2 Walkways

The ideal scenario for a corridor-wide network of walkways is a 5-foot-wide concrete sidewalk along both sides of the roadway and a 5 to 7-foot-wide planting strip to buffer these walks from the roadway. In addition, 5 to 10-foot-wide asphalt walkways and bikeways would provide more direct links to destinations and public facilities. Specific walkway recommendations are outlined later. Sidewalks within the Right-of-Way are typically 5-foot-wide concrete walks. Beyond the right-of-way and in less developed areas outside the growth center, asphalt walk may be used.

5.E.3 Bikeways

The existing paved shoulders on Route 116 can accommodate Class II bike lanes between Commerce Street and Silver Street. Bike lanes throughout the corridor will improve bicycle connections with proposed Class I bike paths at:

- Commerce Street to Shelburne Falls Road
- Friendship Lane to Buck Hill Road

Bicycle park-and-ride facilities, including bike storage lockers, would coincide with the town's proposed vehicle park-and-ride areas. Bicycle storage facilities will also be an integral part of the town's village area and specific commercial centers and key public facilities including the Commercial Plaza, Town Hall, Community School, post office, and Lantman's IGA. Signs and pavement marking will improve the visibility of all types of bikeway facilities including bike paths, bike lanes and bike route. Bike lanes and bike routes indicate to motorists that the roadways are to be shared and they encourage the use of bicycles as a viable alternative to automobile travel.

5.E.4 Street Trees

Street trees help define roadway edges and direct traffic, provide attractive canopies, and create comfortable, pedestrian scale spaces along the street. They give streets and neighborhoods an identity and help create community character. Street trees must be selected and placed carefully in order to withstand harsh roadside conditions, avoid interference with overhead utility lines, retain adequate site distances and minimize shielding of roadway lighting. With these criteria in mind, street tree plantings are suggested throughout the corridor from Commerce Street to Friendship Lane. These will be coordinated with existing tree plantings and lawn areas. Specific tree species and varieties may be selected from the 1993 list of *Recommended Street Trees for Vermont Communities* prepared by the Vermont Department of Forest, Parks and Recreation, and the Vermont Urban and Community Forestry Council.

5.E.5 Street Lighting

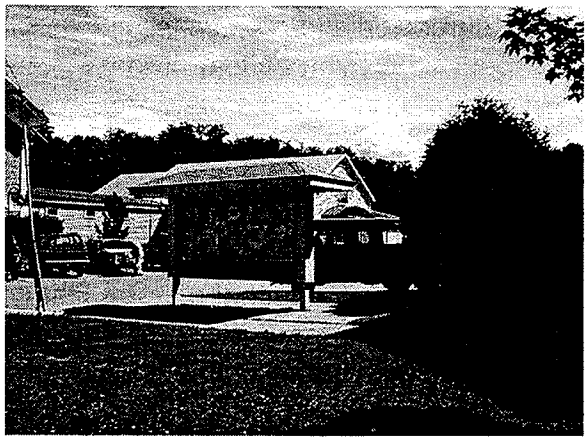
Lighting throughout the corridor is deficient, uneven, and unattractive from an aesthetic standpoint. Presently, mast arm fixtures are mounted on approximately every other power pole on the east side of the roadway from the fire station south to Papa Nicks. These provide low light levels with dark areas in between. In addition, the high mounting height of the light fixtures does not fit the desired pedestrian atmosphere. Desirable lighting qualitites to be considered in making lighting improvements along the corridor include:

- Adequate light output
- Consistent color of light
- Absence of glare
- Uniform, low-contrast light levels
- Appropriate mounting height and scale
- Satisfactory intervals between lights
- Aesthetic poles and light fixtures

Street lighting should be improved within the Village core (Commerce Street to Friendship Lane) in conjunction with pedestrian improvements.

5.E.6 Signs

Sign regulation is more art than science. It requires careful balancing between the need for businesses and others to communicate with the public, the need of the public to receive that communication, and the need for the community to balance aesthetics and traffic safety. There is no ideal system of sign regulation and communities have broad legal authority to regulate signs based on safety and aesthetic considerations.



Lantman's IGA currently accommodates walking visitors with an information billboard

For a community's sign ordinance to be effective, it must address the basic issues of sign location and design, and the regulations must be simple in order to make their enforcement and administration efficient. The ordinance should address most types of signs including:

- Permanent and temporary
- Freestanding and wall mounted
- Sign dimensions, number and location
- Animated, flashing and lighted signs
- Colors and materials
- Flags, banners and pennants

In addition to the usual traffic signs presented in the Manual of Uniform Traffic Control Devices (MUTCD), signs are a valuable tool for helping orient pedestrians to the location of streets, public services, special events and attractions. Pedestrian-oriented signs need to be designed and located differently than signs for vehicles. Pedestrians signs need to be visible from either side of the intersection, and large enough to be read at a distance.

Information kiosks provide walking visitors and residents with a variety of information on places of interest, as well as community services and facilities. Similarly, community billboards provide opportunities for posting community special event notices other than on utility poles.

5.E.7 Roadway Design and Bicycle Lanes

The VTrans has developed design standards based upon functional classification of the roadways. Route 116 is classified as a Rural Minor Arterial;Charlotte Road, Mechanicsville Road and Silver Street are classified as Rural Major Collectors. Exhibit 15 lists design standards for the Rural Minor Arterial and Collector classifications.

Exhibit 15 - Design Standards for Rural Minor Arterial and Collector Classifications Within a Village

	Rural Minor Arterial	Rural Collector
Level of Service (LOS)	C or better	C or better (E case-by-case)
Design Speed	30 to 55 mph	25 to 50 mph
Lane Widths	10 to 12 feet	9 to 11 feet
Shoulder Widths	4 to 5 feet	2 to 3 feet

The Route 116 transportation corridor must safely accommodate vehicular and bicycle traffic. It is important to bicyclists that a full 4-foot wide bike lane, or 5 feet lane with curbs, be provided beyond the travel lanes to increase rider comfort and minimize conflicts between vehicles and bicyclists. Refer to 4.C.9.b Roadway and Shoulder Widths, for actual lane/shoulder widths within the study corridor.

5.E.8 Intersection Configuration and Control

Intersections are typically the most congested areas along the corridor and the most confusing for vehicles, pedestrians, and bicyclists due to the increased points of conflict. Improvement alternatives for these intersections are described in Section 6 and include traffic signals and intersection control, lane assignments, pedestrian crosswalks, bicycle facilities and roundabouts.

Section 6
Corridor Improvement Alternatives

"Corridor Improvement Alternatives" is based on information gathered at public hearings, data collected during a survey of existing conditions, and the objectives outlined in "Corridor Improvement Goals & Standards". The alternatives are divided into two categories, "Corridor Improvement Alternatives" and "Intersection Improvement Alternatives". The overall road corridor is further divided into roadway segments between the intersections identified in Exhibit 16 - Intersection Location Map.

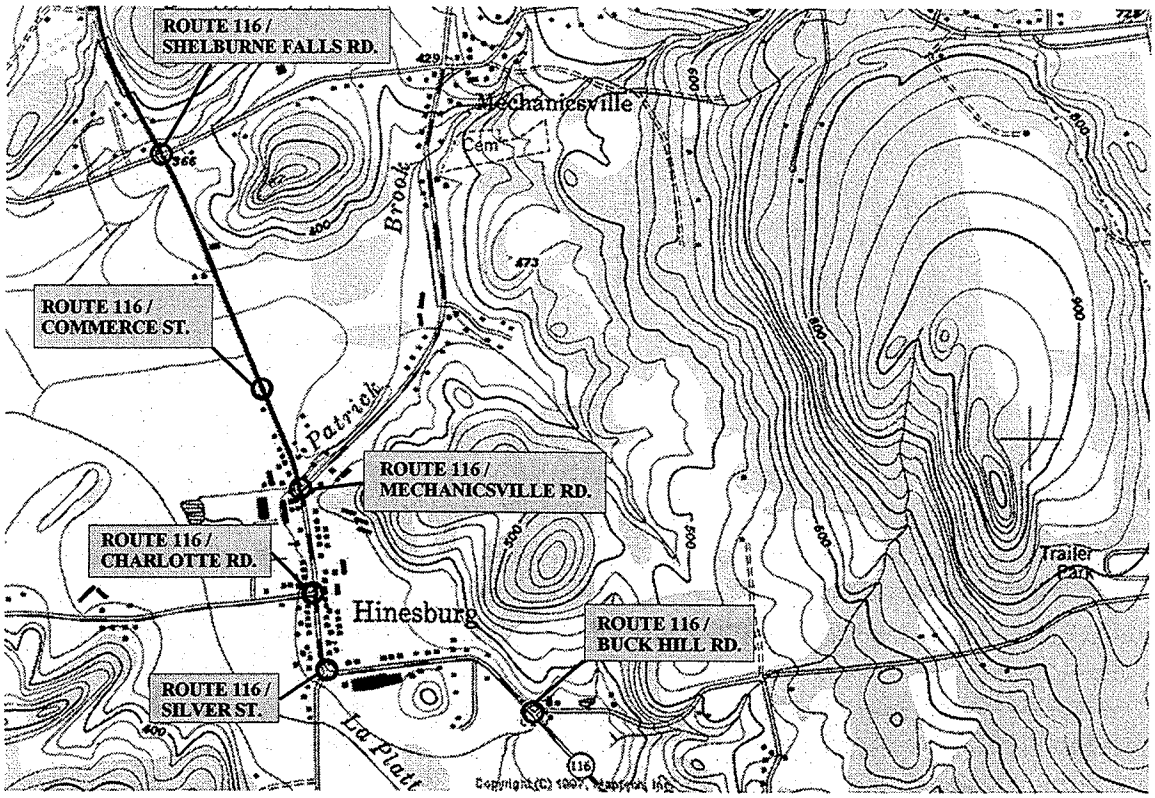


Exhibit 16 - Intersection Location Map

6.A CORRIDOR IMPROVEMENT ALTERNATIVES BY ROADWAY SEGMENT

Plans for an improved streetscape emerged from an ongoing review of the existing conditions, public comments, and the purpose and need statement.
The improved streetscape is reflected in a series of cross sectional views for each of the roadway segments. The following describes the improvement options and alternatives for the individual corridor segments. Refer also to the plan sheets 1 through 9 at the end of this section.

A. No Build

B. Alternative I)A: Improved Streetscape

- Reduce road width from Commerce Street to Silver Street and include four foot shoulders for bike lanes.
- Install pedestrian walkways on both sides of Route 116 from Commerce Street to Friendship Lane.
- Add street trees and lighting from Commerce Street to Friendship Lane.
- Construct separated path on east side of Route 116 from Shelburne Falls Road to Commerce Street and from Friendship Lane to Buck Hill Road.
- Install curbing for access management from Commerce Street to Friendship Lane (includes piped storm water upgrade).

C. Alternative I)B: Improved Streetscape with Parallel Parking

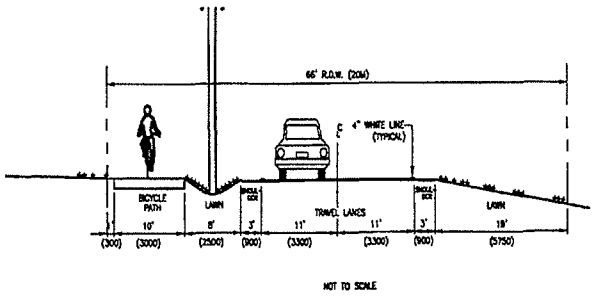
- Modify Alternative I) A to include parallel parking on both sides of Route 116 from Charlotte Road to Silver Street.

D. Alternative I)C: Improved Streetscape with Angled Parking

- Modify Alternative I)B to include angled parking on the west side from Charlotte Road to Silver Street.

6.A.1 Shelburne Falls Road to Commerce Street

0.8 km (0.50 mi)

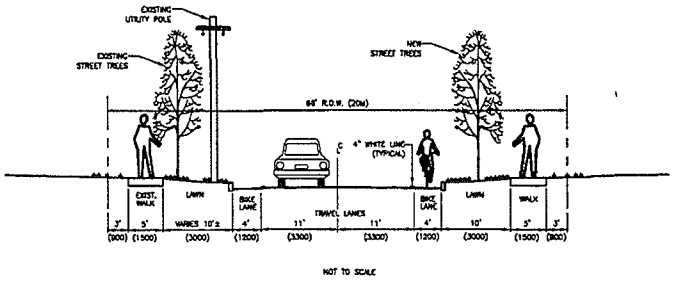


Alternative I)A - Shelburne Falls Road to Commerce street, south bound

This segment is typified by existing, low density development and higher traffic speeds. Under Alternative 1)A, this initial segment will continue with a pavement cross section similar to the existing. A separated bikeway is proposed along the east side of the roadway.

6.A.2 Commerce Street to Mechanicsville Road
0.30 km (0.20 mi)

The existing cross section has a wide pavement area with large open access points. The proposed cross section will reduce the pavement width 0 to 1.5 m (0 to 5 ft) on the west side and include a raised curbed sidewalk. The raised sidewalk will reduce curb cut widths and improve pedestrian circulation especially in the areas by the fire station and the Giroux Properties. The raised walkway pavement should be textured and colored in front of the Giroux properties to maintain access to these businesses and their respective bay doors. A walkway is recommended along the east side with a grassed area separating from the roadway. This grassed area may be curbed with new storm drain structures, maintained as a grassed drainage swale, constructed as a combination of the two.

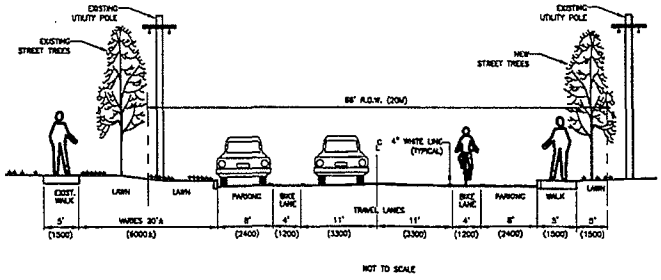


Alternative I)A - Mechanicsville Road to Charlotte Road, south bound

6.A.3 Mechanicsville Road to Charlotte Road
0.30 km(0.20 mi)

The existing road cross section has a wide pavement area with an existing walkway on the east side. It's separation from the road varies from 0 to 3 m (0 to 10 ft). The proposed cross section reduces the pavement width 1.5 m (5 ft) on the west side and features a walkway 1.5 to 3 m (5 to 10 ft) from the road separated by a curb and lawn.

6.A.4 Charlotte Road to Silver Street
0.25 km (0.15 mi)

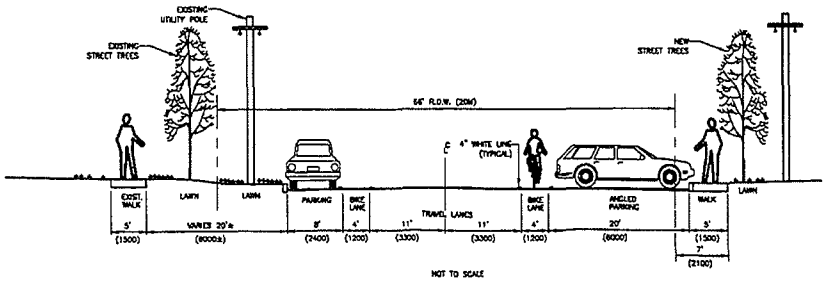


Alternative I)B - Charlotte Road to Silver Street, south bound

This segment will have a proposed cross section similar to the above. The existing walkway on the east side of Route 116 will remain; it is separated from the pavement edge by a 6+/- m (20+/- ft) lawn area. Excessively wide accesses along this segment, used for access and quasi on-street parking, will be consolidated.

Under Alternatives I)B and I)C, this segment will also include on-street parking. Alternative I)B includes parking along both sides of the roadway. Alternative I)C includes parallel parking on the east side and angled parking on the west side.

These alternatives would provide on-street parking for the businesses that presently have uncontrolled parking at wide access drives that are proposed to be narrowed. In addition, the inclusion of on-street parking will work as a traffic calming affect, slowing vehicle in the village area.



Alternative I)C - Charlotte Road to Silver Street, south bound

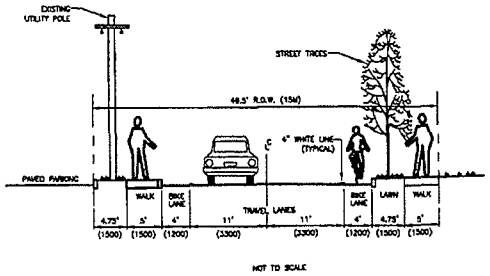
Alternative I)B will create 20 on-street parking spaces while maintaining between 1.5 to 3.0 m (5 to 15 ft) of lawn area within the ROW. Alternative I)C will create 29 on-street parking spaces and require approximately 1.5 m (5 ft) of ROW acquisition. The road section for Alternative I)C will fit within the ROW, however, to do so would require an undesirable shift of the Route 116 through lanes.

6.A.5 Silver Street to Friendship Lane

0.50 km (0.30 mi)

The existing cross section along this segment has a pavement width similar to the proposed.

The proposed cross section incorporates a curbed raised sidewalk along the north edge of the roadway to improve pedestrian connections and to break up the wide open paved access. The south side along the community school will remain similar to the existing with the addition of walkway connections from the school to Friendship Lane and Silver Street.



Alternative I)A - Silver Street to Friendship Lane, south bound

6.A.6 Friendship Lane to Buck Hill Road

0.25 km (0.15 mi)

This segment transitions the edge of the developed village to the more rural road segment of Route 116 south of Buck Hill road. The proposed cross section will maintain the existing pavement widths with the addition of a separated bikeway along the northeast side of the roadway. In conjunction with textured pavement islands in advance of the school, other improvements will be implemented at the curve entering the village to help reduce vehicular speeds including both a real and a perceived narrowing of the roadway.

The existing driveway access on the north side of Route 116 at this curve is wide at its throat and has a wide gravel shoulder. These conditions create a visually wide road and encourage higher vehicle speeds around the curve. To discourage speeding, the drive access throat will be reduced and the wide gravel shoulder will be replaced with narrower shoulder and the extension of curbing around the curve. These will have a traffic calming effect through a perceived and a real reduction in width of Route 116. The curbing will also provide a vertical element to enhance driver awareness of the curve.

6.B INTERSECTION IMPROVEMENT ALTERNATIVES

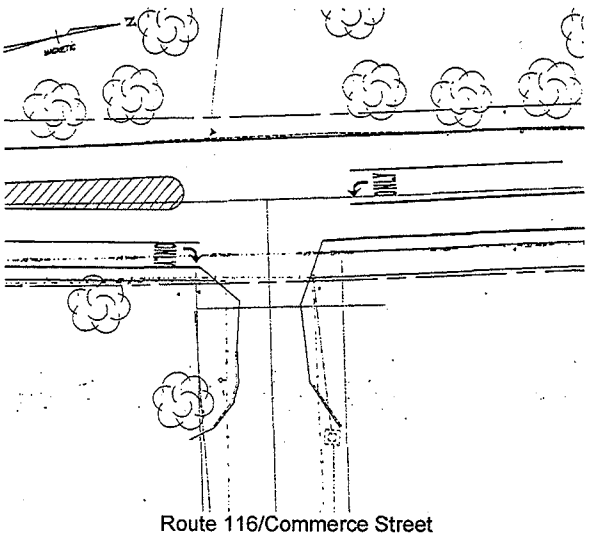
6.B.1 Route 116/Shelburne Falls Road

The review of this existing signalized intersection found that it currently operates at good Levels-of-Service (LOS), but remains a High Accident Location (HAL). As a result, proposed alternatives are geared toward safety and pedestrian improvements at this location. The following is a list and summary of the Intersection Improvement Alternatives reviewed.

A. **No Build**
B. **Alternative II)A: Improved Sight Lines**
   - Intersection sight and visibility improvements
C. **Alternative II)B: Safety Analysis; Signal Upgrade**
   - Signal upgrade based upon detailed safety review
   - Pedestrian crossings and actuated signals

Review of the Route 116/Shelburne Falls Road accident history shows that the frequency of accidents has increased since the installation of the traffic signal system. These have included a significant occurrence of rear-end and angle accidents. Based upon review of the accident listings and the intersection geometrics, several safety improvements are recommended. Vegetation in the northeast corner of the intersection should be cleared to improve the visibility of the intersection. This clearing should allow for southbound Route 116 traffic to see, in advance, the vehicles queued on the east side of the intersection. Presently, these vehicles are not visible until close to the intersection which does not allow southbound traffic to react to their movement. In addition, the following signal upgrades may be appropriate based upon a detailed safety review; increased yellow or all red signal timings, approach zone presence vehicle detection to prevent signal phase changes once vehicles have entered an approach zone on the high speed approaches, or other safety review alternatives.

6.B.2 Route 116/ Commerce Street



Route 116/Commerce Street
Existing Conditions

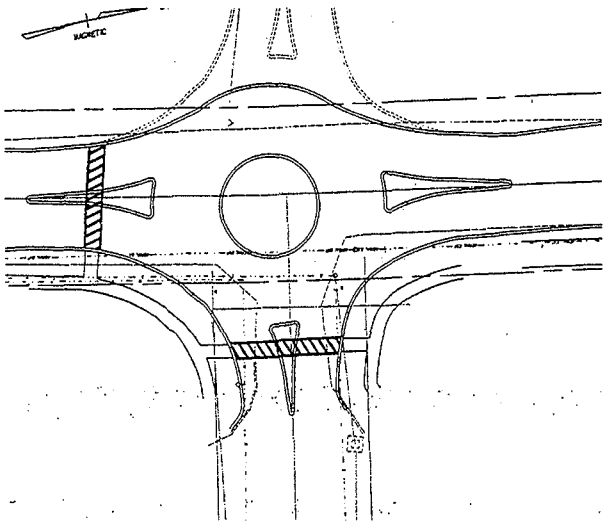
The review of this unsignalized intersection found that with its configuration of exclusive Route 116 left and right-turn lanes onto Commerce Street, it is projected to remain operating at good LOS. In addition, the intersection has the capacity for increased traffic with the existing geometry and adjacent available open land. The alternatives for this location are based upon corridor traffic calming and future traffic planning initiatives. The following is a list and summary of the Intersection Improvement Alternatives reviewed.

A. No Build
B. Alternative III)A: Roundabout
C. Alternative III)B: Signalized Intersection

Over the long term, Hinesburg is interested in shifting traffic entering onto Route 116 from Mechanicsville Road and Charlotte Road to the Commerce Street intersection because of its available expansion capabilities. The Mechanicsville Road traffic would likely shift naturally to Commerce Street because of congestion at the Mechanicsville Road/Route 116 intersection. Physical changes at the Commerce Street/Mechanicsville Road and Mechanicsville Road/Route 116, possibly including closing the Route 116/Mechanicsville Road intersection to westbound traffic, would further encourage this shift to Commerce Street.

Charlotte Road traffic could shift to this location with the construction of a new internal bypass road from Charlotte Road north to the west approach to the Commerce Street/Route 116 intersection. To better understand the impacts of these new connections and the anticipated traffic expansion, an average day signal warrant analysis was performed for the design years. Based upon the existing traffic patterns, a signal is not warranted at this location through year 2015. However, traffic increases resulting from one or more of these new connections will likely cause a signal to be warranted at the Route 116/Commerce Street intersection.

Alternative III)A: Roundabout
A roundabout would serve multiple functions at this location. The first is the creation of a visual gateway to the village core with a central landscaped island and pedestrian amenities. Second, a roundabout would provide traffic calming and the capability to meet the existing and planned traffic volumes with little delay.



Route 116/Commerce Street
Alternative III)A : Roundabout

Alternative III)B: Signalized Intersection A signal would be required only to improve the vehicle capacity of the intersection. As part of a typical signal installation, pedestrian actuated signals would be incorporated.

6.B.3 Route 116/Mechanicsville Road

The review of this unsignalized intersection found that there are some operational and congestion deficiencies at this location which affect both the individual intersection and along Mechanicsville Road. Mechanicsville Road intersects Route 116 at an angle with a wide intersection throat allowing for faster turns onto Mechanicsville Road from Route 116 northbound. This problem of fast turning traffic is made worse because of the higher traffic volumes from the south on Route 116. In addition, poor (F) LOS are experienced for vehicles making left turns southbound onto Route 116. Traffic planning goals include future development of alternatives to divert all or some of the traffic exiting onto Route 116 from Mechanicsville Road to the Commerce Street intersection. To meet these goals, various traffic planning initiatives will be required based upon the chosen intersection alternative. The following is a list and summary of the Intersection Improvement Alternatives reviewed.

A. **No Build**
B. **Alternative IV)A: Lane Upgrades**
   - Pavement marking of exclusive left and right-turn westbound lanes
   - Reduction of intersection throat width including separation from the adjacent former fire house driveway in the northeastern quadrant of the intersection
C. **Alternative IV)B: Roundabout**
D. **Alternative IV)C: Signalized Intersection**
E. **Alternative IV)D: One-way Street**

- Closure of intersection to traffic exiting onto Route 116

Alternative IV)A: Lane Upgrades Lane upgrades would reduce the usable intersection throat by marking the two westbound lanes to match the existing use, and sharpen the right-turn corner from Route 116. In addition, the former fire house driveway, which is a paved area contiguous to the intersection throat, would be separated from the intersection by a curbed island and pavement markings. Each of these improvements will have a traffic calming affect due to the real and perceived reduction of the intersection throat width. This alternative will not improve the capacity of the intersection because westbound vehicles already form two lanes in the wide intersection throat. Increased delays at this intersection will encourage people to seek alternate routes and move the town towards the planning goal of diverting traffic to Commerce Street. In addition, the Mechanicsville Road/Commerce Street intersection would be signed to direct southbound Mechanicsville Road traffic to use Commerce Street.

Alternative IV)B: Roundabout A roundabout would serve multiple functions at this location. First, it continues the concept of village gateways with a central landscape island and pedestrian amenities. Second, a roundabout would provide traffic calming and the capability to meet existing and planned traffic volumes with little delay. Unfortunately, existing structures do not allow enough area to meet the size requirements for a roundabout.

Alternative IV)C: Signalized Intersection Due to the poor LOS for the Mechanicsville Road approach, average day signal warrants were performed for this intersection for the design years. These showed that the intersection would warrant a signal by the year 2015 unless traffic diversion measures occur. A signal at this location would provide good LOS for the projected traffic volumes. As part of a typical signal installation, pedestrian actuated signals would be incorporated.

Alternative IV)D: One-way Street The conversion of Mechanicsville Road to a one-way street heading east from Route 116 to Commerce Street would significantly affect traffic circulation on this roadway, Commerce Street and CVU Road. Mechanicsville Road could remain two-way from Commerce Street south to the "Hinesburg Village Center" or to a turn around area in this vicinity. The Route 116/Mechanicsville Road intersection would no longer have traffic exiting onto Route 116, thereby improving the LOS and eliminating the need for future expansion. South bound traffic, which formerly used Mechanicsville Road to continue south on Route 116, would divert to CVU Road or to Commerce Street based on ease of access and travel patterns. To facilitate additional south bound traffic on Commerce Street, the Mechanicsville Road/Commerce Street intersection will need to be signed to direct traffic flow for south bound Mechanicsville Road traffic onto Commerce

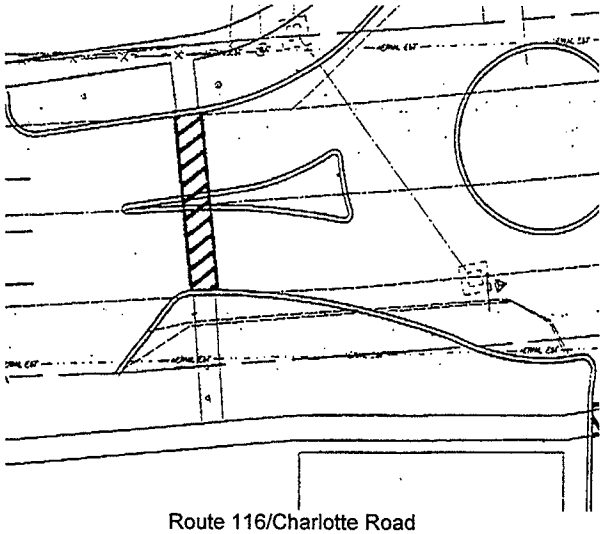
Street. Further analysis of these roadways and intersections should be performed prior to conversion of this roadway to a one-way street.

6.B.4 Route 116/Charlotte Road

The review of this unsignalized intersection found that the Charlotte Road approach experiences poor (F) LOS for left turning traffic. The recent addition of left and right-turn lanes has improved the traffic flow by increasing the available queue lengths and also allowing right-turning vehicles to bypass waiting left-turn vehicles. Due to these congestion conditions, the reviews focused on capacity improvements for this location. The following is a list and summary of the Intersection Improvement Alternatives reviewed.

A. **No Build**
B. **Alternative V)A: Roundabout.**
C. **Alternative V)B: Signalized Intersection**

Alternative V)A: Roundabout A roundabout would serve multiple functions at this location. The first is the continuation of village gateways including a central landscape island, and pedestrian amenities. The second is traffic calming and the increased capability to meet the projected traffic volumes with reduced delay from the Charlotte Road approach. However, existing structures, access to Lantman's, and the Charlotte Road approach grade make it difficult to meet roundabout size and geometric requirements at this location. Therefore, a roundabout is not recommended for further consideration at this intersection.



Route 116/Charlotte Road
Alternative V)A: Roundabout

Alternative V)B: Signalized Intersection. Due to the poor LOS for the Charlotte Road approach, average day signal warrants were performed for this intersection for the design years. These showed that the intersection will not warrant a signal through the year 2015. However, during public discussion, it was strongly felt that a signal should be included as an alternative at this location. A signal at this location would provide good LOS for the projected traffic volumes. However, signal warrants are not met and a signal would produce the following undesirable results:

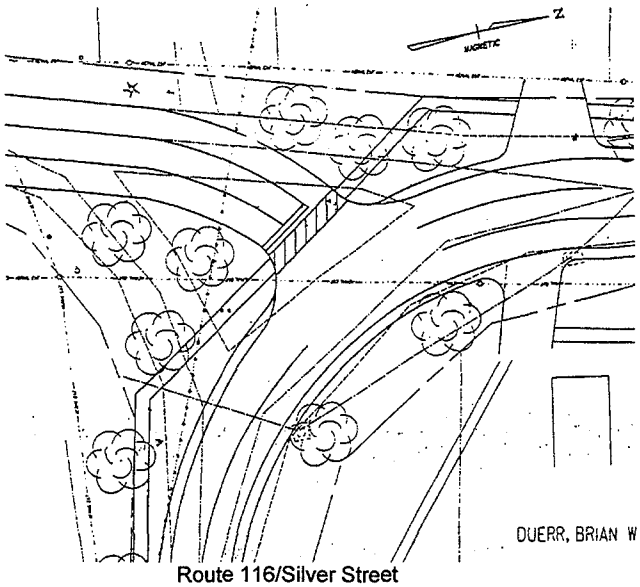
- Overall intersection vehicle delays would be increased due to the increased delay for Route 116 through traffic.
- Even though Charlotte Road volumes are higher in the morning hours and drop off significantly later in the day, the signal would need to operate during the entire day to meet operational requirements. This inconvenience could be offset slightly by the use of a semi-actuated signal system.
- The cost of installation and maintenance would likely fall to the Town of Hinesburg, since VTrans will not install signals at intersections which do not meet the Signal Warrants. This situation may also require the Town to take over maintenance of this segment of Route 116 from VTrans.

6.B.5 Route 116/Silver Street

The review of this unsignalized intersection found that there are some operational and congestion deficiencies based upon the intersection geometrics and the traffic patterns. The intersection is presently configured as a "Y" intersection approach off of Silver Street which increases the number of conflict points for vehicles within the intersection. The "Y" approach configuration benefits Silver Street right-turning traffic which can bypass waiting left-turning traffic when the queues are not long. However, during high volume times, this right-turn movement is blocked by vehicles queued to make left turns. This is aggravated because the predominant traffic pattern is to/from the north on Route 116. As a result of this traffic pattern, poor Levels-of-Service (F) are experienced by vehicles making left turns onto Route 116. The study alternatives address the issues of congestion, conflict points, and the intersection's close proximity to the community school. The following is a list and summary of the Intersection Improvement Alternatives reviewed.

A. **No Build**
B. **Alternative VI)A: "T"-Intersection**
C. **Alternative VI)B: Roundabout**
D. **Alternative VI)C: Signalized Intersection**

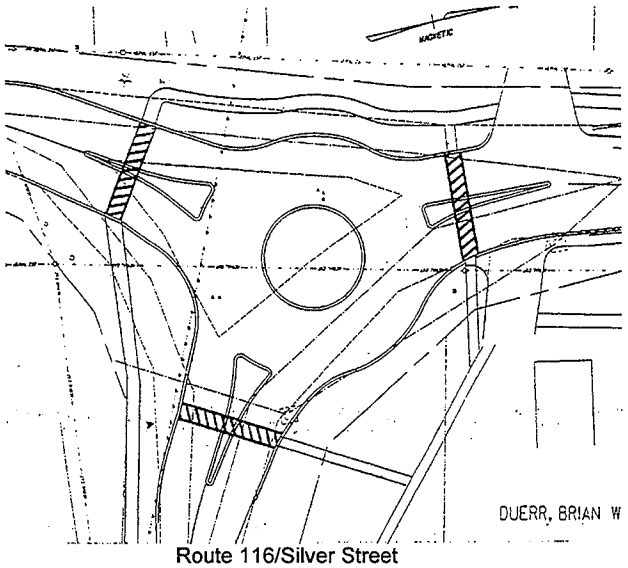
Alternative VI)A: "T"-Intersection. The conversion of Silver Street to a "T"-intersection will reduce the intersection conflict points, allow for increased queue lengths, and reduce southbound traffic speeds. The reduction of conflict points and reduced southbound traffic speeds will improve the safety of this



Route 116/Silver Street
Alternative VI)A: T-Intersection

intersection. The new geometry will require southbound Route 116 traffic turning onto Silver Street to slow in an exclusive right-turn lane and make a more nearly 90 degree turn. The Silver Street approach to Route 116 will also be reconfigured to have exclusive left and right-turn lanes which will increase the available lane storage lengths. This increase in storage lengths will improve slightly the existing Silver Street right-turning traffic delay, but will not improve the left-turning traffic delay.

Alternative VI)B: Roundabout A roundabout would serve multiple functions at this location. The first is traffic calming and the creation of a village gateway with a central landscape island and pedestrian amenities. A roundabout would help control traffic speeds and accommodate pedestrian crossings for the adjacent elementary school. The second is improved capability to meet the existing and planned traffic volumes with little delay. The geometric configuration of this roundabout will require shifting the intersection toward the park to the northeast to accommodate the approach grades from Silver Street. In addition, this shift would facilitate the combination and connection of private drives located on the west edge of the intersection and roundabout.



Route 116/Silver Street
Alternative VI)B: Roundabout

Alternative VI)C: Signalized Intersection Due to the poor LOS for the Silver Street approach, average day signal warrants were performed for this intersection for the design years. These showed that the intersection would warrant a signal by the year 2015. A signal at this location would provide good LOS for the projected traffic volumes. As part of a typical signal installation, pedestrian actuated signals would be incorporated.

6.C SECONDARY SCOPE REVIEW—THREE PROJECT ALTERNATIVES

Secondary to the main Route 116 Corridor Study, this project includes a review of three proposed projects and their effects on Route 116 traffic.

6.C.1 Internal Bypass West of Route 116, Commerce Street to Silver Street

A limited review of an internal bypass west of Route 116 between the Commerce Street and Silver Street intersections was performed. This review focused on general impacts to natural resources and Route 116 traffic.

The construction of this internal bypass would have two distinct segments. A northern segment from Commerce Street to the Charlotte Road/Stella Road intersection, and a southern segment from Charlotte Road to Silver Street. Due to their lengths, these roadways would not divert the main through traffic off of Route 116, but would instead provide secondary access between Route 116 and Charlotte Road. As such, vehicles would use the internal bypass to access adjacent parcels and Charlotte Road.

The northern bypass segment, from Commerce Street to Charlotte Road would provide an ideal bypass for Charlotte Road traffic traveling to/from north Route 116. The Commerce Street intersection, as previously discussed, has the ability to handle increased traffic due to its existing configuration and ease of expansion. This road segment would also allow for a secondary connection to the Route 116 properties and access to future planned expansion to the north of Commerce Street and west of Route 116. The configuration of this segment would require detailed coordination with private landowners, including the cheese plant, and with the involved state agencies. Significant resource impacts are listed in Section 7.

The southern bypass segment from Charlotte Road to Silver Street would likely have little impact on traffic to/from Charlotte Road. This is because the main traffic movements to/from Charlotte Road are to the north on Route 116, and it is easy for Charlotte Road traffic to make right turns onto southbound Route 116. Due to the steep banks, wetlands, and LaPlatte River flood plain, the construction of this bypass segment and access to it would be more difficult than the Charlotte Road to Commerce Street segment.

6.C.2 Silver Street to Route 116/Buck Hill Road Connection

The construction of a road connection from Silver Street east to the Route 116/Buck Hill Road intersection would close the existing Route 116/Silver Street intersection to through traffic. This new route would affect Route 116 traffic patterns in two ways:

- Silver Street traffic going to/from the north on Route 116 would be diverted such that a significant increase of traffic would occur in front of the community school. This would reduce the effectiveness of some of the recent and proposed pedestrian safety improvements and traffic calming efforts along this segment.

- Traffic now moving directly north/south along Route 116 and Silver Street would have increased travel times due to the additional road length of this route. Since the additional travel time would likely be less then a few minutes, the new road connection would not be a significant detraction for local traffic or for regional commuter traffic whose only options are continuing along Route 116 or using Route 7.

The construction of this roadway connection would heavily impact significant natural resources and result in wetlands reduction, flood zones constriction, and stream alteration. These impacts are listed briefly in Section 7.

6.C.3 Park and Ride Lot

The Town of Hinesburg has initiated planning for a Park and Ride lot easily accessible from Route 116 and in close proximity to the village. As part of the initial planning, two primary locations were identified as possible options:

- A single Park and Ride lot located north of the village on either a vacant "Commerce Park" parcel or on the west side of Route 116 opposite Commerce Street.

- Multiple small parking lots within the village designated for Park and Ride use.

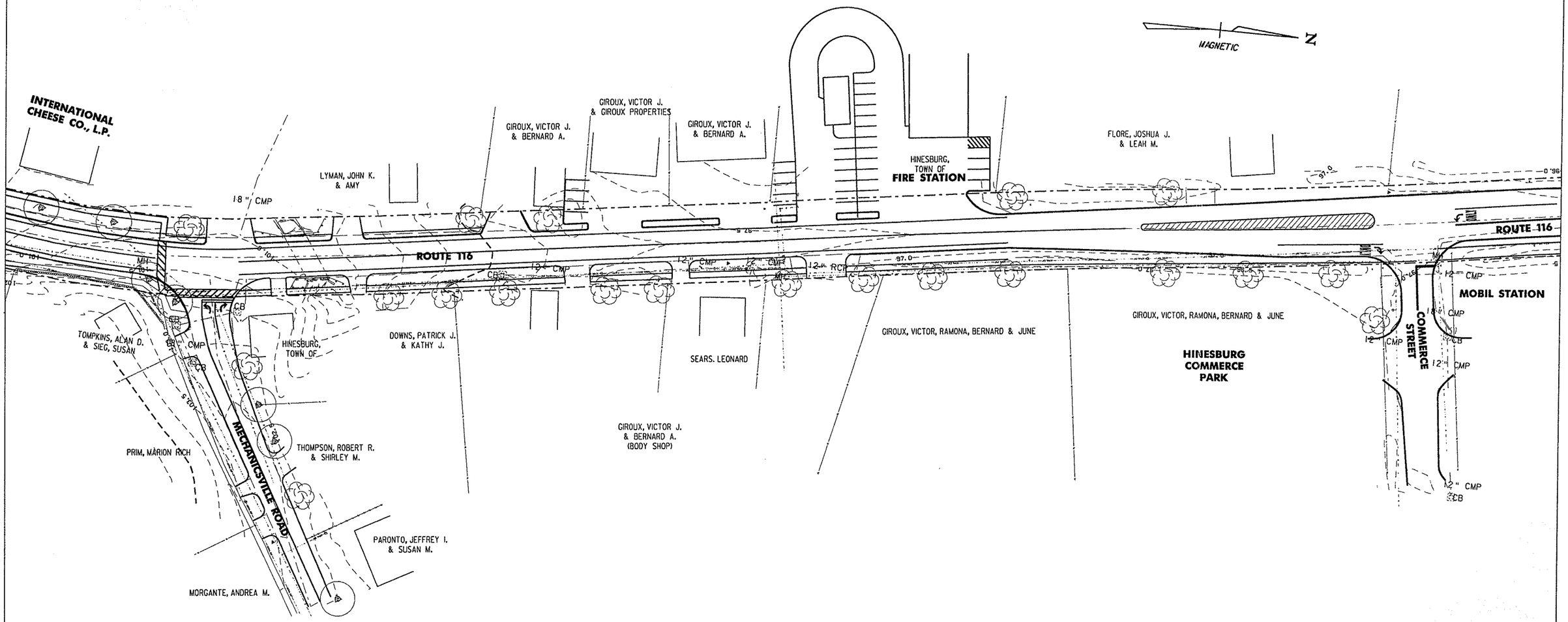
Coordinating development of Park and Ride alternatives and Route 116 improvement alternatives will require addressing several key concerns for proper implementation:

- Pedestrian and bicycle connections to these park and ride lots are desirable to promote shared use of these parking areas and other village parking facilities. The shared use potential for these lots is greatest when they are in close proximity to the village.

- The traffic patterns along Route 116 indicate that a Park and Ride lot would most likely be utilized for travel to northerly employment destinations such as Burlington, Williston, Essex and others destinations reached by Interstate I-89. To facilitate its use, the lot should be easily accessible and in close proximity to the three main roads that converge on the village: Silver Street, Charlotte Road and Route 116.

The benefits of a Park and Ride lot in the Route 116 corridor will likely be based on its potential for shared use. The traffic patterns suggest that a more northerly location would be more effective for a Park and Ride lot. Since most of the vehicles would arrive from the south and depart to the north, use of this northern lot would have little effect on reducing the amount of traffic within the village core.

Metric



DATUM
VERTICAL _____
HORIZONTAL _____

0 20 40
SCALE 1:1000
IN METERS

NO.	DATE	REVISIONS	BY	CK'D

DuBois & King INC.
ENGINEERING PLANNING MANAGEMENT DEVELOPMENT

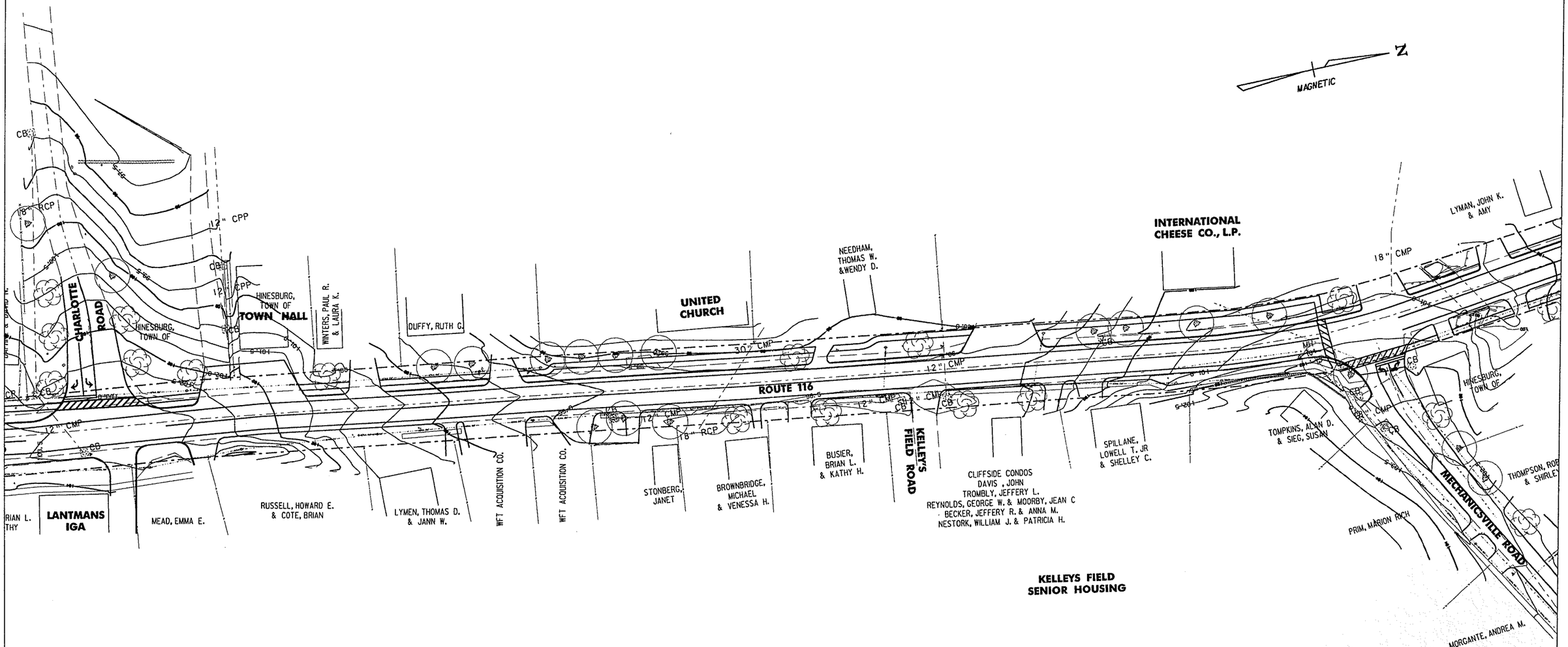
ROUTE 116 CORRIDOR
TRANSPORTATION PROJECT DEVELOPMENT

PROJECT NO.: **B16259F2**

DESIGN FILE NAME: ROADWAY ALTERNATIVE IA
IPARM FILE NAME:
SURVEYED BY:
SQUAD LEADER: JAS

PLOT DATE: DEC. 2002
SURVEY DATE:
DRAWN BY: GW
SHEET: 1 OF 9

Metric



DATUM
VERTICAL _____
HORIZONTAL _____

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SCALE 1:1000
IN METERS

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PLOT DATE: DEC. 2002
SURVEY DATE:
DRAWN BY: GW
SHEET: 2 OF 9

Metric

MAGNETIC

CARPENTER, RODNEY E. & ZIRA L.

EMMONS, CLARK H. & HAZEL L.

BAST, ROBERT S.

ALLEN, RAYMOND & CHARLOTTE

WAINER L. J. DR. & REBECCA

MARTIN, CRAIG T.

BIRD, RICHARD D. & JOYCE R.

DREW, WILLIAM T. & PATRICIA A.

CARPENTER, SARAH MEMORIAL LIBRARY

SUMNER, RALPH M. & REBECCA A.

WALKER, DONA H., DAPHNE & DAVID N.

CHARLOTTE ROAD

HINESBURG, TOWN OF

HINESBURG, TOWN OF TOWN HALL

WINTERS, PAUL R. & LAURA K.

SILVER STREET

ROUTE 116

DUERR, BRIAN W.

ROBINSON, REGINALD H. & SANDRA J.

RUSSEL, PERRY & OTHERS

ROMAN CATHOLIC DIOCESE OF BURLINGTON, INC.

ST. JUDE ROMAN CATHOLIC DIOCESE OF BURLINGTON, INC.

FALLON, JOSEPH D. & ELLEN M.

RATH, DAVID & MICHELLE L.

GIROUX, EUGENE & NORMA

GREENBERG, MARVIN A.

BUSIER, BRIAN L. & KATHY

LANTMANS IGA

MEAD, EMMA E.

RUSSELL, HOWARD E. & COTE, BRIAN

GOOD TIMES CAFE

MEMORIAL PARK

HINESBURG, TOWN OF

LYMAN PARK

MASONIC TEMPLE

RAYMOND, WM & ROSE; MARTIN, TERRY & JENNY

HINESBURG ELEMENTARY SCHOOL

MEAD, EMMA E.

18" RCP

12" RCP

12" CPP

12" CMP

CB

MP

0 20 40

SCALE 1:1000 IN METERS

DATUM

VERTICAL _____

HORIZONTAL _____

NO.	DATE	REVISIONS	BY	CK'D

DuBois & King inc.

ENGINEERING PLANNING MANAGEMENT DEVELOPMENT

ROUTE 116 CORRIDOR
TRANSPORTATION PROJECT DEVELOPMENT

PROJECT NO.: **B16259F2**

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PLOT DATE: DEC. 2002
SURVEY DATE:
DRAWN BY: GW
SHEET: 3 OF 9

MAGNETIC

N

ORCHARD HILL CONDOMINIUMS

HINESBURG ELEMENTARY SCHOOL

FRIENDSHIP LANE

ORCHARD HILL RD.

ROUTE 116

LYMAN MEADOW RD.

FARNHAM, RICHARD (CLIFFEAST CONDOS)

KEHOE, SEAN P. & SUSAN M.

CHICKERING, ROLFE L. & GRACE C.

LYMAN, ROBERT

ZONTANOS, NICHOLAS & VOULA

ZONTANOS, NICHOLAS & VOULA

MEAD, DOUGLAS E. & PATRICIA A.

HART & MEAD, INC.

TEXACO STATION

HART & MEAD, INC.

MEAD, EMMA E.

LYMAN MEADOWS CONDOMINIUMS

DATUM

VERTICAL _____

HORIZONTAL _____

0 20 40

SCALE 1:1000
IN METERS

NO.	DATE	REVISIONS	BY	CK'D

DuBois & King INC.

ENGINEERING PLANNING MANAGEMENT DEVELOPMENT

ROUTE 116 CORRIDOR
TRANSPORTATION PROJECT DEVELOPMENT

PROJECT NO.: B16259F2

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PLOT DATE: DEC. 2002
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DRAWN BY: GW
SHEET: 4 OF 9

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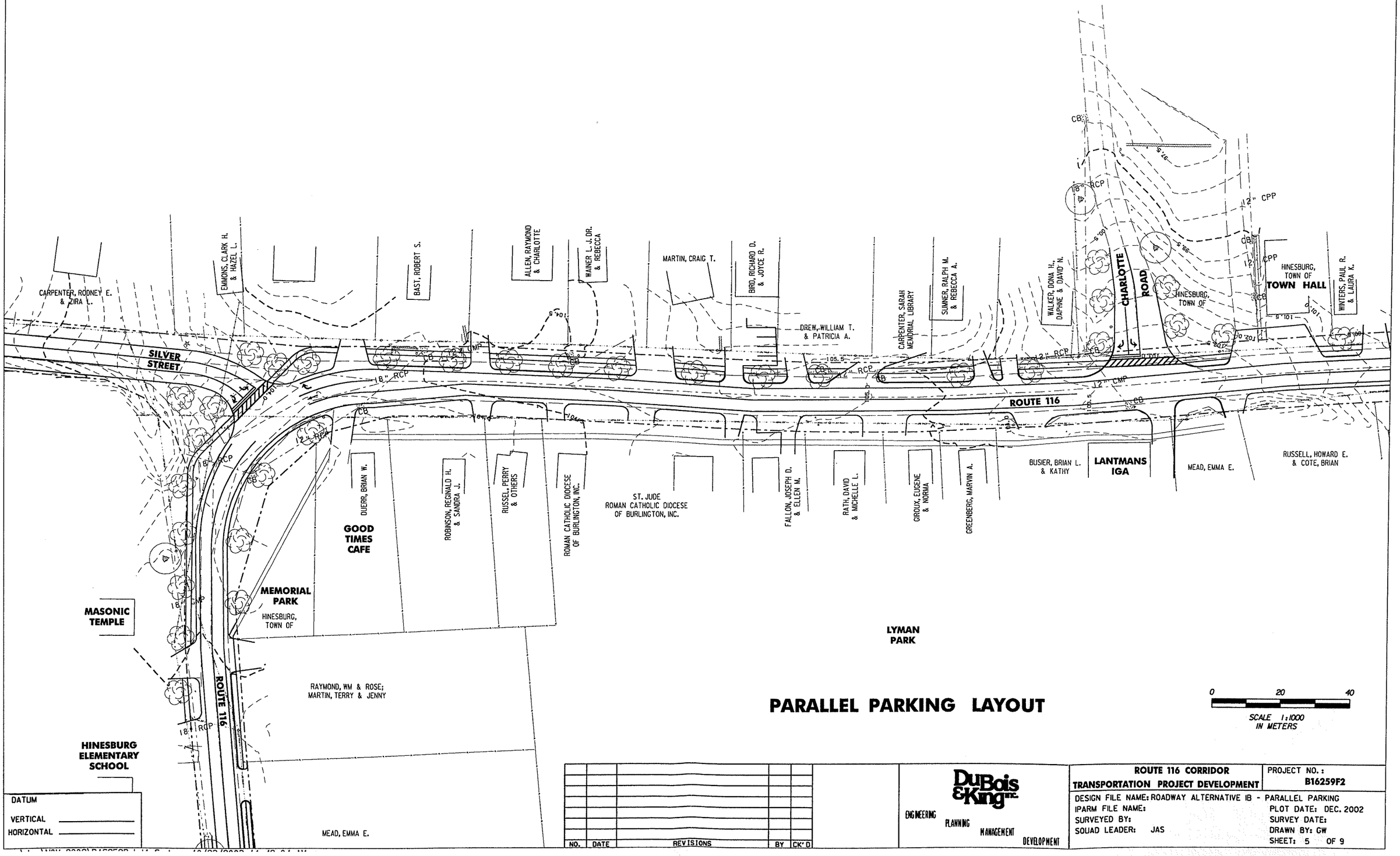

PARALLEL PARKING LAYOUT

0 20 40

SCALE 1:1000 IN METERS

NO.	DATE	REVISIONS	BY	CK'D

DuBois & King inc.
ENGINEERING PLANNING MANAGEMENT DEVELOPMENT

ROUTE 116 CORRIDOR TRANSPORTATION PROJECT DEVELOPMENT

PROJECT NO.: B16259F2

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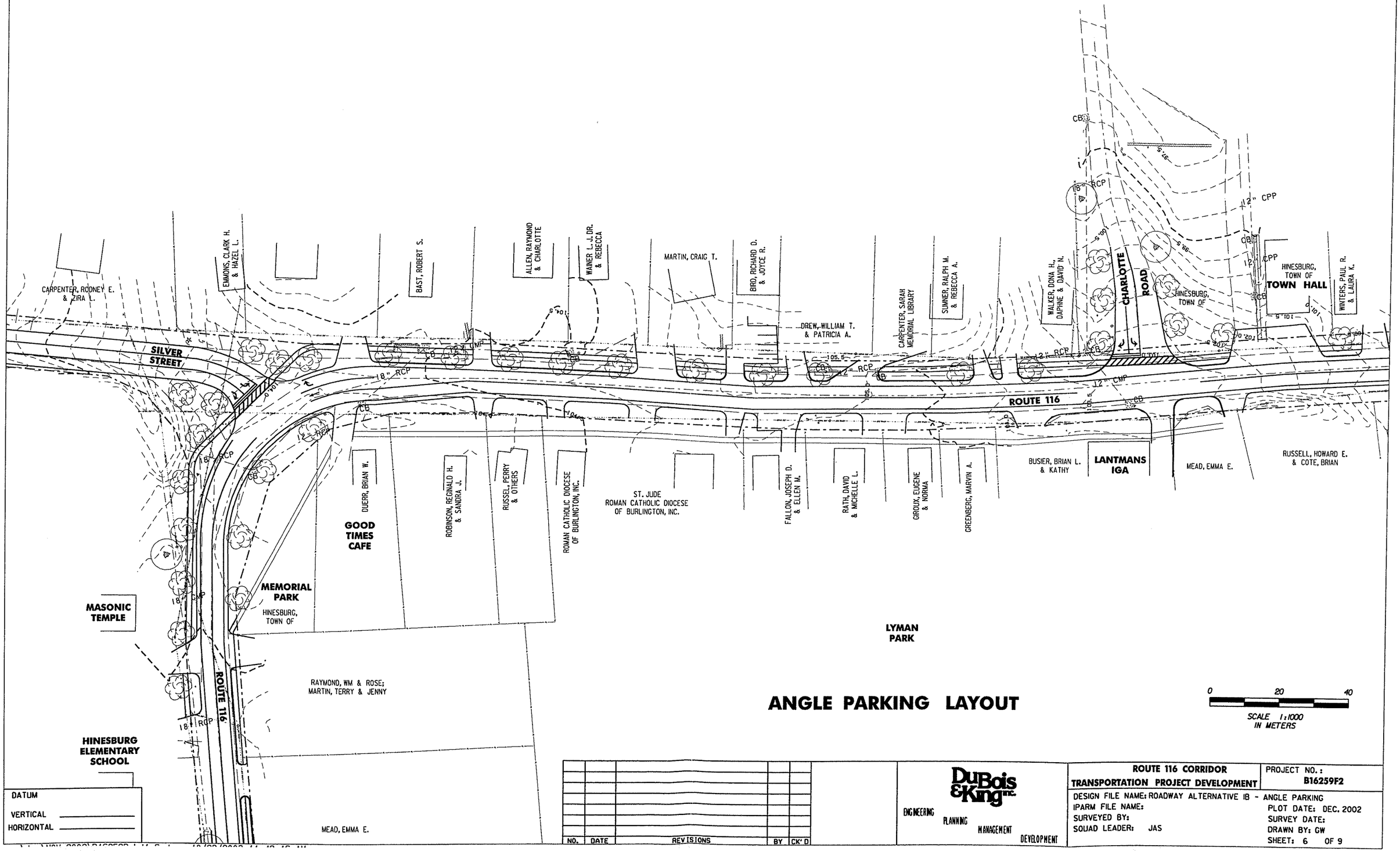
SHEET: 5 OF 9

Metric



ANGLE PARKING LAYOUT

0 20 40

SCALE 1:1000 IN METERS

DATUM
VERTICAL _____
HORIZONTAL _____

NO.	DATE	REVISIONS	BY	CK'D

DuBois & King inc.
ENGINEERING PLANNING MANAGEMENT DEVELOPMENT

ROUTE 116 CORRIDOR TRANSPORTATION PROJECT DEVELOPMENT

PROJECT NO.: B16259F2

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IPARM FILE NAME:
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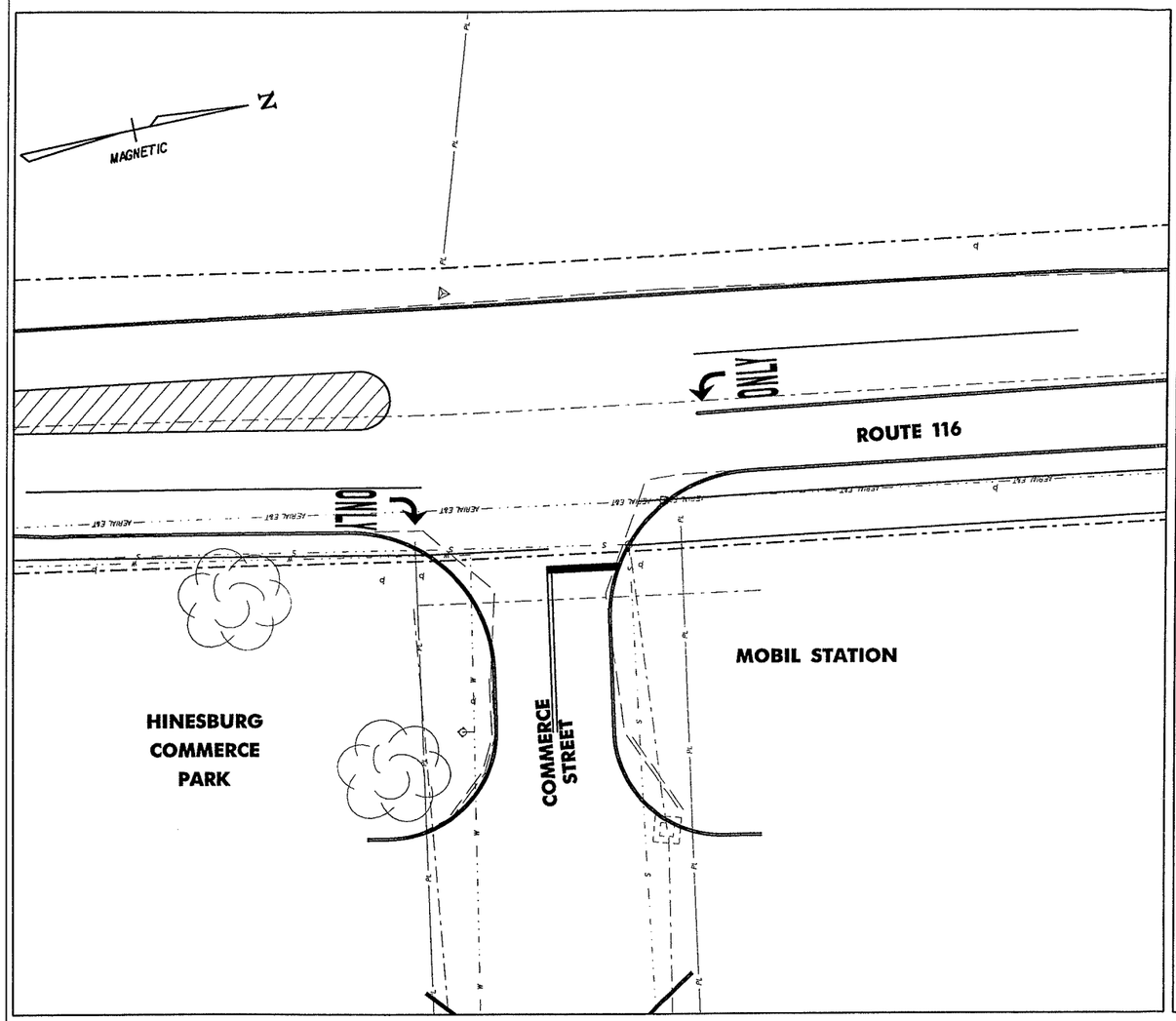
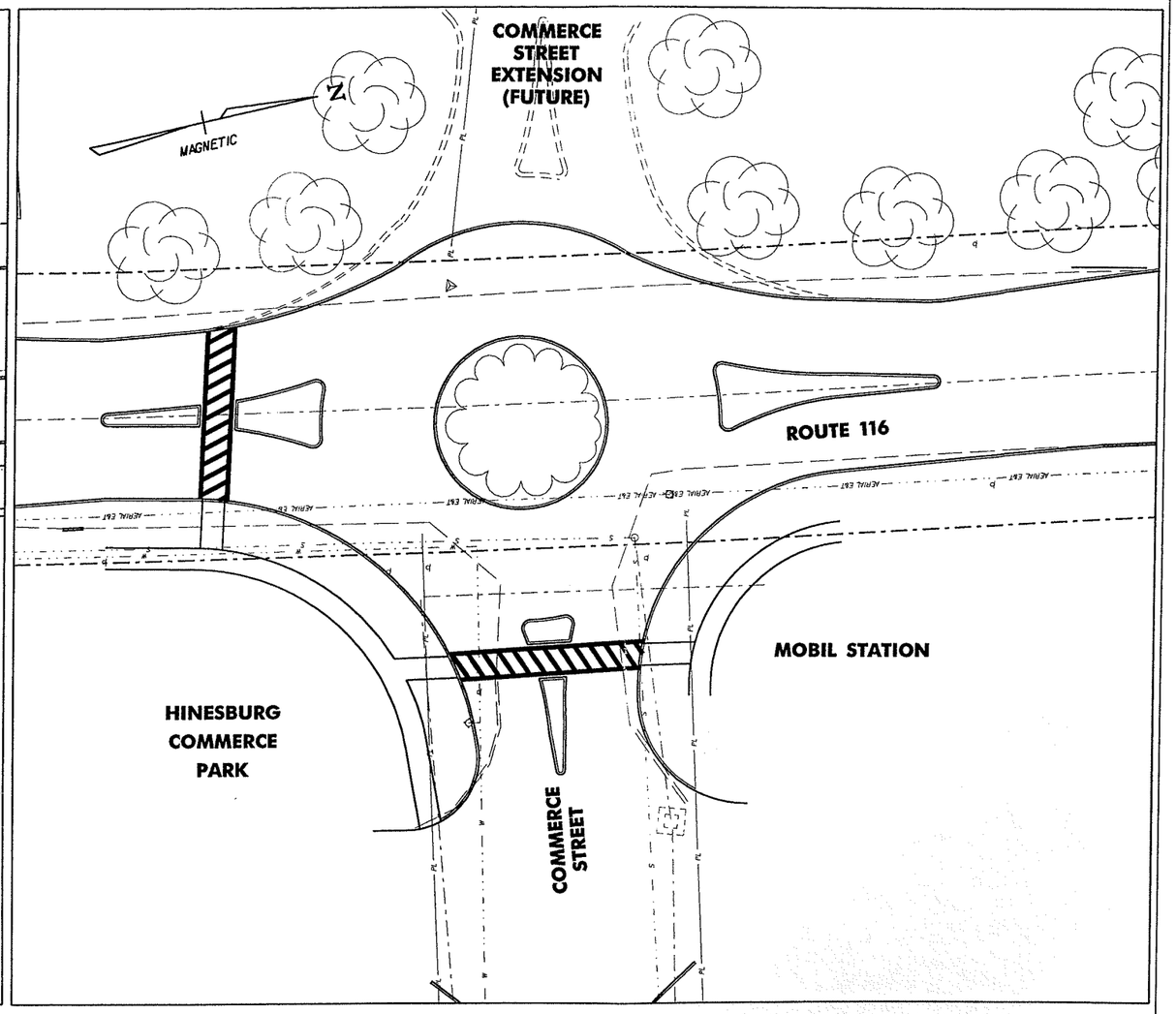
SQUAD LEADER: JAS
PLOT DATE: DEC. 2002
SURVEY DATE:
DRAWN BY: GW
SHEET: 6 OF 9

Metric



EXISTING TURN LANE CONFIGURATION



ROUNDABOUT ALTERNATIVE

ROUTE 116 /COMMERCE STREET ALTERNATIVES

DATUM
VERTICAL _____
HORIZONTAL _____

0 8 16
SCALE 1:400
IN METERS

NO.	DATE	REVISIONS	BY	CK'D

DuBois & King inc.
ENGINEERING PLANNING MANAGEMENT DEVELOPMENT

ROUTE 116 CORRIDOR
TRANSPORTATION PROJECT DEVELOPMENT

PROJECT NO.: B16259F2

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IPARM FILE NAME:
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PLOT DATE: DEC. 2002
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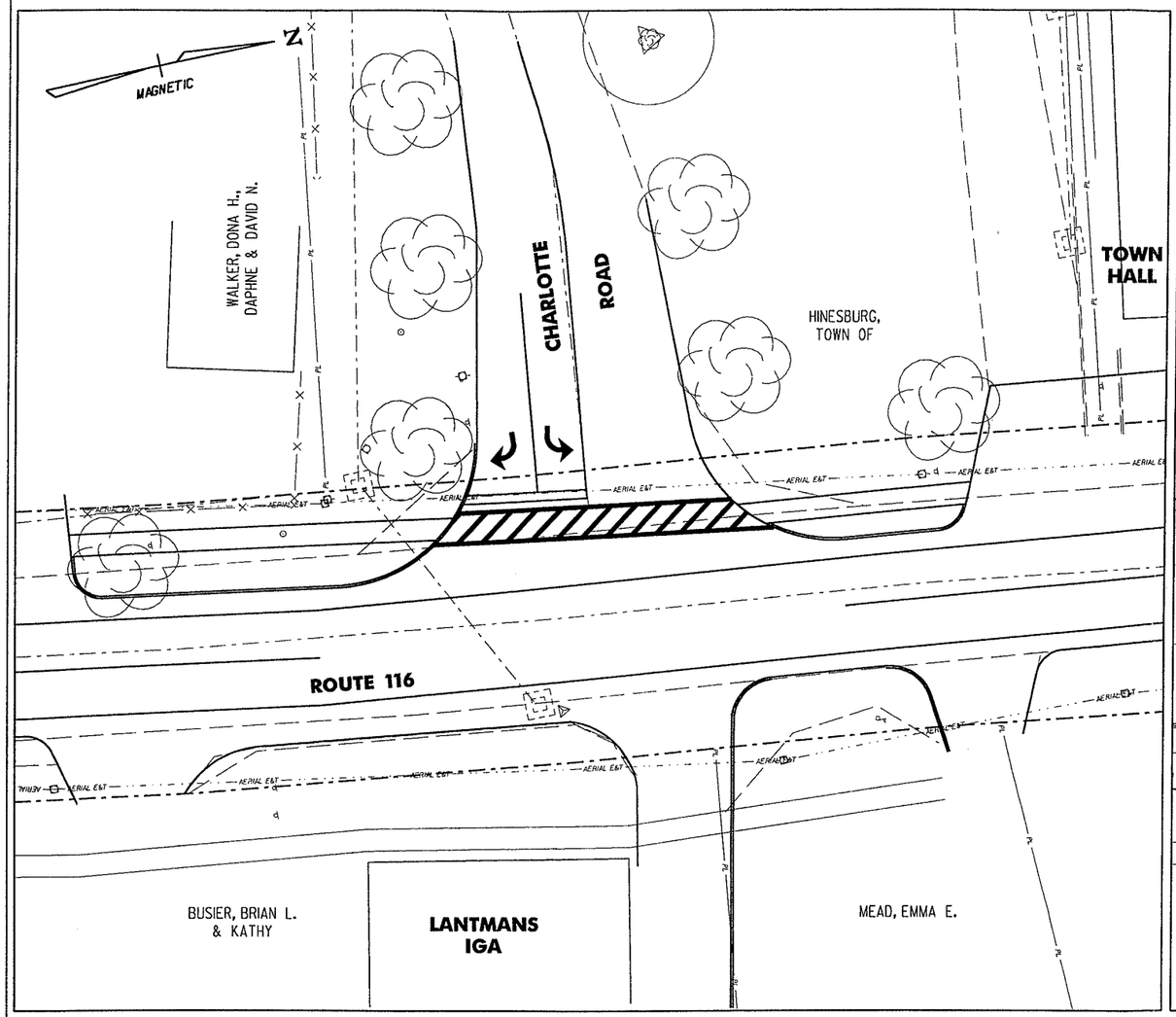
Metric



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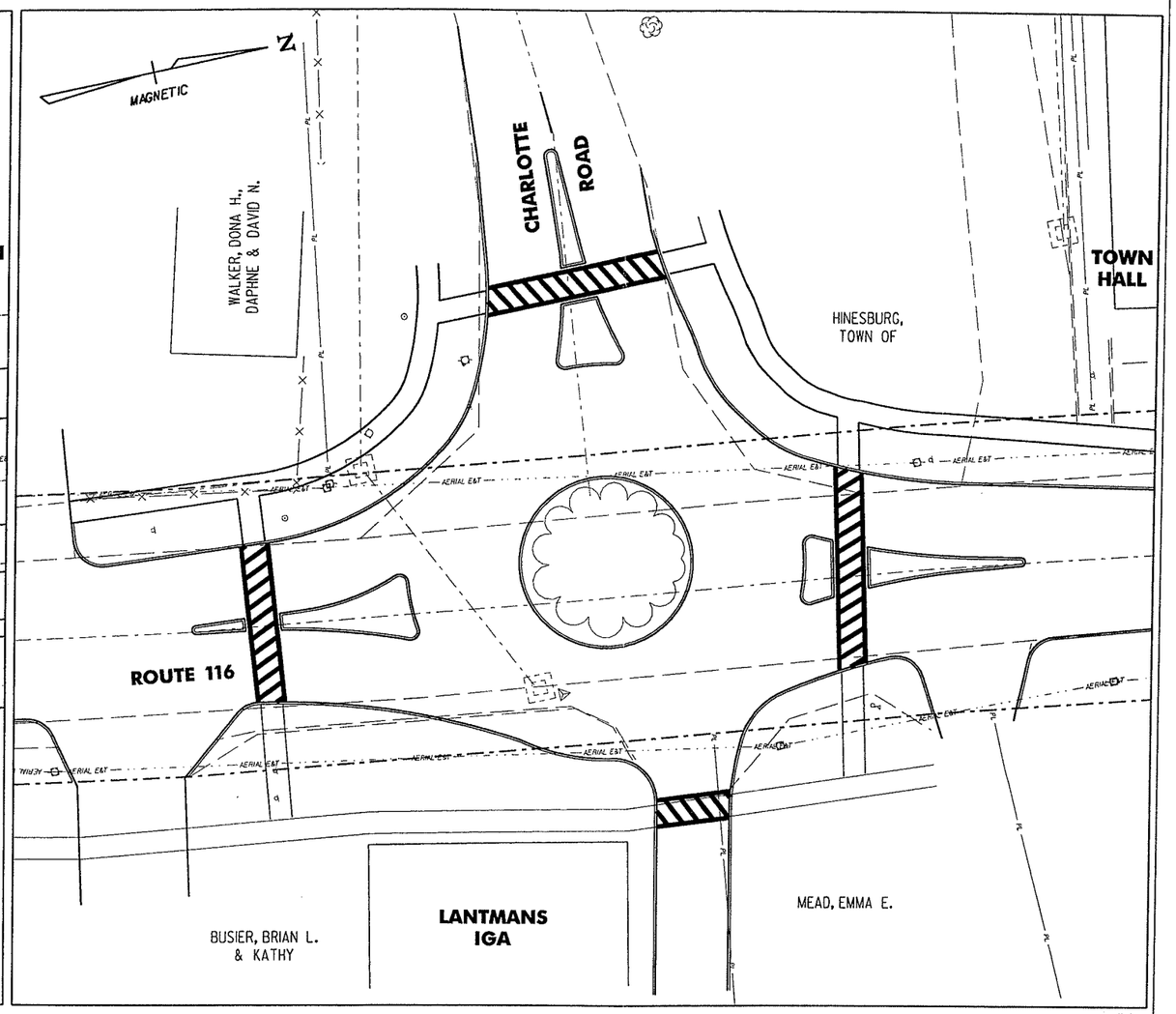

ROUNDABOUT ALTERNATIVES

ROUTE 116 /CHARLOTTE ROAD ALTERNATIVES

DATUM
VERTICAL _____
HORIZONTAL _____

0 8 16
SCALE 1:400
IN METERS

NO.	DATE	REVISIONS	BY	CK'D

DuBois & King inc.
ENGINEERING PLANNING MANAGEMENT DEVELOPMENT

ROUTE 116 CORRIDOR
TRANSPORTATION PROJECT DEVELOPMENT

PROJECT NO.: B16259F2

DESIGN FILE NAME: ROUTE 116 / CHARLOTTE ROAD ALTERNATIVES
IPARM FILE NAME:
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PLOT DATE: DEC,2002
SURVEY DATE:
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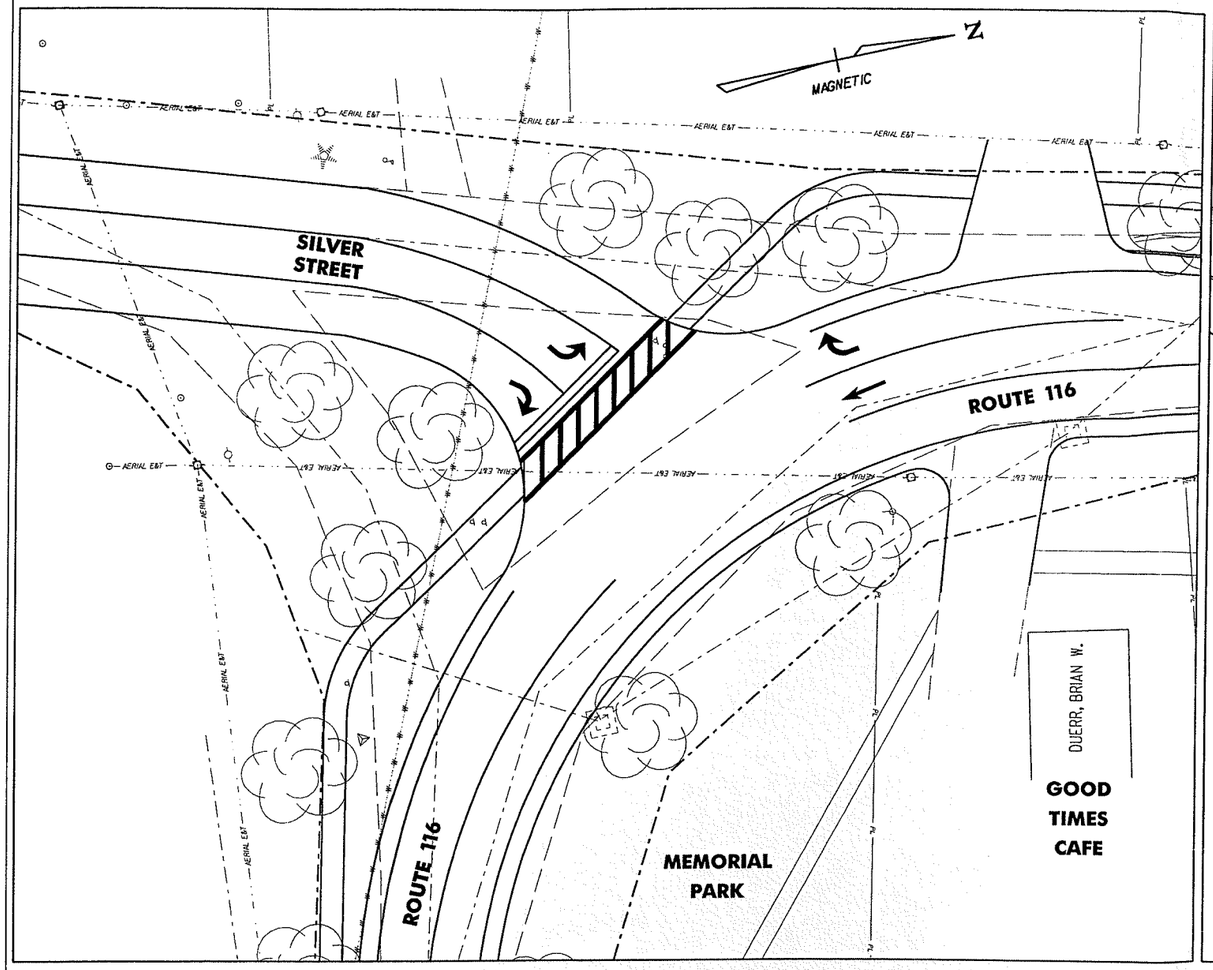
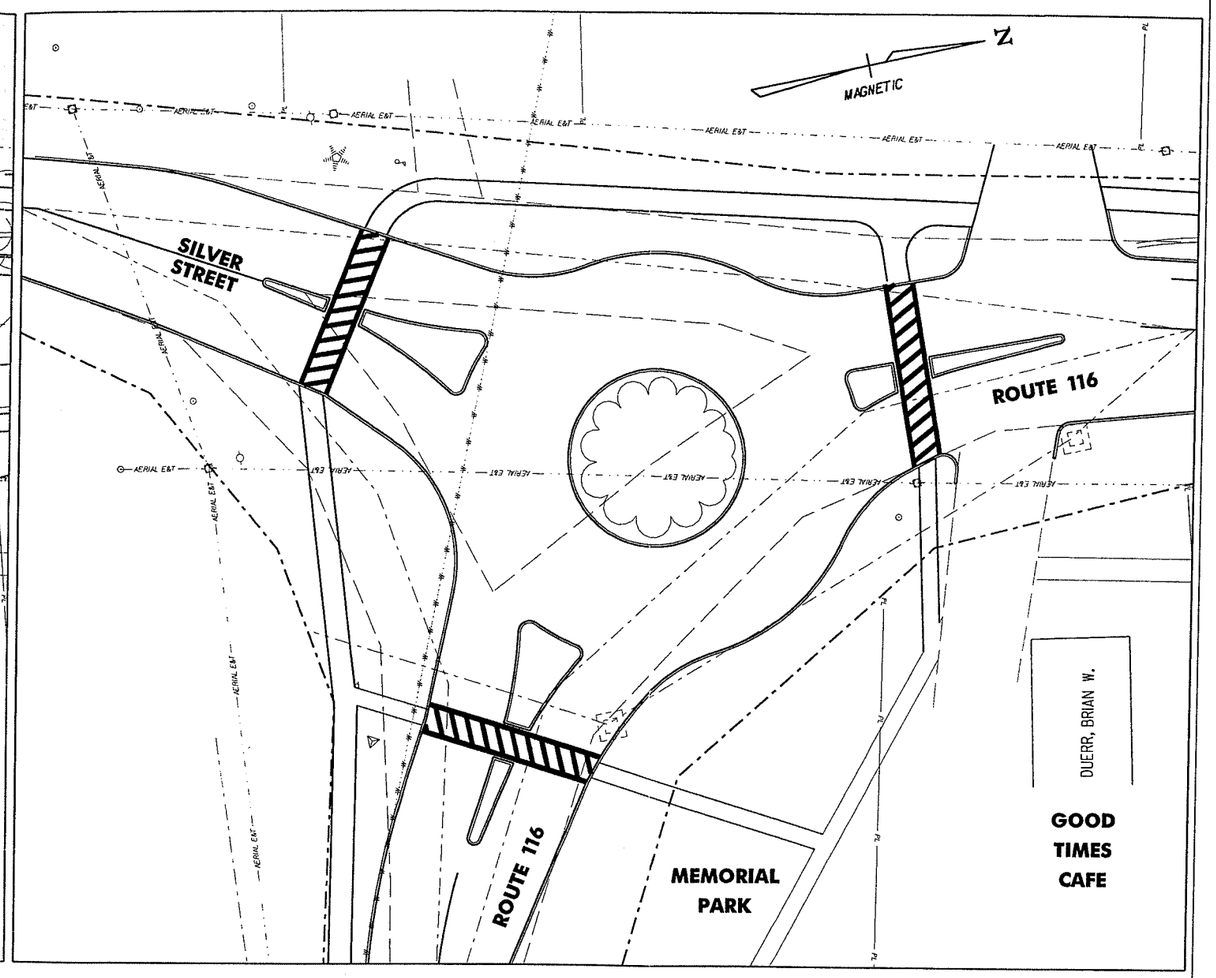
SHEET: 8 OF 9

Metric



TURN LANE ALTERNATIVE



ROUNDABOUT ALTERNATIVE

ROUTE 116 /SILVER STREET ALTERNATIVES

DATUM
VERTICAL
HORIZONTAL

0 8 16
SCALE 1:400
IN METERS

NO.	DATE	REVISIONS	BY	CK'D

DuBois & King inc.
ENGINEERING PLANNING MANAGEMENT DEVELOPMENT

ROUTE 116 CORRIDOR
TRANSPORTATION PROJECT DEVELOPMENT

PROJECT NO.: B16259F2

DESIGN FILE NAME: ROUTE 116 / SILVER STREET ALTERNATIVES
IPARM FILE NAME:
SURVEYED BY:
SQUAD LEADER: JAS
PLOT DATE: DEC, 2002
SURVEY DATE:
DRAWN BY: GW
SHEET: 9 OF 9

Section 7
Improvement Options Evaluation & Matrices

The improvement alternatives presented in this report will improve safety, reduce vehicular congestion, add pedestrian and bicycle facilities, provide access management and improve aesthetics within the Route 116 corridor. Individual evaluation of each alternative is presented in a matrix format that addresses general criteria including construction costs and schedules, engineering modifications, resource impacts, local and regional traffic issues, permit requirements, and capacity analysis (LOS).

Specific evaluation criteria include:

Implementation Cost

Implementation Schedule

Engineering
- Alignment Change
- Signal Upgrade
- Drainage Improvements
- Utility Relocation
- ROW Acquisition

Impacts
- Agricultural Lands
- Flood Plain
- Wetlands
- Fish & Wildlife
- Threatened & Endangered Species
- Hazardous Materials
- Archaeological & Historic
- Public Lands
- LCWF - Section 6(F)

Local & Regional issues
- Accommodates Truck Traffic
- Safety
- Pedestrian Use
- Access Management
- Traffic Calming
- Landscaping
- Lighting
- Meets Purpose & Need

Permits Required
- Act 250
- 401 Water Quality
- 404 COE Permit
- Stream Alteration
- Conditional Use Determination
- Storm Water Discharge
- Threatened & Endangered Species
- Historic Preservation

Year 2000 Capacity Analysis
Year 2005 Capacity Analysis
Year 2015 Capacity Analysis

The following matrices provide a useful tool for summarizing and comparing the various corridor and intersection improvement alternatives detailed in Section 6. The

construction cost estimates are ten percent higher than those presented in the 2000 ISR report and Appendix 13 in order to account for the annual increase in construction costs.

Route 116 Corridor Improvement Alternatives				
	No Build	**Alternative I)A Improved Streetscape**	**Alternative I)B Improved Streetscape parallel parking**	**Alternative I)C Improved Streetscape perpendicular parking**
Engineering & Construction Cost		$2,664,000	$2,758,000	$2,828,000
Design & Implementation Schedule	N/A	5 years +	5 years +	5 years +
Engineering				
Alignment Change	No	Yes - Width	Yes - Width	Yes - Width
Signal Upgrade	No	No	No	No
Drainage Improvements	No	Reduced pvmt area; curbs; storm system	curbs; storm system	curbs; storm system
Utility Relocations	No	Yes	Yes	Yes
ROW Acquisition	No	No	No	Yes
Impacts				
Agricultural Lands	No	No	No	No
Flood Plain	No	No	No	No
Wetlands	No	No	No	No
Fish & Wildlife	No	No	No	No
Threatened & Endangered Species	No	No	No	No
Hazardous Materials	No	No	No	No
Archaeological & Historic	No	No	No	No
Public Lands	No Effect	No Effect	No Effect	No Effect
LCWF - Section 6(f)		Yes - Com. School	Yes - Com. School	Yes - Com. School
Local & Regional Issues				
Handles Truck Traffic	Yes	Yes	Yes	Yes
Safety	Adequate; poor ped. crossings	Reduced vehicle speeds; improved ped. crossings	Reduced vehicle speeds; improved ped. crossings	Reduced vehicle speeds; improved ped. crossings
Pedestrian Use	East Walk; min. crossings	New Walks and crossings	New Walks and crossings	New Walks and crossings
Bicycle Use	Existing shlds; no signage	4' wide paved shlds w/ signage	4' wide paved shlds w/ signage	4' wide paved shlds w/ signage
Access Management	Poor	Yes	Yes	Yes
Traffic Calming	Minimal	Yes	Yes	Yes
Landscaping	Non-continuous plantings	Continuous street trees	Continuous street trees	Continuous street trees
Lighting	Minimal	Continuous Lighting	Continuous Lighting	Continuous Lighting
Meets Purpose & Need		Yes	Yes	Yes

Permits Required				
Act 250	No	No	No	No
401 Water Quality	No	No	No	No
404 COE Permit	No	No	No	No
Stream Alteration	No	No	No	No
Cond. Use Determination	No	No	No	No
Storm Water Discharge*	No	No	No	No
T&E Species	No	No	No	No
SHPO	No	No	No	No

*Note: Stormwater becomes more of an issue with curbs and closed drainage systems. It is likely that stormwater permits will be necessary when adding curbs and closed drainage systems.

Route 116/Shelburne Falls Road Intersection Alternatives			
	No Build	**Alterative II)A Improved Sight Lines**	**Alternative II)B Safety Analysis; Signal Upgrade**
Engineering & Construction Cost		$14,900	$32,600
Design & Implementation Schedule	N/A	6 months	1 Year
Engineering			
Alignment Change	No	No	No
Signal Upgrade	No	No	Yes
Drainage Improvements	No	No	No
Utility Relocations	No	No	No
ROW Acquisition	No	No	No
Impacts			
Agricultural Lands	No	No	No
Flood Plain	No	No	No
Wetlands	No	No	No
Fish & Wildlife	No	No	No
Threatened & Endangered Species	No	No	No
Hazardous Materials	No	No	No
Archaeological & Historic	No	No	No
Public Lands	No	No	No
LCWF - Section 6(f)	No	No	No
Local & Regional Issues			
Handles Truck Traffic	Yes	Yes	Yes
Safety	High Accident Location	Sight Improvements	Improved Vehicle/ Pedestrian Safety
Pedestrian Use	No Existing Crossings	No Improvement	Ped. Actuated Signal Crossings
Bicycle Use	No Existing	No Improvement	No Improvement
Access Management	N/A	N/A	N/A
Traffic Calming	None	None	None
Landscaping	Overgrown Existing vegetation	Maintained Vegetation to improve Sight Lines	Maintained Vegetation to improve Sight Lines
Lighting	Signal Lights Only	Signal Lights Only	Signal Lights Only
Meets Purpose & Need		Partial	Yes

Permits Required			
Act 250	No	No	No
401 Water Quality	No	No	No
404 COE Permit	No	No	No
Stream Alteration	No	No	No
Cond. Use Determination	No	No	No
Storm Water Discharge	No	No	No
T&E Species	No	No	No
SHPO	No	No	No
Year 2000 Capacity Analysis (LOS)			
Route 116/Shelburne Rd/CVU Rd			
EB (Shelburne)	C	C	C
WB (CVU Rd)	C	C	C
NB (Rte 116)	B	B	B
SB (Rte 116)	C	C	C
Overall Intersection	C	C	C
Year 2005 Capacity Analysis (LOS)			
Route 116/Shelburne Rd/CVU Rd			
EB (Shelburne)	C	C	C
WB (CVU Rd)	C	C	C
NB (Rte 116)	B	B	B
SB (Rte 116)	F	F	F
Overall Intersection	E	E	E
Year 2015 Capacity Analysis (LOS)			
Route 116/Shelburne Rd/CVU Rd			
EB (Shelburne)	C	C	C
WB (CVU Rd)	C	C	C
NB (Rte 116)	B	B	B
SB (Rte 116)	F	F	F
Overall Intersection	F	F	F

Route 116/Commerce Street Intersection Alternatives			
	No Build	**Alterative III)A Roundabout**	**Alternative III)B Signal**
Engineering & Construction Cost		$192,900	$92,500
Design & Implementation Schedule	N/A	3 Year	1 Year
Engineering			
Alignment Change	No	Yes	No
Signal Upgrade	No	No	Yes
Drainage Improvements	No	Curb; storm system	Curb; storm system
Utility Relocations	No	Yes	Yes
ROW Acquisition	No	Yes	No
Impacts			
Agricultural Lands	No	No	No
Flood Plain	No	No	No
Wetlands	No	No	No
Fish & Wildlife	No	No	No
Threatened & Endangered Species	No	No	No
Hazardous Materials	No	No	No
Archaeological & Historic	No	No	No
Public Lands	No	No	No
LCWF - Section 6(f)	No	No	No
Local & Regional Issues			
Handles Truck Traffic	Yes	Yes	Yes
Safety	Adequate; No Ped. Crossings	Add Ped. Crossings; reduced vehicle speeds	Add Ped. Crossings with Signal Actuation
Pedestrian Use	No Existing Crossings	Add Ped Crossing; Reduced Vehicle Speeds	Ped. Actuated Signal Crossings
Bicycle Use	Unsigned Shoulder	Signed Shoulder; Reduced Speeds	Signed Shoulder
Access Management	N/A	N/A	N/A
Traffic Calming	None	Reduced Vehicle Speeds	None
Landscaping	Adj. Properties	Gateway	Continuous Street Trees
Lighting	Adj. Properties	Continuous Lights	Continuous Lights
Meets Purpose & Need		Yes	Partial

Permits Required			
Act 250	No	No	No
401 Water Quality	No	No	No
404 COE Permit	No	No	No
Stream Alteration	No	No	No
Cond. Use Determination	No	No	No
Storm Water Discharge	No	No	No
T&E Species	No	No	No
SHPO	No	No	No
Year 2000 Capacity Analysis (LOS)			
Route 116/Commerce Street			
SB (Rte 116)			
Left	A	A	A
WB (Commerce)			
Left	E	A	B
Year 2005 Capacity Analysis (LOS)			
Route 116/Commerce Street			
SB (Rte 116)			
Left	A	A	A
WB (Commerce)			
Left	E	A	B
Year 2015 Capacity Analysis (LOS)			
Route 116/Commerce Street			
SB (Rte 116)			
Left	A	A	A
WB (Commerce)			
Left	F	A	B

Route 116/Mechanicsville Road Intersection Alternatives					
	No Build	**Alterative IV)A Lane Upgrades**	**Alternative IV)B Roundabout**	**Alternative IV)C Signal**	**Alternative IV)D One-Way**
Engineering & Construction Cost		$11,100	$196,900	$85,800	$22,200
Design & Implementation Schedule	N/A	1 Year	5 Year	1 Year	2 Year+
Engineering					
Alignment Change	No	Yes - Approach	Yes	Yes - Approach	Yes
Signal Upgrade	No	No	No	Yes	No
Drainage Improvements	No	No	No	No	No
Utility Relocations	No	No	Yes	No	No
ROW Acquisition	No	No	Yes	No	No
Impacts					
Agricultural Lands	No	No	No	No	No
Flood Plain	No	No	No	No	No
Wetlands	No	No	No	No	No
Fish & Wildlife	No	No	No	No	No
Threatened & Endangered Species	No	No	No	No	No
Hazardous Materials	No	No	No	No	No
Archaeological & Historic	No	No	No	No	No
Public Lands	No	No	No	No	No
LCWF - Section 6(f)	No	No	No	No	No
Local & Regional Issues					
Handles Truck Traffic	Yes	Yes	Yes	Yes	Yes
Safety	Wide Throat; Higher Turning Speeds	Narrowed Throat; Reduced Turn Speeds	Improved Congestion; Reduced Speeds	Improved Congestion	Narrowed Throat; Reduced Turn Speeds; No Exiting Traffic
Pedestrian Use	SE corner walks; No Existing Crossings	Add Ped Crossing; Reduced Vehicle Speeds	Add Ped Crossing; Reduced Vehicle Speeds	Ped. Actuated Signal Crossings	Add Ped Crossing; Reduced Vehicle Speeds
Bicycle Use	Unsigned Shoulder	Signed Shoulder; Reduced Speeds	Signed Shoulder; Reduced Speeds	Signed Shoulder	Signed Shoulder; Reduced Speeds
Access Management	N/A	N/A	N/A	N/A	N/A
Traffic Calming	None	Reduced Vehicle Turning Speeds	Reduced Vehicle Speeds	None	Reduced Vehicle Turning Speeds
Landscaping	Adj. Properties	Continuous Street Trees	Gateway	Continuous Street Trees	Continuous Street Trees
Lighting	Adj. Properties	Continuous Lights	Continuous Lights	Continuous Lights	Continuous Lights
Meets Purpose & Need		Yes	Yes	Yes	Yes

Permits Required					
Act 250	No	No	No	No	No
401 Water Quality	No	No	No	No	No
404 COE Permit	No	No	No	No	No
Stream Alteration	No	No	No	No	No
Cond. Use Determination	No	No	No	No	No
Storm Water Discharge	No	No	No	No	No
T&E Species	No	No	No	No	No
SHPO	No	No	No	No	No
Year 2000 Capacity Analysis (LOS)					
Route 116/Mechanicsville			B	B	
SB (Rte 116)					
Left	A	A			
WB (Mechanicsville)	F	F			
Left	F	F			
Right	B	B			
Year 2005 Capacity Analysis (LOS)					
Route 116/Mechanicsville			B	B	
SB (Rte 116)					
Left	A	A			
WB (Mechanicsville)	F	F			
Left	F	F			
Right	B	B			
Year 2015 Capacity Analysis (LOS)					
Route 116/Mechanicsville			B	B	
SB (Rte 116)					
Left	A	A			
WB (Mechanicsville)	F	F			
Left	F	F			
Right	B	B			

Route 116/Charlotte Road Intersection Alternatives			
	No Build	**Alternative V)A Roundabout**	**Alternative V)B Signal**
Engineering & Construction Cost		$190,200	$92,500
Design & Implementation Schedule	N/A	5 Year	1 Year
Engineering			
Alignment Change	No	Yes	Yes - Approach
Signal Upgrade	No	No	Yes
Drainage Improvements	No	No	No
Utility Relocations	No	Yes	No
ROW Acquisition	No	Yes	No
Impacts			
Agricultural Lands	No	No	No
Flood Plain	No	No	No
Wetlands	No	No	No
Fish & Wildlife	No	No	No
Threatened & Endangered Species	No	No	No
Hazardous Materials	No	No	No
Archaeological & Historic	No	No	No
Public Lands	No	No	No
LCWF - Section 6(f)	No	No	No
Local & Regional Issues			
Handles Truck Traffic	Yes	Yes	Yes
Safety	Adequate; No Ped. Crossings	Added Ped. Crossings; Improved Congestion; Reduced Speeds	Added Ped. Crossings; Improved Congestion
Pedestrian Use	East Walk; No Existing Crossings	Add Ped Crossing; Reduced Vehicle Speeds	Ped. Actuated Signal Crossings
Bicycle Use	Unsigned Shoulder	Signed Shoulder; Reduced Speeds	Signed Shoulder
Access Management	N/A	N/A	N/A
Traffic Calming	None	Reduced Vehicle Speeds	None
Landscaping	Adj. Properties	Gateway	Continuous Street Trees
Lighting	Adj. Properties	Continuous Lights	Continuous Lights
Meets Purpose & Need		Yes	Yes

Permits Required			
Act 250	No	No	No
401 Water Quality	No	No	No
404 COE Permit	No	No	No
Stream Alteration	No	No	No
Cond. Use Determination	No	No	No
Storm Water Discharge	No	No	No
T&E Species	No	No	No
SHPO	No	No	No
Year 2000 Capacity Analysis (LOS)			
Route 116/Charlotte Road/Lantmans		A	B
NB (Rte 116)			
Left	A		
SB (Rte 116)			
Left	A		
EB (Charlotte)	F		
Left	F		
Right	C		
WB (Lantmans)	F		
Year 2005 Capacity Analysis (LOS)			
Route 116/Charlotte Road/Lantmans		A	B
NB (Rte 116)			
Left	A		
SB (Rte 116)			
Left	A		
EB (Charlotte)	F		
Left	F		
Right	D		
WB (Lantmans)	F		
Year 2015 Capacity Analysis (LOS)			
Route 116/Charlotte Road/Lantmans		A	B
NB (Rte 116)			
Left	B		
SB (Rte 116)			
Left	A		
EB (Charlotte)	F		
Left	F		
Right	E		
WB (Lantmans)	F		

Route 116/Silver Street Intersection Alternatives				
	No Build	**Alternative VI)A T-Intersection**	**Alternative VI)B Roundabout**	**Alternative VI)C Signal**
Engineering & Construction Cost		$154,900	$207,500	$92,500
Design & Implementation Schedule	N/A	3 Year	5 Year	1 Year
Engineering				
Alignment Change	No	T-Intersection; Lengthened Queuing	Yes	Yes; T-Intersection
Signal Upgrade	No	No	No	Yes
Drainage Improvements	No	No	No	No
Utility Relocations	No	No	Yes	No
ROW Acquisition	No	No	Yes	No
Impacts				
Agricultural Lands	No	No	No	No
Flood Plain	No	No	No	No
Wetlands	No	No	No	No
Fish & Wildlife	No	No	No	No
Threatened & Endangered Species	No	No	No	No
Hazardous Materials	No	No	No	No
Archaeological & Historic	No	No	No	No
Public Lands	No	Yes	Yes	Yes
LCWF - Section 6(f)	No	Yes- Elem. School	Yes- Elem. School	Yes- Elem. School
Local & Regional Issues				
Handles Truck Traffic	Yes	Yes	Yes	Yes
Safety	Adequate; No Ped. Crossings	Added Ped. Crossings	Added Ped. Crossings; Improved Congestion; Reduced Speeds	Added Ped. Crossings; Improved Congestion
Pedestrian Use	Northeast Walk; Existing Crossings at School	Added Ped. Crossings	Add Ped Crossing; Reduced Vehicle Speeds	Ped. Actuated Signal Crossings
Bicycle Use	Unsigned Shoulder	Signed Shoulder	Signed Shoulder; Reduced Speeds	Signed Shoulder
Access Management	N/A	N/A	N/A	N/A
Traffic Calming	None	Reduced Vehicle Turning Speeds	Reduced Vehicle Speeds	Reduced Vehicle Turning Speeds
Landscaping	Adj. Properties	Continuous Street Trees	Gateway	Continuous Street Trees
Lighting	Adj. Properties	Continuous Lights	Continuous Lights	Continuos Lights
Meets Purpose & Need		Yes	Yes	Yes

Permits Required				
Act 250	No	No	No	No
401 Water Quality	No	No	No	No
404 COE Permit	No	No	No	No
Stream Alteration	No	No	No	No
Cond. Use Determination	No	No	No	No
Storm Water Discharge	No	No	No	No
T&E Species	No	No	No	No
SHPO	No	No	No	No
Year 2000 Capacity Analysis (LOS)				
Route 116/Silver Street			B	B
NB (Silver)	D	D		
Left	F	F		
Right	B	B		
WB (Rte 116)				
Left	A	A		
Year 2005 Capacity Analysis (LOS)				
Route 116/Silver Street			B	B
NB (Silver)	F	F		
Left	F	F		
Right	C	C		
WB (Rte 116)				
Left	B	B		
Year 2015 Capacity Analysis (LOS)				
Route 116/Silver Street			B	B
NB (Silver)	F	F		
Left	F	F		
Right	C	C		
WB (Rte 116)				
Left	B	B		

SECONDARY SCOPE REVIEW ALTERNATIVES			
	Internal Bypass	**Silver Street To Buck Hill Road Connection**	**Park and Ride (west of Commerce)***
Engineering			
Alignment Change	Y	Y	N
Signal Upgrade	@Commerce Street?	N	Commerce Street ?
Drainage Improvements	Y	Y	Y
Utility Relocations	N	N	Y
ROW Acquisition	Y - Significant	Y - Significant	Y
Impacts			
Agricultural Lands	Y	Y	Y
Flood Plain	Y	Y	Y
Wetlands	Y	Y	Y
Fish & Wildlife	N	Possible	N
Threatened & Endangered Species	N	N	N
Hazardous Materials	N	N	N
Archaeological & Historic	Sensitive	Sensitive	Sensitive
Public Lands	Y	Y	N
LCWF - Section 6(f)	N	N	N
Permits Required			
Act 250	Y	Y	N
401 Water Quality	Y	Y	Y
404 COE Permit	Y	Y	Y
Stream Alteration	Y	Y	N
Cond. Use Determination	Y	Y	Y
Storm Water Discharge	Y	Y	Y
T&E Species	N	N	N
SHPO	Possible	Possible	N

* The "West of Commerce Street" location was recommended since the multiple village lots are undefined and the Commerce Park lot is within a planned development with existing impact reviews and permits in place.

Section 8
Conclusions & Recommendations

The "Route 116 Hinesburg Village Corridor Study" and its recommended improvement alternatives is intended to be used as a guide for the Town of Hinesburg in developing its own implementation plan for the preferred Route 116 corridor improvements. Future implementation of these alternatives will be affected by several factors including public participation, project costs, project impacts, and permitting issues.

The Town of Hinesburg's recommended alternatives are as follows:

8.A PREFERRED CORRIDOR IMPROVEMENTS:

Alternative I)B - Improved streetscape with parallel parking on both sides of the Route 116 from Charlotte Road to Silver Street.
Cost: $2,758,000

8.B PREFERRED INTERSECTION IMPROVEMENTS:

8.B.1 Shelburne Falls Road:
Alternative II)A and II)B - Improved sight lines, safety analysis, and signal upgrade.
Cost: $47,500

8.B.2 Commerce Street:
No-Build Alternative, due to lack of congestion in foreseeable future. Some Planning Commission members questioned the desirability of a roundabout at this location.
Cost: N/A

8.B.3 Mechanicsville Road:
Alternative IV)A - Lane upgrades.
Cost: $11,100

8.B.4. Charlotte Road:
Alternative V)B - Signal
(Refer to section 6 for discussion of signal issues and the need to meet the state's standard signal warrants.)
Cost: $92,500

8.B.5. Silver Street:

Short Term:
Alternative VI)A - "T" Intersection
Cost: $154,900

Long Term:
Alternative VI)B - Roundabout
Cost: $207,500

8.C PROJECT PRIORITIES

These transportation alternatives emerged from the community's expressed interest in improving the quality of life within the study corridor. The purpose and need statement reflects this interest along with improving pedestrian and vehicular movement within the corridor in ways that will also enhance the overall appearance of the streetscape. As with any corridor study, addressing safety issues was a top priority in this study. The next highest priority was improving pedestrian and bicycle access, a goal clearly expressed during the project's public participation process. A third priority was increasing the availability of safe and convenient on-street parking within the village center, between Charlotte Road and Silver Street.

At the March 20, 2002 meeting with the town officials and CCMPO Staff, the Town stated the following priorities for implementing the recommended improvements. Intersection improvements were given a higher priority than road segment improvements. The Town also stated that they currently maintain the existing street lighting, sidewalks, and street trees; and they intend to work with the State to maintain the recommended improvements once constructed.

8.C.1 Intersection Priorities, Highest to Lowest

1. Silver Street
2. Charlotte Road
3. Mechanicsville Road
4. Commerce Street

8.C.2 Road Segment Priorities, Highest to Lowest

1. Charlotte Road to Silver Street with on-street parallel parking both sides; this segment is considered by many to be the "heart" of the old village.
2. Mechanicsville Road to Commerce Street
3. Silver Street to Friendship Court
4. Mechanicsville Road to Charlotte Road

8.D PHASED IMPLEMENTATION

The above recommendations for transportation improvements within the corridor are intended to be phased over the next 20 years. This time frame reflects the financial burdens of implementing these improvements and acknowledges that conditions within the corridor will change over the years as improvements are made.

8.E STORMWATER

Stormwater, and how it is handled during the actual design of these improvements, is an important issue for town officials. Stormwater permitting will likely have a significant impact on project designs. As recently as September 25, 2002, and under the current 1997 stormwater procedures, the Agency of Natural Resources has determined that a stormwater permit is not required because the project involves less than two acres of new impervious surface. However, by the time the proposed improvements are in the actual design stages, the new stormwater standards may require a permit.

Section 9
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Section 10
Glossary of Terms and Abbreviations

AADT: Annual Average Daily Traffic Volume

AASHTO: American Association of State Highway and Transportation Officials

ACCESS MANAGEMENT: The planning, design and implementation of land use and transportation strategies to control the flow of traffic between the road and surrounding land.

ADA: The Americans with Disabilities Act: civil rights legislation passed in 1990, effective July 1992.

ADT: Average Daily Traffic. The measurement of the average number of vehicles passing a certain point each day on a highway, road or street.

ARTERIAL (STREET): A street designed for moderate speed and offering direct routes for intercommunity travel.

BICYCLE: A vehicle having two tandem wheels, either of which is more than 16" in diameter or having three wheels in contact with the ground any of which is more than 16" in diameter, propelled solely by human power, upon which any person or persons may ride.

BICYCLE FACILITIES: A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking facilities, mapping all bikeways, and shared roadways not specifically designated for bicycle use.

BICYCLE LANE (BIKE LANE): A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

BICYCLE PATH (BIKE PATH): A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right of way or within an independent right of way.

BICYCLE ROUTE (BIKE ROUTE): A segment of a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers, with or without specific bicycle route number.

BIKEWAY: Any road, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. A Bike Path is a Class I Bikeway; a Bike Lane is a Class II Bikeway; and a Bike Route is a Class III Bikeway.

CCMPO: Chittenden County Metropolitan Planning Organization

CCRPC: Chittenden County Regional Planning Commission

CCTA: Chittenden County Transportation Authority

CLEAR ZONE: The roadside border area starting at the edge of the traveled way, available for use by errant vehicles.

CLEARANCE, LATERAL: The width required for safe passage as measured in a horizontal plane.

CLEARANCE, VERTICAL: The height required for safe passage as measured in a vertical plane.

COLLECTOR (STREET): A street designated to carry traffic between local streets and arterials, or from local street to local street.

CROSS SECTION or TYPICAL CROSS SECTION or TYPICAL: Diagrammatic presentation of a highway profile at right angles to the centerline at a given location.

CROSSWALK: Portion of a roadway designated for pedestrian crossing, marked or unmarked. Unmarked crosswalks are the natural extension of the shoulder, curb line or sidewalk.

DHV (DESIGN HOURLY VOLUME): Reflects the relationship between the percentage of AADT and the highest hours of the year.

DRAINAGE: The system of pipes, drainage ways, ditches and structures by which surface or sub-surface waters are collected and conducted from an area.

EASEMENT (RIGHT OF WAY): A right acquired to use or control property, outside of the established right-of-way limits for a designated purpose.

FHWA: Federal Highway Administration, U.S. Dept. Of Transportation

FRONTAGE ROAD: A road designated and designed to serve local traffic parallel and adjacent to a highway or arterial street.

GRADE (Gradient): A measure of the steepness of a roadway, bikeway or walkway, expressed in a ratio of vertical rise per horizontal distance, usually in percent; e.g. a 5% grade equals 5 m of rise over a 100 m horizontal distance.

GRADE SEPARATION: The vertical separation of conflicting travelways with a structure.

HAL: High Accident Location

HIGHWAY: A general term denoting a public way for purposes of vehicular travel, including the entire area within the right of way.

HIGHWAY CAPACITY: The maximum number of vehicles that a highway can handle during a specific unit of time at a given level of service.

INTERSECTION: A place where two roads or a road and a driveway meet.

ISTEA: The Intermodal Surface Transportation Efficiency Act.

LOCAL STREET: A street designated to provide access to and from residences or businesses.

LOS: "Level of Service" is a measure of a facility's operational conditions and effectiveness based on speed, delay and density. Six levels of service, "A" through "F", are defined for each facility. Level of Service "A" represents free flow of vehicles; "E" represents operating conditions at capacity, and "F" defines breakdown flow conditions.

MATERIALS: Any substances specified for use in the construction of a project and its appurtenances.

MIXED-USE DEVELOPMENT: The development of a tract of land, building, or structure with a variety of complementary and integrated uses, such as, but not limited to, residential, office, manufacturing, retail, public, or entertainment, in a compact urban form.

MODE OF TRAVEL: The choice of means of travel, whether a vehicle, bus, feet, bicycle, or rail.

MOTOR VEHICLE: A vehicle that is self-propelled or designed for self-propulsion.

MPO: Metropolitan Planning Organization: An agency that combines the governing bodies of neighboring cities whose combined population exceeds 50,000.

MULTI-USE PATH: A path physically separated from motor vehicle traffic by an open space or barrier and either within a highway right-of-way or within an independent right-of-way, used by bicyclists, pedestrians, joggers, skaters and other non-motorized travelers.

MUTCD: The "Manual on Uniform Traffic Control Devices," approved by the Federal Highway Administration as a national standard for placement and selection of all traffic control devices on or adjacent to all highways open to public travel.

NHS (NATIONAL HIGHWAY SYSTEM): A Federal government designation which may affect the design of and priority for funding of these highways.

PAVEMENT MARKINGS: Painted or applied lines or legends placed on a roadway surface for regulating, guiding or warning traffic.

PEDESTRIAN A person on foot, in a wheelchair or walking a bicycle.

PEDESTRIAN FACILITY: A facility provided for the benefit of pedestrian travel, including walkways, crosswalks, signs, kiosks, signals, illumination and benches.

RIGHT OF WAY: The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.

RIGHT-OF-WAY (ROW): A general term denoting publicly-owned land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

ROADWAY: The portion of the highway, including shoulders, for vehicle use.

ROUNDABOUT: A small low speed traffic circle 5' to 120' in diameter located at the intersection of two streets with approaches that are tangential to a central raised island where vehicle speeds are physically constrained to 10 to 20 mph.

SHARED ROADWAY: Any roadway upon which a bicycle lane is not designated and which may be legally used by bicycles regardless of whether such facility is specifically designated as a bikeway.

SHOULDER: The portion of a highway that is contiguous to the travel lanes provided for pedestrians, bicyclists, emergency use by vehicles and for lateral support of base and surface courses.

SHOULDER BIKEWAY: A type of bikeway where bicyclists travel on a paved shoulder.

SHY DISTANCE: The distance between the edge of a travelway and a fixed object; typically 2' for bicycles.

SIDEWALK: The portion of a highway designed for preferential or exclusive use by pedestrians.

SIGHT DISTANCE: The distance a person can see along an unobstructed line of sight; the length of roadway visible to a driver.

SIGNS: Provide information to motorists, pedestrians and bicyclists. Black and white regulatory signs provide information on legal requirements. Black and yellow warning signs advise about potentially hazardous roadway conditions. Green or white guide/destination signs provide navigational information along streets, and inform about intersecting routes and important destinations.

SKEW ANGLE: The angle formed between a roadway, bikeway or walkway and an intersecting roadway, bikeway, walkway or railway, measured away from the perpendicular.

SSTA: Special Services Transportation Agency

STREET: A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

STREET FURNITURE: Accessories and amenities placed on sidewalks for the convenience and accommodation of pedestrians. These may include such things as benches or other seating, trash receptacles, drinking fountains, planters, kiosks, clocks, newspaper dispensers, or telephones.

STREET TREE: A tree planted within public right-of-way.

STREETSCAPE: The visual character of a street as determined by elements such as structures, greenery, driveways, open space, view, and other natural and man-made components.

STRIP DEVELOPMENT: Linear individual commercial development along an arterial highway accessed primarily by automobiles

with little or no pedestrian circulation between projects on the strip.

STRUCTURE: A bridge, retaining wall, tunnel, or culvert.

TDM: Travel Demand Management/Ride-sharing

TIP: Transportation Improvement Plan

TRAFFIC CALMING: Of or relating to transportation techniques, programs, or facilities intended to slow the movement of motor vehicles.

TRAFFIC CONGESTION: A condition resulting from more vehicles trying to use a given road during a specific period of time than the road can handle under acceptable levels of delay or inconvenience.

TRAFFIC CONTROL DEVICES: Signs, signals or other fixtures, whether permanent or temporary, placed on or adjacent to a roadway by authority of a public body having jurisdiction to regulate, warn or guide traffic.

TRAFFIC VOLUME: The given number of vehicles that pass a given point for a given amount of time (hour, day, year). See ADT.

TRAVELED WAY: The portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

URBAN AREA: The area immediately surrounding an incorporated city or rural community that is urban in character, regardless of size.

UTILITY: The privately, publicly, or cooperatively owned lines, facilities, and systems for producing, transmitting, or distributing communications, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, storm water, not connected with highway drainage, and other similar commodities, including publicly owned fire and police signal systems and street lighting systems, which directly or indirectly serve the public or any part thereof.

V/C RATIO: The ratio of demand flow rate to capacity for a traffic facility.

VEHICLE: Any device in, upon or by which any person or property is or may be transported or drawn upon a highway, including vehicles that are self-propelled or powered by any means.

VILLAGE MIXED USE AREA: These are the older developed areas of Colchester, in which future development is meant to be compatible with the existing diverse and relatively dense mix of uses on a village scale.

VTrans: Vermont Agency of Transportation

WALKWAY: A transportation facility built for use by pedestrians, including persons in wheelchairs. Walkways include sidewalks, paths and paved shoulders.

WIDE OUTSIDE LANE: A wider than normal curbside travel lane that is provided for ease of bicycle operation where there is insufficient room for a bike lane or shoulder bikeway.